MAFF Ministry of Agriculture Fisheries and Food

STATEMENT OF PHYSICAL CHARACTERISTICS
AND
AGRICULTURAL LAND CLASSIFICATION
CADEBY QUARRY (EXTENDED AREA),
CONISBROUGH, SOUTH YORKSHIRE
PROPOSED QUARRY EXTENSION
NOVEMBER 1992

ADAS
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SUMMARY

An Agricultural Land Classification and Physical Characteristics survey of approximately 103ha of land at Cadeby was carried out in November 1992. 19.52ha of this falls within Grade 1. Soil profiles are deep and well-drained, consisting typically of light to medium textured stoneless or very slightly stony topsoils and subsoils. This land has no or very minor limitations to agricultural use.

Grade 2 land covers a total of 1.05ha. Soil profiles are very similar to those described above but limestone bedrock occurs at around 80cm depth and slight soil droughtiness is thus the limiting factor in this case.

17.19ha of Subgrade 3a land occurs on the site. Profiles are well drained and consist of light to medium textured topsoils and subsoils overlying limestone bedrock at between 40cm and 60cm depth. Soil droughtiness is again the factor limiting the ALC grade of this land.

4.7ha of Subgrade 3b land occurs in two separate areas. Profiles are well drained and consist typically of light textured topsoil directly overlying limestone bedrock at between 30cm and 40cm depth. Severe soil droughtiness is the factor limiting ALC grade in this case.

6.59ha of Grade 4 land has been mapped in the south of the site. This area has been recently retored but the absence of topsoil and the presence of very large limestone boulders at or near the soil surface (which will restrict the use of agricultural machinery) means that it cannot be graded higher than Grade 4.

CONTENTS

MAP

STATEMENT OF PHYSICAL CHARACTERISTICS AND AGRICULTURAL LAND CLASSIFICATION REPORT ON THE PROPOSED QUARRY EXTENSIONS AT CADEBY QUARRY, CONISBROUGH, SOUTH YORKSHIRE

1. INTRODUCTION AND STATEMENT OF PHYSICAL CHARACTERISTICS

1.1 Location and Survey Methods

The site lies 6Km south west of Doncaster town centre and is centred on Grid Reference SE523008. Survey work was carried out in November 1992 when soils were examined by hand auger borings at 100m intervals predetermined by the National Grid. Extra borings were made, where necessary, to refine grade boundaries and four soil pits were dug to determine depths to bedrock, to allow the assessment of subsoil structure and to collect samples for laboratory analysis. Land quality was assessed using the methods described in "Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land" (MAFF, 1988).

1.2 Land Use and Relief

At the time of survey, 41% of the land was in arable use. The remainder consisted of the existing quarry, a length of dismantled railway, scrub and farm woodland and an area of restored land in the south of the site. Site altitude varies from 40m AOD in the north east to 80m in the south west. The land is gently sloping (typically 0-3°) with an easterly aspect but moderate to strong slopes of appeximately 8° limit a small area of land in the south west of the site to Subgrade 3b.

1.3 Climate

Grid Reference	:	SE 523008
Altitude (m)	:	70
Accumulated Temperature above 0°C (January-June)	:	1348 day°C
Average Annual Rainfall (mm)	:	610
Climatic Grade	:	1
Field Capacity Days	:	128
Moisture Deficit (mm) Wheat	:	103
Moisture Deficit (mm) Potatoes	:	94

1.4 Geology, Soils and Drainage

The area is underlain by deposits of Lower Magnesian Limestone which occur within 1m of the surface in parts of the site. Soils are formed on loamy material derived from weathering of the limestone. Profiles are well drained, falling in Wetness Class 1. Topsoils and subsoils are generally light to medium-textured, typically consisting of sandy loam, sandy silt loam, sandy clay loam or medium clay loam.

1.5 Soil Properties

Three main soil types occur on this site, descriptions of which are given below. Topsoil and subsoil resources are also shown on the accompanying maps along with soil thickness and volume information.

(a) Soil Type 1:- Deep light to medium textured soils (Unit T1/S1A)
(Full Profile Description, Table 1)

This soil over limestone occurs in the north and west of the site. It is characterised by deep, well drained profiles formed in light to medium textured material derived from weathered loamy marl beds within the limestone.

(b) Soil Type 2:- Shallow light to medium textured soils (Unit T1/S1B)
(Full Profile Description, Table 2)

This soil formed on limestone, occurs in the north and south west of the site. It is characterised by being well drained, profiles passing to limestone bedrock at between 30cm and 80cm depth.

(c) Soil Type 3:- Restored soil (Unit S2)

This soil type occurs in a recently restored part of the quarry in the southern part of the site. It is characterised by the absence of topsoil and the presence of many blocks of limestone (varying from medium sized stones to large boulders) at or near the soil surface.

1.6 Soil Resources

(i) Topsoils

Unit T1 occurs over the whole site with the exception of the areas of urban and restored land. It is light to medium textured and consists of sandy loam, sandy silt loam or medium silty clay loam which is stoneless to slightly stony (typically around 2-4% small and medium subrounded limestones, rising to 8% in places). It has a moderately to well-developed fine subangular blocky structure. Median unit thickness is 30cm.

(ii) Subsoils

Unit S1A occurs in the north and west of the site. It is light to medium textured, consisting of sandy loam, sandy silt loam, sandy clay loam or medium silty clay loam. This unit is very slightly stony and typically contains 2-4% small and medium subrounded limestones. It has a well developed fine to medium angular blocky structure. Mean thickness is 70cm.

Unit S1B occurs in the north and south west of the site. It is very similar to Unit S1A but mean thickness is only 20cm, with weathering limestone bedrock occurring at between 30cm and 80cm depth.

Unit S2 occurs in the south of the site. This soil unit consists of recently restored material and typically consists of a slightly to moderately stony (commonly 8-16% medium sized stones to boulder sized limestone blocks) medium silty clay loam. This soil unit is compacted and, as topsoil is absent, has a mean depth of 100cm.

2. SOIL PROFILE DESCRIPTIONS

Table 1

Soil Type 1 (T1/S1A) - Deep light to medium textured soil
Land Use: Arable Slope: 0°
Profile Pit 1:- Near auger boring 26

Depth (cm)	Description
0.30	Dark brown (10YR 3/3) fine sandy loam; no mottles; stoneless; moist; moderately developed fine to medium subangular blocky structure; friable; very slightly porous; few fine and medium fibrous roots; slightly sticky; slightly plastic; non-calcareous; abrupt smooth boundary.
30-55	Brown 7.5YR 4/4) fine sandy loam; no mottles; stoneless; moist; moderately developed fine to medium subangular blocky structure; firm soil strength; few fine fibrous roots; slightly sticky; slightly plastic; non-calcareous; abrupt smooth boundary.
55-120	Yellowish brown (10YR 5/4) fine sandy loam; no mottles; stoneless; moist; moderately developed medium angular blocky structure; firm soil strength; few medium fibrous roots; slightly sticky; slightly plastic; non-calcareous.

Table 2

Soil Type 2 (T1/S1B) - Shallow light to medium textured soil
Land Use: Quarry Face Slope 0°
Profile Pit 2:- Near auger boring 27

Depth (cm)	Description
0.25	Dark brown (10YR 4/3) fine sandy loam; no mottles; very slightly stony (approx 1% small subrounded soft limestones; moist; moderately to well developed fine subangular blocky structure; friable; slightly porous; many fine and medium fibrous roots; slightly sticky; slightly plastic; slightly calcareous; clear wavy boundary.
25-35	Dark brown (7.5YR 4/2) medium clay loam; common indistinct dark brown (7.5YR 4/4) mottles; very slightly stony (approximately 2% small to medium subrounded soft limestones; moist; well developed fine subangular blocky structure; friable; slightly porous; common fine fibrous roots; moderately sticky; moderately plastic; slightly calcareous; clear irregular boundary.
35-65	Brown (7.5YR 5/3) fine sandy silt loam; few indistinct reddish yellow (7.5YR 6/6) mottles; very slightly stony (approximately 2% small to medium subrounded soft limestones); moist; well developed medium angular blocky structure; friable; slightly porous; common fine fibrous roots; moderately stocky; moderately plastic; slightly calcareous; smooth sharp boundary.
65+	Weathering limestone bedrock; few fine fibrous roots to 85cm.

3. AGRICULTURAL LAND CLASSIFICATION

The ALC grades occurring on this site are as follows:-

Grade/Subgrade	Hectares	Percentage of Total Area
1	19.52	19.0
2	1.05	1.0
3a	17.19	16.7
3b	4.70	4.6
4	6.59	6.4
5		
(Subtotal)	(49.05)	(47.7)
Urban	39.56	38.6
Non Agricultural	1.37	1.3
Woodland - Farm	12.74	12.4
- Commercial		
Agricultural Buildings		
Open Water		
Land not surveyed		
(Subtotal)	(53.67)	(52.3)
TOTAL	102.72	100

3.1 Grade 1

Grade 1 land occurs in four separate areas - three in the north of the site and one in the south west. Profiles are deep and well drained, falling in Wetness Class I. Topsoils and subsoils are generally light or medium textured (consisting of sandy loam, sandy silt loam, sandy clay loam or medium silty clay loam) and stoneless to very slightly stony. This land has no or very minor limitations to agricultural use.

3.2 Grade 2

Grade 2 land occurs in three small separate areas in the north west of the site. The topsoils are light to medium textured (generally medium sandy loam or medium silty clay loam) and overlie light to heavy textured subsoils (consisting of sandy loam or sandy clay loam in the two most westerly areas and heavy silty clay loam in the most easterly area). Profiles are well drained (falling in Wetness Class I) and stoneless to very slightly stony, with weathering limestone bedrock occurring at between 70cm and 90cm depth. Slight soil droughtiness is, therefore, the factor which limits this land to Grade 2.

3.3 Subgrade 3a

Land in this subgrade occurs in four separate areas in the north and south west of the site. Profiles are well drained (falling in Wetness Class I) and typically consist of sandy loam or medium silty clay loam topsoils overlying sandy clay loam or medium silty clay loam subsoils. Profiles are very slightly to slightly stony (typically 4.8% small and medium subrounded limestones). Weathering limestone bedrock occurs at between 40cm and 60cm depth and soil droughtiness is, therefore, the factor limiting this land to Subgrade 3a.

3.4 Subgrade 3b

Subgrade 3b land occurs in the centre of the site and in the south western corner. Profiles are well drained (falling in Wetness Class I) and typically consist of slightly stony fine sandy loam topsoils overlying weathering limestone at approximately 35cm depth. These soils have a low water holding capacity and are, therefore, restricted to Subgrade 3b by soil droughtness.

A small area of the Subgrade 3b land in the south west of the site has deeper soils but in this case slopes of 8-11° are the factor limiting ALC grade.

3.5 Grade 4

Land in this grade occurs in the south of the site where land has been retored after quarrying. There is no topsoil and the subsoil has been compacted, thus reducing soil permeability. Very large limestone boulders are commonly found at or near the soil surface thus restricting the use of agricultural machinery. For these reasons this land is restricted to Grade 4.

3.6 Urban

This refers to the existing quarry in the centre of the site and a dismantled railway in the north east.

3.7 Non Agricultural

This refers to two small areas of scrubland in the south of the site.

3.8 Farm Woodland

This occurs in two separate areas in the north east of the site.

MAPS