



RETFORD CIRCULAR ECONOMY PROJECT
TECHNICAL APPENDIX 10.3 ALC SURVEY AREA B

FEBRUARY 2023

**SOIL RESOURCES
AND AGRICULTURAL QUALITY OF
LAND AT SUTTON-CUM-LOUND**

Report 2106/2

14th February 2023

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OF LAND AT SUTTON-CUM-LOUND**

F.W. Heaven BSc, MISoilSci

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

14th February, 2023

SUMMARY

A soils and agricultural land quality survey has been undertaken of 7.7 ha of agricultural land at Sutton-cum-Lound in the Bassetlaw district of Nottinghamshire.

The survey has shown mainly sandy soils forming land of mainly sub-grade 3b agricultural quality with a lesser area of sub-grade 3a. The agricultural limitation is droughtiness.

1.0 Introduction

- 1.1 This report provides information on the agricultural quality and use of 7.7 ha of land at Sutton-cum-Lound in the Bassetlaw District of North Nottinghamshire near to Retford. The report is based on a survey of the land in January 2023.

SITE ENVIRONMENT

- 1.2 The site comprises a mixture of roads, disturbed ground covered with trees and concrete plant in the south, with an area of arable land in the north.
- 1.3 The land is gently sloping, with an average elevation of around 14 m AOD.

AGRICULTURAL USE

- 1.4 At the time of the survey in January the arable land was in a mixture of winter cereal and bare fallow.

PUBLISHED INFORMATION

- 1.5 British Geological Survey 1:50,000 scale information shows the basal geology as Triassic pebbly sandstone of the Chester Formation. There is recorded to be a superficial cover of the River Terrace deposits of sand and gravel.
- 1.6 The National Soil Map¹ at 1:250,000 scale shows the land as Blackwood Association, comprising deep permeable sandy and coarse loamy soils developed in glaciofluvial drift.
- 1.7 There is no published post 1988 detailed survey of Agricultural Land Classification. The provisional Agricultural Land Classification map shows most of the land as grade 3 with a small area of grade 2 around the access road in the south.

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 detailed soil resource and agricultural quality survey was carried in January 2023. The survey was based on observations at intersects of a 100 m grid, giving a sampling 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 location is in an appendix to this report.
- 2.2 The survey shows one principal soil type on the site. The topsoil is stony brown medium sandy loam. It overlies medium sand upper subsoil with similar stones to the topsoil. It is mainly brownish in colour with many fine ochreous mottles indicating slight seasonal wetness from ground water. The lower subsoil in most of the site is gravelly sand, but in the northern limit of the site the lower subsoil is medium sand, similar to the upper subsoil but with less stones.
- 2.3 An example profile from a pit at location 3 (Map 1) is described below:
- | | |
|----------|--|
| 0-35 cm | Brown to dark brown (10YR 4/3) medium sandy loam; 4% small rounded quartzite stones; moderately developed medium subangular blocky structure; friable under a frost layer; common very fine fibrous roots; common fine and medium pores; sharp smooth boundary to: |
| 35-60 cm | Brown (7.5YR 5/4) medium sand with common reddish brown (5YR 4/6) fine mottles; 8-10% small rounded quartzite stones; structureless, single grain; friable; a few fine fibrous roots; no visible pores; clear smooth boundary to: |
| 60+ cm | Extremely stony medium sand |
- 2.4 The soils are permeable but may be affected by rising groundwater (Soil Wetness Class II).

3.0 Agricultural Quality

3.1 To assist in assessing land quality, the former 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 Agricultural Land Classification (ALC) system classifies land into five grades numbered 1 to 5, with grade 3 divided into two sub-grades (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.² The relevant site data for an average elevation of 14 m is given below.

- Average annual rainfall: 577 mm
- January-June accumulated temperature >0°C 1416 day°
- Field capacity period 112 days
(when the soils are fully replete with water) early Dec – early Apr
- Summer moisture deficits for: wheat: 113 mm
potatoes: 107 mm

3.3 The survey described in the previous section was used in conjunction with the agroclimatic data above to classify the site using the revised guidelines for agricultural land classification issued in 1988 by the Ministry of Agriculture, Fisheries and Food.³ There are no climatic limitations at this locality.

SURVEY RESULTS

3.4 Land of grades 3 exists on the site. Land quality is determined by droughtiness.

² *Climatological Data for Agricultural Land Classification*. Meteorological Office, 1989

³ *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*. MAFF, 1988.

Subgrade 3a

- 3.5 There is a small amount of land in the north of the site, on slightly lower ground where the soils are less stony than elsewhere. The sandy soils are likely to experience moderate droughtiness under the local climate, and average yields of arable crops are likely to be reduced as a result.

Sub-grade 3b

- 3.6 Most of the agricultural land on the site has stony sandy soils with limited moisture reserves. Under the local climate these soils are very droughty and summer droughtiness is likely to lead to low average yields.

Other land

- 3.7 Most of the land of the site is composed of disturbed ground with woodland, and industrial land with roads hard standing and plant buildings.

Grade areas

- 3.8 The land grade is shown on Map 1 and the area occupied is shown below.

Table 1. Areas within the survey area occupied by the different land grades

<i>Grade/sub-grade</i>	<i>Area (ha)</i>	<i>% of site</i>	<i>% of agricultural land</i>
Sub-grade 3a	0.44	6	13
Sub-grade 3b	2.86	37	87
Other land	4.42	57	0
Total	7.72	100	100

4.0 Soil resources and their use

Topsoil

- 4.1 Stripped topsoil should be stored in separate resource bunds no more than 3 m high and kept grassed and free from construction traffic until required for re-use. The *Construction Code of Practice for Sustainable Use of Soils on Construction Sites* (Defra 2009) provides guidance on good practice in soil handling.

APPENDIX
MAPS AND DETAILS OF OBSERVATIONS

Key to table

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

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)

⁷calcareous classes as defined in Hodgson (1997)

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
S	Soil limitations

Suffixes & prefixes:

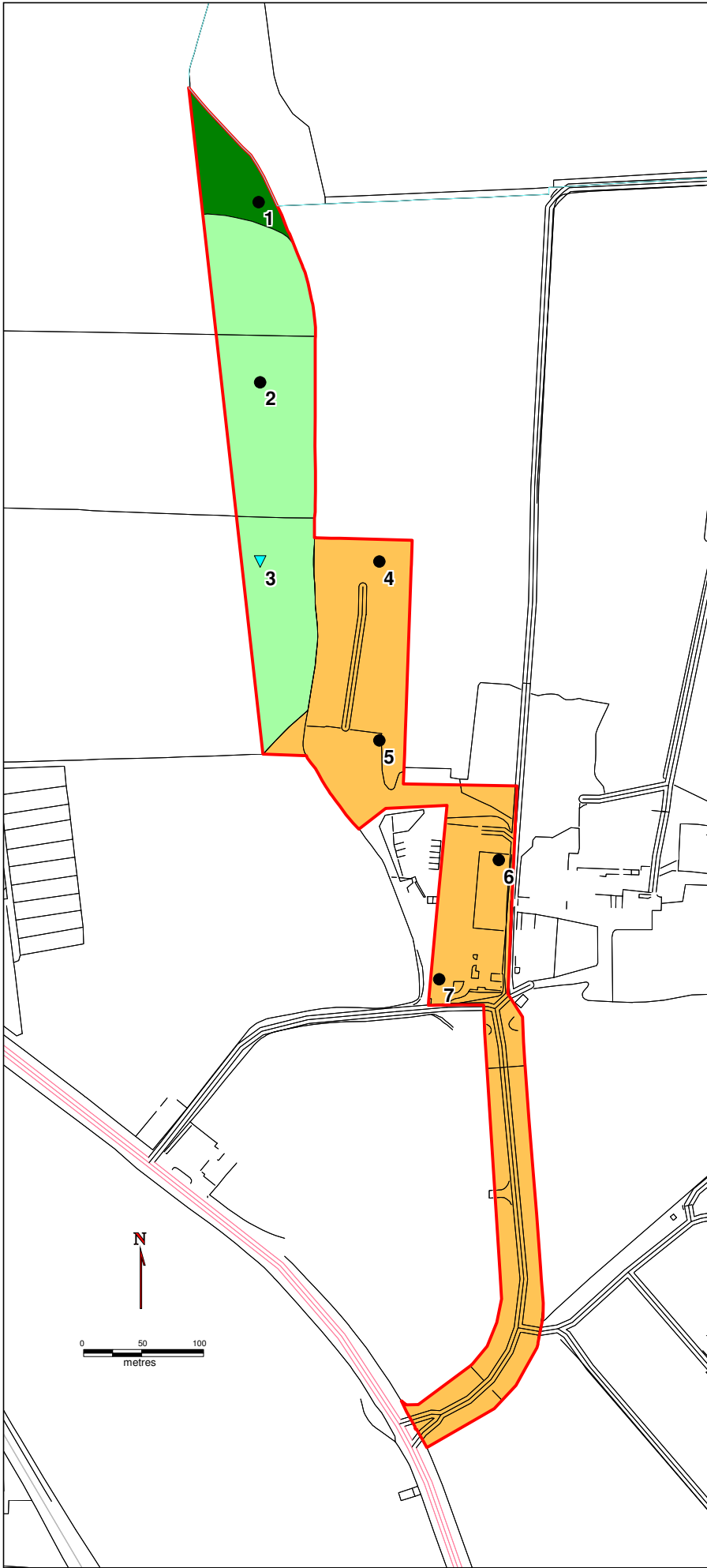
o - organic

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

(vsl, sl, m, v, x) ca (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



KEY

Location of the observations

- Auger location
- ▼ Soil description pit

Agricultural Land Quality

- Sub-grade 3a
- Sub-grade 3b
- Non agricultural land
- Survey area

Project

**Land at Sutton-cum-Lound
Area C**

Map

**Map 1
Location of the observations
and
Agricultural Land Quality**



Lockington Hall
Lockington
Derby DE74 2RH
Tel: 01509 670470

Scale
1:5,000 at A4

Date
01/02/2023