

Issue number: BT-NG-020627-560-0032

Proposed Grid Supply Point Substation off the A131

Environmental Appraisal
Appendix 9: Agricultural Land Classification
April 2022

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Appendix 9: Agricultural Land Classification

1. Introduction

1.1 Purpose of this Document

- 1.1.1 This appendix sets out the approach to, and results of, the Agricultural Land Classification (ALC) survey relevant to the proposed GSP substation.
- 1.1.2 The report includes the desk-based information collated and the ALC survey information used to assess the land grade according to the ALC system.
- 1.1.3 The extent of the site is shown on Figure 1 of the Environmental Appraisal.

2. Planning Policy and Guidance

- 2.1.1 This ALC assessment is consistent with the direction given by the National Planning Policy Framework (Department for Communities and Local Government, 2021) in paragraph 174 as follows:

‘Planning policies and decisions should contribute to and enhance the natural and local environment by: recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land.

Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality’.

- 2.1.2 Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use, and Grade 5 is very poor quality land, with severe limitations due to adverse soil characteristics, relief, climate or a combination of these. Grade 3 land is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land).
- 2.1.3 Grades 1, 2 and 3a are defined as the best and most versatile (BMV) land.

3. Methodology

- 3.1.1 The Ministry of Agriculture, Fisheries and Food (MAFF, 1988) guidelines contain a system of grading land quality for land use planning. It divides farmland into five grades, according to the degree of limitation imposed upon land use by the inherent physical characteristics of climate, site and soils. Use of the ALC methodology is supported by Natural England Technical Advice Note 049 (TIN049) (Natural England, 2012).
- 3.1.2 No detailed ALC information is available for the site; therefore, a detailed assessment of the site has been undertaken, using the ALC guidelines and criteria (MAFF, 1988).
- 3.1.3 The detailed survey involved examination of the soil’s physical properties at five locations. The locations of the auger points were recorded to enable these to be located in the future, for verification, if necessary.

- 3.1.4 At each location, the soil profile was examined to a maximum depth of 1.2m, where practicable, by hand with the use of a 5cm diameter Dutch soil auger. Soil pits were also excavated at selected locations with an insulated spade in order to examine the physical soil profile characteristics of the main representative soil types, including subsoil structure. The soil profile at each auger or soil pit location was described using the Soil Survey Field Handbook (Hodgson, 1997) and each soil profile was ascribed an ALC grade following the ALC guidelines (MAFF, 1988).
- 3.1.5 The MAFF guidelines (1988) require that the following factors be investigated:
- Climate: Average annual rainfall (AAR) and accumulated temperature (AT0) above 0°C between January and June;
 - Site: Gradient, micro relief and flooding;
 - Soils: Texture, structure, depth, stoniness, and chemical toxicity; and
 - Interactive Factors: Soil wetness, soil droughtiness and liability to erosion.
- 3.1.6 To confirm soil texture, samples were collected from one location and sent to an accredited laboratory for particle size distribution analysis. The data sheets are included as Annex 1 of this Appendix.

4. Assessment

4.1 The site

- 4.1.1 The site is located to the northeast of Wickham St Paul and to the southwest of Sudbury. It is bounded by Butler’s Wood to the north, Waldegrave Wood to the south, the A131 to the east and is surrounded by agricultural land on all other sides.
- 4.1.2 The site covers an area of approximately 7 hectares (ha) as shown on Figure 1. There is an agricultural drain/ditch that crosses the site and flows along its northern boundary, in a westerly direction. This drainage ditch is crossed in two places within the site boundary by existing tracks.
- 4.1.3 The land use within the site at the time of the survey was arable (post-harvest).

4.2 Climate

- 4.2.1 Climatological data for ALC are provided for 5km intersections of the National Grid by the Meteorological Office, in collaboration with the National Soil Resources Institute. The data from these points can be interpolated, providing climate data for specific sites. Interpolated data for the site, representing the main climatic data required to undertake an ALC assessment, is set out in Table 4.1.

Table 4.1: ALC Climate Data (National Grid Reference TL9854 3993)

Parameter	Data
Altitude (m)	70
Average Annual Rainfall (AAR) (mm)	597
Accumulated Temperature (AT0) (day degrees)	1397
Moisture deficit for wheat (mm)	117

Parameter	Data
Moisture deficit for potatoes (mm)	112
Field Capacity Days (FCD)	107

4.2.2 The main parameters used in the assessment of an overall climatic limitation are AAR as a measure of overall wetness, and AT0 as a measure of the warmth in the growing season.

4.2.3 Climate does not impose an overall limitation on ALC grade at this site in relation to the criteria set out in the ALC Guidelines. Climate does, however, have an important influence on the interactive limitations of soil wetness and soil droughtiness. The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

4.3 The site

4.3.1 Gradient, microrelief and flooding can pose limitations to agricultural productivity on a site. The site is relatively flat with no noticeable microrelief. As such neither pose a limitation to the agricultural land grade.

4.3.2 The entire site is within Flood Zone 1, defined as having a low probability of flooding on the Flood Map for Planning (Environment Agency, 2021). As such it is not considered that flood risk poses a limitation to the agricultural land grade.

4.4 Parent materials

4.4.1 The underlying geology is shown to comprise London Clay Formation. Across the entire site this is covered with drift deposits described as Diamicton, a poorly sorted deposit (British Geological Society, 2021).

4.5 Soils

4.5.1 Background information on the soils likely to be present has been taken from the Soil Survey of England and Wales (1983) 1:250 000 soil map. This shows the soils present at the site to comprise soils of the Oak 2 Soil Association. These are described as slowly permeable seasonally waterlogged fine loamy over clayey and fine silty over clayey soils. It is also noted that some soils will have a chalky subsoil.

4.5.2 The ALC survey confirmed the general characteristics described above. Topsoil thickness ranged from 32cm to 42cm and is likely to represent the general plough depth. All profiles exhibited evidence of gleying in the subsoil, with one profile also showing evidence of gleying in the topsoil. The topsoil had a clay loam texture, with one profile recorded as having a silty clay loam texture, with the subsoil texture ranging from clay loam to heavy silty clay loam.

4.5.3 Augering at three of the survey locations was stopped between 70-80cm below ground level due to obstructions, likely to be larger stone material and reflective of the poorly sorted nature of the drift deposits.

4.5.4 An assessment of the detailed soil characteristics and how they influence soil wetness and droughtiness limitations to ALC grade is presented in Section 4.6 below.

4.6 Interactive factors

- 4.6.1 The profiles all exhibit a wetness limitation. The texture of the topsoil, combined with the presence of a slowly permeable layer, result in the soil profiles all being defined as Wetness Class III. This limits the grade to Grade 3a in all but one profile. At auger location 4, whilst the texture is similar to the other profiles, the topsoil is calcareous and this reduces the influence of the wetness limitation, meaning that this profile would be assigned to Grade 2 in the absence of any other limitation.
- 4.6.2 The moisture deficit associated with potatoes, as set out in the ALC Guidelines (MAFF, 1988) results in a droughtiness limitation, limiting the land grade to Grade 3a across the entire site.
- 4.6.3 The droughtiness calculations would be affected by the fact that augering at three locations was limited by stones. However, as exposing the full profile to 1.2m below ground level at the other auger locations, where the soil characteristics in terms of texture were very similar, did not result in a different land grade, it is considered that the assessment made based on available data remains correct.

5. Agricultural Land Classification Grade Distribution

- 5.1.1 The entire site has been mapped as Grade 3a as shown in Table 5.1. Whilst one auger location was assessed as being Grade 2 land in relation to a wetness limitation, this auger location has a droughtiness limitation to Grade 3a.

Table 5.1: ALC grade distribution

ALC Grade	Area	%
Grade 1	0	
Grade 2	0	
Grade 3a	7ha	100
Grade 3b	0	
Grade 4	0	
Grade 5	0	

- 5.1.2 Grade 3a land covers the entire site is comprised of Grade 3a land, an area of approximately 7ha. This is considered to be BMV land.
- 5.1.3 Braintree is primarily a rural district comprising a high proportion of high quality agricultural land. The Agricultural Land Classification Statistics (the Multi-Agency Geographic Information for the Countryside (MAGIC) website, 2022) show that Grade 2 and Grade 3 land (the data do not separate out Grades 3a and 3b) comprise 95.7% of the District, with Grade 2 land comprising 65.8% of this. As such, in the local context, the loss of the Grade 3a land at the site would be small with a localised impact.

6. Soil Management

6.1 During construction

- 6.1.1 Appendix 1 (Construction Environmental Management Plan (CEMP)) includes measures to manage dust, waste, water, noise, vibration and soil during construction.
- 6.1.2 Soil handling and re-use will be undertaken in accordance with the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Measures would include but not be limited to the following:
- recording the soil resources present;
 - how the topsoil and subsoil will be stripped and stockpiled;
 - suitable conditions for when soil handling will be undertaken, for example avoiding handling of soil when in a plastic state;
 - indicative soil storage locations;
 - how soil stockpiles will be designed taking into consideration site conditions and the nature/composition of the soil;
 - suitable protective surfacing where soil stripping can be avoided, based on sensitivity of the environment and proposed works;
 - approach to reinstating soil that has been compacted, where required; and
 - details of measures required for soil restoration.
- 6.1.3 Where land is reinstated or where habitat is created according to Figure 4 of the Environmental Appraisal, the appropriate soil conditions (for example through the replacement of stripped layers and the removal of any compaction) will be recreated. This will be achieved to a depth of 1.2m (or the maximum natural soil depth if this is shallower).

6.2 During operation

- 6.2.1 It is not considered likely that soils will be affected during operation.

7. Conclusions

- 7.1.1 This ALC assessment, undertaken to support the planning application for the proposed GSP substation off the A131, has been undertaken in line with the published guidelines (MAFF, 1988). The desk-based and field survey data has shown that the entire site comprises Grade 3a land, which is considered to be best and most versatile. Section 5 of the Planning Statement sets out the alternatives considered and the justification for this site being selected as the preferred option.
- 7.1.2 Measures have been proposed to ensure the appropriate handling of soils and the reinstatement where possible or their effective re-use within the site to support landscape planting. All soil handling and re-use will be undertaken in line with published guidance as set out in the Appendix 1 (CEMP) of the Environmental Appraisal.

References

- British Geological Society (2021). Geology of Britain viewer. <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> - Accessed in March 2022.
- Department for Communities and Local Government (2021). National Planning Policy Framework (NPPF) <https://www.gov.uk/government/publications/national-planning-policy-framework--2>
- Department for Environment Food and Rural Affairs (Defra) (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.
- Environment Agency (2021). Flood map for planning. <https://flood-map-for-planning.service.gov.uk/> - Accessed March 2022.
- Hodgson, J. M. (Ed) (1997). Soil Survey Field Handbook: Describing and Sampling Soil Profiles. Cranfield University.
- MAGIC (2022) *MAGIC on the MAP*. Online at: <https://magic.defra.gov.uk/magicmap.aspx> [Accessed March 2022]
- Ministry of Agriculture, Fisheries and Food (MAFF) (1988) Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land.
- Natural England (2012) Natural England Technical Information Note 049. Agricultural Land Classification: protecting the best and most versatile agricultural land.
- Soil Survey of England and Wales (1983). 1:250 000 Soil Map of England and Wales

Annex 1: Agricultural Land Classification Lab Data and Logs



Analysis Results (SOIL)

Customer ARCADIS
ELSMONT
ASH ROAD
STROUD
GL5 3NZ

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

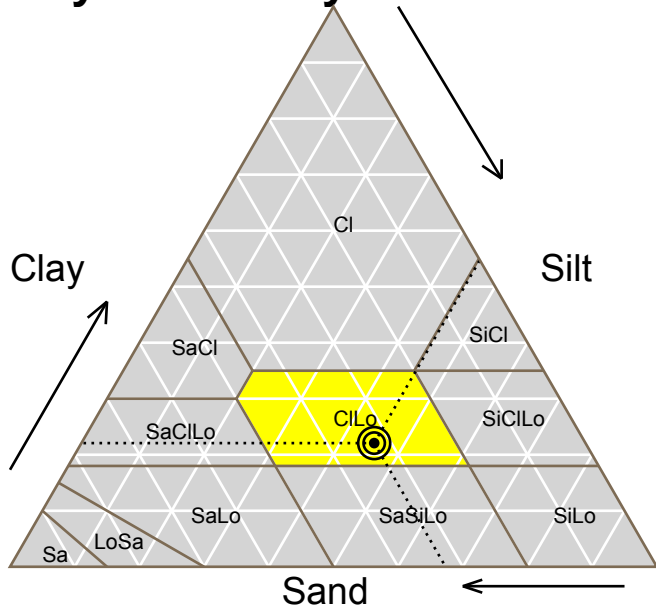
Sample Ref SS-03-TS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/01

Crop

Physical Analysis



Analysis	Result (%)
Sand	32.66
Silt	45.26
Clay	22.08
Very Fine Sand	10.25
Fine Sand	14.49
Medium Sand	7.86
Coarse Sand	0.06
Very Coarse Sand	< 0.01
Stones >2mm	7.20
Soil Type	CI Lo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium



Analysis Results (SOIL)

Customer ARCADIS
ELSMONT
ASH ROAD
STROUD
GL5 3NZ

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

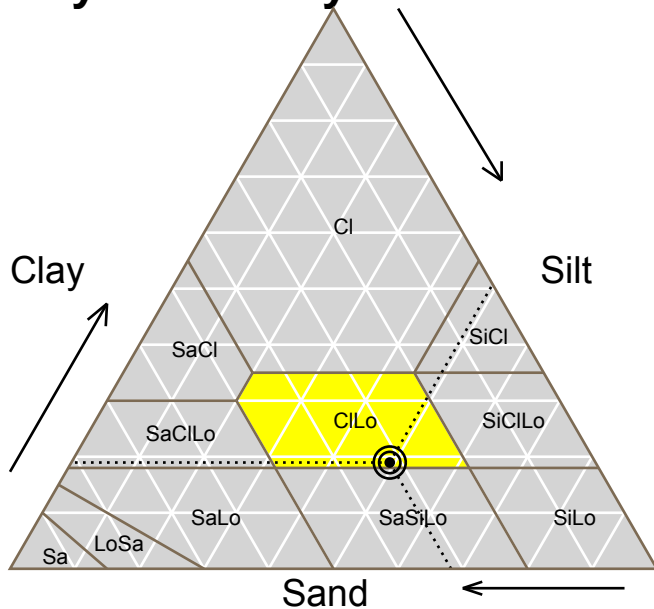
Sample Ref SS-03-SS

Date Received 19/01/2022 (Date Issued: 25/01/2022)

Sample No G05767/02

Crop

Physical Analysis



Analysis	Result (%)
Sand	31.81
Silt	49.22
Clay	18.97
Very Fine Sand	13.39
Fine Sand	9.44
Medium Sand	8.10
Coarse Sand	0.88
Very Coarse Sand	< 0.01
Stones >2mm	7.80
Soil Type	ClLo Clay Loam

Property	Assessment
Available Water	Medium to High
Drainage Rate	Medium to Slow
Inherent Fertility	Medium to High
Potential C.E.C.	Medium to High
Leaching Risk	Moderate to Low
Warming Rate	Medium

Code	Location				
10044940	GSP Substation				
Date(s)		Surveyor(s)		Company	
24-Nov-21		BL/AS		Arcadis	
Weather		Relief		Land use and vegetation	
Dry, sunny		Flat ground - no gradient or microtopographical limitations		Arable	
NGR			Altitude		
TL98543993			70m		
MAFF prov		MAFF detailed		Flooding	
Grade 2		None available		Entire site within Flood Zone 1 - low probability of flooding	
AAR	ATO	MDw	MDp	PCD	Climate grade
597	1397	117	112	107	Grade 1 potential Flat site so no local climatic limitations
Bedrock		Superficial deposits			
London Clay Formation - Clay, Silt And Sand. Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period.		Lowestoft Formation - Diamicton. Superficial Deposits formed up to 2 million years ago in the Quaternary Period.			
Soil data		Soil association(s)			
SSEW 1:250 000 mapping		Oak 2. Slowley permeable seasonally waterlogged fine loamy over clayey and fine silty over clayey soils. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging. Some clayey soils with chalky subsoils.			

Point	What3Words	Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix		Mottle 1		Mottle 2		Texture	Stones		Struture	Calc.	Mn C	SPL	Drought			Wet	Classification		Point notes
						Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour	%		Type	MBw					MBp	Gd	WC		Grade	Limitation	
1	nets.paper.highlighted	70	0	N/A	Arable	0	42	42	10YR 3/3	Very fine, 1%	2.5YR 5/8	N/A	N/A	cl	2	Hard		Fine sub-angular blocky	1%	N	Y	38.4	-10.4	3a	III	3a	Wetness + droughtiness	
2	router.shut.otter	70	0	N/A	Arable	0	33	33	10YR 6/2	N/A	N/A	N/A	N/A	cl	2	Hard		Fine sub-angular blocky	N	N	Y	38.3	-17.4	3a	III	3a	Wetness + droughtiness	
3	faunting.send.expel	70	0	N/A	Arable	0	32	32	10YR 6/2	Fine, 35%	7.5YR 5/8	N/A	N/A	hzcl	2	Hard		Medium to coarse sub-angular blocky	N	N	Y				III	3a	Wetness + droughtiness	
4	reaction.sprouting.videos	70	0	N/A	Arable	0	32	32	10YR 4/3	N/A	N/A	N/A	N/A	cl	1	Hard		Fine sub-angular blocky	1%	N	Y	-11.6	-17.3	3a	III	3a	Wetness + droughtiness	STOP (hard stone)
5	lasts.crucially.dizziness	70	0	N/A	Arable	0	36	36	10YR 4/3	N/A	N/A	N/A	N/A	cl	1	Hard		Fine sub-angular blocky	5%	Y	Y	-10.8	-14.1	3a	III	3a	Wetness + droughtiness	STOP (hard stone)
						36	70	34	Gley 1 / 10Y	Fine, 50%	7.5YR5/8	N/A	N/A	cl	2	Hard		Coarse sub-angular blocky	N	Y	Y				III	3a	Wetness + droughtiness	STOP (hard stone)
						0	34	34	10YR 4/3	N/A	N/A	N/A	N/A	mzcl	1	Hard		Fine sub-angular blocky	N	Y	Y	0.5	-13.7	3a	III	3a	Wetness + droughtiness	
						34	79	45	2.5Y 5/2	Fine, 50%	7.5YR5/8	N/A	N/A	zcl	5	Hard		Coarse sub-angular blocky	N	Y	Y				III	3a	Wetness + droughtiness	STOP (hard stone)

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