Hainault Farm
London Borough of Redbridge

Statement of Physical Characteristics
November 1995

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

HAINAULT FARM
LONDON BOROUGH OF REDBRIDGE

Introduction

1 This report presents the findings of a semi detailed survey of Agricultural Land Classification (ALC) and site physical characteristics of 49 9 hectares of land at Hainault Farm in the London Borough of Redbridge The survey was carried out during November 1995

2 The survey was commissioned by the Ministry of Agriculture Fisheries and Food (MAFF) from its Land Use Planning Unit in Reading in connection with proposals for mineral extraction This survey supersedes previous ALC surveys on this land The distribution of ALC grades was found to broadly concur with a previous survey carried out by ADAS Commercial

3 The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS 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 1

4 At the time of survey the land use on the site was mainly winter cereals The northern most field was in set aside whilst a field adjacent to the farm buildings at Hainault Farm was in grass

Summary

5 The findings of the survey are shown on the enclosed ALC map The map has been drawn at a scale of 1 10000 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)	% site area
3a	32 5	65 1
3b	17 4	34 9
Total site area	49 9	100 0

7 The fieldwork was conducted at an average density of 1 boring every 2 hectares A total of 28 borings and two soil pits were described

8 Land quality on the site ranges from subgrade 3a (good quality) land to subgrade 3b (moderate quality) land

9 Land quality is influenced primarily by soil wetness and/or droughtiness To the west and south of the site soils were found to be relatively shallow over gravelly horizons which are affected by soil droughtiness to the extent that subgrade 3b is appropriate Across the north eastern part of the site deep relatively stonefree clayey soils are poorly drained and are thereby classified as subgrade 3a on the basis of soil wetness Elsewhere on the site soils were found to be intermediate between these two types and were therefore typically affected by soil wetness and droughtiness Subgrade 3a has been assigned

Factors Influencing ALC Grade

Climate

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

11 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 464 907
Altitude	m AOD	30
Accumulated Temperature	day°C	1464
Average Annual Rainfall	mm	595
Field Capacity Days	days	110
Moisture Deficit Wheat	mm	121
Moisture Deficit Potatoes	mm	118

12 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

13 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 (ATO January to June) as a measure of the relative warmth of a locality

14 The combination of rainfall and temperature at this site mean that there is no overall climatic limitation to land quality although climatic factors do interact with soil properties to influence the interactive limitations of soil wetness and droughtiness Neither exposure not frost risk are believed to affect the site

Site

15 The site lies at an altitude of 25 36m AOD falling gently from north east to south west Nowhere on the site do relief gradient or flooding affect agricultural land quality

Geology and soils

16 The most detailed published geological information for this site (BGS 1976) shows the east and north east of the site to be underlain by London Clay whilst the remainder of the site is mapped as drift deposits of Boyn Hill Gravel

17 The most detailed published soils information for the site (SSEW 1983) shows the east and north east of the site to comprise soils of the Windsor association in conjunction with the London Clay deposits These soils are described as slowly permeable seasonally waterlogged clayey soils mostly with brown subsoils Some fine loamy or fine silty over clayey (SSEW 1983) The remainder of the site is shown as urban on the published soils map

Agricultural Land Classification

18 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

19 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 III

Subgrade 3a

20 Good quality land has been mapped across the majority of the site where soil wetness and/or soil droughtiness limitations exist

21 Profiles were found to fall into two different types Soils towards the north east were distinctly different from soils elsewhere in the subgrade 3a mapping unit Here profiles typically comprise non calcareous medium clay loam topsoils having 2 15% total flints (0 8% >2cm in diameter) These pass directly to gleyed clay subsoils which were found to be slowly permeable Stone contents range from 0 10% total flints by volume Occasional profiles were found to be impenetrable (to soil auger) below about 65 70 cm Due to the presence of shallow slowly permeable horizons soil drainage is impeded and given the relatively dry local climatic regime at this locality Wetness Class III is appropriate This corresponds to subgrade 3a on the basis of soil wetness which is likely to adversely affect plant growth and development and restrict the opportunities for landwork In addition the interaction between soil properties (most significantly the clay textures and poor structures in the subsoil along with slight

stoniness) and the dry climatic regime (high soil moisture deficits in regional terms) causes these soils to have slightly restricted reserves of soil moisture Soil droughtiness is thereby equally limiting for these soils resulting in subgrade 3a

22 The second soil type within the 3a mapping unit is similar to that described above except that lower subsoils tend to be more stony Topsoils of medium clay loam with 5 15% total flints by volume pass directly to gleyed and slowly permeable clay in the upper subsoil containing 5 25% flints Most of the profiles were impenetrable (to soil auger) between about 45 and 60 cm depth but a soil pit (2p Appendix III) revealed that below this depth horizons were very stony having 35 50% flints by volume in a gleyed clay matrix The slow permeability of the upper subsoil horizons causes drainage to be impeded and wetness class III to be assigned Soil droughtiness is equally limiting due to restricted profile available water caused by the combination of clay textures poor subsoil structural conditions and high stone contents particularly in the lower subsoils

Subgrade 3b

23 Moderate quality land has been mapped as two separate mapping units to the north west and south of the survey area

24 This land is associated with soils which are very stony and/or shallow over gravelly horizons Soil pit 1 (1p Appendix III) is typical of these soils and the subgrade 3b land mapped Profiles generally comprise non calcareous medium clay loam topsoils containing 15 30% total flints by volume (3 10% >2 cm in diameter) These pass to medium or heavy clay loam upper subsoils which were occasionally found to be gleyed but permeable Profiles were typically impenetrable (to soil auger) below the upper subsoil at depths between 40 and 45 cm but pit 1 proved lower subsoils to comprise sandy clay loam horizons containing 50 70% + flints The interaction between a relatively dry climate and such soil properties (i e very stony poorly structured subsoil horizons) causes profile available water to be significantly restricted such that it may not meet the demands of a growing crop throughout the year Soil droughtiness therefore limits this land to subgrade 3b Crop growth and yield potential is likely to be adversely affected as consequence

Soil Resources

25 The following section and the accompanying soil resources map describe the pattern of topsoil and subsoil resources on the site It should be emphasised that the map is not a soil stripping map but merely an illustration of the soil resources available for restoration on the site When considering these details it is important to remember that soils were sampled to a maximum depth of 120 cm during survey work In some cases soil resources will extend below this depth The depths and volumes quoted should be treated with caution due to soil variability

Unit A

26 This unit comprises an average 30 cm of dark greyish brown or brown (10YR 4/2 or 10YR 4/3) non calcareous medium clay loam topsoil containing 10 30% total flints by volume (5 9% >2 cm in diameter)

27 These overlie an average 20 cm of brown or dark brown (10YR 4/3 or 3/3) medium or heavy clay loam upper subsoil having 10 35% total flints This upper subsoil horizon exhibits no evidence of drainage imperfections and is well aerated and rooted It has good structure comprising weakly developed medium sub angular blocky peds of friable consistence

28 Lower subsoil horizons comprise a further 20 25 cm of light brownish grey (10YR 6/2) sandy clay loam which has common ochreous mottles (strong brown 7 5YR 5/8) and contains approximately 50% flints by volume Structural conditions are poor the soil material being loose and not forming structural units or peds Below about 60 cm depth subsoils pass to poorly structured gravel (i e >70% flints by volume) Pit 1 is typical of this soil unit

Unit B

29 This unit comprises the same topsoil as detailed above for unit A, (para 26)

30 These overlie upper subsoils of gleyed clay which extend about 20 30 cm and which are dark grey or grey (10YR 4/1 or 10YR 5/1) plus strong brown (7 5YR 5/8) mottles and contain about 5% flints These subsoil horizons are poorly structured being composed of moderately well developed coarse angular blocky peds of firm consistence and less than 0 5% biopores >0 5 mm in diameter They are therefore slowly permeable and impede soil drainage

31 On the evidence of pit 2 (these subsoils are impenetrable to soil auger) subsoils pass to gleyed and slowly permeable clays which become progressively more stony with depth About 20 25 cm of grey (10YR 5/1 or 2 5YR 5/1) clay with many yellowish brown mottles (10YR 5/8) containing approximately 35% flints overlie a further 50 cm of grey (10YR 5/1 or 25 5/1) mottled (10YR 5/8) clay containing up to 50% flints by volume These subsoil horizons were assumed to be poorly structured and slowly permeable although they were in fact too stony for an accurate structural assessment to be made

Unit C

32 Topsoils are as for units A and B as previously described (para 26)

33 Subsoils comprise about 90 cm of brown light greyish brown or grey (10YR 5/3 10YR 6/2 or 6/1) clay which is mottled and gleyed (yellowish brown or strong brown 10YR 5/6 or 7 5YR 5/8) and which contains only 0 5% total flints It is inferred from pit 2 that these clay subsoils are poorly structured and slowly permeable having moderately well developed coarse angular blocky peds of firm consistence and less than 0 5% biopores >0 5 mm in diameter

Unit D

34 This unit comprises topsoils which are slightly shallower and less stony than the topsoils in units A, B and C These topsoils comprise an average 25 cm of very dark brown greyish brown or brown (10YR 3/2 or 10YR 4/3) non calcareous medium clay loam with 0 5% total flints by volume

35 Subsoils in unit D are as described above for unit C (para 33)

Unit E

36 Topsoils are as for unit D as described in para 34

37 Subsoils are as for unit B as described in paras 30 31

Table 3 Soil Resources

Unit	Topsoil			Subsoil		
	av depth (cm)	area (ha)	volume (m^3)	av depth (cm)	area (ha)	volume (m^3)
A	30	7 6	22 800	90	7 6	68 400
B	30	3 0	9 000	90	3 0	27 000
C	30	4 4	13 200	90	4 4	39 600
D	25	7 9	19 750	95	7 9	75 050
E	25	27 0	67 500	95	27 0	256 500
Total Soil resource		49 9	132 250 (m^3)		49 9	466 550 (m^3)

November 1995

Michelle Leek
Resource Planning Team
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1976) Sheet 257 Romford 1 50 000 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) Sheet 6 Soils of South East England
SSEW Harpenden

Soil Survey of England and Wales (1984) Bulletin 15 *Soils and their Use in South East England.* SSEW Harpenden

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 WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile Six soil wetness classes are identified and are defined in the table below

Wetness Class	Duration of waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years [2]
II	The soil profile is wet within 70 cm depth for 31 90 days in most years or if there is no slowly permeable layer within 80 cm depth it is wet within 70 cm for more than 90 days but only wet within 40 cm depth for 30 days in most years
III	The soil profile is wet within 70 cm depth for 91 180 days in most years or if there is no slowly permeable layer present within 80 cm depth it is wet within 70 cm for more than 180 days but only wet within 40 cm depth for between 31 90 days in most years
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years or if there is no slowly permeable layer present within 80 cm depth it is wet within 40 cm depth for 91 210 days in most years
V	The soil profile is wet within 40 cm depth for 211 335 days in most years
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land* (MAFF 1988)

[1] The number of days is not necessarily a continuous period
[2] In most years is defined as more than 10 out of 20 years

APPENDIX III

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	**DCW**	Deciduous Wood
HTH	Heathland	**BOG**	Bog or Marsh	**FLW**	Fallow
PLO	Ploughed	**SAS**	Set aside	**OTH**	Other
HRT	Horticultural Crops				

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	**EX**	Exposure
FR	Frost Risk	**GR**	Gradient	**MR**	Microrelief
FL	Flood Risk	**TX**	Topsoil Texture	**DP**	Soil Depth
CH	Chemical	**WE**	Wetness	**WK**	Workability
DR	Drought	**ER**	Erosion Risk	**WD**	Soil Wetness/Droughtiness
ST	Topsoil Stoniness				

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	**SLST**	soft oolitic or dolimitic limestone
CH	chalk	**FSST**	soft fine grained sandstone
ZR	soft argillaceous or silty rocks	**GH**	gravel with non porous (hard) stones
MSST	soft medium grained sandstone	**GS**	gravel with porous (soft) stones
SI	soft weathered igneous/metamorphic rock		

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	**VC** very 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 **VF** very friable **FR** friable **FM** firm **VM** very firm
EM extremely firm **EH** extremely hard

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 appropiate 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

SOIL PIT DESCRIPTION

Sit Name HAINAULT FM LB REDBRDGE P t N ber 1P

Grid Refe e e TQ46409100 A e age A l Ra fall 595 mm
Acc m lated Tempe at e 1464 degree days
F eld Cap c ty L l 110 days
Land Use Set a d
Slope a d Aspect degrees

HORIZON	TEXTURE	COLOUR	STONES 2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0 18	MCL	10YR32 00	3	24	HR		WKMSAB	FR		
18 38	MCL	10YR33 00	4	28	HR		WKMSAB	FR	G	
38 60	SCL	10YR62 00	0	50	HR	C	LOOSE	VF	P	
60 120	GH	10YR62 00	0	0		C			P	

W tness Grade 1 W tness Class I
Gleying 38 cm
SPL m

D o ght G ade 3B APW 077mm MBW 44 mm
APP 076mm MBP 42 mm

FINAL ALC GRADE 3B
MAIN LIMITATION D o ghti

SOIL PIT DESCRIPTION

Site Name HAINAULT FM LB REDBRDGE P t N mber 2P

Grid Refe e ce TQ46509030 A e age Ann al Rai fall 595 mm
Acc m lated Tempe at e 1464 degree days
F eld Capac ty Le el 110 days
Land Us Ce eals
Slope a d A pect deg ee

HORIZON	TEXTURE	COLOUR	STONES 2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0 28	MCL	10YR41 42	1	5	HR					
28 47	C	10YR51 00	1	22	HR	M	MDCAB	FM	P	
47 71	C	25Y 51 00	0	35	HR	M		FM	P	
71 120	C		0	50	HR				P	

Wetness Grade 3A Wetness Class III
Gley ng 28 cm
SPL 28 cm

D ought Grade 3B APW 090mm MBW 31 m
APP 080mm MBP 38 mm

FINAL ALC GRADE 3B
MAIN LIMITATION Dro ght ess

SAMPLE NO	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	WETNESS CLASS	WHEAT GRADE	POTS AP	POTS MB	M REL AP	M REL MB	DRT	FLOOD	EXP	DIST	LIMIT		COMMENTS	
1	TQ46509130	SAS	NE	01	22	22	3	3A	124	3	101	17	3A				WD	3A	Q HCL TS	
1P	TQ46409100	SAS			38		1	1	077	44	076	42	3B				DR	3B		
2	TQ46409120	SAS	SW	02	25	25	3	3A	118	3	095	23	3A				WD	3A	SANDY 60	
2P	TQ46509030	CER			28	28	3	3A	090	31	080	38	3B				DR	3B		
3	TQ46109110	SAS					1	1	039	82	039	79	4				DR	3B	IMP 30	SEE 1P
4	TQ46309110	SAS			28	28	3	3A	080	41	085	33	3B				WD	3A	IMP 60	SEE 2P
5	TQ46509110	SAS	W	02	25	25	3	3A	068	53	068	50	4				WD	3A	IMP 50	SEE 2P
6	TQ46009100	SAS					1	1	052	69	052	66	4				DR	3B	IMP 40	SEE 1P
7	TQ46209100	SAS			28		2	2	063	58	063	55	4				DR	3B	IMP 45	SEE 1P
8	TQ46409100	SAS			30	50	3	3A	130	9	107	11	3A				WD	3A		
9	TQ46109090	SAS					1	1	048	73	048	70	4				DR	3B	IMP 40	SEE 1P
10	TQ46309090	CER			30	30	3	3A	129	8	106	12	3A				WD	3A		
11	TQ46509090	CER	E	02	30	30	3	3A	112	9	106	12	3A				WD	3A	IMP 95	
12	TQ46209080	CER			28	28	3	3A	088	33	097	21	3B				WD	3A	IMP 65	SEE 2P
13	TQ46409080	CER			28	28	3	3A	087	34	095	23	3B				WD	3A	IMP 65	SEE 2P
14	TQ46609080	LEY	SW	01	30	30	3	3A	126	5	103	15	3A				WD	3A		
15	TQ46309070	CER			35		2	2	073	48	073	45	3B				DR	3B	IMP 45	SEE 1P
16	TQ46509070	LEY					1	1	050	71	050	68	4				WD	3A	IMP 30	V DRY
17	TQ46309070	CER			28	28	3	3A	076	45	076	42	3B				WD	3A	IMP 50	SEE 2P
18	TQ46209060	CER			30	30	3	3A	081	40	087	31	3B				WD	3A	IMP 60	SEE 2P
19	TQ46409060	CER			30	30	3	3A	078	43	078	40	3B				WD	3A	IMP 50	SEE 2P
20	TQ46309050	CER			28	28	3	3A	073	48	073	45	3B				WD	3A	IMP 50	SEE 2P
21	TQ46509050	CER			28		2	2	059	62	059	59	4				WD	3A	IMP 40	SEE 2P
22	TQ46409040	CER			30		2	2	061	60	061	57	4				DR	3B	IMP 40	SEE 1P
23	TQ46509040	CER			37	37	3	3A	075	46	076	42	3B				WD	3A	IMP 52	SEE 2P
24	TQ46609040	PGR					1	1	062	59	062	56	4				DR	3B	IMP 40	SEE 1P
25	TQ46509030	CER			30	42	3	3A	081	40	085	33	3B				DR	3B	IMP 60	SEE 1P
26	TQ46709030	CER			30		2	2	075	46	075	43	3B				DR	3B	IMP 50	SEE 1P
27	TQ46409020	CER			30	45	3	3A	079	42	089	29	3B				WD	3A	IMP 70	SEE 2P
28	TQ46609020	CER			30	65	2	2	129	8	106	12	3A				DR	3A		

				MOTTLES			PED		STONES				STRUCT/	SUBS					
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL	GLEY	2	6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC	
1	0 22	mcl	10YR43 00	00MN00	00	C			0	0	HR	2							
	22 60	c	10YR62 00	75YR58	00	M		Y	0	0		0		P			Y		
	60 80	c	10YR53 00	10YR56	00	M		Y	0	0		0		P			Y		
	80 120	c	10YR53 00	10YR56	00	M		Y	0	0		0		P			Y	Y	
1P	0 18	mcl	10YR32 00						3	0	HR	24	WKMSAB	FR					
	18 38	mcl	10YR33 00						4	0	HR	28	WKMSAB	FR	G				
	38 60	scl	10YR62 00	75YR58	00	C	00MN00	00 Y	0	0	HR	50	LOOSE	VF	P				
	60 120	gh	10YR62 00	75YR58	00	C		Y	0	0		0		P					
2	0 25	mcl	10YR43 00						8	4	HR	15							
	25 60	c	10YR62 61	75YR58	00	M		Y	0	0	HR	5		P			Y		
	60 120	c	10YR62 61	75YR58	00	M		Y	0	0		0		P			Y		
2P	0 28	mcl	10YR41 42						1	0	HR	5							
	28 47		10YR51 00	10YR58	00	M	00MN00	00 Y	1	0	HR	22	MDCAB	FM	P	Y		Y	
	47 71	c	25Y 51 00	10YR58	00	M	00MN00	00 Y	0	0	HR	35		FM	P	Y		Y	
	71 120	c						Y	0	0	HR	50			P			Y	
3	0 30	mcl	10YR43 00						9	4	HR	30							IMP 30 FLINTY
4	0 28	mcl	10YR42 00						4	1	HR	10							
	28 60	c	10YR51 61	75YR58	00	M		Y	0	0	HR	5		P			Y		IMP 60 FLINTY
5	0 25	mcl	10YR43 00						8	6	HR	15							
	25 50	c	10YR62 00	75YR58	00	M		Y	0	0	HR	10		P			Y		IMP 50 FLINTY
6	0 25	mcl	10YR42 00						8	6	HR	25							
	25 40	hcl	10YR43 00						0	0	HR	30		M					IMP 40 FLINTY
7	0 28	mcl	10YR43 00						5	1	HR	15							
	28 45	c	10YR62 52	75YR58	00	M		Y	0	0	HR	10		P					IMP 45 FLINTY
8	0 30	mcl	10YR43 00						0	0	HR	5							
	30 50	hcl	10YR53 00	10YR58	62	M	00MN00	00 Y	0	0	HR	5		M					
	50 120	c	10YR51 61	75YR58	00	M		Y	0	0	HR	2		P			Y		
9	0 25	mcl	10YR43 00						8	4	HR	30							
	25 40	mcl	10YR43 00						0	0	HR	35		G					IMP 40 FLINTY
10	0 30	mcl	10YR32 00						0	0		0							
	30 120	c	10YR62 00	75YR68	00	C		Y	0	0		0		P			Y		
11	0 30	mcl	10YR32 00						0	0		0							
	30 95	c	10YR62 00	75YR68	00	M		Y	0	0		0		P			Y		IMP 95 STONES
12	0 28	mcl	10YR33 00						1	0	HR	1							
	28 65		10YR73 00	75YR68	00	C		Y	0	0	HR	2		P			Y		IMP 65 FLINTY

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	ABUN	CONT	PED COL	GLEY	STONES 2	6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
13	0 28	mcl	10YR32 00						2	0	HR	2							
	28 65	c	10YR62 00	75YR68 00	M			Y	0	0	HR	5		P		Y		IMP 65	FLINTY
14	0 30	mcl	10YR43 00						2	1	HR	5							
	30 50	c	10YR53 00	75YR58 00	M			Y	0	0	HR	2		P		Y			
	50 120	c	10YR51 61	75YR58 00	M			Y	0	0		0		P		Y			
15	0 35	mcl	10YR33 00						3	0	HR	3							
	35 45	hcl	10YR73 00	75YR58 00	C			Y	0	0	HR	5		M				IMP 45	FLINTY
16	0 30	mcl	10YR43 00						3	1	HR	8						IMP 30	STONES
17	0 28	mcl	10YR32 00						2	0	HR	3							
	28 50	c	10YR62 00	75YR58 00	C			Y	0	0	HR	5		P		Y		IMP 50	FLINTY
18	0 30	mcl	10YR32 00						4	0	HR	10							
	30 60	c	10YR62 73	75YR58 00	C			Y	0	0	HR	3		P		Y		IMP 60	FLINTY
19	0 30	mcl	10YR32 00						2	0	HR	2							
	30 50	c	10YR62 00	75YR58 00	C			Y	0	0	HR	5		P		Y		IMP 50	FLINTY
20	0 28	mcl	10YR43 00						3	1	HR	8							
	28 50	c	10YR51 61	75YR58 00	M			Y	0	0	HR	8		P		Y		IMP 50	FLINTY
21	0 28	mcl	10YR42 00						3	1	HR	10							
	28 40	c	10YR62 53	75YR58 00	M			Y	0	0	HR	15		P				IMP 40	FLINTY
22	0 30	mcl	10YR41 00						1	0	HR	8							
	30 40	hcl	10YR51 00	10YR56 00	C			Y	0	0	HR	30		M				IMP 40	FLINTY
23	0 30	mcl	10YR41 00						1	0	HR	7							
	30 37	hcl	10YR42 51	10YR56 00	F				0	0	HR	10		M					
	37 50	c	25Y 51 00	10YR68 00	M			Y	0	0	HR	20		P		Y			
	50 52	c	25Y 51 00	10YR68 00	M			Y	0	0	HR	40		P		Y		IMP 52	FLINTY
24	0 30	mcl	10YR42 00						2	0	HR	8							
	30 40	mcl	10YR43 00						0	0	HR	25		M				IMP 40	FLINTY
25	0 30	mcl	10YR41 42						0	0	HR	5							
	30 42	hcl	10YR53 00	10YR56 00	C			Y	0	0	HR	15		M					
	42 55	c	25Y 51 00	10YR56 00	M		00MN00 00	Y	0	0	HR	25		P		Y			
	55 60		25Y 51 00	10YR56 00	M		00MN00 00	Y	0	0	HR	40		P		Y		IMP 60	FLINTY
26	0 30	mcl	10YR42 00						2	0	HR	8							
	30 45	mcl	10YR54 53	10YR56 00	C			Y	0	0	HR	15		M					
	45 50	scl	10YR54 53	10YR56 00	C			Y	0	0	HR	40		M				IMP 50	FLINTY
27	0 30	mcl	10YR41 00						4	1	HR	15							
	30 45	hcl	10YR41 51	10YR58 00	C			Y	0	0	HR	30		M					
	45 70	c	25Y 51 00	75YR58 00	M		00MN00 00	Y	0	0	HR	25		P		Y		IMP 70	FLINTY

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL	PED GLEY	STONES 2	STONES 6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
28	0 30	mcl	10YR41 00						1	0	HR	5						
	30 50	hcl	10YR53 00	10YR58 00	C			Y	0	0	HR	10		M				
	50 65	hcl	10YR53 00	10YR58 00	C			Y	0	0	HR	20		M				
	65 120	c	25Y 41 00	75YR58 00	M			Y	0	0	HR	5		P			Y	