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**PHYSICAL CHARACTERISTICS REPORT INCORPORATING AGRICULTURAL LAND CLASSIFICATION**

LAND NORTH OF HALL FARM, INTWOOD, NORFOLK

1.0 INTRODUCTION

1.1 A Soil and Agricultural Land Classification survey was carried out over 20.3 ha of land to the north of Hall Farm, Intwood, Norfolk, in connection with a proposed sand and gravel extraction. The survey was conducted on 24 October 1989.

1.2 A total of 23 observations were made, using a dutch auger, to a depth of 1.2m, unless stopped by impenetrable gravel. In addition two soil pits were dug to assess subsoil conditions in more detail. Five topsoil samples were sieved to assess the stone content.

1.3 The site comprised all or parts of 3 fields. The field to the west was under a grass ley and the one to the east under winter wheat. The middle field was supporting permanent grass.

2.0 **AGRICULTURAL LAND CLASSIFICATION**

2.1 The land has been classified predominantly as Grade 3b, with a small area to the south of the site, at the top of the slope, as Grade 3a. Four small areas of non agricultural land have been identified, with three being woodland and the fourth at the eastern end being an old sand and gravel pit currently used as a tip for farm waste.

2.2 The following table gives a breakdown of the areas and grades:

| Grade | Area ha | % |
|---|---|---|
| 3a | 1.8 | 8.9 |
| 3b | 17.0 | 83.7 |
| Non Agricultural | 1.5 | 7.4 |
| Total | 20.3 | 100 |

2.3 The major limitation associated with this site is droughtiness. The majority of the area which is Grade 3b has sandy soils with a variable stone content. On the Grade 3a area the soils are slightly heavier, but tend to be moderately stony and hence still suffer from a drought limitation. Although irrigation is available on the farm, it is considered that there is insufficient to warrant upgrading. In addition as much of the site has a moderate slope with the central area restricted to 3b on slope, irrigation could cause erosion on these sandy soils if not carefully controlled.

2.4 A full description of the site and soil physical characteristics is given below.

## 3.0 SITE PHYSICAL CHARACTERISTICS

### Climate

3.1 Climatic information for the site has been interpolated from the 5km grid dataset produced by the Meteorological Office (Met Office , 1989). The average annual rainfall for the site is 608mm which is low by national standards. The number of days at which the site is likely to be at field capacity is moderately low at 118.

3.2 The accumulated temperature for this area is 1415 degrees celsius. This parameter indicates the cumulative build-up of warmth available for crop growth, and along with rainfall has an influence on the development of soil moisture deficits and susceptibility to drought. The calculated soil moisture deficits for wheat and potatoes are 119 and 113 mm respectively and thus the soils will require good reserves of available water to prevent drought stress.

### Relief

3.3 The site has a northerly aspect forming one site of a dry valley, with the lowest lying land adjacent to the railway on the northern boundary.

3.4 The altitude rises from approximately 14 m AOD adjacent to the railway to 32 m AOD on the mid point of the southern boundary.

Slopes are generally in the order of 5 to $7^0$ with a steeper area of some $10^0$ in the middle of the site. The land tends to flatten out toward the northern boundary.

## 4.0 SOIL PHYSICAL CHARACTERISTICS

### Geology

4.1 The published geology map, Sheet 161 Norwich, (Geol. Surv 1975) shows the area as fluvioglacial sands and gravels overlying chalk at depth.

4.2 The geological survey carried out by D K Symes Associates which accompanies the application confirms the above, but in some bore holes shows a stony clay (boulder clay) overlying the sands and gravels.

### Soils

4.2 The area is mapped as the Burlingham 1 Association by the Soil Survey of England and Wales (Soil Surv. 1984). This association contains sandy soils of the Newport series along with fine loamy textured stony soils of the Burlingham series.

4.3 The current survey confirms that the majority of the site is made up of Newport series soils, with a small area of finer textured soils.

4.4 Two soil mapping units were delineated and these are described below. However the area of soil mapping unit number 2 is so small that it does not warrant separate treatment when the site is worked and is only therefore included for completeness sake.

SOIL MAPPING UNIT 1

| | | | |
|---|---|---|---|
| Topsoil | Texture | : | Medium sandy loam, occasionally loamy medium sand. |
| | Colour | : | brown, (10 yr 4/4 or 4/3) |

| | | | |
|---|---|---|---|
| | Stone | : | typically 5-10%, comprising mainly small and medium round and subangular flints. Stonier patches may occur locally, especially on the steeper sloping land. |
| | Depth | : | in the range 30-40 cm, typically 35 cm. |
| | Boundary | : | smooth sharp lower boundary. |
| | Roots | : | common to many fine and very fine roots. |
| Subsoil | Texture | : | loamy medium sand or medium sand. |
| | Colour | : | strong brown or yellowish brown (7.5 YR 5/6 and 10 YR 6/5). |
| | Stone | : | variable ranging from stonefree to very stony 20-30% small and medium sub-rounded and subangular flints. |
| | Depth | : | In some profiles workable sand and gravel immediately below topsoil. In other profiles variable from 55-75 cm. |
| | Structure | : | massive or single grain. |
| | Consistence | : | friable and occasionally firm. |
| | Porosity | : | less than 0.5% biopores, but many very fine pores. |
| | Boundary | : | clear wavy boundary. |
| Parent Material: | | | |
| Sand and Gravel | | : | Ranging from 0% stones to 30-50% gravel with sand matrix. Stones are predominantly flint. |

**SOIL MAPPING UNIT 2**

| | | | |
|---|---|---|---|
| Topsoil | Texture | : | medium sandy loam. |
| | Colour | : | Brown (10 YR 4/4 or 4/3) |
| | Stone | : | typically 5-10%, comprising mainly small and medium subrounded and subangular flints. |
| | Depth | : | in the range 30-40 cm. |
| | Boundary | : | smooth sharp boundary. |
| | Roots | : | common to many fine or very fine. |
| Subsoil 1 | Texture | : | medium sandy loam. |
| | Colour | : | Yellowish brown (10 YR 5/4). |
| | Stone | : | typically 10% small and medium subrounded and subangular flints. |
| | Depth | : | in the range 45-60 cm. |
| | Structure | : | masked by stones. |
| | Consistence: | | friable |
| | Boundary | : | clear wavy. |
| Subsoil 2 | Texture | : | sandy clay loam |
| | Colour | : | strong brown (7.5 YR 5/6). |
| | Stones | : | variable 15-20% small and medium flints as above. |
| | Depth | : | Assumed to go below 1.2 m as unable to auger as too stony. |
| | Structure | : | masked by stones. |
| | Consistence: | | firm. |

Additional Information :

At the eastern end of the site near the existing pit a stony sandy clay loam till was found underlying the loamy sand or sand subsoil generally below 80 cm depth. However over the majority of the mapping unit, no till was found within the top 1.2 m depth. At the site of pit 2 this till occurred at 50 cm depth, but was not found at this level in any of the auger bores. The characteristics of this pit equate more closely with the auger bores in mapping unit 2.

Additional Information : The soils are free draining wetness class I. As this is a narrow area the soils will be variable due to the neighbouring fluvioglacial sand and gravel.

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Cambridge

## References

Geological survey of Great Britain (1975) 1:50,000 scale map Sheet No.161, Norwich, Solid and Drift Edition.

MAFF (1988). Agricultural Land Classification of England and Wales.

Meteorological Office (1989) Climatological data for Agricultural Land Classification.

Soil Survey of England and Wales (1984) Soils and their use in Eastern England.