

Cambs 75/89

PHYSICAL CHARACTERISTICS REPORT INCORPORATING
AGRICULTURAL LAND CLASSIFICATION

LAND AT DIDDINGTON, CAMBRIDGESHIRE

1.0 INTRODUCTION

1.1 A survey was carried out over 91 ha of land at Diddington, Cambridgeshire in connection with a planning application to extract sand and gravel. The land lies to the west of the existing Little Paxton Pit, operated by ECC Construction Materials Ltd and to the east of the village of Diddington.

1.2 A total of 95 inspections were made using a dutch auger to a depth of 1.2m unless stopped by impenetrable gravel. In addition, four soil pits were dug to assess the subsoil conditions. The survey was carried out between 29th December 1989 and 8th January 1990.

1.3 The majority of the area was growing winter cereals, with two fields in the middle of the site recently cultivated. Previous cropping on the land had included cereals, sugar beet and potatoes.

2.0 SITE PHYSICAL CHARACTERISTICS

Climate

2.1 Climatic information for the site has been interpolated from the 5km grid datasets produced by the Meteorological Office (Met Office 1989). The average rainfall for the site is 562mm which is low by national standards. The number of days at which the site is likely to be at field capacity is also low at 103.

2.2 The accumulated temperature for this area is approximately 1455 degrees celsius and soil moisture deficits for wheat and potatoes are 121 and 116 respectively.

2.3 Climate itself is not limiting to agricultural land quality. However, the interaction of climate with soil texture in this relatively dry geographical area results in some soils being susceptible to drought.

Relief

2.4 The land is relatively flat with an altitude of 15m AOD. Relief therefore does not constitute a limitation to agricultural use.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The land has been classified as grades 2, 3a and 3b and a breakdown of the grades found is given below:

Grade	Area (Hectares)	%
2	23.7	26
3a	55.8	61
3b	11.5	13
Total	91.0	100

3.2 The major limitations found on site are droughtiness and in the northeastern part wetness and workability. Heavy textured clayey soils are found at the northeastern end of the site and these are restricted to 3b. Adjacent to this area are fine loamy soils over the terrace gravels which have a gleyed subsoil. These soils have been restricted to Grade 3a as a result of wetness and workability.

3.3 Over the remainder of the site, coarse loamy profiles predominate. These soils are generally well drained and the major limitation is droughtiness. The underlying sands and gravels vary in depth from as shallow as 45cm to over 120cm. Where the gravels were encountered below 90cm depth the soils have been classified as Grade 2 otherwise the land has been assigned to Grade 3a. Although many profiles exhibit an appreciable amount of stone in the topsoil, very

little was above 2cm in diameter and therefore apart from reducing the available water capacity of the soil, stoniness was not considered a limiting factor in its own right.

3.4 Irrigation facilities are available on the site and hence with the addition of irrigation water the effects of droughtiness may be reduced.

3.5 A full description of the site and soil physical characteristics is given below.

4.0 SOIL PHYSICAL CHARACTERISTICS

Geology

4.1 The area is shown on the 1:50,000 drift geology map sheet 187 (Geol Surv 1975) as First and Second Terrace River Gravels overlying Oxford Clay. The survey just completed indicated an area of alluvium adjacent to the course of the stream at the north east of the site.

Soils

4.2 Five main soil types have been distinguished for the purposes of land restoration. It should be noted that variations occur within these mapping units and in strictly pedological terms many soil series were present. The soil types described below are based on texture, drainage and depth to gravel.

4.3 Mapping Unit A comprises medium and coarse loamy soils over gravel at depth. These soils have a medium clay loam or medium sandy loam topsoil over a similar textured upper subsoil. Beneath this the textures ranged from sandy loam to sandy clay and were generally moderately stony before going on to sand and gravel at below 90cm depth. The soils were generally well drained (Wetness Class I) although some profiles showed very faint ochreous mottles and/or

manganese concretions in the lower subsoil. The stone content in the topsoil and upper subsoil was variable ranging from about 5-20%, but generally being around 7-10%. The stones were mainly less than 2cm in diameter with many less than 1cm.

- 4.4 Mapping Unit B has soils which are similar to those described above but with the underlying sands and gravels encountered above 90cm depth, mainly in the range 50-70cm. These soils generally have no lower subsoil horizon but in other respects are similar to Unit A and are also assessed as Wetness Class I.
- 4.5 Mapping Unit C comprises fine loamy soils over sand and gravel. A typical soil has a heavy clay loam topsoil with common (5-15%) small and very small flints. Beneath the topsoil is a heavy clay loam subsoil which has common ochreous mottling and a similar stone content as the topsoil. The soils have been assessed as Wetness Class II.
- 4.6 The soils of Mapping Unit D are developed in the clayey alluvium at the northeast of the site. These soils have a clay topsoil overlying a strongly gleyed clay subsoil (Wetness Class III). In most profiles the clay directly overlies the sand and gravel, but in a few profiles a stony sandy clay loam layer was present. The clayey alluvial material was stoneless throughout.
- 4.7 Mapping Unit E comprises moderately well drained (Wetness Class I/II) fine loamy soils over sand and gravel. A typical profile has a heavy clay loam or clay topsoil over a similar textured brown upper subsoil which has a strongly developed medium subangular blocky structure. The lower subsoil is similar in texture but has common faint ochreous mottling and some manganese concretions. The soils are slightly stony in the topsoil and upper subsoil (2-5% small flints) becoming stonier at depth before passing into the sand and gravel.

Resource Planning Group
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APPENDIX I

SOIL MAPPING UNIT A

Topsoil	Texture	: sandy loam or medium clay loam
	Colour	: dark brown 10YR or 7.5YR 4/3 and 3/3
	Stone	: in range 5-20% but typically 7-10% small and very small subangular and rounded flints
	Depth	: 30-35 cm
	Structure	: cultivated
	Boundary	: sharp smooth
	Roots	: common fine and very fine
	Subsoil 1	Texture
Colour		: brown 10YR or 7.5YR 4/5 and 5/5
Stone		: in range 5-20% small and very small subangular flints
Depth		: 50-70 cm
Structure		: weak medium subangular blocky
Consistence		: friable
Porosity		: moderate
Boundary		: clear smooth
Roots	: few fine and very fine	
Subsoil 2	Texture	: variable - sandy loam, sandy clay loam, clay loam and sandy clay
	Colour	: strong brown or reddish brown 7.5YR or 5YR 4/6 and 5/6
	Stone	: variable - 0-25% small flints
	Depth	: 70-120+ cm
	Structure	: weak medium to coarse subangular blocky
	Consistence	: friable to firm dependent on texture
	Porosity	: slightly to moderately porous
	Boundary	: clear smooth
Roots	: few fine and very fine	

Mineral Sand and Gravel i) 50-70% stones mainly small and very small
 ii) coarse sand matrix
 iii) stones mainly flints and chalk
 iv) calcareous

MAPPING UNIT B

As for mapping unit A with no lower subsoil horizon. Depth to underlying sand and gravel 45-90 cm, but mainly in the range 50-70 cm.

MAPPING UNIT C

Topsoil Texture : heavy clay loam
 Colour : dark brown 10YR 3/3 or 4/3
 CaCO₃ : non calcareous
 Stone : in range 5-15% small and very small flints
 Depth : 30-35 cm
 Structure : cultivated
 Boundary : sharp smooth
 Roots : common fine and very fine

Subsoil Texture : heavy clay loam
 Colour : yellowish brown 10YR 5/3
 Mottling : common ochreous
 Stone : in range 5-15% small flints
 Depth : 50-70 cm
 Structure : moderate coarse subangular blocky
 Consistence : friable to firm
 Porosity : slightly porous < 0.5% macropore
 Boundary : clear smooth
 Roots : few very fine

Mineral Sand and Gravel : As for mapping unit A.

MAPPING UNIT D

Topsoil	Texture	: Clay
	Colour	: dark brown 10YR 4/3
	CaCO ₃	: non calcareous
	Stone	: stoneless
	Depth	: 30 cm
	Structure	: cultivated
	Boundary	: abrupt smooth
	Roots	: few fine and very fine
Subsoil	Texture	: clay
	Colour	: yellowish grey brown 10YR or 2.5YR 5/3 and 5/2
	Mottling	: common distinct ochreous and grey
	Stone	: stoneless
	Depth	: 90-120 cm
	Structure	: strong very coarse angular blocky
	Consistence	: firm
	Porosity	: very slightly porous < 0.5% macropores
	Boundary	: sharp smooth
	Roots	: few very fine
Mineral	Sand and Gravel	: as for Unit A.

MAPPING UNIT E

Topsoil	Texture	: heavy clay loam or clay
	Colour	: dark brown 10YR 4/3
	CaCO ₃	: non calcareous
	Stone	: 2-5% small subangular flints
	Depth	: 30-35 cm
	Structure	: cultivated
	Boundary	: clear smooth
	Roots	: common very fine

Subsoil	Texture	: heavy clay loam or clay
	Colour	: brown 10YR 4/4
	Stone	: very slightly stony 1-3% small flints
	Depth	: 40-60 cm
	Structure	: strong medium subangular blocky
	Consistence	: friable
	Porosity	: moderately porous 1-2% macropores
	Boundary	: gradual smooth
	Roots	: few very fine
Subsoil 2	Texture	: heavy clay loam or clay
	Colour	: brown 10YR 5/4
	Mottling	: common faint ochreous and manganese concretions
	Stone	: moderately stony 15-25% small and very small flints
	Structure	: weak medium and coarse subangular blocky
	Consistence	: friable
	Porosity	: slightly porous
	Boundary	: clear smooth
	Roots	: few very fine
Mineral	Sand and Gravel	: As for Unit A.