Pilning

Agricultural Land Classification

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Resource Planning Team
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FRCA Western Region

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PILNING

AGRICULTURAL LAND CLASSIFICATION SURVEY

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INTRODUCTION

1 This report presents the findings of a semi detailed Agricultural Land Classification (ALC) survey of 420 ha of land at Pilning South Gloucestershire Field survey was based on 160 auger borings and 9 soil profile pits and was completed in March 1997 During the survey 9 topsoil samples were analysed for particle size distribution (PSD)

2 The survey was conducted by the Resource Planning Team of FRCA Western Region (formerly ADAS Taunton Statutory Group) on behalf of MAFF in its statutory role in the preparation of South Gloucestershire Local Plan

3 Information on climate geology and soils and from previous ALC surveys was considered and is presented in the relevant section Apart from the published regional ALC map (MAFF 1977) which shows the site at a reconnaissance scale as Grade 3 the site was previously surveyed in 1985 at a scale of 1 25 000 (ADAS 1985) This shows a large part of the western side of the site as Subgrades 3a b and c according to the classification criteria at that time However the current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988) and supersedes any previous ALC survey Grade descriptions are summarised in Appendix I

4 At the time of survey land cover was mainly permanent grass Whereas the area west of the A403 around the village of Severn Beach is devoted mainly to pony paddocks the area east of the A403 is conspicuously well farmed and produces good crops of fattening grass and for conservation and is much appreciated by farmers in the area An area of 7 0 ha of agricultural land within the survey area was not surveyed because the owner refused his permission for access Other land which was not surveyed included various categories of urban land particularly in and around Severn Beach where there are also several areas of waste ground and at least one caravan site The boundaries of the new M49 and the recently amended boundaries of the A403 in the north of the site have all been sketched on to the attached ALC map from visual survey as an up to date large scale plan was not available These boundaries include many areas of amenity tree planting associated with the new roads

SUMMARY

5 The distribution of ALC grades is shown on the accompanying 1 20 000 scale ALC map The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas Areas are summarised in the Table 1

Table 1 Distribution of ALC grades Pilning

Grade	Area (ha)	% Surveyed Area (292 ha)
3b	202	69
4	90	31
Agricultural land not surveyed	7	
Other land	103	
Total site area	402	

6 This shows none of the area to be best and most versatile The survey found only Subgrade 3b and Grade 4 in both cases limited by wetness Although the soil profiles are in themselves similar the area of Grade 4 was found in the south east of the site where the climatic data indicates that field capacity days exceed 175

CLIMATE

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

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

9 Climatic variables also affect ALC grade through interactions with soil conditions The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes which are compared with the moisture available in each profile in assessing soil droughtiness limitations These are described in later sections A critical boundary of 175 FC Days was found to run from south west to north east approximately through Marsh Common This was precisely established for each auger survey point on each side of the boundary

Table 2 Climatic Interpolations Pilning

Grid Reference		ST 545 851	ST 565 831
Altitude (m)		6	6
Accumulated Temperature (day C)		1538	1538
Average Annual Rainfall (mm)		791	796
Overall Climatic Grade		1	1
Field Capacity Days		174	176
Moisture deficit (mm)	Wheat	102	102
	Potatoes	95	95

RELIEF

10 Altitude ranges from around 6 m over most of the site increasing to around 8 m towards Pilning railway station

11 Although the land is low lying and virtually all level the incidence of flooding as assessed from local knowledge during the course of the survey is believed not to constitute a limitation to agricultural land quality

GEOLOGY AND SOILS

12 The underlying geology of the site is shown on the published geology map (BGS 1962) as estuarine alluvium The current survey found this parent material to be remarkably consistent with all topsoil PSD samples analysed as silty clay

13 Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1 250 000 (SSEW 1983) as Newchurch 2 association This is described as comprising deep stoneless mainly calcareous clayey soils with groundwater controlled by ditches and pumps This is the case within the survey area where drainage is to main rhyne controlled by tidal flap so that there is some daily variation in main rhyne water level depending on the state of the tide However the observed freeboard between field level and ditchwater level was observed to be typically 1 5 to over 2 m During the course of the survey ditch maintenance was being undertaken by South Gloucestershire Internal Drainage Board on main rhynes under their control This appeared to apply to a considerable proportion of the existing rhynes particularly in the area south east of the A403

AGRICULTURAL LAND CLASSIFICATION

14 The distribution of ALC grades found by the current survey is shown on the accompanying 1 20 000 scale map and areas are summarised in Table 1 The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas

Subgrade 3b

15 Almost all topsoil textures at least when assessed to 25 cm were found to be silty clay Where subject to less than 176 field capacity days any Wetness Class from II to IV with silty clay topsoil indicates Wetness Grade 3b This mapping unit therefore only excludes Wetness Class I which has no gleying evident within 40 cm and no slowly permeable layer

16 Pits 1 2 4 and 7 are typical of profiles in the west and south of the site which are clearly Wetness Class IV with poor SPL structure and poor porosity Several of these pits are found at the west end of the site where conditions are particularly poor in the area mapped as Subgrade 3c in the 1985 survey

17 The survey found better subsoil structural conditions in the centre and east of the site and in the area east of Ellinghurst Farm These were investigated by other pits revealing a range of subsoil conditions many of them borderline in subsoil structure and porosity criteria which are critical to the identification of a slowly permeable layer Pits 3 5 and 9 were finally assessed as Wetness Class III or IV but in each case subsoil structure and porosity were found to be sufficiently borderline or variable to be borderline Wetness Class II overall and Pit 8 was assessed as Wetness Class II Such conditions seem more appropriate to the firm surface conditions and good summer drainage reported for the area However the great majority of soil observations showed gleying present within 40 cm which indicates Wetness Class II whether or not a slowly permeable layer is also present With clay topsoil textures this inevitably leads to Wetness Grade 3b and overall assessment of the mapping unit as Subgrade 3b

18 Very few profiles were found to be without gleying in the top 40 cm (Wetness Class I) This indicates Wetness Grade 3a limited only by workability and is illustrated by Pit 6 However these isolated borings cannot form a significant mapping unit and have been absorbed within the area shown as Subgrade 3b

19 It is worth noting that the area shown as Subgrade 3b conceals a wide range of soil wetness conditions However the survey provides a true reflection of site conditions interpreted in strict accordance with the revised guidelines and criteria for grading the quality of agricultural land This is precisely the justification for undertaking the new survey despite the existence of the 1985 survey

Grade 4

20 Soil profiles within the area shown as Grade 4 are much as described for Subgrade 3b above with the great majority being Wetness Class IV and a few being Wetness Class III with gleying or the slowly permeable layer occurring rather lower in the profile However they are found in an area with over 175 FC Days and the boundary between the two mapping units follows the 175 6 FC Days boundary This crosses the site from southwest to northeast running past Marsh Common

21 A very few observations were found to be Wetness Class I or II which give rise to isolated instances of WetnessGrade 3b but nowhere do these form a significant mapping unit

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FRCA Bristol
March 1997

REFERENCES

ADAS RESOURCE PLANNING TEAM (1985) Agricultural Land Classification Survey of Pilning Aust Scale 1 25 000 Reference 1 ADAS Bristol

BRITISH GEOLOGICAL SURVEY (1981) Chepstow Sheet 250 1 50 000 series Solid and Drift edition BGS London

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

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

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

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

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

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 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

APPENDIX I

DESCRIPTION OF GRADES AND SUBGRADES

Grade 1 excellent quality agricultural land

Land with no or very minor limitations to agricultural use A very wide range of agricultural and horticultural crops can be grown and commonly include top fruit soft fruit salad crops and winter harvested vegetables Yields are high and less variable than on land of lower quality

Grade 2 very good quality agricultural land

Land with minor limitations which affect crop yield cultivations or harvesting A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops The level of yield is generally high but may be lower or more variable than Grade 1

Grade 3 good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops timing and type of cultivation harvesting or the level of yield Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2

Subgrade 3a good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops especially cereals or moderate yields of a wide range of crops including cereals grass oilseed rape potatoes sugar beet and the less demanding horticultural crops

Subgrade 3b moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year

Grade 4 poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields of which are variable In most climates yields of grass may be moderate to high but there may be difficulties in utilisation The grade also includes very droughty arable land

Grade 5 very poor quality agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough grazing except for occasional pioneer forage crops

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

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

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

Wetness Class I

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

Wetness Class II

The soil profile is wet within 70 cm depth for 31 90 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 70 cm for more than 90 days but not wet within 40 cm depth for more than 30 days in most years

Wetness Class III

The soil profile is wet within 70 cm depth for 91 180 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 70 cm for more than 180 days but only wet within 40 cm depth for between 31 and 90 days in most years

Wetness Class IV

The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 40 cm depth for 91 210 days in most years

Wetness Class V

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

Wetness Class VI

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

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

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

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

APPENDIX III

ABBREVIATIONS AND TERMS USED IN SURVEY DATA

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

1 Terms used on computer database in order of occurrence

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

LAND USE At the time of survey

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

GRDNT Gradient as estimated or measured by hand held optical clinometer

GLEY SPL Depth in centimetres to gleying or slowly permeable layer

AP (WHEAT/POTS) Crop adjusted available water capacity

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

DRT Best grade according to soil droughtiness

If any of the following factors are considered significant Y will be entered in the relevant column

MREL	Microrelief limitation	**FLOOD**	Flood risk	**EROSN**	Soil erosion risk
EXP	Exposure limitation	**FROST**	Frost prone	**DIST**	Disturbed land
CHEM	Chemical limitation				

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

OC	Overall Climate	**AE**	Aspect	**EX**	Exposure
FR	Frost Risk	**GR**	Gradient	**MR**	Microrelief

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

TEXTURE Soil texture classes are denoted by the following abbreviations

S	Sand	**LS**	Loamy Sand	**SL**	Sandy Loam
SZL	Sandy Silt Loam	**CL**	Clay Loam	**ZCL**	Silty Clay Loam
ZL	Silt Loam	**SCL**	Sandy Clay Loam	**C**	Clay
SC	Sandy clay	**ZC**	Silty clay	**OL**	Organic Loam
P	Peat	**SP**	Sandy Peat	**LP**	Loamy Peat
PL	Peaty Loam	**PS**	Peaty Sand	**MZ**	Marine Light Silts

For the sand loamy sand sandy loam and sandy silt loam classes the predominant size of sand fraction will be indicated by the use of the following prefixes

F Fine (more than 66% of the sand less than 0 2mm)
M Medium (less than 66% fine sand and less than 33% coarse sand)
C Coarse (more than 33% of the sand larger than 0 6mm)

The clay loam and silty clay loam classes will be sub divided according to the clay content **M** Medium (< 27% clay) **H** heavy (27 35% clay)

MOTTLE COL Mottle colour using Munsell notation

MOTTLE ABUN Mottle abundance expressed as a percentage of the matrix or surface described

F few <2% **C** common 2 20% **M** many 20 40% **VM** very many 40%+

MOTTLE CONT Mottle contrast

F faint indistinct mottles evident only on close inspection
D distinct mottles are readily seen
P Prominent mottling is conspicuous and one of the outstanding features of the horizon

PED COL Ped face colour using Munsell notation

GLEY If the soil horizon is gleyed a Y will appear in this column If slightly gleyed an S will appear

STONE LITH Stone Lithology One of the following is used

HR	All hard rocks and stones	**SLST**	Soft oolitic or dolimitic limestone

CH	Chalk	**FSST**	Soft fine grained sandstone
ZR	Soft argillaceous or silty rocks	**GH**	Gravel with non porous (hard) stones
MSST	Soft medium grained sandstone	**GS**	Gravel with porous (soft) stones
SI	*Soft weathered igneous or metamorphic rock*		

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

STRUCT The degree of development size and shape of soil peds are described using the following notation

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

CONSIST Soil consistence is described using the following notation

L	Loose	**VF**	Very Friable	**FR**	Friable	**FM**	Firm
VM	Very firm	**EM**	Extremely firm		**EH**	Extremely Hard	

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

POR Soil porosity If a soil horizon has poor porosity with less than 0 5% biopores >0 5mm a Y will appear in this column

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

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

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

2 Additional terms and abbreviations used mainly in soil pit descriptions

STONE ASSESSMENT

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

MOTTLE SIZE

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

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

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

MANGANESE CONCRETIONS Assessed by volume

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

STRUCTURE Ped Development *

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

POROSITY

P	Poor	less than 0 5% biopores at least 0 5mm in diameter
G	Good	more than 0 5% biopores at least 0 5mm in diameter

ROOT ABUNDANCE

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

ROOT SIZE

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

HORIZON BOUNDARY DISTINCTNESS

Sharp	<0 5cm	**Gradual**	6 13cm
Abrupt	0 5 2 5cm	**Diffuse**	>13cm
Clear	2 5 6cm		

HORIZON BOUNDARY FORM Smooth wavy irregular or broken *

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

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Pilning	Pit 1 (ASP 23)	0	PGR	Av Rainfall 793 mm ATO 1538 day C	Estuarine alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 174 Climatic Grade 1	PSD SAMPLES TAKEN
1/97	19 3 97	ST 5476 8509	HLJ/PB	Exposure Grade 1	TS 0 25 cm ZC (S3 Z60 C37)

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	18	ZC	2 5Y52	0	0	0					MF VF		Clear smooth
2	28	ZC	2 5Y62	0	MDFO G 10YR56 5Y61	0	WCPr	Fm	P	G (low)	MVF		Grad smooth
3	60+	ZC	2 5Y62	0	MDFO G 10YR58 5Y61	C	WCSAB	Fm	P	P (low)	MVF		

Profile Gleyed From 18 cm

Depth to Slowly Permeable Horizon 28 cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	121 mm
	Potatoes	98 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+19 mm
	Potatoes	+3 mm
Droughtiness Grade	2	(Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) We

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Pilning	Pit 2 (ASP 16)	0	Permanent Grass	Av Rainfall 793 mm ATO 1538 day C FC Days 174 Climatic Grade 1 Exposure Grade 1	Estuarine alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY		PSD SAMPLES TAKEN
1/97	19/3/97	ST 5478 8522	PB/ HLJ		TS 0 25 cm ZC (S2 Z53 C45)

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	17	ZC	10YR42	1% HR (VIS)	FFDO 10YR56	None					MF + VF		Clear smooth
2	25	ZC	25Y53	0% (VIS)	CDFO (10YR56)	None	WCPr breaking to CSAB	Firm	Poor	Poor (b rd 1)	MF+ VF		Gradual smooth
3	65+	ZC	5G61	0% (VIS)	VMDFO (10YR56)	Common	WCPr breaking to MVCAB	Firm	Poor	Poor *	FF + VF		

Profile Gleyed From 17 cm

Depth to Slowly Permeable Horizon 17 cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	121 mm
	Potatoes	98 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+19 mm
	Potatoes	+3 mm
Droughtiness Grade	2	(Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks *still the odd one

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Pilning	Pit 3 (ASP 47)	0	PGR	Av Rainfall 793 mm ATO 1538 day C	Estuarine alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 174 Climatic Grade 1 Exposure Grade 1	PSD SAMPLES TAKEN
1/97	19/3/97	ST 5532 8480	HLJ/PB		TS 0 25 cm ZC(s3 Z57 C40)

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	18	ZC	2 5Y52	0	CRRC FDFO 7 5YR56	0					CF VF		Clear smooth
2	40	ZC	2 5Y52	0	FFFO 10YR56	0	MMSAB	Fr	G	P	CF VF		Clear smooth
3	67	ZC	5Y62	0	CDFO 10YR58	F	WCSAB*	Fm	P	P	FF CVF		Clear wavy
4	90+	ZC	2 5Y62	0	MDFO 10YR58	0	WCSAB	Fm (Fr in parts)	P	P (low)	FF VF		

Profile Gleyed From	40 cm
Depth to Slowly Permeable Horizon	40 cm
Wetness Class	III/II
Wetness Grade	3b

Available Water	Wheat	139 mm
	Potatoes	116 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+37 mm
	Potatoes	+21 mm
Droughtiness Grade	1	(Calculated to 120 cm)

Final ALC Grade	3b
Main Limiting Factor(s)	We

Remarks H3 borderline SPL structure almost moderately developed

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Pilning	Pit 4 (ASP 86)	0	Permanent Grass	Av Rainfall 793 mm ATO 1538 day C	Estuarine alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 174 Climatic Grade 1 Exposure Grade 1	PSD SAMPLES TAKEN
1/97	19/3/97	ST 5464 8438	PB/ HLJ		TS 0 25 cm ZC(S0 Z49 C51)

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	ZC	2 5Y42	1% HR (VIS)	CDFO (10YR56)	None					MF + VF		Clear smooth
2	60+	ZC	05Y61	0% (VIS)	MDFO (10YR58)	Common	MCPr breaking to CAB	Firm	Poor	Poor	CF + VF		

Profile Gleyed From 0 cm

Depth to Slowly Permeable Horizon 22 cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	123 mm
	Potatoes	100 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+21 mm
	Potatoes	+5 mm
Droughtiness Grade 2		(Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Pilning	Pit 5 (ASP 109)	Flat	Permanent Grass	Av Rainfall 793 mm ATO 1538 day C	Estuarine alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade 1	PSD SAMPLES TAKEN
1/97	21/3/97	ST 5616 8427	PB/HLJ		TS 0 25 cm ZC (S4 Z49 C47)

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	18	ZC	10YR32	0	FDFO 10YR56	None					MF VF		Clear wavy
2	28	C	7 5YR52	0	MDFO (10YR58)	0	MMPr BR to MC(S)AB	FM	P	G (low)	CVF		Gradual smooth
3	88+	C	7 5YR52	0	MDFO G 10YR58 5YR61	0	MCPr Br to MC(S)AB	FM	P	P (low)	CVF		

Profile Gleyed From 18 cm

Depth to Slowly Permeable Horizon 28 cm

Wetness Class IV/II

Wetness Grade 3b

Available Water	Wheat	121 mm
	Potatoes	98 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+19 mm
	Potatoes	+3 mm
Droughtiness Grade	2	(Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) Wetness

Remarks H3 has borderline porosity and combined with MCSAB secondary structure gives a borderline SPL at WC IV/II

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Pilning	Pit 6 (ASP 95)	0	PGR	Av Rainfall 793 mm ATO 1538 day C	Estuarine alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 174 Climatic Grade 1 Exposure Grade 1	PSD SAMPLES TAKEN
1/97	21/3/97	ST 5632 8441	HLJ/PB		TS 0 25 cm ZC (S3 Z58 C39)

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	23	ZC	10YR42	0	0	0					MF VF		Clear smooth
2	42	C	7 5YR52	0	0	F	MCSAB tending to MCPr	Fr	M	G	CF VF		Grad smooth
3	66	C	7 5YR52	0	FFFO 10YR58	F	WCSAB	Fr	M	G	CVF		Clear wavy
4	90+	C/ZC	7 5YR62	0	CDFO 10YR58	0	WCSAB tending to VCPI	Fr	M	G	FVF		

Profile Gleyed From 66 cm

Depth to Slowly Permeable Horizon

Wetness Class I

Wetness Grade 3a

Available Water	Wheat	138 mm
	Potatoes	114 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+36 mm
	Potatoes	+19 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		PARENT MATERIAL
Pilning	Pit 7 (ASP 154)	0	PGR	Av Rainfall 793 mm ATO 1538 day C	Estuarine alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 174 Climatic Grade 1 Exposure Grade 1	PSD SAMPLES TAKEN
1/97	24/3/97	ST 5572 8368	HLJ/PB		TS 0 25 cm ZC (S2 Z59 C39)

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	18	ZC	2 5Y52	0	CDFO 10YR56	0					MF VF		Grad smooth
2	30	ZC	2 5Y62	0	MDFO 10YR56	0	WCSAB	Fm	P	P (low)*	MF VF		Clear smooth
3	55+	ZC	10Y51	0	CDMO 10YR58	F	WCPr	Fm	P	P	FVF		

Profile Gleyed From 0 cm

Depth to Slowly Permeable Horizon 18 cm

Wetness Class IV

Wetness Grade 3b

Available Water	Wheat	121 mm
	Potatoes	98 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+19 mm
	Potatoes	+3 mm
Droughtiness Grade	2	(Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) We

Remarks Earthworm channels present H2

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE			PARENT MATERIAL
Pilning	Pit 8 (ASP 130)	0	PGR	Av Rainfall ATO FC Days Climatic Grade Exposure Grade	793 mm 1538 day C 175 1 1	Estuarine Alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY			PSD SAMPLES TAKEN
1/97	24/3/97	ST 5558 8396	HLJ/PB			TS 0 25 cm ZC (S2 Z52 C46)

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	16	ZC	10YR41	0	0	0					MF VF		Clear smooth
2	29	ZC	2 5Y52	0	FFFO 10YR56	0	WCSAB	Fr	M	G	MVF		Clear smooth
3	47	ZC	2 5Y62 10YR62	0	CDFO 10YR58	F	W MCSAB (variable)	Fm	P	P/G (variable)	CVF		Grad smooth
4	75+	C	7 5YR62	0	MDMO G 10YR58 10GY71	0	MMSAB	Fr	G	G (low)	FVF		

Profile Gleyed From 29 cm

Depth to Slowly Permeable Horizon (Dubious) 29 47 cm

Wetness Class II

Wetness Grade 3b

Available Water	Wheat	183 mm
	Potatoes	120 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+81 mm
	Potatoes	+25 mm

Droughtiness Grade 1 (Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) We

Remarks H3 a dubious SPL but does not extend below 50 cm therefore WC II borderline WC IV

SITE NAME	PROFILE NO	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Pilning	Pit 9 (ASP 167)	0	PGR	Av Rainfall 793 mm ATO 1538 day C	Estuarine alluvium
JOB NO	DATE	GRID REFERENCE	DESCRIBED BY	FC Days 175 Climatic Grade 1 Exposure Grade 1	PSD SAMPLES TAKEN
1/97	24/3/97	ST 5627 8359	HLJ/PB		TS 0 25 cm ZC (S3 Z58 C34)

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	ZC	10YR41	0	0	0					MF VF		Clear smooth
2	40	ZC	10YR53	0	0	0	WCSAB (variable)	Fr	M	G	CF VF		Clear smooth
3	70	C	7 5YR52	0	MDMO G 10YR58 2 5Y61	0	MMPr Br to MCSAB	Fm	P	P (low)	FF VF		

Profile Gleyed From 40 cm

Depth to Slowly Permeable Horizon 40 cm

Wetness Class WC III/II

Wetness Grade 3b

Available Water	Wheat	128 mm
	Potatoes	105 mm
Moisture Deficit	Wheat	102 mm
	Potatoes	95 mm
Moisture Balance	Wheat	+26 mm
	Potatoes	+10 mm
Droughtiness Grade	2	(Calculated to 120 cm)

Final ALC Grade 3b

Main Limiting Factor(s) We

Remarks

H3 low porosity despite earthworm channels present throughout profile Mainly between the peds in H3

Depth to gleying borderline at 40 cm but assessed as 40+ cm

SPL dubious both on porosity and secondary structure Therefore profile considered to be borderline WC II even WC I