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WYCOMBE DISTRICT LOCAL PLAN
Land North West of Princes Risborough, Buckinghamshire

Semi-detailed survey

Agricultural Land Classification
ALC Map and Report

April 1999

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

WYCOMBE DISTRICT LOCAL PLAN
LAND NORTH WEST OF PRINCES RISBOROUGH, BUCKINGHAMSHIRE
SEMI-DETAILED SURVEY

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 33 ha of land north-west of Princes Risborough, Buckinghamshire. The survey was carried out during March 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). The survey was carried out in connection with MAFF's statutory input to the Wycombe District Local Plan. 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 land use on the site was oilseed rape on the eastern side of the survey area and permanent pasture to the west.

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
2	2.4	7.3
3b	30.6	92.7
Total surveyed area	33.0	100.0

7. The fieldwork was conducted at an average density of 1 boring per 1.5 hectares of agricultural land. In total, 18 borings and 2 soil pits were described. Additional information from an adjacent survey (FRCA Ref. 0305/045/97) was used in the grading of the present site.

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

8. The survey area has predominantly been graded Subgrade 3b (moderate quality agricultural land), with a small area of Grade 2 (very good quality agricultural land) to the east, adjacent to the railway line. The main limitation across the site is soil wetness, or a joint limitation of soil wetness and droughtiness on the Grade 2 unit.

9. The land classified as Subgrade 3b is located across the majority of the site. The soils in this unit typically comprise very slightly stony heavy silty clay loam or clay topsoils over clay upper and lower subsoils. Evidence of soil wetness is common, related to the presence of low porosity in the clay subsoils. This indicates that the soils are either poorly or imperfectly drained and downwards water movement through the profile is impeded. Soil wetness reduces the versatility of the land in terms of access by machinery (e.g. for cultivations or harvesting) and grazing by livestock if damage to the soil is to be avoided. Soil wetness will also adversely affect seed germination and root growth and will therefore reduce the level and consistency of yields.

10. The land classified as Grade 2 has been mapped in the east of the survey area occupying land of slightly higher elevation than the surrounding area. Typical soils in this mapping unit comprise heavy silty clay loam topsoils over clay upper subsoils. The clays are either moderately or poorly stuctured and only show slight or no signs of wetness, indicating that they are moderately well drained. Calculations of available water suggest that droughtiness is an equal limitation on these soils. Where drought is limiting, there is a slight restriction on the amount of water available for plant growth, which may reduce the level and consistency of crop yields.

FACTORS INFLUENCING ALC GRADE

Climate

11. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

12. 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).

Table 2: Climatic and altitude data

Factor	Units	Values		
Grid reference	N/A	SP 805 051	SP 807 052	SP 809 051
Altitude	m, AOD	110	107	105
Accumulated Temperature	day°C (Jan-June)	1382	1385	1387
Average Annual Rainfall	mm	670	668	667
Field Capacity Days	days	147	147	147
Moisture Deficit, Wheat	mm	105	105	106
Moisture Deficit, Potatoes	mm	95	96	96
Overall climatic grade	N/A	Grade 1	Grade 1	Grade 1

13. 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.

14. 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.

15. The combination of rainfall and temperature at this site mean there is no overall climatic limitation. In addition, the site does not suffer from exposure or frost risk. As such, the site may be considered as being climatically Grade 1. Climatic factors do, however, interact with soil properties to influence soil wetness and soil droughtiness.

Site

16. The site lies between 105 and 111m AOD. In the eastern part of the survey area, the land gently rises in a southwest-northeast direction, while in the extreme south of the site, the land rises more rapidly in a southeast-northwest direction to a small plateau. Elsewhere, the land is flat-lying. Nowhere on the site do gradient, microrelief or flooding adversely affect agricultural land quality.

Geology and soils

17. The most detailed published geological information for this area (BGS, 1994) maps the survey area as mostly Upper Greensand. However, there is also an area of Lower Chalk, bounded Glauconitic marl, mapped in the south of the site and extending towards the centre of the survey area.

18. The most recent published soils information for this area (SSEW, 1983) maps the whole site to be of the Bignor Association. These soils are described as 'Fine loamy soils over sandstone with slowly permeable subsoils and slight seasonal waterlogging. Some slowly permeable seasonally waterlogged coarse loamy soils and fine loamy and fine silty well drained soils over sandstone. Soils shallow to sandstone in places' (SSEW, 1983). Detailed survey work found soils similar to those described here.

AGRICULTURAL LAND CLASSIFICATION

19. 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.

20. 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.

Grade 2

21. Land classified as Grade 2 (very good quality agricultural land) has been mapped across a small area to the north of the site. Soils in this classification unit have a minor joint soil droughtiness/soil wetness limitation. Typical soil profiles comprise stoneless, calcareous,

heavy silty clay loam topsoils over clay upper subsoils, passing to heavy silty clay loam or clay lower subsoils. They are characterised by the soil profile presented at pit 1P. The upper subsoils are poorly structured (very coarse angualr blocky) but do not show any signs of wetness, while the lower subsoils are moderately structured (coarse angular blocky) with ochreous mottles, indicating some slight wetness. Therefore, the evidence from the pit indicates that the soils are well drained, placing them in Wetness Class I which, in combination with the heavy silty clay loam topsoils places, the soils in Grade 2. Although the profiles are well drained, because of the relatively fine topsoil textures (heavy silty clay loam), the soils are downgraded on workability, as they are slower to return to a workable condition after wetting compared to coarser topsoil textures. Drought calculations, based on pit evidence and local climatic data, suggest that the soils can be classified as Grade 2 on drought, therefore, within this unit the soils have equal limitations of soil wetness and soil droughtiness. Although a wide range of agricultural and horticultural crops can be grown on these soils, the slight droughtiness limitation may be sufficient to lower the level and consistency of crop yields compared to land of higher quality.

Subgrade 3b

22. Land classified as Subgrade 3b occupies most of the surveyed area. Typical soil profiles comprise very slightly stony, heavy silty clay loam or clay topsoils over clay upper and lower subsoils. They are represented by soil pits 2P (present survey) and 10P (previous adjacent survey, FRCA Ref. 0305/045/97). Information from the pits indicated that the clay subsoils show signs of soil wetness, in the form of ochreous mottles, and have slowly permeable structures, which are sufficient to impede downward water movement through the profile. The grading of some borings also uses information from pit 1P, in particular, the upper subsoil, which was shown to have a slowly permeable structure. In pit 1P itself, the absence of any wetness and insufficient depth meant that no slowly permeable layer was present in the Grade 2 unit. However, the same clay type was found in other borings, but was shown to be both gleyed (indicating signs of wetness) and of sufficient depth to act as a slowly permeable layer. In the local climate, the profiles in this unit are poorly to imperfectly drained (Wetness Class III or IV) which, in combination with the fine textured topsoils, places the soils in Subgrade 3b. The wetness limitation will impart a restriction on access to the land for cultivations and/or grazing and will also restrict the range of crops that can be produced and the level and consistency of yields that can be achieved.

23. Within the Subgrade 3b mapping unit, isolated borings of better quality soils do occur, due to either absence of gleying in the clay subsoil, insufficient depth of a slowly permeable layer or no slowly permeable layer occurring in the profile, therefore these borings are placed in a slightly higher wetness class (WC II), since they are moderately well drained. Often, these profiles are calcareous, which has the effect of making the soils slightly better structured and more workable. However, since the survey was conducted at a semi-detailed level, the better quality borings are too sporadic to form a discrete mapping unit and have therefore been included in the Subgrade 3b unit.

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SOURCES OF REFERENCE

British Geological Survey (1994) *Sheet No.* 237, *Thame.*
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 of South East England, 1:250,000.*
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:

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. **GLEY/SPL**: 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. **GLEY**: 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	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SU80700540	OSR			27		2	3A	113	8	103	7	2				WE	3A	SEE 1P
3	SU80900540	OSR			30	30	4	3B	117	12	108	12	2				WE	3B	SEE 1P & 2P
5	SU80600530	OSR			40		2	3A	114	9	114	18	2				WE	3A	SEE 1P
7	SU80800530	OSR			28	28	4	3B	92	-13	104	8	3A				WE	3B	SEE 2P
9	SU81000530	OSR			50		2	2	132	27	116	20	2				WD	2	SEE 1P ALSO WK
11	SU80500520	LEY			25	25	4	3B	78	-27	81	-15	3B				WE	3B	SEE 2P
13	SU80700520	OSR			25	25	4	3B	87	-18	96	0	3A				WE	3B	SEE 1P
15	SU80900520	OSR			28	60	3	3B	116	11	107	11	2				WE	3B	SEE 2P
16	SU81000520	OSR			30	30	4	3B	137	32	112	16	1				WE	3B	SEE 1P H2 DENS
17	SU81000520	OSR			40		2	2	118	13	109	13	2				WD	2	SEE 1P ALSO WK
18	SU80300510	LEY			50	50	3	3B	115	10	113	17	2				WE	3B	SEE 10P 045/97
19	SU80400510	LEY			50		2	3A	123	18	114	18	2				WE	3A	SEE 1P & 2P
21	SU80600510	LEY	SE	2	25		2	3A	106	1	114	18	3A				WE	3A	SEE 1P
23	SU80800510	LEY	E	2	35	35	4	3B	118	13	109	13	2				WE	3B	SEE 1P
25	SU81000510	OSR			35	35	4	3B	112	7	103	7	2				WE	3B	SEE 1P
26	SU80400500	LEY			30	30	4	3B	103	-2	101	5	3A				WE	3B	SEE 10P 045/97
29	SU80900500	OSR			45	45	3	3B	117	12	108	12	2				WE	3B	SEE 2P
31	SU80500490	LEY	N	4	28	28	4	3B	104	-1	102	6	3A				WE	3B	SEE 10P 045/97
32	SU80600490	LEY	S	2	30	30	4	3B	105	0	103	7	3A				WE	3B	SEE 10P 045/97
1P	SU81000530	OSR			43		1	2	124	19	102	6	2				WD	2	ALSO WK
2P	SU80800530	OSR			43	43	3	3B	104	-1	109	13	3A				WK	3B	PIT 80 AUG 120

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
1	0-27	HCL	25Y 42						0	0	HR	2							
	27-47	C	25Y 53	10YR56	C	D		Y	0	0		0		P		Y			SEE 1P H2 DENSE
	47-100	C	05Y 62	10YR56	5B C	F		Y	0	0	CH	5		M			Y		SEE 1P FRIABLE
3	0-30	HZCL	25Y 42						0	0	HR	2							
	30-60	C	05Y 43	10YR56	C	D		Y	0	0		0		P		Y			SEE 2P
	60-100	C	05Y 62	10YR56	C	F		Y	0	0		0		M			Y		SEE 1P FRIABLE
5	0-25	C	10YR42						0	0	HR	2						Y	
	25-40	C	25Y 72						0	0		0		M			Y		SEE 1P FRIABLE
	40-60	C	25Y 72	25Y 66	C	F		Y	0	0		0		M			Y		SEE 1P FRIABLE
	60-90	C	25Y 72	25Y 66	C	F		Y	0	0		0		M			Y		SEE 1P FRIABLE
7	0-28	HCL	25Y 42						0	0	HR	2							
	28-70	C	05Y 43	10YR56	5B C	D		Y	0	0		0		P		Y			SEE 2P DENSE
9	0-28	HZCL	25Y 42						0	0		0						Y	
	28-50	C	25Y 53						0	0		0		P				Y	SEE 1P
	50-100	HZCL	05Y 62	10YR56	C	F		Y	0	0		0		M				Y	SEE 1P FRIABLE
11	0-25	C	10YR42						0	0	HR	2							
	25-55	C	05Y 43	10YR56	C	D		Y	0	0		0		P		Y			SEE 2P DENSE
13	0-25	HCL	10YR42						0	0	HR	2							
	25-50	C	25Y 63 53	10YR56	C	D		Y	0	0		0		P		Y			SEE 1P H2 DENSE
	50-65	C	25Y 63 53	10YR56	C	D		Y	0	0		0		P		Y		Y	SEE 1P H2 DENSE
15	0-28	HZCL	25Y 42						0	0	HR	2							
	28-60	C	05Y 52	10YR56	C	D		Y	0	0		0		M					SEE 2P POROUS
	60-100	C	05Y 43	10YR56	C	D		Y	0	0		0		P		Y			SEE 2P DENSE
16	0-30	HZCL	25Y 42						0	0	HR	2							
	30-55	C	25Y 53	10YR56	C	D		Y	0	0	HR	2		P		Y			SEE 1P H2 DENSE
	55-120	C	05Y 62	10YR56	C	F			0	0		0		M			Y		SEE 2P FRIABLE
17	0-30	HZCL	25Y 42						0	0		0						Y	
	30-40	C	25Y 53						0	0		0		P				Y	SEE 1P
	40-100	C	05Y 62	10YR56	C	F		Y	0	0		0		M				Y	SEE 1P FRIABLE
18	0-30	HZCL	25Y 42						0	0		0							
	30-50	C	05Y 42	10YR56	F	F			0	0	HR	2		M					SEE 10P 045/97
	50-90	C	05Y 52	10YR56	C	F		Y	0	0	HR	4		P		Y			SEE 10P 045/97
19	0-30	HZCL	25Y 42						0	0		0							
	30-50	C	05Y 52	10YR56	F	F			0	0	HR	4		M				Y	SEE 2P POROUS
	50-100	C	05Y 62	10YR56	5B C	F		Y	0	0		0		M				Y	SEE 1P FRIABLE
21	0-25	C	25Y 52						0	0	HR	2						Y	
	25-60	C	25Y 72	25Y 66	C	F		Y	0	0		0		M				Y	SEE 1P FRIABLE
	60-80	C	25Y 71	25Y 66	C	F		Y	0	0		0		M				Y	SEE 1P FRIABLE

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
23	0-35	C	25Y 42						0	0		0						Y	
	35-50	C	25Y 53	10YR56	C	F		Y	0	0	CH	2		P		Y	Y		SEE 1P H2 DENSE
	50-100	C	05Y 62	10YR56	C	F		Y	0	0		0		M				Y	SEE 1P FRIABLE
25	0-27	HZCL	25Y 42						0	0	HR	2						Y	
	27-35	C	25Y 52 53	10YR56	C	D		Y	0	0	HR	5		P		Y	Y		SEE 1P H2 DENSE
	35-70	C	25Y 52 53	10YR56	C	D		Y	0	0	CH	2		P		Y	Y		SEE 1P H2 DENSE
26	0-30	C	25Y 42						0	0		0							
	30-90	C	05Y 52	10YR56	C	F		Y	0	0	HR	4		P		Y			SEE 10P 045/97
29	0-30	HCL	25Y 42						0	0	HR	4							
	30-45	C	05Y 53						0	0		0		M					
	45-100	C	05Y 43	10YR56	C	D		Y	0	0		0		P		Y			SEE 2P DENSE
31	0-28	C	25Y 42						0	0		0						Y	
	28-50	C	05Y 52	10YR56	C	F		Y	0	0		0		P		Y	Y		SEE 10P 045/97
	50-90	C	05Y 62	10YR56	C	F		Y	0	0		0		M				Y	SEE 1P FRIABLE
32	0-30	C	25Y 42						0	0		0							
	30-90	C	05Y 52	10YR56	C	F		Y	0	0		0		P		Y			SEE 10P 045/97
1P	0-27	C	25Y 42						0	0	HR	2						Y	
	27-43	C	25Y 53						0	0	HR	2	MDVCAB	FM P	Y	Y	Y	Y	NOT SPL-SHALLOW
	43-54	C	05Y 62 72	10YR56	C	F			0	0		0	MDCAB	FR M				Y	FRIABLE
	54-120	ZC	05Y 62 72	10YR56	C	F			0	0	FSST	20	MDCAB	FR M				Y	WTH'D FSST/ZR
2P	0-27	HCL	25Y 42						0	0		0							
	27-43	C	05Y 53						0	0		0	MDCAB	FM M					POROUS
	43-80	C	05Y 43	10YR58	C	D		Y	0	0		0	MDCAB	FM P	Y	Y			DENSE