

Combs 23/91

PHYSICAL CHARACTERISTICS REPORT INCORPORATING
AGRICULTURAL LAND CLASSIFICATION

KEELARS AND SUNNYMEAD FARMS ELMSTEAD ESSEX

1.0 INTRODUCTION

- 1.1 A survey was carried out over 34.4 ha of land at Keelars and Sunnymead Farms, Elmstead, Essex in connection with a planning application by Redland Aggregates for sand and gravel extraction. The site lies to the east of Wivenhoe and adjoins an existing sand and gravel working (see map). The site is bounded to the west by Keelars Lane, to the north by the B1027 road and to the south by Alresford Road, whilst to the east of the site lies open farmland.
- 1.2 The site was first surveyed in 1987 as part of a study of a number of sites included within the Essex Mineral Structure Plan. At that time a semi-detailed survey was carried out over this site and 18 inspections were made to a depth of 90 cm unless stopped by impenetrable stone. During the current survey a further 22 observations were made using a spade and dutch auger to a depth of 1.2 m unless prevented by stones. In addition 5 soil pits were dug to assess subsoil conditions and to assist in determining the depth of rooting.
- 1.3 The site comprises 3 fields alongside Keelars Lane and a further small field on the eastern side of Sixpenny Brook at the northern end of the site. At the time of survey all the land on Keelars Farm was under winter barley whilst the two fields on Sunnymead Farm were sown to peas and sugar beet.
- 1.4 All the land with the exception of the small field to the east of Sixpenny Brook is capable of being irrigated. Irrigation water at present comes from a lake in the sand and gravel workings on the western side of Keelars Lane, however this lake is currently being used by the gravel company for washing the mineral and is rapidly silting up. Both farmers reported that there is unlikely to be water available from this source in two years time. Both farmers currently irrigate crops of sugar beet, potatoes and peas. A small reservoir exists on

Sunnymead Farm but this on its own would be insufficient to irrigate all the fields.

2.0 AGRICULTURAL LAND CLASSIFICATION

2.1 The site has been classified in accordance with the guidelines of the Agricultural Land Classification of England and Wales (MAFF, 1988). Irrigation has been taken into consideration when grading the site and consequently the land has been upgraded by one grade or sub-grade where applicable. A breakdown of the individual grades and areas is given below;

ALC grade	Area (ha)	%
2	10.2	29.7
3a	18.3	53.2
3b	5.9	17.1
TOTAL	34.4	100.0

2.2 The major limitation associated with this site is droughtiness with a wetness limitation in the valley bottom of the Sixpenny Brook. The majority of the soils overlie sands and gravels or hoggin at a relatively shallow depth. Soil pits revealed that plant roots did not penetrate the coarse sands and gravels and that the hoggin was only partly rooted due to its poor structure, consequently moisture balance figures calculated for these soils in this low rainfall area revealed a moderately severe droughtiness limitation.

2.3 Along the eastern side of the site is a narrow band of shallow, stony soils overlying sands and gravels. This area is graded 3b with irrigation. The two fields to the south of Prospect House have been mapped as Grade 2 with irrigation. These soils are relatively uniform overlying hoggin at about 50-60 cm depth.

2.4 To the north of Prospect House the land is much more variable, consequently with irrigation the area has been mapped as Grade 3a. The variation was evident in the barley crop with areas of thin patchy crop alongside thick lush crop.

- 2.5 The low lying land adjacent to the Sixpenny Brook has been classified as Grade 3a due to a wetness limitation caused by a fluctuating groundwater table.
- 2.6 The site was originally mapped as Grades 3a and 3b for the Essex Mineral Structure Plan survey, but this was carried out prior to the introduction of the revised guidelines for Agricultural Land Classification.
- 2.7 A full description of the site and soil physical characteristics is given below.

3.0 SITE PHYSICAL CHARACTERISTICS

Climate

- 3.1 Area specific climate data has been obtained by interpolating information contained in the 5 km grid data set produced by the Meteorological Office (Met Office, 1989).
- 3.2 The average annual rainfall for the site is approximately 567 mm making this one of the lowest rainfall areas of the country. Soils are likely to be at field capacity for a relatively short period of approximately 96 days.
- 3.3 The accumulated temperature for this site is approximately 1440 degrees Celsius. This parameter indicates the cumulative build up of warmth available for crop growth, and in conjunction with rainfall has an influence on the development of soil moisture deficits and susceptibility to drought. The moisture deficits for wheat and potatoes on this site are 128 and 126 mm respectively, which are higher than average for lowland England.
- 3.4 There is no overall climatic limitation to the agricultural use of the land, although soils with low available water capacities will be highly susceptible to drought.

Relief

- 3.5 The majority of the site slopes gently from west to east falling toward the Sixpenny Brook. Altitude ranges from 30 m AOD alongside Keelars Lane down to approximately 24 m at the Brook. The small field to the east of the Brook falls from east to west. Slopes do not constitute a limitation to agricultural use anywhere on the site with the steepest slopes being less than 7 degrees.

4.0 SOIL PHYSICAL CHARACTERISTICS

Parent Material/Geology

- 4.1 No detailed geology map exists for the area, but the 1:250,000 drift geology map (Geol. Surv., 1907) shows the area to be covered by glacial loams and sands and gravels.

Soils

- 4.2 The 1:250,000 soil map produced by the Soil Survey of England and Wales (Soil Surv., 1984), show the western part of the site as the Tendring Association and the eastern part as Wix Association. The findings of this survey broadly confirm this, with the sandy soils mainly confined to the eastern side.
- 4.3 Four mapping units have been identified on the site and their distribution is shown on the accompanying map. Mapping units I, II and IV are relatively uniform whilst mapping unit III is a complex made up of several different soils. Descriptions of the individual mapping units are given below.

4.4 MAPPING UNIT I (11.9 ha)

Slightly stony brown sandy silt loam or fine sandy loam over brown sandy silt loam over hoggin/sand and gravel.

Topsoil	Texture:	medium sandy silt loam or fine sandy loam
	CaCO ₃ :	non calcareous
	Colour:	dark brown (7.5YR4/3)
	Stone:	typically 5-10% small and medium subangular and subrounded flints
	Depth:	30-35 cm
	Structure:	cultivated
	Roots:	common fine and very fine
	Boundary:	abrupt smooth lower boundary
Subsoil 1	Texture:	medium sandy silt loam
	CaCO ₃ :	non calcareous
	Colour:	brown (7.5YR5/5)
	Stone:	typically 5-10% small and medium subangular and subrounded flints
	Depth:	45-55 cm
	Structure:	moderate medium and coarse angular and subangular blocky
	Consistence:	friable
	Porosity:	moderately porous, 0.5-1% biopores
	Roots:	few/common fine and very fine roots
	Boundary:	abrupt smooth lower boundary
Subsoil 2	Texture:	sandy clay loam or clay loam with sandy lenses
	CaCO ₃ :	non calcareous
	Colour:	yellowish red (5YR4/6 - 7.5YR6/6)
	Stone:	moderately to very stony 15-35% small and medium subangular and subrounded flints
	Depth:	80-100 cm
	Structure:	massive
	Consistence:	firm

Porosity: very slightly porous, less than 0.5%
biopores
Roots: few very fine roots
Boundary: clear smooth lower boundary

Parent Material: sand and gravel deposit, 40-60% gravel,
no roots.

4.5 SOIL MAPPING UNIT II (4.6 ha)

Moderately stony dark brown sandy loam over very stony brown loamy sand
over sand and gravel.

Topsoil Texture: medium/fine sandy loam
CaCO₃: non calcareous
Colour: dark brown (7.5YR4/3)
Stone: 10-25% small and medium subangular and
 subrounded flints
Depth: 35 cm
Structure: cultivated
Roots: common fine and very fine roots
Boundary: abrupt smooth lower boundary

Subsoil 1 Texture: Loamy medium sand and medium sand
CaCO₃: non calcareous
Colour: brown (7.5YR5/5)
Stone: 20-40% small and medium subangular and
 subrounded flints
Depth: 40-60 cm
Structure: structureless
Consistence: very friable
Porosity: very porous
Roots: few very fine roots
Boundary: abrupt wavy lower boundary

Parent Material: sand and gravel deposit, reddish yellow,
40-60% fine and medium gravel, no roots

4.6 SOIL MAPPING UNIT III (15.8 ha)

Soil complex containing soils of Mapping Units I and II described above together with a slightly stony dark greyish brown sandy silt loam over a mottled, slightly stony fine sandy loam/sandy clay loam over hoggin.

Topsoil	Texture:	medium sandy silt loam or fine sandy loam
	CaCO ₃ :	non calcareous
	Colour:	dark greyish brown (10YR4/2)
	Stone:	2-7% fine and medium subangular and subrounded flints
	Depth:	30-35 cm
	Structure:	cultivated
	Roots:	common fine and very fine roots
	Boundary:	clear smooth lower boundary
Subsoil 1	Texture:	fine sandy loam/sandy clay loam
	CaCO ₃ :	non calcareous
	Colour:	very pale brown (10YR7/4)
	Mottles:	many prominent ochreous and common distinct grey mottles
	Stone:	5-10% small and medium subangular and subrounded flints
	Depth:	50-60 cm
	Structure:	moderate medium and coarse angular blocky
	Consistence:	friable/firm
	Porosity:	slightly porous, 0.5-1% biopores, including infilled earthworm channels
	Roots:	few fine and very fine roots
	Boundary:	gradual smooth lower boundary
Subsoil 2	Texture:	coarse sandy clay loam with patches of clay loam, coarse sandy loam and loamy coarse sand
	CaCO ₃ :	non calcareous
	Colour:	light grey (10YR6/1 and 7/1)
	Mottles:	common distinct ochreous mottles

Stone: 25-30% small and medium round and subangular flints
Depth: 120 cm
Structure: massive
Consistence: firm
Porosity: variable depending on texture
Roots: few fine and very fine mainly confined to old channels

4.7 SOIL MAPPING UNIT IV (2.1 ha)

Dark brown medium clay loam over mottled greyish brown medium clay loam over prominently mottled clay loam and silty clay loam over sand and gravel below 1 m depth. Due to the limited extent of this Mapping Unit in the riverine alluvium no soil pit was dug and therefore only limited data was obtained from two auger borings.

5.0 SOIL HANDLING

5.1 In general terms the topsoil quality across the site is similar although in Map Unit II and to a small extent in Map Unit III, very stony areas do occur. However, these constitute a relatively small percentage of the whole site and therefore all topsoils may be handled together. The topsoil depth across the site ranges from 30-35 cm.

5.2 In the case of subsoils, the upper subsoils to a depth of 0.5 m depth are all generally light textured and therefore could all be handled together. The lower subsoil however is more variable and therefore should be stripped and stored separately from the upper subsoil.

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May 1991

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