The Sizewell C Project

6.5 Volume 4 Southern Park and Ride

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

Contents

Tables

Figures

None provided.

Plates

None provided.

Appendices

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 Wickham Market park and ride development for Sizewell C. The assessment was undertaken in accordance with the ALC system for England and Wales, October 1988 ('the ALC Guidelines').

A detailed ALC survey of the proposed southern park and ride site found agricultural land in Grades 3a (5.4ha), 3b (7.9ha) and Grade 4 (4.2ha). Grade 3a land is considered to be among the best and most versatile agricultural land in England and Wales, the lowest ALC grade to fall in 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 southern park and ride development (hereafter referred to as the proposed development) for Sizewell C. 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.

1.1.2 The site is approximately 26.4 hectares (ha) in size, located north-east of Wickham Market, to the east of the B1078/B1116 and to the north of the A12. Of this, approximately 17.7ha is predominately agricultural land. The remainder of the site encompasses a section of the A12 and an associated slip road.

1.1.3 When surveyed in August 2016 the site was in arable production, part under cereal stubble and part under potato.

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 Framework[1] (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."

1.2.4 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

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

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.

1.2.6 The site falls within the area for the Suffolk Coastal District Core Strategy and Development Management Policies[2]. 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 Best and Most Versatile (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) ALC[3] 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 18 locations on a 100m by 100m grid. The grid reference of the sample 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

[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 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 Profiles[4]. 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 and accumulated temperature above 0°C between January and June (accumulated temperature).
- Site: gradient, micro relief and flooding.
- Soils: texture, structure, depth, stoniness, and chemical toxicity.
- Interactive factors: soil wetness, soil droughtiness and liability to erosion.

b) Natural England technical advice note 049

1.3.7 Use of the ALC methodology is also supported by Natural England Technical Advice Note 049[5], published in 2012.

1.3.8 Technical Advice Note 049 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.

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

[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

providing climate data for specific sites. Interpolated data for the proposal site is given in **Table 1.1**.

Table 1.1: Southern Park and Ride ALC climate data.

	National Grid Reference TM 407 702.
Altitude (m).	27
Average annual rainfall (mm).	591
Accumulated Temperature (day degrees).	1,418
Moisture Deficit for wheat (mm).	122
Moisture Deficit for potatoes (mm).	118
Field Capacity Duration (days).	110

1.4.2 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall as a measure of overall wetness, and accumulated temperature 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 level. Gradient and microtopography do not limit ALC grade within the site.

1.4.5 No natural watercourses adjoin the site but two small ponds lie to the immediate west of the site. Standpipes are present at the east and west edges of the site for crop irrigation.

1.4.6 There is no evidence at the site that it experiences flooding, and the site sits within Flood Zone 1 (lowest flood risk) on the Environment Agency Flood Map for Planning[6].

[6] Environment Agency Flood Map for Planning http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap

c) Soils and parent materials

1.4.7 The British Geological Survey Geology of Britain Viewer[7] shows the site to be underlain by an area mapped as the crag group (quaternary shallow-water marine and estuarine sands, gravels, silts and clays), with an overlying drift deposit of superficial diamicton of the lowestoft formation (an extensive sheet of poorly-sorted matrix-supported chalky till as well as outwash sands and gravels, silts and clays).

1.4.8 Field survey work at the site found soil material that was predominantly light textured (sandy) with some clay loam topsoil and heavy textured (clayey) material at depth. The lightest topsoil found at the site had a loamy medium sand texture. Where this topsoil is present the land is limited to a maximum of Grade 2, the sandy surface material being vulnerable to structural breakdown and capping which can obstruct crop germination.

1.4.9 Stone content often rises in the 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 in the site has a medium sandy loam to loamy medium sand topsoil and upper subsoil, with lighter sand material and increasing stone content at depth. The land covered by this soil type is limited to Grades 3b and 4 by soil droughtiness, the more severe limitation being associated with higher stone content.

1.4.11 Grade 3a land is a mix of two soil types. The first is similar to the Grade 3b and 4 land described above but with clayey lower subsoil. The second has clay loam topsoil over a clay loam to clay subsoil, which impedes drainage of water down through the soil. With the relatively low rainfall, the land with impeded drainage is occasionally wet (Wetness Class III). The land covered by these soils is limited to Grade 3a by soil droughtiness/ soil wetness.

1.4.12 This proposal site benefits from irrigation, enabling the production of higher value crops such as potato, where crop quality as well as yield benefits substantially from the extra water. The access to irrigation cannot, however, be used to mitigate or eliminate the ALC soil droughtiness limitation in assessing the ALC grade. As well as the additional cost of irrigation, access to water is limited by abstraction licences potentially outside of the control of the farmer.

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

e) Agricultural Land Classification grade distribution

1.4.13 A part of the site is classed as non-agricultural land, comprising the section of the A12 slip road that falls within the proposal site. The site is agricultural land in ALC Grades 3a, 3b and 4. The extent of ALC grades inside the proposal site in relation to the areas currently surveyed is shown on **Figure 10.3** of **Volume 4, Chapter 10**, with area measurements given in **Table 1.2**.

Table 1.2: ALC grade distribution.

ALC Grade.	Area (ha).	Area (%).
1 – Excellent quality agricultural land.	0	0
2 – Very good quality agricultural land.	0	0
3a – Good quality agricultural land.	5.4	20.45
3b – Moderate quality agricultural land.	7.9	29.92
4 – Poor quality agricultural land.	4.2	15.92
5 – Very poor quality agricultural land.	0	0
Non-agricultural	8.9	33.71
Total	**26.4**	**100**

1.4.14 Grade 3a land covers 5.4ha of the site (20.45%). It comprises two soil types with the first running in a band from the south-west (from around the disused pit) up to the north-east. This soil type has light textured topsoil over a clayey subsoil. The clayey subsoil impedes drainage and makes the land occasionally wet (Wetness Class III) but the light textured topsoil lessens the severity of the soil wetness limitation. The dominant limitation is soil droughtiness, with the clayey subsoil's poor structure restricting plant roots ability to access water.

1.4.15 The remainder of the Grade 3a area has soils with a medium clay loam topsoil over a heavy clay loam to clay subsoil. The depth at which subsoils become slowly permeable varies leaving the land occasionally to seldom wet (Wetness Class III to II). Soil droughtiness limits the land to Grade 3a, along with soil wetness where the profile is Wetness Class III. A single point was found to be Grade 2, limited by wetness and droughtiness, when considered in isolation, but may be an outlier and cannot be resolved as a separate area at the detailed level of assessment.

1.4.16 Grade 3b land is found in the northern half of the site. Soil profiles have a light texture, getting lighter with depth, and frequently with a moderately to very stony subsoil. The sandy soil with a high stone content cannot retain a

large volume of plant available water resulting in a soil droughtiness limitation to Grade 3b.

1.4.17 Grade 4 land is found along the northern and eastern edges of the site. Soil profiles are similar to that described for the Grade 3b land above, but are lighter textured and/or have a higher stone content. As a result, the land has a stronger soil droughtiness limitation.

1.5 Conclusions

1.5.1 A detailed ALC survey of the site found agricultural land in Grades 3a (5.4ha), 3b (7.9ha) and Grade 4 (4.2ha). Grade 3a land is considered to be among the best and most versatile agricultural land in England and Wales, the lowest ALC grade to fall in this category.

Appendix 10A1: Auger log and key

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		Classification	
	Sqr.	E	N					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation
1	TM	31828	57787	21	0		STB	0	25		75YR32						LMS	8	HR		N			-18	-55	3b	I	1*	3b	DR
								25	35		75YR44						LMS	8	HR	M										
								35	75		75YR56						MS	2	HR	M										
								75	120		75YR46						HCL	5	HR	M										
2	TM	31697	57705	28	0		STB	0	25	25	7.5yr43						LMS	2	HR		N			-51	-60	4	I	1	4	DR
								25	35	10	7.5yr43						LMS	30	HR	G										
								35	120	85							LMS	50	HR	M										
3	TM	31751	57711	21	0		STB	0	25		75YR32						LMS	8	HR		N			-49	-55	3b	I	1*	3b	DR
								25	35		75YR44						LMS	8	HR	M										
								35	75		75YR56						MS	2	HR	M										
								75	120		75YR46						MS	50	HR	M										
4	TM	31849	57669	19	0		STB	0	25		75YR32						LMS	8	HR		N			-32	-55	3b	I	1*	3b	DR
								25	35		75YR44						LMS	8	HR	M										
								35	105		75YR56						MS	2	HR	M										
								105	120		75YR46						HCL	5	HR	M										
5	TM	31597	75607	21	0		STB	0	25	25	10yr42						LMS	6	HR		N			-51	-59	4	I	1	4	DR
								25	45	20	10yr42						LMS	30	HR	G										
								45	50	5	10yr53						MS	5	HR	G										
								50	120	70							MS	50	HR	M										
6	TM	31700	57605	26	0		STB	0	25	25	7.5yr43						LMS	5	HR		N			-12	-52	3b	I	1	3b	DR
								25	50	25	2.5YR54						LMS	5	HR	M										
								50	80	30	2.5yr63						MS	5	HR	M										
								80	110	30	7.5yr64						MSL	2	HR	M										
								110	120	10	7.5yr64						MSL	10	CH	M										
7	TM	31799	57610	26	0		STB	0	25	25	7.5yr43						LMS	2	HR		N			-51	-60	4	I	1	4	DR
								25	35	10	7.5yr43						LMS	30	HR	G										
								35	120	85							LMS	50	HR	M										
8	TM	31595	57509	22	0		STB	0	30	30	10yr42						MSL	8	HR		S			-14	-35	3b	I	1	3b	DR
								30	40	10	10yr54						MSL	20	HR	M										
								40	120	80							MSL	50	HR	M										
9	TM	31704	57510	22	0		STB	0	25	25	75yr43						LMS	4	HR		N			-25	-50	3b	I	1	3b	DR
								25	55	30	75yr63						LMS	10	HR	M										
								55	70	15	75yr64						LMS	10	HR	M										
								70	95	23	10yr64	CD	10yr51	CD	10yr56	Y	C	2	HR	P			Y							
								95	105	10	10yr64	CD	10yr61	CD	10yr56	Y	C	20	CH	P										
								105	120	15							C	50	CH	P										

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		Classification	
	Sqr.	E	N					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation
10	TM	31598	57412	23	0		POT	0	30	30	10yr32						MCL	10	HR		S			11	-8	2	II	2	2	WD
								30	65	35	10yr54	FD	10yr61				MCL	2	HR	M										
								65	75	10	10yr64	FD	10yr61	CD	10yr68	Y	HCL	2	HR	P		F								
								75	120	45	10yr61	CD	10yr56	MD	10yr68	Y	C	20	CH	P		C								
11	TM	31697	57411	24	0		STB	0	35	35	10yr42						MSL	6	HR		N			-22	-30	3b	I	1	3b	DR
								35	50	15	10yr53						MSL	10	HR	M										
								50	55	5	10yr53						LMS	10	HR	M										
								55	120	65							LMS	50	HR	M										
12	TM	31798	57407	26	0		STB	0	25	25	7.5yr43						LMS	2	HR		N			-51	-60	4	I	1	4	DR
								25	35	10	7.5yr43						LMS	30	HR	G										
								35	120	85							LMS	50	HR	M										
13	TM	31597	57305	26	1	NW	POT	0	30	30	75yr32						MCL	10	HR		N			0	-18	3a	III	3a	3a	WD
								30	110	80	75yr61	MD	75yr56			Y	C	8	CH	P			Y							
								110	120	10	75yr64	CD	75yr61	CD	75yr56	Y	HZCL	5	CH	P			Y							
14	TM	31697	57308	27	1	SE	POT	0	30	30	75yr32						MSL	10	HR		N			-17	-27	3a	III	2	3a	DR
								30	75	45	75yr54	CD	75yr61	CD	75yr56	Y	HCL	8	HR	P			Y							
								75	100	25	75yr54	CD	75yr61	CD	75yr65	Y	C	30	HR	P			Y							
								100	120	20							C	50	HR	P										
15	TM	31799	57309	25	0		STB	0	25	25	7.5yr43						LMS	2	HR		N			-51	-60	4	I	1	4	DR
								25	35	10	7.5yr43						LMS	30	HR	G										
								35	120	85							LMS	50	HR	M										
16	TM	31597	57206	21	1	SE	POT	0	20	20	75yr32						MSL	5	HR		M			-2	-21	3a	III	2	3a	DR
								20	55	35	10yr54	CD	10yr61	CD	10yr56	Y	C	2	CH	P			Y							
								55	95	40	10yr54	CD	10yr61	CD	10yr56	Y	C	10	CH	P			Y							
								95	120	25							C	50	CH	P										
17	TM	31696	57206	24	1	ESE	POT	0	30	30	75yr32						MCL	10	HR		M			9	-12	3a	II	2	3a	DR
								30	60	30	10yr54						MCL	5	HR	M										
								60	80	20	10yr54	CD	10yr61	CD	10yr56	Y	HCL	2	HR	P			Y							
								80	120	40	10yr54	CD	10yr61	CD	10yr56	Y	HCL	10	CH	P			Y							
18	TM	31496	57106	23	1	ESE	STB	0	30	30	75yr32						MSL	2	HR		N			-26	-34	3b	I	1	3b	DR
								30	50	20	75yr54						LMS	2	HR	G										
								50	120	70							LMS	50	HR	M										
END																														

Auger Log key

Depth - Top

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

Land use

ARA	Arable
CER	Cereal
WHT	Wheat
BAR	Barley
MZE	Maize
OAT	Oats
OSR	Oilseed rape
LIN	Linseed
FBE	Field beans
POT	Potatoes
SBT	Sugar beet
BRA	Brassicas
FOD	Fodder crops
FRT	Soft and top fruit
HRT	Horticultural crops
PAS	Pasture
LEY	Ley grass
PGR	Permanent pasture
RGR	Rough grazing
SCR	Scrub
HTH	Heathland
BOG	Bog or marsh
DCW	Deciduous Woodland
CFW	Coniferous woodland
PLO	Ploughed
STB	Crop stubble
FLW	Fallow (inc. set aside)
SAS	Set aside (where known)
OTH	Other

Mottle 1,2 - Form

FF	Few Feint
FD	Few Distinct
FP	Few Prominent
CF	Common Feint
CD	Common Distinct
CP	Common Prominent
MF	Many Feint
MD	Many Distinct
MP	Many Prominent
VF	Very many Feint
VD	Very many Distinct
VP	Very many Prominent

Texture

CS	Coarse Sand
MS	Medium sand
FS	Fine Sand
LCS	Loamy Coarse Sand
LMS	Loamy Medium Sand
LFS	Loamy Fine Sand
CSL	Coarse Sandy Loam
MSL	Medium sandy loam
FSL	Fine Sandy Loam
CSZL	Coarse Sandy Silt Loam
MSZL	Medium Sandy Silt Loam
FSZL	Fine Sandy Silt Loam
ZL	Silt Loam
SCL	Sandy Clay Loam
MCL	Medium Clay Loam
HCL	Heavy Clay Loam
MZCL	Medium Silty Clay loam
HZCL	Heavy Silty Clay Loam
SC	Sandy Clay
ZL	Silty Clay
C	Clay
P	Peat
SP	Sandy Peat
LP	Loamy Peat
PL	Peaty Loam
PS	Peaty Sand
MZ	Marine Light Silts
IMP	Impenetrable to roots

Limitations

NN	None
OC	Overall climate
AE	Aspect
EX	Exposure
FR	Frost risk
GR	Gradient
MR	Microrelief
FL	Flood risk
TX	Texture
DP	Soil depth
CH	Chemical
WE	Wetness
WK	Workability
DR	Droughtiness
ER	Erosion risk
WD	Wetness/Droughtiness
ST	Topsoil stoniness

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% CaCO3)
VS	Very slightly calcareous (0.5 - 1% CaCO3)
S	Slightly calcareous (1 - 5% CaCO3)
M	Moderately calcareous (5 - 10% CaCO3)
V	Very calcareous (>10% CaCO3)
Y	Calcareous (>1% CaCO3)

Mn C (ferrimanganous concretions)

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