



September 2022

**Croudace Homes Ltd**

# **Assessment of the Impact on Agricultural Land and Soil Resources**

at

**Land at Henfield Road, Albourne, West Sussex**

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Long Toll, Woodcote,  
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## 1. Introduction

- 1.1. Reading Agricultural Consultants Ltd (RAC) is instructed by Croudace Homes Ltd to assess the impact of the proposed development of land at Henfield Road, Albourne, West Sussex on agricultural land quality and soil resources. This report follows a survey report of the survey of the Agricultural Land Classification (ALC) and soil resources at the site that was issued in June 2022. The findings of that survey are also included within this report for ease of cross-reference.

## 2. Relevant Policy

- 2.1. In a national context, paragraph 174 of the National Planning Policy Framework<sup>1</sup> (NPPF) indicates that planning policies and decisions should contribute to and enhance the natural and local environment by:
- protecting and enhancing soils; and
  - recognising, amongst other matters, the wider benefits from natural capital and ecosystem services, including the economic and other benefits of the best and most versatile (BMV) agricultural land.
- 2.2. Paragraph 175 goes on to state that plans should allocate land with the least environmental or amenity value, where consistent with other policies in the NPPF, and footnote 58 explains 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.
- 2.3. Policy DP12 of the adopted Mid Sussex District Plan 2014-2031, entitled Protection and Enhancement of Countryside, states that:

*“Agricultural land of Grade 3a and above will be protected from non-agricultural development proposals. Where significant development of agricultural land is demonstrated to be necessary, detailed field surveys should be undertaken and proposals should seek to use areas of poorer quality land in preference to that of higher quality.”*

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<sup>1</sup> Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework.  
9549 – Albourne

### 3. Background to Agricultural Land Classification

- 3.1. Guidance for assessing the quality of agricultural land in England and Wales is set out in the revised guidelines and criteria for grading the quality of agricultural land<sup>2</sup>, and summarised in Natural England's Technical Information Note 049<sup>3</sup>.
- 3.2. 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. 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.
- 3.3. 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 severe limitations which restrict use to permanent pasture or rough grazing.
- 3.4. Land which is classified as Grades 1, 2 and 3a in the ALC system is defined in Annex 2 of the NPPF as BMV agricultural land.
- 3.5. 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 on an Ordnance Survey base at a scale of One Inch to One Mile (1:63,360) and is now available at 1:250,000. The Provisional ALC map shows the site as Grade 2 with a small area of undifferentiated 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*

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<sup>2</sup> **MAFF (1988)**. *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land*. MAFF Publications.

<sup>3</sup> **Natural England (2012)**. *Technical Information Note 049 - Agricultural Land Classification: protecting the best and most versatile agricultural land*, Second Edition.

*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 ..."*

- 3.6. 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. The survey undertaken followed the established ALC guidelines and criteria.

## 4. Background Data to the ALC Survey

### General features and land form

- 4.1. The site extends to 11.3ha of mostly arable land. Non-agricultural land within the site includes a pocket of woodland in the north and access tracks.
- 4.2. The site is bordered to the east by Albourne Church of England Primary school and residential properties off The Street, to the south by Church Lane, and to the north-east by Henfield Road. Other agricultural land borders to the west and north-west.
- 4.3. Topography across the site is gently undulating with a highest elevation of 40m above Ordnance Datum (AOD) and a lowest of 32m AOD.

### Agro-climatic conditions

- 4.4. Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point dataset at representative altitude of 36m AOD. The data are given in Table 1. The site has a warm and wet climate, with moderately large moisture deficits. The number of Field Capacity Days (FCD) is higher than is average for lowland England (150) and is unfavourable for providing opportunities for agricultural field work.

**Table 1:** Local agro-climatic conditions

Parameter	Value
Average Annual Rainfall	841mm
Accumulated Temperatures >0°C	1,495 day°
Field Capacity Days	177 days
Average Moisture Deficit, wheat	108mm
Average Moisture Deficit, potatoes	102mm

## Soil parent material and soil type

- 4.5. The underlying geological units mapped by the British Geological Survey<sup>4</sup> within the site are the Weald Clay Formation in the north and the Lower Greensand Group in the south. The Weald Clay Formation comprises dark grey, thinly bedded mudstone with some subordinate siltstones, sandstones, limestones and clay ironstones. The Lower Greensand Group comprises mainly sands and sandstones with silts and clays in some intervals. There are no superficial deposits mapped across the site.
- 4.6. The Soil Survey of England and Wales soil association mapping<sup>5</sup> (1:250,000 scale) shows the Kingston association across the southern and central areas. This association contains fine loamy over clayey soils, with some fine and coarse loamy soils. Soil profiles are typically assessed as Wetness Class (WC) III-IV<sup>6</sup>. Soils of the Fyfield and Dundale series within the association are permeable and well drained in WC I.
- 4.7. The Wickham 1 association is mapped across the northern part of the site and comprises slowly permeable, fine silty over clayey, fine loamy over clayey and clayey soils. Soil profiles are typically assessed as WC IV.

## 5. Agricultural land quality

### Soil survey methods

- 5.1. Eleven soil profiles were examined across the site using an Edelman (Dutch) auger at an observation density of one per hectare in accordance with the established recommendations for ALC surveys. Two observation pits were also excavated to examine subsoil structures. The locations of observations are shown on Figure RAC/9549/1. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120cm or any impenetrable layer:
- soil texture;
  - significant stoniness;

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<sup>4</sup> **British Geological Survey (2022).** *Geology of Britain viewer*, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

<sup>5</sup> **Soil Survey of England and Wales (1984).** *Soils of South East England* (1:250,000), Sheet 6.

<sup>6</sup> **Jarvis et al (1984).** *Soils and Their Use in South East England*. Soil Survey of England and Wales Bulletin 15, Harpenden.

- colour (including localised mottling);
- consistency;
- structural condition;
- free carbonate; and
- depth.

- 5.2. One topsoil sample was submitted for laboratory determination of particle size distribution, pH, organic matter content and nutrient contents (P, K, Mg). Results are presented in Appendix 1.
- 5.3. Soil 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.
- 5.4. 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.

### **Agricultural land classification and site limitations**

- 5.5. Assessment of land quality has been carried out according to the revised ALC guidelines<sup>2</sup>. Soil profiles have been described according to Hodgson<sup>7</sup> which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.
- 5.6. There are two main soil types at the site.

### **Soil Type 1 – Heavy silty clay loams over clay**

- 5.7. The first soil type is present across the north of the site. The topsoil comprises dark greyish brown (2.5Y4/2 in the Munsell soil colour charts<sup>8</sup>) heavy silty clay loam. Stone content is very slightly stony, up to 5% by volume. The topsoil has a medium to coarse subangular blocky structure and is friable to firm.

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<sup>7</sup> Hodgson, J. M. (Ed.) (1997). *Soil survey field handbook*. Soil Survey Technical Monograph No. 5, Silsoe.

<sup>8</sup> Munsell Color (2009). *Munsell Soil Color Book*. Grand Rapids, MI, USA  
9549 – Albourne

- 5.8. The upper subsoil is grey, greyish brown or light brownish grey (10YR5/1 or 10YR5/2, 2.5Y5/2 or 2.5Y6/2) clay, with one recording of heavy silty clay loam. The upper subsoil is predominantly stoneless, with one recording of 10% stone by volume. It has a coarse prismatic structure, is firm to very firm and contains many ochreous mottles indicating prolonged periods of wetness.
- 5.9. The lower subsoil comprises grey (10YR6/1) stoneless clay. The structure is coarse prismatic and the consistency is very firm. Ochreous mottling continues within this horizon.
- 5.10. Soils with these characteristics are assessed as WC IV and are limited to Grade 4 by soil wetness.

### **Soil Type 2 – Heavy clay loams**

- 5.11. The second soil type is present across the central and southern areas. The topsoil comprises dark greyish brown (10YR4/2), heavy clay loam which is stoneless to very slightly stony, with up to 3% by volume. The topsoil has a medium subangular blocky structure and a friable consistency.
- 5.12. The upper subsoil is greyish brown, light brownish grey or brown (10YR5/2, 10YR6/2 or 10YR5/3) heavy clay loam, with one recording of clay. The upper subsoil is predominantly stoneless with one recording of 3% by volume. It has a medium subangular blocky structure, a friable consistency and ochreous mottling.
- 5.13. The lower subsoil comprises grey, greyish brown, light greyish brown or pale brown (10YR5/1, 10YR5/2, 10YR6/2, 10YR6/3) stoneless, heavy clay loam or clay. The structure is medium subangular blocky to medium angular blocky and the consistency is firm. This horizon contains ochreous mottling.
- 5.14. Soils with these characteristics are restricted by soil wetness. Where there is no slowly permeable layer, profiles are assessed as WC II and are limited to Subgrade 3a. Where profiles contain a slowly permeable clay lower subsoil, profiles are assessed as WC III and are limited to Subgrade 3b by soil wetness.
- 5.15. The ALC distribution within the site is shown in Figure RAC/9549/2 and the areas of each grade are given in Table 2.

**Table 2:** Agricultural Land Classification

<b>Grade</b>	<b>Description</b>	<b>Area (ha)</b>	<b>% of agricultural land</b>
Subgrade 3a	Good quality	2.7	24
Subgrade 3b	Moderate quality	4.9	43
Grade 4	Poor quality	3.7	33
Total Agricultural		11.3	100
Non-Agricultural		<0.1	-



## 6. Assessment

- 6.1. The site comprises approximately 11.3ha of mostly agricultural land, of which only 2.7ha (24%) is BMV land in Subgrade 3a. Most of the site is moderate or poor quality land in Subgrade 3b and Grade 4, which is not protected from non-agricultural development by Policy DP12 of the Mid Sussex District Plan. Indeed, although this area of land is not considered to represent significant development of agricultural land within the terms of Policy DP12, the proposed development does mostly use areas of poorer quality land in preference to higher quality land.
- 6.2. Paragraph 174 of the NPPF does not preclude the use of BMV land for non-agricultural development but indicates that decisions should recognise the economic and other benefits of BMV land. In this instance, the two fields are predominantly non-BMV land and are managed according to the main limiting factor on site, which is soil wetness. The land is primarily used for arable cropping but has been in pasture, and the two fields are farmed as a separate block from a farm base near Henfield, and do not adjoin other land farmed by the same occupier. The economic benefits derived from 2.7ha of BMV land are therefore very limited.
- 6.3. Furthermore, most of the Subgrade 3a land on the site is found in the southern field which is proposed to be retained as open space. The soil resources and the inherent agricultural land quality on this part of the site will remain, and the soils can continue to perform various ecosystem functions, such as the production of biomass, the storage of water, carbon and nutrients, and support for biodiversity.
- 6.4. As such, only approximately 1ha of Subgrade 3a land in the northern field will be lost to irreversible built development. It is estimated from the Provisional ALC data that there are approximately 11,102ha of BMV land in Mid Sussex District, of which 456ha is Grade 2 land and 10,646ha is Subgrade 3a (on the assumption that the 21,292ha of Grade 3 land is divided evenly between the two subgrades). This represents 37% of all agricultural land in the District.
- 6.5. The irreversible loss of BMV land at the site therefore represents 0.009% of the BMV land within the District. It is evident that this is not a significant loss of BMV agricultural land.

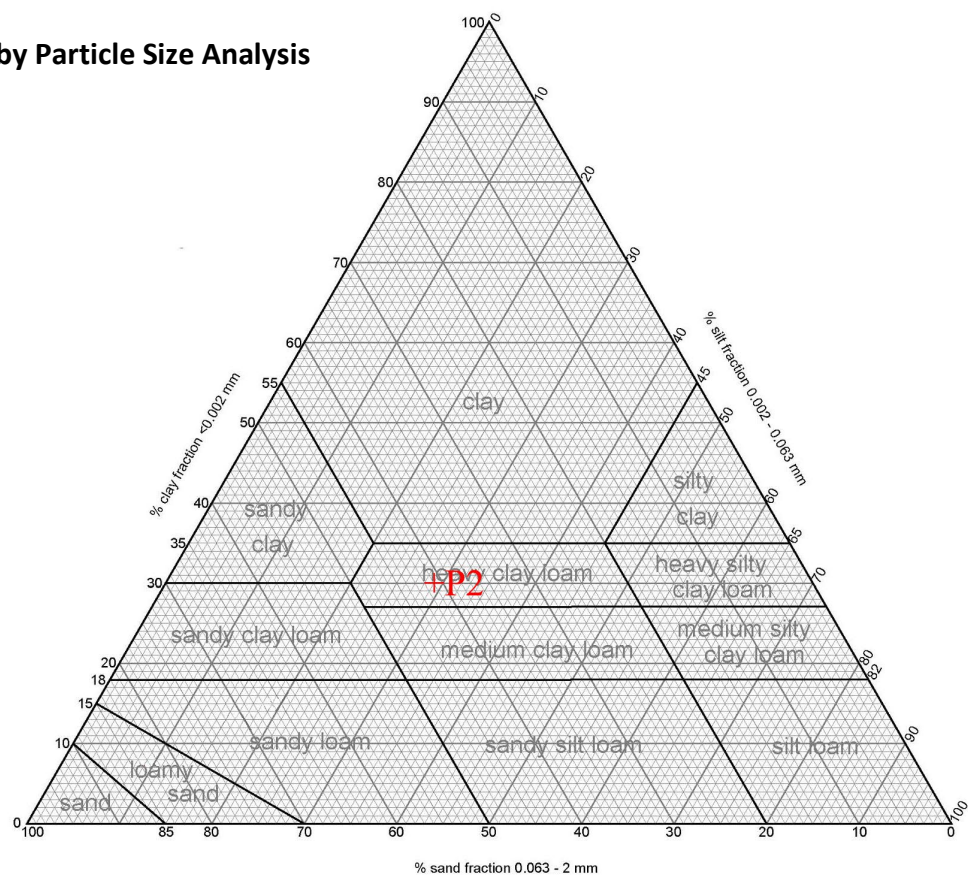
## Appendix 1: Laboratory Data

Determinand	Pit 2	Units
Sand 2.00-0.063 mm	41	% w/w
Silt 0.063-0.002 mm	29	% w/w
Clay <0.002 mm	30	% w/w
Organic Matter	3.9	% w/w
Texture	Heavy clay loam	

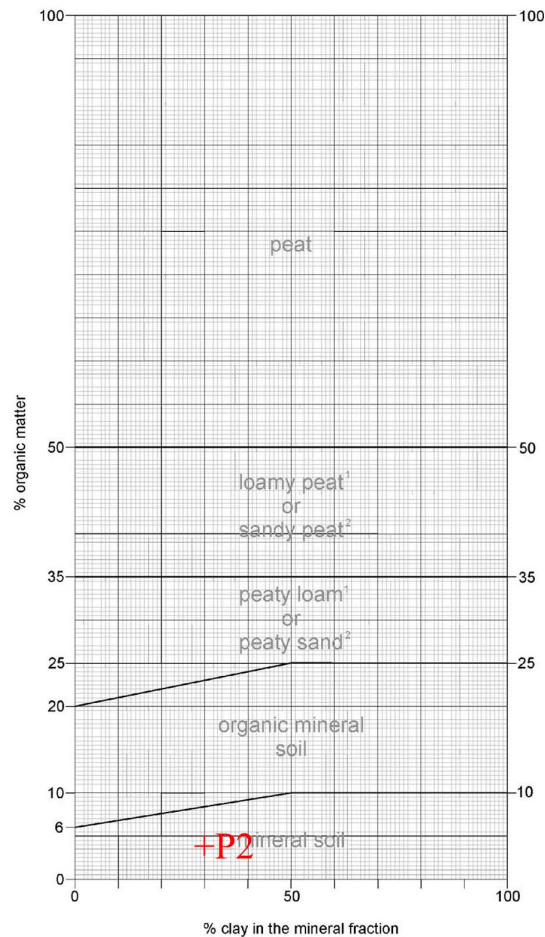
Determinand	Pit 2	Units
Soil pH	6.2	
Phosphorus (P)	76.4	Mg/l (av)
Potassium (K)	228	Mg/l (av)
Magnesium (Mg)	114	Mg/l (av)

Determinand	Pit 2	Units
Phosphorus (P)	5	ADAS Index
Potassium (K)	2+	ADAS Index
Magnesium (Mg)	3	ADAS Index

Soil Texture by Particle Size Analysis



Organic Matter Class



<sup>1</sup>Less than 50% sand in the mineral fraction  
<sup>2</sup> 50% sand or more in the mineral fraction

## Appendix 2: Soil Profile Summaries and Droughtiness 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.

Stone types			Climate Data		Wetness Class Guidelines					AT0	
%	TAv	EAv	MDwheat	108	II		III	IV	V	1,495	
hard	1	0.5	MDpotato	102	SPL within 80cm, gleying within 40cm		>76cm	48-76cm	<48cm	Limitation	
			FCD	177	SPL within 80cm, gleying at 40-70cm		>63cm	<63cm			
					No SPL but gleying within 40cm		coarse subsoil	I	other cases	II	Grade 1

hard flint & pebble

AAR 841

Maximum depth of auger penetration is underlined

Site No.	Depth cm	Texture	CaCO <sub>3</sub>	Colour	Mottle colour	abundance	stone% hard	stone%	Struct-ure	APwheat mm	AP potato mm	Gley	SPL	WC	Wetness grade WE	Final Grade	Limiting Factor(s)
<b>1</b>	T 0 30	hZCL	n	2.5YR4/2	Fe	few	5	0		53	53	n	n	IV	4	<b>4</b>	WE
	30 47	hZCL	n	2.5Y5/2	Femn	com	0	0		37	41	y	n				
	47 70	C	n	10YR6/1	Femn	many	0	0	poor	29	15	y	y				
	70 120	C	n	10YR6/1	Fe	v.many	0	0	poor	29	15	y	y				
									Total	<b>149</b>	<b>109</b>						
									MB	41	7						
Droughtiness grade (DR)										1	2						
<b>2/P1</b>	T 0 25	hZCL	n	2.5Y4/2	Fe	com	2	0		53	53	y	n	IV	4	<b>4</b>	WE
	25 32	C	n	10YR5/2, 7.5YR5/4	Fe	many	0	0		37	41	y	n				
	32 70	C	n	10YR6/1	Fe	many	0	0	poor	29	15	y	y				
	70 120	C	n	10YR6/1	Fe	few	0	0	poor	29	15	y	y				
									Total	<b>149</b>	<b>109</b>						
									MB	41	7						
Droughtiness grade (DR)										1	2						
<b>3</b>	T 0 28	hZCL	n	2.5Y4/2			5	0		53	53	n	n	IV	4	<b>4</b>	WE
	28 71	C	n	10YR5/1, 7.5YR5/4	Fe	v.many	10	0	poor	37	41	y	y				
	71 120	C	n	10YR6/1	Fe	many	0	0	poor	29	15	y	y				
									Total	<b>149</b>	<b>109</b>						
Droughtiness grade (DR)										1	2						

4	T	0	27	hZCL	n	2.5Y4/2			5	0		53	53	n	n	IV	4	4	WE
		27	50	C	n	2.5Y6/2	Fe	many	0	0	poor	37	41	y	y				
		50	120	C	n	10YR6/1	Fe	many	0	0	poor	29	15	y	y				
												Total	149	109					
												MB	41	7					
Droughtiness grade (DR)												1	2						
5	T	0	30	hCL	n	10YR4/2			3	0		53	53	n	n	//	3a	3a	WE
		30	65	hCL	n	10YR5/2	Fe	com	3	0		37	41	y	n				
		65	120	hCL	n	10YR5/2	Femn	com	0	0		29	15	y	n				
												Total	149	109					
												MB	41	7					
Droughtiness grade (DR)												1	2						
6	T	0	38	hCL	n	10YR4/2			0	0		53	53	n	n	///	3b	3b	WE
		38	68	hCL	n	10YR5/2	Fe	com	0	0		37	41	y	n				
		68	120	C	n	10YR6/2	Femn	com	0	0	poor	29	15	y	y				
												Total	149	109					
												MB	41	7	Large bare patch/ poor crop growth.				
Droughtiness grade (DR)												1	2						
7	T	0	30	hCL	n	10YR4/2			2	0		53	53	n	n	///	3b	3b	WE
		30	58	C	n	10YR5/3	Fe	many	0	0		37	41	y	n				
		58	120	C	n	10YR6/3	Femn	v.many	0	0	poor	29	15	y	y				
												Total	149	109					
												MB	41	7	Dry soil				
Droughtiness grade (DR)												1	2						
8	T	0	32	hCL	n	10YR4/2			2	0		53	53	n	n	///	3b	3b	WE
		32	67	hCL	n	10YR6/2	Fe	many	0	0		37	41	y	n				
		67	120	C	n	10YR6/3	Fe	v.many	0	0	poor	29	15	y	y				
												Total	149	109					
												MB	41	7					
Droughtiness grade (DR)												1	2						
9	T	0	28	hCL	n	10YR4/2			2	0		53	53	n	n	//	3a	3a	WE
		28	65	hCL	n	10YR5/2	Fe	com	0	0		37	41	y	n				
		65	98	hCL	n	10YR5/2	Fe	com	0	0		29	15	y	n				

		98	120	hCL	n	10YR6/3	Fe	few	0	0		29	15	n	n				
											Total	149	109						
											MB	41	7						
											Droughtiness grade (DR)	1	2						
P2	T	0	30	hCL	n	10YR4/2			2	0		53	53	n	n	//	3a	3a	WE
		30	65	hCL	n	10YR5/2	Fe	many	0	0		37	41	y	n				
		65	120	hCL	n	10YR5/2	Fe	many	0	0		29	15	y	n				
											Total	149	109						
											MB	41	7						
											Droughtiness grade (DR)	1	2						
10	T	0	32	hCL	n	10YR4/2			2	0		53	53	n	n	//	3a	3a	WE
		32	60	C	n	10YR6/2	Fe	many	0	0		37	41	y	n				
		60	95	hCL	n	10YR6/3	Fe	com	0	0		29	15	y	n				
		95	120	hCL	n	10YR6/3			0	0		29	15	n	n				
											Total	149	109						
											MB	41	7						
											Droughtiness grade (DR)	1	2						
11	T	0	32	hCL	n	10YR4/2			2	0		53	53	n	n	///	3b	3b	WE
		32	56	hCL	n	10YR5/2	Femn	com	0	0		37	41	y	n				
		56	120	C	n	10YR5/1	Fe	many	0	0	poor	29	15	y	y				
											Total	149	109						
											MB	41	7						
											Droughtiness grade (DR)	1	2						



### Appendix 3: Site Photographs



Pit 1: Pit wall



Pit 1: Clay pit base



Pit 1: Topsoil



Pit 1: Upper subsoil





Pit 2: Pit wall



Pit 2: Topsoil

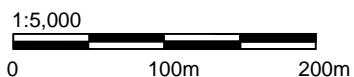
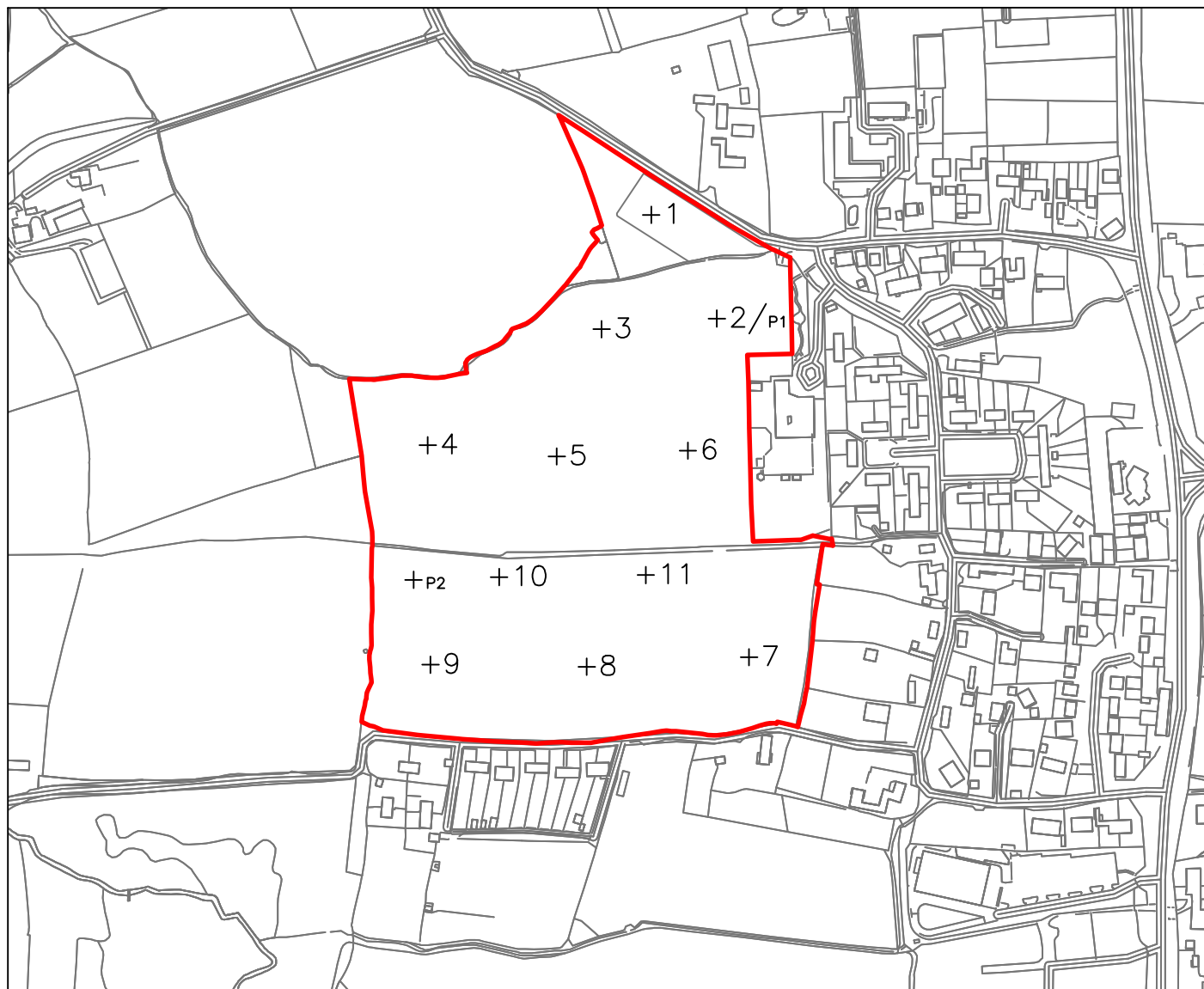


Pit 2: Upper subsoil photo 1





Pit 2: Upper subsoil photo 2

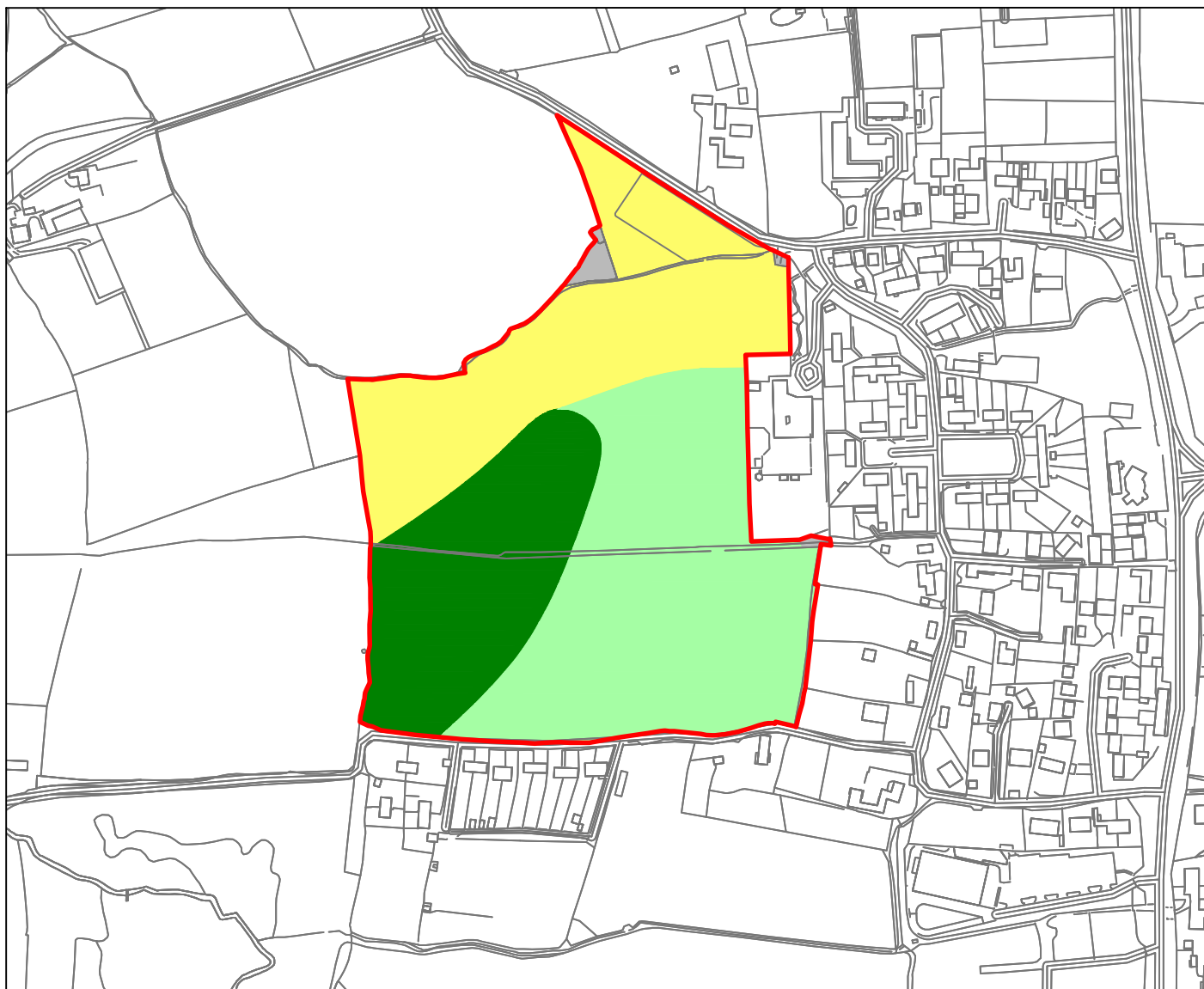




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KEY	
	Survey boundary
+1	Observations
+P	Pit

Rev.	Comment	Date
Drawing title OBSERVATION PLAN		
Contract LAND SOUTH OF HENFIELD ROAD, ALBOURNE, WEST SUSSEX		
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1:5,000  
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### KEY

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

Rev.	Comment	Date
Drawing title AGRICULTURAL LAND CLASSIFICATION		
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