

## AGRICULTURAL LAND CLASSIFICATION

## KINGSKERSWELL BYPASS, DEVON

## Report of survey

## 1.0 INTRODUCTION

## 1.1

There are two sites which are being considered in the context of the Kingskerswell Bypass as possible junctions. The survey work was completed on behalf of MAFF as part of its statutory input to the planning procedure. ADAS' Bristol based Resource Planning Team carried out a detailed Agricultural Land Classification (ALC) survey of the site in December 1992 at a boring density of approximately one per hectare. These borings were supplemented by two soil inspection pits in order to assess subsoil conditions.

## 1.2

On the published ALC Map sheet No. 188 (MAFF 1973) the northern half of the northern site is mapped as Grade 4; the southern half as Grade 3. The southern site is mapped as predominantly Grade 3 with some Grade 4 to the south-east of the site. The current survey was undertaken to provide a more detailed representation of the agricultural land quality using the Revised Guidelines and Criteria (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.

## 1.3

The proportion of ALC grades are shown in the tables below and are illustrated on the accompanying maps. A description of the grades used in the ALC system can be found in Appendix 1.

Table 1 Distribution of ALC grades: Northern site

| Grade | Area<br>(ha) | % of Survey<br>Area | % of Agricultural<br>Land |
|-------|--------------|---------------------|---------------------------|
| 3A    | 7.9          | 31.3                | 36.1                      |
| 3B    | 13.4         | 53.2                | 61.2                      |
| 4     | 0.6          | 2.4                 | 2.7                       |
| Urban | 3.3          | 13.1                | 100% (21.9 ha)            |
| TOTAL | 25.2         | 100%                |                           |

**Table 2 Distribution of ALC grades: Southern site**

| Grade     | Area<br>(ha) | % of Survey<br>Area | % of Agricultural<br>Land |
|-----------|--------------|---------------------|---------------------------|
| 3B        | 14.1         | 46.1                | 75.0                      |
| 4         | 4.1          | 13.4                | 21.8                      |
| 5         | 0.6          | 2.0                 | 3.2                       |
| Non Agric | 3.5          | 11.4                | <u>100%</u> (18.8 ha)     |
| Urban     | 8.2          | 26.8                |                           |
| Farm Bdgs | 0.1          | 0.3                 |                           |
| TOTAL     | 30.6         | 100%                |                           |

## 2.0 CLIMATE

### 2.1

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 lower grades despite other favourable conditions.

### 2.2

Climatic data for the site was interpolated from the published Agricultural Climate Dataset (Meteorological Office 1989). The parameters used for assessing climate are accumulated temperature, (a measure of the relative warmth of a locality) and average annual rainfall, (a measure of overall wetness). The results shown in Table 3 indicate that there is no climatic limitation at either the northern or the southern site.

**Table 3 Climatic interpolations: Kingskerswell**

|                                 | Site: Northern | Southern |
|---------------------------------|----------------|----------|
| Grid Reference                  | SX876690       | SX889666 |
| Height (m)                      | 10             | 85       |
| Accumulated Temperature ( days) | 1600           | 1515     |
| Average Annual Rainfall (mm)    | 937            | 1021     |
| Overall Climatic Grade          | 1              | 1        |
| Field Capacity (Days)           | 195            | 206      |
| Moisture Deficit, Wheat (mm)    | 106            | 91       |
| Potatoes (mm)                   | 99             | 81       |

### 2.3

No local climatic factors such as exposure were noted in the survey area. Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat (MDW) and potatoes (MDP) are also shown. This data is used in

assessing the soil wetness and droughtiness limitations referred to in Section 5.

### 3.0 RELIEF

#### 3.1

The northern survey area occupies an undulating valley floor of 15-20 m AOD. The southern part of the site rises to 35m AOD, and here steep slopes impose Subgrade 3B and Grade 4 limitations.

#### 3.2

The survey area to the south of Kingskerswell occupies a narrow steep sided valley. Land rises from 30m AOD to a maximum altitude of 85m AOD. All but a small area of land north of the A3032 has slopes greater than 7 degrees, restricting the land to Subgrade 3B or worse.

### 4.0 GEOLOGY AND SOILS

#### 4.1

The published 1:50,000 scale solid and drift geology map, sheet 339, (Geological Survey of England and Wales 1976) shows the majority of the northern site to be underlain by Marine and Estuarine Alluvium, with some Bovey Formation deposits to the north-east of the site and Watcombe Breccia and Upper Green Sand to the south-west of the site. The southern site is underlain by Watcombe Breccia with a strip of Marine and Estuarine Alluvium south of the railway line.

#### 4.2

The Soil Survey of England and Wales mapped the soils of the area in 1983, at a reconnaissance scale of 1:250,000. This map shows the south-west corner of the southern site to be of the Denbigh 1 Association\* and the remaining soils to be of the Withnell 1 Association\*\*. The southern site is comprised entirely of the Denbigh 1 Association. During the recent field survey a single soil type was identified, although depth of profiles and stone contents varied.

---

\* Denbigh 1 Association - well drained fine loamy and silty soils over rock. Some similar soils with slowly permeable subsoils. Bare rock and shallow soils locally.

\*\* Withnell 1 Association - well drained loamy soil over sandstone, usually on steep slopes. Some fine loamy soils with slowly permeable subsoils.

4.3

Soils comprise medium and heavy clay loam and occasionally clay topsoils over slightly stony clay and heavy clay loam subsoils. Similar textured soils on the lower slopes comprised stonier upper subsoils (44% hard rock between 30-60 cm) below which there was more than 70% hard rock. Stone percentages were determined by sieving horizon samples, and calculating volumetric displacement by the stones in water.

## 5.0 AGRICULTURAL LAND CLASSIFICATION

5.1

The distribution of ALC grades identified in the survey area are detailed in Section 1 and are shown on the accompanying ALC map. The information is correct at the scale shown but any enlargement would be misleading.

### Subgrade 3A

5.2

Land graded 3A corresponds to the gentler slopes on the northern site. Soils are free draining however, the heavy clay loam topsoil and high Field Capacity days imposes a moderate workability limitation on the land. Consequently the land is graded 3A.

### Subgrade 3B

5.3

There are three reasons for land graded 3B. Firstly, soils in the valley floor correspond to the heavier textured stone free profiles described in paragraph 4.3. These soils are gleyed and slowly permeable within 40cm depth indicating a moderately severe wetness limitation (Wetness Class IV) which combined with medium clay loam topsoils restricts the land to Subgrade 3B. Secondly, soils on the lower slopes of the southern site comprise relatively high topsoil (18% small stones) and subsoil (44% small and large stones) stone contents. These high stone contents and in places shallow soils impose a moderately severe droughtiness limitation. Thirdly, land on the valley sides which has a slope of 7-11 degrees is restricted to Subgrade 3B due to the limited range of agricultural machinery which can be used safely.

Grades 4 and 5

5.4

All land graded 4 and 5 corresponds to the steep slopes situated on the valley sides. These have gradients of over 11 and 18 degrees respectively. This land has an increased risk of soil erosion and is unsuitable for the safe operation of the machinery used in soil cultivation and crop harvesting.

Non-Agricultural Land and Urban Land

5.5

The land mapped as non-agricultural includes derelict land and a small orchard. The urban land corresponds to the road and rail routes which cross the sites, a garden centre and industrial area in the southern site.

December 1992

Resource Planning Team  
ADAS  
Bristol

## REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1976). Solid and Drift edition. Sheet 339 Newton Abbot, Provisional 1:50,000 scale.

MAFF (1973). Agricultural Land Classification Map sheet 188 Provisional 1:63,360

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

METEOROLOGICAL OFFICE (1989). Published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office.

SOIL SURVEY OF ENGLAND AND WALES (1983). Sheet 5 Soils of South West England 1:250,000 scale.

## APPENDIX

### DESCRIPTION OF THE GRADES AND SUB-GRADES

#### 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 moist 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 parkland, 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.