

**AGRICULTURAL LAND CLASSIFICATION
INCORPORATING DETAILS OF SOIL PHYSICAL CHARACTERISTICS
BARTON LE CLAY**

1.0 INTRODUCTION

1.1 This 13 ha site was inspected on the 18th and 19th of April 1989 in connection with proposals to excavate a borrow pit. A total of 15 soil inspections were made on a 100m grid basis, superimposed on the national grid. At the time of survey the site was under a brassica crop and topsoil stripping had commenced towards the southern end.

2.0 AGRICULTURAL LAND CLASSIFICATION

2.1 The site is graded predominantly 3a. A small area of unsurveyed land is mapped towards the south of the site, where topsoils had already been removed at the time of survey. Non agricultural land is mapped on the steeply sloping, shrub covered banking towards the northwest.

2.2 Soils on site are well drained (wetness class I) slightly or occasionally moderately stony at the surface, and comprise heavy clay loam or silty clay loam topsoils overlying weathered chalk below 25-35 cm depth. Occasionally a narrow (10-25 cm) band of chalky silty clay loam subsoil overlies the weathered chalk bedrock. The principal limitation to land quality is droughtiness. The relative severity of this depends on the degree of weathering present in the underlying chalk. This determines the depth to which plant roots can penetrate to extract water stored in the chalk to use for crop growth. Soil profile pit observations on site indicate that the chalk is well weathered and fissured to depths of 70-80 cm; which is the depth to which plant roots will penetrate in most years. Although patches of moderate (15-20%) surface stone were noted in the more steeply sloping central parts of the site, these do not constitute a limitation to land quality since they principally comprise of chalk fragments of less than 2cm diameter, which do not significantly impede cultivation/drilling operations.

A full description of site physical factors is provided overleaf:

3.0 SITE PHYSICAL FACTORS

Relief

A breakdown of agricultural land quality in hectares and percentage terms is provided below :

ALC	Ha	%
3a	10.5	79.9
NA	0.8	5.7
Unsurveyed	1.9	14.4
Total	13.2	100.0

3.1 The site lies between altitudes of 120 and 143 m AOD, in a watershed location at the crest of the chalk escarpment. Within the area of agricultural land, gradients are gentle and do not constitute a limitation to land quality. Steeper gradients were noted on the shrub covered banking to the north east of the site.

Climate

3.2 Site specific climate^{data} has been obtained by interpolating information contained in the 5km grid agroclimatic data set produced by the Meteorological Office, (Met Office, 1989),.

3.3 The annual average rainfall is approximately 629 mm (25.2 inches) which is low by national standards. Soils are likely to at field capacity for a relatively short period of approximately 123 days. During this time the workability of the land is not likely to be greatly impaired due to the free draining nature of the chalk substrate.

3.4 The accumulated temperature for this area is approximately 1333° celsius. This parameter indicates the cumulative build up of warmth available for crop growth and has an influence in the development of soil moisture deficits. The soil moisture deficits for wheat and potatoes are 107 mm and 99 mm respectively.

3.5 The site is neither frost prone, nor particularly exposed.

Geology & Soils

3.6 No detailed geology map exists for this area, however the site is believed to be underlain by Middle chalk.

3.7 The site has been mapped at the scale of 1:63,360 by the Soil Survey of England and Wales. This indicates the occurrence of soils of the Swaffham Prior association which is broadly in accordance with field survey observations. A detailed description of soil physical characteristics follows. (Note that only one soil mapping unit has been identified on site).

4.0 SOIL PHYSICAL CHARACTERISTICS

SOIL MAPPING UNIT I

Topsoil	Texture :	calcareous silty clay loam or clay loam
	Colour :	dark greyish brown, (2.5 Y4/2)
	Stone :	typically 5-10%, comprising mainly very small and small, few medium chalk fragments. Stonier (up to 20% cover) patches may occur locally on the more steeply sloping shoulder of the slope, in the central part of the site.
	Depth :	in the range 25-35 cm;
	Structure :	cultivation zone - not applicable.
	Boundary :	smooth clear lower boundary.
	Roots :	common to abundant fine and very fine roots.
Subsoil (where present)	Texture :	strongly calcareous silty clay loam
	Colour :	pale brown and yellowish brown, (10YR 5/4 & 10YR 6/3)
	Stone :	variable; in the range 10-30% soil volume comprising very small, small and medium chalk fragments.
	Depth :	in the range 35-45 cm.
	Structure :	weakly developed medium and fine sub angular blocky and angular blocky; friable
	Porosity :	less than .5% biopores; common very fine pores
	Boundary :	smooth or wavy gradual lower boundary
	Roots :	common fine and very fine roots.

Weathered chalk : variable dependent on degree of weathering present:

In most parts of the site the chalk comprises of white (2.5Y8/2 or 2.5Y8/1) loosely bedded thin (1-2cm thick) beds which are highly fissured to depths of 70-80 cm. The beds typically have brown (10YR5/3), 1-3mm thick coatings of weathered chalk and organic debris on their surfaces. Roots are variable but are typically few, with patches of common and abundant in localised (more highly fissured) parts of the profile.

Where weathering is particularly advanced (ie. at Pit 1 and on the lower, level ground towards the west of the site) no bedding or jointing is discernable within the chalk. The matrix takes on a "fudgy" appearance and textures to a silt loam or silty clay loam. These horizons have weak fine subangular blocky and angular blocky structures with friable consistence.

Below depths of 70-80 cm the chalk typically becomes more tightly bedded and harder. Beds are coarser (2-5 cm thick and have thinner (1/2 mm) coatings of weathered chalk and organic debris. Roots are typically few fine and very fine, becoming rare below 80/90 cm depth.

Exceptions to this general trend occur on the higher ground surrounding the 143m spot height; where slightly harder and more tightly bedded chalk (in 2-3 cm thick beds) occur between 30 and 70 cm depth*. Although this chalk becomes slightly softer below 70 cm, it shows an

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overall similarly in total depth of weathering and root penetration, with the profiles described above.

*NB impenetrable to hand auger between 30-40 cm.

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