

**AGRICULTURAL QUALITY
OF LAND WEST OF LUZLOW LANE
BAGNALL**

Report 2460/1

9th December 2024

Land
Research
ASSOCIATES
www.lra.co.uk

**AGRICULTURAL QUALITY
OF LAND WEST OF LUZLOW LANE, BAGNALL**

M W Palmer, PhD, MISoilSci, CSci

Report 2460/1
Land Research Associates Ltd
Tapton Park Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

9th December 2024

SUMMARY

An agricultural land quality survey has been undertaken of 2.0 ha of land west of Luzlow Lane, Bagnall during December 2024.

The land has slowly permeable fine loamy soils with drainage restrictions. Agricultural land quality is limited to Subgrade 3b by wetness.

1.0 Introduction

- 1.1 This report provides information on the agricultural quality of 2.0 ha of land west of Luzlow Lane, Bagnall, Staffordshire. The report is based on a survey of the land in December 2024.

SITE ENVIRONMENT

- 1.2 The survey area comprises parts of four adjoining small fields, bordered to the east by Luzlow Lane and on other sides by adjoining agricultural land. The land is very gently sloping, at an average elevation of approximately 247.5 m AOD.
- 1.3 All of the fields are under grass, ungrazed at the time of survey.

PUBLISHED INFORMATION

- 1.4 British Geological Survey 1:50,000 scale information records the basal geology as sandstone of the Millstone Grit, Chatsworth Grit and Rough Rock. Devensian glacial till is recorded to overlie the bedrock across the site, but absent on the site margins in the east and west.
- 1.5 The National Soil Map (published at 1:250,000 scale) records the land as Brickfield 3 Association: mainly fine loams with slowly permeable subsoil formed in glacial till¹. Bromsgrove Association is recorded on the eastern margins: mainly coarse loamy soils formed over soft reddish sandstone.

¹ Ragg, J.M., *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 soils and agricultural land quality survey was carried out in December 2024 in accordance with MAFF (1988) Agricultural Land Classification guidelines². 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 hand augerings and pits to a maximum depth of 1.2 m. A wider area was surveyed (c. 9 ha) to provide more detail. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.
- 2.2 The soils were dominantly found to comprise organic sandy clay loam topsoil over permeable sandy clay loam upper subsoil. The subsoils show evidence of seasonal waterlogging (greyish colouration with ochreous mottles) to shallow depth. The upper subsoil is typically permeable, with the lower subsoil weakly structured and slowly permeable, usually from around 40-55 cm depth. These soils are poorly-draining under the local climate (Soil Wetness Class IV). An example soil profile is described from a pit excavation at observation point 5 (see Map 1) in an appendix to the report.
- 2.3 Some variation was observed in the wider survey area: stonier soils with less drainage restriction were encountered on the margins of the site, suggesting the drift cover thins to sandstone. However, this variation does not affect the application area.

²MAFF, (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 Classification³.
- 3.3 The relevant site data for an average elevation of 247.5 m and a central point at grid reference SJ 933,491 is given below.
- Average annual rainfall: 916 mm
 - January-June accumulated temperature >0°C 1181 day°
 - Field capacity period 222 days
 - Summer moisture deficits for:
wheat: 61 mm
potatoes: 39 mm
- 3.4 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 MAFF⁴. The cool climate at this elevation limits land quality to a maximum of Subgrade 3a.

SURVEY RESULTS

- 3.5 The agricultural quality of the land is primarily determined by wetness. Other factors have been assessed but do not affect the land grade. Land of Grade 3 has been identified.

Subgrade 3b

- 3.6 The land has moderately high topsoil clay content and poor drainage (Soil Wetness Class IV). While autumn cultivations for arable cropping are theoretically possible, the land is generally too wet for spring machinery access.

³Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

⁴MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Grade areas

- 3.7 The land grade is shown on Map 2 and the area occupied shown below.

Table 1: Areas occupied by the different land grades (ha)

<i>Grade/subgrade</i>	<i>Area (ha)</i>	<i>% of the land</i>
Subgrade 3b	2.0	100
Total	2.0	100

APPENDIX
DETAILS OF OBSERVATIONS
MAPS

Land west of Luzlow Lane, Bagnall: 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 >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
1	0-25	SCL(org)	<5	25-35	SCL	xxx	~~35-49~~ 49+	HCL Stopped on stones	xxx	1	IV	3b	W
2	0-25	SCL(org)	<5	25-43	SCL	xxx	~~43-90+~~	HCL	xxx	3	IV	3b	W
3	0-25	SCL(org)	<5	25-55	CSL(r)	o	~~55-90+~~	SCL(r)	xx	3	III/IV	3a/3b	W
4	0-15	SCL(org)	<5	16-68	mstSCL(r)	xxx	68+	Stopped on stones		2	III	3a	W
5	0-23	SCL(org)	<5	23-53	SCL	xxx	~~53-90+~~	SCL	xxx	2	IV	3b	W
6	0-20	SCL(org)	<5	20-42	SCL	xxx	~~42-57~~ ~~57-90+~~	SCL HCL/SC	xxx xxx	2	IV	3b	W
7	0-20	SCL(org)	<5	20-29	SCL	xxx	~~29-90+~~	C	xxx	2	IV	3b	W
8	0-20	SCL(org)	<5	20-44	SCL	xxx	~~44-90+~~	SCL	xxx	2	IV	3b	W
9	0-33	SCL(org)	<5	33-55	SCL	xxx	~~55-90+~~	SCL	xxx	2	IV	3b	W

Soil log key

Gley indicators¹

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)

Slowly permeable layers⁴

a depth underlined (e.g. 5Q) indicates
the top of a slowly permeable layer

A wavy underline (e.g. 5Q) indicates
the top of a layer borderline to slowly permeable

Texture²

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

Wetness Class⁵

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

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

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

¹Gley indicators in accordance with Hodgson, J.M., 1997. Soil Survey Field Handbook (third edition). Soil survey technical monograph No. 5

²Texture in accordance with particle size classes in Hodgson (1997)

³ Occasionally recorded in the texture box

⁴Permeability 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)

⁵Soil Wetness Classes are defined in Hodgson (1997)

⁶stoniness classes as defined in Hodgson (1997)

⁷calcareous 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

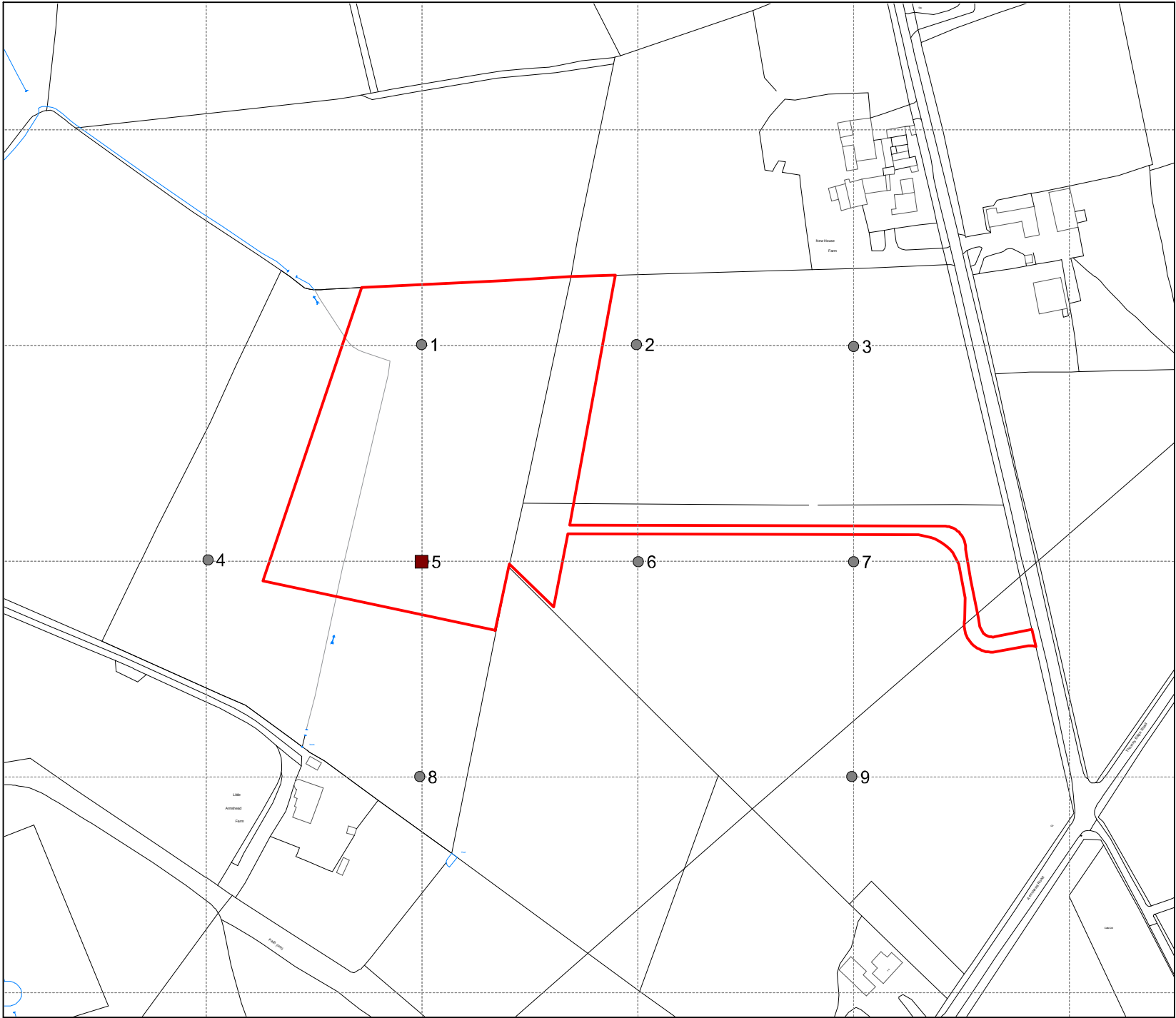
SOIL PIT DESCRIPTIONS

Observation 5

0-22 cm	Very dark greyish (10YR 3/1) organic sandy clay loam; stoneless; moderately developed fine sub-angular blocky structure; friable; many fine fibrous roots; smooth gradual boundary to:
22-47 cm	Pinkish grey (7.5YR 6/2) sandy clay loam with 10% fine strong brown (7.5YR 5/8) mottles; 5-10% soft weathered sandstone fragments; moderately developed coarse sub-angular blocky structure; friable; porous; common fine fibrous roots; smooth gradual boundary to:
47-55 cm	Grey (7.5YR 6/1) sandy clay loam with 40% medium strong brown (7.5YR 5/8) mottles; 10% small and medium soft sandstone fragments; weakly developed coarse angular blocky structure; firm; <0.5% macropores; few fine fibrous roots; wavy gradual boundary to:
55-120 cm	Grey (7.5YR 5/1) clay with 40% medium strong brown (7.5YR 5/8) mottles; very slightly; weakly developed very coarse prismatic structure to structureless (massive); firm and plastic; <0.5% macropores; no roots.

Soil Wetness Class IV

ALC: Subgrade 3b (wetness limitation)



KEY

- Auger observations
- Pits
- Site boundary

Site:

Luzlow Lane
Bagnall

Map title:

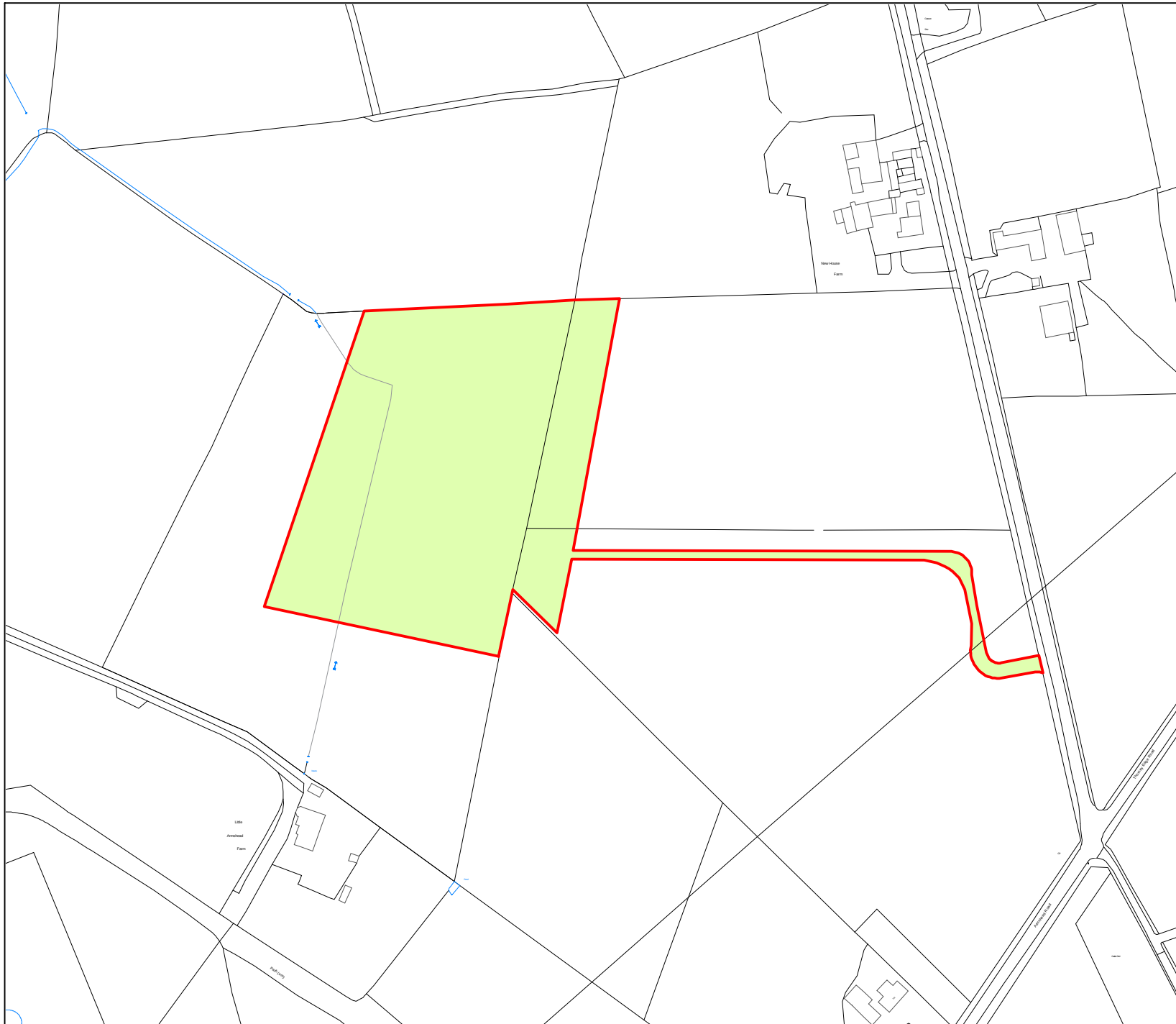
MAP 1
Observations

Land
Research
ASSOCIATES

Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 09/12/2024

Scale: 1:2,500



KEY

 Subgrade 3b

 Site boundary

Site:

Luzlow Lane
Bagnall

Map title:

MAP 2
Agricultural Land
Classification

Land
Research
ASSOCIATES

Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 09/12/2024

Scale: 1:2,500