A1

LAND AT EYNSHAM
West Oxfordshire Local Plan

Agricultural Land Classification
ALC Map and Report
Semi-detailed survey

October 1998

Resource Planning Team
Eastern Region
FRCA Reading

RPT Job Number: 3305/052/98
MAFF Reference: EL 33/1860

AGRICULTURAL LAND CLASSIFICATION REPORT

LAND AT EYNSHAM
WEST OXFORDSHIRE LOCAL PLAN

SEMI-DETAILED SURVEY

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 196 ha of land on the western fringes of Eynsham in Oxfordshire. The survey was carried out during August 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 West Oxfordshire Local Plan. This survey supersedes any previous ALC information for this land (FRCA reference number 3305/49/84).

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 land use on the site was a mixture of cultivated land, stubble and temporary or permanent grassland. The areas mapped as 'Other land' include playing fields, roads and tracks, farm buildings, a disused railway line and an area of previous workings now restored to water and woodland.

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	70.1	38.8	35.7
3b	110.7	61.2	56.5
Other land	15.3	N/A	7.8
Total surveyed area	180.8	100	92.2
Total site area	196.1	-	100

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

7. The fieldwork was conducted at an average density of 1 boring per 2 hectares of agricultural land. A total of 96 borings and 7 soil pits was described.

8. Soil droughtiness and soil wetness are the key factors affecting land quality on the site. The better quality land (Subgrade 3a) is generally located on the slightly higher areas, where stony, droughty soils have developed from the underlying terrace gravel deposits. Here, the impact of the soil droughtiness limitation will be felt in reduced or less consistent yields and a restriction in the range of crops that would perform well on such land. The poorer land (Subgrade 3b) is generally located in the lower-lying floodplain areas, where heavy soils have developed from the underlying Oxford Clay, with shallow clay subsoils that create a significant soil wetness limitation. This limitation will also affect the levels and consistency of yields but, in addition, will restrict the number of days when the land is in a suitable condition for cultivations, trafficking by machinery or grazing by livestock without risk of damage to soil structure. Some very droughty land in the south is also placed in Subgrade 3b.

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	SP417093	SP412091	SP429090
Altitude	m, AOD	70	80	63
Accumulated Temperature	day°C (Jan-June)	1434	1423	1442
Average Annual Rainfall	mm	673	683	656
Field Capacity Days	days	145	147	142
Moisture Deficit, Wheat	mm	107	105	109
Moisture Deficit, Potatoes	mm	99	97	102
Overall climatic grade	N/A	Grade 1	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 limitation. Local climatic factors such as frost risk or exposure are also not believed to be significant. The site is climatically Grade 1.

Site

14. The topography of the site includes a floodplain and gently sloping land on either side, all in the range 65–85 metres. Nowhere on the site does gradient, microrelief or flooding affect the classification .

Geology and soils

15. The most detailed published geological information for the site (BGS, 1978) shows the lower-lying floodplain areas to comprise mostly Oxford Clay with some alluvium, with the higher land comprising terrace deposits of gravel.

16. The most detailed published soils information for the site (SSEW, 1980 and 1981) shows the Denchworth association over the Oxford Clay (described as "slowly permeable, seasonally waterlogged, clayey soils...") and the Badsey 1 association over the terrace deposits (described as "well-drained, calcareous and non-calcareous fine loamy soils over limestone gravel..."). The detailed fieldwork confirmed that the main soil types follow the pattern of the geology.

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. The areas of Subgrade 3a roughly correspond to the higher ground on the site which is underlain by terrace deposits of gravel. A range of soil characteristics are contained in this subgrade, and three soil pits have been examined to describe the conditions that exist, pits 1P, 5P and 7P. On these stony soils it was not possible to auger to depth, given the very dry conditions that prevailed at the time of the fieldwork. Even two of the pits could not be examined to depth and, therefore, some of the land has been conservatively placed in Subgrade 3a; some localised areas of better land may therefore exist.

20. Pit 1P describes those Subgrade 3a soils at the heavier end of the range. Calcareous heavy clay loam topsoils overlie calcareous clay subsoils to at least 70cm. Subsoils were very hard and dry and contained approximately 24% hard rock, probably increasing in stone content below 70cm (the depth to which the pit was dug). The soils were free-draining (Wetness Class I) and roots were observed to the base of the pit. Given the limited depth to which the soil was described, together with the textures, stone contents and moderate structures, soil droughtiness is the main limitation. Pit 7P describes slightly lighter soils (medium clay loam over heavy clay loam over medium clay loam) with similar stone contents in the upper subsoil

but with stone contents decreasing from approximately 48 cm. This pit was impenetrable at 85cm, possibly with increasing stone contents beneath this depth. Pit 5P describes the sandiest and stoniest of the soils, with an upper subsoil of loamy coarse sand which contains approximately 47% stone. Surprisingly, however, there is a slowly permeable clay lower subsoil which places these soils in Wetness Class II. Droughtiness, however, is still the overriding limitation. These soils were examined to 120cm and fall easily into Subgrade 3a in terms of droughtiness.

21. A droughtiness limitation such as is experienced on this land will manifest itself agriculturally in terms of generally lower and less consistent yields than those on better quality land.

Subgrade 3b

22. The areas of Subgrade 3b roughly correspond with the lower-lying land on the site which is underlain by Oxford Clay or alluvium. Soil wetness is the key limitation on such land, although there is an area in the extreme south-east of the site where very stony soils experience a droughtiness limitation.

23. Three pits (2P, 3P and 4P) have been described on this wet land, all of which exhibit non-calcareous clay or heavy clay loam topsoils overlying clay subsoils. In comparison with the adjacent stonier land, the soils are relatively stone-free (although during fieldwork the presence of only 2% stone was often enough to prevent deep penetration by the auger). There is clear evidence of gleying within 40cm related to the clay subsoils that are slowly permeable. These soils fall into Wetness Class IV and, given the heavy topsoil textures and the prevailing field capacity level (142–147 days), are limited to Subgrade 3b. This degree of soil wetness will restrict the range of crops that can consistently yield well under such conditions, as well as limiting the number of days when the soil is in a suitable condition for cultivations, trafficking by machinery or grazing by livestock.

24. In the south-east of the site a relatively limited area of Subgrade 3b droughtiness exists. Pit 6P is typical of the soils in this area. Medium clay loam topsoils overlie loamy coarse sand subsoils with stone contents in the range 50–66%. The pit was dug to 110cm with roots observed to this depth. A number of additional small 'pits' were also dug in this general area to confirm the extent of these soils (and have been recorded as auger sample points 197–201). The range of crops and the consistency of yields will be more restricted here than on the Subgrade 3a land that also experiences soil droughtiness as the main limiting factor.

Edgar Black
Resource Planning Team
Eastern Region
FRCA Reading

SOURCES OF REFERENCE

British Geological Survey (1978) *Sheet No.236, Witney.*
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 (1980) *Sheet 6, South East England.*
SSEW: Harpenden.

Soil Survey of England and Wales (1981) *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.

APPENDIX II

SOIL DATA

Contents:

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

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

Boring Header Information

1. **GRID REF**: national 100 km grid square and 8 figure grid reference.

2. **USE**: Land use at the time of survey. The following abbreviations are used:

ARA:	Arable	**WHT:**	Wheat	**BAR:**	Barley
CER:	Cereals	**OAT:**	Oats	**MZE:**	Maize
OSR:	Oilseed rape	**BEN:**	Field beans	**BRA:**	Brassicae
POT:	Potatoes	**SBT:**	Sugar beet	**FCD:**	Fodder crops
LIN:	Linseed	**FRT:**	Soft and top fruit	**FLW:**	Fallow
PGR:	Permanent pasture	**LEY:**	Ley grass	**RGR:**	Rough grazing
SCR:	Scrub	**CFW:**	Coniferous woodland	**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	--WETNESS-- GLEY	SPL	CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SP41601010	CER			25	25	4	3B	76	-31	76	-23	3B				WE	3B	IMP50
4	SP41701000	CER			30	30	4	3B	76	-31	76	-23	3B				WE	3B	IMP50
6	SP41901000	CER			25	25	4	3B	79	-28	82	-17	3B				WE	3B	
8	SP41600990	CER			28	28	4	3B	71	-36	71	-28	3B				WE	3B	IMP45
11	SP41900990	CER			25	25	4	3B	81	-26	84	-15	3B				WE	3B	
14	SP41500980	CER	S	2	30		2	3A	67	-40	67	-32	3B				WD	3A	IMPQSPL
16	SP41700980	STB			35	35	4	3B	94	-13	105	6	3A				WE	3B	SEE
20	SP42100980	PGR			28	28	4	3B	81	-26	84	-15	3B				WE	3B	
24	SP41600970	STB	N	1			1	1	61	-46	61	-38	3B				DR	4	I35 HARD/DRY
26	SP41800970	CER			22	22	4	3B	77	-30	80	-19	3B				WE	3B	
27	SP41900970	CER			25	25	4	3B	79	-28	82	-17	3B				WE	3B	
28	SP42000970	PGR	W	2	25	25	4	3B	79	-28	82	-17	3B				WE	3B	
30	SP42200970	CER					1	1	49	-58	49	-50	4				DR	3B	IMPQDR
34	SP41500960	STB			30	30	4	3B	125	18	102	3	2				WE	3B	Q SPL 30-60
36	SP41700960	CER			25	25	4	3B	78	-29	81	-18	3B				WE	3B	
38	SP41900960	CER			28	28	4	3B	85	-22	91	-8	3B				WE	3B	
40	SP42100960	CER					1	2	49	-58	49	-50	4				DR	3B	IMPQDR
42	SP42300960	CER	E	1	58	58	2	3A	100	-7	106	7	3A				WE	3A	
46	SP41400950	CER	NE	3	30	30	4	3B	85	-22	91	-8	3B				WE	3B	
48	SP41600950	CER	NE	3			1	2	127	20	119	20	2				WE	2	NOSPL
50	SP41800950	CER			30	30	4	3B	86	-21	92	-7	3B				WE	3B	
52	SP42000950	STB	W	1			1	1	49	-58	49	-50	4				DR	3A	SEE PIT 1
54	SP42300950	CER	S	1			1	2	49	-58	49	-50	4				DR	3B	IMPQDR
56	SP42400950	RGR			20	20	4	3B	79	-28	85	-14	3B				WE	3B	
57	SP42600950	RGR					1	1	60	-47	60	-39	3B				DR	3A	IMPQDR
60	SP41500940	STU			28	28	4	3B	84	-23	90	-9	3B				WE	3B	
62	SP41700940	CER			25	35	4	3B	87	-20	93	-6	3A				WE	3B	
64	SP41900940	STB			32	32	4	3B	93	-14	105	6	3A				WE	3B	SEE PIT 2
66	SP42100940	STB	S	2			1	1	56	-51	56	-43	4				DR	3A	I37 SEE PIT 1
70	SP42500940	RGR			15	15	4	3B	78	-29	84	-15	3B				WE	3B	
71	SP42600940	RGR			25	25	4	3B	83	-24	89	-10	3B				WE	3B	
73	SP41400930	STU			30	30	4	3B	86	-21	92	-7	3B				WE	3B	
75	SP41600930	STU			28	28	4	3B	85	-22	91	-8	3B				WE	3B	
77	SP41800930	STU			25		4	3B	55	-52	55	-44	4				WE	3B	IMPQSPL
79	SP42000930	STB			35	35	4	3B	94	-13	106	7	3A				WE	3B	SEE PIT 2
81	SP42200930	CER			25	25	4	3B	79	-28	82	-17	3B				WE	3B	
83	SP42400930	PGR					1	1	76	-31	76	-23	3B				DR	3A	IMPQDR
88	SP41300920	STU			15	15	4	3B	78	-29	84	-15	3B				WE	3B	
90	SP41500920	STU			28	28	4	3B	85	-22	91	-8	3B				WE	3B	
92	SP41700920	STU			25	25	4	3B	82	-25	88	-11	3B				WE	3B	
94	SP41900920	STU			45	45	3	3B	93	-14	102	3	3A				WE	3B	
96	SP42100920	LEY					1	2	33	-74	33	-66	4				DR	3B	IMPX3QDR

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	--WETNESS-- GLEY	SPL	CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
98	SP42300920	PGR	N	2			1	2	33	-74	33	-66	4				DR	3B	IMPQDR
100	SP42500920	PGR			28	28	4	3B	82	-25	85	-14	3B				WE	3B	
102	SP42700920	PGR					1	1	33	-74	33	-66	4				DR	3A	IMPQDR
110	SP41800910	STU					1	2	58	-49	58	-41	3B				DR	3A	IMPQSEEPIT1
112	SP42000910	LEY					1	2	35	-72	35	-64	4				DR	3B	IMPQDR
114	SP42200910	PGR					1	2	33	-74	33	-66	4				DR	3B	IMPQDR
116	SP42400910	PGR					1	1	30	-77	30	-69	4				DR	3A	IMPQDR
118	SP42600910	PGR					1	1	49	-58	49	-50	4				DR	3A	IMPQDR
120	SP42900910	PGR							46	-61	46	-53	4				DR	3A	IMP30CM
121	SP43000910	PGR					1	1	46	-61	46	-53	4				DR	3A	
122	SP43100910	PGR					1	1	52	-55	52	-47	4				DR	3A	
123	SP41100900	STU			28	28	4	3B	82	-25	88	-11	3B				WE	3B	
125	SP41300900	STU			15	15	4	3B	78	-29	84	-15	3B				WE	3B	
127	SP41500900	STU			30	30	4	3B	83	-24	89	-10	3B				WE	3B	
129	SP41700900	STU			28	28	4	3B	85	-22	91	-8	3B				WE	3B	
131	SP41900900	STU					1	2	66	-41	66	-33	3B				DR	3A	IMPQDR
133	SP42100900	LEY					1	2	52	-55	52	-47	4				DR	3B	IMPQDR
135	SP42300900	PGR					1	2	36	-71	36	-63	4				DR	3B	IMPQDR
137	SP42500900	PGR					1	1	30	-77	30	-69	4				DR	3A	IMPQDR
139	SP42700900	PGR			30	30	4	3B	81	-26	84	-15	3B				WE	3B	
141	SP42900900	PGR			30	30	4	3B	83	-24	89	-10	3B				WE	3B	ORGANICSOIL
142	SP41000890	STU			25	25	4	3B	85	-22	91	-8	3B				WE	3B	
144	SP41200890	STU			30	30	4	3B	84	-23	90	-9	3B				WE	3B	
146	SP41400890	STU					1	2	92	-15	101	2	3A				DR	3A	IMPQDR
148	SP41600890	STU			50	50	3	3A	95	-12	104	5	3A				WE	3A	IMP
149	SP41700890	STU			28	28	4	3B	81	-26	87	-12	3B				WE	3B	
150	SP41800890	STU			30	30	4	3B	80	-27	81	-18	3B				WE	3B	IMP
152	SP42000890	STU			30		2	3A	101	-6	108	9	3A				WE	3A	IMPQDR
154	SP42200890	ARA					1	2	141	34	117	18	1				WK	2	NOGLEY
156	SP42400890	PGR					1	1	69	-38	69	-30	3B				DR	3A	IMPQDR
158	SP42200890	CER					1	2	70	-35	70	-27	3B				DR	3A	IMPQDR
160	SP42800890	CER			30		2	2	146	39	112	13	3B				WE	2	NOSPL
162	SP41100880	STU			15	15	4	3B	75	-32	78	-21	3B				WE	3B	
164	SP41300880	STU			30	30	4	3B	83	-24	89	-10	3B				WE	3B	
166	SP41500880	STU				78	2	3A	122	15	116	17	2				WE	3A	
168	SP41700880	STU			30	30	4	3B	85	-22	91	-8	3B				WE	3B	SPL35TO50
170	SP41900880	STU			30	30	4	3B	77	-30	78	-21	3B				WE	3B	
171	SP42000880	ARA			32	32	4	3B	82	-25	88	-11	3B				WE	3B	
172	SP42100880	ARA					1	2	139	32	117	18	1				WK	2	NOGLEY
176	SP42500880	CER					1	1	55	-52	55	-44	4				DR	3A	IMPQDR
178	SP42700880	CER					1	1	67	-40	67	-32	3B				DR	3A	IMPQDR
180	SP41200870	STU			42	42	3	3B	90	-17	97	-2	3A				WE	3B	

SAMPLE NO.	GRID REF	USE	ASPECT		GRDNT	--WETNESS-- GLEY	SPL	CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
182	SP41400870	STU				30	30	4	3B	82	-25	84	-15	3B				WE	3B	SPL35TO50
186	SP42400870	CER				52	52	2	2	98	-9	106	7	3A				WE	2	DEEPER
188	SP42600870	CER						1	1	59	-48	59	-40	3B				DR	3A	IMPQDR
190	SP42800870	CER						1	1	66	-41	66	-33	3B				DR	3A	IMPQDR
192	SP42500860	STU								74	-33	74	-25	3B				DR	3B	IMP45CM
194	SP42700860	STU								65	-42	65	-34	3B				DR	3B	PROB 3ADR
196	SP42600850	STU						1	1	116	9	109	10	2				DR	2	IMP90CM
197	SP42520845	ARA						1	1	83	-24	84	-15	3B				DR	3B	
198	SP42450843	ARA						1	1	103	-4	106	7	3A				DR	3A	
199	SP42450845	ARA					45	3	2	91	-16	102	3	3A				WE	3A	
1P	SP42200950	STB						1	1	91	-16	105	6	3A				DR	3A	PIT TO 70CM
200	SP42400849	ARA						1	1	65	-42	67	-30	3B				DR	3B	
201	SP42370846	ARA						1	1	75	-32	76	-23	3B				DR	3B	
2P	SP42200930	CER				28	28	4	3B	82	-25	88	-11	3B				WE	3B	
3P	SP41500910	STU	SE	2		30	35	4	3B	84	-23	90	-9	3B				WE	3B	
4P	SP41600990	CER				28	35	4	3B	85	-22	91	-8	3B				WE	3B	P60AUG70IMP
5P	SP42100920	LEY	NW	2		50	50	2	2	96	-11	73	-26	3A				DR	3A	P65A120
6P	SP42700860	CER						1	1	72	-37	66	-33	3B				DR	3B	P90AUG110(STIL
7P	SP42600910	PGR						1	1	103	-4	100	1	3A				DR	3A	PIT60AUG85QDR

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
1	0-25	HCL	10YR42						0	0	HR	2						N
	25-50	C	10YR53	10YR58	M			Y	0	0	HR	2		P			Y	N
4	0-30	C	10YR43						0	0	HR	2						N
	30-50	C	10YR52	75YR58	M			Y	0	0	HR	2		P			Y	N
6	0-25	HCL	10YR42						2	0	SLST	2						
	25-55	C	25Y 63	10YR56	M			Y	0	0		0		P			Y	
8	0-28	HCL	10YR54						0	0	HR	2						
	28-45	C	25Y63	10YR58	M			Y	0	0	HR	2		P			Y	N
11	0-25	HCL	10YR42	10YR56	C			Y	0	0		0						
	25-55	C	10YR52	10YR56	M			Y	0	0		0		P			Y	
14	0-30	HCL	10YR43						0	0	HR	5						N
	30-40	HCL	10YR53	10YR58	C			Y	0	0	HR	5		M				N
16	0-35	HCL	10YR42						0	0	HR	3						Y
	35-70	C	05Y 5152	10YR58	M	D		Y	0	0	HR	3		P			Y	
20	0-28	HCL	25Y 43						0	0	HR	2						N
	28-55	C	25Y 63	10YR58	M			Y	0	0	HR	2		P			Y	N
24	0-35	HCL	25Y 42						0	0	HR	3						
26	0-22	C	10YR42	10YR56	C			Y	0	0		0						
	22-55	C	10YR62	10YR56	M			Y	0	0		0		P			Y	
27	0-25	C	10YR42	10YR56	C			Y	0	0		0						
	25-55	C	10YR52	10YR56	M			Y	0	0		0		P			Y	
28	0-25	HCL	10YR42						0	0	SLST	2						
	25-55	C	25Y 63	10YR56	M			Y	0	0	SLST	1		P			Y	
30	0-30	MCL	10YR42						2	0	SLST	5						
34	0-30	HCL	10YR42						0	0	HR	5						
	30-60	C	25Y 5152	10YR58	M	D		Y	0	0	HR	5		P			Y	
	60-120	C	05Y 5152	10YR58	M	D		Y	0	0		0		P			Y	
36	0-25	C	10YR42	10YR56	C			Y	0	0	HR	1						
	25-55	C	10YR62	10YR56	M			Y	0	0		0		P			Y	
38	0-28	MCL	10YR44						0	0	HR	2						N
	28-60	C	25Y 63	75YR58	C			Y	0	0		0		P			Y	N
40	0-30	HCL	10YR42						2	0	SLST	5						

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	
42	0-25	HCL	10YR32						2	0	HR	5						N	
	25-58	C	10YR53					N	0	0	SLST	5		M					
	58-80	C	10YR53	10YR56	C			Y	0	0	SLST	2		P			Y		
46	0-30	HCL	10YR42						0	0	HR	2						N	
	30-60	C	25Y 53	10YR58	M			Y	0	0	HR	2		P			Y	N	
48	0-30	HCL	10YR43						0	0	HR	2						N	
	30-58	HZCL	10YR54						0	0	HR	2		M					
	58-100	C	10YR54	10YR56	C			S	0	0	HR	1		M				N	
50	0-30	MCL	10YR43						0	0	HR	1							
	30-60	C	10YR53	10YR56	C			Y	0	0		0		P			Y		
52	0-30	HCL	25Y 42						0	0	HR	10						Y	IMP HARD/DRY
54	0-30	HCL	10YR42						2	0	SLST	5							
56	0-20	C	25Y 42	10YR56	C			Y	0	0	HR	2						N	
	20-60	C		10YR56	M			Y	0	0		0		P			Y	N	
57	0-20	MCL	10YR42						2	0	HR	5						Y	
	20-40	HCL	10YR54						0	0	HR	20		M				Y	
60	0-28	HCL	10YR43						0	0	HR	2						N	
	28-60	C	10YR53	10YR58	M			Y	0	0	HR	2		P			Y	N	
62	0-25	HCL	10YR43						0	0	HR	2							
	25-35	C	10YR54	10YR56	C			Y	0	0		0		M					
	35-60	C	10YR53	10YR56	M			Y	0	0		0		P			Y		
64	0-32	HCL	10YR32						0	0	HR	2						Y	
	32-70	C	05Y 5152	10YR58	M	D		Y	0	0	HR	2		P			Y		
66	0-30	HCL	10YR42						3	0	HR	15						Y	
	30-37	C	10YR4446						0	0	HR	15		M				Y	
70	0-15	C	25Y 42	10YR56	C			Y	0	0	HR	2						N	
	15-60	C	25Y 63	10YR56	C			Y	0	0		0		P			Y	N	
71	0-25	HCL	10YR42						0	0	HR	2						N	
	25-60	C	25Y 63	10YR56	C			Y	0	0	HR	1		P			Y	N	
73	0-30	HCL	10YR42						0	0	HR	2						N	
	30-60	C	25Y 63	10YR58	M			Y	0	0		0		P			Y	N	
75	0-28	HCL	10YR44						0	0	HR	2						N	
	28-60	C	25Y 62	75YR58	M			Y	0	0	HR	1		P			Y	N	

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
77	0-25	C	10YR42						0	0	HR	2						
	25-35	C	25Y63	10YR56	C			Y	0	0		0		P				
79	0-35	HCL	10YR3242						0	0	HR	2						Y
	35-70	C	25Y 5253	10YR5658	C	D		Y	0	0	HR	3		P			Y	Y
81	0-25	HCL	10YR42						1	0	HR	2						
	25-55	C	25Y 63	10YR56	M			Y	0	0		0		P			Y	
83	0-30	MCL	10YR43						0	0	HR	2						N
	30-45	MCL	10YR54						0	0	HR	2		M				N
88	0-15	C	10YR42	10YR56	C			Y	0	0	HR	1						N
	15-60	C	25Y 62	10YR56	M			Y	0	0		0		P			Y	Y
90	0-28	HCL	10YR42						0	0	HR	2						N
	28-45	C	25Y 52	10YR58	C			Y	0	0		0		P			Y	N
	45-60	C	25Y 61	10YR58	M			Y	0	0		0		P			Y	N
92	0-25	C	25Y 52						0	0	HR	1						N
	25-60	C	25Y 63	10YR58	M			Y	0	0		0		P			Y	N
94	0-30	HCL	10YR43						0	0	HR	1						N
	30-45	C	10YR54						0	0	HR	2		M				N
	45-65	C	10YR53	10YR56	C			Y	0	0	HR	2		P			Y	N
96	0-20	HCL	10YR43						0	0	HR	5						Y
98	0-20	HCL	10YR54						0	0	HR	5						Y
100	0-28	MCL	10YR43						0	0	HR	2						N
	28-55	C	10YR54	10YR56	C			Y	0	0		0		P			Y	N
102	0-20	MCL	10YR43						2	0	HR	10						Y
110	0-30	HCL	10YR42						2	0	HR	5						N
	30-35	C	10YR33						0	0	HR	10		M				N
112	0-20	HCL	10YR43						0	0	HR	2						Y
114	0-20	HCL	10YR43						0	0	HR	5						Y
116	0-20	MCL	10YR43						2	0	HR	10						Y
118	0-30	MCL	10YR43						2	0	HR	10						Y
120	0-30	MCL	10YR43						2	0	HR	15						Y

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT.	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
121	0-30	MCL	10YR43						2	0	HR	15						Y
122	0-25	MCL	10YR42						2	0	HR	15						Y
	25-35	MCL	10YR54						0	0	HR	15		M				Y
123	0-28	C	10YR42						0	0	HR	2						N
	28-60	C	25Y 51	10YR56	M			Y	0	0		0		P			Y	N
125	0-15	C	10YR42	10YR56	C			Y	0	0	HR	2						N
	15-50	C	25Y 63	75YR68	M			Y	0	0		0		P			Y	N
	50-60	C	25Y 61	75YR68	M			Y	0	0		0		P			Y	N
127	0-30	C	10YR42	10YR56	C			Y	0	0	HR	2						N
	30-50	C	25Y 61	75YR68	M			Y	0	0		0		P			Y	N
	50-60	C	25Y 61	75YR68	M			Y	0	0		0		P			Y	N
129	0-28	HCL	10YR43						0	0	HR	2						N
	28-60	C	25Y 52	10YR68	M			Y	0	0		0		P			Y	N
131	0-30	HCL	10YR42						0	0	HR	5						N
	30-40	HCL	10YR43						0	0	HR	10		M				N
133	0-30	HCL	10YR43						0	0	HR	2						Y
135	0-22	HCL	10YR43						0	0	HR	5						Y
137	0-20	MCL	10YR43						2	0	HR	10						Y
139	0-30	C	10YR52	10YR56	C			Y	0	0		0						N
	30-55	C	25Y 62	10YR56	M			Y	0	0		0		P			Y	N
141	0-30	OHCL	10YR41	05YR56	M			Y	0	0	SLST	2						Y
	30-60	OHZCL	25Y 52	10YR56	M			Y	0	0	SLST	2		P			Y	Y
142	0-25	HCL	10YR42						0	0		0						
	25-60	C	25Y 52	10YR56	M			Y	0	0		0		P			Y	
144	0-30	C	10YR42						0	0		0						N
	30-60	C	25Y 52	10YR56	M			Y	0	0		0		P			Y	N
146	0-30	C	25Y 43						0	0	HR	2						Y
	30-55	C	10YR54	10YR56	F				0	0	HR	2		M				Y
	55-65	HCL	10YR53						0	0	HR	10		M				Y
148	0-30	MCL	10YR43						0	0	HR	2						N
	30-50	MCL	10YR54						0	0	HR	2		M				N
	50-65	C	10YR53	10YR56	C			Y	0	0	HR	2		P			Y	N

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
149	0-28	C	25Y 43						0	0	HR	2						N
	28-60	C	25Y 63	10YR56	C			Y	0	0	HR	2		P			Y	N
150	0-30	HCL	10YR42						0	0	HR	2						
	30-52	C	10YR53	10YR56	C			Y	0	0	HR	2		P			Y	N
152	0-30	C	25Y 43						0	0	HR	2						Y
	30-80	C	10YR53	10YR56	C			Y	0	0	SLST	10		M				Y
154	0-32	HCL	10YR43						0	0	HR	2						N
	32-42	C	10YR54						0	0	HR	2		M				N
	42-120	C	10YR54						0	0		0		M				N
156	0-30	MCL	10YR43						0	0	HR	5						Y
	30-45	HCL	10YR54						0	0	HR	18		M				Y
158	0-28	HCL	10YR43						2	0	HR	5						Y
	28-45	HCL	75YR54						0	0	HR	8		M				Y
160	0-30	HCL	10YR42						0	0	HR	2						Y
	30-60	C	10YR53	10YR56	C			Y	0	0	SLST	5		M				Y
	60-120	SCL	25Y 63	10YR56	C			Y	0	0	SLST	10		M				Y
162	0-15	C	10YR42	10YR56	C			Y	0	0		0						
	15-55	C	25Y 63	10YR56	M			Y	0	0		0		P			Y	
164	0-30	C	25Y 43						0	0	HR	2						N
	30-60	C	25Y 53	10YR58	M			Y	0	0		0		P			Y	N
166	0-30	HCL	25Y 43						0	0	HR	2						N
	30-50	HCL	10YR42						0	0	HR	2		M				N
	50-78	C	10YR54						0	0		0		M				N
	78-100	C	75YR54	75YR56	C			S	0	0		0		P			Y	N
168	0-30	HCL	25Y 43						0	0	HR	2						N
	30-50	C	25Y 63	10YR56	C			Y	0	0	HR	1		P			Y	N
	50-60	C	10YR56						0	0	HR	10		M				N
170	0-30	C	25Y 43						0	0	HR	2						N
	30-52	C	25Y 64	10YR56	C			Y	0	0	HR	1		P			Y	N
171	0-32	C	25Y 43						0	0	HR	4						N
	32-60	C	25Y 64	10YR58	M			Y	0	0	HR	2		P			Y	N
172	0-32	HCL	10YR43						0	0	HR	2						N
	32-68	C	75YR44						0	0	HR	1		M				N
	68-120	C	10YR54						0	0	HR	5		M				N

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	
176	0-25	MCL	10YR42						2	0	HR	10							
	25-38	MCL	10YR54						0	0	HR	33		M					
178	0-30	MCL	10YR43						2	0	HR	5							
	30-40	MCL	10YR54						0	0	HR	5		M					
180	0-30	HCL	10YR42						0	0	HR	1						N	
	30-42	C	10YR54	10YR56	F				0	0		0		M				N	
	42-60	C	25Y 63	10YR56	C			Y	0	0		0		P			Y	N	
	60-61	C	25Y 63	10YR56	F			Y	0	0		0		P			Y	N	
182	0-30	HCL	25Y 43						0	0	HR	2						N	
	30-50	C	25Y 53	10YR56	C			Y	0	0	HR	2		P			Y	N	
	50-55	HCL	25Y 64						0	0	HR	10		M				Y	
186	0-28	MCL	10YR43						2	0	HR	5							
	28-52	HCL	10YR54						0	0	HR	10		M					
	52-75	C	10YR53	10YR56	C			Y	0	0	HR	2		P			Y		
188	0-28	MCL	10YR43						2	0	HR	10							
	28-38	MCL	10YR54						0	0	HR	20		M					
190	0-28	MCL	10YR42						2	0	HR	8							
	28-45	MCL	10YR54						0	0	HR	30		M					
192	0-35	MCL	10YR43						2	0	HR	5						Y	
	35-45	MCL	10YR43						0	0	HR	13		M				Y	
194	0-28	MCL	10YR43						3	0	HR	10						Y	
	28-42	MCL	10YR54						0	0	HR	15		M				Y	
196	0-35	MCL	10YR43						2	0	HR	8						Y	
	35-90	MCL	75YR44						0	0	HR	10		M				Y	
197	0-30	MCL	10YR44						2	0	HR	5						Y	
	30-50	HCL	10YR54						0	0	HR	10		M				Y	
	50-60	LCS	10YR64						0	0	HR	45		M				Y	
198	0-30	MCL	10YR43						2	0	HR	5						Y	
	30-50	HCL	75YR54						0	0	HR	10		M				Y	
	50-85	C	75YR54						0	0	HR	2		M				Y	
199	0-28	MCL	10YR43						2	0	HR	5						Y	
	28-45	HCL	75YR54						0	0	HR	10		M				Y	
	45-65	C	10YR56	10YR53	C			Y	0	0	HR	2		P	Y		Y	Y	
1P	0-35	HCL	25Y 42						3	0	HR	10						Y	CEMENTED
	35-70	C	10YR4446						3	0	HR	24		M				Y	I70 HARD/DRY

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	
200	0-35	MCL	10YR33						2	0	HR	15						Y	
	35-70	LCS	10YR64						0	0	HR	45			M			Y	
201	0-25	MCL	10YR43						2	0	HR	5						Y	
	25-45	HCL	10YR54						0	0	HR	10			M			Y	
	45-55	LCS	10YR64						0	0	HR	45			M			Y	
2P	0-28	C	10YR42	10YR56	C			Y	0	0	HR	2							
	28-60	C	25Y 52	10YR56	M			Y	0	0		0	MCAB	FM	P	Y		Y	
3P	0-30	C	25Y 42						0	0	HR	2						N	
	30-35	C	25Y 51	10YR56	C			Y	0	0	HR	2	MCSAB	FM	M	Y			N
	35-60	C	05Y 61	10YR56	M			Y	0	0		0	MCAB	FM	P	Y		Y	N
4P	0-28	HCL	10YR42						1	0	HR	5						N	
	28-35	C	25Y 52	10YR56	M			Y	0	0	HR	2			M			N	N
	35-60	C	25Y 53	10YR58	M			Y	0	0	HR	2	MCAB	FM	P	Y		Y	N
5P	0-28	HCL	10YR43						2	0	HR	19						Y	
	28-50	LCS	10YR56						0	0	HR	47			M			Y	
	50-120	C	25Y 61	75YR58	M			Y	0	0	SLST	1	MCAB	FM	P	Y		Y	Y
6P	0-34	MCL	10YR43						1	0	HR	12						Y	14% total stone
	34-62	LCS	10YR56						0	0	HR	45			M			Y	50% total stone
	62-110	LCS	10YR66						0	0	HR	61			M			Y	66% total stone
7P	0-22	MCL	10YR42						1	0	HR	10						Y	
	22-48	HCL	10YR54						0	0	HR	23			M			Y	
	48-85	MCL	10YR66						0	0	HR	5			M			Y	