

DAWLISH.99**AGRICULTURAL LAND CLASSIFICATION SURVEY****CONTENTS**

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DAWLISH. 99

AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 386 ha of land at Dawlish, Devon. Field survey was based on 171 auger borings and 8 soil profile pits, and was completed in February 1999. During the survey 10 samples were analysed for particle size distribution (PSD).
2. The survey was conducted by the Resource Planning Team of FRCA Western Region on behalf of MAFF in its statutory role in the preparation of Teignbridge Local Plan.
3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. The published regional ALC map (MAFF 1977) shows the site at a reconnaissance scale as mainly Grades 1 and 2 with Grades 3 and 4 on the steeper slopes. Only a small part of the site had been surveyed previously (ADAS 1985) but this is now occupied by the school opposite Gatehouse Farm. Both the published regional ALC map and the 1985 survey were compiled according to guidelines which are no longer current whereas the current survey uses the Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (MAFF 1988) and therefore supersedes any previous ALC survey. Grade descriptions are summarised in Appendix I.
4. Several small surveys have previously been carried out on small plots of land around the periphery of the current site. Three sites collectively known as Dawlish North (ADAS 1993) all show Subgrade 3a with loamy medium sand topsoil confirmed by two PSD analyses. Of the two sites known as Dawlish South (ADAS 1993) one is shown as Subgrade 3b limited by gradient and other is shown as Subgrade 3a limited by droughtiness. This was confirmed by a soil pit which had medium clay loam topsoil texture confirmed by PSD analysis. All these sites are compatible with the current survey. However, the previous survey at Shutterton Bridge (ADAS 1992) shows mainly Grade 1 with some Grade 2. This survey has one pit with topsoil texture confirmed as medium sandy loam but the stone contents measured at the pit indicate Grade 2 limited by droughtiness. The current survey also shows *Grade 2 limited by droughtiness* adjacent to the 1992 site, which tends to agree with the pit of the 1992 survey if not the substantial areas of Grade 1.
5. At the time of survey land cover was mainly cereals with grass for mixed grazing, particularly in the steeper slopes, some oilseed rape and an active horticultural enterprise within the grounds of Langdon Hospital where the cultivated fields were found to be intimately mixed with the hospital buildings and amenity grass. Other land which was not surveyed included the Langdon Hospital site, residential land, woodland, two schools and occasional farm buildings.

SUMMARY

6. The distribution of ALC grades is shown on the accompanying 1: 15 000 scale ALC map. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas. Areas are summarised in the Table 1.

Table 1: Distribution of ALC grades: Dawlish 99

Grade	Area (ha)	% Surveyed Area (313.3 ha)
2	77.6	25
3a	122.5	39
3b	85.2	27
4	25.3	8
5	2.7	1
Other land	72.3	
Total site area	385.6	

7. This shows that 64% of the area was found to be best and most versatile. This is mainly Grade 2 limited by droughtiness on sandy soils in the north of the site with Subgrade 3a particularly in the centre and south of the site where more stony soils are found, but again the primary limitation was found to be droughtiness. Other land was found to be mainly Subgrade 3b and Grade 4 limited by gradient on the steeper slopes mainly in the centre and south of the site.

8. Although this indicates that much of the site is good quality agricultural land, compared to the previous published regional ALC map, the current survey shows no Grade 1 and a considerably reduced area of Grade 2. This is mainly because the current survey uses the Revised Guidelines for ALC, in particular the criteria for assessment of restrictions due to droughtiness which reflect the limitations imposed by stone contents and the lighter sandy soil textures.

CLIMATE

9. Estimates of climatic variables for this site were derived from the published agricultural climate dataset "Climatological Data for Agricultural Land Classification" (Meteorological Office, 1989) using standard interpolation procedures. Data for key points around the site are given in Table 2 below.

10. Since the ALC grade of land is determined by the most limiting factor present, overall climate is considered first because it can have an overriding influence by restricting land to a lower grade despite more favourable site and soil conditions. Parameters used for assessing overall climate are accumulated temperature, a measure of relative warmth and average annual rainfall, a measure of overall wetness. The results shown in Table 2 indicate that there is no overall climatic limitation.

11. Climatic variables also affect the ALC grade through interactions with soil conditions. The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes, which are compared with the moisture available in each profile in assessing soil droughtiness limitations. These are described in later sections.

Table 2: Climatic Interpolations: Dawlish 99

Grid Reference	SX 968 791	SX 957 773	SX 959754
Altitude (m)	10	85	25
Accumulated Temperature (day °C)	1593	1509	1578
Average Annual Rainfall (mm)	883	930	874
Overall Climatic Grade	1	1	1
Field Capacity Days	182	189	182
Moisture deficit (mm): Wheat	107	95	104
Potatoes	101	86	97

RELIEF

12. *Altitude ranges from 10 metres at Shutterton Lane in the north of the site to 90 metres at Holcombe Farm in the south of the site. Slopes in the north of the site are mainly gentle to moderate and therefore not limiting to ALC but south of Langdon Road steeper slopes are frequently found which limit the land to Subgrade 3b, Grade 4 and even small areas of Grade 5 in the valley between Dawlish and Holcombe.*

13. Soil erosion is known to be a significant problem on the lighter soils of the Bridgnorth series. At the time of survey one field which apparently had been reseeded with an over-firm seedbed was badly rilled virtually from the top of the field and with wash accumulating at the bottom where it also caused a problem on the road below. Another farmer who grows winter cereals regularly claims to have the measure of the problem with single pass seedbed preparation which leaves a deep loose cultivated layer capable of absorbing normal rainfall. Overall, the severity of the consequences of erosion on the Bridgnorth series, particularly where the topsoil is a finer sandy loam may be sufficient limitation to preclude it from Grade 1. Perversely it is the local areas with fine sandy loam textures which have higher available water contents and therefore do not suffer the minor droughtiness limitation which downgrades the slightly coarser soils in the same area to Grade 2, which are most susceptible to erosion.

GEOLOGY AND SOILS

14. The underlying geology of the site is shown on the published geology map (IGS, 1976) as mainly *Dawlish Sandstone in the north of the site with Teignmouth Breccia to the south of the Langdon Road. The published map also shows a small patch of Dawlish Breccia at the top of the hill above Langdon Hospital. This was all borne out by the current ALC survey which found the Dawlish Sandstone to be mainly limited by droughtiness primarily due to the lighter textures within the soil profile and the Teignmouth Breccia to be limited by droughtiness primarily because of its stone content. However both areas were found to be*

variable both in terms of texture and stone content. The Dawlish Breccia perhaps suffered in both respects having lighter textures through the profile and also higher stone contents.

15. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW 1983) as Bridgnorth association to the north of the Langdon Road and Crediton association to the south. Bridgnorth association is described as comprising well drained sandy and coarse loamy soils over soft sandstone with occasional deeper soils and presenting the risk of water and wind erosion. The Crediton Association is described as comprising well drained gritty reddish loamy soils over breccia, locally less stony. This was based on the earlier more detailed survey of soil series in the Exeter District (SSEW 1972) which basically shows Bridgnorth series to the north and Crediton series to the south but with small areas of other minor soil series. This was largely confirmed by the current ALC survey, although this also found that the localised breccia deposits within the area of Bridgnorth series were of considerable significance to ALC grade, but these had not been distinguished as a separate soil series.

AGRICULTURAL LAND CLASSIFICATION

16. The distribution of ALC grades found by the current survey is shown on the accompanying 1: 15 000 scale map and areas are summarised in Table 1. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas.

Grade 2

17. The area shown as Grade 2 was found in the north of the area where the SSEW shows Bridgnorth soil series. These soils had mainly medium sandy loam topsoil textures at Wetness Class I. This is illustrated by Pits 1, 3 and 4 where Pit 1 shows only slight stone content in the topsoil, Pit 3 shows moderate stone content in the topsoil and extending into the middle subsoil while Pit 4, which is located on the edge of the breccia deposits, shows moderate stone content extending from the topsoil and throughout the profile. All stone contents were measured by sieving a sample from each horizon at each pit. While Pits 3 and 4 were both assessed as Droughtiness Grade 2, Pit 1 was found to be Droughtiness Grade 1 partly because of its lower stone content but also because Horizon 2 from 28 to 77cm was assessed as fine sandy loam texture. This is typical of several borings in the north of the survey area which as described above should be restricted to Grade 2 because of the slight risk of erosion.

Subgrade 3a

18. Within the north site the area shown as Subgrade 3a is mainly limited by droughtiness, although borings were found to be variable and the area shown as Subgrade 3a includes several Grade 2 borings and also several Subgrade 3b borings. A typical Subgrade 3a profile is illustrated by Pit 6 which found moderate stone contents in the topsoil and upper subsoil, becoming very stony in the lower subsoil, with medium sandy loam topsoil at Wetness Class I. Subsoil textures throughout the area were found to be highly variable ranging from sand to sandy clay in narrow horizons with a profile which would not be repeated at another boring only a short distance away.

19. To the south of the Langdon Road the area shown as Subgrade 3a was also found to be limited by droughtiness with frequently sandy clay loam topsoil at Wetness Class I. This is illustrated by Pit 8 which was also moderately stony in the topsoil and upper subsoil and very stony in lower subsoil. However, topsoil textures were found to be variable with other profiles showing medium sandy loam topsoil textures such as those illustrated by Pits 6 and 7. However profiles in the area were generally moderately stony indicating an almost universal droughtiness limitation to Subgrade 3a. Pit 7 is included in the area of Subgrade 3a even though it was assessed as marginal Droughtiness Grade 2.

Subgrade 3b

20. Much of the area shown as Subgrade 3b was found to have a primary limitation due to gradient with slopes of 8-11 degrees, particularly in the south of the survey area.

21. North of the Langdon Road, several auger borings were assessed as Subgrade 3b due to droughtiness mainly caused by light textures through the profile. These are illustrated by Pits 2 and 5 which both found loamy medium sand over medium sand, and soft sandstone rock was found in Pit 5. Whereas Pit 5 was considered to be an isolated shallow profile and was therefore included within the area shown as Subgrade 3a, Pit 2 represents several borings in that area which were found to be similar.

22. Other small areas shown as Subgrade 3b were found to be primarily limited by wetness such as at ASP 23, ASP 49-72 and around ASP 150-152.

Grade 4

23. The larger areas of Grade 4 found in the south of the survey area are limited by gradient with slopes of 12-18 degrees whereas the two small areas of Grade 4 in the north of the site were found to be severely limited by wetness.

Grade 5

24. The small areas of Grade 5 shown in the south of the site represent the steepest slopes on the sides of one valley where gradients were recorded up to 22 degrees.

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APPENDIX I

DESCRIPTION OF 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.

Source: MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land, MAFF Publications, Alnwick.

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile.

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years.

Wetness Class II

The soil profile is wet within 70 cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but not wet within 40 cm depth for more than 30 days in most years.

Wetness Class III

The soil profile is wet within 70 cm depth for 91-180 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31 and 90 days in most years.

Wetness Class IV

The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.

Wetness Class V

The soil profile is wet within 40 cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years.

Notes: The number of days specified is not necessarily a continuous period.

'In most years' is defined as more than 10 out of 20 years.

Source: Hodgson, J M (Ed) (1997) Soil Survey Field Handbook. Soil Survey Technical Monograph No 5, Silsoe.