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REIGATE AND BANSTEAD DISTRICT LOCAL PLAN
Land North-east of Horley, Surrey
Semi-Detailed Survey

Agricultural Land Classification
ALC Map and Summary Report

December 1997

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

REIGATE AND BANSTEAD DISTRICT LOCAL PLAN
LAND NORTH-EAST OF HORLEY, SURREY
SEMI DETAILED SURVEY

INTRODUCTION

1 This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 119 6 ha of land located around Great Lake Farm to the north east of Horley in Surrey The survey was carried out during December 1997

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 the Reigate and Banstead 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 land use on the site comprised arable land and permanent grassland The grassland was either vacant or being used to graze horses The areas mapped as Other land include woodland farm and derelict buildings dwellings a pond and tracks

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	33 7	30 3	28 2
3b	77 6	69 7	64 9
Other land	8 3		6 9
Total surveyed area	111 3	100	93 1
Total site area	119 6		100

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

7 The fieldwork was conducted at an average density of approximately 1 boring per 2 hectares of agricultural land Fifty-one borings and six soil pits were described

8 The agricultural land on this site has been classified as Subgrade 3a (good quality) and Subgrade 3b (moderate quality) The principal limitation to land quality is soil wetness

9 The majority of the agricultural land at this site has been mapped as Subgrade 3b with Subgrade 3a occurring in two areas towards the centre and south east of the site The soils observed comprise fine loamy and silty topsoils overlying fine loamy silty and clayey subsoils The clayey subsoil horizons impede soil drainage and occur at moderate and shallow depths in the profile The relative depth determines the severity of the soil wetness problem and in combination with topsoil texture determines the ALC grade Some Subgrade 3a land is shown because the water table in these areas regularly fluctuates and is likely to be close to the surface for a significant period in most years This causes the versatility of the land to be restricted by soil wetness to a level whereby Subgrade 3a is appropriate

10 Soil wetness reduces the versatility of the land in terms of access by machinery (e g for cultivations or harvesting) and for grazing by livestock 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

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	TQ 291 441	TQ 295 444
Altitude	m AOD	55	55
Accumulated Temperature	day C (Jan June)	1460	1459
Average Annual Rainfall	mm	772	770
Field Capacity Days	days	163	162
Moisture Deficit Wheat	mm	110	110
Moisture Deficit Potatoes	mm	104	104
Overall climatic grade	N/A	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 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

16 The site lies between approximately 53 and 58m AOD The land rises gently to the north and south of Burstow stream which bisects the site Slopes across the site are gentle and do not affect agricultural land quality Burstow Stream, a tributary of the River Mole has a deep channel and although it is known to flood last did so in 1968 according to the land occupier On this basis flooding is not significant in terms of agricultural land quality Other site factors such as microrelief are also not significant

Geology and soils

17 The published geological information (BGS 1978) shows the majority of the site to be underlain by low terrace river gravel and alluvial drift deposits Towards the north-west of the site these give way to solid Weald Clay deposits

18 The most detailed published soils information for the site (SSEW 1983 and 1984) shows it to comprise soils of the Shabbington and Wickham 1 associations The Shabbington soils which are shown to occupy the south and centre of the site are described as deep fine loamy and fine loamy over sandy soils variably affected by groundwater Some slowly permeable seasonally waterlogged fine loamy fine loamy over clayey soils (SSEW 1983) The Wickham soils which occupy approximately one-third of the site to the north are described as Slowly permeable seasonally waterlogged fine silty over clayey fine loamy over clayey and clayey soils (SSEW 1983) During the survey clayey soils were most common although some sandier soils were encountered especially towards the south and centre of the site

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

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

Subgrade 3a

21 Land of good quality has been mapped in two separate units across the centre and towards the south east of the site The principal limitation to land quality in these areas is soil wetness The soils are characterised by the pit observations 1P 2P and 5P (see Appendix II)

22 Two soil types are described in this subgrade at this site The most common typically comprises a medium clay loam or medium silty clay loam topsoil overlying similar or heavy clay loam upper subsoils These pass to clay or silty clay lower subsoils Soil pit 2 (see Appendix II) represents this soil type It proves the existence of poor structures in the clayey horizons These are slowly permeable and therefore significantly impede drainage and cause seasonal waterlogging Many of the profiles were gleyed at shallow depth representing further evidence of seasonal waterlogging The depth of the slowly permeable clayey subsoils (between 45 and 70cm) in combination with the shallow gleying results in the soils being assigned to Wetness Class III The combination of imperfect soil drainage topsoil texture and climatic factors gives rise to a land classification of Subgrade 3a Excessive soil wetness may adversely affect crop growth and development as well as limiting the 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

23 The second less extensive soil type in this subgrade is typified by the pit observations 1P and 5P (see Appendix II) The classification is similarly based on a soil wetness limitation but soil conditions are different The profile typically comprises a medium silty clay loam or medium clay loam topsoil overlying similar or slightly heavier (heavy clay loam) upper subsoils These pass to a sandy clay loam horizon which was occasionally observed to pass to silty clay towards 120cm Stone contents within the topsoil and upper subsoil are typically slight up to 10% small flints by volume In the sandy clay loam lower subsoil stone content increases to a maximum of 25% small flints by volume Within the subsoil horizons gleying as evidence of soil wetness was common within 40cm In addition there was a significant volume of manganese concretions within the subsoil horizons as further evidence of seasonal waterlogging The pits proved that highly manganiferous sandy clay loam lower subsoil was in most cases slowly permeable However where this was proved not to be the case (5P see Appendix II) by soil structure alone slowly permeable conditions prevailed as the manganese concretions cause a hard soil pan to be present The slowly permeable nature was evidenced by water being perched on this layer at the time of survey when in general groundwater levels were at a greater depth Because this horizon occurs between 58 and 70cm it is too deep to be affected by normal agricultural practices such as subsoiling As such this horizon significantly impedes drainage to the extent that Wetness Class III is most applicable With similar topsoils and climate to the more prevalent soil type described above Subgrade 3a is the most appropriate classification

Subgrade 3b

24 Land of moderate quality has been mapped across the majority of the site in two discrete units The principal limitation in these areas is soil wetness The soils are characterised by the pit observations 3P 4P and 6P (see Appendix II)

25 The soils across this area are of a single type They comprise medium/heavy clay loam or medium silty clay loam topsoils which may contain 2 3% total flints by volume These either directly overlie slowly permeable clay or silty clay in the subsoil or pass through a thin horizon of heavy clay loam/heavy silty clay loam into a clay or silty clay lower subsoil These profiles are all gleyed within 40cm Evidence of severely impeded drainage arises from the presence of slowly permeable horizons between 20 and 42cm as confirmed by soil pits 3 4 and 6 (see Appendix II) The subsoils are mostly either stone free or contain up to 5% flints by volume Such drainage characteristics equate to Wetness Class IV which when considered

alongside topsoil textures and the prevailing climatic conditions result in a Subgrade 3b classification The effects of soil wetness are described in para 22 above Subgrade 3b land is less versatile than that classified as Subgrade 3a because the limitations are more severe ie access restrictions are greater and crop yields are more likely to be adversely affected

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SOURCES OF REFERENCE

British Geological Survey (1978) *Sheet 286 Reigate Drift Edition 1 50000 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

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

AMPLE 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
3	TQ29474524	PLO			25	25	4	3B		0		0					WE	3B	
4	TQ28704510	PLO	NE	1	25	25	4	3B		0		0					WE	3B	
6	TQ28904510	CER	NE	1	28	28	4	3B		0		0					WE	3B	
8	TQ29104510	CER	N	1	25	25	4	3B		0		0					WE	3B	
10	TQ29304510	PLO			30	30	4	3B		0		0					WE	3B	SEE 4P
12	TQ29504510	PLO			32	32	4	3B		0		0					WE	3B	
21	TQ28704490	PLO	S	1	30	30	4	3B		0		0					WE	3B	
23	TQ28904490	OSR	S	1	25	25	4	3B		0		0					WE	3B	
24	TQ29004490	OSR	S	1	25	25	4	3B		0		0					WE	3B	
25	TQ29104492	OSR	S	1	30	50	3	3B	133	23	110	6	2				WE	3B	HCL TOPSOIL
27	TQ29304490	PLO			25	25	4	3B		0		0					WE	3B	
30	TQ28804480	CER	S	1	25	25	4	3B		0		0					WE	3B	
32	TQ29004480	PLO			28	28	4	3B		0		0					WE	3B	SEE 3P
39	TQ28704470	CER	N	1	25	48	3	3A		0		0					WE	3A	
41	TQ28904470	PLO			25	70	3	3A	116	6	110	6	2				WE	3A	
43	TQ29104470	PLO			25	60	3	3A		0		0					WE	3A	SEE 5P
45	TQ29304470	PLO			25	25	4	3B		0		0					WE	3B	
47	TQ29504470	PLO			30	30	4	3B		0		0					WE	3B	
52	TQ29004460	PLO			30	48	3	3A	116	6	121	17	2				WE	3A	
54	TQ29204460	PLO			25	25	4	3B	126	16	101	-3	2				WE	3B	
56	TQ29404460	PLO			25	25	4	3B		0		0					WE	3B	
58	TQ29654454	PLO			28	28	4	3B		0		0					WE	3B	
59	TQ28704450	PLO			35	80	2	2	95	-15	98	-6	3A				DR	3A	IMP 80 MN PAN
60	TQ28804450	PLO			25	25	4	3B		0		0					WE	3B	
61	TQ28904450	PLO			25	25	4	3B		0		0					WE	3B	
63	TQ29104450	CER			28	70	3	3A	144	34	122	18	1				WE	3A	
65	TQ29304450	PGR			28	65	3	3A	137	27	114	10	2				WE	3A	
67	TQ29504450	PGR			25	48	3	3A		0		0					WE	3A	SEE 1P
76	TQ29404440	PGR			25	25	4	3B		0		0					WE	3B	
78	TQ29604440	PGR			25	55	3	3A	98	-12	103	1	3A				WE	3A	
80	TQ28704430	PLO			25	65	3	3A	81	-29	88	16	3B				WE	3A	IMP 65 MN/HR
82	TQ28904430	PLO			28	28	4	3B		0		0					WE	3B	
84	TQ29104430	CER			30	30	4	3B		0		0					WE	3B	
86	TQ29304430	PGR			30	60	3	3A	124	14	105	1	2				WE	3A	
88	TQ29504430	PGR			20	35	4	3B	97	-13	102	-2	3A				WE	3B	
90	TQ29704430	PGR			25	50	3	3A		0		0					WE	3A	
92	TQ29904430	PGR			22	22	4	3B	120	10	96	-8	2				WE	3B	
01	TQ29404420	PGR			35	60	3	3A		0		0					WE	3A	SEE 2P
03	TQ29604420	PGR			25	40	4	3B		0		0					WE	3B	
105	TQ29804420	PGR			30	60	3	3A	97	13	105	1	3A				WE	3A	IMP 65 MN PAN
06	TQ29964419	PGR			25	45	3	3B		0		0					WE	3B	HCL TOPSOIL
107	TQ28734410	PLO			25	25	4	3B		0		0					WE	3B	

SAMPLE NO	GRID REF	ASPECT USE	GRDNT	GLEY	SPL	WETNESS- CLASS	WETNESS- GRADE	-WHEAT- AP	-WHEAT- MB	-POTS AP	-POTS MB	M REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
108	TQ28914412	PGR		25	40	4	3B		0		0					WE	3B	
109	TQ29104410	CER		25	25	4	3B		0		0					WE	3B	
110	TQ29244415	PGR		35	35	4	3B		0		0					WE	3B	
112	TQ29504410	PGR		28	60	3	3A	88	-22	92	-12	3B				WE	3A	IMP 60 MN PAN
114	TQ29704410	PGR		33	33	4	3B		0		0					WE	3B	
116	TQ29904410	PGR		22	35	4	3B	131	21	108	4	2				WE	3B	
117	TQ29604400	PGR		25	35	4	3B		0		0					WE	3B	
118	TQ29774400	PGR		35	44	4	3B		0		0					WE	3B	SEE 6P
119	TQ29704319	PGR		25	43	4	3B		0		0					WE	3B	
1P	TQ29504450	PGR		37	60	3	3A	120	10	110	6	2				WE	3A	PIT 75 AUG 100
2P	TQ29404420	PGR		26	54	3	3A	94	-16	105	1	3A				WE	3A	PIT 70 AUG 100
3P	TQ29004480	PLO		25	25	4	3B	98	12	108	4	3A				WE	3B	PIT 70
4P	TQ29304510	PLO		20	20	4	3B	85	-25	97	-7	3B				WE	3B	PIT 60 AUG 70
5P	TQ29104470	PLO		28	105	3	3A	153	43	114	10	1				WE	3A	PIT 85 AUG 120
6P	TQ29774410	PGR		23	41	4	3B	108	-2	107	3	3A				WE	3B	PIT 88

SAMPLE	DEPTH	TEXTURE	COLOUR	- -MOTTLES- COL	ABUN	CONT	- PED COL	GLEY	----STONES- >2	>6	LITH	TOT	-- STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
3	0 25	HCL	25Y 53						0	0	HR	2							
	25 40	C	25Y 73	75YR58	M	D	FEW MN	Y	0	0	HR	2		P			Y		
	40-70	C	05Y 72	75YR68	M	D	FEW MN	Y	0	0	HR	2		P			Y		
4	0-25	HCL	25Y 42						0	0	HR	2							
	25-70	C	25Y 61	10YR68	M	D	FEW MN	Y	0	0		0		P			Y		
6	0-28	HCL	25Y 42						0	0	HR	2							
	28-55	C	25Y 53 63	10YR68	C	D	COM MN	Y	0	0	HR	2		P			Y		
	55-90	ZC	25Y 61 71	75YR68	M	D		Y	0	0		0		P			Y		
8	0-25	MZCL	25Y 42						0	0	HR	2							
	25-70	ZC	05Y 61	10YR58	M	D	FEW MN	Y	0	0		0		P			Y		
10	0-30	HCL	25Y 52	75YR46	C	D		Y	0	0	HR	2							SEE 4P
	30-70	C	05Y 61 62	75YR46 58	M	D	FEW MN	Y	0	0	HR	2		P			Y		
12	0 32	HZCL	25Y 53						0	0	HR	2							
	32 50	C	25Y 64	75YR58	M	D	FEW MN	Y	0	0	HR	2		P			Y		
	50-70	C	05Y 71	75YR68	C	D		Y	0	0		0		P			Y		V FIRM
21	0-30	HCL	25Y 42						0	0	HR	2							
	30-70	ZC	05Y 71	75YR58	M	D		Y	0	0		0		P			Y		
23	0 25	MZCL	25Y 42						0	0	HR	2							
	25 70	ZC	25Y 61	10YR68	M	D	FEW MN	Y	0	0		0		P			Y		
24	0-25	MCL	25Y 42				FEW MN		0	0	HR	2							
	25-70	ZC	25Y 61 63	10YR68	M	D	FEW MN	Y	0	0		0		P			Y		
25	0 30	HCL	10YR42				FEW MN		0	0	HR	2							
	30 50	C	25Y 53	10YR56	C	F	COM MN	Y	0	0	HR	2		M					
	50-90	C	25Y 63	10YR66	C	D	MANY MN	Y	0	0		0		P			Y		
	90 120	ZC	25Y 61	10YR68	M	D		Y	0	0		0		P			Y		
27	0-25	HZCL	25Y 63	75YR56	C			Y	0	0		0							
	25-35	C	25Y 63	75YR56	C	D	FEW MN	Y	0	0		0		P			Y		
	35 70	C	05Y 71	75YR68	C	D		Y	0	0		0		P			Y		
30	0 25	MCL	25Y 42				COM MN		0	0	HR	2							
	25-70	ZC	25Y 61 63	10YR58 68	M	D	FEW MN	Y	0	0		0		P			Y		
32	0 28	MZCL	10YR42				FEW MN		0	0	HR	2							SEE 3P
	28 70	ZC	25Y 71	10YR58	M	D		Y	0	0		0		P			Y		
34	0 28	MZCL	10YR42				FEW MN		0	0	HR	2							
	28 70	ZC	25Y 71	10YR58	M	D	COM MN	Y	0	0		0		P			Y		

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	
39	0-25	MZCL	10YR42						0	0	HR	2							
	25-35	HZCL	10YR53	10YR56	C	D	COM MN	Y	0	0	HR	2		M					
	35-48	HZCL	25Y 63	10YR58	M	D	COM MN	Y	0	0		0		M					
	48-120	ZC	25Y 71	10YR68	M	D	FEW MN	Y	0	0		0		P		Y			
41	0 25	MCL	10YR42				FEW MN		0	0	HR	2							
	25-35	HCL	25Y 53	10YR58	C	D	COM MN	Y	0	0	HR	5		M					
	35-70	HCL	25Y 52 61	10YR58	M	D	MANY MN	Y	0	0	HR	10		M					
	70-95	SCL	25Y 62	10YR58	M	D	MANY MN	Y	0	0	HR	15		P		Y			BORDER SC IMP 95
43	0-25	MCL	10YR42						0	0	HR	2							SEE 5P
	25-35	HCL	25Y 53	10YR58	M	D	FEW MN	Y	0	0	HR	5		M					
	35-60	HCL	25Y 53	10YR58	M	D	MANY MN	Y	0	0	HR	10		M					
	60-65	SCL	25Y 42	10YR58	M	D	MANY MN	Y	0	0	HR	15		P		Y			BORDER SC IMP 65
45	0-25	HCL	25Y 63						0	0		0							
	25-50	C	25Y 63	75YR58	M	D	FEW MN	Y	0	0		0		P		Y			
	50 70	C	05Y 71	75YR68	C	D		Y	0	0		0		P		Y			
47	0-30	HZCL	25Y 52						0	0		0							
	30-70	ZC	05Y 71	75YR68	C	D		Y	0	0		0		P		Y			
52	0 30	MZCL	10YR42						0	0	HR	2							
	30 48	HZCL	25Y 63	10YR58	C	D	FEW MN	Y	0	0	HR	5		M					
	48 70	HZCL	25Y 63 62	10YR58	C	D	COM MN	Y	0	0	HR	5		M		Y			
	70-80	HZCL	25Y 63 62	10YR58	M	D	MANY MN	Y	0	0	HR	15		M		Y			IMP MN PAN 80
54	0 25	MZCL	10YR42	10YR56	F	F			0	0	HR	2							
	25-55	ZC	25Y 51	10YR56	C	D		Y	0	0		0		P		Y			
	55 80	ZC	25Y 62 72	10YR58 68	M	D	COM MN	Y	0	0		0		P		Y			
	80-120	ZC	05Y 71	10YR58 68	M	D	COM MN	Y	0	0		0		P		Y			
56	0-25	MZCL	25Y 63						0	0		0							
	25-60	C	25Y 63	75YR46	C	D	COM MN	Y	0	0		0		P		Y			
	60 80	C	25Y 61	75YR46	C	D		Y	0	0		0		P		Y			
58	0-28	HZCL	25Y 72	75YR46	C	D		Y	0	0		0							
	28-70	C	25Y 81	75YR46	C	D		Y	0	0		0		P		Y			
59	0 25	MCL	10YR42						0	0	HR	2							
	25 35	HCL	25Y 42	10YR56	F	D			0	0	HR	2		M					
	35 80	HCL	25Y 63 61	10YR58 68	M	D	MANY MN	Y	0	0	HR	10		P		Y			IMP 80 MN PAN
60	0-25	MCL	25Y 42						0	0	HR	2							
	25 60	C	25Y 61 63	10YR58	M	D	COM MN	Y	0	0	HR	2		P		Y			
	60 90	ZC	05Y 71	75YR58	M	D		Y	0	0		0		P		Y			
61	0 25	MCL	10YR42						0	0	HR	2							
	25-80	C	25Y 71 62	10YR58	M	D	COM MN	Y	0	0	HR	5		P		Y			

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
63	0-28	MZCL	25Y 42						0	0	HR	2						
	28-70	HZCL	25Y 53	10YR56	C	D	COM MN	Y	0	0	HR	2		M				
	70-120	ZC	05Y 52 62	75YR58	C	D	FEW MN	Y	0	0		0		P		Y		
65	0-28	MZCL	10YR53						0	0		0						
	28-48	HZCL	10YR53	75YR56	C	D		Y	0	0		0		M				
	48-65	HZCL	25Y 71 81	75YR56	M	D	COM MN	Y	0	0	HR	2		M				
	65-120	C	25Y 62 63	10YR58	M	Y	FEW MN	Y	0	0		0		P		Y		
67	0-25	MZCL	25Y 53	10YR46	F	F			0	0		0						SEE 1P
	25-38	HZCL	25Y 53	75YR56	C			Y	0	0		0		M				
	38-48	HZCL	25Y 63	75YR58	M			Y	0	0	HR	2		M				
	48-70	C	25Y 72	75YR58	M			Y	0	0	ZR	2		P		Y		
	70 80	HZCL	05Y 72	75YR58	M			Y	0	0	ZR	25		P		Y		
76	0-25	MZCL	25Y 53	75YR56	C			Y	0	0		0						
	25-55	ZC	05Y 73	10YR66	C	D		Y	0	0	ZR	2		P		Y		
	55-70	HZCL	05Y 72 82	10YR66	M	D		Y	0	0	ZR	10		P		Y		
	70-80	HZCL	05Y 72 82	10YR66	M	D		Y	0	0	ZR	25		P		Y		
78	0-25	MZCL	25Y 53						0	0		0						
	25-38	HCL	25Y 62 72	75YR58	C		COM MN	Y	0	0	HR	2		M				
	38-55	HCL	25Y 72	75YR68	M		MANY MN	Y	0	0	HR	10		P		Y		
	55-80	HZCL	05Y 72	75YR68	M			Y	0	0	ZR	10		P		Y		
80	0-25	MCL	10YR42						0	0	HR	2						
	25 65	HCL	25Y 62 63	10YR58	M	D	MANY MN	Y	0	0	HR	10		M				IMP 65 MN PAN SPL
82	0 28	MCL	10YR42						0	0	HR	2						
	28 60	ZC	25Y 51	10YR58	M	F	COM MN	Y	0	0		0		P		Y		
	60 90	C	25Y 61	10YR68	M	D	COM MN	Y	0	0		0		P		Y		
84	0-30	MCL	25Y 42				FEW MN		0	0	HR	2						
	30-70	C	25Y 62 63	10YR68	M	D	FEW MN	Y	0	0		0		P		Y		
86	0-30	MZCL	25Y 53						0	0		0						
	30 60	HZCL	25Y 72	75YR58	C	D	COM MN	Y	0	0	HR	2		M				
	60-78	C	25Y 62	75YR56 68	M	D	FEW MN	Y	0	0	HR	5		P		Y		
	78 90	C	05Y 71	75YR56	C	D	FEW MN	Y	0	0	HR	5		P		Y		
	90 120	HCL	05Y 71	75YR56	M	D	MANY MN	Y	0	0	HR	20		P				
88	0 20	MZCL	25Y 52	75YR56	C	D		Y	0	0		0						
	20-35	HZCL	25Y 62	75YR68	C	D	COM MN	Y	0	0		0		M				
	35-80	C	25Y 71	75YR68	M	D		Y	0	0		0		P		Y		
90	0-25	MZCL	25Y 53	75YR56	C			Y	0	0		0						
	25-40	HZCL	25Y 72	75YR58	M	D	MANY MN	Y	0	0		0		M				
	40 50	HZCL	25Y 63	75YR68	M		MANY MN	Y	0	0	HR	2		M				
	50 80	ZC	05Y 71	75YR66	M		FEW MN	Y	0	0	ZR	10		P		Y		

SAMPLE	DEPTH	TEXTURE	COLOUR	-- MOTTLES----- COL	ABUN	CONT	PED COL	GLEY	--- STONES---- 2	6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
92	0-22	HCL	25Y 52	10YR56	F	F			0	0	HR	2							
	22-65	ZC	25Y 62 71	10YR58	M	D	FEW MN	Y	0	0		0		P			Y		
	65-120	ZC	25Y 71 72	75YR58	M	D	COM MN	Y	0	0	HR	5		P			Y		
101	0-35	MZCL	25Y 52						0	0		0							SEE 2P
	35-60	HCL	25Y 62	75YR58	M		MANY MN	Y	0	0	HR	15		M					
	60-85	ZC	05Y 81	75YR66	C			Y	0	0		0		P			Y		
103	0-25	MZCL	25Y 52	75YR56	C	D		Y	0	0		0							
	25-40	HZCL	25Y 62	75YR58	C	D	COM MN	Y	0	0		0		M					
	40-80	ZC	05Y 71	75YR68	M	D		Y	0	0	ZR	10		P			Y		
105	0-30	MCL	10YR42	10YR46	F	F			0	0	HR	2							
	30-45	HCL	25Y 53 62	10YR58 68	C	D	FEW MN	Y	0	0	HR	2		M					
	45-60	HCL	25Y 53 62	10YR58	M	D	MANY MN	Y	0	0	HR	5		M					
	60 65	HCL	25Y 53 71	75YR58	M	D	MANY MN	Y	0	0	HR	15		P			Y		IMP 65 MN PAN
106	0-25	HCL	25Y 52	10YR46	F	D			0	0	HR	2							
	25-45	ZC	25Y 61 71	10YR58	M	D	COM MN	Y	0	0	HR	5		P			Y		
	45-65	ZC	05Y 71	75YR68	M	D	FEW MN	Y	0	0		0		P			Y		
	65-90	ZC	05Y 71	75YR68	M	D		Y	0	0	HR	5		P			Y		
107	0-25	HCL	25Y 42						0	0	HR	2							
	25-70	ZC	25Y 61	10YR68	M	D		Y	0	0		0		P			Y		
108	0 25	MCL	25Y 53	10YR66	F	D			0	0	HR	2							
	25 40	HCL	25Y 53	10YR66	C	D	COM MN	Y	0	0		0		M					
	40 80	ZC	25Y 61	75YR68	M	D		Y	0	0		0		P			Y		
109	0-25	HCL	25Y 42				FEW MN		0	0	HR	2							
	25-70	C	25Y 61 62	10YR68	M	D	FEW MN	Y	0	0		0		P			Y		
110	0 35	MZCL	25Y 63						0	0		0							
	35 65	HZCL	25Y 71	75YR58	C	D	COM MN	Y	0	0		0		P			Y		
	65-70	HCL	25Y 71	75YR58	C	D	MANY MN	Y	0	0	HR	20		P					
112	0 28	MZCL	25Y 52	75YR56	C	D		Y	0	0		0							
	28 40	MZCL	25Y 63	75YR68	C	D	COM MN	Y	0	0	HR	5		M					
	40 60	HCL	25Y 63	75YR58	M	D	MANY MN	Y	0	0	HR	20		P					IMP MN PAN 60
114	0-33	HZCL	25Y 51 52	10YR56	C	D		Y	0	0		0							
	33-70	C	05Y 71 62	75YR46 58	M	D	COM MN	Y	0	0		0		P			Y		
116	0 22	MZCL	05Y 52	10YR56	F	F			0	0		0							
	22 35	HCL	25Y 63 62	10YR58	C	D	FEW MN	Y	0	0		0		M					
	35 70	C	05Y 71	75YR58	M	D	COM MN	Y	0	0		0		P			Y		
	70-120	ZC	05Y 71	75YR68	M	D	COM MN	Y	0	0		0		P			Y		

SAMPLE	DEPTH	TEXTURE	COLOUR	-- MOTTLES -- COL	ABUN	CONT	-- PED -- COL	GLEY	--- STONES- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
117	0 25	HZCL	10YR53						0	0		0							
	25 35	HZCL	25Y 53	10YR56	C	D	COM MN	Y	0	0		0		M					
	35 80	ZC	25Y 62 63	10YR58	M	D	COM MN	Y	0	0	HR	2		P		Y			
118	0-35	HCL	10YR53	10YR56	F	D			0	0		0							SEE 6P
	35 44	HCL	25Y 53	10YR46 58	C	D	COM MN	Y	0	0		0		M					
	44 75	C	25Y 62 72	75YR58	M	D	COM MN	Y	0	0		0		P		Y			
119	0 25	HCL	25Y 43	10YR56	F	D	FEW MN		0	0		0							
	25-43	HCL	25Y 52	10YR56	C	D	COM MN	Y	0	0		0		M					
	43 70	C	25Y 51 52	75YR46 58	M	D	COM MN	Y	0	0		0		P		Y			
	70-95	ZC	05Y 71	75YR58	M	D		Y	0	0		0		P		Y			
1P	0 25	MZCL	10YR53				FEW MN		0	0		0							BORING 67
	25-37	MCL	25Y 53	10YR56	F	D	FEW MN		0	0	HR	2	MDCSAB	FR M					
	37-60	MCL	25Y 73	10YR66	C	D	MANY MN	Y	0	0	HR	10	WKCSAB	FR M	N				WATER @ 58
	60 100	SCL	25Y 73	75YR58	M	D	MANY MN	Y	0	0	HR	20	WKCSAB	FM P	Y		Y		PIT 75 AUG 100
2P	0 26	MCL	25Y 52						0	0	HR	2							BORING 101
	26 54	HCL	25Y 72	75YR58 68	M	D	MANY MN	Y	0	0	HR	10	WKCSAB	FM M	N				WATER @ 52
	54 70	ZC	05Y 71	75YR56	M	D	FEW MN	Y	0	0		0	WKCSAB	FM P	Y		Y		
3P	0 25	HZCL	25Y 53						0	0		0							BORING 32
	25 50	C	25Y 72	75YR56	M	D		Y	0	0	HR	10	WKCAB	FR M	Y		Y		
	50 70	ZC	25Y 71	75YR56	M	D	25Y 71	Y	0	0		0	WKCPR	FM P	Y		Y		PIT 70
4P	0 20	HCL	25Y 52	75YR56 46	C	D	FEW MN	Y	0	0	HR	2							BORING 10
	20-70	C	25Y 62	75YR58	M	D	FEW MN	Y	0	0	HR	2	MASSVE	VM	Y		Y		PIT 60 AUG 70
5P	0 28	MZCL	10YR53				FEW MN		0	0	HR	2							BORING 43
	28 38	HCL	25Y 63	75YR68	C	D	05Y 72	Y	0	0	HR	5	MDCSAB	FR M	N				
	38 58	HCL	25Y 72	05YR58	M	D	25Y 7282	Y	0	0	HR	10	WKCSAB	FR M	N				
	58 105	SCL	25Y 62	05YR46	M	D		Y	0	0	HR	25	WKMSAB	FR G	Y				WATER @ 58
	105 120	ZC	05Y 71	75YR58	M	D		Y	0	0		0		FM P	Y		Y		PIT 85 AUG 120
6P	0 23	MCL	25Y 42	10YR56	F	D			0	0		0							BORING 118
	23 41	HCL	25Y 52 62	10YR58	C	D	25Y 52	Y	0	0		0	MDCSAB	FR M					
	41 66	C	25Y 71 72	75YR58	M	D	COM MN	Y	0	0	HR	2	WKCAB	FM P	Y		Y		
	66 88	ZC	05Y 71	75YR68	M	D	FEW MN	Y	0	0		0	WKCAB	FM P	Y		Y		PIT 88