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STATEMENT OF PHYSICAL CHARACTERISTICS

LAND AT FACTORY FARM, WOULDHAM ROAD, BORSTAL, KENT.

MAFF Ministry of Agriculture Fisheries and Food

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FACTORY FARM TIP, WOULDHAM ROAD, BORSTAL

1. BACKGROUND

1.1. The 2.28 ha site lies just to the south of the River Medway, west of Chatham in Kent. It is bounded to the east by the M2 motorway, to the south by allotment gardens, and to the west by an existing refuse tip. The northern boundary does not coincide with any obvious physical feature. The site was inspected on 18th June 1990 in connection with proposals for the extraction of chalk.

1.2. The site was surveyed using a 110 cm Dutch soil auger with samples being taken at variable intervals across the site. In addition one soil pit was examined.

Land - Use

1.3. At the time of survey the land was uncultivated, although it had been under winter barley during the previous year. Approximately half the site is mapped as non-agricultural since it has already been quarried.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1. The site lies at approximately 20 m A.O.D., falling gently towards the River Medway to the north-west and rising very slightly towards the south-east.
Gradient is not a significant limitation in terms of land quality in this locality.

Climate

2.2. The average annual rainfall for this area is approximately 652 mm (Met. Office, 1989), this being low for the south-east of England. The median accumulated temperature above 0°C between January and June, a measure of the relative warmth of the locality is expected to be 1480 day degrees (Met. Office, 1989), this is relatively high in a regional context. The site has approximately 132 field capacity days, which provides a measure of the effect of climate on the soil water regime. Crop adjusted moisture deficits are 121 mm for wheat and 116 mm for potatoes.
In summary, the locality is relatively warm and dry in regional, (and national), terms.

2.3. Climatic factors per se place no limitation on agricultural land quality, but do affect interactive limitations between soil and climate, namely soil wetness and droughtiness.

Geology and Soils

2.4. British Geological Survey, Sheet 272, Chatham (1978) shows the site to be underlain by Cretaceous Upper Chalk.

2.5. Soil survey of England and Wales, Sheet 6, Soils of South-east England, (1983), shows the site as brown calcareous earths of the Coombe 1 association. These are described as fine silty soils over chalk or chalky drift at variable depth, (SSEW, 1983).

2.6. Detailed field examination of the soils confirms that there is one soil group present across the site.

2.7. Soils on the site are characteristically shallow over chalk, commonly becoming impenetrable, (to soil auger), within 50 cm depth. Profiles typically comprise slightly stony, (c. 3-5% chalk stones and medium flints), to very stony, (c. 25-30% chalk stones and flints), medium silty clay loam topsoils either directly overlying chalk at very shallow depths, (i.e. 22-28 cm), or

passing through very stony, (c. 10-50% chalk stones and flints) medium silty clay loam in the upper subsoil and becoming impenetrable over hard rubbly white chalk at about 50 cm depth. All profiles are very calcareous throughout.

3. AGRICULTURAL LAND CLASSIFICATION

3.1. The ALC grading of the survey area is primarily determined by interactions between climate and soil factors, specifically droughtiness. Topsoil stoniness is also of significance in terms of ALC grading at this location. ALC grade 3b has been mapped across the site as indicated below.

Grade	ha	% of total agricultural land
3b	1.18	100
Total agricultural area	1.18	
Land in non agricultural use	1.10	
Total area	2.28	

3.2. Appendix 1 gives a general description of the grades and sub-grades identified in this survey.

3.3. Grade 3b

Land of this quality occurs across 1.18 ha of the site and represents 100% of the total agricultural land area. Soil profiles typically comprise slightly stony, (c. 3-5% chalk stones and medium flints), to very stony, (c. 25-30% chalk stones and flints) medium silty clay loam topsoils which either directly overlie rubbly white chalk at depths between 22 and 28 cm, or pass through very stony, (i.e., c. 10-50% chalk stones and flints), medium silty clay loam in the upper subsoil and become impenetrable, (to soil auger), over rubbly white chalk within 50 cm depth. All profiles are very calcareous throughout.

Due to the shallow depth of profiles over chalk* and the stony nature of the soils, droughtiness is a major limitation on the site and thereby restricts the land to a maximum of Grade 3b.

*estimated rooting depth of 70 cm.

4. SOIL RESOURCES

4.1. Soils on the site can be allocated to one topsoil and one subsoil unit. At some locations subsoil is absent with topsoils resting directly over chalk. The mean topsoil depth is 28 cm, with a range of 22-32 cm. Topsoil texture and stone content is fully described in paragraphs 2.7 and 3.3. Where they occur, subsoils comprise between 18-20 cm of very chalky medium silty clay loam containing up to 50% chalk stones and flints. Due to their relatively shallow depth over the chalk substratum, soil resources on the site are very limited in amount. However the undisturbed chalk does form a rootable medium and has the ability to make a contribution towards supplying the moisture requirement of crops and grass.

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REFERENCES

BRITISH GEOLOGICAL SURVEY, (1978), Sheet 272, Chatham.

MAFF, (1988), Agricultural land classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

METEOROLOGICAL OFFICE, (1989), Climatological datasets for agricultural land classification.

SOIL SURVEY OF ENGLAND AND WALES, (1984) Bulletin 15 - Soils and their use in SE England.

SOIL SURVEY OF ENGLAND AND WALES, (1983), Sheet 6, Soils of South-east England.

APPENDIX 1

DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

Grade 1 – excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 – very good quality agricultural land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 – good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a – good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b – moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 – poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 – very poor quality agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Descriptions of other land categories used on ALC maps

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: golf courses, private parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports/airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

Agricultural buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg polythene tunnels erected for lambing) may be ignored.

Open water

Includes lakes, ponds and rivers as map scale permits.

Land not surveyed

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above land cover types, eg buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will usually be shown.

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six revised soil wetness classes (Hodgson, in preparation) are identified and are defined in Table 11.

Table 11 Definition of Soil Wetness Classes

Wetness Class	Duration of Waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years[2].
II	The soil profile is wet within 70 cm depth for 31-90 days in most years *or*, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but not wet within 40 cm depth for more than 30 days in most years.
III	The soil profile is wet within 70 cm depth for 91-180 days in most years *or*, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 180 days,but only wet within 40 cm depth for between 31 and 90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years *or*, if there is no slowly permeable layer within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

[1] The number of days specified is not necessarily a continuous period.

[2] 'In most years' is defined as more than 10 out of 20 years.

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.