3301-076-98

A1

CHERWELL DISTRICT LOCAL PLAN REVIEW
Land at Whitelands Farm Bicester
Oxfordshire

Agricultural Land Classification
ALC Map and Report

November 1998

Resource Planning Team
Eastern Region
FRCA Reading

RPT Job Number 3301/076/98
MAFF Reference EL 33/01588

AGRICULTURAL LAND CLASSIFICATION REPORT

CHERWELL DISTRICT LOCAL PLAN REVIEW
LAND AT WHITELANDS FARM BICESTER

INTRODUCTION

1 This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 80 hectares of land at Whitelands Farm Bicester in Oxfordshire The survey was carried out during November 1998

2 The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)[1] on behalf of the Ministry of Agriculture Fisheries and Food (MAFF) The survey was carried out in connection with MAFF s statutory input to the Cherwell District Local Plan Review 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 the agricultural land use on the site included oilseed rape cereals permanent grassland recently ploughed land and stubble The areas mapped as Other land include woodland farm buildings and a track way

SUMMARY

5 The findings of the survey are shown on the enclosed ALC map The map has been drawn at a scale of 1 10 000 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	5 2	6 9	6 7
3b	69 8	93 1	89 8
Other land	2 7	N/A	3 5
Total surveyed area	75 0	100	96 5
Total site area	77 7		100

7 The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land In total 76 borings and 4 soil pits are described

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

8 The majority of the agricultural land at this site has been classified as Subgrade 3b (moderate quality) with a smaller extent of Subgrade 3a (good quality) The principal limitations to land quality are soil droughtiness with soil wetness to the southeast

9 On the lower land in the south east of the site the soils suffer from a soil wetness limitation where the underlying geology is Oxford Clay The soils in this area typically comprise clay or heavy fine loamy topsoils These pass to less permeable clays which act to impede the movement of water down through the profile The depth to these poor draining clay horizons will determine the final ALC grade Where these occur at shallow depths the land is classified as Subgrade 3b and where these are found deeper Subgrade 3a is appropriate Poorly drained soils cause land utilisation to be restricted and yield potential to be reduced

10 Over the majority of the site the soils suffer from a soil droughtiness limitation where the underlying geology is Combrash These soils are well drained and generally calcareous throughout Topsoils are slightly stony fine loamy or occasionally fine silty These pass to similarly textured but stony subsoils which were impenetrable to the soil auger This combination of soil properties interacting with the local climate limits the amount of water available to a growing plant resulting in a soil droughtiness limitation Subgrade 3b is therefore appropriate for this land Crop growth and yield could be adversely affected especially in drier years Within this area topsoil stoniness also limited land quality to Subgrade 3b in some locations The effect of this limitation is to act as an impediment to cultivation harvesting and crop growth

FACTORS INFLUENCING ALC GRADE

Climate

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

10 The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met Office 1989)

Table 2 Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SP 571 223	SP 572 216
Altitude	m AOD	75	69
Accumulated Temperature	day C (Jan June)	1419	1427
Average Annual Rainfall	mm	665	659
Field Capacity Days	days	144	142
Moisture Deficit Wheat	mm	105	106
Moisture Deficit Potatoes	mm	96	98
Overall climatic grade	N/A	Grade 1	Grade 1

11 The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions

12 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR) as a measure of overall wetness and accumulated temperature (AT0 January to June) as a measure of the relative warmth of a locality

13 The combination of rainfall and temperature at this site mean that there is no overall climatic variation Local climatic factors such as exposure and frost risk do not affect land quality at this location The site is climatically Grade 1 However climatic factors do interact with soil properties to influence soil wetness and soil droughtiness At this locality the climate is average in regional terms

Site

14 The site lies at altitudes in the range 82–65 m AOD and falls through gently gradients from the north west to the south east The site is not affected by adverse gradient or flooding However two fields have ridge and furrow microrelief but this is not severe enough to cause a limitation

Geology and soils

15 The most detailed published geological information for the site (Gen Surv GB 1863) maps most of it as Combrash with Oxford Clay to the south east

16 The most detailed published soils information covering the area (SSEW 1983) maps the majority as soils of the Aberford association These soils are described as shallow locally brashy well drained calcareous fine loamy soils over limestone Some deeper calcareous soils in colluvium (SSEW 1983) To the south of the site soils of the Wickham 2 association are mapped These are described as slowly permeable seasonally waterlogged fine loamy over clayey fine silty over clayey and clayey soils Small areas of slowly permeable calcareous soils on steeper slopes (SSEW 1983) Soils consistent with these descriptions were observed across the site

AGRICULTURAL LAND CLASSIFICATION

17 The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1 page 1

18 The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II

Subgrade 3a

19 Good quality agricultural land is mapped on the lowest ground close to the Oxford Road (A41T) It is principally limited by soil wetness Soils in this mapping unit comprise non calcareous heavy clay loam topsoils which may contain up to 5% hard limestone by volume

These overlie stoneless clay upper subsoils which then pass to gleyed slowly permeable clayey lower subsoils some of which have a sandier component and may become calcareous The depth to these poorly structured clays range from 45–62 cm which assigns these soils to Wetness Class III or II Relating the soil wetness class to the heavy topsoil texture and median field capacity days (144 FC days) results in land with a Subgrade 3a classification The effect of a slight soil wetness limitation can adversely affect plant growth or impose restrictions on cultivations or grazing by livestock

Subgrade 3b

20 Moderate quality land occurs over the majority of the site It occurs in conjunction with two main soil types

21 Soils occurring over deposits of Cornbrash located in the central and western areas of the site have a soil droughtiness limitation Soils comprise very slightly to moderately stony (2 26% total hard limestone fragments by volume with 0–16% > 2cm in size) medium clay loam heavy clay loam medium silty clay loam or heavy silty clay loam topsoils The topsoils are not uniformly calcareous These pass into predominately calcareous heavy clay loam upper subsoils which are impenetrable to the soil auger (from 35 70 cm) due to the high volumes of limestone Pits 1 3 and 4 (see Appendix II) are typical of these soils Pit 1 in the eastern area comprises a slightly stony (10% total by volume 6% > 2cm in size) calcareous heavy clay loam topsoil This passes to a very stony heavy clay loam (60% total by volume) overlying limestone bedrock at a depth of 60 cm Pit 3 in the central area comprises a moderately stony calcareous heavy clay loam topsoil (21% total by volume 7% > 2cm in size) This overlies a very stony (61% total by volume) heavy clay loam upper subsoil The lower subsoil is a very stony (63% total by volume) medium silty clay loam over bedrock at a depth of 55 cm Pit 4 in the west consists of a slightly stony (17% total by volume 7% > 2cm in size) calcareous heavy clay loam topsoil This passes to a moderately stony (32% total by volume) heavy clay loam This overlies a very stony (40% by volume) medium silty clay loam lower soil over bedrock at a depth of 62 cm Perched water as a result of recent heavy rainfall was observed in Pits 3 and 4 above the bedrock indicating a lack of fissuring which is considered to limit rooting In view of this and the large tabular limestone flags occurring at these depths rooting was assumed to be negligible below these depths and the drought calculations terminated The combination of soil textures depths and high stone contents in conjunction with the local climate means that these profiles hold restricted reserves of water The resulting drought stress may cause the level and consistency of yields to be depressed Moisture balance calculations indicate that for this land Subgrade 3b is therefore appropriate

22 Soils underlain by Oxford Clay located in the eastern area of the site are affected by a soil wetness limitation Soils typically comprise non calcareous stoneless clay and heavy clay loam topsoils These pass to poorly structured clayey subsoils from 25–34 cm which may be variably calcareous Pit 2 (see Appendix II) is typical of these soils and proved the existence of these shallow slowly permeable horizons which impede drainage down through the profile The depth to these slowly permeable horizons results in these soils being assigned to Wetness Class IV and combined with the clayey topsoils the interaction with the prevailing climate result in these soils being classified as Subgrade 3b The effect of a significant soil wetness limitation can adversely affect seed germination and survival It also

inhibits the development of a good root system and can in extreme cases lead to plant death Soil wetness is a major factor in determining the number of days when the soil is in a suitable condition for cultivation trafficking by machinery or grazing by livestock

23 Of equal significance in terms of land quality is the presence of more than 15% hard brashy limestone by volume that are greater than 2 cm in size in the topsoil These are observed to occur as localised stony patches particularly in the central and western areas of the site These will have the effect of increasing production costs by enhancing wear and tear to farm machinery and impairing the establishment growth and quality of crops

Colin Pritchard & Alun Evans
Resource Planning Team
Eastern Region
FRCA Reading

SOURCES OF REFERENCE

Geological Survey Of Great Britain (1863) *Sheet No* 45 S E *(Old Series) Banbury* 1 inch to 1 mile Solid Edition
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,* 1 250 000
SSEW Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*
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

Soil wetness is a major factor in determining the number of days when the soil is in a suitable condition for cultivation trafficking by machinery or grazing by livestock

23 Of equal significance in terms of land quality is the presence of more than 15% hard brashy limestone by volume that are greater than 2 cm in size in the topsoil These are observed to occur as localised stony patches particularly in the central and western areas of the site These will have the effect of increasing production costs by enhancing wear and tear to farm machinery and impairing the establishment growth and quality of crops

Colin Pritchard & Alun Evans
Resource Planning Team
Eastern Region
FRCA Reading

APPENDIX II

SOIL DATA

Contents

Sample location map

Soil abbreviations explanatory note

Soil pit and soil boring descriptions (boring and horizon levels)

SOIL PROFILE DESCRIPTIONS EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database This uses notations and abbreviations as set out below

Boring Header Information

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

SAMPLE NO	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	WETNESS CLASS	WHEAT GRADE	WHEAT AP	WHEAT MB	POTS AP	POTS MB	M REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SP56402270	OSR	E	1			1	2	58	-47	58	38	3B				DR	3B	DISTURBED?
2	SP56502270	OSR					1	2	107	2	114	18	3A				DR	3A	BORDERG2
3	SP56302260	OSR	W	1			1	2	66	39	66	30	3B				DR	3B	IMP40/SEE4P
4	SP56402260	OSR					1	2	69	36	69	27	3B				DR	3B	POSS3A/SEE4P
5	SP56502260	OSR					1	2	42	63	42	54	4				DR	3B	IMP25/SEE3P
6	SP56602260	OSR					1	2	38	-67	38	58	4				DR	3B	IMP28/SEE3P
7	SP56702260	OSR					1	2	63	-42	63	33	3B				DR	3B	IMP45/4P+TS
8	SP56302250	OSR	W	1			1	2	42	-63	42	54	4				DR	3B	IMP25/SEE2P
9	SP56402250	OSR					1	2	62	-43	62	34	3B				DR	3B	IMP38/SEE4P
10	SP56502250	OSR					1	2	71	34	71	25	3B				DR	3A	IMP45/SEE4P
11	SP56602250	OSR					1	2	59	-46	59	37	3B				DR	3B	IMP37/SEE4P
12	SP56702250	OSR	SE	1			1	2	40	65	40	56	4				DR	3B	IMP25/SEE3P
13	SP56802250	OSR	E	1			1	2	56	-49	56	-40	3B				DR	3B	IMP35/SEE3P
14	SP56902250	OSR					1	2	38	67	38	58	4				DR	3B	IMP25/SEE3P
15	SP57002250	OSR					1	2	44	61	44	52	3B				DR	3B	IMP28/SEE3P
16	SP56302240	OSR	W	1			1	2	41	-64	41	55	4				DR	3B	IMP25/SEE3P
17	SP56402240	OSR					1	2	37	68	37	59	4				DR	3B	IMP22/SEE3P
18	SP56502240	OSR	S	1			1	2	80	25	80	16	3B				DR	3A	IMP49/SEE4P
19	SP56602240	OSR	E	1			1	2	51	54	51	-45	4				DR	3B	IMP30/SEE3P
20	SP56702240	OSR	SE	1			1	1	46	59	46	50	4				DR	3B	IMP28/SEE3P
21	SP56802240	OSR					1	2	40	65	40	56	4				DR	3B	IMP25/SEE3P
22	SP56902240	OSR					1	1	47	58	47	49	4				DR	3B	IMP27/SEE3P
23	SP57002240	OSR					1	1	81	24	81	15	3B				DR	3A	IMP50/SEE4P
24	SP57102240	OSR					1	1	48	57	48	-48	4				DR	3B	IMP30/SEE3P
25	SP57202240	OSR					1	1	39	-66	39	57	4				DR	3B	IMP25/SEE3P
26	SP56502230	OSR					1	2	48	57	48	-48	4				DR	3B	IMP28/SEE3P
27	SP56602230	OSR					1	2	42	63	42	54	4				DR	3B	IMP25/SEE3P
28	SP56702230	OSR					1	2	65	-40	65	31	3B				DR	3B	IMP40/SEE3P
30	SP56902230	OSR					1	2	42	63	42	54	4				DR	3B	IMP25/SEE1P
31	SP57002230	OSR					1	2	64	-41	64	32	3B				DR	3B	IMP42/SEE1P
32	SP57102230	OSR					1	2	40	65	40	56	4				DR	3B	IMP25/SEE1P
33	SP57202230	PLO					1	2	54	51	54	42	4				DR	3B	IMP30/SEE1P
34	SP57302230	PLO					1	1	103	2	114	18	3A				DR	3A	BORDERG2
35	SP56602220	OSR					1	2	44	-61	44	52	4				DR	3B	IMP30/SEE1P
36	SP56702220	OSR					1	2	83	22	83	13	3B				DR	3A	
37	SP56802220	OSR					1	1	48	57	48	48	4				DR	3B	IMP30/SEE1P
38	SP56902220	OSR					1	2	50	55	50	46	4				DR	3B	IMP30/SEE1P
39	SP57002220	OSR					1	2	39	66	39	57	4				DR	3B	IMP25/SEE1P
40	SP57102220	PLO					1	2	60	-45	60	36	3B				DR	3B	IMP40/SEE1P
41	SP57202220	PLO					1	2	51	54	51	-45	4				DR	3B	IMP29/SEE1P
42	SP57302220	PLO					1	1	52	53	52	-44	4				DR	3B	IMP30/SEE1P
43	SP56702210	OSR					1	1	49	56	49	47	4				DR	3B	IMP30/SEE1P

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
44	SP56802210	OSR					1	1	48	57	48	-48	4				DR	3B	IMP30/SEE1P
45	SP56902210	OSR					1	2	50	55	50	-46	4				DR	3B	IMP30/SEE1P
46	SP57002210	PLO					1	2	45	-60	45	51	4				DR	3B	IMP27/SEE1P
47	SP57102210	PLO					1	1	69	36	69	27	3B				DR	3B	IMP42/SEE1P
48	SP57202210	PLO					1	2	73	32	73	23	3B				DR	3B	IMP42/SEE1P
49	SP56812192	PGR	SW	1			1	1	72	33	72	24	3B				DR	3B	IMP43/SEE1P
50	SP56902200	PGR					1	1	60	-45	60	36	3B	Y			DR	3B	RIDGE/FURROW
51	SP57002200	PLO					1	2	55	50	55	-41	3B				DR	3B	IMP35/SEE1P
52	SP57102200	PLO					1	1	59	-46	59	37	3B				DR	3B	IMP35/SEE1P
53	SP57202200	PLO			25	25	4	3B	87	18	93	3	3A				WE	3B	SEE2P
54	SP56902190	PGR	W	1			1	1	51	54	51	-45	4	Y			DR	3B	RIDGE/FURROW
55	SP57002190	STB			28	28	4	3B	81	24	87	9	3B				WE	3B	SEE2P
56	SP57102190	STB	W	1	40	40	3	3B	104	1	106	10	3A				WE	3B	SEE2P
57	SP56902180	PGR	SW	1			1	2	89	16	93	3	3A				DR	3A	IMP55/SEE1P
58	SP57002180	CER			27	27	4	3B	83	22	89	7	3B				WE	3B	SEE2P
59	SP57102180	STB					1	2	66	39	66	30	3B				DR	3B	IMP40/SEE1P
60	SP57202180	STB			38		1	3A	79	26	82	14	3B				WD	3A	IMP55
61	SP57002170	PGR	SW	1	23	23	4	3B		0		0		Y			WE	3B	RIDGE/FURROW
62	SP57102170	STB	S	1	0	34	4	3B	86	19	92	4	3A				WE	3B	SEE2P
63	SP57202170	STB			0	27	4	3B	88	17	100	4	3A				WE	3B	SEE2P
64	SP57302170	CER	E	2	0	27	4	3B	93	12	102	6	3A				WE	3B	SEE2P
65	SP57402170	CER	E	1	59	59	2	3A	109	4	116	20	3A				WE	3A	SEE2P
66	SP57202160	CER	SE	2	30	30	4	3B	89	16	101	5	3A				WE	3B	SEE2P
67	SP57302160	CER	E	2	0	36	4	3B	93	12	105	9	3A				WE	3B	SEE2P
68	SP57402160	CER	E	1	55	55	2	3A	138	33	116	20	1				WE	3A	SEE2P
69	SP57502160	CER			45	45	3	3A	109	4	111	15	3A				WE	3A	IMP85
70	SP57202150	CER	SE	1			1	2	67	38	67	29	3B				DR	3B	IMP45/SEE1P
71	SP57302150	CER	SE	1	55	55	2	3A	102	3	108	12	3A				WE	3A	SEE2P
72	SP57402150	CER	E	1	28	28	4	3B	93	12	105	9	3A				WE	3B	SEE2P
73	SP57302140	CER	SW	1	62	62	2	3A	118	13	115	19	2				WE	3A	IMP90
74	SP57402140	CER	W	1	25	25	4	3B		0		0					WE	3B	SEE2P
75	SP57302130	CER	SW	1	28	28	4	3B		0		0					WE	3B	SEE2P
76	SP57142160	PGR	SE	1	55	55	2	2	114	8	109	13	2				WE	2	SEE2P
77	SP57242142	CER			32		2	3A	103	2	103	7	3A				WE	3A	IMP80
1P	SP57002210	PLO					1	2	63	-42	66	30	3B				DR	3B	PITT060CM
2P	SP57202170	STB			26	26	4	3B	84	21	93	3	3B				WE	3B	AT AB 63
3P	SP57002190	OSR	E	1			1	2	59	-47	63	33	3B				DR	3B	PITT065CM
4P	SP56402250	OSR					1	2	72	33	78	18	3B				DR	3B	PITT062CM

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	0-27	HCL	10YR43						8	4	HR	10						Y	
	27 35	HCL	10YR44						0	0		0		M				Y	IMP LMST
2	0-27	HCL	10YR42						0	0	HR	3						Y	
	27 75	HCL	10YR54						0	0	HR	3		M				Y	IMP LMST
3	0-25	HCL	10YR43						0	0	HR	5							
	25-40	HCL	10YR54						0	0	HR	5		M					IMP LMST
4	0-35	HCL	10YR43						0	0	HR	4							
	35-40	HCL	10YR44						0	0		0		M				Y	IMP LMST
5	0 25	HCL	10YR43						4	0	HR	6							IMP LMST
6	0 25	HCL	10YR43						12	5	HR	25						Y	
	25-28	HCL	10YR54						0	0	HR	25		M				Y	IMP LMST
7	0 27	HCL	10YR43						16	6	HR	26						Y	
	27-45	HCL	10YR44						0	0	HR	10		M				Y	IMP LMST
8	0 25	HCL	10YR43						5	3	HR	8							IMP LMST
9	0 22	HCL	10YR43						6	2	HR	8							
	22 38	HCL	10YR44						0	0	HR	1		M				Y	IMP LMST
10	0 23	HCL	10YR43						0	1	HR	5						Y	
	23-45	HCL	10YR54						0	0	HR	10		M				Y	IMP LMST
11	0-27	HCL	10YR43						8	3	HR	10						Y	
	27 37	HCL	10YR54						0	0	HR	10		M				Y	IMP LMST
12	0 25	HCL	10YR43						8	3	HR	12						Y	IMP LMST
13	0 27	HCL	10YR43						8	2	HR	10						Y	
	27 35	HCL	10YR44						0	0	HR	8		M				Y	IMP LMST
14	0-25	HCL	10YR43						11	4	HR	16						Y	IMP LMST
15	0-28	HCL	10YR43						8	2	HR	14						Y	IMP LMST
16	0 25	HCL	10YR43						8	4	HR	10						Y	IMP LMST
17	0 22	HCL	10YR43						4	0	HR	6							IMP LMST
18	0 26	HCL	10YR43						6	3	HR	8							
	26 49	HCL	75YR44						0	0		0		M				Y	IMP LMST
19	0 27	HCL	10YR43						0	0	HR	6							
	27 30	HCL	10YR44						0	0		0		M				Y	IMP LMST

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	
20	0-28	MZCL	10YR43						10	5	HR	15						Y	IMP LMST
21	0-25	HCL	10HR43						8	3	HR	12						Y	IMP LMST
22	0 27	MZCL	10YR44						4	0	HR	8						Y	IMP LMST
23	0 26	MCL	10YR44						1	0	HR	5						Y	
	26 50	C	10YR5456						0	0	HR	5		M				Y	IMP LMST
24	0-25	MCL	10YR44						8	0	HR	11						Y	
	25-30	HZCL	10YR46						0	0	HR	15		M				Y	IMP LMST
25	0 25	MCL	10YR5444						11	0	HR	15						Y	IMP LMST
26	0 28	HCL	10YR43						3	1	HR	6						Y	IMP LMST
27	0-21	HCL	10YR43						4	0	HR	6							
	21 25	HCL	10YR44						0	0		0		M				Y	IMP LMST
28	0-25	HCL	10YR43						5	1	HR	6							
	25-40	HCL	10YR44						0	0	HR	5		M					IMP LMST
30	0 25	HCL	10YR43						6	2	HR	8						Y	IMP LMST
31	0-25	HCL	10YR43						8	4	HR	13						Y	
	25-42	HCL	10YR44						0	0	HR	10		M				Y	IMP LMST
32	0 25	HCL	10YR43						8	3	HR	12						Y	IMP LMST
33	0 30	HZCL	10YR5444						2	0	HR	5						Y	IMP LMST
34	0-28	MCL	10YR5444						1	0	HR	3						Y	
	28-58	HCL	10YR54						0	0		0		M				Y	
	58-70	HCL	25Y66						0	0	HR	10		M				Y	IMP LMST
35	0 23	HCL	10YR43						10	4	HR	15						Y	
	23 30	HCL	25Y56						0	0	HR	30		M				Y	IMP LMST
36	0 29	HCL	10YR43						0	0	HR	4							
	29 50	HCL	10YR4446						0	0	HR	2		M					IMP LMST
37	0 25	MCL	10YR43						5	2	HR	8						Y	
	25-30	HCL	10YR54						0	0	SLST	30		M				Y	IMP LMST
38	0 27	HCL	10YR43						6	2	HR	8							
	27 30	HCL	10YR4446						0	0	HR	2		M					IMP LMST
39	0 25	HCL	10YR43						10	5	HR	15						Y	IMP LMST

SAMPLE	DEPTH	TEXTURE	COLOUR	-MOTTLES COL	ABUN	CONT	PED COL	GLEY	STONES 2	6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
40	0 25	HCL	10YR43						0	0	HR	8						Y	
	25-40	C	10YR56						0	0	HR	25		M				Y	IMP LMST
41	0-29	HZCL	10YR5444						3	0	HR	7						Y	IMP LMST
42	0-27	MCL	10YR5444						1	0	HR	3						Y	
	27 30	HCL	10YR54						0	0		0		M				Y	IMP LMST
43	0-25	MCL	10YR42						5	0	HR	5						Y	
	25-30	MCL	10YR54						0	0	HR	20		M				Y	IMP LMST
44	0 25	MCL	10YR43						8	2	HR	8						Y	
	25-30	HCL	10YR54						0	0	HR	20		M				Y	IMP LMST
45	0 30	HCL	10YR43						7	2	HR	7							IMP LMST
46	0 27	HCL	10YR43						0	0	HR	8							IMP LMST
47	0-25	MCL	10YR43						0	0	HR	4							
	25-42	C	10YR56						0	0	SLST	6		M					IMP LMST
48	0-29	HZCL	10YR5456						0	0	HR	2							
	29-42	C	75YR5456						0	0	HR	10		M				Y	IMP LMST
49	0 23	MCL	10YR43						0	0		0							
	23-43	HCL	10YR54						0	0	HR	4		M					IMP LMST
50	0 23	MCL	10YR43						0	0		0							
	23-35	HCL	10YR54						0	0	HR	5		M				Y	IMP LMST
51	0 25	HCL	10YR43						0	0	HR	8						Y	
	25-35	HCL	10YR54						0	0	SLST	20		M				Y	IMP LMST
52	0 25	MCL	10YR43						0	0	HR	4							
	25-35	C	10YR56						0	0		0		M					IMP LMST
53	0 25	HZCL	25Y54						0	0	HR	1							
	25-60	C	25Y51	10YR68	M	D		Y	0	0		0		P		Y			
54	0 23	MZCL	10YR43						2	0	HR	2						Y	
	23-30	HZCL	10YR54						0	0	HR	30		M				Y	IMP LMST
55	0 28	C	25Y54						0	0		0							
	28-38	C	25Y51	10YR68	M	D		Y	0	0		0		P		Y	Y		PLASTIC
	38-58	C	10YR66	10YR68	M	D		S	0	0	HR	20		P		Y	Y		FIRM
56	0-27	C	25Y54						0	0		0							
	27-40	C	10YR5456						0	0		0		M					
	40-65	C	25Y63	10YR58	C	D		Y	0	0		0		P		Y			PLASTIC
	65-85	C	25Y51	10YR68	M	D		Y	0	0		0		P		Y			PLASTIC

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	ABUN	CONT	PED COL	GLEY	STONES 2	6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
57	0 23	HCL	10YR42						0	0		0							
	23-55	C	10YR42						0	0		0						Y	IMP LMST
58	0 27	C	25Y54						0	0		0							
	27-60	C	25Y53	10YR68	M	D		Y	0	0		0		P		Y			PLASTIC
59	0-27	HCL	25Y53						0	0		0						Y	
	27-40	C	25Y66	10YR58	C	D		S	0	0	HR	20		M				Y	IMP LMST
60	0-27	C	25Y44						0	0	HR	2							
	27 38	C	25Y54						0	0		0		M					
	38-55	C	25Y66	10YR58	M	F		S	0	0	HR	15		M				Y	IMP LMST
61	0-23	HCL	10YR42						0	0		0							
	23-65	C	25Y53	10YR58	C	F		Y	0	0		0		P		Y			
62	0-34	C	10YR52	10YR46	C	F		Y	0	0		0							
	34-60	C	25Y61	10YR68	M	D		Y	0	0		0		P		Y			PLASTIC
63	0-27	C	25Y52	10YR58	C	F		Y	0	0		0							
	27 38	C	25Y5363	10YR58	M	D		Y	0	0	HR	10		P		Y	Y		PLASTIC
	38-70	C	25Y61	10YR68	C	D		Y	0	0		0		P		Y			PLASTIC
64	0 27	C	10YR51	10YR46	M	D		Y	0	0		0							
	27 60	C	25Y61	10YR68	M	D		Y	0	0		0		P		Y			PLASTIC
	60 75	C	25Y51	10YR68	C	D		Y	0	0		0		P		Y			PLASTIC
65	0 35	HCL	10YR43						0	0		0							
	35-59	C	10YR54						0	0		0		M					FIRM
	59-80	C	25Y63	10YR58	M	D		Y	0	0		0		P		Y			PLASTIC
66	0 30	C	10YR52						2	0	HR	2							
	30-40	C	25Y63	10YR58	M	F		Y	0	0	HR	10		P		Y	Y		PLASTIC
	40 70	C	25Y51	10YR68	M	D		Y	0	0		0		P		Y			PLASTIC
67	0-36	C	10YR42	10YR46	C	D		Y	0	0		0							
	36 70	C	25Y61	10YR68	M	D		Y	0	0		0		P		Y			PLASTIC
68	0-29	HZCL	10YR43						0	0		0							
	29-55	C	10YR54						0	0		0		M					
	55-90	C	25Y63	10YR58	C	D		Y	0	0		0		P		Y			PLASTIC
	90-120	C	75YR63	10YR58	M	D		Y	0	0		0		P		Y			PLASTIC
69	0 34	MZCL	10YR43						0	0		0							
	34-45	C	10YR54						0	0		0		M					
	45-68	C	25Y63	10YR58	M	D		Y	0	0	HR	10		P		Y	Y		
	68-85	C	25Y64	10YR58	C	D		Y	0	0	HR	20		P		Y	Y		IMP LMST

SAMPLE	DEPTH	TEXTURE	COLOUR	-MOTTLES- COL	ABUN	CONT	PED COL	GLEY	STONES 2	6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
70	0 30	HCL	10YR43						5	1	HR	8						Y	
	30-45	HCL	10YR54						0	0	HR	30		M				Y	IMP LMST
71	0-25	HCL	10YR43						3	1	HR	5							
	25-55	C	10YR54						0	0	HR	5		M				Y	
	55-80	C	10YR52	10YR58	M	D		Y	0	0		0		P		Y		Y	
72	0 28	HCL	10YR42						1	0	HR	1							
	28-70	C	10YR53	10YR58	M	F		Y	0	0		0		P		Y			
73	0 28	HCL	10YR42						0	0		0							
	28-62	C	25Y54						0	0		0							
	62 90	SC	25Y6264	10YR56	C	F		Y	0	0		0		P		Y			
74	0-25	HCL	10YR42						0	0		0							
	25-50	C	25Y52	10YR56	M	F		Y	0	0		0		P		Y			
75	0-28	HCL	10YR42						0	0		0							
	28-55	C	25Y62	10YR56	C	F		Y	0	0		0		P		Y			
	55-60	HCL	25Y66					Y	0	0	HR	20						Y	DISTURBED
76	0-23	MZCL	10YR32						0	0		0							
	23-55	C	10YR54						0	0		0						Y	
	55-70	SC	25Y62	10YR56	M	F		Y	0	0	HR	30		P		Y		Y	WET
	70 90	C	25Y62	10YR58	C	D		Y	0	0		0		P		Y		Y	
77	0 32	HCL	10YR42						0	0	HR	2							
	32-80	SCL	25Y6466	10YR58	C	F		Y	0	0	HR	20		M		N		Y	PROB NOT SPL
1P	0-26	HCL	10YR43						6	3	HR	10						Y	PSD
	26 60	HCL	75YR56						0	0	HR	60		M				Y	
2P	0 26	C	25Y5354						0	0		0							PSD
	26 36	C	25Y51	10YR58	M	D		Y	0	0	HR	5	MDCAB	FM	P	Y		Y	
	36 65	C	05Y51	10YR68	M	D		Y	0	0	HR	5	MDCAB	FM	P	Y		Y	
3P	0 25	HCL	10YR44						7	0	HR	21						Y	
	25-35	HCL	75YR5444						0	0	HR	61		M				Y	
	35-65	MZCL	25Y6668	75YR58	C	D		S	0	0	HR	63		M				Y	
4P	0 22	HCL	10YR44						7	1	HR	17						Y	
	22 55	HCL	75YR5444						0	0	HR	32	MDCSAB	FR	M	N		Y	
	55-62	MZCL	25Y68	10YR58	C	F		S	0	0	HR	40		M				Y	