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Vicarage Farm, Kirtlington
Oxfordshire
Agricultural Land Classification
ALC Map And Report
September 1993

VICARAGE FARM GOLF COURSE, KIRTLINGTON, OXFORDSHIRE

AGRICULTURAL LAND CLASSIFICATION REPORT

1 Summary

- 1 1 In April 1993 a detailed Agricultural Land Classification (ALC) survey was made on approximately 71 hectares of land at Kirtlington in Oxfordshire
- 1 2 The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS in response to a commission by MAFF's Land Use Planning Unit to provide information on the quality of agricultural land affected by proposals for a golf course development
- 1 3 The classification has been made using 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 long term limitations on its use for agriculture
- 1 4 The fieldwork was carried out with an observation density of approximately one per hectare A total of 69 borings and 3 soil pits were examined
- 1 5 The land encountered at this site was of very good (Grade 2) to moderate (Subgrade 3b) quality The land of very good quality located to the east of the site is limited by soil wetness caused by surface water gleying above a deep slowly permeable clay layer

The land of good quality (Subgrade 3a) to the centre of the site is graded as such because it again is affected by soil wetness caused by a slowly permeable layer as above but at moderate depth This subgrade is also appropriate in the area to the extreme west of the site for two reasons

- i) Close to the canal soils were assigned to Wetness Class III (see Appendix II) on the basis of high groundwater At the time of survey the water table was encountered at about 50 cm and it is likely to be at this depth for at least 6 months (180 days) in most years
- ii) Land rising to the east of the canal became impenetrable due to limestone at moderate depths restricting the amount of water available for crop growth thereby causing a soil droughtiness problem

Land of moderate quality (Subgrade 3b) covers the majority of the site and is mapped for one or two reasons

- i) To the east of the site heavy topsoil textures lie over shallow slowly permeable clay layers resulting in a soil wetness and workability limitation

- ii) To the west of the site soil lies over weathered limestone at relatively shallow depth restricting water availability to crops creating a soil droughtiness limitation such that Subgrade 3b is appropriate

Table 1 Distribution of Grades and Subgrades

<u>Grade</u>	<u>Area (ha)</u>	<u>% of Site</u>	<u>% of Agricultural Area</u>
2	4.8	6.7	7.2
3a	12.3	17.2	18.4
3b	49.6	69.5	74.4
Non Agricultural	2.7	3.8	100 (66.7 ha)
Woodland	0.3	0.4	
Urban	1.4	2.0	
Agricultural Buildings	0.3	0.4	
Total Area of Site	71.4 ha	100	

- 1.6 The distribution of the ALC grades is shown on the attached map. The information is presented at a scale of 1:5,000. It is accurate at this level but any enlargement would be misleading. This map supersedes any previous ALC information for this site.
- 1.7 At the time of survey the agricultural area of the site was set aside apart from a small area being grazed by horses.
- 1.8 A general description of the grades and subgrades is provided as an appendix. 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.
- 2 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 the 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 5 km 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.

Table 2 . Climatic Interpolation

Grid Reference	SP 485192	SP 492192	SP 495197
Altitude (m AOD)	70	90	100
Accumulated Temperature (days Jan June)	1428	1405	1394
Average Annual Rainfall (mm)	644	651	653
Field Capacity (days)	142	143	143
Moisture Deficit Wheat (mm)	107	105	104
Moisture Deficit Potatoes (mm)	100	96	94
Overall Climatic Grade	1	1	1

3 Relief

3 1 Land within this survey area lies between 70 and 100 m AOD occurring in 3 distinct sections In the west close to the canal is the lowest land part of the River Cherwell floodplain This then rises steeply to a plateau area on which the Vicarage Farm buildings are situated The land then steadily rises eastwards to the eastern site boundary

4 Geology and Soil

4 1 The published geological sheets (British Geological Survey Sheet 218 (1968) Chipping Norton and Sheet 236 (1982) Witney) show the underlying geology to be a combination of recent alluvium deposits on the floodplain Jurassic white limestone on the steeper slopes and Jurassic Forest Marble and Cornbrash on the plateau (weathered limestone deposits) passing to Jurassic Oxford Clay on the gentle slopes in the east of the site

4 2 The main soil types that occur on the site from Soils of South East England (Sheet 6 SSEW 1983) are from the west

- i) Fladbury 1 Association, covering the area on the floodplain within the site The soils here are described as deep clay alluvial soils which are prominently mottled The field examination did not agree with this description The soils here being variably sandy and unmottled
- ii) Over the majority of the site soils of the Aberford Association are mapped (SSEW 1983) and described as a well drained fine loamy soil over limestone On detailed field examination over a large proportion of this area this was found to be broadly true
- iii) Towards the south east of the site on slight slopes soils of the Denchworth Association are mapped (SSEW 1983) and described as slowly permeable clayey or fine loamy over clayey soil Detailed field examination confirmed the presence of this general soil type

5 **Agricultural Land Classification**

5 1 Table 1 (para 1 5) provides the details of the area measurement 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 is shown on the attached sample point map

5 3 Grade 2

Land of this quality is mapped as a single block to the east of the site on the land of highest altitude Soils here are typical of those found in pit 2 (see Appendix III) where soil wetness is the main limitation This is evidenced by gleying in the sandy clay loam upper subsoil from around 35 cm which overlies a deep slowly permeable clay layer such that Wetness Class II is appropriate This degree of wetness together with the topsoil encountered and the climatic regime of the area gives rise to Grade 2 land with a slight wetness limitation

5 4 Subgrade 3a

Land of this quality is mapped in two sections The largest towards the west of the site close to the canal The smaller towards the centre and east of the site

The larger area was found to have variable soils which were limited by wetness primarily by a locally high water table caused by the canal's proximity At the time of survey (April) the water table was at c 50 cm suggesting that it remains within 70 cm for at least 180 days in most years (see Appendix II) It was difficult to assess for how long each year the water table was within 40 cm (see Appendix II) Wetness Class III and consequently Subgrade 3a was considered to be the appropriate classification for these soils

The smaller area towards the east of the site is also limited by wetness In this case however the evidence is in the form of gleying at a shallow depth and occasionally a slowly permeable layer at moderate depth Where gleying alone occurs the topsoil texture is such that a classification of Subgrade 3a is appropriate as a result of a slight workability restriction

5 5 Subgrade 3b

Land of this quality covers the majority of the agricultural area of the site Pit 3 (see Appendix III) is typical of the soils found towards the east of the site where soil wetness is the principal limitation Profiles here typically comprise a heavy clay loam topsoil overlying a gleyed and slowly permeable poorly structured clay subsoil This both adversely affects seed germination and survival and the development of a good root system Soil wetness also inhibits the number of days when trafficking and cultivation may occur

The remaining area mapped as Subgrade 3B towards the west of the site is limited by droughtiness Pit 1 (see Appendix III) is typical of the soils found in this area Profiles typically comprise a shallow calcareous heavy clay loam topsoil over an impenetrable (to augers) stony clay layer Pit 1 confirms the stoniness and how it affects plant growth by both limiting available water in the profile and reducing rooting depth of plants due to the interlocking platy nature of the limestone These factors in combination with the local climatic regime lead to a classification of Subgrade 3b

- 5 6 The areas marked as Urban include partially metalled tracks leading across the site both to and alongside the canal some disused agricultural buildings and an occupied house
- 5 7 The areas marked as non agricultural include an unmetalled track to the east of the site the garden and associated areas of an occupied house two small areas of scrub at either end of the metalled track, an area of scrub behind the disused agricultural buildings and an area of scrub and woodland bordering the canal

ADAS Reference 3301/59/93
MAFF Reference EL 33/00290

Resource Planning Team
Guildford Statutory Group
ADAS Reading

Sources of Reference

- * British Geological Survey (1968) Sheet No 218 Chipping Norton 1 63360
- * British Geological Survey (1982) Sheet No 236 Witney 1 50000
- * 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 (1984) Sheet No 6 Soils of South East England 1 250000
- * Soil Survey of England and Wales (1984) Soils and their use in South East England Bulletin No 15

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.

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.

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

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 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 database. This has commonly used notations and abbreviations 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 Mize OSR Oilseed rape
BEN Field Beans BRA Brassica 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 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 Stomess

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 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 subdivided 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 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 dolomitic 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 granular 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 soil horizon has less than 0.5% biopores >0.5 mm a Y will appear in this column

11 **IMP** If the profile is impervious a Y will appear in this column at the appropriate horizon

12 **SPL** Slowly permeable layer If the soil horizon is slowly permeable Y will appear in this column

13 **CALC** If the soil horizon is calcareous Y will appear in this column

14 Other notations

APW available water capacity (in mm) determined for wheat

APP available water capacity (in mm) determined for potatoes

MBW moisture balance wheat

MBP moisture balance potatoes

SOIL PIT DESCRIPTION

Site Name KIRTLINGTON GC OXON Pit Number 1P
 Grid Reference SP48951912 Average Annual Rainfall 648 mm
 Accumulated Temperature 1417 degree days
 Field Capacity Level 143 days
 Land Use
 Slope and Aspect 01 degrees SW

HORIZON	TEXTURE	COLOUR	STONES	2	TOT STONE	MOTTLES	STRUCTURE
0 20	HCL	10YR43 00	0		10		
20 43	C	75YR46 00	15		40		
43 70	C	25Y 63 66	40		60	F	

Wetness Grade 2 Wetness Class I
 Gleying 000 cm
 SPL No SPL

Drought Grade 3B APW 68 mm MBW 38 mm
 APP 75 mm MBP 23 mm

FINAL ALC GRADE 3B
 MAIN LIMITATION Droughtiness

SOIL PIT DESCRIPTION

Site Name KIRTLINGTON GC OXON Pit Number 2P
 Grid Reference SP49501950 Average Annual Rainfall 648 mm
 Accumulated Temperature 1417 degree days
 Field Capacity Level 143 days
 Land Use
 Slope and Aspect 02 degrees W

HORIZON	TEXTURE	COLOUR	STONES	2	TOT STONE	MOTTLES	STRUCTURE
0 32	SCL	10YR42 43	0		2		
32 35	SCL	10YR54 00	0		2		MDCSAB
35 55	SCL	10YR53 52	0		2	C	MDCSAB
55 80	SCL	10YR53 00	0		5	C	MDCSAB
80 98	MSL	10YR53 00	0		15	C	MDCSAB
98 120	C	25Y 70 00	0		0	M	

Wetness Grade 2 Wetness Class II
 Gleying 035 cm
 SPL 098 cm

Drought Grade 1 APW 153mm MBW 47 mm
 APP 118mm MBP 20 mm

FINAL ALC GRADE 2
 MAIN LIMITATION Wetness

SOIL PIT DESCRIPTION

Site Name KIRTLINGTON GC OXON Pit Number 3P

Grid Reference SP49401920
 Average Annual Rainfall 648 mm
 Accumulated Temperature 1417 degree days
 Field Capacity Level 143 days
 Land Use
 Slope and Aspect 02 degrees SW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	MOTTLES	STRUCTURE
0 26	HCL	10YR42 00	0	5		
26 60	C	05Y 71 00	0	0	M	WKVCAB

Wetness Grade 3B
 Wetness Class IV
 Gleying 026 cm
 SPL 026 cm

Drought Grade 3B
 APW 83 mm MBW 23 mm
 APP 89 mm MBP 9 mm

FINAL ALC GRADE 3B
 MAIN LIMITATION Wetness

SAMPLE NO	GRID REF	ASPECT USE	WETNESS		WHEAT		POTS		M REL		EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	
1	SP49501980	SAS N	01	038 038	4	3B	130	24 107	9	2				WE 3B	SPL 38
1P	SP48951912	SAS SW	01	000	1	2	68	38 75	23	3B				DR 3B	IMP 70
2	SP49301970	SAS W	02	022 030	4	3B	105	1 96	2	3A				WE 3B	SPL 30
2P	SP49501950	SAS W	02	035 098	2	2	153	47 118	20	1				WE 2	GLEYS 35
3	SP49401970	SAS W	01	000	1	2	65	41 65	33	3B				DR 3B	IMP 40 SEE 1P
3P	SP49401920	SAS SW	02	026 026	4	3B	83	23 89	9	3B				WE 3B	SPL 26
4	SP49501970	SAS NW	01	040 040	3	3B	142	36 105	7	2				WE 3B	SPL 40
5	SP49201960	SAS SW	04	033 033	4	3B	114	8 105	7	2				WE 3B	SPL 33
6	SP49301960	SAS S	03	000	1	2	60	46 60	38	3B				DR 3B	IMP 38 SEE 1P
7	SP49401960	SAS S	03	000	1	2	67	39 67	31	3B				DR 3B	IMP 40 SEE 1P
8	SP49501960	SAS W	05	095 095	1	2	146	40 110	12	1				WK 2	SPL 95 WK WORK
9	SP49301950	SAS W	02	033 033	4	3B	114	8 105	7	2				WE 3B	SPL 33
10	SP49401950	SAS S	03	000	1	1	64	42 64	34	3B				DR 3B	IMP 40 SEE 1P
11	SP49501950	SAS W	04	075 115	1	2	153	47 112	14	1				WE 2	SPL 115
12	SP49301940	SAS N	01	024 060	3	3B	122	16 112	14	2				WE 3B	SPL 60
13	SP49401940	SAS N	03	070 070	2	2	122	16 99	1	2				WE 2	WEDR
14	SP49501940	SAS N	02	000	1	1	135	29 107	9	2				DR 2	SANDY
16	SP48701930	SAS N	06	000	1	1	89	17 94	4	3A				DR 3A	IMP 60 SEE 1P
17	SP49101930	SAS SW	01	000	1	2	36	70 36	62	4				DR 4	IMP 23 SEE 1P
18	SP49201930	SAS W	01	055 055	2	3A	136	30 114	16	1				WE 3A	SPL 55
19	SP49301930	SAS SW	04	025	2	3A	151	45 106	8	2				WE 3A	
20	SP49401930	SAS S	01	000	1	1	154	48 109	11	1				1	
21	SP49501930	SAS S	01	000	1	2	147	41 108	10	1				WK 2	WET 70 WK WORK
22	SP49601930	SAS S	02	028 050	3	3B	99	7 111	13	3A				WE 3B	SPL 50
23	SP48501920	SAS W	04	000	3	3A	89	17 97	1	3A				WE 3A	IMP 60
24	SP48601920	SAS W	02	000	1	1	38	68 38	60	4				DR 4	IMP 22 SEE 1P
25	SP48701920	SAS N	01	000	1	2	45	61 45	53	4				DR 4	IMP 29 SEE 1P
26	SP48801920	SAS N	01	000	1	2	48	58 48	50	4				DR 4	IMP 28 SEE 1P
27	SP48901920	SAS N	01	000	1	2	41	65 41	57	4				DR 4	IMP 24 SEE 1P
28	SP49001920	SAS W	01	000	1	2	57	49 57	41	3B				DR 3B	IMP 42 SEE 1P
29	SP49101920	SAS W	01	000	1	2	36	70 36	62	4				DR 4	IMP 22 SEE 1P
30	SP49201920	SAS NW	01	000	1	2	55	51 55	43	4				DR 4	IMP 33 SEE 1P
31	SP49301920	SAS SW	03	073 073	2	3A	135	29 116	18	2				WE 3A	SPL 73
32	SP49401920	SAS SW	05	025 025	4	3B	82	24 88	10	3B				WE 3B	SPL 25
33	SP49501920	SAS SE	03	010 010	4	3B	77	29 83	15	3B				WE 3B	SPL 10
34	SP49601920	SAS SE	03	039 055	3	3A	137	31 107	9	2				WE 3A	SPL 55
35	SP48501910	SAS		000	3	3A	158	52 113	15	1				WE 3A	HIGH WAT TBL
36	SP48601910	SAS W	01	000	3	3A	105	1 108	10	3A				WE 3A	HIGH WAT TBL
37	SP48701910	SAS W	08	000	1	2	85	21 96	2	3B				SL 3B	SL SLOPE
38	SP48801910	SAS W	01	000	1	2	36	70 36	62	4				DR 4	IMP 22 SEE 1P
39	SP48901910	SAS		000	1	2	45	61 45	53	4				DR 4	IMP 26 SEE 1P
41	SP49101910	PGR		000	1	2	85	21 94	4	3B				DR 3B	IMP 65 SEE 1P

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
42	SP49201910	PGR		000	1	2	50	56	50	48	4			DR	4	IMP 30 SEE 1P
43	SP49301910	SAS SW	03	090 090	1	2	143	37	112	14	1			WK	2	SPL 90 WK WO
44	SP49401910	SAS SW	05	000 028	4	3B	86	20	92	6	3A			WE	3B	SPL 28
45	SP49501910	SAS S	05	010 010	4	3B	77	29	83	15	3B			WE	3B	SPL 10
46	SP48501900	SAS		000	3	3A	157	51	110	12	1			WE	3A	HIGH WAT TBL
47	SP48601900	SAS W	01	000	3	3B	145	39	117	19	1			WE	3A	HIGH WAT TBL
48	SP48701900	SAS SW	05	000	1	2	100	6	110	12	3A			DR	3A	IMP 70 LIMESTN
49	SP48801900	SAS SW	03	000	1	2	79	27	79	19	3B			DR	3B	IMP 50 SEE 1
50	SP48901900	SAS SE	01	000	1	2	44	62	44	54	4			DR	4	IMP 26 SEE 1
51	SP49001900	SAS SE	01	000	1	3A	58	48	58	40	3B			DR	3B	IMP 37 SEE 1P
52	SP49101900	SAS SE	02	000	1	2	64	42	64	34	3B			DR	3B	IMP 38 SEE 1
53	SP49201900	SAS SE	02	000	1	2	76	30	76	22	3B			DR	3B	IMP 45 SEE 1P
54	SP49301900	SAS SW	02	000	1	2	83	23	83	15	3B			DR	3B	IMP 48 SEE 1P
55	SP49401900	SAS SW	04	000 028	4	3B	86	20	92	6	3A			WE	3B	SPL 28
56	SP48601890	SAS		000	3	3A	151	45	111	13	1			WE	3A	HIGH WAT TBL
57	SP48701890	SAS SW	02	000	3	3A	115	9	116	18	2			WE	3A	IMP 85 LIMES
58	SP48801890	SAS S	02	000	1	2	50	56	50	48	4			DR	4	IMP 30 SEE 1
59	SP49001890	SAS SE	01	000	1	2	50	56	50	48	4			DR	4	IMP 30 SEE 1P
60	SP49101890	SAS SE	02	000	1	2	50	56	50	48	4			DR	4	IMP 30 SEE 1P
61	SP49201890	SAS SE	01	000	1	2	88	18	92	6	3A			DR	3A	IMP 55 LIMES
62	SP49301890	SAS SE	01	000	1	2	46	60	46	52	4			DR	4	IMP 30 SEE 1P
63	SP48901880	SAS S	02	000	1	2	50	56	50	48	4			DR	4	IMP 30 SEE 1
64	SP49001880	SAS SE	01	035 050	4	3B	96	10	108	10	3A			WE	3B	SPL 50
65	SP49101880	SAS SE	02	000	1	2	44	62	44	54	4			DR	4	IMP 28 SEE 1P
66	SP49201880	SAS SE	02	000	1	2	41	65	41	57	4			DR	4	IMP 25 SEE 1
67	SP49301880	SAS SE	02	000	1	2	58	48	58	40	3B			DR	3B	IMP 35 SEE 1P
68	SP49001870	SAS SE	01	000	1	2	42	64	42	56	4			DR	4	IMP 26 SEE 1P
69	SP49101870	SAS SE	02	035 035	4	3B	86	20	92	6	3A			WE	3B	SPL 35
70	SP49201870	SAS SE	02	000	1	2	44	62	44	54	4			DR	4	IMP 28 SEE 1
71	SP49101860	SAS SE	03	035 035	4	3B	105	1	112	14	3A			WE	3A	SPL 35

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES			PED		STONES			STRUCT/	SUBS				
				COL	ABUN	CONT	COL	GLEYS	2	6	LITH	TOT	CONSIST	STR	POR	IMP	SPL
1	0 23	hc1	10YR42 00						0	0	0						
	23 38	c	10YR54 00	10YR52 56	F				0	0	0		M				
	38 120	c	25Y 62 61	10YR66 00	M		00MN00 00	Y	0	0	0		P			Y	
1P	0 20	hc1	10YR43 00						0	0	HR	10					Y
	20 43	c	75YR46 00						15	10	HR	40		M			Y
	43 70	c	25Y 63 66	75YR58 00	F				40	0	HR	60		M			Y
2	0 22	c	10YR42 00						0	0	HR	2					Y
	22 30	c	25Y 64 66	10YR66 00	F			Y	0	0	HR	2		M			Y
	30 100	c	05Y 61 00	10YR66 00	M			Y	0	0	HR	10		P		Y	Y
2P	0 32	sc1	10YR42 43						0	0	HR	2					
	32 35	c1	10YR54 00						0	0	HR	2	MDCSAB	VF	G		
	35 55	sc1	10YR53 52	10YR56 00	C			Y	0	0	HR	2	MDCSAB	VF	G		
	55 80	sc1	10YR53 00	10YR56 00	C			Y	0	0	HR	5	MDCSAB	FR	M		
	80 98	ms1	10YR53 00	10YR56 00	C		00FE00 00	Y	0	0	HR	15	WKCSAB	FR	G		
	98 120	c	25Y 70 00	10YR56 66	M			Y	0	0		0		P		Y	
3	0 23	hc1	25Y 44 00						0	0	HR	2					
	23 40	c	10YR56 00						0	0	HR	10		M			Y
3P	0 26	hc1	10YR42 00						0	0	HR	5					
	26 60	c	05Y 71 00	10YR66 00	M		05Y 61 00	Y	0	0		0	WKVCAB	VM	P	Y	Y
4	0 23	hc1	10YR43 00						0	0		0					
	23 40	sc1	10YR46 56						0	0	HR	2		M			
	40 85	sc	05Y 73 00	10YR66 00	M			Y	0	0		0		P		Y	
	85 120	sc1	25Y 72 00	10YR56 66	M			Y	0	0		0		M			
5	0 22	hc1	10YR44 00						0	0	HR	2					Y
	22 33	c	10YR56 00						0	0		0		M			
	33 65	c	05Y 62 00	10YR66 00	C			Y	0	0		0		P		Y	
	65 100	c	05GY51 00	10YR46 00	C			Y	0	0		0		P		Y	
6	0 23	hc1	10YR44 00						0	0	HR	2					Y
	23 38	c	10YR56 00						0	0	HR	20		M			Y
7	0 24	hc1	10YR43 00						0	0	HR	2					
	24 40	c	10YR56 00	00MN00 00	F				0	0	HR	5		M			
8	0 22	hc1	10YR43 00						0	0	HR	2					
	22 55	sc1	75YR56 00						0	0	HR	2		M			
	55 95	ms1	75YR58 00	00MN00 00	C		10YR53 00		0	0	HR	2		M			
	95 120	c	25Y 70 00	10YR56 00	M			Y	0	0		0		P		Y	
9	0 20	hc1	10YR44 00						0	0		0					
	20 33	c	75YR46 00						0	G		0		M			
	33 70	c	75YR56 00	00MN00 00	M		10YR52 53	Y	0	0		0		P		Y	
	70 100	c	05Y 62 00	10YR66 00	C		00MN00 00	Y	0	0		0		P		Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES			PED		STONES			STRUCT/ CONSIST	SUBS				
				COL	ABUN	CONT	COL	GLE	2	6	LITH		TOT	STR	POR	IMP	SPL
10	0 22	mc1	10YR42 00						0	0	HR	2					
	22 38	hc1	75YR56 00						0	0	R	2		M			
11	0 30	hc1	10YR43 00						0	0	HR	2					
	30 75	sc1	10YR56 00	10YR53 00	F		00MN00 00		0	0	HR	2		M			
	75 90	sc1	10YR52 00	10YR56 00	C		00MN00 00	Y	0	0		0		M			
	90 115	ms1	75YR58 00	10YR53 00	C				Y	0	0	0		M			
115 120	c	25Y 70 00	75YR58 00	M				Y	0	0	0		P			Y	
12	0 24	hc1	10YR42 00						0	0		0					
	24 45	c	05G 51 00	75YR46 56	M				Y	0	0	0		M			
	45 60	sc	75YR56 00							0	0	0		M			
	60 100	c	05Y 52 00	75YR56 00	M				Y	0	0	0		P			Y
13	0 20	sc1	10YR42 00						0	0	HR	5					
	20 45	sc1	75YR44 00						0	0	HR	10		M			
	45 70	sc	75YR44 46				00MN00 00		0	0	HR	15		M			
	70 120	c	25Y 63 00	75YR56 00	M		00MN00 00	Y	0	0	HR	10		P			Y
14	0 28	sc1	10YR42 00						0	0	HR	2					
	28 65	ms1	10YR44 00						0	0	HR	5		M			
	65 75	ms1	75YR56 00						0	0	HR	5		M			
	75 85	sc	75YR56 00				00MN00 00		0	0	HR	5		M			
	85 95	sc1	75YR56 00				00MN00 00		0	0	HR	5		M			
	95 120	1ms	75YR58 00						0	0	HR	5		M			
16	0 27	mc1	10YR43 00						0	0	HR	2					Y
	27 58	sc1	75YR56 00						0	C	PR	2		M			Y
	58 60	hr	00ZZ00 00						0	0		0		P			Y
17	0 20	hc1	10YR46 00						0	0	HR	10					Y
	20 23	c	75YR56 00						0	0	HR	20		P			Y
18	0 30	hc1	10YR42 00						0	0		0					
	30 55	c	10YR56 00						0	0		0		M			
	55 120	c	25Y 61 00	75YR56 00	M				Y	0	0	0		P			Y
19	0 25	mc1	10YR42 00						0	0		0					
	25 60	sc	25Y 52 62	10YR56 00	M				Y	0	0	0		P			
	60 70	sc1	25Y 61 00	75YR56 00	M				Y	0	0	0		M			
	70 120	ms1	25Y 61 62	75YR56 00	M				Y	0	0	0		M			
20	0 35	sc1	10YR43 00						0	0	HR	1					
	35 45	sc1	10YR44 00						0	0	HR	2		M			
	45 120	ms1	10YR44 46						0	0	HR	5		M			
21	0 25	sc1	10YR42 00						0	0	HR	1					
	25 120	sc1	10YR56 00						0	0	HR	3		M			

SAMPLE	DEPTH	TEXTURE	COLOUR	-MOTTLES			PED		STONES			STRUCT/ CONSIST	SUBS				
				COL	ABUN	CONT	COL	GLEYS	2	6	LITH		TOT	STR	POR	IMP	SPL
22	0 28	hc1	10YR42 00						0	0	HR	1					
	28 50	c	10YR62 54 75YR56 00 M				00M00 00 Y		0	0		0		M			
	50 70	c	10YR62 00 75YR56 00 M				00M00 00 Y		0	0		0		P			Y
23	0 25	mc1	10YR43 00						0	0	HR	2					Y
	25 50	sc1	75YR56 00						0	0	HR	2		M			Y
	50 60	c	75YR56 00						0	0		0		M			Y
24	0 22	mc1	10YR53 00						0	0	HR	5					Y
25	0 26	hc1	10YR53 63						0	0	HR	5					Y
	26 29	hr	10YR82 00						0	0		0		P			Y
26	0 28	hc1	10YR46 00						0	0	HR	5					Y
27	0 24	hc1	10YR46 00						0	0	HR	5					Y
28	0 22	hc1	10YR43 00						0	0	HR	10					Y
	22 38	c	75YR56 00						0	0	HR	20		M			Y
	38 42	hr	00ZZ00 00						0	0		0		P			Y
29	0 22	hc1	75YR46 56						0	0	HR	10					Y
	22 25	hr	10YR71 00						0	0		0		P			Y
30	0 28	hc1	10YR46 00						0	0	HR	5					Y
	28 33	c	75YR46 56						0	0	HR	20		M			Y
	33 35	hr	10YR71 00						0	0		0		P			Y
31	0 23	hc1	10YR53 00						0	0	HR	1					
	23 28	c	10YR53 00						0	0		0		M			
	28 73	c	10YR56 00				00M00 00		0	0	HR	1		M			
	73 120	c	10YR53 00 75YR56 00 M				00M00 00 Y		0	0	HR	1		P			Y
32	0 25	hc1	10YR42 00						0	0	HR	5					
	25 60	c	25Y 62 00 75YR58 00 M					Y	0	0		0		P			Y
33	0 10	hc1	10YR42 00						0	0	HR	1					
	10 60	c	25Y 62 00 75YR58 00 M					Y	0	0		0		P			Y
34	0 25	sc1	10YR42 00						0	0	HR	1					
	25 39	sc	10YR44 00 75YR58 00 C						0	0		0		M			
	39 55	c1	10YR53 54 75YR56 00 M				00M00 00 Y		0	0		0		M			
	55 120	sc	10YR53 54 75YR56 00 M				00M00 00 Y		0	0		0		P			Y
35	0 28	mc1	10YR43 00						0	0		0					
	28 75	sc1	75YR46 00						0	0		0		M			
	75 120	ms1	75YR46 00						0	0		0		M			

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES			PED		STONES			STRUCT/	SUBS					
				COL	ABUN	CONT	COL	GLE	2	6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
36	0 26	mc1	10YR43 00						0	0	HR	5						Y
	26 62	sc1	75YR46 56						0	0	HR	5		M				Y
	62 78	c	75YR54 56						0	0	HR	5		M				Y
	78 85	c	10YR64 82						0	0	HR	60		P				Y
37	0 23	hc1	10YR54 82						0	0	HR	5						Y
	23 60	c	10YR54 82						0	0	HR	20		M				Y
	60 68	c	10YR82 54						0	0	HR	40		M				Y
38	0 22	hc1	10YR46 00						0	0	HR	10						Y
39	0 26	hc1	10YR46 00						0	0	HR	5						Y
41	0 25	hc1	10YR43 00						0	0	HR	1						
	25 35	c	75YR46 00						0	0	HR	10		M				Y
	35 65	c	25Y 64 00						0	0	HR	30		M				Y
42	0 28	hc1	10YR43 00						0	0	HR	5						
	28 30	c	75YR46 00						0	0	HR	40		M				Y
43	0 28	hc1	10YR42 00						0	0	HR	1						
	28 55	sc1	10YR54 00					00MN00 00	0	0	HR	1		M				
	55 90	sc	10YR54 00	10YR56 00 C				00MN00 00	0	0	HR	1		M				
	90 120	c	10YR42 54	75YR56 00 M				00MN00 00 Y	0	0	HR	1		P			Y	
44	0 28	hc1	10YR42 00	10YR56 00 C					Y	0	0	HR	1					
	28 60	c	25Y 63 00	75YR56 66 M					Y	0	0		0		P			Y
45	0 10	hc1	10YR42 00							0	0	HR	1					
	10 60	c	25Y 62 00	75YR58 00 M					Y	0	0		0		P			Y
46	0 26	ms1	10YR43 00							0	0		0					
	26 50	ms1	75YR54 00							0	0		0		M			
	50 120	ms1	75YR56 00							0	0		0		M			
47	0 26	hc1	10YR43 00							0	0		0					
	26 60	c	75YR46 00							0	0		0		M			
	60 100	c	75YR56 00							0	0		0		M			
	100 120		75YR56 00							0	0		0		M			
48	0 25	hc1	10YR43 00							0	0	HR	2					Y
	25 40	c	10YR43 44							0	0	HR	5		M			Y
	40 55	sc1	75YR44 00							0	0	HR	5		M			Y
	55 70	sc	75YR44 00							0	0	HR	5		M			Y
49	0 26	hc1	10YR44 00							0	0	HR	2					Y
	26 50	c	75YR54 00							0	0	HR	15		M			Y

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES		PED		STONES			STRUCT/	SUBS						
				COL	ABUN	CONT	COL	GLE	2	6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
50	0 25	hc1	10YR44 00						0	0	HR	5						Y
	25 26	c	10YR44 00						0	0	HR	10		M				Y
51	0 28	c	10YR44 00						0	0	HR	5						
	28 37	c	10YR46 00						0	0	HR	10		M				Y
52	0 26	hc1	10YR43 00						0	0	HR	1						
	26 38	sc1	75YR44 00						0	0	HR	2		M				
53	0 28	hc1	10YR43 00						0	0	HR	1						
	28 43	c	75YR44 00						0	0	HR	1		M				
	43 45	c	75YR44 00						0	0	HR	40		M				Y
54	0 25	hc1	10YR42 00						0	0	HR	1						
	25 48	c	75YR54 00				00MN00 00		0	0	HR	1		M				
	48 50	c	75YR54 00						0	0	HR	40		M				
55	0 28	hc1	10YR42 00	10YR56 00 C				Y	0	0	HR	1						
	28 60	c	25Y 62 00	75YR56 00 M			00MN00 00 Y		0	0		0		P				Y
56	0 35	sc1	10YR43 00						0	0	HR	1						
	35 120	1	10YR44 00						0	0	HR	1		M				
57	0 26	hc1	10YR43 00						0	0	HR	1						
	26 65	c	75YR46 00						0	0	HR	1		M				
	65 80	sc	75YR46 00						0	0	HR	2		M				
	80 85	ms1	10YR44 00						0	0	HR	30		M				Y
58	0 28	hc1	10YR44 00						0	0	HR	5						Y
	28 30	sc1	25Y 66 00						0	0	HR	20		M				Y
59	0 28	hc1	10YR44 00						0	0	HR	5						Y
	28 30	c	10YR44 00						0	0	HR	30		M				Y
60	0 25	hc1	10YR43 00						0		HR	5						
	25 30	c	10YR44 00						0	0	HR	10		M				
61	0 25	hc1	10YR43 00						0	0	HR	2						
	25 55	c	75YR44 00						0	0	HR	1		M				
62	0 26	hc1	10YR43 00						0	0	HR	10						
	26 30	c	75YR44 00						0	0	HR	40		M				Y
63	0 28	hc1	10YR44 00						0	0	HR	5						Y
	28 30	c	10YR44 00						0	0	HR	30		M				Y
64	0 28	c	10YR44 00						0	0	HR	1						
	28 35	c	75YR46 00						0	0	HR	1		M				
	35-50		75YR46 00	75YR58 00 C			00MN00 00 Y		0	0	HR	1		M				
	50 68	c	75YR46 00	75YR58 00 C			25Y 62 00 Y		0	0	HR	1		P				Y
	68 70	c	75YR46 00					Y	0	0	HR	30		M				Y

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES			PED		GLEYS	STONES		STRUCT/ CONSIST	SUBS			CALC	
				COL	ABUN	CONT	COL	COL		2	6		LITH	TOT	STR		POR
65	0 25	hc1	10YR43 00						0	0	HR	10					Y
	25 28	c	75YR44 00						0	0	HR	40	M				Y
66	0 25	hc1	10YR43 00						0	0	HR	10					Y
67	0 28	hc1	10YR43 00						0	0	HR	5					Y
	28 35	c	10YR44 00						0	0	HR	15	M				Y
68	0 25	hc1	10YR53 00						0	0	HR	10					Y
	25 26	c	25Y 66 00						0	0	HR	25	M				Y
69	0 25	hc1	10YR53 00						0	0	HR	1					Y
	25 35	c	25Y 66 00	10YR56 00 C			00M00 00		0	0	HR	2	M				Y
	35 60	c	05Y 73 00	75YR58 00 M			00M00 00 Y	Y	0	0	HR	2	P			Y	Y
70	0 25	hc1	10YR43 00						0	0	HR	10					Y
	25 28	c	75YR44 00						0	0	HR	40	M				Y
71	0 28	hc1	10YR43 53						0	0	HR	1					
	28 35	c	25Y 63 64						0	0	HR	5	M				Y
	35-80	c	25Y 64 63	10YR66 00 C				Y	0	0	HR	8	M			Y	Y