

**Gloucestershire Minerals Plan  
Forest of Dean Sites  
Agricultural Land Classification  
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**GLOUCESTERSHIRE MINERALS PLAN  
FOREST OF DEAN SITES**

**AGRICULTURAL LAND CLASSIFICATION SURVEY**

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# GLoucestershire Minerals Plan

## Forest of Dean Sites

### Agricultural Land Classification Survey

#### INTRODUCTION

1 This report presents the findings of detailed Agricultural Land Classification (ALC) surveys of 199 ha of land at 4 sites in the Forest of Dean Gloucestershire. Field survey was based on 186 auger borings and 12 soil profile pits and was completed in August 1997. During the survey 13 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 Gloucestershire Minerals 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 maps. 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 tables below.

**Table 1 Distribution of ALC grades Hewelsfield**

Grade	Area (ha)	% Surveyed Area (81.3 ha)
2	56.7	70
3a	21.6	26
3b	3.0	4
Agricultural land not surveyed	9.2	
Other land	8.4	
Total site area	98.9	

5 This shows that 96% of the area was found to be best and most versatile, mainly Grade 2 and Subgrade 3a, with minor and occasionally moderate limitations, mainly due to restricted workability due to the topsoil textures.

**Table 2 Distribution of ALC grades Stowe Hill Quarry**

Grade	Area (ha)	% Surveyed Area (39.9 ha)
3a	28.1	70
4	11.8	30
Other land	0.4	
Total site area	40.3	

6 This shows that 70% of the surveyed area was found to be best and most versatile This is shown as Subgrade 3a but includes a variety of soil profiles several Grade 2 and some scattered Subgrade 3b The remaining land shown as Grade 4 was found to be consistently heavy and showing evidence of severe wetness

**Table 3 Distribution of ALC grades Pingry Farm Coleford**

Grade	Area (ha)	% Surveyed Area (40.8 ha)
2	12.2	30
3a	17.8	44
3b	10.8	26
Other land	1.2	
Total site area	42.0	

7 This shows that 74% of the surveyed area was found to be best and most versatile This is shown as Subgrade 3a and Grade 2 with limitations mainly due to restricted workability but also due to wetness in the Subgrade 3a Other land is shown as Subgrade 3b with limitations due to gradient stoniness and soil depth

**Table 4 Distribution of ALC grades Drybrook Quarry**

Grade	Area (ha)	% Surveyed Area (13.7 ha)
2	10.8	78
3a	0.2	2
3b	2.7	20
Other land	4.0	
Total site area	17.7	

8 This indicates that 80% of the area surveyed was found to be best and most versatile This is mainly Grade 2 with a minor limitation due to topsoil workability Small areas of Subgrade 3b extending from the east are limited by stronger gradients with slopes of 8-11° and another small area of Subgrade 3b is limited by wetness

## CLIMATE

9 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 section

10 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 at Tables 5 to 8 indicate that there is an overall climatic limitation which limits the land to Grade 2 in all the sites

11 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.

## HEWELSFIELD SITE

12 Apart from the published regional ALC map (MAFF 1977) which shows the site at a reconnaissance scale as Grade 3, the site had not been surveyed previously. Also, there has been no recent detailed ALC survey on this or any land nearby, although a recent survey on similar parent material at Coleford (ADAS 1994) shows mainly Grade 2 with some Subgrade 3a and 3b.

### Climate

13 The following data is taken to represent the site.

**Table 5 Climatic Interpolations Hewelsfield Site**

Grid Reference	SO 570 016	SO 565 016
Altitude (m)	205	183
Accumulated Temperature (day °C)	1303	1329
Average Annual Rainfall (mm)	1039	1021
Overall Climatic Grade	2	2
Field Capacity Days	218	215
Moisture deficit (mm)		
Wheat	68	71
Potatoes	50	54

### Relief

14 Altitude ranges from 183 metres at the north of the site to 207 metres at above Poolfield Court Farm with mainly gentle and moderate slopes which are not limiting.

### Geology and Soils

15 The underlying geology of the site is shown on the published geology map (IGS 1974 1978) as Carboniferous Limestone, mainly Lower Dolomite but with Lower Limestone Shale to the north of the site and Crease Limestone to the south of the site. This distribution was largely borne out by the recent survey.

16 Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250,000 (SSEW 1983) as mainly Crwbin Association which is described as comprising shallow well drained loamy soils over limestone. This was also borne out by the recent survey.

## **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 2**

18 The area shown as Grade 2 comprises the main mapping unit of the site. Typical topsoil texture was medium silty clay loam although medium clay loam and silt loam were also found and confirmed by PSD analysis. At Wetness Class I (See Appendix II) this implies only a minor limitation due to restricted workability. This is defined in the ALC guidelines as a relation between topsoil texture and the climatic characteristics of the site expressed as Field Capacity Days in this case around 215 FC Days. This mapping unit is illustrated by Pits 1, 3 and 4.

19 Within the area scattered borings show slight evidence of wetness in the lower subsoil as common manganese deposits and occasionally as slightly gleyed ped faces. The occasional appearance of red clay in the lower subsoil suggests the possibility of a slowly permeable layer (SPL) and this was investigated at Pit 5. However in this case an SPL was shown not to exist and the profile was assessed as borderline between Wetness Class I and II, borderline also between Grade 2 and Subgrade 3a. This was taken to illustrate the half dozen or so borings through this mapping unit with similar minor wetness characteristics.

### **Subgrade 3a**

20 Rather more convincing wetness characteristics can be seen in a narrow strip at the south of the site and along the ridge around Poolfield Court Farm and these have been identified more positively as Subgrade 3a with a moderate limitation due to wetness. These are mainly medium silty clay loam topsoils at Wetness Class II or III with occasional borings found to be heavy silty clay loam at Wetness Class I.

21 The ridge to the west of Woodland Farms was found more consistently to show heavy silty clay loam topsoil textures at Wetness Class I indicating a moderate limitation due to restricted workability. Although many of the borings across this ridge were found to be shallow and impenetrable to the auger a typical profile at ASP 13 was investigated as Pit 2 and despite a stone content of 70% below 41 cm was found to be droughtiness Grade 2 even when the available water in the profile was calculated only to 60 cm. This is taken to be representative of this mapping unit.

### **Subgrade 3b**

22 Small areas of short slopes in the west of the site were found to be Subgrade 3b with gradients of 8 or 9° and a small area to the west of Poolfield Court Farm was found to be Subgrade 3b with restricted soil depth on shallow soils over rock outcropping almost to the surface.

## Agricultural Land Not Surveyed

23 The area of 9.2 ha at Cows Hill Farm was not surveyed because the owners refused permission for access

## Other Land

24 A small area shown as other land includes roads and tracks, agricultural buildings, residential land, and two small areas of woodland

## STOWE HILL QUARRY SITE

25 Apart from the published regional ALC map (MAFF 1977) which shows the site at a reconnaissance scale as Grade 3, the site had not been surveyed previously. An adjacent site had been previously surveyed as a potential, more limited extension to Stowe Hill Quarry (ADAS 1994). This survey found soils similar to the current survey and shows Grade 2 and Subgrade 3a and 3b. The area shown as Subgrade 3b includes Wetness Class IV profiles similar to those found in the current survey and shown in this case as Grade 4. This apparent inconsistency is due to the observed balance of topsoil textures in the wet area, whereas the 1994 survey found mainly lighter textures, those found in the current survey were mainly heavy silty clay loam or clay.

## Climate

26 The following data is taken to represent the site

**Table 6 Climatic Interpolations Stowe Hill Quarry Site**

Grid Reference	SO 573 069	SO 566 066
Altitude (m)	183	182
Accumulated Temperature (day °C)	1326	1328
Average Annual Rainfall (mm)	1016	1026
Overall Climatic Grade	2	2
Field Capacity Days	216	218
Moisture deficit (mm)   Wheat	72	71
Potatoes	55	54

## Relief

27 Altitude varies little across the site, being around 183 metres, with mainly gentle and moderate slopes which are not limiting.

## **Geology and Soils**

28 The underlying geology of the site is shown on the published geology map (IGS 1974) as Carboniferous Lower Limestone and Limestone Shale. The area in the south east of the site shown as Limestone Shale was found to coincide with the clay soils giving rise to ALC Grade 4.

29 Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW 1983) as the Ston Easton Association. These are described as well drained fine silty over clayey soils on limestone, some being shallow over rock. This was borne out in part by the current survey although the published description does not seem to predict the wet clay soils shown as Grade 4 in the current ALC survey.

## **Agricultural Land Classification**

30 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 2. 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**

31 The area shown as Subgrade 3a includes several Grade 2 borings at the northeast end of the site as well as several others which are borderline to Grade 2. These have mainly medium and heavy silty clay loam topsoils at Wetness Class I indicating a minor limitation due to restricted workability. These are illustrated by Pit 1 which is sited at an impenetrable boring in order to investigate also the extent of a stony but rootable subsoil. In this case it was found to extend from 42 to below 80 cm with around 70% stone but with common very fine roots and was assumed to extend to at least 100 cm for the calculation of available water. Topsoil texture at Pit 1 was confirmed by PSD analysis to be heavy silty clay loam but borderline to medium silty clay loam.

32 The area shown as Subgrade 3a also includes borings which show evidence of wetness with manganese or gleying in the lower subsoil. These were assessed as Wetness Class II. Some borings which were found to be more shallow than that described at Pit 1 were assessed as droughtiness Subgrade 3a. Pit 2 represents perhaps the shallow end of the spectrum but with only 25 cm of topsoil over fissured rock is graded as Subgrade 3b because of restricted soil depth. Taking account of approximately 15% soil matrix in horizon 2 in the calculation of profile available water shows this to be Subgrade 3a on droughtiness. Other shallow profiles were found on a narrow ridge around ASP 18 and 26.

33 Two profiles at ASP 25 and 29 were found to show a possible slowly permeable layer in the lower subsoil similar to Pit 2 in the previous survey (ADAS 1994). These were assessed as Wetness Class IV Subgrade 3b but being few and scattered have been included in the Subgrade 3a mapping unit along with any shallow profiles such as at Pit 2 of the current survey.



## Grade 4

34 The area shown as Grade 4 was found to be deep clay slowly permeable from below the topsoil and therefore Wetness Class IV with either heavy silty clay loam or clay topsoil this was assessed as Grade 4 with a severe limitation due to wetness and is illustrated by Pit 3

## PINGRY FARM COLEFORD

35 Apart from the published regional ALC map (MAFF 1977) which shows the site at a reconnaissance scale as Grade 3 the site had not been surveyed previously In 1994 a survey was carried out for the Forest of Dean Local Plan (ADAS 1994) on land adjacent to the Pingry Farm site This showed mainly Grade 2 adjacent to the current site with some Subgrade 3b on valley sides further to the north

## Climate

36 The following data is taken to represent the site

**Table 7 Climatic Interpolations Pingry Farm**

Grid Reference	SO 576 094	SO 570 095
Altitude (m)	183	213
Accumulated Temperature (day °C)	1325	1291
Average Annual Rainfall (mm)	995	1003
Overall Climatic Grade	2	2
Field Capacity Days	212	213
Moisture deficit (mm)   Wheat	74	72
Potatoes	58	54

## Relief

37 Altitude ranges from 183 m at Pingry Farm to 213 m near Breckness Court Slopes over 7° between Breckness Court Highfield Barn and in the north of the site limit the land to Subgrade 3b at Pingry Farm

## Geology and Soils

38 The underlying geology of the site is shown on the published geology map (IGS 1974) as largely Carboniferous limestone This was borne out by the recent ALC survey which found parent materials to be fractured limestone

39 Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1 250 000 (SSEW 1983) as mainly Crwbin Association which is described as having shallow well drained loamy soils over limestone

40 This was largely borne out by the recent ALC survey which found soils to have largely clay loam topsoils over heavier slightly stony subsoils with some sandier and very stony soils around the north edge of the site Slowly permeable subsoils were found at several borings at the top of the site and confirmed at Pit 1

### **Agricultural Land Classification**

41 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 3 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 2**

42 The Grade 2 mapping unit covers a large part of the south and east of the site These soils were identified as having clay loam topsoils which overlay heavy clay loam or silty clay loam subsoils and clay to depth Pit 2 confirmed that although slightly stony the soils were not droughty and that the clay subsoil was not slowly permeable and therefore there was no wetness limitation The profile was assessed as Wetness Class I which with 212 Field Capacity days implies a workability limitation due to the medium clay loam topsoil texture

#### **Subgrade 3a**

43 An area in the centre of the site was identified as land of good quality Subgrade 3a In this mapping unit the soils generally have clay loam or silty clay loam topsoils which pass onto heavier subsoils Pit 1 confirmed the presence of a slowly permeable layer in the lower subsoil and the profile was assessed as Wetness Class II although below the SPL shattered limestone was found Along the northern edge of this block of Subgrade 3a land the soils were more stony but were also mapped as Subgrade 3a They were considered to be so due to soil droughtiness

#### **Subgrade 3b**

44 An area of land along the northern western and southern boundaries of the site has been identified as land of moderate quality Subgrade 3b In the south and north gradients in excess of 7° downgrade these areas to Subgrade 3b

45 Along the western boundary and in the north immediately bordering the Subgrade 3a land shallow and very stony profiles were found These are illustrated by Pit 3 where the main limitation was assessed as topsoil stone content

## Other Land

46 Other land includes a strip of woodland in the south west near to Breckness Court and a number of farm buildings

## DRYBROOK QUARRY SITE

47 Apart from the published regional ALC map (MAFF 1977) which shows the site at a reconnaissance scale as Grade 3 the site had not been surveyed previously. A recent survey at Manning s Farm Drybrook (ADAS 1994) found mainly Subgrades 3a and 3b but was of soils developed on different parent material

## Climate

48 The following data is taken to represent the site

**Table 8 Climatic Interpolations Drybrook Quarry Site**

Grid Reference	SO 635176	SO 634 179
Altitude (m)	230	255
Accumulated Temperature (day °C)	1266	1238
Average Annual Rainfall (mm)	857	863
Overall Climatic Grade	2	2
Field Capacity Days	187	188
Moisture deficit (mm) Wheat	75	72
Potatoes	57	53

## Relief

49 Altitude ranges from 230 m at the farm buildings to 255 m on the ridge with mainly gentle and moderate slopes which are not limiting but with stronger slopes adjacent to the woodland at the east of the site where gradients of 8-11° limit this area to Subgrade 3b

## Geology and Soils

50 The underlying geology of the site is shown on the published geology map (IGS 1974) as mainly Lower Dolomite (Carboniferous Limestone) with a small area of Crease limestone at the south of the site. This was largely borne out by the current survey particularly on the sloping land whereas in the valley the soil parent material was found to be deeper alluvium

51 Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW 1983) as mainly Crwbin Association which is described as comprising shallow well drained loamy soils over limestone. Dunkswick Association soils are shown nearby. These comprise slowly permeable seasonally waterlogged fine loamy over clayey soils developed on till derived from sandstone and shale. The current survey found soils matching this description in the valley bottom

## **Agricultural Land Classification**

52 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 4. 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 2**

53 Much of the area shown as Grade 2 was found to be medium clay loam topsoil at Wetness Class I, implying a minor limitation due to restricted workability. Auger borings in the area were frequently found to be impenetrable at around 50 cm and this was investigated at Pit 1. This found the stony subsoil to extend from 50 to below 84 cm with a few very fine roots evident. Calculation of available water for the profile to 90 cm shows this to be at least *droughtiness Grade 2* and was taken to be *representative of similar profiles on the sloping land with bright orange or reddish brown soils over limestone rock*.

54 Soils on the same mapping unit on the valley floor were found to be more variable frequently with sandy loam or sandy silt loam topsoil as well as medium clay loam.

### **Subgrade 3a**

55 A small area adjacent to the road and buildings was found to show evidence of wetness in one case with gleying within 40 cm (Wetness Class III) and in another with a distinct slowly permeable layer in the lower subsoil also Wetness Class III.

### **Subgrade 3b**

56 One small area of Subgrade 3b was found to have slopes of 8–11° as described previously but with a soil profile as described as Pit 1 which would be capable of contributing soil resources to any future restoration programme.

57 Another small area at the top of the site was found to have heavy clay loam topsoils but with a slowly permeable layer starting at around 60 cm. This was assessed as Wetness Class III. Subgrade 3b limited by wetness.

### **Other Land**

58 Other land in the survey area includes farm buildings and a bungalow and also a large area of young woodland presumably planted to screen the quarry workings to the east.

59 The owner reports that a main gas pipeline runs through the site just to the east of ASPS 10 13 and 14 This should not affect land quality for agriculture but it may be relevant to possible quarry operations

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24 September 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

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

<b>MREL</b>	Microrelief limitation	<b>FLOOD</b>	Flood risk	<b>EROSN</b>	Soil erosion risk
<b>EXP</b>	Exposure limitation	<b>FROST</b>	Frost prone	<b>DIST</b>	Disturbed land
<b>CHEM</b>	Chemical limitation				

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

<b>OC</b>	Overall Climate	<b>AE</b>	Aspect	<b>EX</b>	Exposure
<b>FR</b>	Frost Risk	<b>GR</b>	Gradient	<b>MR</b>	Microrelief

<b>FL</b>	Flood Risk	<b>TX</b>	Topsoil Texture	<b>DP</b>	Soil Depth
<b>CH</b>	Chemical	<b>WE</b>	Wetness	<b>WK</b>	Workability
<b>DR</b>	Drought	<b>ER</b>	Erosion Risk	<b>WD</b>	Soil Wetness/Droughtiness
<b>ST</b>	Topsoil Stoniness				

**TEXTURE** Soil texture classes are denoted by the following abbreviations

<b>S</b>	Sand	<b>LS</b>	Loamy Sand	<b>SL</b>	Sandy Loam
<b>SZL</b>	Sandy Silt Loam	<b>CL</b>	Clay Loam	<b>ZCL</b>	Silty Clay Loam
<b>ZL</b>	Silt Loam	<b>SCL</b>	Sandy Clay Loam	<b>C</b>	Clay
<b>SC</b>	Sandy clay	<b>ZC</b>	Silty clay	<b>OL</b>	Organic Loam
<b>P</b>	Peat	<b>SP</b>	Sandy Peat	<b>LP</b>	Loamy Peat
<b>PL</b>	Peaty Loam	<b>PS</b>	Peaty Sand	<b>MZ</b>	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

<b>F</b>	Fine (more than 66% of the sand less than 0.2mm)
<b>M</b>	Medium (less than 66% fine sand and less than 33% coarse sand)
<b>C</b>	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

<b>F</b>	faint indistinct mottles evident only on close inspection
<b>D</b>	distinct mottles are readily seen
<b>P</b>	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

<b>HR</b>	All hard rocks and stones	<b>SLST</b>	Soft oolitic or dolimitic limestone
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<b>CH</b>	Chalk	<b>FSST</b>	Soft fine grained sandstone
<b>ZR</b>	Soft argillaceous or silty rocks	<b>GH</b>	Gravel with non porous (hard) stones
<b>MSST</b>	Soft medium grained sandstone	<b>GS</b>	Gravel with porous (soft) stones
<b>SI</b>	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

<b><u>Degree of development</u></b>	<b>WA</b>	Weakly developed Adherent	<b>WK</b>	Weakly developed
	<b>MD</b>	Moderately developed	<b>ST</b>	Strongly developed
<b><u>Ped size</u></b>	<b>F</b>	Fine	<b>M</b>	Medium
	<b>C</b>	Coarse	<b>VC</b>	Very coarse
<b><u>Ped Shape</u></b>	<b>S</b>	Single grain	<b>M</b>	Massive
	<b>GR</b>	Granular	<b>AB</b>	Angular blocky
	<b>SAB</b>	Sub angular blocky	<b>PR</b>	Prismatic
	<b>PL</b>	Platy		

**CONSIST** Soil consistence is described using the following notation

<b>L</b>	Loose	<b>VF</b>	Very Friable	<b>FR</b>	Friable	<b>FM</b>	Firm
<b>VM</b>	Very firm	<b>EM</b>	Extremely firm			<b>EH</b>	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

<b>VIS</b>	Visual	<b>S</b>	Sieve	<b>D</b>	Displacement
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## MOTTLE SIZE

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

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

## POROSITY

<b>P</b>	Poor	less than 0.5% biopores at least 0.5mm in diameter
<b>G</b>	Good	more than 0.5% biopores at least 0.5mm in diameter

## ROOT ABUNDANCE

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

## ROOT SIZE

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

## HORIZON BOUNDARY DISTINCTNESS

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

**HORIZON BOUNDARY FORM** Smooth wavy irregular or broken \*

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