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A1
Aylesbury Vale Local Plan
Land south of Winslow,
Buckinghamshire
Agricultural Land Classification
ALC Map and Report
September 1996

MAFF
Ministry of
Agriculture
Fisheries
And Food

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Resource Planning Team
Guildford Statutory Group
ADAS Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

AYLESBURY VALE LOCAL PLAN: LAND SOUTH OF WINSLOW

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 71 hectares of land to the south of Winslow in Buckinghamshire. The survey was carried out during August 1996.

2. The work was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) from its Land Use Planning Unit in Reading, in connection with MAFF's statutory input to the Aylesbury Vale Local Plan. This survey supersedes any previous ALC information for this land, including a detailed survey undertaken in 1988 (ADAS Ref: 0301/23/88), which was carried out prior to MAFF's revision of its ALC guidelines.

3. The current work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. 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 majority of agricultural land was under permanent pasture. Some of this land, in the west of the site, had remnant ridge and furrow features. A large area of land to the south of Western Lane was in cereal stubble. The areas shown as 'Other Land' consist of residential dwellings, a stable block, tracks, roads and woodland. The agricultural land not surveyed comprises land for which details of ownership and/or tenancy were unavailable at the time of survey, thus preventing access onto the land.

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 overleaf.

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 53 borings and 3 soil pits were described.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% Total site area	% Surveyed Area
2	16.7	23.4	36.3
3a	7.1	10.0	15.4
3b	22.2	31.2	48.3
Other land	5.1	7.2	
Not Surveyed	20.1	28.2	
Total surveyed area	46.0	-	100.0
Total site area	71.2	100.0	-

8. Land classified as Grade 2 (very good quality) is subject to minor soil droughtiness or soil wetness limitations, which occasionally act in conjunction. Land limited by soil droughtiness typically comprises non-calcareous medium sandy loam topsoils. These overlie relatively deep, similarly textured upper subsoils and loamy medium sand lower subsoils. These profiles tend to be slightly stony and are well or moderately well drained. The interaction between these soil properties and the prevailing climate acts to impart a minor soil droughtiness limitation. This may lead to the soil available water being insufficient to fully meet crop needs. Consequently, this land will suffer from slightly lower and less consistent crop yields. Land limited by soil wetness comprises non-calcareous medium clay loam topsoils. These overlie permeable clay loam and clay upper subsoils which pass into slowly permeable clay lower subsoils. The clay subsoils act to slightly impede drainage, as indicated by gleying at depth. The interaction between the medium textured topsoils and these drainage characteristics with the local climate acts to impart slight restrictions on the flexibility of cropping, stocking and cultivations.

9. Land classified as Subgrade 3a (good quality) is also subject to either soil droughtiness or soil wetness limitations. Where the former occur, the profiles are similar to those equating to Grade 2 land but have shallower upper subsoils. This has the effect of lowering the amount of soil water available for uptake by crop roots, and thus this land is classified as Subgrade 3a. Where soil wetness is limiting, profiles are similar to those described in para. 8 but gleying occurs at much shallower depths within the soil profile. This indicates that these profiles are waterlogged for slightly longer periods and will be subject to less flexibility of cropping, stocking and cultivations than land classified as Grade 2.

10. Just under half of the agricultural land has been classified as Subgrade 3b (moderate quality). All of this land is subject to significant soil wetness and workability limitations. Non-calcareous and calcareous medium and heavy clay loam topsoils directly overlie poorly structured clay subsoils. These subsoils are slowly permeable and will significantly impede drainage. The resultant waterlogging will thus restrict seed germination and growth as well as limit the timing of cultivations. Wet soils such as these are susceptible to structural damage through trafficking by agricultural machinery and grazing livestock.

Factors Influencing ALC Grade

Climate

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

12. 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 764 276	SP 764 270
Altitude	m, AOD	112	90
Accumulated Temperature	day°C (Jan-June)	1370	1396
Average Annual Rainfall	mm	679	674
Field Capacity Days	days	142	141
Moisture Deficit, Wheat	mm	103	105
Moisture Deficit, Potatoes	mm	93	97

13. 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.

14. 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.

15. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation (Climatic Grade 1). However, climatic factors do interact with soil properties to influence soil wetness and droughtiness. At this locality the climate is relatively cool and dry, in regional terms, such that the risk of soil droughtiness will be enhanced.

16. Local climatic factors such as frost risk and exposure are not thought to adversely affect agricultural land use on this site.

Site

17. The land on this site ranges from 90m AOD along the south-western boundary to 115m AOD in the north. The land slopes gently from north-east to south-west. Gradient and micro-relief do not affect agricultural land quality across the site.

18. Flooding does not appear to be limiting on this site.

Geology and soils

19. The relevant geological sheet (GSGB, 1864) shows most of the site to be underlain by Jurassic solid deposits of Cornbrash (interbedded rubbly limestone and clay). A survey of the Soils of Buckinghamshire (Temple, 1929), indicates that these solid deposits may in turn be overlain by superficial glacial drift deposits of boulder clay in the vicinity of Winslow.

20. The most recently published soils information for this area (SSEW, 1983) maps the Ashley soil association across the northern part of the site with soils of the Denchworth association shown across the southern-most part of the site. Ashley soils are derived from deposits of chalky boulder clay and are described as 'fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging' (SSEW, 1983). Denchworth soils are developed over deposits of Oxford Clay and are described as 'slowly permeable, seasonally waterlogged clayey soils with similar fine loamy over clayey soils' (SSEW, 1983).

21. Detailed field examination of the soils on the site broadly confirms the presence of variably drained soils derived from chalky boulder clay towards the north of the site, and poorly drained clayey soils overlying Oxford Clay across the southern-most parts of the site.

Agricultural Land Classification

22. 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 2.

23. 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 III.

Grade 2

24. Very good quality land has been mapped across the northern part of the site. The land is limited to a minor extent by soil droughtiness and/or soil wetness/workability.

25. Soils within these mapping units were found to be variable with non-calcareous, medium clay loam or medium sandy loam topsoils which may contain up to 2% total flints. Subsoils are variable but commonly comprise similarly textured or heavier upper subsoils of sandy clay loam or heavy clay loam, and pass to clay in the lower subsoil with occasional sandier lenses. These profiles are only very slightly stony throughout, containing a maximum of 5% flints or limestone fragments. Many of the observations were impenetrable to the soil auger at depths below 40cm, but soil pit 2 (see Appendix III) proved the existence of a rootable soil resource to at least 120cm.

26. Many of the soils in the Grade 2 mapping unit show signs of slightly impeded drainage through the presence of manganese concretions and ochreous mottling at depths below, or occasionally within, the topsoil. This is the result of clayey horizons in the lower subsoil which are defined as slowly permeable, and thereby impede soil drainage. Such drainage characteristics result in these soils being assessed as wetness class I, II or very occasionally III, (see Appendix II) resulting in an ALC wetness grade of 1, or 2 depending upon the topsoil texture. Slight soil wetness may affect crop growth and yield as well as restricting the utilisation of the land by affecting the timing of cultivations and/or grazing by livestock.

27. Some of the land assigned to Grade 2 is affected by minor droughtiness, where sandier soils are found The soil characteristics described in para. 25 above, combine with the prevailing climatic conditions (which are relatively cool and dry in a regional context), to restrict the amount of water in the profile which will be available to plants. Moisture balance calculations indicate that there is insufficient soil moisture to meet the demands of a growing crop throughout the growing season. As a result the yield potential may be reduced, such that land cannot be classified higher than ALC Grade 2.

Subgrade 3a

28. Good quality land has been mapped across the north and west of the site. Soils are variable within this unit but they are affected by either soil droughtiness or soil wetness restrictions.

29. Soil profiles within the 3a mapping units are variable. Those affected by wetness comprise non-calcareous, medium clay loam topsoils which may be very slightly stony (i.e., 2-5% total flints). These overlie similar or slightly heavier upper subsoils and pass to clay lower subsoils. Profiles are typically gleyed at shallow depths and slowly permeable below 45cm depth. Soil pit 1p (see Appendix III) is representative of this soil type. As a result of the slow permeability of the lower subsoils, soil drainage will be impeded to the extent that wetness class III is appropriate, which when combined with local climatic conditions, gives rise to a land classification of Subgrade 3a on the basis of soil wetness. This is likely to cause crop growth and development to be adversely affected, as well as restricting the timing of landwork and/or grazing.

30. Occasional profiles within the 3a mapping unit are restricted by soil droughtiness. Non-calcareous medium sandy loam topsoils containing up to 2% total flints, overlie similar upper subsoils and pass to loamy medium sand lower subsoils. These profiles are generally well drained, wetness class I, but the interaction between these sandy soils, and the prevailing climate, gives rise to soil droughtiness which will adversely affect the yield potential for crops.

Subgrade 3b

31. The land assigned to this grade is affected by soil wetness. Profiles comprise non-calcareous or occasionally calcareous, medium or heavy clay loam topsoils, directly overlying gleyed and slowly permeable clay subsoils which significantly impede soil drainage such that wetness class III or IV is appropriate. Soil pit 3 is typical of these soils. The combination of soils with such a poor drainage status, heavy topsoil textures and the prevailing climatic conditions results in a land classification of Subgrade 3b. This degree of soil wetness will significantly restrict the timing of cultivations and/or grazing and adversely affect crop development.

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SOURCES OF REFERENCE

Geological Survey of Great Britain (1864) *Sheet No. 46 NW,* GSGB: London.

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Soil Survey of England and Wales (1983) *Sheet 6, Soils of South East England.* SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England, Bulletin No. 15* SSEW: Harpenden.

Temple, M.S. (1929) *A Survey of the Soils of Buckinghamshire,* University of Reading.

APPENDIX I

DESCRIPTION OF THE GRADES AND SUBGRADES

Grade 1: Excellent Quality Agricultural Land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2: Very Good Quality Agricultural Land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural or horticultural crops can usually be grown but on some land of this grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When more demanding crops are grown, yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a: Good Quality Agricultural Land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b: Moderate Quality Agricultural Land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass, or lower yields of a wider range of crops or high yields of grass that 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 that restricts use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

SOIL WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Wetness Class	Duration of waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years.[2]
II	The soil profile is wet within 70 cm depth for 31-90 days in most years **or**, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but only wet within 40 cm depth for 30 days in most years.
III	The soil profile is wet within 70 cm depth for 91-180 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

[1] The number of days is not necessarily a continuous period.
[2] 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL DATA

Contents:

Sample location map

Soil abbreviations - Explanatory Note

Soil Pit Descriptions

Soil boring descriptions (boring and horizon levels)

Database Printout - Horizon Level Information

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

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

Boring Header Information

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

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

ARA:	Arable	**WHT:**	Wheat	**BAR**:	Barley
CER:	Cereals	**OAT**:	Oats	**MZE**:	Maize
OSR:	Oilseed rape	**BEN**:	Field Beans	**BRA**:	Brassicae
POT:	Potatoes	**SBT**:	Sugar Beet	**FCD**:	Fodder Crops
LIN:	Linseed	**FRT**:	Soft and Top Fruit	**FLW**:	Fallow
PGR:	Permanent Pasture	**LEY**:	Ley Grass	**RGR**:	Rough Grazing
SCR:		Scrub	**CFW**:		Coniferous Woodland
DCW:	Deciduous Wood				
HTH:	Heathland	**BOG**:	Bog or Marsh	**FLW**:	Fallow
PLO:	Ploughed	**SAS**:	Set aside	**OTH**:	Other
HRT:	Horticultural Crops				

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

4. **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	**EX**:	Exposure
FR:	Frost Risk	**GR**:	Gradient	**MR**:	Microrelief
FL:	Flood Risk	**TX**:	Topsoil Texture	**DP**:	Soil Depth
CH:	Chemical	**WE**:	Wetness	**WK**:	Workability
DR:	Drought	**ER**:	Erosion Risk	**WD**:	Soil Wetness/Droughtiness
ST:	Topsoil Stoniness				

Soil Pits and Auger Borings

1. **TEXTURE**: soil texture classes are denoted by the following abbreviations.

S:	Sand	**LS**:	Loamy Sand	**SL**:	Sandy Loam
SZL:	Sandy Silt Loam	**CL**:	Clay Loam	**ZCL**:	Silty Clay Loam
ZL:	Silt Loam	**SCL**:	Sandy Clay Loam	**C**:	Clay
SC:	Sandy Clay	**ZC**:	Silty Clay	**OL**:	Organic Loam
P:	Peat	**SP**:	Sandy Peat	**LP**:	Loamy Peat
PL:	Peaty Loam	**PS**:	Peaty Sand	**MZ**:	Marine Light Silts

For the sand, loamy sand, sandy loam and sandy silt loam classes, the predominant size of sand fraction will be indicated by the use of the following prefixes:

F: Fine (more than 66% of the sand less than 0.2mm)
M: Medium (less than 66% fine sand and less than 33% coarse sand)
C: Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content: **M:** Medium (<27% clay) **H**: Heavy (27-35% clay)

2. **MOTTLE COL**: Mottle colour using Munsell notation.

3. **MOTTLE ABUN**: Mottle abundance, expressed as a percentage of the matrix or surface described.

F: few <2% **C:** common 2-20% **M**: many 20-40% **VM**: very many 40% +

4. **MOTTLE CONT:** Mottle contrast

F: faint - indistinct mottles, evident only on close inspection
D: distinct - mottles are readily seen
P: prominent - mottling is conspicuous and one of the outstanding features of the horizon

5. **PED. COL**: Ped face colour using Munsell notation.

6. **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	**SLST**:	soft oolitic or dolomitic limestone
CH:	chalk	**FSST**:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	**GH**:	gravel with non-porous (hard) stones
MSST:	soft, medium grained sandstone	**GS**:	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock		

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

8.**STRUCT**: the degree of development, size and shape of soil peds are described using the following notation:

degree of development	**WK**: weakly developed **ST**: strongly developed	**MD**: moderately developed
ped size	**F**: fine **C**: coarse	**M**: medium **VC**: very coarse
ped shape	**S** : single grain **GR**: granular **SAB**: sub-angular blocky **PL**: platy	**M**: massive **AB**: angular blocky **PR**: prismatic

9.**CONSIST**: Soil consistence is described using the following notation:

L: loose **VF**: very friable **FR**: friable **FM**: firm **VM**: very firm
EM: extremely firm **EH**: extremely hard

10.**SUBS STR**: Subsoil structural condition recorded for the purpose of calculating profile droughtiness: **G**: good **M**: moderate **P**: poor

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

12. **IMP**: If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.

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

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

15. Other notations
    APW: available water capacity (in mm) adjusted for wheat
    APP: available water capacity (in mm) adjusted for potatoes
    MBW: moisture balance, wheat
    MBP: moisture balance, potatoes

SOIL PIT DESCRIPTION

Site Name : AYLESBURY LP, S. WINSLOW Pit Number : 1P

Grid Reference: SP77002740 Average Annual Rainfall : 679 mm
Accumulated Temperature : 1384 degree days
Field Capacity Level : 142 days
Land Use : Permanent Grass
Slope and Aspect : 02 degrees SW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 33	MCL	10YR41 00	0	2	HR	C				
33- 49	HCL	25Y 42 00	0	5	HR	C	MDCSAB	FM	M	
49- 80	C	25Y 52 00	0	2	HR	M	MDMPR	FM	P	Y

Wetness Grade : 3A Wetness Class : III
Gleying :0 cm
SPL :049 cm

Drought Grade : APW : 000mm MBW : 0 mm
APP : 000mm MBP : 0 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness

SOIL PIT DESCRIPTION

Site Name : AYLESBURY LP, S. WINSLOW Pit Number : 2P

Grid Reference: SP76102760
Average Annual Rainfall : 679 mm
Accumulated Temperature : 1384 degree days
Field Capacity Level : 142 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	MSL	10YR42 00	0	2	HR	C				
28- 62	MSL	10YR41 00	0	5	HR	M	MDCSAB	FR	M	
62-105	SCL	10YR62 00	0	2	HR	M	MDCAB	FM	P	
105-120	C	05Y 41 00	0	1	SLST	C		FM	P	Y

Wetness Grade : 2
Wetness Class : III
Gleying :0 cm
SPL :062 cm

Drought Grade : 2
APW : 135mm MBW : 30 mm
APP : 106mm MBP : 9 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Soil Wetness/Droughtiness

SOIL PIT DESCRIPTION

Site Name : AYLESBURY LP, S. WINSLOW Pit Number : 3P

Grid Reference: SP76302710 Average Annual Rainfall : 679 mm
Accumulated Temperature : 1384 degree days
Field Capacity Level : 142 days
Land Use : Arable
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	HCL	10YR42 00	0	2	HR					
25- 55	C	25Y 51 52	0	8	CH	C	MDCAB	FM	P	Y

Wetness Grade : 3B Wetness Class : IV
Gleying :025 cm
SPL :025 cm

Drought Grade : APW : 000mm MBW : 0 mm
APP : 000mm MBP : 0 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	ASPECT USE		GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SP76302770	PGR					1	1	066	-39	066	-31	3B				DR	2	I 42, SEE 2P
1P	SP77002740	PGR	SW	02	0	049	3	3A	000	0	000	0					WE	3A	BORING 20
2	SP76102760	PGR			028		2	1	083	-22	085	-12	3B				DR	2	SEE 2P
2P	SP76102760	PGR			0	062	3	2	135	30	106	9	2				WD	2	BORING 2
3	SP76202760	PGR					1	1	118	13	101	4	2				DR	2	
3P	SP76302710	ARA			025	025	4	3B	000	0	000	0					WE	3B	BORING 59
4	SP76302760	PGR			075		1	1	100	-5	081	-16	3A				DR	2	SEE 2P
5	SP76402760	PGR			0		2	2	000	0	000	0					WE	2	
7	SP76102750	PGR	S	02	022	022	4	3B	000	0	000	0					WE	3B	
8	SP76202750	PGR	S	03	0	039	3	3A	130	25	107	10	2				WE	3A	
11	SP77102750	PGR	SE	02	028	060	3	3A	134	29	110	13	2				WE	3A	SEE 1P
13	SP76102740	PGR			025	025	4	3B	000	0	000	0					WE	3B	
14	SP76202740	PGR	SE	02			1	1	000	0	000	0					DR	3B	I30X2DRY
15	SP76302740	STB	S	02	030	095	2	2	134	29	112	15	2				WD	2	
16	SP76402740	STB	S	02	030	030	4	3B	000	0	000	0					WE	3B	
17	SP76502740	PGR	S	01	0	025	4	3B	000	0	000	0					WE	3B	
20	SP77002740	PGR	SW	03	030	055	3	3A	000	0	000	0					WE	3A	SEE 1P
21	SP77102740	PGR	NW	05	055	055	2	2	000	0	000	0					WE	2	
22	SP77302740	PGR					1	1	062	-43	062	-35	3B				DR	2	SEE 2P
23	SP77402740	PGR	S	02			1	1	068	-37	068	-29	3B				DR	2	SEE 2P
24	SP77502740	RGR	E				1	1	079	-26	079	-18	3B				DR	2	SEE 2P
26	SP76102730	PGR	S	02	025	025	4	3B	000	0	000	0					WE	3B	
27	SP76202730	PGR	SE	02	0	065	3	3A	000	0	000	0					WE	3A	
28	SP76302730	STB	S	01	030	030	4	3B	108	3	116	19	3A				WE	3B	
29	SP76402730	STB	S	01	025	075	2	2	137	32	112	15	1				WE	2	
30	SP76502730	STB	S	02	030	030	4	3B	000	0	000	0					WE	3B	V CALC 30
34	SP77002730	PGR	NW	02			1	1	059	-46	059	-38	3B				DR	3A	SEE AB 35
35	SP77102730	PGR	NW	05	045		1	1	109	4	090	-7	3A				DR	3A	
36	SP77202730	PGR	S	01			1	1	113	8	096	-1	2				DR	2	
37	SP77302730	PGR	NW	02			1	1	077	-28	077	-20	3B				DR	2	SEE 2P
38	SP77402730	PGR	E	01			1	1	060	-45	060	-37	3B				DR	2	SEE 2P
39	SP77502730	PGR	E	06	050	050	2	2	107	2	112	15	3A				WE	2	
41	SP76002720	PGR	S	01	025	025	4	3B	000	0	000	0					WE	3B	
42	SP76102720	PGR			032	032	4	3B	000	0	000	0					WE	3B	
43	SP76202720	STB			035	035	4	3B	000	0	000	0					WE	3B	NON CALC
44	SP76302720	STB			025	040	3	3A	000	0	000	0					WE	3A	V CALC 40
45	SP76402720	STB			020	020	4	3B	000	0	000	0					WE	3B	V CALC 20
46	SP76502720	STB	S	02	030	030	4	3B	107	2	113	16	3A				WE	3B	
47	SP76602720	PGR	S	01	0	032	4	3B	000	0	000	0					WE	3B	
51	SP77002720	PGR	W	02	045	045	3	3A	000	0	000	0					WE	3A	
52	SP77102720	PGR	S	01	028	028	4	3B	000	0	000	0					WE	3B	
53	SP77202720	PGR	S	02	030	035	4	3B	000	0	000	0					WE	3B	

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
54	SP77302720	PGR	S	02	0		2	1	084	-21	086	-11	3B				DR	2		SEE 2P
55	SP77402720	PGR	E	06	0	045	3	3A	000	0	000	0					WE	3A		
56	SP77502720	PGR	E	02	0		2	2	122	17	114	17	2				WE	2		
57	SP77602720	PGR	W	06			1	1	097	-8	078	-19	3A				DR	3A		SANDY
58	SP76202710	STB	S		032		2	2	000	0	000	0					WE	2		PROB 3B
59	SP76302710	STB	S		030	030	4	3B	000	0	000	0					WE	3B		
60	SP76402710	STB	S	01	030	030	4	3B	000	0	000	0					WE	3B		
61	SP76502710	PGR	S	01	0	030	4	3B	000	0	000	0					WE	3B		
65	SP77402710	RGR	E	05	028	055	3	3A	000	0	000	0					WE	3A		
66	SP77502710	PGR	S	01	060	060	2	2	000	0	000	0					WE	2		
67	SP77602710	PGR	SW	02	035	035	4	3B	000	0	000	0					WE	3B		
68	SP76302700	STB	S		030	030	4	3B	000	0	000	0					WE	3B		
69	SP76402700	ARA	S		027	027	4	3B	000	0	000	0					WE	3B		
70	SP76502700	PGR	E		0	032	4	3B	000	0	000	0					WE	3B		

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
1	0-30	msl	10YR42 00						0	0	HR	3							
	30-42	msl	10YR43 00						0	0	HR	10		M					IMP 42, FLINTS
1P	0-33	mcl	10YR41 00	10YR46 00	C			Y	0	0	HR	2							
	33-49	hcl	25Y 42 00	10YR56 00	C		25Y 41 00	Y	0	0	HR	5	MDCSAB	FM M					
	49-80	c	25Y 52 00	10YR58 68	M		25Y 54 00	Y	0	0	HR	2	MDMPR	FM P	Y		Y	Y	
2	0-28	msl	10YR43 00						0	0	HR	2							
	28-55	msl	10YR52 00	75YR58 00	M			Y	0	0	HR	5		M					IMP 55, FLINTS
2P	0-28	msl	10YR42 00	75YR58 00	C			Y	0	0	HR	2							
	28-62	msl	10YR41 00	05YR46 00	M		00MN00 00	Y	0	0	HR	5	MDCSAB	FR M					
	62-105	scl	10YR62 00	75YR68 51	M			Y	0	0	HR	2	MDCAB	FM P	Y		Y		
	105-120	c	05Y 41 00	10YR58 00	C			Y	0	0	SLST	1		FM P			Y	Y	
3	0-28	msl	10YR43 00						0	0	HR	2							
	28-55	msl	10YR42 43	10YR58 00	F				0	0	HR	2		M					
	55-80	lms	75YR46 56						0	0	HR	1		M					
	80-120	ms	10YR56 00						0	0		0		M					
3P	0-25	hcl	10YR42 00						0	0	HR	2							
	25-55	c	25Y 51 52	10YR58 68	C		25Y 53 00	Y	0	0	CH	8	MDCAB	FM P	Y		Y	Y	
4	0-30	msl	10YR42 00						3	0	HR	1							
	30-60	lms	10YR43 00						0	0	HR	2		M					
	60-75	lms	10YR56 00						0	0	HR	5		M					
	75-95	msl	10YR46 00	10YR56 00	C		00MN00 00	Y	0	0	HR	8		M					IMP 95, FLINTS
5	0-30	mcl	10YR42 00	75YR58 00	C		00MN00 00	Y	0	0	HR	1							
	30-45	mcl	10YR41 00	75YR46 00	M		00MN00 00	Y	0	0	HR	1		M					
	45-120	hcl	10YR51 00	75YR46 00	M		00MN00 00	Y	0	0	HR	2		M					
7	0-22	mcl	10YR42 00						0	0	HR	2							
	22-35	c	10YR53 00	10YR56 00	M			Y	0	0	HR	1		P			Y		
	35-100	c	25Y 61 53	10YR58 00	M			Y	0	0	CH	5		P			Y	Y	
8	0-28	mcl	10YR41 00	10YR58 00	C			Y	0	0	HR	2							
	28-39	hcl	10YR53 00	10YR56 00	C		00MN00 00	Y	0	0	HR	1		M					
	39-90	c	25Y 52 00	10YR56 00	C		00MN00 00	Y	0	0	CH	5		P			Y	Y	
	90-120	c	25Y 51 00	10YR56 00	C			Y	0	0	CH	5		P			Y	Y	
11	0-28	mcl	10YR42 43	10YR46 00	F				0	0	HR	3							
	28-45	mcl	10YR52 53	10YR56 00	C			Y	0	0	HR	5		M					
	45-60	mcl	25Y 52 53	10YR56 00	C		00MN00 00	Y	0	0	HR	8		M					
	60-120	c	05Y 52 00	10YR58 00	M		00MN00 00	Y	0	0		0		P			Y		
13	0-25	mcl	10YR43 00						0	0	HR	2						Y	
	25-55	c	10YR53 00	10YR58 00	M			Y	0	0	CH	15		P			Y	Y	
	55-100	c	05Y 61 00	10YR58 00	M			Y	0	0	CH	2		P			Y	Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
14	0-30	mcl	10YR43 00						0	0	HR	2							IMP 30, FLINTS
15	0-30	mcl	10YR43 00	10YR58 00	C				0	0	HR	2							
	30-45	hcl	25 Y53 00	10YR58 00	C			Y	0	0	HR	2		M					
	45-55	c	10YR56 00	75YR58 00	C			Y	0	0		0		M					
	55-70	scl	25 Y66 00	10YR58 00	C			Y	0	0		0		M					
	70-75	msl	25 Y66 00	10YR58 00	C			Y	0	0		0		M					
	75-95	lms	25 Y66 00	10YR58 00	C			Y	0	0		0		M					
	95-120	c	25 Y50 00	10YR58 00	C			Y	0	0		0		P		Y			
16	0-30	mcl	10YR42 00						0	0		0							
	30-60	c	25 Y52 00	10YR58 00	C			Y	0	0		0		P		Y	Y		
17	0-25	mcl	10YR42 00	10YR56 00	C			Y	0	0		0							
	25-60	c	25 Y53 00	10YR56 00	C			Y	0	0	HR	5		P		Y	Y		
20	0-30	mcl	10YR42 00	10YR46 00	F				0	0	HR	2							
	30-40	mcl	10YR42 52	10YR46 56	C		00MN00 00	Y	0	0	HR	3		M					
	40-55	hcl	10YR53 00	10YR56 00	C		00MN00 00	Y	0	0	HR	5		M					
	55-100	c	25Y 52 53	10YR66 00	M		00MN00 00	Y	0	0	HR	3		P		Y	Y		
21	0-25	mcl	10YR42 00	10YR46 00	F				0	0	HR	2							
	25-55	mcl	10YR42 52	10YR46 56	F		00MN00 00		0	0	HR	5		M					
	55-90	c	05Y 51 00	10YR58 00	M		00MN00 00	Y	0	0	HR	5		P		Y	Y		
22	0-30	msl	10YR42 00						0	0	HR	5							
	30-40	msl	10YR43 00						0	0	HR	15		M					IMP 40, FLINTS
23	0-30	msl	10YR43 00						0	0		0							
	30-42	msl	10YR43 00						0	0	HR	5		M					IMP 42, FLINTS
24	0-30	msl	10YR41 42						2	0	HR	2						Y	
	30-50	msl	10YR42 00						0	0	HR	5		M				Y	IMP 50, FLINTS
26	0-25	hcl	10YR43 00						0	0		0							
	25-70	c	25 Y52 00	10YR58 00	C		25 Y60 00	Y	0	0	CH	10		P		Y	Y		
27	0-28	mcl	10YR41 00	75YR58 00	M			Y	0	0	HR	2							
	28-65	hcl	10YR53 00	10YR56 00	M			Y	0	0		0		M					
	65-90	c	25Y 62 63	10YR56 00	M			Y	0	0		0		P		Y	Y		
28	0-30	mcl	10YR42 00						0	0	HR	2						Y	
	30-60	c	25Y 63 00	10YR58 00	C			Y	0	0	HR	1		P		Y	Y		
	60-80	c	25Y 71 00	10YR68 00	M			Y	0	0	HR	1		P		Y	Y		IMP 80, FLINTS
29	0-25	mcl	10YR43 00						0	0	HR	2							
	25-45	mcl	10YR53 00	10YR58 00	C			Y	0	0	HR	2		M					
	45-75	scl	25Y 54 00	10YR58 00	C			Y	0	0	HR	2		M					
	75-120	c	10YR52 53	75YR58 00	M			Y	0	0	SLST	10		P		Y	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	
30	0-30	hcl	10YR42 00						0	0	HR	2						Y	
	30-70	c	25Y 63 53	10YR58 00	M			Y	0	0	CH	5		P			Y	Y	
34	0-28	mcl	10YR42 00						0	0	HR	3							
	28-35	mcl	10YR44 54						0	0	HR	10		M					IMP 35, FLINTS
35	0-23	msl	10YR43 00						0	0		0							
	23-45	msl	10YR44 00	10YR56 00	F				0	0		0		M					
	45-60	lms	10YR44 54	10YR56 00	C			Y	0	0	HR	3		M					
	60-120	lms	75YR56 00					Y	0	0		0		M					
36	0-30	msl	10YR42 43						0	0	HR	2							
	30-55	msl	10YR44 00						0	0	HR	5		M					
	55-75	lms	10YR44 54						0	0	HR	5		M					
	75-90	lms	10YR44 46						0	0	HR	10		M					
	90-120	lms	10YR56 00						0	0	HR	5		M					
37	0-15	msl	10YR41 00						0	0	HR	2						Y	
	15-50	scl	10YR42 00						0	0	HR	2		M				Y	IMP 50, FLINTS
38	0-35	msl	10YR41 42						0	0		0						Y	IMP 35, FLINTS
39	0-30	mcl	10YR42 00						0	0		0							
	30-45	mcl	10YR43 00						0	0		0		M					
	45-50	hcl	10YR53 00						0	0		0		M					
	50-80	c	25Y 53 00	10YR56 00	M			Y	0	0	HR	2		P			Y	Y	
41	0-25	hcl	10YR42 00						0	0		0							
	25-70	c	25 Y53 00	10YR58 00	C			Y	0	0	HR	2		P			Y	Y	
42	0-32	hcl	10YR43 00						0	0		0							
	32-70	c	25 Y52 00	10YR58 00	C			Y	0	0		0		P			Y	Y	
43	0-25	mcl	10YR43 00						0	0	HR	2							
	25-35	mcl	10YR42 43						0	0	HR	2		M					
	35-60	c	25Y 53 00	10YR58 00	M		00MN00 00	Y	0	0		0		P			Y		
44	0-25	hcl	10YR42 00						0	0	HR	2						Y	
	25-40	hcl	10YR53 42	10YR58 00	M			Y	0	0		0		M				Y	
	40-65	c	25Y 53 51	10YR58 00	M			Y	0	0		0		P			Y	Y	
45	0-20	hcl	10YR42 00						0	0	HR	2						Y	
	20-35	c	10YR53 00	10YR58 00	M			Y	0	0	CH	15		P			Y	Y	
	35-75	c	25Y 51 53	10YR58 00	M			Y	0	0	CH	15		P			Y	Y	
46	0-30	hcl	10YR42 00						0	0	HR	2						Y	
	30-75	hcl	25Y 63 53	10YR58 00	M			Y	0	0	CH	15		P			Y	Y	BORDER CLAY

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
47	0-32	mcl	10YR52 00	10YR58 00	C			Y	0	0		0							
	32-60	c	25 Y52 00	75YR58 00	C			Y	0	0	HR	2		P			Y	Y	
51	0-30	mcl	10YR43 00						0	0	HR	5							
	30-45	c	25Y 54 00	10YR58 00	F				0	0	HR	5		M				Y	
	45-80	c	05Y 51 52	10YR58 00	M		00MN00 00	Y	0	0	HR	5		P			Y	Y	
52	0-28	mcl	10YR42 43						0	0	HR	3							
	28-45	c	25Y 52 53	10YR58 00	C			Y	0	0	HR	5		P			Y	Y	
	45-80	c	25Y 51 53	10YR58 00	M		00MN00 00	Y	0	0	HR	5		P			Y	Y	
53	0-30	mcl	10YR42 00						0	0	HR	2							
	30-35	hcl	10YR53 54	10YR66 00	C		00MN00 00	Y	0	0	HR	10		M					
	35-70	c	25Y 52 62	10YR58 68	M		00MN00 00	Y	0	0	HR	5		P			Y	Y	
54	0-30	msl	10YR42 00	10YR56 00	C			Y	0	0	HR	2							
	30-55	msl	10YR52 00	10YR58 00	C		10YR61 00	Y	0	0	HR	5		M					IMP 55, FLINTS
55	0-30	mcl	10YR32 00	75YR58 00	C			Y	0	0		0							
	30-45	hcl	10YR53 00	10YR56 00	C			Y	0	0	HR	2		M				Y	
	45-65	c	25 Y53 00	25 Y56 00	C			Y	0	0		0		P			Y	Y	
	65-75	scl	10YR58 00	75YR58 00	C			Y	0	0		0		M			Y		
	75-120	c	25 Y52 00	10YR56 00	M		25 Y51 00	Y	0	0		0		P			Y	Y	
56	0-20	mcl	10YR41 00	10YR46 00	C			Y	2	0	HR	2							
	20-90	hcl	10YR41 51	75YR46 00	M		00MN00 00	Y	0	0	HR	2		M					
57	0-30	msl	10YR42 00						0	0	HR	2							
	30-50	lms	10YR54 00						0	0	HR	5		M				Y	
	50-120	lms	10YR54 00						0	0	HR	2		M				Y	
58	0-32	mcl	10YR32 00						0	0	HR	2							
	32-40	c	25 Y53 00	10YR58 00	C		25 Y62 00	Y	0	0	HR	5		P				Y	IMP 40, FLINTS
59	0-30	hcl	25 Y43 00						0	0	HR	1						Y	
	30-60	c	25 Y53 00	10YR58 00	C			Y	0	0	HR	2		P			Y	Y	
60	0-30	hcl	25 Y43 00						0	0		0						Y	
	30-80	c	25 Y52 00	10YR58 00	C		25 Y60 00	Y	0	0	CH	10		P			Y	Y	
61	0-30	mcl	10YR42 00	10YR56 00	C			Y	0	0	HR	2							
	30-70	c	25 Y53 00	10YR58 00	C			Y	0	0	HR	5		P			Y	Y	
65	0-28	mcl	10YR42 00						0	0		0							
	28-45	hcl	10YR53 00	10YR58 00	C			Y	0	0	HR	2		M					
	45-55	scl	10YR58 00	75YR58 00	C			Y	0	0	HR	2		M					
	55-100	c	25 Y53 00	10YR58 00	M		25 Y60 00	Y	0	0		0		P			Y	Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
66	0-30	hcl	10YR32 00						0	0		0						Y	
	30-60	c	25 Y53 00						0	0	HR	2		M				Y	
	60-90	c	25 Y53 00	25 Y56 00	C			Y	0	0	HR	3		P			Y	Y	
67	0-30	hcl	25 Y42_00						0	0	HR	2						Y	
	30-35	c	25 Y53 00	25 Y56 00	F				0	0	HR	2		M				Y	
	35-80	c	25 Y53 00	25Y 56 00	C			Y	0	0		0		P			Y	Y	
68	0-30	hcl	25 Y43 00						0	0		0						Y	
	30-65	c	25 Y53 00	10YR58 00	C			Y	0	0	HR	2		P			Y	Y	
69	0-27	hcl	10YR42 00	10YR46 00	F				0	0		0							
	27-70	c	25Y 53 52	10YR66 00	M		00MN00 00	Y	0	0		0		P			Y		
70	0-32	mcl	25 Y53 00	10YR58 00	C		25 Y52 00	Y	0	0	HR	2							
	32-60	c	25 Y52 00	10YR58 00	C			Y	0	0	HR	5		P			Y	Y	IMP 60, FLINTS