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Charfield

Agricultural Land Classification

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Resource Planning Team
Bristol
FRCA Western Region

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CHARFIELD

AGRICULTURAL LAND CLASSIFICATION SURVEY

CONTENTS

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INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 271 ha of land at Charfield. Field survey was based on 100 auger borings and 5 soil profile pits, and was completed in January 1997. During the survey 5 samples were analysed for particle size distribution (PSD).

2. The survey was conducted by the Resource Planning Team of FRCA Western Region (formerly ADAS Taunton Statutory Group) on behalf of MAFF in its statutory role in the preparation of South Gloucestershire 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 all Grade 3 except for a small area of Grade 2 around Park Farm, the site was previously surveyed in 1976 at a scale of 1:10560 (ADAS, 1976). 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 arable crops and grassland. An area of 6 ha of agricultural land within the survey area was not surveyed because ownership could not be established. Other land which was not surveyed included residential, industrial and communications.

SUMMARY

5. The distribution of ALC grades is shown on the accompanying 1:20 000 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: Charfield

Grade	Area (ha)	% Surveyed Area (187 ha)
3a	30	16
3b	62	33
4	95	51
Agricultural land not surveyed	6	
Other land	78	
Total site area	271	

6. Small areas of best and most versatile land, Subgrade 3a were found in the recent survey. These have a variety of moderate limitations. The majority of the site is mapped as Subgrade 3b and Grade 4. These soils have moderate and severe wetness limitations, with slowly permeable subsoils. The climatic regime for the area means that the Grade 4 soils would be mapped as Subgrade 3b if the Field Capacity Day value was slightly lower.

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: Charfield

Grid Reference		ST 724 923	ST 722 931	ST 713 921
Altitude (m)		43	25	87
Accumulated Temperature (day °C)		1489	1509	1439
Average Annual Rainfall (mm)		797	785	824
Overall Climatic Grade		1	1	1
Field Capacity Days		179	177	183
Moisture deficit (mm):	Wheat	99	101	92
	Potatoes	89	92	81

RELIEF

10. Altitude ranges from 87 metres at Charfield Hill to 25 metres at Avon House in the north of the site. The steepest land is in the west where some slopes are limiting to agricultural use. The railway runs along a ridge with lower land to the east and west, before rising to the west again.

GEOLOGY AND SOILS

11. The underlying geology of the site is shown on the published geology map (IGS, 1970). The southern and western parts of the site are underlain by Keuper and Tea Green Marl, Dolomitic Conglomerate and Tintern Sandstone. Alluvium is found along the Little Avon River together with some terrace deposits. Charfield itself overlies a complex area of Shales, lavas, limestones and sandstone from the Silurian Era. The recent survey found clearest evidence of marls in the south whilst to the north and west soils developed did not link directly with the mapped geology.

12. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as Worcester Association in the area mapped as Marls, Denchworth on the western edge and Brockhurst 1 and Martock Associations across the rest of the site. More detailed soils information is also available in the 1:63360 scale survey of Malmesbury and Bath area (SSEW, 1974). This map shows a much more complex distribution of soil series but the soils are similarly described as for the mapped Associations.

13. The Worcester Association is described as slowly permeable non-calcareous and calcareous reddish clays over mudstone. Denchworth, Brockhurst 1 and Martock Associations are all slowly permeable soils, Brockhurst being reddish loams over clays, Martock silty over clays and Denchworth clayey.

14. The majority of the soils found in the south were very poorly drained red clays. Some slightly better drained soils were found on the fringes of this area whilst close to the settlement itself stony better drained soils were found. Some of the variations found were picked up in the more detailed soil series map for the area, although variations from this were also found. The soils appear complex particularly in the northern half of the site.

AGRICULTURAL LAND CLASSIFICATION

15. The distribution of ALC grades found by the current survey is shown on the accompanying 1:20 000 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. Several small areas of good quality land were identified in the recent survey. In the fields west of Manor Lane stony profiles were found. A soil profile pit confirmed that there was not wetness in the profiles and they were assessed as Wetness Class I (see Appendix II). Neither did the stone content cause a droughtiness limitation worse than the moderate workability limitation imposed by the heavy clay loam topsoils. Slightly further west on the slightly higher land another soil profile pit confirmed a second type of profile as Subgrade 3a. Here low in the profile slowly permeable red marl was found but without mottling. These soils were assessed as Wetness Class III. Soils related to both these soil types were found to the north of the main road.

17. To the west of the railway line a strip of stony Subgrade 3a land is mapped. A soil profile pit showed the subsoils to become increasingly stony but the droughtiness limitation was no worse than the moderate workability limiation imposed by the heavy clay loam topsoil. These soils are more stony than those to the west of Manor Lane and may be volcanic in origin.

18. Around Park Farm, medium clay loam topsoils were found in moderately drained profiles which were assessed as Wetness Class III. Included in this unit are some better drained soils. It is possible that these soils may extend into the area not surveyed to the north.

Subgrade 3b

19. Various areas of moderate quality land were identified in the survey area. These were primarily soils with moderate wetness limitations, assessed as Wetness Class III. Combined with heavy clay loam topsoils these soils are limited to Subgrade 3b. There are also occasional Wetness Class I profiles with moderate workability limitations imposed by clay topsoils. In the west there is some sloping land with moderate gradient limitations. At Charfield Hill sandier profiles were found, but the combination of Wetness Class IV and the medium sandy loam topsoil still imposed a moderate wetness limitation, Subgrade 3b.

Grade 4

20. Over half of the agricultural land has been mapped as poor quality land with severe wetness limitations. These heavy clay loam and silty clay loam topsoils overlie mainly red clays which are slowly permeable. These soils are assessed as Wetness Class IV. The field capacity day value for the site means that these soils are mapped as Grade 4, however if the field capacity day value was slightly less then the soils would be Subgrade 3b. The slowly permeable layer in the red marls was confirmed in a pit and showed that there was little evidence of waterlogging except a few manganiferous concentrations. However the requirements for the SPL were met for red soils. Along the Little Avon River alluvial deposits were also assessed as Wetness Class IV, but these soils were not reddish in colour.

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April 1997

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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.

GLEY, 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.

GLEY: 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 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	**VC:**	Very coarse
Ped Shape	**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	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Charfield	Pit 1	3°E	PLO	Av Rainfall: 797 mm ATO: 1489 day °C	Keuper Marl
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 179 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN
3/97	23/1/97	ST 7283 9178	GMS/PRW		Topsoil: S15%; Z57%; C28% HZCL/MZCL

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	31	HZCL	7.5YR42	None	None	None	-	-	-	-	-	-	-
2	62	C	5YR44 2.5YR44 from 48 cm (5YR54)	None	FFFO	Few	MCPr	Firm	Poor	Poor	CF, VF outside ped	-	-
3	70	C	5GY51	None	None	None	WCSAB	Firm	Mod	Poor	-	-	-
4	100+	C	2.5YR44 (5YR54)	None	None	Few	MCPr	Firm	Poor	Poor	CF, VF outside ped	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: 31 cm

Wetness Class: IV

Wetness Grade: 4

Available Water	Wheat:	130 mm
	Potatoes:	109 mm
Moisture Deficit	Wheat:	99 mm
	Potatoes:	89 mm
Moisture Balance	Wheat:	31 mm
	Potatoes:	20 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 4

Main Limiting Factor(s): Wetness

Remarks: Borderline to 3b based on FCD. Grade 4 seems harsh.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Charfield	Pit 2	2°E	PGR	Av Rainfall: 797 mm ATO: 1489 day °C	Keuper Marl
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 179 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN
3/97	24/1/97	ST 7170 9190	PRW/GMS		Topsoil S47%; Z26%; C17% MSZL/MCL

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	26	MCL	10YR43	<1% HR (VIS)	None	None	-	-	-	-	MFVF	-	Abrupt smooth
2	62 (58)	C	7.5YR44	<1% HR (VIS)	None	None	MCSAB	Friable	Mod	Good	CVF	-	Wavy smooth
3	80+	C	5YR44 with some 5GY61	None (VIS)	None	None	WMPr breaking to MCAB	Firm	Poor	Few ex ped	CVF ex ped mostly	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: 62

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 135 mm

Potatoes: 114 mm

Moisture Deficit Wheat: 99 mm

Potatoes: 89 mm

Moisture Balance Wheat: 36 mm

Potatoes: 25 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Charfield	Pit 3	7°E	PGR	Av Rainfall: 797 mm ATO: 1489 day °C FC Days: 179 Climatic Grade: 1 Exposure Grade: 1	Tintern Sandstone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		PSD SAMPLES TAKEN
3/97	24/1/97	ST 7143 9220	PRW/GMS		Topsoil S62%; Z22%; C16% MSL

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	32	MSL	10YR43	1% HR (VIS)	None	None	-	-	-	M	CVF	-	Clear smooth
2	73	SC	10YR43 (10YR53)	None	CFFO 10YR56	None	WCSAB with some WCAB and a slight tendency to prismatic	Friable	Mod	<0.5%	CVF	-	Abrupt smooth
3	84	C	5Y63	None	Common Fine 10YR58	Few	Not assessed	-	-	<0.5% biopores	-	-	Abrupt wavy
4	92	SCL with lenses of clay	10YR44	None	Common Fine Faint 10YR56	-	Not assessed	-	-	M	-	-	-

Profile Gleyed From: 32 cm

Depth to Slowly Permeable Horizon: 32 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 152 mm

Potatoes: 115 mm

Moisture Deficit Wheat: 99 mm

Potatoes: 89 mm

Moisture Balance Wheat: 53 mm

Potatoes: 26 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks: H2 not obviously SPL, reluctantly agreed to SPL. Gleying difficult to assess.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Charfield	Pit 4	0°	PGR	Av Rainfall: 797 mm ATO: 1489 day °C FC Days: 179 Climatic Grade: 1 Exposure Grade: 1	Andesitic Lava (igneous)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		PSD SAMPLES TAKEN
3/97	28/1/97	ST 7212 9251	GMS		Topsoil S26%; Z43%; C31% HCL

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	22	HCL	7.5YR43	Neg (VIS)	None	None	-	-	-	-	MVF	-	Abrupt smooth
2	35	HCL	0.5YR43	8% HR> 2cm (S) 25% HR> 2mm (S+D) 33% HR Total	None	None	WMSAB	Friable	Good	Good	MVF	-	Clear smooth
3	70+	HCL	0.5YR44	40% HR> 2cm (S) 14% HR> 2mm (S+D) 54% HR Total	None	None	WMSAB	Friable	Good	Good	CVF	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 3a

Available Water Wheat: 121 mm

Potatoes: 93 mm

Moisture Deficit Wheat: 99 mm

Potatoes: 89 mm

Moisture Balance Wheat: +22 mm

Potatoes: +5 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Workability

Remarks: Some of stone appears to be volcanic with large holes through similar to worm channels improving drainage further.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Charfield	Pit 5	0°	Cereal	Av Rainfall: 797 mm ATO: 1489 day °C	Keuper Marl/Wenlock
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 179 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN
3/97	29/1/97	ST 7190 9194	GMS		Topsoil S29%; Z43%; C28% HCL/MCL

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	25	HCL	10YR43	<1% HR (S)	None	None	-	-	-	-	CVF	-	Abrupt smooth
2	38	C	7.5YR54	8%HR>2cm (S) 10% HR> 2mm (S+D) 18% HR Total	None	None	WCSAB	Friable	Mod	Good	CVF	-	Clear wavy
3	70	C	5Y62 7.5YR54, 64	5% HR >2cm (S) 13% HR>2mm (S+D) 18% HR Total	None	None	W+MCAB with prismatic tendencies	Friable	Mod	Poor	FVF	-	-
4	At this depth several large stones were encountered												

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: I

Wetness Grade: 3a

Available Water	Wheat:	92 mm
	Potatoes:	105 mm
Moisture Deficit	Wheat:	99 mm
	Potatoes:	89 mm
Moisture Balance	Wheat:	-7 mm
	Potatoes:	+16 mm

Droughtiness Grade: 3a (Calculated to 70 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Workability

Remarks: Some stones in H3 are just very weathered parent marl.