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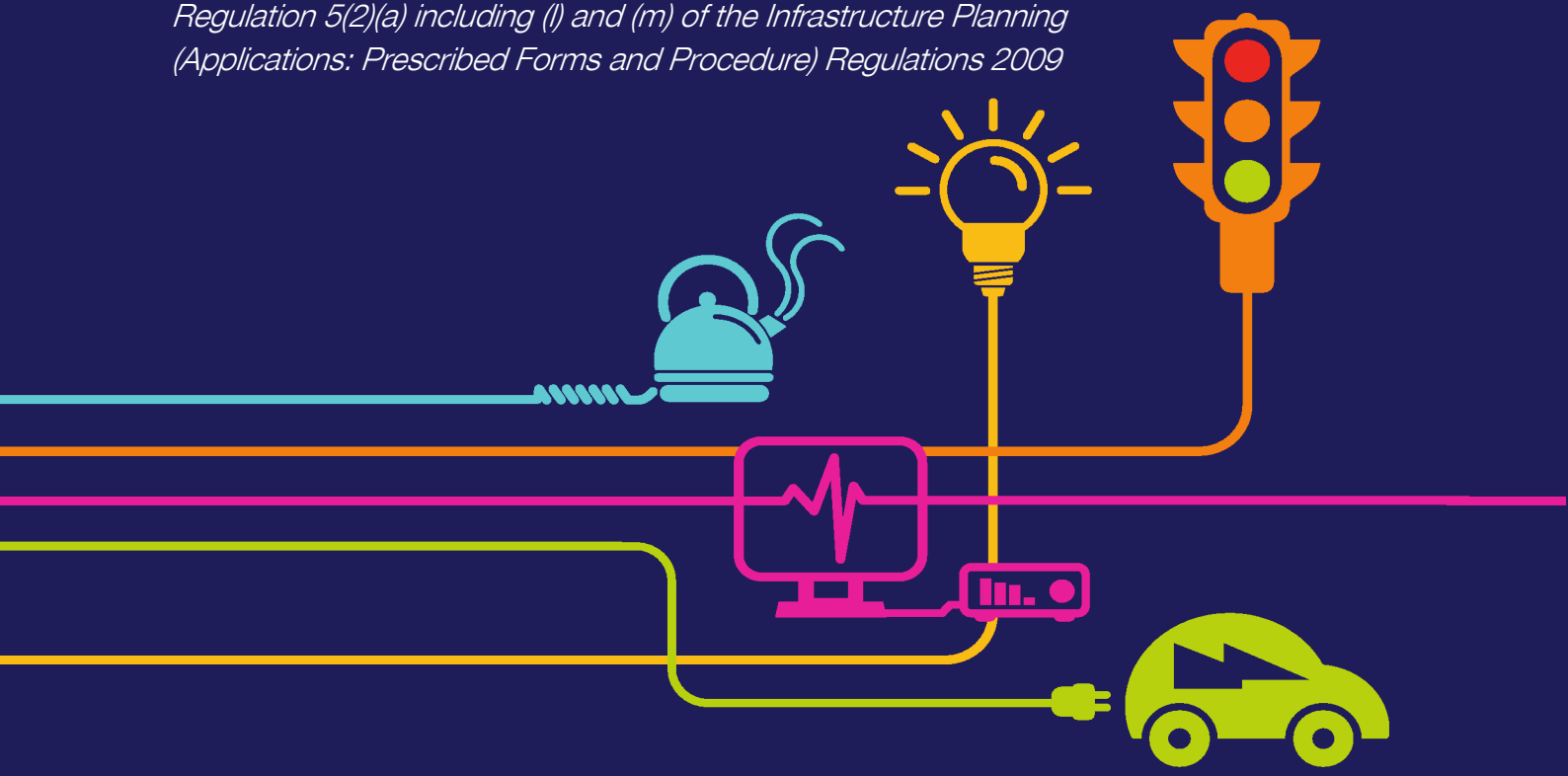
DOCUMENT 5.18

Environmental Statement Chapter 18 Agriculture

National Grid (North Wales Connection Project)

Regulation 5(2)(a) including (l) and (m) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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National Grid
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

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Author		Helen Simpson / Eleanor Reed	
Approved by		Dave Brignall	
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1 Introduction

1.1 INTRODUCTION

1.1.1 This chapter presents information about the potential effects that could result from the Proposed Development (as described in Chapter 3 Description of the Proposed Development; **Document 5.3**) in relation to agricultural land use and soils within the study area (as defined in section 6 study area). It also identifies mitigation measures that are necessary to prevent, reduce or offset any likely significant adverse effects of the Proposed Development.

1.1.2 This chapter is supported by the following Appendices:

- Appendix 18.1: Soil Profiles, ALC Classification and Landholding Data (**Document 5.18.2.1**);
- Appendix 18.2: Agriculture Consultation Correspondence (**Document 5.18.2.2**); and
- Appendix 18.3: Local Planning Policy: Agriculture (**Document 5.18.2.3**).

1.1.3 Although this chapter presents all of the information necessary to understand the effects on agriculture, other chapters that are useful to read in association with this chapter are: Chapter 11, Geology, Hydrogeology and Ground Conditions (**Document 5.11**) which covers soil types and the risk posed by land contamination and is therefore useful to consider together with the assessment of the soil resource presented in this chapter; Chapter 17, Socio-Economics and Tourism (**Document 5.17**) which considers land use in a social and economic context; and Chapter 9, Ecology and Nature Conservation (**Document 5.9**) which considers the ecological importance of different habitats within and adjacent to the Order Limits. Additionally, cumulative effects on agricultural receptors are identified in Chapter 19, Intra-Project Effects (**Document 5.19**) and Chapter 20, Inter-Project Effects (**Documents 5.20**).

1.1.4 It is also important to consider the Construction Environmental Management Plan (CEMP) (**Document 7.4**) alongside this chapter, as it sets out the mitigation measures necessary to minimise any adverse impact on agriculture and soils. An Outline Soil Management Plan (SMP) (**Document 7.10**) containing mitigation measures in line with the Department for Environment, Food and Rural Affairs (Defra) guidance (Ref 18.1) has been produced to

inform the Development Consent Order (DCO) application. This will be updated prior to construction using more detailed, site specific, data where required. A Drainage Mitigation Plan (DMP) will also be produced prior to construction as set out in the CEMP (**Document 7.4**). However, high-level agricultural drainage surveys have been carried out, with drainage areas identified and included within the Order Limits, as shown on Figure 4.1 Construction Plans (**Document 5.4.1.1**).

1.1.5 All technical terms and abbreviations used within this chapter are defined in the Glossary and Abbreviations (**Document 1.4**).

2 Legislation and Planning Policy

2.1 INTRODUCTION

2.1.1 This section sets out the legislative and planning policy framework that is relevant to the agricultural assessment. A full review of compliance with national and local planning policy is provided in the Planning Statement (**Document 7.1**) and a full review of relevant legislation is set out in the Legislation Compliance Audit (**Document 5.28.2.1**).

2.2 LEGISLATION

Town and Country Planning (General Development Procedure) Order

2.2.1 The Town and Country Planning (General Development Procedure) Order 1995 (GDPO) (S.I. No 1995/419), Article 10(1), paragraph (w) states that the local planning authority must consult the Secretary of State (SoS) for Wales if the area of a proposed permanent development exceeds 20 ha of Best and Most Versatile (BMV) agricultural land (Ref 18.2). This is reiterated in the Welsh Assembly Government's Technical Advice Note 6 (TAN6): Planning for Sustainable Rural Communities, July 2010 (Ref 18.3), and referenced in the Planning Policy Wales (Ref 18.4).

2.2.2 Although this legislation does not provide any legislative protection for agricultural land, it is considered relevant to the assessment. It provides context to the scale of loss of agricultural land to development (either through the land being given over to built development or undergoing a permanent change in use); and a guide to consider significance where 20 ha or more of BMV is affected.

2.3 NATIONAL POLICY

National Policy Statements

2.3.1 National Policy Statements set out the primary policy tests against which the application for a DCO for the Proposed Development will be considered.

2.3.2 National policy related to nationally significant energy infrastructure projects is set out in the Overarching National Policy Statement for Energy (EN-1) (Ref 18.5). Also of relevance to the Proposed Development is the National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 18.6). These

two documents provide the primary policy tests related to the Proposed Development.

2.3.3 Table 18.1 provides details of the elements of NPS EN-1 that are relevant to this chapter, and how and where they are covered in the Environmental Statement (ES).

2.3.4 EN-5 Paragraph 1.7.5 of Section 1, states the effects of electricity network infrastructure on soil are *'likely to be negative, at least in the short-term, requiring significant mitigation, but there is uncertainty around long-term effects depending on the specific location and the sensitivity of the receiving environment'*.

2.3.5 EN-5 Paragraph 2.8.9, states that '*undergrounding a 400kV line may mean disturbing a swathe of ground up to 40 metres across, which can disturb sensitive habitats, have an impact on soils and geology, and damage heritage assets, in many cases more than an overhead line would*'.

2.3.6 In terms of agricultural impacts, EN-5 Paragraph 2.10.8, states that '*there is little evidence that exposure of crops, farm animals or natural ecosystems to transmission line electromagnetic fields (EMFs) has any agriculturally significant consequences'*.

Table 18.1: Relevant National Policy

National Policy Statement (NPS) for Energy EN-1	How the policy has been addressed in the assessment
Paragraph 5.10.8 of Section 5: Land use including open space, green infrastructure & Green Belt, states: '*Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land, applicants*	A detailed desk based survey has been undertaken across all land within the study area to provide the relative proportions of ALC Grades 1, 2, Subgrade 3a, 3b, Grades 4 and 5. In addition, soil surveys have been completed in areas of permanent land take, allowing an assessment of the scale of both the temporary and permanent loss of BMV and non-BMV land within the study area. As stated in paragraph 9.2.3, at the Tŷ Fodol Tunnel Head House (THH) and Cable Sealing End Compound (CSEC) site, the soil survey identified that there was the potential to reduce the impact to BMV land through the careful siting

Table 18.1: Relevant National Policy	
National Policy Statement (NPS) for Energy EN-1	How the policy has been addressed in the assessment
should ensure that they have considered the risk posed by land contamination'.	of infrastructure. Careful siting and considered design has therefore enabled the majority of Tŷ Fodol THH/CSEC to be located on non-BMV land (Subgrade 3b), minimising permanent BMV land take as far as was practicable.

Planning Policy Wales (Edition 9)

2.3.7 The current edition of Planning Policy Wales (PPW) is Edition 9 issued in November 2016 (Ref 18.4). Paragraph 5.1.2 of the PPW states that one of the Welsh Government's principle objectives for the conservation and improvement of the nation's natural heritage is to promote the functions and benefits of soils, and in particular their function as a carbon store.

2.3.8 Paragraph 4.10 of Section 4: Planning for Sustainability, gives specific details regarding the conservation of BMV land. The paragraph entitled Conserving the Best and Most Versatile Agricultural Land states:

'In the case of agricultural land, land of grades 1, 2 and 3a of the Department for Environment, Food and Rural Affairs (Defra) Agricultural Land Classification system (ALC) is the best and most versatile, and should be conserved as a finite resource for the future. In development plan policies and development management decisions considerable weight should be given to protecting such land from development, because of its special importance. Land in grades 1, 2 and 3a should only be developed if there is an overriding need for the development, and either previously developed land or land in lower agricultural grades is unavailable, or available lower grade land has an environmental value recognised by a landscape, wildlife, historic or archaeological designation which outweighs the agricultural considerations. If land in grades 1, 2 or 3a does need to be developed, and there is a choice between sites of different grades, development should be directed to land of the lowest grade'.

2.3.9 Although not yet adopted, the Draft PPW Edition 10 continues to place emphasis on the continued conservation of BMV land (Ref 18.7). Paragraph 2.54 states:

'*Finally, and only where all other alternatives have been fully exhausted, where greenfield sites are necessary, the value of the agricultural land will*

need to be taken into account, with the best and most versatile land preserved wherever possible.'

2.4 LOCAL PLANNING POLICY

2.4.1 The Anglesey and Gwynedd Joint Local Development Plan, 2017 (Ref 18.8) sets out a number of policies that relate to agricultural land use and soils. These are set out in Appendix 18.3, Local Planning Policy: Agriculture (**Document 5.18.2.3**).

2.5 NATIONAL PLANNING GUIDANCE

Code of Good Agricultural Practice

2.5.1 The Welsh Government Code of Good Agricultural Practice for the Protection of Water, Soil and Air for Wales (No.20) published in 2011 (Ref 18.9), recognises the importance of maintaining good quality soils in Wales. Section 1.1.3 states '*Healthy soils are the foundation of any successful farm business. Soil provides a stable medium for crop development, supports feed for livestock and enables good field access if properly managed. Soils are a finite and non-renewable resource and so it is essential that they be managed correctly'*.

Technical Advice Note (TAN) 6: Planning for Sustainable Rural Communities

2.5.2 The Welsh Assembly Government published the 'Technical Advice Note (TAN) 6: Planning for Sustainable Rural Communities' in 2010 (Ref 18.3), to provide practical guidance on the role of the planning system in supporting the delivery of sustainable rural communities, including sustainable agriculture.

2.5.3 Paragraph 6.2.1 states that '*When preparing development plans and considering planning applications, planning authorities should consider the quality of agricultural land and other agricultural factors and seek to minimise any adverse effects on the environment*'.

2.5.4 The document also acknowledges the limitations of the published Provisional 1:250,000 ALC map (see Figure 18.1; **Document 5.18.1.1**) and highlights the requirement for a resurvey at a smaller scale to obtain a definitive ALC grade.

Welsh Soils Action Plan (Consultation Document)

2.5.5 The Welsh Soils Action Plan (Consultation Document) was issued by the Welsh Government in 2008 (Ref 18.10). It sought views on the actions required to protect and enhance the soil resource in Wales to inform the

Environment Strategy for Wales, with the recognition that '*achieving a high level of protection of our soil resource is an important part of delivery of a sustainable future for Wales.*'

2.5.6 Action 9 of the Welsh Soils Action Plan (Consultation Document) states that the Welsh Assembly Government is committed to retaining the ALC system to retain BMV land, making ALC information widely available to all parties involved in the planning system, and undertaking detailed fieldwork where development proposals are considered to be potentially damaging to the national agricultural interest.

Environment Strategy for Wales

2.5.7 The Environment Strategy for Wales published in May 2006 (Ref 18.11), sets out environmental and sustainability targets for the period up to 2026 and strategies to achieve them. The Environment Strategy Action Plan, 2nd Edition, 2008 (Ref 18.12), focuses on ten themes, with a number of actions under each theme to be developed in order to progress towards the Environment Strategy's outcomes.

2.5.8 None of the ten themes are specifically dedicated to soils and/or agriculture. However, the importance of soils is recognised for the delivery of ecosystem services particularly in relation to soil carbon and its role in climate change; and the delivery of biodiversity. Additionally, the Action Plan '*recognises the crucial role of rural land managers in helping to deliver biodiversity, soil conservation, and carbon and water management'*.

3 Scope of Assessment and Consultation

3.1 INTRODUCTION

3.1.1 This section describes the scope of the assessment of effects on agricultural land use and soils, with reference to the SoS Scoping Opinion, ongoing consultation with stakeholders, and additional information that has influenced the scope of the assessment.

3.1.2 Discussions have taken place with the Welsh Government to agree the scope, methodology and assessment results of the Agriculture assessment, as described in Appendix 18.2, Agriculture Consultation Correspondence (**Document 5.18.2.2**). Chapter 5, EIA Consultation (**Document 5.5**) lists all the meetings which have taken place and the topics discussed.

3.1.3 Responses to comments from Stage 3 Consultation can be found in Chapter 5 Appendix 5.2 Schedule of Responses to the Preliminary Environmental Information Report and the Consultation Report (**Document 6.1**). Responses to the comments provided during the technical stakeholder review of the draft ES are provided in Chapter 5, Appendix 5.3 Schedule of the responses to the technical stakeholder review of the draft Environmental Statement (**Document 5.5.2.3**).

3.2 SECRETARY OF STATE'S (SOS) SCOPING OPINION

3.2.1 Table 18.2 sets out the issues that were raised in the SoS Scoping Opinion and how these have been addressed in the ES.

Table 18.2: Issues Raised in the Secretary of State's Scoping Opinion

Paragraph	Issue Raised by SoS	Response
3.167	The Secretary of State notes that the 1977 ADAS data represents the most recent ALC data available for the Scoping study area and welcomes that a targeted scheme of ALC assessment	A detailed desk-based study has been completed using published and purchased data sources to determine the general soil characteristics of the study area. The distribution of ALC grades within the study area is shown on

Table 18.2: Issues Raised in the Secretary of State's Scoping Opinion		
Paragraph	Issue Raised by SoS	Response
	would be undertaken to inform the siting of permanent and temporary infrastructure. The ES should include a figure identifying the ALC grade(s) along the route.	the Provisional 1:250,000 ALC mapping (Ref 18.13) and Figure 18.1 (**Document 5.18.1.1**). The scale of the mapping does not allow the accurate determination of ALC grade at the field scale, nor does it differentiate between Subgrade 3a (BMV) and Subgrade 3b (non-BMV) land. Therefore, within the ES, these data sources have been supplemented and confirmed through LandIS NATMAP data (Ref 18.14); which have been used in conjunction with published soils data including 'Soils and their Use in Wales' (Ref 18.15) to identify the relative proportions of Subgrade 3a and 3b within the study area. However, as spatial arrangement of the ALC Grading cannot be obtained from the NATMAP data, the data can only be presented in a tabular form (Appendix 18.1 (**Document 5.18.2.1;** Tables 18.1.1 and 18.1.2) and is consequently not represented in a mapped format. Some targeted soil sampling has also been undertaken in areas of permanent land take. The survey-determined ALC grading of these areas is represented in Figures 18.2, 18.3 and 18.4 (**Documents 5.18.1.2, 5.18.1.3 and 5.18.1.4**). A description of the methodology used in the ES for the ALC assessment is detailed in Appendix 18.1 (**Document 5.18.2.1**).

Table 18.2: Issues Raised in the Secretary of State's Scoping Opinion		
Paragraph	Issue Raised by SoS	Response
3.168	Paragraph 15.6.13 states that it is not necessary to carry out a detailed soil survey along the entire route, however the Secretary of State considers that the surveys should be designed with due consideration of any undergrounded sections of cable. Similarly, the assessment of impacts on ALC should consider the effects of undergrounding, in addition to those from positioning of equipment (for example, CSECs, THH and pylons). The methodology for defining the ALC baseline should be agreed with the relevant consultees.	In addition to the proposed detailed ALC desk study (as described above), targeted soil survey has been completed in areas of permanent land take. The soil survey locations have been informed by the results of the desktop study (as described above) and information obtained by National Grid. The surveys inform the ALC Grade (land quality), land use, and provide a verification of the desk based LandIS data. Agreement on the soil survey methodology to define the ALC baseline has been confirmed by the Land Quality Advisory Service (LQAS) (Welsh Government); see Appendix 18.2 (**Document 5.18.2.2**).
3.169	The ES should quantify the area of best-most versatile land that would be lost, both temporarily and permanently.	The detailed, desk based, survey described above provides the relative proportions of ALC Grades 1, 2, 4 and 5; and Subgrades 3a and 3b within the study area. Therefore, allowing the areas of both temporary and permanent loss of BMV and non-BMV land within the study area to be quantified, as detailed in section 9 proposed mitigation and residual effects.
3.170	The Secretary of State welcomes the commitment to obtain data on Agri-Environment Schemes (AES) within the application site, along with detailed and	The available data for Agri-Environment Schemes (AES), ALC, Soils and Landholdings are considered to be the most current available and cover the whole Order Limits.

Table 18.2: Issues Raised in the Secretary of State's Scoping Opinion		
Paragraph	Issue Raised by SoS	Response
	location specific information on farming operations, existing soil conditions, field land drainage and services and organic farming practices. Should this information not be available to the Applicant for the whole application site, the ES should identify any limitations to the assessment that may result.	The methodology used in the assessment is discussed in section 4 methodology, with data sources presented in Appendix 18.1 (**Document 5.18.2.1**).
3.171	The assessment of impacts on agricultural land use should consider the potential effects within the undergrounded sections. For example, the ES should identify whether there would be any restrictions on agricultural activities (for example, ploughing) over underground cables once the proposed development is operational. Any agricultural restrictions around pylons and underneath transmission lines should also be identified.	The only section of underground cabling would be that which is routed through the tunnel and in concrete troughs between the THHs and the CSECs at Braint and Tŷ Fodol, within the operational site boundaries. The cable would therefore not be directly installed in agricultural land. The presence and operation of the tunnel would not affect agriculture receptors; as the location and design specification are such that the tunnel would be at depth and would not create any ground disturbance, restrict ploughing depth, or interfere with agricultural drainage. Any agricultural restrictions arising due to the overhead line (OHL) and pylons have been identified and discussed within this chapter.
3.172	Table 15.2 of the Scoping Report identifies sensitivity levels from 'negligible' to 'high'; however, the matrix in Table 15.4 identifies sensitivity levels from 'very low' to 'high'.	The sensitivity levels and magnitude of impact levels used for the assessment are Negligible, Low, Medium and High. The methodology is set out in section 4.

Table 18.2: Issues Raised in the Secretary of State's Scoping Opinion		
Paragraph	Issue Raised by SoS	Response
	The Applicant should ensure consistent terminology is used within the ES.	
3.173	The ES should detail how the Applicant would ensure successful reinstatement of land temporarily affected during the construction phase. The draft CEMP confirms that pre-condition surveys (including a photographic record, written description and topographical survey) would be carried out of all land affected by works and welcomes this approach. This information should be provided within the ES.	The Outline SMP (**Document 7.10**) which forms part of the CEMP (**Document 7.4**) sets out the general methods for handling, excavation, storage and reinstatement of soils and peat. The CEMP also contains the following reinstatement commitment: '*To facilitate the reinstatement of land, soil and watercourses, pre-condition surveys will be discussed with landowners and where agreed, carried out of land within working areas. This will include a photographic record, written description and topographical survey, which will be used to ensure a complete and accurate reinstatement of land*'. As the pre-condition surveys would not be undertaken until after the DCO is in place, the results cannot be provided in the ES as requested.
3.174	Paragraph 14.1.2 of the Scoping Report refers to a '*Land Use and Agriculture chapter of the ES',* however the Scoping Report only covers potential impacts on agriculture. The Secretary of State considers that the ES should consider the potential impacts of the proposed development on all land uses.	This chapter assesses the potential impacts of the Proposed Development on the following factors: • loss of agricultural land; • environmental disruption to agricultural landholdings; • damage or disturbance to soil resources; • loss of soil resources;

Table 18.2: Issues Raised in the Secretary of State's Scoping Opinion		
Paragraph	Issue Raised by SoS	Response
	With this in mind, the Secretary of State advises that the Applicant to give consideration to widening the scope of this chapter to consider land use in the wider context, bearing in mind Section 5.10 of NPS EN-1.	• loss of eligibility for AES; and • disturbance to agricultural land drainage. Other aspects of land use are covered in separate chapters for example amenity uses (open spaces and recreational areas) are covered in Chapter 17, Socio-Economics and Tourism (**Document 5.17**); nature areas in Chapter 9, Ecology and Nature Conservation (**Document 5.9**); and contaminated land in Chapter 11, Geology Hydrogeology and Ground Conditions (**Document 5.11**).

3.3 CONSULTATION

3.3.1 All consultation was undertaken with the LQAS, Department for Environment and Rural Affairs, Welsh Government. Copies of the correspondence are presented in Appendix 18.2 (**Document 5.18.2.2**).

3.3.2 An initial email was sent to the LQAS general information email address on 12 October 2016 to establish the appropriate contact person within LQAS. LQAS responded on 13 October 2016 and subsequently provided a copy of the digitised Provisional ALC map for Wales on 19 October 2016.

3.3.3 A letter setting out details of the proposed methodology for determining the ALC grading of land within the Order Limits was sent to the LQAS on the 20 October 2016.

3.3.4 The LQAS confirmed the proposed approach was acceptable in an email dated 16 November 2016, but also requested further clarification regarding the use of agroclimatic data within the assessment. The LQAS response also confirmed that, although it was possible that the Provisional ALC dataset (Ref 18.13) would be withdrawn and replaced with a 'Predictive ALC' dataset in the timescale of the production of the ES, the Provisional ALC dataset could continue to be used up to submission of the raft DCO (**Document 2.1**).

3.3.5 In response, an updated version of the letter clarifying the use of agroclimatic data within the assessment was reissued to the LQAS on 21 November 2016.

3.3.6 The proposed methodology included the use of a desk based approach to determine the ALC grade of land under temporary development and within the pylon footprint; and the use of the standard soil surveying methodology as set out in Natural England's Technical Information Note 049 (TIN049), Agricultural Land Classification: protecting the Best and Most Versatile agricultural land on areas identified for permanent development (Ref 18.16). There is no Welsh guidance equivalent to TIN049 and consequently this document is considered 'universal'. Full details of the agreed methodology are provided in section 4, methodology.

3.4 UPDATES SINCE SCOPING

3.4.1 One change to the proposed scope of assessment occurred between the submission of the Scoping Report (Ref 18.17) issued in May 2016 and the Preliminary Environmental Information Report (PEIR) (Ref 18.18) issued in October 2016 as part of Stage 3 Consultation. The assessment of impacts to soil resource was sub divided, allowing the potential impacts resulting from the disturbance of the soil resource to be assessed separately from the potential loss of soil resource.

3.4.2 The proposed scope of assessment as presented in the PEIR (Ref 18.18) has been refined in order to present a clear and concise assessment. Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015, Schedule 4, Part (y), requires that the local planning authority consults Secretary of State for Wales if the area of a proposed permanent development exceeds 20 ha of BMV land (Ref 18.2). Therefore, the loss of agricultural land has been assessed by estimating the amount and quality of land that may be affected by the Proposed Development, with a threshold of 20 ha of permanent BMV loss used to determine whether the loss is significant or not. Magnitude of effect and receptor sensitivity classifications are consequently not assigned. Rather, any permanent BMV loss that exceeds 20 ha is assessed as significant, whilst any that is temporary or occupies less than 20 ha is assessed as not significant. However, a discussion of the degree of BMV loss in relation to the total area of BMV on Anglesey and in Gwynedd has also been provided in paragraphs 9.3.18 and 9.3.19.

3.4.3 There has also been a change to the way the AES are assessed in terms of magnitude of change from the baseline. Due to the nature of AES, they can either be in place, or not. As a result, there are three levels of impact magnitude; a permanent loss of eligibility to existing schemes (i.e. on

schemes which are currently in place) due to placement of permanent infrastructure (high magnitude); a temporary loss of eligibility due to temporary works in which the land would be re-eligible for the AES following the construction phase (low magnitude), and no impact on AES (no effect).

3.4.4 The long-term effects to landholdings as a result of permanent land use change (loss of agricultural land from the landholding) are considered to be fully mitigated through the process of discussion and negotiation between National Grid, the landowners and any agricultural tenants (if applicable), with the environmental impacts assessed through the permanent loss of agricultural land assessment. Permanent loss of landholding is therefore not considered further within the assessment.

3.4.5 The Proposed Development has the potential to result in the local disruption, severance or blocking of agricultural drainage systems (including open ditches, stone-filled trenches and underdrainage systems), which could lead to localised waterlogging, as well as the potential disruption of surface water runoff and creation of silt laden water both within the Order Limits and on adjacent land. High-level agricultural drainage surveys have been conducted, with drainage areas identified and included within the Order Limits, as shown on Figure 4.1 Construction Plans (**Document 5.4.1.1**).

3.4.6 Since the PEIR, there has been a change to the way agricultural land drainage is assessed, in terms of magnitude of change from the baseline. Due to the nature of agricultural land drainage systems, they can either function, or not. As a result, there are two levels of impact magnitude; a permanent loss of function due to placement of permanent infrastructure (high magnitude); and no impact on land drainage (no effect). Effects of development can be readily mitigated by standard measures for instance diversion and reinstatement. These measures are incorporated in to the CEMP (**Document 7.4**), with a DMP to be prepared prior to the commencement of works. The DMP will specify measures to minimise the impact of the construction on existing drainage systems. Therefore, the effects to agricultural land drainage as a result of the Proposed Development are considered to be fully mitigated.

3.5 SCOPE OF ASSESSMENT

3.5.1 The following aspects are assessed:

- loss of agricultural land;
- damage or disturbance to soil resources;
- loss of soil resources;

- environmental disruption to agricultural landholdings;
- loss of eligibility for AES; and
- disruption to agricultural land drainage.

3.5.2 The Agriculture assessment only considers the potential environmental impacts of the Proposed Development to agriculture and soils, therefore potential impacts to farm business and farm viability are not assessed (see section 3.4.4 above).

Welsh Language

3.5.3 Considerations have been given to the potential for this topic to impact on the Welsh Language in any way, drawing upon findings of the Welsh Language Impact Assessment (**Document 5.26**). It has been concluded that there is no potential for the sources of effects or affected receptors dealt with in this chapter to have any effects upon the Welsh Language.

4 Methodology

4.1 INTRODUCTION

4.1.1 This section outlines the technical methods used to determine the baseline, how it could be affected by the Proposed Development (the impacts) and how significant the effects of these impacts are likely to be.

4.1.2 The approach to determining the significance of effects resulting from the Proposed Development broadly follows the generic approach described in Chapter 6, EIA Methodology and Basis of Assessment (**Document 5.6**).

4.2 GUIDANCE SPECIFIC TO AGRICULTURE

4.2.1 There is no sector specific guidance on the assessment of impacts to agricultural land use and soils. However, the following section provides information on the guidance associated with the gathering of agricultural baseline information, for the analysis of this information.

4.2.2 Relevant guidance in relation to classifying agricultural land and soils is listed below. This list is focused on important guidance documents however, other specific guidance may also be used where localised issues necessitate.

- MAFF, (1988); 'Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land' (Ref 18.19);
- Defra, (2009); 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' (Ref 18.1); and
- Welsh Assembly Government, (2011); 'Welsh Government Code of Good Agricultural Practice for the Protection of Water, Soil and Air for Wales (No.20)' (Ref 18.9).

4.3 BASELINE DATA GATHERING AND FORECASTING METHODS

4.3.1 The impact assessment has largely been undertaken by means of a desk study, utilising information from published sources and from direct liaison and consultation, for example data gathered from landowners/occupiers for the Proposed Development.

4.3.2 As described in paragraphs 3.3.1 to 3.3.4, the methodology for assessing the presence and extent of BMV land within the study area was agreed by the Welsh Government in November 2016 (Appendix 18.2; **Document 5.18.2.2**).

4.4 TECHNICAL ANALYSIS

4.4.1 For areas of permanent land take (the Tunnel Head Houses (THHs) and Cable Sealing End Compounds (CSECs) at Braint and Tŷ Fodol and the associated permanent access tracks; and the extension to Pentir Substation), detailed soil surveys were carried out in line with standard procedures. Standard procedures are set out in Natural England's TIN049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land' (Ref 18.16). The surveys were undertaken on the 6 and 7 December 2016.

4.4.2 Appendix 18.1 (**Document 5.18.2.1**) contains the data obtained from the site surveys, including observations from the soil profiles, the droughtiness calculations and the subsequent ALC grading.

4.4.3 As described in Appendix 18.1 and Appendix 18.2 (**Document 5.18.2.1** and **Document 5.18.2.2**), for areas of temporary disturbance (for example temporary access tracks and pylon working areas) and at pylon locations, ALC grading was determined using Provisional ALC mapping (Ref 18.13) in conjunction with published soils data 'Soils and their use in Wales' (Ref 18.15), and LandIS NATMAP data (Ref 18.14) to determine the likely proportion of BMV land through the identification of areas of potential Subgrade 3a (BMV) or Subgrade 3b (non-BMV) land.

4.5 ASSESSMENT CRITERIA

Loss of Agricultural Land

4.5.1 For agricultural land, the assessment of significance is based on a threshold of the permanent loss of 20 ha of BMV agricultural land, taken from 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) (Ref 18.2); and referenced in TAN6 (Ref 18.3) and PPW (Ref 18.4). These documents do not state that this threshold should be used to determine loss significance for the purpose of impact assessment; however, as this is the area of BMV loss that triggers a requirement to consult the SoS it implies that this is also the point at which the loss is considered to be significant. Therefore, for the purposes of this assessment a total permanent loss of BMV land which exceeds 20 ha is considered significant, whilst any loss of BMV which is temporary or which falls below the 20 ha threshold is considered as being not significant. Therefore, neither magnitude of impact nor receptor sensitivity classifications are assigned.

4.5.2 If the permanent agricultural land take were slightly above or below the 20 ha threshold, professional judgement would be used to determine likely significance, taking into consideration the ALC availability and land use of the wider area.

Soil Resources Assessment Criteria

4.5.3 There are no defined criteria, or policy guidance on the assessment of the effects of development on soil resources[1]. Therefore, the assessment has considered the identified soil resources; the sensitivity of these soil resources to damage (the resistance and resilience of the soil environment, not the importance of the land for agricultural use) in terms of susceptibility to erosion and/or presence of organic rich soils/peat; and the degree of loss of soil resource that could potentially occur due to the Proposed Development.

4.5.4 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 based upon data compiled by Knox *et al*., (Ref 18.20). Therefore, as a general rule, heavy (clay rich) soils are classified as low sensitivity (low soil erodibility), whilst light sandy soils are classified as high sensitivity (high soil erodibility).

4.5.5 However, it is important to note that soils of differing texture and structural development will behave differently following reinstatement. For example, the incorrect handling/reinstatement of a heavy (clay rich) soil whilst in a plastic state may result in a reinstated soil profile with poor natural drainage and a subsequent increased risk of soil loss (erosion) due to surface water runoff. Whereas, the permeable nature of light sandy soils means that the natural structural recovery and drainage potential of the soils is more easily maintained upon reinstatement. However, as appropriate mitigation measures, such as the good practice set out in the Outline SMP (**Document 7.10**) and the CEMP (**Document 7.4**), will mitigate against any potential adverse impacts during reinstatement regardless of the soil texture or prevailing structure, only soil erodibility (i.e. the sensitivity of the undisturbed soil profile or soil stockpiles) is considered in the sensitivity criteria of the soil assessment.

[1] Soil: The upper layer of the earth's crust, in which plants grow (agricultural soil): descriptions usually identify the relevant characteristics of its (usually) horizontal layers in terms of their significance for soil characteristics and crop growth, usually to 1.2 m depth.

Landholding Assessment Criteria

4.5.6 There are no defined criteria, or policy guidance on the assessment of the effects of development on agricultural land holdings. Therefore, the assessment of the effect of the Proposed Development has been assessed in terms of the identified land holdings, and the proportional temporary loss of agricultural land within the land holding as a result of the Proposed Development.

4.5.7 The environmental effects on landholding are only assessed for temporary loss of agricultural land, whereby the land would be returned to agricultural use after completion of construction.

Agri-Environment Schemes (AES) Assessment Criteria

4.5.8 There are no defined criteria, or policy guidance on the assessment of the effects of development on AES. Therefore, the effect of the Proposed Development has been assessed in terms of the change of eligibility of the land for AES, as described in paragraph 3.4.3, which in summary identifies three levels of impact magnitude. This includes: a permanent loss of eligibility to existing schemes (i.e. on schemes which are currently in place) due to placement of permanent infrastructure (high magnitude); a temporary loss of eligibility due to temporary works in which the land would be re-eligible for the AES following the construction phase (low magnitude), and no impact on AES (no effect).

4.5.9 It should be noted that AES are designed to provide areas of ecological enhancement and therefore some of the AES considered in this chapter may also contain features which are considered to be ecological constraints, for example species diverse hedgerows. This chapter focuses on the impacts in terms of changes in AES eligibility of landholdings currently enrolled in an AES and does not consider the ecological or economic implications of the Proposed Development.

Agricultural Land Drainage Assessment Criteria

4.5.10 There are no defined criteria, or policy guidance on the assessment of the effects of development on agricultural land drainage. Therefore, the effect of the Proposed Development has been assessed in terms of the potential disturbance to agricultural land drainage.

4.5.11 The Proposed Development has the potential to result in the local disruption, severance or blocking of agricultural drainage systems (including open ditches, stone-filled trenches and underdrainage systems), which are considered to be of medium sensitivity to development.

Assessment Criteria

Sensitivity of Receptors

4.5.12 The receptor sensitivity criteria are presented in Table 18.3.

Table 18.3: Receptor Sensitivity

Receptor	Sensitivity	Justification
Soil Resource and AES		
Soils with high risk of erosion and organic soils (peat). Land under Organic AES	High	Development on those soils should be avoided, however if this is not possible, they require careful consideration and site specific planning of construction methods, for example, use of temporary working surfaces, sensitive storage, protection from drying out, in order to preserve their functions. Soils of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change. Increased mitigation requirements beyond standard measures are required for organically managed land.
Soils with moderate risk of erosion. Land under High Level/Advanced AES	Medium	Control and management measures as set out in the CEMP (**Document 7.4**) will provide appropriate protection to these soils, however damage is likely to occur if worked in less than ideal conditions, for example when above their plastic limit. The soils should be given appropriate consideration because of their importance for agricultural production. Control and management measures as set out in the CEMP

Table 18.3: Receptor Sensitivity		
Receptor	Sensitivity	Justification
Soil Resource and AES		
		(**Document 7.4**) will provide appropriate protection to land under these AES.
Soils with low risk of erosion. Land under Entry Level AES	Low	These soils are generally more resistant to damage. Control and management measures as set out in the CEMP (**Document 7.4**) will provide appropriate protection to land under these AES.
Poor quality soils within an urban environment not supporting biodiverse habitats, no risk of erosion. Land not under an AES	Negligible	These soils are already highly disturbed and of poor quality. Only control and management measures as set out in the CEMP (**Document 7.4**) are required.
Landholding		
Landholding	Medium	Considered that all agricultural landholdings are of the same sensitivity to temporary land loss.
Agricultural drainage		
Agricultural drainage systems	Medium	Drainage ditches and field drains (underdrainage) do not vary in their sensitivity to damage or disruption. Effects of development can be readily mitigated by control and management measures set out in the CEMP **(Document 7.4)**.

Magnitude of Impact

4.5.13 The levels of magnitude of impact used within the assessment are presented in Table 18.4. The magnitude of impact has been assessed in terms of the change from baseline conditions.

Table 18.4: Criteria to assess the magnitude of impacts					
Magnitude	Disturbance to Soil Resource	Loss of Soil Resource	AES	Landholding	Agricultural land drainage
High	Permanent irreversible or long-term (> two years) reversible damage to soil quality through handling, and stockpiling	<25% of soil resources suitable for reuse on-site	Permanent change to land holding AES eligibility	Temporary loss in excess of ten percent of the holding's area	Loss in drainage function
Medium	Medium-term (six months to two years) temporary disturbance. Reversible damage to soil quality for example through handling, stockpiling and machinery traffic	25-50% of soil resources suitable for reuse on-site	Not applicable	Temporary loss of between five and ten percent of the holding's area	Not applicable
Low	Short-term (<six months) disturbance of soil resources. Reversible damage to soil quality for example through handling, stockpiling and heavy machinery traffic	51-95% of soil resources suitable for reuse on-site	Temporary change to land holding AES eligibility	Temporary loss of between one and five percent of the holding's area	Not applicable
Negligible	No damage or very small-scale surface damage equivalent to that done by a	>95% of soil resources suitable for reuse on-site	No change to AES eligibility	Temporary loss of less than one percent of the holding's	No change to drainage function

Table 18.4: Criteria to assess the magnitude of impacts					
Magnitude	Disturbance to Soil Resource	Loss of Soil Resource	AES	Landholding	Agricultural land drainage
	typical farm machinery traffic			area; or the loss of land suitably mitigated through CEMP Measures	

Significance

4.5.14 As described in paragraph 4.5.1, the loss of agricultural land has been assessed by estimating the amount and quality of land that may be affected by the Proposed Development, with a threshold of 20 ha of permanent BMV loss used to determine whether the loss is significant or not, as per Ref 18.2. Any permanent BMV loss that exceeds 20 ha is assessed as significant, whilst any that is temporary or occupies less than 20 ha is assessed as not significant. Consequently, magnitude of impact and receptor sensitivity classifications are not assigned and no reference is made to Table 18.5.

4.5.15 For all effects except the loss of agricultural land, the level of significance of effects (paragraph 4.5.14) has been assessed using Table 18.5. Where effects are determined as Major or Moderate the effect is considered significant (shaded cells in Table 18.5). Where effects are determined as Minor or Negligible, the effect is considered not significant.

Table 18.5: Classification of Effects				
Sensitivity of receptor	Magnitude of impact			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor/Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor/Negligible	Negligible	Negligible	Negligible

4.6 ASSUMPTIONS AND LIMITATIONS

4.6.1 The assessment of the impacts to the land subject to temporary land take and land under the pylon footprint within the Order Limits is based on published ALC and soils data, including; the Provisional ALC mapping (Ref 18.13) with published soils data, LandIS NATMAP data (Ref 18.14) and 'Soils and their use in Wales' (Ref 18.15), as further described in Appendix 18.1 **(Document 5.18.2.1)**. The approach for these areas has not included any field survey. The justification for this approach, is that the land use change (loss of agricultural land) and soil disturbance would be temporary. This assessment approach has been agreed with Welsh Government (Appendix 18.2; **Document 5.18.2.2**).

4.6.2 The desk based calculation of ALC Grade has been undertaken on land graded as Grade 3 on the Provisional ALC mapping, to determine whether the land is most likely to be Subgrade 3a or 3b (BMV or non-BMV). No further calculations were carried out for areas identified as Grades 1, 2, 4 or 5 on the Provisional ALC mapping, and the areas of each grade within the Order Limits were taken directly from the digitised Provisional ALC mapping provided by the LQAS. For the identified Grade 3 land, where the calculations resulted in a Grade other than Subgrade 3a or 3b, the Grade was adjusted. For example, a calculated Grade 1 or 2 remained BMV land, but was re-assigned to Subgrade 3a, whilst a calculated Grade 4 or 5 remained non-BMV, but was re-assigned to Subgrade 3b.

4.6.3 This desktop assessment approach reflects the predominant land quality and soil characteristics within the study area. Therefore, it allows for the assessment of effects for loss of agricultural land and damage to soil resources at a scale appropriate to assess both the permanent loss of agricultural land and the effect of temporary disturbance on soils in agricultural use.

4.6.4 Following construction, all land within the Braint THH/CSEC; Tŷ Fodol THH/CSEC, and Pentir Substation extension, would be permanently excluded from agricultural use, either through built development or land use change. To assess a worst case, the assessment also assumes that this is the case for the land within the pylon footprints. However, in reality for areas of pasture, it is highly likely that the land within the pylon footprint (with the exception of the pylon foundations) would be accessible to livestock and therefore agricultural use (grazing) would be reinstated following construction. It should also be noted that the majority of pylons would be located in pasture. The temporary construction compounds, temporary working areas and temporary access would be temporary structures and would be returned to agricultural use.

5 Basis of Assessment

5.1 INTRODUCTION

5.1.1 The basis of assessment section sets out the assumptions that have been made in respect of the design flexibility maintained within the draft DCO (**Document 2.1**), and the consideration that has been given to alternative scenarios and the sensitivity of the assessment to changes in the construction commencement year.

5.1.2 Details of the available flexibility are included in Chapter 3, Description of the Proposed Development, (**Document 5.3**), Chapter 4, Construction, Operation, Maintenance and Decommissioning of the Proposed Development (**Document 5.4**) and are also considered in Chapter 6, EIA Methodology and Basis of Assessment (**Document 5.6**).

5.2 FLEXIBILITY ASSUMPTIONS

5.2.1 The Agriculture assessment has been undertaken based upon the design shown on the Works Plans (**Document 4.4**), Figure 4.1 Construction Plans (**Documents 5.4.1.1**), Figure 4.2 Third Party Services Construction Plans (**Document 5.4.1.2**) and the Design Plans (**Document 4.13**). To take account of the flexibility allowed for in the draft DCO, consideration has been given to the potential for effects to be of greater significance should any of the permanent or temporary infrastructure elements be moved within the Limits of Deviation (LOD) or Order Limits.

5.2.2 Where relocating temporary or permanent infrastructure within the LOD may have changed the significance of an effect, an environmental commitment has been made, to restrict works in these areas. The Schedule of Environmental Commitments is provided in Volume 7 (**Document 7.4.2.1**) for more information.

5.2.3 The assumptions made regarding the use of flexibility are set out in Table 18.6 below.

Table 18.6: Flexibility assumptions		
Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
Horizontal LOD for pylons and conductors	Each pylon is assessed in the location shown on the Works Plans (**Document 4.4**). The location of the conductors is not relevant to this assessment.	Consideration has also been given to the possible effects of locating pylons anywhere else within the LOD, and areas were excluded where the magnitude of effects or sensitivity of receptors could increase.
Vertical Limits of Deviation for pylons and conductors.	Assessed at the height shown in Appendix 3.1 Indicative Pylon Schedule (**Document 5.2.3.1**)	Whilst the vertical height of the pylon would not impact agricultural receptors, the footprint of taller pylons would be greater. Therefore, this is assessed in the pylon footprint element as described below.
Pylon footprint	The assessment assumes that all land within the pylon footprint would be permanently removed from agricultural use, rather than just the land used for the foundations. The pylon footprint assessed is that indicated in Appendix 3.1 Indicative Pylon Schedule (**Document 5.2.3.1**)	The assessment also considers the possible effects of the use of the pylon with the largest footprint across the entire route, which would increase the area of land take.
Pylon foundation type	The type of foundation used is not relevant to this assessment	N/A
Tunnel alignment within LOD	This is not applicable to the Agriculture assessment. The tunnel is not considered in this assessment as the permanent land take occurring from the tunnel will occur within the Braint and Tŷ Fodol THH/CSECs and is therefore	N/A

Table 18.6: Flexibility assumptions		
Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
	considered in the THH/CSEC assessment.	
Tunnel depth	This is not relevant to the assessment of agricultural effects.	N/A
Tunnel construction compounds	Construction work could take place anywhere within the compound areas identified on the Works Plans (**Document 4.4**).	N/A
Braint and Tŷ Fodol THH/CSEC/ and Pentir Substation	The assessment has been undertaken based on the maximum parameters shown on Design Plans (**Document 4.13**).	N/A
Access tracks and working areas	Access tracks and working areas would be located where they are currently shown on Figure 4.1 Construction Plans (**Document 5.4.1.1**).	Consideration has also been given to the possible effects of locating access tracks and working areas anywhere else within the Order Limits.
Penmynydd Road Compound	Construction work could take place anywhere within the compounds area identified on the Works Plans (**Document 4.4**).	N/A
Pentir Construction Compound	Construction work could take place anywhere within the compounds area identified on the Works Plans (**Document 4.4**).	N/A
Third Party Services	It has been assumed that all third party services will be undergrounded within the LOD shown on Figure 4.2 Third	N/A

Table 18.6: Flexibility assumptions		
Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
	Party Services Construction Plans (**Document 5.4.1.2**) Access tracks and working areas would be located where they are currently shown on Figure 4.2 Third Party Services Construction Plans (**Document 5.4.1.2**).	

5.3 CONSIDERATION OF SCENARIOS

5.3.1 Three scenarios have been considered for the Proposed Development. These are:

- Option A and B as explained in Chapter 3, Description of the Proposed Development (**Document 5.3**);
- Direction and method of tunnelling (Scenarios 1 and 2 and 3) as explained in Chapter 4, Construction, Operation, Maintenance and Decommissioning (**Document 5.4**); and
- Construction traffic using the existing A5025 (Link 1) alignment or using the new alignment as proposed by Horizon Nuclear Power and as explained in Chapter 4, Construction, Operation, Maintenance and Decommissioning (**Document 5.4)**.

5.3.2 Table 18.7 details where these scenarios are relevant to the Agriculture assessment and how they have been assessed in section 9, proposed mitigation and residual effects.

Table 18.7: Consideration of Scenarios	
Option	How it has been considered within the assessment
Option A and B	The assessment considers the two OHL Options that are being applied for in the draft DCO (**Document 2.1**) (as fully described in Chapter 3, Description of the Proposed Development (**Document 5.3**)). These Options consider

Table 18.7: Consideration of Scenarios	
Option	How it has been considered within the assessment
	alternative routeing in Section D; Option A, over-sails a property, and Option B avoids over-sail of the property, but requires an additional pylon. The two Options result in slight variations to the Order Limits in Sections C and D in order to take account of the differences in the LOD. In this assessment, the study area refers to Option A, unless otherwise noted. Where differences arise between Option A and Option B, this is clearly stated in the text; and the assessment considers both Options where these differences have the potential to change the inputs to or outputs of the assessment.
Direction of Tunnelling (Scenarios 1, 2 and 3)	The tunnelling scenarios are not considered separately within the assessment, as the total area of permanent and temporary land take is the same irrespective of tunnelling direction. Please note that the tunnel itself is not considered in this assessment as the resultant land take would occur within the Braint and Tŷ Fodol THH/CSECs and is therefore considered in the THH/CSEC assessment. Also, the tunnel is to be constructed via trenchless technology and laid at depth; and therefore would not create any ground (soil) disturbance, or restrict agricultural practice (ploughing depth).
Construction traffic using the existing A5025 (Link 1) alignment or using the new alignment as proposed by Horizon Nuclear Power.	The only difference between the two options is in relation to the route that construction traffic will take, which is not a consideration for the assessment of impacts on agricultural land use and soils.

5.4 SENSITIVITY TEST

Construction Start Date

5.4.1 Under the terms of the draft DCO (**Document 2.1**), construction could commence in any year up to five years following grant of the DCO.

Consideration has been given to whether the potential mitigation or residual effects reported in this chapter would differ if construction were to commence in any year up to and including the fifth year.

5.4.2 Whilst there is the potential for long-term changes to the baseline due to climate change, which could potentially lead to alterations in agricultural land quality (ALC grade), for example through increased levels of soil wetness in the winter and increased droughtiness in the summer. It is highly unlikely that there will be any perceptible changes in the baseline between baseline data acquisition and 2024. It has therefore not been necessary to undertake a more detailed assessment for an alternative programme to that set out in Chapter 4, Construction, Operation, Maintenance and Decommissioning of the Proposed Development (**Document 5.4**).

Duration of Construction Activities

5.4.3 It is possible that some construction activities may take a longer or shorter length of time to complete than currently predicted in the construction programme used for the purposes of assessment. Certain assessment methodologies use defined durations when considering effects within the assessment, for example in relation to peak periods of construction, such as that considered for construction traffic effects (consideration is given to the peak week of traffic and the average weekly traffic over the peak year). To ensure a robust assessment, additional consideration has been given to any difference in the effects as assessed should there be any increase or decrease in the duration of individual construction activities, or indeed the construction programme as a whole.

5.4.4 It is considered that there is some potential for the soil resource to be sensitive to changes in the duration of activities or the construction programme as a whole, and this sensitivity is considered further in section 9, mitigation and residual effects.

6 Study Area

6.1 INTRODUCTION

6.1.1 The study area for the assessment of the direct impacts on agricultural land use and soils is the Order Limits, which are the full extent of area required to locate and construct the Proposed Development, hereafter referred to as the 'Study Area'. The Order Limits are illustrated on Figure 3.1 (**Document 5.3.1.1**).

6.1.2 The study area for landholdings considers the larger farming units (all land owned and/or tenanted by a business or farming enterprise; both within and without the Order Limits) for all land parcels identified within the Order Limits, hereafter referred to as the 'Landholding study area'. Therefore, the larger farming units may include land parcels beyond the Order Limits.

6.1.3 Six sections (identified as A to F) have been identified along the route of the Proposed Development, as illustrated on Figure 3.1 (**Document 5.3.1.1**).

7 Baseline Conditions

7.1 INTRODUCTION

7.1.1 The majority of agricultural land within the study area is typical of Anglesey and Gwynedd, and is primarily comprised of pasture land, with discrete areas of mixed and arable land.

7.1.2 The Provisional ALC mapping (Ref 18.13) indicates that the majority of the agricultural land within the study area is comprised of ALC Grade 4 and 5, with small areas of ALC Grade 3; which is also typical for Anglesey and Gwynedd (Table 18.8).

7.1.3 The soils across the study area are typical for the area; and are primarily comprised of slowly permeable cambic stagnogley soils (57% of the study area) and freely draining typical brown earths (38% of the study area).

7.1.4 Although there is flexibility for the elements of the Proposed Development within the LOD, the dominance of these soil types within the study area means that should deviation from the assessed layout of the Proposed Development (as shown in Figure 4.1 Construction Plans; **Document 5.4.1.1**) occur, the distribution of soil types subject to temporary disturbance and land take is unlikely to vary significantly from that presented below.

7.1.5 Information pertaining to the enrolment of land in AES within the study area was provided by the Welsh Government.

Information pertaining to landholdings was identified following consultations with the landowners (see Appendix 18.1; **Document 5.18.2.1**).

Table 18.8: ALC grading for Anglesey, Gwynedd and the Study Area*

ANGLESEY		
Provisional ALC Grade	Area (ha)	Percentage (%) of total agricultural land on Anglesey
Grade 1	0.0	0.0
Grade 2	1,077.6	1.6
Grade 3	27,295.5	41.6

Grade 4	26,997.8	41.2
Grade 5	10,206.0	15.6
TOTAL	65,576.9	100.0
GWYNEDD		
Provisional ALC Grade	Area (ha)	Percentage (%) of total agricultural land in Gwynedd
Grade 1	154.1	0.1
Grade 2	365.0	0.2
Grade 3	19,230.0	8.5
Grade 4	58,850.0	26.1
Grade 5	146,739.4	65.1
TOTAL	225,337.3	100.0
STUDY AREA		
Provisional ALC Grade	Area (ha)	Percentage (%) of total agricultural land in the study area.
Grade 1	0.0	0.0
Grade 2	0.0	0.0
Grade 3	398.0	55.3
Grade 4	245.6	34.2
Grade 5	85.5	10.5
TOTAL	719.1	100.0
*Taken from the Provisional ALC mapping for Wales (Ref 18.13).		

7.2 FUTURE BASELINE PREDICTIONS

7.2.1 The construction phase would commence within five years of the grant of the DCO, and the construction is anticipated to take around six years. It is anticipated that the identified baseline scenario for agriculture will not change significantly as a result of natural processes and systems during this period. However, the baseline does have the potential to alter due to changes in land use and farming practices. These changes may include, but are not limited to, the adoption or surrender of AES; and shift from pastoral to arable agricultural practices.

7.2.2 Over the operational lifetime of the Proposed Development, there is the continued potential for changes in the assessed baseline due to shifts in land use and farming practice, such as those mentioned above. However, in addition, there is also the potential for long-term changes to the baseline due to climate change. These could potentially lead to alterations in agricultural land quality (ALC grade), for example through increased levels of soil wetness in the winter and increased droughtiness in the summer. This may in turn influence extent and location of BMV land. Changes in rainfall may also affect decomposition rates and soil organic matter content. However, it is considered that the lifetime of the Proposed Development is not long enough for any natural changes in the land use and land quality to be sufficient to alter the findings of the assessment.

7.2.3 The baseline has the potential to change in the period between DCO consent and the start of construction (which could be in any year up to five years up to five years following grant of the DCO) due to new developments being brought forward within the vicinity of the study area, for example through the temporary or permanent loss of agricultural land to development. Where development proposals are known about, these are considered both in section 10 of this chapter and in Chapter 20, Inter-Project Effects (**Document 5.20**). If further developments emerged that had any potential for significant effects on agriculture, there would be a requirement for the applicants to consider the cumulative effect of their proposals on soils and agriculture with those of the Proposed Development.

7.2.4 In summary, as there is little potential for the baseline presented in this chapter to change significantly over the lifetime of the Proposed Development, it is reasonable to adopt the current baseline for use in the assessment.

7.3 AGRICULTURAL LAND

Soil Resource and ALC

7.3.1 Using published sources (Ref 18.15) eleven Soil Associations were identified within the study area. A summary of the published Soil Association data is provided in Table 18.9. The distribution of these eleven associations within the study area is presented in Figure 18.5 (**Document 5.18.1.5**).

Table 18.9: Soil Associations in the Study Area including calculated Subgrade 3a/3b proportions								
Soil Association	Soil Series	Soil Type	Soil Characteristics	Wetness	Erodibility[a]	Area (ha) (%)	% Subgrade 3a	% Subgrade 3b
Eardiston 1 (541c)	Eardiston, Bromyard, Bromsgrove	Typical brown earths	Well drained reddish coarse loamy soils over sandstone, shallow in places especially on brows. Some reddish fine silty soils over shale and siltstone.	The Eardiston and Bromsgrove series are well drained. The Bromyard series is normally waterlogged for short periods in winter.	Moderate risk of water erosion	12.7 (1.8%)	100	0
Denbigh 1 (541j)	Denbigh, Powys, Sannan, Barton, Manod	Typical brown earths	Well drained fine loamy and fine silty soils over rock. Some similar soils with slowly permeable subsoils and	Most of the soils are permeable and naturally well drained. Sannan soils experience occasional waterlogging depending on situation and	Small risk of water erosion	13.6 (1.9%)	98	2

Table 18.9: Soil Associations in the Study Area including calculated Subgrade 3a/3b proportions

Soil Association	Soil Series	Soil Type	Soil Characteristics	Wetness	Erodibility[a]	Area (ha) (%)	% Subgrade 3a	% Subgrade 3b
			slight seasonal waterlogging.	subsoil permeability.				
Wick 1 (541r)	Wick, Arrow, Newport	Brown Earths	Deep, well drained coarse sandy loam soils over glaciofluvial drift.	Permeable and well drained. Can be waterlogged in winter if undrained.	Moderate risk of water erosion	53.3 (7.4%)	100	0
East Keswick 1 (541x)	East Keswick, Nercwys, Arrow	Typical brown earths	Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.	East Keswick soils are well drained, whereas seasonal waterlogging is a feature of lower horizons in Nercwys and Arrow soils.	Small risk of water erosion	103.9 (14.5%)	100	0
East Keswick 3 (541z)	East Keswick, Wilderhope, Crwbin	Typical brown earths	Well drained fine loamy soils often	The soils are well drained.	Small risk of water erosion	91.2* (12.7%)	100	0

Table 18.9: Soil Associations in the Study Area including calculated Subgrade 3a/3b proportions								
Soil Association	Soil Series	Soil Type	Soil Characteristics	Wetness	Erodibility[a]	Area (ha) (%)	% Subgrade 3a	% Subgrade 3b
			deep but sometimes over limestone. Very shallow soils in places.					
Fforest (713c)	Fforest, Wenallt, Llangendeirne	Cambic stagnogley soils	Slowly permeable seasonally waterlogged reddish fine silty and fine loamy soils, some with a peaty surface horizon.	Fforest subsoils are slowly permeable and often contain a fragipan which, with the gentle relief, slows water movement so that the soils are waterlogged for much of the year and excess winter rains run rapidly to the water courses.	Very small risk of water erosion	41.9 (5.8%)	5	95

Table 18.9: Soil Associations in the Study Area including calculated Subgrade 3a/3b proportions								
Soil Association	Soil Series	Soil Type	Soil Characteristics	Wetness	Erodibility[a]	Area (ha) (%)	% Subgrade 3a	% Subgrade 3b
Cegin (713d)	Cegin, Greyland, Brickfield, Sannan, Denbigh	Cambic stagnogley soils, typical stagnogley soils, Pelo-stagnogley soils	Slowly permeable seasonally waterlogged fine silty and clayey soils.	In wet districts Cegin, Brickfield and Greyland soils are waterlogged for long periods in the growing season and even with artificial drainage they can remain wet throughout the winter.	Very small risk of water erosion	117.7 (16.4%)	17	83
Brickfield 2 (713f)	Brickfield, Nercwys, East Keswick	Cambic stagnogley soils, with Stagnogleyic and typical brown earths	Loamy and clayey soils with Impeded drainage.	Soils have slowly permeable subsurface horizons and are seasonally waterlogged, but usually respond well to artificial drainage. East	Very small risk of water erosion	248.7 (34.6%)	40	60

Table 18.9: Soil Associations in the Study Area including calculated Subgrade 3a/3b proportions								
Soil Association	Soil Series	Soil Type	Soil Characteristics	Wetness	Erodibility[a]	Area (ha) (%)	% Subgrade 3a	% Subgrade 3b
				Keswick series is usually well drained.				
Wilcocks 1 (721c)	Wilcocks, Kielder, Fordham	Cambic stagno-humic gley soils	Slowly permeable seasonally waterlogged fine loamy and fine loamy over clayey upland soils with a peaty surface horizon.	The main soils are severely waterlogged near the surface, the wetness being due to a combination of high rainfall, slowly permeable subsoil and gentle relief.	Very small risk of erosion	32.4 (4.5%)	0	100
Conway (811b)	Conway, Clwyd, Fladbury	Typical alluvium gley soils	Deep stoneless fine silty and clayey soils variably affected by groundwater.	Conway and Fladbury soils are seasonally waterlogged. The Clwyd series is seasonally waterlogged.	Very small risk of water erosion	0.1 (<0.01%)	18	82

Table 18.9: Soil Associations in the Study Area including calculated Subgrade 3a/3b proportions

Soil Association	Soil Series	Soil Type	Soil Characteristics	Wetness	Erodibility[a]	Area (ha) (%)	% Subgrade 3a	% Subgrade 3b
Adventurers' 1 (1024a)	Adventurers Altcar	Amorphous and semi-fibrous peat	Deep peat soils.	With good groundwater control the soils are well drained. Where undrained they are severely or permanently waterlogged.	Very small risk of wind erosion	3.4 (0.5%)	Adventurers' 1 soils are only present within Grade 4 or 5 areas	

*The area of East Keswick 3 changes under Option B, with a total area of 90.6 ha (12.6%)

[a]Determined from Ref 18.20: Knox et al. (2015); 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. pp147'. Cranfield University.

7.3.2 Two of the identified Soil Associations; Wick 1 (53.3 ha, 7.4% of soils in the study area) and Eardiston 1 (12.7 ha, 1.8% of soils in the study area) are of Moderate risk of water erosion and are therefore, considered to be sensitive to damage and susceptible to loss (**medium receptor sensitivity**).

7.3.3 The Wick 1 Soil Association is located in Section F, whilst the Eardiston 1 Soil Association is located in Section C (Figure 18.5 (**Document 5.18.1.5**)).

7.3.4 The Adventurers 1 association (3.4 ha, 0.5% of soils in the study area) is organic rich (peaty) and is therefore, considered to be sensitive to damage (**high receptor sensitivity**).

7.3.5 Three discrete areas of the Adventurers 1 Soil Association are located in Sections C and D (Figure 18.5 (**Document 5.18.1.5**)).

7.3.6 The remaining Soil Associations make up 90.3% of the soils identified in the study area. These soils are neither erosion prone nor organic rich and have been assessed as less sensitive to damage and less susceptible to loss than lighter textured, sandy soils (**low receptor sensitivity**).

7.3.7 The most current and detailed published ALC data covering Anglesey, Gwynedd and the study area is the 1:250,000 scale Provisional ALC map for Wales (Ref 18.13). Table 18.8 shows a breakdown of the Provisional ALC data for Anglesey, Gwynedd and the study area.

7.3.8 The agricultural land within the study area is comprised of ALC Grade 3 (55.3%), Grade 4 (34.2%) and Grade 5 (10.5%).

7.3.9 The change in Order Limits for Option B results in a reduced study area of 0.6 ha relative to Option A. As a result, the quantity of the East Keswick 3 Soil Association and area of ALC Subgrade 3a land both decrease by 0.6 ha in Option B.

Landholding

7.3.10 There are 271 landholdings within the Landholding study area; all of which are subject to potential impact from the Proposed Development as a result of the flexibility afforded

7.3.11 All landholdings are considered to be of **medium receptor sensitivity**.

Agri-Environment Schemes (AES)

7.3.12 There are 134 individual AES within the study area; comprising 89 Entry level schemes, and 45 advanced level schemes. There are no registered organic schemes present in the study area. All identified schemes are subject to

potential impact from the Proposed Development as a result of the flexibility afforded by the draft DCO (**Document 2.1**).

7.3.13 Using the criteria in Table 18.3, Glastir Entry level schemes (or equivalent) are considered to be of **low receptor sensitivity**; whilst Glastir Advanced level schemes (or equivalent) are considered to be of **medium receptor sensitivity**.

Agricultural Land Drainage

7.3.14 High-level agricultural drainage surveys have been undertaken, with drainage areas identified and included within the Order Limits as shown on Figure 4.1 Construction Plans (**Document 5.4.1.1**).

7.3.15 Using the criteria in Table 18.3, land drainage systems are considered to be of **medium receptor sensitivity**.

8 Potential Effects

8.1 INTRODUCTION

8.1.1 This section describes the type of agricultural effects that could occur as a result of the Proposed Development (Table 18.10).

8.1.2 As described in paragraph 5.3.1 and Table 18.7, two Options are being applied for in the draft DCO (**Document 2.1**); Option A and Option B. Both Options are assessed, where appropriate.

Table 18.10: Potential Agricultural Effects of the Proposed Development

Potential Effect	Description	Receptor	Phase			
			C	O	M	D
Permanent loss of agricultural land	Permanent agricultural land take could occur where agricultural land cannot be reinstated as it is within the footprint of the permanent infrastructure.	Agricultural Land		✓		
Damage or disturbance to soil resources	The construction, maintenance and decommissioning activities could result in a temporary disturbance of soil resources (adverse); although it is anticipated that the scale of the disturbance during construction and decommissioning could be greater than those during discrete and targeted maintenance activities. Activities which have an impact upon soil resources include, but are not limited to: • stripping and stockpiling of topsoil and subsoil, storage and reinstatement;	Soils	✓		✓	✓

Table 18.10: Potential Agricultural Effects of the Proposed Development						
Potential Effect	Description	Receptor	Phase			
			C	O	M	D
	• ground excavation; • stockpiling materials; • levelling ground; • access track construction; and • vehicle movements on-site. The potential adverse effects of such operations on soil resources include, but are not limited to: • damage to the structure and compaction; • loss of soil nutrients; • loss of soil biota (for example bacteria, fungi, earthworms) and reduction of its activity; and • mixing of soil horizons (especially topsoil with subsoil) reducing their potential for reuse and future productivity. The disturbance of soil resources may result in the impairment of their function, quality and resilience. This could be caused *in situ* or through soil removal, handling, storage and subsequent reinstatement.					
Loss of soil resources	There could be a loss of soil resource caused by soil removal, handling and storage, during the stripping of soils to enable construction or decommissioning phase activities. This loss could occur through erosion, excess trafficking on plant wheels, or unauthorised export.	Soil	✓		✓	✓

Table 18.10: Potential Agricultural Effects of the Proposed Development						
Potential Effect	Description	Receptor	Phase			
			C	O	M	D
	The loss of soil resource could result in the impairment of the remaining soils' function, quality and resilience. This effect also comprises such changes as reduction of topsoil depth. Incorrect handling of soils could also result in the mixing of topsoil and subsoils and/or the contamination of soil with overburden; these mixed or contaminated soils could no longer be of a quality suitable for reuse and could also be effectively 'lost'. Additionally, during large-scale projects, there is the potential for disease and pathogen transfer between different areas of agricultural land (a biosecurity risk). This is considered in the loss of soil resource as the main cause of disease and pathogen transfer is due to the transfer of soil from infected to uninfected areas via heavy plant.					
Impacts to landholding due to change in land-use	There could be a temporary restriction on agricultural practices.	Agricultural landholding	✓		✓	✓

Table 18.10: Potential Agricultural Effects of the Proposed Development						
Potential Effect	Description	Receptor	Phase			
			C	O	M	D
Loss of eligibility for AES	There could be a loss of compliance with/eligibility for any AES in place.	Agricultural landholding	✓		✓	✓
Impacts to agricultural land drainage	There could be a permanent change to on-site or off-site drainage.	Agricultural land drainage	✓			✓
C = Construction Phase; O = Operation Phase; M = Maintenance works; D = Decommissioning Phase.						

9 Mitigation and Residual Effects

9.1 INTRODUCTION

9.1.1 Appropriate mitigation measures have been included to reduce, prevent or control potential adverse impacts of the Proposed Development.

9.2 MITIGATION

Mitigation by Design

9.2.1 These are measures that have been incorporated into the design of the Proposed Development to minimise or prevent potential impacts. These measures include the routeing of the OHL and the site selection for the THH/CSECs. For example, where there is an area of peat soil (Adventurers' 1) in Section C the proposed access track shown on Figure 4.1 Construction Plans (**Document 5.4.1.1**) has been routed around the field, and the permanent infrastructure works within this field have been reduced as far as practicable to limit the amount of ground disturbance. This commitment is included in the Schedule of Environmental Commitments (Commitment HAB039; **Document 7.4.2.1**).

9.2.2 Through the iterative design process, which also included a review of consultation responses, the Provisional ALC mapping information (Ref 18.13) was used in conjunction with the LandIS NATMAP data (Ref 18.14) and Soils and their use in Wales (Ref 18.15) to identify preferred temporary works locations in non-agricultural or non-BMV land as far as practicable, whilst also taking into account engineering and other environmental considerations. As a result, the majority of temporary disturbance occurs on non-BMV land. Due to the dominance of two soil types within the study area (accounting for 95% of soils within the study area), it can be assumed that the distribution of soil types subject to temporary disturbance and land take is unlikely to vary significantly from that presented below due to the flexibility afforded by the draft DCO (**Document 2.1**) (see paragraph 7.1.4 and Chapter 6, EIA Methodology and Basis of Assessment (**Document 5.6**).

9.2.3 At the Tŷ Fodol THH/CSEC site, the soil survey identified that there was the potential to reduce the impact to BMV land through the careful siting of infrastructure. Careful siting and considered design has enabled the majority

of Tŷ Fodol THH/CSEC (55.2%) to be located on non-BMV land (Subgrade 3b), minimising permanent BMV land take as far as was practicable.

9.2.4 Although the routeing of temporary access tracks as shown on Figure 4.1 Construction Plans (**Document 5.4.1.1**) has been designed to follow field boundaries wherever possible, it is acknowledged that the flexibility which would be afforded by the draft DCO (**Document 2.1**) allows for these tracks to be routed anywhere within the Order Limits, other than any areas restricted through a commitment in the Schedule of Environmental Commitments (**Document 7.4.2.1**). However, should track realignment within the study area be necessary, such re-routeing would consider the potential agricultural effects and, wherever practicable, the alignment would continue to be along boundaries, in field margins or in areas of non-agricultural land to minimise agricultural impacts.

Control and Management Measures

9.2.5 The control and management measures relevant to agricultural effects are set out in the CEMP (**Document 7.4**) and summarised in Table 18.11.

Table 18.11: General CEMP Measures Relevant to Agricultural Effects

CEMP Code	Description	Reason
SM11	Prior to construction, more site/soil specific measures to protect soils will be set out in a detailed SMP, based upon the outline document (**Document 7.10**) and supplemented, by additional survey data, where required.	Minimise disturbance to, and loss of, the soil resource
SM12	An Outline SMP **(Document 7.10)** has been produced and includes mitigation measures in accordance with Defra guidance (Ref 18.1).	Minimise disturbance to, and loss of, the soil resource
AE15	The Dust Management Plan (DuMP) will contain the following measures in relation to storage and handling of materials; • handling and transfer of soil and dusty materials will be controlled to minimise dust generation. During material handling operations the number of handling operations will be kept to a minimum to	Minimise soil erosion (loss of the soil resource) and subsequent dust generation

Table 18.11: General CEMP Measures Relevant to Agricultural Effects		
CEMP Code	Description	Reason
	ensure that dusty material is not moved or handled unnecessarily; • sand and other aggregates will be covered, bulk cement and other fine powder materials will be delivered in enclosed tankers and stored with suitable emission control systems to prevent escape of material; • for smaller supplies of fine powder materials bags will be sealed after use and stored appropriately to prevent dust; • minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; • when loading vehicles in the vicinity of receptors and under dry windy conditions conducive to dust dispersal, material handling methods will be used that minimise the generation of airborne dust. Drop heights will be kept to a minimum. Where there are visible dust issues and under prolonged dry conditions sources will be dampened down; • soils will be managed in line with measure SM12; and • avoid scabbling (roughening of concrete surfaces), if possible.	
WE51	A Drainage Management Plan (DMP) will be prepared prior to the commencement of works. The DMP will specify measures to minimise the impact of the construction on existing drainage systems.	Minimise disturbance to agricultural land drainage

Table 18.11: General CEMP Measures Relevant to Agricultural Effects		
CEMP Code	Description	Reason
WE52	The DMP will specify appropriate design and control measures; these will be developed following detailed drainage investigations and hydrological assessments, which will determine potential location specific risks.	Minimise disturbance to agricultural land drainage
WE55	To prevent sediment laden run-off entering watercourses/standing water bodies the following measures will be implemented, where necessary: • soils will not be stockpiled within 8 m of surface water features, will not block surface runoff pathways, and would preferably be located in Flood Zone A; • with the exception of stockpiles with a lifetime of less than 3 months, all stockpiles would be seeded to reduce runoff, those in place for shorter durations would be covered to reduce the risk of silty runoff; • further runoff control measures will be provided (e.g. buffer strips, earth bunds, silt fences, grips, settlement ponds and straw bales, or other proprietary treatment etc.) as required on a site-specific basis; • where works are adjacent to watercourses/water bodies subject to WE31, appropriate barriers will be installed temporarily along their edge to prevent plant tracking down slopes and damaging riparian vegetation or to prevent silt laden runoff flowing untreated into the watercourse/water body; • mud will be controlled at site entry and exit points using wheel cleaning areas and road sweepers as appropriate;	Minimise disturbance to, and loss of, the soil resource to watercourses/standing water bodies

Table 18.11: General CEMP Measures Relevant to Agricultural Effects		
CEMP Code	Description	Reason
	• tools and plant will be washed out and cleaned in designated areas within the construction compounds where runoff is isolated for treatment before discharge to watercourse/ground or sewer under consent from National Resources Wales (NRW); and • construction Sustainable Drainage Systems (SuDS) (such as settlement lagoons or other temporary attenuation) will be used if necessary and where appropriate to do so. • Over-pumping around culvert working areas will be carefully managed through the application of silt management measures to prevent suspension of sediment or contamination. • discharges to watercourses would be permitted by NRW, where required, in accordance with the requirement of the Environmental Permitting Regulations.	
WE56	Prior to construction the following will be undertaken: • the replacement of shallow drains as appropriate which cross a working area with sealed twin wall uPVC pipes where required; • perforated uPVC land drains will be installed in wet areas where required; • any known main drain which will be severed by a pylon leg foundation will be diverted; • potential drains along field headlands will be investigated and diverted as required; • the clearing of existing ditches and culverts through environmentally sensitive	Minimise disturbance to agricultural land drainage

Table 18.11: General CEMP Measures Relevant to Agricultural Effects		
CEMP Code	Description	Reason
	means to alleviate flows which may otherwise be restricted and in accordance with the Biodiversity Mitigation Strategy (**Document 7.7**); • the identification of existing drainage outfalls within watercourses and any work required to improve existing outfalls; • the identification of springs, wells and water supplies and the identification of the appropriate protection; and • the installation of interceptor or cut off pipes in areas within the Order Limits that are known to have frequent shallow drains crossing them.	
R2	To facilitate the reinstatement of land, soil and watercourses, pre-condition surveys will be discussed with landowners and where agreed, carried out on land within working areas. This will include a photographic record, written description and topographical survey, which will be used to ensure appropriate reinstatement of land.	Facilitates the complete and accurate reinstatement of land, soil and watercourses.
R3	Reinstatement will be in accordance with the relevant parts of the BMS (**Document 7.7**) include making good any damage or disturbance to any soil structure, native or other planting, grass, fencing, hard landscaping or structures, where in-situ reinstatement is possible.	Facilitates the complete and accurate reinstatement of land, soil and watercourses.

Mitigation Measures

9.2.6 There are no mitigation measures required to address effects related to agricultural land use and soils.

9.3 LOSS OF AGRICULTURAL LAND

Permanent Loss of Agricultural Land

9.3.1 The effects of permanent loss of agricultural land on farm businesses is considered to be fully mitigated through the process of discussion and negotiation between National Grid, the landowners and any agricultural tenants (if applicable). The following therefore, focusses on the area of BMV land that would be lost to the Proposed Development.

Construction

9.3.2 Table 18.12 provides the estimate of land take in each ALC grade, including Subgrade 3a and 3b, due to the pylons, based upon Figure 4.1 Construction Plans (**Document 5.4.1.1**). Where pylons would be located within arable rotations or are used for hay and silage cropping, the area beneath the pylon would be excluded from agricultural use, as agricultural machinery cannot be used in these areas. Additionally, the positioning of obstacles within arable fields can be an impediment to the use of largescale and automated machinery, increasing the area of exclusion. However, where pylons would be located within pasture land, the area beneath the pylon can still be grazed and therefore there is no additional loss of agricultural land above the direct loss of the area of the four foundation plinths (approximately 4 m^2 per pylon). Therefore, as the majority of identified agricultural land use within the study area is pasture (see paragraph 7.1.1), to represent a likely worst case, the permanent loss of land due to each pylon is considered to be the entire pylon footprint (all land between the four foundation plinths); which varies with pylon type.

9.3.3 Consideration was given to the possible effects of the use of the pylon with the largest footprint across the entire route, which would increase the total potential area of land take (see Table 18.7). This is considered to represent an absolute worst-case scenario for loss of agricultural land through development and exclusion, however this degree of land take is highly unlikely.

9.3.4 Tables 18.12 and 18.13 present the total land take due to the pylon footprints and mitigation areas according to Appendix 3.1 Indicative Pylon Schedule (**Document 5.2.3.1**) and potential worst-case scenario, respectively.

9.3.5 When considering the pylon types identified in Appendix 3.1 Indicative Pylon Schedule (**Document 5.2.3.1**), the total land take in Option A due to the pylon footprints and environmental mitigation areas would cover an area of 10.1 ha, of which approximately 1.25 ha would be located on BMV agricultural land. The difference in total and BMV land take under Option B (which has an

additional pylon) is so small (41 m^2) it makes no difference to land take calculations when presented in hectares (after rounding up to two decimal places) (see Table 18.12).

9.3.6 However, under the worst-case scenario, total land take in Option A due to the pylon footprints and environmental mitigation areas would cover an area of 13.3 ha, of which approximately 2.43 ha would be located on BMV agricultural land. The total land take in Option B would cover an area of 13.4 ha, where approximately 2.51 ha would be located on BMV agricultural land (Table 18.13).

Table 18.12: Net permanent land take in the Study Area (m^2) due to new pylons and essential mitigation. Assessed for the pylon types identified in the Indicative Pylon Schedule (Document 5.3.2.1)

Soil Association	Route Option	BMV	Non-BMV		
		Subgrade 3a (m^2)	Subgrade 3b (m^2)	Grade 4 (m^2)	Grade 5 (m^2)
Eardiston 1 (541c)		232	0	0	108
Denbigh 1 (541j)		204	4	0	0
Wick 1 (541r)		6,863	24,340	967	0
East Keswick 1 (541x)		1,247	1,137	1,254	1,536
East Keswick 3 (541z)	Option A	2,989	0	0	169
	Option B	3,030	0	0	187
Fforest (713c)		14	244	526	79
Cegin (713d)		88	432	234	0
Brickfield 2 (713f)		837	39,784	2,108	347
Wilcocks 1 (721c)		0	664	13,819	93

Table 18.12: Net permanent land take in the Study Area (m^2) due to new pylons and essential mitigation. Assessed for the pylon types identified in the Indicative Pylon Schedule (Document 5.3.2.1)

Soil Association	Route Option	BMV	Non-BMV		
		Subgrade 3a (m^2)	Subgrade 3b (m^2)	Grade 4 (m^2)	Grade 5 (m^2)
Adventurers' 1 (1024a)		0	105	108	98
Total BMV	Option A	12,474 m^2	Total non-BMV	Option A	88,152 m^2
		1.25 ha			8.81 ha
	Option B	12,515 m^2		Option B	88,170 m^2
		1.25 ha			8.82 ha

Table 18.13: Worst case net permanent land take in the Study Area (m^2) due to new pylons and essential mitigation. Based upon the largest pylons being constructed across the entire route.

Soil Association	Route Option	BMV	Non-BMV		
		Subgrade 3a (m^2)	Subgrade 3b (m^2)	Grade 4 (m^2)	Grade 5 (m^2)
Eardiston 1 (541c)		816	0	0	408
Denbigh 1 (541j)		986	18	0	0
Wick 1 (541r)		6,863	24,340	1,844	0
East Keswick 1 (541x)		5,602	1,137	1,847	2,134
East Keswick 3 (541z)	Option A	6,583	0	0	816
	Option B	7,399	0	0	816
Fforest (713c)		45	771	2,448	408
Cegin (713d)		586	2,862	5,086	0
Brickfield 2 (713f)		2,805	42,736	4,816	1,224

Table 18.13: Worst case net permanent land take in the Study Area (m^2) due to new pylons and essential mitigation. Based upon the largest pylons being constructed across the entire route.

Soil Association	Route Option	BMV	Non-BMV		
		Subgrade 3a (m^2)	Subgrade 3b (m^2)	Grade 4 (m^2)	Grade 5 (m^2)
Wilcocks 1 (721c)		0	664	13,819	408
Adventurers' 1 (1024a)		0	408	408	408
Total BMV	Option A	24,287 m^2	Total non-BMV	Option A	109,009 m^2
		2.43 ha			10.9 ha
	Option B	25,103 m^2		Option B	109,009 m^2
		2.51 ha			10.9 ha

9.3.7 The ALC in areas of permanent infrastructure land take (the THH/CSECs at Braint and Tŷ Fodol and associated permanent access tracks; and the extension to Pentir Substation) was calculated using data from the detailed soil survey and summarised in Table 18.14. Detailed descriptions of the soil survey methodology and ALC calculations for the areas of permanent land take are presented in Appendix 18.1 (**Document 5.18.2.1**).

9.3.8 The ALC survey data show that all agricultural land within Braint the THH/CSEC site and associated permanent access track is of non-BMV quality; Subgrade 3b and 4 (moderate to poor quality) (Table 18.14 and Figure 18.3 (**Document 5.18.1.3**)).

9.3.9 The layout of the Proposed Development presented in the Design Plans (**Document 4.13**) shows that there would be 1.51 ha of permanent agricultural land take at the Tŷ Fodol THH/CSEC site. The majority of this permanent land take would be located on Subgrade 3b (non-BMV) land (0.84 ha; 55.2%), however a proportion of permanent land take would occur on Subgrade 3a (BMV) land (0.68 ha; 44.8%) (Figure 18.4 (**Document 5.18.1.4**) and Table 18.14).

9.3.10 The ALC survey data show that all agricultural land within the Pentir Substation Extension is of non-BMV quality; Subgrade 3b and 4 (Moderate to poor quality) (Table 18.14 and Figure 18.2 (**Document 5.18.1.2**)).

9.3.11 As illustrated in Tables 18.12 and 18.14, based upon Appendix 3.1 Indicative Pylon Schedule (**Document 5.2.3.1**) the Proposed Development would result in a permanent loss of approximately 16.0 ha of agricultural land; of which 1.9 ha is BMV. The scale of land take between route Options A and B is too small to register; therefore, it can be stated that there is no difference in land take between the two Options.

9.3.12 Under this scenario, the permanent loss of agricultural land due to the Proposed Development would not exceed the 20 ha threshold and any effect would, therefore, be considered **not significant**, regardless of the BMV status of the land (as discussed in paragraph 4.5.1).

9.3.13 As illustrated in Tables 18.13 and 18.14, considering the worst-case scenario, with the largest pylons constructed across the entire route; approximately 19.3 ha of agricultural land; of which 3.1 ha is BMV would be permanently lost. Therefore, the total worst case permanent land take would remain below the 20 ha threshold and be considered **not significant**, regardless of the BMV status of the land (as discussed in Paragraph 4.5.1).

9.3.14 It is acknowledged that even a small permanent loss of BMV land would, in certain circumstances, be considered of greater importance in localities or regions where this resource is particularly scarce. Therefore, even though the 1.9 ha or 3.1 ha of permanent loss of BMV land due to the Proposed Development (as calculated from Appendix 3.1 Indicative Pylon Schedule (**Document 5.3.2.1**) and as a worst case respectively) is considered to be not significant, the scale of the loss is also considered in the context of the ALC baseline of Anglesey and Gwynedd as a whole (see Table 18.7).

9.3.15 The ALC data for Anglesey and Gwynedd were taken from the Provisional mapping for Wales (Ref 18.13), which does not provide a subdivision of Grade 3 into Subgrade 3a (BMV) and 3b (non-BMV). Therefore, to present a likely worst case for BMV loss, a 50:50 split between Subgrade 3a and 3b is assumed for both Anglesey and Gwynedd.

9.3.16 The only BMV land within the study area is Subgrade 3a, as areas of higher quality land (Grades 1 and 2) were avoided at an early stage of the design and route selection process (mitigation by design). There is no Grade 1 land on Anglesey and Grade 2 land comprises 1.6% of all agricultural land within the county (1,078 ha). When applying the 50:50 split, as described above, to the total Grade 3 land in the county, it is assumed that there is 13,648 ha of Subgrade 3a (Table 18.7). Therefore, the total area of BMV on Anglesey is calculated as 14,725 ha.

9.3.17 The majority (91.2%) of agricultural land in Gwynedd is Grade 4 and 5. Only 0.3% of agricultural land in Gwynedd comprises Grade 1 (154.1 ha, 0.1%)

and Grade 2 (365 ha; 0.2%), as stated above these higher grades of land are completely avoided within the study area. When applying the 50:50 split to the total Grade 3 land in the county, it is assumed that there is 9,615 ha of Subgrade 3a (Table 18.7). Therefore, the total area of BMV in Gwynedd is calculated as 10,134 ha.

9.3.18 Based upon Appendix 3.1 Indicative Pylon Schedule (**Document 5.2.3.1**) the Proposed Development would result in 0.6 ha of permanent BMV loss on Anglesey (Table 18.15), which accounts for 0.004% of the total available BMV land in the county. Under the worst-case scenario, where all pylons are of the largest construction, and therefore have the largest footprint, the area of BMV loss on Anglesey would increase to 1.7 ha (Table 18.16), which accounts for 0.011% of the total available BMV land in the county. The scale of countywide BMV loss under both the predicted and worst-case scenarios further supports the conclusion of the assessment that the scale of permanent total BMV loss is **not significant.**

9.3.19 Under both the predicted and worst-case scenarios, the Proposed Development would result in 1.4 ha of permanent BMV loss on Gwynedd (Tables 18.15 and 18.16), which accounts for 0.01% of the total available BMV land; again, supporting the conclusion of the assessment that the scale of permanent total BMV loss is **not significant**.

9.3.20 Therefore, considering both the spatial distribution and total quantity, the permanent loss of agricultural land is considered to be **not significant**.

Table 18.14: Permanent infrastructure land take (non-pylon) in the Study Area (ha)

	BMV	Non-BMV	
Soil Association	Subgrade 3a (ha)	Subgrade 3b (ha)	Grade 4 (ha)
Braint Tunnel Head House and Cable Sealing End Compound			
East Keswick 1 (541x)	0.0	0.01	0.0
Brickfield 2 (713f)	0.0	1.51	0.0
Braint Tunnel Head House and Cable Sealing End Compound Access Road			
East Keswick 1 (541x)	0.0	0.53	0.0
Brickfield 2 (713f)	0.0	0.14	0.0
Tŷ Fodol Tunnel Head House and Cable Sealing End Compound			
Wick 1 (541r)	0.68	0.84	0.0

Pentir Substation extension			
Wick 1 (541r)	0.0	1.28	0.0
Wilcocks 1 (721c)	0.0	0.31	0.77
Total BMV	0.68	Total non-BMV	5.38
Determined through soil survey.			

Table 18.15: Total permanent and temporary land take in Anglesey and Gwynedd (ha). Assessed for the pylon types identified in Appendix 3.1 Indicative Pylon Schedule (Document 5.3.2.1).

	BMV (ha)	Non-BMV (ha)
Anglesey		
Total temporary land take	48.4 (49.0)	88.1
Total permanent land take	0.6	7.0
Gwynedd		
Total temporary land take	0.0	16.6
Total permanent land take	1.4	7.2
Option B land take provided in bracket, where different from Option A.		

Table 18.16: Worst case scenario permanent and temporary land take in Anglesey and Gwynedd (ha). Based upon the largest pylons being constructed across the entire route.

	BMV (ha)	Non-BMV (ha)
Anglesey		
Total temporary land take	48.4 (49.0)	88.1
Total permanent land take	1.7	9.0
Gwynedd		
Total temporary land take	0.0	16.6
Total permanent land take	1.4	7.3
Option B land take provided in bracket, where different from Option A.		

Decommissioning

9.3.21 The return of land to its original agricultural use following infrastructure removal at decommissioning may offset any adverse effect of the original loss of agricultural land; although this is seen as neutralising the original effect rather than being a beneficial effect.

Design flexibility

9.3.22 There are no aspects of design flexibility that would lead to effects of greater significance than those already outlined above.

Temporary Loss of Agricultural Land

9.3.23 Although it is not possible to mitigate against temporary land take, as discussed in paragraph 4.5.1, temporary land take is not considered a significant effect with respect to the loss of agricultural land, regardless of the area of land take. This is due to this land only being taken out of agricultural use for a relatively short period of time, before being reinstated to its original use and condition.

Construction

9.3.24 The temporary loss of agricultural land is not considered as a potentially significant construction phase effect; and is not reported further within the assessment. The areas of temporary land take/land use change are reported below for illustrative and information purposes only. Although not specifically considered, the temporary loss of agricultural land use is considered implicitly in the assessment of potential impacts on soil resources (through potential damage and loss) and impacts on landholding.

9.3.25 Table 18.17 provides the estimate of temporary land take in each ALC grade, including Subgrade 3a and 3b, from the proposed temporary works. It should be noted that all works at Wylfa Substation are on non-agricultural land and hence not included in the Table. The methodology for determining Subgrade 3a and 3b estimates for each soil association is summarised in section 4 methodology and fully detailed in Appendix 18.1 (**Document 5.18.2.1**).

Table 18.17: Temporary infrastructure land take in the Study Area (ha)

	BMV	Non-BMV		
Soil Association	Subgrade 3a (ha)	Subgrade 3b (ha)	Grade 4 (ha)	Grade 5 (ha)
Penmynydd Road Construction Compound				
East Keswick 1 (541x)	0.00	0.00	0.00	1.96
East Keswick 3 (541z)	0.00	0.00	0.00	2.90
Conway (811b)	0.00	0.00	0.00	0.00
Pentir Construction Compound				

Table 18.17: Temporary infrastructure land take in the Study Area (ha)				
	BMV	Non-BMV		
Soil Association	Subgrade 3a (ha)	Subgrade 3b (ha)	Grade 4 (ha)	Grade 5 (ha)
Wick 1 (541r)	0.00	0.00	0.00	2.84
Wilcocks 1 (721c)	0.00	0.00	0.00	1.04
Access tracks and bellmouths				
Eardiston 1 (541c)	0.76	0.00	0.43	0.18
Denbigh 1 (541j)	1.05	0.02	0.00	0.00
Wick 1 (541r)	0.00	0.11	3.12	1.04
East Keswick 1 (541x)	10.31	0.78	1.84	1.26
East Keswick 3 (541z) Option A	6.58	0.00	0.00	1.01
East Keswick 3 (541z) Option B	6.46	0.00	0.00	1.01
Fforest (713c)	0.09	1.60	3.21	0.51
Cegin (713d)	0.63	3.08	7.29	0.00
Brickfield 2 (713f)	3.50	5.63	8.64	1.60
Wilcocks 1 (721c)	0.00	0.00	1.06	1.35
Adventurers' 1 (1024a)	0.00	0.32	0.16	0.22
Third Party works				
Eardiston 1 (541c)	0.56	0.00	0.10	0.00
Denbigh 1 (541j)	0.62	0.01	0.15	0.00
Wick 1 (541r)	0.00	0.00	1.79	0.22
East Keswick 1 (541x)	4.14	0.00	0.60	0.18
East Keswick 3 (541z) Option A	2.58	0.00	0.00	0.21
East Keswick 3 (541z) Option B	0.02	0.32	0.10	0.23
Fforest (713c)	0.02	0.32	0.10	0.23

Table 18.17: Temporary infrastructure land take in the Study Area (ha)				
	BMV	Non-BMV		
Soil Association	Subgrade 3a (ha)	Subgrade 3b (ha)	Grade 4 (ha)	Grade 5 (ha)
Cegin (713d)	0.23	1.14	2.86	0.00
Brickfield 2 (713f)	0.87	1.38	3.20	0.00
Wilcocks 1 (721c)	0.00	0.00	0.36	0.08
Adventurers' 1 (1024a)	0.00	0.00	0.00	0.00
Pylon, scaffold and bridge working areas and temporary pylons				
Eardiston 1 (541c)	0.88	0.00	0.11	0.23
Denbigh 1 (541j)	1.21	0.02	0.18	0.00
Wick 1 (541r)	0.00	0.00	1.39	0.00
East Keswick 1 (541x)	6.00	0.00	1.16	0.90
East Keswick 3 (541z) Option A	5.14	0.00	0.05	0.48
East Keswick 3 (541z) Option B	5.81	0.00	0.05	0.48
Fforest (713c)	0.04	0.76	1.74	0.31
Cegin (713d)	0.85	4.17	8.49	0.00
Brickfield 2 (713f)	3.21	4.81	4.66	1.54
Wilcocks 1 (721c)	0.00	0.00	0.29	0.22
Adventurers' 1 (1024a)	0.00	0.14	0.24	0.31
Drainage Mitigation Areas				
Eardiston 1 (541c)	0.35	0.00	0.08	0.00
Denbigh 1 (541j)	0.83	0.01	0.00	0.13
Wick 1 (541r)	0.00	0.02	1.30	0.59
East Keswick 1 (541x)	1.81	0.00	0.79	0.73
East Keswick 3 (541z) Option A	3.44	0.00	0.00	0.29

Table 18.17: Temporary infrastructure land take in the Study Area (ha)				
	BMV	Non-BMV		
Soil Association	Subgrade 3a (ha)	Subgrade 3b (ha)	Grade 4 (ha)	Grade 5 (ha)
East Keswick 3 (541z) Option B	3.47	0.00	0.00	0.29
Fforest (713c)	0.03	0.59	2.67	0.94
Cegin (713d)	0.18	0.86	2.10	0.00
Brickfield 2 (713f)	1.48	2.22	3.35	0.21
Wilcocks 1 (721c)	0.00	0.00	0.27	1.93
Adventurers' 1 (1024a)	0.00	0.09	0.03	0.01
Total Option A	BMV	48.4 ha	Non-BMV	104.6 ha
Total Option B		49.0 ha		104.6 ha

9.3.26 The total temporary land take due to the Proposed Development under Option A is approximately 153.0 ha, of which approximately 48.4 ha (31.6%) is located on BMV agricultural land. The addition of pylon 4AP065 and relocation of pylons 4AP064 and 4AP066; the requirement for scaffolding; and associated access track changes under Option B increases the total area of temporary land take to 153.6 ha of which approximately 49.0 ha (31.9%) is located on BMV agricultural land.

9.3.27 As shown in Tables 18.15 and 18.16, using Option B land take as a worst case, the total temporary landtake on Anglesey under both the predicted scenario (based on Appendix 3.1 Indicative Pylon Schedule (**Document 5.3.2.1**)) and worst case scenario (based on Appendix 3.1 largest pylon being used along the entire route) would be 0.49 ha. Using the 50:50 criteria for defining Subgrade 3a and 3b for Anglesey and Gwynedd from the Provisional ALC data, as described in paragraph 9.3.15; the temporary loss of BMV land due to the Proposed Development would be equivalent to 0.01% of the available BMV land on Anglesey.

9.3.28 Tables 18.15 and 18.16 illustrate that under both the predicted scenario (based on Appendix 3.1 Indicative Pylon Schedule (**Document 5.3.2.1**)) and worst case scenario (based on the largest pylon being used along the entire route), none of the temporary development in Gwynedd occurs on BMV land. Therefore, there would be no temporary loss of BMV land due to the Proposed Development in Gwynedd.

9.3.29 In summary, the total potential worst case permanent and temporary land take in both Anglesey and Gwynedd is less than 0.01% of the BMV land available in each region, and is therefore not considered a potential negative effect.

Decommissioning

9.3.30 Temporary land take may be required to facilitate the removal of pylons and permanent infrastructure at decommissioning. However, as discussed in paragraph 4.5.1, temporary land take is not considered a significant effect; and therefore, the potential for temporary land take at decommissioning is discussed for information and illustrative purposes only. It is predicted that the scale of the temporary loses would be equivalent to those calculated for the construction phase.

Design flexibility

9.3.31 There are no aspects of design flexibility that would lead to effects of greater significance than those already outlined above.

9.4 DAMAGE TO SOIL RESOURCES

9.4.1 The potential adverse effects of construction operations on soil resources include, but are not limited to:

- damage to soil structure and compaction, and creation of conditions conducive to excessive drying or wetness.
- loss of soil nutrients;
- loss of soil biota (for example bacteria, fungi, earthworms) and/or reduction of its activity; and
- mixing of soil horizons (especially topsoil with subsoil) reducing their potential for reuse and their future productivity.

9.4.2 The standard soil specific mitigation measures, as listed below, and as set out in Table 18.11, would minimise damage to the soil resources and ensure that they retain their properties, function and structure upon restoration.

- CEMP Measures SM11,
- SM12,
- R2, and
- R3.

Construction

9.4.3 Construction activities may result in temporary disturbance to soil resources as listed in paragraph 9.4.1.

9.4.4 The length of the construction period/duration of soil disturbance is currently predicted to be up to six years, which could result in irreversible or long-term damage to soil quality through handling, and stockpiling, however, the standard mitigation measures, as set out in Table 18.11 and the mitigation measures box above, would reduce the risk of damage to soil structure and soil deformation (compaction and smearing) to a level where no damage or very small-scale surface damage (equivalent to that done by a typical farm machinery traffic) would be likely to occur. Consequently, the magnitude of impact would be reduced to **negligible.**

9.4.5 Therefore, the residual impact to the soils of **low** sensitivity (90.3% the soils in the study area) and **medium** sensitivity (9.2% the soils in the study area) would be a **negligible** effect and **not significant**.

9.4.6 The residual impact to the soils of **high** sensitivity (0.5% the soils in the study area) would be a **minor** effect and **not significant**.

Maintenance

9.4.7 Localised short-term soil disturbance may be required to allow for routine maintenance such as annual infrastructure inspections. Less frequent, non-routine, maintenance of the infrastructure may require soil disturbance; such work is typically limited to the planned refurbishment of particular components or the replacement of components as required.

9.4.8 With appropriate mitigation in place (as listed above), the residual impacts to the **low, medium** and **high** sensitivity soils are therefore considered to be the same as the temporary (construction) impacts (**negligible** and **minor** effects**,** and **not significant**, see paragraph 9.5.2), although the scale and extent of works would be significantly less.

Decommissioning

9.4.9 Due to the similar type and duration of works and the consequent potential impacts to soil resources, there is also a potential for disturbance to the soil resource at the decommissioning phase to be similar, but no worse than at the construction phase. Decommissioning effects of soil disturbance and damage are therefore also predicted to result in a **negligible** to **minor** effect and **not significant.**

Design flexibility

9.4.10 There are no aspects of design flexibility that would lead to effects of greater significance than those already outlined above.

9.5 LOSS OF SOIL RESOURCES

9.5.1 The potential adverse effects of operations on soil resources include, but are not limited to:

- loss through soil erosion;
- loss through soil mixing;
- loss via plant wheels;
- loss of soils' function, quality and resilience;
- loss through unauthorised soil export; and
- mixing of soil horizons (especially topsoil with subsoil) reducing their potential for reuse and future productivity.

9.5.2 The standard soil specific mitigation measures, as listed in the box below, and as set out in Table 18.11, would minimise loss of the soil resources and ensure that soils retain their properties, function and structure upon restoration.

- CEMP Measures SM11,
- SM12,
- AE15, and
- WE55.

Construction

9.5.3 The majority of excavated soils would be stored on-site and reinstated *in situ* within the same landholding (temporary development areas). Where *in situ* reinstatement is not possible (permanent development areas), the soil resource would be reused elsewhere within the same landholding, where practicable to do so, for example in landscaping and/or screening. However, it is anticipated that small volumes of topsoil generated at permanent development areas may need to be exported from site for reuse elsewhere.

9.5.4 The implementation of standard mitigation measures, as set out in the box above would ensure that appropriate handling, storage, reinstatement and

transportation methodologies are employed resulting in the properties, function and structure of the soils remaining at a status suitable for reuse; either within the Proposed Development or at other consented development sites in the wider area if there is a requirement for soil to be exported from site.

9.5.5 The above measures would minimise the loss of soil resources such that over 95% of soil resources (as per criteria in Table 18.4) are retained in a state suitable for reuse; resulting in a **negligible** magnitude of impact (the <5% loss is due to unavoidable small-scale losses arising from factors such as trackout of soils on construction vehicle wheels). Therefore, using the criteria set out in Table 18.5, the effect of soil resource loss for the **low** and **medium** sensitivity soil resources (described in Appendix 18.1 Document 5.18.2.1) would be a **negligible** residual effect and **not significant**.

9.5.6 The effect of soil resource loss for the **high** sensitivity organic rich peaty soils of the Adventurers' 1 association would be a **minor** adverse residual effect and **not significant**.

Maintenance

9.5.7 The disturbance of soil resources, and hence the potential for soil loss, within the Proposed Development would be largely restricted to the construction stage. However, there is also potential for disturbance of soil resources during any maintenance works which may be required; although the scale and extent of these works and hence the potential scale of soil loss would be significantly less than for initial construction. The use of appropriate standard soil mitigation measures for soil handling, storage, reinstatement and transportation methodologies would minimise the loss of soil resources such that over 95% of affected soil resources are retained in a state suitable for reuse. Therefore, the residual effects to the high, medium and low sensitivity soils which may be impacted by the works would be the same as for construction (**negligible** to **minor** adverse effect and **not significant**).

Decommissioning

9.5.8 Due to the similar type and duration of works and the consequent potential impacts to soil resources, there is also a potential for soil loss at the decommissioning phase to be similar, but no worse than, at the construction phase. Therefore, the effects of decommissioning are not specifically addressed, but are considered to be the same as the residual effects identified at construction (**negligible** to **minor** adverse effect and **not significant**).

Design flexibility

9.5.9 There are no aspects of design flexibility that would lead to effects of greater significance than those already outlined above.

9.6 LANDHOLDING

9.6.1 The potential adverse effects of the Proposed Development on agricultural land holdings may include a temporary restriction on agricultural practices. Additionally, the temporary loss of agricultural land may result in long-term implications for a landholding if the land is not properly protected during construction and reinstated to the same quality/productivity as previous. The mitigation measures, as listed below and set out in Table 18.11, would minimise potential adverse effects. All landholdings are considered to be of medium sensitivity to development.

- CEMP Measures SM11,
- SM12,
- AE15, and
- R2.

Construction

9.6.2 Under both Option A and Option B, there are 271 landholdings within the study area, 100 of which would experience no temporary or permanent land take due to the Proposed Development as shown on Figure 4.1 Construction Plans (**Document 5.4.1.1**).

9.6.3 The remaining 171 landholdings would experience permanent and temporary changes in the amount of available agricultural land (see Table 18.1.17 in Appendix 18.1 (**Document 5.18.2.1**) for a summary). The extent of temporary land take is recorded as a percentage of the overall landholding presented in Table 18.18.

9.6.4 Detailed information on the assessment of temporary and permanent development on landholdings can be found in section 1.6 of Appendix 8.1 (**Document 5.18.2.1**), and the number of landholdings affected by the works and the extent of land take is summarised in Tables 18.1.15 and 18.1.16 of Appendix 8.1 (**Document 5.18.2.1**).

Table 18.18: Number of landholdings experiencing temporary land take and scale of loss (as % of total landholding area).

Scale of loss	<1% of landholding	1 to 4.9% of landholding	5 to 10% of landholding	>10% of landholding	
Magnitude of impact	Negligible	Low	Medium	High	
Option A					Total
Number of landholdings	43	64	33	31	171
Option B					Total
Number of landholdings	43	63	34	31	171

9.6.5 During construction 43 landholdings would temporarily lose <1% of their agricultural land; the magnitude of impact of this scale of loss is considered to be **negligible** (Table 18.4). Therefore, using the criteria in Table 18.5 the residual effect is considered to be a **negligible** effect and **not significant**.

9.6.6 During construction under Option A there are 64 landholdings that would temporarily lose between 1% and 4.9% of their agricultural land; which decreases to 63 landholdings under Option B. The magnitude of impact of this scale of loss is considered to be **low.** With mitigation measures in place, such as those presented in the box above, the loss is considered to be suitably mitigated and the magnitude of impact is reduced to **negligible** (Table 18.4). Therefore, using the criteria in Table 18.5 the residual effect is considered to be **negligible** and **not significant**.

9.6.7 During construction, under Option A, 33 landholdings would temporarily lose between 5% and 9.9% of their agricultural land; this increases to 34 landholdings under Option B, due to the increased level of land take required under this Option. The magnitude of impact of this scale of loss is considered to be **medium.** With mitigation measures in place, such as those presented in the box above, the loss is considered to be suitably mitigated and the magnitude of impact is reduced to **negligible** (Table 18.4). Therefore, using the criteria in Table 18.5 the residual effect is considered to be **negligible** and **not significant**.

9.6.8 During construction, under both Option A and Option B, 31 landholdings would temporarily lose more than 10% of their agricultural land, the magnitude of impact of this scale of loss is considered to be **high**. With mitigation measures in place, such as those presented in the box above, the loss is considered to be suitably mitigated and the magnitude of impact is reduced

to **negligible** (Table 18.4). Therefore, using the criteria in Table 18.5 the residual effect is considered to be **negligible** and **not significant**.

Design flexibility

9.6.9 There are an additional 100 landholdings which would experience no temporary land take based on the routeing shown on Figure 4.1 Construction Plans (**Document 5.4.1.1**), but which may, at construction, experience temporary land take due to the flexibility afforded by the draft DCO (**Document 2.1**). However, as the same mitigation measures described and assessed above would be applied to all land subject to temporary development, there would be no significant impact to any landholding, regardless of the scale of the temporary loss, due to the flexibility afforded by the draft DCO (**Document 2.1**) (see Tables 18.3, 18.4 and 18.5).

Maintenance

9.6.10 During operation, routine and non-routine maintenance of the infrastructure may also be required which may also lead to the temporary loss of land from landholdings and consequent impacts to normal farm operations; although this would be over smaller, more discrete, areas than for construction.

9.6.11 As the amount and location of temporary landtake required for maintenance operations would be dependent upon the works being undertaken; it is possible that, as during construction, the scale of loss (magnitude of impact) could range from negligible to high. However, as the same standard mitigation measures would be in place as during construction the residual effect (as assessed for construction) is considered to be **negligible** and **not significant**.

Decommissioning

9.6.12 At decommissioning, the scale of temporary loss of agricultural land and associated impacts to landholding, are expected to be equivalent to those reported above for the construction stage; the need for site specific mitigation would be assessed and implemented on a landholding by landholding basis at that time, for each individual landholding to ensure that the effect of the loss was **not significant**.

Design flexibility

There are no aspects of design flexibility that would lead to effects of greater significance than those already outlined above.

9.7 AGRI-ENVIRONMENT SCHEMES

9.7.1 The potential adverse effects of operations on AES include a temporary or permanent loss of eligibility. The mitigation measures, as listed below, would minimise potential adverse effects.

- CEMP Measures SM11,
- SM12, and
- R2.

Construction

9.7.2 None of the fields experiencing permanent land take from the THH/CSECs, based on data provided by the Welsh Government, are registered to an AES (Design Plans, **Document 4.13**).

9.7.3 The only permanent loss of land within registered AES is due to pylons (Appendix 3.1 Indicative Pylon Schedule (**Document 5.3.2.1**)). As none of the Option A or Option B locations for pylons 4AP064, 4AP065 and 4AP066 are within an AES, the data for AES experiencing permanent loss of land presented below are correct for both Option A and Option B.

9.7.4 The data identifies five AES within the study area that would experience permanent land loss due to pylons; these locations and/or pylon numbers are not identified within the text as this could potentially compromise confidentiality agreements. However, the location and identity of each affected AES/pylon has been identified, such that where potential impacts to AES are identified, appropriate mitigation would be put in place. For reasons of confidentiality, AES data are also not presented as a Figure within the ES.

9.7.5 None of the five identified AES experiencing permanent land take are registered as Organic Schemes. Two of the AES are Glastir Entry level schemes; whilst three of the AES are Glastir Advanced level schemes.

9.7.6 After pylon construction, and post reinstatement of access tracks/working areas etc. it is expected that AES eligibility would be reinstated for the field as a whole, as permanent loss of land is restricted to the pylon plinths/foundations (approximately 4 m^2 per pylon, 1 m^2 per leg), or can be approximated as the pylon footprint if an exclusion zone is applied. Therefore, all impacts to AES eligibility due to the Proposed Development are considered to be temporary, which is a **low** magnitude of impact (Table 18.4). Additionally, depending on the nature of the AES, the land within the pylon footprint may also meet AES eligibility criteria.

9.7.7 Within Option A, the data provided by the Welsh Government identifies 46 AES within the study area which would experience temporary land loss. None of the identified AES are registered as Organic Schemes. Seven are Glastir Advanced level schemes, and the remaining 39 are Glastir Entry level schemes. Within Option B, 47 AES which would experience temporary land loss are identified; seven Glastir Advanced level schemes, and 40 Glastir Entry level schemes. The additional scheme impacted by Option B is due to the additional temporary infrastructure requirements.

9.7.8 In all cases this loss would be temporary and the mitigation measures set out above would ensure that soil resources retain their properties, function and structure upon restoration; allowing the land to be returned to the same quality and condition as prior to construction; and thereby AES eligibility to be reinstated.

9.7.9 Using the criteria in Table 18.4 the residual effect of temporary loss of eligibility to the **low** sensitivity Entry level schemes is considered to be a **negligible** effect and **not significant**.

9.7.10 Using the criteria in Table 18.4 the residual effect of temporary loss of eligibility to these **medium** sensitivity Advanced level schemes is considered to be a **minor** adverse effect and **not significant**.

Maintenance

9.7.11 As a worst-case it is assumed that maintenance may require the temporary disturbance of land under Entry level and Advanced level schemes; although the scale of disturbance/number of affected AES would be lower than at construction. Based upon the assessment of the construction phase and with the same standard mitigation measures in place to ensure quality of the restored soils and land, the residual effect of temporary loss of AES eligibility during maintenance is also predicted to be **negligible** to **minor adverse** and **not significant**

Decommissioning

9.7.12 AES are driven by policy and are consequently subject to change over time. Therefore, the types and distribution of AES at decommissioning are not known. However, for the purposes of this assessment it has been assumed that decommissioning would require the temporary disturbance of land under Entry level and Advanced level schemes; and that as with construction, the area of temporary land take would be returned to agricultural use.

9.7.13 Based upon the assessment of the construction phase and with the same standard mitigation measures in place to ensure quality of the restored soils

and land, the residual effect of temporary loss of AES eligibility during decommissioning is also predicted to be **negligible** to **minor adverse** and **not significant.**

9.7.14 Additionally, the return of land to its original agricultural use, as a result of pylon removal, may offset any adverse effect of its original loss on AES potential, though this is seen as neutralising the original effect rather than being a beneficial effect.

9.7.15 The significance of effects during operation, maintenance and decommissioning are predicted to be a **negligible** to **minor adverse** effect and **not significant**.

Design flexibility

9.7.16 The flexibility afforded by the draft DCO (**Document 2.1**) may result in different or additional AES experiencing temporary land loss, to those assessed above. However, as there are no schemes of high sensitivity located within the Order Limits (i.e. organic AES) there are no aspects of design flexibility that would lead to effects of greater significance than those already outlined above.

9.8 AGRICULTURAL LAND DRAINAGE

9.8.1 All agricultural land drainage is considered to be a medium sensitivity receptor. The potential adverse effects of operations on agricultural land drainage may include a temporary or permanent loss of drain functionality through severance or blockage; leading to localised waterlogging, as well as the potential disruption of surface water runoff and creation of silt laden water both within the Order Limits and on adjacent land. Initial high-level agricultural drainage surveys have been conducted, with drainage areas identified in the study area. A DMP (CEMP measure WE51) would be prepared prior to the commencement of works, which would specify measures to minimise the impact of the construction on existing drainage systems.

- CEMP Measures WE51,
- WE52,
- WE55, and
- WE56.

Construction

9.8.2 There is the potential for construction activities to disturb (sever or block) agricultural land drainage schemes, which are of **medium** sensitivity. With

mitigation measures in place, such as those presented in the box above, the loss functionality is considered to be suitably mitigated and the magnitude of impact is reduced to **negligible** (Table 18.4). Therefore, the residual effect is considered to be **negligible** and **not significant** (Table 18.5).

Maintenance

9.8.3 Maintenance operations could also lead to the severance or blockage of agricultural drainage. However, it is expected that appropriate mitigation measures such as those described in the DMP (CEMP measure WE51) and as described above would be in place. Therefore, using the criteria in Table 18.5 the residual effect is considered to be **negligible** and **not significant**.

Decommissioning

9.8.4 The decommissioning works are expected to be of a similar scale to those undertaken at construction, however it is noted that agricultural land drainage would already have been modified at construction to avoid permanent infrastructure (pylon foundations). It is also expected that appropriate mitigation measures such as those described in the DMP (CEMP measure WE51) and as described above would be in place. Therefore, using the criteria in Table 18.5 the residual effect is considered to be **negligible** and **not significant**.

Design flexibility

9.8.5 There are no aspects of design flexibility that would lead to effects of greater significance than those already outlined above.

10 Cumulative Effects

10.1 INTRODUCTION

10.1.1 This section of the assessment considers the cumulative effects of the various elements of the Proposed Development and the accumulated effects of the proposals with other developments proposed in the vicinity.

10.2 INTRA PROJECT CUMULATIVE EFFECTS

10.2.1 Intra-project effects are reported in Chapter 19, Intra-Project Effects (**Document 5.19**).

10.3 INTER PROJECT CUMULATIVE EFFECTS

10.3.1 Inter-project cumulative effects occur when two or more planned developments have an effect on the same receptor leading to an overall effect of greater significance. Note that these 'other developments' are developments that have not yet been constructed and are not operational; where developments are constructed and operational they are considered to form part of the existing baseline.

10.3.2 Chapter 20 Inter-Project Cumulative Effects (**Document 5.20**) presents a methodology for determining whether inter-project cumulative effects could occur as a result of these 'other developments' being built and/or operated at the same time as the Proposed Development. This methodology is based upon the Planning Inspectorate Advice Note 17, which deals with cumulative effects assessment. A long list of other developments needs to be developed and agreed initially. Once this is agreed, the methodology consists of four main stages as follows:

- Stage 1: a long list of other developments is identified and outline information gathered. Consideration is given to whether the other development is within the zone of influence (ZOI) for each topic; if it is, then the assessment progresses to stage 2.

- Stage 2: consideration is given to the potential temporal overlap i.e. whether the construction or operational effects of the other development could coincide with those of the Proposed Development. Consideration is also given to the scale and nature of the other development, the nature of the receiving environment and whether there are shared receptors,

and whether there is a 'pathway' for a cumulative effect to occur. At the end of stage 2 a shortlist of other developments is considered in stages 3 and 4.

- Stage 3: detailed information is gathered about each of the shortlisted other developments, typically in the form of ESs or Scoping Reports.
- Stage 4: cumulative effects are assessed and mitigation identified, and apportioned, where necessary. The securing mechanism for any necessary mitigation is identified.

10.3.3 The potential for cumulative effects to occur is considered for any effects that are minor, moderate or major. However, where the residual effects on a shared receptor are concluded to be negligible for either the Proposed Development or the other development, it is not considered possible for there to be a resulting inter-project cumulative effect. Where all effects related to a particular topic are negligible, for either the proposed Development or other development, the other development is screened out at stage 2.

10.3.4 Details about the 'other developments' on the long list considered at stage 1 are provided in Chapter 20 Inter-Project Cumulative Effects (**Document 5.20**) and its appendices.

Stage 1 and Stage 2

10.3.5 Table 18.19 provides a summary of stages 1 and 2 of the inter-project cumulative effects assessment on Agricultural receptors. Where the effects of other developments are either outside the ZOI or outside the temporal scope of the Proposed Development, they have not been included in this table.

10.3.6 For the purposes of the agricultural land (permanent BMV loss) cumulative assessment the Zone of Influence is considered to be the counties of Anglesey and Gwynedd, thereby the cumulative effect is measured at a regional scale. The Zone of Influence for the assessment of cumulative effects to soil resources is considered to be the LOD for the North Wales Connection Project, as cumulative effects would only occur if the same area of soil resource were impacted (disturbed) by multiple developments.

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Table 18.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA					
Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
Wylfa Newydd Nuclear Power Station	Yes	Yes	Potential overlap between both the construction and operational phases.	Shared receptors: Best and Most Versatile (BMV) agricultural land (regional) and soil resource (shared receptor due to the spatial overlap of the two developments, resulting in a potential repeated disturbance to the same soils, whereas the agricultural land is assessed at the regional scale). Potential for cumulative effects on agricultural land to occur as a result of the potential permanent cumulative loss of BMV land exceeding 20 hectares (ha) and this receptor is therefore taken through to stage 3/4. **Negligible** effects predicted on the potential shared soil receptor by the Proposed Development therefore there is no potential for significant cumulative effects.	Yes – BMV only
Wylfa Nuclear Power Station Decommissioning	No	No			
Penrhos Leisure Village	Yes	Yes	Overlap between the full build out of the sites and the Proposed Development's construction and also an overlap between the operational phases of the developments.	Shared receptor: BMV agricultural land (assessed at the regional scale). Due to the size and scale of the development (200 hectares (ha) mixed use development) there is a potential for the loss of BMV agricultural land. However, from the Penrhos Leisure Village Development location plan, the Provisional 1:250,000 Agricultural Land Classification (ALC) indicates that the agricultural land at Penrhos is ALC grade 4, i.e. non-BMV. Therefore, there is no potential for a cumulative effect. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	No
Anglesey Eco Park	Yes	Yes	The first phases of the Eco Park would be constructed by 2018 however full development would run to 2020/2021 therefore there is an overlap between the construction phases of this development and the Proposed	Shared receptor: BMV agricultural land (regional). From the Anglesey Eco Park Development planning boundary, the Provisional 1:250,000 ALC indicates that the land is ALC grade 4, i.e. non-BMV. Therefore, there is no potential for a cumulative effect. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	No

Table 18.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			Development. There would also be an overlap in the operational phases.		
Parc Cybi	Yes	Yes	The spine road and a truck stop has been completed. The hotel would be completed prior to the construction of the Proposed Development. Other elements of the outline permission may be constructed at the same time as the Proposed Development (timescale currently unknown). There would also be an overlap in the operational phases.	Shared receptor: BMV agricultural land (regional). Due to the size and scale of the Parc Cybi development (48.5 ha) there is a potential for cumulative effects. From the Parc Cybi Development location plan, the Provisional 1:250,000 ALC indicates that the land at Parc Cybi could potentially be ALC grade 3 or 4. Therefore the land has the potential to be BMV; and hence, there is a potential for significant cumulative effects. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	Yes – BMV only
Rhyd-y-Groes Re-power	Yes	Yes	Construction works have commenced and are expected to have been completed prior to the construction of the Proposed Development. There would be an overlap in the operational phases.	Shared receptor: BMV agricultural land (regional). The re-powering of an existing wind farm would result in no additional permanent loss of agricultural land within the site. Currently the land around the turbines remains in agricultural use (grazing) and this is reported as continuing after repowering. Therefore, there is no potential for cumulative effects. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	No
Holyhead Waterfront Redevelopment	Yes	Yes	Construction programme is anticipated to last 7	Shared receptor: BMV agricultural land (regional). The size and scale of the Holyhead Waterfront Redevelopment suggest there is a potential for cumulative effects. From the Holyhead Waterfront Redevelopment location plan, the	No

Table 18.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			years in its entirety, which is likely to occur on a phased basis, however, the start date is unknown. Therefore an overlap could occur in construction and operational phases.	Provisional 1:250,000 ALC mapping indicates that the land is non-agricultural and the Welsh Government Predictive ALC tool (Ref 20.9), shows there is a low likelihood of permanent BMV land take as a result of the Holyhead Waterfront Redevelopment. Therefore, it is considered unlikely for a cumulative effect to occur. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	
Glyn Rhonwy Pumped Storage	Yes	Yes	Construction is expected to last four years with the development operational by 2019. However as construction does not appear to have started yet, it is assumed that there could be an overlap between construction and operational phases.	Shared receptor: BMV agricultural land (regional). Due to the size and scale of the Glyn Rhonwy Pumped Storage development there is a potentially for cumulative effects from the loss BMV of agricultural land. From the Glyn Rhonwy Pumped Storage Development planning boundary, the Provisional 1:250,000 ALC indicates that the land is ALC grade 5 and non-agricultural, i.e. non-BMV. Therefore, there is no potential for a cumulative effect. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	No
Underground Grid Connection between Glyn Rhonwy Pumped Storage Development and Pentir Substation	Yes	Yes	The connection is expected to take less than a year however as the start date is not currently known, it is assumed there could be overlap in the construction and operational phases.	Shared receptor: soil resource (shared receptor due to the spatial overlap of the two developments, resulting in a potential repeated disturbance to the same soils). The Underground Grid Connection would be expected to apply control measures to ensure that the disturbance and loss of soil resources would be reduced to a level where it would be acceptable in planning terms. Furthermore, the nature and location of the development, with trenches predominantly within the verges of the adopted highway network, would limit the potential for agricultural soil disturbance. There is limited potential for physical overlap of the two working areas as the Proposed Development would be mainly routed through agricultural soils. **Negligible** effects are predicted on the potential shared soil receptor by the Proposed Development, therefore there is no potential for significant cumulative effects.	No

Table 18.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
West Anglesey Demonstration Project	No	No	Marine and planning consent is not currently in place. Therefore timescales are unknown.	Shared receptor: BMV agricultural land (regional). The West Anglesey Demonstration Project documentation identifies that the land is non-agricultural, however; the pastoral land use and surrounding geographical location (ALC Grade 4) suggests that the agricultural land is non-BMV. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	No
Holyhead Deep	No	No			
A487 Caernarfon to Bontnewydd Bypass	Yes	Yes	Overlap between construction phases in 2020 to 2021 and the operational phases.	Shared receptor: BMV agricultural land (regional). The bypass assessment reported the loss of agricultural land as a potential environmental effect; however it did not specify the area of necessary land take or area of BMV loss. From the development's location, the Provisional 1:250,000 ALC indicates that the land is potentially ALC grade 3 or 4 and therefore there is potential for loss of BMV agricultural land and therefore cumulative effect. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	Yes - BMV
Menai Science Park	Yes	Yes	The first phase of the development would be completed prior to the construction phase of the Proposed Development however the remainder of the development would take approximately 10 years to complete (more detailed timescale currently unknown) therefore is likely to overlap with construction phase of the Proposed Development.	Shared receptor: BMV agricultural land (regional). From the Menai Science Park location plan, the Provisional 1:250,000 ALC mapping indicates that all land within the site is Grade 3 and hence has the potential to be BMV. Therefore, there is potential for a cumulative effect to occur. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	Yes - BMV

Table 18.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA					
Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
Third Menai Crossing	Yes	Yes	Potential for the construction phases to overlap (construction timescale currently unknown anticipated to be 2020/2021 to 2022/2023). The operations phases would also overlap.	Potential shared receptor: BMV agricultural land (regional). Due to the size and scale of the Third Menai Crossing there is a potential for a cumulative effect. Considering the Proposed Alignment Options for the crossing the Provisional 1:250,000 ALC indicates that all land is Grade 3 and hence has the potential to be BMV and result in cumulative effects. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	Yes - BMV
A55 - Junction 15 & Junction 16 Improvement	Yes	Yes	Potential for the construction phases to overlap (timescales currently unknown but expected to be between autumn 2020 to autumn 2022). The operational phases would also overlap.	Shared receptor: BMV agricultural land (regional). Due to the size and scale of the A55 – Junction 15 & Junction 16 Improvement development there is a potential for a cumulative effect. However, the Provisional 1:250,000 ALC indicates that all land within the site is Grade 4 and hence not BMV therefore cumulative effects are considered to be unlikely. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	No
A55 Abergwyngregyn to Tai'r Meibion Improvement	Yes	Yes	Overlap between construction phases in 2020 and the operational phases.	Shared receptor: BMV agricultural land (regional). Due to the size and scale of the A55 Abergwyngregyn to Tai'r Meibion development there is a potential for a cumulative effect. The A55 Abergwyngregyn to Tai'r Meibion project documentation also identifies the dominant land use affected as pastoral agriculture, comprising Sub-grade 3a, 3b and Grade 4 farmland, based mainly around beef and sheep farming and considered to be of 'local significance'. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	Yes – BMV
Nant y Garth Landfill Site	No	No			
Caernarfon Brickworks Quarry	No	No			
Amlwch Liquid Natural Gas (LNG)	Yes	Yes	The construction phase may coincide with that	Shared receptor: BMV agricultural land (regional).	No

Table 18.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			of the Proposed Development depending on planning consent (construction start date currently unknown). Likely to be an overlap in operation phases.	Due to the size and scale of the Amlwch Liquid Natural Gas (LNG) development there is a potential for a cumulative effect. However, the Amlwch Liquid Natural Gas (LNG) development would result in no BMV loss therefore, no cumulative effects are anticipated. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	
Green Wire	Yes	Yes	Timescales currently unknown. If connection in place as per the agreement (completed by end of 2020) there would be an overlap with the OHL and tunnel construction however not with works at Pentir. Likely to be an overlap in operation phases.	Shared receptor: BMV agricultural land (regional) and soil resource (shared receptor due to the spatial overlap of the two developments, resulting in a potential repeated disturbance to the same soils, whereas the agricultural land is assessed at the regional scale). Due to the size and scale of the Green Wire development there is a potential for cumulative effects from the loss of BMV agricultural land. The Green Wire Development would be expected to apply control measures to ensure that the disturbance and loss of soil resources would be reduced to a level where it would be acceptable in planning terms. **Negligible** effects are predicted on the potential shared soil receptor by the Proposed Development therefore there is no potential for significant cumulative effects and soil recourse are not considered further in the assessment.	Yes – BMV
Llanbadrig Solar Farm	Yes	Yes	It is likely that this development would be constructed before the construction phase of the Proposed Development. There would be an overlap with the operational phases.	Shared receptor: BMV agricultural land (regional). The footprint of the supporting posts of the solar panels would be less than 1% of the total development area (< 1 ha) and sheep would be allowed to graze in between and beneath the solar panel arrays, therefore agricultural use would continue. Soil survey for the Llanbadrig Solar Farm has shown that the application site is classed as Grade 3b (non-BMV) therefore there is no potential for cumulative effects. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	No
Codling Wind Park	Yes	Yes	On-shore elements are not currently the subject of a planning application therefore	Shared receptor: BMV agricultural land (regional). Off-shore wind farm, with onshore infrastructure. Due to the size and scale of the Codling Wind Park there is a potential for cumulative effects from the loss of agricultural land.	Yes - BMV

Table 18.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			timescales are unknown. Potential for overlap between construction and operational phases.		
Grŵp Llandrillo Menai Llangefni Campus	Yes	Yes	Although some elements would be completed prior to the construction phase of the Proposed Development there is the potential for overlap between the full build out of the site (timescale currently unknown) and the construction of the Proposed Development. There is also overlap between the operational phases of the developments.	Shared receptor: BMV agricultural land (regional). The majority of the Grŵp Llandrillo Menai Llangefni Campus site is agricultural land; however, a defined area of agricultural land or agricultural land take; or the BMV status of that land are not provided in the Environmental Statement. Based on the location of the proposed Grŵp Llandrillo Menai Llangefni Campus the Provisional 1:250,000 ALC indicates that all agricultural land within the site is Grade 3 and hence has the potential to be BMV, therefore there is potential for cumulative effects. There is no spatial overlap of the two developments and therefore no potential for repeated disturbance to the same soils (cumulative effects to soil resources).	Yes - BMV
Dinorwig Cables	Yes	Yes	Potential overlap between construction phases (cable installation is programmed for between 2019 and 2025) along with overlap in the operational phases.	Shared receptor: soil resource (shared receptor due to the spatial overlap of the two development, resulting in a potential repeated disturbance to the same soils). The Dinorwig Cables would be expected to apply control measures to ensure that the disturbance and loss of soil resources would be reduced to a level where it would be acceptable in planning terms. Furthermore, with trenches predominantly within the verges of the adopted highway network, would limit the scale of agricultural soil disturbance. The Proposed Development being mainly routed through agricultural soils and therefore there is limited potential for physical overlap of the two working areas. **Negligible** effects are predicted on the potential shared soil receptor by the Proposed Development, therefore there is no potential for significant cumulative effects.	No

Table 18.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA					
Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
Holyhead Port Expansion	No	No			

Stage 3 and Stage 4

10.3.8 At the end of Stage 2 the original long list of other developments was reduced to a short list of other development where there would be potential for a significant cumulative effect to occur. The short list of other developments is as follows:

- Wylfa Newydd Nuclear Power Station;
- Parc Cybi;
- A487 Caernarfon to Bontnewydd Bypass;
- Menai Science Park;
- Third Menai Crossing;
- A55 Abergwyngregyn to Tai'r Meibion Improvement;
- Green Wire;
- Codling Wind Park; and
- Grŵp Llandrillo Menai Llangefni Campus.

10.3.9 Stage 3 requires the gathering of detailed information; however, a substantial amount of information about the other developments had already been gathered to support stages 1 and 2.

10.3.10 The results of the Stage 4 assessment of cumulative effects and mitigation are presented in Table 18.20 below.

10.3.11 Professional judgement has been applied in determining whether the combination of effects from two developments could result in a significant effect overall. In the case of minor effects, it is considered highly unlikely that effects could prove to be additive; however, professional judgement has been applied to check that two or more minor effects do not have potential to accumulate, thereby resulting in a potentially significant effect.

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Table 18.20 Agriculture CEA					
Development Name	Effects on shared receptors from the Proposed Development	Effects on shared receptors from the 'other development'	Assessment of Cumulative effect with Proposed Development	Proposed Mitigation applicable to the Proposed Development including any apportionment	Residual Cumulative Effect
Wylfa Newydd Power Station	BMV Agricultural land – (not significant).	BMV Agricultural land – **Minor** adverse (not significant).	The total potential BMV loss in Anglesey as a result of the Proposed Development (1.7 ha) and all elements of the Wylfa Newydd Power Station development (251.9 ha) would be 253.6 ha. This assumes a worst-case scenario, in which the Wylfa Newydd Power Station Assessment includes Subgrade 3b in the BMV total, and the worst-case land-take calculated for the Proposed Development. The cumulative scale of the loss is considered in the context of the ALC baseline of Anglesey as a whole, in which a cumulative loss of 1.7% of BMV land on Anglesey could potentially be permanently removed from agricultural use. The proportion of loss related to the Proposed Development compared with the Wylfa Newydd Power Station would be proportionately very small, and as the loss relating to Wylfa Newydd is considered to only be **minor**; it is not considered possible for there to be a significant cumulative effect.	None.	**Not significant**
Parc Cybi	BMV Agricultural land – (not significant).	Permanent loss of Grade 3 agricultural land, with the potential to be BMV.	The total potential BMV loss in Anglesey as a result of the Proposed Development (1.7 ha) and Parc Cybi (48.5 ha) would be 50.2 ha. This assumes a worst-case scenario, in which the Parc Cybi land take assumes all Grade 3 land is Subgrade 3a (i.e. BMV), and the worst-case land-take calculated for the Proposed Development. The cumulative scale of the loss is considered in the context of the ALC baseline of Anglesey as a whole, in which a cumulative loss of 0.34% of BMV land on Anglesey could potentially be permanently removed from agricultural use. Therefore, it is considered unlikely that a significant cumulative effect would to occur.	None.	**Not significant**
A487 Caernarfon to Bontnewydd Bypass	BMV Agricultural land – (not significant).	No information available.	From the Welsh Government Predictive ALC tool (Ref 20.9), there is a low likelihood of permanent BMV land take as a result of the A487 Caernarfon to Bontnewydd Bypass.	n/a	n/a

Table 18.20 Agriculture CEA					
Development Name	Effects on shared receptors from the Proposed Development	Effects on shared receptors from the 'other development'	Assessment of Cumulative effect with Proposed Development	Proposed Mitigation applicable to the Proposed Development including any apportionment	Residual Cumulative Effect
			Therefore, it is considered not possible for a significant cumulative effect to occur.		
Menai Science Park	BMV Agricultural land – (not significant).	No information available.	IACC did not require an assessment of the impact of Menai Science Park to agricultural land to inform the planning application (33C304B/ECON). Therefore, the effect upon agricultural land was considered to be not significant. The total potential BMV loss in Anglesey as a result of the Proposed Development (1.7 ha) and the Menai Science Park (8.3 ha) would be 10 ha. This assumes a worst-case scenario, in which the worst-case land-take calculated for the Proposed Development. The cumulative scale of the loss is considered in the context of the ALC baseline of Anglesey as a whole in which a cumulative permanent loss of 0.07% of BMV land on Anglesey could potentially occur. Therefore, it is considered not possible for a significant cumulative effect to occur.	n/a	n/a
Third Menai Crossing	BMV Agricultural land – (not significant).	No information available.	There is insufficient information as yet about the effects of the other development, and as such the potential cumulative effects with the Proposed Development would need to be a consideration during the relevant assessment and consenting for that development. From the Welsh Government Predictive ALC tool (Ref 20.9), there is a low likelihood of permanent BMV land take as a result of the Third Menai Crossing. Therefore, it is considered not possible for a significant cumulative effect to occur.	n/a	n/a
A55 Abergwyngregyn to Tai'r Meibion Improvement	BMV Agricultural land – (not significant).	BMV Agricultural land – Slight Adverse (not significant).	A55 Abergwyngregyn to Tai'r Meibion assessment states that there would be a permanent loss of approximately 2.8 ha of Subgrade 3a and 2.9ha of Sub-grade 3b agricultural land. The total potential BMV loss on Gwynedd as a result of the Proposed Development (1.4 ha) together with the A55 Abergwyngregyn to Tai'r	None.	**Not significant**

Table 18.20 Agriculture CEA					
Development Name	Effects on shared receptors from the Proposed Development	Effects on shared receptors from the 'other development'	Assessment of Cumulative effect with Proposed Development	Proposed Mitigation applicable to the Proposed Development including any apportionment	Residual Cumulative Effect
			Meibion (2.8 ha) would be 4.2 ha. This assumes a worst-case scenario, in related to land-take calculated for the Proposed Development. The cumulative scale of the loss is considered in the context of the ALC baseline of Gwynedd as a whole, in which a cumulative permanent loss of 0.04% of BMV land on Gwynedd could potentially occur. Therefore, it is considered not possible for a significant cumulative effect to occur.		
Green Wire	BMV Agricultural land – (not significant).	No information available.	There is insufficient information as yet about the effects of the other development, and as such the potential cumulative effects with the Proposed Development would need to be a consideration during the relevant assessment and consenting for that development. From the Welsh Government Predictive ALC tool (Ref 20.9), there is a low likelihood of permanent BMV land take as a result of the Green Wire development. Therefore, it is considered not possible for a significant cumulative effect to occur.	n/a	n/a
Codling Wind Park	BMV Agricultural land – (not significant).	No information available.	There is insufficient information as yet about the effects of the other development, and as such the potential cumulative effects with the Proposed Development would need to be a consideration during the relevant assessment and consenting for that development. From the Welsh Government Predictive ALC tool (Ref 20.9), there is a low likelihood of permanent BMV land take as a result of the Codling Wind Park. Therefore, it is considered not possible for a significant cumulative effect to occur.	n/a	n/a
Grŵp Llandrillo Menai Llangefni Campus	BMV Agricultural land – (not significant).	No information available.	Grŵp Llandrillo Menai Llangefni Campus documents state that the development would result in a permanent loss of Grade 3 agricultural land, with the potential to be BMV.	None.	**Not significant**

Table 18.20 Agriculture CEA					
Development Name	Effects on shared receptors from the Proposed Development	Effects on shared receptors from the 'other development'	Assessment of Cumulative effect with Proposed Development	Proposed Mitigation applicable to the Proposed Development including any apportionment	Residual Cumulative Effect
			IACC did not require an assessment of the impact to agricultural land to inform the Environmental Statement (PP/05399564). Therefore, the effect upon agricultural land was considered to be not significant. The total potential BMV loss on Anglesey as a result of the Proposed Development (1.7 ha) and the Grŵp Llandrillo Menai Llangefni Campus (13.8 ha) would be 15.5 ha. This assumes a worst-case scenario, in which the entire Grŵp Llandrillo Menai Llangefni Campus site area would be BMV land and a worst-case land-take calculated for the Proposed Development. The cumulative scale of the loss is considered in the context of the ALC baseline of Anglesey as a whole (see paragraphs 9.3.15-9.3.16), in which a cumulative loss of 0.1% of BMV land on Anglesey could potentially be permanently removed from agricultural use. Therefore, it is considered not possible for a significant cumulative effect to occur.		

Conclusion

10.3.12 Taking into consideration all of the other developments for which a potential cumulative effect has been identified, the overall effects are considered to be not significant.

11 Summary

11.1 AGRICULTURE

11.1.1 The permanent loss of BMV agricultural land as a result of the Proposed Development would not exceed 20 ha and is therefore considered to be **not significant**. This conclusion is also supported when considering the proportional loss of BMV land as a consequence of the Proposed Development in relation to the available BMV land within Anglesey and Gwynedd; 0.003% and 0.1% respectively.

11.1.2 Through the implementation of control and management measures for the handling and storage of soil, soil loss, and the associated impairment of the remaining soils' function, quality and resilience, would be reduced. Consequently, the effect of the Proposed Development in terms of disturbance or damage to soil properties would be **not significant**, with the residual impact considered negligible in almost all instances (99.5% of the study area).

11.1.3 In line with standard best practice, the majority of soils would be reinstated *in situ* within the same landholding, or reused within the same landholding for screening/landscaping.) Small volumes of topsoil generated at permanent development areas may require exporting from site for reuse at other development sites in the wider area. Additionally, the implementation of standard and site specific measures for the handling and storage of soil resources would also ensure that soil loss, and the associated impairment of the remaining soils' function, quality and resilience, would be reduced. The above measures would minimise the loss of soil resources such that over 95% of soil resources would be retained in a state suitable for reuse and the effect the effect of the Proposed Development in terms of loss of soil resources would be **not significant**, with the residual impact after mitigation considered **negligible**.

11.1.4 The Entry and Advanced level Glastir schemes within the study area would only experience a temporary disturbance due to the Proposed Development and would regain AES eligibility following construction. Therefore, the impact of the Proposed Development upon AES is **not significant**.

11.1.5 High-level agricultural drainage surveys have been conducted. Effects of the Proposed Development would be readily mitigated by standard measures e.g. diversion and reinstatement, such that there would be no residual loss of functionality. These measures are incorporated in to the CEMP (**Document 7.4**), and a DMP would be prepared prior to the commencement of works. The DMP would specify measures to minimise the impact of the construction on existing drainage systems. Therefore, the effects of the Proposed Development on agricultural land drainage would be **not significant**, with the residual impact considered **negligible.**

11.1.6 A summary of the potential effects is provided in Table 18.21.

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Table 18.21: Potential Agricultural Effects of the Proposed Development					
Resource/Receptor	Sensitivity	Potential effects and sensitivity	Mitigation	Residual Magnitude	Significance
BMV Agricultural Land	**N/A**	Permanent loss of BMV agricultural land.	Extent of the study area and placement of temporary and permanent infrastructure designed to minimise the impact to BMV land as far as practicable in balance with the constraint priorities identified by other disciplines.	N/A	**Not Significant**
Soil Resources (damage)	**High**	Damage to organic rich peaty soils (Adventurers 1) which are prone to erosion and susceptible to loss.	The Outline SMP (**Document 7.10**) which forms part of the CEMP (**Document 7.4**) sets out standard best practice working methods and mitigation measures for handling, excavation, storage and reinstatement of soils and peat. The SMP is based upon measures such as those set out in Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 18.1). As relocating temporary or permanent infrastructure from an area of low or medium sensitivity soils into an area of these high sensitivity soils would increase the significance of the residual effect from negligible to minor adverse, an environmental commitment has been made, to restrict works in these areas. Further details are provided in the Schedule of Environmental Commitments (**Document 7.4.2.1**).	Negligible	Minor adverse - **Not Significant**
	Medium	Damage to erosion prone soils (Eardiston 1 and Wick 1)	The Outline SMP (**Document 7.10**) which forms part of the CEMP (**Document 7.4**) sets out standard best practice working methods and mitigation measures for handling, excavation, storage and reinstatement of soils and peat. The SMP is based upon measures such as those set out in Defra's Construction Code of	Negligible	Negligible - **Not Significant**

Table 18.21: Potential Agricultural Effects of the Proposed Development					
Resource/Receptor	Sensitivity	Potential effects and sensitivity	Mitigation	Residual Magnitude	Significance
			Practice for the Sustainable Use of Soils on Construction Sites (Ref 18.1).		
	Low	Damage to soils which are not prone to erosion and susceptible to loss	The Outline SMP (**Document 7.10**) which forms part of the CEMP (**Document 7.4**) sets out standard best practice working methods and mitigation measures for handling, excavation, storage and reinstatement of soils and peat. The SMP is based upon measures such as those set out in Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 18.1).	Negligible	Negligible - **Not Significant**
Soil Resources (loss)	**High**	Loss of soil resource caused by poor soil removal, handling and storage; or unauthorised export; may result in the impairment of the remaining soils' function, quality and resilience. This effect also comprises such changes as reduction of topsoil depth. Additionally, unregulated soil loss increases the potential for disease and pathogen transfer between different areas of agricultural land (a biosecurity risk).	The Outline SMP (**Document 7.10**) which forms part of the CEMP (**Document 7.4**) sets out standard best practice working methods and mitigation measures for handling, excavation, storage and reinstatement of soils and peat. The SMP is based upon measures such as those set out in Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 18.1).	Negligible	Minor adverse - **Not Significant**
	Medium			Negligible	Negligible - **Not Significant**
	Low			Negligible	Negligible - **Not Significant**
Agricultural Landholding	**Medium**	The loss of agricultural land from a landholding may place restrictions on normal agricultural practices within that landholding.	The Outline SMP (**Document 7.10**) which forms part of the CEMP (**Document 7.4**) sets out standard best practice working methods and mitigation measures for handling, excavation, storage and reinstatement of soils and peat. The SMP is based upon measures such as those set out in Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 18.1). National Grid would ensure that Agricultural Liaison Officers (ALO) maintain communication with farmers/landowners to ensure their needs are understood before, during and after construction.	Negligible	Negligible - **Not Significant**

Table 18.21: Potential Agricultural Effects of the Proposed Development

Resource/Receptor	Sensitivity	Potential effects and sensitivity	Mitigation	Residual Magnitude	Significance
Agri-Environment Schemes	**Medium**	In the absence of appropriate mitigation measures for soil handling and storage, there is the potential for the quality of land reinstatement to fall short of the requirements which would allow AES eligibility to be reinstated. Therefore, the potential impact to AES in the absence of mitigation is the permanent loss of compliance/eligibility.	Temporary loss of eligibility cannot be mitigated. The Outline SMP (**Document 7.10**) which forms part of the CEMP (**Document 7.4**) sets out standard best practice working methods and mitigation measures for handling, excavation, storage and reinstatement of soils and peat. The SMP is based upon measures such as those set out in Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 18.1). The implementation of these measures would ensure that the land is restored to a standard where it is eligible for the same level of AES as before construction.	Negligible	Minor adverse - **Not Significant**
	Low			Negligible	Negligible - **Not Significant**
Agricultural Land Drainage	**Medium**	In the absence of appropriate mitigation measures, there is the potential for the loss of function of agricultural land drainage.	A DMP will be produced prior to construction as set out in the CEMP (**Document 7.4**). The implementation of a DMP will ensure that the agricultural land drainage is restored to function as before construction.	Negligible	Negligible - **Not Significant**

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12 References

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