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Basingstoke & Deane Local Plan
Site 20: Apples Nursery School, Ball Hill
Agricultural Land Classification
ALC Map & Report
January 1994

BASINGSTOKE AND DEANE LOCAL PLAN
SITE 20 : APPLES NURSERY SCHOOL, BALL HILL
AGRICULTURAL LAND CLASSIFICATION REPORT

1. Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality on an area of land at Ball Hill, Hampshire. The work forms part of MAFF's statutory input to the Basingstoke and Deane Local Plan.

1.2 Approximately 2 hectares of land was surveyed in December 1993. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 3 soil auger borings and one soil inspection pit were assessed in accordance with MAFF's revised guidelines and criteria for grading the quality of agricultural land (MAFF, 1988). These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long term limitations on its use for agriculture.

1.3 The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.

1.4 At the time of the survey the land use on the site was permanent grassland.

1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas are given in the table below. The map has been drawn at a scale of 1:5,000. It is accurate at this scale, but any enlargement would be misleading. This map supersedes any previous survey information for this site.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site	% of Agricultural Area
3a	2.1	95.5	100
Urban	0.1	4.5	
Total area of site	2.2	100%	

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

1.7 The land has been classified good quality, Subgrade 3a. The principal limitation is that of soil wetness, due to the presence of a poorly structured, slowly permeable clay horizon at depths in the profile that in combination with the relatively moist local climatic regime, leads to a moderate degree of drainage impedance. This has the effect of restricting crop growth, grazing by livestock and the opportunities for trafficking by machinery.

2. Climate

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

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

2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met. Office 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site. However, climatic and soil factors interact to influence soil wetness and droughtiness. Within this locality, the combination of relatively high Field Capacity Days and low Moisture Deficits, in a regional context, lead to a greater probability of wetness rather than droughtiness being the principal limitation. This is, however, dependant on the soil types encountered.

2.4 No local climatic factors such as exposure of frost risk affect the site.

Table 2 : Climatic Interpolation

Grid Reference :	SU428633
Altitude (m) :	115
Accumulated Temperature (days) :	1403
Average Annual Rainfall (mm) :	787
Field Capacity (days) :	175
Moisture Deficit, Wheat (mm) :	97
Moisture Deficit, Potatoes (mm) :	87
Overall Climatic Grade :	1

3. Relief

3.1 The site lies between approximately 115m and 120m AOD, gently sloping from southwest to northeast. Nowhere on the site does gradient or microrelief affect land quality.

4. Geology and Soil

4.1 The British Geological Survey published map, Sheet 267, Hungerford (1:63,360, (1947), shows the majority of the site to be underlain by Quaternary Bagshot Beds (sand), with a small area to the southwest shown as Plateau Gravel.

4.2 The Soil Survey of England and Wales published map, Sheet 6, Soils of South East England (1:250,000, 1983) shows the site to be underlain by soils of the Wickham 3 Association, describing them as, 'slowly permeable, seasonally waterlogged fine loamy and coarse loamy over clayey soils, and similar more permeable soils with

slight waterlogging' (SSEW, 1983). Soils of this general nature were encountered at the site.

5. Agricultural Land Classification

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

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

Subgrade 3a

5.3 The agricultural land at this site is considered to be good quality overall. The principal limitation is soil wetness due to poorly structured slowly permeable clay subsoil horizons encountered at moderate depth creating a drainage impedance. Typically the soils consisted of a very slightly stony (c.3% flints by volume) medium silty clay loam topsoil, over a moderately structured (see Pit 1, Appendix III) very slightly stony (c.2% flints by volume) medium silty clay loam upper subsoil. This passes at about 40 cm to a similarly stony, gleyed moderately structured medium clay loam horizon. which overlies the poorly structured slowly permeable clay. The depths at which the clay was encountered over the majority of the site (50-55 cm) are such that, in combination with local climatic factors, Wetness Class III (see Appendix II) is most appropriate. The soil drainage status in combination with the topsoil texture then leads to Subgrade 3a being applied. Occasional observations were of a slightly better quality, with the slowly permeable clay horizon occurring at greater depth. These were however, considered to be of insufficient quantity or distribution to be considered as a separate unit.

Land of this quality could be expected to produce moderate yields of a wide variety of crops such as potatoes, sugar beet and oilseed rape and high yields of a narrower range of crops, principally cereals and grass.

5.4 Wetness affected land can, depending on the severity of the problem, be subject to restrictions on the number of days when cultivation by machinery and/or grazing by livestock may occur without causing structural damage to the soil. Soil wetness can also affect seed germination and development by reducing temperature and causing anaerobism due to waterlogging. These restrictions limit the range of crops that can tolerate such conditions.

5.5 The small area shown as Urban within the site, is the concrete base of a building that no longer exists.

SOURCES OF REFERENCE

* British Geological Survey (1947) Sheet 267, Hungerford 1:63,360.

* MAFF (1988) Agricultural Land Classification of England and Wales : Revised guidelines and criteria for grading the quality of agricultural land.

* Meteorological Office (1989) Climatological Data for Agricultural Land Classification.

* Soil Survey of England and Wales (1983) Sheet No. 6, Soils of South East England, 1:250,000.

* Soil Survey of England and Wales (1984), Soils and their use in South East England, Bulletin No. 15.

APPENDIX I

DESCRIPTION OF THE GRADES AND SUB-GRADES

Grade 1 : Excellent Quality Agricultural Land

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

Grade 2 : Very Good Quality Agricultural Land

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

Grade 3 : Good To Moderate Quality Agricultural Land

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

Subgrade 3a : Good Quality Agricultural Land

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

Sub-grade 3b : Moderate Quality Agricultural Land

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

Grade 4 : Poor Quality Agricultural Land

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

Grade 5 : Very Poor Quality Agricultural Land

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

Urban

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

Non-agricultural

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

Woodland

Includes commercial and non-commercial woodland.

Agricultural Buildings

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

Open Water

Includes lakes, ponds and rivers as map scale permits.

Land Not Surveyed

Agricultural land which has not been surveyed.

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

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

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

Wetness Class II

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

Wetness Class III

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

Wetness Class IV

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

Wetness Class V

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

Wetness Class VI

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

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

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents :

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

SOIL PROFILE DESCRIPTIONS : EXPLANATORY NOTE

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

Boring Header Information

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

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

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

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

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

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

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

7. **DRT** : Best grade according to soil droughtiness.

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

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

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

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

Soil Pits and Auger Borings

1. **TEXTURE** : soil texture classes are denoted by the following abbreviations.

S : Sand **LS** : Loamy Sand **SL** : Sandy Loam **SZL** : Sandy Silt Loam **CL** : Clay Loam **ZCL** : Silty Clay Loam
SCL : Sandy Clay Loam **C** : Clay **SC** : Sandy Clay **ZC** : Silty Clay **OL** : Organic Loam **P** : Peat **SP** : Sandy Peat
LP : Loamy Peat **PL** : Peaty Loam **PS** : Peaty Sand **MZ** : Marine Light Silts

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

F : Fine (more than 66% of the sand less than 0.2mm)
M : Medium (less than 66% fine sand and less than 33% coarse sand)
C : Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content.

M : Medium (< 27% clay) **H** : Heavy (27-35% clay)

2. **MOTTLE COL** : Mottle colour

3. **MOTTLE ABUN** : Mottle abundance, expressed as a percentage of the matrix or surface described.

F : few <2% **C** : common 2-20% **M** : many 20-40 **VM** : very many 40%+

4. **MOTTLE CONT** : Mottle contrast

F : faint - indistinct mottles, evident only on close inspection **D** : distinct - mottles are readily seen
P : prominent - mottling is conspicuous and one of the outstanding features of the horizon

5. **PED. COL** : Ped face colour

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

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

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

7. **STRUCT** : the degree of development, size and shape of soil 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

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

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

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

G : good **M** : moderate **P** : poor

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

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

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

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

14. Other notations

APW : available water capacity (in mm) adjusted for wheat
APP : available water capacity (in mm) adjusted for potatoes
MBW : moisture balance, wheat
MBP : moisture balance, potatoes

SOIL PIT DESCRIPTION

Site Name : BASINGSTOKE LP SITE 20 Pit Number : 1P

Grid Reference: SU42706320 Average Annual Rainfall : 787 mm
Accumulated Temperature : 1403 degree days
Field Capacity Level : 175 days
Land Use : Permanent Grass
Slope and Aspect : 01 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 22	MZCL	10YR42 00	0	2		
22- 37	MZCL	10YR53 00	0	2		MCSAB
37- 51	MCL	10YR64 00	0	3	M	WCSAB
51-120	C	25Y 63 00	0	5	M	WCSAB

Wetness Grade : 3A Wetness Class : III
Gleying :037 cm
SPL :051 cm

Drought Grade : APW : mm MBW : 0 mm
APP : mm MBP : 0 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness

program: ALC012 LIST OF BORINGS HEADERS 10/01/94 BASINGSTOKE LP SITE 20 page 1

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	WETNESS CLASS	WETNESS GRADE	WHEAT AP	WHEAT MB	POTS AP	POTS MB	M.REL DRT	EROSN FLOOD	FROST EXP	CHEM DIST	ALC LIMIT	COMMENTS
1	SU42806330	PGR	N	01	030	075	2	2		0		0					WE 2	SPL 75
1P	SU42706320	PGR	N	01	037	051	3	3A		0		0					WE 3A	SPL 51 PIT 72
2	SU42706320	PGR	N	02	035	055	3	3A		0		0					WE 3A	SPL 55
3	SU42806320	PGR	N	02	035	050	3	3A		0		0					WE 3A	SPL 50

program: ALC011 COMPLETE LIST OF PROFILES 14/01/94 BASINGSTOKE LP SITE 20 page 1

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
1	0-30	mzcl	10YR42 00						0	0	HR	1						
	30-50	mzcl	10YR53 00	10YR58	00	C		Y	0	0	HR	1		M				
	50-75	hcl	10YR53 00	10YR58	00	C		Y	0	0	HR	20		M				
	75-85	c	25Y 63 00	75YR56	58	C		Y	0	0	HR	30		M			Y	
1P	0-22	mzcl	10YR42 00						0	0	HR	2						
	22-37	mzcl	10YR53 00						0	0	HR	2	MCSAB	FR M				
	37-51	mcl	10YR64 00	75YR58	00	M		Y	0	0	HR	3	WCSAB	FR M				
	51-120	c	25Y 63 00	75YR58	00	M		Y	0	0	HR	5	WCSAB	FM P	Y		Y	
2	0-35	mzcl	10YR42 00						0	0	HR	3						
	35-55	mzcl	10YR52 00	10YR56	00	C		Y	0	0	HR	2		M				
	55-75	c	25Y 52 00	10YR58	00	M		Y	0	0	HR	2		P			Y	
	75-120	c	25Y 72 00	10YR68	00	M		Y	0	0	HR	3		P			Y	
3	0-35	mzcl	10YR42 00						0	0	HR	3						
	35-50	hcl	10YR52 00	10YR58	00	C		Y	0	0	HR	2		M				
	50-100	c	25Y 62 00	75YR58	00	M		Y	0	0	HR	2		P			Y	