

**AGRICULTURAL LAND
CLASSIFICATION**

**MID-BEDFORDSHIRE
DISTRICT LOCAL
PLAN**

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1.0 BACKGROUND

- 1.1 ADAS Statutory Group were requested on behalf of MAFF to assess the agricultural land quality of five sites which are currently included in the area of search for the Mid Bedfordshire District Local Plan. The five sites, which extend to 94 hectares in total, were surveyed in March 1995. They are known as; land east of Biggleswade (4) (north and south), land at Home Farm, Cranfield (7), land east of Marston Moretaine (14) and land south of Stotfold (24).
- 1.2 On the published Provisional 1:63 360 scale Agricultural Land Classification Map, sheet number 147 (MAFF, 1969) the areas are mainly shown as grades 2 and 3. Site 24 is entirely grade 2, as is site 4 (north). Site 4 (south) is shown as having a small area of grade 2 land in the north with the remaining land as grade 3. Site 7 is depicted as entirely grade 3. Site 14 was mapped as non-agricultural land. Since this map is of a reconnaissance nature designed primarily for strategic planning purposes, the current survey was undertaken to provide more detailed information on land quality within the areas of search.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

- 2.1 Site specific climatic information for the six sites has been obtained by interpolating data contained in the 5 km grid climatological dataset for Agricultural Land Classification produced by the Meteorological Office (1989). This information is shown in summary overleaf.

	SITES				
	4 (north)	4 (south)	7	14	24
Annual Average Rainfall (mm)	550	551	599	582	570
Accumulated Temperature (°C)	1443	1440	1360	1445	1426
Altitude	32	35	112	36	51
Field Capacity Days	94	94	116	108	105
MD Wheat (mm)	121	120	108	118	119
MD Potatoes (mm)	117	116	100	114	113

2.2 These characteristics do not impose any overall climatic limitation to land quality at the sites. However, climatic factors specifically field capacity days and soil moisture deficits do interact with soil factors to influence soil wetness and droughtiness limitations. At this locality the climate is relatively dry in regional terms.

Altitude and Relief

2.3 The sites are widely spaced throughout the Mid Bedfordshire District, occupying gently undulating land, with maximum gradients of 4°. The sites range in height from 30 to 112 m AOD with site 7 occupying the highest land.

2.4 Neither gradient or altitude constitute limitations to agricultural land quality.

Geology and Soils

2.5 The published drift edition geology maps of varying scales which cover these sites (1:50 000 scale, sheet 204, 1976; 1:253 440 scale, sheet 16, 1907; 1:625 000 scale Quaternary Map of the United Kingdom South) show that large areas are covered by a variety of drift deposits; River terrace gravels occur at sites 4 (north) and 14 which both lie adjacent to river tributaries. Boulder clay and morainic drift is present at site 7 and in the northeast of site 4 (south), the remainder of site 4 (south) being covered by glacial gravel. At site 24 the Upper Cretaceous Chalk which runs south of Bedford in a southwest to northeast ridge is exposed.

2.6 The Soil Survey of England and Wales have mapped this area at a scale of 1:63 360 (sheet 147, 1968) and this map indicates the occurrence of 5 soil associations within the Local Plan Area.

2.7 The most extensive association is the Milton Association which generally occurs in conjunction with gravel deposits. This is mapped over the whole of site 14, the majority of site 24 and in the east of site 4 (south). Overlying the river terrace gravels at site 4 (north) are soils of the Biggleswade Association. Other soils present within the survey area include the Cottenham Association which occurs over the majority of site 4 (south) in conjunction with the glacial gravel. The Burwell Association is mapped in a small area of land adjacent to the stream in the south of site 24. The Hanslope Association covers the boulder clay deposits at site 7.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The following table provides a breakdown of the ALC grades identified on all five sites in hectares and percentage terms. A definition of the ALC grades is contained in Appendix 1.

Table 1 : Distribution of ALC grades

ALC	Site	4 (N)	4 (S)	7	14	24
1			7.84			
2		3.83	7.15			16.56
3a		9.54	1.67	16.7	22.75	
3b					5.02	
4						
Non Agric					2.67	
TOTAL		13.37	16.66	16.7	30.44	16.56

3.2 A detailed description of the soils and ALC grades identified on each site in turn is provided overleaf:

4.0 **SITE 4 (NORTH) BIGGLESWADE**

Soils

- 4.1 One main soil type was identified which broadly corresponded with the mapped Biggleswade Soil Association. Typical profiles are free draining (wetness class I) and comprise very slightly stony non calcareous medium sandy loam topsoils over very slightly stony medium sandy loam or occasionally sandy clay loam upper subsoils. Lower subsoils which occur at variable depth comprise slightly stony medium sand or loamy medium sand which typically overlie slightly or moderately stony medium sand at depth. In the south eastern part of the site an undulating band of stony gravel (35-38% stone by volume) was noted between 65-90 cms depth.

Agricultural Land Classification

- 4.2 The site is graded predominantly 3a, with smaller areas of 2. A breakdown of ALC grades in hectares and percentage terms is provided below.

Grade	ha	%
2	3.83	28.7
3a	9.54	71.3
TOTAL	<u>13.37</u>	<u>100.00</u>

Grade 2

- 4.3 Grade 2 land is mapped in the central and northeastern part of the site coinciding with the deeper, better bodied and more water retentive variants. Although free draining, these soils have a restricted available water capacity due to the presence of light textured sand at depth in the profile, and the land is consequently restricted to grade 2 by minor droughtiness constraints.

Subgrade 3a

- 4.4 The remainder of the site is mapped as subgrade 3a, profiles in this area have a reduced depth of loamy materials overlying the sand which is often slightly or moderately stony. The available water capacity of these soils is correspondingly reduced and the land is restricted to 3a by moderate droughtiness imperfections.
- 4.5 Although individual profiles of lighter textured soils are or approach grade 3b on the southwestern edge of the site, these have not been delineated separately.

5.0 **SITE 4 (SOUTH) BIGGLESWADE**

Soils

- 5.1 Two main soil types were identified on this site which broadly correspond with the mapped Milton and Cottenham Soil Associations. The first, located in the western and central part of the site comprises very slightly stony non calcareous medium sandy loam or medium clay loam topsoil, over very slightly stony sandy clay loam upper subsoils which typically become lighter textured with depth. These soils are free draining and are assessed as wetness class I.
- 5.2 The second soil type is on the eastern boundary and comprises very slightly stony, non calcareous sandy clay loam topsoil over very slightly stony sandy clay loam upper subsoil. This overlies slightly stony sandy clay becoming moderately stony below depths of 55-80 cm. These soils were assessed as wetness class II/III dependant on depth to slowly permeable clay and/or groundwater.

Agricultural Land Classification

- 5.3 Land on this site has been graded 1, 2 and 3a. Land quality to the south of the track has been assessed on the basis of agricultural potential in an irrigated state, since irrigation from an adequate and assured water supply is currently practised within this area. A breakdown of land quality in hectares and percentage terms is provided below.

Grade	ha	%
1	7.84	47.0
2	7.15	43.0
3a	1.67	10.0
TOTAL	<u>16.66</u>	<u>100.00</u>

Grade 1

- 5.4 This occurs to the south of the track in the western and central parts of the site corresponding with the fine loamy and coarse loamy soils described in paragraph 5.1. Soils are assessed as wetness class I and with the benefit of irrigation water this land has very few limitations to agricultural use.

Grade 2

This occurs in 2 main situations:

- 5.5 In the eastern part of the site south of the track, grade 2 land is mapped in areas of fine loamy soils overlying gravelly clay which are more fully described in paragraph 5.2. Land of this type is usually assessed as slightly to moderately droughty, but due to the availability of irrigation, a substantial part of the droughtiness limitation is alleviated and the land is consequently graded 2. Individual profiles are also limited by minor winter wetness and workability imperfections.
- 5.6 The second main area of grade 2 occurs to the north of the track in the western and central parts of the site, coinciding with the lighter textured soil variant described in paragraph 5.1. These soils are free draining (wetness class I) but are restricted to grade 2 by minor summer droughtiness constraints which result from the presence of loamy sand and sand textures within the lower subsoil.

Subgrade 3a

- 5.7 This occurs in the eastern part of the site north of the track corresponding with the fine loamy over stony clayey soils described in paragraph 5.2. Land of this type is restricted to 3a by slight to moderate droughtiness imperfections.

6.0 **SITE 7 CRANFIELD**

Soils

- 6.1 Soils on this site are derived from the underlying boulder clay drift and comprise very slightly stony, calcareous clay or very occasionally heavy clay loam topsoil over very slightly stony, calcareous, clay upper subsoil to a depth of 50/55 cm. At this depth very slightly/slightly stony strongly mottled chalky boulder clay was encountered and continued to 120 cm+ depth. In most areas borings were distinctly mottled and slowly permeable at relatively shallow depth and were assessed as wetness class III. Individual borings of better drained soils in the north of the site were assessed as wetness class II.

Agricultural Land Classification

Subgrade 3a

- 6.2 This 16.7 hectare site is graded entirely 3a. Although imperfectly drained (wetness class III) these naturally calcareous soils tend to be better structured and more easily worked than their non calcareous counterparts and the land is therefore eligible for subgrade 3a. Although individual profiles of better drained soils in the north of the site are or approach grade 2, they have not been delineated separately. The land is limited by slight to moderate winter wetness and workability imperfections.

7.0 SITE 14 EAST OF MARSTON MORETAINE

Soils

Two main soil types were found on the site.

- 7.1 The majority of the site broadly corresponds with the mapped Milton association and mainly comprises very slightly stony non calcareous heavy clay loam (occasionally medium clay loam or clay) topsoils, over similar or heavier upper subsoils. Lower subsoils which typically occur between 60-100 cm depth, comprise very slightly stony calcareous dense clay which is slowly permeable. Often occurring immediately above the dense clay is a narrow horizon of moderately stony sandy clay loam which becomes lighter textured with depth. At the time of survey these sandy horizons were frequently saturated. Drainage status is assessed mainly as wetness class II.
- 7.2 The second soil type occurs in small areas in the south and east of the site and in the fields adjacent to Bedford Road. Soils typically comprise very slightly stony non calcareous heavy clay loam or clay topsoils over very slightly stony non calcareous clay. Lower subsoils which typically occur between 40-55 cm depth comprise very slightly stony calcareous dense grey clay which is slowly permeable. These profiles have been assessed as wetness class III.

Agricultural Land Classification

- 7.3 The site is predominantly graded 3a, with smaller areas of 3b. A breakdown of ALC grades in hectares and percentage terms is provided below.

Grade	ha	%
Subgrade 3a	22.75	74.7
Subgrade 3b	5.02	16.5
Non Agricultural	2.67	8.8
TOTAL	30.44	100.0

Subgrade 3a

- 7.4 Subgrade 3a land is mapped extensively over the site corresponding with the better drained and slightly lighter textured soil variants described in paragraph 7.1. Slowly permeable clay is typically present between 60/100 cm depth and the land is consequently assessed as wetness class II, or occasionally, wetness class I. The combination of relatively heavy topsoil textures with slight drainage imperfections result in the land being restricted to 3a by slight to moderate wetness and workability constraints.

Although individual profiles of lighter textured soils occur towards the south of the site, that are or approach grade 2, these have not been delineated separately.

Subgrade 3b

- 7.5 This is mapped in small areas along the western and eastern edges of the site, corresponding with the slightly heavier and more poorly drained soil variants described in paragraph 7.2. These soils are typically slowly permeable between 40-55 cm and are assessed as wetness class III. The combination of heavier topsoil textures with imperfect soil drainage results in a more significant wetness and workability limitation and the land is consequently restricted to subgrade 3b.

Non Agricultural

- 7.6 A narrow strip of non agricultural land is mapped in the north and western part of the site which corresponds to a dyke and associated large earth embankment.

8.0 **SITE 24 SOUTH OF STOTFOLD**

Soils

Two main soil types were identified:

- 8.1 The first main soil type occurs on higher ground in the north of the site corresponding with the area mapped as the Milton Association on the published soil map. Profiles in this area are typically free draining (wetness class I) and comprise very slightly stony sandy clay loam or occasionally medium clay loam topsoils over slightly stony sandy clay loam upper subsoils. Upper subsoils typically overlie slightly stony similarly textured lower subsoils except in a small area to the north of site, where lower subsoils may be moderately stony (up to 20% flint). Clayey Chalk Marl is encountered below 70/80 cm on mid slopes. Coarser textured loamy medium sand lower subsoils occur sporadically throughout this area.
- 8.2 The second main soil type occurs on lower ground in the south of the site where profiles are more clayey and correspond to those of the mapped Burwell Association which are derived from Chalk Marl. These soils are typically strongly calcareous and very slightly stony throughout, and comprise heavy clay loam or occasionally medium clay loam topsoils over heavy clay loam or occasionally clay upper subsoils. Lower subsoils typically consist of gleyed silty clay or clay derived from the Chalk Marl parent material which is encountered at depths of between 70/80 cm. The clayey textured Chalk Marl is slowly permeable and wetness class is assessed as II or occasionally I.

Agricultural Land Classification

Grade 2

This 16.6 hectare site has been mapped as entirely grade 2.

- 8.3 Grade 2 land in the north of the site corresponds to the sandy clay loam soils described in paragraph 8.1. These soils are well drained (wetness class I) and hold moderately good reserves of available water for crop growth. Slight droughtiness limitations exclude this land from grade 1. Although individual profiles with inferior drainage or, in the north of the site, stonier topsoils approach grade 3a, these have not been delineated separately.

8.4 In the south of the site grade 2 land is associated with the calcareous clayey soils derived from the Chalk Marl deposits (see paragraph 8.2). Due to their calcareous nature these soils are moderately well structured and relatively well drained. Mottling, an indication of subsoil wetness, is usually present below 50/60 cm with a slowly permeable layer at 70/80 cm resulting in a soil wetness class of II or occasionally I. Since profiles are naturally calcareous all topsoil variants are eligible for grade II on workability grounds and the land is limited by minor wetness and workability imperfections together with slight summer droughtiness constraints.

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Appendix 1

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 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 levels of yields. It is mainly suited to grass with occasional arable crops (eg. cereals and forage crops) the yield 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.