3301-039-90

STATEMENT OF PHYSICAL CHARACTERISTICS

FOXLEY FIELDS FARM
FINMERE

STATEMENT OF PHYSICAL CHARACTERISTICS

FOXLEY FIELDS FARM, FINMERE, OXFORDSHIRE

1 BACKGROUND

1 1 Approximately 42 ha of land to the west of Finmere in Oxfordshire was surveyed on 15th May 1992 in connection with proposals for mineral extraction The site is situated immediately to the south of the B4031 and is bounded to the west by a dismantled railway line

1 2 The site was surveyed using 120 cm Dutch soil augers with samples being taken at 100 m intervals on a grid basis Additional information was obtained from three soil inspection pits

Land Use

1 3 At the time of survey much of the site was in permanent pasture being grazed by sheep whilst fields to the north were in winter cereals and those to the south had been cultivated
Areas of mature deciduous woodland were present on the site Across a small area at the far north of the site the topsoil had been removed It was therefore not surveyed because of disturbance

2 PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2 1 The site is at an altitude of 120-121 m A O D and is generally flat or very gently sloping north Gradient nor altitude represent a significant limitation in terms of agricultural land quality

Climate

2 2 Estimates of climatic variables were obtained by interpolation from a 5 km grid database (Met Office 1989) for a representative location in the survey area

Climatic Interpolation

Grid Reference	SP 626 326
Altitude (m AOD)	121
Accumulated temperature (days Jan-June)	1361
Average annual rainfall (mm)	675
Field capacity days	146
Moisture deficit wheat (mm)	99
Moisture deficit potatoes (mm)	89

2 3 There is no overall climatic limitation at this locality although it should be noted that soil moisture deficits are relatively low These will affect the interaction between soil and climatic factors in terms of soil droughtiness Climatic factors also affect the interactive limitation of soil wetness

Geology and Soils

2 4 Soil Survey of England and Wales Sheet 6 (1983) Soils of South-East England indicates the presence of three soil mapping units in the vicinity of the site Towards the north of the site the Essendon association has been mapped The bulletin which accompanies sheet 6 (SSEW 1984) describes these soils as flinty coarse over clayey paleo-argillic stagnogley soils with slowly permeable subsoils They are developed in gravelly plateau and river terrace drifts overlying slowly permeable Jurassic Cretaceous and Tertiary strata Across the remainder of the site soils which have developed in chalky till (Chalky Boulder Clay) have been mapped The Ashley association is shown through the middle of the site These soils are described as fine loamy over clayey stagnogleyic argillic brown earths developed in thin loamy head over chalky till (SSEW 1984) The Ragdale association has been mapped towards the south of the site these soils being described as pelostagnogleys over chalky till (SSEW 1984)

2 5 Detailed field examination of the soils broadly confirms the existence of three main soil types similar to those identified by the Soil Survey of England and Wales

3 AGRICULTURAL LAND CLASSIFICATION

3 1 The ALC grading of the survey area is primarily determined by the interaction between climate and soil factors namely wetness and droughtiness In addition topsoil stone contents also act to limit agricultural land quality across some parts of the site ALC grades 2 3a and 3b have been mapped and a breakdown of these grades in terms of area and extent is given below

	Area (ha)	% total agricultural land
Grade		
2	24 55	66
3a	6 35	17
3b	6 35	17
Total agricultural area	37 25	100
Non-Agricultural	0 5	
Woodland	3 0	
Urban	0 5	
Not Surveyed	0 7	
Total area of site	41 95	

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 occurs across much of the site Topsoils typically comprise non-calcareous sandy clay loam medium clay loam or occasionally sandy loam or sandy silt loam textures Topsoils are variably stony containing between 2 and 20% total flints Subsoils are of similar texture although occasional profiles have heavier (heavy clay loam) lower subsoil horizons Stone contents increase with depth and most profiles become impentrable (to soil auger) as a result of stony horizons (ie 30 - 40% total stones) at varying depths between 32cm and 72 cm

Profiles are generally well drained wetness class I although occasionally evidence of impeded drainage in the form of gleying was observed below about 25-50 cm These profiles were assigned to wetness class II or III depending on the depth to gleying and slowly permeable horizons of heavy clay loam

The principal restriction to land of this quality is that of a minor droughtiness limitation All profiles are stony to varying degrees this having the effect of reducing the soil moisture reserves available for plant growth However in this locality the reduced reserves of available soil moisture resulting from the physical properties of the soil are partially offset by low values for soil moisture deficits This results in the droughtiness limitation being only a minor one

Occasional profiles are also limited by topsoil stone contents in the range 5-10% v/v > 2 cm These act to restrict the effectiveness and cost of cultivations through reduced yields and wear of farm machinary In addition a few profiles are subject to a minor wetness limitation The slow permeability of heavy clay loam horizons in the lower subsoil results in impeded water movement through the profile and the development of gleying Soil wetness may adversely affect plant growth or impose restrictions on cultivations or grazing by livestock

3 4 Grade 3a

A small area of land of this quality has been mapped across the northern part of the site

Profiles are similar in textural terms to those described above in section 3 3 but are generally more stony at shallower depths The overriding limitation is that of soil droughtiness which is caused by moderate profile stoniness in the range 20-40% flints Profiles typically become impenetrable (to soil auger) at shallow depths within 40 cm due to stony subsoil horizons which contain about 35-40% v/v flints Profiles may also be limited to sub-grade 3a as a result of topsoil stone contents in the range 10-15% v/v > 2 cm Soils mapped as land of this quality are well drained and thereby assigned to wetness class I

3 5 Grade 3b

Land of this quality has been mapped towards the south of the site It is associated with heavier more poorly drained soils which have developed over Chalky Boulder Clay Profiles typically comprise medium or heavy clay loam topsoils which are only very slightly stony (1-4% total flints) and non-calcareous These overlie similar textures in the upper subsoil and pass to gleyed and slowly permeable heavy clay loam or clay between 27 and 38 cm Profiles are only very slightly to slightly stony throughout although occasionally they may become impenetrable (to soil auger) over moderately stony horizons below 52 cm

This mapping unit is limited by wetness and workability Gleyed and slowly permeable horizons are present at relatively shallow depth in the soil profiles causing them to be assigned to wetness class IV The combination of soil wetness class climatic regime and the soil texture at this locality is likely to result in adverse effects on plant growth and impose restrictions on cultivations and/or grazing

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 emphasised 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

Three topsoil units were identified across the site

4 2 Unit 1

This unit comprises an average 27 cm of brown or dark greyish brown (10YR 4/3 10YR 5/3 or 10YR 4/2) medium sandy loam or medium sandy silt loam These topsoils are typically very slightly to slightly stony (ie 2-13% v/v of medium angular flints) and non-calcareous

4 3 Unit 2

This unit comprises an average 29 cm of dark greyish brown or brown (10YR 4/2 or 10YR 4/3) non-calcareous medium clay loam or ocasionally heavy clay loam The unit tends to be very slightly stony having about 1-5% v/v of flints in total

4 4 Unit 3

This unit occurs across the northern most part of the site and typically comprises 28 cm of brown or dark yellowish brown (10YR 4/3 or 10YR 4/4) sandy clay loam These topsoils are non-calcareous and very slightly to moderately stony (ie containing between 1 and 30% v/v total flints)

Three subsoil units were identified

4 5 Unit 1

This unit occurs across the far southern part of the site and comprises between 25 and 93 cm (with an average depth of 72 cm) of mottled and gleyed heavy clay loam or clay The predominant matrix colour is light brownish grey (2 5 Y 6/2) whilst yellowish brown (10YR 5/6 or 10YR 5/8) mottles are common Profiles are gleyed and slowly permeable within 40 cm of the surface These subsoils tend to be very slightly to slightly stony (ie 2-10% flints) although occasionally they become impenetrable (to soil auger) as a result of very stony horizons containing 35 - 40% flints The lower subsoil horizons become calcareous at depth

These subsoils have poor structures throughout being composed of weakly developed medium to coarse angular blocky peds of firm or very firm consistence The soils have <0 5% biopores and are therefore slowly permeable

4 6 Unit 2

This unit has been mapped principally across the centre of the site and is variable in nature It comprises an average 41 cm of medium/heavy clay loam or sandy clay loam tending to become heavier and/or more sandy with depth Subsoil colours range from pale brown 10YR 6/3 to brown and yellowish brown 10YR 5/3 and 5/4 Mottle colours include brownish yellow (10YR 6/6 and 6/8) and yellowish brown (10YR 5/6 and 5/8) where gleying is evident

These subsoils have variable stone contents ranging from horizons which are stoneless to those which contain about 35-40% v/v total flints, which may be impenetrable to soil auger The drainage status of these soils is also variable ranging from those which are well drained wetness class I to those where gleyed and slowly permeable horizons occur at shallow depths wetness class IV

These subsoils have moderately good structures throughout being composed of weakly developed coarse angular blocky peds which tend to become sub-aangular blocky with depth The peds are very friable and tend to be porous

4 7 Unit 3

This unit occurs towards the north of the site and comprises moderately stony shallower profiles (with an average depth of 22 cm) of sandy clay loam medium sandy loam or loamy medium sand which rest over very stony horizons which are typically impenetrable to soil auger Stone contents vary between 2 and 35% v/v total flints although more commonly horizons contain 20-30% stones Profiles typically become impenetrable (to soil auger) over very stony horizons (ie 35-40% v/v stones) below 32 cm and usually within 60 cm In general soils are well drained (wetness I or II)

These subsoils have good structures to about 80 cm when they become moderately good Within 80 cm structures comprise weakly developed medium to coarse sub-angular blocky peds of friable consistence Below 80 cm the structures are of similar size and shape but the peds become firm These subsoils are porous having >0 5% bipores and permeable although they may be slightly affected by ground water movement

June 1992

ADAS Ref 3301/039/90
MAFF Ref EL 7020

RESOURCE PLANNING TEAM
ADAS
Guildford Statutory Centre

SOURCES OF REFERENCE

- 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 [SSEW] (1983) Sheet 6 Soils of South-East England

- SSEW (1984) Bulletin 15 Soils and their use in South-East England