

## LAND CLASSIFICATION NOTES FOR ECHILLS FARM, KINGS BROMLEY

### Introduction

This 18 ha site lies 1 km west of Kings Bromley, 4 km east of Rugeley,  $\frac{1}{2}$  km south of the river Trent and immediately north of the A513. The Eastern site boundary adjoins a sand and gravel quarry but the remainder of the site adjoins open countryside. The site is level at an altitude of about 62 m with a short fall of approximately 1 m onto the river flood plain which comprises the north east portion of the site. The only site limitation to the agriculture use of the land is the regular winter flooding on the flood plain.

The area receives an average annual rainfall of 694 mm of which nearly half falls between April and September. The accumulated temperature above 0°C (January to June) is 1403 which indicates that the site is grade I for climate. The interaction of summer temperatures and rainfall produce soil moisture deficits of 100 mm for wheat and 91 mm for potatoes. The median duration of field capacity is 162 days.

The southern portion of the site is underlain by river terrace fluvio-glacial sand and gravels whilst the north east corner is underlain by riverine alluvium. These two contrasting parent materials give rise to two very different soil types. The alluvial soil are heavy clays with a slightly organic topsoil and are waterlogged for much of the year. The river terrace deposits have produced sandy soils which are slightly stony in the topsoil but become much stonier with depth. In these latter soils, drought is the main limiting factor, whilst on the flood plain, soil wetness and winter flooding are the main limitations to the agricultural use of the land. The land is mostly under arable cultivation though the flood plain is restricted to permanent pasture.

The site was visited in September 1990, and 22 soil observations were made on a 100 m by 100 m grid using a 120 cm Dutch soil auger. Several soil pits were dug to assess subsoil stone content and subsoil structure.

#### Agricultural Land Classification

Grade 2 Land occupies 3.3 ha and accounts for 18.3% of the site. This land forms a broad strip across the centre of the site on the river terrace soils. The soils typically have a sandy loam topsoil and sandy loam upper subsoil passing into loamy sand in the lower subsoil. No pure sand textures were observed in the subsoil. The soils are generally less stony in the top and especially the subsoil than the remainder of the site. Most of the soils had damp subsoils below 70 cms indicating additional available water from a high ground water table.

Grade 3a Land occupies 1.1 ha and accounts for 6.2% of the site. This small parcel of land occurs in the north west corner where the soils have a sandy loam topsoil and where the subsoil layers are less stony than adjoining land. The soils typically have 10% total topsoil stones and a comparable subsoil stone content. Where the subsoil stone content increases the soil textures are generally less sandy than the adjoining soil, thereby compensating for the stonier nature of the subsoils.

Grade 3b Land occupies 8.9 ha and accounts for 49.4% of the site. This is the most widespread grade of land found and occupies the majority of the sandy river terrace soils. The soils typically have a sandy loam or loamy sand topsoil, the latter particularly pronounced towards the west and northern edges of the site. In most cases a pure sand subsoil is encountered between 28 and 70 cms depth, and the subsoils are generally moderately to very stony (more than 35% stones), reaching a maximum recorded value of 64% in boring 17. In common with the other sandy soils, drought is the main limitation to the

agricultural use of the land, the main difference between these soils and the higher quality land being the sandier subsoils and/or increased subsoil stone content.

Grade 4 Land occupies 3.3 ha and accounts for 18.3% of the site. This land occupies the north east corner and corresponds to the heavy clay soils of the flood plain alluvium. The soils typically have a clay topsoil with a thin slightly organic horizon overlying a grey gleyed subsoil within 10 - 20 cms. The soils are slowly permeable to the surface although subsoil structural development is well developed. These soils suffer prolonged waterlogging, and drainage would be difficult due to the lack of adequate outfalls and the proximity of the ground water table to the surface. At the time of survey after a prolonged dry summer, these soils were wet within about 30 cms of the surface.

In addition to the soil wetness limitations caused by heavy, slowly permeable subsoils this land also suffers from regular winter flooding which restricts the land use to a permanent pasture. Even so, care will have to be exercised when allowing stock onto the land to avoid poaching.

Non Agricultural Land occupies 1.4 ha and accounts for 7.8% of the site. This land occurs as a belt running across the centre of the site where an open ditch and marshy woodland dominated by willow and alder occurs. Previous attempts at ploughing are evident but the area is not in agricultural use.

## SOILS REPORT FOR ECHILLS FARM, KINGS BROMLEY

Three soil units are described for the site:-

Soil Unit I covers 3.6 ha and accounts for 70% of the site. These soils are derived from stoneless riverine alluvium and the typical profile is shown below.

Pit Profile 1 0 - 13 cms dark brown clay, common mottles. Well developed medium sub angular blocky structure. Firm consistence.

13 - 31 cms grey clay. Common mottles and abundant manganese concretions. Well developed coarse and very coarse prismatic structure. Very firm consistence.

31 - 77 cms grey clay. Many mottles and manganese concretions. Well developed very coarse prismatic structure.

77 - 100 cms+ dark, green, grey clay. No structural assessment made.

The topsoil is slightly organic reflecting the prolonged period of waterlogging and the permanent pasture. The soil structure is very well developed for such a heavy soil but this could easily be damaged during soil movement.

Soil Unit II covers 10.8 ha and accounts for 60% of the site. Soils are sandy with stony subsoils and are derived from the fluvio-glacial river terrace. These soils typically have a sandy loam topsoil with a loamy sand or sandy loam upper subsoil passing into loamy sand or more rarely sand lower subsoils below 50 - 70 cms. A typical profile description is given below.

## Pit Profile 2

0 - 32 cms brown sandy loam. No mottles. Weakly developed medium and coarse sub angular blocky structure readily breaking down to a medium crumb structure. 11% stones, mainly small and medium rounded quartzite pebbles.

32 - 38 cms reddish, brown sandy loam. Weakly developed coarse and medium subangular blocky structure. Friable consistence. 40% stones, mainly small and medium rounded quartzite pebbles.

38 - 50 cms of reddish, brown loamy sand. Weakly developed medium subangular blocky structure, readily breaking down to medium crumb structure. Very friable consistence. 54% stones, mainly small and medium rounded quartzite pebbles.

50 - 100 cms+ reddish brown sand. Single grain structure. Loose consistence. 54% stones, mainly small and medium rounded quartzite pebbles.

Soil Unit III covers 3.6 ha and accounts for 20% of the site. These soils are the sandiest on the site having a loamy sand, or more rarely sandy loam, topsoil with sand subsoils often immediately below the topsoil. The soils have a similar stone content to soil unit II and are derived from the same fluvio-glacial river terrace. A typical soil profile is given below.

## Pit Profile 3

0 - 30 cms dark reddish brown loamy sand. No mottles seen. 14% stones, mainly medium and small rounded quartzite pebbles.

30 - 50 cms reddish brown sand. Weakly developed medium and coarse sub angular blocky structures, readily breaking down to

medium crumb structure. Very friable consistence. 49% stones, mainly small and medium rounded quartzite pebbles.

50 - 100 cms brown sand. Weakly developed medium and coarse sub angular blocky structure readily breaking down to medium crumb structure and single grains. 24% stones, mainly small and medium rounded quartzite pebbles.

#### Soil Nutrient Status

Soil samples were taken from each of the two main fields on the site at positions made on map 2. The results of the analysis are shown at appendix 1.

Appendix 1

Nutrient Analysis Results

Sample	pH	P (mg/l)	K (mg/l)	Mg (mg/l)
1	5.2	4	98	491
2	7.4	69	170	28