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West Oxfordshire District Local Plan

Northcourt Farm, Clanfield

Agricultural Land Classification Report

May 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

WEST OXFORDSHIRE DISTRICT LOCAL PLAN
NORTHCOURT FARM, CLANFIELD

1. Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of sites in the district of West Oxfordshire. The work formed part of MAFF's statutory input to the preparation of the West Oxfordshire Local Plan.

1.2 Approximately 3 hectares of land relating the aforementioned site east of the village of Clanfield in West Oxfordshire was surveyed in May 1994. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 4 borings and one soil inspection pit were assessed 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.

1.3 The work was carried out by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.

1.4 At the time of the survey the agricultural land was under permanent grass, part of which was taken up by horse paddocks. The Urban land shown comprises part of a garden.

1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas 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 would be misleading. This map supersedes any previous survey information for this site.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site
3a	2.8	96.6
Urban	0.1	3.4
Total area of Site	2.9	100%

1.6 The agricultural land on the site has been classified as Subgrade 3a with soil droughtiness being the main limitation. Soils comprise very slightly stony fine loamy or fine silty topsoils over very slightly to moderately stony fine loamy

subsoils which become sandy at depth. The interaction of these freely draining stony soils with the comparatively dry nature of the local climate results in a moderate restriction to available water reserves and land is classified as Subgrade 3a due to a moderate soil droughtiness limitation. The effect of this limitation on cultivations can result in drought stress to crops during the drier parts of the year.

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.

Table 2 : Climatic Interpolation

Grid Reference	SP288019
Altitude, (m, AOD)	70
Accumulated Temperature (°days, Jan-June)	1440
Average Annual Rainfall (mm)	680
Field Capacity Days	146
Moisture deficit, wheat (mm)	107
Moisture deficit, potatoes (mm)	99

2.2 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality.

2.3 It should be noted that climatic factors do interact with soil properties to influence soil wetness and droughtiness. In particular, the moisture deficits for the locality interact with the light stony soils on the site to increase the risk of soil droughtiness problems.

3. Relief

3.1 The site is almost flat, lying at an altitude of approximately 70 metres AOD. Nowhere on the site do relief or gradient affect agricultural land quality.

4. Geology and Soils

4.1 The published geology map for the site area, Sheet 236 (BGS, 1982) shows the underlying geology to be First Terrace Deposits of floodplain river gravels. To the extreme east of the site area is mapped a deposit of alluvium.

4.2 The published soils information for the area, Sheet 6 (SSEW, 1983) shows the entire site to comprise soils of the Kelmscot association which is described as

"Calcareous fine loamy soils over gravel, variably affected by groundwater. Associated with non calcareous clayey soils over gravel. Flat land , risk of flooding" (SSEW, 1983). A detailed field examination of soils on the site confirmed the presence of calcareous fine loamy over medium sandy textured soils passing to calcareous gravel in the lower subsoil.

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 3a

5.3 The entire site is classified as Subgrade 3a, good quality agricultural land. Soil profiles are well drained (Wetness Class I), calcareous and typically comprise medium clay loam or medium silty clay loam topsoils containing 1-5% total small limestones. Upper subsoils consist of heavy clay loam with 5-20% limestones over lower subsoils of similar texture with 31-50% limestones. This passes to loamy medium sand between 60-90 cm depth which contains 35-50% limestones to depth. It can be seen from auger boring information that, in detail, stone contents and depths to the loamy medium sand horizon do vary. However, Soil Pit 1 was felt to be representative of the soils, showing them to become stonier with depth (all stone volumes in the pit were sieved). The stony loamy medium sand horizon was encountered at 75 cm depth in this case. The pit was dug to a depth of 90 cm, thereafter becoming impenetrable to dig. Rooting was evident to this depth and is likely to continue a little further. Even if this were to extend to 120 cm , an example boring 1Q (not a field auger boring), indicates that there is no overall effect on the droughtiness of these soils. If this scenario is extended to the other borings, one or two may qualify for Grade 2 on droughtiness but, in view of the stoniness observed and the likelihood of it increasing below where borings became impenetrable, it was felt rooting to an intermediate depth was more appropriate, with a resultant classification of Subgrade 3a. The significant volumes of profile stone restrict water reserves held in the soil for plant growth and this, combined with climatic characteristics, results in a classification of Subgrade 3a with the land being downgraded by a moderate droughtiness limitation. One profile of better quality was encountered but this was included in the predominant mapping unit for this site.

REFERENCES

* British Geological Survey (1982), Sheet No. 236 (Solid and Drift Edition), Witney, 1:50,000 scale.

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

* Meteorological Office (1989), Climatological Data for Agricultural Land Classification.

* Soil Survey of England and Wales (1983), Sheet 6, Soils of South East England, 1:250,000 scale and accompanying legend. Bulletin 15, Soils of South East England (1984).

APPENDIX I

DESCRIPTION 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 (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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religous buildings, cemetries. 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. 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, eg. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will be shown.

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

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 only wet within 40 cm depth for 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 present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or**, if there is no slowly permeable layer present 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.

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.

[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 PIT AND SOIL BORING DESCRIPTIONS

Contents :

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	**DCW** :	Deciduous Wood
HTH :	Heathland	**BOG** :	Bog or Marsh	**FLW** :	Fallow
PLO :	Ploughed	**SAS** :	Set aside	**OTH** :	Other
HRT :	Horticultural Crops				

3. **GRDNT** : Gradient as estimated or measured by a hand-held optical clinometer.

4. **GLEY/SPL** : 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	**EX** :	Exposure
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
ST :	Topsoil Stoniness				

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. **GLEY** : 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	**SLST** :	soft oolitic or dolimitic limestone
CH :	chalk	**FSST** :	soft, fine grained sandstone
ZR :	soft, argillaceous, or silty rocks	**GH** :	gravel with non-porous (hard) stones
MSST :	soft, medium grained sandstone	**GS** :	gravel with porous (soft) stones
SI :	soft weathered igneous/metamorphic rock		

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 **ST** : strongly developed	**MD** : moderately developed
ped size	**F** : fine **C** : coarse	**M** : medium **VC** : very coarse
ped shape	**S** : single grain **GR** : granular **SAB** : sub-angular blocky **PL** : platy	**M** : massive **AB** : angular blocky **PR** : prismatic

9. **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

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 appropiate 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

SOIL PIT DESCRIPTION

Site Name : W OXON LP N'COURT FM Pit Number : 1P

Grid Reference: SP28780193 Average Annual Rainfall : 680 mm
Accumulated Temperature : 1440 degree days
Field Capacity Level : 146 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 18	MZCL	10YR32 00	0	2	HR					Y
18- 40	HCL	10YR44 54	0	5	HR		MDCSAB	FR	M	Y
40- 50	HCL	10YR44 54	0	20	HR		WKCSAB	FR	M	Y
50- 75	MCL	10YR63 00	0	31	HR				M	Y
75- 90	LMS	10YR72 00	0	47	HR				M	Y

Wetness Grade : 1 Wetness Class : I
Gleying : cm
SPL : No SPL

Drought Grade : 3A APW : 102mm MBW : -5 mm
APP : 103mm MBP : 4 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	ASPECT USE	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	SP28800200	PGR				1	1	082	-25	085	-14	3B				DR	3A	IMP60 AS1P Q2
1P	SP28780193	PGR				1	1	102	-5	103	4	3A				DR	3A	IMP90
1Q	SP28780193	PGR				1	1	110	3	103	4	3A				DR	3A	DR 1P TO 120
2	SP28800190	PGR				1	1	087	-20	092	-7	3B				DR	3A	IMP70 AS1P
3	SP28880192	PGR				1	1	112	5	106	7	2				DR	2	IMP100 BDR2/3A
4	SP28720201	PGR				1	1	091	-16	095	-4	3B				DR	3A	IMP80 AS1P Q2

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	IMP	SPL	CALC	
1	0-30	mcl	10YR41 00						0	0	HR	5						Y	
	30-45	hcl	10YR53 00						0	0	HR	20		M				Y	
	45-60	scl	10YR21 00	10YR66 00	C		00MN00 00		0	0	HR	40		M				Y	IMP60 CALC STONES
1P	0-18	mzcl	10YR32 00						0	0	HR	2						Y	
	18-40	hcl	10YR44 54						0	0	HR	5	MDCSAB	FR	M			Y	
	40-50	hcl	10YR44 54						0	0	HR	20	WKCSAB	FR	M			Y	
	50-75	mcl	10YR63 00						0	0	HR	31		M				Y	
	75-90	lms	10YR72 00						0	0	HR	47		M				Y	IMP 90 CALC STONES
1Q	0-18	mzcl	10YR32 00						0	0	HR	2						Y	
	18-40	hcl	10YR44 54						0	0	HR	5	MDCSAB	FR	M			Y	
	40-50	hcl	10YR44 54						0	0	HR	20	WKCSAB	FR	M			Y	
	50-75	mcl	10YR63 00						0	0	HR	31		M				Y	
	75-120	lms	10YR72 00						0	0	HR	47		M				Y	1P TAKEN TO 120
2	0-28	mcl	10YR42 00						0	0	HR	1						Y	
	28-45	hcl	10YR42 43						0	0	HR	5		M				Y	
	45-70	mcl	10YR64 00						0	0	HR	50		P				Y	IMP70 CALC STONES
3	0-30	mcl	10YR42 00						0	0	HR	5						Y	
	30-45	hcl	10YR53 00						0	0	HR	10		M				Y	
	45-90	hcl	25Y 53 63						0	0	HR	20		M				Y	
	90-100	lms	10YR73 00						0	0	HR	50		P				Y	IMP100 CALC STONES
4	0-25	mcl	10YR42 00						0	0	HR	2						Y	
	25-35	hcl	10YR43 00						0	0	HR	5		M				Y	
	35-45	hcl	10YR44 00						0	0	HR	30		M				Y	
	45-65	mcl	10YR44 00						0	0	HR	35		M				Y	
	65-80	lms	10YR56 00						0	0	HR	35		M				Y	IMP 80 CALC STONES