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**CHERWELL LOCAL PLAN
LAND AT HANWELL FIELDS
AGRICULTURAL LAND CLASSIFICATION
ALC MAP AND REPORT**

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AGRICULTURAL LAND CLASSIFICATION

1. BACKGROUND

- 1.1 An Agricultural Land Classification, (ALC), survey was carried out on approximately 90 ha of land at Hanwell Fields, north of Banbury, Oxfordshire during October 1990 and April 1992 in connection with the Cherwell Local Plan. The majority of the site was surveyed during October 1990, with a further 29 ha being surveyed in April 1992 in order to determine the quality of land affected by the possible inclusion of this site in the Cherwell Local Plan.
- 1.2 The site was surveyed using 110 cm and 120 cm Dutch soil augers with samples being taken at 100 m intervals. Soil inspection pits were examined on the sites to enable more detailed soil description.
- 1.3 The site was the subject of a reconnaissance survey in 1976 and a subsequent more detailed survey in 1982 which included only parts of the present area under consideration. The information from this later survey has been used where possible to assist in the current land classification of the site.

Land Use

- 1.4 At the time of survey, the site was principally given over to arable cropping (i.e., winter cereals, field beans or oilseed rape), with small areas of permanent pasture.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

- 2.1 The site lies between approximately 95 and 150 m AOD. The western-most part of the site is relatively flat with land falling moderately towards the east. Across the middle of the site, slopes of 5-6° were recorded, these not being sufficient to limit agricultural land quality. However, slopes of 7.5-12° were measured across a small valley along the southern boundary which do act as a limitation to land quality.

Climate

- 2.2 Estimates of climatic variables relevant to the assessment of agricultural land quality were obtained by interpolation from a 5 km grid point database, (Met. Office, 1989) for representative locations in the survey area.

Climatic Interpolations

Grid Reference:	SP453427	SP447426	SP438425
Altitude (m, AOD):	95	120	150
Accumulated Temperature (°days, Jan-June):	1390	1362	1328
Average Annual Rainfall (mm):	688	695	704
Field Capacity Days:	158	158	160
Moisture deficit, wheat (mm):	104	101	97
Moisture deficit, potatoes (mm):	95	91	86

- 2.3 The important parameters in assessing an overall climatic limitation are average annual rainfall, a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality. Although average annual rainfall, and consequently moisture deficits, are moderately low in a national context, there is no overall climatic limitation affecting the land quality of the site. However, climatic factors do interact with soil factors to influence soil wetness and droughtiness limitations.

Geology and Soils

- 2.4 British Geological Survey, Sheets 201, Banbury, (1982) and 218, Chipping Norton, (1968) shows the site to be underlain by Jurassic Lias deposits. These comprise Lias Clays and Marlstone Rock Beds. The western most part of the site is shown as Upper Lias deposits and Marlstone Rock Beds, whilst east of Hanwell Fields, Middle and Lower Lias deposits are mapped across the mid and lower slopes. A small area of Alluvium has been mapped adjacent to the stream towards the east of the site.
- 2.5 Soil Survey of England and Wales (1983) Sheet 6, Soils of South-East England, shows a range of soil associations across the site. The Wickham 2 association has been mapped across the mid and lower slopes in relation to the Middle and Lower Lias deposits whilst soils of the Banbury association are shown across the upper slopes, west of Hanwell Fields. Wickham 2 association soils are described as, 'fine loamy over clay; typical stagnogleys developed in loamy drift over Jurassic clays', (SSEW, 1984). Soils of the Banbury association are described as, 'stony, well drained fine loamy brown earths, resting on shattered ironstone at moderate depth', (SSEW, 1984).
- 2.6 Detailed field examination of the soils broadly confirms this distribution with three soil types being identified.
- 2.7 Soils associated with Marlstone Rock deposits comprise silt loam, silty clay loam or clay loam tending to become heavier with depth. Impenetrable marlstone occurs at variable depths in the profile, tending to be shallow (i.e., at 25-40 cm), in places, but more commonly deeper (i.e., an average of 70-100 cm). Profiles may be slightly to moderately stony and are well drained (wetness class I).

- 2.8 Soils associated with Middle and Lower Lias deposits comprise medium or heavy clay loam or silty clay loam topsoils overlying similar textures in the upper subsoil and passing to clay in the lower subsoil. Evidence of imperfect drainage in the lower subsoil combined with the slowly permeable nature of the clay horizons in the subsoil causes these soils to be assigned to wetness class II or III. Soils of this type are found across much of the Hanwell Fields site.
- 2.9 Soils associated with Upper Lias deposits are similar to those described in section 2.8 above, but are generally of poorer drainage status. Medium or heavy clay loam topsoils overlie gleyed and slowly permeable clay in the subsoil which becomes pure, bluish grey Lias Clay at depth. Wetness classes III and IV are assigned to these profiles.

3. AGRICULTURAL LAND CLASSIFICATION

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

3.2 The ALC grading of the survey area is primarily determined by the interaction between climate and soil factors, namely wetness and droughtiness. In addition gradient affects the land quality across a limited area of the site. ALC grades 2, 3a, 3b and 4 have been mapped and a breakdown of these grades in terms of area and extent is given below.

<u>Grade</u>	<u>Area (ha)</u>	<u>% of total agricultural land</u>
2	31.59	36
3a	24.86	29
3b	29.86	34
4	0.75	1
Total agricultural area	<u>87.06</u>	<u>100</u>
Non-agricultural	1.22	
Woodland	1.12	
Urban	0.15	
Farm Buildings	0.35	
Total area surveyed	<u>89.90 ha</u>	

3.3 Grade 2

Land of this quality occurs across the central part of the site and is associated with two different situations.

- To the west of Hanwell Fields, land of this quality occurs in association with Marlstone Rock deposits. Profiles typically comprise heavy clay loam or heavy silty clay loam topsoils resting over similar textures to depth. The soils are well drained (wetness class I) but have a slight workability limitation due to the heavy nature of the topsoils. In addition, occasional profiles become impenetrable (to soil auger) due to brashy marlstone at depths of about 58-80 cm. Such profiles are slightly droughty and their agricultural potential is thereby limited.
- To the east of Hanwell Fields across the mid-slopes of the site, and to the east of the stream, soils are derived from Middle and Lower Lias deposits. Profiles typically comprise silt loam, medium silty clay loam or medium clay loam topsoils which overlie heavier textures in the subsoil, passing from heavy silty clay loam and heavy clay loam in the upper subsoil to medium clay or silty clay in the lower subsoil. Evidence of impeded drainage in the form of gleying, (typically from 32-55 cm) is common and profiles are thus assigned to wetness class II. Wetness and workability limitations affect this land and cause it to be assigned to a maximum of grade 2.

3.4 Grade 3a

Land of this quality is found in two situations.

- The large unit of grade 3a land towards the east of the site, on the lower slopes and that in the far west adjacent to The Elms is found in association with Upper and Lower Lias deposits and the main limitation to agricultural use is wetness and workability. Profiles typically comprise medium clay loam or occasionally medium silty clay loam topsoils passing to slightly heavier clay loams in the upper subsoil and resting over slowly permeable clay or silty clay at variable depths greater than 45 cm. This causes restricted subsoil drainage as evidenced by gleying observed at about 30-45 cm from the surface. Profiles are assigned to wetness class III accordingly and are limited in their agricultural potential by wetness and workability problems.
- The small unit of grade 3a land around Hanwell Fields is limited on the basis of soil droughtiness as caused by shallow profiles resting over marlstone at about 50 cm. Medium clay loam or medium silty clay loam topsoils may be slightly stony (i.e., c. 2-9% v/v hard marlstone fragments) and typically overlie similar textures or heavy clay loam in the subsoil. Profiles become impenetrable, (to soil auger) over brashy marlstone at 50 cm, this having the effect of reducing the water available to plants from the soil, and causing a droughtiness limitation.

3.5 Grade 3b

Land is assigned to this grade on the basis of a number of limitations.

- A small area of grade 3b land in the unit at the west of the site, and the area to the north of Hanwell Fields Farm which has been mapped as Grade 3b, is limited by droughtiness due to the presence of impenetrable (to soil auger) brashy marlstone at 30-45 cm depth and moderate soil stoniness. Profiles comprise medium clay loam or silty clay loam with between 3 and 20% v/v marlstone fragments throughout and brashy marlstone at shallow depth.
- East of Hanwell Fields, the presence of a small valley feature causes some land to be downgraded on the basis of gradient. The maximum gradient recorded was 12°, but small areas fall within the range 7°-11°. In view of the difficulty this may cause to cultivation practices and the increased erosion risk a land classification of grade 3b is appropriate.
- The majority of grade 3b land is associated with poorly drained soils which have wetness and workability limitations. Profiles comprise medium or heavy clay loam or silty clay loam topsoils overlying similar textures and passing to slowly permeable clay or silty clay usually within 40 cm. Gleying is associated with this clay horizon, typically occurring from about 25-40 cm. Soils are assigned to wetness class III or more usually IV. Soil wetness problems restrict the workability, cultivation and versatility of this land.

3.6 Grade 4

A small unit of grade 4 land occurs in association with a small steep-sided valley along the southern boundary of the site. Although the soils found here were moderately well drained and deep, gradients of 11-12° were recorded and the land was assigned to grade 4 accordingly. It is to be expected that cultivation of this land would be difficult and that the erosion risk would be considerable.

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Resource Planning Team
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SOURCES OF REFERENCE

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