



STATEMENT OF PHYSICAL CHARACTERISTICS
AND
AGRICULTURAL LAND CLASSIFICATION
UPSLAND, KIRKLINGTON
NORTH YORKSHIRE
EXTRACTION OF SAND AND GRAVEL
MARCH 1995

ADAS
Leeds Statutory Group

Job No:- 44/95
MAFF Ref:- 10645
Commission No:- 1623

2 FCS 10658

SUMMARY

A detailed Agricultural Land Classification and Statement of Physical Characteristics survey of 54.1 ha of land at Upsland, Kirklington, was carried out in March 1995.

At the time of survey all of the land was in agricultural use and 2.4 ha falls in Grade 2. This land is typically well drained with medium-textured topsoils and subsoils with, in places, very light-textured horizons at depth. This land is limited to Grade 2 by topsoil stoniness and slight soil droughtiness.

18.9 ha of the site falls in Subgrade 3a. Generally very slightly to slightly stony light to medium-textured topsoils overlie slightly to moderately stony light to medium-textured subsoils. Gravel begins at between 50cm and 80cm depth and the ALC grade is limited by topsoil stoniness and/or soil droughtiness. In a small area in the north-east of the site the Subgrade 3a land consists of stoneless heavy clay loam topsoils over sandy loam or medium silty clay loam upper subsoils and sand lower subsoils. In this case soil droughtiness alone limits the ALC grade.

The remainder of the site (32.8 ha) falls in Subgrade 3b. At Mill Hill the soils are poorly drained with medium to heavy-textured topsoils and, in places, upper subsoils, overlying heavy clay loam or clay. These soils become slowly permeable at about 30cm depth and soil wetness and topsoil workability restrictions limit the land to Subgrade 3b.

The remainder of the Subgrade 3b land consists of well drained profiles where moderately stony light to medium-textured topsoils overlie very stony but similarly-textured subsoils. In this case topsoil stoniness limits the land to Subgrade 3b.

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STATEMENT OF PHYSICAL CHARACTERISTICS AND AGRICULTURAL LAND CLASSIFICATION REPORT ON THE PROPOSED SAND AND GRAVEL QUARRY AT UPSLAND, KIRKLINGTON, NORTH YORKSHIRE

1. INTRODUCTION AND STATEMENT OF PHYSICAL CHARACTERISTICS

1.1 Location and Survey Methods

The site lies approximately 9km north of Ripon town centre, on the north side of the B6267 Masham - Thirsk road. It covers a total area of 54.1 ha. Survey work was carried out in March 1995 when the soils were examined by hand auger borings at 100m intervals predetermined by the National Grid. A number of topsoil samples were sieved to more accurately ascertain topsoil stoniness and three soil inspection pits were dug to allow full profile descriptions to be made. The 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 most of the site was under winter cereals, with smaller areas of oilseed rape and set-aside in the north.

Site altitude varies from 50m AOD in the east (Upsland Hill) and 48m in the south (Mill Hill) to approximately 37m AOD in the north. The land is level to moderately sloping (0-4°) with variable aspect.

1.3 Climate

Grid Reference	: SE 305 803
Altitude (m)	: 40
Accumulated Temperature above 0°C (January - June)	: 1352 day °C
Average Annual Rainfall (mm)	: 662
Climatic Grade	: 1
Field Capacity Days	: 163
Moisture Deficit (mm) Wheat	: 103
Moisture Deficit (mm) Potatoes	: 93

1.4 Geology, Soils and Drainage

The site is underlain by Magnesian Limestone over which lie deposits of boulder clay derived from reddish mudstones (at Upsland Hill and Mill Hill), post-glacial alluvium (in the north-east and north-west), and glacial sand and gravel (over the remainder of the site).

The soils on the site closely reflect the drift geology. Those formed over glacial sand and gravel are well drained (Wetness Class I) and consist of very slightly to moderately stony light to medium-textured topsoils over moderately to very stony light to medium-textured subsoils.

Soils formed over the boulder clay are typically imperfectly or poorly drained (falling in Wetness Classes III or IV) with medium or heavy-textured topsoils and, in places, upper subsoils, overlying slowly permeable heavy clay loam or clay.

The alluvial soils in the north-east and north-west vary between well drained and poorly drained (Wetness Classes I to IV) and consist of medium to heavy-textured topsoils overlying very light to heavy-textured subsoils.

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:- Alluvial soils complex (Unit T1/S1)
(Full Profile Description, Table 1)

This soil, formed on deposits of post-glacial alluvium, north-east and north-west of the site. It is characterised by medium to heavy-textured topsoils overlying stoneless sand, loamy sand or heavy silty clay loam.

- (b) Soil Type 2:- Medium to heavy-textured boulder clay soils (Unit T2/S2)
(Full Profile Description, Table 2)

This soil, formed on till derived from reddish mudstones, occurs in the south and west of the site. It is characterised by a medium to heavy-textured topsoil overlying a heavy-textured subsoil.

- (c) Soil Type 3:- Light to medium-textured soils (Unit T3A/S3A and T3B/S3B)
(Full Profile Description, Table 3)

This soil, formed on deposits of glacial sand and gravel, is the most widespread soil type on the site. It is characterised by very slightly to moderately stony light to medium-textured topsoils over very slightly to very stony light to medium-textured subsoils.

1.6 Soil Resources

(i) Topsoils

Unit T1 occurs in the north-east and north-west of the site. It is heavy-textured, consisting of heavy clay loam or heavy silty clay loam, and stoneless to very slightly stony, containing up to 4% sandstones and hard stones. It has a moderately developed coarse subangular blocky structure and a median depth of 30cm .

Unit T2 occurs in the south and west. It is medium to heavy-textured (consisting of medium, sandy or heavy clay loam) and very slightly to slightly stony, containing 4-10% sandstones and hard stones in most cases. Unit T2 has a moderately developed coarse subangular blocky structure and a median depth of 30cm.

Unit T3 is the most common topsoil type on the site and has been divided into two sub-units. T3A is slightly to moderately stony, typically containing 6-20% sandstones and hard stones which range in size from very small to very large. Unit T3B is found in the south-west and south-east of the site. It is only very slightly to slightly stony, generally containing 4-6% sandstones and hard stones.

Both units consist of medium sandy loam, medium clay loam or sandy clay loam with a moderately developed medium to coarse subangular blocky structure.

Unit T3A has a median depth of 35cm while Unit T3B is slightly shallower, with a median depth of 30cm.

(ii) Subsoils

Unit S1 underlies Unit T1. It is formed on post-glacial alluvium and its texture is very variable, changing from medium or coarse sand to heavy silty clay loam over short distances. The structure varies from medium prismatic to coarse angular blocky and single grain depending on the texture. The mean depth of Unit S1 is 89cm.

Unit S2 underlies Unit T2 on Upland Hill and Mill Hill. It is heavy-textured (usually heavy clay loam or clay) and very slightly to slightly stony, with 3-10% very small to very large sandstones and hard stones. It has a moderately developed coarse angular blocky to medium prismatic structure and a mean depth of 69cm.

Unit S3, like the topsoil unit which overlies it, has been divided into two sub-units. Both sub-units are light to medium-textured, consisting of medium sandy loam, medium clay loam or sandy clay loam, and both typically have a strongly developed medium subangular blocky structure. However Unit S3A is slightly to very stony, containing 12%-50% very small to large rounded to subangular sandstones and hard stones, and has a mean depth of 26cm, while Unit S3B is very slightly to slightly stony, containing 5-10% sandstones and hard stones, and has a mean depth of 77cm.

2. SOIL PROFILE DESCRIPTIONS

Table 1 Alluvial soil, T1/S1

Profile Pit 1 (Near auger boring 18)

Slope:- 0°
Land Use:- Oilseed rape
Weather:- Cool and bright after recent snow showers

Depth cm	Horizon Description
0-26	Olive brown (2.5Y 4/3), heavy clay loam; no mottles; very slightly stony, with around 2% very small to medium-sized stones of mixed lithologies; moist; moderately developed coarse subangular blocky structure; firm; moderately porous; many very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear irregular boundary.
26-55	Grey (10YR 5/1) medium sandy loam; common distinct yellowish brown (10YR 5/8) mottles; stoneless; moist; weakly developed coarse angular blocky to massive structure; firm; very porous; common very fine fibrous roots; slightly sticky; slightly plastic; non-calcareous; clear irregular boundary.
55-120	Grey (10YR 6/1) coarse sand; no mottles; moderately stony, with around 20% very small rounded hard stones; moist; single grain structure; extremely porous; few very fine fibrous roots; non-sticky; non plastic; non-calcareous.

Table 2 Medium to heavy-textured boulder clay soil T2/S2

Profile Pit 2 (Near auger boring 47)

Slope:- 3°
 Land Use:- Winter Cereals
 Weather:- Cool, snow showers

Depth cm	Horizon Description
0-28	Brown (7.5YR 4/2) sandy clay loam; no mottles; slightly stony, containing around 7% very small to large subrounded and sub-angular stones of mixed lithology; moist; moderately developed coarse subangular blocky structure; firm; moderately porous; many fine and very fine fibrous roots; moderately sticky; very plastic; non-calcareous; clear smooth boundary.
28-49	Reddish brown (5YR 5/3) clay; common indistinct yellowish red (5YR 5/8) mottles; slightly stony, containing around 10% very small to very large subrounded and subangular stones of mixed lithology; moist; moderately developed coarse angular blocky and medium prismatic structure; firm to very firm; slightly porous (<0.5% pores >0.5mm); many very fine fibrous roots; moderately sticky; very plastic; non-calcareous; clear smooth boundary.
49-120	Reddish brown (5YR 4/3) clay; common indistinct yellowish red (5YR 4/6) mottles; slightly stony, with around 10% very small to very large subrounded and subangular stones of mixed lithology; moist; moderately developed coarse angular blocky and medium prismatic structure; very firm; slightly porous (<0.5% pores >0.5mm); common very fine fibrous roots; moderately sticky; very plastic; non-calcareous.

Table 3 Light to medium textured soil, T3A/T3B

Profile Pit 3 (auger boring 24)

Slope:- 0°
 Land Use:- Winter cereals
 Weather:- Snow showers

Depth cm	Horizon Description
0-31	Brown (7.5YR 4/2) sandy clay loam; no mottles; moderately stony, containing approximately 18% very small to large rounded to subangular sandstones and hard stones (of which 16% > 2cm); moist; moderately developed coarse subangular blocky structure; friable; moderately porous; many fine and very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear smooth boundary.
31-79	Brown (7.5YR 4/3) sandy clay loam; no mottles; very stony, containing approximately 50% very small to large rounded to subangular sandstones and hard stones; moist, strongly developed medium subangular blocky structure; friable moderately porous; common very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear smooth boundary.
79+	Yellowish brown (10YR 5/4) sandy clay loam; no mottles; extremely stony, containing approximately 80% very small to large rounded to subangular sandstones and hard stones.

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	2.4	4.4
3a	18.9	34.9
3b	32.8	60.7
4		
5		
(Sub total)	(54.1)	(100.0)
Urban		
Non Agricultural		
Woodland - Farm		
- Commercial		
Agricultural Buildings		
Open Water		
Land not surveyed		
(Sub total)		
 TOTAL	 54.1	 100.0

3.1 Grade 2

A small area of Grade 2 land occurs in the south-east of the site. The soils are well drained, falling in Wetness Class I, and typically consist of sandy clay loam topsoils and subsoils. Horizons of medium or coarse sand occur below 75cm depth in places. Topsoils are slightly stony, containing 6-8% total sandstones and hard stones, and subsoils are typically slightly stony, containing 12-15% sandstones and hard stones. Slight soil droughtiness and topsoil stoniness are the factors which limit this land to Grade 2.

3.2 Subgrade 3a

Land in this subgrade is found in the south, east and west of the site. The soils are generally well drained (Wetness Class I) and typically consist of medium sandy loam, medium clay loam or sandy clay loam topsoils and subsoils. Topsoils are very slightly to slightly stony, containing 6-14% total sandstones and hard stones, and subsoils are slightly to moderately stony, with 8-20% total sandstones and hard stones. Horizons of gravel begin at between 60cm and 80cm depth in places and the land is limited to Subgrade 3a by soil droughtiness and/or topsoil stoniness.

In the north-east of the site the soils are of alluvial origin and consist of stoneless heavy clay loam topsoils overlying thin light to medium textured upper subsoils and sand lower subsoils. In these areas soil droughtiness is the only factor limiting the ALC grade.

3.3 Subgrade 3b

Most of the site falls in this subgrade although there are two distinct soil types. The first occurs at Mill Hill in the south, where the soils are poorly drained, falling in Wetness Class IV, and consist of medium clay loam, sandy clay loam or heavy clay loam topsoils and, in places, upper subsoils, overlying heavy clay loam or clay. Slowly permeable layers generally begin at around 30cm depth and the land is limited to Subgrade 3b by soil wetness and topsoil workability restrictions.

The second soil type is the more widespread and is found on the flatter land. These soils are well drained (Wetness Class I) and consist of moderately stony sandy loam, sandy clay loam or medium clay loam topsoils overlying very stony but similarly-textured subsoils. Topsoils typically contain 16-20% stones greater than 2cm while subsoils contain around 50% total stones. Horizons of gravel typically begin at between 50cm and 80cm depth. In this case topsoil stoniness is the main factor limiting the land to Subgrade 3b

MAPS