8FCS 3315

WEST DORSET LOCAL PLAN: EASTERN AREA CONSULTATION
AGRICULTURAL LAND CLASSIFICATION

REPORT OF SURVEY

1. Introduction

In October, 1989, a detailed Agricultural Land Classification (ALC) survey was carried out over a total of six sites covering 178.8 hectares. The surveys were requested as part of MAFF's input to the West Dorset Local Plan: Eastern Area Consultation.

The fieldwork was conducted by the Resource Planning Group at an approximate auger sampling density of one boring per hectare. Land around the following areas was surveyed:-

Crossways	(52.2 ha)
Puddletown	(21.7 ha)
Maiden Newton	(32.8 ha)
Winterbourne Abbas	(27.2 ha)
Osmington	(24.1 ha)
Chickerell	(20.8 ha)

The ALC system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long term limitations on its use for agriculture. The distribution of grades for each site is detailed below and illustrated on the accompanying ALC maps at a scale of 1:10,000. The information is accurate at the scale shown, but any enlargement of the maps would be misleading.

2. Climate

Estimates of important climatic variables were obtained for each of the sites by interpolation from a 5 km grid database in order to assess any overall climatic limitation. The results for each site are given separately below.

The important parameters for assessing an overall climatic limitation are accumulated temperature and average annual rainfall. Accumulated temperature is a measure of the relative warmth of a locality and averge annual rainfall is a measure of overall wetness.

The prevailing climate also affects the ALC in these localities through soil droughtiness and soil wetness, and local climatic factors such as exposure are also significant.

3. **Crossways**

Table 1: Distribution of ALC Grades, Crossways

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
2	37.6	72.1	74.8
3A	1.8	3.4	3.6
3B	6.5	12.5	12.9
4	4.4	8.4	8.7
Non Agric	1.9	3.6	
	52.2 ha	100%	100% (50.3ha)

Land to the north and south of the village of Crossways was surveyed. A total of 49 auger borings and 4 soil pits were examined. Altitudes range from 50-55 metres and the topography is flat to gently sloping. A minor dry valley feature runs south/north through the northern section and cuts through a slight shoulder feature.

The site is underlain by deposits of gravel which have given rise to soil profiles with high percentages of flint throughout and which affect the grading in limiting the available water in the profile and in causing high topsoil stone contents.

Table 2: Climatic Interpolation, Crossways

Grid Reference	:	SY770890
Altitute (m)	:	55
Accumulated Temperature (° days)	:	1519
Average Annual Rainfall (mm)	:	958
Field Capacity (days)	:	194
Moisture Deficit, Wheat (mm)	:	100
Moisture Deficit, Potatoes (mm)	:	92

The majority of the site has been placed in **Grade 2.** The soils are typically deep medium sandy silt loams (which may become medium sandy loams at depth) with topsoil stone contents less than 10% and no evidence of soil wetness. The soils are limited to Grade 2 because both the topsoil stone contents and available water in the profile preclude them from Grade 1. The available water is limited by the sandier nature of the subsoil and the increased presence of hard flint stones.

Areas of **sub-grades 3A and 3B** have been identified where the topsoil stone contents are locally above 10% and 15% respectively; four stoniness assessments were made throughout the site.

An area of **Grade 4** land has been mapped in the south-west and delimits an area that has been mined and restored. The field is now several feet below the surrounding land, and is without topsoil. The soil that has been replaced has high surface stone contents.

4. **Puddletown**

Table 3: Distribution of ALC Grades, Puddletown

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
3A	10.8	49.1	49.8
3B	10.9	49.5	50.2
Non Agric	0.3	1.4	
	22.0 ha	100%	100% (21.7 ha)

Land on the north-western fringe of Puddletown was surveyed, and a total of 23 borings and 1 soil pit were examined and 2 stoniness assessments made. The survey area includes the alluvial floodplain of the River Piddle at approximately 55 metres, and the higher Plateau Gravel land to the north which extends to a height of 75 metres. The Geology Map, Sheet 328, also shows Upper Chalk along the extreme eastern and southern fringes.

Table 4: Climatic Interpolations, Puddletown

	Location 1	2
Grid Reference	SY760951	SY755946
Altitude (m)	75	60
Accumulated Temperature (° days)	1494	1511
Average Annual Rainfall (mm)	1007	999
Field Capacity (days)	202	200
Moisture Deficit, Wheat (mm)	93	96
Moisture Deficit, Potatoes (mm)	83	86

The alluvial floodplain area has been classified as **Sub-grade 3B** as a result of a significant soil wetness problem. These deep organic soils, typically medium sandy silt loams show clear evidence of gleying from the surface but lack a slowly permeable layer within the top 80 cm. The evidence of wetness appears to result from a local groundwater table problem. At the time of survey the soils where damp throughout the profile despite the dryness of the preceeding months, and have been placed in an estimated wetness class of IV the soil profile is wet within 70 cm depth for more than 6 months but not wet within 40 cm for more than 7 months: (ie Table 11, Revised ALC Guidelines). The microrelief of the floodplain has been modified to produce a broad ridge and furrow system to assist the drainage on the ridges but has produced localised areas of very poor drainage with waterlogged and poached surfaces at the time of survey.

The majority of the gravel land has been placed in **Sub-grade 3A.** Here, these deep profiles show no evidence of soil wetness (WC I) but are limited to 3A as a result of topsoil stone contents in excess of 10% (by volume). Two ridge tops in the north of the area are mapped as sub-grade 3B and delimit areas where the topsoil stone contents significantly increase and where gradient becomes a locally limiting factor.

5. **Maiden Newton**

Table 5: Distribution of ALC Grades, Maiden Newton

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
3A	21.3	64.9	66.4
3B	8.1	24.7	25.2
4	2.7	8.2	8.4
Non Agric	0.7	2.2	———
	32.8 ha	100%	100% (32.1 ha)

The survey area for Maiden Newton included a total of 32.8 hectares comprising a number of agricultural blocks of land on the northern and southern edges of the village. Two soil pits and 36 auger borings were examined.

The majority of the site occupies the floodplains of the Rivers Frome and Hooke. Here, the soils have developed over Upper Greensand. The higher land to the south and north is underlain by Lower Chalk. This difference in geology is reflected in the relevant soils that have developed in each area and is further reflected in the differing physical limitations that prevail.

Altitudes vary between 130 and 90m and, as a result, two climatic interpolations were calculated for the site.

Table 6: Climatic Interpolations, Maiden Newton

	Location 1	Location 2
Grid Reference :	SY601974	SY596973
Altitude (m) :	91	125
Accumulated Temperature (° days) :	1478	1440
Average Annual Rainfall (mm) :	1046	1058
Field Capacity (days) :	208	210
Moisture Deficit, Wheat, (mm) :	85	81
Moisture Deficit, Potatoes (mm) :	71	66
Overall Climatic Grade :	I	II

Both interpolations are in fact borderline climatically between Grades 1 and 2, with the land above approximately 125 metres suffering a slight climatic limitation. However, both site and soil factors are more important in the grading process and, as a result, no Grade 2 land has been identified on the ALC map.

The majority of the lowlying floodplain has been classified as **Sub-grade 3A.** Two factors are critical to the final grade - flooding and degree of soil wetness. As regards the incidence of flooding, only verbal information has been obtained from the local water authority; experience suggested that winter flooding should be classified as "frequent" (more than once in three years) in occurence and "short" (not more than 2 days) in duration. This immediately places a 3A site limitation on the area (see Table 3, Revised ALC Guidelines).

The previous incidence of summer flooding would not cause further downgrading.

As regards the degree to which these floodplain soils suffer from a wetness limitation, no local dipwell information is available. These sandy soils show clear evidence of gleying throughout the profile. This observed wetness is not caused by the presence of slowly permeable layers within the top 80 cms but results from a combination of factors:-

(a) periods when the river channel is at bank-full capacity, causing impeded drainage and waterlogging throughout the floodplain and

(b) the movement of water down through the surrounding higher Chalk land into the Greensand floodplain below.

Given the degree of mottling and pale matrix colours observed consistently in the field it is believed that these soils can at best be placed no higher than Wetness Class III ("if there is no slowly permeable layer within 80 cm depth, the soil profile 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," Table II, Revised ALC Guidelines). Given this preferred wetness class, the soils are limited to sub-grade 3A at the prevailing Field Capacity value (208 days) as a result of the sandy silt loam and medium clay loam topsoil textures.

Parts of the floodplain land in the south and north have been further downgraded to **Sub-grade 3B** where the soil wetness appears to be at least one degree worse than elsewhere or where the local microrelief is a more limiting factor. In the extreme north an area of **Grade 4** has also been identified. This is an extremely wet site which is affected by heavy topsoil textures and shallow slowly permeable layers. The land use reflects this as the area appears abandoned and is now rush-infested with even the course of previous surface drains blocked by wet vegetation.

Soil pit number two is typical of the soils developed over the Chalk geology on the higher land to the south. These soils are affected most by soil workability and have been placed within **Sub-grade 3A.** Topsoil textures, typically, are heavy clay loams with subsoil horizons of well-drained clay; the soils are placed in Wetness Class I or II.

Two areas in the south of the site and one in the north have been downgraded to **Sub-grade 3B** where the gradients are locally limiting.

6. Winterbourne Abbas

Table 7: Distribution of ALC Grades, Winterbourne Abbas

Grade	Area (ha)	% of Survey/agricultural Area
3A	11.7	43.0
3B	11.4	41.9
4	2.1	7.7
5	2.0	7.4
	27.2 ha	100%

A total of 27.2 hectares were surveyed in two agricultural blocks to the north of the village. One soil pit and 17 auger borings were examined and two stoniness assessments were made.

Upper Chalk is the common formation for the area and affects the grading through the degree of soil development and the degree of stoniness. Climatic and site factors are also relevant in determining the final grade. The survey areas occupy the south-facing slopes of this chalkland topography where altitudes range between 100-140 metres. Given this range in altitude, two climatic interpolations were calculated.

Table 8: Climatic Interpolations, Winterbourne Abbas

		Location 1	Location 2
Grid Reference	:	SY615905	SY620909
Altitude (m)	:	100	135
Accumulated Temperature (° days)	:	1471	1431
Average Annual Rainfall (mm)	:	1003	1032
Field Capacity (days)	:	201	205
Moisture Deficit, Wheat (mm)	:	90	84
Moisture Deficit, Potatoes (mm)	:	78	71
Overall Climatic Grade	:	I	II

The interpolations reveal that an overall climatic limitation does affect the higher altitudes in the survey area. However, other local climatic factors, and site and soil limitations further downgrade the land. As a result, Sub-grade 3A is the highest grade found in the site.

The 3A land is found on the crest top locations. Soil Pit No 1 is typical of these 3A profiles. The soils are well-drained medium silty clay loams developed over Chalk with topsoil stone contents less than 10% (by volume; mostly flint). The soils are limited by the depth of their profiles mostly becoming impenetrable in the Chalk between 30-45 cm. Evidence of wind pruning highlights the effect of strong winds from the south and south-west, creating an exposure risk which confirms the 3A grading by excluding the more sensitive horticultural crops.

The majority of the 3B land has been downgraded as a result of locally limiting gradients. These slopes are often associated with flinty shoulders in the chalk where topsoil stone contents exceed 15%. The valley bottom feature in the south-west of the western agricultural block is downgraded to 3B despite its deeper and well-drained heavy clay loam subsoils. Here, topsoil stone contents are greater than 15% for stones > 2 cm, and greater than 10% for stones > 6 cm, as a result of movement down from the steeper slopes on the valley sides.

The map units of Grade 4 and 5 delimit areas of very steep slopes.

7. Osmington

Table 9: Distribution of ALC Grades Osmington

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
3A	2.0	8.3	9.0
3B	6.2	25.7	27.8
4	14.1	58.6	63.2
Non-Agric	0.8	3.3	100% (22.3 ha)
Farm Buildings	0.9	3.7	
Urban	0.1	0.4	
	24.2 ha	100%	

A total of 24 hectares was surveyed on the southern and eastern fringes of the village. One soil pit and 25 auguer borings were examined.

The site mostly occupies the north-facing slopes of Osmington Hill, the inland slopes of the main coastal ridge. The topography is gently sloping but gradients are locally significant around one valley feature that cuts northwards to the village. The geology around this valley feature is complex, with Upper Greensand and Portland Sand occurring. Elsewhere to the west the soils are developed over Middle Purbeck. Altitudes vary between 107 and 75 metres and two climatic interpolations have been calculated.

Table 10: Climatic Interpolations, Osmington

	Location 1	Location 2
Grid Reference :	SY720827	SY728829
Altitude (m) :	107	75
Accumulated Temperature (°days) :	1465	1501
Average Annual Rainfall (mm) :	942	910
Field Capacity (days) :	189	185
Moisture Deficit, Wheat (mm) :	97	102
Moisture Deficit, Potatoes (mm) :	87	94
Overall Climatic Grade :	1	1

The local climatic factor of exposure is significant throughout the site and particularly along the higher southern fringe. This land on the brow of Osmington Hill is open to the full impact of strong and constant winds from the south and south-west which blow direct from the sea and are therefore salt-laden. There is clear evidence of windpruning of both trees and hedges in the field boundaries and this upper ridge is therefore downgraded to 3B as this factor would probably preclude even the less demanding horticultural crops (see the description of the grades and sub-grades, p 3, Revised ALC Guidelines). Moving northwards and downslope the impact of exposure moderates but even in the lowest point of the central valley the effect of salt-blow is clear. These lower slopes may be graded no higher than 3A as a result.

The effect of exposure over the site is often not critical as soil factors provide the most limiting physical factor. Much of the site is downgraded to Grade 4 as a result of soils showing shallow gleying with shallow permeable layers (SPLs). The soils fall into wetness class IV as a result, which combines with the clay and heavy clay loam topsoil textures to produce a low grade. The areas of **3B** outline similar soils with deeper SPLs (WC III) and lighter topsoils (heavy clay loams). The soil pit description is typical of the Grade 4 profiles.

A limited area of **Sub-grade 3A** has been identified in the north-east. The soils in this map unit do show evidence of shallow gleying but have no clear evidence of SPLs. They thus fall into wetness class II and are limited to 3A by the exposure risk.

8. Chickerell

Table 11: Distribution of ALC Grades, Chickerell

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
3B	18.4	88.5	100% (18.4 ha)
Non-Agric	0.4	1.9	
Urban	1.6	7.7	
Farm Buildings	0.4	1.9	
	20.8 ha	100%	

One block of land to the west of the B3157 and another north of the old village of Chickerell were surveyed, totalling 20.8 hectares. The land is lowlying and gently sloping with altitudes ranging between 35-45 metres. One climatic interpolation is representative of both blocks. The southern area is underlain by Oxford Clay, the northern area by Forest Marble Cornbrash geology; similar soil profiles have developed on both sites with soil wetness and soil workability the important limiting factors.

Table 12: Climatic Interpolation, Chickerell

Grid Reference		SY645802
Altitude (m)	:	40
Accumulated Temperature (°days)	:	1543
Average Annual Rainfall (mm)	:	803
Field Capacity (days)	:	165
Moisture Deficit, Wheat (mm)	:	112
Moisture Deficit, Potatoes (mm)	:	107
Overall Climatic Grade	:	1

The above show that there is no overall climatic limitation but exposure is considered to be a significant local climatic factor. The western edges of the southern block occupy a low coastal crest which lies directly open to strong coastal winds over Chesil Beach. As at Osmington, a 3B limitation prevails, excluding the range of horticultural

crops. The northern block lies slightly further inland but there is still clear evidence of the impact of these strong winds on the field boundaries.

A 3B soil workability limitation also affects the whole of the survey area. Soil profiles show clear evidence of shallow gleying and shallow permeable layers which places the soils in Wetness Class IV. Given the heavy nature of the topsoil textures (typically clay) sub-grade 3B results, given the prevailing Field Capacity value (165 days). The soils show similar limiting factors to those graded Class 4 at Osmington. At Chickerell, the lower FCDay value eases the workability of these heavy soils.