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Croudace Homes Ltd

Agricultural Land Classification and Soil Resources

at

Land North of School Road, Arborfield Cross

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Contents

1	INTRODUCTION.....	1
2	SITE AND CLIMATIC CONDITIONS	2
3	AGRICULTURAL LAND QUALITY ASSESSMENT	4
	APPENDIX 1: LABORATORY DATA	7
	APPENDIX 2: SOIL PROFILE SUMMARIES AND CALCULATIONS	9
	APPENDIX 3: PIT DESCRIPTION AND PHOTOGRAPHS	11
	FIGURE RAC/10640/1 OBSERVATIONS.....	13
	FIGURE RAC/10640/2 AGRICULTURAL LAND CLASSIFICATION	14

1 Introduction

- 1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by Croudace Homes Ltd to investigate the Agricultural Land Classification (ALC) and soil resources of land north of School Road, Arborfield Cross by means of a detailed survey of soil and site characteristics.
- 1.2 Guidance for assessing the quality of agricultural land in England and Wales is set out in the Ministry of Agriculture, Fisheries and Food (MAFF) revised guidelines and criteria for grading the quality of agricultural land¹, and summarised in Natural England's Technical Information Note (TIN) 049².
- 1.3 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. The principal physical factors influencing grading are climate, site conditions and soil which, together with interactions between them, form the basis for classifying land into one of the five grades.
- 1.4 Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use. Grade 2 is very good quality agricultural land, with minor limitations which affect crop yield, cultivations or harvesting. Grade 3 land has moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield, and is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land). Grade 4 land is poor quality agricultural land with severe limitations which significantly restrict the range of crops and/or level of yields. Grade 5 is very poor quality land, with very severe limitations which restrict use to permanent pasture or rough grazing.
- 1.5 Land which is classified as Grades 1, 2 and 3a in the ALC system is defined as best and most versatile (BMV) agricultural land.
- 1.6 As explained in Natural England's TIN049, the whole of England and Wales was mapped from reconnaissance field surveys in the late 1960s and early 1970s, to provide general strategic guidance on agricultural land quality for planners. This Provisional Series of maps was published

¹ **MAFF (1988).** *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land.*

² **Natural England (2012).** *Technical Information Note 049 - Agricultural Land Classification: protecting the best and most versatile agricultural land*, Second Edition.

on an Ordnance Survey base at a scale of One Inch to One Mile (1:63,360). The Provisional ALC map shows the site as Grade 3. However, TIN049 explains that:

"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 ..."

- 1.7 TIN049 goes on to explain that a definitive ALC grading should be obtained by undertaking a detailed survey according to the published guidelines, at an observation density of one boring per hectare. This survey follows the detailed methodology set out in the ALC guidelines.

2 Site and climatic conditions

General features, landform and drainage

- 2.1 The site extends to 5.5ha of agricultural land mostly in a field of permanent pasture, with also the corner of a neighbouring arable field to the east included in the site boundary. The site is bordered by The Coombes Church of England primary school and School Road to the south and other agricultural land to the north, east and west. Non-agricultural land comprises a small section of School Road.
- 2.2 The topography across the site slopes gently from the south-west, at an elevation of 60m above Ordnance Datum (AOD) to 50m in the north-east.
- 2.3 No discernible drainage features were observed within the site boundary. The land is in the Environment Agency Flood Zone 1 and has a low probability of flooding.

Agro-climatic conditions

- 2.4 Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point data set at representative altitude of 55m AOD. Data is given in Table 1. The rainfall is moderate for South East England and the temperature is moderately warm. Crop moisture deficits are moderately large. The number of Field Capacity Days is favourable, meaning there are opportunities for agricultural field work. There is no overriding climatic limitation to agricultural land quality.

Table 1: Local agro-climatic conditions

Parameter	Value
Grid Reference	SU 76634 67075
Average Annual Rainfall	665 mm
Accumulated Temperatures >0°C	1,462 day°
Field Capacity Days	137 days
Average Moisture Deficit, wheat	114 mm
Average Moisture Deficit, potatoes	108 mm

Soil parent material and soil type

- 2.5 The bedrock geology mapped by the British Geological Survey³ is the London Clay Formation. This formation mainly comprises blue-grey to grey-brown silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay.
- 2.6 No superficial deposits are mapped across the site.
- 2.7 The Soil Survey of England and Wales soil association mapping⁴ (1:250,000 scale) shows the Wickham 4 association at the site. This association is characterised by slowly permeable, fine loamy over clayey and fine silty over clayey soils associated with similar clayey soils, often with brown subsoils. Profiles are typically poorly drained of Wetness Class (WC) IV⁵, although they can be improved to WC III where effectively drained.
- 2.8 Soils of the Bursledon association are mapped near the south-west of the site. This association is characterised by deep, fine loamy soils associated with deep, coarse loamy soils variably affected by groundwater. Some component soils are loamy over clayey. Soils are variably wet and are commonly of WC II or III after drainage. Some component soils are well-drained of WC I.

³ **British Geological Survey (2025).** *BGS Geology Viewer*, <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

⁴ **Soil Survey of England and Wales (1984).** *Soils of South East England* (1:250,000), Sheet 6.

⁵ **Jarvis et al (1984).** *Soils and Their Use in South East England*. Soil Survey of England and Wales Bulletin 15, Harpenden.

3 Agricultural land quality assessment

Soil survey methods

- 3.1 Five soil profiles were examined using an Edelman (Dutch) auger at an observation density slightly in excess of the one per hectare recommended for ALC surveys². One pit was also excavated to examine soil structures. At each observation point the following characteristics were assessed for each soil horizon up to 120cm or any impenetrable layer:
- soil texture;
 - stone content;
 - colour (including localised mottling);
 - consistency;
 - structural condition;
 - free carbonate; and
 - depth.
- 3.2 One topsoil sample was submitted for laboratory determination of particle size distribution, pH, organic matter content and nutrient contents (P, K, Mg). Results are in Appendix 1.
- 3.3 Soil Wetness Class (WC) was determined from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling, and slowly permeable subsoil layers at least 15cm thick, in relation to the number of Field Capacity Days at the location.
- 3.4 Soil droughtiness was investigated by the calculation of moisture balance equations (given in Appendix 2). Crop-adjusted Available Profile Water (AP) is estimated from texture, stoniness and depth, and then compared to a calculated moisture deficit (MD) for the standard crops wheat and potatoes. The MD is a function of potential evapotranspiration and rainfall. Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs.
- 3.5 Assessment of agricultural land quality has been carried out according to the revised ALC guidelines¹. Soil profiles have been described according to Hodgson⁶ which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.

⁶ Hodgson, J. M. (Ed.) (1997). *Soil survey field handbook*. Soil Survey Technical Monograph No. 5, Silsoe.

Agricultural land quality

3.6 Figure 1 shows the distribution of soil types at the site.

Figure 1: Soil types



Legend

G2 London Clay within 41cm, medium clay loam topsoil
C2 Deeper loam soils with sandy clay loam or medium clay loam topsoil over London Clay

Soil Type 1

- 3.7 The first soil type (G2) is found in the north of the site and has a dark brown (10YR3/3) or dark yellowish brown (10YR3/4) medium clay loam topsoil. The subsoil consists of dark yellowish brown (10YR4/6) clay, which is stoneless or very slightly stony. The subsoil contains ochreous mottling throughout, indicating prolonged periods of wetness. The subsoil has a medium to coarse subangular blocky structure and a firm to very firm consistency. This horizon is slowly permeable and restricts the downward drainage of water through the soil profile.
- 3.8 Profiles with these characteristics are poorly drained of WC IV and are restricted to Subgrade 3b by soil wetness with a medium clay loam topsoil. Observation 3 is of WC III and is restricted to Subgrade 3a.

Soil Type 2

- 3.9 The second soil type (C2) is found across the south. The topsoil comprises dark brown (10YR3/3) or dark yellowish brown (10YR3/4) medium clay loam or sandy clay loam, which is very slightly stony, at 3-5%.
- 3.10 The upper subsoil comprises brown (10YR4/3 or 10YR5/3), dark yellowish brown (10YR4/6) or light brownish grey (2.5Y6/2) sandy clay loam, sandy silt loam or sandy loam. The upper subsoil is permeable with a medium to coarse subangular blocky structure and a loose consistency. The upper subsoil contains ochreous mottling, with some profiles also recording ferri-manganiferous nodules.
- 3.11 The lower subsoil comprises greyish brown (10YR5/2 or 2.5Y5/2) or brown (10YR5/3) clay. The lower subsoil is stoneless to slightly stony, up to 8%. This horizon is firm to very firm and slowly permeable.
- 3.12 Profiles with these characteristics are imperfectly to poorly drained of WC III or IV. Waterlogging in response to groundwater accentuates soil wetness. Upper subsoil horizons above the slowly permeable clay lower subsoil were saturated at the time of the survey. Observation 2 is of WC III, with a medium clay loam topsoil and is restricted to Subgrade 3a. The remaining observations are of WC IV and are limited to Subgrade 3b.
- 3.13 The distribution of ALC is shown on Figure RAC/10640/2 and in Table 2.

Table 2: ALC

Grade	Description	Area (ha)	% of agricultural land
Subgrade 3a	Good quality	1.1	20
Subgrade 3b	Moderate quality	4.3	80
	Total Agricultural	5.4	100
	Non agricultural	0.1	-

Appendix 1: Laboratory Data

Determinand	A 0-25cm	Units
Sand 2-0.063mm	47	% w/w
Silt 0.063-0.002 mm	33	% w/w
Clay <0.002 mm	20	% w/w
Organic Matter	3.4	% w/w
Total Nitrogen	0.20	% w/w
Texture	Medium clay loam	

Determinand	A 0-25cm	Units
Soil pH	7.5	
Phosphorus (P)	36.8	mg/l (av)
Potassium (K)	176	mg/l (av)
Magnesium (Mg)	78.7	mg/l (av)

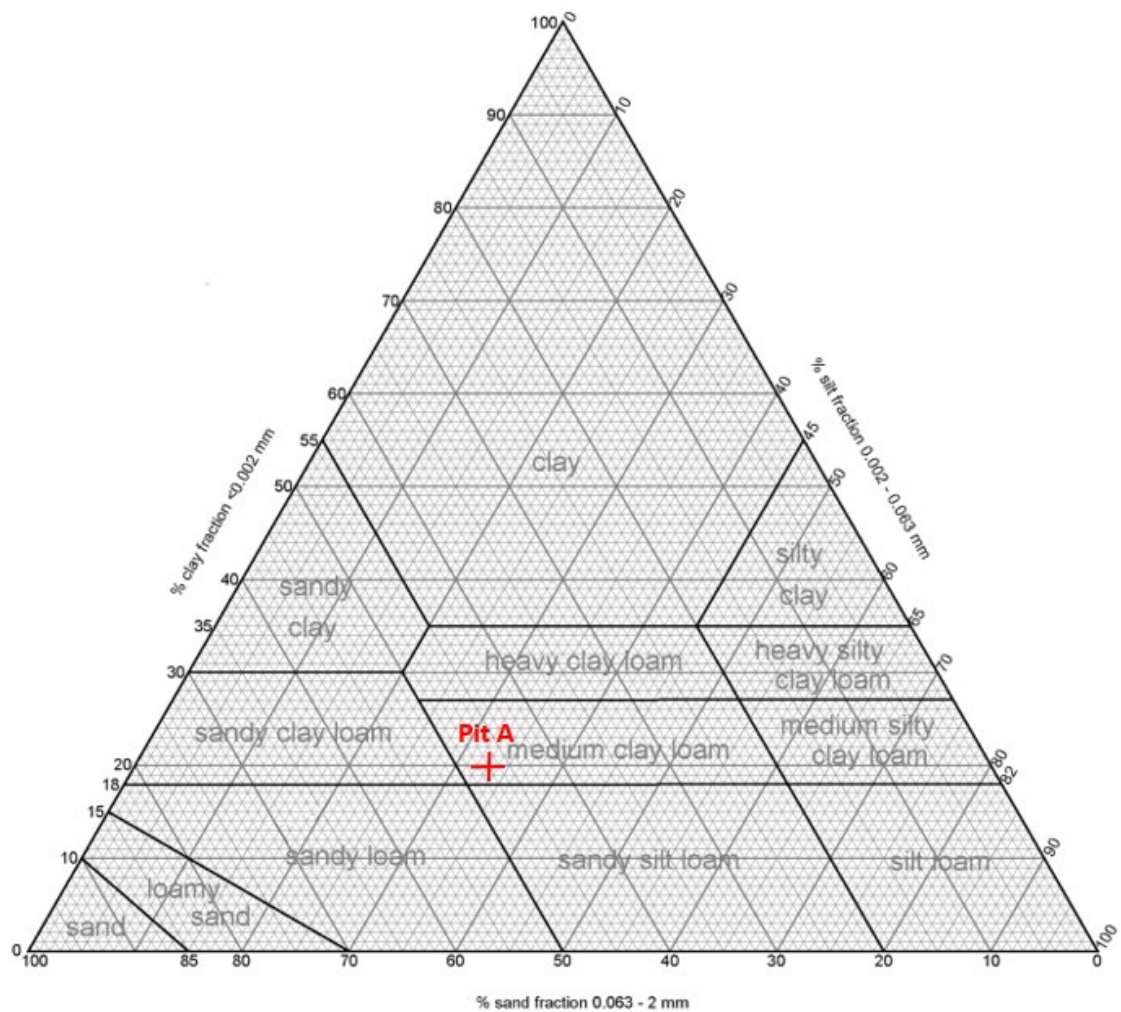
Determinand	A 0-25cm	Units
Phosphorus (P)	3	ADAS Index
Potassium (K)	2-	ADAS Index
Magnesium (Mg)	2	ADAS Index
Organic Matter (SOM)	moderate	SSEW ⁴

Samples are composites of 15-20 cores taken to 25cm depth.

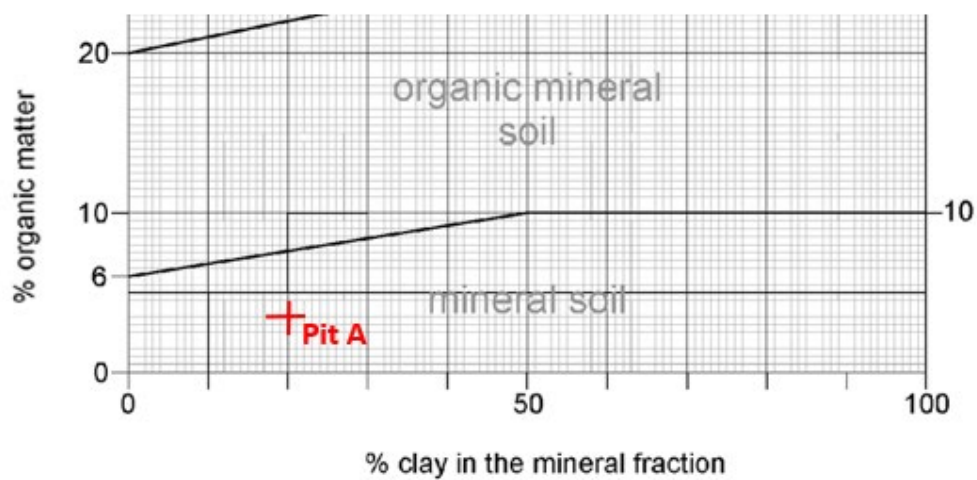
Particle size by Pipette method, Carbon by Skalar machine.

Organic Matter = Total Organic Carbon /0.58. Reported on 30°C dry sample basis

Soil Texture by Particle Size Analysis



Organic Matter Class



Appendix 2: Soil Profile Summaries and Calculations

Wetness / workability limitations are determined according to the methodology given in Appendix 3 of the ALC guidelines, MAFF 1988

Droughtiness calculations are made according to the methodology given in Appendix 4 of the ALC guidelines, MAFF 1988.

Grades are shown for drought, wetness and any other soil or site factors which are relevant. The overall Grade is set by the most limiting factor and shown on the right.

																	SU 76634
																	67075
Stone types %TAvEAv hard10.5 N/A hardflint & pebble					Climate Data MDwheat114 MDpotato108 FCD137 AAR665					Wetness Class Guidelines SPL within 80cm, gleying within 40cm>64cm37-64cm<37cm SPL within 80cm, gleying at 40-70cm>46cm<46cm No SPL but gleying within 40cmcoarse subsoil / other cases // Maximum depth of auger penetration is <u>underlined</u>							Climate 1462 D° Limitation Grade 1 55 m
Site No.	Depth cm	Texture	CaCO ₃	Colour	Mottle colour	abund-ance	stone% hard	stone% N/A	Struct-ure	AP wheat mm	AP potato mm	Gley	SPL	WC	Wetness grade WE	Final Grade	Limiting Factor(s)
1	T	0	30	SCL	n	10YR3/2			-	50	50	n	n	IV	3b	3b	WE GW
		30	60	SCL		10YR4/3	Fe	com		38	43	(y)	n				
		60	100	C		10YR5/3, 10YR5/8	Fe, grey	pred	poor	26	12	y	y				
		100	120	Mst					poor	10	0		y				
									Total	124	105	GR.gradient					N
									MB	10	-3	GW. WC IV (Table 11)					
									Droughtiness grade (DR)	2	2						
2	T	0	38	mCL	n	10YR3/3			-	66	66	n	n	III	3a	3a	WE
		38	70	SCL		10YR4/3	Mn, com	com		38	48	(y)	n				
		70	79	SCL		10YR5/3	Fe	many		9	0	y	n				
		79	100	C		10YR5/2, 10YR5/8	Fe, grey	pred	poor	15	0	y	y				
		100	120	Mst					poor	10	0		y				
									Total	138	114	GR.gradient					3-4o
									MB	24	6	GW. WC III (Table 11)					NNE
									Droughtiness grade (DR)	2	2						
3	T	0	40	mCL	n	10YR3/4			-	70	70	n	n	III	3a	3a	WE
		40	120	C		10YR4/6	Fe, om	pred	poor	59	37	(y)	y				
									Total	129	107						

										MB	15	-1									
										Droughtiness grade (DR)	2	2									
4	T	0	28	mCL	n	10YR3/3	Fe, grey	com	3	-	49	49	n	n	IV	3b	3b	WE			
		28	120	C		10YR4/6			pred	5	poor	74	52	(y)	y						
												Total	123	101	GR.gradient		NNE				
												MB	9	-7	GW. WC IV (Table 11)						
										Droughtiness grade (DR)	2	2									
5	T	0	37	SCL	n	10YR3/4	Fe	com	5	-	60	60	n	n	IV	3b	3b	WE			
		37	72	SZL		2.5Y6/2	Mn, Fe	many	5		44	53	y	n							
		72	120	C		2.5Y5/2	Mn, Fe	many	5	poor	32	0	y	y							
												Total	136	113	GR.gradient		2-3o		NNE		
										MB	22	5	GW. WC IV (Table 11)								
										Droughtiness grade (DR)	2	2									
Pit A	T	0	25	mCL	n	10YR3/4	Fe	many	5	-	43	43	n	n	IV	3b	3b	WE			
		25	60	SL		10YR4/6			pred	5		46	50	(y)	n						
		60	75	SL		10YR4/6			pred	5		16	14	(y)	n						
		75	120	C		10YR5/2			pred	0	poor	32	0	y	y						
										Total	136	107	GR.gradient		1-2o						
										MB	22	-1	GW. WC IV (Table 11)					Poached			
										Droughtiness grade (DR)	2	2									

Appendix 3: Pit Description and Photographs

Pit A		Description (grass), poaching evident
Ap	0-25 cm	Dark Yellowish brown (10YR3/4) medium clay loam, fine sized granulated peds that are loose and well developed; abundant roots throughout, iron mottling along roots, about 5% hard stones.
Bg(i)	25-60 cm	Dark Yellowish brown (10YR4/6) sandy loam, medium-coarse subangular blocky structure, weakly developed with a loose consistency, many roots, many iron mottles, about 5% hard stones.
Bg(ii)	60-75 cm	Dark Yellowish brown (10YR4/6) sandy loam, medium-coarse subangular blocky structure, weakly developed with a loose consistency, predominant iron mottles, about 5% hard stones.
BCg	75-120 cm	Greyish Brown (10YR5/2) clay, many iron mottles, firm to very firm consistency, slowly permeable.

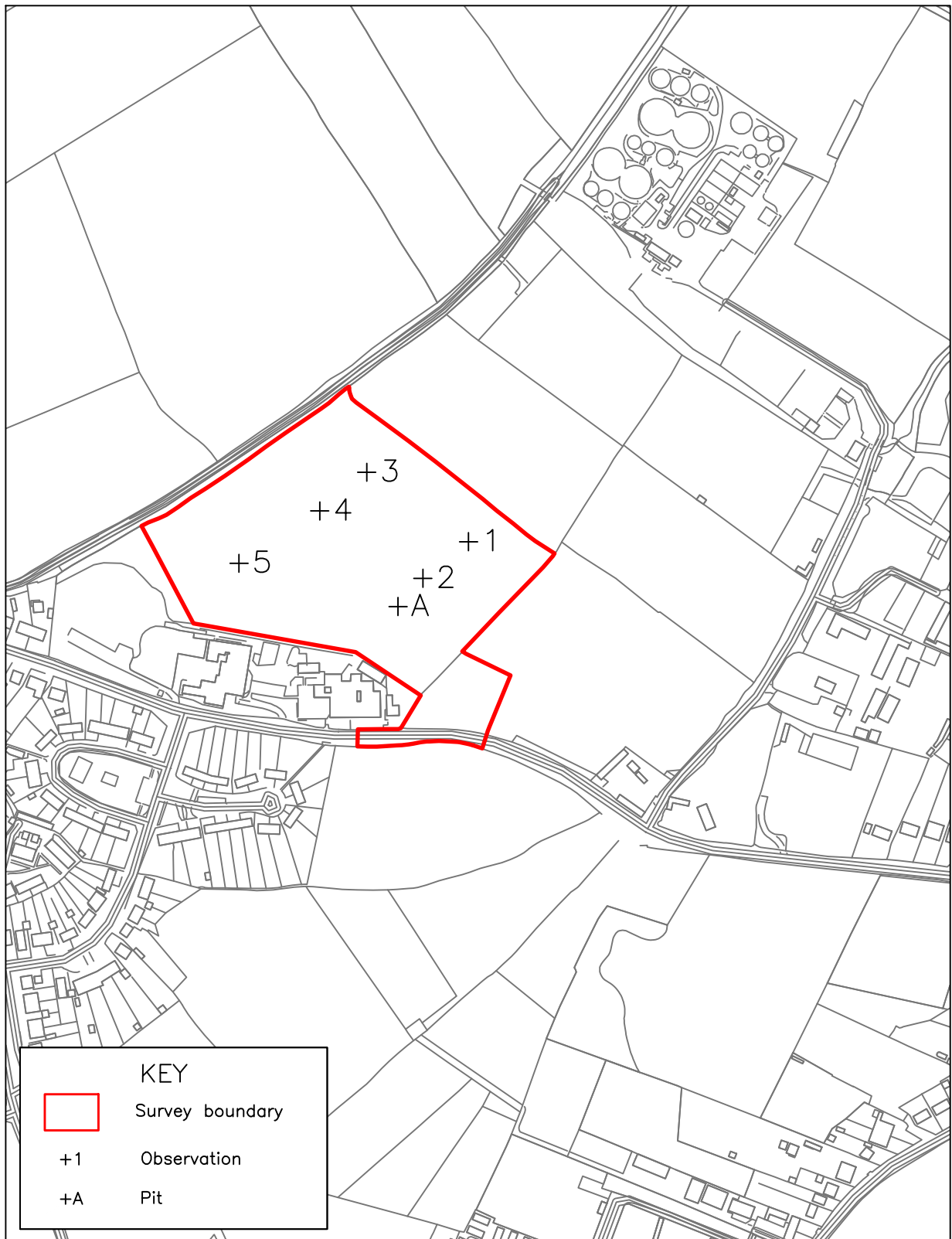
Geology: London Clay Formation

Pit A structures reassembled
Marker every 10cm



Observation 1	Observation 2	Observation 5
Sandy clay loam topsoil and sandy clay loam or sandy loam subsoil over clay, waterlogged in subsoil over clay		
		
Augered soil from the top of the profile on the left, soil on right is 60cm+, tape marks every 10 cm		

Observation 3	Observation 4	View near Observation 5 in north-west field behind Coombe Primary School
medium clay loam topsoil over clay subsoil		
		
Augered soil from the top of the profile on the left, soil on right is 60cm+, tape marks every 10 cm		

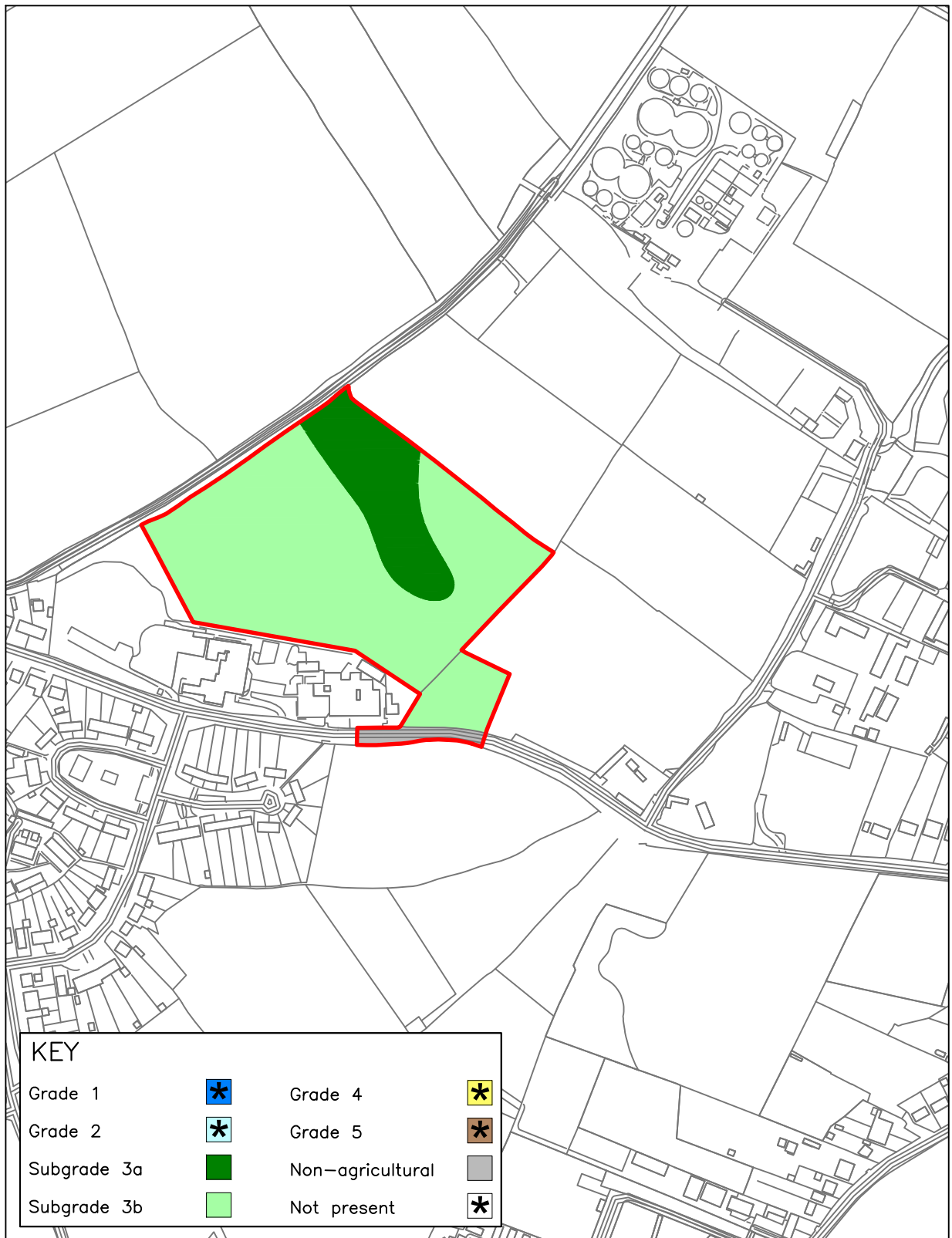


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1:5,000

0 100m 200m

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	Scales 1:5,000@A4	Date 03/2025				
			A Rev.	RLB Comment	070325 Date	 READING AGRICULTURAL CONSULTANTS

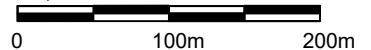


KEY

Grade 1		Grade 4	
Grade 2		Grade 5	
Subgrade 3a		Non-agricultural	
Subgrade 3b		Not present	

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