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Station Road, Alvechurch
Agricultural Land Classification

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Resource Planning Team
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STATION ROAD, ALVECHURCH
AGRICULTURAL LAND CLASSIFICATION SURVEY

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STATION ROAD, ALVECHURCH

AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 37.2 ha of land at Alvechurch. Field survey was based on 35 auger borings and 3 soil profile pits, and was completed in June 1997. During the survey 4 samples were analysed for particle size distribution (PSD).
2. The survey was conducted by the Resource Planning Team of FRCA Western Region on behalf of MAFF in its statutory role in the preparation of the Bromsgrove District Local Plan.
3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as wholly Grade 3, the site had not been surveyed previously. However, the current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF, 1988) and supersedes any previous ALC survey. Grade descriptions are summarised in Appendix I.
4. At the time of survey land cover was grass. Other land which was not surveyed included residential housing, ponds and steep sided wooded land surrounding the ponds.

SUMMARY

5. The distribution of ALC grades is shown on the 1:10 000 scale ALC map. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas. Areas are summarised in the Table 1.

Table 1: Distribution of ALC grades: Station Road, Alvechurch

Grade	Area (ha)	% Surveyed Area (32.8 ha)
3a	6.3	19.2
3b	26.5	80.8
Other land	4.4	-
Total site area	37.2	100.0

6. The agricultural land across the site has been graded largely as Subgrade 3b with some Subgrade 3a. The Subgrade 3a land occurs in the north east of the site, south of School Lane and West of Redditch Road. The Subgrade 3b land covers the remaining site area. The soils have moderate limitations to their agricultural use, due to soil wetness.

CLIMATE

7. Estimates of climatic variables for this site were derived from the published agricultural climate dataset "Climatological Data for Agricultural Land Classification" (Meteorological Office, 1989) using standard interpolation procedures. Data for key points around the site are given in Table 2 below.

8. Since the ALC grade of land is determined by the most limiting factor present, overall climate is considered first because it can have an overriding influence by restricting land to a lower grade despite more favourable site and soil conditions. Parameters used for assessing overall climate are accumulated temperature, a measure of relative warmth and average annual rainfall, a measure of overall wetness. The results shown in Table 2 indicate that there is no overall climatic limitation.

9. Climatic variables also affect ALC grade through interactions with soil conditions. The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes, which are compared with the moisture available in each profile in assessing soil droughtiness limitations. These are described in later sections

Table 2: Climatic Interpolations: Station Road, Alvechurch

Grid Reference	SP 026 720
Altitude (m)	130
Accumulated Temperature (day °C)	1347
Average Annual Rainfall (mm)	751
Overall Climatic Grade	1
Field Capacity Days	178
Moisture deficit (mm): Wheat	89
Potatoes	76

RELIEF

10. Altitude ranges from 105 metres in the extreme south east of the site to 140 metres around High House Farm. The land is gently sloping over the majority of the site, with some gradients in the south of the site exceeding 7° and therefore limiting some areas to Subgrade 3b.

GEOLOGY AND SOILS

11. The underlying geology of the site is shown on the published geology map (IGS, 1979) as Triassic Mudstones. The recent survey found the soils across the site to be clay loams overlying the clay.

12. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as Whimple 3 in the South West of the site, a small area of Wigton Moor Soils in the South East bordering Redditch Road, and Brockhurst 2 soils over the remaining site area.

13. The Brockhurst 2 Association is described as having slowly permeable, seasonally waterlogged reddish fine loamy over clayey and clayey soils. The soils described for the Whimple 3 Association are reddish fine loamy over clayey soils which have slowly permeable subsoils and slight seasonal waterlogging. The Wigton Moor Association has fine and coarse loamy soils which are variable affected by groundwater.

14. The majority of the soils described in the present survey were heavy and poorly drained with some better drained soils in the north east.

AGRICULTURAL LAND CLASSIFICATION

15. The distribution of ALC grades found by the current survey is shown on the accompanying 1:10 000 scale map and areas are summarised in Table 1. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas.

Subgrade 3a

16. An area of Subgrade 3a, good quality agricultural land was identified in the recent survey. This land was mapped in the north and north east of the site and the soils described as medium clay loam topsoils overlying heavy clay loam subsoils which overlay clay to depth. Three soil profile pits confirmed the clay as slowly permeable, and the soils were assessed as Wetness Class III. (See Appendix II).

Subgrade 3b

17. The majority of the site has been mapped as land of moderate quality. The soils were described as having medium clay loam topsoils which overlie heavy clay loam and clay in the centre and east of the site. The soils were found to be moderately stony however the profile pits confirmed the soils to be limited by wetness, the clay was identified as slowly permeable and the soils were assessed as Wetness Class IV.

18. In the south of the site some areas of land have moderate gradient limitations of 8-9°.

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June 1997

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCE, (1979), UK, South, 1:625 000 series .IGS, London.

HODGSON, J M (Ed) (1974) Soil Survey Field Handbook, Technical Monograph No 5. Soil Survey of England and Wales, Harpenden.

HODGSON, J M (In preparation) Soil Survey Field Handbook, Revised edition.

MAFF (1977) 1:250 000 series Agricultural Land Classification, South West Region. MAFF Publications, Alnwick.

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

METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land Classification. Meteorological Office, Bracknell.

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 3, Soils of Midland and Western England, 1:250 000 scale. SSEW, Harpenden.

SOIL SURVEY OF ENGLAND AND WALES (1984) Soils and Their Use in Midland and Western England, Bulletin No 12. SSEW, Harpenden.

APPENDIX I

DESCRIPTION OF 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 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 most 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.

Source: MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land, MAFF Publications, Alnwick.

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile.

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years.

Wetness Class 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.

Wetness Class 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.

Wetness Class 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.

Wetness Class V

The soil profile is wet within 40 cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years.

Notes: The number of days specified is not necessarily a continuous period.

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

Source: Hodgson, J M (In preparation) Soil Survey Field Handbook, Revised Edition.

APPENDIX III

ABBREVIATIONS AND TERMS USED IN SURVEY DATA

Soil pit and auger boring information collected during ALC survey is held on a computer database and is reproduced in this report. Terms used and abbreviations are set out below. These conform to definitions contained in the Soil Survey Field Handbook (Hodgson, 1974).

1. Terms used on computer database, in order of occurrence.

GRID REF: National 100 km grid square and 8 figure grid reference.

LAND USE: At the time of survey

WHT:	Wheat	SBT:	Sugar Beet	HTH:	Heathland
BAR:	Barley	BRA:	Brassicas	BOG:	Bog or Marsh
OAT:	Oats	FCD:	Fodder Crops	DCW:	Deciduous Wood
CER:	Cereals	FRT:	Soft and Top Fruit	CFW:	Coniferous Woodland
MZE:	Maize	HRT:	Horticultural Crops	PLO:	Ploughed
OSR:	Oilseed Rape	LEY:	Ley Grass	FLW:	Fallow (inc. Set aside)
POT:	Potatoes	PGR:	Permanent Pasture	SAS:	Set Aside (where known)
LIN:	Linseed	RGR:	Rough Grazing	OTH:	Other
BEN:	Field Beans	SCR:	Scrub		

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

GLEYS, SPL: Depth in centimetres to gleying or slowly permeable layer.

AP (WHEAT/POTS): Crop-adjusted available water capacity.

MB (WHEAT/POTS): Moisture Balance. (Crop adjusted AP - crop potential MD)

DRT: Best grade according to soil droughtiness.

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				

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		

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)

MOTTLE COL: Mottle colour using Munsell notation.

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%+

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.

PED. COL: Ped face colour using Munsell notation.

GLEYS: If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

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 or metamorphic rock		

Stone contents are given in % by volume for sizes >2cm, >6cm and total stone >2mm.

STRUCT: The degree of development, size and shape of soil pedes are described using the following notation

<u>Degree of development</u>	WK: Weakly developed	MD: Moderately developed
	ST: Strongly 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	AB: Angular blocky
	SAB: Sub-angular blocky	PR: Prismatic
	PL: Platy	

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	

SUBS STR: Subsoil structural condition recorded for the purpose of calculating profile droughtiness: **G:** Good **M:** Moderate **P:** Poor

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

IMP: If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.

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

CALC: If the soil horizon is calcareous with naturally occurring calcium carbonate exceeding 1% a 'Y' will appear this column.

2. Additional terms and abbreviations used mainly in soil pit descriptions.

STONE ASSESSMENT:

VIS: Visual **S:** Sieve **D:** Displacement

MOTTLE SIZE:

EF: Extremely fine <1mm	M: Medium 5-15mm
VF: Very fine 1-2mm>	C: Coarse >15mm
F: Fine 2-5mm	

MOTTLE COLOUR: May be described by Munsell notation or as ochreous (OM) or grey (GM).

ROOT CHANNELS: In topsoil the presence of 'rusty root channels' should also be noted.

MANGANESE CONCRETIONS: Assessed by volume

N: None	M: Many	20-40%
F: Few <2%	VM: Very Many	>40%
C: Common 2-20%		

STRUCTURE: Ped Development *

WA: Weakly adherent	M: Moderately developed
W: Weakly developed	S: Strongly developed

POROSITY:

P: Poor - less than 0.5% biopores at least 0.5mm in diameter
G: Good - more than 0.5% biopores at least 0.5mm in diameter

ROOT ABUNDANCE:

The number of roots per 100cm ² :	Very Fine and Fine	Medium and Coarse
F: Few	1-10	1 or 2
C: Common	10.25	2 - 5
M: Many	25-200	>5
A: Abundant	>200	

ROOT SIZE

VF: Very fine <1mm	M: Medium 2 - 5mm
F: Fine 1-2mm	C: Coarse >5mm

HORIZON BOUNDARY DISTINCTNESS:

Sharp: <0.5cm	Gradual: 6 - 13cm
Abrupt: 0.5 - 2.5cm	Diffuse: >13cm
Clear: 2.5 - 6cm	

HORIZON BOUNDARY FORM: Smooth, wavy, irregular or broken.*

* See Soil Survey Field Handbook (Hodgson, 1974) for details.

SITE NAME Station Road, Alvechurch		PROFILE NO. Pit 1 (ASP 28)	SLOPE AND ASPECT 3° South	LAND USE PGR	Av Rainfall: 751 mm ATO: 1347 day °C FC Days: 178 Climatic Grade: 1 Exposure Grade: 1	PARENT MATERIAL River Gravel
JOB NO. 33/97		DATE 5/6/97	GRID REFERENCE ST 0273 7179	DESCRIBED BY SH/PB		PSD SAMPLES TAKEN H1 MCL: S30; Z46; C24

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size, Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	30	MCL	7.5YR42	6% > 2cm (S) 16% < 2cm (S+D) 22% HR	None	None	-	-	-	-	MF Fibrous	-	Sharp smooth
2	40	HCL/C	7.5YR53	9% > 2cm (S) 16% < 2cm (S+D) 25% HR	CDFO	Common	MM, CSAB	Firm	Good	Poor	CF Fibrous	-	Abrupt smooth
3	85+	C	5YR53	30% HR (VIS)	MDFO	Many	WCSAB	Firm	Poor	Poor	CVF Fibrous	-	-

Profile Gleyed From: 30
Depth to Slowly Permeable Horizon: 40
Wetness Class: IV
Wetness Grade: 3b

Available Water Wheat: 104 mm
 Potatoes: 87 mm
Moisture Deficit Wheat: 89 mm
 Potatoes: 76 mm
Moisture Balance Wheat: +15 mm
 Potatoes: +11 mm
Droughtiness Grade: 2 (Calculated to 110 cm)

Final ALC Grade: 3b
Main Limiting Factor(s): Wetness

Remarks: H3 SPL but common roots mainly around stones indicate that stones assist drainage and aeration, ∴ criteria for SPL met but borderline.

SITE NAME		PROFILE NO.	SLOPE AND ASPECT		LAND USE		Av Rainfall: 751 mm		PARENT MATERIAL			
Station Road, Alvechurch		Pit 2 (ASP 26)	2-3 ° South East		Permanent Grass		ATO: 1347 day °C		Triassic Mudstone			
JOB NO.		DATE	GRID REFERENCE		DESCRIBED BY		FC Days: 178		PSD SAMPLES TAKEN			
33/97		5/6/97	SP 0248 7183		SH/SK		Climatic Grade: 1		H1: C: S19; Z43; C38 H2: C: S29; Z35; C36			
Exposure Grade: 1												

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size, Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	30	HCL/C	75YR43	2% rounded (VIS)	None	None	-	-	-	-	C fine fib	-	Sharp smooth
2	46	HCL/C	75YR53	c 5% stones, rounded in band to 44c m depth (VIS)	75YR46 Common/ Many	None	STCPR	Very Firm	N/A	Good	C roots fine fib - following ped faces and spaces	-	Smooth abrupt
3	82 augered to 100	C	05YR44 (05YR53) ped face	-	5GY61 Many	None	STCPR	Very Firm	N/A	Poor	Few fine fib following ped faces	-	-

Profile Gleyed From: 30	Available Water	Wheat: mm	Final ALC Grade: 3b/4
Depth to Slowly Permeable Horizon: 46		Potatoes: mm	Main Limiting Factor(s): Wetness
Wetness Class: IV	Moisture Deficit	Wheat: mm	
Wetness Grade: 3b/4		Potatoes: mm	Remarks: Grade dependent on topsoil texture, borderline 3b/4. SPL at 46 cm: WC IV Borderline III
	Moisture Balance	Wheat: mm	
		Potatoes: mm	
	Droughtiness Grade: 1	(Calculated to 120 cm)	

SITE NAME Station Road, Alvechurch		PROFILE NO. Pit 3 (ASP 34)	SLOPE AND ASPECT 3° South	LAND USE Permanent Grass	Av Rainfall: 751 mm ATO: 1347 day °C FC Days: 178 Climatic Grade: 1 Exposure Grade: 1	PARENT MATERIAL Valley gravel
JOB NO. 33/97		DATE 5/6/97	GRID REFERENCE SP 0297 7173	DESCRIBED BY SH/PB		PSD SAMPLES TAKEN MCL: S35; Z43; C22

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size, Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	28	MCL	10YR53	10% HR (VIS)	None	None	-	-	-	-	MF, VF, Fib	-	Sharp smooth
2	46	HCL	7.5YR53	20% HR (VIS)	MDMG 10YR62 CDFO 10YR58	Few	WM, CSAB	Friable	Good	Good	CF, VF, Fib	-	Clear smooth
3	90+	C	5YR44	5% HR (VIS)	CDFG 10YR63	Common	MCPPr	Firm	Poor	Poor	FVF, Fib	-	

Profile Gleyed From: 28
Depth to Slowly Permeable Horizon: 46
Wetness Class: IV
Wetness Grade: 3b

Available Water Wheat: 128 mm
Potatoes: 106 mm
Moisture Deficit Wheat: 89 mm
Potatoes: 76 mm
Moisture Balance Wheat: +39 mm
Potatoes: +30 mm
Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3b
Main Limiting Factor(s): Wetness

Remarks: SPL at 46 cm: WC IV borderline III
Grade 2 on topsoil stones