

**AGRICULTURAL LAND CLASSIFICATION
AND STATEMENT OF PHYSICAL CHARACTERISTICS**

**CHAPMAN'S WELL EXTENSION
PROPOSED OPENCAST COAL SITE**

ADAS
LEEDS REGIONAL OFFICE

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1. AGRICULTURAL LAND CLASSIFICATION REPORT ON THE PROPOSED EXTENSION TO CHAPMAN'S WELL, OPENCAST COAL SITE

A. GENERAL SITE INFORMATION

INTRODUCTION

The site is located around grid reference **NZ 186497** approximately 3 km north east of Lanchester, County Durham.

It covers a total area of 76.6 hectares of which 83.5 per cent is classified as agricultural.

Survey work was carried out in February 1989 when soils were examined by hand auger borings at points predetermined by the National Grid. The overall survey density was approximately 1 boring per hectare.

Detailed soil descriptions and sampling for laboratory analyses were carried out in inspection pits located at representative points in each of the two main soil types occurring on the site.

All assessments of agricultural land quality were made using the methods described in **Agricultural Land Classification of England and Wales** (MAFF, October 1988).

CLIMATE AND RELIEF

Average Annual Rainfall in the area is approximately 762 mm. Accumulated Temperature above 0°C (January to June) is approximately 1085 day °C and the Mean Duration of Field Capacity is approximately 190 field capacity days. These characteristics result in an overall climatic limitation of subgrade 3b.

Altitude varies from approximately 216 metres to 260 metres above OD. Most of the land is level to gently sloping except for areas north of New Acres Farm and west of Morrow Edge where significant grade limitations are imposed by slopes that vary from strong to steeply sloping. (11-25°).

GEOLOGY

Coal Measure sandstones and shales underlie the site most of which has a superficial cover of boulder clay.

This drift is absent along Morrow edge and north of New Acres Farm where sandstone occurs close to the surface, resulting in thin coarse loamy soils on steep slopes.

Quarrying of the sandstone north west of New Acres Farm has left a large area of hummocky disturbed land.

LAND USE

Agricultural land consists mainly of improved pasture with some winter cereals being grown around Morrow Edge Farm. North of New Acres Farm and west of Morrow Edge, rough moorland type vegetation predominates.

Non Agricultural land uses consist largely of woodland with some scrub vegetation and vacant land near Morrow Edge Farm and in the south eastern corner of the site.

B. AGRICULTURAL LAND CLASSIFICATION GRADES

The ALC grades occurring on this site are as follows:

Grade or subgrade	Hectares	Percentage of site	Percentage of total agricultural land
3b	41.3	54.0%	64.5%
4	15.9	20.5%	24.9%
5	6.8	9.0%	10.6%
Non Agricultural	12.2	16.0%	-
Farm Buildings	<u>0.4</u>	<u>0.5%</u>	<u>-</u>
Total	76.6	100.0%	100%

SUBGRADE 3b

Climate is the main limitation on ALC grade in this area and restricts all soils to a maximum of subgrade 3b. This subgrade contains most of the better boulder clay soils on the site. These consist of medium textured sandy clay loams or clay loams over similar or heavier subsoils. All fall within Wetness Classes III or IV depending on gleying and depth to the slowly permeable subsoil horizon. Soils of this type in Wetness Class III would normally fall within subgrade 3a, but because of the overriding climatic limitation these are downgraded to 3b alongside soils in Wetness Class IV.

GRADE 4

Soils in this grade are widespread on the lower lying edge of the site and consist mainly of heavy clay loam and clay. Peat or loamy peat is also common, but is rarely the dominant texture within the agriculturally important top 25 cm. These soils fall into Wetness Class IV and are restricted to Grade 4 by a combination of heavy texture and wetness.

North west of New Acres Farm peaty topsoil textures overlie coarse loamy and sandy subsoils. Cultivation of these soils, however is severely restricted by the irregular topography, rock outcrops and localised slopes of more than 11° . This area is restricted to Grade 4 for these reasons.

GRADE 5

Grade 5 land is restricted to two areas. The area north of Morrow Edge Plantation is limited by steep slopes of more than 18° . That adjoining New Acres Farm is restricted by a lack of topsoil and its generally disturbed irregular hummocky nature.

NON AGRICULTURAL

This consists mainly of woodland with small areas of scrub vegetation, around Morrow Edge Farm, and the disused quarries in the extreme south east.

FARM BUILDINGS

This consists of the buildings at Morrow Edge Farm.

2. STATEMENT OF PHYSICAL CHARACTERISTICS (Soil Properties and Resources) CHAPMAN'S WELL EXTENSION OCCS.

Soils on the site are derived mainly from boulder clay which forms a thick cover over the Coal Measures, especially on the more gently undulating land between Morrow Edge and New Acres Farms. Soils of this type also occur on the lower lying ground along the western and northern edges of the site. Soils derived from solid strata are restricted to the narrow escarpment north of Morrow Edge Farm where sandstone occurs close to the surface. Useable soil resources are largely absent in the badly disturbed area north west of New Acres Farm.

The topsoil and subsoil resources on the site are shown on the accompanying maps, along with soil depth and volume information. Boulder clay soils are subdivided into areas of predominantly medium and predominantly heavy texture, but these can be merged if required.

SOIL TYPE 1: DEEP, MEDIUM AND HEAVY TEXTURED BOULDER CLAY SOILS

A. GENERAL CHARACTERISTICS

This soil type is widespread and consists mainly of sandy clay loam or medium clay loam topsoils (Unit T1) overlying sandy clay loam, clay loam or clay subsoil to depth (Units S1A, S1B, S1C).

A representative inspection pit (Table 1) showed a moderately developed medium and fine subangular blocky structure passing into a coarse angular blocky upper subsoil that becomes notably less well developed down the profile.

B. TOPSOIL RESOURCES (UNIT T1)

The optimum topsoil thickness in this medium textured unit is 25 cm, except in the areas of rough grazing along the extreme western edge of the site. Here, topsoils often consist of peaty horizons too thin to separate as a resource.

C. SUBSOIL RESOURCES

Subsoils within this soil type are split into 4 sub units of various thicknesses. **Sub unit S1A** consists of heavy textured material to 100 cm depth and has a median thickness of 75 cm. **Sub unit S1B** is, overall, a lighter resource and consists of medium textured material to a similar depth. **Sub unit S1C** occurs in the areas without a significant topsoil and this consists of up to 100 cm of heavy to medium textured material from the surface downwards.

SOIL TYPE 2: SHALLOW, LIGHT AND MEDIUM TEXTURED SANDSTONE SOILS OFTEN WITH PEATY TOPSOILS

A. GENERAL CHARACTERISTICS

This soil type occurs along Morrow Edge and north of New Acres Farm where solid sandstone occurs below weathering sandstone fragments, usually within 60 cm of the surface. Soils consist of a thin humose or peaty topsoil over sandy clay loam and sandy loam subsoils. Deeper topsoils of this type are found only south of Morrow Edge Farm and in the south eastern corner of the site (Units T2a and T2b).

A representative inspection pit (Table 2) showed a moderately developed medium angular blocky subsoil structure below a thin amorphous peaty topsoil and litter layer.

B. TOPSOIL RESOURCES

With the exception of sub units T2a and T2b topsoils generally consist of peaty horizons which are too thin to separate as a resource.

Sub unit T2a is formed of medium textured material with an optimum thickness of 15 cm. Sub unit T2b consists of peaty textures with an optimum thickness of 35 cm. Past disturbance of this area however, may give considerable localised variations in this thickness.

C. SUBSOIL RESOURCES

Subsoils within this soil type are divided into 3 sub units of various thicknesses Sub unit S2A consists mainly of medium to heavy textured material with a median thickness of 35 cm. Sub units S2B and S2C occur in areas without a significant topsoil. S2B is the thinner and lighter resource and consists of light textured material with a median thickness of 20 cm. Unit S2C consists of medium textured material with a median thickness of 45 cm.

Subsoil resources are largely absent in the extreme south eastern corner of the site below topsoil resource unit T2b.

3. SOIL PROFILE PIT DESCRIPTIONS

TABLE 1

SOIL PROFILE PIT A (NGR NZ 190 502)

MEDIUM TO HEAVY TEXTURED BOULDER CLAY SOIL

LAND USE : GRASS

SLOPE : 0°

WETNESS CLASS: IV

Horizon	Depth	Description
1.	0-25 cm	Very dark greyish brown (10YR 3.2) sandy clay loam; unmottled; slightly stony with common medium subrounded and rounded sandstones; moist; moderately developed medium and fine sub angular blocky structure; medium packing density; moderately porous; common fine pores and fissures; moderately porous; common fine pores and fissures; moderately weak soil strength; moderately sticky; moderately plastic; common fine fibrous roots; non calcareous; sharp wavy boundary.
2.	25-49 cm	Pale brown (10YR 5/3) sandy clay loam; many medium and coarse distinct clear brownish yellow (7.5YR 6/8) mottles; slightly stony with common medium and large rounded and subrounded sandstones; very moist; moderately developed coarse angular blocky structure; medium packing density; slightly porous; common very fine pores and fissures; moderately firm soil strength; moderately sticky; moderately plastic; common fine fibrous roots; non calcareous; clear irregular boundary.

3. 49-100 cm Light grey (10YR 6/1) sandy clay loam with lenses of sandy loam and clay; many coarse distinct clear reddish yellow (7.5YR 6/8) and N6 (grey) mottles; moderately stony with many medium and large sandstones; very moist; weakly developed adherent coarse angular blocky structure; high packing density; slightly porous; few fine pores and fissures; moderately weak soil strength; moderately sticky; moderately plastic; few very fine fibrous roots; non calcareous.

TABLE 2

SOIL PROFILE PIT B (NGR 188 504)

LIGHT TO MEDIUM TEXTURED SHALLOW SANDSTONE SOILS

LAND USE : SEMI NATURAL MOORLAND VEGETATION

SLOPE : 11^o NORTH

WETNESS CLASS: I

Horizon	Depth	Description
1.	0-9 cm	Partly decomposed litter; sharp smooth boundary.
2.	9-16 cm	Black (7.5YR 2.0) amorphous peat; unmottled; no stones; very moist; abundant fine and very fine fibrous, and many medium and coarse woody roots; sharp irregular boundary.
3.	30-40 cm	Very pale brown (10YR 7/3) medium sandy loam; many medium prominent sharp brownish yellow (7.5YR 6/8) mottles; moderately stony with many large angular sandstones; moist; moderately developed medium angular blocky structure; low packing density; extremely porous; common fine pores and fissures; moderately weak soil strength; slightly sticky; non plastic; many very fine fibrous roots; non calcareous.
4.	40 cm+	Large and very large weathering sandstones.

SCHEDULE OF SOIL AUGER BORINGS

GLOSSARY OF ABBREVIATIONS USED

1. SOIL TEXTURES (alphabetical)

c	Clay
csl	Coarse Sandy Loam
fsl	Fine Sandy Loam
fscl	Fine Sandy Clay Loam
fszl	Fine Sandy Silt Loam
hcl	Heavy Clay Loam
lms	Loamy Medium Sand
lp	Loamy Peat
mcl	Medium Clay Loam
msl	Medium Sandy Loam
mzcl	Medium Silty Clay Loam
Org.mcl	Organic Medium Clay Loam
pl	Peaty Loam
pt	Peat
sc	Sandy Clay
scl	Sandy Clay Loam
zc	Silty Clay

2. MOTTLES

Com	Common
V. Many	Very Many
Fnt	Faint
Dist	Distinct
Prom	Prominent
O	Ochreous
G	Grey

BORING	DEPTH CM	TEXTURE	MATRIX/PED FACE COLOUR	MOTTLES
001	0-15	pl	75YR20	-
	15-30	hcl	10YR64	Many Prom OG
	30-80	c	10YR64	Many Prom OG
002	0-10	pt	75YR20	-
	10-30	msl	75YR72	Com Dist O
	30-45	lms	75YR72	Few Dist O
003	0-10	lp	75YR20	-
	10-20	hcl	5YR42	Many Dist OG
004	0-10	lp	75YR20	-
	10-45	scl	10YR52	Many Prom OG
005	0-10	lp	75YR20	-
	10-45	scl	10YR53	Many Dist OG
	45-60	c	10YR64	Many Prom OG
006	0-7	msl	75YR20	-
	7-30	scl	10YR64	-
	30-45	c	10YR64	Few Dist O
007	0-7	lp	75YR20	-
	7-15	msl	75YR53	-
	15-30	lms	75YR64	-
008	0-15	lms	10YR42	- disturbed area
009	0-10	mcl	10YR42	-
	10-30	cinders	-	-
010	0-45	cinders	10YR64	Many Prom OG

BORING	DEPTH CM	TEXTURE	MATRIX/PED FACE COLOUR	MOTTLES
011	0-10	pt	10YR21	Many Prom OG
	10-60	fsc1	75YR44	
012	0-20	msl	10YR42	Many Prom OG
	20-40	msl	10YR53	
013	0-25	scl	10YR42	Many Prom OG
	25-100	scl	10YR64	Many Prom OG
014	0-25	scl	10YR42	Many Prom OG
	25-100	sc	N5	Many Prom OG
015	0-22	mcl	10YR42	Many Prom OG
	22-100	sc	N5	Many Prom OG
016	0-15	pt	10YR21	-
	15-100	hcl	10YR42	Many Prom OG
017	0-7	pt	10YR21	-
	7-20	msl	5YR42	-
018	0-30	mcl	10YR32	-
	30-50	hcl	10YR64	Com Dist OG
	50-100	c	10YR54	Com Dist OG
019	0-22	scl	10YR42	Com Dist OG
	22-100	scl	10YR66	Com Dist OG
020	0-25	scl	10YR32	Com Dist OG
	25-100	sc	N5	Many Prom OG
021	0-22	scl	10YR42	Many Prom OG
	22-100	sc	10YR66	Many Prom OG

BORING	DEPTH CM	TEXTURE	MATRIX/PED FACE COLOUR	BOTTLES
022	0-15	mcl	10YR54	-
	15-100	c	10YR64	Many Prom OG
023	0-7	pt	10YR21	-
	7-32	msl	5YR42	-
024	0-23	mcl	10YR32	-
	23-40	mcl	10YR64	Com Dist OG
	40-70	hcl	10YR53	Com Dist OG
	70-100	msl	10YR53	Com Dist O
025	0-5	pt	10YR21	-
	5-30	msl	10YR44	-
	30-40	hcl	10YR64	Com Dist OG
026	0-25	scl	10YR42	-
	25-100	sc	10YR64	Com Dist OG
027	0-25	fscl	10YR42	-
	25-100	scl	10YR64	Com Dist OG
028	0-20	hcl	10YR42	-
	20-100	sc	10YR51	Many Prom OG
029	0-25	mcl	N2	-
	25-100	c	N6	Many Prom OG
030	0-10	hcl	10YR41	-
	10-100	c	10YR64	Many Prom OG
031	0-7	pt	10YR21	-
	7-20	msl	10YR32	-

BORING	DEPTH CM	TEXTURE	MATRIX/PED FACE COLOUR	MOTTLES
032	0-25	mcl	10YR43	-
	25-50	sc1	10YR52	Com Dist OG
	50-100	c	10YR62	Com Dist OG
033	0-25	sc1	10YR42	-
	25-100	sc1	10YR66	Many Dist OG
034	0-25	mzcl	10YR42	-
	25-100	zc	10YR52	Many Dist OG
035	0-25	mzcl	10YR42	-
	25-100	mzcl	10YR52	Com Dist OG
036	0-25	sc1	10YR42	-
	25-50	sc1	10YR52	Com Dist OG
	50-100	c	10YR62	Many Prom OG
037	0-25	mcl	10YR32	-
	25-50	hcl	10YR52	Com Dist OG
	50-100	c	10YR62	Many Dist OG
038	0-25	mcl	N3	-
	25-100	c	N6	Many Prom OG
039	0-7	pt	10YR21	-
	7-30	mcl	10YR64	Com Dist OG
	30-100	c	10YR64	Many Prom OG
040	0-25	mcl	10YR42	-
	25-100	sc	10YR64	Com Dist OG
041	0-25	sc1	10YR42	-
	25-100	sc1	10YR68	Com Dist O

BORING	DEPTH CM	TEXTURE	MATRIX/PED FACE COLOUR	MOTTLES
042	0-25	scl	10YR42	-
	25-100	scl	10YR52	Many Dist O
043	0-25	mzcl	-	-
	25-60	mzcl	-	Many Dist OG
044	0-35	fscl	10YR42	-
	35-60	scl	10YR61	Many Prom OG
	60-100	sc	10YR71	Many Prom OG
045	0-30	scl	10YR43	-
	30-100	scl	10YR51	Many Dist OG
046	0-30	pt	10YR21	-
	30-100	sc	10YR62	Many Prom OG
047	0-5	pt	10YR21	-
	5-40	mcl	10YR52	Com Prom OG
	40-100	c	10YR61	Many Prom OG
048	0-35	msl	10YR43	-
049	0-25	scl	10YR42	-
	25-100	sc	10YR62	Com Dist OG
050	0-25	fszl	N6	-
	25-50	msl	N2	Com Dist OG
	50-100	zc	N5	Com Dist G
051	0-30	mzcl	10YR42	-
	30-100	zc	N5	Many Dist OG

BORING	DEPTH CM	TEXTURE	MATRIX/PED FACE COLOUR	MOTTLES
063	0-25	hcl	10YR41	-
	25-50	c	10YR72	V. Many Prom G
	50-100	c	10YR64	Many Prom OG
064	0-30	mcl	10YR32	-
	30-50	hcl	10YR64	Many Prom OG
	50-100	c	10YR64	Many Prom OG
065	not surveyed			
066	0-30	pt	10YR31	-
	30-50	hcl	10YR54	Com Dist OG
	50-100	c	10YR64	Many Prom OG
067	0-25	mcl	10YR42	-
	25-100	c	10YR62	Many Prom OG
068	0-30	fsc1	10YR42	-
	30-55	cs1	75YR66	Com Dist OG
069	0-27	org.mcl	10YR41	-
	27-40	hcl	10YR41	Com Dist OG
	40-100	c	10YR64	Com Dist OG
070	0-30	hcl	10YR41	-
	30-45	msl	10YR72	V. Many Prom G
	45-95	c	10YR64	Many Prom OG
071	0-15	mcl	10YR32	-
	15-40	mcl	10YR33	-
072	0-30	mcl	10YR32	-
	30-100	c	10YR64	Many Prom OG

BORING	DEPTH CM	TEXTURE	MATRIX/PED FACE COLOUR	NOTES
052	0-25	scl	10YR42	-
	25-100	scl	10YR52	Com Dist OG
053	0-25	scl	10YR42	-
	25-80	scl	10YR52	Com Dist OG
054	0-35	pl	10YR21	-
	35-100	scl	10YR61	Many Prom OG
055	0-15	mcl	10YR32	-
	15-27	mcl	10YR42	-
	27-100	c	10YR72	Many Prom OG
056	0-5	pt	10YR21	-
	5-20	fscl	10YR44	
057	0-25	scl	10YR42	-
	25-50	mcl	10YR53	Few Dist O
	50-100	c	10YR61	Many Dist OG
058	0-25	scl	10YR42	-
	25-100	sc	75YR66	Many Dist OG
059	0-30	scl	-	-
	30-100	fscl	-	-
060	0-25	scl	-	-
	25-100	scl	-	-
061	not surveyed			
062	0-35	pt	10YR21	-

BORING	DEPTH CM	TEXTURE	MATRIX/PED FACE COLOUR	NOTTLES
073	0-30	hcl	10YR41	-
	30-100	c	10YR63	Many Prom OG
074	0-25	hcl	10YR32	-
	25-30	hcl	10YR53	Com Dist OG
	30-100	c	10YR64	Many Prom OG
075	0-20	ns1	75YR32	-
	20-30	ms1	10YR66	-
076	0-25	mcl	75YR32	-
	25-30	hcl	75YR32	-
	30-100	c	10YR64	Com Dist O
077	0-100	hcl	5Y31	Few Dist O
078	0-10	lp	5YR51	-
	10-27	ms1	75YR42	Com Dist O
	27-45	scl	10YR73	Com Dist OG
	45-60	ms1	10YR76	Com Dist O