SOIL PHYSICAL CHARACTERISTICS REPORT FOR LAND INCLUDED IN THE PROPOSED ANKER OPENCAST COAL SITE

1. INTRODUCTION

The site lies to the north of Polesworth and east of Shuttington. It is bounded by the M42 in the east, by minor roads in the south and west and by agricultural land in the north. The site was surveyed in 1990 using the MAFF Revised Agricultural Land Classification system, when soils were augered to 100cm at 100m grid intersections, to provide a density of one boring per hectare. Additional profiles were described as necessary to determine soil and land quality boundaries.

The site has a complex solid and drift geology which has influenced the Agricultural Land Classification grading and given rise to a number of different soils. Land quality ranges from Grade 2 to Sub grade 3b and 6 distinct soil units have been identified.

2. CLIMATIC LIMITATIONS

The climate of an area is measured by the Average Annual Rainfall, as a measure of overall wetness, and the Accumulated Temperature (January to June), as a measure of warmth. The climate in this area is non limiting because the AAR is 653mm and the Accumulated Temperature is 1386°C.

The rain falls fairly evenly throughout the year with rainfall peaks in August and November and a relative dry spell between February and April. The mean last frost occurs in early May.

3. SITE LIMITATIONS

The land lies at an altitude of 85m in the centre of the site falling to 70m in the north and southwest corner of the site.

The land is gently undulating and no where does gradient limit the classification of the land.

4. SOIL LIMITATIONS

The site is underlain by a complex geology which has influenced the soils.

In the south Coal Measure deposits give rise to sandy clay loam and clay loam soils which overlie heavy clay loam or clay; these soils fall into Wetness Class III and IV. In the centre of the site Mercia Mudstones which in places are overlain by Boulder Clay have a clay loam or sandy clay loam topsoil which overlies red clay. These soils fall into Wetness Class IV. Glacial sands and gravels have been deposited on the hill south of New Covert and in this area deep, slightly stony sandy loams overlie loamy sand with clay loam in some profiles at depth. These soils fall into Wetness Class I and II. On the gentle slopes in the north interbedded bands of Bromsgrove sandstones and mudstones give rise to fine sandy loam and sandy silt loam soils which overlie subsoils varying in texture from loamy sand to clay loam. These soils fall into Wetness Class I to III.

5. INTERACTIVE LIMITATIONS

The interaction between climate, site and soil determines whether a soil will be prone to drougtiness, wetness or erosion. The majority of soils on this site are medium to heavy textured and therefore not prone to drought. The exception being on the hill south of New Covert and where weathering rock occurs within auger depth.

A soils susceptibility to drought is measured by the amount of water the profile can hold (Ap) in comparison to the potential soil moisture deficit for the area (MD). In this area the medium moisture deficit for wheat is 104mm and for potatoes is 95mm.

Seasonal waterlogging affects soil workability and crop yields, wetness is therefore an important parameter in the classification of land. It is measured by reference to climate particularly field capacity days, soil water and topsoil texture. This site is at field capacity for approximately for 144 days. Most soils have gley morlogy and are slowly permeable within 60cm of the surface; soil wetness ranges from Wetness I to Wetness IV.

6. LAND USE

At the time of survey the land supported cereals, oilseed rape and potatoes.

7. AGRICULTURAL LAND CLASSIFICATION

Land quality ranges from Grade 2 to Sub-grade 3b.

7.1 Grade 2

Grade 2 is mapped over 26 ha and 18% of the site to include two soil types.

To the south of New Covert deep, slightly stony (5-10%), sandy loams overlie loamy sand and sand. These soils fall into Wetness Class I. The soils are slightly susceptible to drought in dry years and so could not be graded higher. Isolated profiles of Grade 1 occur. In areas where the sandy soils are underlain by clay loam and clay, the soils fall into Wetness Class II and III and hence into Grade 2.

To the north of New Covert fine sandy loam and sandy silt loam soils overlie clay loam and weathering sandstone or mudstone. These soils fall into Wetness Class II and III. They are generally stoneless to very slightly stony. The soils may be prone to drought in dry years where the bedrock is located within auger depth.

7.2 Sub Grade 3a

This Sub grade is mapped extensively to include 52.1 ha and 36% of the site. It includes sandy silt loam to sandy loam and occasionally sandy clay loam soils, which overlie sandy clay loam and clay loam. These soils have a slowly permeable layer within 65cm of the surface and fall into Wetness Class III and IV. They are very slightly to slightly stony and typically contain 5-10% by volume to the south of New Covert and less than 5% to the north of New Covert. The soils in this Sub grade are quite variable and small areas of Grade 2 and Grade 1 have been included within the area mapped as Sub grade 3a.

7.3 Sub Grade 3b

This Sub grade is mapped over 60.6 ha and 42% of the site, to include sandy clay loam and clay loam soils which overlie clay loam and clay. The soils show signs of impeded drainage with evidence of gleying within 30cm of the surface and have a slowly permeable layer within 40cm. These soils are too poorly drained for a higher grade. At the southern end of the site bands of weathering sandstone occur within 60cm of the surface and in these areas the sandy loam and occasionally sandy clay loam soils are prone to drought.

7.4 Non Agricultural and Woodland

These grades account for 5.2 ha and 4% of the site. They are mapped over woods, derelict buildings and old marl pits.

8 SOIL UNITS

8.1 Unit 1

8.1.1 Unit 1a

This unit is mapped over low lying ground in the centre of the site.

Typically 25cm of dark brown (10YR 3/3) sandy clay loam or clay loam overlies dark greyish brown 10YR 4/2 heavy clay loam. Reddish brown (5YR 5/3) clay occurs at 35-40cm in most profiles.

The topsoil has a weakly formed coarse subangular blocky structure. Below 25cm structures are typically slightly porous, moderate coarse and very coarse subangular and angular blocky. Below 35cm moderately coarse prismatic structures predominate. The soils are gleyed below 25-30cm and slowly permeable below 35-40cm. They fall into Wetness Class IV.

Stone contents range from 0-5% and typically are about 3% of small and medium rounded quartzite pebbles. There are many plant roots but they are mainly confined to ped faces below 40cm.

8.1.2 Unit 1b

This unit has a litter layer at the surface which has developed under woodland. The underlying soils are similar to those in Unit 1a.

8.2 Unit 2

This unit is mapped in the north and centre of the site to include light to medium textured soils which have formed on interbedded silt and sandstone. The subsoil texture of the resulting soils varies over small distances.

Typically 30cm of dark brown (10YR 4/4) sandy loam, sandy silt loam or occasionally sandy clay loam overlies similar textured strong brown 7.5 YR 4/6 to red brown 5YR 4/4 subsoils. Below 50cm subsoils vary in texture from strong brown (7.5YR 4/6) loamy sand and weathering sandstone to yellowish red (5YR 4/6) heavy clay loam and weathering mudstone. An impenetrable layer of soft rock occurs in some profiles at depths below 70cm.

The sandy soils are moderate to very porous throughout and typically have a moderately formed subangular blocky structure to 50cm and weak, medium subangular blocky to single grain below this depth. They fall into Wetness Class I. The heavy soils which have developed over mudstone are moderatley porous in the vicinity of the pit and have weak medium and coarse subangular blocky structures in the topsoil and upper subsoil. Below 50cm moderately porous medium and coarse angular blocky to coarse prismatic structures are typical. These soils fall into Wetness Class I to III.

The soils contain few hard quartzite stones, usually less than 5%, near the surface. But soft blocks of weathering sandstone account for up to 40% of the horizon immediately above the weathering sandstone.

Plant root and worm channels were seen throughout the pits to a depth of 80cm or to weathering rock.

8.3 Unit 3

This unit is mapped on the hill to the south of New Covert where glacial sands and gravels overlie the solid geology.

Typically 30cm of dark brown 10YR 3/3 sandy loam overlies strong brown (7.5YR 4/6) sandy loam to 50cm. Strong brown (7.5YR 5/6) loamy sand occurs below this depth and yellowish red 5YR 5/6

sandy clay loam to clay occurs often at depths below 60cm, especially towards the boundaries of this unit.

The soils are porous throughout and typically have weakly formed medium subangular blocky structures in the topsoil and weak coarse subangular blocky structures below 30cm. The structure of the lower subsoil varies with the texture from weak, coarse subangular blocky in the loamy sand horizons to coarse prismatic in the sandy clay loam and clay horizons. The soils are free draining and fall into wetness class I and II.

Small medium and large rounded quartzite pebbles account for 5-10% of the topsoil and upper subsoils but stone content tends to decrease with depth and few stones occur in the heavier horizons. Plant roots and worm channels were common to the base of the pit at 80cm.

8.4 Unit 4

8.4.1 Unit 4a

This unit is mapped over Coal Measure deposits at the southern end of the site. It includes medium and heavy textured soils with impeded drainage. Typically 27cm of dark brown (10YR 3/3) clay loam or sandy clay loam overlies yellowish brown (10YR 6/4) sandy clay loam to silty clay loam subsoils. Heavy clay loam to silty clay occurs below 50 cm in most profiles. The soils have a weak, coarse subangular blocky structure in the topsoil which becomes moderate coarse prismatic by 40cm. The soils are gleyed within 40cm and have a slowly permeable layer at depths below 35cm. They fall into wetness class III and IV.

Small and medium round quartzite pebbles account for less than 3% of the profile. Blocks of weathering sandstone occur in isolated areas where weathering sandstone occurs within auger depth. These areas are marked with an asterisk on the soil resource map.

Plant roots and worm channels are common in the topsoil but few below 60cm.

8.4.2 Unit 4b

This unit is mapped over similar soils to those in unit 4a except they have an organic layer at the surface having, formed under woodland.

8.5 Unit 5

This unit contains two distinct soil types which are closely intermixed. Heavy soils similar to those in Unit 4 are intermixed with sandy loam and sandy clay loam soils which have formed over weathering sandstone. The depth to sandstone varies from 25-70cm.

8.6 Unit 6

This unit has no soil at the surface. It includes the sites of old buildings and extensive tracks which are composed of hardcore.

8.7 Summary of Soil Units (Typical Profile)

Unit	Depth (cm)	Texture	Stones
1	0-25	SCL-CL	3%
	25-40	CL	3%
	40-100	C	3%
1a	5-0	organic mat	
2	0-30	SL-SZL	< 5%
	30-50	SL-SCL	< 5%
	50-100	LS-C	<5-40%
3	0-30	SL	5-10%
	30-50	SL	5-10%
	50-60/80	LS	< 5%
	60/80-100	SCL-C	< 5%
4	0-27	CL-SCL	< 3%
	27-50	SCL-ZCL	< 3%
	50-100	CL-ZC	< 3%
4a	5-0	Organic mat	
5	0-27	CL-SL	0-10%
	27-40	CL-LS	0-15%
	40-100	C/Sst	0-40%
6	No soils at the surface		

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