

8FCS 4482

PENWITH DISTRICT PLAN HAYLE, PHILLACK and CONNOR DOWNS

Agricultural Land Classification

Report of Survey

1. Summary

As part of MAFF's statutory input to the preparation of the Penwith District Plan, detailed Agricultural Land Classification (ALC) surveys were carried out around Hayle, Phillack and Connor Downs in Cornwall

A total of 218 hectares was surveyed around the three settlements to provide information on the type of land quality to be affected by future development. The areas surveyed were larger than those requested by Penwith District Council planners in order to help MAFF assess the knock-on effects of local development and to define areas of poorer land quality which MAFF might view as more suitable for development

The tables attached provide the ALC statistics by grade for each individual area surveyed, and the distribution of the grades is shown on the enclosed ALC maps. Together, these indicate that the area within the Hayle bypass contains Sub-grade 3A land, that the agricultural land adjacent to Phillack is of Grade 2 quality changing into Sub-grade 3A land towards the Towans, and that Connor Downs is surrounded by high quality land with Grade 2 on the southern fringe and Sub-grade 3A along the northern and eastern fringes. The only significant area of poor quality land has been mapped adjacent to the A30 roundabout at the northern edge of Hayle

The fieldwork was carried out by the Resource Planning Group (South West Region) at a scale of 1:10,000 (ie approximately one soil observation per hectare). The information is also mapped at 1:10,000 and 1:10,500 and is accurate at these scales but any enlargement may be misleading. This survey information supercedes previous ALC information for this area

Survey work has been carried out using MAFF's "Revised guidelines and criteria for grading the quality of agricultural land" (MAFF 1989). These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. A description of the general grades used in the ALC system is attached

44/91 + 45/91

TABLE 1 Distribution of Grades and Sub-grades Hayle

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
2	3 4	2 6	3 1
3A	90 8	69 6	83 0
3B	15 2	11 7	13 9
Non Agric	10 5	8 1	<u>100</u> (109 4 ha)
Urban	7 6	5 8	
Agric Bldgs	2 9	2 2	
	<u>130 4</u> ha	<u>100</u>	

TABLE 2 Distribution of Grades and Sub-grades Phillock

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
2	13 7	36 6	44 1
3A	14 4	38 5	46 3
3B	3 0	8 0	9 6
Non Agric	4 6	12 4	<u>100</u> (31 1 ha)
Urban	1 7	4 5	
	<u>37 4</u> ha	<u>100</u>	

TABLE 3 Distribution of Grades and Sub-grades Connor Downs

Grade	Area (ha)	% of Survey Area	% of Agricultural Area
2	17 2	34 0	35 3
3A	31 5	62 3	64 7
Non Agric	1 0	2 0	<u>100</u> (48 7 ha)
Urban	0 9	1 7	
	<u>50 6</u> ha	<u>100</u>	

2 Climate

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

A detailed estimate of the prevailing climate has been made for each survey area by interpolation from a 5km grid dataset. The latter is held in LandIS, a computer-based land information system developed by the SSLRC and funded by MAFF

The parameters used in assessing the impact of overall climate are accumulated temperature (a measure of the relative warmth of a locality) and average annual rainfall (a measure of overall wetness)

Hayle and Phillack Survey Areas six climatic interpolations were requested, the details of which are attached as an appendix. Climatically, the survey areas may be placed in Grade 1. The area is moderately droughty (moisture deficits for wheat range between 94-103mm) and experiences a high field capacity day range (199-205 days) which restricts the flexibility of field operations

The local climatic factor of exposure is, however, significant and much of the area is downgraded as a result (details are given in the ALC section)

Connor Downs Survey Area a further two interpolations were requested for this area (see appendix) which indicate a similar climate to Hayle with FC days in excess of 200 days. Exposure is again locally limiting

3 Geology and Relief

The soils at Connor Downs and those within the Hayle bypass are developed over slate on gently undulating topography, with an area of alluvium around a receiving site at the northern roundabout

The soils at Phillack are developed on more variable geology consisting of blown sand, head deposits and sandstones with interbedded slates

4 Agricultural Land Classification

4.1 Hayle Survey Area

Sub-grade 3A the majority of the survey area has been placed in this grade with site exposure as the main limiting factor. The land has a westerly and north-westerly aspect and is approximately 2,000m from Hayle estuary. It lies open to the strong winds from the north-west and the prevailing south-westerlies that curve into St. Ives Bay

The significance of the local exposure has been assessed in relation to the range of crops that may be grown under these conditions. The site is considered unsuitable for the regular growing of the more sensitive crops such as strawberries, lettuce, bulbs and flowers and the use of polythene tunnels. Intensive field vegetable production would be the most appropriate land use

Two minor areas which receive shelter from the urban area and the railway embankment are placed in Grade 2

Two pits were dug in this map unit to confirm that the soils themselves may be placed in 3A (see pits 1 and 2 in the appendix) The soils exhibit medium clay loam topsoil textures overlying deep heavy clay loam subsoils The subsoils are stony with stone contents ranging from 15% in the upper subsoil to approximately 35% fine slate in the lower subsoil The profiles show no evidence of soil wetness and are placed in Wetness Class I (ie they are not wet within 70cm for more than 30 days in most years) Both workability and droughtiness permit these soils in 3A

Two minor areas of Sub-grade 3B highlight areas where slopes are locally in excess of 7 degrees and a further two areas delimit topsoils with stone contents greater than 10% (greater than 6cm) related to boundary removal and bypass work

A further area of 3B has been identified at the northern roundabout with soil wetness as the main limitation in a receiving site The wetness is related to shallow gleying, shallow slowly permeable layers and poor outfalls adjacent to local streams

4 2 Phillack Survey Area

Grade 2 an area of high quality land has been mapped on the land adjacent to the urban area on the south facing slopes which receive shelter from the coastal winds by the Towans sand dunes Pit 3 is typical of these soils which exhibit medium clay loam topsoils overlying upper subsoils of similar texture and moderate structural conditions and deep lower subsoil heavy clay loams containing up to 50% hard stones and moderate structural conditions The soils show no evidence of wetness and are placed in Grade 2 due to a slight workability limitation and a slight droughtiness limitation

Sub-grade 3A this grade defines a distinct soil type developed on the blown sand which is downgraded due to a significant droughtiness and exposure limitation Pit 4 is typical of these soils and is characterised by a loamy medium sand topsoil overlying a deep subsoil of similar texture with a moderate structure (single grain)

Sub-grade 3B an extremely sandy area has been mapped along the western fringe, where medium sand subsoils limit the available water for crops

Two additional map units of 3B delimit areas with locally steep gradients

4 3 Connor Downs Survey Area

Similar soils occur around the village but an ALC distinction has been made on the basis of a reduced exposure risk along the southern fringe. Here, a degree of shelter is afforded by the urban area sufficient to allow the more sensitive horticultural crops to be grown. This area is placed in Grade 2 with soil workability as the main limitation. The latter relates to the topsoil texture which is typically medium clay loam and which reduces the flexibility of the land in terms of the timing of field operations.

Along the northern and western fringes the land is open to the strong winds from the west and north-west. At the time of survey part of this area was devoted to bulb production but it is felt to be unsuitable for sustained production from such sensitive crops (see 4 1). Pits 1 and 2 are typical of these soils.

DESCRIPTION OF THE GRADES AND SUB-GRADES

Grade 1 - excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly 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 moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor quality agricultural land

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

Descriptions of other land categories used on ALC maps

Urban

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

Non-agricultural

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

Agricultural buildings

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

Open water

Includes lakes, ponds and rivers as map scale permits

Land not surveyed

Agricultural land which has not been surveyed

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

SOIL PROFILE DESCRIPTIONS EXPLANATORY NOTE

(1) TEXTURE -

Soil texture classes are denoted by the following abbreviations
(all Upper case*)

S	Sand
LS	Loamy Sand
SL	Sandy Loam
SZL	Sand Silt Loam
ZL	Silt Loam
MZCL	Medium Silty Clay Loam
MCL	Medium Clay Loam
SCL	Sandy Clay Loam
HZCL	Heavy Silty Clay Loam
HCL	Heavy Clay Loam
SC	Sandy Clay
ZC	Silty Clay
C	Clay

For the sand loamy sand sandy loam and sandy silt loam classes the predominant size of sand fraction may be indicated by the use of prefixes, thus

F	fine (more than $\frac{2}{3}$ of sand less than 0.2 mm)
C	coarse (more than $\frac{1}{3}$ of sand greater than 0.6 mm)
M	medium (less than $\frac{2}{3}$ fine sand and less than $\frac{1}{3}$ coarse sand)

The sub-divisions of clay loam and silty clay loam classes according to clay content are indicated as follows -

M	medium (less than 27% clay)
H	heavy (27-35% clay)

Other possible texture classes include

P	Peat
SP	Sandy Peat
LP	Loamy Peat
PL	Peaty Loam
PS	Peaty Sand
MZ	Marine Light Silts

* There are two exceptions to the Upper Case rule -

- The prefix "Calc" is used to identify naturally calcareous soils containing more than 1% Calcium Carbonate
- For organic mineral soils the texture of the mineral fraction is prefixed by "Org"

(11) STRUCTURE -

Nature and size of structural units are denoted by the following abbreviations

SAB Subangular Blocky
AB Angular Blocky
P Prismatic

(single grain, granular and platy are not abbreviated)

F Fine
M Medium
C Coarse
VC Very Coarse

eg Weak MSAB = Weakly developed medium subangular blocky

(111) OTHER

f = few = less than 2% of the matrix or surface described
c = common = 2-20% of the matrix or surface described
m = many = 20-40% of the matrix or surface described
vm = very many = +40% of the matrix or surface described

f = faint = indistinct mottles, evident only on close examination
d = distinct = although not striking the mottles are readily seen
p = prominent = the mottles are conspicuous and the mottling is one of the outstanding features of the horizon
gm = grey mottling
om = ochreous mottling

eg **cdom** = common distinct ochreous mottles

rrc = rusty root channels
ppf = pale ped faces
mn = manganese

st = stones 6 cm
sst = stones 2-6 cm
vsst = stones 2 cm

WC = Wetness Class (use Roman numerals eg WC IV)
SPL = Slowly Permeable Layer
WT = Water Table
I = Impenetrable if used in Depth Column
IMP = Impenetrable if used in soil profile notes
(IMP 2 x 40 cm = 2 additional borings both impenetrable at 40 cm)
ASP = Auger Sample Point

SOIL PIT DESCRIPTION

Site Name HAYLE & PHILLACK, PENWITH Pit Number 1P

Grid Reference SW56303675 Average Annual Rainfall 1054 mm
Accumulated Temperature 1587 degree days
Field Capacity Level 205 days
Land Use Arable
Slope and Aspect 03 degrees S

<u>HORIZON</u>	<u>TEXTURE</u>	<u>COLOUR</u>	<u>STONES >2</u>	<u>TOT STONE</u>	<u>MOTTLES</u>	<u>STRUCTURE</u>
0- 25	MCL	10YR34 00	2	4		
25- 55	HCL	75YR34 00	0	12		WDFSAB
55- 75	HCL	10YR54 00	0	35		

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

Drought Grade 2 APW 115 mm MBW 17 mm
APP 121 mm MBP 30 mm

FINAL ALC GRADE 3A
MAIN LIMITATION Exposure

SOIL PIT DESCRIPTION

Site Name HAYLE & PHILLACK, PENWITH Pit Number 2P

Grid Reference SW57353740 Average Annual Rainfall 1054 mm
Accumulated Temperature 1587 degree days
Field Capacity Level 205 days
Land Use Grassland
Slope and Aspect degrees

<u>HORIZON</u>	<u>TEXTURE</u>	<u>COLOUR</u>	<u>STONES >2</u>	<u>TOT STONE</u>	<u>MOTTLES</u>	<u>STRUCTURE</u>
0- 30	MCL	10YR33 00	0	0		
30- 60	MCL	10YR44 00	0	1		WCSAB
60- 85	HCL	10YR63 00	0	20		MCSAB

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

Drought Grade 2 APW 116 mm MBW 18 mm
APP 115 mm MBP 24 mm

FINAL ALC GRADE 3A
MAIN LIMITATION Exposure

SOIL PIT DESCRIPTION

Site Name HAYLE & PHILLACK, PENWITH Pit Number 3P
Grid Reference SW56203825 Average Annual Rainfall 1054 mm
Accumulated Temperature 1587 degree days
Field Capacity Level 205 days
Land Use Field Vegetables
Slope and Aspect 06 degrees SE

<u>HORIZON</u>	<u>TEXTURE</u>	<u>COLOUR</u>	<u>STONES >2</u>	<u>TOT STONE</u>	<u>MOTTLES</u>	<u>STRUCTURE</u>
0- 29	MCL	10YR43 00	0	0		
29- 70	MCL	75YR34 00	0	5		MCSAB
70- 85	HCL	75YR44 00	0	50		

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

Drought Grade 2 APW 111 mm MBW 14 mm
APP 115 mm MBP 27 mm

FINAL ALC GRADE 2
MAIN LIMITATION Workability

SOIL PIT DESCRIPTION

Site Name HAYLE & PHILLACK, PENWITH Pit Number 4P
Grid Reference SW55803845 Average Annual Rainfall 1054 mm
Accumulated Temperature 1587 degree days
Field Capacity Level 205 days
Land Use Arable
Slope and Aspect 01 degrees SE

<u>HORIZON</u>	<u>TEXTURE</u>	<u>COLOUR</u>	<u>STONES >2</u>	<u>TOT STONE</u>	<u>MOTTLES</u>	<u>STRUCTURE</u>
0- 28	LMS	10YR42 00	0	0		
28-125	LMS	10YR64 00	0	0		SG

Wetness Grade 1 Wetness Class I
Gleying 000 cm
SPL No SPL

Drought Grade 3A APW 086 mm MBW -11 mm
APP 067 mm MBP -21 mm

FINAL ALC GRADE 3A
MAIN LIMITATION Droughtiness

SOIL PIT DESCRIPTION

Site Name CONNOR DOWNS, PENWITH DC Pit Number 1P
Grid Reference SW59703945 Average Annual Rainfall 1036 mm
Accumulated Temperature 1597 degree days
Field Capacity Level 203 days
Land Use Bulbs
Slope and Aspect degrees

<u>HORIZON</u>	<u>TEXTURE</u>	<u>COLOUR</u>	<u>STONES >2</u>	<u>TOT STONE</u>	<u>MOTTLES</u>	<u>STRUCTURE</u>
0- 30	MCL	10YR43 00	0	2		
30- 85	HCL	75YR54 00	0	10		MCSAB

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

Drought Grade 2 APW 114 mm MBW 7 mm
APP 111 mm MBP 24 mm

FINAL ALC GRADE 3A
MAIN LIMITATION Exposure

SOIL PIT DESCRIPTION

Site Name CONNOR DOWNS, PENWITH DC Pit Number 2P
Grid Reference SW58853905 Average Annual Rainfall 1036 mm
Accumulated Temperature 1597 degree days
Field Capacity Level 203 days
Land Use Arable
Slope and Aspect 02 degrees

<u>HORIZON</u>	<u>TEXTURE</u>	<u>COLOUR</u>	<u>STONES >2</u>	<u>TOT STONE</u>	<u>MOTTLES</u>	<u>STRUCTURE</u>
0- 45	MCL	10YR44 00	0	2		
45- 85	HCL	75YR44 00	0	5		WCSAB

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

Drought Grade 2 APW 120 mm MBW 23 mm
APP 118 mm MBP 31 mm

FINAL ALC GRADE 3A
MAIN LIMITATION Exposure