

A1
West Sussex Minerals Plan
Objector Site 55: North of
Duncton Common
Agricultural Land Classification
ALC Map and Report
June 1995

AGRICULTURAL LAND CLASSIFICATION REPORT

WEST SUSSEX MINERALS PLAN

OBJECTOR SITE 55: NORTH OF DUNCTON COMMON.

1. Summary

- 1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of objector sites in West Sussex. The work forms part of MAFF's statutory input to the West Sussex Minerals Plan.
- 1.2 The site comprises approximately 24 hectares of land to the south of the disused railway line at Duncton Common near Heath End in West Sussex. An Agricultural Land Classification (ALC) survey was carried out during June 1995. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 24 borings and two soil inspection pits were described 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 a long term limitation on its use for agriculture.
- 1.3 The work was carried out by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.
- 1.4 At the time of survey, the land on the site comprised barley and permanent grassland.
- 1.5 The distribution of grades and subgrades is shown on the attached ALC map, the areas and extent are given in the table below. The map has been drawn at a scale of 1:10,000. It is accurate at this scale, but any enlargement would be misleading.

Table 1: Distribution of Grades and Subgrades

Grade	Area (ha)	% of Agricultural Land
3a	1.8	7.4
3b	<u>22.5</u>	<u>92.6</u>
Total area of site	24.3	100%

- 1.6 Appendix I 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 majority of the agricultural land on the site has been classified as Subgrade 3b, moderate quality land, with soil droughtiness, wetness and slope as the main limitations. The soils within this mapping unit typically comprise coarse sandy textured subsoils which become sandier, and occasionally more stony, with depth. Consequently, these soils show a significant restriction upon profile available water which can affect the level and consistency of crop yields. Where gradients of between 9-10° were measured on the site, a classification of Subgrade 3b due to a significant slope limitation results. Steep slopes can restrict the safe and efficient use of agricultural machinery. On the lower ground, land has been classified as Subgrade 3b due to a significant wetness limitation caused by the presence of a slowly permeable clay below the topsoil. Poorly drained wet

soils can inhibit plant growth and rooting, and may be more susceptible to structural damage through trafficking by agricultural machinery or poaching by grazing livestock.

- 1.8 Good quality Subgrade 3a land is mapped where topsoils are lighter and the slowly permeable clay occurs deeper in the profile than on adjacent Subgrade 3b land. Therefore any drainage imperfections and consequent wetness limitations on this land are diminished, thereby allowing the land to be classified as better quality.

2. Climate

- 2.1 The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe climatic 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 average annual 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 However, climatic factors do interact with soil factors to influence soil wetness and droughtiness limitations. At this location, the field capacity days are relatively high in a regional context and therefore the likelihood of any soil wetness problems may be increased.
- 2.5 No local climatic factors such as exposure or frost risk are believed to affect the site.

Table 2 : Climatic Interpolations

Grid Reference	SU 960 193
Altitude (m)	30
Accumulated Temperature (Day °C, Jan-June)	1507
Average Annual Rainfall (mm)	905
Field Capacity (days)	192
Moisture Deficit, Wheat (mm)	101
Moisture Deficit, Potatoes (mm)	94
Overall Climatic Grade	1

3. Relief

- 3.1 The site lies at an altitude of approximately 20-42m AOD, the majority of the site lying on a plateau with slopes encountered towards the east and south of the site. Towards the south-east of the site, slopes measured with an optical reading clinometer were found to be 9-10°, being sufficiently steep as to cause a limitation upon agricultural use.

4. Geology and Soils

- 4.1 The published geological map (BGS, 1972) shows the underlying geology of the site to comprise Sandgate Beds.
- 4.2 The published Soil Survey map (SSEW, 1983) shows the soils over the majority of the site to comprise those of the Shirrell Heath 1 association. These are described as 'well drained sandy soils with a bleached subsurface horizon. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging. Some sandy and coarse loamy soils affected by groundwater often with humose surface horizon' (SSEW 1983).
- 4.3 Detailed field examination broadly confirms the published map. Soils across the site typically comprise sandy textures, although the proportions of sand in the profile was found to vary. Subsoils on the higher parts of the site were found to be stony, with soils typically comprising loamy textures over slowly permeable clays on the lower reaches of the site.

5. Agricultural Land Classification

- 5.1 The location of the soil observation points are shown on the attached sample point map.

Subgrade 3a

- 5.2 Two small areas of land on the lower reaches of the site have been classified as Subgrade 3a, good quality land, with soil droughtiness and/or wetness as the main limitations. Soil textures within these mapping units are variable although they commonly comprise loamy and sandy textures resting upon heavier subsoils. Soils also tend to show signs of a wetness imperfection in the form of gleying. A soil inspection pit (pit no. 2) found the clay subsoil to be poorly structured and slowly permeable, causing a drainage impedence. However, variability in the depths at which the clay is encountered in these mapping units means that some soil observations show classifications on the basis of soil wetness of Grade 2 and Subgrade 3a. Other profiles within the 3a mapping units are more sandy and thereby limited by soil droughtiness, restricting the level and consistency of crop yields. Therefore an overall classification of Subgrade 3a is appropriate for the land in these mapping units. Poorly drained wet soils may inhibit plant and root development, and may be more susceptible to structural damage through trafficking by agricultural machinery or poaching by grazing livestock.

Subgrade 3b

- 5.8 An area of land towards the south-eastern edge of the site was found to comprise slopes measuring 9-10°, being sufficient to restrict the safe and efficient use of agricultural machinery. Gradient has a significant effect on mechanised farm operations since most conventional agricultural machinery performs best on level ground.
- 5.9 The majority of the land within this mapping unit is restricted by a significant droughtiness limitation. Soils on the higher ground on the site, tend to comprise sandier textures with increased stone contents with depth. These soils proved impenetrable to the plough at depths of 30-50cm due to stony subsoils. Impenetrability may have been exacerbated by the hot and dry conditions at the time of survey. A soil inspection pit (pit

1) was dug to investigate the nature of these soils. At the location of the pit, a moderately stony (25% total flints v/v, 10% > 2cm size) loamy medium sand topsoil rests upon a similar textured upper subsoil containing 30% total flints v/v and extending to a depth of 45cm. A very stony (45% total flints v/v) loamy medium sand lower subsoil was found to extend to a depth of 60cm, where a very stony (50% total flints v/v) medium sand was encountered. The soil inspection pit became impenetrable to digging at a depth of 70cm, and for the purposes of calculating profile available water it has been assumed that the very stony medium sand horizon extends to a depth of at least 120cm. A combination of the sandy soil textures, stone contents and the local climatic regime means that there is a significant restriction upon the amount of profile available water for plant growth. This will affect the level and consistency of crop yields such that a classification of Subgrade 3b is appropriate.

- 5.10 At the location of soil inspection pit no. 2, a slowly permeable clay subsoil causing a significant drainage impedence was observed at a depth of 30cm. Such drainage characteristics equate these soils to Wetness Class IV, with a resultant classification of Subgrade 3b due to this significant wetness limitation. Poorly drained wet soils can inhibit plant growth and rooting, and may be more susceptible to structural damage through trafficking by agricultural machinery or poaching by grazing livestock.

ADAS Ref: 4203/130/95
MAFF Ref: EL 42/228

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1972), Sheet No. 317, Chichester, 1:50,000 Series (drift edition).

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 6, Soils of South East England, 1:250,000 and accompanying legend.*

APPENDIX I

DESCRIPTION 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 (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 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 including: 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. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm 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

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

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.

Definition of Soil Wetness Classes

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.

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.

¹The number of days specified is not necessarily a continuous period.

²'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents :

Soil Abbreviations - Explanatory Note

Soil Pit Descriptions

Database Printout - Boring Level Information

Database Printout - Horizon Level Information

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. **GLEYSPL** : 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. **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	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 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

SOIL PIT DESCRIPTION

Site Name : DUNCTON COMMON

Pit Number : 1P

Grid Reference: SU95801930

Average Annual Rainfall : 905 mm

Accumulated Temperature : 1507 degree days

Field Capacity Level : 192 days

Land Use : Barley

Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	LMS	10YR43 00	10	25	HR					
25- 45	LMS	10YR44 00	0	30	HR				M	
45- 60	LMS	10YR54 00	0	45	HR				M	
60-120	MS	10YR56 00	0	50	HR				M	

Wetness Grade : 1

Wetness Class : I

Gleying : cm

SPL : cm

Drought Grade : 3B

APW : 054mm MBW : -47 mm

APP : 045mm MBP : -49 mm

FINAL ALC GRADE : 3B

MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : DUNCTON COMMON

Pit Number : 2P

Grid Reference: SU96001910

Average Annual Rainfall : 905 mm
 Accumulated Temperature : 1507 degree days
 Field Capacity Level : 192 days
 Land Use : Barley
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	MCL	10YR42 43	0	2	HR	C				
30-120	C	10YR31 41	0	0		C	WKCPL	FM	P	

Wetness Grade : 3B

Wetness Class : IV
 Gleying : 0 cm
 SPL : 030 cm

Drought Grade : 2

APW : mm MBW : 0 mm
 APP : mm MBP : 0 mm

FINAL ALC GRADE : 3B

MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS	
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB						DRT
1	SU95701940	MAZ			1	1	77	-24	65	-29	3B			DR	3B	
1P	SU95801930	BAR			1	1	054	-47	045	-49	3B			DR	3B	PIT TO 70
2	SU95801940	BAR			1	1	72	-29	55	-39	3B			DR	3B	
2P	SU96001910	BAR				0 030	4	3B		0	0	2		WE	3B	
3	SU96201940	BAR				030 030	4	3B		0	0	3A		WE	3B	
4	SU96301940	PEA			1	1	100	-1	85	-9	3A			DR	3A	
5	SU96401940	PGR	SE	09	1	1	60	-41	60	-34	3B			DR	3B	I40 SLOPE
6	SU96501940	PGR				045 045	3	3A	88	-13	80	-14	3A	WD	3A	
7	SU95601930	BAR				045 045	3	3A	56	-45	62	-32	3B	DR	3B	I65 SEE 1P
8	SU95701930	BAR			1	1	32	-69	32	-62	4			DR	3B	I40 SEE 1P
9	SU95801930	BAR			1	1	27	-74	27	-67	4			DR	3B	I30 SEE 1P
10	SU95901930	BAR			1	1	48	-53	48	-46	4			DR	3B	I80
11	SU96001930	PEA			1	1	72	-29	56	-38	3B			DR	3B	
12	SU96101930	PEA			1	1	41	-60	41	-53	4			DR	3B	I50 SEE 1P
13	SU96201930	PEA			1	1	68	-33	51	-43	3B			DR	3B	
14	SU96301930	PGR	E	10	1	1	43	-58	43	-51	4			DR	3B	3B SLOPE
15	SU95601920	CER	SE	05	1	1	50	-51	50	-44	4			DR	3B	I30 SEE1P
16	SU95701920	CER	SE	05	1	1	31	-70	31	-63	4			DR	3B	I30 SEE1P
17	SU95801920	CER	SE	05			25	-76	25	-69	4			DR	3B	I25 SEE1P
18	SU95901920	CER	SE	05	1	1	49	-52	49	-45	4			DR	3B	I30 SEE1P
19	SU96001920	CER	SE	05	1	1	77	-24	66	-28	3B			DR	3B	I30 SEE1P
20	SU96101920	CER	SE	10	1	2	49	-52	49	-45	4			DR	3B	3B SLOPE
21	SU95801910	CER				030	2	2	124	23	111	17	2	WD	2	
22	SU95901910	BAR				020	2	2	091	-10	068	-26	3A	DR	3A	
23	SU96001910	CER				0 030	4	3B		0	0	2		WE	3B	
24	SU95901900	CER				0 030	4	3B		0	0	2		WE	3B	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS			CALC	
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR		POR
1	0-25	lms	10YR43 00					8	0	HR	12					
	25-50	lms	10YR44 00					0	0	HR	5		M			
	50-65	sc1	10YR54 56					0	0	HR	5		M			
	65-120	ms	10YR66 74					0	0		0		M			
1P	0-25	lms	10YR43 00					10	0	HR	25					
	25-45	lms	10YR44 00					0	0	HR	30		M			PIT DUG TO
	45-60	lms	10YR54 00					0	0	HR	45		M			70CM
	60-120	ms	10YR56 00					0	0	HR	50		M			
2	0-30	lms	10YR43 00					3	0	HR	6					
	30-50	lms	75YR44 00					0	0	HR	2		M			
	50-120	ms	10YR56 66					0	0		0		M			
2P	0-30	mc1	10YR42 43	10YR58 00	C		Y	0	0	HR	2					
	30-120	c	10YR31 41	10YR68 00	C		Y	0	0		0	WKCP	FM	P	Y	Y
3	0-30	mc1	10YR43 00					0	0	HR	5					
	30-55	c	10YR53 00	10YR68 71	M		Y	0	0		0		P		Y	IMPEN 65
	55-65	sc1	10YR52 53	10YR58 00	C		Y	0	0	HR	10		M		Y	HARD ROCK
4	0-30	ms1	10YR43 44					8	0	HR	10					
	30-45	ms1	10YR44 00					0	0	HR	10		M			
	45-70	lms	10YR46 00					0	0		0		M			
	70-120	ms	10YR66 76					0	0		0		M			
5	0-25	ms1	10YR43 00					5	0	HR	8					IMPEN 40
	25-40	ms1	10YR44 00					0	0	HR	10		M			HARD ROCK
6	0-20	ms1	10YR43 00					5	0	HR	8					
	20-45	lms	10YR44 00					0	0	HR	15		M			
	45-70	c	10YR41 00	10YR58 00	C		Y	0	0		0		P		Y	
	70-120	ms	10YR74 66	10YR58 00	C		Y	0	0		0		M		Y	
7	0-30	lms	10YR43 00					5	0	HR	8					IMPEN 65
	30-45	lms	10YR44 00					0	0	HR	10		M			HARD ROCK
	45-65	sc	10YR62 00	10YR68 71	M		Y	0	0	HR	10		P		Y	
8	0-25	lms	10YR44 00					8	0	HR	12					IMPEN 40
	25-40	lms	10YR54 00					0	0	HR	15		M			HARD ROCK
9	0-30	lms	10YR44 00					10	0	HR	15					I30 HARD ROCK
10	0-25	lms	10YR44 00					10	0	HR	15					
	25-40	lms	10YR44 00					0	0	HR	10		M			
	40-80	ms	10YR66 00					0	0	HR	10		M			I80 HARD ROCK
11	0-30	lms	10YR44 00					6	0	HR	8					
	30-65	lms	10YR46 00					0	0	HR	2		M			
	65-120	ms	10YR66 76					0	0		0		M			

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS						
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR	POR	IMP	SPL	CALC
12	0-30	lms	10YR43 44					7	0	HR	11							
	30-50	lms	10YR44 00					0	0	HR	15	M						150 HARD ROCK
13	0-30	lms	10YR44 00					8	0	HR	12							
	30-45	lms	10YR44 00					0	0	HR	15	M						
	45-60	ms	10YR56 00					0	0	HR	2	M						
	60-120	ms	10YR66 76					0	0		0	M						
14	0-25	mzc1	10YR43 44					6	0	HR	10							125 HARD ROCK
15	0-30	ms1	10YR54 00					0	0	HR	2							130 HARD ROCK
16	0-30	lms	10YR54 00					0	0	HR	2							130 HARD ROCK
17	0-25	lms	10YR54 00					0	0	HR	5							125 HARD ROCK
18	0-30	ms1	10YR54 00					0	0	HR	5							130 HARD ROCK
19	0-30	ms1	10YR54 00					0	0	HR	2							130 HARD ROCK
20	0-30	ms1	10YR54 00					0	0	HR	5							130 HARD ROCK
21	0-30	ms1	10YR43 00					0	0		0							
	30-50	ms1	10YR42 00					Y	0	0	0	M						
	50-75	ms1	10YR52 00					Y	0	0	0	M						
	75-90	mc1	10YR51 00					Y	0	0	0	M						
22	0-20	ms1	10YR43 00					0	0	HR	3							
	20-50	lms	10YR42 00	10YR56 00	C			Y	0	0	HR	3	M					
	50-75	lms	10YR52 00	10YR58 00	C			Y	0	0	0	M						
	75-100	mc1	10YR51 00	10YR56 00	C			Y	0	0	0	M						
23	0-30	mc1	10YR42 00	10YR56 00	C			Y	0	0	0							
	30-120	c	10YR52 00	10YR58 00	C			Y	0	0	0	P						Y
24	0-30	mc1	10YR42 00	10YR58 61	C			Y	0	0	0							
	30-120	c	10YR42 00	10YR58 00	C			Y	0	0	0	P						Y