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WEST SUSSEX MINERALS PLAN
SITE 4 : VALDOE PIT EXTENSION
AGRICULTURAL LAND CLASSIFICATION
ALC MAP & REPORT
SEPTEMBER 1993

**WEST SUSSEX MINERALS PLAN
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1.0 Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality on a number of sites in West Sussex. The work forms part of MAFF's statutory input to the preparation of the West Sussex Minerals Plan.

1.2 Approximately 61 hectares of land relating to Site 4, north of Lavant Straight, East Lavant, West Sussex was surveyed during September 1993. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 43 soil auger borings, 6 soil inspection pits and 15 topsoil stone content measurements were described in accordance with MAFF's revised guidelines and criteria for grading the quality of agricultural land (MAFF, 1988). These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on its use for agriculture.

1.3 Work was conducted by members of the Resource Planning Team in the Guildford Statutory Group. At the time of the survey land had been recently ploughed and sown with oilseed rape.

1.4 The distribution of grades and subgrades is shown on the attached ALC map and the areas are given in the table below. The map has been drawn at a scale of 1:5000. It is accurate at this scale, but any enlargement would be misleading. This map supersedes any previous information for this site.

Table 1 : Distribution of Grades and Subgrades

<u>Grade</u>	<u>Area (ha)</u>	<u>% of Agricultural Area</u>
3a	16.2	26.6
3b	44.2	72.6
4	0.5	0.8
Non Agricultural	0.2	
Total area of site	61.1	100.

1.5 Appendix 1 gives a general description of the grades, subgrades and land use categories identified in the survey. The main classes are described in terms of the type of limitation that can occur, the typical cropping range and the expected level and consistency of yield.

1.6 The site has been classified as a mixture of Subgrades 3a and 3b and Grade 4. Subgrade 3a land has been downgraded due to a significant soil droughtiness limitation. Profiles comprise slightly stony topsoils and upper subsoils overlying very stony lower subsoils. Land classified as Subgrade 3b corresponds to profiles with a moderately severe droughtiness limitation, associated with high volumes of flint fragments in the profile. As a consequence reserves of available water for plant growth are severely restricted. In addition, land in the furthest north-east field plus a small area in the south-east of the site can be classed as no better than Subgrade 3b due to high topsoil stone contents. The area of Grade 4 land, occupying the valley bottom, has been downgraded because of extremely stony topsoils.

2.0 Climate

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

2.2 The main parameters used in the assessment of the overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality.

2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met. Office, 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site.

2.4 No local climatic factors such as exposure or frost risk affect the site. However, climatic factors do interact with soil factors to influence soil wetness and droughtiness limitations. At this locality, the field capacity days are relatively high, thus increasing the likelihood of soil wetness.

Table 2 : Climatic Interpolation

Grid Reference :	SU868084
Altitude (m) :	35
Accumulated Temperature (days) :	1508
Average Annual Rainfall (mm) :	848
Field Capacity (days) :	178
Moisture Deficit, Wheat (mm) :	109
Moisture Deficit, Potatoes (mm) :	104
Overall Climatic Grade :	1

3.0 Relief

3.1 The site occupies gently undulating land, rising from 35m AOD in the south to 45m AOD in the north of the survey area. Nowhere on the site does gradient or relief impose any limitation to the land quality.

4.0 Geology and Soil

4.1 BGS Sheet 317, Chichester (1957) shows the underlying geology of the entire site to be Valley Gravel.

4.2 The soil type for the site, as shown on the Soil Survey map of South East England (SSEW, 1983, 1:250,000) comprises the Charity 1 Association. These soils are described as 'well drained fine silty over clayey soils, locally very flinty and some shallow over flint gravel' (SSEW, 1983).

5.0 Agricultural Land Classification

5.1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade are shown on the attached ALC map.

5.2 The location of the soil observation points is shown on the attached sample point map.

Subgrade 3a

5.3 Approximately one quarter of the site has been classed as good quality agricultural land which is limited by soil droughtiness. Pit 2 is typical of Subgrade 3a profiles in the south-east of the site. These comprise slightly stony (6% hard rock > 2cm; 11% total hard rock by volume) medium clay loam topsoils overlying slightly stony (5% hard rock by volume) clay upper subsoils. At approximately 53cm the profile comprises a moderately stony (20% hard rock by volume) clay layer which becomes much more stony at approximately 63cm. The combination of soil textures, profile stone contents, moderate sub-structural conditions and the local climatic regime means that this land can be graded no higher than Subgrade 3a.

5.4 In the western area of the site, droughtiness is also the key limitation. Topsoils comprise slightly stony (6% hard rock > 2cm; 12% total hard rock by volume) medium clay loams and medium silty clay loams. These are underlain by moderately stony (19% hard rock by volume) heavy clay loam upper subsoils and, from approximately 60cm, very stony clay lower subsoils. These profiles are typified by soil inspection pits 5 and 6.

5.5 For both soil types profile characteristics combine with climatic factors to restrict the available water for crops held in the profile, which consequently reduces the range of crops which can be grown. Any crops that are grown are subject to a moderate risk of drought stress.

Subgrade 3b

5.6 Land has been assessed as moderate quality because of a significant droughtiness and/or topsoil stoniness limitation. Land adjacent to the existing pit, in the furthest north-east field of the site, and also a small area in the south-east, can be classed as no better than Subgrade 3b due to the high topsoil stone contents. Hard stones larger than 2cm comprise between 16% and 35% inclusive, by volume, of the top 25cm. The main effects of these stones are to act as a severe impediment to cultivation, harvesting and crop growth.

5.7 The remaining profiles are downgraded to Subgrade 3b because of a significant droughtiness limitation. Topsoils comprise moderately stony (approximately 12% hard rock > 2cm; 30% total hard rock by volume) medium silty clay loam textures. At 30cm depth, profiles become slightly more stony (30-35% hard rock by volume) and were generally impenetrable to an auger. Profiles comprise very stony (50-55% hard rock by volume), heavy textured lower subsoils which due to the stoniness and dry conditions were impenetrable to a pick axe at approximately 60cm depth. Consequently at the time of survey it was impossible to determine soil conditions below 60cm, or assess rooting depths. Thus, soil inspection pits 1, 3 and 4 (which typify such profiles) have been graded on depth reached in the pits. All stone contents were evaluated by dry and/or wet sieving. These profiles are thought to be very drought prone however due to the high total stone volumes throughout. The land is thereby assigned to Subgrade 3b.

Grade 4

5.7 Land occupying the valley bottom can be classed as no better than Grade 4 because of extremely stony topsoils. Hard stones larger than 2cm comprise between 36% and 50% inclusive, by volume, of the top 25cm. This limitation severely impedes cultivation, harvesting and crop growth.

Non-Agricultural

5.8 A small area marked as Non-agricultural is occupied by a small copse.

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Resource Planning Team
Guildford Statutory Group
ADAS Reading

APPENDIX I

DESCRIPTION OF THE GRADES AND SUB-GRADES

Grade 1 : Excellent Quality Agricultural Land

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

Grade 2 : Very Good Quality Agricultural Land

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

Grade 3 : Good To Moderate Quality Agricultural Land

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

Subgrade 3a : Good Quality Agricultural Land

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

Sub-grade 3b : Moderate Quality Agricultural Land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass, or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 : Poor Quality Agricultural Land

Land with severe limitations which significantly restrict the range of crops and/or the level of yields. It is mainly suited to grass with occasional arable crops (eg. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. the grade also includes very droughty arable land.

Grade 5 : Very Poor Quality Agricultural Land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture : housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including : private parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports/airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland.

Agricultural Buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg. polythene tunnels erected for lambing) may be ignored.

Open Water

Includes lakes, ponds and rivers as map scale permits.

Land Not Surveyed

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above, eg. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will be shown.

APPENDIX II

REFERENCES

- * British Geological Survey (1957), Sheet No. 317, Chichester, 1:50,000
- * MAFF (1988), Agricultural Land Classification of England And Wales : Revised guidelines and criteria for grading the quality of agricultural land.
- * Meteorological Office (1989), Climatological Data Sets for Agricultural Land Classification.
- * Soil Survey of England and Wales (1983), Sheet 6, Soils of South East England, 1:250,000 and accompanying legend.

APPENDIX III

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70cm depth for more than 30 days in most years.

Wetness Class II

The soil profile is wet within 70cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 70cm for more than 90 days, but not wet within 40cm depth for more than 30 days in most years.

Wetness Class III

The soil profile is wet within 70cm depth for 91-180 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 70cm for more than 180 days, but only wet within 40cm depth for 31-90 days in most years.

Wetness Class IV

The soil profile is wet within 70cm depth for more than 180 days but not wet within 40cm depth for more than 210 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 40cm depth for 91-210 days in most years.

Wetness Class V

The soil profile is wet within 40cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40cm depth for more than 335 days in most years.

(The number of days is not necessarily a continuous period. 'In most years' is defined as more than 10 out of 20 years.)

APPENDIX IV

SOIL PIT AND SOIL BORING DESCRIPTIONS

- Contents :
- * Soil Abbreviations : Explanatory Note
 - * Soil Pit Descriptions
 - * Database Printout : Boring Level Information
 - * Database Printout : Horizon Level Information

SOIL PROFILE DESCRIPTIONS : EXPLANATORY NOTE

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

Boring Header Information

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

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

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

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

4. GLEY/SPL : Depth in cm to gleying or slowly permeable layers.

5. AP (WHEAT/POTS) : Crop-adjusted available water capacity.

6. MB (WHEAT/POTS) : Moisture Balance.

7. DRT : Best grade according to soil droughtiness.

8. If any of the following factors are considered significant, an entry of 'Y' will be entered in the relevant column.

MREL : Microrelief limitation FLOOD : Flood risk EROSN : Soil erosion risk EXP : Exposure limitation FROST : Frost
DIST : Disturbed land CHEM : Chemical limitation

9. LIMIT : The main limitation to land quality. The following abbreviations are used.

OC : Overall Climate AE : Aspect EX : Exposure FR : Frost Risk GR : Gradient MR : Microrelief
FL : Flood Risk TX : Topsoil Texture DP : Soil Depth CH : Chemical WE : Wetness WK : Workability
DR : Drought ER : Soil Erosion Risk WD : Combined Soil Wetness/Droughtiness ST : Topsoil 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
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 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

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

6. STONE LITH : One of the following is used.

HR : all hard rocks and stones MSST : soft, medium or coarse grained sandstone
SI : soft weathered igneous or metamorphic SLST : soft oolitic or dolimitic limestone
FSST : soft, fine grained sandstone ZR : soft, argillaceous, or silty rocks CH : chalk
GH : gravel with non-porous (hard) stones GS : gravel with porous (soft) stones

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

7. STRUCT : the degree of development, size and shape of soil pedes are described using the following notation:

- degree of development WK : weakly developed MD : moderately developed ST : strongly developed

- ped size F : fine M : medium C : coarse VC : very coarse

- ped shape S : single grain M : massive GR : granular AB : angular blocky SAB : sub-angular blocky PR : prismatic
PL : platy

8. CONSIST : Soil consistence is described using the following notation:

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

9. SUBS STR : Subsoil structural condition recorded for the purpose of calculating profile droughtiness.

G : good M : moderate P : poor

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

11. IMP : If the profile is impenetrable a 'Y' will appear in this column at the appropriate horizon.

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

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

14. 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 : W. SUSSEX MINS - SITE 4 Pit Number : 1P

Grid Reference: SU87150800 Average Annual Rainfall : 848 mm
Accumulated Temperature : 1508 degree days
Field Capacity Level : 178 days
Land Use : Bare Soil
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 22	MZCL	10YR43 00	8	28		WCSAB
22- 42	MZCL	75YR44 00	0	15		MCSAB
42- 55	C	75YR46 00	0	40		

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

Drought Grade : 3B APW : 70 mm MBW : -39 mm
APP : 73 mm MBP : -31 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS - SITE 4 Pit Number : 2P

Grid Reference: SU87500800 Average Annual Rainfall : 848 mm
 Accumulated Temperature : 1508 degree days
 Field Capacity Level : 178 days
 Land Use : Bare Soil
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 33	MCL	10YR43 00	6	11		MCSAB
33- 53	C	10YR46 00	0	5		MCSAB
53- 63	C	10YR56 00	0	20		

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

Drought Grade : 3B APW : 88 mm MBW : -21 mm
 APP : 97 mm MBP : -7 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS - SITE 4 Pit Number : 3P

Grid Reference: SU87150820 Average Annual Rainfall : 848 mm
 Accumulated Temperature : 1508 degree days
 Field Capacity Level : 178 days
 Land Use : Bare Soil
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT. STONE	MOTTLES	STRUCTURE
0- 28	MZCL	10YR42 00	12	30		WMSAB
28- 60	MZCL	75YR43 00	0	30		
60- 65	HCL	10YR64 00	0	50		

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

Drought Grade : 3B APW : 75 mm MBW : -34 mm
 APP : 81 mm MBP : -23 mm

FINAL ALC GRADE : 3B
 MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS - SITE 4 Pit Number : 4P

Grid Reference: SU87150835 Average Annual Rainfall : 848 mm
Accumulated Temperature : 1508 degree days
Field Capacity Level : 178 days
Land Use : Bare Soil
Slope and Aspect : 01 degrees S

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 29	MZCL	10YR43 00	18	30		WCSAB
29- 58	MCL	10YR44 00	0	30		

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

Drought Grade : 3B APW : 69 mm MBW : -40 mm
APP : 73 mm MBP : -31 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS - SITE 4 Pit Number : 5P

Grid Reference: SU86750835 Average Annual Rainfall : 848 mm
Accumulated Temperature : 1508 degree days
Field Capacity Level : 178 days
Land Use : Bare Soil
Slope and Aspect : 01 degrees S

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 30	MCL	10YR42 00	7	14		WDCSAB
30- 65	HCL	10YR44 00	0	20		
65- 70	HCL	10YR44 00	0	50		

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

Drought Grade : 3B APW : 88 mm MBW : -21 mm
APP : 97 mm MBP : -7 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS - SITE 4 Pit Number : 6P

Grid Reference: SU86600815 Average Annual Rainfall : 848 mm
 Accumulated Temperature : 1508 degree days
 Field Capacity Level : 178 days
 Land Use : Bare Soil
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 29	MCL	10YR43 00	5	9		WCSAB
29- 43	HCL	75YR44 00	0	7		WCSAB
43- 58	C	75RY56 54	0	7		MCSAB
58- 90	C	10YR56 00	0	30		

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

Drought Grade : 3A APW : 104mm MBW : -5 mm
 APP : 105mm MBP : 1 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS		
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB						DRT	FLOOD
1	SU87000860	PL0		000	1	2	53	-56	53	-51	4			DR	3B	IMPEN 35	
1P	SU87150800	PL0		000	1	2	70	-39	73	-31	3B			DR	3B	PIT DUG TO 55	
1S	SU87200860	PL0		000	1	2	36	-73	36	-68	4			ST	3A	TOPSOIL STONE	
2	SU87100860	PL0		000	1	2	54	-55	54	-50	4			DR	3B	IMPEN 35	
2P	SU87500800	PL0		000	1	2	88	-21	97	-7	3B			DR	3A	PIT DUG TO 63	
2S	SU87300860	PL0		000	1	2	34	-75	34	-70	4			ST	3B	TOPSOIL STONE	
3	SU87200855	PL0	S	01	000	1	3A	85	-24	90	-14	3B		DR	3A	IMPEN 58	
3A	SU87250860	LIN		000	1	2	49	-60	49	-55	4			DR	4	IMPEN 30	
3P	SU87150820	PL0		000	1	2	75	-34	81	-23	3B			DR	3B	PIT DUG TO 65	
3S	SU87350865	PL0	E	01	000	1	2	33	-76	33	-71	4		ST	3B	TOPSOIL STONE	
4	SU87300855	PL0	S	01	000	1	2	91	-18	103	-1	3A		DR	3A	IMPEN 68	
4P	SU87150835	PL0	S	01	000	1	2	69	-40	73	-31	3B		DR	3B	PIT DUG TO 58	
4S	SU87550870	PL0		000	1	2	43	-66	43	-61	4			ST	3B	TOPSOIL STONE	
5	SU87400860	PL0	S	01	000	1	2	57	-52	57	-47	4		DR	3B	IMPEN 35	
5A	SU87450855	PL0		000	1	2	89	-20	96	-8	3A			DR	3B	IMPEN 60	
5P	SU86750835	PL0	S	01	000	1	2	88	-21	97	-7	3B		DR	3A	PIT DUG TO 70	
5S	SU87500860	PL0	W	03	000	1	2	34	-75	34	-70	4		ST	3B	TOPSOIL STONE	
6	SU86900850	PL0		000	1	2	64	-45	64	-40	3B			DR	3B	IMPEN 40	
6P	SU86600815	PL0		000	1	2	104	-5	105	1	3A			DR	3A	ROOTS 90;PIT90	
6S	SU87400850	PL0		000	1	2	25	-84	25	-79	4			ST	3B	TOPSOIL STONE	
7	SU87000850	PL0		000	1	2	63	-46	63	-41	3B			DR	3B	IMPEN 40	
7S	SU87250845	PL0	S	02	000	1	2	36	-73	36	-68	4		ST	3A	TOPSOIL STONE	
8S	SU87300842	PL0	N	02	000	1	2	32	-77	32	-72	4		ST	3B	TOPSOIL STONE	
9	SU87200850	PL0	S	02	000	1	2	67	-42	67	-37	3B		DR	3B	IMPEN 40	
9S	SU87350842	PL0	W	02	000	1	2	30	-79	30	-74	4		ST	3B	TOPSOIL STONE	
10	SU87300850	PL0	S	01	000	1	2	69	-40	69	-35	3B		DR	3B	IMPEN 40	
10S	SU87300835	PL0	N	02	000	1	2	31	-78	31	-73	4		ST	3B	TOPSOIL STONE	
11S	SU87300834	PL0	N	01	000	1	2	31	-78	31	-73	4		ST	3B	TOPSOIL STONE	
12	SU86700840	PL0		000	1	2	48	-61	48	-56	4			DR	4	IMPEN 30	
12S	SU87220833	PL0	W	01	000	1	2	34	-75	34	-70	4		ST	3B	TOPSOIL STONE	
13	SU86800840	PL0		000	1	2	79	-30	79	-25	3B			DR	3B	IMPEN 50	
13S	SU87220832	PL0	W	01	000	1	2	36	-73	36	-68	4		ST	3A	TOPSOIL STONE	
14S	SU87170827	PL0	W	01	000	1	2	36	-73	36	-68	4		ST	3A	TOPSOIL STONE	
15	SU87000840	PL0		000	1	2	68	-41	68	-36	3B			DR	3B	IMPEN 45	
15S	SU87300831	PL0	N	01	000	1	2	33	-76	33	-71	4		ST	3B	TOPSOIL STONE	
18	SU	0	PL0	N	01	000	1	2	52	-57	52	-52	4		DR	3B	IMPEN 32
20	SU86600830	PL0		000	1	2	102	-7	110	6	3A			DR	3A	IMPEN 80	
21	SU86700830	PL0		000	1	2	79	-30	79	-25	3B			DR	3B	IMPEN 50	
22	SU86800830	PL0		000	1	2	57	-52	57	-47	4			DR	3B	IMPEN 35	
23	SU86900830	PL0		000	1	2	66	-43	66	-38	3B			DR	3B	IMPEN 40	
25	SU87100830	PL0		000	1	2	89	-20	95	-9	3A			DR	3A	IMPEN 60	
28	SU86600820	PL0		000	1	1	67	-42	67	-37	3B			DR	3B	IMPEN 40	

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS	
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB						DRT
29	SU86700820	PLO		000	1	1	69	-40	69	-35	3B			DR	3B	IMPEN 40
30	SU86800820	PLO	01	000	1	1	69	-40	69	-35	3B			DR	3B	IMPEN 40
33	SU87100820	PLO		000	1	2	49	-60	49	-55	4			DR	3B	IMPEN 30
35	SU87300820	PLO		000	1	1	60	-49	60	-44	3B			DR	3B	IMPEN 35
37	SU86600810	PLO		000	1	1	60	-49	60	-44	3B			DR	3B	IMPEN 35
38	SU86700810	PLO		000	1	1	67	-42	67	-37	3B			DR	3B	IMPEN 40
39	SU86800810	PLO		000	1	1	49	-60	49	-55	4			DR	4	IMOEN 30
39A	SU86800810	PLO	01	000	1	1	69	-40	69	-35	3B			DR	3B	IMPEN 40
44	SU87300810	PLO		000	1	1	97	-12	107	3	3A			DR	3A	SEE PIT 2
46	SU87500810	PLO		000	1	2	65	-44	65	-39	3B			DR	3B	IMPEN 40
47	SU87600810	PLO		058	1	3A	82	-27	87	-17	3B			WK	3A	IMPEN 62
48	SU86800860	PLO		000	1	2	62	-47	62	-42	3B			DR	3B	IMPEN 40
49	SU86900800	PLO		000	1	2	48	-61	48	-56	4			DR	4	IMPEN 30
50	SU87000800	PLO		000	1	2	79	-30	79	-25	3B			DR	3B	IMPEN 50
51	SU87100800	PLO		000	1	2	59	-50	59	-45	3B			DR	4	IMPEN 35
52	SU87200800	PLO		000	1	2	63	-46	63	-41	3B			DR	3A	IMOEN 40
53	SU87300800	PLO		000	1	2	62	-47	62	-42	3B			DR	3A	IMPEN 40
54	SU87400800	PLO		000	1	2	60	-49	60	-44	3B			DR	3A	IMPEN 40
56	SU87500800	PLO		000	1	2	81	-28	82	-22	3B			DR	3A	IMPEN 52
57	SU87600800	PLO		000	1	2	78	-31	78	-26	3B			DR	3A	IMPEN 48
58	SU87700800	PLO		000	1	2	94	-15	110	6	3A			DR	3A	IMPEN 70
59	SU87500790	PLO		000	1	2	64	-45	64	-40	3B			DR	3B	IMPEN 40

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED		-----STONES-----			STRUCT/		SUBS				
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
1	0-30	mc1	10YR43 00						7	0	HR	15						
	30-35	hc1	10YR44 00						0	0	HR	20				M		
1P	0-22	mzc1	10YR43 00						8	0	HR	28	WCSAB	FR			Y	
	22-42	mzc1	75YR44 00						0	0	HR	15	MCSAB	FR	M		Y	
	42-55	c	75YR46 00						0	0	HR	40				M		
1S	0-25	mc1	10YR43 00						12	0	HR	22						
2	0-35	mc1	10YR43 00						7	0	HR	15						
2P	0-33	mc1	10YR43 00						6	0	HR	11	MCSAB	FR			Y	
	33-53	c	10YR46 00						0	0	HR	5	MCSAB	FR	M		Y	
	53-63	c	10YR56 00						0	0	HR	20				M		
2S	0-25	mc1	10YR43 00						16	0	HR	26						
3	0-20	hzc1	10YR43 00						3	0	HR	6						
	20-45	c	75YR46 00						0	0	HR	5				M		
	45-58	c	75YR44 00						0	0	HR	25				M		
3A	0-30	mc1	10YR43 00						0	0	HR	9						
3P	0-28	mzc1	10YR42 00						12	0	HR	30	WMSAB	FR			Y	
	28-60	mzc1	75YR43 00						0	0	HR	30				M		
	60-65	hc1	10YR64 00						0	0	HR	50				M		
3S	0-25	mc1	10YR43 00						18	0	HR	28						
4	0-22	mzc1	10YR43 00						3	0	HR	8						
	22-33	mzc1	10YR44 00						0	0	HR	30				M		
	33-60	c	75YR46 00						0	0	HR	5				M	Y	
	60-68	c	75YR46 42						0	0	HR	25				M	Y	
4P	0-29	mzc1	10YR43 00						18	0	HR	30	WCSAB	FR				
	29-58	mc1	10YR44 00						0	0	HR	30				M	Y	
4S	0-32	mc1	10YR43 00						16	0	HR	26						
5	0-30	mzc1	10YR42 00						4	0	HR	12						
	30-35	mzc1	75YR54 00						0	0	HR	25				M		
5A	0-25	mc1	10YR43 00						0	0	HR	6						
	25-35	hc1	10YR44 00						0	0	HR	4				M		
	35-60	c	10YR54 00	00MN00	00	F			0	0	HR	4				M		
5P	0-30	mc1	10YR42 00						7	0	HR	14	WDCSAB	FR				
	30-65	hc1	10YR44 00						0	0	HR	20				M	Y	
	65-70	hc1	10YR44 00						0	0	HR	50				M		

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES-----			STRUCT/ CONSIST	SUBS			SPL	CALC
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR		
5S	0-25	mc1	10YR43 00					16	0	HR	26					
6	0-35	mc1	10YR43 00					0	0	HR	10					
	35-40	hc1	10YR44 00					0	0	HR	8			M		
6P	0-29	mc1	10YR43 00					5	0	HR	9	WCSAB	FR	Y		
	29-43	hc1	75YR44 00					0	0	HR	7	WCSAB	FR M	Y		
	43-58	c	75RY56 54					0	0	HR	7	MCSAB	FR M	Y		
	58-90	c	10YR56 00					0	0	HR	30			M		
6S	0-25	mc1	10YR43 00					38	0	HR	48					
7	0-28	mzc1	10YR42 00					7	0	HR	15					
	28-40	hzc1	10YR44 00					0	0	HR	15			M		
7S	0-25	mc1	10YR43 00					12	0	HR	22					
8S	0-25	mc1	10YR43 00					20	0	HR	30					
9	0-25	mzc1	10YR43 00					2	0	HR	6					
	25-40	hzc1	10YR46 00					0	0	HR	15			M		
9S	0-25	mc1	10YR43 00					25	0	HR	35					
10	0-28	mzc1	10YR42 00					3	0	HR	8					
	28-40	mzc1	75YR46 00					0	0	HR	5			M		
10S	0-25	mc1	10YR43 00					22	0	HR	32					
11S	0-25	mc1	10YR43 00					22	0	HR	32					
12	0-30	mc1	10YR43 00					0	0	HR	12					
12S	0-25	mc1	10YR43 00					15	0	HR	25					
13	0-30	mc1	10YR43 00					0	0	HR	11					
	30-50	hc1	10YR44 00					0	0	HR	5			M		
13S	0-25	mc1	10YR43 00					12	0	HR	22					
14S	0-25	mc1	10YR43 00					12	0	HR	22					
15	0-30	mzc1	10YR42 00					11	0	HR	20					
	30-45	hc1	10YR54 00					0	0	HR	10			M		
15S	0-25	mc1	10YR43 00					18	0	HR	28					
18	0-32	mzc1	10YR42 00					10	0	HR	15					

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED		----STONES----			STRUCT/ CONSIST	SUBS				
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR	IMP	SPL
20	0-35	mc1	10YR43 00						0	0	HR	9					
	35-45	hc1	10YR44 00						0	0	HR	5					M
	45-80	c	10YR54 00						0	0	HR	9					M
21	0-30	mc1	10YR43 00						0	0	HR	9					
	30-50	c	10YR54 00						0	0	HR	8					M
22	0-35	mc1	10YR43 00						0	0	HR	10					
23	0-40	mc1	10YR43 00						0	0	HR	9					
25	0-30	mzc1	10YR42 00						7	0	HR	15					
	30-60	mzc1	10YR54 00						0	0	HR	10					M
28	0-20	mzc1	10YR34 00						0	0	HR	10					
	20-40	hzc1	10YR44 00						0	0	HR	5					M
29	0-20	mzc1	10YR34 00						0	0	HR	5					
	20-40	hzc1	10YR44 00						0	0	HR	5					M
30	0-40	mzc1	10YR34 00						0	0	HR	10					
33	0-30	mzc1	10YR42 00						7	0	HR	15					
35	0-35	mzc1	10YR44 00						6	0	HR	11					
37	0-35	mzc1	10YR33 00						0	0	HR	10					
38	0-20	mzc1	10YR34 00						0	0	HR	10					
	20-40	hzc1	10YR33 00						0	0	HR	5					M
39	0-30	mzc1	10YR34 00						0	0	HR	15					
39A	0-40	mzc1	10YR34 00						0	0	HR	10					
44	0-25	mzc1	10YR44 00						6	0	HR	11					
	25-45	mzc1	10YR46 00						0	0	HR	5					M
	45-65	hzc1	10YR46 00						0	0	HR	5					M
46	0-30	mzc1	10YR43 00						2	0	HR	10					
	30-40	mc1	10YR46 00						0	0	HR	15					M
47	0-28	hc1	10YR43 00						4	0	HR	12					
	28-58	ms1	10YR44 00						0	0	HR	20					M
	58-62	c	10YR53 00	10YR56 00	M			Y	0	0	HR	8					M
48	0-40	mc1	10YR44 00						0	0	HR	15					

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS			CALC
				COL	ABUN	CONT		GLEY	>2	>6		LITH	TOT	STR	
49	0-30	mc1	10YR43 00					0	0	HR	12				
50	0-30	mc1	10YR44 00					0	0	HR	10				
	30-50	hc1	10YR54 00					0	0	HR	5			M	
51	0-30	mc1	10YR43 00					8	0	HR	18				
	30-40	hc1	10YR54 00					0	0	HR	15			M	
52	0-30	mc1	10YR43 00					5	0	HR	10				
	30-40	hc1	10YR54 00					0	0	HR	10			M	
53	0-30	mc1	10YR43 00					4	0	HR	10				
	30-40	hc1	10YR54 00					0	0	HR	20			M	
54	0-28	mc1	10YR43 00					4	0	HR	15				
	28-40	c	10YR44 00					0	0	HR	15			M	
56	0-30	mc1	10YR43 00					4	0	HR	10				
	30-52	hc1	10YR44 00					0	0	HR	5			M	
57	0-30	mc1	10YR43 00					2	0	HR	7				
	30-48	hc1	10YR44 00					0	0	HR	5			M	
58	0-30	mc1	10YR43 00					2	0	HR	10				
	30-48	hc1	10YR44 00					0	0	HR	10			M	
	48-70	c	10YR46 00					0	0	HR	2			M	
59	0-28	mc1	10YR43 00					2	0	HR	7				
	28-40	hc1	10YR44 00					0	0	HR	10			M	