ROUNDHOUSE FARM, MARSTON MEYSEY, WILTSHIRE

STATEMENT OF PHYSICAL CHARACTERISTICS

1. Introduction

In May 1990, the Resource Planning Group carried out a detailed survey of the soil resources at Roundhouse Farm near Marston Meysey in Wiltshire. The survey was conducted in connection with the proposal to extract sand and gravel deposits by Greenham Construction Materials Ltd and to restore the 56 hectare site to agriculture.

A detailed Agricultural Land Classification (ALC) was undertaken to determine the land quality of the site; the soil was examined by auger, with a density of one boring per hectare, and three soil pits were described which provided detailed soil resource information, particularly for the soil ‘s structural conditions.

The distribution of the ALC grades and the location of the soil borings and soil pits are shown on the accompanying ALC and Auger Sample Point (ASP) maps. Topsoil and subsoil resources are shown on the accompanying Soil Resource maps. The maps have been produced at a scale of 1:10,000; the information is accurate at this scale, but any enlargement from the base scale would be misleading.

2. Climate

An assessment of the prevailing climate was made by interpretation from a 5 km national database for a site grid reference SU 135964 at 76 metres. The agricultural effects of overall climate are assessed by reference to the two important climatic parameters, average annual rainfall (a measure of the overall wetness of a site) and accumulated temperature (a measure of the relative warmth of a locality). The results below show that there is in fact no overall climatic limitation, and no additional local climatic factors were noted: -

Accumulated temperature:	1440º days
Average Annual Rainfall:	689 mm
Field Capacity:	156 days
Moisture Deficit, Wheat :	105 mm
Moisture Deficit, Potatoes :	97 mm

3. Geology

Borehole information supplied by the developers show that the topsoils and upper subsoils are developed over a sand and gravel mix, with clay at depth. From the point of view of agricultural restoration, where the sand and gravel contains less than 70% gravel (with rounded stones greater than 2 cm) this resource is viewed as a lower subsoil to a potential depth of 1.2 metres. Adequate structural conditions within this depth will permit root penetration in search of available moisture.

4. Agricultural Land Classification

A total of 57 auger borings and 3 soil pits ware examined. Table 1 provides details of the distribution of grades mapped

Table 1: Distribution of ALC Grades and Sub-Grades

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
3A.	44.9	78.9	82.7
3B	9.4	16.5	17.3
Non-Agric	1.6	2.8	100% (54.3 ha)
Urban	0.6	1.1	
Agric Bldgs	0.4	0.7	
Total	56.9 ha	100%	

The ALC systems provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on its use for agriculture. Classification was made according to MAFF 's revised guidelines and criteria for grading the quality of agricultural land which have been operational from 1 January 1989.

Sub-Grade 3A:

The majority of the soils on the site have been placed in this grade, with soil droughtiness as the typical single most limiting factor. Droughtiness is related to the extensive lower subsoil horizon of Loamy Coarse Sand which contains high hard stone percentages (typically 25%). The soils are, however, groundwater gleys (no slowly permeable layers within 80 cm, but gleyed within 40 cm) and there may, as a result, be a significant contribution to the profile available water from the fluctuating groundwater. Pit 1, for example, had a water table well within the top 120 cm (at 83 cm) at the time of survey (mid-May after a dry spring), together with subsoil structures that would permit root penetration to depth. The standard droughtiness calculation for this profile produces an ALC grade of 3A; this has been upgraded by a single grade to reflect the contribution of the groundwater. Pit 2 reveals a water table at a similar depth but the presence of an impenetrable layer prevents any upgrading, and the site has been placed largely within a 3A droughtiness map unit; it is accepted that there may be pockets of less droughty soils but it has not proved practicable to map these separately.

These groundwater gleys are rapidly permeable and fall into Wetness Class I (ie they are not wet within 70 cm for more than 30 days in most years) and, even where clay topsoils occur, still qualify for sub-grade 3A.

No site specific information on flooding was available. The classification is therefore based on the assumption that the winter flood risk is no greater than frequent (+1:3 years) and short (less than 48 hours).

Sub-Grade 3B:

Four such map units have been identified. All reflect poorer parts of the site where soil profiles contain thick clay horizons which are slowly permeable and which restrict the soils to Wetness Class IV.

5. Soil Resources: Topsoil

"Topsoil" includes the organic rich surface horizons which typically extended between 20-30 cm. A variety of textures occur across the site and these need to be handled separately in their workability groupings outlined in Table 2 below.

Table 2: Soil Resources, Topsoil (see accompanying map)

Map Unit	Texture	Depth (cm)	Area (ha)	Volume m^3
A	MCL/MZCL/ZL	24	18.02	43,248
B	MCL	22	2.87	6,314
C	HCL/HZCL	22	26.27	57,794
D	C	22	5.26	11,572
E	C	20	1.86	3,720

Across the site, there is a **Total Topsoil Resource available of 122,648 m^3.**

6. Soil Resources: Subsoil

“Subsoil” comprises the non—organic rich lower horizons, and may be divided into ‘upper’ and 'lower' layers.

Upper subsoil consists predominantly of clay textured horizons. Overall thickness varies slightly across the site and is reflected in Table 3 below; there is a further variation in stone content but it has not proved practicable to distinguish additional groupings. Given the heavy nature of the textures, the presence of large percentages of small stones in a sandy matrix will actually assist the drainage of the restored profile (provided there is little compaction during handling).

Table 3: Soil Resources, Upper Subsoil (see accompanying map)

Map Unit	Texture	Depth (cm)	Area (ha)	Volume (m^3)
A	C	20	42.74	85,480
B	C	40	11.54	46,160

This provides a **Total Upper Subsoil Resource available of 131,640 m^3**.

Lower Subsoil consists of a sand and gravel mix that extends to depth. The matrix is a Loamy Coarse Sand texture which typically contains 20-30% hard rounded stone. This is common across the survey area and should be excavated to 1.2 metres. Beneath Upper Subsoil map unit A this resource should extend for 70 cm (from approximately 42 to 120 cm); beneath Upper Subsoil map unit B this should extend for 56 cm (from approximately 64 to 120 cm).

Table 4: Soil Resources, Lower Subsoil (see accompanying map)

Map Unit	Depth (cm)	Area (ha)	Volume (m^3)
A	70	42.74	299,180
B	56	11.54	64,624

This provides a **Total Lower Subsoil Resource available of 363,804 m^3.**

DESCRIPTION OF THE GRADES AND SUBGRADES

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 include 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 most 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: private park land, 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.

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.

Source: MAFF (1988) Agricultural Land Classification of England and Wales (Revised guidelines and criteria for grading the quality of agricultural land) Alnwick.