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Melbourne Farm & Showell Nurseries,
Chippenham

**AGRICULTURAL LAND CLASSIFICATION**
**REPORT OF SURVEY**

Resource Planning Team
**Taunton Statutory Unit**

November 93

ADAS

# MELBOURNE FARM AND SHOWELL NURSERIES

## AGRICULTURAL LAND CLASSIFICATION AND SITE PHYSICAL CHARACTERISTICS

### Report of Survey

## 1. SUMMARY

Forty two hectares of land at Melbourne Farm and Showell Nurseries, Chippenham, Wiltshire were surveyed using the Agricultural Land Classification (ALC) System in September 1993. The survey was carried out for MAFF as part of its statutory role in connection with a planning application made to Wiltshire County Council under the Town and Country Planning Act 1990.

The fieldwork was carried out by ADAS (Resource Planning Team, Taunton Statutory Unit) at a scale of 1:10,000. The information is correct at this scale but any enlargement would be misleading. Details of the findings of the survey and the distribution of grades are detailed below.

**Distribution of ALC grades: Melbourne Farm and Showell Nurseries**

| Grade | Area (ha) | % of Survey Area | % of Agricultural Land |
|---|---|---|---|
| 1 | 8.6 | 20.5 | 22.9 |
| 2 | 12.6 | 30.1 | 33.5 |
| 3b | 16.4 | 39.1 | 43.6 |
| Urban | 0.7 | 1.7 | 100% (37.6ha) |
| TOTAL | 41.9 | 100% | |

Over half of the land surveyed was found to be of best and most versatile quality. The main limitation to the soils in the area is droughtiness caused by light textured stony subsoils.

## 2. INTRODUCTION

Forty two hectares of land at Melbourne Farm and Showell Nurseries, Chippenham, Wiltshire were surveyed using the Agricultural Land Classification (ALC) System in September 1993. The survey was carried out for MAFF as part of its statutory role in connection with a planning application made to Wiltshire County Council under the Town and Country Planning Act 1990.

The fieldwork was carried out by ADAS (Resource Planning Team, Taunton Statutory Unit) at a scale of 1:10,000 (approximately one sample point every hectare). The information is correct at this scale but any enlargement would be misleading. A total of 39 auger sample points and two soil profile pits were examined. Five soil samples were taken for particle size distribution analysis.

The published Provisional one inch to the mile ALC map of this area (MAFF 1970) shows the site to be Grade 2. Part of the area had been surveyed in 1975 but this survey was not detailed enough for the current requirements. The recent survey supersedes all the previous maps having been carried out at a more detailed level and using the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988).

These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The grading takes account of the top 120cm of the soil profile. A description of the grades used in the ALC System can be found in Appendix 2.

## 3. CLIMATE

The grade of the land is determined by the most limiting factor present. The overall climate is considered first because it can have an overriding influence on restricting land to a lower grade despite other favourable conditions.

Estimates of climatic variables were obtained for the site by interpolation from the Agricultural Climate Dataset (Meteorological Office 1989). The data are shown in Table 1.

The parameters used for assessing overall climatic limitations are accumulated temperature, (a measure of the relative warmth of a locality) and average annual rainfall, (a measure of overall wetness). Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat (MDW) and potatoes (MDP) are also shown. These data are used in assessing the soil wetness and droughtiness limitations referred to in later sections. A description of the Wetness Classes used can be found in Appendix 3.

**Table 1 Climatic Interpolation: Melbourne Farm and Showell Nurseries**

| | | |
|---|---|---|
| Grid Reference | ST 909 713 | ST 916 716 |
| Altitude (m) | 50 | 45 |
| Accumulated Temperature (deg days) | 1486 | 1491 |
| Average Annual Rainfall | 743 | 743 |
| Overall Climatic Grade | 1 | 1 |
| Field capacity (Days) | 168 | 167 |
| Moisture Deficit, Wheat (mm) | 104 | 105 |
| Potatoes (mm) | 96 | 98 |

## 4. RELIEF AND LANDCOVER

The site is generally flat except in the east where there is some sloping land associated with the small stream. The site is between 45m AOD and 50m AOD.

At the time of survey all the northern fields were under grass for grazing. Part of the large central field was being reseeded and the land at Showell nuseries was being used to grow maize.

## 5. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:63,360 scale solid and drift geology map, sheet 265 (Geological Survey of England and Wales 1965). Similarly, the soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000.

The site is predominantly covered by First Terrace gravel drift deposits. There are small areas of Kellaway Clays from the Upper Jurrasic along the stream and in the west.

The soils have been mapped as the Badsey 1 Association. These are described as well drained calcareous and non calcareous fine loamy soils over limestone gravel. The Association also includes some deep fine loamy soils and fine loamy soils over gravel affected by groundwater.

The recent surveys found the soils to be typical of the mapped Association, with variable thicknesses of soils above the stony subsoils.

## 6. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades identified in the survey area is detailed in Table 2 and shown on the accompanying ALC map. The information is correct at the scale shown but any enlargement would be misleading.

**Table 2 Distribution of ALC grades: Melbourne Farm and Showell Nurseries**

| Grade | Area (ha) | % of Survey Area | % of Agricultural Land |
|---|---|---|---|
| 1 | 8.6 | 20.5 | 22.9 |
| 2 | 12.6 | 30.1 | 33.5 |
| 3b | 16.4 | 39.1 | 43.6 |
| Urban | 0.7 | 1.7 | 100% (37.6ha) |
| TOTAL | 41.9 | 100% | |

### Grade 1

An area of Grade 1 has been mapped in the north east of the site. These soils are well drained and are Wetness Class I. The topsoil texture of these soils is medium clay loam as confirmed by particle size distribution analysis. The depth of the topsoil varies from between 20cm to 35cm. The soils are virtually stoneless except at depth and do not have a droughtiness limitation. The soils become heavier with depth and the stony horizon at depth has a heavy clay loam texture. The stone content of this horizon was measured in a soil profile pit to be 52%.

### Grade 2

Several areas of Grade 2 have been mapped. These soils are slightly droughty because there are stones in the profile which reduce the available water content. These soils have a mixture of heavy clay loam and medium clay loam topsoils. In this mapping unit there are some Wetness Class II soils but the majority are Wetness Class I. The main limitation to these soils is droughtiness.

### Subgrade 3b

There are two limitations in this mapping unit. Firstly in the east the soils are poorly drained associated with the stream. These soils have heavy clay loam topsoils which become slowly permeable clays in the subsoil. These soils are Wetness Class 111 and are Subgrade 3b. Secondly for the rest of the soils the main limitation is droughtiness. These soils are stony and light in texture in the subsoils. This reduces the water available to crops and thus the versatility of the soils. In a soil profile pit dug in this unit the stone content was measured to be 14% in the topsoil, 53% in the upper subsoils and over 70% from 70cm. The stone content of the subsoils horizons is variable and in many cases does

The stone content of the subsoils horizons is variable and in many cases does not exceed 70%. These horizons are therefore considered to be soil and contribute to the water storage capacity of the soil. These soils are generally well drained and are Wetness Class I. The topsoil texture of this unit was confirmed by particle size distribution analysis.

**Other land**

The farm tracks and pieces of woodland have been mapped as non agricultural. Part of the application area includes the A350 which has been mapped as Urban.

## 7. SOIL RESOURCES

The areas referred to can be found on the accompanying Soil Resources map.

"Topsoil" is defined as the organic rich surface horizon. A broad distinction can be made between the topsoils with medium and heavy clay loam texture: These distinct topsoils should be handled seperately as they are significantly different in terms of workability. The medium clay loams vary in depth from 20cm to 35cm but a median depth is 25cm. The structure of this topsoil is weakly developed coase subangular blocky and it is friable in consistence. The heavy clay loams are less variable and are generally 30cm deep. The topsoil structure of the heavy clay loam is smaller in size than the medium clay loam, being a weakly developed medium subangular blocky structure with friable consistence.

A total topsoil resource of 100600$m^3$ is available, distributed as shown in Table 3.

**Table 3 Topsoil Resources**

| Map Unit | Depth | Area | Soils | Volume |
|---|---|---|---|---|
| 1,2,3,7,8,9,10 | 25cm | 24.4 | MCL | 61000$m^3$ |
| 4,5,6 | 30cm | 13.2 | HCL | 39600$m^3$ |
| | | | | 100600$m^3$ |

"Subsoil" is defined as the less organic rich lower horizons.

The subsoil horizons are very variable around the site. In places the stony horizons are high in the profile, but elswhere these horizons are found much deeper, below heavier horizons. The variability is reflected in the number of soil units. Within each unit there is some soils which are more typical of other units on the site but there is insufficient volume to distinguish the soil as a seperate unit at that location.

**Unit 1** has a mixture of medium clay loam and medium sandy silt loam upper subsoils with very few stones. The colour of this horizon is typically 10YR43 with a moderately well developed coarse subangular blocky structure. The porosity is good. The lower subsoil horizons are heavier being clays and heavy clay loams. These have similar structure and porosity to the upper subsoil. At depth this unit has a stony horizon with about 50% hard stones in a heavy clay loam matrix.

**Unit 2** has a generally heavier upper subsoil, a heavy clay loam which lies above a stony heavy clay loam lower subsoil similar to the bottom horizon of Unit 1. The subsoil colours are lighter than Unit 1, 10YR54 becoming 10YR46 and 10YR56. These soils also have moderate subsoil structural condition with good porosity.

**Unit 3** is similar to Unit 2 except that the upper subsoil is stony with about 20% hard stones. The upper subsoil colour is 10YR46.

**Unit 4** has clay subsoils which have low porosity and are 10YR51 in colour. The subsoils have virtually no stones and are poorly drained.

**Unit 5** also has clay upper subsoils with 10YR46 and 56 matrix colours. These have few stones. The lower subsoil is a stony heavy clay loam matrix with about 30% stones. The colour of this horizon is 2.5Y66 and 64. These soils have moderate structural conditions.

**Unit 6** has stony subsoils in medium sandy loam and loamy medium sand textures. The stone content is variable but the upper subsoils average about 50% whilst the lower subsoil in places exceeds 70% hard rock. Whilst soil with over 70% stone is no longer technically a soil it makes a valuable contribution to the available water in the profile and is considered part of the agricultural resource at the site. The porosity of these subsoils is good and the soil is weakly developed but has good structural condition. The colours of these horizons are generally 10YR46 and 56.

**Unit 7** has heavy clay loam upper subsoils to 60cm without stones but good porosity. Below this there are clay horizons again with few stones. These soils have moderate structural condition. The colour of the heavy clay loam is 10YR43 and 54 whilst the clay is more ochreous.

**Unit 8** has a heavy clay loam upper subsoil over stony medium sandy loam and loamy medium sand. The upper subsoil has a colour of 10YR54 whilst the lower subsoil has a variable colour typical of river terrace deposits.

**Unit 9** has 10YR43 heavy clay loam over ochreous and grey clay to deep in the profile where the stony heavy clay loam horizon found in many of the units occurs. The porosity of the clays is low and they have moderate to poor structural condition.

**Unit 10** is similar to Unit 9 except that the stony horizon is in a matrix of medium sandy loam. The clays are also better structured. The colours are similar to Unit 9.

A total subsoil resource of 350600$m^3$ is available, distributed as shown in Table 4.

**Table 4 Subsoil Resources**

| Map Unit | Depth (cm) | Area (ha) | Soils | Volume ( $m^3$) |
|---|---|---|---|---|
| 1 | 25-70 | 9.0 | MSZL/MCL | 40500 |
| 1 | 70-100 | 9.0 | C | 27000 |
| 1 | 100-120 | 9.0 | HCL | 18000 |
| 2 | 25-55 | 2.9 | MCL/HCL | 8700 |
| 2 | 55-120 | 2.9 | HCL | 18850 |
| 3 | 25-40 | 2.2 | HCL | 3300 |
| 3 | 40-120 | 2.2 | HCL | 17600 |
| 4 | 30-120 | 1.9 | C | 17100 |
| 5 | 30-70 | 3.4 | C | 13600 |
| 5 | 70-120 | 3.4 | HCL | 17000 |
| 6 | 30-120 | 7.9 | MSL/LMS | 71100 |
| 7 | 25-60 | 4.5 | HCL | 15750 |
| 7 | 60-120 | 4.5 | C | 27000 |
| 8 | 25-40 | 2.8 | HCL | 4200 |
| 8 | 40-120 | 2.8 | MSL/LMS | 22400 |
| 9 | 25-60 | 1.2 | HCL/C | 4200 |
| 9 | 60-120 | 1.2 | HCL | 7200 |
| 10 | 25-60 | 1.8 | C | 6300 |
| 10 | 60-120 | 1.8 | MSL/LMS | 10800 |
| | | | | 350600 |