2011-96-93

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MAFF Ministry of Agriculture Fisheries and Food

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Swale Borough Local Plan (Iwade)
Site 14 : North of Iwade School
Agricultural Land Classification
ALC Map and Report
June 1993

SWALE BOROUGH LOCAL PLAN (IWADE)
SITE 14 : NORTH OF IWADE SCHOOL, IWADE
AGRICULTURAL LAND CLASSIFICATION REPORT

1. Summary

1.1 In June 1993, a detailed Agricultural Land Classification, (ALC), survey was carried out on 10.9 hectares of land at Iwade in Kent. ADAS was commissioned by MAFF's Land Use Planning Unit to determine the quality of agricultural land under consideration for inclusion in the Swale Borough Local Plan.

1.2 The survey was conducted by members of the Resource Planning Team, Guildford Statutory Group at an observation density of approximately one boring per hectare. A total of 10 borings and one soil inspection pit were described in accordance with MAFF's revised guidelines and criteria for grading the quality of agricultural land, (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 its use for agriculture.

At the time of survey, the agricultural land on the site was in permanent grassland being utilised for hay and for grazing by cattle. In addition, areas of urban, farm buildings and non-agricultural (small ponds) were mapped.

1.3 The distribution of grades and subgrades is shown on the attached ALC map and the area and extent are given in the table below. The map has been drawn at a scale of 1:5,000. It is accurate at this scale, but any enlargement may be misleading. This map supersedes any previous ALC information for the site.

Table 1 : Distribution of Grades and Subgrades

	Area (ha)	% of agricultural area
Grade 3b	10.42	100
Total agricultural area	10.42	
Urban	0.23	
Non-agricultural	0.18	
Farm buildings	0.07	
Total area of site	10.90 ha	

1.4 A general description of the grades and land-use categories identified in this survey is provided as an appendix. The grades are described in terms of the type of limitation that can occur, the typical cropping range and the expected level and consistency of yield.

1.5 The site has been graded entirely Subgrade 3b. It has been graded on the basis of soil wetness and workability limitations arising from the occurrence of heavily textured, poorly drained soils derived from London Clay.

2. Climate

2.1 Estimates of climatic variables relevant to the assessment of agricultural land quality were obtained by interpolation from a 5 km grid point dataset (Met Office, 1989) for a representative location in the survey area.

Table 2 : Climatic Interpolation

Grid Reference	TQ900681
Altitude (m, AOD)	10
Accumulated Temperature (°days, Jan-June)	1487
Average Annual Rainfall (mm)	566
Field Capacity Days	109
Moisture deficit, wheat (mm)	128
Moisture deficit, potatoes (mm)	127

2.2 Climatic factors are considered first when classifying land since climate can be overriding in the sense that adverse climatic conditions may restrict land quality irrespective of favourable site and soil conditions. The details in the table above show that there is no overall climatic limitation affecting this site. In addition, no local climatic factors such as exposure or frost risk affect the site.

2.3 However, climatic factors do interact with soil factors to influence soil wetness and droughtiness limitations. At this locality, the climate is particularly warm and dry in both regional and national terms. The effect of this is to decrease the likliehood of soil wetness problems, whilst enhancing the chances of soil droughtiness.

3. Relief

3.1 The site is generally flat, lying at an altitude of approximately 10m AOD and falling very slightly towards the south-west. Nowhere on the site do gradient or microrelief act to limit agricultural land quality.

4. Geology and Soils

4.1 British Geological Survey, (1977) Sheet 272, Chatham shows the majority of the site to be underlain by Tertiary London Clay with small outcrops of Recent Head Brickearth along the southern site boundary, north of Iwade County Primary School.

4.2 Soil Survey of England and Wales (1976) Sheet TQ86, Soils in Kent III, shows the site to comprise soils of the Windsor series, with a small area of the Wickham series shown to coincide with deposits of Head Brickearth along the southern boundary. These pelostagnogleys are described as, 'imperfectly to poorly drained stoneless silty and clayey soils', (SSEW, 1976).

4.3 Detailed survey of the soils on the site found them to be similar to those described by the Soil Survey, deep clayey soils affected by poor drainage.

5. Agricultural Land Classification

5.1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map.

5.2 The location of the soil observation points are shown on the attached sample point map.

Subgrade 3b

5.3 The entire area of agricultural land on the site has been assigned to Subgrade 3b. Soil wetness and workability limitations act to restrict the agricultural use of this land principally to cereals and grass. Profiles comprise non-calcareous heavy clay loam, or clay topsoils which may contain up to 2% total flints. Topsoils were generally found to be gleyed and to directly overlie gleyed and slowly permeable clay in the subsoil. Profiles are thereby poorly drained due to the presence of slowly permeable clay at shallow depth and are assigned to Wetness Class III. Despite the relatively warm, dry climatic regime which exists at this locality, poor soil drainage status and heavy topsoil textures give rise to significant soil wetness and workability problems. The land will be prone to restrictions on cultivations and grazing and crop establishment and growth may be adversely affected by wet soil conditions. These restrictions are such that land cannot be graded higher than Subgrade 3b.

ADAS Ref: 2011/96/93
MAFF Ref: EL20/245

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

* British Geological Survey (1977) Sheet 272, Chatham

* MAFF (1988) Agricultural Land Classification of England and Wales : Revised guidelines and criteria for grading the quality of agricultural land.

* Meteorological Office (1989) Climatic datasets for Agricultural Land Classification.

* Soil Survey of England and Wales (1976) Sheet TQ86, Soils in Kent III, and accompanying bulletin.

APPENDIX I

DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

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 includes 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.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

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.

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

Definition of Soil Wetness Classes

Wetness Class	Duration of Waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years[2].
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.
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.
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.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

[1] The number of days specified is not necessarily a continuous period.

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

APPENDIX III

SOIL BORING AND SOIL PIT DESCRIPTIONS

Contents:

* Soil boring descriptions
* Soil pit descriptions
* Soil Abbreviations : Explanatory Note

SOIL PROFILE DESCRIPTIONS : EXPLANATORY NOTE

Soil profile and pit information obtained during ALC surveys is held on a database. This has commonly used notations and abbreviations as set out below.

BORING HEADERS

1. GRID REF : National grid square followed by 8 figure grid reference.

2. USE : Land-use at the time of survey.
   The following abbreviations are used.

ARA - arable	PAS/PGR - permanent pasture
WHT - wheat	RGR - rough grazing
BAR - barley	LEY - ley grassland
CER - cereals	CFW - coniferous woodland
OAT - oats	DCW - deciduous woodland
MZE - maize	SCR - scrub
OSR - oilseed rape	HTH - heathland
BEN - field beans	BOG - bog or marsh
BRA - brassicae	FLW - fallow
POT - potatoes	PLO - ploughed
SBT - sugarbeet	SAS - set-aside
FDC - fodder crops	OTH - other
FRT - soft and top fruit	LIN - linseed
HOR/HRT - horticultural crops	

3. GRDNT : Gradient as measured by optical reading clinometer.

4. GLEY/SPL : Depth in centimetres (cm) to gleyed and/or slowly permeable horizons.

5. AP (WHEAT/POTS) : Crop-adjusted available water capacity. The amount of soil water (in millimetres) held in the soil profile that is available to a growing crop (wheat and potatoes are used as reference crops).

6. MB (WHEAT/POTS) : The moisture balance for wheat and potatoes obtained by subtracting the soil moisture deficit from the crop-adjusted available water capacity.

7. DRT: Grade according to soil droughtiness assessed against soil moisture balances.

8. M REL : Micro-relief)
   FLOOD : Flood risk)
   EROSN : Soil erosion)
   EXP : Exposure) If any of these factors are considered significant in terms of the assessment of agricultural land quality a `y' will be entered in the relevant column.
   FROST : Frost prone)
   DIST : Disturbed land)
   CHEM : Chemical limitation)

9. LIMIT : Principal limitation to agricultural land quality.
The following abbreviations are used:

OC - overall climate
AE - aspect
EX - exposure
FR - frost
GR - gradient
MR - micro-relief
FL - flooding
TX - soil texture
DP - soil depth
CH - chemical limitations
WE - wetness
WK - workability
DR - drought
ER - erosion
WD - combined soil wetness/soil droughtiness
ST - topsoil stoniness

PROFILES & PITS

1. TEXTURE : Soil texture classes are denoted by the following abbreviations:

S - sand
LS - loamy sand
SL - sandy loam
SZL - sandy 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.

F - fine (more than ⅔ of the sand less than 0.2 mm)
C - coarse (more than ⅓ of sand greater than 0.6 mm)
M - medium (less than ⅔ fine sand and less than ⅓ 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:

OL - organic loam
P - peat
SP - sandy peat
LP - loamy peat
PL - peaty loam
PS - peaty sand
MZ - marine light silts

2. MOTTLE COL : Mottle colour

3. MOTTLE ABUN : Mottle abundance

F - few - less than 2% of matrix or surface described
C - common - 2-20% of the matrix
M - many - 20-40% of the matrix
VM - very many - 40% + of the matrix

4. MOTTLE CONT : Mottle continuity

F - faint - indistinct mottles, evident only on close examination
D - distinct - mottles are readily seen
P - prominent - mottling is conspicuous and one of the outstanding features of the horizon

5. PED.COL : Ped face colour

6. STONE LITH : Stone lithology. One of the following is used.

HR - all hard rocks or stones
MSST - soft, medium or coarse grained sandstone
SI - soft weathered igneous or metamorphic
SLST - soft oolitic or dolomitic limestone
FSST - soft, fine grained sandstone
ZR - soft, argillaceous, or silty rocks
CH - chalk
GH - gravel with non-porous (hard) stones
GS - gravel with porous (soft) stones

Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

7. STRUCT : the degree of development, size and shape of soil peds are described using the following notation.

- <u>degree of development</u>
  WK - weakly developed
  MD - moderately developed
  ST - strongly well developed

- <u>ped size</u>

F - fine
M - medium
C - coarse
VC - very coarse

- <u>ped shape</u>

S - single grain
M - massive
GR - granular
SB/SAB - sub-angular blocky
AB - angular blocky
PR - prismatic
PL - platy

8. CONSIST : Soil consistence is decribed using the following notation:

L - loose
VF - very friable
FR - friable
FM - firm
VM - very firm
EM - extremely firm
EH - extremely hard

9. SUBS STR : Subsoil structural condition recorded for the purpose of calculating profile droughtiness.

G - good
M - moderate
P - poor

10. POR : Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'y' will appear in this column.

11. IMP : If the profile is impenetrable a 'y' will appear in this column at the appropriate horizon.

12. SPL : Slowly permeable layer. If the soil horizon is slowly permeable a 'y' will appear in this column.

13. CALC : If the soil horizon is calcareous, a 'y' will appear in this column.

14. <u>Other Notations</u>

APW - available water capacity (in mm) adjusted for wheat
APP - available water capacity (in mm) adjusted for potatoes
MBW - moisture balance, wheat
MBP - moisture balance, potatoes

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
1	0-28	hcl	25Y 41 00	10YR46 00	C			Y	0	0		0							
	28-70	c	10YR52 00	10YR56 00	M		00MN00 00	Y	0	0		0		P			Y		
1P	0-22	hcl	10YR41 00	10YR56 00	C			Y	0	0		0							
	22-50	c	25Y 61 00	10YR56 00	M			Y	0	0		0	MDCSAB FR	M		Y			
	50-75	c	10YR51 00	10YR58 00	M			Y	0	0		0	WKCSAB FM	P	Y		Y		Tending to AB
2	0-26	c	10YR41 00	10YR46 00	C			Y	0	0		0							
	26-70	c	25Y 52 00	10YR56 00	M		00MN00 00	Y	0	0		0		P			Y		
3	0-27	hcl	10YR52 51	75YR46 56	C			Y	0	0		0							
	27-70	c	10YR61 00	75YR58 00	M			Y	0	0		0		P			Y		
4	0-30	c	10YR31 00	10YR56 00	C			Y	0	0		0							
	30-50	c	10YR41 00	10YR56 00	C			Y	0	0		0		M					
	50-90	c	10YR52 00	10YR56 66	M		00MN00 00	Y	0	0		0		P			Y		
5	0-30	hcl	10YR31 00	10YR56 00	C			Y	0	0	HR	2							
	30-45	c	10YR51 00	10YR56 00	C			Y	0	0		0		M					
	45-90	c	10YR53 00	10YR56 00	M		00MN00 00	Y	0	0		0		P			Y		
6	0-10	mcl	10YR31 00						0	0	HR	2							
	10-22	hcl	10YR52 00	10YR56 00	C			Y	0	0		0		M					
	22-60	hcl	25Y 62 00	10YR56 00	M		00MN00 00	Y	0	0		0		M					
	60-90	c	10YR52 00	10YR56 00	M		00MN00 00	Y	0	0		0		P			Y		
7	0-30	c	10YR51 00	75YR46 56	C			Y	0	0		0							
	30-70	c	10YR51 52	75YR58 00	M			Y	0	0		0		P			Y		
8	0-25	c	10YR41 51	75YR56 00	C			Y	0	0		0							
	25-75	c	10YR61 00	75YR58 00	M			Y	0	0		0		P			Y		
9	0-20	hcl	10YR31 00	10YR46 00	F				0	0	HR	2							
	20-40	c	25Y 62 00	10YR56 00	M			Y	0	0		0		M					
	40-80	c	05Y 61 00	10YR66 00	M			Y	0	0		0		P			Y		
10	0-31	c	10YR43 00						0	0		0							
	31-55	c	10YR53 00	10YR58 00	M			Y	0	0		0		P			Y		Imp 55+ - stone

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	TQ89806820	PGR			0	28	3	3B		0		0					WE	3B	
1P	TQ89876802	HAY			0	50	3	3B		0		0					WE	3B	
2	TQ89906820	PGR			0	26	3	3B		0		0					WE	3B	
3	TQ89716804	PAS	N	1	0	27	3	3B		0		0					WE	3B	
4	TQ89806810	HAY	N	1	0	50	3	3B		0		0					WE	3B	
5	TQ89906810	HAY	N	1	0	45	3	3B		0		0					WE	3B	
6	TQ90006810	PGR	N	1	10	60	2	3A		0		0					WE	3A	
7	TQ89806800	PAS	NW	1	0	30	3	3B		0		0					WE	3B	
8	TQ89906800	PAS	N	1	0	25	3	3B		0		0					WE	3B	
9	TQ90006800	HAY			0	40	3	3B		0		0					WE	3B	
10	TQ89806790	PAS	S	1	31	31	3	3B		0		0					WE	3B	IMP 55 - STONE

SOIL PIT DESCRIPTION

Site Name : SWALE LP(IWADE)- SITE 14 Pit Number : 1P

Grid Reference: TQ89876802 Average Annual Rainfall : 566 mm
Accumulated Temperature : 1487 degree days
Field Capacity Level : 109 days
Land Use :
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 22	HCL	10YR41 00	0	0	C	
22- 50	C	25Y 61 00	0	0	M	MDCSAB
50- 75	C	10YR51 00	0	0	M	WKCSAB

Wetness Grade : 3B Wetness Class : III
Gleying :0 cm
SPL :50 cm

Drought Grade : APW : mm MBW : 0 mm
APP : mm MBP : 0 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness