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STATEMENT OF PHYSICAL CHARACTERISTICS

ROFFORD HALL ,NEAR CHALGROVE ,OXFORDSHIRE

MAFF Ministry of Agriculture Fisheries and Food

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1 BACKGROUND

1 1 The 23 81 ha site lies to the north west of Chalgrove in Oxfordshire adjacent to Rofford Hall It is bounded to the west by a minor road and to the south by a farm track The south-eastern boundary comprises part of the perimeter fence of Chalgrove Airfield and a farm track whilst Rofford Hall bounds the site to the east The north-east is bounded by a stream and a small area of woodland whilst the northern boundary coincides with a break-in slope The site was inspected during early March 1990 in connection with proposals for minerals extraction

1 2 The site was surveyed using 100 cm and 120 cm Dutch soil augers with samples being taken at approximately 100 m intervals across the site In addition three soil inspection pits were examined

Land- Use

1 3 At the time of survey most of the site was under oilseed rape although the field to the east of the track was in winter cereals A small area to the north-east of Rofford Hall was given over to grassland

2 PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2 1 The site lies at approximately 60-65 m A O D and falls very gently towards the north and east To the north-east of Rofford Hall the land lies slightly lower than elsewhere and there are a number of springs issuing from the area Gradient is not a significant limiation in terms of land quality in this locality

Climate

2 2 The average annual rainfall for this area is approximately 605-610 mm (met office 1989) this being relatively dry both in national and regional terms The median accumulated temperature above 0 C between January and June a measure of the relative warmth of the locality is expected to be about 1440-1446 day degrees (met office 1989) The site has approximately 127 field capacity days which provides a measure of the effect of climate on the soil water regime Crop adjusted moisture deficits are 113-114 mm for wheat and 107-108 mm for potatoes The site is unlikely to be especially frost prone or exposed

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 254 Henley-on-Thames (1980) shows most of the site to be underlain by Younger River Gravels which rest over Gault clay The area to the north-east of Rofford Hall is underlain by alluvium

2 5 Soil Survey of England and Wales Sheet 6 Soils of South East England (1983) shows the entire site as the Waterstock Association These soils are described as fine loamy gleyic argillic brown earths which tend to be seasonally waterlogged and have mottling in the subsoil

2 6 Detailed field examination of the soils indicates that there are two groups present across the site

2 7 Firstly and most extensively there are those soils whose profiles typically comprise slightly stony (ie c 2-5% v/v of small and medium flints) or occasionally stony (ie c 8-9% v/v of small and medium flints) medium sandy loam or occasionally

sandy silt loam topsoils These overlie similar textures or sandy clay loam in the upper subsoil and to depth or pass to lighter textures (loamy medium sand or medium sand) or to heavier textures (medium clay or sandy clay) in the lower subsoil between about 60 and 80 cm depth Most profiles become impenetrable (to soil auger) over gravel in a sandy matrix between 70 and 110 cm Mottling and gleying is common at depths greater than about 30 cm but profiles are not slowly permeable within 60 cm and thereby fall into wetness Class I or II

2 8 The second soil group occurs in association with the alluvial deposits towards the north-east of the site north of Rofford Hall Profiles typically comprise peaty loam or organic clay loam topsoils overlying heavy silty clay loam organic medium clay or medium clay in the subsoil Occasional profiles become impenetrable (to soil auger) over gravel or about 50 cm or pass to medium sandy loam below about 70 cm
All profiles are very poorly drained since they occur in an area of groundwater seepage and are mottled and gleyed from the surface and slowly permeable from about 10-35 cm depth

3 AGRICULTURAL LAND CLASSIFICATION

3 1 The ALC grading of the survey area is primarily determined by interactions between climate and soil factors namely wetness and droughtiness ALC grades 2 3a and 4 have been mapped and a breakdown of these grades in terms of area and extent is given below

Grade	ha	% of total agricultural land
2	16 60	72
3a	3 09	13
4	3 50	15
Total agricultural area	23 19	100
Woodland	0 62	
Total area	23 81	

3 2 Appendix 1 gives a generalised description of the grades and sub-grades identified in this survey

3 3 Grade 2

Land of this quality occupies approximately 72 % (16 6 ha) of the total agricultural land on the site
Profiles typically comprise slightly stony (c 2 5% small and medium flints v/v) or occasionally stony (c 8-9% v/v of small and medium flints) medium sandy loam or occasionally sandy silt loam topsoils These overlie similar textures or sandy clay loam in the upper subsoil and to depth or pass to medium sand loamy medium sand sandy clay or medium clay in the lower subsoil at variable depths Profiles usually become impenetrable (to soil auger) between 80 and 110 cm due to the presence of gravel in a sandy matrix
Although these soils are commonly mottled and gleyed at variable depths greater than about 35 cm they are not slowly permeable within 60 cm and are thereby assigned to wetness Class I or II
Profiles possess a minor droughtiness limitation which is due to both soil textural characteristics and only moderate depth (80-110 cm) over gravel Nevertheless a wide range of agricultural and horticultural crops can be grown on this land although yields may be slightly lower or more variable than would be the case on Grade 1 land

3 4 Grade 3a

Grade 3a land which occurs as two small mapping units occupies approximately 13 % (3 09 ha) of the total agricultural land on the site

Topsoils are typically slightly stony (c 2-5 % v/v of small and medium flints) medium sandy loam or occasionally sandy silt loams overlying similar textures or sandy clay loam in the subsoil and occasionally passing to sandy clay or medium clay below about 60 cm Mottling between about 30 and 55 cm depth and gleying between 35 and 70 cm is common but profiles are not slowly permeable within 60 cm and are thus assigned to wetness Class I or II

The presence of gravel at depths between 70 and 80 cm imposes a moderate droughtiness limitation on these soils thereby restricting them to Grade 3a

3 5 Grade 4

Land mapped as this quality occurs in the small valley lying to the north of Rofford Hall Topsoils are peaty or organic loamy resting over slowly permeable clay or silty clay subsoils which may pass into sandy or gravelly layers with depth The land is very wet due to the presence of water seepage/wet flushes

Although alluvial deposits are mapped (British Geological Survey 1980) it is believed that this area may be associated with the geological boundary between the permeable sand and gravel deposits and the underlying impermeable Gault clay

Although some drainage improvement may be possible it is considered that the constant seepage of water in this area associated with a spring line would make economic improvement unlikely Wetness Class V has therefore been ascribed to this locality on this basis The land therefore has severe limitations to agricultural use due to serious wetness problems and is appropriately included in Grade 4

4 SOIL RESOURCES

Soil Units Consideration for Restoration

4 1 Overlays accompanying the ALC map illustrate the pattern of topsoil and subsoil resources on the site It should be emphasized that this is not a soil stripping map but merely an illustration of soil resources available for restoration on the site When considering these details it is important to remember that soils were sampled to a maximum depth of 100-120 cm during survey work In some cases soil resources will extend below this depth

Two topsoil units were identified across the site

4 2 Unit 1

This unit is most extensive on the site and typically comprises about 30 cm (with a range of 23-36 cm) of dark brown or very dark greyish brown (10 yr 3/3 10 yr 4/3 and 10 yr 3/2) medium sandy loam or sandy silt loam These topsoils are commonly slightly stony (ie c 2-5 % v/v of medium angular flints) and non-cancerous to very slightly calcareous

4 3 Unit 2

This unit is found in association with the lower lying wet area to the north of Rofford Hall It typically comprises an average 19 cm (with a range of 10-35 cm) of dark grey (5 y 4/1) peaty loam or organic clay loam

Two subsoil units were identified

4 4 Unit 1

This unit occurs across most of the site and typically comprises between 38 and 97 cm (with an average depth of 70 cm) of light or dark yellowish brown yellowish brown or brown (10 yr 6/4

4/4 4/6 5/4 4/3 or 5/3) sandy clay loam medium sandy loam or sandy clay/medium clay textures Occasional profiles contain horizons of sandy silt loam loamy medium sand or medium sand Commonly profiles become impenetrable (to soil auger) over gravel in a sandy matrix at depth greater than 70 cm Although mottling and gleying is common between 35 and 70 cm depth these soils are not usually slowly permeable within 80 cm However occasional profiles are slowly permeable from 60 cm

These subsoils have moderately good structures throughout being composed of moderately well developed to well developed medium to coarse angular blocky or occasionally sub-augular blocky peds of friable consistence The soils have >0 5 % biopores throughout and are therefore permeable and relatively freely draining However occasionally subsoils pass into poorly structured sandy clay or medium clay below about 60 cm depth which is slowly permeable

4 5 Unit 2

This unit occurs to the north of Rofford Hall and is found in association with lower lying wet land The unit typically comprises about 89 cm (with a range of 40 cm to 105 cm) of dark grey grey or light yellowish brown (5 y 4/1 10 yr 5/1 and 10 yr 6/4) peaty loam or organic clay loam in the upper subsoil overlying dark gray grey or light grey (2 5 y 4/0 10 yr 5/1 10 yr 7/2 and 2 5 y 5/0) (sometimes organic) medium clay to depth or occasionally passing to light grey (10 yr 7/1) medium sand or medium sandy loam below about 60 cm Although occasional profiles become impenetrable (to soil auger) at depths greater than 50 cm the most significant characteristics of this subsoil unit is the very poor drainage status as evidence by mottling and gleying to the surface

These subsoils are believed to have a poor structure as a result of continuous groundwater seepage and consequent saturation The clay horizons in particular are very wet and had a plastic consistency at the time of survey

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SOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1980) Sheet 254 Henley-on-Thames

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 (1983) Sheet 6 Soils of South-East England

SOIL SURVEY OF ENGLAND AND WALES (1984) Bulletin 15 Soils and their use in 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