

TIVERTON LOCAL PLAN, AGRICULTURAL LAND CLASSIFICATION

REPORT OF SURVEY

1. INTRODUCTION

In July 1991 a detailed Agricultural Land Classification (ALC) was carried out on the eastern fringe of Tiverton in Devon. The survey work was requested as part of MAFF's statutory response to the preparation of the Tiverton Local Plan and included six blocks of agricultural land which may be affected by the Plan's proposals. A total of 128 hectares was surveyed.

The ALC provides a framework for classifying land according to the extent to which physical or chemical characteristics impose long-term limitations on its use for agriculture. Fieldwork was conducted by members of the Resource Planning Group (South West Region) using MAFF's revised guidelines and criteria for grading the quality of agricultural land (operational since 1.1.89). A total of 117 soil borings and 5 soil pits were examined.

The results of the survey are shown on the attached ALC map at a scale of 1:10,000, and the areas of each grade of land affected by the proposals are given in the table below. The information is accurate at the scale shown, but any enlargement would be misleading. Each block contains significant amounts of high quality land (Grades 1, 2 or 3A). Grade 2 is the predominant grade, with soil workability as the most limiting physical factor.

Distribution of Grades and Sub-grades (combined figures;
hectares)

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
1	3.4	2.9	3.1
2	83.9	72.0	76.6
3A	14.0	12.0	12.8
3B	8.0	6.9	7.3
4	0.2	0.2	<u>0.2</u>
Non Agric	3.5	3.0	
Urban	2.9	2.5	100% (109.5 ha)
Agric Bldgs	<u>0.6</u>	<u>0.5</u>	
	116.5 ha	100%	

2. CLIMATE

Climatic limitations are assessed first as these may produce an overriding limitation, irrespective of favourable site or soil conditions. The two key parameters used in assessing an overall climatic limitation are average annual rainfall (a measure of local wetness) and accumulated temperature (a

measure of the overall warmth of a locality). Together these parameters show that there is in fact no overall climatic limitation affecting this part of Tiverton.

Details of the local climate were obtained by interpolation from a MAFF/Met office 5 km grid dataset for four representative locations (see table below). Whilst there is no overall climatic limitation, the parameter field capacity days (FCD) is critical to the eventual grading (this indicates the number of days in a year when rainfall exceeds evapotranspiration). FCD directly relates to soil workability and soil wetness.

The table below also provides local estimates of the moisture deficits for key crops. However, given the textures, structures and depths of the soils present, soil droughtiness is not a limiting factor.

Climatic Interpolations

Grid Reference	55970141	55980132	55984129	559801118	55968132
Altitude (m)	84	87	108	114	70
Average Annual Rainfall (mm)	1040	1022	1029	1020	1021
Accumulated Temperature (°days)	1494	1490	1466	1460	1510
Field Capacity (days)	213	209	210	208	210
Moisture Deficit, Wheat (mm)	87	88	85	85	90
Moisture Deficit, Potatoes (mm)	76	76	73	72	79
Overall Climatic Grade	1	1	1	1	1

3. AGRICULTURAL LAND CLASSIFICATION

3.1 Land North of By-pass at Little Gornhay (Area A)

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
2	7.6	57.6	58.9
3A	3.9	29.5	30.2
3B	1.4	10.6	10.9
Urban	<u>0.3</u>	<u>2.3</u>	
	13.2 ha	100%	100% (12.9 ha)

Two pits were examined in this area to confirm the distinction between the Grade 2 and Sub-grade 3A soils. Pit II is typical of the Grade 2 soils which exhibit light textured topsoils and subsoils which are stone-free, well-drained and well structured. Topsoil textures vary between medium sandy loams and medium clay loams (MCL). On balance, these soils have been graded as G.2 with workability as the key limitation related to topsoil texture (MCL). Given the prevailing FCD level (210), there is a slight limitation on the time during which soil cultivations, trafficking or grazing by

livestock may occur without causing soil structural damage.

Pit I is typical of the Sub-grade 3A soils which exhibit medium clay loam topsoils and upper subsoils and a lower subsoil of heavy clay loam. This lower subsoil shows significant signs of wetness (gleying) although there are no slowly permeable horizons. This evidence of waterlogging is harmful to crop roots and creates a more significant workability limitation than that for the adjacent G.2 soils.

A minor area of Sub-grade 3B has been identified where shallow gleying was observed in association with a clay horizon that was slowly permeable. A significant wetness and workability limitation therefore downgrades this section.

3.2 Land adjacent to River Lowman (Area B)

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
2	5.9	47.2	61.4
3B	3.7	29.6	<u>38.6</u>
Non Agric	<u>2.9</u>	<u>23.2</u>	
	12.5 ha	100%	100% (9.6 ha)

The agricultural section of this site possesses two ALC grades, Grade 2 and Sub-grade 3B. Pit III confirms the classification of the Grade 2 soils. Although there are slight signs of wetness in the lower subsoil, these are not significant (ie the profile is not gleyed); the soils qualify for Wetness Class I (ie the profile is presumed to be not wet within 70 cm for more than 30 days in most years) and are downgraded due to a slight workability limitation related to the topsoil textures (MCL) and the prevailing FC day level.

The Sub-grade 3B units represent areas where gradients or microrelief are locally limiting.

3.3 Land North of Blundell's Road (Area C)

The whole of this 12 hectare block has been classified as Grade 2. Soil workability is the main limiting factor. Topsoil stone contents are locally high (perhaps related to old site workings) but are variable and are not considered to be high enough to downgrade the soils below G.2.

3.4 Land South of Blundell's Road, Pool Anthony (Area A)

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
2	22.5	86.5	89.6
3A	1.9	7.3	7.6
3B	0.7	2.7	<u>2.8</u>
Urban	0.7	2.7	
Agric Bldgs	<u>0.2</u>	<u>0.8</u>	100% (25.1 ha)
	26.0 ha	100%	

Pit II is located in this site and confirms Grade 2 as the predominant grade. Adjacent auger borings are impenetrable at shallow depths, but the pit reveals only very minor stone contents in the subsoil. The soil resource extends to below 80 cm, is well-drained with good subsoil structure and is therefore only downgraded due to a soil workability limitation related to the topsoil textures (MCL) and the prevailing FC day level.

Two map units of Sub-grade 3A delineate soils in topographic hollows that are gleyed and therefore experience significant subsoil waterlogging. This wetness and workability problem limits these areas to no better than G.3A.

A minor area of Sub-grade 3B has been mapped where gradients are locally limiting.

3.5 Area South of Post Hill, Hartnoll Farm (Area B)

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
2	24.9	93.3	94.7
3B	1.4	5.2	<u>5.3</u>
Non Agric	0.3	1.1	
Urban	<u>0.1</u>	<u>0.4</u>	100% (26.3 ha)
	26.7 ha	100%	

Grade 2 is the predominant grade in this area with soils similar to those described in 3.4. Pit IV description also applies to this section, with soil workability as the most limiting factor.

Two minor areas of Sub-grade 3B have been mapped where gradients are locally limiting.

3.6 Land adjacent to Tidcombe Hall (Area C)

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
1	3.4	12.8	14.2
2	10.4	39.3	43.3
3A	8.2	30.9	34.2
3B	1.8	6.9	7.5
4	0.2	0.7	0.8
Non Agric	0.3	1.1	
Urban	1.8	6.8	100% (24.0 ha)
Agric Bldgs	0.4	1.5	
	26.5 ha	100%	

The grading of the soils on this site ranges between G.1 and G.4. An area of Grade 1 picks out a unit where the soils are lighter than elsewhere. Pit V is typical of these soils which exhibit fine sandy silt loam topsoils overlying deep medium clay loams. The soil resource is deep, and the subsoils show good well-drained structural conditions with minor stone contents. These lighter topsoils do not experience a workability limitation.

Adjacent soils have been mapped as Grade 2, as they exhibit the typical heavier profile characteristics with medium clay loam topsoils that suffer from a slight workability limitation.

The area of Sub-grade 3A soils adjacent to the Gran Western Canal show clear evidence of gleying caused by shallow waterlogging for significant periods of the year. This waterlogging creates an important wetness and workability limitation which is the key factor in downgrading these soils. These particular soils are generally without any slowly permeable horizons in the subsoils but where they do occur, in one limited location, they are further downgraded to Sub-grade 3B.

Three additional map units of Sub-grade 3B in the south west of the site and one unit of Grade 4 identify area where gradients are locally limiting.

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: golf courses, 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.

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

(i) TEXTURE:-

Soil texture classes are denoted by the following abbreviations (all Upper case*):

S	Sand
LS	Loamy Sand
SL	Sandy Loam
SZL	Sand Silt Loam
ZL	Silt Loam
MZCL	Medium Silty Clay Loam
MCL	Medium Clay Loam
SCL	Sandy Clay Loam
HZCL	Heavy Silty Clay Loam
HCL	Heavy Clay Loam
SC	Sandy Clay
ZC	Silty Clay
C	Clay

For the sand, loamy sand, sandy loam and sandy silt loam classes the predominant size of sand fraction may be indicated by the use of prefixes, thus:

F	fine (more than $\frac{2}{3}$ of sand less than 0.2 mm)
C	coarse (more than $\frac{1}{3}$ of sand greater than 0.6 mm)
M	medium (less than $\frac{2}{3}$ fine sand and less than $\frac{1}{3}$ coarse sand)

The sub-divisions of clay loam and silty clay loam classes according to clay content are indicated as follows:-

M	medium (less than 27% clay):
H	heavy (27-35% clay)

Other possible texture classes include:

P	Peat
SP	Sandy Peat
LP	Loamy Peat
PL	Peaty Loam
PS	Peaty Sand
MZ	Marine Light Silts

* There are two exceptions to the Upper Case rule:-

- The prefix "Calc" is used to identify naturally calcareous soils containing more than 1% Calcium Carbonate
- For organic mineral soils, the texture of the mineral fraction is prefixed by "Org".

(ii) **STRUCTURE:-**

Nature and size of structural units are denoted by the following abbreviations:

SAB Subangular Blocky
AB Angular Blocky
P Prismatic

(single grain, granular and platy are not abbreviated)

F Fine
M Medium
C Coarse
VC Very Coarse

eg Weak MSAB = Weakly developed medium subangular blocky

(iii) **OTHER**

f = few = less than 2% of the matrix or surface described
c = common = 2-20% of the matrix or surface described
m = many = 20-40% of the matrix or surface described
vm = very many = +40% of the matrix or surface described

f = faint = indistinct mottles, evident only on close examination
d = distinct = although not striking, the mottles are readily seen
p = prominent = the mottles are conspicuous, and the mottling is one of the outstanding features of the horizon

gm = grey mottling
om = ochreous mottling

eg cdom = common distinct ochreous mottles

ppf = pale ped faces
mn = manganese

st = stones 6 cm
sst = stones 2-6 cm
vsst = stones 2 cm

WC = Wetness Class (use Roman numerals, eg WC IV)

SPL = Slowly Permeable Layer

WT = Water Table

I = Impenetrable if used in Depth Column

IMP = Impenetrable if used in soil profile notes

(IMP 2 x 40 cm = 2 additional borings, both impenetrable at 40 cm)

ASP = Auger Sample Point

SITE NAME Tiverton Local Plan ALC	PROFILE NUMBER Pit 1	SLOPE AND ASPECT Flat	LAND USE Permanent Pasture	Av Rainfall :- 1040	PARENT MATERIAL Alluvium
	DATE July 1991	GRID REFERENCE		ATO :- 1494 FC Days :- 213 Climatic grade :- 1	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
Topsoil	0-23	10YR43	MCL	-	-								
Sub 1.	23-37	10YR53	MCL	-	-	Moderately developed coarse SAB	+0.5%	Moderate	Friable	-	-	-	
Sub 2.	37-80	10YR62	HCL	5% hard rock or stone	Common 10YR66 gleyed	Moderately developed medium SAB	+0.5%	Good	Friable	-	-	-	

Depth to Slowly Permeable Horizon :- Gleyed <40 cm No SPL Wetness Class :- III Wetness Grade :- 3A	Available Water Wheat :- Potatoes :- Moisture Deficit Wheat :- 88 Potatoes :- 76 Moisture Balance Wheat :- +43 mm Potatoes :- +54 mm Droughtiness Grade :- 1	Final ALC Grade :- 3A Main Limiting Factor(s) :- Soil Wetness Remarks :-
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SITE NAME		PROFILE NUMBER	SLOPE AND ASPECT		LAND USE		Av Rainfall :- 1040		PARENT MATERIAL				
Tiverton Local Plan ALC		Pit 2	3° SW		Ley Grassland		ATO :- 1494		Lower sandstone				
		DATE	GRID REFERENCE				FC Days :- 213						
		July 1991					Climatic grade :- 1						
Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
Topsoil	0-23	05YR44	MSL	-	-	-	-	-	-	-	-	-	-
Sub 1.	23-58	2.5YR44	MSL	-	-	Moderately developed, coarse SAB	+0.5%	Moderate	Friable	-	-	-	-
Sub 2.	58-120	2.5YR34	LMS	-	-	Weakly developed coarse SAB	+0.5%	Good	Friable	-	-	-	-
Depth to Slowly Permeable Horizon :- No SPL				Not gleyed		Available Water		Wheat :-		Final ALC Grade :- 1			
						Potatoes :-							
Wetness Class :- I				Moisture Deficit		Wheat :- 88				Main Limiting Factor(s) :-			
						Potatoes :- 76							
Wetness Grade :- 1				Moisture Balance		Wheat :- +46 mm							
						Potatoes :- +27 mm							
				Droughtiness Grade :- 1						Remarks :- Topsoil textures vary between MSL and MCL. On balance, the map unit has been graded as G.2 with a workability limitation related to topsoil texture (MCL).			

SITE NAME		PROFILE NUMBER		SLOPE AND ASPECT		LAND USE		Av Rainfall :- 1021		PARENT MATERIAL			
Tiverton Local Plan ALC		Pit 3		Flat		Permanent Pasture		ATO :- 1510		Alluvium			
		DATE		GRID REFERENCE				FC Days :- 210					
July 1991													
Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
Topsoil	0-15	7.5YR44	MCL	-	-	-	-	-	-	-	-	-	-
Sub 1.	15-40	7.5YR54	MCL	-	-	Moderately developed, coarse SAB	+0.5%	Moderate	Friable	-	-	Few MN Concre-tions	-
Sub 2.	40-65	7.5YR46 PED Colour 05YR43	HCL	-	Common mottles 7.5YR56	Moderately developed, coarse SAB	+0.5%	Moderate	Friable	-	-	-	-
Sub 3.	65-80	05YR56 PED Colour 05YR46	HCL	10% Hard Rock or Stone	-	Moderately developed, medium SAB	+0.5%	Good	Friable	-	-	Common MN Concre-tions	-
Depth to Slowly Permeable Horizon :- Not Gleyed No SPL				Available Water Wheat :-				Final ALC Grade :- 2					
				Potatoes :-									
Wetness Class :- I				Moisture Deficit Wheat :- 90				Main Limiting Factor(s) :- Workability					
				Potatoes :- 79									
Wetness Grade :- 2				Moisture Balance Wheat :- +30 mm									
				Potatoes :- +41 mm									
				Droughtiness Grade :- 2				Remarks :- Mottled but not gleyed. Red soil without pale ped faces.					

SITE NAME Tiverton Local Plan ALC	PROFILE NUMBER Pit 4	SLOPE AND ASPECT Flat	LAND USE Permanent Pasture	Av Rainfall :- 1022 ATO :- 1490 FC Days :- 209 Climatic grade :- 1	PARENT MATERIAL Lower Sandstone
	DATE July 1991	GRID REFERENCE			

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
Topsoil	0-25	7.5YR44	MCL	2% Hard Rock or Stone	-	-							
Sub 1.	25-48	7.5YR44	MCL	2% Hard Rock or Stone	-	Weakly developed fine SAB	+0.5%	Good	Friable	-	-	-	
Sub 2.	48-70	7.5YR46	MCL	5% Hard Rock or Stone	-	Weakly developed fine SAB	+0.5%	Good	Friable	-	-	-	

Depth to Slowly Permeable Horizon :- None present	Available Water Wheat :- Potatoes :-	Final ALC Grade :- 2
Wetness Class :- I	Moisture Deficit Wheat :- 88 Potatoes :- 76	Main Limiting Factor(s) :- Workability
Wetness Grade :- 2	Moisture Balance Wheat :- +34 mm (to 70 cm) Potatoes :- +60 mm	Remarks :- Profile depth to 70 plus.
	Droughtiness Grade :- 1	

SITE NAME Tiverton Local Plan ALC		PROFILE NUMBER Pit 5	SLOPE AND ASPECT Flat	LAND USE Maize	Av Rainfall :- 1020 ATO :- 1460 FC Days :- 208 Climatic grade :- 1	PARENT MATERIAL Lower Sandstone
		DATE July 1991	GRID REFERENCE			

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
Topsoil	0-25	05YR34	FSZL	2% medium grained SST	-	-							
Sub 1.	25-80+	7.5YR44	MCL	5% medium grained SST	-	Weakly developed fine SAB	+0.5%	Good	Friable	-	-	-	

Depth to Slowly Permeable Horizon :- Not Gleyed No SPL Wetness Class :- I Wetness Grade :- 1 [RPG0076/JR/DW4]	Available Water Wheat :- Potatoes :- Moisture Deficit Wheat :- 85 Potatoes :- 72 Moisture Balance Wheat :- +57 mm (to 80 cm) Potatoes :- +69 mm Droughtiness Grade :- 1	Final ALC Grade :- 1 Main Limiting Factor(s) :- Remarks :-
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