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**MILTON KEYNES EXPANSION STUDY
AREA 9 - WHADDON**

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

May 1998

**Resource Planning Team
Eastern Region
FRCA Reading**

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AGRICULTURAL LAND CLASSIFICATION REPORT

MILTON KEYNES EXPANSION STUDY AREA 9 - WHADDON

SEMI-DETAILED SURVEY

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 90.5 ha of land located to the south-east of Whaddon, a village to the west of Milton Keynes in Buckinghamshire. The survey was carried out during May 1998.
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), in connection with its statutory input to the Milton Keynes Expansion Study. 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 the 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 agricultural land use on the site comprised winter cereals and grassland, both ley and permanent. This was vacant at the time of survey. The areas mapped as 'Other land' include farm buildings and woodland with an area of landscaped public open space to the south-east of the survey area.

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
3b	76.9	100	85.0
Other land	13.6	-	15.0
Total surveyed area	76.9	100	85.0
Total site area	90.5	-	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 2 hectares of agricultural land. In total, 41 borings and two soil pits were described.

8. All the agricultural land at this site has been classified as Subgrade 3b, moderate quality. The principal limitation to land quality is soil wetness. The soils observed comprise loamy topsoils overlying clayey subsoils. The clayey subsoil horizons occur at shallow depths in the profile and significantly impede soil drainage. Soil wetness reduces the versatility of the land in terms of access by machinery (e.g. for cultivations or harvesting) and for grazing if damage to the soil is to be avoided. It also has the effect of reducing the level and consistency of yields.

FACTORS INFLUENCING ALC GRADE

Climate

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

10. 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 819 330	SP 816 337
Altitude	m, AOD	115	125
Accumulated Temperature	day°C (Jan-June)	1363	1352
Average Annual Rainfall	mm	659	662
Field Capacity Days	days	139	139
Moisture Deficit, Wheat	mm	102	101
Moisture Deficit, Potatoes	mm	93	91
Overall climatic grade	N/A	Grade 1	Grade 1

11. 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.

12. 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.

13. The combination of rainfall and temperature at this site means that there is no overall climatic limitation. Other local climatic factors such as exposure and frost risk are also not believed to affect the site; it is climatically Grade 1.

Site

14. The site lies between approximately 110 and 125m AOD. Over the majority of the site, to the north, the land falls gently towards the northern boundary. To the south of the Shenley Road which bisects the site, the land falls gently towards the stream close to the southern border with, in addition, a natural drainage channel forming a valley through the centre of this area, again falling to the south. Beyond the stream, the land rises up to and beyond the site boundary. None of the slopes within the survey area are of sufficient gradient to adversely affect agricultural land quality. Other site factors such as microrelief and flooding are also not significant.

Geology and soils

15. The published geological information for the site (BGS, 1971) show the majority of the site to be underlain by glacial boulder clay as a drift deposit overlying solid Oxford Clay. Towards the south of the site, the area immediately surrounding the stream is mapped as being underlain by alluvial drift deposits.

16. The most detailed published soils information for the site (SSEW, 1983 and 1984) shows the whole area to comprise soils from the Hanslope association. These are described as, 'Slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous clayey soils. Slight risk of water erosion.' (SSEW, 1983). Soils of these types were encountered during the survey.

AGRICULTURAL LAND CLASSIFICATION

17. 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.

18. 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 3b

19. Land of moderate quality has been mapped across all of the agricultural land at this site. The principal limitation is soil wetness. The soils are characterised by the pit observations 1P and 2P (see Appendix II).

20. Across the site the soils are of a single type. They comprise a non-calcareous heavy clay loam or clay topsoil passing directly to clay subsoils which commonly become calcareous from between 40 and 70cm. The profiles contain up to 5% flints by volume with, in addition, up to 5% chalk fragments by volume in the calcareous lower horizon. The profiles all present evidence of seasonal waterlogging in the form of gleying either in the topsoil or upper subsoil. The soil pits confirm that the clay subsoils are poorly structured and slowly permeable between 25 and 45cm. The presence of slowly permeable horizons causes drainage to be significantly impeded. Under the prevailing local climatic conditions these drainage characteristics equate to Wetness Classes III and IV which, when considered alongside the topsoil textures result in a Subgrade 3b classification.

21. Soil wetness restricts the versatility of the land by limiting cultivation and/or grazing opportunities without damaging the soil. It is also likely to adversely affect plant growth and therefore yield level and consistency may be reduced.

Matthew Larkin
Resource Planning Team
Eastern Region
FRCA Reading

SOURCES OF REFERENCE

British Geological Survey (1971) *Sheet No. SP83. Milton Keynes. Solid and Drift Edition. 1:25 000 scale.*
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) *Soils of South East England. 1:250 000 Scale.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils of South East England. Bulletin No. 15.*
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 descriptions

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

- GRID REF:** national 100 km grid square and 8 figure grid reference.
- 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
- GRDNT:** Gradient as estimated or measured by a hand-held optical clinometer.
- GLEYS/SPL:** Depth in centimetres (cm) to gleying and/or slowly permeable layers.
- AP (WHEAT/POTS):** Crop-adjusted available water capacity.
- MB (WHEAT/POTS):** Moisture Balance. (Crop adjusted AP - crop adjusted 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	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 DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYS	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT					
1	SP81803420	CER N	1	35	35	4	3B	103	1	107	15	3A			WE	3B	
2	SP81503410	CER NE	1	30	30	4	3B	100	-2	105	13	3A			WE	3B	
3	SP81703410	CER NW	1	32	32	4	3B	101	-1	106	14	3A			WE	3B	
4	SP81903410	CER		28	28	4	3B	104	2	102	10	3A			WE	3B	
5	SP81203400	CER NE	1	30	30	4	3B	100	-2	104	12	3A			WE	3B	
6	SP81403400	CER		29	29	4	3B	92	-10	103	11	3A			WE	3B	
7	SP81603400	CER NE	1	30	40	3	3B	103	1	108	16	3A			WE	3B	
8	SP81803400	CER N	1	32	32	4	3B	114	12	113	21	2			WE	3B	2P LOCATION
9	SP81103390	CER NE	1	30	30	4	3B	100	-2	105	13	3A			WE	3B	
10	SP81303390	CER NE	1	35	35	4	3B	102	0	107	15	3A			WE	3B	
11	SP81503390	CER W	1	30	30	4	3B	92	-10	104	12	3A			WE	3B	
12	SP81703390	CER		29	29	4	3B	91	-11	103	11	3A			WE	3B	
13	SP81903390	CER		25	25	4	3B	103	1	101	9	3A			WE	3B	
14	SP81203380	CER NE	1	0	30	4	3B	100	-2	105	13	3A			WE	3B	
15	SP81403380	CER NE	1	28	28	4	3B	91	-11	103	11	3A			WE	3B	
16	SP81603380	CER		30	37	4	3B	94	-8	106	14	3A			WE	3B	
17	SP81803380	CER		30	30	4	3B	107	5	104	12	2			WE	3B	
18	SP82003380	CER		26	55	3	3B	117	15	111	19	2			WE	3B	
19	SP81303370	CER NW	1	30	30	4	3B	100	-2	105	13	3A			WE	3B	
20	SP81503370	CER NE	1	28	28	4	3B	92	-10	104	12	3A			WE	3B	
21	SP81703370	CER W	1	30	30	4	3B	100	-2	105	13	3A			WE	3B	
22	SP81903370	CER E	1	30	30	4	3B	100	-2	105	13	3A			WE	3B	
23	SP81403360	CER NW	1	30	30	4	3B	100	-2	105	13	3A			WE	3B	
24	SP81603360	CER		28	28	4	3B	98	-4	103	11	3A			WE	3B	
25	SP81803360	CER		27	27	4	3B	97	-5	102	10	3A			WE	3B	
26	SP82003360	CER		25	25	4	3B	96	-6	100	8	3A			WE	3B	
27	SP81483353	CER N	1	35	35	4	3B	103	1	108	16	3A			WE	3B	
28	SP81703350	CER		30	30	4	3B	92	-10	103	11	3A			WE	3B	
29	SP81903350	CER		0	28	4	3B	95	-7	103	11	3A			WE	3B	
30	SP81603340	LEY S	1	0	27	4	3B	103	1	101	9	3A			WE	3B	
31	SP81803340	LEY S	2	0	27	4	3B	97	-5	102	10	3A			WE	3B	
32	SP82003340	SAS S	1	0	30	4	3B	98	-4	103	11	3A			WE	3B	
33	SP81703330	LEY S	1	28	40	3	3B	108	6	106	14	2			WE	3B	1P LOCATION
34	SP81903330	RGR W	2	0	30	4	3B	100	-2	104	12	3A			WE	3B	Q DISTURBED
35	SP81803320	LEY SE	2	28	40	3	3B	108	6	106	14	2			WE	3B	
36	SP82003320	SAS N	1	30	30	4	3B	101	-1	106	14	3A			WE	3B	
37	SP81723310	LEY SE	2	0	45	3	3B	101	-1	105	13	3A			WE	3B	
38	SP81903310	PGR W	4	0	28	4	3B	112	10	102	10	2			WE	3B	
39	SP81803300	LEY SE	3	0	28	4	3B	104	2	102	10	3A			WE	3B	
40	SP82003300	RGR S	4	35	35	4	3B	95	-7	106	14	3A		Y	WE	3B	DISTURBED
41	SP81883295	RGR S	2	0	30	4	3B	91	-11	103	11	3A		Y	WE	3B	Q DISTURBED
42	SP81803400	LEY SE	2	29	29	4	3B	95	-7	103	11	3A			WE	3B	PIT 75

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--				-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT					
2P	SP81703330	CER W	1	22	22	4	3B	92	-10	100	8	3A			WE	3B	PIT 75

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	COMMENTS
				COL	ABUN	CONT		GLEY	>2	>6							
1	0-35	HCL	10YR43					0	0	HR	1						
	35-80	C	25Y 53 71	10YR58	C	D		Y	0	0	HR	1	P		Y	Y	+2%CH PLASTIC
2	0-30	HCL	10YR42					0	0	HR	1						
	30-80	C	25Y 62 61	10YR68	M	D		Y	0	0	HR	1	P		Y		CALC60+ PLASTIC
3	0-32	HCL	10YR42					0	0	HR	1						
	32-50	C	05Y 51	10YR68	M	D		Y	0	0	HR	1	P		Y		PLASTIC
	50-80	C	05Y 51	10YR68	M	D		Y	0	0	CH	5	P		Y	Y	
4	0-28	HCL	10YR43					0	0	HR	2						
	28-45	C	10YR52 53	10YR56	C	D	FEW MN	Y	0	0	HR	2	P		Y		
	45-60	C	10YR52 53	10YR58	C	D		Y	0	0	HR	5	P		Y	Y	+2% CHALK
	60-90	C	25Y 61 63	10YR58	M	D		Y	0	0	HR	5	P		Y	Y	+5% CHALK
5	0-30	HCL	10YR43					0	0	HR	1						
	30-80	C	25Y 52 62	75YR58	M	D		Y	0	0	CH	2	P		Y	Y	PLASTIC & WET
6	0-29	HCL	25Y 42 43					0	0	HR	2						
	29-45	C	25Y 51 52	10YR56 58	M	D	FEW MN	Y	0	0	HR	2	P		Y		PLASTIC
	45-70	C	25Y 51 61	10YR58	M	D	COM MN	Y	0	0	CH	5	P		Y	Y	+2% FLINTS
7	0-30	HCL	10YR42					0	0	HR	1						
	30-40	C	10YR53 61	10YR58	C	D		Y	0	0	HR	1	M		Y		
	40-80	C	25Y 62 61	10YR68	M	D		Y	0	0	CH	5	P		Y	Y	
8	0-32	HCL	10YR42					0	0	HR	1						
	32-55	C	25Y 53 62	10YR58	C	D		Y	0	0	HR	1	M		N	Y	2P LOCATION
	55-90	C	25Y 52 61	10YR58	M	D		Y	0	0	CH	2	P		Y	Y	
9	0-30	HCL	10YR43					0	0	HR	1						
	30-60	C	25Y 52 61	75YR58	M	D		Y	0	0	HR	1	P		Y		PLASTIC
	60-80	C	25Y 61	75YR58	M	D		Y	0	0	CH	2	P		Y	Y	
10	0-35	HCL	10YR43					0	0	HR	1						
	35-80	C	25Y 63 61	75YR58	M	D		Y	0	0	HR	2	P		Y		PLASTIC
11	0-30	HCL	10YR42					0	0	HR	2						
	30-70	C	25Y 51 52	10YR58	M	D	COM MN	Y	0	0	HR	2	P		Y		PLASTIC
12	0-29	HCL	10YR42					0	0	HR	2						
	29-50	C	25Y 51 61	10YR58	M	D	FEW MN	Y	0	0	HR	2	P		Y		PLASTIC
	50-70	C	25Y 51 61	10YR58	M	D	COM MN	Y	0	0	CH	5	P		Y	Y	+5% FLINTS
13	0-25	HCL	10YR43					0	0	HR	2						
	25-55	C	10YR51 53	10YR56	C	D	FEW MN	Y	0	0	HR	2	P		Y		V MOIST PLASTIC
	55-90	C	25Y 51 53	10YR58	M	D		Y	0	0	CH	5	P		Y	Y	+5% FLINTS

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS			CALC		
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR		POR	IMP
14	0-30	MCL	10YR4/2	10YR4/6	C	D		Y	0	0	HR	1					
	30-60	C	25Y 6/1	75YR5/8	M	D		Y	0	0	HR	2	P		Y		PLASTIC
	60-80	C	05Y 5/1	10YR5/6	M	D		Y	0	0	HR	1	P		Y	Y	DENSE
15	0-28	HCL	10YR4/3						0	0	HR	2					
	28-70	C	25Y 5/3 6/1	75YR5/8	M	D		Y	0	0	HR	2	P		Y		PLASTIC
16	0-30	HCL	10YR4/2						0	0	HR	2					
	30-37	C	25Y 5/2	10YR5/6 5/8	C	D	FEW MN	Y	0	0	HR	2	M				
	37-70	C	25Y 5/1 6/1	10YR5/8	M	D	COM MN	Y	0	0	HR	2	P		Y		PLASTIC
17	0-30	HCL	10YR4/3	10YR5/6	F	D			0	0	HR	2					
	30-60	C	25Y 5/1 5/2	10YR5/8	M	D	FEW MN	Y	0	0		0	P		Y		
	60-90	C	25Y 6/1 6/3	10YR5/8	M	D		Y	0	0	HR	5	P		Y	Y	+5% CHALK
18	0-26	HCL	10YR4/2 4/3						0	0	HR	2					
	26-55	C	10YR5/3	10YR5/6	C	D	FEW MN	Y	0	0	HR	2	M				
	55-70	C	10YR5/1 5/3	10YR5/8	M	D	COM MN	Y	0	0	HR	2	P		Y		PLASTIC
	70-100	C	25Y 6/1 6/3	10YR5/8	M	D		Y	0	0	HR	10	P		Y	Y	+5% CHALK
19	0-30	MCL	10YR4/3						0	0	HR	1					
	30-80	C	25Y 5/2 6/1	75YR5/8	M	D		Y	0	0		0	P		Y		PLASTIC
20	0-28	HCL	10YR4/3						0	0	HR	1					
	28-70	C	25Y 6/2 6/1	75YR5/8	M	D		Y	0	0	HR	1	P		Y		PLASTIC
21	0-30	HCL	10YR4/2						0	0	HR	1					
	30-50	C	25Y 5/2 5/1	75YR5/8	M	D		Y	0	0	HR	1	P		Y		PLASTIC
	50-80	C	25Y 5/2 6/1	10YR5/8	M	D		Y	0	0	CH	2	P		Y	Y	+2% FLINTS
22	0-30	HCL	10YR4/2						0	0	HR	1					
	30-55	C	25Y 5/2	10YR5/8	C	D		Y	0	0	HR	1	P		Y		PLASTIC
	55-80	C	05Y 5/2 5/1	10YR5/8	M	D		Y	0	0	CH	2	P		Y	Y	+2% FLINTS
23	0-30	MCL	10YR4/3						0	0	HR	1					
	30-50	C	25Y 6/3 6/1	75YR5/8	M	D		Y	0	0	HR	2	P		Y		PLASTIC
	50-80	C	05Y 6/1	10YR5/8	M	D		Y	0	0	CH	2	P		Y	Y	PLASTIC
24	0-28	HCL	10YR4/3						0	0	HR	2					
	28-65	C	25Y 5/1 5/3	10YR5/8	M	D	FEW MN	Y	0	0	HR	2	P		Y		
	65-80	C	25Y 6/1 6/3	10YR5/8	M	D		Y	0	0	HR	5	P		Y	Y	+5% CHALK
25	0-27	HCL	10YR4/3						0	0	HR	2					
	27-55	C	25Y 5/1 5/2	10YR5/8	M	D	FEW MN	Y	0	0	HR	2	P		Y		PLASTIC
	55-80	C	25Y 6/1 6/3	10YR5/8	M	D		Y	0	0	HR	5	P		Y	Y	+5% CHALK
26	0-25	HCL	10YR4/3						0	0	HR	2					
	25-45	C	25Y 5/1 5/2	10YR5/8	M	D	FEW MN	Y	0	0	HR	2	P		Y		PLASTIC
	45-80	C	25Y 6/1 6/2	10YR5/8	M	D		Y	0	0	HR	5	P		Y	Y	+5% CHALK

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED		----STONES-----			STRUCT/ CONSIST	SUBS			CALC			
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR		IMP	SPL	
27	0-35	MCL	10YR42						0	0	0								
	35-60	C	25Y 62	10YR68	M	D			Y	0	0	HR	2		P		Y	PLASTIC	
	60-80	C	25Y 61	10YR58	M	D			Y	0	0	CH	2		P		Y	Y	
28	0-30	HCL	10YR42							0	0	HR	2						
	30-45	C	25Y 51 61	10YR58	M	D	FEW MN		Y	0	0	HR	2		P		Y	PLASTIC	
	45-70	C	05Y 51 52	10YR56	58	M	D	FEW MN	Y	0	0	CH	5		P		Y	Y	+3% FLINTS
29	0-28	HCL	10YR42 43	10YR46	C	D			Y	0	0	HR	2						
	28-50	C	25Y 51 61	10YR58	M	D	FEW MN		Y	0	0	HR	2		P		Y	PLASTIC	
	50-75	C	05Y 51 52	10YR56	58	M	D	FEW MN	Y	0	0	CH	5		P		Y	Y	+2% FLINTS
30	0-27	HCL	10YR42 41	10YR46	C	D			Y	0	0	HR	2						
	27-45	C	25Y 51 53	10YR58	M	D	FEW MN		Y	0	0	HR	2		P		Y	PLASTIC	
	45-90	C	25Y 61 63	10YR58	M	D			Y	0	0	HR	5		P		Y	Y	+5% CHALK
31	0-27	HCL	10YR42	10YR56	C	D			Y	0	0	HR	2						
	27-68	C	25Y 51 52	10YR58	M	D	FEW MN		Y	0	0	HR	2		P		Y	PLASTIC	
	68-80	C	25Y 61 63	10YR58	M	D			Y	0	0	HR	5		P		Y	Y	+3% CHALK
32	0-30	C	10YR41	75YR46	C	D			Y	0	0		0						WET SURFACE
	30-60	C	25Y 53 61	10YR68	C	D			Y	0	0		0		P		Y	PLASTIC	
	60-80	C	25Y 61	10YR68	M	D			Y	0	0	CH	2		P		Y	Y	
33	0-28	HCL	10YR42	10YR46	F	D				0	0	HR	2						1P LOCATION
	28-40	C	10YR51 53	10YR56	M	D	FEW MN		Y	0	0	HR	2		M				
	40-60	C	25Y 51 53	10YR58	M	D	FEW MN		Y	0	0	HR	2		P		Y	PLASTIC	
	60-90	C	25Y 61 63	10YR58	M	D			Y	0	0	HR	5		P		Y	Y	+5% CHALK
34	0-30	HCL	25Y 41 42	10YR56	C	F			Y	0	0		0						DISTURBED
	30-50	C	25Y 51 61	75YR58	M	D	COM MN		Y	0	0	HR	2		P		Y	PLASTIC	
	50-80	C	05Y 61 51	10YR58	M	D			Y	0	0	CH	5		P		Y	Y	
35	0-28	HCL	10YR43							0	0	HR	2						
	28-40	HCL	10YR53 54	10YR56	C	F			Y	0	0	HR	2		M				
	40-65	C	25Y 51 53	10YR58	M	D	FEW MN		Y	0	0	HR	2		P		Y	PLASTIC	
	65-90	C	25Y 61 63	10YR58	M	D			Y	0	0	HR	5		P		Y	Y	+5% CHALK
36	0-30	HCL	10YR42							0	0		0						
	30-50	C	25Y 52 62	10YR58	C	D			Y	0	0		0		P		Y	PLASTIC	
	50-80	C	25Y 62 61	10YR58	M	D			Y	0	0	CH	2		P		Y	Y	
37	0-28	HCL	10YR42	10YR46	C	D	FEW MN		Y	0	0	HR	2						
	28-45	HCL	10YR53	10YR56	C	D	FEW MN		Y	0	0	HR	10		M				BORDER CLAY
	45-55	C	10YR52	10YR58	M	D	FEW MN		Y	0	0	HR	2		P		Y	PLASTIC	
	55-80	C	25Y 61 63	10YR58	M	D			Y	0	0	HR	5		P		Y	Y	+5% CHALK
38	0-28	HCL	10YR41	10YR46	C	F			Y	0	0	HR	2						
	28-55	C	25Y 51 53	10YR58	M	D	FEW MN		Y	0	0	HR	2		P		Y	PLASTIC	
	55-100	C	25Y 61 63	10YR58	M	D			Y	0	0	HR	5		P		Y	Y	+5% CHALK

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED	----STONES----			STRUCT/	SUBS								
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC		
39	0-28	HCL	10YR42 43 10YR46		C	F				Y	0	0	HR	2						
	28-63	C	10YR51 53 10YR58		M	D	FEW MN		Y	0	0	HR	2		P				Y	
	63-90	C	25Y 51 63 10YR58		M	D			Y	0	0	HR	10		P			Y	Y	+3% CHALK
40	0-35	HCL	10YR41 42								0	0	HR	2						DISTURBED
	35-70	C	25Y 51 52 10YR58		M	D	COM MN		Y	0	0	HR	2		P			Y		PLASTIC
41	0-30	HCL	25Y 32 75YR46		C	D			Y	0	0	HR	2							DISTURBED
	30-70	C	25Y 51 52 75YR58		M	D	COM MN		Y	0	0	HR	5		P			Y		PLASTIC
1P	0-29	HCL	10YR43 10YR46		F	D					0	0	HR	2						PIT AT BOR 70
	29-53	C	25Y 51 10YR58		M	D	25Y 51 52	Y		0	0	HR	2	STCAB	FM	P	Y		Y	FEW MN PLASTIC
	53-75	C	25Y 61 63 10YR58		M	D	FEW MN	Y		0	0	HR	5	WKCAB	FM	P	Y		Y	PIT 75 +5% CH
2P	0-22	HCL	10YR42 43								0	0	HR	2						PIT AT BOR 20
	22-55	C	25Y 51 52 10YR58		M	D	25Y 53	Y		0	0	HR	2	WDCAB	MN	P	Y		Y	FEW MN MOIST
	55-75	C	25Y 61 63 10YR58		M	D	FEW MN	Y		0	0	CH	5	WDCAB	FM	P	Y		Y	PIT 75 +3% HR