

35/90  
no map produced  
as land quality unchanged  
from 15/89

SOIL AND LAND CLASSIFICATION REPORT FOR RESTORED LAND AT  
WASPERTON, JANUARY 1991

1. Summary

The land has been classified following the Agricultural Land Classification of England and Wales - revised guidelines and criteria for grading the quality of agricultural land (MAFF 1988). All the land surveyed, 17.9 hectares is classified as sub grade 3b. The survey was undertaken in January 1991 when the soils were augered and pits dug to assess the soils physical characteristics.

2. Background information

The area is mapped as River Terrace deposits on geology sheet number 201, Banbury, Geological Survey.

3. Agricultural Land Use

At the time of the January 1991 survey area 1 was under oilseed rape and area 2 under grass and winter cereals.

4. Agricultural Land Classification

4.1 Climatic limitations

The main parameters used in the assessment of the climatic limitations are Average Annual Rainfall (AAR), as a measure of overall wetness and Accumulated Temperature (ATO) as a measure of the relative warmth of the locality. The figures for AAR are 615 mm and for ATO are 1446°C (January to June) indicating that there are no climatic limitations on this site.

## 4.2 Site limitations

The assessment of site factors is primarily concerned with the way in which topography influences the use of agricultural machinery and hence the cropping potential of the land. The site is almost level with only small localised hollows and ridges; these do not affect the grading of the land. The land does not appear to have a serious flooding limitation, despite its proximity to the river.

## 4.3 Soil limitations

The main soil properties which affect the cropping potential and management requirements of the land are texture, structure, depth, stoniness and chemical fertility. These may act as limitations separately, in combination or through interactions with climate and site factors. The physical limitations which result from interactions between climate, site and soil are wetness, droughtiness and erosion.

Chemical limitations are not a problem on this site. There is no reason to suspect the presence of toxic metals, and levels of major nutrients and lime are all very satisfactory. Details of soil analyses are quoted in the appendix.

The soils are typically slightly stony, sandy loams over gravelly sandy loam or loamy sand. Pockets of clay loam occur in some areas and clay tailings occur at depths below 60 cm in some profiles. Despite the mainly light texture of the soils on site, surface wetness appears to be a seasonal problem due to massive and platy structures in the subsoils especially at the northern half of area 1 and the southern half of area 2. Soil pits revealed a weak to moderately formed medium sub angular blocky structure in the topsoil and upper subsoil with a narrow (5-10 cm) massive horizon at

the top of the subsoil layer. Below 45-50 cm a mainly massive horizon greatly reduces water and root penetration.

The high stone content of the subsoils (typically 15-25% and up to 50%) coupled with the massive structure of the lower subsoil reduces rooting depth and makes the soils prone to drought.

In the ALC system the method used to assess droughtiness provides an indication of the average droughtiness based on two reference crops, winter wheat and main crop potatoes. It takes account of crop rooting and foliar characteristics to obtain an estimate of the average soil moisture balance (MB) for the reference crops at a given location. MB is calculated on the basis of two parameters - the crop adjusted available water capacity (ie the amount of water a profile can hold) and the moisture deficit (ie the difference between rainfall and potential evapotranspiration during the growing season).

## 5. Agricultural Land Quality

Both areas have been classified as sub grade 3b. Droughtiness is the main limiting factor in the classification of the land. It is caused by the light texture and stony nature of the subsoils, coupled with poor sub soil structures which together reduce the water holding capacity of the profile. The topsoil stone content was measured as being approximately 12%, with small and medium sized rounded hard stones. In the upper subsoil (35-50 cm) the stone content was in the range 18-25% and below this depth the stone content increased posing problems during pit digging using a spade and pickaxe.

The topsoil is rarely contaminated with subsoil or clay tailings except at the northern end of area 2 where pockets occur at the surface in isolated areas. There is no soil pattern limitation.

## 6. Recommendations

As previously stated, subsoil compaction was present over all the site, but was particularly noticeable in the north part of area 1 and the south part of area 2. Subsoil loosening should be carried out in dry soil conditions after harvest of the present crops in area 1 and the south part of area 2. The subsoiling direction should cross the lines of drains, and the working depth should be the maximum possible consistent with achieving good loosening. This is likely to be approximately 40 cm, and the spacing between the tines should be not more than twice the depth of working. This operation should effectively remove compaction from the upper subsoil and improve crop rooting depth and water movement to the drains. Compact layers in the lower subsoil are not easily rectified and will continue to restrict the water holding capacity of the profile.

Subsoiling of the grass field in the north part of area 2 is not recommended at present, but the opportunity to carry this out should be taken when the area is reseeded.

Soil nutrient levels are good in all areas (appendix). No lime is required and standard fertiliser applications should be made as outlined in MAFF Reference Book 209 "Fertiliser Recommendations". Savings in phosphate fertiliser should be possible for most crops because of the high soil levels present.

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## APPENDIX

### Soil Chemical Analysis

Area	pH	Phosphorus mg/l (index)	Potassium mg/l (index)	Magnesium mg/l (index)
1 North	7.4	70 (4)	240 (2)	136 (3)
1 South	7.0	86 (5)	239 (2)	61 (2)
2 North	7.2	87 (5)	244 (3)	134 (3)
2 South	6.9	82 (5)	171 (2)	91 (2)

Levels of available nutrients are quoted in milligrammes per litre of soil with the equivalent ADAS nutrient indices in brackets.

These are interpreted as

Index 0	-	very low
1	-	low
2	-	satisfactory
3 and above	-	high