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Tinkers Barn, Guiting Power

Agricultural Land Classification and Statement of Site Physical Characteristics

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Resource Planning Team
Bristol
FRCA Western Region

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AGRICULTURAL LAND CLASSIFICATION SURVEY AND STATEMENT OF SITE PHYSICAL CHARACTERISTICS

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AGRICULTURAL LAND CLASSIFICATION SURVEY AND STATEMENT OF SITE PHYSICAL CHARACTERISTICS

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 13.0 ha of land at Tinkers Barn, Guiting Power. Field survey was based on 16 auger borings and 2 soil profile pits, and was completed in August 1997. During the survey 2 samples were analysed for particle size distribution (PSD).

2. The survey was originally conducted by the Resource Planning Team of FRCA Western Region on behalf of MAFF in its statutory role in the preparation of Gloucestershire Minerals Plan. The relevant data has been lifted directly from that survey to form the current report which is in connection with an application to the Minerals Planning Authority under the Town and Country Planning Act, 1990. This is understood to involve the systematic shallow quarrying of the entire site for roofing slate and walling stone.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as Grade 3, the site had not been surveyed previously. However, the current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF, 1988) and supersedes any previous ALC survey. Grade descriptions are summarised in Appendix I.

4. A number of previous surveys have been carried out on sites nearby at Huntsman's Quarry (ADAS, 1989, 1994) and one at Brockhill Quarry (ADAS, 1994). The findings of these surveys have been taken into account when grading land in the current survey.

5. At the time of survey land cover was oilseed rape.

SUMMARY

6. The distribution of ALC grades is shown on the accompanying 1:10 000 scale ALC map. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas. Areas are summarised in the Table 1.

Table 1: Distribution of ALC grades: Tinkers Barn, Guiting Power

Grade	Area (ha)	% Surveyed Area (12.9 ha)
3a	2.2	17
3b	10.7	83
Other land	0.1	
Total site area	13.0	

7. This shows that only 17% of the area surveyed was found to be best and most versatile. This is shown as Subgrade 3a with a primary limitation due to restricted workability. The remainder of the site is shown as Subgrade 3b limited by topsoil stoniness and droughtiness.

CLIMATE

8. Estimates of climatic variables for this site were derived from the published agricultural climate dataset "Climatological Data for Agricultural Land Classification" (Meteorological Office, 1989) using standard interpolation procedures. Data for key points around the site are given in Table 2 below.

9. Since the ALC grade of land is determined by the most limiting factor present, overall climate is considered first because it can have an overriding influence by restricting land to a lower grade despite more favourable site and soil conditions. Parameters used for assessing overall climate are accumulated temperature, a measure of relative warmth and average annual rainfall, a measure of overall wetness. The results shown in Table 2 indicate that there is an overall climatic limitation which limits the land to Grade 2.

10. Climatic variables also affect ALC grade through interactions with soil conditions. The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes, which are compared with the moisture available in each profile in assessing soil droughtiness limitations. These are described in later sections.

Table 2: Climatic Interpolations: Tinkers Barn, Guiting Power

Grid Reference		SP 112 260	
Altitude (m)		245	230
Accumulated Temperature (day °C)		1235	1252
Average Annual Rainfall (mm)		810	805
Overall Climatic Grade		2	2
Field Capacity Days		183	082
Moisture deficit (mm):	Wheat	76	78
	Potatoes	58	61

RELIEF

11. Altitude ranges from 230 - 245 m, with gentle and moderate slopes which are not limiting.

GEOLOGY AND SOILS

12. The underlying geology of the site is shown on the published geology map (IGS, 1978) as Great Oolite, which is Jurassic Limestone. This was borne out by the recent ALC survey.

13. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as the Elmton 1 Association with small areas of Sherborne Association. More detailed soils information is also available in the 1:25 000 scale survey of the Stow on the Wold area, Soils in Gloucestershire II (SSEW, 1978).

14. The Elmton 1 Association is described as having variably shallow well drained brashy calcareous fine loamy soils over limestone. The Sherborne association is developed on Jurassic limestone with thin interbedded clays which give considerable soil variation although generally the soils are described as shallow well drained brashy calcareous clayey soils over limestone.

15. The recent survey found soils in this field to have mainly heavy silty clay loam topsoil texture which were also very stony and consistent with the description for Sherborne Association. Soils with deeper topsoils and less stones were found in the south east corner of the field although the distribution is somewhat patchy.

AGRICULTURAL LAND CLASSIFICATION

16. The distribution of ALC grades found by the current survey is shown on the accompanying 1:10 000 scale map and areas are summarised in Table 1. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas.

Subgrade 3a

17. In the small area of Subgrade 3a shown in the south east corner of the field, soils were found to have a variably stony heavy or medium silty clay loam topsoil which was somewhat deeper than in the Subgrade 3b, at around 25 cm. The upper subsoil to around 50 cm was only slightly stony heavy clay loam, and this in turn was overlying fissured limestone in the lower subsoil. This is illustrated by Pit 4, which although in itself was assessed as Grade 2, was included within a Subgrade 3a mapping unit where the primary limitation was found to be due to restricted workability owing to the heavy silty clay loam topsoils. Pit 5, although not within this site, is perhaps more typical of this Subgrade 3a mapping unit and is included in the supporting data for this reason.

Subgrade 3b

18. Although auger borings in the area shown as Subgrade 3b were generally impenetrable below the topsoil, examination of profile pits in this field and in the surrounding area allowed the assessment of subsoil conditions and stone contents by sieving. This found topsoil stone contents, retained on a 2 cm sieve, ranging from just over 15% to 20% by volume. Total subsoil stone contents below around 20 cm varied little at 70% to 90%. Typical soils in this mapping unit are therefore limited by topsoil stone content and droughtiness, where the available water for the profile was generally calculated to around 100 cm. This is illustrated by Pit 3.

SOIL RESOURCES

19. The site has been divided into two distinct areas, shown as Soil Units on the attached map of soil resources. This is not a soil stripping map but is intended to illustrate the soil resources available for restoration.

Soil Unit I

20. This unit extends to 10.7 ha or 83% of the site. Topsoil was found to be consistently around 20 cm deep, calcareous mainly heavy silty clay loam, dark brown 75YR33 and friable with moderately developed medium to coarse granular or fine to medium subangular blocky structure. Total stone content assessed by sieving was found to be 30-35% with typically 16-18% being over 2cm. Abrupt or clear smooth boundary. This information is derived from Pit 3 and other pits in similar profiles nearby.

21. An upper subsoil was distinguished at pit sites, extending to around 40 cm. This was generally heavy clay loam, mid brown 7.5YR43/44 and with common or many fine roots. With total stone contents around 70% it was difficult to assess structure, although at Pit 3 it was described as moderately developed medium granular to fine subangular blocky. Clear or gradual smooth boundary.

22. Any lower subsoil, or soil forming material, is scarcely distinguished from underlying fissured rock, except by the presence of few or common very fine roots. Colour was typically 2.5Y64/74 and stone content around 80%. Soil matrix variable in texture ranging from clay to coarse sandy loam, sandy clay loam at Pit 3.

Soil Unit II

23. This unit was identified at the lower end of the field and is characterised by a deeper topsoil and a deeper topsoil with a lower topsoil stone content at 12 to 20% by volume. Of this only 3% was assessed as medium stones greater than 2 cm at Pit 5. Topsoil texture can be lighter and was assessed as medium silty clay loam at Pit 4. Otherwise similar to the topsoil in Unit I. However, surface evidence and auger borings suggest that the distribution and horizon depths of this soil unit can be patchy.

24. An upper subsoil with only 5 to 12% stone content was found to extend to 47 or 50cm at Pits 4 and 5. This was mid brown 7.5YR43 heavy clay loam or heavy silty clay loam with moderately developed coarse subangular blocky structure, friable consistence and common fine and very fine roots.

25. A lower subsoil extending to around 100 cm was , at least in Pit 5, identified with common fine and very fine roots despite around 75% stone content. The matrix was consistently heavy clay loam, 10YR54 and firm but too stony to assess structure. Although most profile pits showed no evidence of wetness, two pits adjacent to this site showed few or common ochreous mottles in the lower subsoil, but were still assessed as Wetness Class I.

26. In both units the parent material to 120 cm is fissured limestone with very few if any roots visible. However some fine matrix can be seen in fissures and could be as much as 20% by volume.

Table 3: Soil Resources: Tinkers Barn, Guiting Power

Map Unit	Depth, cm	Area, ha	Texture	Stones %	Volume, m^3
Topsoil					
I	0-20	10.7	HCL/HZCL	30-35	21 400
II	0-25	2.2	H/MZCL	15	5 500
				Total topsoil	26 900 m^3
Subsoil					
I	20-40	10.7	HCL	70	21 400
	40-90	10.7	SCL variable	80	53 500
II	25-50	2.2	HCL	10	5 500
	50-100	2.2	HCL variable	75	11 000
				Total subsoil	91 400m^3

27. Depths and volumes quoted should be treated with caution due to soil variability. Soil resources may extend below 120cm.

RESTORATION

28. The working method described in Section 10 of the Planning Application and the proposals for restoration and aftercare in Section 11 are considered appropriate.

29. However, the critical limitations to land quality are topsoil depth and stone content, and the success of restoration will depend on sensitive stripping of topsoil to preserve as much as possible for restoration, while not contaminating it with stony subsoil. Stripping depth should be determined by visual assessment based on stone content rather than to a specific depth.

30. Soil Unit II is characterised by a rather deeper topsoil and upper subsoil to around 50 cm with lower stone content. This could be restored to a small area of Subgrade 3a but if the area of this application is to be worked and restored in isolation, the area of Subgrade 3a at 2.2 ha would not make a viable field unit. The deeper topsoil and upper subsoil should therefore be used to improve the restored profile over the whole field. The small quantity of better subsoil in Unit II should be stored separately and placed below topsoil during restoration.

31. There may also be opportunity to set aside relatively stone free soil forming material from within the parent material, if this is found during quarrying. It is understood that this has been used at Huntsman's Quarry to improve the quality of restoration. Such material will be relatively inert and should be used as a subsoil or mixed with subsoil material during restoration.

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Resource Planning Team
FRCA Bristol
8 October 1997

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APPENDIX I

DESCRIPTION OF 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 include 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 and horticultural crops can usually be grown but on some land in 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. Where 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 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 most 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.

Source: MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land, MAFF Publications, Alnwick.

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile.

Wetness Class I

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

Wetness Class 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 not wet within 40 cm depth for more than 30 days in most years.

Wetness Class 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 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 and 90 days in most years.

Wetness Class IV

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

Wetness Class V

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

Wetness Class VI

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

Notes: The number of days specified is not necessarily a continuous period.

'In most years' is defined as more than 10 out of 20 years.

Source: Hodgson, J M (Ed) (1997) Soil Survey Field Handbook. Soil Survey Technical Monograph No 5, SSLRC, Cranfield University.

APPENDIX III

ABBREVIATIONS AND TERMS USED IN SURVEY DATA

Soil pit and auger boring information collected during ALC survey is held on a computer database and is reproduced in this report. Terms used and abbreviations are set out below. These conform to definitions contained in the Soil Survey Field Handbook (Hodgson, 1997).

1. Terms used on computer database, in order of occurrence.

GRID REF: National 100 km grid square and 8 figure grid reference.

LAND USE: At the time of survey

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

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

GLEY, SPL: Depth in centimetres to gleying or slowly permeable layer.

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

MB (WHEAT/POTS): Moisture Balance. (Crop adjusted AP - crop potential MD)

DRT: Best grade according to soil droughtiness.

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				

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				

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)

MOTTLE COL: Mottle colour using Munsell notation.

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%+

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.

PED. COL: Ped face colour using Munsell notation.

GLEY: If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

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 or metamorphic rock

Stone contents are given in % by volume for sizes >2cm, >6cm and total stone >2mm.

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

Degree of development	**WA:**	Weakly developed Adherent	**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		

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		

SUBS STR: Subsoil structural condition recorded for the purpose of calculating profile droughtiness: **G:** Good **M:** Moderate **P:** Poor

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

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

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

CALC: If the soil horizon is calcareous with naturally occurring calcium carbonate exceeding 1% a 'Y' will appear this column.

2. Additional terms and abbreviations used mainly in soil pit descriptions.

STONE ASSESSMENT:

VIS:	Visual	**S:**	Sieve	**D:**	Displacement

MOTTLE SIZE:

EF:	Extremely fine <1mm	**M:**	Medium 5-15mm
VF:	Very fine 1-2mm>	**C:**	Coarse >15mm
F:	Fine 2-5mm		

MOTTLE COLOUR: May be described by Munsell notation or as ochreous (OM) or grey (GM).

ROOT CHANNELS: In topsoil the presence of 'rusty root channels' should also be noted.

MANGANESE CONCRETIONS: Assessed by volume

N:	None		**M:**	Many	20-40%
F:	Few	<2%	**VM:**	Very Many	>40%
C:	Common	2-20%			

STRUCTURE: Ped Development *

WA:	Weakly adherent	**M:**	Moderately developed
W:	Weakly developed	**S:**	Strongly developed

POROSITY:

P:	Poor	- less than 0.5% biopores at least 0.5mm in diameter
G:	Good	- more than 0.5% biopores at least 0.5mm in diameter

ROOT ABUNDANCE:

The number of roots per $100cm^2$:		Very Fine and Fine	Medium and Coarse
F:	Few	1-10	1 or 2
C:	Common	10.25	2 - 5
M:	Many	25-200	>5
A:	Abundant	>200	

ROOT SIZE

VF:	Very fine	<1mm	**M:**	Medium	2 - 5mm
F:	Fine	1-2mm	**C:**	Coarse	>5mm

HORIZON BOUNDARY DISTINCTNESS:

Sharp:	<0.5cm	**Gradual:**	6 - 13cm
Abrupt:	0.5 - 2.5cm	**Diffuse:**	>13cm
Clear:	2.5 - 6cm		

HORIZON BOUNDARY FORM: Smooth, wavy, irregular or broken.*

* See Soil Survey Field Handbook (Hodgson, 1997) for details.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Huntsman's Quarry 97	Pit 3 ASP 16-26	1° South	OSR	Av Rainfall: 803 mm ATO: 1258 day °C	Oolitic Limestone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 180 Climatic Grade: 1 Exposure Grade: 2	PSD SAMPLES TAKEN
53/97	14/8/97	SP 1129 2606	PB/SH		TS 0-20 cm HCL (S:25; Z:45; C:30)

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	20	HCL	75YR33	16% > 2cm (S) 21% < 2cm (S+D) 37% HR	0	0	MDCGR	Fr	G	G	MF + VF	Y	Clear smooth
2	40	HCL	75YR43	50% >2 cm (S) 18% < 2cm (S+D) 68% HR	0	0	MD MGR-FSAB	Fr	G	G	MVF	Y	Clear smooth
3	105	SCL	10YR64	70% > 2cm (S) 6% < 2cm (S+D) 76% HR	0	0	Too stony to determine	Fr	(M)	G	CVF	Y	Gradual smooth
4	Shattered Rock		25Y74								None seen		

Profile Gleyed From: -

Depth to Slowly Permeable Horizon: -

Wetness Class: I

Wetness Grade: 3a

Available Water	Wheat:	58 mm
	Potatoes:	51 mm
Moisture Deficit	Wheat:	78 mm
	Potatoes:	61 mm
Moisture Balance	Wheat:	-20 mm
	Potatoes:	-10 mm

Droughtiness Grade: 3b (Calculated to 105 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Dr, St

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Huntsman's Quarry 97	Pit 4 (ASP 58)	1° South	OSR	Av Rainfall: 803 ATO: 1258 °C	Oolitic Limestone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 180 Climatic Grade: 2	PSD SAMPLES TAKEN
53/97	14/8/97	SP 1135 2570	SH/PB	Exposure Grade: 1	TS 0-25 cm MZCL (S:16; Z:62; C:22)

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size, Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	25	MZCL	7.5YR33	20% HR (VIS)	0	0	MMSAB	Fr*	-	-	CF, MVF	Y	Clear smooth
2	50	HCL	7.5YR43	5% HR (VIS)	0	0	MCSAB	Fr*	M	G	CVF, FF	Y	Clear smooth
3	80	HCL	7.5YR43	75% HR (VIS)	0	0	Too stony	Fm	(M)	G	CF, VF	Y	Grad smooth
4	120	C	10YR54	70% HR (VIS)	0	0	Too stony	Fm	(M)	G	FF	Y	

Profile Gleyed From: -

Depth to Slowly Permeable Horizon: -

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 94 mm

Potatoes: 84 mm

Moisture Deficit Wheat: 78 mm

Potatoes: 61 mm

Moisture Balance Wheat: +16 mm

Potatoes: +23 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 2

Main Limiting Factor(s): Wk, Dr

Remarks: Cleaned up pit
*H1, H2 Consistence friable when moist

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Huntsman's Quarry 97	Pit 5 (ASP 71)	1° South	Cereal	Av Rainfall: 803 mm ATO: 1258 day °C	Oolitic limestone
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 180 Climatic Grade: 2 Exposure Grade: 1	PSD SAMPLES TAKEN
53/97	14/8/97	SP 1155 2565	SH/PB		TS 0-25 cm HZCL (S:16; Z:52; C:32)

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	30	HZCL	10YR33	3% >2cm (S) 9% < 2cm (S+D) 12% HR	0	0	MMSAB	Fr*	-	-	CF, MVF	Y	Clear smooth
2	47	HZCL	7.5YR43	12% HR (VIS)	0	0	MCSAB	Fr*	M	G	CVF, FF	Y	Clear smooth
3	100	HCL	10YR54	65% > 2cm (S) 11% < 2cm (S+D) 76% HR	0	0	Too stony	Fm	(M)	G	CF, VF	Y	Grad smooth
4	120	CSL	2.5Y73	80% HR (VIS)	FFFO 7.5YR56	0	Too stony	Fr	(M)	G	None sen	Y	

Profile Gleyed From: -

Depth to Slowly Permeable Horizon: -

Wetness Class: I

Wetness Grade: 3a

Available Water Wheat: 97 mm

Potatoes: 87 mm

Moisture Deficit Wheat: 78 mm

Potatoes: 61 mm

Moisture Balance Wheat: +19 mm

Potatoes: +26 mm

Droughtiness Grade: 2 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wk

Remarks: