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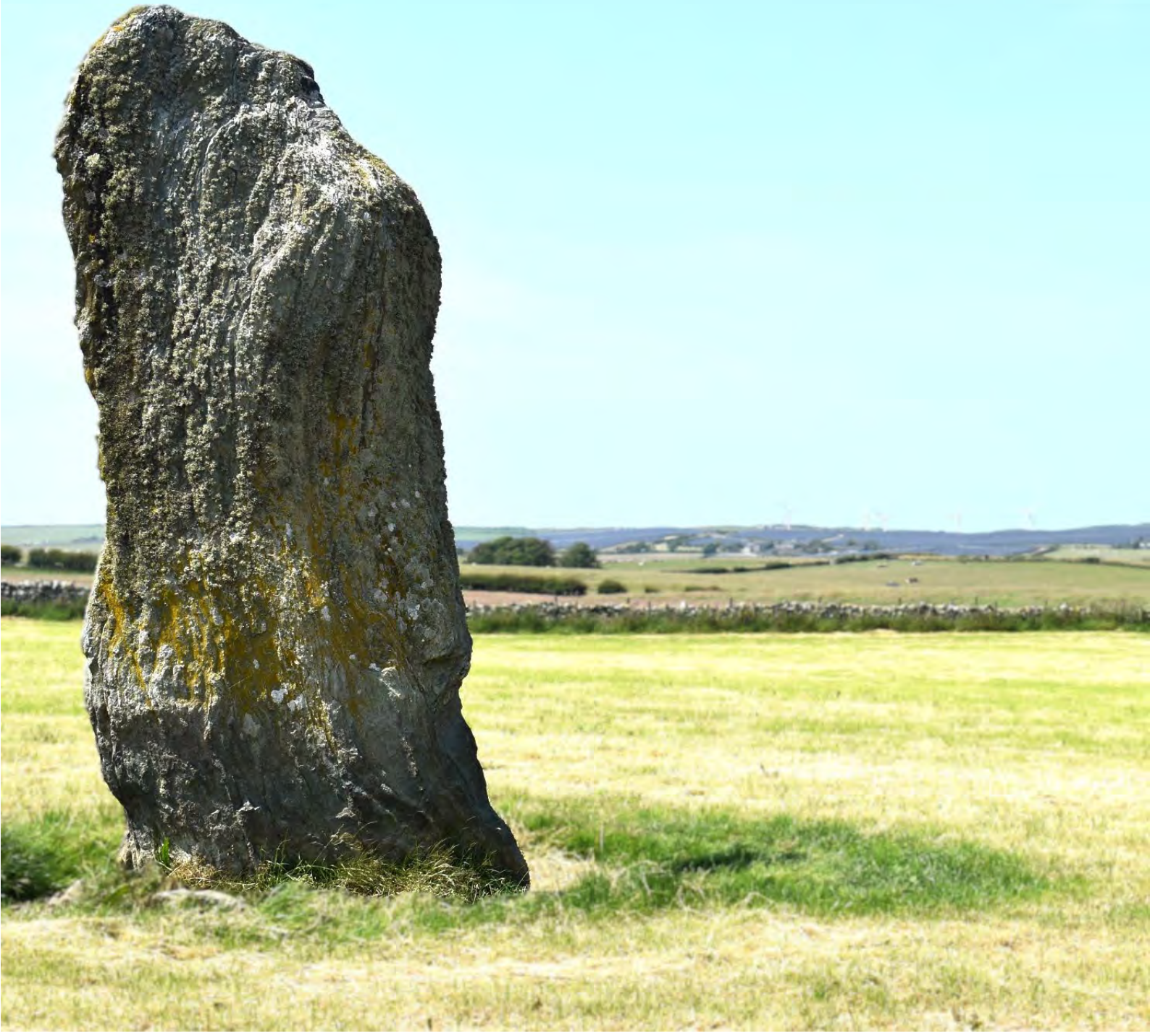

Preliminary Environmental Information Report

Volume III

Appendix 12-1: Agricultural Land Classification Report

Prosiect Maen Hir - September 2024

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lightsource bp

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AGRICULTURAL LAND CLASSIFICATION
MAEN HIR SOLAR PROJECT

CLIENT: LIGHTSOURCE RENEWABLE DEVELOPMENT LTD
PROJECT: MAEN HIR SOLAR PROJECT
DATE: 28TH JUNE 2023 – ISSUE 1
ISSUED BY: JAMES FULTON MRICS FAAV

CONTENTS

1. EXECUTIVE SUMMARY

1.1 This report assesses the Agricultural Land Classification (ALC) grading of 1505.9Ha, of agricultural land at to the southeast of Caemes on Anglesey.

1.2 This assessment sets out that the majority of the site is limited by wetness with smaller areas limited by soil depth, droughtiness and gradient/microrelief.

1.3 The land is graded as follows:

Grade 2:	27.8 Ha
Grade 3a:	315.1 Ha
Grade 3b:	324 Ha
Grade 4:	443.7 Ha
Shown to be non-BMV:	340.7 Ha
Non-Agricultural:	54.6 Ha
Total:	1505.9 Ha

2. INTRODUCTION

2.1 Amet Property Ltd have been instructed by Lightsource Renewable Development Ltd to produce an Agricultural Land Classification (ALC) report on a 1505.9-hectare site on land to the southeast of Caemes on Anglesey.

2.2 The report's author is James Fulton BSc (Hons) MRICS FAAV who has worked as a chartered surveyor, agricultural valuer, and agricultural consultant since 2004, has a degree in agriculture which included modules on soils and over 10 years' experience in advising farmers on soil structure and cultivation methods and in producing agricultural land classification reports. Additional information on authors experience is found at *appendix 1*.

2.3 The report is based on an initial site visit conducted by James Fulton and 5 assistant surveyors on the 19th, 20th and 21st April 2023 and further surveys by James Fulton and 7 assistant surveyors across 38 man-days in May 2024. During all survey days the conditions were dry and sunny, and soils were moist at all depths. During the 2023 surveys areas to the north were surveyed on a reconnaissance basis and the majority of Block B was surveyed at a semi-detail scale. Following significant liaising with LQAS a protocol for the survey was agreed whereby areas shown to be non-BMV on the predictive map were not surveyed and a detailed ALC conducted on areas shown by predictive mapping to be grade 3a or grade 2.

2.4 The surveyed area extends to 1505.9Ha of predominantly grassland in 4 distinct blocks.

Block A

Block A extends to 466Ha made up of 84.3Ha to the southeast of Bodewyrd and 381.7Ha northeast of Bodewyrd. 236.3Ha of the site is shown on the predictive map to be non-BMV and so has not been surveyed. 35.4Ha (the old oil storage site) was found during an initial reconnaissance survey to be previously developed and non-agricultural and so has not been surveyed)

Block B

Block B extends to 424.8 Ha to the north and east of Llyn Alaw of which 20.1Ha is shown on the predictive map as non-BMV.

Block C

Block C extends to 211.2 Ha to the north of LLanerchymedd and east of the B5111 opposite the southeast area of Block B.

Block D

Block D extends to 403.9Ha east of Llanerchymedd and west of Capel Coch of which 83.3Ha is shown on the predictive map as non-BMV.

2.5 During the inspection 22 trial pits were dug to a depth of 120cm or as deep as possible if the sample point became impenetrable. In addition to the trial pits an auger was used to take approximately one sample every hectare on the proposed development site to a depth of 120cm with smaller trial pits at some of these locations to confirm soil structure and colour where it was not clear from the auger samples. A plan of auger points and trial pit locations can be found at *appendix 2.* The trial pit locations were selected as they were representative of the soils found on site. Where subsoils were inspected with a spade, descriptions of structure have been recorded based on the soil survey field handbook[1]; where an auger has been used the structure is described as good, moderate or poor based on figure 9,10 and 11 in the MAFF[2] guidance. Colours are described using Munsell Colours[3].

2.6 Further information has been obtained from the MAGIC website, the Soil Survey of England and Wales, the British Geological Survey, the Meteorological Office and the Predictive ALC maps for Wales.

2.7 The collected information has been judged against the Ministry of Agriculture Fisheries and Food Agricultural Land Classification of England and Wales revised guidelines and criteria for grading the quality of agricultural land.

2.8 The principal factors influencing agricultural production are climate, site and soil and the interaction between them MAFF (1988) & Natural England (2012)[4].

2.9 The report is prepared and formatted considering the latest BSSS guidance[5].

[1] Hodgson, JM (1997) Soil Survey Field Handbook

[2] MAFF (1988) - *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land*. MAFF Publications

[3] Munsell Color (2009) Munsell Soil Color Charts

[4] MAFF (1988) - *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land*. MAFF Publications

[5] BSSS (2022) Working with Soil Guidance Note on Assessing Agricultural Land Classification Surveys in England and Wales

3. PUBLISHED INFORMATION

3.1 Geology

Block A

The British Geological Survey 1:50,000 scale map shows the bedrock geology to be New Harbour Group – Mica schist and psammite.. Across the majority of the site superficial deposits or Till, Devensian – Diamicton are recorded with some small areas with no superficial deposits and others of Alluvium – clay, silt, sand and gravel.

Block B

The British Geological Survey 1:50,000 scale map shows the bedrock geology to be Ordovician Rocks – Mudstone and sandstone. Across the majority of the site superficial deposits or Till, Devensian – Diamicton are recorded with some small areas where there are no superficial deposits recorded, others of Alluvium – clay, silt, sand and gravel and

Block C

The British Geological Survey 1:50,000 scale map shows the bedrock geology to be Ordovician Rocks – Mudstone and sandstone with superficial deposits or Till, Devensian – Diamicton.

Block D

The British Geological Survey 1:50,000 scale map shows the bedrock geology to be Coedana Granite – Granite with some very small areas of Coedana complex – Hornfells. Across the majority of the site superficial deposits or Till, Devensian – Diamicton are recorded with some small areas with no superficial deposits and others of Alluvium – clay, silt, sand and gravel.

3.2 The soils to the north of Rhos-goch are identified as Brickfield 2 Association – slowly permeable seasonally waterlogged fine loamy soils with the rest of the site identified as Cegn Association – slowly permeable seasonally waterlogged fine silty and clayey soils.

Block A

The soils on most of block are recorded as Brickfield 2 Association – slowly permeable seasonally waterlogged fine loamy soils; a small strip east of Bodewryd recorded as East Keswick 1 Association – Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging; and on the higher ground around Gwredog they are recorded as Denbigh 1 Association – Well drained fine loamy and fine silty soils over rock.

Block B

The soils to the north of Rhos-goch are identified as Brickfield 2 Association – slowly permeable seasonally waterlogged fine loamy soils with the rest of the site identified as Cegn Association – slowly permeable seasonally waterlogged fine silty and clayey soils.

Block C

The whole site is recorded as Cegin Association – Slowly permeable seasonally waterlogged fine silty and clayey soils.

Block D

Most of the site is recorded as Cegin Association – Slowly permeable seasonally waterlogged fine silty and clayey soils. There is an area in the north west and then through the centre of the site down to the southeast and a separate area in the northeast recorded as East Keswick 1 Association – Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging; and a very small area to the far east of the site recorded as Eardiston 1 Association – Well drained eddish coarse loamy soils over sandstone, shallow in places especially on brows.

3.3 The WAG predictive agricultural land classification map shows the land grade to range from grade 2 to grade 4. Areas shown on the map as grade 3b and 4 have not been surveyed and are shown on maps as previously recorded as non-BMV.

4. CLIMATE

4.1 Climate has a major, and in places overriding, influence on land quality affecting both the range of potential agricultural uses and the cost and level of production.

4.2 There is published agro-climatic data for England and Wales provided by the Meteorological Office, such data for the subject site is listed in the table below.

Agro-Climatic Data – Full details can be found at *appendix 3*

Block A

Grid Reference	240883 390948
Altitude (ALT)	54
Average Annual Rainfall (AAR)	960
Accumulated Temperature - Jan to June (ATO)	1419
Duration of Field Capacity (FCD)	202
Moisture Deficit Wheat	81
Moisture Deficit Potatoes	66

Block B

Grid Reference	240831 388009
Altitude (ALT)	62
Average Annual Rainfall (AAR)	986
Accumulated Temperature - Jan to June (ATO)	1410
Duration of Field Capacity (FCD)	205
Moisture Deficit Wheat	79
Moisture Deficit Potatoes	63

Block C

Grid Reference	243021 385071
Altitude (ALT)	69
Average Annual Rainfall (AAR)	1042
Accumulated Temperature - Jan to June (ATO)	1404
Duration of Field Capacity (FCD)	214
Moisture Deficit Wheat	74
Moisture Deficit Potatoes	58

Block D

Grid Reference	244459 382285
Altitude (ALT)	67
Average Annual Rainfall (AAR)	1057
Accumulated Temperature - Jan to June (ATO)	1407
Duration of Field Capacity (FCD)	216
Moisture Deficit Wheat	74
Moisture Deficit Potatoes	57

4.3 The site is quite well spread out and the elevation varies quite significantly too and so the climatic data has been worked out for each separate map and checked against individual survey points. The most significant limiting factor across all the site is the number of field capacity days and its use in calculating wetness limitation and while this varies across the areas it I always in the range of 176-225FCD found at Table 6.

4.4 The main parameters used in assessing the climatic limitation are average annual rainfall (AAR), as a measure of overall wetness; and accumulated temperature (ATO), as a measure of the relative warmth of a locality.

4.5 The AAR and ATO are on the boundary of limiting the land to grade 2 in blocks a and b and given the variation in altitude of the site it is likely that some sample points will be limited to grade 2 and some will not. Where this is the only limiting factor, it has been assessed for individual points and found to limit these areas to grade 2.

4.6 The site has some areas especially near to water courses where flooding appears to have occurred but these areas seem to be more affected by groundwater and wetness than by flooding and so it is not deemed that flood risk is a limiting factor to land grade.

5. STONINESS

5.1 The topsoil ranged from stoneless up to 15% stone in places. The stones are consistently platy subangular to subrounded hard stone but the majority are too small to limit land grade. In places there are rocky outcrops and boulders/rocks very near to the surface that will impact on land grade but these will be no more limiting than other factors and so are not assessed any further.

6. GRADIENT AND MICRORELIEF

6.1 The sample points across the site range from 26m-116m AOD. The maximum gradient measured on the site was around 6 degrees and so gradient is not a limiting factor. There are areas around rocky outcrops and in other places where microrelief would prevent any sort of mechanical cultivation and limit land grade and while these areas are small they are included within the grading maps where they are the most limiting factor.

7. SOILS

7.1 The soils found on site largely follow the expectations set by the national soils map with the exception that the topsoil is generally heavier than would be expected. Full information on the sample points along with trial pit descriptions and photographs and lab test results can be found at *appendix 4*.

7.2 During the first site visits in 2023 the topsoil was recorded as medium clay loam, heavy clay loam and clay. Silt was noted as a significant constituent of the soil but not considered high enough to describe the soils as silty clay loams. When samples were sent to the laboratory, they were all assessed as having a higher organic matter content and a higher clay content than expected from the in-field workability assessment. It is considered that the laboratory testing is more accurate than the in-field testing and that the high levels of organic matter were improving workability and impacting the outcome from the in-field assessment. Because of this difficulty in field assessing texture, it was agreed with LQAS that a substantially higher level of lab testing would be carried out.

Block A

7.3 Topsoils in block A vary quite significantly in both colour and texture form medium sandy silty loam to organic clay and dark yellowish brown (10YR 3/4) to grey (10YR 5/1) and often change repeatedly over short distances. In some areas there is no subsoil with the site becoming impenetrable at as shallow as 20cm due to shaley slatey material or sometimes solid rock or boulder while in other areas there is a moderately to poorly structured clay loam or clay subsoil usually gleyed and sometimes slowly permeable. The slowly permeable subsoils were predominantly found at lower elevations, but subsoils changed repeatedly over short distances in the same way as topsoils.

Block B, C and D

7.4 Topsoil colour varied slightly across the site but the majority are brown (10YR 4/3) dark brown (7.5YR 3/2, 7.5YR 3/3 or 10YR 3/3) or dark greyish brown (10YR 4/2 or 10YR 5/2). Topsoil texture was largely just either side of the change from heavy clay loam to clay with some areas where it was noticeable lighter but the lab tests all showed it to still be heavy clay loam but closer to the change to medium clay loam than to clay.

7.5 Soils are shallow in places (largely where the British geological survey maps show there to be no superficial deposits). Where soils are shallow they are usually at least slightly stony and as depth increases the number and size of stones increases until there is a layer of either rock or boulder that is too big to be dug through

7.6 Where there are subsoils, they were recorded in field and confirmed by lab tests to be either clay or occasionally silty clay, sometime clay loam. Most of these subsoils are gleyed from between 25 and 70 cm with structures ranging from moderately structured (weak fine or medium subangular blocky) to poorly structured (coarse angular blocky, weak coarse angular blocky and subangular blocky and weak medium angular blocky). Some soils have strong

evidence of biopores and rooting suggesting that they drain relatively well while others have little or no evidence of permeability and are recorded as slowly permeable.

INTERACTIVE FACTORS

8. WETNESS

8.1 An assessment of the wetness class of each sample point was made based on the flow chart at Figure 6 in the MAFF guidance. The wetness class and topsoil texture were then assessed against Table 6 and Table 7 of the MAFF guidance to determine the ALC grade according to wetness. The wetness assessment can be found at *appendix 4*.

8.2 Where there is no slowly permeable layer and no gleyed horizon the assessment results in wetness class I.

8.3 Where there is a gleyed horizon at between 40 and 70cm and a slowly permeable started deeper than 75cm the assessment results in wetness class II.

8.4 Where there is a gleyed horizon at less than 40cm and slowly permeable layer starting deeper than 55cm the assessment results in wetness class III.

8.5 Where there is a gleyed horizon at less than 40cm and slowly permeable layer starting at less than 55cm the assessment results in wetness class IV.

8.6 Table 6 and Table 7 with 176 to 225 FCD and clay topsoil wetness class I and wetness class II result in a limit of grade 3b while wetness class III and wetness class IV result in grade 4.

9. DROUGHTINESS

9.1 Droughtiness limits are defined in terms of moisture balance for wheat and potatoes using the formula:

MB (Wheat) = AP (Wheat) - MD (Wheat)

and

MB (Potatoes) = AP (Potatoes) - MD (Potatoes)

Where:
MB = Moisture Balance
AP = Crop Adjusted available water capacity
MD = Moisture deficit

9.2 Moisture deficit for wheat and potatoes can be found in the agro-climatic data and are as follows:

MD (Wheat) = 79
MD (Potatoes) = 63

9.3 Crop adjusted available water is calculated by reference to the total available water and easily available water which is calculated by reference to soil texture and structural condition and the stone content.

9.4 The moisture balance was calculated for the trial pit locations and where droughtiness was considered likely to be a limiting factor and can be seen at *appendix 4.* Where soils are shallow and stony droughtiness is sometimes the limiting factor.

10. AGRICULTURAL LAND CLASSIFICATION

10.1 The Agricultural Land Classification provides a framework for classifying land according to which its physical or chemical characteristics impose long-term limitations on agricultural use. The limitations can operate in one or more of four principle ways: they may affect the range of crops that can be grown, the level of yield, the consistency of yield and the cost of obtaining it.

10.2 The principle physical factors influencing agricultural production are climate, site and soil and the interactions between them which together form the basis for classifying land into one of 5 grades; grade 1 being of excellent quality and grade 5 being land of very poor quality. Grade 3 land, which constitutes approximately half of all agricultural land in the United Kingdom is divided into 2 subgrades – 3a and 3b. A full definition of all of the grades can be found at *appendix 5.*

10.3 This assessment sets out that the majority of the site is limited by wetness with smaller areas limited by soil depth, droughtiness and gradient/microrelief.

10.4 The breakdown of land by classification is:

Block A

Grade 2:	13.6 Ha
Grade 3a:	111.2 Ha
Grade 3b:	62.2 Ha
Grade 4:	7.3 Ha
Shown to be non-BMV:	236.3 Ha
Non-Agricultural:	35.4 Ha
Total:	466 Ha

Block B

Grade 3a:	43.2 Ha
Grade 3b:	90.2 Ha
Grade 4:	271.3 Ha
Shown to be non-BMV:	20.1 Ha
Total:	424.8 Ha

Block C

Grade 3a:	40.6 Ha
Grade 3b:	54.7 Ha
Grade 4:	104.1 Ha
Non-Agricultural:	11.8 Ha
Total:	211.2 Ha

Block D

Grade 2:	14.2 Ha
Grade 3a:	120.1 Ha
Grade 3b:	116.9 Ha
Grade 4:	61 Ha
Shown to be non-BMV:	84.3 Ha
Non-Agricultural:	7.4 Ha
Total	403.9 Ha

Total

Grade 2:	27.8 Ha
Grade 3a:	315.1 Ha
Grade 3b:	324 Ha
Grade 4:	443.7 Ha
Shown to be non-BMV:	340.7 Ha
Non-Agricultural:	54.6 Ha
Total:	1505.9 Ha

10.5 A plan of the land grading can be found at *appendix 6*.

Appendix **1 –** Details of the Authors Experience

James Fulton

Professional Education and Qualifications

BSc (Hons) Agriculture, University of Nottingham (2004)

Member of the Royal Institution of Chartered Surveyors (MRICS) (2008)

Fellow of the Central Association of Agricultural Valuers (FAAV) (2009)

Relevant Work Experience

While working for a regional firm from 2004 until 2016 as part of my work I provided advice to farmers on soils, cultivation techniques and cropping and was involved in field trials which assessed cropping and cultivation techniques and how they impacted soil structure. At the same time I worked alongside an experienced surveyor who produced Agricultural Land Classification reports and I received training in field survey techniques and the ALC process to the point where I was able to produce ALC reports.

In 2016 I left my employer and formed Amet Property Ltd providing development consultancy and other rural practice surveying services. Of all of the services that we provide Agricultural Land Classification reports is the single largest area of work accounting for approximately 70% of all of my working time.

While I am not a member of the BSSS I meet the minimum competencies set out by the BSSS in Document 1 *Foundation skills in field soil investigation, description and interpretation* and Document 2 *Agricultural Land Classification (England and Wales)*

Professional Standards

As a member of the Royal Institution of Chartered Surveyors and Fellow of the Central Association of Agricultural Valuers I am bound by their professional standards and am only able to carry out work where I am suitably qualified and experienced to do so. Due to the formal and practical training that I have received I am able to competently produce Agricultural Land Classification reports.

Assistant Surveyors

All assistant surveyors have completed the BSSS working with soil course and have been trained to meet the requirements of BSSS Document 1 *Foundation skills in field soil investigation, description, and interpretation.*

Appendix 2a

Survey Area

Area shown to be non-BMV on predictive map

Non-Agricultual

Trial Pit location

Appendix 2b

Survey Area

Area shown to be non-BMV on predictive map

Trial Pit location

Appendix 2c

Survey Area

Trial Pit Location

Promap
LANDMARK INFORMATION

Plotted Scale - **1:10000**. Paper Size - **A3**

Appendix 2d

Survey Area

Area shown to be
non-BMV on predictive map

trial Pit Location

Promap
LANDMARK INFORMATION

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Plotted Scale - 1:9000. Paper Size - A2