BROGBOROUGH LANDFILL SITE
Agricultural Land Classification and Statement of Soil Physical Characteristics

May 1997

Resource Planning Team
Eastern Region
FRCA Cambridge

RPT Job Number: 30/97
MAFF Reference: EL 01/02168
LURET Job Number: ME3R 7RH

AGRICULTURAL LAND CLASSIFICATION REPORT

BROGBOROUGH LANDFILL SITE, BROGBOROUGH BEDS.

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 188.4 ha of land at Brogborough in Bedfordshire. The survey was carried out during May 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 clay from the site to be used for capping the adjacent landfill site. This survey supersedes previous ALC information for this land.

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, with the exception of two small areas of woodland which have been mapped as other land, the land use on the site was largely winter wheat with rough grass in the south west corner. The majority of the site was unsurveyed as it is an active landfill site.

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
3b	30.7	100	16.3
Agricultural land not surveyed	157.0	N/A	83.3
Other land	0.7	N/A	0.4
Total surveyed area	30.7	100	16.3
Total site area	188.4	-	100

7. The fieldwork was conducted at an average density of 1 auger boring per hectare. A total of 33 auger borings and 2 soil pits was described.

8. The entire site has been graded 3b (moderate quality agricultural land) due to significant wetness and workability limitations caused by the clay topsoils in combination with the slowly permeable clay subsoils directly below them.

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 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	SP 961 405
Altitude	m, AOD	62
Accumulated Temperature	day°C (Jan-June)	1417
Average Annual Rainfall	mm	586
Field Capacity Days	days	116
Moisture Deficit, Wheat	mm	114
Moisture Deficit, Potatoes	mm	107
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 (ATO, January to June), as a measure of the relative warmth of a locality.

13. The combination of rainfall and temperature at this site mean that it is relatively warm and dry during the critical growing season, therefore imposing no overall limitation to land quality. As a result the site has a climatic grade of 1.

Site

14. The site occupies level or gently sloping land in the range 60 to 75m AOD. The site is well sheltered, by higher ground to the north, west and south, and by the landfill site to the east. Gradient, microrelief, exposure and altitude are therefore not limiting factors on this site.

Geology and soils

15. No detailed geology map exists for the area. The 1:250 000 scale map, published by the Institute of Geological Sciences, (Sheet 52° N - 02° W, 1983) shows the entire site to comprise Oxford Clay.

16. The Soil Survey of England and Wales have mapped the area on two occasions. At a scale of 1:63 360 (Sheet 147, 1968) the site is depicted as comprising soils of the Rowsham Series. This is summarised as a non-calcareous gley soil.

17. At the reconnaissance scale of 1:250 000 the Soil Survey of England and Wales (Sheet 4, 1983) mapped the whole site as the Denchworth Association. These soils are briefly described as slowly permeable seasonally waterlogged clayey soils with similar fine loamy over clayey soils. Some fine loamy over clayey soils with only slight seasonal waterlogging and some slowly permeable calcareous clayey soils.

18. During the present survey, the entire site has been assessed as one soil type, comprising predominantly non-calcareous or very slightly calcareous, very slightly stony heavy clay or clay topsoils. Below this, the upper subsoils are predominantly stone free, variably calcareous dense clay (occasionally found to be very slightly or slightly stony). Lower subsoils are almost invariably stone free, very calcareous dense clay (very occasionally slightly stony and lighter textured). Subsoils are typically gleyed and slowly permeable immediately below the topsoil.

AGRICULTURAL LAND CLASSIFICATION

19. 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.

20. 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.

Grade 3b

21. The whole site has been graded 3b and corresponds with the soils described in paragraph 18 above. These soils have been assessed as wetness class III due to the presence of slowly permeable clay subsoils directly below the topsoil. This combines with the clay topsoils to impose significant wetness and workability limitations and results in the land being excluded from any higher grade.

Soil Resources

22. The entire site has been assigned to a single soil resource (Soil Type I) comprised of clay over clay, as described in more detail in paragraph 18, and in the statement of soil physical characteristics at Appendix III. A soil resources map identifying Soil Type I is attached to this report. This map is not necessarily a soil stripping map but is illustrative of the soil resources available. The depths and volumes quoted should be treated with caution due to soil variability. The soil resources may extend below 120 cm.

Table 3. Soil resources.

	Area (ha)	Thickness (cm)	Volume (m^3)
Topsoil	30.7	30	92 100
Subsoil	30.7	90	276 300

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SOURCES OF REFERENCE

Institute of Geological Sciences (1983) Sheet 52° N - 02° W, *East Midlands.*

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 (1968) Sheet 147, *Bedford and Luton.*

Soil Survey of England and Wales (1983) Sheet 4, *Eastern England.*
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 Agricultural 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 (30.7 ha)

Topsoil

Texture	clay
Colour	predominantly 2.5Y 4/2, occasionally 10YR 4/2
Depth	30cm
Stoniness	<1%
Roots	many fine and very fine
Calcium carbonate	predominantly non-calcareous, occasionally very slightly or slightly calcareous
Boundary form	abrupt, smooth

Subsoil

Texture	dense clay
Colour	predominantly 2.5Y 5/3 and 5/4 and 10YR 5/3 and 5/4, occasionally 2.5Y 5/2 and 5/1 and 10YR 5/4 and 5/2.
Mottles	common distinct ochreous mottles 2.5Y 5/6 and 5/8 and 10YR 5/6 and 5/8 common distinct grey mottles 2.5Y 5/1, 5/2, 6/1 and 6/2
Depth	120cm
Stoniness	<1%
Structure	moderately developed, adherent, coarse angular
Consistence	firm
Porosity	<0.5% >0.5mm
Roots	many fine and very fine
Calcium carbonate	predominantly slightly calcareous in the upper subsoil and becoming very calcareous with common chalky nodules in the lower subsoil
Concretions	few manganese concretions in places

Comments:

The lower subsoil is invariably significantly more calcareous than the upper subsoil, this may need to be taken into account when stripping the site as it might alter the soils effectiveness as a capping material.

The profile has been assessed as wetness class III.