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**Landkey**  
**Agricultural Land Classification**  
**July 1998**

Resource Planning Team  
Bristol  
FRCA Western Region

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**LANDKEY, BARNSTAPLE**  
**AGRICULTURAL LAND CLASSIFICATION SURVEY**

**CONTENTS**

	<b>Page</b>
INTRODUCTION	1
SUMMARY	2
CLIMATE	2
RELIEF	3
GEOLOGY AND SOILS	3
AGRICULTURAL LAND CLASSIFICATION AND MAP	3
REFERENCES	5
APPENDIX I    Description of the Grades and Subgrades	6
APPENDIX II    Definition of Soil Wetness Classes	8
APPENDIX III    Survey Data:	9
	Sample Point Location Map
	Pit Descriptions
	Boring Profile Data
	Boring Horizon Data
	<i>Abbreviations and Terms used in Survey Data</i>

## LANDKEY, NEAR BARNSTAPLE

### AGRICULTURAL LAND CLASSIFICATION SURVEY

#### INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 192.8 ha of land at Landkey, near Barnstaple. Field survey was based on 79 auger borings and 3 soil profile pits, and was completed in June 1998. During the survey 4 samples were analysed for particle size distribution (PSD).

2. The survey was conducted by the Resource Planning Team of FRCA Western Region on behalf of MAFF in its statutory role in the preparation of North Devon Local Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. The published regional ALC map (MAFF 1977), shows the site at a reconnaissance scale as Grade 2 to the north of the village with Grade 3 to the south and east and extensive areas of Grade 4 in the lower lying land through the centre. The site was also included in a 1981 survey of Barnstaple (ADAS 1981) under the guidelines for classification which were in operation at that time. This survey also shows Grade 2 to the north of the village but with mainly Subgrade 3a to the east and south and small patches of Subgrade 3c in the lower lying land. However, the current survey uses the Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (MAFF, 1988) and supersedes any previous survey. In particular the Revised Guidelines rely heavily on the recognition of any slowly permeable layer within the soil profile, critical to the assessment of Wetness Class. They now also require auger borings to be considerably deeper than was the case in 1981. Such differences in the guidelines for classification largely explain any variation between the two surveys. Grade descriptions are summarised in Appendix I.

4. Two other surveys have been carried out in recent years under the Revised Guidelines on land adjacent to the north of the current survey area (both ADAS 1994). These show mainly Subgrade 3a limited by workability on land along the main road at Cradleman's Cross, becoming wetter and shown as Grade 4 north of the old railway line at Acland Cross. These findings are entirely consistent with the current survey and match well at the edges,.

5. At the time of survey land cover was mainly grass with one large field of linseed. Two small areas of agricultural land within the survey area were not surveyed because consent for access for survey was not available or had been refused. Other land which was not surveyed included mainly residential land and roads, the village football pitch and areas of grassland at Hunnacott Farm in the south west of the survey area which had reverted to alder woodland.

## SUMMARY

6. The distribution of ALC grades is shown on the accompanying 1: 12 500 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: Landkey**

Grade	Area (ha)	% Surveyed Area (131.2 ha)
3a	34.2	26
3b	69.4	53
4	27.6	21
Agricultural land not surveyed	3.8	
Other land	57.8	
Total site area	192.8	

7. This shows that 26% of the area surveyed was found to be best and most versatile, Subgrade 3a limited by restricted workability. The rest of the land was found to be Subgrade 3b and Grade 4, all limited by wetness.

## CLIMATE

8. 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.

9. 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.

10. 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. A critical boundary of 200 FC Days was found to run approximately along the 50 metre contour to the north of the village with another small area to the south bounded by the 60 metre contour.



### **Subgrade 3a**

16. The areas shown as Subgrade 3a were found to have heavy clay loam topsoils at Wetness Class I, indicating a moderate limitation due to restricted workability. An isolated boring within this area at ASP 1 was found to be Grade 4 with a clay slowly permeable layer close to the surface and there could be other similar patches within the area shown as Subgrade 3a although no evidence was seen during the current survey. This mapping unit is illustrated by Pit 2.

### **Subgrade 3b**

17. Much of the survey area is shown as Subgrade 3b, typically with heavy clay loam topsoil at Wetness Class III and with a slowly permeable layer starting in the middle to lower subsoil such as illustrated by Pit 1.

18. However, the area of Subgrade 3b shown to the south of the village was found to be variable with several scattered borings of Subgrade 3a and also several of Grade 4 where patches of slowly permeable clay are closer to the surface.

19. Only one observation, at ASP 80E, was found to represent a small area limited to Subgrade 3b by gradient.

### **Grade 4**

20. The areas shown as Grade 4, particularly in the east and centre of the site, were found to be heavy clay loam or heavy silty clay loam topsoil at Wetness Class IV with a slowly permeable layer starting in the upper subsoil. These are illustrated by Pit 3.

21. The areas shown as Grade 4 also include a few scattered borings of Subgrade 3b and one, at ASP 55, which was found to be Subgrade 3a. This was possibly a small patch of better drained material, but it could also be a small part of a larger area of better land which extends beyond the boundary of the survey area.

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27 July 1998

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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 (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

<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.

**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.

<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:**

**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 <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, 1997) for details.

SITE NAME		PROFILE NO.	SLOPE AND ASPECT	LAND USE	Av Rainfall: 949 mm	PARENT MATERIAL
Landkey		Pit 1 (ASP 35)	4 ° S	PGR	ATO: 1533 day °C	Pilton shales
JOB NO.		DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 195	PSD SAMPLES TAKEN
34.98		2.6.98	SS5971 3132	PB	Climatic Grade: 1	TS 0-25 cm : HCL (S25: Z43: C32%)
					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	24	HCL	10YR42	10% HR (vis)	CRRC	0	-	-	-	-	MF, VF	-	Clear Smooth
2	55	HCL	10YR53	10% HR (vis)	0	0	MDM, CSAB	FR	G	G	CVF	-	Clear Smooth
3	60	C	2.5Y62	5% HR (vis)	CDFO 10YR66	0	MDCSAB	FM	M	G	CVF	-	Clear Smooth
4	80+	C	2.5Y74	0	MDMO 10YR66	0	MDCPR	FM	P	P	FVF	-	

Profile Gleyed From: 55 cm

Slowly Permeable Horizon From: 60 cm

Wetness Class: III

Wetness Grade: 3b

Available Water Wheat: 141 mm

Potatoes: 119 mm

Moisture Deficit Wheat: 93 mm

Potatoes: 83 mm

Moisture Balance Wheat: +48 mm

Potatoes: +36 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): We

Remarks:

SITE NAME		PROFILE NO.	SLOPE AND ASPECT		LAND USE		Av Rainfall: 1009 mm		PARENT MATERIAL			
Landkey		Pit 2 (ASP 2)	0°		Linseed		ATO: 1505 day °C		Pilton shales			
JOB NO.		DATE	GRID REFERENCE		DESCRIBED BY		FC Days: 205		PSD SAMPLES TAKEN			
34.98		3.6.98	SS 5886 3159		PB		Climatic Grade: 1		TS 0-25 cm: HCL (S30: Z38: C32%)			
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	25	HCL	10YR42	1% > 2 cm (s) 10% < 2 cm (s+d) 11% HR	0	0	-	-	-	-	MF	-	Clear Smooth
2	50 (45-55)	HCL	10YR54,44	4% > 2 cm (s) 18% < 2 cm (s+d) 22% HR	0	0	MDF, MSAB	FR	G	G	CVF	-	Clear Wavy
3	80+	C	2.5Y62	25% > 2 cm (s) 33% < 2 cm (s+d) 58% ZR	0	F	Too stony	-	(M)	G	FVF	-	

Profile Gleyed From: -  
 Slowly Permeable Horizon From: -  
 Wetness Class: I  
 Wetness Grade: 3a

Available Water Wheat: 126 mm  
 Potatoes: 105 mm  
 Moisture Deficit Wheat: 93 mm  
 Potatoes: 83 mm  
 Moisture Balance Wheat: +33 mm  
 Potatoes: +22 mm  
 Droughtiness Grade: 1 (Calculated to 120 cm)

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

Remarks:



SITE NAME		PROFILE NO.	SLOPE AND ASPECT	LAND USE		Av Rainfall: 901 mm		PARENT MATERIAL				
Landkey		Pit 3 (Asp 71)	3° N	PGR		ATO: 1556 day °C		Alluvium (river terrace deposits)				
JOB NO.		DATE	GRID REFERENCE	DESCRIBED BY		FC Days: 195		PSD SAMPLES TAKEN				
34.98		4.6.98	SS 5968 3090	PB		Climatic Grade: 1		TS 0-25 cm : HZCL (S18: Z49: C33%)				
						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	HZCL	10YR52	1% HR (vis)	CRRC	0	-	-	-	-	MF, VF	-	Clear Smooth
2	36	C	2.5Y52	0	FDFO 7.5YR46	0	MDCPR	FR	M	G (low)	CF, VF	-	Abrupt Smooth
3	66+	C	5Y71	25% HR, ZR (vis)	MDMO 10YR58	0	M	FM	P	P	FF, VF	-	

Profile Gleyed From: 36 cm *	Available Water	Wheat: 113 mm	Final ALC Grade: 4
Slowly Permeable Horizon From: 36 cm		Potatoes: 95 mm	Main Limiting Factor(s): We
Wetness Class: IV	Moisture Deficit	Wheat: 93 mm	
Wetness Grade: 4		Potatoes: 83 mm	Remarks: H1 gleyed. H2 almost gleyed, therefore profile almost gleyed from 0 cm.
	Moisture Balance	Wheat: +20 mm	
		Potatoes: +12 mm	
	Droughtiness Grade: 2	(Calculated to 120 cm)	