# AGRICULTURAL QUALITY OF LAND AT EVENHILL LITTLEBOURNE

Report 1857/1

8th July 2021

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# AGRICULTURAL QUALITY

# OF LAND AT EVENHILL, LITTLEBOURNE

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Report 1857/1
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8th July, 2021

**SUMMARY**

An agricultural land quality survey has been undertaken of 15.7 ha of land at Evenhill in the village of Littlebourne, Kent during July 2021.

The majority of the land is limited by wetness limitations, restricting the quality of the land to a mix of Subgrades 3a and 3b.

# 1.0 Introduction

1.1 This report provides information on the soils and agricultural quality of 15.7 ha of land at Evenhill in the village of Littlebourne, Kent.

**SITE ENVIRONMENT**

1.2 The survey area comprises two fields divided by a ditch. The northern section is part of a larger field and is bounded in the north by the A257 and in the east by houses and gardens. The southern field is bounded to the north by houses and gardens to the south-west by the Howletts Animal Park and the south-east by Bekesbourne Road. The two fields form two small hills generally sloping gently or moderately down to a central ditch.

1.3 At the time of survey the whole of the area was under a wheat crop.

**PUBLISHED INFORMATION**

1.4 1:50,000 scale BGS information records the geology of the survey area as Thanet Formation - sand, silt and clay, overlain by Head deposits (clay and silt).

1.5 The National Soil Map (published at 1:250,000 scale) records the whole of the survey area as Hamble 1 Association: deep fine silty soils with variable drainage formed in wind-blown deposits[1].

[1]Ragg, J.M., *et al.,* (1984). *Soils and their Use in South East England,* Soil Survey of England and Wales Bulletin No. 15, Harpenden.

## 2.0 Soils

2.1 A detailed soils and agricultural quality survey was carried out in July 2021 in strict accordance with MAFF (1988) guidelines[1]. 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 The soils in the survey area are imperfectly to poorly-drained and assessed as Soil Wetness Class III or IV depending on the depth to a slowly permeable subsoil layer. They comprise medium or heavy silty clay loam topsoil, usually overlying a heavy silty clay loam upper subsoil grading to a clay lower subsoil. The upper subsoil was usually gleyed and mottled but permeable, with the underlying clay found to constitute a slowly permeable layer. Occasionally the upper subsoil layer is absent. In a very limited area in the north the topsoil is moderately stony.

2.3 An example profile is described below from a pit at observation 3 (Map 1).

| | |
|---|---|
| 0-35 cm | Dark greyish brown (10YR 4/2) medium silty clay loam; non-calcareous, 5% total stones, small to medium rounded and sub-angular quartzite and flint; weakly developed medium sub-angular blocky structure; friable; abundant fine fibrous roots; smooth clear boundary to: |
| 35-55 cm | Brown (10YR 5/3) heavy silty clay loam; 3% small to medium rounded and sub-angular quartzite and flint; weakly developed medium sub- angular blocky structure; firm; many fine fibrous roots; >0.5% biopores; smooth clear boundary to: |
| 55-100 cm+ | Brown and yellowish brown (10YR 5/3, 5/6) clay; stoneless; weakly developed coarse to very coarse angular blocky structure; firm; common fibrous roots; <0.5% bio-pores. |

[1]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. This report describes the main limitations affecting ALC grades at this site. Other factors (e.g. droughtiness, soil depth, micro-relief etc.) were assessed but did not affect the overall grading of the site.

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 26 m AOD is given below.

- Average annual rainfall: 685 mm
- January-June accumulated temperature >0°C 1466 day°
- Field capacity period (when the soils are fully replete with water) 141 days late Sept-early May
- Summer moisture deficits for: wheat: 120 mm potatoes: 117 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[3]. There are no climatic limitations at this locality.

**SURVEY RESULTS**

3.4 The agricultural quality of the land of the majority of the survey area is determined by wetness and workability. A very small area has the quality determined by topsoil stoniness. Land of grade 3 has been identified.

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

**Subgrade 3a**

3.5 The soil profiles in this area are imperfectly draining and assessed as Wetness Class III. They have a medium silty clay loam topsoil which, together with the number of field capacity days at this location, result in a moderate wetness and workability limitation. Also included in land of Subgrade 3a quality is an area in the west (Map 2) which is also imperfectly draining and assessed as Wetness Class III but has a heavy silty clay loam topsoil. However, the topsoil and subsoil in this area are very calcareous and therefore as naturally calcareous soils are normally better structured and hence more workable they are of a higher quality than non-calcareous soils.

**Subgrade 3b**

3.6 This land is imperfectly to poorly-drained (Wetness Class III or IV) which together with a heavy topsoil results in a significant wetness and workability limitation, mainly restricting the use of such land for arable cropping to autumn sowings.

A small area in the north of the site has a moderately high topsoil stone content. Stones can have a detrimental effect on cultivation, harvesting and crop growth and cause increased wear on farm machinery. Therefore, land where the upper 25 cm of topsoil contains below 35% but above 15% of hard stones larger than 2 cm or below 20% and above 10% of hard stones greater than 6 cm are assessed as Subgrade 3b quality.

**Grade areas**

3.7 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 3a** | 5.9 | 38 |
| **Subgrade 3b** | 9.8 | 62 |
| **Total** | 15.7 | 100 |

**APPENDIX**
**DETAILS OF OBSERVATIONS**
**MAPS**

## Land at Evenhill, Littlebourne, Kent: 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 | 0-32 | MZCL | 18 | 32-48 | HZCL | xxx | 48-120 | C | xxx | 3 | III | 3b | St |
| 2 | 0-35 | MZCL | 12 | 35-50 | HZCL | xxx | 50+ Impenetrable | | | 3 | II/III | 3a | St |
| 3 | 0-35 | MZCL | 5 | 35-55 | HZCL | xxx | 55-120 | C | xxx | 2 | III | 3a | W |
| 4 | 0-28 | HCL | 4 | 28-120 | C | xxx | | | | 5 | IV | 3b | W |
| 5 | 0-31 | HCL | 4 | 31-120 | C | xxx | | | | 4 | IV | 3b | W |
| 6 | 0-35 | MZCL | 5 | 35-47 | HZCL | xx | 47-120 | C | xxx | 2 | III | 3a | W |
| 7 | 0-30 | MZCL | 5 | 30-45 | HZCL | xxx | 45-120 | C | xxx | 0 | III | 3a | W |
| 8 | 0-32 | HZCL (v, chky) | 3 | 32-57 | HZCL (v, chky) | xxx | 57-120 | C | xxx | 4 | III | 3a | W |
| 9 | 0-35 | C (v, chky) | 2 | 35-70 | C (sl) | xxx | 70-80<br>80+ Impenetrable | C | xxxx | 2 | IV | 3b | W |
| 10 | 0-35 | HZCL | 5 | 35-90 | HZCL/C | xxx | 90-120 | C | xxxx | 2 | IV | 3b | W |
| 11 | 0-31 | MZCL | 2 | 31-120 | C | xxx | | | | 2 | IV | 3b | W |
| 12 | 0-32 | HZCL | 2 | 32-120 | HZCL/C | xxx | | | | 1 | IV | 3b | W |
| 13 | 0-32 | HZCL | 3 | 32-45 | HZCL | xxx | 45-120 | C | xxx | 1 | III | 3b | W |
| 14 | 0-30 | HZCL | 2 | 30-120 | HZCL/C | xxx | | | | 0 | IV | 3b | W |
| 15 | 0-33 | HZCL | 2 | 33-50 | HZCL | xxx | 50-120 | C | xxx | 0 | III | 3b | W |
| 16 | 0-32 | HZCL | 2 | 32-48 | HZCL | xxx | 48-120 | C | xxx | 0 | III | 3b | W |

## 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

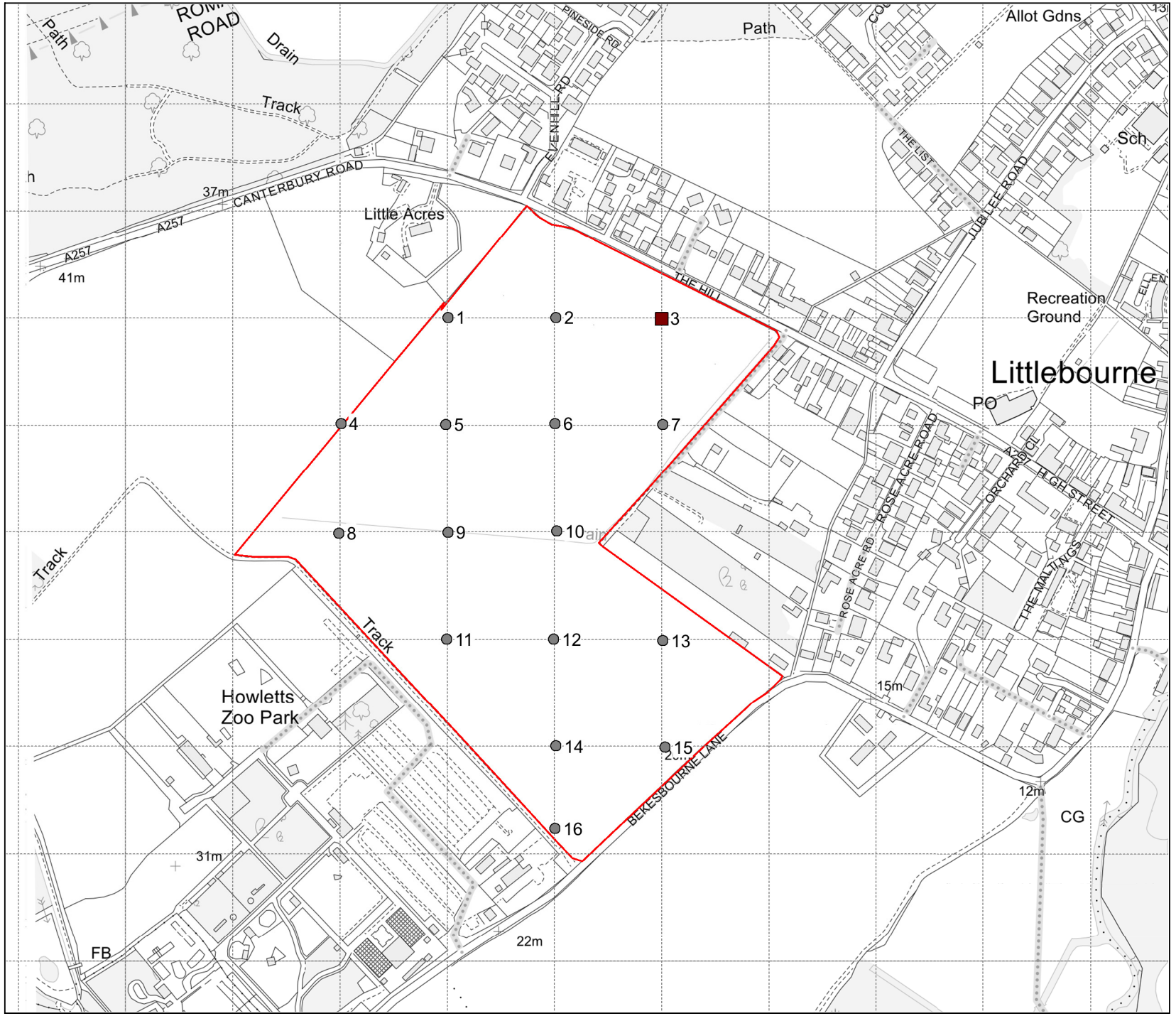
*Suffixes & prefixes:*

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
[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)




KEY

- Auger observations
- Pits
- Site boundary

Client:

GLADMAN

Site:

Littlebourne

Map title:

MAP 1
Observations

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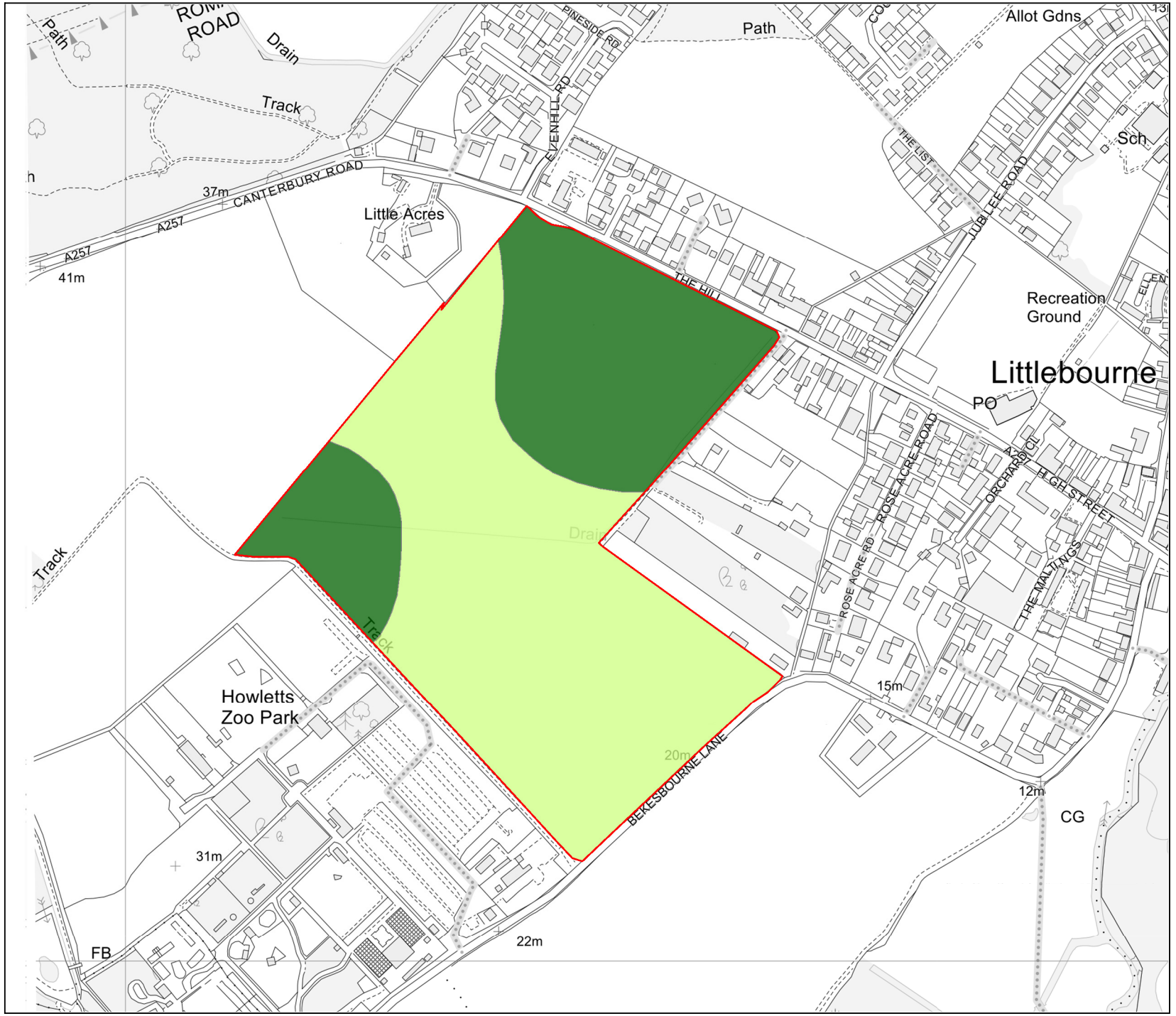
DE74 2RH
www.lra.co.uk

Date: 08/07/2021

Scale: 1:5,000




KEY

- Subgrade 3a
- Subgrade 3b
- Site boundary

Client: GLADMAN

Site: Littlebourne

Map title: MAP 2 Agricultural Land Classification

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Date: 08/07/2021

Scale: 1:5,000