



October 2022

Bloor Homes North West

Agricultural Land Classification and Soil Resources

at

Lower Cleggswood Farm, Littleborough, Rochdale

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Table of Contents

1 INTRODUCTION.....1

2 SITE AND CLIMATIC CONDITIONS2

3 AGRICULTURAL LAND QUALITY3

APPENDIX 1: LABORATORY DATA7

APPENDIX 2: SOIL PROFILE SUMMARIES AND GRADE CALCULATIONS9

APPENDIX 3: PHOTOGRAPHS14

FIGURE RAC/9676/1: OBSERVATIONS16

FIGURE RAC/9676/2: AGRICULTURAL LAND CLASSIFICATION.....17

1 Introduction

- 1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by Bloor Homes North West to investigate the Agricultural Land Classification (ALC) and soil resources of land at Lower Cleggswood Farm, Littleborough, Rochdale 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 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.* MAFF Publications.

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 4. 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 MAFF guidelines.

2 Site and climatic conditions

General features, land form and drainage

- 2.1 The site extends to 18.9ha, of which 16.4ha is agricultural grassland. Non-agricultural land comprises the farm house and yard, Heald Lane and Hollingworth Road car park. The site is located on the north-east side of the settlement of Smithy Bridge and is otherwise bounded to the south by Lake Bank, to the east by Hollingworth Road and to the north by the Rochdale Canal and other grassland.
- 2.2 The main topographic feature is Brown Brow Hill in the west of the site. The summit is at 181m above Ordnance Datum (AOD). The land slopes gently down to the east, to a shallow valley at around 165m AOD, then up to around 170m AOD at the eastern boundary, and moderately then steeply down to the north to around 150m AOD at the Rochdale Canal. The slopes in the north-west of the site toward the canal are at gradients that affect the ALC.

Agro-climatic conditions

- 2.3 Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point data set at a representative altitude of 168m AOD, and are given in Table 1. The climate is cold and very wet with moderately small to small moisture deficits. The number of Field Capacity Days is very large, and is considered to be very unfavourable for providing opportunities for agricultural field work. There is an overriding climatic limitation to Subgrade 3b.

Table 1: Local agro-climatic conditions

Parameter	Value
Average Annual Rainfall	1,215mm
Accumulated Temperatures >0°C	1,243 day°
Field Capacity Days	271 days
Average Moisture Deficit, wheat	51mm
Average Moisture Deficit, potatoes	28mm

Soil parent material and soil type

- 2.4 The underlying geology mapped by the British Geological Survey³ across the site belongs to the Pennine Lower Coal Measures Formation which includes interbedded grey mudstone, siltstone and pale grey sandstone with marine fossils and coal seams. Across Brown Brow Hill and on the steep slopes in the north of the site is Milnrow Sandstone, which is a distinct unit within the Pennine Lower Coal Measures Formation and is dominated by sandstone.
- 2.5 Superficial deposits of till are mapped across the shallower slopes of the site. Head deposits are mapped within the shallow valley in the east.
- 2.6 The Soil Survey of England and Wales soil association mapping⁴ (1:250,000 scale) shows the Brickfield 3 association across most of the site and the Rivington 2 association in the east. The main component Brickfield soils include clay loam textures throughout, becoming increasing grey with depth. The subsoils are slowly permeable resulting in seasonal waterlogging (Wetness Class (WC) IV).
- 2.7 The contrasting Rivington 2 association is characterised by sandy loam or sandy silt loam soils overlying sandstone at moderate depth. The profiles are well drained (WC I)⁵.

3 Agricultural land quality

Soil survey methods

- 3.1 In total, 16 soil profiles were examined using an Edelman (Dutch) auger at an observation density of approximately one per hectare in accordance with the established recommendations for ALC surveys². Two soil pits were also excavated to examine subsoil structures and stone content. The locations of observations are indicated on Figure RAC/9676/1. At each observation

³ **British Geological Survey (2022).** *Geology of Britain viewer*, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

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

⁵ **Jarvis et al (1984).** *Soils and Their Use in Northern England*. Soil Survey of England and Wales Bulletin 10, Harpenden.

point the following characteristics were assessed for each soil horizon up to a maximum of 120cm or any impenetrable layer:

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

- 3.2 Two topsoil samples were submitted for laboratory determination of particle size distribution, pH, organic matter content and nutrient contents (P, K, Mg). Results are presented 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.

Agricultural land classification and site limitations

- 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.
- 3.6 Agricultural land quality across the site is limited by an overarching climatic limitation to Subgrade 3b; and by soil wetness to Subgrade 3b, Grade 4 and Grade 5. Gradient limitations are equal to or less than wetness limitations in all profiles.

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

Subgrade 3b

- 3.7 Land of Subgrade 3b quality occurs across the mid-slopes of the site. The topsoil is mainly very dark grey (10YR3/1 in the Munsell soil colour charts⁷) medium clay loam or sandy clay loam. The average depth is 24cm. The topsoil is stoneless to very slightly stony. A pit excavated in this soil type revealed common roots and some visible pores. The topsoil has a medium subangular blocky structure. The topsoil is variably mottled, and sometimes gleyed.
- 3.8 The upper subsoil is dark greyish brown or brown (10YR4/2 or 10YR5/3) sandy clay loam or one instance of sandy loam. There is a thin stony layer beneath the topsoil which includes around 20% stone, but the main upper subsoil horizon is typically slightly stony at around 15% stone. The upper subsoil has a medium subangular blocky structure, but was very dry and firm at the time of survey. The presence of ochreous mottles is indicative of wetness and gleying.
- 3.9 Where the subsoil is sandy loam, the profiles are assessed as WC I or II, and where the subsoil is sandy clay loam the profiles are in WC III. With medium clay or sandy clay loam topsoil, these profiles are limited by wetness to Subgrade 3b. The profile in WC I is located in a hollow so may be subject to a microtopography limitation but, in any case, is limited to Subgrade 3b by the overriding climatic limitation.

Grade 4

- 3.10 Predominantly found in the west and south-west, profiles in Grade 4 include very dark grey (10YR3/1) organic heavy clay loam topsoil of 28cm average depth. Most of the topsoil is stoneless, other than in the south where it is slightly stony.
- 3.11 The upper subsoil is greyish brown or brown (10YR5/2 or 10YR5/3) clay or sandy clay with distinct or prominent medium ochreous mottles. There are no or very few stones. The upper subsoil mainly passes to similarly coloured but slowly permeable clay. Profiles are in WC IV and limited severely to Grade 4 due to the organic nature of the topsoil.

Grade 5

- 3.12 Soil profiles in Grade 5 are similar to those of Grade 4, although they are slowly permeable immediately beneath the topsoil. The profiles are in WC V which, when combined with organic heavy clay loam topsoil, results in a severe wetness limitation to Grade 5.

⁷ **Munsell Color (2009).** *Munsell Soil Color Book*. Grand Rapids, MI, USA

3.13 The ALC distribution within the site is shown in Figure RAC/9676/2 and the areas of each grade are given in Table 2. Photographs taken at the site are given in Appendix 3.

Table 2: ALC areas

Grade	Description	Area (ha)	%
Subgrade 3b	Moderate quality	6.6	35
Grade 4	Poor quality	4.8	25
Grade 5	Very poor quality	4.7	25
Non-agricultural		2.8	15
Total		18.9	100

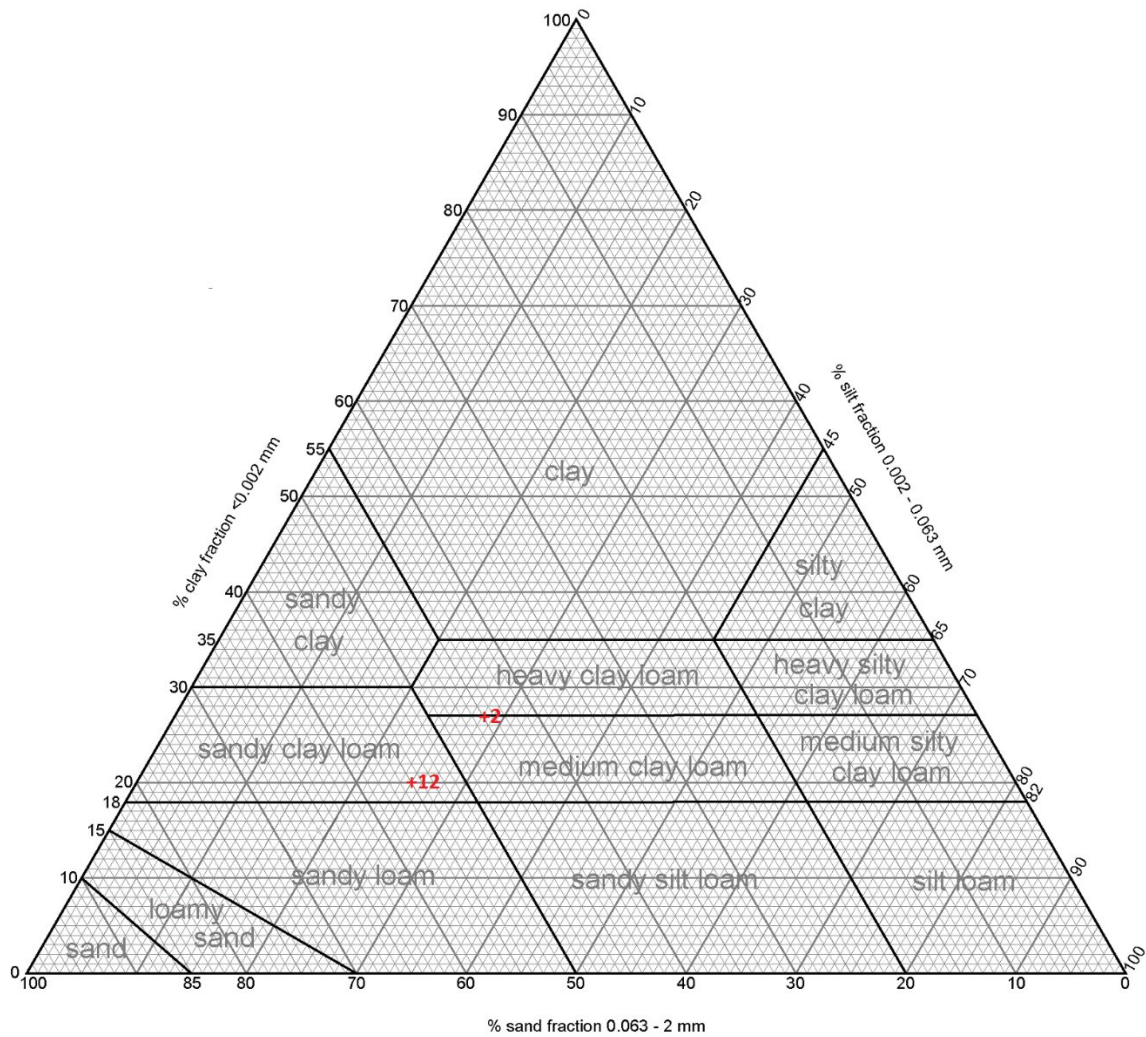
Appendix 1: Laboratory Data

Determinand	Site 2	Site 12	Units
Sand 2.00-0.063 mm	45	55	% w/w
Silt 0.063-0.002 mm	28	25	% w/w
Clay <0.002 mm	27	20	% w/w
Organic Matter	14.7	6.1	% w/w
Texture	Organic Heavy clay loam	Sandy clay loam	

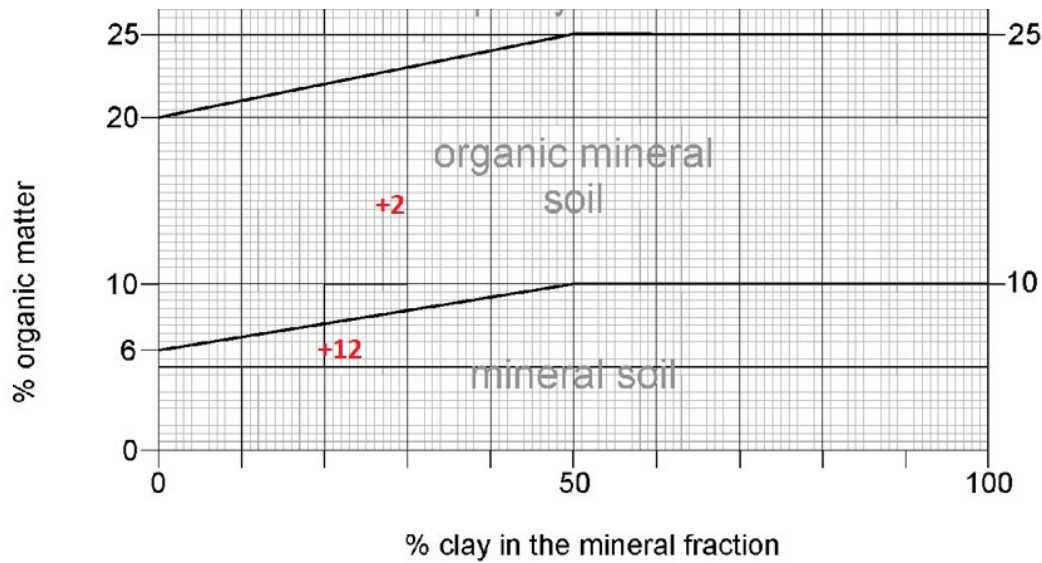
Determinand	Site 2	Site 12	Units
Soil pH	6.0	6.3	
Phosphorus (P)	49.0	25.6	mg/l (av)
Potassium (K)	55.6	124	mg/l (av)
Magnesium (Mg)	66.9	51.5	mg/l (av)

Determinand	Site 2	Site 12	Units
Phosphorus (P)	4	3	ADAS Index
Potassium (K)	0	2-	ADAS Index
Magnesium (Mg)	2	2	ADAS Index

Soil Texture by Particle Size Analysis



Organic Matter Class



Appendix 2: Soil Profile Summaries and Grade 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											
%	TA _v	EAv		MDwheat	51			SPL within 80cm, gleying within 40cm				I/		III		IV		V	
hard	1	0.5		MDpotato	28			SPL within 80cm, gleying at 40-70cm				40-70cm							
chalk	10	7		FCD	271			No SPL but gleying within 40cm				coarse subsoil		I/		other cases		III	
hard flint & pebble				Maximum depth of auger penetration is <u>underlined</u>															

Site No.		Depth cm		Texture	CaCO ₃	Colour	Mottle colour	abund- ance	stone% hard	stone% chalk	Struct- ure	APwheat mm	AP potato mm	Gley	SPL	WC	Wetness grade WE	Final Grade	Limiting Factor(s)	
1	T	0	30	ohCL		10YR3/1	och	cmp				84	84	y	n	I/	4	4	WE	
		30	60	SC		10YR5/2	och	cmp				40	45	y	n					
		60	120	SC		7.5YR4/4	och	cmp			poor	48	13	n	y					
												Total	172	142						
												MD	121	114						
Droughtiness grade (DR)												1	1							
2	T	0	<u>30</u>	ohCL		10YR3/1	och	mmd				84	84	y	n	V	5	5	WE	
		30	60	C		10YR5/3	och	cmp	10		poor	30	35	y	y					
		60	120	C		10YR5/3	och	cmp			poor	42	13	y	y					
												Total	156	132						
												MD	105	104						
Droughtiness grade (DR)												1	1							
3	T	0	25	ohCL		10YR3/1	och	mmd				70	70	y	n	V	5	5	WE	
		25	<u>50</u>	C		10YR5/3	och	cmp	10		poor	30	30	y	y					
		50	120	C		10YR5/3	och	cmp			poor	49	26	y	y					
												Total	148	126						
												MD	97	98						
Droughtiness grade (DR)												1	1							
4	T	0	30	ohCL		10YR3/1	och	fmp				84	84	n	n	V	5	5	WE	
		30	<u>70</u>	C		10YR5/1	och	cmp			poor	40	52	y	y					
		70	120	C		10YR5/2	och	cmp			poor	35	0	y	y					
												Total	159	136						
												MD	108	108						

Droughtiness grade (DR)										1	1							
5	T	0	30	ohCL	10YR3/1	och	fmp			84	84	y	n	V	5	5	WE	
				C	2.5Y4/1	och	cmp	poor		40	52	y	y					
				C	2.5Y4/1	och	cmd	poor		35	0	y	y					
							Total	159	136									
							MD	108	108									
Droughtiness grade (DR)										1	1							
6	T	0	30	ohCL	10YR3/1	och	fmp			84	84	n	n	V	5	5	WE	
				C	2.5Y4/1	och	cmp	poor		40	52	y	y					
				SC	2.5Y4/1	och	cmd	poor		40	0	y	y					
							Total	164	136									
							MD	113	108	Some sand in USS but still V firm								
Droughtiness grade (DR)										1	1							
7	T	0	30	ohCL	10YR3/1	och	fmp			84	84	n	n	V	5	5	WE	
				C	2.5Y4/1	och	cmp	poor		40	52	y	y					
				C	2.5Y4/1	och	cmd	poor		35	0	y	y					
							Total	159	136									
							MD	108	108	G4 Slope								
Droughtiness grade (DR)										1	1							
8	T	0	20	SCL	10YR3/1					34	34	n	n	/	3a	3b	MR	
				SL	10YR4/2	och	fmd			15	15	n	n					
				SL	10YR4/2	och	fmd			107	60	n	n					
							Total	156	109									
							MD	105	81	Hollow Area								
Droughtiness grade (DR)										1	1							
9	T	0	20	mCL	10YR3/1					36	36	n	n	//	3b	3b	WE	
				SCL	10YR5/3	och	fmd			15	15	n	n					
				SL	10YR5/3	och	fmd			107	60	n	n					
							Total	158	111									
							MD	107	83	Very dry								
Droughtiness grade (DR)										1	1							
10	T	0	20	ohCL	10YR3/1					56	56	n	n	IV	4	4	WE	
				hCL	10YR3/1	och	fmd			24	24	n	n					

		35	120	C		10YR5/2	och	cmd		poor	69	46	y	y				
										Total	148	126						
										MD	97	98			Very dry			
										Droughtiness grade (DR)	1	1						
11	T	0	30	ohCL		10YR3/1					84	84	n	n	IV	4	4	WE
		30	45	C		10YR5/2	och	cmd			24	24	y	n				
		45	120	C		10YR5/2	och/grey	cmd		poor	56	33	y	y				
										Total	164	141						
										MD	113	113			USS some sand			
										Droughtiness grade (DR)	1	1						
12	T	0	25	SCL		10YR3/1	och	mmd	5		43	43	n	n	III	3b	3b	WE
		25	40	SCL		10YR5/3	och	cmd	20		18	18	y	n				
		40	45	SCL		10YR5/3	och	cmd	15		6	6	y	n				
		45	120	SCL		10YR5/2	och	cmd	15		66	32	y	n				
										Total	134	100						
										MD	83	72			P1			
										Droughtiness grade (DR)	1	1			TS - mSAB well rooted, many worms, few visible p			
															USS - firm, very dry, few pores and roots mSAB augere			
13	T	0	20	SCL		10YR3/1	och	fmd	5		32	32	n	n	III	3b	3b	WE
		25	45	SCL		10YR5/3	och	cmd	20		24	24	y	n				
		45	120	SCL		10YR5/2	och	cmd	5		74	36	y	n				
										Total	131	93						
										MD	80	65						
										Droughtiness grade (DR)	1	1						
14	T	0	30	mCL		10YR3/1	och	fmd	5		51	51	n	n	III	3b	3b	WE
		25	45	SCL		10YR5/3	och	cmd	20		24	24	y	n				
		45	120	SCL		10YR5/2	och	cmd	5		74	36	y	n				
										Total	150	112						
										MD	99	84						
										Droughtiness grade (DR)	1	1						
15	T	0	30	ohCL		10YR3/1			5		80	80	n	n	IV	4	4	WE
		30	45	C		10YR5/3	och	cmd	5		23	23	y	n				
		45	65	C		10YR5/2	och	cmd	5	poor	16	25	y	y				

		65	120	C		10YR5/2	och	cmd	5	poor	37	6	y	y			
										Total	156	134					
										MD	105	106				Uss mixed sand and clay	
										Droughtiness grade (DR)	1	1					
16	T	0	30	mCL		10YR3/2	och	fff	5		51	51	n	n	IV	3b	3b
		30	45	C		5YR4/3	och	mmd	5		23	23	y	n			
		45	55	C		5YR4/3	och	mmd	5	poor	10	12	y	y			
		55	120	C		5YR4/3	och	mmd	5	poor	43	19	y	y			
										Total	127	105					
										MD	76	77				Slope 3b	
										Droughtiness grade (DR)	1	1					

Appendix 3: Photographs

Pit



Topsoil



Large stones

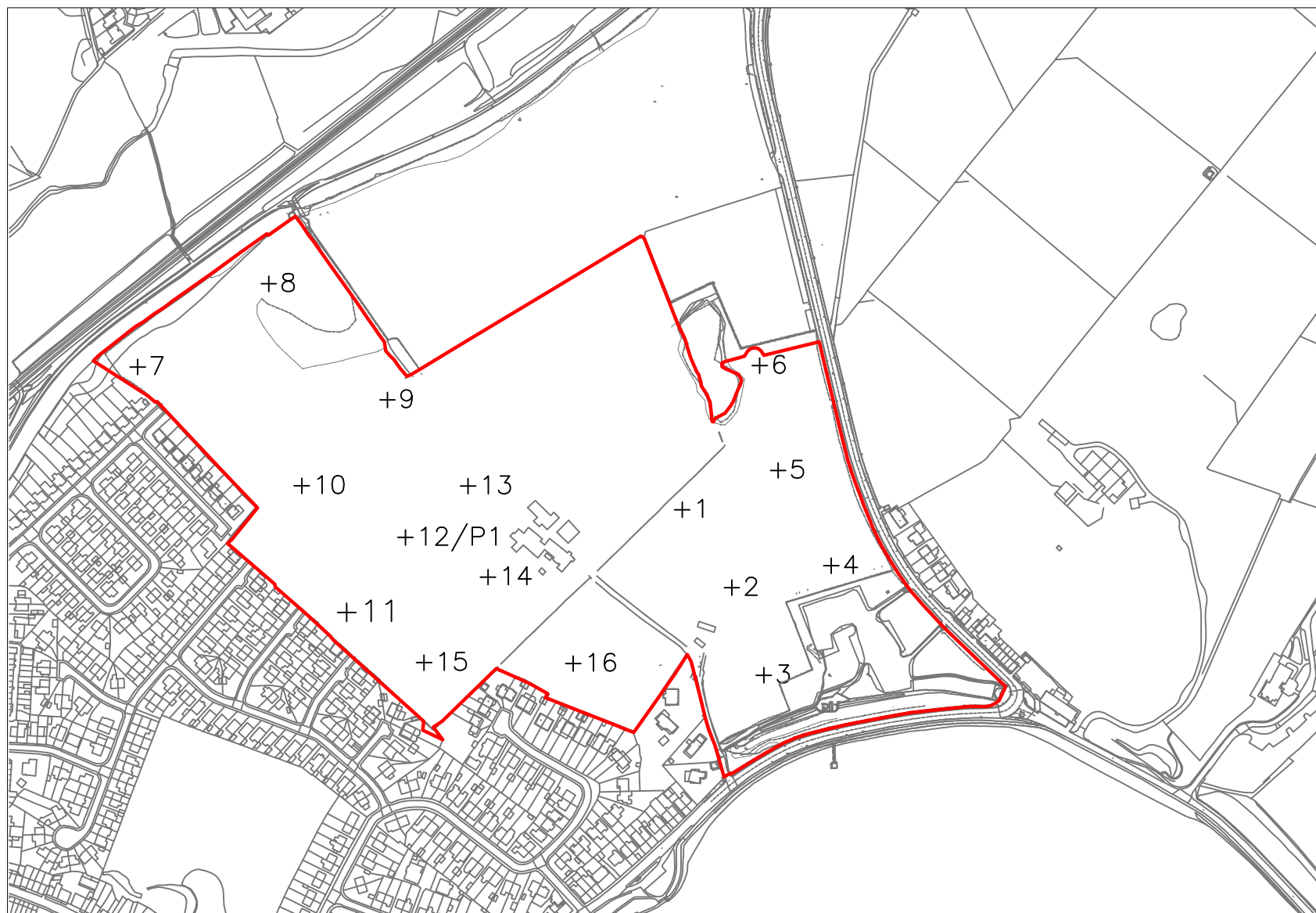


Subsoil



View of slope to canal



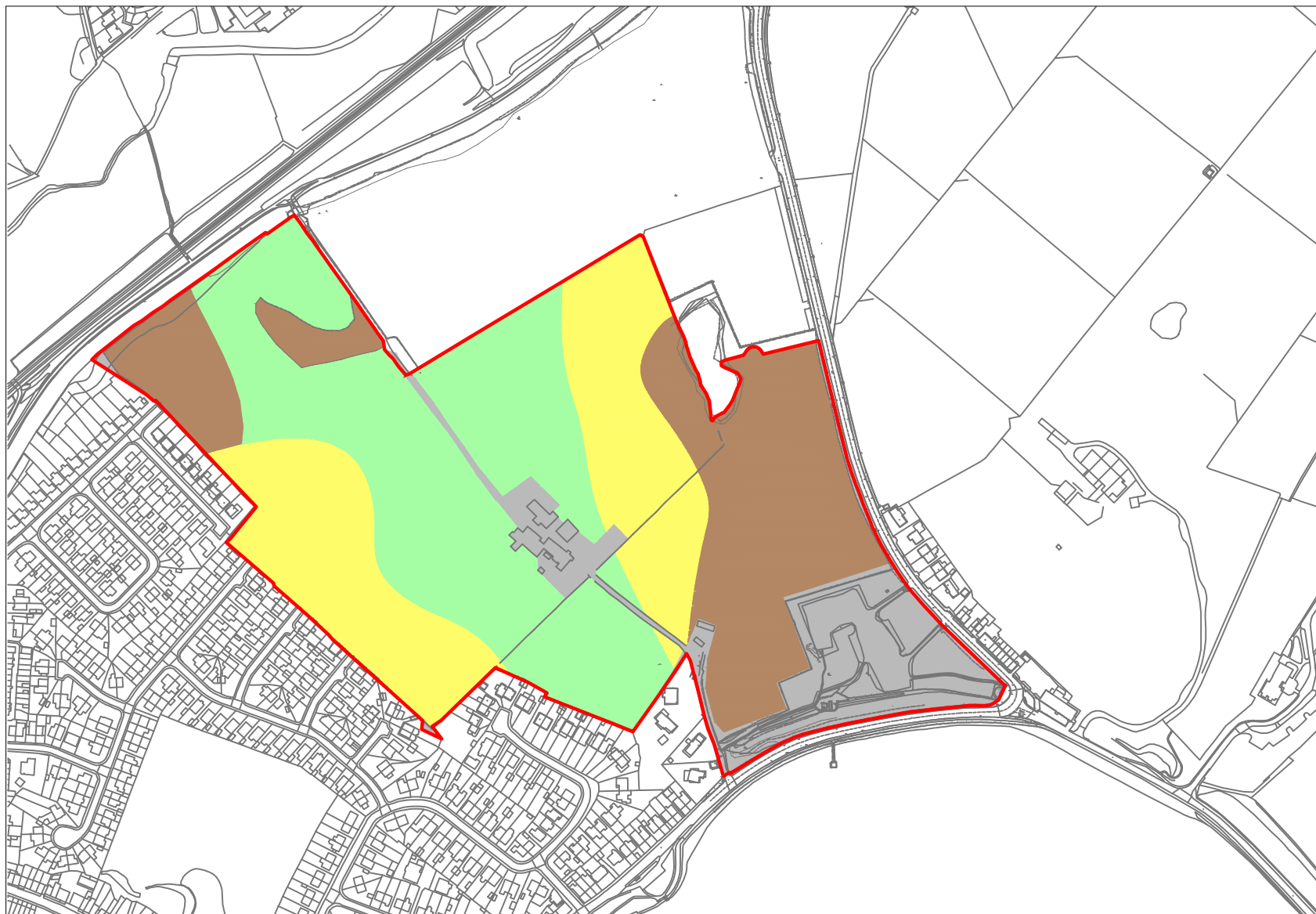


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KEY

-  Survey boundary
- +1 Observations
- +P Pit

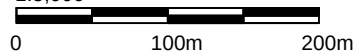
Rev.	Comment	Date
Drawing title OBSERVATION MAPPING		
Contract LOWER CLEGGSWOOD FARM, LITTLE BOROUGH, ROCHDALE		
Reading Agricultural Consultants Ltd Gate House Beechwood Court Long Toll Woodcote RG8 0RR 01491 684233 www.reading-ag.com		
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Ref. RAC/9676/1	Rev.	
Drawn by AGM	Checked by AIF	
Scales 1:5,000@A4	Date 09/2022	



KEY

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

1:5,000



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Rev.	Comment	Date
Drawing title AGRICULTURAL LAND CLASSIFICATION		
Contract LOWER CLEGGSWOOD FARM, LITTLE BOROUGH, ROCHDALE		
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Ref. RAC/9676/2	Rev.	
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Scales 1:5,000@A4	Date 09/2022	