PHYSICAL CHARACTERISTICS REPORT FOR LAND AT HORSEHAY

An Agricultural Land Classification of approximately 14 hectares of land to the southwest of Horsehay was undertaken in November 1989. The site lies east and south of an existing quarry.

The survey was carried out using a 5 cm dutch auger. The soils were augered at hundred metre grid intersections to 100 cm or to an impenetrable layer if closer to the surface. Additional profiles were augered and pits dug as necessary, to give a density of 1 boring per 0.9 hectares.

Most of the site has been disturbed and is mapped as Grade 4. A small area of Sub-grade 3b is mapped in the north west to include undisturbed land. Two soil units have been identified.

1 Land Use

The entire site supports grass on which sheep had been grazing recently.

2 Site Details and Limitations

2.1 Climatic Limitations

The site receives an average annual rainfall of 798 mm and has an accumulated temperature (January to June) of 1272°C. This combination of rainfall and accumulated temperature limits the agricultural potential of the land to Grade 2.

2.2 Location and Site Limitations

The site lies to the south west of Horsehay. Its southern and eastern boundaries are formed by roads whilst the western boundary is formed by the edge of an existing quarry. Only in the north is the site adjacent to agricultural land.

The land lies at an altitude of 190 m. Most of the site is very gently sloping and nowhere does gradient limit the classification of the land. There is little evidence of differential settlement on the restored land, although on the hill top occasional shallow hollows occur, which were waterlogged at the time of survey. Microrelief does not limit the classification of this site.

2.3 Geology and Soil Limitations

The area is underlayed by Coal Measure deposits of the Carboniferous period. The resulting soils are heavy textured and typically have about 25 cm of medium clay loam over similar textured mottled subsoils. Heavy clay occurs below 40 or 50 cm. The soils show evidence of impeded drainage and fall into wetness class 4. Soils like these occur along the north eastern boundary of the site.

Most of the site has been disturbed and restored with little of the original soil being replaced. The man made profile has about 15 to 20 cm of heavy clay loam material which although compacted is beginning to take on topsoil characteristics in the form of organic staining and finer soil structures. Clay appears below 15 to 20 cm. Sandstone shale and coal fragments occur frequently throughout the profile. In many areas the soils were too compact to auger below 60 or 70 cm.

2.4 Interactive Limitations

The main limiting factor in the classification of this land is soil wetness, caused by compaction on the disturbed land and heavy soil textures. The degree of wetness is determined by the length for which soils are at field capacity (183 days on this site), the wetness class in which they occur and the texture of the topsoil. The disturbed soils have slowly permeable horizons close to the surface and fall into wetness class 4.

The undisturbed soils also fall into wetness class 4.

Despite the restricted rooting depth on the restored land drought is not the main limiting factor in the classification of this land.

3 Agricultural Land Classification

The entire site is in agricultural use and the majority is mapped as Grade 4.

3.1 Sub-grade 3b

This grade accounts for 1.1 hectares 8% of the site. It is mapped in the north east where the undisturbed soils have a slowly permeable layer at about 40 cm and gleying above this depth. The soils contain a few large sandstone blocks but are generally stoneless. The soils fall into wetness class 4. The area which has medium clay loam topsoils which are at field capacity for about 183 days is mapped at Sub-grade 3b.

3.2 Grade 4

This grade is mapped over 13.1 hectares and 92% of the site to include restored, heavy textured clay loam soils which overlie clay. The soils are compacted and the original structures disorientated, although a new structure is developing at the surface. The soils are slowly permeable and falling to wetness class 4. With heavy clay loam topsoils the land is mapped as grade 4. The soils contain many blocks of coal, shale and sandstone although large pieces did not occur in the topsoil in the vicinity of the pit.

4 Soil Units

Two units have been identified which will require separate handling if the site is worked for coal.

4.1 Unit 1

This unit is mapped over the disturbed land. Typically 15 to 20 cm of very dark greyish brown (10YR 3/2) heavy clay loam overlies dark grey and grey (10YR 4/1 to 5/1) clay with pockets of clay loam. The subsoil occurs to at least 100 cm and contains many fragments of coal, shale and sandstone.

A new structure is beginning to form and typically consists of weakly formed course prismatic which breaks to weakly formed course sub-angular blocky peds. The peds contain few pores and the roots are disorientated in the profiles. In the subsoil the structures are very course prismatic to platey and roots are mainly confined to ped faces. The soils are slowly permeable and iron cementing is occurring on stone faces. Bands of severe compaction occur at about 20 and 60 cm in the vicinity of the pit.

The pH is about 6.0 in the top 15 cm and 4.7 below 30 cm. The coal fragments give the profile and unnaturally high organic matter level of 12% in the topsoil and over 9% in the subsoil.

4.2 Unit 2

This unit is mapped over undisturbed land in the north east.

Typically 25 cm of dark brown (10YR 3/3) medium clay loam overlies brown (10YR 5/5) clay loam. Heavy clay occurs below 40 cm which is yellowish brown (10YR 5/6) at 40 cm and becomes very pale brown (10YR 7/2) with depth.

The soil structures vary from weak course prismatic at the surface, which breaks to moderate, course sub-angular blocky under pressure, to strongly formed course prismatic below 40 cm. The soils are slightly porous to 40 cm and slowly permeable below this depth. Distinct rusty and grey mottles

occur in the gleyed horizon below 25 cm.

Occasional sandstone blocks occur to 40 cm but the soils are structureless below this depth. Roots occur to the base of the pit at 80 cm. The pH ranges from 6.5 in the top soil to 5.3 below 60 cm. The organic matter content is 5.6% in the topsoil.

5 Summary

Most of the site is restored and land quality is low. Two separate units have been identified which will require separate handling if the site is worked for coal. Suitable soil making materials may need to be found if the site is worked for coal.

Summary of ALC

Grade	Ha	%
3b	1.1	8
4	13.1	92
Total	14.2	100

Summary of Soil Units

Unit	Depth (cm)	Texture	pH	OM%
1	0-17	CL(h)	6.0	12.2 (coal)
	17-100	C	4.7	9.0 (coal)
2	0-25	CL(m)	6.5	5.6
	25-40	CL(m)	6.7	1.9
	40-100	C (h)	5.3	1.5

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