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Land at Newent
Agricultural Land Classification
January 1998

Resource Planning Team
Bristol
FRCA Western Region

Job Number 83/97

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NEWENT '97

AGRICULTURAL LAND CLASSIFICATION SURVEY

CONTENTS

	Page
INTRODUCTION	1
SUMMARY	1
CLIMATE	2
MANTLEY HOUSE, NEWENT	2
WEST SITE, NEWENT	5
REFERENCES	8
APPENDIX I Description of the Grades and Subgrades	9
APPENDIX II Definition of Soil Wetness Classes	11
APPENDIX III Survey Data:	12
	Sample Point Location Map
	Pit Descriptions
	Boring Profile Data
	Boring Horizon Data
	Abbreviations and Terms used in Survey Data

NEWENT '97

AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 120.8 ha of land in two sites at Newent, Gloucestershire. Field survey was based on 114 auger borings and eight soil profile pits, and was completed in January 1998. During the survey 10 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 Forest of Dean District Local Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. 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.

SUMMARY

4. The distribution of ALC grades is shown on the accompanying 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 Table 1 below.

Table 1: Distribution of ALC grades: Newent

Grade	Area (ha)	% Surveyed Area (109.0ha)
1	19.9	18
2	28.9	27
3a	29.9	27
3b	26.2	24
4	4.1	4
Other land	11.8	-
Total site area	120.8	100

5. Of the land surveyed at Newent 72% was found to be best and most versatile. This primarily coincides with the areas of Bromsgrove sandstone which are found in the vicinity and have weathered to deep sandy soils. Most of the Grade 2 mapping units are sandier than the Grade 1 areas and have minor drought limitations. Locally there are areas to the west of Newent limited by gradient. The large area of Subgrade 3a and Subgrade 3b land extending south-east from Newent is developed over Mercia Mudstone and consists of mainly medium clay loam topsoils on the Subgrade 3a land and heavy clay loam topsoils on the Subgrade 3b

land, over red clayey slowly permeable subsoils giving moderate and severe wetness limitations.

CLIMATE

6. Estimates of climatic variables for each 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 sites are given in the relevant sections.

7. 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 Tables 2 and 3 indicate that there is no overall climatic limitation.

8. 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.

MANTLEY SITE, NEWENT

9. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as being mostly Grade 1 with some Grade 2 towards Oxenhall, the site was previously surveyed in 1983 at a scale of 1:13 700 (ADAS, 1983). The potential route of the A 40, running to the north of the town was also surveyed in 1991 (ADAS, 1991).

10. The 1983 survey was carried out under the published classification system in use at that time. The system was revised in 1988 and it is to these guidelines that the current survey has been undertaken. Generally similar profiles were found in each survey; well drained, sandy soils with variable stone contents and of variable depth. The revised guidelines give precise criteria for assessing the Wetness Class (see Appendix II) and other aspects of grading the land. There are also precise criteria for the calculation of potential droughtiness which were not available to the 1983 survey.

11. The land around and to the west of Mantley Chase was mainly mapped as Grade 2 in the 1983 survey. During the current survey this has now been assessed as Grade 1 and Subgrade 3a. The previous survey mainly found profiles with either weathered sandstone or variable sandy clay loams in the lower subsoils. These were downgraded due to droughtiness but as it is mentioned in Paragraph 10 the current system has precise guidelines for the calculation of droughtiness which showed that deep profiles with sandy clay loam subsoils are generally Grade 1 but where there is more sandstone in the profile they are Subgrade 3a due to droughtiness.

Climate

12. The following data is taken to represent the site.

Table 2: Climatic Interpolations: Mantley Site, Newent

Grid Reference	SO 713 261
Altitude (m)	44
Accumulated Temperature (day °C)	1473
Average Annual Rainfall (mm)	765
Overall Climatic Grade	1
Field Capacity Days	165
Moisture deficit (mm):	
Wheat	104
Potatoes	95

Relief

13. Altitude ranges from 32 metres on Horsefair Lane to 60 metres at the southern end of the site near the nursery with mainly gentle and moderate gradients. There are strong and moderately steep gradients in the valley in the middle of the site on either side of the B 4221 which limit the land to Subgrade 3b and Grade 4.

Geology and Soils

14. The underlying geology of the site is shown on the published geology map (BGS, 1988) as being mainly Bromsgrove Sandstone. Alluvium is mapped along the stream and there is a band of Mudstone running north-east to south-west through the site. Alluvial soils were found by the stream and profiles of varying depth developed over sandstone cover the rest of the site.

15. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as being from the Bromsgrove and Bridgnorth Associations, which are both developed over sandstone. More detailed soils information is also available in the 1:25 000 scale survey (SSEW, 1985) which shows soil series including Bromsgrove, Bridgnorth, Cuckney, Eardiston and Newent. However it was not possible to confirm these units at this level of survey.

16. The Bromsgrove Association is described as comprising well drained reddish coarse loamy soils over soft sandstone which may be deep in places. They are associated with fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. In contrast Bridgnorth soils are described as well drained sandy and coarse loamy over soft sandstone. The soils found during the current survey were mostly well drained and of varying depths over weathered sandstone.

Agricultural Land Classification

17. 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.

Grade 1

18. The land mapped as Grade 1 consists of deep well drained sandy loam and medium clay loam topsoils over sandy clay loam subsoils. The profiles were assessed as Wetness Class I. With the relatively high local rainfall and the absence of stones there is no drought limitation as is confirmed by Pit 4 from the Southend Lane site. This mapping unit is also discussed in Paragraph 11.

Grade 2

19. The profiles in this mapping unit are similar to those of the Grade 1 land, but with reddish clay and sandy clay lower subsoils which have a slightly lower available water content than the sandy clay loams. This means that the amount of available moisture in the profile is reduced leading to a minor droughtiness limitation. Pit 8 represents this mapping unit.

Subgrade 3a

20. The Subgrade 3a land on the southern side of the B 4221 is developed on sandstone. These profiles are well drained and were assessed as Wetness Class I. They typically consist of medium sandy loam topsoil over loamy medium sands with loamy sand or sandstone at depth. Where the sandstone has not weathered down fractured bedrock is found at the bottom of the profiles. In either case the available water in the profile is reduced and there may be a moderate drought limitation. This is represented by Pit 8 and is also discussed in Paragraph 11.

21. A narrow band of Subgrade 3a is also along the stream to the north west of Mantley House is developed on alluvium. These profiles consist of heavy clay loam topsoils over heavy clay loam subsoils. The subsoils contain mottling and manganese concretions and are gleyed, but this starts below 40 cm and they are not slowly permeable so they were assessed as Wetness Class II with a moderate wetness limitation.

Subgrade 3b

22. The Subgrade 3b land immediately to the north of the stream on the northern side of the B 4221 is downgraded because of strongly sloping gradients of 9-11°. This will restrict the accurate use of some agricultural machinery, thus restricting cropping practises.

23. The rest of the land has a moderate drought limitation where the soil textures are lighter than the Subgrade 3a land. The profiles typically consist of deep well drained loamy medium sands to depth again reducing the amount of available moisture in the profile.

Grade 4

24. The Grade 4 land on either side of the B 4221 is downgraded because of moderately steep and steep gradients of 12-17°. This will restrict the safe and accurate use of some agricultural machinery, thus restricting cropping practises.

EAST SITE, NEWENT

25. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as being Grade 1 on the western side and Grade 3 on the eastern side, the site was previously surveyed in 1983 at a scale of 1:13 700 (ADAS, 1983). The potential route of the A 40 to the north of the town was also surveyed in 1991 (ADAS, 1991).

26. The 1983 survey was carried out under the published classification system in use at that time. The system was revised in 1988 and it is to these guidelines that the current survey has been undertaken. Generally similar profiles were found in each survey: well drained, sandy soils with variable stone contents and of variable depth. The revised guidelines give precise criteria for assessing the Wetness Class (see Appendix II) and other aspects of grading the land. There are also precise criteria for the calculation of potential droughtiness which were not available to the 1983 survey.

27. The field at the top of Southend Lane, opposite the nurseries, was mapped in 1983 as mainly Grade 2 with some Grade 1, whereas the current survey found Subgrade 3a due to a moderate wetness limitation. The profiles have reddish clay subsoils which are known to mask evidence of wetness even though they may be slowly permeable. This characteristic was not recognised in the previous classification system but is now recognised in the current system causing some areas to be downgraded.

28. The western half of the field opposite the filling station on the B 4216 was shown in the 1983 survey as Subgrade 3a due to wetness, largely due to the evidence of ochreous mottling in the upper subsoils. In the current survey the mottling was apparent but it was found to start below 40 cm and its cause was a high local water table rather than a slowly permeable layer. According to the present system this type of profile is assessed as Wetness Class I and with heavy clay loam topsoils gives Grade 2. The rest of the field was mapped as Grade 2 in 1983 but has now been mapped as Subgrade 3a. This is for reasons similar to those mentioned in Paragraph 26 where the soils are developed over Mercia Mudstone.

29. At the time of survey land cover was permanent and ley pasture, winter wheat and cereal stubble.

Climate

30. The data shown in Table 3. is taken to represent the site.

Relief

31. Altitude ranges from 25 metres along the stream in the centre of the site, to 45 metres on the edge of the town with mainly gentle and moderate gradients which are not limiting.

Table 3: Climatic Interpolations: Southend Lane and The B 4216, Newent

Grid Reference	SO 728 256
Altitude (m)	30
Accumulated Temperature (day °C)	1488
Average Annual Rainfall (mm)	737
Overall Climatic Grade	1
Field Capacity Days	161
Moisture deficit (mm): Wheat	106
Potatoes	99

Geology and Soils

32. The underlying geology of the site is shown on the published geology map (BGS, 1988) as being mainly Bromsgrove Sandstone, with Mercia Mudstone on the eastern side of the site.

33. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as being from the Hodnet and Bromsgrove Associations. More detailed soils information is also available in the 1:25 000 scale survey (SSEW, 1985) which shows soil series including Bromsgrove, Dunnington Heath, Hodnet, Melbourne, Newent, Staunton and Whimple. However it was not possible to confirm these units at this level of survey.

34. The Hodnet Association is described as comprising reddish fine and coarse loamy soils with slowly permeable subsoils and slight seasonal waterlogging. There may be some similar well drained reddish fine loamy soils. In contrast the Bromsgrove Association is described as well drained reddish coarse loamy soils over soft sandstone but deep in places. They are associated with fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging.

35. This was largely borne out by the current survey with mostly well drained soils over sandstone with varying amounts of stone being found. On the mudstone the soils were clayey and poorly drained with slowly permeable subsoils.

Agricultural Land Classification

36. 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.

Grade 1

37. The land mapped as Grade 1 on the south-east side of Newent consists of deep well drained sandy loams and clay loams over sandy clay loam subsoils. The profiles were assessed as Wetness Class I. With the relatively high local rainfall and the absence of stones there is no

drought limitation as is confirmed by Pit 4. The Grade 1 land near the B 4216 is slightly heavier with medium sandy loam topsoils over sandy clay loams and sandy clay subsoils being found. There can be gleying present in the subsoil but this starts below 40 cm and a slowly permeable sandy clay subsoil was seen to start below 80 cm. They were therefore assessed as Wetness Class I. They are similar to Pit 6 except that they have a lighter textured topsoil. Paragraph 27 also mentions this mapping unit.

Grade 2

38. The majority of profiles in this mapping unit are similar to those described above except that they have weathered sandstone at depth which will reduce the available water content. This indicates a minor droughtiness limitation and is illustrated by Pit 5. This mapping unit also includes scattered Grade 1 and Subgrade 3a profiles where the depth to the sandstone varies.

39. The Grade 2 land near the B 4216 has heavier textures and may show gleying in the subsoil but this starts below 40 cm so the profiles were assessed as Wetness Class I. They have heavy clay loam topsoils which indicate a minor workability limitation and this is illustrated by Pit 6.

Subgrade 3a

40. The Subgrade 3a mapping units have a moderate wetness limitation. As is mentioned in Paragraphs 26 and 27 the soils are developed over Mercia Mudstone which weathers to reddish clay loams and clays. There can be gleying in the subsoils but this is below 40 cm, and in the absence of an slowly permeable layer the profiles were assessed as Wetness Class III. PSD analysis shows that the topsoils are lighter than hand texturing and field workability would suggest, with Pit 2 actually having a fine sandy silt loam topsoil which leads to Grade 2. Pits 2 and 3 illustrate these two mapping units.

Subgrade 3b

41. These soils are developed over the Mercia Mudstone and have heavy and medium clay loam topsoils over reddish clay subsoils which are slowly permeable and were assessed as Wetness Class IV. The depth to the slowly permeable subsoil varies across the mapping unit and where it is deeper the profiles were assessed as Wetness Class III. These are graded as Subgrade 3b with heavy clay loam topsoils but as Subgrade 3a where there are medium clay loam topsoils respectively, so there are a few isolated Subgrade 3a profiles within the mapping unit.

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February 1998

REFERENCES

ADAS RESOURCE PLANNING TEAM, (1983) Agricultural Land Classification Survey of Newent. Scale 1:13 700, Reference 30, ADAS Bristol.

ADAS RESOURCE PLANNING TEAM, (1991) Agricultural Land Classification Survey of Longford (A 40) to M 50 Gorsley Road. Scale 1:10 000, Reference 14/91, ADAS Bristol.

BRITISH GEOLOGICAL SURVEY (1988) Sheet 216, Tewkesbury 1:50 000 series Solid and Drift edition. BGS, London.

HODGSON, J M (Ed) (1997) Soil Survey Field Handbook. Soil Survey Technical Monograph No 5, Silsoe.

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 5, Soils of South West England, 1:250 000 scale. SSEW, Harpenden.

SOIL SURVEY OF ENGLAND AND WALES (1984) Soils and Their Use in South West England, Bulletin No 14. SSEW, Harpenden.

SOIL SURVEY OF ENGLAND AND WALES (1985) Sheet SO72, Newent, 1:25 000 scale. 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 (Ed) (1997) Soil Survey Field Handbook. Soil Survey Technical Monograph No 5, Silsoe.

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, 1997).

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 peds are described using the following notation

<u>Degree of development</u>	WA: Weakly developed Adherent	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
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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%		

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, 1997) for details.

SITE NAME		PROFILE NO.	SLOPE AND ASPECT		LAND USE		Av Rainfall: 758 mm		PARENT MATERIAL			
Newent		Pit 1 (ASP85)	1 ° West		Permanent Grass		ATO: 1477 day °C		Mercia Mudstone			
JOB NO.		DATE	GRID REFERENCE		DESCRIBED BY		FC Days: 161		PSD SAMPLES TAKEN			
83/97		13/1/98	SO 732 254		PB/HLJ		Climatic Grade: 1		Topsoil 0-25 MCL S:34 Z:45 C:21			
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	20	MCL	10YR52	0% (vis)	FRRC	None	-	-	-	Good	MF+VF	-	Abrupt Wavy
2	45	HCL/C	10YR63	1% HR (vis)	CDMO (10YR56)	Few	WKCPPr	Friable	Moderate	Good* ¹	CVF	-	Abrupt Smooth
3	75+	C	0.5YR54 (0.5YR63)	0% (vis)	FFFO (75YR56)	None	WKCPPr	Firm	Moderate	Poor	FVF	-	-

Profile Gleyed From: 20 cm Slowly Permeable Horizon From: 45 cm Wetness Class: IV Wetness Grade: 3b	Available Water Wheat: 140 mm Potatoes: 116 mm Moisture Deficit Wheat: 106 mm Potatoes: 99 mm Moisture Balance Wheat: 34 mm Potatoes: 17 mm Droughtiness Grade: 1 (Calculated to 120 cm)	Final ALC Grade: 3b Main Limiting Factor(s): Wetness Remarks: * ¹ many small pores, no large ones
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SITE NAME		PROFILE NO.	SLOPE AND ASPECT		LAND USE		Av Rainfall: 758 mm		PARENT MATERIAL			
Newent		Pit 2 (ASP124)	3° West		Cereal		ATO: 1477 day °C		Mercia mudstone			
JOB NO.		DATE	GRID REFERENCE		DESCRIBED BY		FC Days: 161		PSD SAMPLES TAKEN			
82/97		12/1/98	SO 726 249		PB/HLJ		Climatic Grade: 1		Topsoil 0-25 FSZL S:41 Z:43 C:16			
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	28	FSZL	7.5YR52	0% (vis)	None	None	-	-	-	Good	CVF	-	Sharp Smooth
2	42	C	7.5YR54,63	0% (vis)	CDFO+P (7.5YR56) (7.5YR53)	None	WKCPPr	Friable	Moderate	Good	CVF	-	Gradual Smooth
3	60	C	0.5YR54 7.5YR72 (7.5YR62)	0% (vis)	CDFO (7.5YR56)	Few	WKCPPr	Firm	Poor	Good	FVF	-	Gradual Smooth
4	80 (95)	C	0.5YR54 7.5YR72 (7.5YR62)	0% (vis)	CDFO (7.5YR56)	Few	WKCPPr	Firm	Poor	Poor	FVF	-	Clear Smooth
5	120	C	2.5YR44	0% (vis)	None	Few	-	Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 28-95 cm	Available Water	Wheat: 143 mm	Final ALC Grade: 2
Slowly Permeable Horizon From: 60 cm		Potatoes: 120 mm	Main Limiting Factor(s): Wetness
Wetness Class: III	Moisture Deficit	Wheat: 106 mm	
Wetness Grade: 2		Potatoes: 99mm	Remarks: Pit dug to 80, boundary between H4 and H5 at 95 cm Augered to 120 cm Subgrade 3a mapping unit
	Moisture Balance	Wheat: 37 mm	
		Potatoes: 21 mm	
	Droughtiness Grade: 1	(Calculated to 120 cm)	

SITE NAME Newent		PROFILE NO. Pit 3 (ASP 118)	SLOPE AND ASPECT Level	LAND USE Permanent Grass	Av Rainfall: 758 mm ATO: 1477 day °C	PARENT MATERIAL Mercia mudstone
JOB NO. 83/97		DATE 12/1/98	GRID REFERENCE SO 724 250	DESCRIBED BY HLJ/PB	FC Days: 161 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN Topsoil 0-25 MCL S:36 Z:41 C:23

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	MCL	0.5YR43	0% (vis)	None	None	-	-	-	-	CF+VF	-	Clear Smooth
2	58	HCL	2.5YR43	0% HR (vis)	None	None	WKCP	Firm	Poor	Good	CVF	-	Clear Smooth
3	72	C	2.5YR34 (0.5YR63)	0% (vis)	None	Few	WKCP	Firm	Poor	Poor	FVF	-	Abrupt Smooth
4	90+	C	2.5YR34 5GY61	30% MSST (vis)	CDFO ^{*1} 10YR66	Common	WKCSAB	Firm	Moderate	Poor	FVF	-	

Profile Gleyed From: 72 cm
Slowly Permeable Horizon From: 58 cm
Wetness Class: III
Wetness Grade: 3a

Available Water Wheat: 118 mm
Potatoes: 98 mm
Moisture Deficit Wheat: 106 mm
Potatoes: 99 mm
Moisture Balance Wheat: 12 mm
Potatoes: -1 mm
Droughtiness Grade: 2 (Calculated to 120 cm)

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

Remarks: ^{*1} H4 Mottles in pale tea green marl. Only few Mn in H3 to be evidence of wetness. Water in pit is sitting on H4. Does this mean H3 is not an spl and therefore WCII.

SITE NAME Newent		PROFILE NO. Pit 4 (ASP68)	SLOPE AND ASPECT 1 ° South	LAND USE Permanent Grass	Av Rainfall: 758 mm ATO: 1477 day °C	PARENT MATERIAL Bromsgrove sandstone
JOB NO. 83/97		DATE 12/1/98	GRID REFERENCE SO 726 255	DESCRIBED BY PB/HLJ	FC Days: 161 Climatic Grade: 1 Exposure Grade: 1	PSD SAMPLES TAKEN Topsoil 0-25 FSL S:52 Z:33 C:15

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	FSL	0.5YR41 7.5YR32	0% (vis)	None	-	-	-	-	Good	MVF	-	Gradual Smooth
2	70	FSL	0.5YR43	0% (vis)	None	None	MDCSAB	Friable	Moderate	Good	CVF	-	Gradual Smooth
3	100+	SCL*1	0.5YR54 (7.5YR63)	0% (vis)	None	None	WKVCSAB	Friable	Moderate	Good	FVF	-	-

Profile Gleyed From: Not gleyed

Slowly Permeable Horizon From: No spl

Wetness Class: I

Wetness Grade: 1

Available Water Wheat: 166 mm

Potatoes: 126 mm

Moisture Deficit Wheat: 106 mm

Potatoes: 99 mm

Moisture Balance Wheat: 60 mm

Potatoes: 27 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 1

Main Limiting Factor(s):

Remarks: *1 red areas are heavier than lighter areas.

SITE NAME		PROFILE NO.	SLOPE AND ASPECT	LAND USE	Av Rainfall: 758 mm	PARENT MATERIAL
Newent		Pit 5 (ASP76)	1 ° South East	Permanent Grass	ATO: 1477 day °C	
JOB NO.		DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 161	PSD SAMPLES TAKEN
83/97		13/1/98	SO 723 254	HLJ/PB	Climatic Grade: 1 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	32	MCL	7.5YR42	0% (vis)	None	None	-	-	-	-	MVF	-	Gradual Smooth
2	57	SCL	7.5YR53	0% (vis)	None	None	MDCSAB	Friable	Moderate	Good	CVF	-	Gradual Smooth
3	82	SCL	7.5YR63	0% (vis)	CDFO (10YR56)	None	WKVCSAB	Friable	Moderate	Good (low)	FVF	-	-
4	90	MSST	7.5YR56,63	Rock	-	-	-	-	(Moderate)	-	-	-	-

Profile Gleyed From: 57 cm

Slowly Permeable Horizon From: No spl *1

Wetness Class: I

Wetness Grade: 1

Available Water Wheat: 124 mm

Potatoes: 115 mm

Moisture Deficit Wheat: 106 mm

Potatoes: 99 mm

Moisture Balance Wheat: 18 mm

Potatoes: 16 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Drought

Remarks: *1 H4 sandstone acting as spl
Moisture balances calculated with FSZL topsoil are 31 and 28 respectively which is Grade 1

SITE NAME		PROFILE NO.	SLOPE AND ASPECT		LAND USE		Av Rainfall: 758 mm		PARENT MATERIAL			
Newent		Pit 6 (ASP34)	1 ° South West		Permanent Grass		ATO: 1477 day °C		Bromsgrove sandstone			
JOB NO.		DATE	GRID REFERENCE		DESCRIBED BY		FC Days: 161		PSD SAMPLES TAKEN			
83/97		13/1/98	SO 7310 2585		PB/HLJ		Climatic Grade: 1		Topsoil 0-25 HCL S:35 Z:35 C:30			
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	7.5YR32	0% (vis)	None	None	-	-	-	Good	MF+VF	-	Gradual Smooth
2	48	HCL	7.5YR42	2% (vis)	None	None	MDCSAB	Friable	Moderate	Good	CVF	-	Abrupt Smooth
3	82	HCL	7.5YR63	0% (vis)	CDMO+P (7.5YR46,72)	Few* ²	WKCP _r	Friable	Moderate	Good * ¹	FVF	-	Clear Smooth
4	103+	SC* ³	0.5YR54 (0.5YR63)	0% (vis)	FDFO+P (7.5YR46,72)	Few	WKCP _r	Friable	Moderate	Poor	FVF	-	-

Profile Gleyed From: 48 cm

Slowly Permeable Horizon From: 82 cm

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 155 mm

Potatoes: 117 mm

Moisture Deficit Wheat: 106 mm

Potatoes: 99 mm

Moisture Balance Wheat: 49 mm

Potatoes: 18 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Workability

Remarks: Water entering above H4.
*¹ low in places
*² Common in parts
*³ heavy textured red, lighter pale

SITE NAME		PROFILE NO.	SLOPE AND ASPECT		LAND USE		Av Rainfall: 758 mm		PARENT MATERIAL	
Newent		Pit 7 (ASP16)	3 ° South East		Permanent Grass		ATO: 1477 day °C		Mudstone	
JOB NO.		DATE	GRID REFERENCE		DESCRIBED BY		FC Days: 165		PSD SAMPLES TAKEN	
82/97		14/1/98	SO 714 261		PB/HLJ		Climatic Grade: 1		Topsoil 0-25 MSL S:67 Z:21 C:15	
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	22	MSL	0.5YR42	1% HR (vis)	None	None	-	-	-	Good	MF+VF	-	Gradual Smooth
2	49	SCL	0.5YR43	1% HR (vis)	None	None	MDCSAB	Friable	Moderate	Good	CVF	-	Clear Smooth
3	75	C	2.5YR43 (2.5YR43)	0% (vis)	0.5G71	None	MDVCP	Very firm	Poor	Good*1	FVF	-	Clear Smooth
4	85	C	2.5YR43 (2.5YR43)	0% (vis)	0.5G71	None	WKCP	Very firm	Poor	Good*2	FVF	-	-
5	120	SC	2.5YR44	0% (vis)	None	None	-	-	(M)	Good	FVF	-	-

Profile Gleyed From: Not gleyed

Slowly Permeable Horizon From: No spl

Wetness Class: I

Wetness Grade: 1

Available Water Wheat: 138 mm

Potatoes: 104 mm

Moisture Deficit Wheat: 104 mm

Potatoes: 95 mm

Moisture Balance Wheat: 34 mm

Potatoes: 9 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Drought

Remarks: *1 & *2 due to many large pores, although these tend to be ex-ped (not all are). Pit dug to 85cm Augered to 120 cm Patches of turquoise in H3 & 4 - not mottles

SITE NAME		PROFILE NO.	SLOPE AND ASPECT		LAND USE		Av Rainfall: 758 mm		PARENT MATERIAL			
Newent		Pit 8 (ASP44)	3 ° North		Fallow		ATO: 1477 day °C		Bromsgrove Sandstone			
JOB NO. 83/97		DATE	GRID REFERENCE		DESCRIBED BY		FC Days: 165		PSD SAMPLES TAKEN			
		13/1/98	SO 712 257		PB/HLJ		Climatic Grade: 1		Topsoil 0-25 MSL S:76 Z:14 C:10			
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	28	MSL	0.5YR43	0% (vis)	None	None	-	-	-	Good	CF+VF	-	Abrupt irregular
2	56	LMS	0.5YR44	1% (vis)	None	None	MDCAB	Very Friable	Moderate	Good	FVF	-	Gradual Smooth
3	84	LMS	2.5YR43	0% (vis)	None	None	WKVCAB	Very Friable	Good	Good	FVF	-	Diffuse Smooth
4	110+	MS	2.5YR44	0% (vis)	None	None	WKVCAB	Very Friable	Good	Good	FVF	-	-

Profile Gleyed From: Not gleyed Slowly Permeable Horizon From: No spl Wetness Class: I Wetness Grade: 1	Available Water Wheat: 101 mm Potatoes: 81 mm Moisture Deficit Wheat: 104 mm Potatoes: 95 mm Moisture Balance Wheat: -3 mm Potatoes: -14 mm Droughtiness Grade: 3a (Calculated to 120 cm)	Final ALC Grade: 3a Main Limiting Factor(s): Drought
		Remarks: H1 is borderline LMS H3 is bordeline MS