

STANSTED SOLAR FARM

Agricultural Resources Report

OXF 11537

Stansted Solar Farm Project
September 2021

AGRICULTURAL LAND CLASSIFICATION

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Contents

1.	INTRODUCTION.....	1
2.	METHODOLOGY.....	2
3.	LOCATION, LAND USE, TOPOGRAPHY AND CLIMATE	3
4.	PUBLISHED GEOLOGY AND SOILS	5
5.	RPS DETAILED SURVEY INFORMATION	6
6.	AGRICULTURAL LAND USE	8
7.	ANALYSIS AND CONCLUSION.....	9
8.	REFERENCES.....	10

Figures

Appendices

Appendix 1 - Auger Boring Descriptions

1. INTRODUCTION

- 1.1 This report presents an assessment of the agricultural resources affected by the proposed solar farm at Stansted, Essex. The agricultural resources considered in the report include:
- The quality of the agricultural land, according to the 1988 Ministry of Agriculture Revised Agricultural Land Classification (ALC) System; and
 - The current farming land use within the Site
- 1.2 The methodology for data collection is presented in Section 2 of the report. Section 3 describes the location, topography and climatic characteristics of the Site and Section 4 describes the published geological, soils and DEFRA ALC information relevant to this Site. Section 5 describes the results of RPS ALC work carried out on the Site and Section 6 considers the current farming land use on the Site. Section 7 provides an analysis of the effects of the proposal on agricultural resources in the context of current National Policy.

2. METHODOLOGY

2.1 The agricultural resources that have been included in the study are agricultural land quality and soil resources. The methods used to collect data on these agricultural resources are described below.

Agricultural Land Classification

2.2 The assessment of the effects on agricultural land quality and soil resources is based on a desk top assessment of relevant published information and a detailed site survey.

Desk Top Study

2.3 The desk top study included the following information:

- Climatic data from the Met Office's standard 5km grid point data set for a representative point near the centre of the Site. This information is relevant to the assessment of key criteria within the Agricultural Land Classification system;
- Geological Information from British Geological Survey Internet Portal at www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html, consulted October 2019;
- Soil Information from the National Soil Map published by the Soil Survey of England and Wales (1:250,000), specifically Sheet 4 (Eastern England) and accompanying Bulletin (1984);
- Soil Survey of England and Wales (Sheet 148, Saffron Walden)1:63,360;
- MAFF (1977) 1:250,000 series Agricultural Land Classification (South East Region);
- Detailed DEFRA survey information for this Site;
- Results of previous detailed ALC survey work undertaken on this Site in 2006.

3. LOCATION, LAND USE, TOPOGRAPHY AND CLIMATE

Location and Land Use

- 3.1 The agricultural land within the Site comprises predominantly arable agricultural land and lies to the south east of Stansted Airport to the south of Mill End.

Topography

- 3.1.2 This is an area of gently sloping land which rises gradually south to north from approximately 90 to 100m AOD. Gradient does not limit the quality of the agricultural land on the Site.

Climate

Climate Information

- 3.2 The climatic information needed to apply the Agricultural Land Classification system has been obtained from the LandIS 5km grid point dataset. This is a specialist agroclimatic dataset, collated specifically by the Meteorological Office and the Soil Survey Land Research Centre for use in determining the detailed ALC of individual sites. The definition and the application of the different climatic parameters from the dataset in the ALC system is described below:
- Average Annual Rainfall. This is the average total of rainfall, measured in mm, at a given location based on a Met Office rainfall dataset for 1941 – 1970. This parameter is used in conjunction with the accumulated temperature to assess an overall climatic limitation within the ALC system;
 - Accumulated Temperature. The excess of daily air temperatures above a selected threshold temperature, 0 degrees Celsius, summed between January to June.
 - Moisture Deficit for wheat and potatoes. This is a crop-adjusted figure which represents the balance between rainfall and potential evapotranspiration calculated over a critical portion of the growing season. This parameter is used in the determination of droughtiness limitations within the ALC system.
 - Field Capacity Duration. The duration of the period when the soil moisture deficit is at zero. Soils usually return to field capacity (zero deficit) during the autumn or early winter and the field capacity period, measured in days, ends in spring when evapotranspiration exceeds rainfall and a moisture deficit begins to accumulate. This parameter is used in the determination of a wetness limitation within the ALC system.

3.3 Data for the Site is as follows:

Reference Point	
Altitude (m)	95
Accumulated Temperature ATO (day degrees)	102
Average Annual Rainfall AAR (mm)	628
Climatic Grade	1366
Field Capacity Duration (days)	110
Moisture Deficit for wheat (mm)	103
Moisture Deficit for potatoes (mm)	121

4. PUBLISHED GEOLOGY AND SOILS

Geology

- 4.1 The geological map for this area (British Geological Sheet 222, Great Dunmow, published at 1:50,000) shows the land as glacial till locally known as Chalky Boulder Clay. At depth this is a dark grey clay with lumps of chalk, but nearer the surface, within the top 1 to 2m it has weathered and the chalk content reduces. There are many instances where the upper part of the glacial till has been completely de-calcified.

Published Soils Information

- 4.2 The Site is covered by a reconnaissance soil map produced in 1969 by the Soil Survey of England and Wales (Sheet 148, Saffron Walden) shows broad groupings of soils called Soil Associations, which are closely linked to the geological parent material.
- 4.3 The main areas of Chalky Boulder Clay as shown on the published geological sheet are shown on Sheet 148 to comprise soils from the Hanslope Association or grouping of soils (Association 6). This is named after one of its typical components, the Hanslope series, which is an imperfectly drained, calcareous, clayey soil. Similar soils with both better and worse drainage (Stretham and Ragdale series respectively) are also present within the Association, as are a range of soils on partially or wholly decalcified Boulder Clay such as the Faulkbourne and Oak series.

Published DEFRA Agricultural Land Classification Information

- 4.4 The published MAFF 1 inch to 1 mile provisional ALC Sheet 148 and the accompanying report show the Site and virtually all of the areas of Chalky Boulder Clay and Hanslope Association in the vicinity of Stansted as Grade 2.
- 4.5 Further surveys of Grade 2 land associated with the Chalky Boulder Clay have been carried out by DEFRA in the vicinity, as shown on Figure 1, which show the land to comprise a mixture of Grades 2, 3a and 3b.

5. RPS DETAILED SURVEY INFORMATION

Agricultural Land Classification - Site Inspection

- 5.1 The Site was surveyed in detail in 2007 by RPS, and the author of this report, in connection with the Stansted G2 project. The survey included the examination of hand auger borings at a density of 1 per ha together with soil pits examined to confirm the soil characteristics identified through the auger boring survey. The location of the auger borings across the Site and immediate vicinity is shown on Figure 2 and the resulting classification of the land is shown in Figure 3. The auger boring descriptions are attached at Appendix 1. This survey data was provided in the Stansted G2 Environmental Statement and the results of this work remain valid for the classification of this Site.
- 5.2 The overriding limitation on the quality of the agricultural land is the susceptibility to soil wetness and the degree to which this limits the agricultural land quality within the survey area depends on the combination of:
- the topsoil texture of the soil profile, typically heavy clay loam or clay;
 - the presence and depth of gleying within the soil profile;
 - the depth within the soil profile to the slowly permeable layer (SPL). This is a poorly structured horizon that inhibits the movement of water through the soil profile; and
 - the degree to which the soil profile is calcareous.
- 5.3 The types of soil profiles identified within the survey and their gradings according to soil wetness are described below:
- profiles with a heavy clay loam topsoil or calcareous clay topsoil where there is no gleying or an SPL (Wetness Class I) are graded 2;
 - profiles with a calcareous clay or heavy clay loam topsoil texture, gleyed within 40cm of the surface with an SPL between 60 – 80cm depth, or gleyed below 40cm and with a SPL between 40 and 80cm depth (Wetness Class II) are graded 2;
 - profiles with a calcareous clay or heavy clay loam topsoil texture, gleyed within 40cm of the surface with an SPL within 60cm (Wetness Class III) are graded 3a;
 - profiles with a non-calcareous clay or heavy clay loam topsoil texture, gleyed within 40cm of the surface with a slowly permeable layer within 60cm (Wetness Class III) are graded 3b.

5.4 The areas and percentages of ALC Grades across the Site are therefore as follows:

Grade	Area (ha)	Percentage (%)
2	1.35	6
3a	15.1	70
3b	5.3	24
Total	21.75	100

6. AGRICULTURAL LAND USE

- 6.1 The land within the Site is currently being farmed by a farming enterprise based at Parkers Farm, Takeley on a short-term farm business tenancy (FBT) where notice has recently been served.
- 6.2 The holding comprises a large arable based farming enterprise comprising more than 200ha of land. The continued operation of this large arable based farming enterprise would not be jeopardised by the loss of this land held on the basis of a short term FBT.

7. ANALYSIS AND CONCLUSION

- 7.1 The weight to be attached to the area of agricultural land affected by the proposal in the overall planning balance should be considered in the context of the relevant national and local planning framework.
- 7.2 The National Planning Policy Framework (NPPF) 2021, sets out the Government's planning policies for England and how these are expected to be applied. Section 15, Paragraph 174 states that:
- Planning policies and decisions should contribute to and enhance the natural and local environment by:*
- a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
- b) 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, and of trees and woodland*
- 7.3 The best and most versatile land is defined as land graded 1, 2 or 3a according to the MAFF ALC guidelines 1988.
- 7.4 The Site comprises a total of approximately 16.45 ha of the best and most versatile agricultural land, but the majority of this, 15.1 ha, comprises the lowest within this category as Subgrade 3a land. The survey work carried out by DEFRA in the vicinity of the Site and the RPS survey of over 400ha of land in 2007 (as part of the Stansted Airport G2 project) have identified that high quality Subgrade 3a and Grade 2 land dominates this area of chalky boulder clay, as it does across large swathes of Eastern England.
- 7.5 The use of this land for this solar farm project would not, in any event, lead to the permanent loss of the agricultural quality of the land, which could be reinstated to its former agricultural use following decommissioning. There would also be no effect on the structure of farming land use or productivity within the area. The land is currently farmed on the basis of a short term tenancy by a large arable farming enterprise where the continued operation of the holding will not be jeopardised by the loss of the land held on this short term arrangement.
- 7.6 The development of the Site as a solar farm would therefore affect an area of typical boulder clay land which would not affect agricultural productivity or the viability of individual farm holdings and where the land could be returned to its former use, following decommissioning. It would not therefore lead to permanent losses of the best and most versatile land according to the NPPF.

8. REFERENCES

MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for grading the quality of agricultural land MAFF Publications,

MET OFFICE (1989) Climatological Data for Agricultural Land Classification Meteorological Office Bracknell

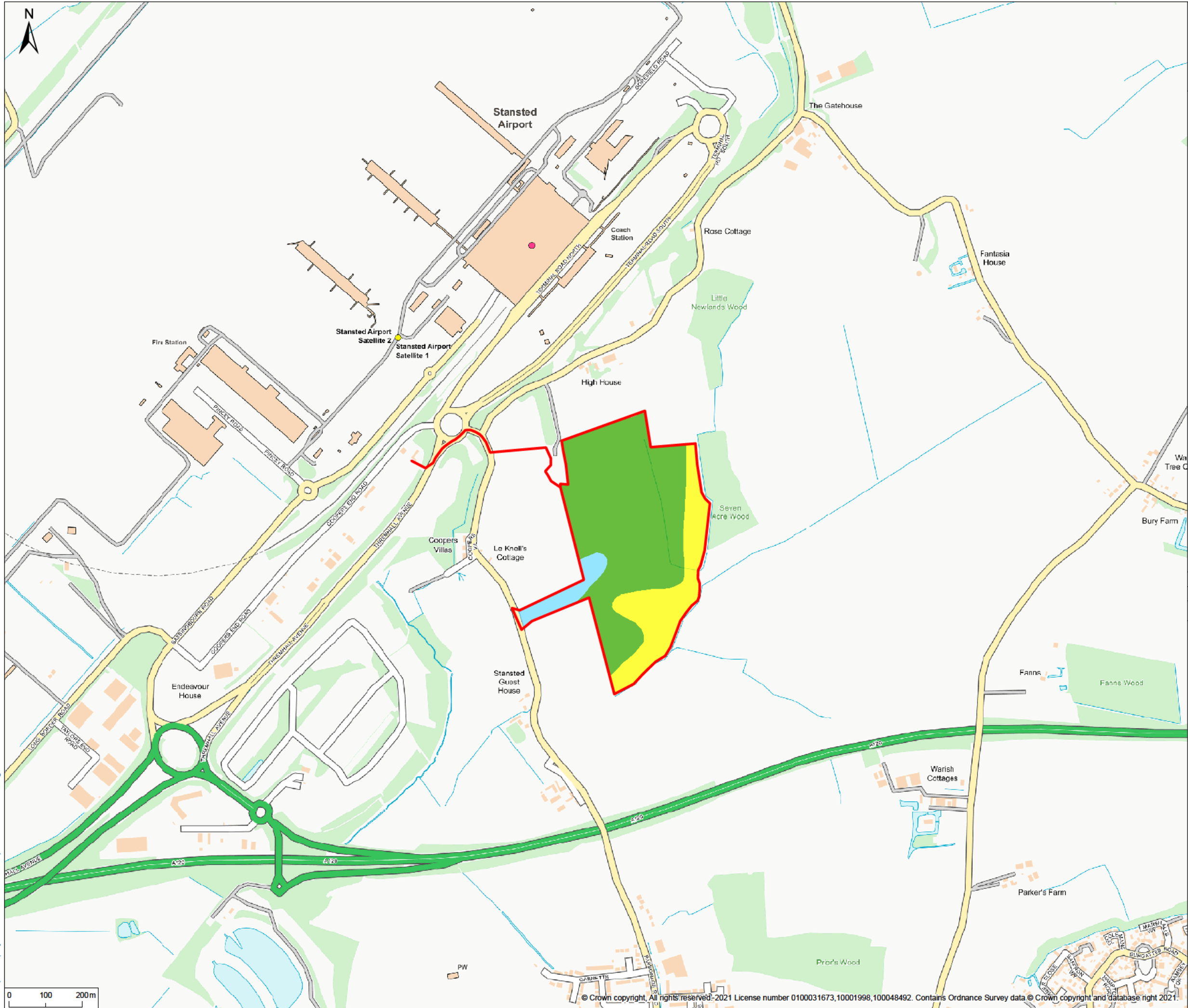
SOIL SURVEY OF ENGLAND AND WALES (1984) Soils and Their Use in Eastern England

British Geological Survey Viewer: [REDACTED]

Soil Survey of England and Wales (Sheet 148, Saffron Walden)1:63,360



FIGURES



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- Legend**
- Site Boundary
 - ALC 2
 - ALC 3a
 - ALC 3b

Rev	Description	By	CB	Date



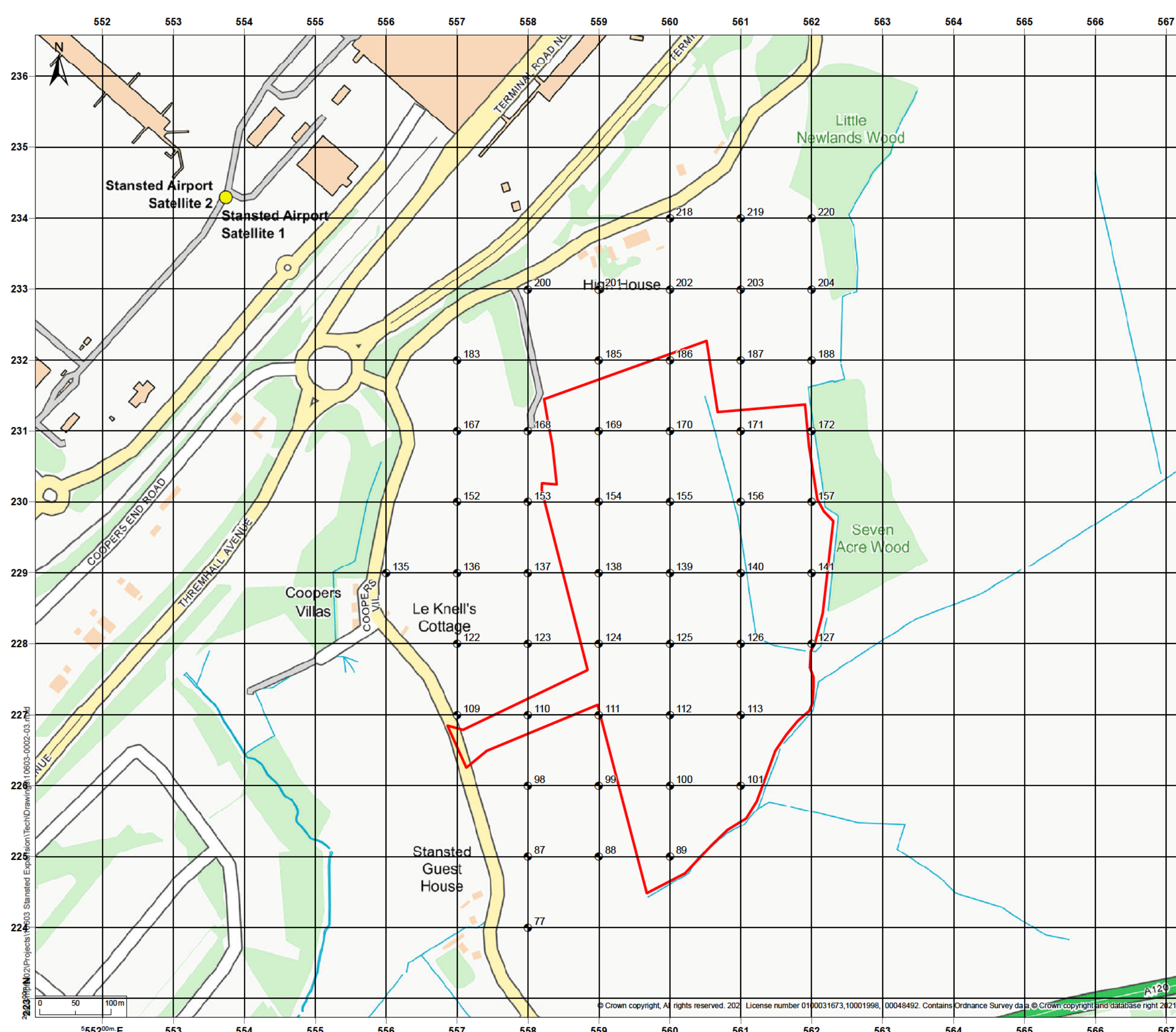
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 Project **Stansted Solar Farm Project**
 Title **Agricultural Land Classification Survey**

Status	Drawn By	PM/Checked By
ISSUE	BG	JT
Project Number	Scale @ A3	Date Created
OXF10603	1:10,000	AUG 2021
Figure Number		Rev
3		-

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- Legend**
- Site Boundary
 - Auger Boring Location

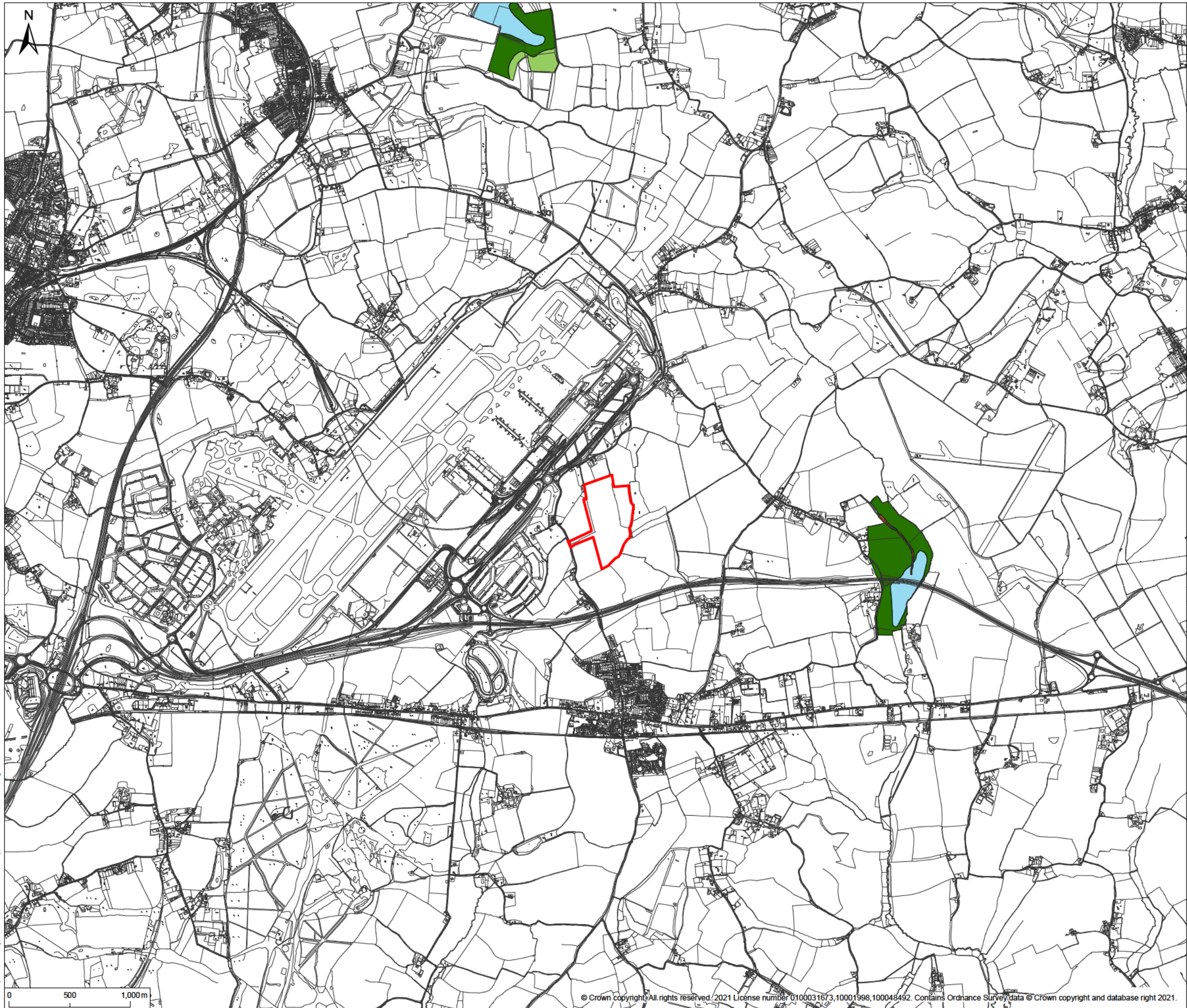
Rev	Description	By	CB	Date

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 Title **Auger Boring Location Plan**

Status **DRAFT** Drawn By **BG** PM/Checked By **JT**
 Project Number **OXF10603** Scale @ A3 **1:5,000** Date Created **SEP 2021**
 Figure Number **2** Rev -

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- Legend**
- Site Boundary
 - Agricultural Land Classification**
 - Grade 1
 - Grade 2
 - Grade 3a
 - Grade 3b
 - Grade 4
 - Grade 5
 - Not Surveyed
 - Other

Rev	Description	By	CB	Date



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 Title **ALC DEFRA Context Plan**

Status	Drawn By	PM/Checked By
DRAFT	BG	JT
Project Number	Scale @ A3	Date Created
OXF10603	1:30,000	SEP 2021
Figure Number		Rev
1		-

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APPENDICES

APPENDIX 1

Auger Boring Descriptions

Stansted Solar Farm Auger Boring Descriptions

Key

Textures

HCl Heavy Clay Loam

C Clay

SC Sandy clay

Colours

DB – Dark Brown

B – Brown

G – Grey

GB- greyish brown

YB – yellowish brown

RB – reddish brown

Others

SPL – slowly permeable layer

O – ochreous mottles

G – grey mottles

Calc - calcareous

Number	Depth	Colour	Texture	Depth to SPL	Wetness Class	Grade
77	0 - 29	DGB	c			
	29 +	G, o & gb	c	29	III	3b
87	0 - 26	DB	c, calc			
	26 - 45	B, o	c, calc			
	45 - 70	B, o & g	c, calc			
	70 +	B, o & g	sc, stony	45	III	3a
88	0 - 27	DGB	c			
	27 +	B, o & gb	c	>70	II	3a
89	0 - 28	DGB	c			
	28 +	G, o & gb	c	28	III	3b
98	0 - 25	DB	c, calc			
	25 - 45	B, o	c, calc			
	45 +	YB, o & g	c, chalky	45	III	3a
99	0 - 25	DB	c, calc			
	25 - 45	B, o	c, calc			
	45 +	YB, o & g	c, chalky	45	III	3a

Number	Depth	Colour	Texture	Depth to SPL	Wetness Class	Grade
100	0 - 24	DGB	c, calc			
	24 - 45	B, o	c, calc			
	45 +	YB, o & g	c, calc	45	III	3a
101	0 - 24	DGB	c			
	24 +	G, o & gb	c	24	III	3b
109	0 - 25	DB	c, calc			
	25 - 35	B	c, calc			
	35 - 50	GB, o	c, calc			
	50 +	YB, o & g	c, calc	50	III	3a
110	0 - 27	DGB	c, calc			
	27 - 45	B	c, calc			
	45 +	B, o	c, calc	50	II	2
111	0 - 33	DB	c, calc			
	33 +	YB, o & g	c, chalky	33	III	3a
112	0 - 27	DGB	c			
	27 - 40	B, o	c			
	40 +	GB, o	c	27	III	3b
113	0 - 28	DGB	c			
	28 - 45	B, o	c			
	45 +	GB, o	c	28	III	3b
122	0 - 25	DB	c, calc			
	25 - 35	B, o	c, calc			
	35 +	YB, o & g	c, calc	35	III	3a
123	0 - 31	DGB	hcl, calc			
	31 - 40	GB, o	c, calc			
	40 +	GB, o & g	c, calc	40	III	3a
124	0 - 30	DB	c, calc			
	30 - 50	GB, occ o	c, calc			
	50 - 60	GB, o	c, calc			
	60 +	GB, o & g	c, calc	60	II	2
125	0 - 29	DB	c			
	29 - 50	B	c			
	50 - 75	B, o	c			
	75 +	B, o & g	c	50	II	3a

Number	Depth	Colour	Texture	Depth to SPL	Wetness Class	Grade
126	0 - 24	DB	c, calc			
	24 - 60	YB, o & g	c, calc			
	60 +	YB, o & g	c, chalky	24	III	3a
127	0 - 25	DB	c			
	25 - 45	B, o	c			
	45 +	GB, o	c	45	III	3b
135	0 - 26	DB	c, calc			
	26 +	YB, o & g	c, chalky	26	III	3a
136	0 - 26	DB	c, calc			
	26 +	YB, o & g	c, chalky	26	III	3a
137	0 - 28	DB	c, calc			
	28 - 45	YB, o & g	c, calc			
	45 +	YB, o & g	c, calc	28	III	3a
138	0 - 28	DB	c, calc			
	28 - 50	B, o	c, calc			
	50 +	YB, o & g	c, chalky	50	III	3a
139	0 - 25	DB	c, calc			
	25 - 45	B, o	c, calc			
	45 +	YB, o & g	c, chalky	45	III	3a
140	0 - 25	DB	c, calc			
	25 - 35	B, o	c, calc			
	35 - 45	YB, o	c, chalky			
	45 +	YB, o & g	c, chalky	45	III	3a
141	0 - 24	DB	c			
	24 +	RB o	c	24	III	3b
152	0 - 25	DB	c, calc			
	25 - 45	GB, o	c, calc			
	45 +	YB, o & g	c, calc	45	III	3a
153	0 - 25	DB	c, calc			
	25 - 45	GB, o	c, calc			
	45 +	YB, o & g	c, calc	45	III	3a
154	0 - 28	DB	c, calc			
	28 - 55	GB, o	c, calc			
	55 +	GB, o & g	c, calc	55	III	3a

Number	Depth	Colour	Texture	Depth to SPL	Wetness Class	Grade
155	0 - 24	DB	c, calc			
	24 - 40	B, o	c, calc			
	40 +	YB, o & g	c, calc	35	III	3a
156	0 - 26	DB	c, calc			
	26 - 40	YB, o	c, calc			
	40 +	YB, o & g	c, chalky	40	III	3a
157	0 - 25	DB	c			
	25 - 35	B, o	c			
	35 +	RB, o	c	35	III	3b
167	0 - 25	DB	c, calc			
	25 - 50	YB, o & g	c, calc			
	50 +	YB, o & g	c, chalky	25	III	3a
168	0 - 25	DB	c, calc			
	25 - 50	YB, o & g	c, calc			
	50 +	YB, o & g	c, chalky	25	III	3a
169	0 - 25	DB	c, calc			
	25 - 50	YB, o & g	c, calc			
	50 +	YB, o & g	c, chalky	25	III	3a
170	0 - 26	DGB	c, calc			
	26 - 35	B, o	c, calc			
	35 +	YB, o & g	c, calc	35	III	3a
171	0 - 26	DB	hcl			
	26 - 45	B	c, calc			
	45 - 60	YB, o	c, calc			
	60 +	YB, o & g	c, chalky	45	II	3a
172	0 - 26	DB	c			
	26 - 35	B, o	c			
	35 +	RB, o	c	35	III	3b
183	0 - 27	DB	c, calc			
	28 +	YB, o & g	c, chalky	27	III	3a
185	0 - 28	DB	c, calc			
	27 +	YB, o & g	c, chalky	27	III	3a
186	0 - 25	DGB	c, calc			
	25 - 35	B, o	c, calc			
	35 +	YB, o & g	c, calc	35	III	3a

Number	Depth	Colour	Texture	Depth to SPL	Wetness Class	Grade
187	0 - 26	DB	c, calc			
	26 - 30	B	c, calc			
	30 +	B, o & g	c, calc	30	III	3a
188	0 - 25	DB	c			
	25 - 35	B, o	c			
	35 +	RB, o	c	35	III	3b
203	0 - 25	DB	c			
	25 - 50	B, o	c			
	50 +	RB, o	c	25	III	3b
204	0 - 24	DB	c			
	24 - 45	B	c			
	45 +	B, o	c	45	II	3a
218	0 - 30	DGB	c, calc			
	30 - 50	GB, o	c, calc			
	50 +	GB, o & g	c, calc	50	III	3a
219	0 - 30	DB	c			
	30 - 45	GB, o	c			
	45 +	GB, o & g	c	45	III	3b
220	0 - 27	DB	hcl, calc			
	27 - 40	YB, o	c, calc			
	40 +	YB, o & g	c, calc	40	III	3a