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CANTERBURY LOCAL PLAN
LAND AT GREENHILL, KENT
AGRICULTURAL LAND CLASSIFICATION
ALC MAP AND REPORT
JULY 1993

AGRICULTURAL LAND CLASSIFICATION

CANTERBURY LOCAL PLAN LAND AT GREENHILL, KENT

1. SUMMARY

1.1 In March 1993, an Agricultural Land Classification (ALC) survey was carried out on 18.2 hectares of land to the south of Herne Bay, in Kent. ADAS was commissioned by MAFF to determine the quality of land identified in the Canterbury District draft local plan.

1.2 The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 17 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 agricultural use.

At the time of survey, the majority of the site was being used for arable cropping (winter cereal) with a small area of permanent pasture.

1.3 The distribution of grades and sub-grades is shown on the attached ALC map and the areas 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.

Distribution of Grades and Sub-grades

	<u>Area (ha)</u>	<u>% total agricultural area</u>
Grade 3a	7.2	41.9
3b	10.0	58.1
Total agricultural area	<u>17.2</u>	100
Urban	0.5	
Non-agricultural	<u>0.5</u>	
Total area of site	<u>18.2 ha</u>	

1.4 Appendix 1 gives a general description of the grades and land use categories identified in this study.

1.5 The land quality of this site varies between good and moderate, the site being graded 3a or 3b. This land has moderate limitations, in this case of wetness and workability commonly having a slowly permeable clay layer within 40 cm and always being gleyed above this depth. The primary difference between the two grades at this site is the topsoil texture. In the higher quality areas (3a), a lower clay content produced a topsoil of medium clay loam texture. In the lower grade areas a higher clay content created heavy clay loam topsoil textures. This difference in texture affects the workability of the land.

2. CLIMATE

- 2.1 The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.
- 2.2 The main parameters used in the assessment of the overall climatic limitation are annual average rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality.
- 2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset. (Met. Office, 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site.
- 2.4 No local climatic factors such as exposure or frost risk affect the site.

Climatic Interpolation

Grid Reference :	TR171671
Altitude (m) :	15
Accumulated Temperature (days) :	1476
Average Annual Rainfall (mm) :	582
Field Capacity (days)	119
Moisture Deficit, Wheat (mm) :	128
Moisture Deficit, Potatoes (mm) :	127
Overall Climatic Grade :	1

3. RELIEF

- 3.1 The site lies at an altitude of 10-15m AOD, land sloping gently east to the lowest point of altitude. Nowhere on the site do relief or altitude affect agricultural land quality.

4. GEOLOGY AND SOILS

- 4.1 The published geological sheet for the site (BGS. 1974, Sheet 273) shows the underlying geology to be Pleistocene and Recent Head Brickearth overlying Eocene London Clay. To the east and west of the site is mapped Eocene London Clay without drift deposits.
- 4.2 The published soils map relevant to the site (SSEW. 1983, Sheet 6) shows the survey area to be mapped as the Windsor Association - "slowly permeable seasonally waterlogged clayey soils mostly with brown subsoils. Some fine loamy over clayey and fine silty over clayey soils ..." (SSEW, 1983).
- 4.3 A detailed examination of the soils on the site confirmed the presence of fine loamy, fine silty, and clayey soils with shallow clayey slowly permeable layers.

5. AGRICULTURAL LAND CLASSIFICATION

- 5.1 Paragraph 1.3 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 is shown on the attached sample point map.

Subgrade 3A

- 5.3 Land of this quality is mapped to the north of the site. Profiles are non calcareous throughout and typically comprise topsoils of medium silty clay loam or occasionally medium clay loam containing 1-2% flints by volume. Upper subsoils consist of a thin layer of stoneless clay, occasionally heavy silty clay loam which is gleyed and often slowly permeable. Lower subsoils comprise stoneless slowly permeable clay. Profiles suffer from significant wetness imperfections as evidenced by gleying from 30-35 cm depth in the profile and slowly permeable layers beginning from 30-55 cm depth of which pit 1 is typical. Wetness class is assessed as III. This in combination with a medium topsoil texture and with the prevailing field capacity day range (119) limits land to subgrade 3A due to wetness. The period during which the land can be effectively cultivated is reduced by the above limitation. Together with wetness soils also suffer from a droughtiness limitation. The poorly structured clay subsoils combined with the dry nature of the climate for the locality reduces the amount of available water for crop growth.

Subgrade 3B

- 5.4 Moderate quality agricultural land covers the majority of the site. Profiles are non calcareous and typically comprise topsoils of heavy clay loam and silty clay loam, occasionally clay containing 0-2% flints by volume. Subsoils comprise slowly permeable clay or a thin horizon of gleyed heavy clay loam or silty clay loam with negligible stone content over slowly permeable clay. Profiles again suffer from significant wetness imperfections as evidenced by gleying from 28-36 cm in the profile and slowly permeable layers beginning within 28-55 cm depth. Wetness class is assessed as III and this in combination with a heavier topsoil texture and the field capacity day range (119) limits land to subgrade 3B. The heavier topsoil textures further restrict the ease and flexibility with which the land can be cultivated.
- 5.5 The areas marked as non agricultural include farm tracks and a large garden around Whitehill Cottage.
- 5.6 The areas marked as urban are metalled roads.

SOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY, 1974. Geological Map Sheet 273, Faversham, Solid and drift edition. 1:50,000 scale.

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

METEOROLOGICAL OFFICE, 1989. Climatological datasets for agricultural land classification.

SOIL SURVEY OF ENGLAND AND WALES, 1983. Soils map sheet 6 "Soils of South East England". 1:250,000 scale and accompanying legend.

APPENDIX 1 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 working 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 <i>or</i> , 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 <i>or</i> , 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 <i>or</i> , 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.

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) If any of these factors are considered
EROSN : Soil erosion) significant in terms of the assessment
EXP : Exposure) of agricultural land quality a 'y' will
FROST : Frost prone) be entered in the relevant column.
DIST : Disturbed land)
CHEM : Chemical limitation)

9. **LIMIT** : Principal limitation to agricultural land quality.

The following abbreviations are used:

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

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 $\frac{2}{3}$ of the 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)

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

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

8. **CONSIST** : Soil consistence is described 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. Other Notations

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 NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	
1	TR17006720	CER E	01	035	050	3	3A	138	10	115	-12	3A			WE 3A WEDR
1P	TR17206710	CER E	01	032	032	3	3A	133	5	110	-17	3A			WE 3A WEDR
2	TR17106710	CER E	01	036	036	3	3B		0		0				WE 3B SPL 36
3	TR17206710	CER E	01	032	032	3	3A	132	4	109	-18	3A			WE 3A WEDR
4	TR17306710	CER E	01	035	045	3	3A	138	10	115	-12	3A			WE 3A WEDR
5	TR16906700	CER S	01	030	030	3	3B		0		0				WE 3B SPL 30
6	TR17006700	CER E	01	030	030	3	3B		0		0				WE 3B SPL 30
7	TR17106700	CER SE	02	035	035	3	3A	134	6	111	-16	3A			WE 3A WEDR
8	TR17206700	CER SE	02	035	045	3	3A	144	16	113	-14	3A			WE 3A WEDR
9	TR17306700	CER SE		034	034	3	3B		0		0				WE 3B SPL 50
10	TR17406700	CER		030	030	3	3A	128	0	105	-22	3A			WE 3A WEDR
11	TR16906690	CER		035	050	3	3B		0		0				WE 3B SPL 50
12	TR17006690	CER		030	030	3	3B		0		0				WE 3B SPL 30
13	TR17106690	CER NE	03	030	055	3	3B		0		0				WE 3B SPL 55
14	TR17206690	CER SE	03	030	030	3	3B		0		0				WE 3B SPL 30
15	TR17306690	CER SE		028	028	3	3B		0		0				WE 3B SPL 28
16	TR17406690	CER SE		030	055	3	3A	135	7	113	-14	3A			WE 3A WEDR
17	TR17206680	PGR		030	050	3	3B		0		0				WE 3B SPL 50

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED		-----STONES-----			STRUCT/ CONSIST	SUBS				
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR	IMP	SPL
1	0-25	mzc1	25Y 31 41						0	0	HR	2					
	25-35	mzc1	25Y 42 00						0	0		0		M			
	35-50	hzc1	25Y 52 00	10YR46	00	C			Y	0	0	0		M			
	50-120	c	25Y 52 00	10YR56	00	M			Y	0	0	0		P			Y
1P	0-32	mzc1	10YR42 00						0	0	HR	1					
	32-120	c	10YR53 00	10YR56	00	M	00MN00	00	Y	0	0	0	MDCAB	FM	P	Y	Y
2	0-36	hzc1	25Y 42 00						0	0	HR	2					
	36-120	c	10YR53 00	10YR56	00	M	00MN00	00	Y	0	0	0		P			Y
3	0-32	mzc1	25Y 42 00						0	0	HR	2					
	32-45	c	25Y 52 00	10YR56	00	M			Y	0	0	0		P			Y
	45-120	c	25Y 52 53	75YR56	00	M	00MN00	00	Y	0	0	0		P			Y
4	0-35	mzc1	10YR42 00						0	0	HR	2					
	35-45	hzc1	25Y 62 52	10YR46	56	C	00MN00	00	Y	0	0	0		M			
	45-120	c	25Y 53 00	75YR56	00	M	00MN00	00	Y	0	0	0		P			Y
5	0-30	c	10YR42 00						0	0	HR	2					
	30-120	c	10YR53 54	75YR58	00	M			Y	0	0	HR	1		P		Y
6	0-30	c	10YR42 00						0	0	HR	2					
	30-120	c	10YR53 00	75YR56	00	M	00MN00	00	Y	0	0	0		P			Y
7	0-35	mzc1	10YR42 00						0	0	HR	1					
	35-120	c	25YR53 00	75YR56	00	M	00MN00	00	Y	0	0	0		P			Y
8	0-35	mzc1	10YR42 00						0	0	HR	1					
	35-45	hzc1	10YR53 00	10YR56	00	C			Y	0	0	0		M			
	45-70	zc	10YR53 54	75YR56	58	M	00MN00	00	Y	0	0	0		P			Y
	70-90	hzc1	10YR53 54	75YR56	58	M	00MN00	00	Y	0	0	0		M			Y
	90-120	zc	10YR53 00	75YR56	58	M	00MN00	00	Y	0	0	0		P			Y
9	0-34	hzc1	10YR42 00						0	0	HR	1					
	34-50	c	10YR53 54	75YR56	00	M	00MN00	00	Y	0	0	0		P			Y
	50-120	c	10YR53 00	75YR56	00	M	00MN00	00	Y	0	0	0		P			Y
10	0-30	mc1	10YR42 00						0	0	HR	1					
	30-120	c	10YR53 00	000C00	00	C			Y	0	0	0		P	Y		Y
11	0-35	hc1	10YR42 00						0	0	HR	1					
	35-50	c	10YR41 00	000C00	00	C			Y	0	0	HR	1		M		
	50-120	c	10YR41 00	000C00	00	C			Y	0	0	0		P	Y		Y
12	0-30	hc1	10YR42 00						0	0	HR	2					
	30-120	c	10YR53 00	000C00	00	C			Y	0	0	0		P	Y		Y

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED		-----STONES-----			STRUCT/		SUBS			
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL
13	0-30	hc1	10YR42 00						0	0	HR	2					
	30-55	hzc1	10YR52 00 000C00 00 C					Y	0	0	0	0		M			
	55-120	c	10YR52 00 000C00 00 C					Y	0	0	0	0		P	Y	Y	
14	0-30	hzc1	10YR42 00						0	0	0	0					
	30-120	c	75YR53 00 000C00 00 C					Y	0	0	0	0		P	Y	Y	
15	0-28	hc1	10YR42 00						0	0	0	0					
	28-120	c	10YR53 00 000C00 00 M					Y	0	0	0	0		P	Y		
16	0-30	mc1	10YR42 00						0	0	HR	1					
	30-55	c	25Y 62 00 000C00 00 C					Y	0	0	0	0		M			
	55-120	c	25Y 62 00 000C00 00 M					Y	0	0	0	0		P	Y	Y	
17	0-30	hc1	10YR42 00						0	0	0	0					
	30-50	hc1	10YR53 00 000C00 00 M					Y	0	0	0	0		M			
	50-120	c	10YR53 00 000C00 00 M					Y	0	0	0	0		P	Y	Y	

SOIL PIT DESCRIPTION

Site Name : GREENHILL GC CANT LP Pit Number : 1P

Grid Reference: TR17206710 Average Annual Rainfall : 582 mm
Accumulated Temperature : 1476 degree days
Field Capacity Level : 119 days
Land Use : Cereals
Slope and Aspect : 01 degrees E

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 32	MZCL	10YR42 00	0	1		
32-120	C	10YR53 00	0	0	M	MCAB

Wetness Grade : 3A Wetness Class : III
Gleying : 032 cm
SPL : 032 cm

Drought Grade : 3A APW : 133mm MBW : 5 mm
APP : 110mm MBP : -17 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness