A1
PROPOSED GOLF CENTRE
EAST EWELL
SURREY
AGRICULTURAL LAND CLASSIFICATION
ALC MAP & REPORT
MARCH 1994

PROPOSED GOLF CENTRE
EAST EWELL SURREY
AGRICULTURAL LAND CLASSIFICATION REPORT

1 0 Summary

1 1 ADAS was commissioned by MAFF s Land Use Planning Unit to provide information on land quality for land at East Ewell in Surrey The work forms part of MAFF's statutory input to the planning application for a golf centre

1 2 Approximately 24 hectares of land relating to the aforementioned site was surveyed in March 1994 The survey was undertaken at a detailed level of approximately one boring per hectare A total of 28 soil auger borings and three soil inspection pits were assessed in accordance with MAFF s revised guidelines and criteria for grading the quality of agricultural land (MAFF 1988) These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose longterm limitations on its use for agriculture

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

1 4 At the time of the survey the landuse on the site was land that had been recently ploughed and permanent grass or what appeared to be set aside

1 5 The distribution of grades and subgrades is shown on the attached ALC map and the areas are given in the table below The map has been drawn at a scale of 1 5 000 It is accurate at this scale but any enlargement would be misleading This map supersedes any previous survey information for the site

Table 1 - Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Area
2	10 2	42 2	42 8
3a	6 8	28 1	28 6
3b	6 8	28 1	28 6
Non Agricultural Land	0 4	1 6	100% (23 8)
Total Area of Site	24 2	100%	

1 6 Appendix 1 gives a general description of the grades subgrades and land use categories identified in the survey The main classes are described in terms of the type of limitation that can occur the typical cropping range and the expected level and consistency of yield

1 7 The site has been classified as grades 2 3a and 3b with soil droughtiness as the main limitation Land classified as grade 2 comprises deep free draining sandy textured soils which experience a slight droughtiness limitation Land classified as subgrade 3a consists of a mixture of sandy textured soils and clay loams which pass to pure chalk or chalky drift in the lower subsoil Available water in the soil profile is restricted due to the presence of chalk and soils suffer a moderate droughtiness limitation Finally land classified as subgrade 3b comprises topsoils of medium clay loam which pass directly to pure chalk and experience significant droughtiness with available water for crops more severely restricted than that of subgrade 3a land

2 0 Climate

2 1 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

2 2 The main parameters used in the assessment of an overall climatic limitation are annual average rainfall as a measure of overall wetness and accumulated temperature as a measure of the relative warmth of a locality

2 3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met Office 1989) The details are given in the table below and these show that there is no overall climatic limitation affecting the site

2 4 No local climatic factors such as exposure or frost risk affect the site However it should be noted that the climatic characteristics below such as low rainfall and low field capacity days (in a regional context) will interact with soil properties to increase the risk of soil droughtiness particularly for shallow soils over chalk

Table 2 - Climatic Interpolation

Grid Reference	TQ 234 617
Altitude (m)	65
Accumulated Temperature (days)	1442
Average Annual Rainfall (mm)	667
Field Capacity (days)	141
Moisture Deficit Wheat (mm)	113
Moisture Deficit Potatoes (mm)	107
Overall Climatic Grade	1

3 0 Relief

3 1 The site lies at an altitude of approximately 60 80 metres with land falling gently north west to the point of lowest altitude Nowhere on the site do altitude or relief affect agricultural land quality

4 0 Geology and Soil

4 1 The published geological sheet for the site Sheet 270 (BGS 1981) shows the underlying geology to be Upper Chalk and to the north west boundary a deposit of Thanet Beds encroaches upon the site

4 2 The published soils information for the area Sheet 6 (SSEW 1983) shows the entire site to comprise soils of the Frilsham association - Well drained mainly fine loamy soils over chalk some calcareous Shallow calcareous fine loamy and fine silty soils in places (SSEW 1983) A detailed inspection of soils on the site revealed the presence of fine loamy and coarse loamy soils mostly over chalk at various depths

5 0 Agricultural Land Classification

5 1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map

5 2 The location of the soil observation points are shown on the attached sample point map

Grade 2

5 3 Land classified as grade 2 represents a mapping unit of variable soil profiles However profiles typically comprise topsoils of non calcareous medium sandy loam or medium clay loam containing 3 12% total flints of which 2-6% were > 2cm in diameter in places Upper subsoils may be calcareous or non calcareous and consist of similar textures with 2-15% total flints and chalk stones Underlying this is calcareous or non calcareous medium sandy loam or loamy medium sand horizons contain 0 6% total flints and chalk stones Soil Pit 3 is typical of these generally coarse loamy soils Some profiles within this map unit had lower subsoils of calcareous medium or heavy clay loam containing 20-40% weathered chalk passing to unweathered chalk between 70 90 cm depth Soil Pit 1 dug into the chalk found effective rooting to penetrate only 15 cm The soils without chalk at depth are well drained with a wetness class of I but they experience a slight droughtiness limitation due to the presence of coarse free draining textures which interact with climatic characteristics to slightly restrict profile available water for crop growth Those profiles where chalk was encountered at depth also suffer a slight droughtiness limitation However the limitation arises due to the inability of roots to penetrate deep into the chalk thereby being unable to extract water from the full profile depth Additionally there are some small areas where topsoil stone volumes of 5 6% > 2cm in diameter also limit land to this grade Stoniness such as this can impair crop establishment growth and quality and increase wear and tear on farm implements and tyres

Occasional profiles of poorer quality were included in this mapping unit They were not mapped separately due to their limited number and distribution

Subgrade 3a

5 4 Good quality agricultural land typically comprises topsoils of calcareous and non calcareous medium clay loam occasionally medium sandy loam containing 4 7% total flints Upper subsoils consist of heavy occasionally medium clay loam or medium sandy loam with 2-5% total flints though sometimes 20 50% weathered chalk Lower subsoils are variable in texture but typically comprise heavy clay loam or sandy clay loam with 10 70% weathered chalk which sometimes passes to pure unweathered chalk between 68 70 cm depth Pit 1 was dug in these soils and found effective rooting to 80 cm depth through chalky drift and pure chalk which was encountered higher up the profile than that of grade 2 Rooting into the pure chalk appeared to be about 10 cm and would certainly be no more than the 15 cm found in Soil Pit 2 Soils are well drained and are assigned to wetness class I but they do suffer from a moderate droughtiness limitation The interaction of significant volumes of flint and weathered chalk restricted rooting into unweathered chalk and climatic characteristics restricts available water reserves such that a classification of subgrade 3a is appropriate

Subgrade 3b

5 5 Land of moderate quality coincides with shallow soils over chalk Profiles typically comprise topsoils of calcareous medium clay loam occasionally medium sandy loam with 6-10% total flints and chalk stones of which 0-4% were > 2cm in diameter This passes occasionally to a horizon of medium sandy loam before passing to chalk from 30-55 cm depth Soil Pit 2 dug in these soils revealed the effective rooting to be only 15 cm into the chalk This restricted rooting and the shallow soil depth severely reduces water in the profile available to plants and the land is classified as subgrade 3b due to a significant droughtiness limitation

5 6 The area marked as Non agricultural consists of a track

ADAS REFERENCE 4002/049/94
MAFF REFERENCE EL 40/759 EL 27/717

Resource Planning Team
Guildford Statutory Group
ADAS Reading

APPENDIX I

DESCRIPTION OF THE GRADES AND SUB GRADES

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 on the 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

Grade 3 Good To Moderate Quality Agricultural Land

Land with moderate limitations which affect the choice of crops 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

Sub grade 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

Sub-grade 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 (eg 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 very severe limitations which restrict use to permanent pasture or rough grazing except for occasional pioneer forage crops

Urban

Built-up or hard' uses with relatively little potential for a return to agriculture housing industry commerce education transport religious buildings cemeteries Also hard surfaced sports facilities permanent caravan sites and vacant land all types of derelict land including mineral workings which are only likely to be reclaimed using derelict land grants

Non agricultural

Soft' uses where most of the land could be returned relatively easily to agriculture including private parkland public open spaces sports fields allotments and soft-surfaced areas on airports/airfields Also active mineral workings and refuse tips where restoration conditions to 'soft after-uses may apply

Woodland

Includes commercial and non-commercial woodland

Agricultural Buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses Temporary structures (eg polythene tunnels erected for lambing) may be ignored

Open Water

Includes lakes ponds and rivers as map scale permits

Land Not Surveyed

Agricultural land which has not been surveyed

Where the land use includes more than one of the above eg buildings in large grounds and where map scale permits the cover types may be shown separately Otherwise the most extensive cover type will be shown

APPENDIX II

REFERENCES

* BRITISH GEOLOGICAL SURVEY (1981) Sheet No 270 South London 1 50 000 scale

* MAFF (1988) Agricultural Land Classification of England And Wales Revised guidelines and criteria for grading the quality of agricultural land

* METEOROLOGICAL OFFICE (1989) Climatological Data for Agricultural Land Classification

* SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet No 6 'Soils of South East England 1 250 000 scale and accompanying legend

APPENDIX III

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70cm depth for more than 30 days in most years

Wetness Class II

The soil profile is wet within 70cm depth for 31 90 days in most years **or** if there is no slowly permeable layer within 80cm depth it is wet within 70cm for more than 90 days but not wet within 40cm depth for more than 30 days in most years

Wetness Class III

The soil profile is wet within 70cm depth for 91-180 days in most years **or** if there is no slowly permeable layer within 80cm depth it is wet within 70cm for more than 180 days but only wet within 40cm depth for 31 90 days in most years

Wetness Class IV

The soil profile is wet within 70cm depth for more than 180 days but not wet within 40cm depth for more than 210 days in most years **or** if there is no slowly permeable layer within 80cm depth it is wet within 40cm depth for 91-210 days in most years

Wetness Class V

The soil profile is wet within 40cm depth for 211-335 days in most years

Wetness Class VI

The soil profile is wet within 40cm depth for more than 335 days in most years

(The number of days is not necessarily a continuous period In most years' is defined as more than 10 out of 20 years)

APPENDIX IV

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents

SOIL PROFILE DESCRIPTIONS : EXPLANATORY NOTE

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

Boring Header Information

1. **GRID REF** : national 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 **HRT** : Horticultural Crops **PGR** : Permanent Pasture **LEY** : Ley Grass **RGR** : Rough Grazing
SCR : Scrub **CFW** : Coniferous Woodland **DCW** : Deciduous Woodland **HTH** : Heathland **BOG** : Bog or Marsh
FLW : Fallow **PLO** : Ploughed **SAS** : Set aside **OTH** : Other

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

4. **GLEY/SPL** : Depth in cm to gleying or slowly permeable layers.

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

6. **MB (WHEAT/POTS)** : Moisture Balance.

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

8. If any of the following factors are considered significant, an entry of 'Y' will be entered in the relevant column.

MREL : Microrelief limitation **FLOOD** : Flood risk **EROSN** : Soil erosion risk **EXP** : Exposure limitation **FROST** : Frost
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** : Soil Erosion Risk **WD** : Combined 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
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 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

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

6. STONE LITH : One of the following is used.

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

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

7. 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

8. 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

9. SUBS STR : Subsoil structural condition recorded for the purpose of calculating profile droughtiness.

G : good M : moderate P : poor

10. POR : Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.

11. IMP : If the profile is impenetrable a 'Y' will appear in this column at the appropiate horizon.

12. SPL : Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

13. CALC : If the soil horizon is calcareous, a 'Y' will appear in this column.

14. 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

Site Name GOLF CO EAST EWELL Pit Number 1P

Grid Reference TQ23676201 Average Annual Rainfall 667 mm
Accumulated Temperature 1442 degree days
Field Capacity Level 141 days
Land Use
Slope and Aspect 02 degrees W

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	MOTTLES	STRUCTURE
0- 30	MSL	10YR42 00	0	5		
30- 40	HCL	10YR44 00	0	12		MDCAB
40- 70	SCL	10YR54 64	0	25		WKMSAB
70- 80	CH	10YR81 00	0	5		

Wetness Grade 1 Wetness Class I
Gleying cm
SPL No SPL

Drought Grade 3A APW 111mm MBW 2 mm
APP 113mm MBP 6 mm

FINAL ALC GRADE 3A
MAIN LIMITATION Droughtiness

SOIL PIT DESCRIPTION

Site Name GOLF CO EAST EWELL Pit Number 2P

Grid Reference TQ23506170

Average Annual Rainfall	667 mm
Accumulated Temperature	1442 degree days
Field Capacity Level	141 days
Land Use	Bare Soil
Slope and Aspect	01 degrees NW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	MOTTLES	STRUCTURE
0- 32	MCL	10YR42 00	3	5		
32- 47	CH	10YR82 00	0	5		

Wetness Grade	1	Wetness Class		I	
		Gleying		cm	
		SPL		No SPL	
Drought Grade	3B	APW	69 mm	MBW	-44 mm
		APP	69 mm	MBP	38 mm

FINAL ALC GRADE 3B
MAIN LIMITATION Droughtiness

SOIL PIT DESCRIPTION

Site Name GOLF CO EAST EWELL Pit Number 3P

Grid Reference TQ23506210

Average Annual Rainfall	667 mm
Accumulated Temperature	1442 degree days
Field Capacity Level	141 days
Land Use	Bare Soil
Slope and Aspect	03 degrees E

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	MOTTLES	STRUCTURE
0- 30	MSL	10YR42 00	0	3		
30- 90	MSL	10YR43 00	0	3		MDCSAB
90-120	LMS	10YR44 00	0	3		WKCSAB

Wetness Grade 1

Wetness Class	I
Gleying	cm
SPL	No SPL

Drought Grade 2

APW	135mm	MBW	22 mm
APP	108mm	MBP	1 mm

FINAL ALC GRADE 2
MAIN LIMITATION Droughtiness

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	TQ23506220	PLO	E	02			1	1	151	38	107	0	2				DR	2	
1P	TQ23676201	SAS	W	02			1	1	111	-2	113	6	3A				DR	3A	ROOTS TO 80CM
2	TQ23606220	PLO	W	02			1	1	152	39	111	4	2				DR	2	
2P	TQ23506170	PLO	NW	01			1	1	69	-44	69	-38	3B				DR	3B	ROOTS TO 47CM
3	TQ23706220	SAS					1	1	112	-1	113	6	3A				DR	3A	ROOTS AS 2P
3P	TQ23506210	PLO	E	03			1	1	135	22	108	1	2				DR	2	
4	TQ23506210	PLO					1	1	142	29	108	1	2				DR	2	
5	TQ23606210	PLO	W	02			1	1	146	33	113	6	2				DR	2	
6	TQ23706210	SAS					1	1	124	11	115	8	2				DR	2	ROOTS AS 2P
7	TQ23406200	PLO	E	04			1	1	87	-26	91	-16	3B				DR	3B	IMP55 Q3A
8	TQ23506200	PLO					1	1	90	-23	96	-11	3B				DR	3B	ROOTS AS 2P
9	TQ23606200	PLO	W	03			1	1	76	-37	77	-30	3B				DR	3B	ROOTS AS 2P
10	TQ23706200	PGR	NW	02			1	1	98	-15	105	-2	3A				DR	3A	IMP 65 AS 1P
11	TQ23806200	PGR	W	03			1	1	104	-9	104	-3	3A				DR	3A	IMP 80 AS 1P
12	TQ23406190	PLO					1	1	154	41	115	8	2				DR	2	
13	TQ23506190	PLO	W	02			1	1	113	0	97	-10	3A				DR	3A	
14	TQ23706190	PGR	N	02			1	1	86	-27	90	-17	3B				DR	3B	IMP60 Q3A AS 1
15	TQ23806190	PGR	NW	02			1	1	90	23	97	-10	3B				DR	3B	IMP65 Q3A AS 1
16	TQ23306180	PLO	E	02			1	1	66	47	66	-41	3B				DR	3B	ROOTS AS 2P
17	TQ23406180	PLO					1	1	127	14	87	-20	3A				DR	3A	
18	TQ23806180	PGR	N	01			1	1	147	34	111	4	2				DR	2	
19	TQ23306170	PLO					1	1	145	32	109	2	2				DR	2	2 TOPSOIL ST
20	TQ23406170	PLO	N	02			1	1	79	-34	81	-26	3B				DR	3B	ROOTS AS 2P
21	TQ23506170	PLO					1	1	75	-38	75	-32	3B				DR	3B	ROOTS AS 2P
22	TQ23506160	PLO	N	02			1	1	68	-45	68	39	3B				DR	3B	ROOTS AS 2P
23	TQ23606160	PLO					1	1	109	-4	111	4	3A				DR	3A	ROOTS AS 2P
24	TQ23706160	PLO					1	1	78	-35	79	-28	3B				DR	3B	ROOTS AS 2P
25	TQ23606150	PLO	N	02			1	1	72	-41	72	35	3B				DR	3B	ROOTS AS 2P
26	TQ23706150	PLO	N	02			1	1	72	-41	72	-35	3B				DR	3B	ROOTS AS 2P
27	TQ23606140	PLO					1	1	125	12	114	7	2				DR	2	ROOTS AS 2P
28	TQ23366178	PLO					1	1	129	16	112	5	2				DR	2	ROOTS AS 2P

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	0-29	msl	10YR42 00						0	0	HR	3							
	29-60	msl	10YR54 00						0	0	HR	3		M					
	60-120	msl	10YR54 00						0	0	HR	6		M					
1P	0-30	msl	10YR42 00						0	0	HR	5							
	30-40	hcl	10YR44 00						0	0	HR	12	MDCAB	FR M					
	40-70	scl	10YR54 64						0	0	CH	25	WKMSAB	VF G			Y		
	70-80	ch	10YR81 00						0	0	HR	5		M			Y		ROOTS FEW 80CM
2	0-29	mcl	10YR42 00						0	0	HR	3							
	29-85	msl	10YR44 00						0	0	HR	2		M					
	85-95	hcl	10YR44 00						0	0		0		M					
	95-120	hcl	10YR74 54						0	0	CH	30		M			Y		
2P	0-32	mcl	10YR42 00						3	0	HR	5					Y		
	32-47	ch	10YR82 00						0	0	HR	5		P			Y		ROOTS 15CM IN CH
3	0-29	mcl	10YR42 00						0	0	HR	4							
	29-70	hcl	10YR54 00						0	0	HR	5		M			Y		
	70-85	ch	00CH00 00						0	0	HR	3		P			Y		
3P	0-30	msl	10YR42 00						0	0	HR	3							
	30-90	msl	10YR43 00						0	0	HR	3	MDCSAB	FR M					
	90-120	lms	10YR44 00						0	0	HR	3	WKCSAB	VF M					
4	0-29	msl	10YR42 00						0	0	HR	3							
	29-100	msl	10YR56 00						0	0	HR	2		M					
	100-120	lms	10YR54 00						0	0		0		M					
5	0-29	mcl	10YR42 00						0	0	HR	4							
	29-55	mcl	10YR54 00						0	0	HR	3		M					
	55-80	mcl	10YR64 00						0	0	CH	20		M			Y		
	80-120	mcl	10YR63 00						0	0	CH	40		M			Y		
6	0-29	mcl	10YR42 00						0	0	HR	2							
	29-60	hcl	10YR44 00						0	0	HR	3		M					
	60-86	c	10YR56 00						0	0	HR	5		M					
	86-101	ch	00CH00 00						0	0	HR	3		P			Y		
7	0-30	mcl	10YR42 00						0	0	HR	3							
	30-55	c	10YR56 00	10YR58 00	F				0	0	HR	3		M					
8	0 36	msl	10YR42 00						2	0	HR	10							
	36-55	msl	10YR56 00						0	0	HR	10		M					
	55-70	ch	00CH00 00						0	0	HR	3		P			Y		
9	0-36	mcl	10YR42 00						0	0	CH	10					Y		
	36-51	ch	00CH00 00						0	0	HR	3		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
10	0-30	mcl	10YR43 00						0	0	HR	5						
	30-50	hcl	10YR44 00						0	0	CH	2		M				Y
	50-65	scl	10YR54 00						0	0	CH	10		M				Y
11	0-27	mcl	10YR42 00						0	0	HR	2						
	27-45	hcl	10YR54 00						0	0	CH	25		M				Y
	45-55	hcl	10YR64 00						0	0	CH	50		M				Y
	55-80	hcl	10YR64 74						0	0	CH	70		M				Y
12	0-35	mcl	10YR42 00						0	0	HR	3						
	35-60	hcl	10YR54 00						0	0	HR	5		M				
	60-70	c	10YR56 00						0	0	HR	5		M				
	70-90	hcl	10YR56 00						0	0	HR	2		M				
	90-120	msl	10YR54 00						0	0		0		M				Y
13	0-36	scl	10YR42 00						3	0	HR	7						
	36-56	mcl	10YR43 00						0	0	HR	3		M				
	56-120	lms	10YR56 00						0	0	HR	10		M				Y
14	0 30	hcl	10YR42 00						0	0	HR	5						Y
	30 60	mcl	10YR64 74						0	0	CH	50		M				Y
15	0-30	msl	10YR43 00						0	0	HR	2						
	30-38	hcl	10YR54 00						0	0	CH	20		M				Y
	38 65	hcl	10YR64 00						0	0	CH	50		M				Y
16	0-30	mcl	10YR53 00						0	0	CH	10						Y
	30-45	ch	00CH00 00						0	0	HR	2		P				Y
17	0-35	mcl	10YR42 00						4	0	HR	12						
	35-47	msl	10YR44 00						0	0	HR	10		M				
	47-65	lms	10YR64 00						0	0	HR	15		M				Y
	65-85	lms	10YR44 00						0	0	HR	5		M				
	85-120	msl	10YR44 00						0	0	HR	2		M				
18	0-26	msl	10YR43 00						0	0	HR	2						
	26-48	hcl	10YR44 00						0	0		0		M				
	48-120	hcl	10YR64 74						0	0	CH	20		M				Y
19	0-35	mcl	10YR42 00						6	0	HR	12						
	35-120	mcl	10YR43 00						0	0	HR	5		M				
20	0-36	mcl	10YR43 00						4	0	HR	8						Y
	36-40	mcl	10YR54 00						0	0	CH	10		M				Y
	40-55	ch	10YR82 00						0	0	HR	3		P				Y
21	0-35	mcl	10YR42 00						0	0	CH	8						Y
	35-50	ch	00CH00 00						0	0	HR	3		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
22	0-32	mcl	10YR42 00						0	0	HR	8						Y
	32-47	ch	00CH00 00						0	0	HR	3		P				Y
23	0-30	mcl	10YR42 00						3	0	HR	7						
	30-68	mcl	10YR44 00						0	0	HR	3		M				
	68-83	ch	00CH00 00						0	0	HR	3		P				Y
24	0-38	mcl	10YR42 00						0	0	HR	6						Y
	38-53	ch	00CH00 00						0	0	HR	3		P				Y
25	0-35	mcl	10YR42 00						3	0	HR	10						Y
	35-50	ch	00CH00 00						0	0	HR	3		P				Y
26	0-35	mcl	10YR42 00						3	0	HR	10						Y
	35-50	ch	00CH00 00						0	0	HR	3		P				Y
27	0-35	mcl	10YR42 00						0	0	HR	3						
	35-50	mcl	10YR56 00						0	0	HR	3		M				
	50-70	scl	10YR56 00						0	0	HR	3		M				
	70-80	msl	10YR56 00						0	0	HR	2		M				
	80-95	ch	00CH00 00						0	0	HR	3		P				Y
28	0-35	mcl	10YR42 00						3	0	HR	8						
	35-90	mcl	10YR44 00						0	0	HR	5		M				
	90-105	ch	10YR82 00						0	0	HR	3		P				Y