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**DIDCOT DEVELOPMENT 2001–2011
LOCAL PLANNING STUDY
Site C, Hill Farm, Didcot
Oxfordshire**

**Agricultural Land Classification
Reconnaissance survey
ALC Map and Report
October 1997**

**Resource Planning Team
Eastern Region
FRCA Reading**

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AGRICULTURAL LAND CLASSIFICATION REPORT

DIDCOT DEVELOPMENT 2001–2011 LOCAL PLANNING STUDY SITE C, HILL FARM, DIDCOT, OXFORDSHIRE

RECONNAISSANCE SURVEY

INTRODUCTION

1. This report presents the findings of a reconnaissance Agricultural Land Classification (ALC) survey of 24.7 ha of land on the north-western edge of Didcot, north of the A4130 ring-road. The survey was carried out during October 1997.
2. The work was undertaken by the Farming and Rural Conservation Agency (FRCA)¹ on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with its statutory input to the Didcot Local Planning Study for the period 2001–2011. This survey supersedes any previous ALC information for this land. It is adjacent to two surveys carried out by FRCA (formerly Statutory ADAS) in 1993 (FRCA reference numbers 3304/45 & 46/93).
3. The fieldwork was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.
4. At the time of survey, the majority of the site had been recently ploughed. The western field contained stubble from a previous crop of oilseed rape. The areas mapped as 'Other land' include a spinney and two roads.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:20,000. It is accurate at this scale but any enlargement would be misleading.
6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.
7. The fieldwork was conducted at an average density of 1 boring per 4 hectares of agricultural land. A total of 9 borings and 2 soil pits was described.
8. The majority of the land has been classified as Subgrade 3a (good quality agricultural land), with a mixture of soil workability and soil droughtiness as the main factors affecting the quality of the land. In the eastern half of this map unit it is soil droughtiness that is most important. Here, non-calcareous clay topsoils and upper subsoils overlie calcareous lower

¹ FRCA is an executive agency of MAFF and the Welsh Office

subsoils of loamy sand and sand with high stone contents. These characteristics restrict the amount of moisture that is available for extraction by crops, causing some drought stress during parts of the growing season or in drier years, and restricting the level and consistency of yields as a result. In the west, soil workability is more important. Here, non-calcareous clay topsoils overlie clay subsoils which become calcareous at depth. There is some evidence of wetness in the lower subsoils, but not enough to cause any specific soil wetness limitation. The fact that this land has clay topsoils imposes a workability limitation. This restricts the number of days when the land can be cultivated, trafficked by machinery or have livestock grazing on it without causing damage to the soil structure.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	17.9	76.2	72.5
3b	5.6	23.8	22.7
Other land	1.2	N/A	4.8
Total surveyed area	23.5	100	95.2
Total site area	24.7	-	100

9. The eastern part of the site has been classified as Subgrade 3b (moderate quality agricultural land), with soil wetness as the limiting factor. Here, non-calcareous clay topsoils overlie poorly structured clay subsoils which significantly restrict the drainage in the profiles. As a result, there is a greater restriction on the number of days when the land can be safely worked.

FACTORS INFLUENCING ALC GRADE

Climate

10. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

11. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

12. 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.

13. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.

Table 2: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SU517918	SU524921
Altitude	m, AOD	55	50
Accumulated Temperature	day°C (Jan-June)	1457	1462
Average Annual Rainfall	mm	575	572
Field Capacity Days	days	122	121
Moisture Deficit, Wheat	mm	116	116
Moisture Deficit, Potatoes	mm	111	111
Overall climatic grade	N/A	Grade 1	Grade 1

14. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Local climatic factors such as exposure or frost risk are also not significant. The site is climatically Grade 1.

Site

15. The site is relatively flat throughout, with altitudes in the range 50–55 metres. No site factors such as gradient, microrelief or flooding are significant.

Geology and soils

16. The most detailed published geological information for the site (BGS, 1971) shows the area to comprise First Terrace Gravels overlying Gault Clay.

17. The most detailed published soils information for the site (SSEW, 1984) shows the area to comprise soils of the Sutton 1 association. These are described as 'well drained, fine and coarse loamy soils, locally calcareous, and, in places, shallow over limestone gravel'. These soils were not found on the site during the survey; much heavier clay profiles were more common.

AGRICULTURAL LAND CLASSIFICATION

18. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 2.

19. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II.

Subgrade 3a

20. The majority of the site has been placed in this subgrade (good quality agricultural land) with a mixture of soil droughtiness and soil workability as the key limitations.

21. Soils in the eastern section of this map unit are represented by Pit 1 (see Appendix II), where soil droughtiness is most important, but is reinforced by a workability limitation. Here, non-calcareous clay topsoils and upper subsoils overlie sandier lower subsoils, with textures of

loamy medium sand and medium sand. Subsoil structures have been assessed as moderate in condition and stone contents are in the range 38–45% (flints). This combination of textures, structures and stone contents, given the prevailing climate, reduces the amount of water that is available for extraction by crops at times during the growing season and in drier years. As a result, this droughtiness limitation affects the level and consistency of yields on this part of the site. The soils show no evidence of wetness and are placed in Wetness Class I. Wetness Class I soils with clay topsoils cannot be graded better than Subgrade 3a in this area due to a workability limitation.

22. Soils in the western section of this map unit are represented by Pit 2 (Appendix II), where soil workability is the key limitation on its own. Here, non-calcareous clay topsoils overlie a series of clay subsoil horizons. There is evidence of gleying from approximately 58 cm but there is no slowly permeable layer present. The subsoil structures have been assessed as moderately developed coarse sub-angular throughout, with the profile becoming calcareous at depth. The soils fall into Wetness Class I. This, in combination with the clay topsoils and the field capacity day level (121 days) restricts the land to this subgrade. The agricultural impact of this limitation is felt in the restriction to the number of days when the soil is in a suitable condition for trafficking by machinery, cultivations or grazing by livestock without causing structural damage.

Subgrade 3b

23. The extreme east of the site has been classified as Subgrade 3b (moderate quality agricultural land) with soil wetness as the key limitation. No soil pit has been located in this map unit as this part of the site is almost adjacent to a previous detailed ALC survey (FRCA reference number 3303/020/96) containing a large tract of similar soils and Subgrade 3b land. A pit on this site is 300 metres away from the eastern boundary of the current site. Non-calcareous clay topsoils overlie calcareous clay subsoils. The subsoils show clear evidence of shallow gleying and are slowly permeable, and are therefore placed in Wetness Class III. This degree of wetness, together with the very heavy nature of the topsoils, restricts this land to Subgrade 3b. Here, there will be a greater restriction on the workability of the land than that to the west, and the degree of wetness will impair seed germination and lead to reduced and variable yields.

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SOURCES OF REFERENCE

British Geological Survey (1971) *Sheet No. 253 Abingdon*.
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Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land*.
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Soil Survey of England and Wales (1983) *Sheet 6 Soils of South East England*.
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*
SSEW: Harpenden

APPENDIX I

DESCRIPTIONS OF THE 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 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 or horticultural crops can usually be grown but on some land of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the level of yields. It is mainly suited to grass with occasional arable crops (e.g. 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

SOIL DATA

Contents:

Sample location map

Soil abbreviations - explanatory note

Soil pit descriptions

Soil boring descriptions (boring and horizon levels)

SOIL PIT DESCRIPTION

Site Name : DIDCOT SITE C HILL FARM Pit Number : 1P

Grid Reference: SU52209190 Average Annual Rainfall : 572 mm
 Accumulated Temperature : 1462 degree days
 Field Capacity Level : 121 days
 Land Use : Ploughed
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 34	C	25 Y42 00	1	6	HR					
34- 55	C	25Y 53 00	0	8	HR		MCSAB	FR	M	Y
55- 68	LMS	10YR56 00	0	38	HR				M	Y
68- 80	MS	10YR56 00	0	45	HR				M	Y
80-120	MS	10YR56 00	0	40	HR				M	Y

Wetness Grade : 3A Wetness Class : I
 Gleying : cm
 SPL : No SPL

Drought Grade : 3A APW : 99 mm MBW : -17 mm
 APP : 93 mm MBP : -18 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : DIDCOT SITE C HILL FARM Pit Number : 2P

Grid Reference: SU51809190 Average Annual Rainfall : 572 mm
 Accumulated Temperature : 1462 degree days
 Field Capacity Level : 121 days
 Land Use :
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	C	25 Y42 00	1	8	HR					
28- 44	C	10YR54 56	0	15	HR		MDCSAB	FR	M	
44- 58	C	10YR54 56	0	5	HR		MDCSAB	FR	M	
58- 68	C	25 Y53 00	0	2	HR	C	MCSAB	FR	M	Y
68- 80	C	25Y 64 00	0	2	HR	M	MCSAB	FR	M	Y

Wetness Grade : 3A Wetness Class : I
 Gleying : 058 cm
 SPL : No SPL

Drought Grade : 3A APW : 99 mm MBW : -17 mm
 APP : 106mm MBP : -5 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Workability

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		DIST
1	SU51809210	STU	048		1	3A	102	-14	110	-1	3A			WD	3A	See 2P
1P	SU52209190	PLO			1	3A	99	-17	93	-18	3A			DR	3A	PIT85CM
2	SU52009210	PLO	032		2	3A	76	-40	76	-35	3B			DR	3A	See 1P
2P	SU51809190	STU	058		1	3A	99	-17	106	-5	3A			WK	3A	
3	SU52209210	PLO	028		2	2	64	-52	65	-46	4			DR	3A	See 1P
4	SU52409210	PLO	035	035	3	3B	98	-18	103	-8	3A			WE	3B	
5	SU51809190	ARA	058	058	2	3A	99	-17	106	-5	3A			WE	3A	See 2P
6	SU52009190	PLO			1	3A	75	-41	75	-36	3B			WD	3A	See 1P
7	SU52209190	PLO			1	3A	81	-35	84	-27	3B			DR	3A	See 1P
8	SU52409190	PLO	030	030	3	3B	83	-33	89	-22	3B			WE	3B	
9	SU51709175	ARA			1	2	84	-32	86	-25	3B			DR	3A	IX2QDR

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED		-----STONES-----			STRUCT/	SUBS	IMP	SPL	CALC
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH					
1	0-29	c	25 Y42 00						0	0	HR	5				
	29-48	c	10YR54 56 00MN00 00 C						0	0	HR	5	M		Y	
	48-80	c	25 Y53 00 10YR58 61 C				00MN00 00 Y	0	0	HR	5	M		Y	Imp stony	
1P	0-34	c	25 Y42 00						1	0	HR	6				
	34-55	c	25Y 53 00						0	0	HR	8	MCSAB FR M		Y	
	55-68	lms	10YR56 00						0	0	HR	38	M		Y	
	68-80	ms	10YR56 00						0	0	HR	45	M		Y	
	80-120	ms	10YR56 00						0	0	HR	40	M		Y	
2	0-32	c	25 Y42 00						0	0	HR	7				
	32-50	c	25 Y53 00 10YR58 00 C					Y	0	0	HR	15	M		Y	Imp stony
2P	0-28	c	25 Y42 00						1	0	HR	8				
	28-44	c	10YR54 56						0	0	HR	15	MDCSAB FR M			
	44-58	c	10YR54 56						0	0	HR	5	MDCSAB FR M			
	58-68	c	25 Y53 00 10YR58 00 C				25Y 61 00 Y	0	0	HR	2	MCSAB FR M		Y		
	68-80	c	25Y 64 00 75YR58 00 M					Y	0	0	HR	2	MCSAB FR M		Y	
3	0-28	c	25 Y42 00						0	0	HR	5			Y	
	28-40	sc	25 Y52 00 10YR58 00 C					Y	0	0	HR	35	M		Y	
	40-52	lms	10YR56 00 75YR58 00 C					Y	0	0	HR	20	M		Y	Imp stony
4	0-35	c	25 Y42 00						0	0	HR	2				
	35-55	c	25 Y52 53 10YR58 00 C					Y	0	0	HR	2	P		Y	
	55-80	c	05 Y52 00 10YR58 00 M				00MN00 00 Y	0	0	HR	2	P		Y	Y	
5	0-28	hc1	10YR43 00						1	0	HR	5				
	28-58	c	25Y 54 00			F	00MN00 00	0	0	HR	10	M				
	58-78	c	25Y 53 00 000C00 00 M				00MN00 00 Y	0	0	HR	5	P	Y	Y		
6	0-22	c	25Y 43 00						1	0	HR	5				
	22-40	c	10YR53 00						0	0	HR	10	M			
	40-50	c	10YR53 00						0	0	HR	20	M			Imp stony
7	0-35	c	10YR42 00						1	0	HR	7				
	35-50	c	10YR54 00						0	0	HR	10	M			
	50-55	c	10YR54 00						0	0	HR	20	M			Imp stony
8	0-30	c	10YR42 00						0	0	HR	2				
	30-60	c	25Y 52 00 000C00 00 C					Y	0	0		0	P	Y	Y	
9	0-30	c	10YR52 00						1	0	HR	5			Y	
	30-50	cs1	10YR56 00						0	0	HR	5	M		Y	
	50-55	cs1	10YR56 00						0	0	HR	10	M		Y	Imp stony

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database. This uses notations and abbreviations as set out below.

Boring Header Information

1. **GRID REF:** national 100 km grid square and 8 figure grid reference.
2. **USE:** Land use at the time of survey. The following abbreviations are used:

ARA: Arable	WHT: Wheat	BAR: Barley
CER: Cereals	OAT: Oats	MZE: Maize
OSR: Oilseed rape	BEN: Field beans	BRA: Brassicae
POT: Potatoes	SBT: Sugar beet	FCD: Fodder crops
LIN: Linseed	FRT: Soft and top fruit	FLW: Fallow
PGR: Permanent pasture	LEY: Ley grass	RGR: Rough grazing
SCR: Scrub	CFW: Coniferous woodland	OTH: Other
DCW: Deciduous woodland	BOG: Bog or marsh	SAS: Set-Aside
HTH: Heathland	HRT: Horticultural crops	PLO: Ploughed

3. **GRDNT:** Gradient as estimated or measured by a hand-held optical clinometer.
4. **GLEYSPL:** Depth in centimetres (cm) to gleying and/or slowly permeable layers.
5. **AP (WHEAT/POTS):** Crop-adjusted available water capacity.
6. **MB (WHEAT/POTS):** Moisture Balance. (Crop adjusted AP - crop adjusted MD)
7. **DRT:** Best grade according to soil droughtiness.
8. If any of the following factors are considered significant, 'Y' will be entered in the relevant column:

MREL: Microrelief limitation	FLOOD: Flood risk	EROSN: Soil erosion risk
EXP: Exposure limitation	FROST: Frost prone	DIST: Disturbed land
CHEM: Chemical limitation		

9. **LIMIT:** The main limitation to land quality. The following abbreviations are used:

OC: Overall Climate	AE: Aspect	ST: Topsoil Stoniness
FR: Frost Risk	GR: Gradient	MR: Microrelief
FL: Flood Risk	TX: Topsoil Texture	DP: Soil Depth
CH: Chemical	WE: Wetness	WK: Workability
DR: Drought	ER: Erosion Risk	WD: Soil Wetness/Droughtiness
EX: Exposure		

Soil Pits and Auger Borings

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

S: Sand	LS: Loamy Sand	SL: Sandy Loam
SZL: Sandy Silt Loam	CL: Clay Loam	ZCL: Silty Clay Loam
ZL: Silt Loam	SCL: Sandy Clay Loam	C: Clay
SC: Sandy Clay	ZC: Silty Clay	OL: Organic Loam
P: Peat	SP: Sandy Peat	LP: Loamy Peat
PL: Peaty Loam	PS: Peaty Sand	MZ: Marine Light Silts

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

F: Fine (more than 66% of the sand less than 0.2mm)
M: Medium (less than 66% fine sand and less than 33% coarse sand)
C: Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content:

M: Medium (<27% clay) **H:** Heavy (27-35% clay)

2. **MOTTLE COL:** Mottle colour using Munsell notation.
3. **MOTTLE ABUN:** Mottle abundance, expressed as a percentage of the matrix or surface described:

F: few <2% **C:** common 2-20% **M:** many 20-40% **VM:** very many 40% +

4. **MOTTLE CONT:** Mottle contrast:

F: faint - indistinct mottles, evident only on close inspection
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 using Munsell notation.
6. **GLEYS:** If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.
7. **STONE LITH:** Stone Lithology - one of the following is used:

HR: all hard rocks and stones	FSST: soft, fine grained sandstone
ZR: soft, argillaceous, or silty rocks	CH: chalk
MSST: soft, medium grained sandstone	GS: gravel with porous (soft) stones
SI: soft weathered igneous/metamorphic rock	GH: gravel with non-porous (hard) stones

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

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

Degree of development	WK : weakly developed	MD : moderately developed
	ST : strongly developed	
Ped size	F : fine	M : medium
	C : coarse	
Ped shape	S : single grain	M : massive
	GR : granular	AB : angular blocky
	SAB : sub-angular blocky	PR : prismatic
	PL : platy	

9. **CONSIST**: Soil consistence is described using the following notation:

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

10. **SUBS STR**: Subsoil structural condition recorded for the purpose of calculating profile droughtiness: **G**: good **M**: moderate **P**: poor
11. **POR**: Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.
12. **IMP**: If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.
13. **SPL**: Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.
14. **CALC**: If the soil horizon is calcareous, a 'Y' will appear in this column.
15. 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 |