PROPOSED SOLAR FARM
LAND NORTH AND EAST OF GREAT WYMONDLEY, HERTFORDSHIRE

AGRICULTURAL EVIDENCE
ON BEHALF OF
THE APPLICANT
BY

TONY KERNON BSc(Hons), MRICS, FBIAC

VOLUME 2: APPENDICES

LPA Reference: 21/03380/FP

PINS Reference: APP/X1925/V/23/3323321

August 2023

KERNON
COUNTRYSIDE CONSULTANTS LIMITED

PROPOSED SOLAR FARM
LAND NORTH AND EAST OF
GREAT WYMONDLEY,
HERTFORDSHIRE

AGRICULTURAL EVIDENCE
ON BEHALF OF
THE APPLICANT
BY

TONY KERNON BSc(Hons), MRICS, FBIAC

VOLUME 2: APPENDICES

LPA Reference: 21/03380/FP

PINS Reference: APP/X1925/V/23/3323321

August 2023

Authorised By APK 08/23

Greenacres Barn, Stoke Common Lane, Purton Stoke, Swindon SN5 4LL
T: 01793 771333 Email: info@kernon.co.uk Website: www.kernon.co.uk

---

CONTENTS

Appendix KCC1

Curriculum Vitae

ANTHONY PAUL KERNON

SPECIALISMS

- Assessing the impacts of development proposals on agricultural land and rural businesses
- Agricultural building and dwelling assessments
- Equestrian building and dwelling assessments (racing, sports, rehabilitation, recreational enterprises)
- Farm and estate diversivification and development
- Inputs to Environmental Impact Assessment
- Expert witness work

SYNOPSIS

Tony is a rural surveyor with 35 years experience in assessing agricultural land issues, farm and equestrian businesses and farm diversification proposals, and the effects of development proposals on them. Brought up in rural Lincolnshire and now living on a small holding in Wiltshire, he has worked widely across the UK and beyond. He is recognised as a leading expert nationally in this subject area. Married with two children. Horse owner.

Tony's specialism is particularly in the following key areas:

- assessing the need for agricultural and equestrian development, acting widely across the UK for applicants and local planning authorities alike;
- farm development and diversification planning work, including building reuse and leisure development, Class Q, camping etc;
- assessing development impacts, including agricultural land quality and the policy implications of losses of farmland due to residential, commercial, solar or transport development, and inputs to Environmental Assessment;
- and providing expert evidence on these matters to Planning Inquiries and Hearings, court or arbitrations.

QUALIFICATIONS

Bachelor of Science Honours degree in Rural Land Management, University of Reading (BSc(Hons)). 1987. Awarded 2:1.
Diploma of Membership of the Royal Agricultural College (MRAC).
Professional Member of the Royal Institution of Chartered Surveyors (MRICS) (No. 81582). (1989).

OTHER PROFESSIONAL ACTIVITIES

Co-opted member of the Rural Practice Divisional Council of the Royal Institution of Chartered Surveyors. (1994 - 2000)
Member of the RICS Planning Practice Skills Panel (1992-1994)
Member of the RICS Environmental Law and Appraisals Practice Panel (1994 - 1997).
Fellow of the British Institute of Agricultural Consultants (FBIAC) (1998 onwards, Fellow since 2004).
Secretary of the Rural Planning Division of the British Institute of Agricultural Consultants (BIAC) (1999 – 2017).
Vice-Chairman of the British Institute of Agricultural Consultants (2019 – 2020)
Chairman of the British Institute of Agricultural Consultants (2020 – 2022)

Greenacres Barn, Stoke Common Lane,
Purton Stoke, Swindon SN5 4LL
T: 01793 771333 Email: info@kernon.co.uk
Website: www.kernon.co.uk

Professional Advisers to Rural Business and on the Environment

EXPERIENCE AND APPOINTMENTS

1997 ------> **Kernon Countryside Consultants.** Principal for the last 25 years of agricultural and rural planning consultancy specialising in research and development related work. Specialisms include essential dwelling and building assessments, assessing the effects of development on land and land-based businesses, assessing the effects of road and infrastructure proposals on land and land-based businesses, and related expert opinion work. Tony specialises in development impact assessments, evaluating the effects of development (residential, solar, road etc) on agricultural land, agricultural land quality, farm and other rural businesses.

1987 - 1996 **Countryside Planning and Management**, Cirencester. In nearly ten years with CPM Tony was involved in land use change and environmental assessment studies across the UK and in Europe. From 1995 a partner in the business.

1983 - 1984 **Dickinson Davy and Markham**, Brigg. Assistant to the Senior Partner covering valuation and marketing work, compulsory purchase and compensation, and livestock market duties at Brigg and Louth.

RECENT RELEVANT EXPERIENCE

TRAINING COURSES

Landspreading of Non Farm Wastes. Fieldfare training course, 24 – 25 November 2009
Foaling Course. Twemlows Hall Stud Farm, 28 February 2010
Working with Soil: Agricultural Land Classification. 1 – 2 November 2017

TRANSPORT ENVIRONMENTAL ASSESSMENT CONTRIBUTIONS

1992	**Port Wakefield Channel Tunnel Freight Terminal, Yorkshire**
1993	**A1(M) Widening, Junctions 1-6 (Stage 2)**
1994 - 1995	**A55 Llanfairpwll to Nant Turnpike, Anglesey (Stage 3)**
1994 - 1995	**A479(T) Talgarth Bypass, Powys (Stage 3)**
1995	**Kilkhampton bypass (Stage 2)**
1997	**A477 Bangeston to Nash improvement, Pembroke**
2000	**Ammanford Outer Relief Road**
2001	**A421 Great Barford Bypass**
2001	**Boston Southern Relief Road**
2003	**A40 St Clears - Haverfordwest**
2003	**A470 Cwmbrach – Newbridge on Wye**
2003	**A11 Attleborough bypass**
2003 - 2008	**A487 Porthmadog bypass (Inquiry 2008)**
2004	**A55 Ewloe Bypass**
2004	**A40 Witney – Cogges link**
2005 – 2007	**A40 Robeston Wathen bypass (Inquiry 2007)**
2005 – 2007	**East Kent Access Road (Inquiry 2007)**
2006	**M4 widening around Cardiff**
2007 – 2008	**A40 Cwymbach to Newbridge (Inquiry 2008)**
2007	**A483 Newtown bypass**
2008 – 2009	**A470/A483 Builth Wells proposals**
2009 – 2017	**A487 Caernarfon-Bontnewydd bypass (Inquiry 2017)**
2009 – 2010	**North Bishops Cleeve extension**
2009 – 2010	**Land at Coombe Farm, Rochford**
2009 – 2011	**A477 St Clears to Red Roses (Inquiry 2011)**
2010 – 2011	**Streethay, Lichfield**
2010 – 2012	**A465 Heads of the Valley Stage 3 (Inquiry 2012)**
2013 – 2016	**A483/A489 Newtown Bypass mid Wales (Inquiry 2016)**
2013 - 2016	**High Speed 2 (HS2) rail link, Country South and London: Agricultural Expert for HS2 Ltd**

2015 – 2017 **A487 Dyfi Bridge Improvements**
2016 – 2018 **A465 Heads of the Valley Sections 5 and 6 (Inquiry 2018)**
2017 - 2018 **A40 Llanddewi Velfrey to Penblewin**
2017 – 2018 **A4440 Worcester Southern Relief Road**
2019 – 2020 **A40 Penblewin to Red Roses**
2019 – 2020 **A55 Jn 15 and 16 Improvements**

NSIP/DCO SOLAR INPUTS

2020 – 2022 **Heckington Fen, Lincolnshire**
Mallards Pass, Lincolnshire/Rutland
Penpergwm, Monmouthshire
Parc Solar Traffwll, Anglesey
Alaw Mon, Anglesey
Parc Solar Caenewydd, Swansea

EXPERT EVIDENCE GIVEN AT PUBLIC INQUIRIES AND HEARINGS

1992	**Brooklands Farm**: Buildings reuse	**Bonehill Mill Farm**: New farm building
	Chase Farm, Maldon: Romoval of condition	
1993	**Haden House**: Removal of condition	**Manor Farm**: New farm dwelling
1994	**Brooklands Farm**: 2nd Inquiry (housing)	**Cameron Farm**: Mobile home
	Barr Pound Farm: Enforcement appeal	**Land at Harrietsham**: Enforcement appeal
	Fortunes Farm Golf Course: Agric effects	
1995	**Village Farm**: New farm dwelling	**Attlefield Farm**: Size of farm dwelling
	Claverdon Lodge: Building reuse	**Bromsgrove Local Plan**: Housing allocation
	Harelands Farm: Barn conversion	**Lichfield Local Plan**: Against MAFF objection
	Castle Nurseries: Alternative site presentation	**Hyde Colt**: Mobile home / glasshouses
1996	**Church View Farm**: Enforcement appeal	**Highmoor Farm**: New farm dwelling
	Flecknoe Farm: Second farm dwelling	**Gwenfa Fields**: Removal of restriction
1997	**Basing Home Farm**: Grain storage issue	**Yatton**: Horse grazing on small farm
	Viscar Farm: Need for farm building / viability	**Newbury Local Plan**: Effects of development
	Lane End Mushroom Farm: Need for dwelling	
1998	**Moorfields Farm**: New farm dwelling	**Two Burrows Nursery**: Building retention
	Maidstone Borough LPI: Effects of dev'ment	**Dunball Drove**: Need for cattle incinerator
	Glenfield Cottage Poultry Farm: Bldg reuse	
1999	**Holland Park Farm**: Farm dwelling / calf unit	**Lambriggan Deer Farm**: Farm dwelling
	Northington Farm: Existing farm dwelling	
2000	**Twin Oaks Poultry Unit**: Traffic levels	**Coldharbour Farm**: Buildings reuse
	Meadows Poultry Farm: Farm dwelling	**Heathey Farm**: Mobile home
	Hazelwood Farm: Beef unit and farm dwelling	**Wheal-an-Wens**: Second dwelling
	Shardeloes Farm: Farm buildings	**Apsley Farm**: Buildings reuse
	Aylesbury Vale Local Plan: Site issues	**Home Farm**: Size of grainstore
	Deptford Farm: Buildings reuse	**A34/M4 Interchange**: Agricultural evidence
2001	**Lambriggan Deer Farm**: Farm dwelling	**Weyhill Nursery**: Second dwelling
	Blueys Farm: Mobile home	**Mannings Farm**: Farm dwelling
2002	**A419 Calcutt Access**: Effect on farms	**Land Adj White Swan**: Access alteration
	Cobweb Farm: Buildings reuse / diversification	**Happy Bank Farm**: Lack of need for building
	Philips Farm: Farm dwelling	**Lower Park Farm**: Building reuse / traffic
	West Wilts Local Plan Inquiry: Dev site	**Stourton Hill Farm**: Diversification
	Manor Farm: Building reuse	
2003	**Fairtrough Farm**: Equine dev and hay barn	**Darren Farm**: Impact of housing on farm
	Hollies Farm: Manager's dwelling	**Greenways Farm**: Farm diversification
	Land at Springhill: Certificate of lawfulness	**Land at Four Marks**: Dev site implications
	Oak Tree Farm: Mobile home	
2004	**Chytane Farm**: Objector to farm dwelling	**Oldberrow Lane Farm**: Relocation of buildings
	Crown East: Visitor facility and manager's flat	**Forestry Building, Wythall**: Forestry issues
	Swallow Cottage: Widening of holiday use	**Lower Dadkin Farm**: Mobile home

	Etchden Court Farm: New enterprise viability	**Villa Vista**: Viability of horticultural unit
	Attleborough Bypass: On behalf of Highways Agency	
2005	**Howells School**: Use of land for horses	**Newton Lane**: Enforcement appeal
	Otter Hollow: Mobile home	**Manor Farm**: Change of use class
	Springfield Barn: Barn conversion	**South Hatch Stables**: RTE refurbishment
	Ashley Wood Farm: Swimming pool	**Trevaskis Fruit Farm**: Farm dwelling
	The Hatchery: Mobile home	**Tregased**: Enforcement appeal
	Stockfields Farm: Building reuse	
2006	**Manor Farm**: Replacement farmhouse	**Bhaktivedanta Manor**: Farm buildings
	Sough Lane: Farm dwelling	**Military Vehicles**: Loss of BMV land
	Whitewebbs Farm: Enforcement appeal	**Ermine Street Stables**: Enforcement appeal
	Land at Condicote: Farm dwelling	**Featherstone Farm**: Replacement buildings
	Rye Park Farm: Enforcement appeal	**Flambards**: Mobile home and poultry unit
	Woodrow Farm: Buildings reuse	**Manor Farm**: Effect of housing on farm
	Rectory Farm: Retention of unlawful bldg	**Goblin Farm**: Arbitration re notice to quit
	Walltree Farm: Retention of structures	**Terrys Wood Farm**: Farm dwelling
	Weeford Island: Land quality issues	**Etchden Court Farm**: Mobile home
	College Farm: Relocation of farmyard	**Hollowshot Lane**: Farm dwelling and buildings
2007	**Woolly Park Farm**: Manager's dwelling	**Barcroft Hall**: Removal of condition
	Park Gate Nursery: Second dwelling	**Kent Access Road**: Effect on farms
	Penyrheol las: Retention of bund	**Greys Green Farm**: Enforcement appeal
	Hucksholt Farm: New beef unit in AONB	**A40 Robeston Wathen bypass**: Underpass
	The Green, Shrewley: Mobile home	**Woodland Wild Boar**: Mobile homes
	Brook Farm: Retention of polytunnels	
2008	**Weights Farm**: Second dwelling	**Whitegables**: Stud manager's dwelling
	Hill Farm: Mobile home	**Balaton Place**: Loss of paddock land
	Relocaton of Thame Market: Urgency issues	**Point to Point Farm**: Buildings / farm dwelling
	Spinney Bank Farm: Dwelling / viability issues	**Norman Court Stud**: Size of dwelling
	Higham Manor: Staff accommodation	**High Moor**: Temporary dwelling
	Robeston Watham bypass: Procedures Hearing	**Land at St Euny**: Bldg in World Heritage Area
	Monks Hall: Covered sand school	**Baydon Meadow**: Wind turbine
	Porthmadog bypass: Road scheme inquiry	
2009	**Claverton Down Stables**: New stables	**Meadow Farm**: Building conversion
	Hailsham Market: Closure issues	**Bishop's Castle Biomass Power Station**: Planning issues
	Gambledown Farm: Staff dwelling	**Foxhills Fishery**: Manager's dwelling
	Oak Tree Farm: Farm dwelling	**Bryn Gollen Newydd**: Nuisance court case
	A470 Builth Wells: Off line road scheme	**Swithland Barn**: Enforcement appeal
	Hill Top Farm: Second dwelling	**Woodrow Farm**: Retention of building
	Sterts Farm: Suitability / availability of dwelling	
2010	**Poultry Farm, Christmas Common**: Harm to AONB	**Stubwood Tankers**: Enforcement appeal
	Wellsprings: Rention of mobile home	**Meridian Farm**: Retention of building
	Redhouse Farm: Manager's dwelling	**Swithland Barn**: Retention of building
	Lobbington Fields Farm: Financial test	
2011	**Fairtrough Farm**: Enforcement appeal	**A477 Red Roses to St Clears**: Public Inquiry
	Etchden Court Farm: Farm dwelling	**Upper Bearfield Farm**: Additional dwelling
	Trottiscliffe Nursery: Mobile home	**North Bishops Cleeve**: Land quality issues
2012	**Tickbridge Farm**: Farm dwelling	**Langborrow Farm**: Staff dwellings
	Blaenanthir Farm: Stables and sandschool	**Heads of the Valley S3**: Improvements
	Land at Stonehill: Eq dentistry / mobile home	**Seafield Pedigrees**: Second dwelling
	Cwmcoedlan Stud: Farm dwelling with B&B	**Beedon Common**: Permanent dwelling
2013	**Barnwood Farm**: Farm dwelling	**Upper Youngs Farm**: Stables / log cabin
	Spring Farm Barn: Building conversion	**Tithe Barn Farm**: Enforcement appeal
	Baydon Road: Agricultural worker's dwelling	**Lower Fox Farm**: Mobile home / building

	Stapleford Farm: Building reuse	**Tewinbury Farm**: Storage barn
	Meddler Stud: Residential development	**Church Farm**: Solar park construction
	Deer Barn Farm: Agricultural worker's dwelling	
2014	**Land at Stow on the Wold**: Housing site	**Land at Elsfield**: Retention of hardstanding
	Allspheres Farm: Cottage restoration	**Queensbury Lodge**: Potential development
	Land at Stonehill: Equine dentistry practice	**Kellygreen Farm**: Solar park development
	Spring Farm Yard: Permanent dwelling	**Spring Farm Barn**: Building conversion
	Land at Valley Farm: Solar park	**Land at Willaston**: Residential development
	Land at Haslington: Residential development	**Bluebell Cottage**: Enforcement appeal
	Manor Farm: Solar farm on Grade 2 land	**Clemmit Farm**: Mobile home
	Penland Farm: Residential development	**Honeycrock Farm**: Farmhouse retention
	Sandyways Nursery: Retention of 23 caravans	**The Mulberry Bush**: Farm dwelling
2015	**The Lawns**: Agricultural building / hardstanding	**Redland Farm**: Residential dev issues
	Harefield Stud: Stud farm / ag worker's dwelling	**Emlagh Wind Farm**: Effect on equines
	Newtown Bypass: Compulsory purchase orders	**Fox Farm**: Building conversion to 2 dwellings
	Barn Farm: Solar farm	**Wadborough Park Farm**: Farm buildings
	Hollybank Farm: Temporary dwelling renewal	**Delamere Stables**: Restricted use
	Five Oaks Farm: Change of use of land and temporary dwelling	
2016	**Clemmit Farm**: Redetermination	**Meddler Stud**: RTE and up to 63 dwellings
	The Lawns: Replacement building	**Land off Craythorne Road**: Housing dev
	Land at the Lawns: Cattle building	**Berkshire Polo Club**: Stables / accomm
2017	**Low Barn Farm**: Temporary dwelling	**Harcourt Stud**: Temporary dwelling
	High Meadow Farm: Building conversion	**Clemmit Farm**: Second redetermination
	Windmill Barn: Class Q conversion	**Stonehouse Waters**: Change of use of lake
	Land at Felsted: Residential development	
2018	**Thorney Lee Stables**: Temporary dwelling	**Watlington Road**: Outline app residential
	Benson Lane: Outline app residential	**A465 Heads of the Valley 5/6**: Agric effects
	Park Road, Didcot: Outline app residential	**The Old Quarry**: Permanent dwelling
	Coalpit Heath: Residential development	**Chilaway Farm**: Removal of condition
2019	**Mutton Hall Farm**: Agric worker's dwelling	**Leahurst Nursery**: Temporary dwelling
	Clemmit Farm: Third redetermination	**Icomb Cow Pastures**: Temp mobile home
	Ten Acre Farm: Enforcement appeal	**Forest Faconry**: Construction of hack pens
	Harrold: 94 Residential dwellings	
2020	**Stan Hill**: Temp dwelling/agric. buildings	**Hazeldens Nursery**: Up to 84 extra care units
	Allspheres Farm: Enlargement of farm dwelling	**Leahurst Nursery**: Agricultural storage bldg
2021	**Ruins:** Dwelling for tree nursery	**Sketchley Lane, Burbage**: Industrial and residential development
2022	**Little Acorns**: Agricultural worker's dwelling	

APPENDIX KCC2

Natural England's Technical Information Note TIN049

Natural England Technical Information Note TIN049

Agricultural Land Classification: protecting the best and most versatile agricultural land

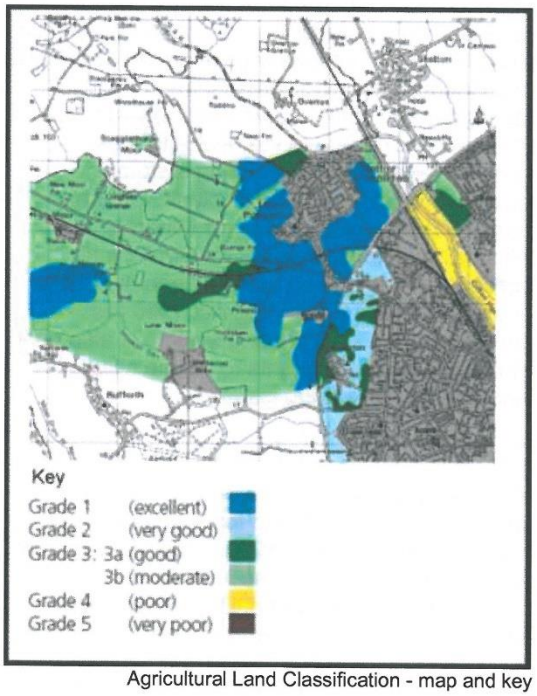
Most of our land area is in agricultural use. How this important natural resource is used is vital to sustainable development. This includes taking the right decisions about protecting it from inappropriate development.

Policy to protect agricultural land

Government policy for England is set out in the National Planning Policy Framework (NPPF) published in March 2012 (paragraph 112). Decisions rest with the relevant planning authorities who should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of higher quality. The Government has also re-affirmed the importance of protecting our soils and the services they provide in the Natural Environment White Paper The Natural Choice:securing the value of nature (June 2011), including the protection of best and most versatile agricultural land (paragraph 2.35).

The ALC system: purpose & uses

Land quality varies from place to place. The Agricultural Land Classification (ALC) provides a method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system. It helps underpin the principles of sustainable development.



Agricultural Land Classification - map and key

Second edition 19 December 2012
www.naturalengland.org.uk

NATURAL ENGLAND

Agricultural Land Classification: protecting the best and most versatile agricultural land

The ALC system classifies land into five grades, with Grade 3 subdivided into Subgrades 3a and 3b. The best and most versatile land is defined as Grades 1, 2 and 3a by policy guidance (see Annex 2 of NPPF). This is the land which is most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non food uses such as biomass, fibres and pharmaceuticals. Current estimates are that Grades 1 and 2 together form about 21% of all farmland in England; Subgrade 3a also covers about 21%.

The ALC system is used by Natural England and others to give advice to planning authorities, developers and the public if development is proposed on agricultural land or other greenfield sites that could potentially grow crops. The Town and Country Planning (Development Management Procedure) (England) Order 2010 (as amended) refers to the best and most versatile land policy in requiring statutory consultations with Natural England. Natural England is also responsible for Minerals and Waste Consultations where reclamation to agriculture is proposed under Schedule 5 of the Town and Country Planning Act 1990 (as amended). The ALC grading system is also used by commercial consultants to advise clients on land uses and planning issues.

Criteria and guidelines

The Classification is based on the long term physical limitations of land for agricultural use. Factors affecting the grade are climate, site and soil characteristics, and the important interactions between them. Detailed guidance for classifying land can be found in: *Agricultural Land Classification of England and Wales: revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988):

- **Climate:** temperature and rainfall, aspect, exposure and frost risk.
- **Site:** gradient, micro-relief and flood risk.
- **Soil:** texture, structure, depth and stoniness, chemical properties which cannot be corrected.

The combination of climate and soil factors determines soil wetness and droughtiness. Wetness and droughtiness influence the choice of crops grown and the level and consistency of yields, as well as use of land for grazing livestock. The Classification is concerned with the inherent potential of land under a range of farming systems. The current agricultural use, or intensity of use, does not affect the ALC grade.

Versatility and yield

The physical limitations of land have four main effects on the way land is farmed. These are:

- the range of crops which can be grown;
- the level of yield;
- the consistency of yield; and
- the cost of obtaining the crop.

The ALC gives a high grading to land which allows more flexibility in the range of crops that can be grown (its 'versatility') and which requires lower inputs, but also takes into account ability to produce consistently high yields of a narrower range of crops.

Availability of ALC information

After the introduction of the ALC system in 1966 the whole of England and Wales was mapped from reconnaissance field surveys, to provide general strategic guidance on land quality for planners. This Provisional Series of maps was published on an Ordnance Survey base at a scale of One Inch to One Mile in the period 1967 to 1974. These maps are not sufficiently accurate for use in assessment of individual fields or development sites, and should not be used other than as general guidance. They show only five grades: their preparation preceded the subdivision of Grade 3 and the refinement of criteria, which occurred after 1976. They have not been updated and are out of print. A 1:250 000 scale map series based on the same information is available. These are more appropriate for the strategic use originally intended and can be downloaded from the Natural England **website**. This data is also available on 'Magic', an interactive, geographical information website **http://magic.defra.gov.uk/**.

Since 1976, selected areas have been re-surveyed in greater detail and to revised

guidelines and criteria. Information based on detailed ALC field surveys in accordance with current guidelines (MAFF, 1988) is the most definitive source. Data from the former Ministry of Agriculture, Fisheries and Food (MAFF) archive of more detailed ALC survey information (from 1988) is also available on **http://magic.defra.gov.uk/**. Revisions to the ALC guidelines and criteria have been limited and kept to the original principles, but some assessments made prior to the most recent revision in 1988 need to be checked against current criteria. More recently, strategic scale maps showing the likely occurrence of best and most versatile land have been prepared. Mapped information of all types is available from Natural England (see *Further information* below).

New field survey

Digital mapping and geographical information systems have been introduced to facilitate the provision of up-to-date information. ALC surveys are undertaken, according to the published Guidelines, by field surveyors using handheld augers to examine soils to a depth of 1.2 metres, at a frequency of one boring per hectare for a detailed assessment. This is usually supplemented by digging occasional small pits (usually by hand) to inspect the soil profile. Information obtained by these methods is combined with climatic and other data to produce an ALC map and report. ALC maps are normally produced on an Ordnance Survey base at varying scales from 1:10,000 for detailed work to 1:50 000 for reconnaissance survey

There is no comprehensive programme to survey all areas in detail. Private consultants may survey land where it is under consideration for development, especially around the edge of towns, to allow comparisons between areas and to inform environmental assessments. ALC field surveys are usually time consuming and should be initiated well in advance of planning decisions. Planning authorities should ensure that sufficient detailed site specific ALC survey data is available to inform decision making.

Consultations

Natural England is consulted by planning authorities on the preparation of all development plans as part of its remit for the natural environment. For planning applications, specific consultations with Natural England are required under the Development Management Procedure Order in relation to best and most versatile agricultural land. These are for non agricultural development proposals that are not consistent with an adopted local plan and involve the loss of twenty hectares or more of the best and most versatile land. The land protection policy is relevant to all planning applications, including those on smaller areas, but it is for the planning authority to decide how significant the agricultural land issues are, and the need for field information. The planning authority may contact Natural England if it needs technical information or advice.

Consultations with Natural England are required on all applications for mineral working or waste disposal if the proposed afteruse is for agriculture or where the loss of best and most versatile agricultural land agricultural land will be 20 ha or more. Non-agricultural afteruse, for example for nature conservation or amenity, can be acceptable even on better quality land if soil resources are conserved and the long term potential of best and most versatile land is safeguarded by careful land restoration and aftercare.

Other factors

The ALC is a basis for assessing how development proposals affect agricultural land within the planning system, but it is not the sole consideration. Planning authorities are guided by the National Planning Policy Framework to protect and enhance soils more widely. This could include, for example, conserving soil resources during mineral working or construction, not granting permission for peat extraction from new or extended mineral sites, or preventing soil from being adversely affected by pollution. For information on the application of ALC in Wales, please see below.

Further information

Details of the system of grading can be found in: *Agricultural Land Classification of England and Wales: revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

Please note that planning authorities should send all planning related consultations and enquiries to Natural England by e-mail to **consultations@naturalengland.org.uk**. If it is not possible to consult us electronically then consultations should be sent to the following postal address:

Natural England
Consultation Service
Hornbeam House
Electra Way
Crewe Business Park
CREWE
Cheshire
CW1 6GJ

ALC information for Wales is held by Welsh Government. Detailed information and advice is available on request from Ian Rugg (**ian.rugg@wales.gsi.gov.uk**) or David Martyn (**david.martyn@wales.gsi.gov.uk**). If it is not possible to consult us electronically then consultations should be sent to the following postal address:

Welsh Government
Rhodfa Padarn
Llanbadarn Fawr
Aberystwyth
Ceredigion
SY23 3UR

Natural England publications are available to download from the Natural England website: **www.naturalengland.org.uk**.

For further information contact the Natural England Enquiry Service on 0300 060 0863 or e-mail **enquiries@naturalengland.org.uk**.

Copyright

Appendix KCC3

Extracts from ALC Methodology (1988)

Ministry of Agriculture, Fisheries and Food

Agricultural Land Classification

of

England and Wales

Revised guidelines and criteria for grading the quality of agricultural land

OCTOBER 1988

CONTENTS

TABLES

TEXT FIGURES

PREFACE

This report provides revised guidelines and criteria for grading the quality of agricultural land using the Agricultural Land Classification (ALC) of England and Wales. The ALC was devised and introduced in the 1960s and Technical Report 11 (MAFF, 1966) outlined the national system, which forms the basis for advice given by the Ministry of Agriculture, Fisheries and Food (MAFF) and Welsh Office Agriculture Department (WOAD) on land use planning matters. Following a review of the system, criteria for the sub-division of Grade 3 were published in Technical Report 11/1 (MAFF, 1976). The classification is well established and understood in the planning system and provides an appropriate framework for determining the physical quality of the land at national, regional and local levels.

Experience gained has shown that some modifications to the ALC system can usefully be made to take advantage of new knowledge and data, to improve the objectivity and consistency of assessments and standardise terminology. The revised guidelines and criteria in this report have been developed and tested with the aim of updating the system without changing the original concepts. A further aim has been to calibrate the revised criteria with those used previously to maintain as far as possible the consistency of grading. The guidelines and methods used to define grades and subgrades are based on the best and most up to date information available but future revisions may be necessary to accommodate new information and technical innovation.

There is a continuing need to distinguish between the better land in Grade 3 and other land in this Grade but it is no longer considered necessary to maintain a threefold division. Two subgrades are now recognised: Subgrade 3a and Subgrade 3b, the latter being a combination of the previous Subgrades 3b and 3c.

Technical Report 11 included proposals for the development of an economic classification system linked to the physical classification. It also identified a number of significant disadvantages for a national system of economic classification, especially the problems associated with the acquisition of objective, up to date, accurate and consistent farm output data. No satisfactory means have been found of overcoming these problems and for this reason economic criteria for grading land have not been adopted. Similarly site specific crop yield data are not regarded as a reliable indication of land quality, because it is not possible to consistently make allowances for variables such as management skill, different levels of input and short-term weather factors.

The principal changes in this revision concern the criteria used to assess climatic limitations and the main limitations involving a climate-soil interaction, namely soil wetness and droughtiness. The revised methods have been developed and evaluated by the Agricultural Development and Advisory Service (ADAS) in close collaboration with the Soil Survey and Land Research Centre (SSLRC, incorporating the Soil Survey of England and Wales) and the Meteorological Office. A number of new and improved climatic datasets have been compiled on the same collaborative basis and these base data are held in LandIS, a computer information system funded by MAFF and developed by SSLRC. The datasets will also be published by the Meteorological Office (in press) and are described in Appendix 1.

The revised system incorporates some features of the 7-class Land Use Capability Classification formerly used by the Soil Survey of England and Wales (Bibby and Mackney, 1969) in which Classes 5, 6 and 7 broadly correspond to Grade 5 of the ALC system. In common with the Scottish Land Capability Classification for Agriculture (Bibby et al, 1982) some of the concepts now introduced originated from the ADAS Land Capability Working Party which met between 1974 and 1981. Although there are similarities with the Scottish system, the Agricultural Land Classification has been developed and calibrated specifically for use in England and Wales. This report describes the criteria and assessment methods which will be used by MAFF and WOAD to classify land. Wherever possible, definitions and methods common to both ADAS and SSLRC have been used.

Acknowledgements

The Ministry is indebted to the Meteorological Office and Soil Survey and Land Research Centre for their assistance, information and advice provided over a period of years. The climate-related components of the system were revised by a working group chaired by A J Hooper (ADAS) and the contributions of J H Minhinick and J F Keers (Meteorological Office), Dr R J A Jones and J M Hollis (SSLRC), D Hewgill, M R Watson and Dr I P Jones (ADAS) are gratefully acknowledged. Valuable assistance was also provided by F Broughton (ADAS). Evaluations and testing of the revised criteria were co-ordinated by M R Watson and carried out by regional staff of the Resource Planning Group, ADAS.

Ministry of Agriculture, Fisheries and Food
October 1988

SECTION 1

INTRODUCTION

The Agricultural Land Classification provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The limitations can operate in one or more of four principal ways: they may affect the range of crops which can be grown, the level of yield, the consistency of yield and the cost of obtaining it. The classification system gives considerable weight to flexibility of cropping, whether actual or potential, but the ability of some land to produce consistently high yields of a somewhat narrower range of crops is also taken into account.

The principal physical factors influencing agricultural production are climate, site and soil. These factors together with interactions between them form the basis for classifying land into one of five grades; Grade 1 land being of excellent quality and Grade 5 land of very poor quality. Grade 3, which constitutes about half of the agricultural land in England and Wales, is now divided into two subgrades designated 3a and 3b. General descriptions of the grades and subgrades are given in Section 2.

Guidelines for the assessment of the physical factors which determine the grade of land are given in Section 3. The main climatic factors are temperature and rainfall although account is taken of exposure, aspect and frost risk. The site factors used in the classification system are gradient, microrelief and flood risk. Soil characteristics of particular importance are texture, structure, depth and stoniness. In some situations, chemical properties can also influence the long-term potential of land and are taken into account. These climatic, site and soil factors result in varying degrees of constraint on agricultural production. They can act either separately or in combination, the most important interactive limitations being soil wetness and droughtiness.

The grade or subgrade of land is determined by the most limiting factor present. When classifying land the overall climate and site limitations should be considered first as these can have an overriding influence on the grade. Land is graded and mapped without regard to present field boundaries, except where they coincide with permanent physical features.

A degree of variability in physical characteristics within a discrete area is to be expected. If the area includes a small proportion of land of different quality, the variability can be considered as a function of the mapping scale. Thus, small, discrete areas of a different ALC grade may be identified on large scale maps, whereas on smaller scale maps it may only be feasible to show the predominant grade. However, where soil and site conditions vary significantly and repeatedly over short distances and impose a practical constraint on cropping and land management a 'pattern' limitation is said to exist. This variability becomes a significant limitation if, for example, soils of the same grade but of contrasting texture occur as an extensive patchwork thus complicating soil management and cropping decisions or resulting in uneven crop growth, maturation or quality. Similarly, a form of pattern limitation may arise where soil depth is highly variable or microrelief restricts the use of machinery. Because many different combinations of characteristics can occur no specific guidelines are given for pattern limitations. The effect on grading is judged according

to the severity of the limitations imposed by the pattern on cropping and management, and is mapped where permitted by the scale of the survey.

The guidelines provide a consistent basis for land classification but, given the complex and variable nature of the factors assessed and the wide range of circumstances in which they can occur, it is not possible to prescribe for every possible situation. It may sometimes be necessary to take account of special or local circumstances when classifying land. For this reason, the physical criteria of eligibility in this report are regarded as guidelines rather than rules although departures from the guidance should be exceptional and based on expert knowledge. Physical conditions on restored land may take several years to stabilise; therefore, the land is not normally graded until the end of the statutory aftercare period, or otherwise not until 5 years after soil replacement.

To ensure a consistent approach when classifying land the following assumptions are made:

1. Land is graded according to the degree to which physical or chemical properties impose long-term limitations on agricultural use. It is assessed on its capability at a good[1] but not outstanding standard of management.

2. Where limitations can be reduced or removed by normal management operations or improvements, for example cultivations or the installation of an appropriate underdrainage system, the land is graded according to the severity of the remaining limitations. Where an adequate supply of irrigation water is available this may be taken into account when grading the land (Section 3.4). Chemical problems which cannot be rectified, such as high levels of toxic elements or extreme subsoil acidity, are also taken into account.

3. Where long-term limitations outside the control of the farmer or grower will be removed or reduced in the near future through the implementation of a major improvement scheme, such as new arterial drainage or sea defence improvements, the land is classified as if the improvements have already been carried out. Where no such scheme is proposed, or there is uncertainty about implementation, the limitations will be taken into account. Where limitations of uncertain but potentially long-term duration occur, such as subsoil compaction or gas-induced anaerobism, the grading will take account of the severity at the time of survey.

4. The grading does not necessarily reflect the current economic value of land, land use, range of crops, suitability for specific crops or level of yield. For reasons given in the preface, the grade cut-offs are not specified on the basis of crop yields as these can be misleading, although in some cases crop growth may give an indication of the relative severity of a limitation.

5. The size, structure and location of farms, the standard of fixed equipment and the accessibility of land do not affect grading, although they may influence land use decisions.

[1] Previously described as 'satisfactory'; no change in the assumed standard of management is intended.

SECTION 2

DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

Grade 1 - excellent quality agricultural land
Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - very good quality agricultural land
Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 - good to moderate quality agricultural land
Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a - good quality agricultural land
Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b - moderate quality agricultural land
Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land
Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor quality agricultural land
Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Descriptions of other land categories used on ALC maps

Urban
Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural
'Soft' uses where most of the land could be returned relatively easily to agriculture, including: golf courses, private parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports/ airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland
Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

Agricultural buildings
Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (e.g. polythene tunnels erected for lambing) may be ignored.

Open water
Includes lakes, ponds and rivers as map scale permits.

Land not surveyed
Agricultural land which has not been surveyed,

Where the land use includes more than one of the above land cover types, e.g. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will usually be shown.

Appendix KCC4

Extracts from the ALC Report (2021)

Appendix H: Agricultural Land Assessment

AGR 4 Solar Limited

AGRICULTURAL LAND
CLASSIFICATION REPORT
FOR PRIORY FARM SOLAR ARRAY

Richard Stock BSc.
September 2021

CONTENTS

1. INTRODUCTION

1.1 Richard Stock was instructed by Axis to prepare an Agricultural Land Classification report on behalf of AGR 4 Solar Limited for Priory Farm Solar Array, to the east of Great Wymondley, Hertfordshire. The survey area covers approximately 85 hectares.

1.2 The report is based on a soil survey which was undertaken between 9th and 11th September 2021 by sampling soil at 80 locations using a 1.2 metre dutch auger and spade and examining two soil profile pits. Further information has been obtained from the MAGIC website and the Soil Survey of England and Wales publications.

1.3 The site is located on the west side of the A1(M) approximately 2 km north of Junction 8. It is centred on National Grid Reference TL 222 286 at an average altitude of 94m AOD.

1.4 The soil survey details have been interpreted to grade the site in accordance with 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) published in 1988. The system considers criteria relating to the **climate,** the **site** and the **soil.**

2. AGROCLIMATIC DATA

2.1 Agroclimatic data for the site influences the agricultural land classification in respect of growing conditions for crops, and the soil reaction in terms of wetness and drought.

2.2 The meteorological office has published agroclimatic data for England and Wales on a five-kilometer grid basis, which can be interpolated to produce data for specific grid points. Although the survey area is over 1km long it is considered that data for the centre of site will be representative of the whole site. The data is shown in the table below.

Grid Reference	TL 222 286
Altitude - ALT	94m
Average Annual Rainfall – AAR (mm)	616
Accumulated Temperature - Jan to June - ATO	1380
Moisture Deficit Wheat - MDMWHT	106
Moisture Deficit Potatoes - MDMPOTS	98
Duration of Field Capacity - FCD	119

2.3 The climatic criteria are considered first when classifying land as climate can be overriding irrespective of soil and site conditions. The main parameters used in the assessment of climatic limitation are Average Annual Rainfall (AAR), as a measure of overall wetness, and Accumulated Temperature (ATO, Jan to June), as a measure of the relative warmth of the area.

2.4 On the basis of Rainfall and Accumulated Temperature, there is no **climatic** limitation to grade.

3 THE SITE

3.1 The site lies on the west side of the A1(M) between Graveley and the villages of Little and Great Wymondley. It comprises 5 gently undulating arable fields lying to the north and south of Graveley Lane. On the north side there are 3 fields which extend from the A1(M) in the east towards Great Wymondley, and on the south side there are 2 fields which extend from the A1(M) in the east towards Little Wymondley.

3.2 The site extends to approximately 85 hectares. At the time of survey cereal crops had been harvested from 4 of the fields and peas from the field at the south end. The fields south of Graveley Lane had been cultivated.

3.3 All the fields are gently undulating around a central elevation of 94m AOD.

3.4 The ground surface generally walked well, but where the land had been cultivated it became sticky after a light shower of rain. The surface stone was predominantly very slight to slight.

3.5 On the basis of **site** characteristics relating to gradient, microrelief and flooding there is no limitation to grade.

4 THE SOILS

4.1 The soils are described in Soil Survey of England and Wales Bulletin 13 (Soils and Their Use in Eastern England) and identified on the 1:250,000 soil map of England and Wales for Eastern England (Sheet 3). The information given in the Bulletin and maps is limited in several ways and is not a definitive soil description. Firstly, soil patterns in England and Wales are commonly complex and vary greatly in composition. Secondly, the minimum area that can be shown on the map is 0.5 km^2 and because of this many soil associations include small patches of soils which, at a larger scale, would be correlated with a different map unit. It is therefore noted that within the limitations of the map, the survey area is shown to comprise 3 different Soil Associations. The site is shown as the Hanslope Association.

4.2 The Hanslope Association is described as '*Slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous clayey soils. Slight risk of water erosion.*' This association includes soils in the Hanslope and Faulkbourne series, which are similar but the Faulkbourne soils are decalcified in the upper layers.

4.3 The soils typically comprise clay or clay loam topsoil overlying slightly stony mottled clay, sometimes with chalk stones at depth. The topsoil is sometimes calcareous but there are significant areas that are decalcified. It is understood that liming is practiced about every 5 years on targeted areas.

4.4 The detailed soil survey broadly confirms the published information, particularly in respect of the variable depth to calcareous clay.

5. AGRICULTURAL LAND CLASSIFICATION

5.1 The site was graded by applying the survey details to the Ministry of Agriculture, Fisheries and Food Guidelines for Agricultural Land Classification (October 1988).

5.2 The current classification system was adopted in 1988 and was a refinement of the previous system. A series of Provisional ALC maps were produced at a scale of 1 inch to 1 mile between 1967 and 1974 based on the earlier classification system and were intended to be for guidance only for strategic planning purposes. A new series of soil maps at a scale of 1:250,000 based on the same information are available on MAGIC, an interactive, geographical information website. The 1:250,000 map for the area suggests that the site falls

into areas covered by Provisional Grades 2 and 3.

5.3 The agricultural land classification system provides a framework for classifying land according to the extent to which it's physical or chemical characteristics impose long-term limitations on agricultural use. The limitations can affect the range of crops that can be grown, the level of yield, the consistency of yield and the cost of obtaining it. The principal factors considered are **Climate, Site and Soil**. These factors, together with interactions between them, form the basis for classifying land into one of five grades. Grade 1 is land of excellent quality and grade 5 is very poor. Grade 3 is divided into sub-grades 3a and 3b since this grade covers about half of England and Wales. The grade or sub-grade is determined by the most limiting factor present.

5.4 On this site there is no limitation to grade according to **Climate**.

5.5 The assessment of **Site** factors considers the way the topography affects agricultural machinery use and crop production. This site comprises gently undulating land and fundamentally offers no restrictions to agricultural use and cropping potential.

5.6 The main **Soil** properties, which may affect cropping potential, are texture, structure, depth, stoniness and chemical fertility. None of the individual properties are limiting to the grade.

5.7 The remaining consideration for ALC grading on this site relates to **Interactive** limitations affected by wetness and drought. The soils fall into 2 main soil types determined by the naturally calcareous nature of the soil. The soils are typically medium, sandy or heavy clay loam over slowly permeable clay.

5.8 With regard to wetness limitation the ALC grade is determined according to Wetness Class and topsoil texture. The ALC System describes the Wetness Class (WC) graphically by reference to the presence of gleying, the duration of field capacity (FCD) and the depth to a slowly permeable layer (SPL). In this climatic area, where there is gleying above 40cm and a slowly permeable layer above 59cm the profile is wetness class III and deeper than 59cm is Wetness Class II. WC III with non-calcareous medium and sandy clay loam topsoil is grade 3a but if the topsoil is naturally calcareous it is up-lifted to grade 2. Heavy clay loam topsoil in WC III is grade 3b but is up-graded to 3a if it is naturally calcareous. In WC II calcareous and non-calcareous medium and sandy clay loam topsoil are both grade 2. Non-calcareous heavy clay loam in WC II is grade 3a, which is up-lifted to grade 2 if it is naturally calcareous.

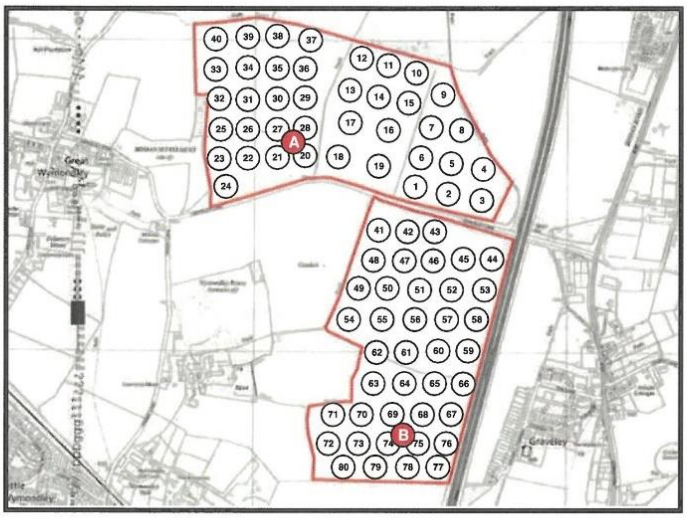
5.9 Droughtiness is assessed by soil Moisture Balance (MB), which is calculated on the basis of crop-adjusted Available Water Capacity of the soil (AP), and Moisture Deficit (MD). AP gives a measure of the amount of water held in the soil which is available to the crop, and the MD part of the calculation is a crop related variable of the balance between rainfall and potential evapotranspiration. The Moisture Balance is the Available Water Capacity less the Moisture Deficit (MB = AP – MD). Moisture balance calculations have been made on representative soil profiles, which confirm a limitation to Grade 2.

5.10 The Agricultural Land Classification Plan reference W29/2 shows the distribution of grades 2, and 3a which is summarised in the table below. Within the Grade 3a land there are individual survey locations of grades 2 and 3b which are too small to map independently.

Grade	Hectares	%
2	27.4	32.2
3a	57.6	67.8
Total	85	100

PLANS

1. **Soil Survey Locations (W29/1)**
2. **Agricultural Land Classification (W29/2)**



CLIENT

AGR 4 Solar Limited

SITE

Priory Farm Solar Array

TITLE

Soil Survey Locations

SCALE NTS

REF W29/1

DATE September 2021

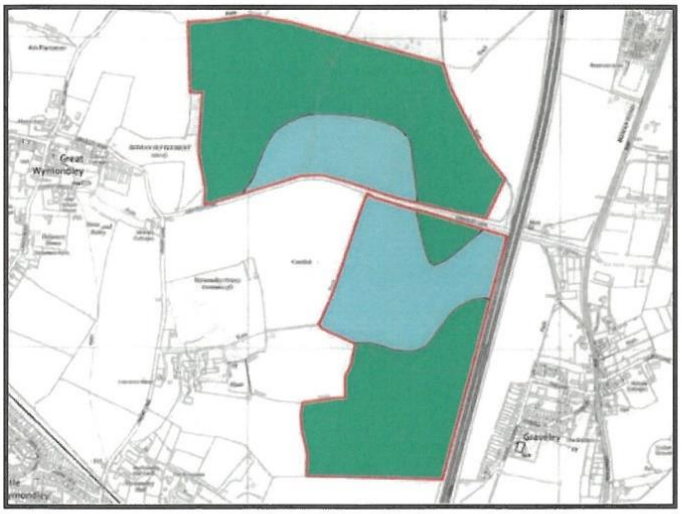
N

LEGEND

Auger location (1)

Pit location (A)

Survey boundary



CLIENT

AGR 4 Solar Limited

SITE

Priory Farm Solar Array

TITLE

Agricultural Land Classification

SCALE NTS

REF W29/2

DATE September 2021

N

LEGEND

Grade 2 Grade 3a Survey boundary

Appendix KCC5
Description of the Installation Process

DESCRIPTION OF THE INSTALLATION PROCESS

Construction Methodology

1 The stages of construction of the panels are described below. These are:

(i) mark-out and lay-out legs;

(ii) piling-in of legs;

(iii) bolting together of frames;

(iv) bolting-on of panels;

(v) cabling and trenching.

2 The machinery used includes:

(i) agricultural loadall;

(ii) tractor and trailer;

(iii) pile driver with rubber tracks;

(iv) standard 360° excavator on tracks with generally small buckets.

3 Panels are installed rapidly. The process involves marking out the grid on the grass and laying out the steel stanchions. This stage is non-instrusive. It does involve machinery carrying the legs, however, and should take place when soils are suitably dry. Typically a tractor and farm trailer are used to transport the legs to the fields, then each leg is lifted off by hand.

4 Alternatively the machinery used will also involve an agricultural loadall or, as per the example below, a smaller loadall in this case with tracks to spread the weight.

Loadall Delivering Legs

5 A team then arrives to knock the stanchions / legs in. From operations we have observed it takes a little over a minute per pole to knock the pole into the ground and move the machine to the next pole[1]. This operation is shown in the photograph below. This was inserting legs into a clay soil, but the deep stoneless soil at Norlington Farm will be similar.

Inserting a Stanchion

6 Typically there will be two or more teams working simultaneously, as shown below.

Team Installing Panels

7 The details vary slightly between panel manufacturers, but the panels will have a taller and shorter stanchion, as shown below. The lack of damage or disturbance to the grassland and ground conditions from this operation is evident in this photograph.

[1] This observation was made on clay soils at the Purton Solar Farm, Wiltshire, in 2015. Ground conditions will inevitably affect installation speed.

Stanchions Inserted (example in Wiltshire)

8 Leg designs vary. A pile of legs is shown below, and the cross section can be seen below and in the ground.

Framework Example

9 The next task is to construct the subframe, which is bolted onto the legs. This does not affect the soil. A loadall machine carries in the subframe and so as long as ground conditions are suitable there is no damage. The assembly team then lift the frame off the loadall and assemble the frame by hand. There are many different designs. The first below is a design not intended for grazing. The second is an installation at Manor Farm, Lanvapley[2].

[2] The Manor Farm project was installed in 2016. The author undertook a site visit in April 2022 to investigate the current conditions of the site and how the land is being farmed during the operational phase of the solar farm development.

Constructing the Frame (Bentham Farm, Wiltshire)

The Frames at Manor Farm, Llanvapley

10 The panels are then attached to the frame. This stage is also non-intrusive to the ground and the only impact is from vehicular access, carrying in the panels. It can be seen that if ground conditions are suitable, there is no damage. The photo simply shows bruised grass from the passage of vehicles.

Panels Added

11 The cabling along the length of the panels is hung underneath the panels (out of the reach of sheep) and then, at the end of a row, it goes underground, as shown below.

Cabling along Panels

12 It is necessary to connect electric cables between the panels and to run the cables back to the substation. This involves trenches, dug with a machine. Immediately after digging these look disruptive to the soil, but they are installed in a similar way to field drainage pipes. Typically topsoil and subsoil are separated, as below.

Cabling Channels

13 The installation of cables is one of the few operations that involves digging whereby the soil structure could potentially be affected. The trenches are always narrow, but soil does have to be dug up to install the cable. In this country we have been burying services (water, oil, gas, telecomms) for many years. In areas where there is a clear subsoil and topsoil distinction, the topsoil should be placed on one side of the trench, and the subsoil on the other. Then once the cable has been laid the subsoil can be added back first, then the topsoil second, to reinstate the soil structure to its original order and state.

14 That means that soils are restored and settle within days, and return to grass growth rapidly.

The Area Two Weeks Later

This photo was taken 14 days after the trench was first dug

15 This particular set of panels is set with the lower edge low to the ground, and so the site is not grazed. The photo shows that there is no evidence of differentiated forage growth over the trench.

Panels After Five Years

16 The route between the legs and the substation is indistinguishable at the Llanvapley site, as shown below. The site is grazed by sheep.

Buried Cables, Monmouthshire

17 With a poorly informed machinery operator, this stage can go wrong. Topsoils and subsoils can get mixed. Topsoils can get placed at the bottom of the trench and subsoils at the top. Properly informed and supervised, this will not happen, and there must be very few machinery operators not aware of how to trench and restore.

18 Critically, however, it would not cause ALC downgrading. The trench is circa 30 - 50cm wide, and even if the excavator operator made a bad mistake (which would be easily seen and so should be capable of being stopped quickly), the mixing of subsoils and topsoils from the trench to the surrounding land, thus rectifying (largely) the error, would be possible after just a few passes with a plough or set of disc cultivators. The ALC system takes one sample very 100 metres. A narrow slit of soil of different texture would not result in ALC downgrading.

Soil Damage from Inserting Legs and Constructing Panels

19 Soil damage should be limited if good practice is followed. The soils are clayey, and therefore sticky when wet but hard and easily trafficked when dry. The installation of legs involves small machinery. The example above involved a pile driver without a cab, at about two tonnes. A three tonne cabbed version is shown below, with people. I compare that to a modern tractor (next to an older one).

Three Tonne Cabbed Pile Driver and Modern Tractor

20 Soil should not be damaged during the installation of legs, because the machinery used is lightweight compared to modern farm machinery.

21 If soil was damaged it can easily be rectified. Soil is frequently affected by agricultural practice. I show below a maize harvest and a photo of soil affected by wheelings during manure spreading. Both show agricultural practice. Neither results in long term damage.

Maize Harvest (Library Photo) and Field Affected by Wheelings During Manure Spreading

22 Even if done poorly it should be possible, and easy, to run a tractor down between the rows of panels with a subsoiler or tines to loosen and restore any compaction. There will be no long-term impact on soils as a result of construction of the panel arrays.

23 There are different models of transformer on the market, so the final details may vary depending upon availability. These stand on concrete bases or pads, and are connected to a drainage system for the water run-off

Transformers at Llanvapley

24 There may also be small connector boxes, such as those shown below.

Connection Boxes

25 The tracks are created by removing the topsoil and then adding stone to the surface. The tracks run along hederows except for the sections shown to access the transformers. These areas can be restored by removing the stone, decompacting the subsoil with agricultural machinery, and replacing the topsoil. The photo below also shows a yard area created for handling the sheep.

Track

26 The soil will be stored in bunds for reuse at the decommissioning stage, as shown below, or will be bunded adjacent to the track.

Storage Bund

27 The construction compound will typically use mats to dissapate weight during use, and will be returned to agriculture after the works are completed.