AGRICULTURAL QUALITY
OF LAND ADJACENT TO SYCAMORE HOUSE
WREXHAM ROAD, HOLT

Report 1776/2

21st June 2022

Land Research ASSOCIATES
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Report 1776/2
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SUMMARY

An agricultural land quality survey has been undertaken of 1.7 ha of land adjacent to Sycamore House, south of Wrexham Road, Holt in February 2021.

The land has loamy soils variably affected by shallow groundwater. Agricultural quality is limited to grade 2 and subgrade 3a by a combination of wetness and droughtiness.

1.0 Introduction

1.1 This report provides information on the soils and agricultural quality of 1.7 ha of land adjacent to Sycamore House, south of Wrexham Road, Holt.

SITE ENVIRONMENT

1.2 The survey area covers one field and an adjoining farm steading. The land is bordered to the north by Wrexham Road, to south by the A534, to east by new residential construction and to the west by a small woodland plantation (and Wrexham Road beyond). The site is very gently sloping, at an average elevation of approximately 18 m AOD.

1.3 At the time of survey the field was in use as a seasonal outdoor area for beef cattle (with supplementary feeding), and was severely poached and waterlogged (see site photo below).



PUBLISHED INFORMATION

1.4 1:50,000 scale BGS information records the geology of the land as Devensian glacial till, over pebbly sandstone of the Chester Formation.

1.5 The National Soil Map (published at 1:250,000 scale) records the land as Wick 1 Association: typically coarse loamy and sandy soils formed in glacio-fluvial deposits, some affected by groundwater[1].

1.6 The Predictive Agricultural Land Classification map of Wales estimates the land as grade 2.

[1]Rudeforth C.C. *et al*., (1984).*Soils and their use in Wales,* Soil Survey of England and Wales. Bulletin No. 11, Harpenden.

2.0 Soils

2.1 A detailed soils and agricultural quality survey was carried out in February 2021 in strict accordance with MAFF (1988) guidelines[2]. It was based on observations at intersects of a 50 m grid, giving a density of four observations 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 The soils were found to comprise slightly stony sandy clay loam topsoil and upper subsoil, in patches over gravel and elsewhere over less stony sandy clay loam or sandy loam layers. The soils are permeable to over 80 cm depth, but the subsoils show evidence of seasonal waterlogging (greyish colours with ochreous mottles).

2.3 An example profile is described below from a pit at observation 4 (Map 1).

0-32 cm	Very dark greyish brown (10YR 3/2) sandy clay loam; slightly stony (small and medium mixed hard stones); well developed medium and coarse sub-angular blocky structure; friable; smooth gradual boundary to:
32-71 cm	Greyish brown (10YR 5/2) sandy clay loam with 2-3% distinct fine strong brown (7.5YR 5/6) mottles; slightly stony; moderately developed medium and coarse sub-angular blocky structure; friable; low packing density; smooth gradual boundary to:
71-120 cm	Greyish brown (10YR 5/2) fine gravel (80% non-porous stones) and loamy coarse sand with 30% diffuse reddish brown (5YR 5/3) mottles; single grain; loose; water table at approx. 100 cm.

2.4 These soils are freely-draining (Soil Wetness Class I or II) once effective drainage is installed.

[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 an average elevation of 18 m is given below.

- Average annual rainfall: 745 mm
- January-June accumulated temperature >0°C 1453 day°
- Field capacity period (when the soils are fully replete with water) 169 days early Dec-Late Mar
- Summer moisture deficits for: wheat: 102 mm potatoes: 93 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 primarily determined by soil wetness and droughtiness. Land of grades 2 and 3 has been identified.

Grade 2

3.5 This grade includes land found in central areas lacking the gravel layers (see Map 2). They are slightly limited by seasonal wetness caused by shallow groundwater, which affects land access with machinery in winter and early spring.

[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*.

Subgrade 3a

3.6 This land, in the west and east of the Site, has gravel layers forming the lower subsoil: the resultant restricted soil moisture reserve means average yields of cereal crops are likely to be reduced by summer droughtiness.

Other land (non-agricultural)

3.7 This land comprises hard standings and agricultural buildings in the north-east of the Site.

Grade areas

3.8 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*
Grade 2	1.0	55
Subgrade 3a	0.4	26
Other land	0.3	19
Total	1.7	100

APPENDIX

DETAILS OF OBSERVATIONS

MAPS

SELECTED DROUGHTINESS CALCULATIONS

Land off Wrexham Road, Holt: 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	Hard standings												
2	Hard standings												
3	0-33	SCL	<5	33-67	SCL	xx	67-70+	Gravel	xxx	1	I	3a	D
4	0-32	SCL	<5	32-71	SCL	xx(x)	71-120	Gravel	xxx	1	II/I	3a	D
5	0-36	SCL	<5	36-82	SCL	xxx	82-100+	SCL	xxx	2	II	2	W/D
6	0-50	SCL(dist)	<5	50+	Stopped					1	-	-	-
7	0-36	SCL/MSL	<5	36-100+	SCL/MSL	xxx				1	II/I	2/1	W/D

Survey 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 mottles or f-m concentrations (gleyed horizon)
xxxx	dominantly blueish matrix often with some ochreous mottles (gleyed horizon)

Slowly permeable layers[4]

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

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

Wetness Class[5]

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

Limitations:

W - wetness/workability
D - droughtiness
De - depth
F - flooding
St – stoniness
Sl – slope
T – topography/microrelief

Suffixes & prefixes:

r-reddish, gn – greenish
o - organic
(m, v, x)st – (moderately, very, extremely) stony, chky-chalky
(vsl, sl, m, v, x)(very slightly, slightly, moderately very, extremely) calcareous

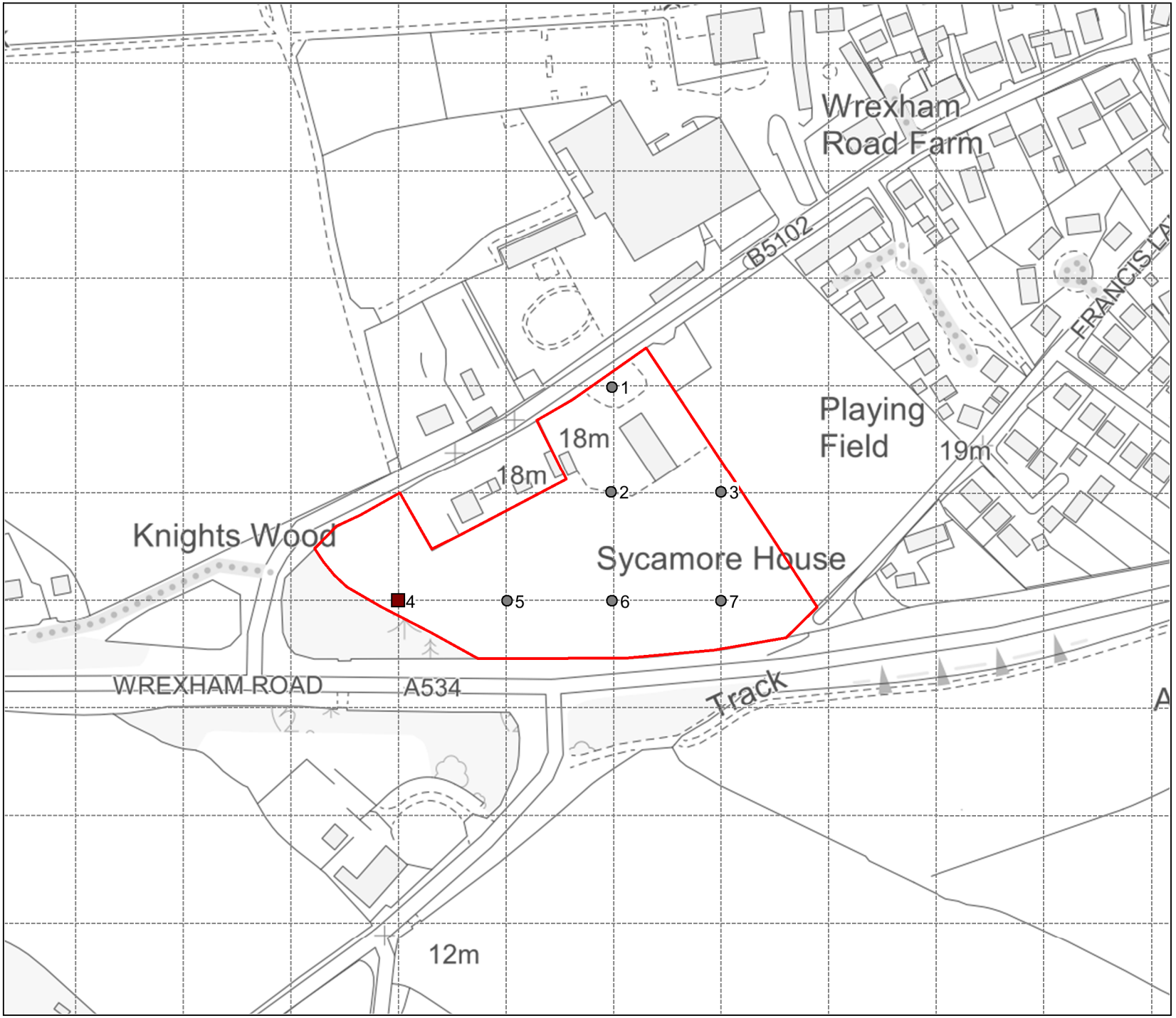
Other abbreviations

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

[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



KEY

- Auger observations
- Pits
- Site boundary

Site:

Wrexham Road
Holt

Map title:

MAP 1
Observations

Land Research ASSOCIATES
Lockington Hall
Lockington
Derby
DE74 2RH
www.lra.co.uk

Date: 17/03/2021

Scale: 1:2,500



KEY

- Grade 2
- Subgrade 3a
- Other land
- Site boundary

Site:

Wrexham Road
Holt

Map title:

MAP 2
Agricultural Land
Classification

Land Research Associates
Lockington Hall
Lockington
Derby
DE74 2RH
www.lra.co.uk

Date: 21/06/2022

Scale: 1:2,500

SITE: Holt
Location: 4

Layer	*Lower depth* (cm)	*Texture symbol* (or stop)	*Structure* (Good, Moderate or Poor)	*% stones*	*Stone type* (see table)
Topsoil	32	scl	m	10	1
Subsoil 1	71	scl	m	10	1
Subsoil 2	120	lcs	m	100	8
Subsoil 3	120	stop	m	0	1

(Lowest horizon depth must be 120 and topsoil cannot be greater than 70 cm (potatoes) or 50 cm (wheat))

DATA USED FROM MASTER TABLE

	Fine earth	*Stones*
Topsoil Av	17	1
Subsoil 1 TAv	15	1
Subsoil 1 EAv	10	0.5
Subsoil 2 TAv	8	2
Subsoil 2 EAv	6	1
Subsoil 3 TAv	0.1	1
Subsoil 3 EAv	0.1	0.5
	(ERR = no data)	

Stone codes	
0	No stones
1	Hard rocks or stones
2	Soft, medium or coarse grained sdst
3	Soft weathered ign or metamorph
4	Soft oolitic or dolomitic limestones
5	Soft fine-grained sandstone
6	Soft argillaceous or silty
7	Chalk
8	Gravel with non-porous stones
9	Gravel with porous stones

PROFILE CALCULATIONS

	Ap potatoes	*Ap wheat*
Topsoil	492.8	492.8
Subsoil 1	516.8	0.0
Subsoil 1	0.0	434.9
Subsoil 2	0.0	0.0
Subsoil 2	0.0	49.0
Subsoil 3	0.0	0.0
TOTAL AP (mm)	101	98
MD (mm)	93	102
AP-MD (mm)	8	-4

AGRICULTURAL LAND GRADE

Class	*Potatoes*	*Wheat*
1		
2	*	
3a		*
3b		
4		

SITE: Holt
Location: 5

Layer	*Lower depth* (cm)	*Texture symbol* (or stop)	*Structure* (Good, Moderate or Poor)	*% stones*	*Stone type* (see table)
Topsoil	36	scl	m	10	1
Subsoil 1	82	scl	m	10	1
Subsoil 2	120	scl	p	10	1
Subsoil 3	120	stop	m	0	1

(Lowest horizon depth must be 120 and topsoil cannot be greater than 70 cm (potatoes) or 50 cm (wheat))

DATA USED FROM MASTER TABLE

	Fine earth	*Stones*
Topsoil Av	17	1
Subsoil 1 TAv	15	1
Subsoil 1 EAv	10	0.5
Subsoil 2 TAv	13	1
Subsoil 2 EAv	8	0.5
Subsoil 3 TAv	0.1	1
Subsoil 3 EAv	0.1	0.5
	(ERR = no data)	

Stone codes	
0	No stones
1	Hard rocks or stones
2	Soft, medium or coarse grained sdst
3	Soft weathered ign or metamorph
4	Soft oolitic or dolomitic limestones
5	Soft fine-grained sandstone
6	Soft argillaceous or silty
7	Chalk
8	Gravel with non-porous stones
9	Gravel with porous stones

PROFILE CALCULATIONS

	Ap potatoes	*Ap wheat*
Topsoil	554.4	554.4
Subsoil 1	462.4	0.0
Subsoil 1	0.0	480.0
Subsoil 2	0.0	0.0
Subsoil 2	0.0	275.5
Subsoil 3	0.0	0.0
TOTAL AP (mm)	102	131
MD (mm)	93	102
AP-MD (mm)	9	29

AGRICULTURAL LAND GRADE

Class	*Potatoes*	*Wheat*
1		
2	*	*
3a		
3b		
4		