AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

LAND AT EYE QUARRY, PETERBOROUGH

1.0 BACKGROUND

1.1 The site covers an area of 13.3 ha near the village of Eye, Peterborough and is the subject on an application to extract sand and gravel. Restoration would be to agriculture using waste materials as landfill. The site is an extension to the existing quarry.

1.2 ADAS Statutory Resource Planning Team undertook a detailed Agricultural Land Classification (ALC) and soil physical characteristics survey of the site during July 1995. Information was collected from auger borings, spaced at 100 m intervals, to a depth of 120 cm or shallower if an impenetrable layer was encountered nearer the surface. Subsoil conditions were assessed from two inspection pits and supplementary auger borings were carried out to confirm the boundaries of soil types.

1.3 On the published provisional 1:63 360 scale ALC map, sheet 123 (MAFF, 1974) the whole area is mapped as grade 3.

1.4 At the time of the survey the whole area had been cultivated following a winter cereal crop.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climatic criteria are considered when classifying land as these may have an overriding limitation in terms of the agricultural use of the land. The main parameters used in the assessment of the overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature (day °C Jan-June), as a measure of the relative warmth of an area.

2.2 A detailed assessment of the prevailing climate for the site has been made by interpolation from the 5 km grid dataset produced by the Meteorological Office (Met. Office, 1989). The details are given in Table 1 and these show that there is no overall climatic limitation affecting the site.

Table 1. Climatic Interpolation

Grid Reference	TF 238 023
Altitude (m)	4
Accumulated Temp. (Day °C, Jan-June)	1450
Average annual rainfall (mm)	560
Moisture deficit, Wheat (mm)	121
Moisture deficit, Potatoes (mm)	117
Field Capacity days	96
Overall Climatic grade	1

Altitude and Relief

2.3 The site comprises level land at an altitude of 4 m AOD, therefore gradient and altitude do not constitute limitations to the quality of the site.

Geology and Soils

2.4 The published 1:50 000 scale solid and drift edition geological map, sheet 158 (Geol. Survey, 1984) shows the majority of the site to comprise First Terrace Deposits with a very small area mapped as Oxford Clay in the north west of the site.

2.5 No detailed soil map exists for the area but the reconnaissance 1:250 000 scale map "Soils of Eastern England" (Soil Survey of England and Wales, 1983) shows the whole area to comprise the Shabbington Association*. Detailed fieldwork identified one major soil type covering the majority of the area with a second soil type restricted to the north west corner of the site corresponding to the area mapped as Oxford Clay.

Soil Type 1 (see Appendix 1 and Soil Types map)

2.6 This soil type covers the majority of the area and consists typically of a heavy clay loam or occasionally medium clay loam topsoil overlying an upper subsoil of clay with sand or occasionally sandy clay or sandy clay loam. These upper soil horizons are only very slightly stony. The upper subsoil overlies a lower subsoil of sandy clay or sandy clay loam which is slightly or occasionally moderately stony. The lower subsoil tends to increase in stone content with depth and also becomes increasingly coarser textured before usually overlying the mineral deposit at variable depths across the site. Occasionally the lower subsoil extended beyond sampling depth. This soil type was assessed as wetness class I or II depending on the evidence of groundwater effects within the profile. The profiles of soil type 1 were also assessed as moderately droughty particularly for deeper rooting crops such as winter wheat.

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* Shabbington Association - deep fine loamy and fine loamy over sandy soils variably affected by groundwater developed in river terrace drift.

Soil Type 2 (see Appendix 1 and the Soil Types Map)

2.7 Soil type 2 comprises a heavy textured soil profile associated with the area mapped as Oxford Clay by the British Geological Survey (Geol. Survey, 1984). A typical profile consists of a very slightly stony clay textured topsoil overlying a similar upper subsoils horizon. This overlies a stonefree calcareous lower clay textured subsoil horizon. The upper subsoil horizon was found to be slowly permeable and hence wetness class was assessed as III.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The land has been classified using the guidelines contained in the Agricultural Land Classification of England and Wales (MAFF, 1988). A breakdown of the individual grades found on the site is given in Table 2.

Table 2. Distribution of grades and subgrades

AGRICULTURAL LAND CLASSIFICATION

Grade	Area (ha)	%
3a	10.80	81.3
3b	2.48	18.7
TOTAL	13.28	100

The definitions of the ALC grades is shown in Appendix 2.

Subgrade 3a

3.2 The majority of the area is limited to subgrade 3a and correlates to almost the whole of the area mapped as soil type 1 described in paragraph 2.6. A moderate droughtiness restriction limits the majority of this area to subgrade 3a. The depth to the underlying gravel is variable throughout this soil type, restricting the soil available water capacity. Moisture balance calculations indicate that in this relatively dry area, the majority of the area will be subgrade 3a, although some grade 2 profiles will occur locally depending on rooting

depth. However, due to the variability in the depth of these soils it is not possible to delineate these areas separately. At a single sample location wetness restricted the quality of the land to subgrade 3a.

Subgrade 3b

3.3 Two small areas within the site were restricted to subgrade 3b. A small area in the north west of the site correlating with soil type 2, described in paragraph 2.7, was assessed as wetness class III. This wetness class together with a clay topsoil results in a moderately severe workability limitation restricting this area to subgrade 3b.

3.4 Similarly in the south west of the site a small area of soil type 1 was assessed as wetness class III. This wetness class and the heavy clay loam texture of the topsoil also results in a moderately severe workability limitation restricting this area to subgrade 3b.

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REFERENCES

BRITISH GEOLOGICAL SURVEY, 1984. Sheet 158, Peterborough, 1:50,000 scale.

MAFF, 1974. Agricultural Land Classification Map. Provisional. Scale 1:63 360 Sheet 123.

MAFF, 1988. Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of agricultural land). Alnwick.

METEOROLOGICAL OFFICE, 1989. Climatolgical Data for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES, 1983. Sheet 4. "Soils of Eastern England". 1:250 000 scale.

Appendix 1

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS
SOIL TYPE 1:

Topsoil	Texture	:	heavy clay loam, occasionally medium clay loam.
	Colour	:	dark greyish brown 10YR4/2 or dark brown 10YR4/3.
	Stone	:	very slightly stony, 1-5% small and medium angular and subangular.
	Boundary	:	smooth, abrupt
	Roots	:	many fine and very fine
	Depth	:	35 cm
Upper Subsoil	Texture	:	clay with sand or occasionally sandy clay or sandy clay loam.
	Matrix colour	:	yellowish brown 10YR5/8 with light olive brown 2.5Y5/3 or occasionally brown 10YR5/3.
	Mottles	:	many prominent ochreous
	Manganese	:	few/common concretions
	Stone	:	predominantly very slightly stony 1-5% small and medium angular and subangular.
	Structure	:	moderately developed coarse subangular blocky
	Consistence	:	friable
	Porosity	:	<0.5% biopores
	Boundary	:	smooth, clear
	Roots	:	many fine and very fine
	Depth	:	68 cm
Lower Subsoil	Texture	:	predominantly sandy clay/sandy clay loam
	Matrix colour	:	brownish yellow 10YR6/8 and light yellowish brown 2.5Y6/4.
	Mottles	:	many prominent ochreous
	Manganese	:	occasionally few concretions
	Stone	:	very slightly or slightly but occasionally moderately.
	Structure	:	weakly developed coarse subangular blocky
	Consistence	:	very friable
	Porosity	:	<0.5% biopores
	Roots	:	common fine and very fine
	Depth	:	90 cm

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS
SOIL TYPE 2:

Topsoil	Texture	:	clay
	Colour	:	dark greyish brown 10YR4/2
	Stone	:	very slightly stony, 2% small and medium angular and subangular.
	Boundary	:	smooth, abrupt
	Roots	:	many fine and very fine
	Depth	:	31 cm
Upper Subsoil	Texture	:	clay
	Matrix colour	:	light olive brown 2.5Y5/2
	Mottles	:	common distinct ochreous
	Stone	:	very slightly stony, 1% small and medium angular and subangular.
	Structure	:	weakly adherent coarse angular blocky
	Consistence	:	firm
	Porosity	:	<0.5% biopores
	Boundary	:	smooth, abrupt
	Roots	:	many fine and very fine
	Depth	:	53 cm
Lower Subsoil	Texture	:	clay
	Matrix colour	:	light yellowish brown 2.5Y6/3
	Mottles	:	many prominent ochreous
	Stone	:	stoneless
	Structure	:	moderately developed coarse prismatic breaking to coarse angular blocky.
	Consistence	:	firm
	Porosity	:	<0.5% biopores
	Roots	:	common fine and very fine
	Depth	:	150 cm +

Comments: Lower subsoil calcareous (5-10%)
Upper subsoil slowly permeable

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 (e.g. 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.