AGRICULTURAL QUALITY OF LAND AT GREAT GLEN

Report 2411/1

31st October 2024

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OF LAND AT GREAT GLEN

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Report 2411/1
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SUMMARY

An agricultural land quality survey has been undertaken of 22.0 ha of land at Great Glen in Leicestershire during October 2024.

The land has heavy soils with restricted drainage, giving land of Subgrade 3b quality, limited by wetness.

1.0 Introduction

1.1 This report provides information on the soils and agricultural quality of 22.0 ha of land at Great Glen, Leicestershire. The report is based on a survey of the land during October 2024.

SITE ENVIRONMENT

1.2 The survey area comprises six fields, bounded to the north by further agricultural land, to the south by housing and London Road, to the east by housing and a recreation ground, and to the west by the grounds of the Leicester Grammar School.

1.3 At the time of survey all of the agricultural land was permanent grassland, with most fields being ridge and furrow.

PUBLISHED INFORMATION

1.4 British Geological Survey 1:50,000 scale information records the underlying geology as mainly Oadby Member glacial till over Charmouth Mudstone Formation. A thin band of sand and gravel deposits are recorded on the eastern boundary.

1.5 The National Soil Map (published at 1:250,000 scale) records the whole of the survey area as Ragdale Association: mainly slowly permeable clay soils formed in chalky glacial till[1].

[1]Ragg., *et al.,* (1984). *Soils and their Use in Midland and Western England,* Soil Survey of England and Wales Bulletin No. 12, Harpenden.

2.0 Soils

2.1 A detailed soils and agricultural quality survey was carried out in October 2024 in accordance with MAFF (1988) guidelines[2]. It was based on observations at intersects of a 100 m grid, giving a density of one observation per hectare. During the survey, soils were examined by a combination of pits and augerings to a maximum depth of 1.2 m. A log of the sampling points and a map (Map 1) showing their locations are in an appendix to this report.

2.2 Soils within the survey area generally comprise a non-calcareous, stoneless or very slightly stony clay or heavy clay loam topsoil, which overlies very slightly stony gleyed and mottled clay upper subsoil. This is underlain by a greyish clay lower subsoil often with chalk fragments. The subsoils were found to constitute a slowly permeable layer and therefore the soil profiles were poorly drained and assessed as Soil Wetness Class IV.

2.3 A soil pit was dug in a representative profile of the soils within the survey area at observation point 10 (see Map 1) and the findings are given in an appendix to this report.

[2]MAFF, (1988).*Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

3.0 Agricultural land quality

3.1 To assist in assessing land quality, the Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF ALC system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.

3.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification[3]. The relevant site data for Grid Reference SP 652,984 for an average elevation of 112 m AOD is given below.

- Average annual rainfall: 656 mm
- January-June accumulated temperature >0°C 1341 day°
- Field capacity period (when the soils are fully replete with water) 144 days
- Summer moisture deficits for: wheat: 99 mm, potatoes: 88 mm

3.3 The survey described in the previous section was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF[4]. There are no climatic limitations at this locality.

SURVEY RESULTS

3.4 The agricultural quality of the land is determined by a wetness and workability limitation. Other factors have been assessed but do not affect the land grade. Land of Grade 3 has been identified.

Subgrade 3b

3.5 The majority of the land has high topsoil clay content (heavy clay loam or clay) and poor drainage (Soil Wetness Class IV). Under the local climate this means that the land is usually too wet for spring machinery land access, and arable cropping is therefore largely limited to autumn sowings.

[3]Meteorological Office, (1989).*Climatological Data for Agricultural Land Classification*.
[4]MAFF, (1988).*Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Non-agricultural land

3.1 This comprises an access road adjoining the southern boundary and a small area of hard standing and cattle pens in the south-west.

Grade areas

3.2 The land grades are shown on Map 2 and the areas occupied shown below.

Table 1: Areas occupied by the different land grades

Grade/subgrade	*Area (ha)*	*% of the land*
Subgrade 3b	21.7	99
Other land	0.3	1
Total	22.0	100

APPENDIX

DETAILS OF OBSERVATIONS

MAPS

Land at Great Glen, Leicestershire: Soils and ALC survey – Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
1	0-35	HCL	0	35-85	C fmn	xxx	85+	Stopped on stone		4	IV	3b	W
2	0-20	C	1	20-62	C fmn	xxx	62-120	C chky fmn	xxx	0	IV	3b	W
3	0-25	HCL	0	25-95	C fmn	xxx	95-120	C fmn	xxx	0	IV	3b	W
4	0-28	HCL	0	28-120	C fmn	xxx				2	IV	3b	W
5	0-15	HCL	0	15-35	C	xxx	35-120	C fmn	xxx	0	IV	3b	W
6	0-27	C	0	27-67	C fmn	xxx	67-120	C fmn	xxx	3	IV	3b	W
7	0-31	C	0	31-62	C ca fmn	xxx	62-120	C chky fmn	xxx	3	IV	3b	W
8	0-25	C	0	25-75	C fmn	xxx	75-120	C + weathered sandstone fmn	xxx	2	IV	3b	W
9	0-35	HCL	0	35-63	C fmn	xxx	63-120	C fmn	xxx	2	IV	3b	W
10	0-27	C	2	27-55	C fmn	xxx	55-120	C chky fmn	xxx	2	IV	3b	W
11	0-29	C	0	29-58	C fmn	xxx	58-120	C chky fmn	xxx	2	IV	3b	W
12	0-28	C	0	28-65	C fmn	xxx	65-120	C chky fmn	xxx	2	IV	3b	W
13	0-28	HCL	2	28-55	C	xxx	55-120	C fmn	xxx	3	IV	3b	W
14	0-29	C	2	29-69	C fmn	xxx	69-120	C ca fmn	xxx	3	IV	3b	W
15	0-32	C	0	32-63	C fmn	xxx	63-120	C chky fmn	xxx	2	IV	3b	W
16	0-28	C	0	28-60	C fmn	xxx	60-120	C chky fmn	xxx	2	IV	3b	W
17	0-23	HCL	0	23-60	C fmn	xxx	60-120	C chky fmn	xxx	3	IV	3b	W
18	0-27	C	0	27-90	C fmn	xxx	90-120	C chky fmn	xxx	4	IV	3b	W
19	0-29	HCL	0	29-50	C fmn	xxx	50-120	C fmn	xxx	2	IV	3b	W
20	0-30	HCL	0	30-65	C fmn	xxx	65-120	C chky fmn	xxx	2	IV	3b	W
21	0-32	C	0	32-120	C fmn	xxx				4	IV	3b	W

Soil log key

Gley indicators[1]

o	unmottled
x	1-2% ochreous mottles and brownish matrix (or a few to common root mottles (topsoils))[3]
xx	>2% ochreous mottles and brownish matrix and/or dull structure faces (slightly gleyed horizon)
xxx	>2% ochreous mottles and greyish or pale matrix (gleyed horizon) or reddish matrix and >2% greyish, brownish or ochreous mottles and pale ped faces
xxxx	mottles or f-m concentrations (gleyed horizon) dominantly blueish/greenish matrix, often with some reddish mottles (gleyed horizon)

Texture[2]

C – clay
ZC - silty clay
SC - sandy clay
CL - clay loam (H-heavy, M-medium)
ZCL - silty clay loam (H-heavy, M-medium)
SZL - sandy silt loam (F-fine, M-medium,C-coarse)
LS - loamy sand (F-fine, M-medium, C-coarse)
SL - sandy loam (F-fine, M-medium, C-coarse)
S - sand (F-fine, M-medium, C-coarse)
SCL - sandy clay loam
P - peat (H-humified, SF-semi-fibrous, F-fibrous)
LP - loamy peat; PL - peaty loam

Limitations:

W - wetness/workability
D - droughtiness
De - depth
F - flooding
St – stoniness
G - gradient
T – topography/microrelief
C - Climate

Suffixes & prefixes:

o - organic

(vsl, sl, m, v, x)**st** – (very slightly, slightly, moderately, very, extremely) **stony**[6]

(vsl, sl, m, v, x)**ca**
(very slightly, slightly, moderately, very, extremely) **calcareous**[7]

Slowly permeable layers[4]

a depth underlined (e.g. <u>50</u>) indicates the top of a slowly permeable layer

A wavy underline (e.g. <u>50</u> indicates the top of a layer borderline to slowly permeable

Wetness Class[5]

I (freely drained) to VI (very poorly drained)

Other abbreviations

fmn - ferri-manganiferous concentrations
dist - disturbed soil layer; chky - chalky
R – bedrock (CH – chalk, SST – sandstone LST – limestone, MST – Mudstone)
r-reddish, gn – greenish

[1]Gley indicators in accordance with Hodgson, J.M., 1997. Soil Survey Field Handbook (third edition). Soil survey technical monograph No. 5
[2]Texture in accordance with particle size classes in Hodgson (1997)
[3] Occasionally recorded in the texture box
[4]Permeability is estimated for auger borings and must be confirmed by full pit observations in accordance with the definitions in: Revised Guidelines for grading the quality of Agricultural Land (Maff 1988)
[5]Soil Wetness Classes are defined in Hodgson (1997)
[6]stoniness classes as defined in Hodgson (1997)
[7]calcareous classes as defined in Hodgson (1997)

Grades shown as intergrade e.g. **3a**/3b are close to the grade boundary. The estimate of which side of the boundary the grading falls is the shown first (in bold here)
grades in brackets eg. (3a) raised by one grade due to calcareous topsoil

Land at Great Glen

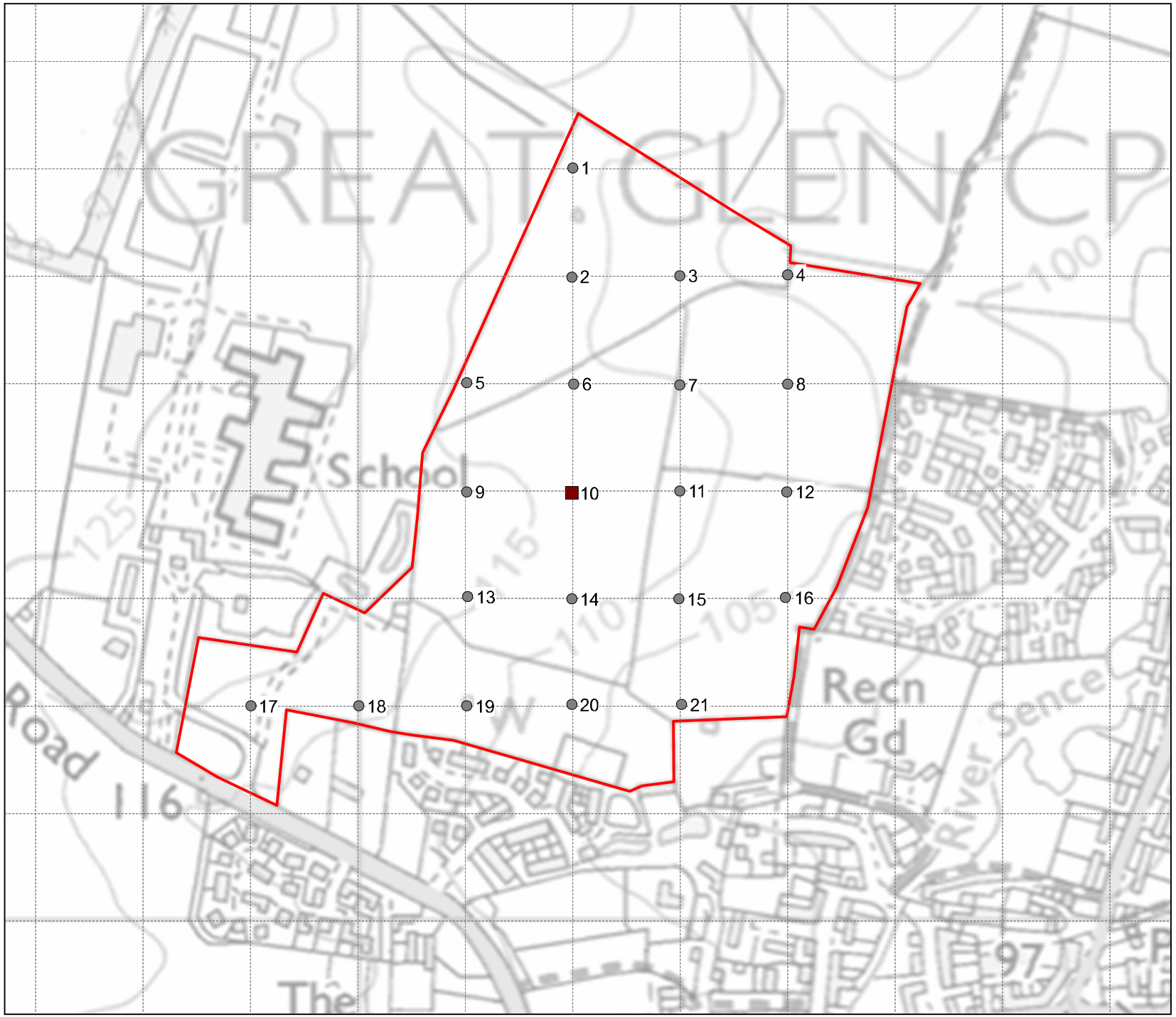
Soil pit data

Pit 1 at Sample Point 10: Slope - 2˚ East
Land use – Grassland (ridge and furrow)

Depth (cm)	Texture	Colour	Mottles	Stone Content	Structure	Pores	Consistence	Structural Condition	Roots	Calcium carbonate content	Fe/Mn	Horizon Boundary
0 – 27	Clay	10YR4/2 (dark greyish brown)	-	2% small sub-angular flint	moderately developed fine to medium sub-angular blocky	-	Friable	-	Abundant fine	Non-calcareous	-	Abrupt, smooth
27 – 55	Clay	2.5Y5/3, 10YR5/6 (light olive brown, yellowish brown)	Very many prominent ochreous mottles (10YR5/6)	5% small to medium sub-angular flint	Moderately developed coarse angular blocky	<0.5% biopores	Friable	Moderate	Many fine	Non-calcareous	Few	Clear, smooth
55 - 100	Clay	2.5Y5/2, 5/3 (greyish brown, light olive brown)	Very many prominent ochreous mottles (10YR5/6)	10% small to medium sub-angular flint plus small rounded chalk	Weakly developed very coarse prismatic	<0.5% biopores	Firm	Poor	Few fine and very fine	Very calcareous	Few	

Wetness Class IV

ALC Grade: 3b
Main limiting factor: Wetness and workability



KEY

- Auger observations
- Pits
- Site boundary

Site:

Great Glen

Map title:

MAP 1
Observations

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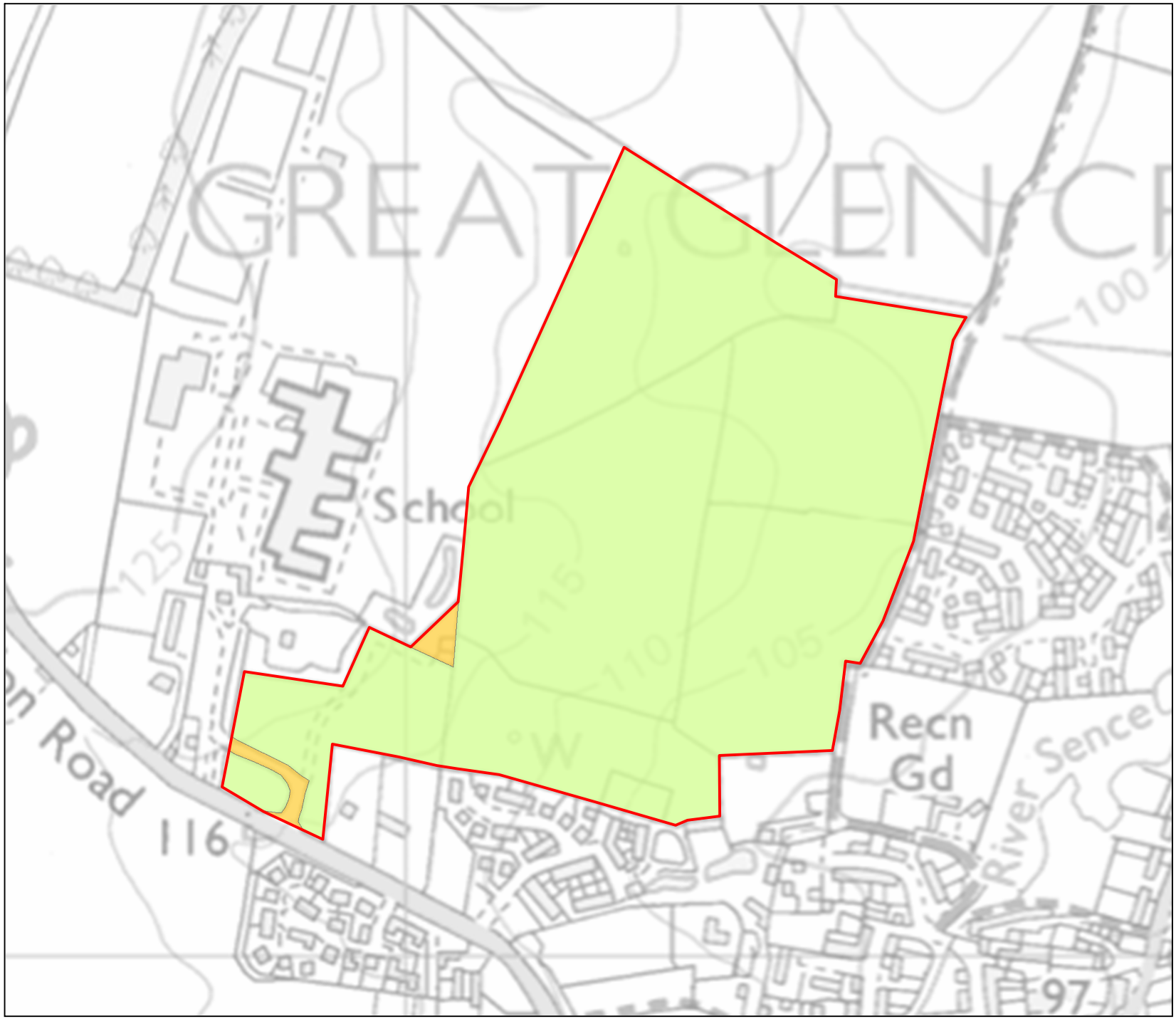
www.lra.co.uk

Date: 31/10/2024

Scale: 1:5,000



KEY

- Subgrade 3b
- Other land
- Site boundary

Site:

Great Glen

Map title:

MAP 2
Agricultural Land
Classification

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Date: 31/10/2024

Scale: 1:5,000