AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS

GROTTINGTON PROPOSAL OPENCAST COAL SITE

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1. AGRICULTURAL LAND CLASSIFICATION REPORT ON THE PROPOSAL OPENCAST COAL SITE AT GROTTINGTON, CORBRIDGE, NORTHUMBERLAND

1.1 Introduction

The site is located around National Grid Reference NY 983694 adjoining the A68 about 5 km north of Corbridge in Northumberland.

Survey work was carried out in November 1989 when soils were examined by hand auger borings at points predetermined by the National Grid. The density of borings was one per hectare. In addition three soil inspection pits were dug to provide further information on soil characteristics.

1.2 Climate and Relief

Salient climatic parameters at Grottington are as follows:-

Average Annual Rainfall (mm)		705
Accumulated Temperature above 0°C (Jan-June)		1123
Field Capacity Days		183
Moisture Deposits:-	wheat (mm)	73
	potatoes (mm)	53

The above temperature and rainfall figures impose an overall climatic limitation of subgrade 3a on the lower parts of the site. Climatic conditions on the higher land, however, are more severe and restrict land above about 210 m a.o.d. to a maximum of subgrade 3b.

Altitude ranges from 207 m a.o.d. south of Grottington Cottages to over 237 m a.o.d. south of Whittington Fell. There is an overall slope down towards the River Pont which runs through the north eastern part of the site. These slopes are mostly gentle except in the south western part of the site where they exceed 11° in places. The area of rough pasture rising up towards Whittington Fell contains very uneven topography on which it would be difficult to use agricultural machinery.

1.3 Geology, Soils and Drainage

Most of the soils are formed on a mixed drift deposit of variable thickness. This drift consists of boulder clay, head and alluvium. Where it is thin solid strata occurs within a metre of the surface. Topsoils are usually of medium or heavy clay loam, or sandy clay loam over a clayey, slowly permeable subsoil (Wetness Class IV). Within this area, however, patches of lighter textured soil (deep sandy loam) do occur. The remaining land, a small area in the south west of the site, contains shallow soils formed on weathering Carboniferous sandstone. Topsoils here usually consist of medium sandy loam which is often organic, over a similar (non-organic), stony subsoil. Bedrock occurs at about 50 cm depth.

1.4 Agricultural Land Classification

1.4.1 Subgrade 3a (3.6 ha)

This small area in the north western part of the site contains sandy loam and loamy sand top and upper subsoils over either heavy clay loam or rock. Wetness and workability as well as the overall climatic limitation are the main restrictions on ALC grade.

1.4.2 Subgrade 3b (25.0 ha)

This subgrade is widespread in the eastern half of the site. Topsoils consist of medium or heavy clay loam or sandy clay loam over a heavy clay loam, sandy clay loam, or clay, slowly permeable subsoil (Wetness Class IV). Soil wetness, workability and, on the higher ground, climate, restrict this land to no better than subgrade 3b.

1.4.2 Grade 4 (12.1 ha)

This area near the south western boundary, is characterised by slopes of more than 11° and very uneven topography which make the use of agricultural machinery difficult. This is restricted to Grade 4 for this reason.

1.4.4 Urban (0.9 ha)

The compound associated with previous coal mining falls within this category.

2. STATEMENT OF PHYSICAL CHARACTERISTICS GROTTINGTON PROPOSED OPENCAST COAL SITE

Two soil types occur at Grottington. One is derived from mixed drift and the other formed on weathered sandstone.

The topsoil and subsoil resources for the site are shown on the accompanying map, along with soil depth and volume information.

i. Drift Derived Soils

These are divided into medium/heavy and light textured subunits. In the medium/heavy subunit the topsoil (T1A) consists usually of faintly mottled stoneless medium clay loam with a well developed medium and fine subangular blocky structure. Topsoils in the light subunit (T1B) are similar except for the lighter texture. Subsoils in the medium/heavy textured subunit (S1A) are formed of heavy clay loam, clay or, occasionally sandy clay loam with a grey matrix and many medium sized prominent mottles. This material is normally stoneless and has a coarse angular blocky structure which becomes strongly developed coarse prismatic at depth. Although this subunit usually extends to a depth of 100 cm, bedrock is occasionally encountered closer to the surface. The lighter textured subsoil subunit (S1B) consists of friable sandy loam or loamy sand which passes into sandstone or occasionally clay at depth.

ii. Sandstone Derived Soils

The topsoil (unit T2) is formed usually of unmottled often organic medium sandy loam containing common small and medium platy sandstones. It has a moderately developed medium subangular blocky structure with many fine fibrous roots. The subsoil (unit S2) is also unmottled and consists of loamy medium sand with very many medium and large platy sandstones. It has a weakly developed fine subangular blocky structure and common fine fibrous roots. Below about 45 cm the subsoil merges into weathering sandstone.

3. SOIL PROFILE DESCRIPTIONS

Grottington Pit A

(a) Medium over heavy textured drift soil

Slope:- 0°
Aspect:- -
Land Use:- Permanent Grass

Horizons
(Depth cm)

0-20 Very dark greyish brown (10YR 3/2) medium clay loam; few fine faint reddish brown (5YR 4/4) mottles; stoneless; moist; well developed medium and fine subangular blocky structure breaking to medium granular; medium packing density; moderately porous with many fine pores and fissures; moderately firm soil strength; moderately sticky and moderately plastic; abundant fine fibrous roots; non calcareous; abrupt irregular boundary.

20-60 Grey (10YR 6/1) sandy clay loam with many medium prominent strong brown (7.5YR 5/8) mottles; stoneless; moist; moderately developed coarse prismatic breaking to coarse angular blocky structure; high packing density; slightly porous; moderately firm soil strength; moderately sticky and moderately plastic; common fine fibrous roots; non calcareous; abrupt even boundary.

60-100 Grey (10YR 6/1) heavy clay loam with many medium prominent strong brown (7.5YR 5/8) mottles; stoneless; moist; strongly developed coarse prismatic structure; high packing density; slightly porous; very firm soil strength; very sticky and very plastic; few fine fibrous roots; non calcareous.

Grottington Pit B

(b) Sandstone derived soil

Slope:- 10°
Aspect:- N
Land Use:- Rough Grazing

Horizons
(Depth cm)

0-25 Dark greyish brown (10YR 4/2) medium sandy loam, unmottled, slightly stony with common small medium and large platy sandstones; moist; moderately developed; medium subangular blocky structure; low packing density; very porous; many medium and fine pores and fissures; moderately weak; slightly sticky; slightly plastic; many fine fibrous roots; non calcareous; gradual wavy boundary.

25-45 cm Strong brown (7.5YR 5/6) loamy medium sand; unmottled with very many medium and large platy sandstones; moist; weakly developed fine subangular blocky structure; low packing density; very porous; common fine pores and fissures; weak soil strength; non sticky; non plastic; common fine fibrous roots; non calcareous; gradual wavy boundary to weathering sandstone.

Grottington Pit C

(c) Light textured drift soil

Slope:- 0°
Aspect:- -
Land Use:- Perm Grass

Horizons
(Depth cm)

0-20 Very dark greyish brown (10YR 3/2) fine sandy loam; stoneless; moist; moderately developed medium subangular blocky structure breaking to fine granular; medium packing density; very porous; friable; slightly sticky and slightly plastic; abundant fine fibrous roots; non calcareous; gradual smooth boundary.

20-40 Dark greyish brown (10YR 4/2) medium sandy loam; common fine and medium distinct reddish brown (5YR 4/4) and grey (10YR 5/1) mottles; stoneless; moist; weakly developed coarse and medium angular blocky structure; very porous; friable; slightly sticky and slightly plastic; many fine fibrous roots; non calcareous; abrupt irregular boundary.

40-100 Grey (10YR 5/1) loamy medium sand; common fine distinct reddish brown (5YR 4/4) mottles; stoneless; moist; weakly developed coarse angular blocky structure; very porous; very friable; non sticky and non plastic; few fine fibrous roots; non calcareous.

APPENDIX

1. Schedule of Soil Auger Borings

Schedule of Soil Auger Borings

Glossary

Textures

S	Sand
Fs	Fine sand
ms	Medium sand
cs	Coarse sand
ls	Loamy sand
lfs	Loamy fine sand
sl	Sandy loam
fsl	Fine sandy loam
csl	Coarse sandy loam
scl	Sandy clay loam
fscl	Fine sandy clay loam
mcl	Medium clay loam
hcl	Heavy clay loam
sc	Sandy clay
zc	Silty clay
zcl	Silty clay loam
zl	Silt loam
szl	Sandy silt loam
O	Organic
Pty	Peaty
pl	Peaty loam
w	Weathering

Colours

All from Munsell Soil Colour Charts

Mottles

O	Ochreous
G	Grey

AUGER BORINGS FOR GROTTINGTON PROP O.C.C.

BORING	WET CLASS	TEXTURE	DEPTH	COLOUR	CaCO3	MOTTLES
001	3	fsl	0-25	10YR32		few faint O
		msl	25-60	10YR62		many distinct OG
		m.hcl	60-100	10YR44		common distinct OG
002		fsl	0-30	75YR44		
		lms	30-60	75YR58		
		SAND.ST	60+			
003	4	fscl	0-20	10YR42		common faint O
		mcl	20-60	10YR62		many distinct OG
		mcl.zcl	60-100	10YR42		many distinct OG
004	4	mcl	0-20	10YR32		few faint O
		mcl	20-50	10YR52		many distinct OG
		hcl	50-100	10YR42		many distinct OGM
005	4	mcl	0-25	10YR32		common faint O
		hcl	25-50	10YR52		many distinct OG
		hcl	50-100	10YR43		common distinct OG
006	4	mcl	0-25	10YR32		few OF
		hcl	25-60	10YR53		common distinct OG
		lms	60-100	10YR63		many distinct O
		SAND.ST	60+			
007	4	m.hcl	0-20	10YR42		
		hcl	20-40	10YR43		few faint O
		hcl	40-100	10YR62		many distinct OG

BORING	WET CLASS	TEXTURE	DEPTH	COLOUR	CaCO3	MOTTLES
008	4	hcl	0-20	10YR42		common faint O
		c	20-60	10YR62		common distinct OG
		hcl	60-100	10YR53		many prominent OG
009	4	msl	0-20	10YR43		
		c	20-60	10YR31		common distinct OG
		w.shale	60-100	10YR21		common distinct O
010	4	mcl	0-20	10YR32		few faint OG
		hcl.c	20-60	10YR61		common distinct O
		msl.scl	60-100	10YR44		many prominent G
011	4	mcl	0-20	10YR32		common faint O
		hcl	20-100	10YR61		common distinct OG
012	4	mcl	0-20	10YR32		few faint O
		mcl	20-45	10YR62		many distinct OG
		hcl	45-100	10YR53		many distinct OG
013	1	fsl	0-30	10YR42		
		fsl	30-50	10YR43		few faint O
		lms	50-100	103862		common distinct O
014	4	hcl	0-25	10YR42		few OF
		c	25-100	75YR54		many prominent OG
015	4	hcl	0-10	10YR32		common distinct O
		hcl	10-45	N6		common distinct OG
		c	45-100	N6		common distinct O

BORING	WET CLASS	TEXTURE	DEPTH	COLOUR	CaCO3	MOTTLES
016	4	mcl	0-20	10YR32		few faint O
		mcl	20-30	10YR42		few faint O
		hcl	30-100	N6		common distinct O
017	4	hcl	0-20	10YR42		common distinct O
		hcl	20-55	N6		common distinct O
		mcl	55-100	10YR53		common distinct OG
018	4	scl	0-30	10YR42		
		scl.c	30-100	10YR72		many prominent OG
019	4	scl	0-25	10YR41		
		c	25-100	2.5Y52		many prominent OG
020	4	scl	0-25	10YR42		
		scl	25-40	10YR52		common distinct OG
		c	40-100	N5		many prominent OG
022	1	pl	0-20	10YR31		
		msl	20-45	10YR44		few distinct O
023	1	msl	0-25	10YR42		
		msl	25-45	10YR44		few faint O
024	4	scl	0-25	10YR42		few distinct O
		scl	25-50	10YR52		common distinct OG
		c	50-100	10YR72		many prominent OG
025	4	scl	0-25	10YR42		
		scl	25-100	10YR52		many prominent OG

BORING	WET CLASS	TEXTURE	DEPTH	COLOUR	CaCO3	MOTTLES
026	3	scl	0-30	10YR42		
		scl	30-45	10YR52		
		c	45-100	10YR72		common distinct OG
027	3	scl	0-30	10YR42		
		scl	30-45	10YR53		
		c	45-75	10YR62		many prominent OG
028	4	scl	0-25	10YR42		
		scl	25-40	10YR52		common distinct O
		c	40-100	10YR72		many prominent OG
029	1	msl	0-35	10YR43		few O
030	1	fsl.scl	0-25	10YR52		few distinct O
		fsl	25-100	N5		many prominent OG
031	4	scl	0-25	10YR41		common distinct O
		scl	25-45	10YR72		P prominent O
032	4	scl	0-25	10YR52		few distinct O
		scl	25-50	10YR62		many distinct OG
		c	50-100	N5		many prominent OG
033	4	szl	0-30	10YR52		
		scl	30-100	10YR62		many prominent OG
034	4	szl	0-30	10YR42		
		scl	30-40	10YR52		common distinct OG
		c	40-100	N5		many prominent OG

BORING	WET CLASS	TEXTURE	DEPTH	COLOUR	CaCO3	MOTTLES
037	4	szl	0-30	10YR42		
		scl	30-45	10YR52		common distinct OG
		c	45-60	10YR62		D distinct OG
		c	60-100	N5		many prominent OG
038	4	scl	0-30	10YR42		few distinct O
		scl	30-45	10YR52		
		c	45-85	2.5Y52		many prominent OG