



The Sizewell C Project

6.9 Volume 8 Freight Management Facility Chapter 10 Soils and Agriculture Appendix 10A Agricultural Land Classification

Revision: 1.0
Applicable Regulation: Regulation 5(2)(a)
PINS Reference Number: EN010012

May 2020

Planning Act 2008
Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009



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Executive Summary

An assessment of agricultural land quality, involving a desktop study and a detailed Agricultural Land Classification (ALC) survey, has been undertaken to determine the quality of agricultural land at the proposed freight management facility development for Sizewell C. The assessment was undertaken in accordance with the ALC system for England and Wales, October 1988 ('the ALC Guidelines').

The detailed survey found agricultural land in Grades 1 (1.4ha), 3a (6.2ha) and 3b (1.8ha), along with a small area of non-agricultural land (1.6ha). Grades 1 and 3a land are considered to be among the best and most versatile agricultural land in England and Wales, the lowest ALC grade to fall into this category.

1. Agricultural Land Classification

1.1 Introduction

1.1.1 This report presents an assessment of Agricultural Land Quality (ALC) at the proposed freight management facility development (hereafter referred to as the proposed development) for the Sizewell C Project.

1.1.2 The purpose of this report is to present details of the agricultural land quality at the site. This report has been prepared by Arcadis on behalf of SZC Co.

1.1.3 The site is approximately 11 hectares (ha) in size and is located near Ipswich with the village of Nacton to the west and bordering the A14 to the east. The site includes approximately 9.4ha of agricultural land, and is approximately 30 kilometres (km) to the south of the main development site.

1.1.4 When surveyed the site was in arable production (wheat with some areas of fallow) with the southern tip excluded from cultivation.

1.2 Agricultural Land Planning policy and context

1.2.1 This ALC assessment is consistent with the direction given by the National Planning Policy Framework¹ (NPPF).

1.2.2 Section 15 of the NPPF deals with conserving and enhancing the natural environment. This includes a requirement that planning policies and decisions should recognise:

“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.”

1.2.3 A footnote to this adds that:

“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.”

¹ National Planning Policy Framework. Department for Communities and Local Government, February 2019
<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

1.2.4 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).

1.2.5 Grades 1, 2 and 3a are defined as the best and most versatile land (BMV).

1.2.6 The site falls within the area covered by the Suffolk Coastal District Core Strategy and Development Management Policies². A number of references are made to the need to, where possible, preserve prime agricultural land for essential food production. No specific policy is, however, set out and it should be considered therefore that guidance related to BMV land reverts to the NPPF.

1.3 Agricultural Land Classification methodology

a) Ministry of Agriculture, Food and Fisheries Agricultural Land Classification System

1.3.1 The Ministry of Agriculture Fisheries and Food (MAFF) ALC³ system of grading land quality for use in land use planning purposes 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. As detailed above, Grade 1 land is of an excellent quality, whilst Grade 5 land has very severe limitations for agricultural use.

1.3.2 Accordingly, a detailed assessment of the proposal site has been undertaken using the MAFF revised guidelines and criteria for ALC published October 1988. The proposed approach to undertake detailed ALC surveys on areas which had not previously been surveyed was accepted by Natural England during consultation in 2016.

1.3.3 The detailed survey involved examination of the soil's physical properties at 9 locations on a 100m by 100m grid. The grid reference of the sample

² Suffolk Coastal Core Strategy Adopted July 2013 <http://www.eastsuffolk.gov.uk/planning/local-plans/suffolk-coastal-district-local-plan/>

³ Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land. Ministry of Agriculture Fisheries and Food, October 1988. <http://archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdf>

locations was recorded to enable these to be relocated for verification, if necessary.

1.3.4 At each location, the soil profile was examined to a maximum depth of approximately 1.2m by hand with the use of a 5cm diameter Dutch (Edleman) soil auger. A number of soil pits were excavated at selected locations with a spade in order to examine the physical soil profile characteristics, including subsoil structure, of the main representative soil types.

1.3.5 The soil profile at each sample location was described using the Soil Survey Field Handbook: Describing and Sampling Soil Profiles⁴. Each soil profile was ascribed an ALC grade following the MAFF ALC Guidelines.

1.3.6 These MAFF guidelines require that the following factors be investigated:

- Climate: Average Annual Rainfall (AAR) and Accumulated Temperature above 0°C between January and June (AT0).
- Site: gradient, micro relief and flooding.
- Soils: texture, structure, depth, stoniness, and chemical toxicity.
- Interactive factors: soil wetness, soil droughtiness and liability to erosion.

1.3.7 To confirm soil texture a topsoil sample was collected from 1 auger location and sent to an accredited laboratory for particle size distribution analysis. The data sheet is included as **Appendix 10A2** of this volume.

b) [Natural England Technical Advice Note 049](#)

1.3.8 Use of the ALC methodology is also supported by Natural England Technical Advice Note 049⁵ (TIN049), published in 2012.

1.3.9 TIN049 describes a detailed ALC survey as having approximately one sample point per hectare. To achieve this sample density and to remove surveyor selection bias, as noted above, sample points were set at 100m intersections aligned with the national grid, located in the field by hand held GPS.

⁴ Soil Survey Field Handbook: Describing and Sampling Soil Profiles' (Ed. J.M. Hodgson, Cranfield University, 1997).

⁵ Agricultural Land Classification: protecting the best and most versatile agricultural land (TIN049). Natural England, 2012. <http://publications.naturalengland.org.uk/publication/35012>

1.4 Agricultural Land Classification assessment

a) Climate

1.4.1 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 is given in **Table 1.1**.

Table 1.1: Freight Management Facility ALC climate data.

Reference Point.	National Grid Reference TM 407 702.
Altitude (m).	25
Average Annual Rainfall AAR (mm).	583
Accumulated Temperature AT0 (day degrees).	1430
Moisture Deficit for wheat (mm).	127
Moisture Defecit for potatoes (mm).	124
Field Capacity Days (FCD).	103

1.4.2 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.

1.4.3 Climate does not impose an overall limitation on ALC grade at this site. 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.

b) The site

1.4.4 Land within the site is gently sloping down to the south and east, levelling out on the higher ground to the north-east. Gradient and microtopography do not limit ALC Grade within the site.

1.4.5 No natural watercourses adjoin the site which appears to drain to a surface water ditch running along the edge of the East Suffolk line.

NOT PROTECTIVELY MARKED

1.4.6 There is no evidence that flood risk limits ALC Grade at any part of the site⁶. However, the site is quite low lying so achieving adequate fall for field drainage may be problematic.

c) **Soils and parent materials**

1.4.7 The British Geological Survey Geology of Britain Viewer⁷ shows the site to be underlain by an area mapped as the Red Crag Formation - sand (formed in quaternary and neogene periods, shallow marine sands ranging from coarse to fine grained). An overlying deposit of Kesgrave Catchment Subgroup (quaternary, fluvial in origin forming beds and lenses reflecting the channels, floodplains and levees of a river or estuary, coarse to fine grained) is also present.

1.4.8 Field survey work at the site found soil material that was predominantly medium textured (loams) with some lighter textured (sandy) material found at depth. Some heavier textured clays were found at some survey points however this was not a common theme in the profiles.

1.4.9 Stone content often rises in the lower subsoil but the topsoil content of larger stones (above 2cm) is not high enough to limit ALC Grade.

d) **Interactive factors**

1.4.10 A typical soil profile found at the site has a sandy loam topsoil over a sandy subsoil, with silt occasionally present at points in the profile.

1.4.11 There is relatively low rainfall at the site therefore the site is rarely wet (Wetness Class 1), as the topsoil and subsoil are predominantly loams and sands there are generally no soil wetness limitations at the site.

1.4.12 The permeable topsoil and subsoil mean the soils are free draining, therefore the majority of the site is limited by soil droughtiness limiting the grade to 3a or 3b.

e) **Agricultural Land Classification grade distribution**

1.4.13 A small area of the site is classed as non-agricultural land. This comprises the section of the Felixstowe Road and a sluice. The remainder of the site is agricultural land in ALC Grades 1, 3a and 3b.

⁶ Environment Agency Flood map for Planning. <http://apps.environment-agency.gov.uk/wiyby/37837.aspx>

⁷ British Geological Survey Geology of Britain viewer.
<http://www.bgs.ac.uk/data/mapViewers/home.html?src=topNav>

1.4.14 The extent of ALC Grades across the site shown on **Figure 10A1**, with area measurements given in **Table 1.2**.

Table 1.2: ALC grade distribution.

ALC Grade.	Area (ha).	Area (%).
1 – excellent quality agricultural land.	1.4	12.73
3a – good quality agricultural land.	6.2	56.36
3b – moderate quality agricultural land.	1.8	16.36
Non-agricultural	1.6	14.55
Total	11.0	100.00

1.4.15 Grade 1 land covers approximately 13% of the site, an area of 1.4ha, comprising soils with a number of key characteristics. The medium textured topsoil and upper subsoil overlays the lightly textured sands or heavy textured lower subsoils. These areas are characterised by no droughtiness or wetness limitations with non-calcareous topsoils and good subsoil structure.

1.4.16 Grade 3a land covers approximately 56% of the site, an area of 6.2ha, comprising soils with a number of key characteristics. One area of Grade 3a is characterised by medium textured topsoil overlaying a light textured subsoil, with one profile containing a horizon of heavy textured clay in the upper subsoil. The majority of the land falling within Grade 3a is made up of medium textured topsoil over medium to light textured subsoils. Both these areas are limited to 3a by soil droughtiness and have no wetness limitations (Wetness Class I).

1.4.17 Grade 3b land comprises 1.8ha in total (approximately 16% of the site). Soil profiles comprise a medium textured topsoil overlaying a light textured freely draining upper subsoil and a medium to heavy textured lower subsoil. The Grade 3b land described was rarely wet (Wetness Class I) and therefore not limited by wetness, however the areas were limited to 3b by soil droughtiness due to their free draining upper subsoils.

1.4.18 The site includes 1.6ha of non-agricultural land, making up approximately 15% of the site comprising a sluice and section of the Felixstowe Road.

1.5 Conclusions

1.5.1 A detailed survey found agricultural land in Grades 1 (1.4ha), 3a (6.2ha) and 3b (1.8ha), along with a small area of non-agricultural land (1.6ha). Grades 1 and 3a land are considered to be among the best and most versatile agricultural land in England and Wales.



APPENDIX 10A1: AUGER LOG AND KEY

Point ID	Location	Alt (m)	Land use	Depth (cm)			Soil matrix Colour	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet			Classification		Point notes
				Top	Bttm	Thick		Form	Colour	Form	Colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation		
1	TM 23796 40684	28	Potatoes	0 46 72 90 116 IMP	46 72 90 116	46 26 18 26	10YR43 10YR56 10YR58 10YR46					SZL S S S	2 5 5 5	HR HR HR HR	G M M					-7.061	-22.176	3a	I	1	3a	Drought	Med SAB Fine Gran; Flint >2cm 2-5% Coarse Gran; Flint >2cm 2-5% Coarse Gran; Flint >2cm 2-5% STOP @ Gravel	
2	TM 23890 40839	23	Potatoes	0 40 60 76 76 IMP	40 60 76 104	40 20 16 28	10YR33 10YR56 10YR66 10YR44					ZL S S LS	5 5 5 5	HR HR HR HR	M M G M					-19.455	-31.5	3b	I	1	3b	Drought	Granular; Flint >2cm 5% Coarse Gran; Flint >2cm 5% Granular; Flint >2cm 5% Coarse Gran; Flint >2cm 5% STOP @ Gravel	
3	TM 23876 40775	25	Potatoes	0 48 IMP	48 80	48 32	10YR33 10YR46					SZL LS	5 10	HR HR	G						-13.49	-13.14	3a	I	1	3a	Drought	Fine Gran Fine Gran STOP @ Gravel
4	TM 23898 40662	27	Potatoes	0 40 66 80	40 66 80 120	40 26 14 40	10YR33 10YR46 10YR54 10YR58					SL LS C S	2 5 5 1	HR HR HR HR	M M M G						-12.025	-28.82	3a	I	1	3a	Drought	Coarse Gran Coarse Gran; Flint >2cm 2% Coarse SAB; Flint >2cm 2% Fine Gran
5	TM 23972 40752	27	Potatoes	0 46 72 72 96	46 72 96 120	46 26 24 24	10YR43 10YR34 10YR66 10YR68					ZL ZL S S	5 2 5 15	HR HR HR HR	G G G G						41.278	30.884	1	I	1	1	None	Granular; Flint >2cm Coarse Gran; Flint >2cm Granular; Flint >2cm Granular; Flint >2cm
6	TM 23999 40677	27	Potatoes	0 48 88	48 88 120	48 40 32	10YR43 10YR58 2.5Y76	M	10YR56				ZL S S	2 2 1	HR HR HR	G G G					17.178	-0.576	3a	I	1	3a	Drought	Granular Granular Fine Granular
7	TM 23971 40608	27	Potatoes	0 42 56 98 98	42 56 98 120	42 14 42 22	10YR33 10YR44 10YR56 10YR56					ZL ZL S C	2 1 5 1	HR HR HR HR	M G M M						30.993	10.638	1	I	1	1	None	Granular Coarse SAB Med Gran Coarse SAB
8	TM 24082 40664	27	Potatoes	0 36 46 78 78	36 46 78 120	36 10 32 42	10YR33 10YR44 10YR46 10YR66	M	10YR33				ZL C S S	2 1 3 5	HR HR HR HR	M M M G		Y	Y		6.621	-10.422	3a	II	2	3a	Drought	Granular Coarse SAB Coarse Gran Fine Gran
9	TM 24071 40571	26	Potatoes	0 32 54 74 IMP	32 54 74 96	32 22 20 22	10YR43 10YR66 7.5YR58 7.5YR46					SZL S LS SC	2 2 1 5	HR HR HR HR	G G G G						-5.859	-30.192	3b	I	1	3b	Drought	Granular; Flint >2cm Fine Gran Med Gran; Flint >2cm Med Gran; Flint >2cm STOP @ Gravel

Auger Log key

Depth - Top

xx Underlining denotes depth to the top of a slowly permeable layer

Land use	Mottle 1,2 - Form	Texture	Limitations
ARA Arable	FF Few Feint	CS Coarse Sand	NN None
CER Cereal	FD Few Distinct	MS Medium sand	OC Overall climate
WHT Wheat	FP Few Prominent	FS Fine Sand	AE Aspect
BAR Barley	CF Common Feint	LCS Loamy Coarse Sand	EX Exposure
MZE Maize	CD Common Distinct	LMS Loamy Medium Sand	FR Frost risk
OAT Oats	CP Common Prominent	LFS Loamy Fine Sand	GR Gradient
OSR Oilseed rape	MF Many Feint	CSL Coarse Sandy Loam	MR Microrelief
LIN Linseed	MD Many Distinct	MSL Medium sandy loam	FL Flood risk
FBE Field beans	MP Many Prominent	FSL Fine Sandy Loam	TX Texture
POT Potatoes	VF Very many Feint	CSZL Coarse Sandy Silt Loam	DP Soil depth
SBT Sugar beet	VD Very many Distinct	MSZL Medium Sandy Silt Loam	CH Chemical
BRA Brassicas	VP Very many Prominent	FSZL Fine Sandy Silt Loam	WE Wetness
FOD Fodder crops		ZL Silt Loam	WK Workability
FRT Soft and top fruit		SCL Sandy Clay Loam	DR Droughtiness
HRT Horticultural crops		MCL Medium Clay Loam	ER Erosion risk
PAS Pasture		HCL Heavy Clay Loam	WD Wetness/Droughtiness
LEY Ley grass		MZCL Medium Silty Clay loam	ST Topsoil stoniness
PGR Permanent pasture		HZCL Heavy Silty Clay Loam	
RGR Rough grazing		SC Sandy Clay	
SCR Scrub		ZL Silty Clay	
HTH Heathland		C Clay	
BOG Bog or marsh		P Peat	
DCW Deciduous Woodland		SP Sandy Peat	
CFW Coniferous woodland		LP Loamy Peat	
PLO Ploughed		PL Peaty Loam	
STB Crop stubble		PS Peaty Sand	
FLW Fallow (inc. set aside)		MZ Marine Light Silts	
SAS Set aside (where known)		IMP Impenetrable to roots	
OTH Other			

Stones - Type

HR	All hard rocks and stones
MSST	Soft, medium or coarse grained sandstone
SI	Soft weathered igneous or metamorphic rock
SLST	Soft oolitic or dolomitic limestone
FSST	Soft, fine grained sandstone
ZR	Soft, argillaceous or silty rocks
CH	Chalk or chalk stones
GH	Gravel composed of non-porous (hard) stones
GS	Gravel composed of porous (soft) stones

Subs Str (subsoil structural condition)

G	Good
M	Moderate
P	Poor

Calcareousness

N	Non-calcareous (<0.5% CaCO ₃)
VS	Very slightly calcareous (0.5 - 1% CaCO ₃)
S	Slightly calcareous (1 - 5% CaCO ₃)
M	Moderately calcareous (5 - 10% CaCO ₃)
V	Very calcareous (>10% CaCO ₃)
Y	Calcareous (>1% CaCO ₃)

Mn C (ferrimanganous concretions)

F	Few
C	Common
M	Many
V	Very many
Y	Common or greater



APPENDIX 10A2: PARTICLE SIZE DISTRIBUTION DATA SHEETS



Analysis Results (SOIL)

Customer ARCADIS (UK) LIMITED
 THE MILL
 BRINSCOMBE PORT
 STROUD
 GL5 2QG

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

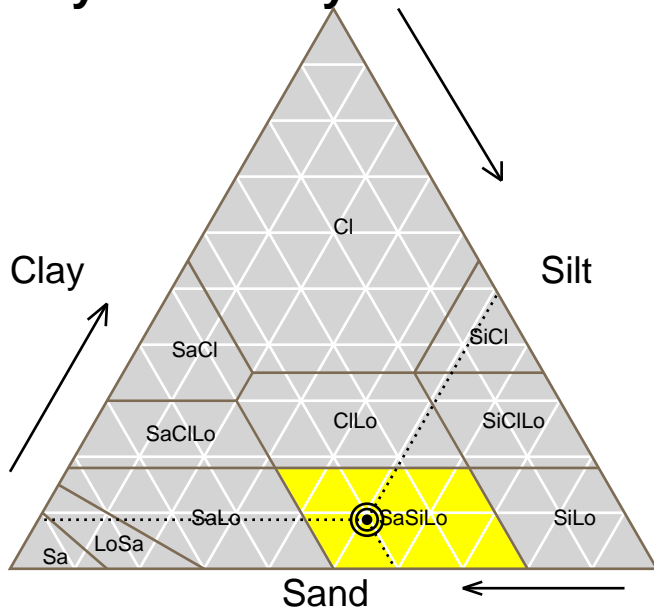
Sample Ref FMF 1 TOPSOIL

Date Received 30/07/2019 (Date Issued: 05/08/2019)

Sample No E337879/01

Crop

Physical Analysis



Analysis	Result (%)
Sand	40.43
Silt	50.81
Clay	8.76
Very Fine Sand	10.50
Fine Sand	13.95
Medium Sand	10.62
Coarse Sand	3.32
Very Coarse Sand	1.42
Stones >2mm	4.40
Soil Type	SaSiLo Sandy Silt Loam

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