

**FLIXTON PARK QUARRY, FLIXTON,
BUNGAY, SUFFOLK**

**Agricultural Land Classification Report
& Statement of Soil Physical
Characteristics**

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**Resource Planning Team
Eastern Region
FRCA Cambridge**

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AGRICULTURAL LAND CLASSIFICATION REPORT & STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

FLIXTON PARK QUARRY, FLIXTON, BUNGAY, SUFFOLK

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 97.4 ha of land at Flixton Park Quarry, Flixton, Suffolk. The survey was carried out during September 1997.
2. The survey was carried out by the Farming and Rural Conservation Agency (FRCA) for the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with an application to extract sand and gravel from the site. This survey supersedes previous ALC information for this land, in particular a survey carried out in 1985 by ADAS on behalf of MAFF.
3. The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. 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.
4. At the time of survey the agricultural land on the site was under a mixture of arable uses with cereal stubble, bare soil ready for planting and winter cereals emerging. In addition to this there was a small area of grassland adjacent to woodland in the southeast of the site. The areas mapped as 'Other Land' comprise the majority of the site and include old quarry workings in the west, an operational quarry in the centre and a large area of woodland in the northeast.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000; it is accurate at this scale but any enlargement would be misleading.
6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	11.0	43.5	11.3
3b	9.8	38.7	10.1
4	4.5	17.8	4.6
Other land	72.1	N/A	74.0
Total surveyed area	25.3	100	-
Total site area	97.4	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 29 borings and 3 soil pits was described.

8. The agricultural land at this site has been graded as ranging from 3a to 4. In the southeast of the site the land has been graded 3a (good quality agricultural land) due to a moderate droughtiness limitation. The centre and northeast of the site has been graded 3b (moderate quality agricultural land) due to significant droughtiness imperfections. A small area in the northeast of the of the site is graded 4 (poor quality agricultural land) due to severe droughtiness limitations.

FACTORS INFLUENCING ALC GRADE

Climate

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

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

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	TM 301864
Altitude	m, AOD	15
Accumulated Temperature	day°C (Jan-June)	1420
Average Annual Rainfall	mm	596
Field Capacity Days	days	115
Moisture Deficit, Wheat	mm	120
Moisture Deficit, Potatoes	mm	116
Overall climatic grade	N/A	Grade 1

11. 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.

12. 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 (AT0, January to June), as a measure of the relative warmth of a locality.

13. The combination of rainfall and temperature at this site mean it is relatively warm and dry. Therefore, the climatic grade for this site has been assessed as 1.

Site

14. The site occupies gently undulating land and generally slopes in a northwesterly direction from high ground in the southeast of the site. The site ranges in altitude from 15 m

AOD in the east, to 30 m AOD in the southeast, northwest of the sewage works. A large area of flat land lies at between 16 to 18m AOD in the centre, north and west of the site. Therefore, neither gradient nor altitude constitute a limitation to the ALC grade.

Geology and soils

15. The geology of the site has not been mapped in detail, however the published 1:250,000 scale solid geology map, sheet 52⁰N-00⁰W, East Anglia (British Geological Survey, 1985) shows the site to comprise Norwich and Red Crag over Upper Chalk, while the 1:253,440 scale drift geology map, sheet 16, (Geological Survey of England and Wales, 1907) shows the solid deposits to be overlain by valley gravel.

16. On the 1:250,000 scale published soils map, sheet 4, Soils of Eastern England (Soil Survey of England and Wales, 1983) the site is shown as consisting entirely of soils of the Newport 4 Association. These soils are briefly described as deep well drained sandy soils. Some very acid soils with bleached subsurface horizons especially under heath or in woodland.

17. During this survey a more detailed inspection of the soils was carried out and two soil types were identified, the distribution of these is shown on the accompanying soil resources map. The soil resources map is not necessarily a soil stripping map but illustrative of the soil resources available for restoration at the site.

Soil Type I (11.0 hectares)

18. This soil type occurs in a ribbon of land adjacent to the southeastern edge of the site, north of Flixton Hall and west of the sewage works. Profiles typically comprise very slightly stony medium sandy loam topsoils, over very slightly or slightly stony medium sandy loams, or occasionally loamy medium sands or sandy clay loams. At depth typically soil textures become slightly lighter, with loamy medium sand which may become medium sand. Lower subsoils are similarly stony or very occasionally moderately stony. Very occasionally, near the pond adjacent to the east of the site, sandy clay and clay textures occur in the lower subsoil. These soils are typically free draining throughout.

Soil Type II (14.3 hectares)

19. The second soil type occurs in the centre and north of the site. Soils typically comprise medium sandy loam or loamy medium sand topsoils over loamy medium sand upper subsoils, which become medium sands at depth. Profile stone content varies with soil depth and location, although it generally increases with depth. Topsoils are typically very slightly or slightly stony, with similar stoniness in the upper subsoils. Lower subsoils range from being slightly to very stony. Where the lower subsoils are very stony, gravel is present and often roots do not penetrate deep into this material. Profiles are typically free draining throughout.

AGRICULTURAL LAND CLASSIFICATION

20. 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, page 1.

21. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II.

Subgrade 3a

22. A ribbon of land adjacent to the southeastern edge of the site, north of Flixton Hall and west of the sewage works, has been graded 3a. This land occurs in conjunction with the typically free draining (wetness class I) deep, medium sandy loam soils described in paragraph 18 (soil type I). Profile textures result in the soils having moderate reserves of water available for plant growth and as a result there is a moderate droughtiness limitation to land quality and the land is graded 3a.

Subgrade 3b

23. In the centre and northeast of the site the land has been graded 3b and this corresponds with the deeper, less stony and therefore slightly more moisture retentive variants of the soils described in paragraph 19 (soil type II). These soils are light textured and typically free draining (wetness class I). Lower subsoils are typically slightly or occasionally moderately stony and profiles are rooted throughout. Nonetheless, the light profile textures and stoniness combine to reduce the water holding capacity of the soils and therefore significant droughtiness limitations restrict the land to subgrade 3b.

Grade 4

24. A small area of land in the north of the site has been graded 4 and this corresponds with shallower, more stony and therefore less moisture retentive variants of the soils described in paragraph 19 (soil type II). Roots commonly do not penetrate throughout the whole profile, typically stopping within the gravelly lower subsoils. This factor in conjunction with the light profile textures results in a severe limitation of the potential for water retention in these soils. Consequently severe droughtiness imperfections restrict this land to subgrade 3b.

Soil resources

25. Two soil types have been identified within the site and their distribution is shown on the accompanying soil resources map which is illustrative of the soil resources within the site for restoration purposes but is not a soil stripping map for the site. A statement of the physical characteristics of Soil Types I and II is given in Appendix II. The thickness and the volume of the Soil Types is given overleaf.

Table 3: Soil Resources

		Area (ha)	Thickness (cm)	Volume (m ³)
Soil Type I	Topsoil	11.0	40	44,000
	Upper Subsoil	11.0	25	27,500
	Lower Subsoil	11.0	55	60,500
Soil Type II	Topsoil	14.3	35	50,050
	Upper Subsoil	14.3	35	50,050
	Lower Subsoil	14.3	50	71,500

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SOURCES OF REFERENCE

British Geological Survey (1985) *Sheet 52⁰N-00⁰W, East Anglia, 1:250,000 scale.*
BGS: London.

Geological Survey of England and Wales (1907) *Sheet 16, 1:253,440 scale.*
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 (1983) *Sheet 4, Soils of Eastern England, 1:250,000 scale.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in Eastern 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

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE I (11.0 hectares)

Topsoil	Texture	: Medium sandy loam
	Colour	: Dark greyish brown or occasionally brown
	Depth	: Typically 40 cm, range 35 to 44 cm
	Stoniness	: Very slightly stony (1-5% flint)
	Calcium carbonate	: Non-calcareous
	Boundary form	: Clear or gradual, smooth
	Upper subsoil	Texture
Colour		: Yellowish brown or occasionally brown
Depth		: Range 60 to 80 cm, typically 65 cm
Stoniness		: Very slightly or slightly stony (2-12%)
Structure		: Weakly developed coarse subangular blocky
Consistence		: Very friable or friable
Structural condition		: Moderate
Porosity		: >0.5%
Calcium carbonate		: Typically non-calcareous, very occasionally calcareous
Boundary form		: Clear or sharp, smooth
Lower subsoil	Texture	: Loamy medium sand and medium sand, very occasionally medium sandy loam, sandy clay or clay
	Colour	: Yellowish brown or brown
	Depth	: 120 cm +
	Stoniness	: Very slightly to moderately stony (2-25%)
	Structure	: Apedal, single grain
	Consistence	: Loose
	Structural condition	: Moderate
	Porosity	: >0.5%
	Calcium carbonate	: Typically non-calcareous, very occasionally slightly calcareous

Wetness Class: I or very occasionally II

SOIL TYPE II (14.3 hectares)

Topsoil	Texture	: Medium sandy loam or loamy medium sand
	Colour	: Dark greyish brown or occasionally brown
	Depth	: Typically 35-40 cm, range 30 to 40 cm
	Stoniness	: Very slightly or slightly stony (2-12% flint)
	Calcium carbonate	: Non-calcareous
	Boundary form	: Abrupt, smooth
Upper subsoil	Texture	: Loamy medium sand
	Colour	: Dark yellowish brown
	Depth	: Range 50 to 80 cm, typically 70 cm
	Stoniness	: Very slightly or slightly stony (2-20%)
	Structure	: Weakly developed coarse subangular blocky
	Consistence	: Very friable
	Structural condition	: Moderate
	Porosity	: >0.5%
	Calcium carbonate	: Typically non-calcareous, very occasionally calcareous
Boundary form	: Abrupt, smooth	
Lower subsoil	Texture	: Medium sand
	Colour	: Yellowish brown, dark yellowish brown or brown
	Depth	: 120 cm +
	Stoniness	: Slightly to very stony (2-75%)
	Structure	: Generally to stony to assess
	Consistence	: Generally to stony to assess
	Structural condition	: Generally to stony to assess
	Porosity	: Generally to stony to assess
	Calcium carbonate	: Typically non-calcareous, very occasionally slightly calcareous

Wetness Class: I

Where lower subsoils are very stony roots may not be present.