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Arun District Local Plan Review
Site ROS 5 (III): Land South of the A259, Middleton-On Sea, West Sussex.
Agricultural Land Classification
ALC Map & Report

March 1997

Resource Planning Team
Eastern Region
FRCA, Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

ARUN DISTRICT LOCAL PLAN
SITE III: LAND SOUTH OF THE A259, MIDDLETON-ON-SEA, WEST SUSSEX

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey on approximately 25 hectares of land to the south of the A259 at Middleton-On-Sea, near Bognor Regis, West Sussex. The survey was carried out during March 1997.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) from its Land Use Planning Unit, in Reading, in connection with the Arun District Local Plan. The results of this survey supersede any previous ALC information for this land. However, two surveys (4202/75/94 & 4202/78/94), which lie within the current site boundary, to the south east, are also referred to in this report.

3. Prior to 1st April 1997, the work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. After this date, the work was completed by the same team as part of the Farming and Rural Conservation Agency (FRCA, Reading). 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 the agricultural land on this site was under winter wheat, with permanent grassland to the east. The areas shown as 'Other Land' comprise agricultural buildings.

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.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	18.3	72.6	69.6
3a	1.4	5.6	5.3
3b	5.5	21.8	20.9
Other Land	1.1	N/A	4.2
Total surveyed area	25.2	100	95.8
Total site area	26.3	-	100

7. The fieldwork was conducted at an average density of approximately one boring per hectare. A total of 21 borings and two soil inspection pits were described during the current survey. A further seven borings and one soil inspection pit were described during the previous two surveys.

8. The majority of the agricultural land on this site has been classified as Grade 2 (very good quality) with some Subgrade 3a (good quality) and Subgrade 3b (moderate quality) to the south east. The key limitations are soil droughtiness and/or soil wetness.

9. The Grade 2 land comprises deep, permeable, very slightly stony, silty clay loams and silt loams which become slightly heavier with depth. Ochreous mottles occur at variable depths in most profiles, reflecting a minor soil wetness limitation due to fluctuating groundwater levels. In this locally dry climatic regime the combination of soil texture, structure and stone content also slightly reduces the amount of profile moisture for crops, resulting in a minor soil droughtiness limitation.

10. The agricultural land that has been classified as Subgrade 3a and 3b is limited by soil wetness. The soil profiles typically comprise silty clay loams which again become heavier with depth. The lower subsoils comprise a poorly structured clay horizon which impedes drainage. The depth to this horizon varies, as reflected by the presence of both good and moderate quality land on this part of the site. Poorly drained soils restrict plant growth and are more susceptible to damage from grazing livestock and agricultural machinery, making them less flexible for agricultural production.

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).

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.

Table 2: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SU 970 011	SU 972 008
Altitude	m, AOD	5	5
Accumulated Temperature	day°C (Jan-June)	1543	1543
Average Annual Rainfall	mm	740	738
Field Capacity Days	days	151	150
Moisture Deficit, Wheat	mm	121	121
Moisture Deficit, Potatoes	mm	118	118
Overall climatic grade	N/A	Grade 1	Grade 1

15. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. However, climatic factors can interact with soil properties to influence soil wetness and droughtiness. At this locality the crop adjusted soil moisture deficits are relatively high because the climate is warm, thus increasing the likelihood of soil droughtiness. Correspondingly, the field capacity day (FCD) values are relatively low, thus decreasing the likelihood of soil wetness. The data on Table 2 show that there is also an important FCD boundary across this site (from 150/151 FCD). Land to the north of the site falls within a slightly wetter climatic regime than the remainder of the site, however, this does not significantly affect land quality at this location.

16. Local climatic factors such as frost risk and exposure are unlikely to adversely affect agricultural land use on this site. The site is climatically Grade 1.

Site

17. The majority of the land on this site is flat and low-lying (2m AOD), though the south of the site does rise to 5m AOD.

18. Gradient, microrelief and flooding do not affect land quality in this area.

Geology and soils

19. The relevant geological sheet (BGS, 1975) maps the entire site as Upper Chalk, however, this has been completely overlain by deep drift deposits of the head brickearth.

20. The most detailed published soils information for this area (SSEW, 1967) maps the Hook soil series (shallow phase with calcareous C horizon) in the north west of the site and the Parkgate soil series (deep phase) in the south-east. The Hook series is described as being 'intermediate in character between the well drained Hamble series and the imperfectly or poorly drained Parkgate soils' (SSEW, 1967). They comprise silt loam topsoils and upper subsoils with fine, faint mottles over silt loam subsoils. The Parkgate soils series 'is similar in many ways to the Hook Series but the profiles are mottled with ochreous and grey or pale colours to within at least 40cm of the surface. The surface and sub-surface horizons of the soils are very uniform with a silt loam texture and weak structure. The flat landscape affects

drainage, for surface run-off is negligible and the lateral movement of water in the soil is slow' (SSEW, 1967).

21. Detailed field examination broadly confirmed the existence of soils similar to those described above. However, soils derived from the Parkgate series are confined to the extreme south-east corner.

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 1.

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 II.

Grade 2

24. The majority of the site has been classified as Grade 2 (very good quality land), due to a minor soil droughtiness and/or soil wetness limitation. These soil profiles are generally non-calcareous, comprising very slightly flinty (2-4% total stone by volume), medium silty clay loam or occasional silt loams topsoils, over medium and heavy silty clay loam subsoils. Soil inspection Pits 1 and 2 showed the subsoils to be moderately well structured and free draining. The common ochreous mottles which occur at variable depths within the profile are therefore believed to be the result of fluctuating groundwater levels rather than a drainage impedance. In this local climatic regime, these profiles have been assessed as either Wetness Class I or II, depending on the depth to gleying. With a medium textured topsoil, the land classified as Wetness Class II has been assigned to Grade 2, because wet soils will inhibit seed germination and growth. They can also slightly limit the timing and flexibility of cultivations as trafficking by agricultural machinery and livestock during the wetter months can lead to structural damage. Soil droughtiness also limits this land to Grade 2, as the combination of soil textures, structures and stone contents, in this locally warm climatic regime, acts to slightly reduce the amount of profile available water for plants. As a result, the level and consistency of crop yields may be restricted.

25. Occasional profiles of slightly higher quality are also included within this mapping unit as they are too limited in either number or extent to map separately.

Subgrade 3a

26. The higher land to the south of the site has been classified as Subgrade 3a (good quality land), with soil wetness as the main limitation. All of the Subgrade 3a land was surveyed in 1994 (4202/075/94) and the soil profiles were described as comprising non-calcareous, typically comprising medium silty clay loam topsoils over heavy clay loam upper subsoils and clay lower subsoils. The profiles are gleyed throughout, becoming heavily gleyed at depth. Soil inspection Pit 1 (from the 1994 survey) revealed the clay horizons to be poorly structured and slowly permeable from moderate depths (60-65cm). The resultant drainage impedance leads to slight seasonal waterlogging which, in this local climatic regime, is consistent with Wetness Class III. Wetness and workability restrictions will be slightly more

limiting than for those soils described as Grade 2. Thus, with a medium textured topsoil, this land has been classified as Subgrade 3a.

Subgrade 3b

27. The lower lying land in the south east corner of the site has been classified as Subgrade 3b (moderate quality) due to a significant soil wetness limitation. Again, most of this land was surveyed in 1994 (4202/075/94 & 4202/078/94), with a small strip of Subgrade 3b land extending into the 1997 survey area. Generally, however, the drain along the boundary between the 1994 and 1997 surveys forms a distinct boundary between the higher and lower quality land.

28. The Subgrade 3b soil profiles display very similar textures and gley characteristics to those described as Subgrade 3a above. However, the depth at which the slowly permeable clay is encountered is much shallower (35cm), therefore causing a more significant drainage impedance. These soils have thus been assigned to Wetness Class IV which, with a medium textured topsoil, gives rise to Subgrade 3b quality land.

Helen Goode
Resource Planning Team
Eastern Region
FRCA Reading

SOURCES OF REFERENCE

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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 (1967) *Sheet SU90, Bognor Regis. Soils of the West Sussex Coastal Plain.* 1:25,000. SSEW: Harpenden.

Soil Survey of England and Wales (1967) Bulletin 3, *Soils of The West Sussex Coastal Plain.* 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	**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 dolimitic limestone
CH:	chalk	**FSST**:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	**GH**:	gravel with non-porous (hard) stones
MSST:	soft, medium grained sandstone	**GS**:	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock		

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

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

degree of development	**WK**: weakly developed **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

4202/041/97

SOIL PIT DESCRIPTION

Site Name : ARUN DLP SITE III Pit Number : 1P

Grid Reference: SU96800120 Average Annual Rainfall : 740 mm
Accumulated Temperature : 1543 degree days
Field Capacity Level : 151 days
Land Use : Wheat
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	MZCL	10YR53 00	0	2	HR					
30- 50	MZCL	10YR53 54	0	2	HR		MDCAB	FR	M	
50- 70	MZCL	10YR53 00	0	2	HR	C	MDCSAB	FR	M	
70-120	HZCL	10YR62 00	0	2	HR	C	MDCSAB	FR	M	

Wetness Grade : 1 Wetness Class : I
Gleying :050 cm
SPL : No SPL

Drought Grade : 2 APW : 158mm MBW : 37 mm
APP : 123mm MBP : 5 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

4202/044

SOIL PIT DESCRIPTION

Site Name : ARUN DLP SITE III Pit Number : 2P

Grid Reference: SU97000110 Average Annual Rainfall : 740 mm
Accumulated Temperature : 1543 degree days
Field Capacity Level : 151 days
Land Use : Wheat
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	MZCL	10YR52 53	0	2	HR					
30- 54	MZCL	10YR54 00	0	0		C	MDCSAB	FR	M	
54-120	MZCL	10YR53 00	0	0		M	MDCSAB	FR	M	

Wetness Grade : 1 Wetness Class : I
Gleying :054 cm
SPL : No SPL

Drought Grade : 2 APW : 160mm MBW : 39 mm
APP : 124mm MBP : 6 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

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program: ALC012 LIST OF BORINGS HEADERS 04/07/97 ARUN DLP SITE III page 1

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
1	SU96700120	WHT		045			1	1	159	38	124	6	2				DR	2	
1P	SU96800120	WHT		050			1	1	158	37	123	5	2				DR	2	At AB 2
2	SU96800120	WHT		070			1	1	150	29	124	6	2				DR	2	See 1P
2P	SU97000110	WHT		054			1	1	160	39	124	6	2				DR	2	At AB 9
3	SU96900120	WHT		050			1	1	151	30	121	3	2				DR	2	
4	SU97000120	WHT		028			2	2	161	40	132	14	1				DR	2	
5	SU97100120	WHT		032			1	1	171	50	136	18	1					1	
6	SU96700112	WHT		053			1	1	157	36	122	4	2				DR	2	
7	SU96800110	WHT		055			1	1	146	25	121	3	2				DR	2	
8	SU96900110	WHT		072			1	1	149	28	113	-5	2				DR	2	PL PAN28
9	SU97000110	WHT		028			2	2	158	37	122	4	2				DR	2	See 2P
10	SU97100110	WHT		060			1	1	159	38	124	6	2				DR	2	
11	SU97200110	PGR		0			2	2	167	46	131	13	1				WE	2	
12	SU97300110	PGR		0			2	2	141	20	130	12	2				WD	2	I95 Sst
13	SU97400110	PGR		045			1	1	168	47	133	15	1					1	
14	SU96900100	WHT		048			1	1	158	37	123	5	2				DR	2	
15	SU97000100	WHT		045			1	1	157	36	122	4	2				DR	2	
16	SU97100100	WHT		035			2	2	159	38	124	6	2				WD	2	
17	SU97200100	PGR		0			2	2	160	39	124	6	2				WD	2	
18	SU97300100	PGR		0			2	2	160	39	124	6	2				WD	2	
19	SU97100090	WHT		058			1	1	158	37	123	5	2				DR	2	
20	SU97300092	PGR		0			2	2	159	38	123	5	2				WD	2	
21	SU97200085	PGR		0	028		4	3B	89	-32	95	-23	3B				WE	3B	Extra Boring

program: ALC011 COMPLETE LIST OF PROFILES 04/07/97 ARUN DLP SITE III

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	0-28	mzcl	10YR42 00						0	0	HR	2							
	28-45	mzcl	10YR54 00						0	0		0		M					
	45-70	hzcl	10YR54 53	10YR56 00	M			S	0	0		0		M					
	70-120	mzcl	25Y 62 64	10YR68 00	M			Y	0	0	CH	5		M				Y	
1P	0-30	mzcl	10YR53 00						0	0	HR	2							Border zl
	30-50	mzcl	10YR53 54						0	0	HR	2	MDCAB	FR M					porous
	50-70	mzcl	10YR53 00	10YR68 00	C			Y	0	0	HR	2	MDCSAB	FR M					Border hzcl
	70-120	hzcl	10YR62 00	10YR58 00	C	00MN00	00	Y	0	0	HR	2	MDCSAB	FR M					porous
2	0-30	mzcl	10YR53 00						0	0	HR	2							Border zl
	30-45	mzcl	10YR44 54						0	0		0		M					
	45-70	hzcl	10YR54 00	10YR56 00	C			S	0	0		0		M					
	70-120	c	10YR52 00	10YR68 00	M	00MN00	00	Y	0	0		0		M					
2P	0-30	mzcl	10YR52 53						0	0	HR	2							
	30-54	mzcl	10YR54 00	10YR56 00	C			S	0	0		0	MDCSAB	FR M					
	54-120	mzcl	10YR53 00	10YR58 00	M	00MN00	00	Y	0	0		0	MDCSAB	FR M					low porosity 85cm+
3	0-28	mzcl	10YR43 00						0	0	HR	2							
	28-50	hzcl	10YR54 00	10YR56 00	M			S	0	0	HR	2		M					
	50-90	c	10YR62 00	10YR58 68	M	00MN00	00	Y	0	0		0		M					sl sandy
	90-120	hcl	10YR62 00	10YR58 51	M	00MN00	00	Y	0	0		0		M					sl sandy
4	0-28	zl	10YR43 00						0	0	HR	2							
	28-45	mzcl	10YR53 00	10YR68 00	C			Y	0	0	HR	1		M					
	45-80	c	10YR62 52	10YR58 00	M			Y	0	0		0		M					
	80-120	mcl	10YR53 00	10YR56 00	M			Y	0	0	HR	8		M					
5	0-32	zl	10YR52 00						0	0	HR	2							
	32-58	mzcl	10YR54 00	10YR58 00	C			S	0	0	HR	2		M					
	58-80	hzcl	10YR53 00	10YR58 00	M	00MN00	00	Y	0	0	HR	2		M					
	80-120	hzcl	10YR63 73	10YR58 00	M	00MN00	00	Y	0	0	HR	2		M					
6	0-33	mzcl	10YR43 00						1	0	HR	4							
	33-53	mzcl	10YR54 00						0	0	HR	2		M					
	53-120	mzcl	10YR62 63	10YR56 00	C	00MN00	00	Y	0	0	HR	2		M					
7	0-29	mzcl	10YR43 00						0	0	HR	3							
	29-55	mzcl	10YR53 54			00MN00	00		0	0	HR	2		M					
	55-65	hzcl	10YR53 54	10YR56 00	C	00MN00	00	Y	0	0	HR	2		M					
	65-120	c	10YR52 53	10YR56 00	C	00MN00	00	Y	0	0	HR	2		M					
8	0-28	mzcl	10YR53 00						0	0	HR	3							
	28-45	hzcl	10YR63 00	10YR56 00	C				0	0	HR	2		P					Q plough pan
	45-72	mzcl	10YR52 00						0	0	HR	2		M					
	72-120	hzcl	10YR62 63	10YR56 00	C			Y	0	0	CH	5		M				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	
9	0-28	mzcl	10YR53 00						0	0	HR	2							
	28-48	mzcl	10YR63 00	75YR56 00	C			Y	0	0	HR	2		M					
	48-120	hzcl	10YR62 63	10YR56 00	C		00MN00 00	Y	0	0	HR	2		M					
10	0-35	mzcl	10YR53 63						0	0	HR	2							
	35-60	mzcl	10YR54 00						0	0	HR	2		M					
	60-120	hzcl	10YR63 00	10YR58 00	M		00MN00 00	Y	0	0	HR	2		M					
11	0-28	zl	10YR62 00	75YR58 00	C			Y	0	0	HR	2							
	28-68	mzcl	10YR63 00	10YR58 00	C			Y	0	0	HR	5		M					
	68-88	mzcl	10YR62 52	10YR68 00	C			Y	0	0	HR	2		M					
	88-120	hzcl	10YR51 00	10YR58 68	M		00MN00 00	Y	0	0	HR	2		M					
12	0-25	zl	10YR52 00	75YR58 00	C			Y	0	0	HR	2							
	25-55	mzcl	10YR63 00	75YR58 00	C			Y	0	0	HR	5		M					
	55-75	mzcl	25Y 62 00	10YR58 00	C			Y	0	0	HR	2		M					
	75-95	hzcl	10YR62 72	10YR58 00	C		00MN00 00	Y	0	0	HR	2		M					I Sandstone
13	0-28	zl	10YR42 00						0	0	HR	2							
	28-45	mzcl	10YR64 00				00MN00 00		0	0	HR	2		M					
	45-69	mzcl	10YR64 00	10YR66 68	C			Y	0	0	HR	2		M					
	69-95	hzcl	10YR63 00	10YR66 00	M		00MN00 00	Y	0	0	HR	2		M					
	95-120	mzcl	10YR73 00	10YR66 00	C		00MN00 00	Y	0	0	HR	5		M					
14	0-30	mzcl	10YR52 00						1	0	HR	2							
	30-48	mzcl	10YR53 00						0	0	HR	2		M					
	48-65	hzcl	10YR63 00	10YR68 00	C		00MN00 00	Y	0	0	HR	2		M					
	65-90	mzcl	10YR63 73	10YR68 00	C		00MN00 00	Y	0	0	HR	1		M			Y		
	90-120	mzcl	10YR73 00	10YR68 00	C		00MN00 00	Y	0	0	CH	5		M			Y		
15	0-25	mzcl	10YR53 00						1	0	HR	2							
	25-45	mzcl	10YR54 00						0	0	HR	2		M					
	45-70	hzcl	10YR64 00	10YR68 00	M		00MN00 00	Y	0	0	HR	2		M					
	70-120	hzcl	10YR62 00	10YR68 00	M		00MN00 00	Y	0	0	HR	1		M					
16	0-35	mzcl	10YR52 00						1	0	HR	2							
	35-60	mzcl	10YR53 00	10YR68 00	C			Y	0	0	HR	2		M					
	60-80	hzcl	10YR64 00	10YR68 00	C		00MN00 00	Y	0	0	HR	2		M					
	80-120	hzcl	10YR63 00	10YR68 00	M		00MN00 00	Y	0	0	HR	1		M					
17	0-25	mzcl	10YR53 00	75YR56 00	C			Y	0	0		0							
	25-55	mzcl	10YR53 54	10YR56 00	C			Y	0	0		0		M					
	55-68	hzcl	25Y 51 00	10YR58 68	M		00MN00 00	Y	0	0		0		M					
	68-120	hzcl	10YR61 62	10YR68 00	M		00MN00 00	Y	0	0		0		M					
18	0-25	mzcl	10YR41 00	75YR46 00	C			Y	0	0		0							
	25-45	mzcl	10YR53 54	10YR56 00	C			Y	0	0		0		M					
	45-70	hzcl	10YR61 53	10YR56 00	C		00MN00 00	Y	0	0		0		M					
	70-120	mzcl	10YR61 53	10YR56 00	C		00MN00 00	Y	0	0	CH	1		M			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
19	0-32	mzcl	10YR52 00						0	0	HR	2						
	32-58	mzcl	10YR53 00						0	0	HR	2		M				
	58-75	mzcl	10YR63 00	10YR58 00	C		00MN00 00	Y	0	0	HR	2		M				
	75-120	hzcl	10YR72 63	10YR58 00	M		00MN00 00	Y	0	0	HR	2		M				
20	0-25	mzcl	10YR53 00	10YR56 00	C			Y	0	0	HR	2						
	25-35	mzcl	10YR52 00	10YR56 00	C			Y	0	0	HR	1		M				
	35-57	mzcl	10YR52 62	10YR56 00	C			Y	0	0		0		M				
	57-120	hzcl	10YR61 00	10YR56 00	M			Y	0	0		0		M				
21	0-18	zl	10YR41 42	10YR56 00	C			Y	0	0		0						
	18-28	mzcl	10YR53 00	10YR56 00	C			Y	0	0		0		P			Y	
	28-60	c	10YR68 00	10YR56 00	M		00MN00 00	Y	0	0		0		P			Y	

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program: ALC012 LIST OF BORINGS HEADERS 18/04/94 SITE 11, ARUN LP page 1

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS-- GRDNT	GLEY	SPL	CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT		ALC COMMENTS
1	SU97000080	SAS	0	035	4		3B		0		0					WE	3B	
1P	SU97100080	SAS	0	060	3		3A		0		0					WE	3A	
2	SU97100080	SAS	0	060	3		3A		0		0					WE	3A	
3	SU97200080	SAS	0	035	4		3B		0		0					WE	3B	
4	SU97200070	SAS	0	065	3		3A		0		0					WE	3A	

program: ALC011 COMPLETE LIST OF PROFILES 25/04/94 SITE 11, ARUN LP

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
1	0-25	mzcl	10YR53 00	10YR58 00	C			Y	0	0		0						
	25-35	hzcl	10YR53 00	10YR58 00	C			Y	0	0		0		M				
	35-70	c	10YR63 00	75YR58 00	M		00MN00 00	Y	0	0		0		P			Y	
1P	0-29	mzcl	10YR52 00	10YR58 00	C		00MN00 00	Y	0	0		0						
	29-60	hzcl	10YR63 00	75YR58 00	M		00MN00 00	Y	0	0		0	MDCSAB FR	M				
	60-80	c	10YR62 00	75YR58 00	M		00MN00 00	Y	0	0		0	MDMAB FM	P			Y	
2	0-35	mzcl	10YR53 00	10YR58 00	C			Y	0	0		0						
	35-60	hzcl	10YR64 00	10YR58 00	C			Y	0	0		0		M				
	60-80	c	10YR63 00	75YR58 00	M		00MN00 00	Y	0	0		0		P			Y	
3	0-30	mzcl	10YR53 00	10YR58 00	C			Y	0	0		0						
	30-35	hzcl	10YR62 00	10YR58 00	C			Y	0	0		0		M				
	35-70	c	10YR63 00	75YR58 51	M		00MN00 00	Y	0	0		0		P			Y	
4	0-30	mzcl	10YR42 00	10YR58 00	C			Y	0	0		0						
	30-65	hzcl	10YR64 00	10YR58 00	C		00MN00 00	Y	0	0		0		M				
	65-90	c	10YR63 00	10YR58 61	M		00MN00 00	Y	0	0		0		P			Y	

4202/078/94

SAMPLE NO.	GRID REF	USE	ASPECT			--WETNESS--		-WHEAT-		-POTS-		M.REL	EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT	
1	SU97200090	PGR		0	030	4	3B		0		0					WE 3B	
2	SU97300090	PGR		0	035	4	3B		0		0					WE 3B	
3	SU97300080	PGR		045	045	3	3A		0		0					WE 3A	
4	SU97400080	PGR		0	040	4	3B		0		0					WE 3B	

program: ALC011 COMPLETE LIST OF PROFILES 18/04/94 SITE 11A, ARUN LP

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	mzcl	25Y 52 00	10YR58 00	C			Y	0	0		0						
	25-30	mzcl	10YR64 00	75YR58 00	C			Y	0	0		0		M				
	30-70	c	10YR63 00	75YR58 00	M		00MN00 00	Y	0	0		0		P			Y	
2	0-20	mzcl	25Y 42 00	10YR58 00	C			Y	0	0		0						
	20-35	mzcl	10YR52 00	10YR58 61	C			Y	0	0		0		M				
	35-75	c	10YR62 00	75YR58 00	M			Y	0	0		0		P			Y	
	75-100	c	10YR64 00	75YR58 61	M		00MN00 00	Y	0	0		0		P			Y	
3	0-25	mzcl	10YR42 00						0	0		0						
	25-45	mzcl	10YR64 00						0	0		0		M				
	45-120	c	10YR64 00	75YR58 00	M		00MN00 00	Y	0	0		0		P			Y	
4	0-25	mzcl	10YR42 00	10YR58 00	C			Y	0	0		0						
	25-40	mzcl	10YR64 00	10YR58 00	C			Y	0	0		0		M				
	40-60	c	10YR63 00	75YR58 00	M			Y	0	0		0		P			Y	
	60-80	c	10YR62 00	75YR58 00	M		00MN00 00	Y	0	0		0		P			Y	