



September 2025

BD Land Promotions Ltd

Agricultural Land Classification and Soil Resources

at

Llanfairfechan, Conwy

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1 Introduction

- 1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by BD Land Promotions Ltd to investigate the Agricultural Land Classification (ALC) and soil resources of land at Llanfairfechan, Conwy, 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.
- 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 is defined in paragraph 3.58 of Planning Policy Wales² as the best and most versatile (BMV) agricultural land.
- 1.6 The Welsh Government has published a Predictive ALC Map for Wales³. The map is designed on a 50m grid. Criteria including climate, slope, soil wetness, droughtiness and stone contents have been considered and used to determine the most likely limitation to agricultural land quality

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

² **Welsh Government (2024).** Planning Policy Wales, Edition 12, February 2024
<https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf>

³ **Welsh Government (2025).** *DataMapWales.* <https://datamap.gov.wales/maps/new#/>

within each grid square. The map predicts this site to be mostly of Subgrade 3b quality, with Subgrade 3a in the north.

- 1.7 However, as explained by the Welsh Government's Frequently Asked Questions on ALC⁴, the only way to accurately determine the agricultural grade of land is by a detailed field survey in accordance with the current ALC guidelines. This survey follows the established methodology and guidelines for carrying out ALC surveys.

2 Site and climatic conditions

General features, land form and drainage

- 2.1 The site is located west of Llanfairfechan and south of Aber Road. Other agricultural land is to the south and west. The land is in agricultural use under permanent pasture, with established tree belts and woodland around most of the perimeter.
- 2.2 The topography is characterised by a moderately steep, north-facing slope, with altitudes between 30m and 55m above Ordnance Datum (AOD). In localised parts of the north of the site, the gradient of slope is up to around 13 degrees, which is limiting to the ALC.
- 2.3 The site drains via the slope and toward the coast at Conwy Bay. There is no significant flood risk mapped at the site⁵.

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 a representative altitude of 44m AOD and are given in Table 1. The climate at the site is moderately warm and very wet with moderate moisture deficits. The number of Field Capacity Days (FCD) is very large and is very unfavourable for providing opportunities for agricultural field work. There is an overriding climatic limitation to the ALC, to Grade 2.

⁴ **Welsh Government (2020).** *Agricultural Land Classification, Frequently Asked Questions.* <https://gov.wales/sites/default/files/publications/2020-06/agricultural-land-classification-frequently-asked-questions.pdf>

⁵ **Natural Resources Wales (2025).** *Flood and Coastal Erosion Risk Maps.* <https://flood-risk-maps.naturalresources.wales/?locale=en>

Table 1: Local agro-climatic conditions

Parameter	Measurement
Grid Ref	SH 67900 74100
Altitude	44m AOD
Average Annual Rainfall	1,102mm
Accumulated Temperatures >0°C	1,431 day°
Field Capacity Days	228 days
Average Moisture Deficit, wheat	87mm
Average Moisture Deficit, potatoes	82mm

Soil parent material and soil type

- 2.5 The principal bedrock geology mapped by the British Geological Survey⁶ is the Nant Ffrancon Subgroup of the Ogwen Group, comprising mudstones, silty mudstones and sandstones. Most of the site is overlain by superficial deposits of till which includes an unsorted mixture of clay, sand, gravel and boulders. In the northern field, superficial deposits of glaciofluvial sand and gravel are mapped.
- 2.6 The Soil Survey of England and Wales soil association mapping⁷ (1:250,000 scale) shows the site as having soils of the Denbigh 1 association, with Cegin association in the west, and bordering closely on the Wick 1 association to the north.
- 2.7 The Denbigh 1 association soils are characterised by brown, clay loam textures throughout, becoming increasingly stony with depth and often passing to slate or mudstone. The soil profiles are well drained, in Wetness Class (WC) I.
- 2.8 The contrasting Cegin association includes fine silty and clayey textures. The soil profiles are waterlogged and intractable for much of the year and may be in WC IV or V.
- 2.9 The Wick 1 association differs again, comprising coarse loamy and sandy soils, locally over gravel. The main soils are well drained, in WC I⁸.

⁶ **British Geological Survey (2025).** *Geology Viewer* <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

⁷ **Soil Survey of England and Wales (1984).** *Soils of Wales* (1:250,000), Sheet 2

⁸ **Rudelforth et al (1984).** *Soils and Their Use in Wales*. Soil Survey of England and Wales Bulletin 11, Harpenden.

3 Agricultural land quality

Soil survey methods

- 3.1 In total, 17 soil profiles were examined using an Edelman (Dutch) auger at an observation density of one per hectare, which is in accordance with the established recommendations for ALC surveys. The excavation of one observation pit was attempted to examine subsoil structures, however ground conditions were too dry to enable extraction of any substantial volume of soil. The locations of observations are shown on Figure RAC/10802/1.
- 3.2 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;
 - stone content;
 - colour (including localised mottling);
 - consistency;
 - structural condition;
 - free carbonate; and
 - depth.
- 3.3 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 FCD at the location.
- 3.4 Soil droughtiness was investigated by the calculation of moisture balance equations (given in Appendix 1). 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 land quality has been carried out according to the revised ALC guidelines¹. Soil profiles have been described according to Hodgson⁹ which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.
- 3.6 The main limitation to agricultural land quality is wetness and workability, which is heavily influenced by the climatic conditions of the site. The site is classified as Subgrade 3b and Grade 4.
- 3.7 The topsoil is dark greyish brown (10YR4/2 in the Munsell soil colour charts¹⁰), slightly stony medium clay loam or heavy clay loam. In the central field, the topsoil is mottled with ochreous stains and is gleyed from the surface.
- 3.8 Upper subsoil was able to be observed in the west of the site and comprises clay loam or clay. The upper subsoil is greyish brown or brown (10YR5/2 or 10YR5/3) and has many distinct mottles. The stone content increases to around 20% by volume and includes a mix of small and larger stones.
- 3.9 It is assumed that the soil profiles are permeable throughout. With gleying in the upper subsoil, the soils are assessed as WC III. With medium clay loam topsoil, there is a wetness limitation to Subgrade 3b, and with heavy clay loam topsoil, there is a wetness limitation to Grade 4.
- 3.10 The steeper sloping parts of the north of the site, with gradients up to 13 degrees, are also limited to Grade 4 by slope.
- 3.11 The areas of each ALC grade at the site are given in Table 2 and their distribution is shown in Figure RAC/10802/2. Photographs taken at the site are given in Appendix 2.

Table 2: Agricultural land classification

Grade	Description	Hectares	%
Subgrade 3b	Moderate quality	9.3	55
Grade 4	Poor quality	7.7	45
	Total agricultural	17.0	100
	Non agricultural	0.1	-

⁹ **Hodgson, J. M. (Ed.) (1997).** *Soil survey field handbook*. Soil Survey Technical Monograph No. 5, Silsoe.

¹⁰ **Munsell Color (2009).** *Munsell Soil Color Book*. Grand Rapids, MI, USA

Appendix 1: 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				
%	TA _v	E _{av}	MDwheat	87		<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>
hard	1	0.5	MDpotato	82	SPL within 80cm, gleying within 40cm		>62cm	25-62cm	<25cm
N/A			FCD	228	SPL within 80cm, gleying at 40-70cm		All		
hard flint & pebble					No SPL but gleying within 40cm	coarse subsoil	<i>II</i>	other cases	<i>III</i>
Maximum depth of auger penetration is <u>underlined</u>									

Site No.		Depth cm		Texture	CaCO ₃	Colour	Mottle colour	abundance	stone% hard	stone% N/A	Structure	APwheat mm	AP potato mm	Gley	SPL	WC	Wetness grade WE	Final Grade	Limiting Factor(s)
1	T	0	<u>30</u>	mCL		10YR4/2			10			54	54	n	n	///	3b	3b	WE
		30	60	C		10YR5/3	Fe	mmd	20			40	48	y	n				
		60	120	C		10YR5/3	Fe	mmd	10			48	16	y	n				
											Total	142	118						
											MD	55	36						
Droughtiness grade (DR)												1	1						
2	T	0	30	mCL		10YR4/2			10			54	54	n	n	///	3b	3b	WE
		30	<u>45</u>	C		10YR5/3	Fe	mmd	20			24	24	y	n				
		45	60	C		10YR5/3	Fe	mmd	20			16	24	y	n				
		60	120	C		10YR5/3	Fe	mmd	10			48	16	y	n				
											Total	142	118						
Droughtiness grade (DR)												1	1						
3	T	0	30	mCL		10YR4/2			10			54	54	n	n	///	3b	3b	WE
		30	65	C		10YR5/2	Fe	mmd	20			44	56	y	n				
		65	80	C		10YR5/2	Fe	mmd	20			12	8	y	n				
		<u>80</u>	120	C		10YR5/2	Fe	mmd	10			32	0	y	n				
											Total	142	118						
Droughtiness grade (DR)												1	1						

4	T	0	30	mCL	10YR4/2	Fe	fmd	10		54	54	n	n	///	3b	3b	WE
			30	45	mCL	10YR5/3	Fe	mmd	20		24	24	y	n			
			45	120	hCL	10YR5/3	Fe	mmd	10		78	40	y	n			
									Total	156	118			Top of slope			
									MD	69	36						
Droughtiness grade (DR)										1	1						
5	T	0	30	mCL	10YR4/2	Fe	fmd	10		54	54	n	n	///	3b	3b	WE
			30	45	mCL	10YR5/3	Fe	mmd	20		24	24	y	n			
			45	120	hCL	10YR5/3	Fe	mmd	10		78	40	y	n			
									Total	156	118			Top of slope			
									MD	69	36						
Droughtiness grade (DR)										1	1						
6	T	0	35	mCL	10YR4/2	Fe	fmd	10		63	63	n	n	///	3b	3b	WE
			35	45	hCL	10YR5/3	Fe	mmd	20		16	16	y	n			
			45	120	C	10YR5/3	Fe	mmd	10		64	40	y	n			
									Total	143	119			Top of slope			
									MD	56	37						
Droughtiness grade (DR)										1	1						
7	T	0	30	hCL	10YR4/2	Fe	mmd	10		54	54	y	n	///	4	4	WE
			30	45	hCL	10YR5/3	Fe	mmd	20		16	16	y	n			
			45	120	C	10YR5/3	Fe	mmd	10		64	40	y	n			
									Total	134	110						
									MD	47	28						
Droughtiness grade (DR)										1	1						
8	T	0	30	hCL	10YR4/2	Fe	mmd	10		54	54	y	n	///	4	4	WE
			30	45	hCL	10YR5/3	Fe	mmd	20		16	16	y	n			
			45	120	C	10YR5/3	Fe	mmd	10		64	40	y	n			
									Total	134	110						
									MD	47	28						
Droughtiness grade (DR)										1	1						
9	T	0	30	hCL	10YR4/2	Fe	mmd	10		54	54	y	n	///	4	4	WE

		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n					
		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n					
					Total				134	110							
					MD				47	28							
					Base of slope												
					Droughtiness grade (DR)				1	1							
10	T	0	30	hCL	10YR4/2	Fe	mmd	10	54	54	y	n	///	4	4		WE
		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n					
		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n					
					Total				134	110							
					MD				47	28							
					Droughtiness grade (DR)				1	1							
11	T	0	30	SCL	10YR4/2	Fe	mmd	10	51	51	y	n	///	3b	3b		WE
		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n					
		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n					
					Total				131	107							
					MD				44	25							
					Droughtiness grade (DR)				1	1							
12	T	0	30	hCL	10YR4/2	Fe	mmd	10	54	54	y	n	///	4	4		WE
		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n					
		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n					
					Total				134	110							
					MD				47	28							
					Droughtiness grade (DR)				1	1							
13	T	0	30	hCL	10YR4/2	Fe	fmd	10	54	54	n	n	///	4	4		WE
		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n					
		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n					
					Total				134	110							
					MD				47	28							
					Droughtiness grade (DR)				1	1							
14	T	0	30	hCL	10YR4/2	Fe	fmd	10	54	54	n	n	///	4	4		WE
		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n					

		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n				
									Total	134	110					
									MD	47	28					
									Droughtiness grade (DR)	1	1					
15	T	0	30	hCL	10YR4/2	Fe	fmd	10	54	54	n	n	///	4	4	WE
		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n				
		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n				
									Total	134	110					
									MD	47	28					
									Droughtiness grade (DR)	1	1					
16	T	0	30	SCL	10YR4/2	Fe	fmd	10	54	54	n	n	///	3b	3b	WE
		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n				
		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n				
									Total	134	110					
									MD	47	28					
									Droughtiness grade (DR)	1	1					
17	T	0	30	mCL	10YR4/2	Fe	fmd	10	54	54	n	n	///	3b	3b	WE
		30	45	hCL	10YR5/3	Fe	mmd	20	16	16	y	n				
		45	120	C	10YR5/3	Fe	mmd	10	64	40	y	n				
									Total	134	110					
									MD	47	28					
									Droughtiness grade (DR)	1	1					

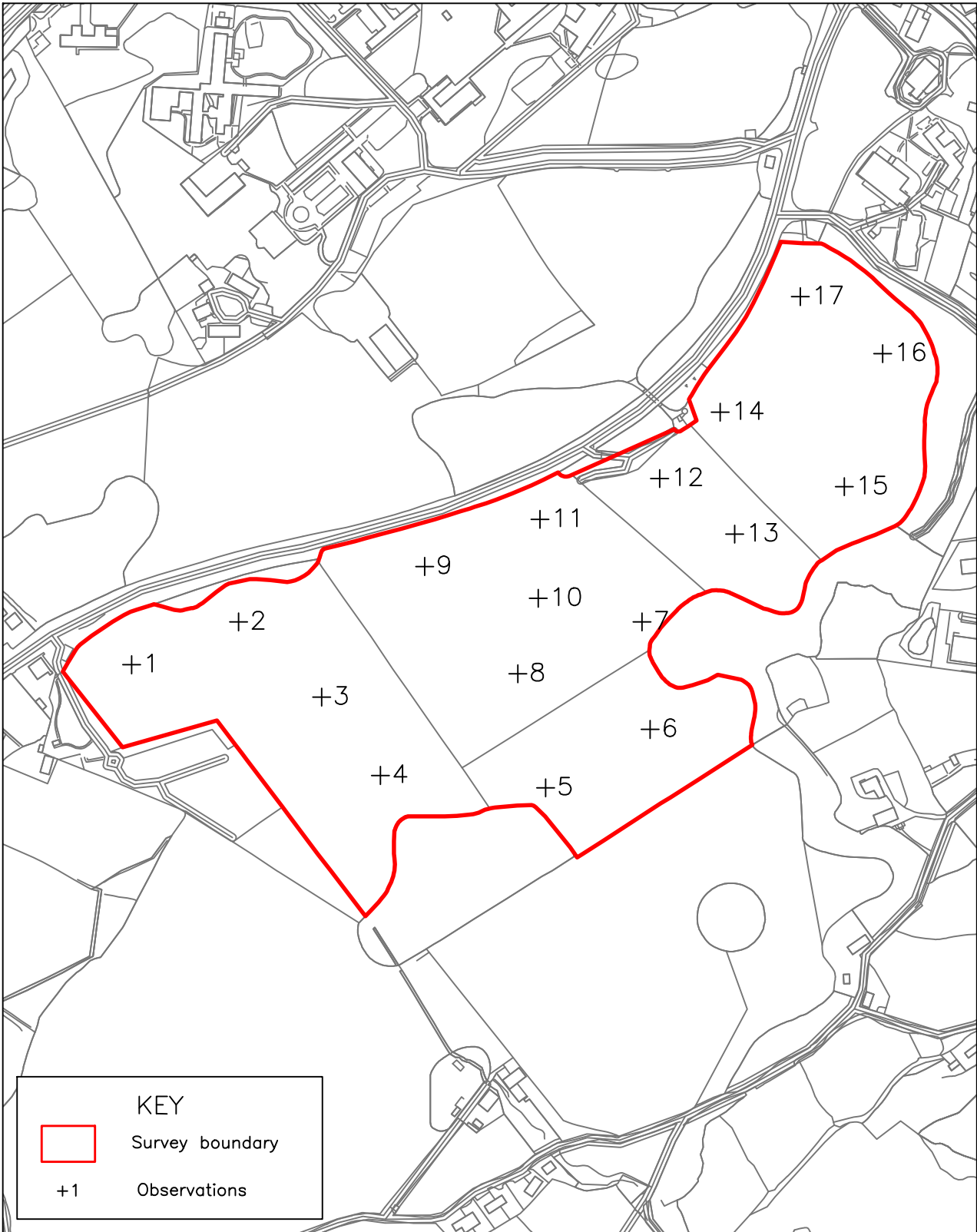
Appendix 2: Site Photographs



Site view from north to south-west



Dry stony topsoil




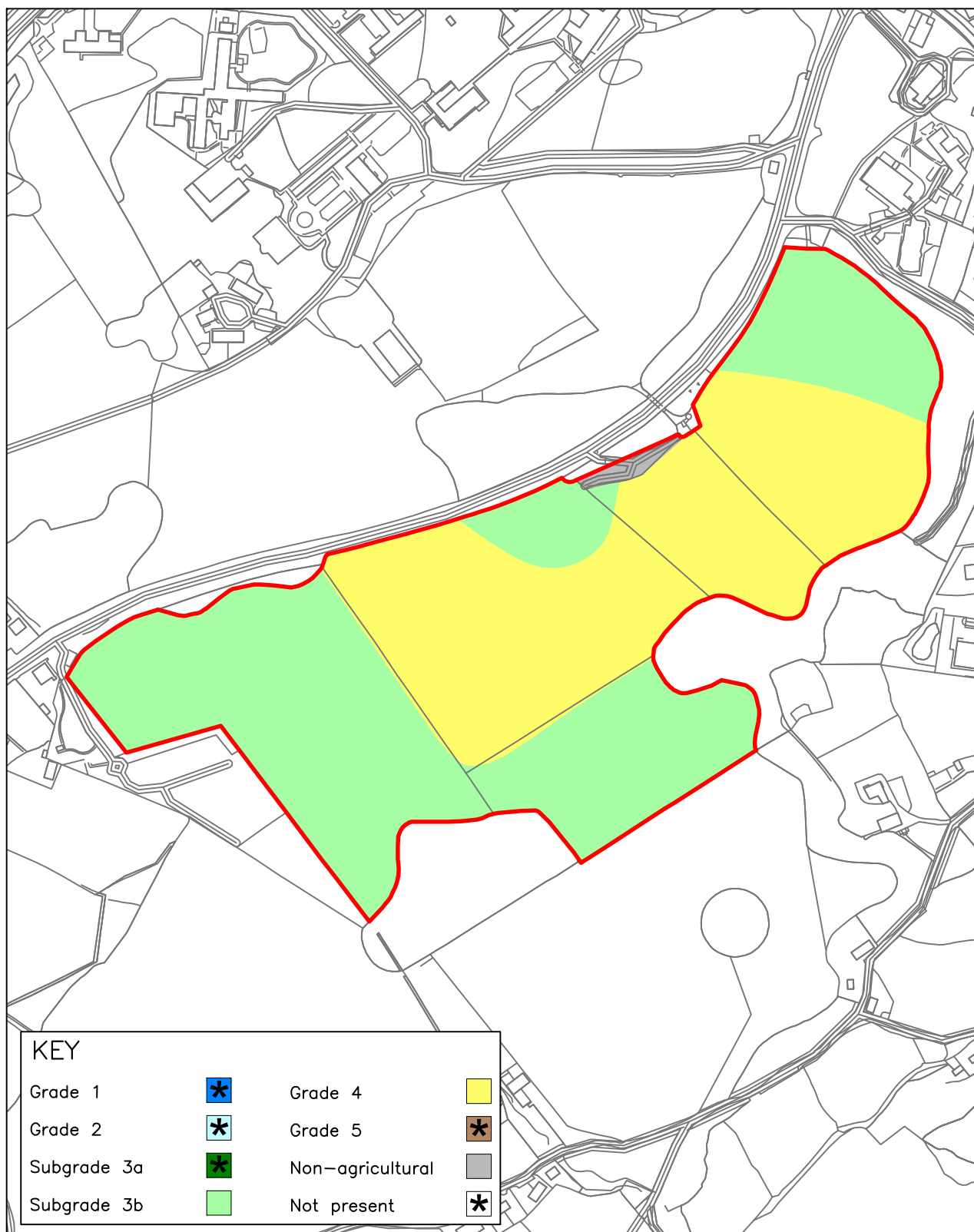
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1:5,000



0 100m 200m

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			Rev.	Comment	Date	



KEY

Grade 1



Grade 4



Grade 2



Grade 5



Subgrade 3a



Non-agricultural



Subgrade 3b

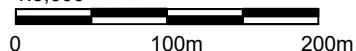


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