

**CORNFORTH EAST QUARRY
COUNTY DURHAM**

**Agricultural Land Classification (ALC)
and Statement of Physical Characteristics
Report and Map**

MARCH 1999

**Resource Planning Team
Northern Region
FRCA, Leeds**

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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

CORNFORTH EAST QUARRY

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 69.8 ha of land lying between the village of Cornforth and the A177 in County Durham. The survey work was carried out during March 1999.
2. The survey was carried out by the Farming and Rural Conservation Agency (FRCA) for the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with the preparation of a detailed working scheme for the soils on the proposed quarry extension. This map and report supersede any previous ALC information for this land.
3. The work was conducted by members of the Resource Planning Team in the Northern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.
4. At the time of survey the agricultural land on the site was mainly sown to winter cereals or had been recently ploughed. Non-agricultural land consists of an existing quarry and soil mounds in the north-west, farm woodland, and farm buildings in the north.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC and Topsoil/Subsoil Resource maps. They have been drawn at a scale of 1:10,000. They are accurate at this scale but any enlargement would be misleading.
6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
1	-	-	-
2	7.4	14.5	10.6
3a	-	-	-
3b	42.2	82.4	60.5
4	1.6	3.1	2.3
5	-	-	-
Agricultural land not surveyed	0.8	N/A	1.1
Other land	17.8	N/A	25.5
Total surveyed area	51.2	100	-
Total site area	69.8	-	100

7. The fieldwork was conducted at an average density of one boring per hectare. A total of 57 borings and three soil pits were described.

8. Grade 2, very good quality agricultural land, covers a total of 7.4 ha. The soils are well or moderately well drained and consist of medium clay loam topsoils overlying medium clay loam or heavy clay loam subsoils. Weathering limestone occurs below 65 cm depth in places. This land is limited to Grade 2 by the overall climate of the area and by either very slight soil droughtiness or very slight soil wetness.

9. Subgrade 3b, moderate quality agricultural land, covers most of the site. Two main soil types occur. The first is well drained and shallow, with weathering limestone occurring within 50 cm depth. In this case soil droughtiness is the grade-limiting factor. The second soil type is poorly drained and consists of medium clay loam topsoils overlying gleyed and slowly permeable heavy clay loam or clay subsoils. These areas are limited to Subgrade 3b by soil wetness.

10. Grade 4, poor quality agricultural land, covers a small area west of the A1(M). The soils are similar to the poorly drained soils on the Subgrade 3b land but this area appears to have no functioning underdrainage system. As a result soil wetness is more of a problem and further limits the ALC grade to Grade 4.

11. Other land on this site consists of the existing quarry and soil mounds (in the west), woodland (in the south and south-east), and farm buildings (in the north).

12. Land not surveyed occurs in a small area in the south-eastern corner of the site.

13. In terms of soil resources, three main soil types were identified on the site. The first comprises shallow soils consisting of medium clay loam or medium silty clay loam topsoils (median thickness 30 cm) and subsoils (mean thickness 15 cm) overlying weathering limestone. The second consists of a medium clay loam or medium silty clay loam topsoil (median thickness 30 cm), a medium clay loam or heavy clay loam upper subsoil (mean thickness 35 cm) and a heavy clay loam or clay lower subsoil (mean thickness 35 cm). This soil type is also underlain by weathering limestone. The third soil type is the most widespread. It typically comprises a medium clay loam topsoil (mean thickness 25cm), a medium clay loam or heavy clay loam upper subsoil (mean thickness 30 cm) and a heavy clay loam or clay lower subsoil (mean thickness 65 cm).

FACTORS INFLUENCING ALC GRADE

Climate

14. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

15. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	NZ 326 341
Altitude	m, AOD	130
Accumulated Temperature	day°C (Jan-June)	1225
Average Annual Rainfall	mm	688
Field Capacity Days	days	175
Moisture Deficit, Wheat	mm	85
Moisture Deficit, Potatoes	mm	69
Overall climatic grade	N/A	Grade 2

16. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

17. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.

18. The combination of rainfall and temperature at this site means that there is an overall climatic limitation of Grade 2.

Site

19. The land on the site is level to moderately sloping (0-6°) with a generally northerly aspect. As such, gradient does not restrict ALC grade at any point, and neither microrelief nor flood risk are grade-limiting factors on this site.

Geology and soils

20. The site is underlain by Magnesian Limestone. East of the A1(M) the limestone is overlain by a thin layer of till whilst west of the A1(M) there is little or no drift cover (BGS, Sheet 27).

21. The soils on the site have been mapped as belonging to the Nercwys association (Soils of England and Wales, Sheet 1).

AGRICULTURAL LAND CLASSIFICATION

22. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

Grade 2

23. Grade 2, very good quality agricultural land, occurs in four separate areas in the south-west and north-west. The soils are well or moderately well drained (Wetness Classes I and II) and consist of medium clay loam topsoils overlying medium clay loam or heavy clay loam subsoils. Weathering limestone occurs below 65 cm depth in places and, where they occur, slowly permeable layers begin at around 70 cm depth. The ALC grade of this land is limited by very slight soil wetness or very slight soil droughtiness, as well as the overall climatic limitation.

Subgrade 3b

24. Moderate quality agricultural land (Subgrade 3b) covers most of the site. In most cases the soils are poorly drained (Wetness Class IV), with medium clay loam topsoils overlying gleyed and slowly permeable heavy clay loam or clay subsoils at between 20 cm and 40 cm depth. In parts of the south-west of the site the soils are well drained (Wetness Class I), with slightly to moderately stony medium clay loam and medium silty clay loam topsoils and subsoils overlying weathering limestone at between 35 cm and 50 cm depth. The grade-limiting factors in these two cases are soil wetness and soil droughtiness respectively.

Grade 4

25. Grade 4, poor quality agricultural land, is found in a small area west of the A1(M). The soils are similar to the poorly drained soils on the Subgrade 3b land, but at the time of survey this area had standing water and it appears that either the underdrainage system has failed or that a system has never been installed. For this reason soil wetness is likely to be more of a limiting factor than on the adjoining Subgrade 3b land and this area has, therefore, been placed in Grade 4.

Other Land

26. Land in this category occurs in the west of the site (an existing quarry and soil mounds), in the south and south-east (woodland), and in the north (farm buildings).

Land Not Surveyed

27. No access was forthcoming for this small area of land in the south-east of the site.

STATEMENT OF PHYSICAL CHARACTERISTICS

28. Three main soil types were identified on the site, descriptions of which are given below. Topsoil and subsoil resources are shown on the accompanying maps along with soil thickness and volume information. Representative pit descriptions are given in Appendix II.

a. Soil Type 1 (T1/U1A/Weathering Limestone)

This soil type is derived from limestone and occurs in the south-west of the site. It is characterised by the presence of weathering Magnesian Limestone at between 35 cm and 50 cm depth.

b. Soil Type 2 (T1/U1B/L1/Weathering Limestone)

This soil type also occurs in the south-west. It is similar to Soil Type 1 but the weathering limestone begins at greater depth, typically at around 65 cm.

c. Soil Type 3 (T2/U2/L2)

This soil type is derived from deposits of till and covers most of the site.

Topsoils

29. Topsoil T1 occurs in the south-west. It typically consists of very slightly to slightly stony (containing 5-12% limestones) medium clay loam or medium silty clay loam. This topsoil has a strongly developed medium subangular blocky structure and a median thickness of 30 cm.

30. Topsoil T2 occurs over most of the site. Its texture is similar to topsoil T1 (medium clay loam in most cases), although it is somewhat less stony, containing 3-5% sandstones and limestones. This topsoil has a moderately developed medium and coarse subangular blocky structure, and a median thickness of 25 cm.

Upper Subsoils

31. Upper subsoils U1A and U1B underlie topsoil T1. Subsoil unit U1A is typically medium-textured (consisting of medium clay loam or medium silty clay loam), with a moderately developed medium angular blocky structure and a mean thickness of 15 cm. It is typically moderately to very stony, containing around 35% limestones, and overlies weathering Magnesian Limestone. Unit U1B is medium to heavy-textured (medium clay loam or heavy clay loam), with a medium and coarse subangular blocky structure. It is very slightly to slightly stony, containing 4-8% limestones, and has a mean thickness of 35 cm.

32. Upper subsoil U2 underlies topsoil T2. It consists of medium clay loam, heavy clay loam or, occasionally, clay, and is very slightly stony, containing 3-5% sandstones and limestones in most cases. Unit U2 has a weakly to moderately developed coarse angular blocky structure and a mean thickness of 30 cm.

Lower Subsoils

33. Lower subsoil L1 underlies topsoil T1 and upper subsoil U1B. It is heavy-textured, consisting of heavy clay loam or clay, and is very slightly to moderately stony, containing up to approximately 35% limestones. Unit L1 typically has a weakly developed coarse subangular blocky structure and a mean thickness of 35 cm. It is underlain by weathering limestone.

34. Lower subsoil L2 underlies topsoil T2 and upper subsoil U2. Like Unit L1 it consists of heavy clay loam or clay, but it is only very slightly to slightly stony, containing around 2-3% sandstones and limestones in most cases. This unit has a weakly developed coarse angular blocky or medium prismatic structure and a mean thickness of 65 cm.

RPT File: 20,316
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SOURCES OF REFERENCE

British Geological Survey (1965) *Sheet No. 27, Durham (Solid and Drift), 1:63,360 scale.*
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.* MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.*
Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 1, Soils of Northern England, 1:250,000 scale.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in Northern England*
SSEW: Harpenden.

[ALC Map]

APPENDIX I

DESCRIPTIONS OF THE GRADES AND SUBGRADES

Grade 1: Excellent Quality Agricultural Land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2: Very Good Quality Agricultural Land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural or horticultural crops can usually be grown but on some land of this grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When more demanding crops are grown, yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a: Good Quality Agricultural Land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b: Moderate Quality Agricultural Land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass, or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4: Poor Quality Agricultural Land

Land with severe limitations which significantly restrict the range of crops and/or the level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5: Very Poor Quality Agricultural Land

Land with severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

SOIL PROFILE DESCRIPTIONS

Soil Type 1: Shallow soil overlying weathering limestone (T1/U1A/Limestone)

Location: Grid Reference NZ 3221 3389

Land Use: Winter cereals

Slope: 2° N

Recent Weather: Wintry showers

Depth (cm)	Horizon Description
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0-29	Dark greyish brown (10YR4/2) medium silty clay loam; no mottles; slightly stony, containing 12% limestones (5% >2 cm); moist; strongly developed medium subangular blocky structure; friable; slightly porous (<0.5% pores >0.5 mm); common fine fibrous roots; abrupt wavy boundary.
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29-36	Dark yellowish brown (10YR4/4) medium silty clay loam; no mottles; moderately to very stony, containing approximately 35% limestones; moist; moderately developed medium angular blocky structure; friable; moderately porous (<0.5% pores >0.5 mm); few fine fibrous roots.
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36+	Weathering Magnesian Limestone.
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Soil Type 2: Moderately deep soil overlying weathering limestone (T1/U1B/L1)

Location: Grid Reference NZ 3210 3408

Land Use: Winter cereals

Slope: 2° N

Recent Weather: Wintry showers

Depth (cm) **Horizon Description**

0-26 Dark greyish brown (10YR4/2) medium silty clay loam; no mottles; very slightly stony, containing 5% limestones (2% >2 cm); moist; strongly developed medium subangular blocky structure; friable; slightly porous (<0.5% pores >0.5 mm); common fine fibrous roots; abrupt wavy boundary.

26-66 Dark yellowish brown (10YR4/4) medium silty clay loam; no mottles; very slightly stony, containing 5% limestones; moist; strongly developed medium and coarse subangular blocky structure; friable; moderately porous (<0.5% pores >0.5 mm); few fine fibrous roots; gradual wavy boundary.

66-75 Light brown (75YR6/4) clay; many distinct reddish yellow (75YR6/8) mottles; moderately stony, containing approximately 30% limestones; moist; weakly developed coarse subangular blocky structure; firm; slightly porous (<0.5% pores >0.5 mm); few fine fibrous roots, gradual wavy boundary.

75+ Weathering Magnesian Limestone.

Soil Type 3: Deep medium to heavy-textured soil derived from till (T2/U2/L2)

Location: Grid Reference NZ 3288 3391

Land Use: Recently ploughed

Slope: 0°

Recent Weather: Wintry showers

Depth (cm) **Horizon Description**

0-27 Dark greyish brown (10YR4/2) medium clay loam; very slightly stony, containing around 3% sandstones and limestones (1% >2 cm); moist; moderately developed medium and coarse subangular blocky structure; firm; moderately porous (<0.5% pores >0.5 mm); common fine fibrous roots; abrupt wavy boundary.

27-38 Yellowish brown (10YR5/4) medium clay loam; very slightly stony, containing 3% sandstones and limestones; moist; moderately developed coarse angular blocky structure; firm; moderately porous (<0.5% pores >0.5 mm); few fine fibrous roots; gradual smooth boundary.

38-58 Light brownish grey (10YR6/2) heavy clay loam; many distinct grey (10YR6/1) and brownish yellow (10YR6/8) mottles; very slightly stony, containing around 3% sandstones and limestones; moist; weakly developed coarse angular blocky structure; firm; slightly porous (<0.5% pores >0.5 mm); few fine fibrous roots, gradual wavy boundary.

58-85 Pinkish grey (75YR6/2) silty clay; many distinct reddish yellow (75YR6/8) mottles; stoneless; moist; weakly developed coarse prismatic structure; extremely firm; slightly to very slightly porous (<0.5% pores >0.5 mm); few fine fibrous roots.

85+ Very pale brown (10YR7/3) weathering Magnesian Limestone.