

**AGRICULTURAL QUALITY
OF LAND NORTH-EAST OF HINCKLEY
(PHASE 1)**

Report 2032/1

14th July, 2022

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Report 2032/1
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SUMMARY

An agricultural land quality survey has been undertaken of 25 ha of land north-east of Hinckley, Leicestershire in June 2022.

The land has three main soil types: deep permeable loams, loamy slowly permeable soils and heavy slowly permeable soils. Half the site is subgrade 3b agricultural quality land, with the rest comprising subgrade 3a and grade 2.

1.0 Introduction

- 1.1 This report provides information on the agricultural quality of 25 ha of land north-east of Hinckley, Leicestershire. The report is based on a survey of the land in June 2022.

SITE ENVIRONMENT

- 1.2 The survey area comprises six fields, bordered to the south by Normandy Way (A47), to the west by Stoke Road and to the north and east by adjoining agricultural land. The land is gently sloping, with an average elevation of approximately 115 m AOD.
- 1.3 At the time of survey the land was under grass used to graze a dairy herd.

PUBLISHED INFORMATION

- 1.4 1:50,000 scale BGS information records the solid geology of the land as Mercia Mudstone. This is recorded to be overlain in the west by Bosworth Clay Member, in the centre by Wolston Sand and Gravel and in the east by Oadby Member glacial till.
- 1.5 The National Soil Map (published at 1:250,000 scale) records the site to be mainly within the Flint Association, typically comprising reddish fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging. In the west, soils are recorded to be within the Beccles 3 Association, typically comprising slowly permeable seasonally waterlogged fine loamy over clayey soils.¹

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 quality survey was carried out in June 2022 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 to a maximum depth of 1.2 m. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report. Soils were found to vary in depth and drainage, as described below.

DEEP PERMEABLE LOAMS

- 2.2 These soils are found in a band across higher ground in the centre of the site. They typically comprise sandy clay loam topsoil and upper subsoil, grading to sandy loam at depth in places. The subsoils are typically gleyed (greyish and pale colouration with ochreous mottles), indicating seasonal waterlogging. These soils are judged to be moderately freely-draining (Soil Wetness Class II).
- 2.3 An example profile is described from sample point 24 (see Map 1) in an appendix to this report.

FINE LOAMY SLOWLY PERMEABLE SOILS

- 2.4 These soils are dominant in the west of the site. They comprise fine loamy topsoils, in places with a thin permeable upper subsoil, over dense slowly permeable clay. The subsoils show evidence of seasonal waterlogging (greyish and pale colouration with ochreous mottles) to shallow depth. Drainage is judged to vary from imperfect to poor (Soil Wetness Class III to IV).
- 2.5 An example profile is described in an appendix to this report from a pit at observation point 15 (see Map 1).

LOAMY OVER SLOWLY PERMEABLE SOILS

- 2.6 These soils occur on the boundary between the deep permeable loams and heavy slowly permeable soils described above. They comprise medium loamy topsoil and upper subsoil, which overlies reddish clay at around 40-50 cm depth. The subsoils show evidence of seasonal waterlogging (greyish and pale ped faces with ochreous mottles) to shallow depth. Drainage is judged to vary from imperfect to poor (Soil Wetness Class III to IV).

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

- 2.7 An example profile is described in an appendix to this report from a pit at observation point 13 (see Map 1).

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. The relevant site data for an average elevation of 115 m is given below.
- Average annual rainfall: 666 mm
 - January-June accumulated temperature >0°C 1345 day°
 - Field capacity period 152 days
(when the soils are fully replete with water) mid Nov-mid Apr
 - Summer moisture deficits for: wheat: 98 mm
potatoes: 87 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 MAFF⁴. There are no climatic limitations at this locality.

SURVEY RESULTS

- 3.4 The agricultural quality of the land is primarily determined by wetness and topsoil stone content. Other factors have been assessed but do not affect the land grade. Land of grades 2 and 3 has been identified.

Grade 2

- 3.5 This land grade occurs in a band across the centre of the site where deep permeable loams occur. Occasional wetness is likely to restrict land access in winter. Also included is land restricted by topsoil stone content which can distort root crops and impair precision cropping.

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*.

Subgrade 3a

- 3.6 This land comprises the loamy slowly permeable soils which have moderately high topsoil clay content and imperfect drainage (Soil Wetness Class III). Under the local climate this combination restricts land access with machinery in winter and early spring, although late spring (as well as autumn) sowings of arable crops are usually possible.

Subgrade 3b

- 3.7 This subgrade includes land with heavy topsoils and imperfect to poor drainage (Soil Wetness Class III and IV). Under the local climate this combination means that land access is usually not possible in winter and spring. Arable land use is therefore mainly limited to autumn-sown crops.

Other land (non-agricultural)

- 3.8 This includes a farm track, area of hardstanding and disused lane.

Grade areas

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

Table 1: Areas occupied by the different land grades

<i>Grade/subgrade</i>	<i>Area (ha)</i>	<i>% of the land</i>
Grade 2	7.2	29
Subgrade 3a	4.9	19
Subgrade 3b	12.4	50
Other land	0.5	2
Total	25.0	100

APPENDIX
DETAILS OF OBSERVATIONS
MAPS

Land north-east of Hinckley (Phase 1): 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	0-30	MCL	5-10	30-50	Cr	xxx	50+	Stopped on stones		3	IV	3b	W
2	0-30	MCL	<5	30-56	SCL	xxx	56+	Stopped on stones		2	II	2	W
3	0-20	SCL	5-10	20-40	SCL	xxx	40+	Stopped on stones		4	II	2	W/St
4	0-31	SCL	<5	31-64+	SCL	xxx	64+	Stopped on stones		2	II	2	W
5	0-21	SCL	5-10	21-40	SCL	xxx	40+	Stopped on stones		3	II	2	W
6	0-30	SCL	<5	30-71	SCL	xxx	71+	Stopped on stones		1	II	2	W
7	0-25	SCL	5-10	25-30	SCL most	xxx	30-80+	C	xxx	2	IV	3b	W
8	0-30	SCL	<5	30-71	SCL	xxx	71+	Stopped on stones		1	II	2	W
9	0-30	SCL	<5	30-80+	C	xxx				4	IV	3b	W
10	0-22	SCL	5-10	22-31	SCL	xxx	31-40 40-80+	SCL C	xx xxx	3	III/IV	3a/b	W
11	0-26	SCL	<5	26-46	SCL	xxx	46-100+	C ch	xxx	2	III	3a	W
12	0-21	SCL	5-10	21-40	SCL mst	xx	40+	Stopped on stones		1	I	-	-
13	0-29	SCL	<5	29-50	SCL	xxx	50-70+	Cr	xxx	0	III	3a	W
14	0-20	SCL	5-10	20-41	MSL	xxx	41-80+	MSL mst	xxx	4	I	2	St
15	0-30	HCL	<5	30-95+	C	xxx				3	IV	3b	W
16	0-12	HCL	<5	12-38	HCL	xxx	38-100+	C ca	xxx	1	IV	3b	W
17	0-30	SCL	<5	30-54	SCL	x	54-66 66-100+	SC Cr	xxx xxx	0	III	3a	W
18	0-19	HCL	<5	19-45	HCL/MCL	xxx	45-60 60+	HHCL Stopped on stones	xxx	4	III	3b	W
19	0-30	SCL	<5	30-44	SCL	xxx	44-100+	Cr	xxx	2	III	3a	W
20	0-30	SCL	5-10	30+	Stopped on brick – disturbed?					1	-	-	-
21	0-25	HCL	<5	25-100+	C	xxx				0	IV	3b	W
22	0-21	HCL	<5	21-100+	C ca	xxx				3	IV	3b	W
23	0-30	SCL	<5	30-60	SCL	xx	60+	Stopped on stones		2	I	1? (near drain)	-
24	0-20	SCL	5-10	20-37	SCL	xx	37-100+	MSL	xxx	2	I	2	St

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 matrix, often with some ochreous mottles (gleyed horizon)

Slowly permeable layers⁴

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

A wavy underline (e.g. 50) 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
SI	- slope
T	- topography/microrelief
C	- Climate

Suffixes & prefixes:

o - organic

(vsl, sl, m, v, x)st – (very slightly, slightly, moderately, very, extremely) stony⁶

(vsl, sl, m, v, x)
(very slightly, slightly, moderately, very, extremely) calcareous⁷

Other abbreviations

fmn - ferri-manganiferous concentrations
dist - disturbed soil layer;
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)

Pit Descriptions

Pit 13

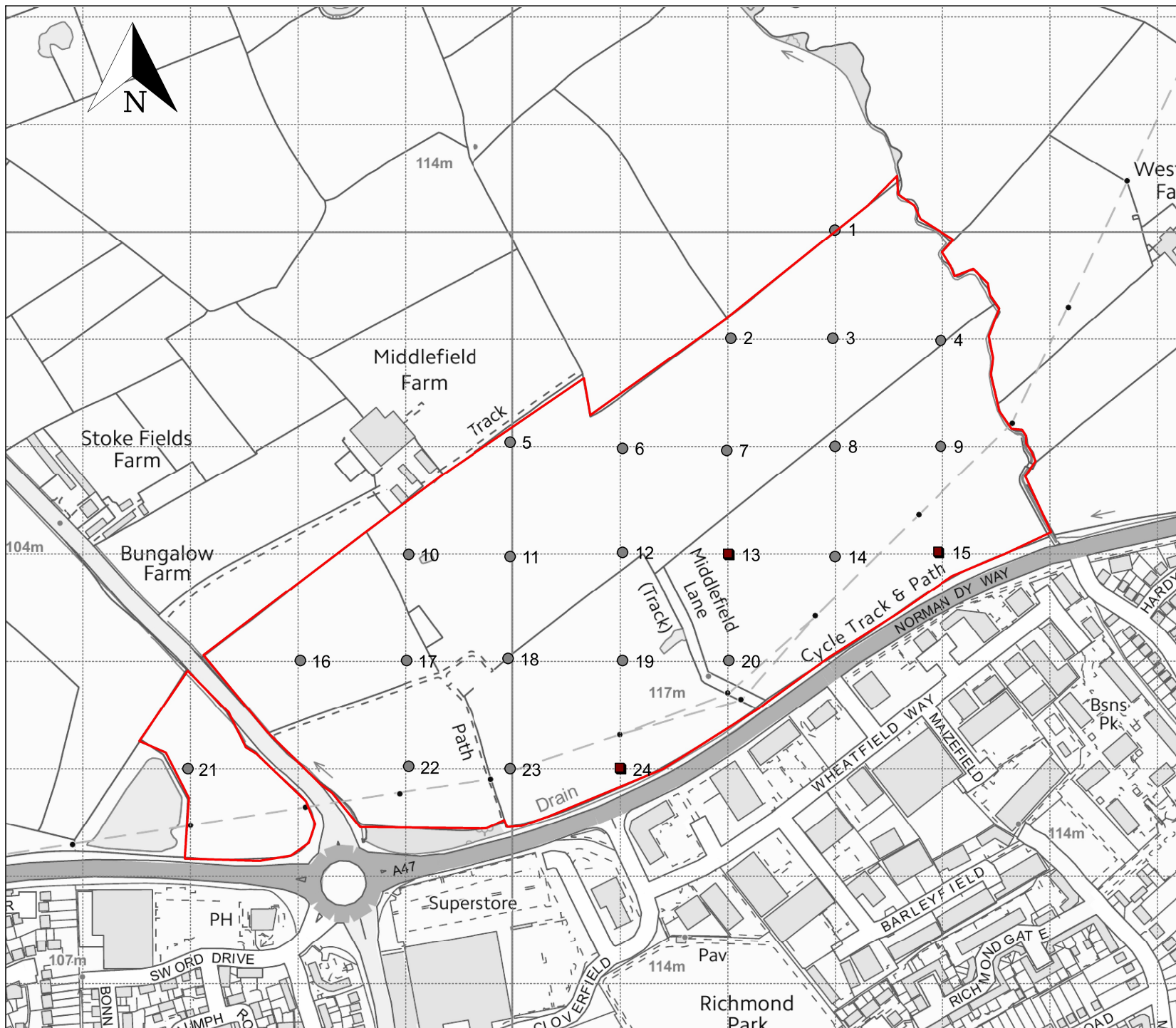
0-29 cm	Dark greyish brown (10YR 4/2) sandy clay loam; slightly stony (small and medium rounded and subangular hard stones); moderately developed medium subangular blocky structure; firm; porous; smooth gradual boundary to:
29-50 cm	Brown (10YR 5/3) sandy clay loam with common distinct medium reddish yellow (7.5YR 7/8) and light brownish grey (10YR 6/2) mottles; slightly stony with small rounded hard stones; moderately developed medium to coarse subangular blocky structure; firm; 1% macro-pores; medium packing density; smooth clear boundary to:
50-100 cm +	Reddish brown (5YR 5/4) clay with distinct reddish yellow (7.5YR 7/6) and strong brown (7.5YR 5/8) mottles, pink (7.5YR 8/3) ped faces and few fine ferri-manganiferous concretions; very slightly stony with small rounded pebbles; medium reddish yellow (7.5YR 6/8) sand inclusions; weakly developed very coarse prismatic structure to structureless (massive); very firm; <0.5% macro-pores.

Pit 15

0-30 cm	Dark greyish brown (10YR 4/2) heavy clay loam; slightly stony with 10% hard rounded and subrounded stones; moderately developed medium subangular blocky structure; friable; common fine fibrous roots; porous; smooth gradual boundary to:
30-100 cm +	Light yellowish brown (10YR 6/4) clay with abundant distinct reddish yellow (7.5YR 6/8) mottles; slightly stony with small and medium rounded and subangular hard stones; weakly developed very coarse prismatic structure; very firm; <0.5% biopores.

Pit 24

0-20 cm	Dark brown (7.5YR 3/2) sandy clay loam; slightly to moderately stony with 10% hard rounded and subrounded stones; well developed medium subangular blocky structure; friable; smooth gradual boundary to:
20-37 cm	Brown (7.5YR 5/2) sandy clay loam with common fine reddish yellow (7.5YR 6/8) and few fine diffuse pink (7.5YR 7/3) mottles; moderately stony with 15% small and medium subangular hard stones; moderately developed coarse angular blocky structure; friable to firm; smooth clear boundary to:
37-100 cm +	Light yellowish brown (10YR 6/4) medium sandy loam with abundant distinct reddish yellow (7.5YR 6/8), very pale brown (10YR 7/4) and yellow (10YR 8/6) mottles; slightly stony with 10-15% small and medium rounded and subangular hard stones; weakly developed medium coarse platy structure; friable; porous.



KEY

- Auger observation
- Soil/land grade description pit
- Survey area

Site:

**Land north-east of Hinckley
Phase 1**

Map title:

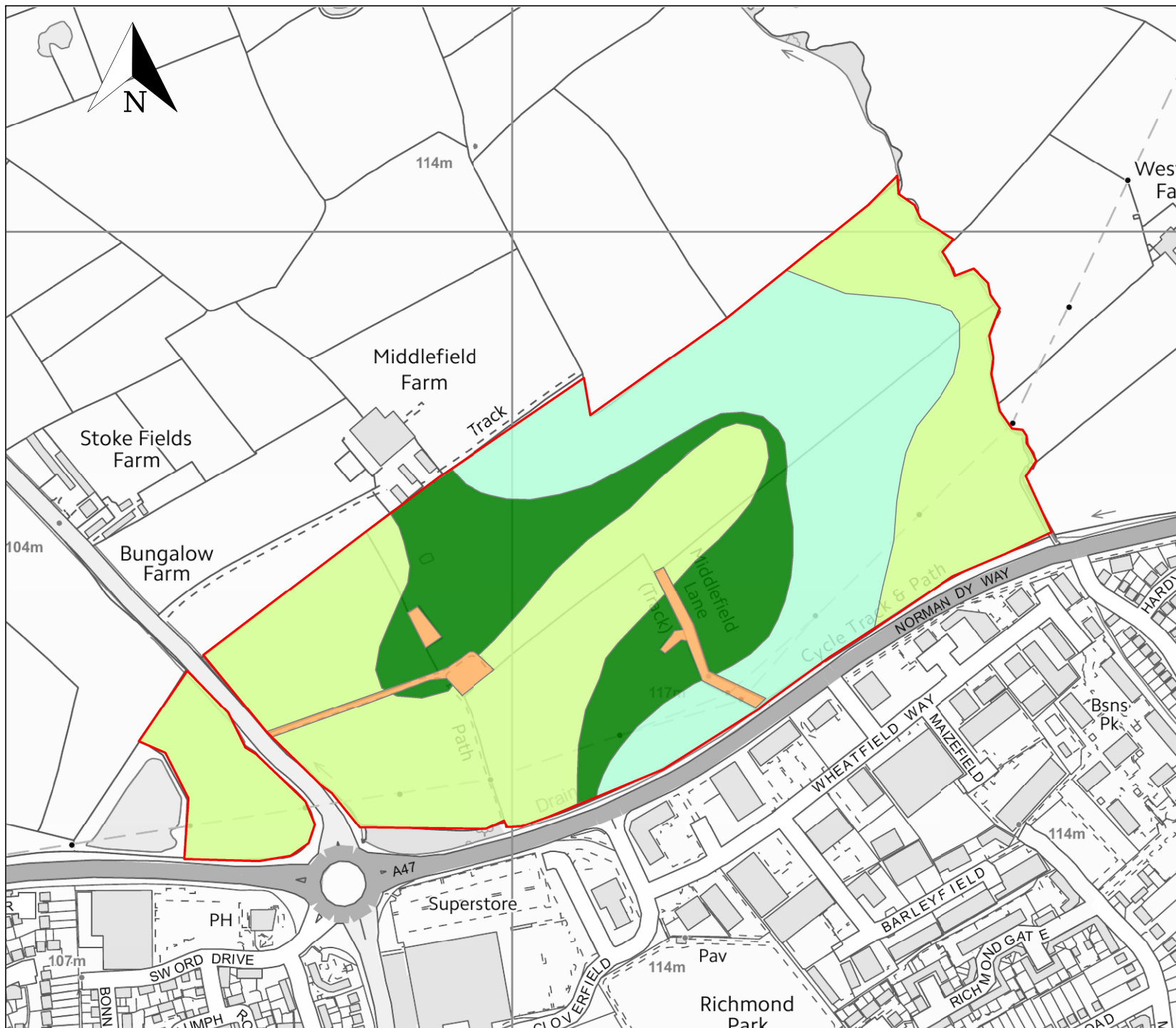
**Map 1
Survey observations**

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Scale: 1:5,000

Date: 08/07/2022



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Non agricultural
- Survey area

Site:

**Land north-east of Hinckley
Phase 1**

Map title:

**Map 2
Agricultural Land Classification**

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Scale: 1:5,000

Date: 08/07/2022