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Bideford

Agricultural Land Classification

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BIDEFORD

AGRICULTURAL LAND CLASSIFICATION SURVEY

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BIDEFORD

AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 1205 ha of land around Bideford, North Devon. It includes the environs of Bideford, Appledore, Northam and East-the-Water. Field survey was based on 405 auger borings and 28 soil profile pits, and was completed in October 1996. During the survey 35 samples, mainly of topsoil, were analysed for Particle Size Distribution (PSD).

2. The survey was conducted by the Resource Planning Team of ADAS Taunton Statutory Group on behalf of MAFF Land Use Planning Unit in its statutory role in the preparation of the Torridge Local Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant sections. Apart from the published regional ALC map (MAFF, 1977) which shows the site at a reconnaissance scale, the site was previously surveyed in 1979 at a scale of 1:25 000 (ADAS, 1979). The regional map shows mostly Grade 3 land, with some areas of Grade 2 near Moreton Park and Kenwith Castle, and Grade 4 land in the river valley north of East-the-Water and adjacent to Northam Burrows. However, the current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF, 1988) and supersedes these previous ALC surveys. Grade descriptions are summarised in Appendix I.

4. At the time of survey land cover was mainly permanent grazing and winter cereal production. There were also areas of maize and fodder crop cultivation. An area of 38 ha of agricultural land within the survey area, at West Pusehill, Northam and East-the Water, was not surveyed because of access restrictions. Other land which was not surveyed included woodland, agricultural buildings and residential areas.

SUMMARY

5. The distribution of ALC grades is shown on the accompanying 1:20 000 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.

6. Half (50 %) of the agricultural land surveyed was found to be 'best and most versatile'. The majority of this has been classified as Subgrade 3a (good quality) with some areas of Grade 2 (very good quality). The remainder of the site is mapped as Subgrade 3b (moderate quality), with small localised areas of Grades 4 and 5 (poor and very poor quality).

7. The areas of Grade 2 land (7 %) have only minor limitations to their agricultural use. The main limiting factor is droughtiness. This occurs where deep well drained profiles overlie the fractured shale bedrock. There is enough soil resource above the bed rock, and the degree to which rock is fractured allows good root penetration, that the potential crop moisture requirements are virtually met.

Table 1: Distribution of ALC grades: Bideford

Grade	Area (ha)	% Surveyed Area (888 ha)
2	68	7
3a	380	43
3b	337	38
4	98	11
5	5	1
Agricultural land not surveyed	38	-
Other land	279	-
Total site area	1205	100

8. The small Grade 2 mapping unit adjacent to Northam Burrows has minor wetness and exposure limitations. Here there is a slowly permeable clay lower subsoil which restricts the drainage of the profiles. The upper horizons of the profiles have lighter textures with material being eroded from the burrows. The prevailing salt laden winds would also place a restriction upon yields and crop choice.

9. The Subgrade 3a land (43 %) has three different types of limitation which are variable in distribution due to the varied nature of the local geology. Some areas are well drained but shallow over bedrock. In these profiles the increased stone contents will reduce the amount of available soil moisture to such an extent that the soils will not be able to meet the potential crop moisture requirements throughout the year, thus reducing crop yields and affecting the choice of some crops.

10. Where the topsoil textures are heavy clay loam, but the profile is still well drained, the interaction of the topsoil with the relatively high local rainfall will cause a moderate workability limitation . This reduces the amount of time when the land will be in a suitable condition for certain cultivations, trafficability and livestocking.

11. Also within these mapping units are areas of poorly drained soils which have a moderate wetness limitation. These profiles have medium clay loam topsoils over permeable upper subsoils but with impaired drainage in the lower subsoils. This will have affects similar to those of the workability limitation.

12. Most of the Subgrade 3b land has a moderate wetness limitation. Compared to the Subgrade 3a profiles these profiles have heavier topsoil textures, or have gleying and slowly permeable layers starting higher up the profile. Yields may be reduced to a greater extent and the window for working or stocking the land will be smaller. Some small areas are limited by their gradient which will restrict the safe and accurate use of some agricultural machinery,

while other localised areas have a moderate drought limitation. Here the stone content of the upper horizons is greater, and the bedrock is found higher up the profile than in the Grade 2 and Subgrade 3a droughty mapping units.

13. The two larger Grade 4 mapping units have severe wetness limitations. These profiles have shallow organic or clay topsoils, over clay subsoils with severely restricted drainage. Within the eastern mapping unit some of the borings have heavy silty clay loam topsoils and are Subgrade 3b but these areas were too small to map at this level of survey. The limitations will be similar to those already mentioned but there will be significant restrictions on the choice of crop and/or the level of yields.

14. The smaller Grade 4 mapping units and the areas of Grade 5 land have severe and very severe limitations due to gradient. The steep slopes will prevent the safe and accurate use of certain agricultural machinery.

CLIMATE

15. 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.

Table 2: Climatic Interpolations: Bideford

Grid Reference		SS 429 256	SS 462 271	SS 475 252
Altitude (m)		100	5	115
Accumulated Temperature (day °C)		1482	1589	1464
Average Annual Rainfall (mm)		1039	910	990
Overall Climatic Grade		1	1	1
Field Capacity Days		211	189	201
Moisture deficit (mm):	Wheat	84	101	84
	Potatoes	72	92	72

Grid Reference		SS 461 307	SS 440 285	SS 430 266
Altitude (m)		55	85	50
Accumulated Temperature (day °C)		1531	1498	1539
Average Annual Rainfall (mm)		914	966	999
Overall Climatic Grade		1	1	1
Field Capacity Days		187	196	204
Moisture deficit (mm):	Wheat	96	90	92
	Potatoes	87	79	81

16. 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 no overall climatic limitation.

17. Climatic variables also affect the ALC grade through interactions with soil conditions. The most important interactive variables are Field Capacity (FC) days which are used in assessing soil wetness and potential soil Moisture Deficits (MD) 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. Potentially critical boundaries of 200 FC days were found to the south east of East-the Water, at an altitude of around 105 meters Above Ordnance Datum (AOD), and near Abbotsham at an altitude of around 35 to 45 meters AOD.

18. Although most of the site is close to the coast much of it is sheltered from exposure by the intervening high ground. Exceptions are on ground to the north of Northam and on some of the higher hill tops. The only land to have a limitation due to exposure is to the west of Appledore, adjacent to Northam Burrows.

RELIEF

19. Altitude ranges from 5 metres along the edge of Northam Burrows to 115 metres near Woodville Farm to the south west of East-the-Water. Gradients within the survey area vary from gently (2-3°) and moderately (4-7°) sloping cultivated agricultural land to strongly (8-11°), moderately strongly (12-15°) and steeply (16-25°) sloping pasture and woodland.

20. Land in the flat valley bottoms of the two tributaries of the River Torridge, to the north of East-the-Water and to the north of Bideford's town centre, both experience winter flooding. However, this is not the overall limiting factor due to the soil types and their associated drainage which are found in these locations.

GEOLOGY AND SOILS

21. The underlying geology of the site shown on the published geology map (IGS, 1977) is a combination of Upper Carboniferous sandstones, siltstones and shales. The northern and southern part of the site are mapped as the Crackington Formation with the central area, from Northam and Buckleigh to Bowood Plantations and Moreton Park, being mapped as the Bideford Formation. A small area of alluvium is mapped in the valley of the River Torridge's tributary to the north of East-the-Water.

22. The parent material of the soils that were found during the recent survey fully match the published geology. Soils probably derived from alluvium were also found in the flat valley bottom the north of Bideford's town centre. By their nature, the Crackington and Bideford Formations are very variable with both shale and sandstone being found in the same soil profiles.

23. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983). This shows the flat northern fringe of the site, adjacent the Northam Burrows, as belonging to the Hallsworth 2 Association. The higher ground at Appledore through to Pusehill and Fordlands is mapped as the Neath Association, with the rest of the site southwards being mapped as the Denbigh 2 Association. A small area of soils from the Manod Association are mapped around Upcott and along the very southern edge of the site to Abbotsham Cross.

24. Soils from the Denbigh 2, Manod and Neath Associations are all described as being well drained, fine loamy or fine silty soils over rock. The Neath soils being developed over sandstones and shales, and the Manod and Denbigh 2 soils over slates, mudstones and siltstones. The Manod soils can be shallow in places while the Neath and Denbigh 2 soils have patches of slowly permeable layers and are affected by groundwater respectively. The Hallsworth 2 soils are described as being slowly permeable, seasonally waterlogged clayey, fine loamy and fine silty soils.

25. For the most part the recent ALC survey found variable, well drained but shallow and poorly drained loamy soils which coincide with those of the Denbigh 2, Manod, and Neath Associations. The soils adjacent to the burrows, although poorly drained in places, also had relatively deep and well drained sandy profiles. In the two flat tributary valleys of the River Torridge poorly drained, silty clay soils were found.

AGRICULTURAL LAND CLASSIFICATION

26. The distribution of ALC grades found by the current survey is shown on the accompanying 1:20 000 scale map and areas are summarised in Table 1, on Page 2. 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.

Grade 2

27. The areas of Grade 2 land in the Buckleigh, Bowden and Upcott, and Warmington areas have minor drought and workability limitations. The profiles are well drained with medium clay loam topsoils and were assessed as Wetness Class I (see Appendix 2). With the relatively wet local climatic conditions this will reduce the amount of time that the ground is in a workable condition. In a few small areas the topsoil textures were close to being heavy clay loams which would increase this to a Subgrade 3a limitation.

28. The profiles are relatively shallow with fractured shale bedrock (over 70 % by volume) being found at 40 - 45 cm. Due to the highly fissured and fractured nature of the bedrock, roots were observed to below 80 cm in the profiles. The large amount of rock in the profiles (5 - 10 % in the topsoils and up to 55 % in the upper subsoils) will slightly reduce the amount of available moisture in the profile and the soils will not be able to meet the potential crop moisture requirements throughout the year. This is likely to have the effect of slightly restricting the level of consistency of crop yields in most years. Pits 13, 21 and 26 were examined in these mapping units.

29. The Grade 2 mapping unit on the edge of Northam Burrows, near Appledore, has a minor wetness limitation. The profiles have medium sandy loam topsoils, where material has been eroded from the adjacent Northam Burrows, over light textured upper subsoils and heavier clayey lower subsoils. The profiles are gleyed below 40 cm and have slowly permeable layers starting below 70 cm. They were assessed as being Wetness Class II. Pit 6 is an example of this mapping unit which was dug on the edge of this unit and has been included in a Subgrade 3a management mapping unit. At Pit 24 the slowly permeable lower subsoil was found higher up the profile than in the surrounding auger borings so although it was assessed as Wetness Class III, Subgrade 3a it has been include in the Grade 2 mapping unit. It was assumed that while a limitation due to exposure may restrict the land to Grade 2 it would be no worse than this.

Subgrade 3a

30. There are three main types of profile mapped as Subgrade 3a but they are variable in distribution due to the variable nature of the geology. Areas with a moderate drought limitation, which will give moderate to high yields of some crops, were found south east of East-the-Water, near Cammaton Road and at Badgers Hill. These areas are represented by Pits 20 and 27. They have medium and heavy clay loam topsoils respectively, and were assessed as Wetness Class I. Stone contents of 10 and 12 % by volume were found in the topsoils, with fractured shale bedrock, 60 - 80 % by volume, starting at 20 - 35 cm. The available water calculations were calculated to depths of 80 and 100 cm.

31. Some areas have fewer stones in the upper horizons with the fractured bedrock being found further down the profiles. These profiles are relatively deep and being well drained were assessed as Wetness Class I. They have heavy clay loam topsoils which restricts the amount of time when the ground is in a workable condition to a greater extent than that mentioned in Paragraph 25 which may influence the choice of crops and cultivations. Pits representing these mapping units were examined to the north of Kenwith castle, south east of Silford Cross, north of, and south east of Warmington and south of Rickard's Down.

32. Also within the site are areas developed over weathered shale which have a moderate wetness limitation. These were found throughout the site with representative pits being examined at Bowden, near the Royal Devon Golf Club, above Abottsham, south of Fordlands Farm and north of Fordlands. All of the pits had medium clay loam topsoils and were assessed as Wetness Class III. Gleying was present in the lower subsoils, starting below 40 cm and slowly permeable layers were also identified, starting at 45 - 60 cm. This will affect the choice of crops, timing and type of cultivation, harvesting or the level of yield.

Subgrade 3b

33. The majority of the land in the Subgrade 3b mapping units has a moderate wetness limitation. This will reduce yields to moderate or low levels depending on the crop as well as affecting the timing and type of cultivation and harvesting. The profiles fall into two categories. The first are similar to the ones mentioned in Paragraph 30 in terms of their drainage regime but have heavy clay loam topsoils. The second category has drainage which is restricted to a greater extent than the Subgrade 3a land but with lighter topsoils, being medium clay loams. They are gleyed above 40 cm and have slowly permeable layers starting

above 52 - 56 cm (the exact depth varies across the site as the FC days change across the site). These profiles were assessed as Wetness Class IV.

34. There are localised areas which have moderate drought or soil depth limitation. In these instances the bedrock is found much closer to the surface. There are moderate restrictions on the available moisture within the soil and the type of cultivations which can be undertaken.

35. The land mapped as Subgrade 3b in certain areas of the site has a moderate limitation to its agricultural use due to its gradient. The gradients found during the survey of 8-11° will restrict the safe and accurate use of some agricultural machinery, thus restricting cropping practises.

36. Two small areas of Grade 4 land with severe wetness limitations, near Boxwood Plantations and Kenwith Castle were included in Subgrade 3b mapping units. It was not appropriate to map them individually at this level of survey.

Grade 4

37. There are two types of mapping unit within this grade. The land in the flat tributary valleys of the River Torridge has a severe wetness limitation. These profiles have organic medium clay loam topsoils in the west and silty clay and clay topsoils in the east. The subsoils are poorly structured and poorly drained clays and silty clays. As shown in Pits 12 and 16 gleying starts at, or just below the surface, and the subsoils are slowly permeable layers. The profiles were therefore assessed as Wetness Class IV. The poor drainage not only limits the length of time when the land is in a workable condition but also limits its usage to permanent pasture. Within the eastern mapping unit some of the borings have heavy silty clay loam topsoils and are Subgrade 3b but these areas were too small to map at this level of survey.

38. The second type of mapping unit has a severe limitation due to the gradients. These are found throughout the site in the steeply incised valleys which are characteristic of the North Devon region. The gradients range from 11 - 18° and severely restrict the type of machinery which can be safely and accurately used.

Grade 5

39. Land in this grade has a very severe limitation to its agricultural use. The gradients, of over 18°, mean that the land is only suitable for permanent grassland due to restrictions on the use of certain machinery.

Other Land

40. Three areas of land, at West Pusehill, near the Appledore Boatyard and at Durrant Lane, Northam were not surveyed due to access restrictions. Other land which was not surveyed includes woodland, residential land, roads, and Farm tracks and buildings.

H Lloyd Jones
Resource Planning Team
Taunton Statutory Group
ADAS Bristol
December 1996

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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 (In preparation) Soil Survey Field Handbook, Revised Edition.

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, 1974).

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.

AB (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
MISST:	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	**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, 1974) for details.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 1 (Asp 539)	3° North	Permanent Grass	Av Rainfall: 1039 mm ATO: 1482 day °C FC Days: 210 Climatic Grade: 1 Exposure Grade: 1	Crackington Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	14.8.96	SS44152560	GMS		RPT/GMS/549

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	MCL	10YR42	1% >2cm HR 7% < 2cm 8% Total HR (S+D)	NONE	NONE	-	-	-	-	MVF	-	Gradual smooth
2	43	HCL	10YR43	12% > 2cm 8% < 2cm 20% HR (S+D)	NONE	NONE	MCSAB	Friable	Moderate	Poor	MVF	-	Clear wavy
3	62	C	10YR63	20%HR (vis)	CDF + MO 10YR66	Few	WCSAB	Friable	Moderate	Poor	C	-	Clear wavy
4	85+	C	10YR71	10% HR (Vis)	MDMO 10YR66	NONE	WCAB	Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 43 cm

Depth to Slowly Permeable Horizon: 62 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 119 mm

Potatoes: 99 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +29 mm

Potatoes: +20 mm

Droughtiness Grade: 2 (Calculated to 120cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 2 (Asp 248)	5° North	Cereals	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 197 Climatic Grade: 1 Exposure Grade: 1	Crackington Formation (Shale)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	15.8.96	SS43852770	*HLJ/PB*		*RPT/PB/394*

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	MCL	10YR43	5% HR (Vis)	NONE	NONE	-	-	-	-	MF,VF	-	Clear smooth
2	43	ZC	10YR62	0% (Vis)	CDFO 10YR58	Common	WMSAB	Firm	Moderate	Poor	FF,VF	-	Clear smooth
3	57	ZC	2.5Y63	0% (Vis)	MDMO 10YR58	NONE	MCPr	Firm	Poor	Poor	FF,VF	-	Gradual smooth
4	80	ZC	2.5Y61	10% ZR (Vis)	MDMO 10YR58	NONE	MCPr	Firm	Poor	Poor	FF,VF	-	Gradual smooth
5	85+	ZC	2.5Y61	40% ZR (Vis)	MDMO 10YR58	NONE	-	-	-	-	-	-	-

Profile Gleyed From: 25 cm

Depth to Slowly Permeable Horizon: 43 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 112 mm

Potatoes: 102 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +22 mm

Potatoes: +23 mm

Droughtiness Grade: 2 (Calculated to 100cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks: Topsoil has 26% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 3 (Asp 228)	5° South	Cereals	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 196 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation (Shale)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	15.8.96	SS43052785	HLJ/PB		RPT/HLJ/229

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	10YR43	1% HR (Vis)	NONE	NONE	-	-	-	-	MF,VF	-	Clear smooth
2	50	C	10YR53, 54	1% HR (Vis)	FFF0 (10YR56)	NONE	MC, MSAB	Firm	Moderate	Good	CF,VF	-	Clear smooth
3	62	C	10YR53	30% > 2 cm 22% < 2cm 52% HR (S+D)	CDFO (10YR68)	NONE	Too stony	-	Moderate (assumed)	Poor	CF,VF	-	Clear wavy
4	95+	C	10YR62	40% ZR,HR (Vis)	MDFO (10YR66)	NONE	-	-	Moderate (assumed)	-	FF,VF	-	-

Profile Gleyed From: 50 cm

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 3a

Available Water Wheat: 128 mm

Potatoes: 103 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +38 mm

Potatoes: +24 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Workability

Remarks: Topsoil 34% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 4 (Asp 398)	2° West	Stubble (Cereal)	Av Rainfall: 999 mm ATO: 1539 day °C FC Days: 204 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	16.8.96	SS429264	GMS/HLJ		RPT/GMS/550

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	HCL	10YR42	< 1% HR > 2 cm(s)	NONE	NONE	-	-	-	Good	MF + VF	-	Clear smooth
2	44	HCL	10YR52 + 10YR54	1% HR > 2cm(s) 2% HR < 2cm(vis) 10% HR Total	NONE	FEW	MCSAB	Friable	Moderate	Good (low biopores but well fractured)	CVF	-	Clear smooth
3	70+	C	2.5Y72/64	10%ZR Total (Vis)	MDF + MO (10YR68)	Few	WCPr	Very Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 44 cm

Depth to Slowly Permeable Horizon: 44 cm

Wetness Class: III

Wetness Grade: 3b

Available Water	Wheat:	128 mm
	Potatoes:	105 mm
Moisture Deficit	Wheat:	90 mm
	Potatoes:	79 mm
Moisture Balance	Wheat:	38 mm
	Potatoes:	26 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks: Gleying starts around 40mm therefore the pit is borderline WCIV, Grade 4.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 5 (Asp 464)	5° North	Barley Stubble	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 208 Climatic Grade: 1 Exposure Grade: 1	*Bideford Formation (Shale)*
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	16.8.96	SS43052600	HLJ/GMS		RPT/HLJ/229

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	35	HCL	10YR43	<1% > 2cm (sieved) *5% Total HR*	NONE	NONE	-	-	-	-	CF,VF	-	Abrupt Wavy
2	60	C	2.5Y62, 64	60% HR (Sandstone) (Visual)	MDFO 10YR68	FEW	Affected by layer of fractured sandstone	-	Moderate (assumed)	Well fissured	CF,VF	-	Abrupt wavy
3	75	C	2.5Y60	10% ZR (Visual)	MDFO 10YR68	NONE	MCPr	V. Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 35 cm

Depth to Slowly Permeable Horizon: 60 cm

Wetness Class: III

Wetness Grade: 3b

Available Water Wheat: 115 mm

Potatoes: 90 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +25 mm

Potatoes: +11 mm

Droughtiness Grade: 2 (Calculated to 120cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks: At 80 cm horizon becomes more weathered shale.
Topsoil 28% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 6 (Asp 16)	3° North	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 190 Climatic Grade: 1 Exposure Grade: 1	Crackington Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.95	16.8.96	SS45573020	HLJ/PB		RPT/HLJ/231

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	22	MSL	10YR42	2% HR (Vis)	NONE	NONE	-	-	-	Good	MF,VF	-	Gradual Smooth
2	55	SC	10YR53/ 54	2% HR (Vis)	FFF0 (75YR58)	FEW	MCSAB	Firm	Moderate	Good	CF,VF	-	Gradual Smooth
3	80	C	2.5Y62	1% HR (Vis)	CDFO (10YR66)	FEW	MCPr	Firm	Poor	Good *[1]	CVF	-	Gradual Smooth
4	100+	C	2.5Y64	4%HR (Vis)	MDMO (10YR68)	Common	WCPr	Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 55 cm

Depth to Slowly Permeable Horizon: 80 cm *[2]

Wetness Class: II

Wetness Grade: 2

Available Water Wheat: 127 mm

Potatoes: 105 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +37 mm

Potatoes: +26 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 2

Main Limiting Factor(s): Wetness

Remarks: *[1] Just good. Many 'small' pores V. few large
*[2] With gradual boundary spl starts just within 80cm

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 7 (Asp 80)	2° North	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 190 Climatic Grade: 1 Exposure Grade: 1/2	Crackington.Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	16.8.96	SS44382942	PB/HLJ		RPT/HLJ/232

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	MCL	10YR42	1% HR (Vis)	NONE	NONE	-	-	-	-	MF,VF	-	Gradual smooth
2	49	HCL	10YR53	1% HR (Vis)	NONE	FEW	WM+CSAB	Friable	Moderate	Good	CF,VF	-	Gradual smooth
3	62	C	10YR53	NONE	CDFO 10YR58	Common	WCSAB	Firm	Poor	Good *[1]	FVF	-	Clear smooth
4	80+	C	2.5Y62	NONE	MDMO (10YR68)	NONE	MCPr	Very Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 49 cm

Depth to Slowly Permeable Horizon: 62 cm

Wetness Class: III

Wetness Grade: 3a

Available Water	Wheat:	133 mm
	Potatoes:	110 mm
Moisture Deficit	Wheat:	90 mm
	Potatoes:	79 mm
Moisture Balance	Wheat:	+43 mm
	Potatoes:	+31 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: *[1] Worse than H2 but still porous
Top soil MCL/SCL/MSL/MS2L

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 8 (Asp 417)	4° North East	Stubble (cereal)	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 204 Climatic Grade: 1 Exposure Grade: 2	Crackington Formation (Sandstone)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	22.8.96	SS42332628	GMS/HLJ		RPT/HLJ/229

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	28	MCL	10YR42	< 1% HR > 2cm(s) 5% HR < 2 cm (vis) 5% HR Total	NONE	NONE	-	-	-	-	CF,VF	-	Gradual Smooth
2	47	HCL	10YR43, 46	1% HR > 2cm(s) 18% HR < 2 cm(S+D) 19% HR Total	NONE	NONE	WCSAB	Friable	Moderate	Poor	FF	-	Clear wavy
3	66	C	10YR53	2% HR > 2cm(s) 6% HR < 2cm (S+D) 8% HR Total	CDFO 10YR56	Common	WCSAB	Firm	Poor	Poor	FF	-	abrupt wavy
4	85+	C	2.5Y63	8% HR Total (Vis)	CDF,MO 7.5YR68	Common	WCPr	Firm	Poor	Poor	FF	-	-

Profile Gleyed From: 47 cm

Depth to Slowly Permeable Horizon: 47 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 122 mm

Potatoes: 101 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +32 mm

Potatoes: +22 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: Boring impenetrable at 30cm
Topsoil is 27% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 9 (near Asp 501)	3° North	Cereals (Stubble)	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 210 Climatic Grade: 1 Exposure Grade: 2	Crackington Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	22.8.96	SS42652580	GMS/HLS		RPT/GMS/551

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	33	MCL	10YR43	< 1% HR > 2cm(s) 12% HR < 2cm(S+D) 12% HR Total	NONE	NONE	-	-	-	Good	MVF	-	Clear smooth
2	53	C	10YR62/53	15% HR > 2cm(s) 18% HR < 2cm(S+D) 33% HR Total	CDF + MO (10YR68)	NONE	WCSAB	Firm	Poor	Poor	FVF	-	Clear smooth
3	80+	C	2.5Y60	10% HR Total (Vis)	CDMO (75YR68)	NONE	WCPr	Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 33 cm

Depth to Slowly Permeable Horizon: 33 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 112 mm

Potatoes: 91 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +22 mm

Potatoes: +12 mm

Droughtiness Grade: 2 (Calculated to 120cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 10 (Asp 159)	2° South	Cereals (Stubble)	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 196 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	22.8.96	SS42652840	GMS/HLJ		RPT/GMS/552

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	37	HCL	10YR42	2% HR Total(s)	NONE	NONE	-	-	-	Good	MF,VF	-	Clear smooth
2	64	C	10YR52	1% HR Total (Vis)	FFDO *[1] (75YR58)	FEW *[1]	MCAB	Firm	Poor	Poor *[2]	CF,VF	-	Clear smooth
3	80+	C	2.5Y63	< 1% HR Total (Vis)	CDFO (7.5YR68)	NONE	WCAB (prismatic tendencies)	Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 64 cm

Depth to Slowly Permeable Horizon: 64 cm

Wetness Class: III

Wetness Grade: 3b

Available Water Wheat: 131 mm

Potatoes: 108 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +41 mm

Potatoes: +29 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks: *[1] wetness associated with rotting stones and spl below. therefore this horizon is just permeable.
*[2] few large worm holes
Topsoil is 28% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 11 (Asp 237)	3° North	Cereal Stubble	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 196 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	22.8.96	SS44302785	HLJ/GMS		RPT/HLJ/234

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	26	MCL	10YR42	< 1% HR (Vis)	NONE	NONE	-	-	-	-	CF,VF	-	Clear smooth
2	45	HCL	7.5YR42	< 1% HR (Vis)	NONE	NONE	MCSAB	V. Friable	Moderate	Good	FVF	-	Clear wavy
3	75	C	10YR73,61	Narrowband of 50% ZR at top of horizon (Vis)	MDMO 10YR68	NONE	WCAB (where fewer stones)	Firm	Poor	Poor	FVF	-	Clear wavy
4	90+	C	2.5Y63,60	50% ZR (Vis)	CMDO 7.5YR68 (Assoc. with weathered stone)	NONE	WCPL	Firm	Poor	Poor	FVF	-	-

Profile Gleyed From: 45 cm

Depth to Slowly Permeable Horizon: 45 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 127 mm

Potatoes: 108 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +37 mm

Potatoes: +29 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 12 (Asp 298)	0°	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 198 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	22.8.96	SS44052718	HLJ/GMS		None

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	10	OMCL	10YR43	None	MRR FDFO	NONE	-	-	-	-	MF,VF	-	Clear wavy
2	35	C	2.5Y50	None	CDFO 05YR58	NONE	SVCPr	Firm	Poor	Poor	LF	-	Clear smooth
3	56	C	10YR62	None	CDMO 10YR66	NONE	MCPr	Firm	Poor	Poor	FF	-	Abrupt smooth
4	65+	C	2.5Y74	None	CDMO 10YR68	NONE	WCSAB	Firm	Poor	Poor	FF	-	-

Profile Gleyed From: 10 cm

Depth to Slowly Permeable Horizon: 10 cm

Wetness Class: IV

Wetness Grade: 4

Available Water Wheat: 129 mm

Potatoes: 106 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +39 mm

Potatoes: +27 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 4

Main Limiting Factor(s): Wetness

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 13 (Asp 546)	4° North	Barley Stubble	Av Rainfall: 966 mm ATO: 1498 day °C	Crackington Formation (Shale)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 199 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES
24.96	23.8.96	SS45152555	HLJ/GMS		RPT/GMS/553

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	26	MCL	10YR32	5% HR Total (Vis)	NONE	NONE	-	-	-	-	MF,VF	-	Clear Wavy
2	41	HCL	10YR43	*2 5% HR > 2cm 51% ZR(+HR) > 2mm 56% Total (S+D)	NONE	NONE	MF,MSAB	Friable	Good	Good	CF,VF	-	Clear irregular
3	80+	C	10YR63	*3 70% + ZR (Vis)	NONE	NONE	Weathered Shale	-	(moderate)	Good	*1 CVF	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 98 mm

Potatoes: 89 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: 8 mm

Potatoes: 10 mm

Droughtiness Grade: 2 (Calculated to 100cm)

Final ALC Grade: 2

Main Limiting Factor(s): Workability and drought

Remarks:
*1 roots coming up from bottom of pit
*2 mainly > 2 cm which are HR, rest is ZR
*3 very weathered stone in H3

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 14 (Asp 193)	5° South	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 196 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	23.8.96	SS44572825	HLJ/GMS		RPT/HLJ/235

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	35	MCL	10YR43	5% HR Total	NONE	NONE	-	-	-	-	MVF	-	Clear wavy
2	45cm *[1]	C	10YR53	10% HR Total (Vis)	FDFO (10YR56/66)	Common	WMSAB	Friable	Good	Good	CVF	-	Gradual *[2] wavy
3	75+	C	2.5Y63	None	MDMO (10YR68)	NONE	MCPr	Firm	Poor	Poor	FVF	-	-
*[3]													

Profile Gleyed From: 45 cm

Depth to Slowly Permeable Horizon: 45 cm

Wetness Class: III (borderline IV)

Wetness Grade: 3a

Available Water Wheat: 135 mm

Potatoes: 112 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +45 mm

Potatoes: +33 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: *[1] 40 - 48cm

*[2] transition into H3 occurs above 40cm in places

*[3] expected bluey grey fourth horizon just seen

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 15 (Asp 233)	1° North	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 196 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	23.8.96	SS43742784	HLJ/GMS		RPT/GMS/554

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	35	HCL	10YR42	5% HR Total (Vis)	NONE	NONE	-	-	-	Good	MF, VF	-	Clear smooth
2	50	C	10YR54	20% HR +ZR Total (Vis)	NONE	NONE	MMSAB	Friable	Good	Good	CF, VF	-	Clear smooth
3	80+	C	2.5Y63	50% HR Total *[1] (Vis)	None	NONE	WFSAB	Friable	Good	Good	CVF	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 3a

Available Water Wheat: 140 mm

Potatoes: 108 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: 50 mm

Potatoes: 29 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Workability

Remarks: *[1] more HR than ZR (cf Pit 13)
calculated to 120 as broken rock rather than weathered layers of bedrock (cf Pit 13)

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 16 (Asp 325)	0°	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 190 Climatic Grade: 1 Exposure Grade: 1	Alluvium
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	4.9.96	SS46252705	GMS		RPT/HLJ/242

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	ZC/HZCL	10YR52	None	CDFO (10YR56)	NONE	-	-	-	-	MVF	-	Clear smooth
2	70+	C	7.5YR52	None	CDFO (10YR56)	NONE	MCPr (easily breaking up)	Firm	Poor	Poor*	CVF	-	-

Profile Gleyed From: surface

Depth to Slowly Permeable Horizon: 25 cm

Wetness Class: IV

Wetness Grade: 4

Available Water	Wheat:	124 mm
	Potatoes:	101 mm
Moisture Deficit	Wheat:	90 mm
	Potatoes:	79 mm
Moisture Balance	Wheat:	+34 mm
	Potatoes:	+22 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 4

Main Limiting Factor(s): Wetness

Remarks: * Variable, many very fine but fewer fine (>0.5), in places borderline good. T/S has 35% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 17 (Asp 416)	3° South	Cereal Stubble	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 196 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	5.9.96	SS47502645	GMS		RPT/CMS/557

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	HCL	7.5YR42	< 1% HR > 2cm 9% > 2mm HR (S+D)	NONE	NONE	-	-	-	-	CVF	-	Clear smooth
2	40	C	10YR43	2% > 2cm HR 22% > 2cm ZR 24% ZR/HR Total (S+D)	NONE	NONE	MCSAB	Friable	Moderate	Good	FVF	-	Clear wavy
3	70+	C	10YR43, 53,54	2% > 2cm HR 27% > 2mm ZR 29% ZR/HR Total (S+D)	Patches of ochreous colour associated with weathering shale. Some small patches were gleyed	NONE	MCSAB (variable)	Friable	Moderate	Good	FVF	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 3a

Available Water	Wheat:	126 mm
	Potatoes:	104 mm
Moisture Deficit	Wheat:	90 mm
	Potatoes:	79 mm
Moisture Balance	Wheat:	+36 mm
	Potatoes:	+25 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a (borderline 2)

Main Limiting Factor(s): Workability

Remarks: H3 variable with many colour variations associated with slate weathering where less stony structure is better developed. Maybe some small patches where gleyed.
Topsoil is 28% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 18 (Asp 387)	2° North	Cereal Stubble	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 196 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	11.9.96	SS46542657	PB/GMS		RPT/PB/396

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	MCL/ HCL	10YR42	5% HR (Vis)	NONE	NONE	-	-	-	-	MF,VF	-	Gradual smooth
2	35	HCL	10YR43	8% HR (Vis)	NONE	NONE	MCSAB	Friable	Moderate	Good	CVF	-	-
3	50	C	2.5Y63,64 10YR53	15% ZR+HR (Vis)	CDFO (10YR58)	Common	WCSAB	Firm	Poor	Good	CVF	-	-
4	80+	C	2.5Y62	5% ZR (Vis)	CDMO (10YR58)	NONE	MCPr	V. Firm	Poor	Poor with a few worm channels between peds	CVF	-	-

Profile Gleyed From: 35 cm

Depth to Slowly Permeable Horizon: 50 cm

Wetness Class: IV

Wetness Grade: 3b/4

Available Water Wheat: 123 mm

Potatoes: 100 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +33 mm

Potatoes: +21 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3b/4

Main Limiting Factor(s): Wetness

Remarks: H3 is transitional
Topsoil is 26% clay
Mapped is Subgrade 3b unit

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 19 (Asp 602E)	2° North	Cereal Stubble	Av Rainfall: 966 mm ATO: 1498 day °C	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 200 Climatic Grade: 1	SOIL SAMPLE REFERENCES
24.96	11.9.96	SS47192520	PB/GMS	Exposure Grade: 1/2	RPT/PB/397

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	15	MCL	10YR42	10% HR (Vis)	NONE	NONE	-	-	-	-	MF,VF	-	Clear smooth
2	30	HZCL	10YR43	25% HR (Vis)	NONE	NONE	MM&CSAB	Friable	Good to moderate	Good	CVF	-	Gradual wavy
3	45	C	10YR64	12% > 2cm (s) 10% < 2cm (Vis) 22% HR Total	CDFO 10YR58	NONE	WCSAB tending to MMPr	Friable	Moderate	Good	FVF	-	Gradual wavy
4	88+	C	2.5Y63	20% HR + ZR (Vis)	MDMO,G 7.5YR 58, 10YR71	Common	WCSAB	Firm	Poor	Poor	NONE	-	-

Profile Gleyed From: 30 cm

Depth to Slowly Permeable Horizon: 45 cm

Wetness Class: IV

Wetness Grade: 3b

Available Water Wheat: 113 mm

Potatoes: 94 mm

Moisture Deficit Wheat: 100 mm

Potatoes: 79 mm

Moisture Balance Wheat: +23 mm

Potatoes: 15 mm

Droughtiness Grade: 2 (Calculated to 120cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks: Topsoil is 27% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 20 (Asp 605)	2° North	Fodder	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 200 Climatic Grade: 1 Exposure Grade: 1/2	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	12.9.96	SS47522530	PB/GMS		RPT/PB/398

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	22	MCL	10YR42	2% > 2cm 10% > 2mm 12% HR (S+D)	NONE	NONE	-	-	-	-	CF,VF	-	Clear smooth
2	80+	HCL	10YR43	35% > 2cm 20% < 2cm 55% HR(S+D) 40% > 2cm 24% > 2mm 64% HR (S+D)	Patches of FFFOG where tightly packed	FEW	WM+CSAB (between stones)	Friable	Moderate	Good	FVF	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 76 mm

Potatoes: 69 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: -14 mm

Potatoes: -10 mm

Droughtiness Grade: 3a (Calculated to 100cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Droughtiness

Remarks: H2 not overall gleyed
Topsoil is 26% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 21 (Asp 453-4)	1° South	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 198 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation (Shale)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	12.9.96	SS47202615	GMS/PB		RPT/GMS/559

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	MCL	10YR43	10% HR (Vis)	NONE	NONE	-	-	-	-	MVF	-	Clear wavy
2	45	HCL	10YR54	50% ZR (Vis)	NONE	NONE	Too stony	Friable	(M)	Good	CVF	-	Clear smooth
3	80+	C	10YR64	> 70% ZR (Vis)	FDFO 10YR58	NONE	Too stony	Friable	(M)	Good	FVF	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 96 mm

Potatoes: 87 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance *Wheat:* *+6 mm*

Potatoes: +8 mm

Droughtiness Grade: 2 (Calculated to 100cm)

Final ALC Grade: 2

Main Limiting Factor(s): Workability and drought

Remarks: Topsoil is 26% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 22 (Asp 113)	4° North	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 190 Climatic Grade: 1 Exposure Grade: 1	Crackington Formation (Shale)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	13.9.96	SS45302880	GMS/PB		RPT/PB/399

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	27	MCL	10YR42	5% HR (Vis)	FRRC in top 10cm	NONE	-	-	-	-	MVF	-	abrupt wavy
2	35+	Rock	10YR62	99% ZR	NONE	NONE	-	-	(M)	-	FVF*	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 2

Available Water	Wheat:	61 mm
	Potatoes:	61 mm
Moisture Deficit	Wheat:	90 mm
	Potatoes:	79 mm
Moisture Balance	Wheat:	-29 mm
	Potatoes:	-18 mm

Droughtiness Grade: 3b (Calculated to 45 cm)

Final ALC Grade: 3b

Main Limiting Factor(s): Soil depth

Remarks: *[1] Roots mainly form a mat above H2, Few penetrate dense rock. Topsoil is 20% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 23 (Asp 114)	3° North	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 190 Climatic Grade: 1 Exposure Grade: 1	Crackington Formation (shale)
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	13.9.96	SS45402880	GMS/PB		RPT/GMS/560

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	27	MCL	10YR42	5% HR (Vis)	CRRC	NONE	-	-	-	-	MF,VF	-	Clear smooth
2	50	HCL	10YR43	10% HR (Vis)	FDFO	Few	MCSAB	Friable	Moderate	Good	CVF	-	Clear smooth
3	60+	ZC	10YR53	80% ZR, HR (Vis)	FDFO	NONE	-	-	(M)	Good	FVF	-	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No spl

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 96 mm

Potatoes: 98 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: +6 mm

Potatoes: +19 mm

Droughtiness Grade: 2 (Calculated to 80cm)

Final ALC Grade: 2

Main Limiting Factor(s): Workability

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 24 (Asp 5)	0°	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 186 Climatic Grade: 1 Exposure Grade: 2	Crackington Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	13.9.96	SS45503050	PB/GMS		RPT/PB/400

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	10	MSL	10YR41	2% HR (Vis)	CRR	NONE	-	-	-	-	MF, VF	-	Clear smooth
2	30	MSL	10YR31	1% HR (Vis)	CDFO 7.5YR56	FEW	WCSAB	Friable	Good	Good	CFVF	-	Gradual Smooth
3	60	MSL	10YR51	1% HR (Vis)	CDFO 7.5YR56	FEW	WCAB	Friable	Good	Poor	FVF	-	Gradual smooth
4	75	LMS	10YR56	NONE (Vis)	MDFO 7.5YR46	Common	WCSAB	Friable	Good	Good	FC	-	Clear smooth
5	90	C	10YR62	2% HR (Vis)	CDCO 10YR56	Common	WASAB	Friable	Moderate	Poor	FC	-	-

Profile Gleyed From: 10 cm

Depth to Slowly Permeable Horizon: 75 cm

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 143 mm

Potatoes: 110 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: 53 mm

Potatoes: 31 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks: Mapped in Grade 2 unit, where clay and gleying is generally at greater depth. Exposure not thought to be worse than Grade 2

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 25 (Asp 289)	2° North	Cereal Stubble	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 195 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	13.9.96	SS42772714	PB/GMS		RPT/PB/401

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	23	HCL	10YR42	10% HR (Vis)	NONE	NONE	-	-	-	-	CF, VF	-	Clear smooth
2	44	C	10YR43	10% HR (Vis)	NONE	NONE	MC, MSAB	Friable	Moderate	Good	FVF	-	Gradual Smooth
3	80	C	10YR44	20% HR (Vis)	NONE	FEW	MCSAB	Firm	Moderate	Good	FVF	-	Gradual smooth
4	87+	C	7.5YR54	40% ZR (Vis)	FFMOG 7.5YR56	FEW	WCSAB	Friable	Moderate	Good	FVF	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 3a

Available Water Wheat: 122 mm

Potatoes: 102 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: 32 mm

Potatoes: 23 mm

Droughtiness Grade: 1 (Calculated to 120cm)

Final ALC Grade: 3a (borderline 2)

Main Limiting Factor(s): Workability

Remarks: (Top soil stones simular to other pits in area)
Top soil is 27% clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 26 (Asp 110)	1° South	Maize	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 190 Climatic Grade: 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	3.10.96	SS44002880	HLJ		RPT/HLJ/237

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	23	MCL	10YR44	5% HR Total (Vis)	NONE	NONE	-	-	-	-	CF + VF	-	Clear smooth
2	36	MCL	10YR44	10% ZR Total (Vis)	NONE	NONE	WCSAB	Friable	Moderate	Good	CF + VF	-	Clear wavy
3	45	MCL	10YR54	40% ZR Total (Vis)	FFFO (10YR56)	NONE	WCSAB	Friable	Moderate	Good	FF + VF	-	Gradual smooth
4	40+	C	75YR54	80% ZR Total (Vis)	NONE	NONE	Too stony	Too stony	Moderate (assumed)	Fissured	FVF	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 2

Available Water Wheat: 98 mm

Potatoes: 95 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: 8 mm

Potatoes: 16 mm

Droughtiness Grade: 2 (Calculated to 90cm)

Final ALC Grade: 2

Main Limiting Factor(s): Drought and workability

Remarks: Topsoil is close to MSZL (still grade 2 Dr)

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 27 (Asp 317)	3° North	Cereal (newly sown)	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 196 Climatic Grade: 1 Exposure Grade: 1/2	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	3.10.96	SS43352705	HLJ		RPT/HLJ/240

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	24	HCL	10YR42	10% ZR Total (Vis)	NONE	NONE	-	-	-	Good	FF + VF	-	Clear smooth
2	35	HCL	10YR43	25% ZR Total (Vis)	NONE	NONE	MC(M)SAB	Friable	Moderate	Good	FF + VF	-	Clear smooth
3	50+	C	10YR43	80% ZR Total (Vis)	NONE	NONE	Too stony	Too Stony	Moderate (assumed)	Fossured	FVF	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 3a

Available Water Wheat: 87 mm

Potatoes: 90 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: -3 mm

Potatoes: 11 mm

Droughtiness Grade: 3a (Calculated to 80cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Drought and workability

Remarks:

Grade 2 drought (MBW9 MBP 11) if calculated to 100 cm.

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Bideford	Pit 28 (Asp 592)	4° North	Permanent Grass	Av Rainfall: 966 mm ATO: 1498 day °C FC Days: 198 *Climatic Grade:* 1 Exposure Grade: 1	Bideford Formation
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCES
24.96	4.10.96	SS47822560	HLJ		RPT/HLJ/243

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	29	HCL	10YR43	5% HR Total (Vis)	NONE	NONE	-	-	-	Good	MF + VF	-	Clear smooth
2	42	HCL	10YR43	15% > 2cm(s) 12% < 2cm (S+D) 27% ZR Total	NONE	NONE	MCSAB	Friable	Moderate	Good	CF + VF	-	Clear smooth
3	75+	C	10YR44	50% ZR Total (Vis)	CDFO (10YR66)	NONE	MMSAB	Friable	Good	Good	FF + VF	-	-

Profile Gleyed From: not gleyed

Depth to Slowly Permeable Horizon: no spl

Wetness Class: I

Wetness Grade: 3a

Available Water Wheat: 129 mm

Potatoes: 108 mm

Moisture Deficit Wheat: 90 mm

Potatoes: 79 mm

Moisture Balance Wheat: 39 mm

Potatoes: 29 mm

Droughtiness Grade: 1 (Calculated to 100 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Workability

Remarks: