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**LAND AT FORMER RAF BROADWELL,
CARTERTON, OXFORDSHIRE**

**Agricultural Land Classification
ALC Map and Report
Semi-Detailed Survey**

February 1999

**Resource Planning Team
Eastern Region
FRCA Reading**

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AGRICULTURAL LAND CLASSIFICATION REPORT

LAND AT FORMER RAF BROADWELL, CARTERTON, OXFORDSHIRE SEMI-DETAILED SURVEY

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of approximately 108 ha of land at former RAF Broadwell, to the west of Carterton in Oxfordshire. The survey was carried out during February 1999.
2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)¹ on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF) and was carried out in connection with MAFF's statutory input to an *ad hoc* planning application for the development of a new community. This survey supersedes any previous ALC information for this land.
3. The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.
4. At the time of survey the agricultural land use on the site was rough grazing and/or Set-aside. The areas mapped as 'Other land' include the infrastructure and buildings associated with the former RAF base, woodland, farm buildings and a food processing plant.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:15,000. It is accurate at this scale but any enlargement would be misleading.
6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	11.7	15.6	10.9
3b	62.6	83.3	58.1
4	0.8	1.1	0.7
Other land	32.7	N/A	30.3
Total surveyed area	75.1	100	69.7
Total site area	107.8	-	100

¹ FRCA is an executive agency of MAFF and the Welsh Office

7. The fieldwork was conducted at an average density of 1 boring per 1.4 hectares of agricultural land. In total, 76 borings and 5 soil pits were described.
8. The agricultural land on this site has been classified as Subgrade 3a (good quality), Subgrade 3b (moderate quality) and Grade 4 (poor quality). The principal limitation to land quality is soil droughtiness. To a lesser extent soil wetness, soil workability and topsoil stoniness also affect land quality.
10. Subgrade 3a land is located in three limited areas across the site. Soils are typically calcareous with heavy clay loam, heavy silty clay loam or clay topsoils, passing to clayey subsoils which overlie limestone at moderate depths. The restricted amount of soil produces a soil droughtiness limitation which will manifest itself in a reduction in crop yield and reduce the flexibility of the land, particularly in drier years. Where clay topsoils are present, there is a soil workability limitation.
11. Subgrade 3b land is classified over most of the site. This land generally experiences a significant soil droughtiness limitation. Soils are calcareous with medium or heavy clay loam or silty clay loam topsoils, which rest over solid limestone or pass through a thin clayey subsoil to the limestone beneath. These soils hold only small reserves of available water, causing a significant soil droughtiness limitation. A topsoil stoniness limitation also affects some of these shallow soils, where 'brashy' limestone is concentrated near the surface. In places, the land suffers from a significant soil wetness limitation. Where this is the case, soils comprise medium or heavy clay loam or clay topsoils passing into clay horizons at shallow depths which impede the movement of water down the profile. This limitation will affect the range and yield of crops that can tolerate such wet conditions, as well as restricting the number of days when the land is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.
12. Grade 4 land extends over a very small area in the south-west of the site, which has been disturbed in the past leaving a soil profile which includes a mixture of bricks, concrete, glass and metal.

FACTORS INFLUENCING ALC GRADE

Climate

13. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.
14. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).
15. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

Table 2: Climatic and altitude data

Factor	Units	Values	
		SP 243 062	SP 250 078
Grid reference	N/A	SP 243 062	SP 250 078
Altitude	m, AOD	100	110
Accumulated Temperature	day°C (Jan-June)	1405	1393
Average Annual Rainfall	mm	728	748
Field Capacity Days	days	159	162
Moisture Deficit, Wheat	mm	98	97
Moisture Deficit, Potatoes	mm	88	86
Overall climatic grade	N/A	Grade 1	Grade 1

16. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.
17. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Other climatic factors such as exposure and frost risk are not believed to be significant at this site. The site is climatically Grade 1.

Site

18. The site is very gently undulating, lying in the altitude range 100–110 m AOD. The higher ground is found along the northern boundary and falls away very gently to the lower lying land along the southern boundary. Nowhere on the site do gradient, microrelief or flooding affect land quality.

Geology and soils

19. The most detailed published geological information for the site (BGS, 1978) shows most of it to be underlain by Forest Marble Clays, with Forest Marble Clays with Limestone, White Limestone and Cornbrash occurring in patches over the site.
20. The most detailed published soils information covering the area (SSEW, 1983) maps most of it comprising soils of the Elmtun 3 association. This is described as 'shallow well drained brashy calcareous fine loamy soils over limestone. Some deeper slowly permeable seasonally waterlogged, mainly calcareous, clayey soils. The Elmtun 1 association soils are shown separately in the north west and south east of the site. This is described as 'shallow well drained brashy calcareous fine loamy soils over limestone. Some similar deeper soils and some non-calcareous and calcareous clayey soils. Soils fitting these descriptions were observed across the site.

AGRICULTURAL LAND CLASSIFICATION

21. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

22. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II.

Subgrade 3a

23. Land of good quality is mapped in three separate areas and is coincident with two soil types.
24. Much of the Subgrade 3a land is affected by a soil droughtiness limitation, occasionally combined with a soil workability restriction. Soils are well drained (Wetness Class I) and comprise calcareous heavy clay loam or heavy silty clay loam or clay topsoils. These may contain up to 10% total flints by volume (1–2% > 2 cm in size) or up to 5% total soft limestone. These pass to clay or heavy clay loam subsoils which were impenetrable to the soil auger from 40–70cm depth. Pit 5 (see Appendix II) is typical of these soils and confirmed the existence of a stony clay subsoil with 25% total hard rock, down to 51cm. Due to the high stone content, soil structure could not be determined. Consequently, a moderate assessment of structural conditions has been assumed. This passed to a very slightly stony clay lower subsoil (5% total hard rock), from 51–63cm, beneath which lay brashy limestone. Rooting was visible in the limestone to at least 73cm and is assumed at this location to continue to 120 cm. Moisture balance calculations indicate a shortfall in the profile available water resulting in a slight soil droughtiness limitation which may cause the level and consistency of yields to be depressed. Subgrade 3a is therefore appropriate. Where clay topsoils are present the land also suffers from a soil workability limitation, which can result in the reduced flexibility of the land due to the reduction in the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock
25. In the south and part of the central area, the remainder of the Subgrade 3a land suffers from a soil wetness limitation. Soils comprise heavy silty clay loam or heavy clay loam topsoils, some of which are calcareous. These may contain up to 3% total flints by volume (1–2% > 2cm in size). These pass to clay upper subsoils, some of which are gleyed and may contain up to 25% total hard rock by volume (8–25%). Beneath this is a slightly to moderately stony (15–40%) heavy clay loam lower subsoil. Pit 3 (see Appendix II) is typical of these gleyed subsoils with a water table at 70cm. The depth to gleying results in these soils being assigned to Wetness Class II. This combination of imperfect drainage, topsoil texture and the prevailing field capacity level (159 days) gives rise to a land classification of Subgrade 3a. Soil wetness can adversely affect plant growth or the ease with which mechanised operations can be carried out or the advisability by livestock.

Subgrade 3b

26. Land of moderate quality has been mapped over most of the site. It occurs in conjunction with two main soils types.
27. Most of the land classified as Subgrade 3b suffers from a significant soil droughtiness limitation. Soils are well drained and comprise calcareous medium or heavy silty clay loam or clay loam topsoils. Topsoil stone contents range from 1–30% total hard rock by volume, in places soft limestone is also recorded in the range 1–5%. These directly overlie solid limestone or pass through a thin clay horizon (containing up to 28% total hard rock) to the limestone beneath. From 25–45cm, soil profiles were impenetrable to the soil auger. Pits 1

and 4 (see Appendix II) are representative of these soils, proving the existence of a stony shallow clay upper subsoil over hard flaggy limestone (see Pit 1) or topsoil directly overlying a brashy rootable limestone (see Pit 4). This combination of soil properties and local climate interact to cause a significant soil droughtiness limitation, which may adversely affect the level and consistency of yields. Moisture balance calculations indicate Subgrade 3b is appropriate for this land.

28. The remainder of the land classified as Subgrade 3b suffers from a significant soil wetness limitation. Soils comprise calcareous very slightly stony medium or heavy clay loam or heavy silty clay loam or clay topsoils. Topsoil stone estimates were calculated to be in the region 0–10% hard rock. These either, directly overlie stoneless slowly permeable clayey subsoils or pass through a heavy clay loam upper subsoil to the less permeable clay beneath. Pit 2 (see Appendix II) confirmed the existence of these poorly structured clay horizons. These profiles all exhibited evidence of severely impeded drainage in the form of gleying within 40 cm. The depth to these slowly permeable subsoils (between 25 and 46 cm) results in soils being assigned to Wetness Class IV or III. This combination of poor drainage, topsoil texture and the prevailing field capacity level (159 days) gives rise to a land classification of Subgrade 3b. Excessive soil wetness adversely affects seed germination and survival, partly by a reduction in soil temperature and partly because of anaerobism. It also inhibits the development of a good root system, all of which can affect the range of crops that can be grown and the level of yield. Soil wetness also influences the sensitivity of the soil to structural damage and is, therefore, a major factor in determining the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

Grade 4

29. Grade 4 land, poor quality, is located in a very small area, in the south of the site. The soils show signs of disturbance with topsoils contaminated with bricks, rubble, clinker and glass. Elsewhere, concrete and wire has been dumped on the surface. It is this variability which restricts land quality to Grade 4 and would result in a significant restriction in the range of crops and/or the level of yields.

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SOURCES OF REFERENCE

British Geological Survey (1978) *Sheet No. 236, Witney*.
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land*.
MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification*.
Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 6, Soils in South East England*.
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*
SSEW: Harpenden

APPENDIX I

DESCRIPTIONS OF THE 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 includes 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 or horticultural crops can usually be grown but on some land of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

SOIL DATA

Contents:

Sample location map

Soil abbreviations - explanatory note

Soil pit and soil boring descriptions (boring and horizon levels)

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database. This uses notations and abbreviations as set out below.

Boring Header Information

1. **GRID REF:** national 100 km grid square and 8 figure grid reference.

2. **USE:** Land use at the time of survey. The following abbreviations are used:

ARA: Arable	WHT: Wheat	BAR: Barley
CER: Cereals	OAT: Oats	MZE: Maize
OSR: Oilseed rape	BEN: Field beans	BRA: Brassicae
POT: Potatoes	SBT: Sugar beet	FCD: Fodder crops
LIN: Linseed	FRT: Soft and top fruit	FLW: Fallow
PGR: Permanent pasture	LEY: Ley grass	RGR: Rough grazing
SCR: Scrub	CFW: Coniferous woodland	OTH: Other
DCW: Deciduous woodland	BOG: Bog or marsh	SAS: Set-Aside
HTH: Heathland	HRT: Horticultural crops	PLO: Ploughed

3. **GRDNT:** Gradient as estimated or measured by a hand-held optical clinometer.

4. **GLEYSPL:** Depth in centimetres (cm) to gleying and/or slowly permeable layers.

5. **AP (WHEAT/POTS):** Crop-adjusted available water capacity.

6. **MB (WHEAT/POTS):** Moisture Balance. (Crop adjusted AP - crop adjusted MD)

7. **DRT:** Best grade according to soil droughtiness.

8. 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		

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

OC: Overall Climate	AE: Aspect	ST: Topsoil Stoniness
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
EX: Exposure		

Soil Pits and Auger Borings

1. **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)

2. **MOTTLE COL:** Mottle colour using Munsell notation.
3. **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% +

4. **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

5. **PED. COL:** Ped face colour using Munsell notation.

6. **GLEYS:** If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

7. **STONE LITH:** Stone Lithology - one of the following is used:

HR:	all hard rocks and stones	FSST:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	CH:	chalk
MSST:	soft, medium grained sandstone	GS:	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock	GH:	gravel with non-porous (hard) stones

Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

8. **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	
Ped shape	S: single grain	M: massive
	GR: granular	AB: angular blocky
	SAB: sub-angular blocky	PR: prismatic
	PL: platy	

9. **CONSIST:** Soil consistence is described using the following notation:

L: loose	FM: firm	EH: extremely hard
VF: very friable	VM: very firm	
FR: friable	EM: extremely firm	

10. **SUBS STR:** Subsoil structural condition recorded for the purpose of calculating profile droughtiness:
G: good M: moderate P: poor
11. **POR:** Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.
12. **IMP:** If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.
13. **SPL:** Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.
14. **CALC:** If the soil horizon is calcareous, a 'Y' will appear in this column.
15. Other notations:
 - APW:** available water capacity (in mm) adjusted for wheat
 - APP:** available water capacity (in mm) adjusted for potatoes
 - MBW:** moisture balance, wheat
 - MBP:** moisture balance, potatoes

SAMPLE NO.	GRID REF	ASPECT USE	---WETNESS---		-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST OIST	CHEM LIMIT	ALC COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB				
1	SP25000800	SAS NE	1	0 28	4	38	92	-6 104	16	3A			WE 3B	SPL28CM
2	SP24900790	SAS			1	1	38	-60 38	-50	4			DR 3B	I26CM/LMST
3	SP25000790	SAS E	1	30 30	3	38	119	21 110	22	2			WE 3B	QSPL35
4	SP25100790	SAS E	1		1	2	86	-12 90	2	3A			DR 3A	I55/LMST
5	SP24900780	SAS			1	1	49	-49 49	-39	38			DR 3B	I32/LMST
6	SP25000780	SAS			1	2	61	-37 61	-27	38			DR 3B	I35/LMST
7	SP25100780	SAS NE	3		1	1	81	-17 81	-7	3A			DR 3A	I50/LMST
8	SP24900770	SAS S	1		1	1	68	-30 68	-20	38			DR 3B	I40/LMST
9	SP25000770	SAS E	1		1	1	53	-45 53	-35	38			DR 3B	I30/LMST
10	SP25100770	SAS E	2	26 26	4	38	91	-7 103	15	3A			WE 3B	SPL26CM
11	SP24800760	RGR S	2	10 35	4	38	88	-10 99	11	3A			WE 3B	SPL28CM
12	SP24900760	RGR S	2	10 25	4	38	88	-10 100	12	3A			WE 3B	SPL25CM
13	SP25000760	SAS S	2		1	1	51	-47 51	-37	38			DR 3B	I30/LMST
14	SP25100760	SAS			1	1	66	-32 66	-22	38			DR 3B	I38/LMST
15	SP24700750	PGR			1	2	76	-22 76	-12	38			DR 3B	I47POSS3A
15A	SP24650745	RGR		28 28	4	38	84	-14 90	2	3A			WE 3B	DISTURBED?
16	SP24800750	RGR S	1	40	1	2	87	-11 90	2	3A			DR 3A	I54/LMST
17	SP24900750	RGR		25	1	2	64	-34 64	-24	38			DR 3B	DISTURBED?
18	SP24350740	RGR		35 35	4	38	93	-5 106	18	3A			WE 3B	SPL35CM
19	SP24500740	PGR			1	2	114	16 107	19	2			WD 2	I87/LMST
22	SP24800740	RGR			1	2	49	-49 49	-39	38			WE 3B	I30/LMST
24	SP24200730	RGR S	1	44 44	3	38	97	-1 109	21	3A			WE 3B	SPL44CM
25	SP24300730	RGR		25 25	4	38	92	-6 104	16	3A			WE 3B	SPL41CM
29	SP24600730	RGR		29	2	3A	87	-11 93	5	3A			WD 3A	I63/LMST
30	SP24700730	RGR		34 34	4	38	88	-10 100	12	3A			WE 3B	QSPL34CM
32	SP24200720	RGR			1	1	46	-52 46	-42	4			DR 3B	?I34/LMST
34	SP24400720	PGR			1	1	72	-26 72	-16	38			DR 3B	?I46/LMST
35	SP24500720	RGR		46	1	3A	91	-7 97	9	3A			WK 3A	I58/LMST
36	SP24600720	RGR			1	3A	104	6 110	22	2			WK 3A	C TOPSOIL
37	SP24700720	RGR			1	3A	81	-17 82	-6	3A			WK 3A	I51/LMST
38	SP24800720	RGR		50 50	2	38	104	6 109	21	2			WE 3B	SPL50CM
39	SP24100710	RGR			1	2	51	-47 51	-37	38			DR 3B	I33/LMST
41	SP24300710	RGR			1	2	51	-47 51	-37	38			DR 3B	I33/LMST
42	SP24450714	PGR			1	2	44	-54 44	-44	4			DR 3B	I25/LMST
43	SP24500710	RGR			1	2	76	-22 76	-12	38			DR 3A	I48/LMST
44	SP24600710	RGR			1	2	51	-47 51	-37	38			DR 3B	I30/LMST
45	SP24700710	RGR			1	2	67	-31 67	-21	38			DR 3B	I40/LMST
46	SP24800710	RGR			1	2	98	0 113	25	3A			DR 3A	I69/LMST
47A	SP24100700	RGR S	1		1	1	71	-27 71	-17	38			DR 3B	I45/LMST
48	SP24200700	RGR			1	1	63	-35 63	-25	38			DR 3B	I37/LMST
49	SP24300700	RGR SE	1		1	1	51	-47 51	-37	38			DR 3B	I34/LMST
51	SP24500700	PGR			1	2	46	-52 46	-42	4			DR 3B	?I27/LMST

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC COMMENTS			
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB					DRT	FLOOD	
53	SP24700700	RGR			1	2	48	-50	48	-40	3B		DR	3B	I28/LMST		
54	SP24800700	RGR			1	2	34	-64	34	-54	4		DR	4	?I26/3BTSST		
55	SP24100690	RGR	E	2	35	35	4	3B	105	7	112	24	2	WE	3B	I75/LMST	
56	SP24100690	RGR	S	1			1	2	61	-37	61	-27	3B	DR	3B	I37/LMST	
59	SP24500690	PGR	W	1			1	2	72	-26	72	-16	3B	DR	3B	I45/LMST	
60	SP24600690	PGR					1	2	79	-19	79	-9	3A	DR	3A	I50/LMST	
61	SP24700690	PGR			46	46	2	3A	118	20	108	20	2	WE	3A	SPL46CM	
63	SP24100680	RGR	N	1			1	2	69	-29	69	-19	3B	DR	3B	I40/LMST	
64	SP24200690	RGR	NE	2			1	2	79	-19	81	-7	3B	DR	3A	I55/LMST	
67	SP24500680	PGR					1	2	44	-54	44	-44	4	DR	3B	I47/LMST	
70	SP24800680	PGR					1	2	77	-21	77	-11	3B	DR	3A	I50/LMST	
71	SP24900670	RGR					1	2	66	-32	66	-22	3B	DR	3B	I38/LMST	
72	SP24200670	RGR	E	1			1	2	67	-31	67	-21	3B	DR	3B	I40/LMST	
73	SP24300670	RGR			25		2	3A	106	8	108	20	2	WE	3A	I80/LMST	
77	SP24700670	PGR					1	3A	72	-26	72	-16	3A	WD	3A	I48/LMST	
79	SP24800660	RGR			0	20	4	3B	97	-1	102	14	3A	WE	3B	SPHAGNUM	
80	SP24200660	RGR	E	1			1	3A	63	-35	63	-25	3B	DR	3B	I40/LMST	
81	SP24300660	RGR	E	1	30		2	3A	109	11	110	22	2	WE	3A		
84	SP24600660	RGR					1	2	60	-38	60	-28	3B	DR	3B	I37/LMST	
86	SP24800660	PGR					1	2	67	-31	67	-21	3B	DR	3A	I40/LMST	
87	SP24200650	RGR	E	2	0	25	4	3B	94	-4	99	11	3A	WE	3B	SPL40CM	
88	SP24300650	RGR	E	1	25	45	3	3B	93	-5	101	13	3A	WE	3B	SPL65CM	
92	SP24700650	RGR			0	19	4	3B	77	-21	83	-5	3B	WE	3B	SPL19CM	
94	SP24200640	RGR			30	30	4	3B	95	-3	99	11	3A	WE	3B	SPL30CM	
95	SP24300640	RGR	E	2			2	3A	108	10	120	32	2	WE	3A		
100	SP24800640	PGR					1	2	49	-49	49	-39	3B	DR	3B	I26/LMST	
101	SP24300630	RGR			0	28	4	3B	101	3	106	18	3A	WE	3B	SPL32CM	
102	SP24400630	RGR	E	3	25		2	3A	69	-29	69	-19	3B	DR	3B	I25/LMST	
106	SP24700630	PGR					1	1	34	-64	34	-54	4	DR	3B	I22CM/LMST	
107	SP24200620	PGR			0	32	4	3B	102	4	107	19	3A	WE	3B	SPL32CM	
108	SP24300620	RGR	E	3	0	25	4	3B	93	-5	97	9	3A	WE	3B	SPL25CM	
109	SP24400620	RGR	W	1	70	70	2	2	140	42	121	33	1	Y	WE	2	DISTURBED?
110	SP24500620	RGR	S	1			1	2	50	-48	50	-38	3B	DR	3B	I30/LMST	
111	SP24400610	RGR	W	1					27	-71	27	-61	4	Y	DR	4	DISTURBED?
1P	SP25000780	SAS			24		2	3A	50	-48	50	-38	3B	DR	3B	LMST40CM+	
2P	SP24300670	RGR			29	29	4	3B	80	-18	83	-5	3A	WE	3B	PITATAB87	
3P	SP24200650	RGR					2	3A	98	0	98	10	3A	WE	3A	GH2070CM	
4P	SP24300710	RGR					1	2	54	-44	55	-33	3B	DR	3B	PIT70CM	
5P	SP24500710	RGR					1	3A	83	-15	91	3	3A	WD	3A	PIT73CM	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES-----			STRUCT/ CONSIST	SUBS					
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR	POR	IMP	SPL
1	0-28	HCL	10YR53	10YR58		C F		Y	0	0	0						
	28-70	C	10Y 62	75YR56		M D		Y	0	0	SLST 3		P			Y	Y
2	0-26	MCL	10YR43						11	5	HR 21						
3	0-30	MCL	10YR42						0	0	HR 1						
	30-50	HCL	10YR42	10YR56		C F		Y	0	0	SLST 4		M			Y	Y
	50-100	C	10Y 61	10YR58		M D		Y	0	0	SLST 4		P			Y	Y
4	0-28	HCL	10YR43						0	0	SLST 2						Y
	28-55	C	10YR44						0	0	HR 6		M				Y
5	0-26	MCL	10YR43						0	0	HR 15						
	26-32	C	10YR44						0	0	SLST 6		M				Y
6	0-28	HCL	10YR4243						0	0	SLST 1						
	28-35	C	10YR44						0	0	SLST 5		M				Y
7	0-28	MCL	10YR42						0	0	SLST 4						Y
	28-50	HCL	10YR54	10YR54		C F		S	0	0	SLST 10		M				Y
8	0-25	MCL	10YR43						0	0	0						
	25-40	C	10YR44						0	0	SLST 4		M				Y
9	0-20	MCL	10YR43						0	0	SLST 2						
	20-30	C	75YR46						0	0	HR 20		M				Y
10	0-26	MCL	10YR43						0	0	0						Y
	26-70	C	25Y 64	75YR44		M D		Y	0	0	SLST 2		P			Y	Y
11	0-10	MCL	10YR43						0	0	0						
	10-25	HCL	10YR53	10YR53		C F		Y	0	0	0		M				Y
	25-35	C	10YR53	10YR58		M D		Y	0	0	0		P			Y	Y
	35-70	C	25Y 63	10YR56		M D		Y	0	0	SLST 4		P			Y	Y
12	0-10	MCL	10YR42						0	0	0						Y
	10-25	HCL	25Y 53	10YR56		C D		Y	0	0	0		M				Y
	25-70	C	25Y 62	10YR58		M D		Y	0	0	SLST 2		P			Y	Y
13	0-20	MCL	10YR43						9	3	HR 16						
14	0-30	MCL	10YR43						0	0	HR 1						
	30-38	C	75YR46						0	0	HR 1		M				Y
15	0-22	HCL	10YR43						0	0	HR 5						
	22-47	C	10YR44						0	0	HR 5		M				
15A	0-28	HZCL	10YR43						5	0	HR 10						
	28-60	C	25Y 62	25Y 66		C		Y	0	0	0		P			Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES-----			STRUCT/ CONSIST	SUBS			CALC
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR	
16	0-25	HCL	10YR43					0	0	0					Y
	25-40	C	10YR43	10YR58	C	F		S	0	0	SLST	3		M	Y
	40-54	C	25Y 71	10YR56	M	D		Y	0	0	SLST	8		M	Y
	54-70	C	25Y 64						0	0	HR	15		M	Y
17	0-25	MCL	10YR43						7	0	HR	10			Y
	25-40	HCL	10YR44	10YR58	C	D		Y	0	0	SLST	3		M	Y
18	0-18	MCL	10YR43						0	0		0			
	18-35	HCL	10YR44						0	0		0		M	
	35-55	C	25Y 6264	10YR56	C	D		Y	0	0		0		P	Y
	55-70	C	25Y 64						0	0	HR	15		M	Y
19	0-23	HCL	10YR43						0	0	HR	8			Y
	23-42	C	10YR44						0	0	HR	5		M	Y
	42-65	SCL	25Y 72						0	0	HR	5		M	Y
	65-87	SC	25Y 5456						0	0	HR	5		M	Y
22	0-22	HCL	10YR44						0	0	HR	5			Y
	22-30	C	75YR4656						0	0	HR	15		M	Y
24	0-26	HCL	10YR53						0	0		0			
	26-44	C	10YR54						0	0		0		M	
	44-70	C	25Y 6264	25Y56	C	D		Y	0	0		0		P	Y Y
25	0-25	HCL	10YR53						0	0		0			
	25-41	C	25Y 53	10YR56	C	D		Y	0	0		0		P	Y
	41-70	C	25Y 6264	10YR66	M	D		Y	0	0		0		P	Y Y
29	0-29	C	10YR44						0	0	HR	5			Y
	29-63	SC	25Y 6454	25Y66	C	D		Y	0	0	HR	10		M	Y
30	0-25	HCL	10YR44						2	0	HR	10			Y
	25-34	C	10YR54						0	0	HR	2		M	Y
	34-70	C	25Y 6462	25Y66	C	D		Y	0	0	HR	5		P	Y Y
32	0-23	MZCL	10YR44						22	8	HR	30			Y
	23-34	HZCL	75YR46						0	0	HR	25		M	Y
34	0-27	MCL	10YR43						0	0	HR	8			Y
	27-39	C	75YR46						0	0	HR	5		M	Y
	39-46	C	75YR46						0	0	HR	25		M	Y
35	0-26	C	10YR43						0	0	HR	2			Y
	26-46	C	75YR4656						0	0		0		M	
	46-58	C	25Y 53	75YR4656	M	D		Y	0	0		0		P	
36	0-27	C	10YR43						0	0	HR	5			Y
	27-37	C	75YR46						0	0	HR	2		M	Y
	37-55	C	25Y 64						0	0	HR	5		M	Y
	55-83	C	25Y 64						0	0	HR	5		M	Y

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED	-----STONES-----			STRUCT/	SUBS						
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
37	0-26	C	10YR44							0	0	HR	5					
	26-37	C	75YR4656							0	0	HR	2	M				Y
	37-51	C	75YR4656							0	0	HR	10	M				Y
38	0-25	C	10YR43							0	0	HR	2					
	25-50	C	75YR46							0	0	HR	2	M				
	50-80	C	25Y 6462	25Y66		C	D		Y	0	0	HR	2	P			Y	Y
39	0-27	HZCL	10YR44							12	4	HR	17					Y
	27-33	HZCL	75YR46							0	0	HR	25	M				Y
41	0-28	HZCL	10YR44							12	4	HR	17					Y
	28-33	HZCL	75YR4656							0	0	HR	25	M				Y
42	0-27	HCL	10YR43							0	0	HR	10					Y
43	0-23	HCL	10YR44							0	0	HR	5					Y
	23-48	C	75YR46							0	0	HR	10	M				Y
44	0-30	HCL	10YR44							0	0	HR	5					Y
45	0-33	HCL	10YR44							0	0	HR	5					Y
	33-40	C	75YR46							0	0	HR	10	M				Y
46	0-28	HZCL	10YR44							0	0	HR	2					
	28-41	C	10YR54							0	0	HR	15	M				Y
	41-69	C	75YR4656							0	0	HR	5	M				
47	0-27	MZCL	10YR44							0	0	HR	7					Y
	27-45	HZCL	75YR46							0	0	HR	25	M				Y
48	0-29	MZCL	10YR44							2	0	HR	5					Y
	29-37	HZCL	75YR46							0	0	HR	25	M				Y
49	0-23	MZCL	10YR44							11	3	HR	16					Y
	23-34	HZCL	75YR56							0	0	HR	25	M				Y
51	0-27	HCL	10YR43							0	0	HR	5					Y
53	0-28	HCL	10YR44							0	0	HR	5					Y
54	0-26	HCL	10YR44							20	10	HR	30					Y
55	0-35	HZCL	75YR44	10YR56		F	F			0	0	SLST	2					
	35-65	C	75YR42	10YR5856		C	D		Y	0	0		0	P			Y	
	65-75	HCL	25Y 76	10YR68		F	D			0	0	SLST	10	M				
56	0-26	HZCL	10YR54							0	0	HR	5					Y
	26-37	HZCL	75YR4656							0	0	HR	25	M				Y

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----		PED COL.	----STONES----		STRUCT/ CONSIST	SUBS			CALC	
				COL	ABUN		CONT	GLEY >2		>6	LITH	TOT		STR
59	0-25	HCL	10YR43				0	0	HR	5				Y
	25-45	C	10YR44				0	0	SLST	10		M		Y
60	0-27	HCL	10YR43				0	0	HR	10				Y
	27-50	C	75YR44				0	0	HR	5		M		Y
61	0-28	HCL	10YR43				0	0	HR	1				Y
	28-46	C	10YR54	10YR66	F	F	0	0	HR	5		M		Y
	46-65	C	25Y 53	10YR68	C	D	Y	0	0	HR	5		P	Y
	65-80	C	25Y 62	10YR56	C	D	Y	0	0	HR	10		M	Y
	80-100	C	25Y 62	10YR56	C	D	Y	0	0	HR	10		M	Y
63	0-30	HZCL	10YR43				0	0	HR	5				
	30-40	C	10YR53				0	0	HR	10		M		
64	0-30	HZCL	10YR43				0	0	SLST	5				
	30-50	HCL	10YR53				0	0	HR	15		M		Y
	50-55	HCL	25Y 76				0	0	HR	10		M		Y
67	0-27	HCL	10YR43				0	0	HR	10				Y
70	0-25	HCL	10YR54				2	0	HR	10				
	25-40	C	75YR44				0	0	HR	2		M		
	40-50	C	25Y 63				0	0	HR	2		P		
71	0-30	HZCL	10YR43				0	0	HR	5				
	30-38	C	10YR53				0	0	HR	8		M		
72	0-30	HZCL	10YR43				0	0	HR	5				
	30-40	C	10YR53				0	0	SLST	5		M		Y
73	0-25	HZCL	10YR53	10YR56	F	F	0	0	HR	3				Y
	25-40	C	10YR43	10YR56	C	D	Y	0	0	HR	8		M	Y
	40-80	HCL	25Y 76	10YR58	C	D	Y	0	0	SLST	15		M	Y
77	0-25	ZC	10YR53				2	0	HR	10				
	25-48	C	75YR44				0	0	HR	10		M		
79	0-20	HZCL	05Y 62	10YR56	C	D	Y	0	0	0				
	20-80	C	05Y 61	10YR4656	M	D	Y	0	0	SLST	2		P	Y
80	0-30	C	10YR53	10YR56	F	F	0	0	HR	5				
	30-40	C	10YR53	10YR56	F	F	0	0	HR	8		M		Y
81	0-30	HZCL	10YR53				0	0	HR	3				Y
	30-45	C	10YR56	10YR56	C	D	Y	0	0	HR	8		M	
	45-80	HCL	25Y 76	10YR58	F	D	0	0	SLST	15		M		Y

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED COL.	-----STONES-----			STRUCT/ CONSIST	SUBS				
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR	POR	IMP
84	0-27	HCL	10YR44					0	0	HR	5					Y
	27-37	C	75YR4656					0	0	HR	15	M				Y
86	0-30	HCL	10YR43					2	0	HR	5					
	30-40	C	10YR53					0	0	HR	5	M				
87	0-25	C	05Y 52	10YR56	C	D		Y	0	0						
	25-80	C	05Y 62	10YR5658	M	D		Y	0	0	HR	2	P		Y	Y
88	0-25	HZCL	10YR56					0	0	HR	3					
	25-45	C	10YR43	10YR56	C	F		S	0	0	HR	3	M			Y
	45-65	C	05Y 51	10YR58	C	D		Y	0	0	HR	3	P		Y	Y
92	0-19	C	25Y 53					0	0		0					Y
	19-60	C	25Y 61	25Y68	M	D		Y	0	0	HR	5	P		Y	Y
94	0-30	C	05Y 52	10YR56	C	D		Y	0	0	HR	2				Y
	30-60	C	05Y 62	10YR56	C	D		Y	0	0	HR	3	P		Y	Y
	60-80	C	05Y 61	10YR68	M	D		Y	0	0	HR	3	P		Y	Y
95	0-25	HZCL	10YR53	10YR56	C	D		Y	0	0						
	25-75	C	75YR44	10YR5658	C	D		S	0	0			M			
100	0-30	HCL	10YR43					2	0	HR	10					
101	0-28	HZCL	05Y 52	10YR56	C	D		Y	0	0						Y
	28-55	C	05Y 62	10YR5658	M	D		Y	0	0	HR	2	P		Y	Y
	55-80	C	05Y 61	10YR5868	M	D		Y	0	0	HR	2	P		Y	Y
102	0-25	HZCL	10YR53	10YR56	F	F		0	0	HR	3					
	25-40	C	10YR42	10YR56	C	D		Y	0	0	SLST	2	M			Y
106	0-22	MCL	75YR44					10	0	HR	15					
107	0-32	HZCL	05Y 52	10YR5658	C	D		Y	0	0						Y
	32-55	C	05Y 62	10YR5658	M	D		Y	0	0	SLST	10	P		Y	Y
	55-80	C	05Y 6171	10YR5658	M	D		Y	0	0	SLST	3	P		Y	Y
108	0-25	C	05Y 52	10YR56	C	D		Y	0	0	HR	2				Y
	25-65	C	05Y 62	10YR5856	M	D		Y	0	0	HR	3	P		Y	Y
	65-80	C	05Y 61	10YR58	M	D		Y	0	0	SLST	4	P		Y	Y
109	0-25	MZCL	10YR31					0	0		0					
	25-40	HZCL	10YR54					0	0		0	M				
	40-70	C	10YR54					0	0		0	M				
	70-120	C	10YR64	75YR56	C	F		Y	0	0		0	P		Y	
110	0-30	HZCL	75YR43					10	3	HR	13					Y

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED		----STONES----			STRUCT/ CONSIST	SUBS					
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR	IMP	SPL	CALC
111	0-20	MZCL	75YR43						10	3	HR	30						
1P	0-24	HCL	10YR42						13	5	HR	17						
	24-35	HCL	10YR42	75YR46	M	D		Y	0	0	HR	28			M			Y
	35-40	HR							0	0		0			P			
2P	0-29	C	25Y 42						0	0		0						
	29-55	C	05Y 61	10YR56	M			Y	0	0		0	WKCAB	FM	P	Y		Y
3P	0-25	HZCL	10YR53						0	0	HR	3						
	25-54	C	10YR43						0	0	HR	25	WKSAB	FM	M	Y		
	54-84	HCL	25Y 76	10YR58	C	D		S	0	0	HR	40			M			
4P	0-28	HCL	10YR43						9	0	HR	15						Y
	28-70	HR							0	0		0			P			
5P	0-23	C	10YR54						2	0	HR	5						Y
	23-51	C	75YR54						0	0	HR	25			M			Y
	51-73	C	75YR54						0	0	HR	5	MCAB	VF	M			Y
	73-120	HR							0	0		0			P			

PIT TO 73CM