

## **AGRICULTURAL LAND CLASSIFICATION**

### **NORTH WEST LEICESTERSHIRE LOCAL PLAN**

#### **SITE J13/J13b**

##### **1.0 INTRODUCTION**

1.1 An Agricultural Land Classification (ALC) survey was undertaken on behalf of MAFF in September 1995, in connection with a site included within the North West Leicestershire Local Plan.

1.2 The site J13/J13b is located to the north and east of Junction 24 of the M1 motorway and comprises two discrete triangular areas of land divided from each other by the A453T road to Nottingham. The smaller area (Site J13) comprises 16 ha of land to the east of Junction 24 of the M1, located between the A453 road to the north and the A6 to the south and bounded to the south east by the Carter Soft Drinks factory on the edge of the village of Kegworth. The larger area (Site J13b) amounting to 125.7 ha, forms a triangular area of land extending from the A453T northwards, with the M1 motorway forming the western boundary and open farmland to the north and east.

1.3 A total of 134 auger borings was made over the entire site using a dutch auger to a depth of 1.2 m unless prevented by impenetrable material. In addition, 12 soil pits representative of all the main soil variants found on the site were dug to help assess subsoil conditions in greater detail. Stone contents were also measured on the more stony soils by sieving both the topsoil and subsoil horizons, to provide information on total stone contents and also the percentage greater than 2 cm diameter.

1.4 At the time of survey the majority of the site was under arable cropping with the fields either still under stubble from the previous crops or cultivated and reseeded. Cropping was typically cereals or maize over the majority of the area

with a small area of grass ley at the northern end of the site near Warren Farm. Two areas of mixed woodland, Green Spot Wood and March Covert, are included within the larger area, together with an area of farm buildings at Warren Farm. A small public road, Warren Lane, crosses the northern end of the site from west to east.

- 1.5 On the published 1:63 360 scale provisional ALC map (MAFF, 1971) the area immediately to the north and east of Junction 24 has been mapped as grade 2, whilst the remaining land has been mapped as grade 3, with the two areas of woodland identified as Non Agricultural. The smaller area of land to the east of Junction 24 has been previously mapped in detail by MAFF in 1986, and this showed the areas as grade 2 and subgrades 3a and 3b. The majority of the larger northern area was also the subject of a previous survey by MAFF in 1982 for a proposed sand and gravel quarry and showed the area as mainly grade 2 and subgrade 3a. Since these earlier surveys, however, the ALC system has been revised (MAFF, 1988) and the previous survey data are insufficient to apply the present classification criteria.

## 2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

### Climate

- 2.1 Climatic criteria are considered when classifying land as these may have an *overriding limitation in terms of the agricultural use of the land*. The main parameters used in the assessment of the overall climatic limitations are average annual rainfall, as a measure of overall wetness, and accumulated temperature (day °C Jan-June) as a measure of the relative warmth of an area.
- 2.2 A detailed assessment of the prevailing climate for the site has been made by interpolation from the 5 km grid dataset produced by the Meteorological Office (Met. Office, 1989). The details are given in Table 1 and show that there is no overall climatic limitation affecting this site.

**Table 1 : Climatic Interpolation**

Grid Reference	SK478276	SK475290
Altitude (m)	30	30
Accumulated Temperature (Day °C, Jan-June)	1426	1426
Average Annual Rainfall (mm)	617	613
Moisture Deficit, Wheat (mm)	111	111
Moisture Deficit, Potatoes (mm)	103	104
Field Capacity (Days)	133	133
Overall Climatic Grade	1	1

- 2.3 Climatic factors, do, however, interact with soil properties to influence soil wetness and droughtiness.

#### Altitude and Relief

- 2.4 The site is relatively flat and lowlying with minor undulations occurring locally reflecting the geomorphology of the area. The altitude of the site ranges from a high of 35 m AOD adjacent to Junction 24 of the M1, falling to approximately 28 m AOD in some of the lower lying alluvial areas. The majority of the area, however, is relatively flat and lies at an altitude of approximately 30 m AOD. Slopes are very gentle over the site. Altitude and relief therefore do not impose any limitation on the agricultural quality of the site.

#### Geology and Soils

- 2.5 The published 1:50 000 scale geology map (Geol Surv. 1976) shows the northern and eastern parts of the site to comprise Alluvium, with River Terrace gravels occurring to the south and west of March Covert Woodland adjacent to the M1 motorway, all of which overlie Keuper Marls and Sandstones at depth.

- 2.6 The reconnaissance soil survey map for the area (Soil Survey, 1983) shows the site to comprise soils of the Wharfe (\*1) and Wick 1 (\*2) Associations.
- 2.7 The detailed survey carried out on the site has identified two distinct soil types, one of which occurs on the river terrace deposits and the other developed on the alluvial deposits. The soil type developed on the river terrace deposits has a number of variants which are important in terms of ALC mapping, particularly the depth to the sandy and stony lower subsoil and the stone content of the horizons above.
- 2.8 The soils developed on the river terrace deposits comprise loamy soils overlying sand and gravel. These soils typically have a dark brown medium sandy loam or sandy clay loam topsoil, approximately 30 cm deep and containing 5-10% small and medium, rounded quartzite pebbles overlying a brown, medium sandy loam or sandy clay loam upper subsoil to approximately 50/60 cm depth. The upper subsoil generally has a moderate medium or coarse subangular blocky structure with 10-20% rounded pebbles. Below this depth the lower subsoil is typically loamy medium sand or medium sand with 25-35% rounded stones and may have a banded appearance, with layers of stoneless sand. These soils occur extensively over the terrace areas of the central part of the site with the slightly lighter textures predominating towards the southern and western parts of this area. Ochreous mottling in the subsoil horizons becomes more frequent toward the eastern side of the area, with manganiferrous staining particularly evident in the lower subsoil indicating the presence of a fluctuating groundwater table. In the field to the west of March Covert, red clays (Keuper Marl) were found within 1.2 m depth in some of the profiles, but not in sufficiently large enough areas to warrant separate delineation.

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- (\*1) Wharfe Association: Deep stoneless permeable fine loamy soils developed on river alluvium. Some similar soils variably affected by groundwater.
- (\*2) Wick 1 Association: Deep well drained coarse loamy and sandy soils locally over gravel, developed on glaciofluvial or river terrace drift. Some similar soils affected by groundwater.

- 2.9 At the southern end of the site, to the south of the A453 road, a deeper variant of the soils developed on the river terrace deposits has been mapped. These soils typically have a medium sandy loam topsoil approximately 30 cm deep with 3-5% small and medium rounded pebbles overlying a medium sandy loam subsoil extending to 70/90 cm depth, with 5-15% stones. The subsoil structure is generally weakly developed medium and coarse subangular blocky and some profiles, especially toward the eastern side of the area, display ochreous mottling indicating the presence of a fluctuating groundwater table.
- 2.10 An additional variant has been mapped on the river terrace deposits which occur extensively at the northern end of the site and also on the slightly higher land to the west of March Covert Wood. These soils have a dark brown medium sandy loam or sandy clay loam topsoil approximately 30 cm deep with 5-15% small and medium rounded quartzite pebbles, overlying a gravelly (10-25%) loamy medium sand upper subsoil. Below 45/60 cm depth the texture is typically medium sand with 25-35% stones. The soils at the northern end of the site typically have manganiferous staining in the subsoil horizons indicating a fluctuating groundwater table, although this is not evident in the soils adjacent to the March Covert woodland probably due to the slightly raised ground levels in this area.
- 2.11 The second distinct soil type has been mapped on the slightly lower land associated with the alluvial deposits. These soils have a dark greyish brown heavy clay loam or clay topsoil, approximately 30 cm deep, with few small and medium rounded stones (1-2%), overlying a stoneless, grey clay subsoil with common distinct ochreous mottles and moderately developed coarse prismatic structure. In many profiles coarse textured gravelly material was encountered at depths ranging from 60-120 cm, with textures ranging from sandy clay loam to sand.

### 3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The land has been classified using the guidelines contained in the Agricultural Land Classification of England and Wales (MAFF, 1988). A breakdown of the individual grades found on the site is given in Table 2 and the definition of each grade is given in Appendix I at the end of the report.

**Table 2 : Distribution of Grades of Subgrades**

<b>Grade</b>	<b>Area (ha)</b>	<b>% of Site</b>
2	9.3	7
3a	61.6	43
3b	59.3	42
Urban	1.6	1
Non-Agricultural	1.6	1
Woodland	7.6	5
Agricultural Buildings	0.7	1
<b>TOTAL</b>	<b>141.7</b>	<b>100</b>

#### Grade 2

3.2 An area of grade 2 has been identified at the extreme south of the site which correlates with the deep coarse loamy soils developed on the river terrace deposits described in paragraph 2.9. These free draining soils have a minor droughtiness limitation. Moisture balance calculations indicate that in this relatively low rainfall area the deeper profiles will be slightly droughty for the deep rooting crops such as wheat, whilst the slightly shallower profiles will be slightly droughty for both wheat and potatoes, restricting the land to grade 2.

### Subgrade 3a

- 3.3 The areas mapped as subgrade 3a correlate with the moderately deep loamy soils developed on the river terrace deposits, described in detail in paragraph 2.8. The major limitation associated with this land is droughtiness due to the depth to the underlying sands and gravels and the stone content in the upper soil horizons, restricting the available water capacity of the soils. Moisture balance calculations indicate that these soils will be moderately droughty in this relatively low rainfall area limiting the land to this subgrade. Soil observations also indicated the presence of a minor wetness limitation in some areas due to a fluctuating groundwater table. These soils are assessed as wetness class I and II and with the relatively coarse textures that predominate wetness is not considered to limit the workability of the land.

### Subgrade 3b

- 3.4 Land which has been mapped as subgrade 3b has been restricted to this subgrade on the basis of either a wetness/workability or a moderately severe droughtiness limitation. The heavy textured alluvial soils which occur on the slightly lower areas within the site and are described in paragraph 2.11 typically have a heavy clay loam or clay topsoil over a slowly permeable clay subsoil and have been assessed as wetness class III, indicating that they will be waterlogged and intractable for considerable periods during the wetter parts of the year. Cultivations and harvesting therefore need to be carefully controlled to prevent serious structural damage occurring to the soils, thereby affecting the range of crops that can be successfully grown.
- 3.5 The other land that has been restricted to subgrade 3b comprises the areas where shallow stony soils on the river terrace deposits have been mapped. These soils, which are described in paragraph 2.10 and occur at the northern end of the site and also the west of March Covert Wood are very droughty. Moisture balance calculations indicate that as a result of the shallow depth to

the underlying sands and gravels and the relatively high stone content in the upper horizons the soils will have a low available water capacity and be very droughty in this low rainfall area, reducing crop yields substantially.

### Urban

- 3.6 Two areas of Urban Land have been mapped, the car park of the factory development at the south of the site and the public road, Warren Lane, in the north.

### Agricultural Buildings

- 3.7 An area of Agricultural Buildings has been delineated at Warren Farm at the northern end of the site.

### Non-Agricultural

- 3.8 Two areas of mixed woodland have been mapped as Non-Agricultural. In addition the farm track that runs alongside the M1 motorway together with the area of embankment where Warren Lane crosses the motorway have been identified as Non- Agricultural.

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## **REFERENCES**

**GEOLOGICAL SURVEY OF GREAT BRITIAN, 1976. Sheet 141, Loughborough, Solid and Drift edition 1:50 000 scale.**

**MAFF, 1971. Agricultural Land Classification Map. Provisional. Scale 1:63 360, Sheet 121.**

**MAFF, 1988. Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of agricultural land). Alnwick.**

**METEOROLOGICAL OFFICE, 1989. Climatological Data for Agricultural Land Classification.**

**SOIL SURVEY OF ENGLAND AND WALES, 1983. Sheet 3, "Soils of Midland and Western England". 1:250 000 scale.**

## Appendix 1

### **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 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 levels of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yield 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.