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Ministry of
Agriculture
Fisheries
and Food

Agricultural Land Classification
Sunderland UDP - Objectors Sites
JUNE 1996

Resource Planning Team

Leeds Statutory Group
ADAS Leeds

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AGRICULTURAL LAND CLASSIFICATION SUMMARY REPORT

SUNDERLAND UDP - OBJECTORS SITES:

HA 5.25, HA 5.26, HA 5.23, WA 55, WA 5.12, HA 5.16 AND HA 5.28

Introduction

This report presents the findings of seven detailed Agricultural Land Classification (ALC) surveys covering 189 ha of land for the Sunderland UDP. The surveys were carried out in May and June 1996.

The surveys were commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Northallerton in connection with the Sunderland UDP.

These surveys supersede any previous ALC surveys on this land.

The work was conducted by members of the Resource Planning Team in the Leeds Statutory Group in ADAS. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

At the time of the survey the land use on the sites was as follows:-

Site HA 5.25

All of the agricultural land was under permanent grass. Other land consisted of farm buildings in the centre, a metalled road running east-west through the site, school playing fields in the south-eastern corner, and a recently bulldozed track in the south.

Site HA 5.26

All of this site was under winter wheat at the time of survey.

Site HA 5.23

All of this site was under winter wheat at the time of survey.

Site WA 55

All of the agricultural land on this site was under winter wheat at the time of survey. Other land on the site consisted of a belt of trees adjoining the track in the east.

Site WA 5.12

The majority of agricultural land on this site was under winter wheat. Remaining agricultural land consists of a belt of rough grassland lying to the eastern edge of the centre of the site and two small areas of permanent grass in the north of the site. Other land consists of farm buildings in the north and an area of wetland south-west of the farm buildings.

Site HA 5.16

Agricultural land in the west and in the south-eastern corner was under oilseed rape at the time of the survey while the remaining agricultural land was under winter barley. Other land in the south eastern corner consisted of parkland, much of which was steeply sloping (17°).

Site HA 5.28

The west of this site was under winter wheat whilst the centre and east were under oilseed rape.

Summary

The field work was conducted at an average density of 1 boring per hectare, and at least one soil pit was dug on each site to allow a full profile description to be made.

The findings of the surveys are shown on the enclosed ALC maps. The maps have been drawn at a scale of 1:5000 and 1:10000. They are accurate at the scale at which they have been mapped but any enlargement would be misleading.

The areas of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land
Area (ha)

Site	Grade 2	Subgrade 3a	Subgrade 3b	Other Land
HA 5.25	-	5.2	19.3	2.4
HA 5.26	-	3.0	-	-
HA 5.23	-	-	11.2	-
WA 55	2.8	3.5	15.6	1.2
WA 5.12	10.9	-	65.3	4.7
HA 5.16	3.6	13.6	8.7	0.6
HA 5.28	-	2.8	14.3	-

Site HA 5.25

The majority of land falls into Subgrade 3b, moderate quality agricultural land. Soils consist of medium textured topsoils over gleyed, slowly permeable heavy textured subsoils. This land is limited to this subgrade by moderate soil wetness and workability restrictions.

The remaining agricultural land, found to the south of the site, falls into Subgrade 3a, good quality agricultural land. Soils consist of medium textured topsoils over light and medium textured gleyed, permeable upper subsoils, in turn over gleyed slowly permeable heavy textured lower subsoils. The ALC grade of this land is limited by slight soil wetness and a pattern restriction.

Other land consists of farm buildings, a metalled road and a track in the south of the site, and school playing fields in the south-eastern corner.

Site HA 5.26

All of this site falls into Subgrade 3a, good quality agricultural land. The soils typically consist of medium-textured topsoils overlying medium to heavy-textured subsoils. The land is limited to this subgrade by a slight soil wetness limitation and by a pattern limitation.

Site HA 5.23

All of this site falls into Subgrade 3b, moderate quality agricultural land. Land covering Rainton Bank and all land south of it has been disturbed. Rainton Bank itself is restored, and land south of it has been disturbed during the placement of sewerage pipes. Soils typically consist of medium-textured topsoils overlying medium to heavy-textured poorly structured subsoils. This land is limited to this subgrade by a moderate soil wetness and workability limitation. The remaining agricultural land to the north of Rainton Bank is undisturbed. Soils consist of medium-textured topsoils overlying heavy-textured subsoils. This land is limited to this subgrade by a moderate soil wetness and workability limitation.

Site WA 55

Grade 2, very good quality agricultural land, is found in the south of this site. The soils are well drained and typically consist of medium clay loam topsoils and upper subsoils overlying fine sandy silt loam, silt loam or loamy fine sand lower subsoils. The land is limited to Grade 2 by a very slight climatic limitation.

Subgrade 3a land, good quality agricultural land, also occurs in the south of the site. The soils are imperfectly drained, generally consisting of medium clay loam topsoils and upper subsoils overlying gleyed and slowly permeable heavy clay loam or clay lower subsoils. Slight soil wetness is the factor restricting this land to Subgrade 3a.

Subgrade 3b land, moderate quality agricultural land, covers the remainder of the agricultural land on the site. The soils consist of medium clay loam topsoils overlying gleyed and slowly permeable heavy clay loam or clay subsoils. They are poorly drained and the land is limited to Subgrade 3b by a moderate soil wetness restriction.

Other, non-agricultural, land on this site consists of a belt of woodland in the east.

Site WA 5.12

Grade 2 land, very good quality agricultural land, is found to the north of the site. Soils consist of medium textured topsoils over light to medium textured subsoils, with gleyed slowly permeable subsoils at depth. These soils are well to moderately well drained, and this land is limited to Grade 2 by very slight soil wetness restrictions.

Remaining agricultural land falls into Subgrade 3b, moderate quality agricultural land. Soils consist of medium textured topsoils over gleyed slowly permeable heavy textured subsoils. They are poorly drained and this land is limited to Subgrade 3b by moderate soil wetness restrictions. Other land consists of farm buildings in the north and an area of wetland south-west of these, and an area of wetland/scrub in the south-west.

Site HA 5.16

Grade 2 land, very good quality agricultural land, occurs in a band running from the centre to the south west of the site. The soils are well drained, consisting of medium clay loam topsoils over similar, permeable, ungleyed subsoils. Climatic limitations restrict this land to Grade 2.

Subgrade 3a land, good quality agricultural land, occurs in the north and in the centre and south of the site. The soils are imperfectly drained, generally consisting of medium clay loam topsoils and upper subsoils overlying gleyed and slowly permeable heavy clay loam or clay lower subsoils. Slight soil wetness limits this land to Subgrade 3a.

Subgrade 3b land, moderate quality agricultural land, covers the remainder of the site. The soils consist of medium clay loam topsoils overlying gleyed, slowly permeable heavy clay loam or clay subsoils. They are poorly drained and the land is limited to Subgrade 3b by a moderate soil wetness restriction. A small area in the south is limited to Subgrade 3b by slopes of 8 - 9°. Other, non-agricultural land, on this site consists of an area of steeply sloping parkland in the south-western corner.

Site HA 5.28

Subgrade 3a, good quality agricultural land, occurs in the north-west of the site. The soils vary between well and imperfectly drained, with medium clay loam topsoils overlying subsoils which range in texture from clay to medium sand. Although some land meets the requirements for Grade 2, a pattern limitation prevents separate areas of Grade 2 land from being mapped, and remaining areas are limited to Subgrade 3a by a slight soil wetness restriction.

Subgrade 3b, moderate quality agricultural land, covers the remainder of the site. The soils are generally poorly drained, with medium clay loam topsoils overlying gleyed and slowly permeable heavy clay loam or clay subsoils. Moderate soil wetness restrictions limit this land to Subgrade 3b. A small area in the west of the site is limited to this subgrade by slopes of around 10°.

Factors Influencing ALC Grade

Climate

Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

The key climatic variables used for grading this site are given in Tables 2 - 8 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

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.

The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (ATO, January to June) as a measure of the relative warmth of a locality.

Any other site factors which influence ALC grade are referred to under each site heading in the following pages.

SITE HA 5.25

Climate

The key climatic variables for this site are given in Table 2.

Table 2: Climatic and altitude data, Site HA 5.25

Factor	Units	Values
Grid reference	N/A	NZ.
Altitude	m, AOD	
Accumulated Temperature	day°C (Jan-June)	
Average Annual Rainfall	mm	
Field Capacity Days	days	
Moisture Deficit, Wheat	mm	
Moisture Deficit, Potatoes	mm	

The combination of rainfall and temperature at this site means that there is an overall climatic limitation of Grade 2.

Site Factors

The site is level to moderately sloping (0° - 5°), and nowhere on site does gradient, micro-relief or flooding cause a limitation to ALC grade.

Geology and Soils

Geology maps for Sunderland (Sheet 21) and Durham (Sheet 27) show the site to be underlain by Coal Measures with a drift cover of boulder clay.

The Soil Survey of England and Wales, Soils of England and Wales (Sheet 1 Northern England) shows soils on the site to comprise the Dunkeswick association.

Agricultural Land Classification

The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1.

Subgrade 3a

Subgrade 3a, good quality agricultural land, is found to the south of the site. Soils consist of very slightly stony medium clay loam and sandy clay loam topsoils, over gleyed, permeable very slightly stony, medium sandy loam upper subsoils, in turn over gleyed slowly permeable sandy clay loam lower subsoils. The slowly permeable layer begins at between 50 cm and 60 cm depth. These soils are imperfectly drained, falling into Wetness Class III (See Appendix II) and this land is limited to Subgrade 3a by slight soil wetness and workability restrictions. These restrictions limit the flexibility of the land, reducing the range of high yielding crops,

utilised, as well as reducing the number of days where the soil is in a suitable condition for cultivation or trafficking by machinery.

Subgrade 3b

Subgrade 3b, moderate quality agricultural land, covers the reminder of the site. Soils consist of very slightly stony medium clay loam topsoils over very slightly stony, gleyed, slowly permeable heavy clay loam and clay subsoils. The slowly permeable layer begins at between 25 cm and 40 cm depth. These soils are poorly drained, falling into Wetness Class IV (see Appendix II) and this land is limited to Subgrade 3b by soil wetness and workability restrictions. These restrictions put a moderate limitation on the flexibility of the land, allowing it to give moderate yields of a narrow range of crops or lower yields of a wider range of crops, and reducing the number of days when the soil is in a suitable condition for cultivation or trafficking by machinery.

Other Land

Other land consists of farm buildings, a metalled road and a track in the south of the site, and school playing fields in the south-eastern corner.

File Ref: RPT 20029

SITE HA 5.26

Climate

Table 3: Climatic and altitude data, Site HA 5.26

Factor	Units	Values
Grid reference	N/A	NZ347469
Altitude	m, AOD	92
Accumulated Temperature	day°C (Jan-June)	1263
Average Annual Rainfall	mm	677
Field Capacity Days	days	172
Moisture Deficit, Wheat	mm	89
Moisture Deficit, Potatoes	mm	75

The combination of rainfall and temperature at this site means that there is an overall climatic limitation of Grade 2.

Site Factors

Most of the land on this site is level to gently sloping (0° - 2°), although in the far west it is moderately sloping (4 - 6°) with a westerly aspect. However, there is no limitation to ALC grade caused by gradient, microrelief or flooding.

Geology and Soils

The geology maps for the area (Durham, Sheet 27), show it to be underlain by Middle Coal Measures, which are overlain by deposits of glacial sand and gravel on Site HA 5.26.

The Soils of England and Wales (Sheet 1, Northern England) shows the soils in the area as belonging to the Dunkeswick association.

Agricultural Land Classification

The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1. The west of this site was subject to a detailed ALC survey in May 1996 ("Sunderland UDP, Hetton Bypass", ADAS Reference 52/96) which found the area in question to be Subgrade 3a.

Subgrade 3a

All of this site has been mapped as Subgrade 3a, good quality agricultural land. The soils typically fall into Wetness Classes II and III (see Appendix II) and consist of medium clay loam topsoils overlying subsoils which range in texture from fine sandy silt loam to heavy clay loam. Both topsoils and subsoils are generally very slightly to slightly stony, and subsoils often become gleyed and slowly permeable at between 50 cm and 70 cm depth. This land is, thus, restricted to Subgrade 3a by a slight soil wetness limitation and by a pattern limitation

which prevents any better quality land being mapped as a separate unit. These limitations restrict the flexibility of the land, reducing the range or yield of crops grown, as well as reducing the number of days when the soil is in a suitable condition for agricultural operations.

File Ref: RPT 20,027

SITE HA 5.23

Climate

The key climatic variables for this site are given in Table 4.

Table 4: Climatic and altitude data, Site HA 5.23

Factor	Units	Values
Grid reference	N/A	NZ344487
Altitude	m, AOD	65
Accumulated Temperature	day°C (Jan-June)	1292
Average Annual Rainfall	mm	669
Field Capacity Days	days	168
Moisture Deficit, Wheat	mm	92
Moisture Deficit, Potatoes	mm	78

The combination of rainfall and temperature at this site means that there is an overall climatic limitation of Grade 2.

Site Factors

Most of the land on this site is level to gently sloping (0° - 3°), although a small area along the southern edge of Rainton Bank is moderately sloping (5°). This land therefore has no limitation to ALC grade caused by gradient, or by microrelief or flooding.

Geology and Soils

The geology map for the area (Sunderland, Sheet 21), shows the site to be underlain by Middle Coal Measures, which are overlain by laminated clay.

The Soils of England and Wales (Sheet 1, Northern England) shows the soils in the area as belonging to the Dunkeswick association.

Agricultural Land Classification

The details of the classification of the site are shown on the attached ALC map, and the area statistics are given in Table 1.

Subgrade 3b

All of this site has been mapped as Subgrade 3b, moderate quality agricultural land. Land to the south of Rainton Bank has been disturbed during the placing of sewerage pipes. These soils fall into Wetness Class IV (see Appendix II) and consist of very slightly stony (1 - 5% small and medium hard stones) medium clay loam topsoils, over very slightly to slightly stony (1 - 10% small, medium and large hard stones) sandy clay loam, heavy clay loam and occasional medium clay loam subsoils. These soils become gleyed and slowly permeable at

between 30 cm and 45 cm depth and are also poorly structured. This land is restricted to Subgrade 3b by moderate soil wetness and workability limitations.

Land to the north of Rainton Bank is undisturbed. These soils also fall into Wetness Class IV (see Appendix II) and consist of very slightly stony (1 - 2% small and medium hard stones) medium clay loam topsoils, overlying gleyed slowly permeable clay subsoils. The slowly permeable layer begins at between 30 cm and 40 cm depth. This land is restricted to Subgrade 3b by moderate soil wetness and workability limitations.

The wetness problems occurring over this land restrict the flexibility of the land, reducing the range or yield of crops grown, as well as reducing the number of days when the soil is in a suitable condition for agricultural operations.

File Ref: RPT 20,028

SITE WA 55

Climate

The key climatic variables for this site are given in Table 5.

Table 5: Climatic and altitude data, Site WA55

Factor	Units	Values
Grid reference	N/A	NZ315593
Altitude	m, AOD	50
Accumulated Temperature	day°C (Jan-June)	1306
Average Annual Rainfall	mm	641
Field Capacity Days	days	158
Moisture Deficit, Wheat	mm	94
Moisture Deficit, Potatoes	mm	81

The combination of rainfall and temperature at this site means there is a climatic limitation to Grade 2.

Site Factors

The land on this site is level to moderately sloping (0 - 4°), and nowhere on the site does gradient limit the ALC grade of the land. Equally, neither microrelief nor flood risk limit the ALC grade on this site.

Geology and Soils

According to the geology map of the area (Sheet 21, Sunderland, 1978), the site is underlain by Middle Coal Measures over which lies late Devensian Pelaw Clay.

The Soils of England and Wales (Sheet 1, Northern England) maps the area as urban land, but adjoining areas have been mapped as Foggathorpe 1 association.

Agricultural Land Classification

The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1.

Grade 2

An area in the south of the site falls in Grade 2, very good quality agricultural land. The soils are well drained, falling in Wetness Class I (see Appendix II), and typically consist of medium clay loam topsoils and upper subsoils overlying silt loam, fine sandy silt loam or loamy fine sand lower subsoils. The topsoils are very slightly stony, containing 2-3% very small and small sandstones and fragments of shale, and the subsoils are stoneless. This land is limited to Grade 2 by an overall climatic restriction, which means yields may be lower or more variable than Grade 1 land with similar physical properties.

Subgrade 3a

Subgrade 3a, good quality agricultural land, also occurs in the south of the site. These soils are imperfectly drained, falling in Wetness Class III (see Appendix II). The soils typically consist of medium clay loam topsoils and upper subsoils overlying gleyed and slowly permeable heavy clay loam or clay lower subsoils at between 45 cm and 50 cm depth. Both topsoils and subsoils are very slightly stony, with around 3% very small and small hard stones, sandstones and shale fragments. The land is restricted to Subgrade 3a by slight soil wetness limitations. These limitations restrict the flexibility of the land by reducing the range of high yielding crops which can be grown and by reducing the number of days in the year when the soil is in a suitable condition for agricultural operations.

Subgrade 3b

Subgrade 3b, moderate quality agricultural land, covers the north of the site and the south-eastern and south-western edges. The soils are poorly drained, falling in Wetness Class IV (see Appendix II), and generally consist of very slightly stony medium clay loam topsoils overlying, in places, thin medium clay loam or heavy clay loam upper subsoils, over gleyed and slowly permeable heavy clay loam or clay. These slowly permeable layers begin at between 25 cm and 40 cm depth and soil wetness is the factor which limits the land to Subgrade 3b. This moderate soil wetness limitation allows the land to give moderate yields of a narrow range of crops or lower yields of a wider range of crops. It also significantly restricts the period when the soils are in a suitable condition for cultivations or trafficking by machinery.

Other Land

Other land on this site consists of a belt of trees adjoining the track which forms the eastern boundary of the site.

File Ref: RPT 20,035

SITE WA5.12

Climate

The key climatic variables for this site are given in Table 6.

Table 6: Climatic and altitude data, Site WA5.12

Factor	Units	Values
Grid reference	N/A	NZ320590
Altitude	m, AOD	45
Accumulated Temperature	day°C (Jan-June)	1311
Average Annual Rainfall	mm	639
Field Capacity Days	days	158
Moisture Deficit, Wheat	mm	95
Moisture Deficit, Potatoes	mm	82

The combination of rainfall and temperature at this site means there is no climatic limitation.

Site factors

The land on this site is level to moderately sloping (0° - 4°), and therefore nowhere on the site does gradient limit the ALC grade of the land. Equally, neither microrelief nor flood risk limit the ALC grade on this site.

Geology and Soils

According to the geology map of the area (Sheet 21, Sunderland, 1978), the site is underlain by Middle Coal Measures over which lies mainly Pelaw Clay with some alluvium in the north.

The Soils of Northern England (Sheet 1, Northern England) maps the area as Foggathorpe 1 association.

Agricultural Land Classification

The details of the classification of the site are shown on the attached ALC map and area statistics of each grade are given in Table 1.

Grade 2

An area in the north of the site falls into Grade 2, very good quality agricultural land. These soils are moderately well drained, falling into Wetness Class II (see Appendix II). They typically consist of medium clay loam and sandy clay loam topsoils over ungleyed, permeable medium sandy loam upper subsoils, in turn over gleyed slowly permeable clay subsoils. The slowly permeable layer starts at between 70 cm and 75 cm depth. The topsoils and upper subsoils are very slightly stony, containing 2% small sandstones, while the clay subsoils are stoneless. This land is limited to Grade 2 by a very slight soil wetness restriction which may

reduce yields slightly compared with Grade 1 land. Some Grade 1 profiles occur on this land but are not consistent enough to be mappable.

Subgrade 3b

The remaining agricultural land falls into Subgrade 3b, moderate quality agricultural land. The soils are poorly drained, falling into Wetness Class IV (see Appendix II) and generally consist of stoneless to very slightly stony medium clay loam and occasional heavy clay loam topsoils overlying, in places, similar shallow upper subsoils, in turn over gleyed slowly permeable heavy clay loam and clay lower subsoils. The slowly permeable layers begin at between 25 cm and 40 cm depth and this land is limited to Subgrade 3b by moderate soil wetness restrictions. This moderate soil wetness limitation allows the land to give moderate yields of a narrow range of crops, or lower yields of a wider range of crops. It also significantly restricts the period when the soils are in a suitable condition for cultivations or trafficking by machinery.

Other Land

Other land consists of farm buildings in the north, wetland to the south-west of this and a small area of boggy scrub in the south-western corner of the site.

File Ref: RPT 20,034

SITE HA 5.16

Climate

The key climatic variables for this site are given in Table 7.

Table 7: Climatic and altitude data, Site HA 5.16

Factor	Units	Values
Grid reference	N/A	NZ338520
Altitude	m, AOD	85
Accumulated Temperature	day°C (Jan-June)	1268
Average Annual Rainfall	mm	667
Field Capacity Days	days	165
Moisture Deficit, Wheat	mm	90
Moisture Deficit, Potatoes	mm	76

The combination of rainfall and temperature at this site means there is a climatic limitation of Grade 2.

Site Factors

The land on the site is level to strongly sloping (0° - 8°). A small area of land in the far south is limited to Subgrade 3b by a gradient of 8°. Nowhere else on the site do gradient, flood risk or microrelief limit the ALC grade.

Geology and Soils

According to the geology map of the area (Sheet 21, Sunderland, 1978) the site is underlain by Middle Coal Measures, with Basal Permian Sand and Lower Magnesian Limestone in the south-eastern corner. The drift geology map suggests a drift cover of laminated clay.

The Soils of Northern England (Sheet 1, Northern England) maps the area as Rivington 2 association.

Agricultural Land Classification

The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1.

Grade 2

Grade 2, very good quality agricultural land, occurs in a band running from the centre to the south west of the site.

The soils are well drained, falling into Wetness Class I (see Appendix II), and typically consist of very slightly stony (1-2% small and medium hard stones) medium clay loam topsoils overlying similar ungleyed permeable subsoils. This land is limited to Grade 2 by an overall

climatic restriction, which means yields may be lower or more variable than Grade 1 land with similar physical properties.

Subgrade 3a

Subgrade 3a land, good quality agricultural land, occurs over the north of the site and in the centre and south. These soils are imperfectly drained, falling into Wetness Class III (see Appendix II). The soils typically consists of medium clay loam topsoils over permeable heavy clay loam or medium clay loam upper subsoils, in turn over gleyed slowly permeable clay lower subsoils at between 50 cm and 55 cm depth. Both topsoils and upper subsoils are very slightly stony, containing around 3 - 5% very small to medium sandstones. This land is restricted to Subgrade 3a by slight soil wetness limitations. These limitations restrict the flexibility of the land by reducing the range of high yielding crops which can be grown and by reducing the number of days in the year when the soil is in a suitable condition for agricultural operations.

Subgrade 3b

Subgrade 3b land, moderate quality agricultural land, covers the remainder of the agricultural land. The soils are poorly drained, falling into Wetness Class IV (see Appendix II), and generally consist of very slightly stony (1 - 2% small and medium hard stones) medium clay loam topsoils over very slightly to slightly stony (2 - 15% medium soft sandstones) gleyed and slowly permeable clay subsoils. These slowly permeable layers begin at between 25 cm and 35 cm depth. This land is restricted to Subgrade 3b by a moderate soil wetness limitation. This limitation allows the land to give moderate yields of a narrow range of crops or lower yields of a wider range of crops. It also significantly restricts the period when the soils are in a suitable condition for cultivations or trafficking by machinery.

Other Land

Other land consists of a small area of steeply sloping parkland to the south-west corner of the site.

File Ref: RPT 20,036

SITE HA 5.28

Climate

The key climatic variables for this site are given in Table 8.

Table 8: Climatic and altitude data, Site HA 5.28

Factor	Units	Values
Grid reference	N/A	NZ368456
Altitude	m, AOD	135
Accumulated Temperature	day°C (Jan-June)	1214
Average Annual Rainfall	mm	692
Field Capacity Days	days	174
Moisture Deficit, Wheat	mm	84
Moisture Deficit, Potatoes	mm	68

The combination of rainfall and temperature at this site means there is a climatic limitation to Grade 2.

Site Factors

Most of the land on this site is level to moderately sloping (0 - 5°), although an area of strongly sloping (8 - 10°) land in the west is limited to Subgrade 3b. Elsewhere on the site the gradient does not provide any limitation to ALC grade. Neither microrelief nor flood risk limit ALC grade at any point on this site.

Geology and Soils

The geology map of the area (Sheet 27, Durham), shows the site to be underlain by Magnesian Limestone over which lies a drift cover of till.

The Soils of England and Wales (Sheet 1, Northern England) shows the soils on the site as belonging to the Dunkeswick association.

Agricultural Land Classification

The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1. The south of the site had been subject to a detailed ALC survey in May 1996 ("Sunderland UDP, Hetton Bypass", ADAS Reference 52/96) which found the land surveyed at that time to be Subgrade 3b.

Subgrade 3a

The north-west of the site falls in Subgrade 3a, good quality agricultural land. The soils vary between well and imperfectly drained, falling into Wetness Classes I to III (see Appendix II). Medium clay loam topsoils overlie subsoils which vary in texture from medium sand to clay. The subsoils become gleyed and slowly permeable below 50 cm depth in places and, although

some profiles meet the requirements for Grade 2, they cannot be accurately mapped together as a separate unit. This land is, thus, limited to Subgrade 3a by a slight soil wetness limitation and by a pattern limitation which prevents any better quality land being mapped as a separate unit. These limitations restrict the flexibility of the land, reducing the range or yield of crops grown, as well as reducing the number of days in the year when the soil is in a suitable condition for agricultural operations.

Subgrade 3b

Subgrade 3b, moderate quality agricultural land, covers the remainder of the site. The soils are generally poorly drained, falling into Wetness Class IV (see Appendix II), and typically consist of very slightly stony medium clay loam topsoils overlying gleyed and slowly permeable heavy clay loam or clay subsoils. The slowly permeable layers begin at between 30 cm and 35 cm depth and the land is limited to Subgrade 3b by moderate soil wetness and topsoil workability restrictions. These restrictions put a moderate limitation on the flexibility of the land, allowing it to give moderate yields of a narrow range of crops or lower yields of a wider range of crops. These limitations also significantly reduce the number of days when the soil is in a suitable condition for agricultural operations.

File Ref: RPT 20,037

SOURCES OF REFERENCE

British Geological Survey (1978) *Sheet 21, Sunderland and (1965) Sheet 27, Durham,* BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.* MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.* Met. Office: Bracknell.

Soil Survey of England and Wales (1984) *Soils and their Use in Northern England* SSEW: Harpenden

APPENDIX I

DESCRIPTIONS OF THE 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 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 of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the 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.

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 the level of yields. It is mainly suited to grass with occasional arable crops (e.g. 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

SOIL WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Wetness Class	Duration of waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years.[2]
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 only wet within 40 cm depth for 30 days in most years.
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 present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years **or**, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

[1] The number of days is not necessarily a continuous period.
[2] 'In most years' is defined as more than 10 out of 20 years.