



STATEMENT OF PHYSICAL CHARACTERISTICS
AND
AGRICULTURAL LAND CLASSIFICATION
LONGLAND LANE, CAMPSALL
DONCASTER, S. YORKS
PROPOSED LIMESTONE QUARRY
OCTOBER 1993

ADAS
Leeds Statutory Group

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SUMMARY

An Agricultural Land Classification and Physical Characteristics survey of approximately 54.5hha of land at Longland Lane, Campsall was carried out in October 1993.

Grade 2 land covers 31.1 of this area. Soils are deep and well drained (Wetness Class I) and consist typically of stoneless to very slightly stony medium or occasionally light textured topsoils over medium to heavy textured subsoils. Although some profiles meet the physical requirements of Grade 1 their occurrence is not widespread enough to warrant separation. Slight droughtiness is the main limitation on the Grade 2 land.

Subgrade 3a land covers 10.3ha. Soil profiles are very similar to those described above, but limestone bedrock occurs at between 55-65cm depth and increases the droughtiness risk which is the limiting factor in soils of this type.

Subgrade 3b land covers 13.1ha. Soil profiles consist of shallow, well drained (Wetness Class 1) very slightly to slightly stony medium clay loam topsoils and very thin subsoils over limestone bedrock at between 30-40cm depth. Severe soil droughtiness limits these soils to Subgrade 3b.

CONTENTS

1. INTRODUCTION AND STATEMENT OF PHYSICAL CHARACTERISTICS
2. SOIL PROFILE DESCRIPTIONS
3. AGRICULTURAL LAND CLASSIFICATION

MAPS

1. TOPSOIL RESOURCES
2. SUBSOIL RESOURCES
3. AGRICULTURAL LAND CLASSIFICATION

STATEMENT OF PHYSICAL CHARACTERISTICS AND AGRICULTURAL LAND
CLASSIFICATION REPORT ON THE PROPOSED LIMESTONE QUARRY AT
LONGLAND LANE, CAMPSALL, NEAR DONCASTER

1. INTRODUCTION AND STATEMENT OF PHYSICAL CHARACTERISTICS

1.1 Location and Survey Methods

The site lies 1 km north west of Doncaster and 1 km south west of Campsall and is centred on National Grid Reference SE 535133. Survey work was carried out in October 1993 when soils were examined by hand auger borings at a density of two borings per hectare at points predetermined by the National Grid. Extra borings were made, where necessary, to refine grade boundaries and three soil pits were dug to determine depth to bedrock, to allow 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 the survey all of the land surveyed was in agricultural use and had been cultivated prior to autumn drilling. Site altitude varies from 30m AOD to 40m AOD. The land is level to moderately sloping (0-4°).

1.3 Climate

Grid Reference	: SE 535133
Altitude (m)	: 35
Accumulated Temperature above 0°C (January-June)	: 1382 day°C
Average Annual Rainfall (mm)	: 601
Climatic Grade	: 1
Field Capacity Days	: 123
Moisture Deficit (mm) Wheat	: 106
Moisture Deficit (mm) Potatoes	: 97

1.4 Geology, Soils and Drainage

The area is underlain by Upper Magnesian limestone. There is no significant drift cover. Soils are well drained (Wetness Class I) and consist of medium clay loam, sandy clay loam or occasionally medium sandy loam topsoils over similar or heavier subsoils. These pass into weathering limestone bedrock at depths varying from 30-120cm from the surface. Heavy clay loam subsoil material, sometimes with a reddish colour is most common just above the underlying limestone. Most soils fall within the Aberford Association as mapped by the Soil Survey and Land Research Centre.

1.5 Soil Properties

One main soil type subdivides into depth variants occurs on this site. Descriptions 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: Medium over medium to heavy textured soils.

(i) Variant 1:- Deep - Limestone at more than 80cm depth (Unit T1/S1A)
(Full Profile Description, Table 1)

This soil formed on limestone occurs widely in the central parts of the site. It is characterised by deep very slightly stony well drained profiles formed in medium, over medium to heavy textured material, derived from weathered limestone.

(ii) Variant 2:- Medium depth - Limestone at 50-80cm (Unit T1/S1B)
(Full Profile Description, Table 2)

This soil formed on limestone occurs in the eastern and western parts of the site. It is characterised by slightly stony well drained profiles in medium over medium to heavy textured material overlying weathering limestone at 50-80cm depth.

(iii) Variant 3:- Shallow - Limestone at less than 50cm depth (Unit T1/S1C)
(Full Profile Description, Table 3)

This soil formed on limestone occurs mainly in the south eastern part of the site. It is characterised by slightly stony to stony well drained profiles in medium and heavy textured material which passes into weathering limestone at less than 50cm from the surface. In places topsoil lies directly over fragmented limestone.

1.6 Soil Resources

(i) Topsoils

Unit T1 occurs over the whole site. It is medium or occasionally light textured and consists of stoneless to slightly stony (typically 1-10% medium to coarse subangular and angular hard limestones) medium clay loam.. It has a moderate to well developed medium sub-angular blocky structure. Median unit thickness is 30cm.

(ii) Subsoils

Unit S1A

Unit S1A is widespread from north to south across the centre of the site. It is medium to heavy textured, consisting of medium clay loam, sandy clay loam or heavy clay loam. Medium sandy loam occurs occasionally. The unit is stoneless to slightly stony and typically contains 0-10% small and medium subangular or angular limestones. Mean thickness is 65cm.

Unit S1B

Unit S1B occurs in the east and west of the site. It is very similar to Unit S1A but mean thickness is only 40cm. Although mean thickness is 40cm depth to bedrock is variable and occasional profiles extend to 120cm.

Unit S1C

Unit S1C occurs mainly in the east with smaller patches in the south west and north west. Again soils are very similar to Unit S1A but have a mean thickness of

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(ii) Subsoils

Unit S1A

Unit S1A is widespread from north to south across the centre of the site. It is medium to heavy textured, consisting of medium clay loam, sandy clay loam or heavy clay loam. Medium sandy loam occurs occasionally. The unit is stoneless to slightly stony and typically contains 0-10% small and medium subangular or angular limestones. Mean thickness is 65cm.

Unit S1B

Unit S1B occurs in the east and west of the site. It is very similar to Unit S1A but mean thickness is only 40cm. Although mean thickness is 40cm depth to bedrock is variable and occasional profiles extend to 120cm.

Unit S1C

Unit S1C occurs mainly in the east with smaller patches in the south west and north west. Again soils are very similar to Unit S1A but have a mean thickness of only 10cm. The unit is slightly stony and typically contains 5-15% fragmented limestone.

2. SOIL PROFILE DESCRIPTIONS

TABLE 1

SOIL TYPE 1, Variant 1: - Deep (T/S1A)

LAND USE: Slope 4°

PROFILE PIT 1 :- Near Auger Boring 15

<u>Depth (cm)</u>	<u>Description</u>
0-30	Dark brown (10YR 3/3) sandy clay loam; no mottles; stoneless; moist; moderately developed medium subangular blocky structure; friable; moderately porous; few fine and medium fibrous roots; slightly sticky; slightly plastic; non calcareous; abrupt smooth boundary.
30-55	Brown (7.5YR 5/4); medium sandy loam; no mottles stoneless; moist; moderately developed coarse angular blocky structure; friable; very porous; few fine fibrous roots; non calcareous; slightly sticky, slightly plastic; abrupt smooth boundary.
55-110	Dark yellowish brown (10YR 4/6); medium sandy clay loam; stoneless; moist; moderately developed coarse subangular blocky structure; friable; very porous; few fine fibrous roots; slightly sticky; slightly plastic; non calcareous; abrupt smooth boundary.
110+	Impenetrable limestone bedrock

TABLE 2

SOIL TYPE 1, Variant 2: Medium depth over limestone (T1/S1B)
 LAND USE: Arable
 SLOPE 1°
 PROFILE PIT 2: Near Auger Boring 138

<u>Depth (cm)</u>	<u>Description</u>
0-25	Dark brown (10YR 3/3) medium clay loam; no mottles; very slightly stony (approx 2% medium subangular hard limestones); moist; moderately developed medium subangular blocky structure; friable; moderately porous; common fine and medium fibrous roots; slightly sticky; slightly plastic; non calcareous; clear smooth boundary.
25-65	Strong brown (75YR 4/6) medium clay loam; no mottles; stoneless; moist; moderately developed coarse subangular blocky structure; friable; moderately porous; common fine fibrous roots; slightly sticky; slightly plastic; non calcareous.
65+	Impenetrable limestone bedrock

TABLE 3

SOIL TYPE 1, Variant 3: Shallow over limestone (T1/S1C)
LAND USE: Arable
SLOPE: 1°
PROFILE PIT 3:- Near Auger Boring 112

<u>Depth (cm)</u>	<u>Description</u>
0-30	Dark brown (20YR 3/3) medium clay loam; no mottles; slightly stony (approx. 12% medium and large subangular and angular hard limestones); moist; moderately developed medium subangular structure; friable; moderately porous; few fine fibrous roots; slightly sticky; slightly plastic; calcareous.
30+	Impenetrable limestone bedrock

3. AGRICULTURAL LAND CLASSIFICATION

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

<u>Grade/Subgrade</u>	<u>Hectares</u>	<u>Percentage of Total Area</u>
1		
2	31.1	57.1
3a	10.3	18.9
3b	13.1	24.0
4		
5		
(Subtotal)	(54.5)	(100)
Urban		
Non Agricultural		
Woodland - Farm		
- Commercial		
Agricultural Buildings		
Open Water		
Land not surveyed		
(Subtotal)		
TOTAL	<u>54.5</u>	<u>100</u>

3.1 Grade 2

Grade 2 land is extensive centrally from north to south across the site. Profiles are well drained (Wetness Class I) and consist of stoneless to slightly stony medium clay loam, sandy clay loam or occasionally medium sandy loam topsoils, overlying unmottled stoneless to slightly stony permeable medium clay loam, sandy clay loam, heavy clay loam or occasionally, medium sandy loam subsoils. Although some profiles meet the physical requirements of Grade 1 their occurrence is not widespread enough to justify separation. Similarly small patches of Subgrade 3a cannot be separated. The Grade 2 area as a whole is limited to this grade by slight soil droughtiness.

3.2 Subgrade 3a

Land in this Subgrade occurs in two separate areas in the east and west of the site. Profiles are similar to the Grade 2 land and consist of well drained (Wetness Class I) permeable very slightly stony medium clay loam and sandy clay loam topsoils over very slightly stony medium clay loam, sandy clay loam or heavy clay loam subsoils. Mean total soil depth, however, is only 70cm and the land is restricted to Subgrade 3a by droughtiness, which is more limiting than on the adjoining Grade 2 land.

3.3 Subgrade 3b

Land in this Subgrade occurs in four separate areas in the eastern and western parts of the site. Profile textures are similar to the Grade 2 and Subgrade 3a land, but are stonier and shallow and in places medium clay loam topsoils lie directly over limestone bedrock. In other places medium clay loam topsoils and thin (10cm) sandy clay loam subsoils, occur over the limestone. This land is limited to Subgrade 3b by severe droughtiness.

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MAPS