Cambs 17/90

PHYSICAL CHARACTERISTICS REPORT INCORPORATING AGRICULTURAL LAND CLASSIFICATION AT HOLT SAND AND GRAVEL QUARRY, NORFOLK

## 1. BACKGROUND

1.1 The survey area comprises sites A and B (13.4 ha in total) which are subject to an application by Atlas Aggregates Limited, for the extraction of sand and gravel at Holt, Norfolk. MAFF surveyed the site in March 1990 in order to assess the agricultural land quality and the soil physical characteristics. This survey was conducted at an auger boring density of one per hectare and supplimented by two soil inspection pits in order to assess subsoil conditions.

## 2. SITE PHYSICAL CHARACTERISTICS

### 2.1 Climate

Climate data for the site was obtained from the published agricultural climatic dataset. (Met Office, 1989). This indicates that for the site's median altitude of 60 m AOD the annual average rainfall is 689 mm (27.1 inches). This data also indicates that field capacity days are 109 and moisture deficits are 107 mm for wheat and 99 mm for potatoes. These climatic characteristics do not impose any climatic limitation on the ALC grading of the survey site.

### Altitude and Relief

2.2.1 The land at site B lies fairly level ranging in altitude from 55 m AOD to 65 m AOD. As a result gradient and altitude do not constitute limitations to the ALC grade.

2.2.2 The non agricultural land comprising site A slopes steeply (up to 20° away from the existing pit face on the eastern boundary) and is dissected by a dry valley feature.

## 3. AGRICULTURAL LAND CLASSIFICATION

3.1 The definitions of the Agricultural Land Classification (ALC) grades are included in Appendix 2.

3.2 The table below shows the ALC grade for the survey area.

| | Agricultural Land Classification | |
|---|---|---|
| | ha | % |
| Site A | | |
| Non Agricultural | 2.8 | 26.4 |
| Site B | | |
| 3a | 6.8 | 64.1 |
| Non Agricultural | 1.0 | 9.5 |
| Total | 10.6 | 100.0 |

3.3 SITE B

3.3.1 Subgrade 3a

The agricultural land has been graded 3a. The soils are moderately droughty*. The occurence of flints within the topsoil and subsoil combine with the light soil textures to impose a moderate limiting effect on the available moisture capacity of this soil. Locally the topsoil stone content (greater than 2cm) is more than 10%, in such areas this also excludes the land from a higher grade. As a result droughtiness, and locally topsoil stone, are the major limitations to the ALC grade.

* At a few locations more droughty or less droughty variants of this soil type occur however they cover too small an area to delineate separately.

3.4 SITE A

3.4.1 Non Agricultural

Site A has been shown as non agricultural, this land includes woodland, areas used for topsoil storage and areas which have already been excavated.

4.0 SOIL PHYSICAL CHARACTERISTICS

Geology

4.1 The published geology map ¼" to 1 mile drift edition, sheet No 12, shows the survey area to comprise sand and gravel deposits.

Soils

4.2 The survey area has been mapped on two occasions firstly at 1:100,000 scale (1973) and secondly at a reconnaissance scale of 1:250,000 (1983). These maps show site A to comprise mainly the Wick 3 Association* with some Newport 4 Association** towards the south of the site. Site B is entirely mapped as Wick 3.

During this survey a detailed inspection of the soils identified two soil types.

Soil Type 1

4.3.1 (Refer Appendix 1 and the soil map).

These soils are found at Site A and typically comprise 20 cm of acidic leaf litter over moderately stony to very stony, acidic, organic sandy loams. This extends into gravelly material at 45/50 cm.

* Wick 3 Association. Deep, well drained coarse loamy often stoneless soils. Some similar sandy soils. Complex patterns locally.

** Newport 4 Association. Deep, well drained sandy soils. Some very acid soils with bleached subsurface horizons especially under heath or in woodland.

Soil Type 2

4.3.2 (Refer Appendix 1 and the soil map).

These soils are found at Site B and are less stony and non acidic. They typically comprise slightly stony sandy loams over slightly to moderately stony sandy loams or loamy sands, with clay or sandy soils at depth.

RESOURCE PLANNING GROUP
CAMBRIDGE RO

April 1990

APPENDIX 1

DESCRIPTION OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE 1

Acidic leaf litter depth : 0-20 cm

Topsoil depth : 20-45/50cm.
texture : organic sandy loam
stone : 30-50% rounded or subangular flints.

Parent material - gravel, with >70cm rounded and subrounded flints, within a sandy loam matrix.

SOIL TYPE 2.

| | | | |
|---|---|---|---|
| Topsoil | texture | : | medium, occasionally fine sandy loam |
| | stone | : | typically 5-10%, occasionally 15% soil volume comprising small medium and large flints. |
| | $CaCO_3$ | : | slighty calcareous |
| | depth | : | 0-30 cm |
| Upper subsoil | texture | : | sandy loam or loamy sand |
| | stone | : | slighty to moderately stony comprising mainly medium flints |
| | structure | : | moderately developed medium and coarse subangular blocky |
| | consistence | : | very friable |
| | depth | : | 50/60 cm |
| Lower subsoil | texture | : | medium sand or loamy sand (often impenetrable) occasionally becoming clay at depth |
| | stone | : | slightly to moderately stony |
| | structure | : | weakly developed medium or coarse subangular blocky (where stony, difficult to assess) |
| | consistence | : | very friable |
| | depth | : | 120 cm |

Additional Information

| | | | |
|---|---|---|---|
| | Drainage | : | both soil types are well drained (wetness Class I) |
| | Field pH | : | Soil Type 2 : pH 7 throughout |
| | | : | Soil Type 1 : <pH 4.5 throughout |
| | Rooting | : | Soil Type 2 : Few to common fine and very fine throughout |
| | | | Soil Type 1 : Few to common fine very fine throughout (conifer roots). |
| | $CaCO_3$ | : | Soil Type 2 : Non calcareous |
| | | | Soil Type 1 : Very slightly or slighty calcareous. |

Appendix 2

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 to 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 root 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. 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 level 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.

References

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1933).
Drift edition geology map sheet 12.
Scale $\frac{1}{4}$" to 1 mile.

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

METEOROLOGICAL OFFICE (1989). Climatic Data extracted from the published Agricultural Climatic Dataset.

SOIL SURVEY OF ENGLAND AND WALES (1973). "Soils of Norfolk", Scale 1:100,000.

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