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BASINGSTOKE AND DEANE BOROUGH LOCAL PLAN
Land around Overton, Hampshire

Agricultural Land Classification
ALC Map and Report

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Resource Planning Team
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AGRICULTURAL LAND CLASSIFICATION REPORT

BASINGSTOKE AND DEANE BOROUGH LOCAL PLAN
LAND AROUND OVERTON, HAMPSHIRE

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 75 hectares of land, in 6 parcels (Areas 1-6), around the town of Overton, in north Hampshire. The survey was carried out during April and May 1998.

2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)[1] on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with MAFF's statutory input to the Basingstoke and Deane Local Plan. Information from a previous survey to the east of Area 1 (FRCA Ref: 1501/288/94) has been used to assist in compiling this report and the accompanying ALC map. This survey supersedes any previous ALC information for this land.

3. The work was conducted by members of the Resource Planning Team in the Eastern 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 the survey most of the agricultural land was in cereal production, the remainder was in permanent grassland. The areas mapped as 'Other land' include residential dwellings and associated buildings, woodland, and allotment gardens.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. It is 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.

7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. In total, 68 borings and 8 soil pits were described.

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[1] FRCA is an executive agency of MAFF and the Welsh Office

Table 1: Area of grades and other land, Overton

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	1.8	2.8	2.4
3a	45.7	71.6	61.1
3b	14.2	22.2	19.0
4	2.2	3.4	2.9
Agricultural land not surveyed	5.7	N/A	7.6
Other land	5.2	N/A	7.0
Total surveyed area	63.9	100	85.4
Total site area	74.8	-	100

Area 1

8. Area 1 is located on the north-western edge of Overton. The land was in cereal production with two small areas of woodland, and has been classified as follows:

Table 2: Area of grades and other land, Area 1

Grade	Area (ha)
3a	10.3
3b	10.2
Other Land	0.2
Total site	20.7

9. The Subgrade 3a area (good quality agricultural land) includes land in the bottom of a dry valley which experiences a topsoil stoniness limitation and land on the valley sides which comprises medium silty clay loam topsoils over chalk and is affected by a soil droughtiness limitation. The Subgrade 3b area (moderate quality agricultural land) includes land on the steep sides of the valley which experiences a gradient limitation and land on the higher valley sides or the crest top which is very shallow over chalk and which experiences a significant soil droughtiness limitation.

Area 2

10. Area 2 is located on the eastern edge of Overton. The land was in cereal production, with a small area of new residential development to the SW corner and has been classified as follows:

Table 3: Area of grades and other land, Area 2

Grade	Area (ha)
3a	12.1
3b	3.2
Other Land	0.1
Total site	15.4

11. Soil droughtiness is the main factor restricting land quality to Subgrade 3a. In places, topsoil stoniness and soil wetness are also significant. Soils are generally deep and comprise medium clay loam topsoils over subsoils of similar texture, or heavy clay loam and clay horizons, which are stony. The Subgrade 3b land is affected by a gradient and/or topsoil stoniness limitations.

Area 3

12. Area 3 is located to the west of Overton. Only a portion of the site has been surveyed due to delays in obtaining permission for access. The land that was surveyed was in permanent grassland and divided into pony paddocks, and has been classified as follows:

Table 4: Area of grades and other land, Area 3

Grade	Area (ha)
2	1.8
3a	0.5
Agricultural land not surveyed	5.7
Total site	8.0

13. The Grade 2 area (very good quality agricultural land) is limited by topsoil stoniness and slight soil droughtiness, and contains deep soils that are slightly stony with medium silty clay loam topsoils and similar or slightly heavier subsoils. The Subgrade 3a area contains similar soils, but the gradient is marginal (7°) and this small area has therefore been included in the mapping unit to the south, which forms part of Area 4.

Area 4

14. Area 4 is located on the south-western edge of Overton. At the time of survey, the majority of the land was being prepared for a spring-sown crop with the remainder in rough grassland, and has been classified as follows. Other land includes allotment areas.

Table 5: Area of grades and other land, Area 4

Grade	Area (ha)
3a	4.4
4	2.2
Other Land	0.2
Total site	6.8

15. The Subgrade 3a land is affected by a mixture of limitations - soil droughtiness and soil wetness, with localised patches where topsoil stoniness is a factor. Soils comprise medium silty clay loam and medium clay loam topsoils which are variably stony, overlying subsoils that become heavier with depth and which may contain poorly draining clays. The Grade 4 area (poor quality agricultural land) relates to a reinstated former mineral working which now has a very variable soil resource, with topsoils typically overlying an ash (refuse) fill material or chalky rubble. A complicated pattern of limitations has arisen, involving a chemical limitation, soil droughtiness, soil wetness and topsoil restrictions.

Area 5

16. Area 5 is located on the eastern edge of Overton. Land use at the time of survey was grass, in a ley rotation, with a woodland fringe to part of the site and an area already developed with housing. Land on this site has been classified as follows:

Table 6: Area of grades and other land, Area 5

Grade	Area (ha)
3a	7.6
Other Land	4.5
Total site	12.1

17. The Subgrade 3a land is affected by a soil droughtiness limitation, with a topsoil stoniness limitation in places. The soils generally comprise variably stony medium silty clay loam topsoils, overlying stony clay subsoils.

Area 6

18. Area 6 is located to the south of Overton. Land use at the time of survey was mostly in cereal production with a small area of permanent grassland and three small areas of non-agricultural use associated with adjacent residential properties. Land on this site has been classified as follows:

Table 7: Area of grades and other land, Area 6

Grade	Area (ha)
3a	10.8
3b	0.8
Other Land	0.2
Total site	11.8

19. The Subgrade 3a land is limited by soil wetness, with a topsoil stoniness limitation in places. The soils comprise variably stony medium silty clay loam topsoils overlying stony, poorly draining, heavy silty clay loam and clay subsoils. The Subgrade 3b land is restricted by a more significant topsoil stoniness limitation.

PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

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

21. The key climatic variables used for grading each site are given in the relevant site sections below and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

22. 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.

23. 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.

24. The combination of rainfall and temperature within this area mean that there is no overall climatic limitation. Local climatic factors, such as exposure and frost risk do not affect land quality at this location. The site is climatically Grade 1. However, climatic factors do interact with soil properties to influence soil wetness and soil droughtiness limitations. (see below) The climatic range for the Overton sites is shown in Table 8. The climate is relatively moist with cool to average temperatures, in regional terms. The likelihood of soil wetness problems may therefore be enhanced.

25. The influence of climate on soil wetness is assessed by reference to median field capacity days. Around Overton, the 175/176 FCD isohyt is straddled for Areas 1,2 and 3 but this did not have a significant affect on grading as other factors notably droughtiness, gradient and topsoil stoniness were more limiting.

Table 8: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SU 512 504	SU 521 493
Altitude	m, AOD	90	122
Accumulated Temperature	day°C (Jan-June)	1435	1399
Average Annual Rainfall	mm	795	827
Field Capacity Days	days	174	179
Moisture Deficit, Wheat	mm	104	97
Moisture Deficit, Potatoes	mm	96	88
Overall climatic grade	N/A	Grade 1	Grade 1

Site

26. The range of altitude for the six sites is approximately 85–120 m AOD. The highest land is located on Area 6 close to Sapley Farm House, where as, the lowest land lies near to St Mary's Church on Area 1. Most of the land is not affected by any site restrictions (i.e., gradient, micro-relief or flooding). However, falling north to south on Area 1 and south to north on Area 2, gradients in the range 7–9.5° limit land quality in places to Subgrade 3b. These slopes will restrict the safe and efficient use of farm machinery.

Geology and soils

27. The most detailed published geological information for the site (BGS, 1975) shows the land with moderate to steep sloping ground to be underlain by Upper Chalk. The higher relatively flatter ground is shown as clay-with-flints, elsewhere river and valley gravel is mapped in the two western areas.

28. The most detailed published soils information covering the area (SSEW, 1983) shows most of it to be underlain by soils of the Carstens association. These soils are described as 'well drained fine silty over clayey, clayey and fine silty soils, often very flinty' (SSEW, 1983). The remainder is mapped as the Charity 2 association. These soils are described as 'well drained flinty fine silty soils in valley bottoms. Calcareous fine silty soils over chalk or chalk rubble on valley sides' (SSEW, 1983). In addition, soils of the Andover 1 association are shown on Area 1. These soils are described as being 'shallow well drained calcareous silty soils over chalk on slopes and crests. Deep calcareous and non-calcareous fine silty soils in valley bottoms. Striped patterns locally.' (SSEW, 1983). Soils corresponding to these descriptions have been observed over the six survey areas.

AGRICULTURAL LAND CLASSIFICATION

Area 1

Climate

29. The combination of rainfall and temperature within this area mean that there is no overall climatic limitation. The land is not believed to be either frost-prone or to suffer from exposure. As such, it may be considered as being climatically Grade 1. The climate data indicates that the 175/176 FCD isohyt is straddled (see para 25) which could result in land being downgraded with a workability limitation. However, at this locality other factors (droughtiness and topsoil stoniness) are more limiting and thus the grading is not influenced by this factor.

Table 9: Climatic and altitude data, Area 1

Factor	Units	Values	
Grid reference	N/A	SU 512 504	SU 510 504
Altitude	m, AOD	90	105
Accumulated Temperature	day°C (Jan-June)	1435	1418
Average Annual Rainfall	mm	795	804
Field Capacity Days	days	174	176
Moisture Deficit, Wheat	mm	104	102
Moisture Deficit, Potatoes	mm	96	93
Overall climatic grade	N/A	Grade 1	Grade 1

Site

30. Area 1 forms part of a dry valley which falls from north to south and lies between 90 and 105m AOD. To the north of the area the valley is obstructed by an embankment which carries the Basingstoke to Andover railway line. The valley forms a tributary of the Test Valley located to the south. To the west and east of the survey area the land is relatively flat at 105m AOD. It then falls to the valley base at approximately 90m AOD which lies towards the centre of the surveyed area. The slopes to the west and some of those to the east of the site are of sufficient gradient to limit the classification to Subgrade 3b at best, being in the range 7-9°. The remaining slopes to the east are moderate (<7°) and therefore not sufficient to

adversely affect land quality. The land along the valley floor falls gently to the south and south-east.

Geology and soils

31. The most detailed published geological information for this area of survey (BGS, 1975) shows all of this area to be underlain by Cretaceous Upper Chalk.

32. The most detailed published soils information covering this area (SSEW, 1983) shows it to be underlain by soils from the Andover 1 and Charity 2 associations. Andover soils are mapped over the majority of the site on the higher land and are described as being 'shallow well drained calcareous silty soils over chalk on slopes and crests. Deep calcareous and non-calcareous fine silty soils in valley bottoms. Striped patterns locally' (SSEW, 1983). Soils of this general description were encountered over the majority of the site. Charity type soils are mapped on the lowest lying land to the south east of the site. These are described as being 'well drained flinty fine silty soils in valley bottoms. Calcareous fine silty soils over chalk or chalk rubble on valley sides, sometimes shallow' (SSEW, 1983). Soils of this general description were encountered on the lower lying land at the valley base.

Subgrade 3a

33. Land of good quality has been mapped in two separate units to the west and centre of the survey area. Principal limitations to land quality include soil droughtiness and the volume of stones >2cm diameter in the topsoil.

34. Two different soil types are described in this Subgrade within this area of survey. Both are permeable and well drained (Wetness Class I). To the west, on the higher ground, the soils comprise a calcareous medium or heavy silty clay loam topsoil lying directly over pure Chalk. The topsoil contains up to 15% chalk fragments and 5% flints by volume. In the representative pit observation, 7P (see Appendix II), roots were observed to penetrate 72 cm into the relatively soft chalk substrate. Given local climatic parameters, the amount of moisture available to plants from this restricted root zone is inadequate to meet crop requirements and, as such Subgrade 3a is appropriate on the basis of soil droughtiness. This limitation is likely to adversely affect the yield and consistency of crops, especially in drier years.

35. The second soil type in this map unit occurs on the lower lying land towards the centre of the site. Soils in this area are characterised by the soil pit 8P (see Appendix II). The majority of the profiles described comprise a calcareous medium silty clay loam topsoil overlying similar or heavy clay loam/silty clay loam subsoils. Topsoils are moderately stony with 15% total flints by volume recorded on average with up to 20% described on occasion. This volume of hard stones includes up to 12% >2cm diameter, an amount sufficient to place a limitation on land quality restricting the classification to Subgrade 3a at best. The limitation is caused because the volume of large stones is sufficient to increase wear and tear on agricultural implements such as ploughs and tractor tyres leading to increased crop production costs. The stones can also affect crop quality by impairing establishment and reducing the nutrient holding capacity of the soil so leading to reduced plant populations especially in precision drilled crops. The volume of flints in the profile becomes greater in the subsoil, up to 43% by volume as recorded at 8P. The volume of stones in the profile is sufficient to

restrict the moisture availability to plants to the extent that Subgrade 3a is appropriate on this basis also. The results of this limitation are described in paragraph 33 above.

Subgrade 3b

36. Land of moderate quality has been mapped in two units within this survey area. The soils are permeable and well drained (Wetness Class I); principal limitations include soil droughtiness and gradient. Towards the east of the site on the higher ground, the soils comprise a calcareous medium silty clay loam topsoil lying directly over chalk. The topsoil contains up to 15% chalk fragments and 5% flints by volume. In the pit observation, 1P on the adjacent survey carried out in 1994 (FRCA Ref: 1501/288/94) roots were observed to penetrate 27 cm into the relatively hard chalk substrate. The combination of restricted rooting and stones in the topsoil reduces the amount of moisture available to plants so that within the local climatic parameters Subgrade 3b is appropriate. The effects of soil droughtiness are likely to be more severe in this area than they are in the areas mapped as Subgrade 3a, i.e. crop yields and consistency are likely to be significantly impaired in most years.

37. The map unit of Subgrade 3b to the west of the survey area and part of the unit to the east of the site are classified as Subgrade 3b on the basis of gradient. Slopes were measured in the range 7-9°. These are sufficient to adversely affect agricultural land quality as some precision farm machinery cannot be safely operated in this area. Therefore Subgrade 3b has been applied because other factors, such as the soil conditions, are not more limiting.

Area 2

Climate

38. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. The site is climatically Grade 1. Local climatic factors such as exposure and frost risk do not affect land quality at this location. The climate data indicates that the 175/176 FCD isohyt is straddled (see para 25) which could result in land down graded with a workability limitation. However, on the lower slopes on this site where this isohyt would be located the soils described either fall into Wetness Class I and are more limited by drought or are Wetness Class III and unaffected in grading by the change in FCD zone.

Table 10: Climatic and altitude data, Area 2

Factor	Units	Values	
Grid reference	N/A	SU 518 501	SU 520 497
Altitude	m, AOD	92	112
Accumulated Temperature	day°C (Jan-June)	1433	1411
Average Annual Rainfall	mm	799	818
Field Capacity Days	days	175	178
Moisture Deficit, Wheat	mm	103	99
Moisture Deficit, Potatoes	mm	94	90
Overall climatic grade	N/A	Grade 1	Grade 1

Site

39. The site lies at altitudes in the range 87-117 m AOD. The highest land occurs along the central part of the eastern boundary with land falling through slight to moderate gradients towards the west and south. Most of the site is not affected by site restrictions (i.e., gradient, microrelief or flooding). However, gradients in the range 8-9.5° were measured along the northern boundary using an optical reading clinometer. These slopes will restrict the safe and efficient use of farm machinery and Subgrade 3b is therefore appropriate.

Geology and soils

40. The most detailed published geological information for the site (BGS, 1975) shows the majority of it to be underlain by Upper Chalk, with river and valley gravel, and clay with flints mapped along the north-east and south-west boundaries respectively.

41. The most detailed published soils information for the area (SSEW, 1983) shows the majority of it to be covered by soils of the Carstens association. These soils are described as 'well drained fine silty over clayey, clayey and fine silty soils, often very flinty' (SSEW, 1983). The remainder of the site is mapped as the Charity 2 association. These soils are described as 'well drained flinty fine silty soils in valley bottoms. Calcareous fine silty soils over chalk or chalk rubble on valley sides' (SSEW, 1983).

Subgrade 3a

42. Land of good quality has been mapped over most of the site. Limitations include soil wetness, soil droughtiness and topsoil stoniness.

43. Soils comprise non-calcareous medium clay loam or medium silty clay loam topsoils. These may contain up to 18% total flints by volume (4–13% > 2 cm in size). Topsoils overlie heavy clay loam or heavy silty clay loam or clay upper subsoils with up to 25% total flints. These pass to similarly textured and stony lower subsoils, which occasionally give way to Chalk. From 45 to 98 cm, many soil profiles in this area proved impenetrable to the soil auger. Soil pits 3P and 4P are used to describe this unit. Both soil pits confirmed the very stony nature of these soils which will result in a reduction in the available water that these soil profiles can hold. Moisture balance calculations which take account of the local climate and these stony horizons indicate that these soils cannot be graded any higher than Subgrade 3a. In addition, from 60 cm (3P) and 73 cm (4P), both pits confirmed the existence of poorly structured clay horizons at depth. These clay subsoils are slowly permeable and impede the movement of water through the soil profile. The depth to gleying and to the slowly permeable layers assigns these soils to Wetness Class III (3P) and II (4P) respectively. The combination of wetness class with the topsoil texture interacts with the local climate to classify this land as Subgrade 3a. There are some limited areas of better drained (WC I) soils on lower land to the west but these have been included in the 3a mapping unit. There are some limited areas of better drained (Wetness Class I) soils on lower land to the west but these have been included in the 3a mapping unit. In places, topsoil stoniness also restricts land quality to Subgrade 3a.

44. The effect of soil wetness, soil droughtiness and topsoil stoniness will act as a constraint to the flexibility of cropping by affecting the range of crops which can be grown, the level of yield, the consistency of yield and the cost of obtaining it.

Subgrade 3b

45. Moderate quality land is mapped in two places and limited by gradient and topsoil stoniness.

46. Along the north-east boundary gradients in the range 8–9.5° are recorded. This limits land quality to Subgrade 3b because conventional agricultural machinery performs best on level ground, whereas, on sloping ground, the safe and efficient use of machinery is impaired.

47. To the south, topsoil stone measurements coincident with the stony soils of the Carstens association. Topsoil stone measurements of 16% (stone > 2 cm) were recorded. The effect of such stoniness is to act as an impediment to cultivation, harvesting and crop growth and to cause a reduction in the available water capacity of the soil. In addition, a significant stone content can affect production costs by increasing the wear and tear to implements and tyres.

Area 3

Climate

48. The combination of rainfall and temperature at this site means that there is no overall climatic limitation. The site is climatically Grade 1. Local climatic factors such as exposure and frost risk do not affect land quality at this location. However, the site does experience a change in the range of median field capacity days (FCD), from 175 FCD to 176 FCD which can be important in the assessment of wetness grade (see para 25) in the ALC system. Although the soils described were Wetness Class 1 factors other than wetness were more limiting at this locality.

Table 11: Climatic and altitude data, Area 3

Factor	Units	Values	
Grid reference	N/A	SU 510 494	SU 509 492
Altitude	m, AOD	94	105
Accumulated Temperature	day°C (Jan-June)	1431	1419
Average Annual Rainfall	mm	799	806
Field Capacity Days	days	175	176
Moisture Deficit, Wheat	mm	103	102
Moisture Deficit, Potatoes	mm	95	93
Overall climatic grade	N/A	Grade 1	Grade 1

Site

49. The site lies at altitudes in the range 85-107 m AOD. The highest land occurs along the southern boundary with land falling through moderate to slight gradients towards the north. The area is not affected by site restrictions (i.e., gradient, microrelief or flooding), although land to the south approaches 7°.

Geology and soils

50. The most detailed published geological information for the site (BGS, 1975) shows the higher land to be mapped as clay-with-flints and the lower lying ground as river and valley gravel.

51. The most detailed published soils information covering the area (SSEW, 1983) shows the entire area to be mapped as soils of the Charity 2 association. These soils are described as, 'well drained flinty fine silty soils in valley bottoms. Calcareous fine silty soils over chalk or chalk rubble on valley sides' (SSEW, 1983).

Grade 2

52. Most of the agricultural land is mapped as Grade 2 (very good quality) and is limited by a combination of soil droughtiness and topsoil stoniness.

53. Soils comprise non-calcareous medium silty clay loam topsoils. These may contain up to 10% total flints by volume (with up to 6% > 2 cm). These pass to similar or heavier textured upper subsoils which continue down to between 75 and 80 cm. These contain up to 15% total flints. The soils are permeable and well drained (Wetness Class 1). Moisture balance calculations indicate that these soils will only suffer from minor shortfalls in available water and Grade 2 is appropriate. The effect of soil droughtiness may cause the level and consistency of yield to be depressed.

54. Of equal significance, in terms of land quality, is the presence of 6% flints by volume, that are greater than 2 cm in size in the topsoil. These will have the effect of increasing production costs by enhancing the wear and tear to farm machinery, and impairing the establishment, growth and quality of crops.

Subgrade 3a

55. A small area along the southern boundary of the site is shown as good quality land. The soils are similar to those described for the Grade 2 land. However, a number of factors particularly gradient close to 7° indicate that this area would not be quite as flexible in terms of cropping and yields and so the area is mapped along with the Subgrade 3a unit which forms part of Area 4 to the north.

Area 4

Climate

56. The combination of rainfall and temperature at this site means that there is no overall climatic limitation. The site is climatically Grade 1. Local climatic factors such as exposure and frost risk do not affect land quality at this location. This area had an FCD range in excess of 176 FCD and so is unaffected by FCD zone changes (see para 25).

Table 12: Climatic and altitude data, Area 4

Factor	Units	Values	
Grid reference	N/A	SU 511 492	SU 510 489
Altitude	m, AOD	104	116
Accumulated Temperature	day°C (Jan-June)	1420	1406
Average Annual Rainfall	mm	806	815
Field Capacity Days	days	176	177
Moisture Deficit, Wheat	mm	102	100
Moisture Deficit, Potatoes	mm	93	90
Overall climatic grade	N/A	Grade 1	Grade 1

Site

57. The site lies at altitudes in the range 104–116 m AOD. The highest land occurs along the southern boundary with land falling through moderate to slight gradients towards the lowest lying land along the northern boundary. The site is not affected by gradient or flood restrictions. However, there is a minor micro-relief limitation due to uneven topography over part of the area caused by the excavation of clay and the subsequent infilling of the mineral working. However, other limitations are more limiting here.

Geology and soils

58. The most detailed published geological information for the site (BGS, 1975) shows the site to be underlain by a capping of river and valley gravel, surrounded by clay-with-flints.

59. The most detailed published soils information covering the area (SSEW, 1983) shows it comprise entirely soils of the Carstens association. These are described as 'well drained fine silty over clayey, clayey and fine silty soils, often very flinty' (SSEW, 1983). Soils corresponding to this description were observed across the undisturbed part of the site.

Subgrade 3a

60. The entire undisturbed agricultural land is classified as Subgrade 3a (good quality). Limitations to land quality include soil wetness, soil droughtiness and topsoil stoniness.

61. Soils in this area are variable and comprise non-calcareous medium silty clay loam topsoils which may contain between 15 and 20 % total flints by volume (7–12 % > 2 cm in size). These overlie clay some of which is not gleyed but denoted as slightly gleyed and poorly structured or pass through a thin horizon of heavy silty clay loam to the clay subsoils beneath. Pits 1, 2 and 3 are typical of these soils (see Appendix II). The depth to these poorly structured clays which are slowly permeable are from 25 to 42 cm. The presence of slowly permeable subsoils assigns these soils to Wetness Class III, or Wetness Class II where the subsoils do not impede water through the profile. The combination of imperfectly drained soils with topsoil texture interacting with the local climate, results in a Subgrade 3a classification. Soil wetness may adversely affect crop growth and development, as well as limiting the flexibility of the land due to the reduction in the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

Grade 4

62. Poor quality land extends over an area formerly worked as a clay pit. Limitations are very localised and include chemical restrictions due to the ash fill (high heavy metal content) used over part of the area which may make small areas unsuitable for cropping. Soil wetness, a lack of topsoil or its localised contamination by glass from the underlying fill are additional limitations which reflect the variability of the pit restoration. As such this area cannot be classified any higher than Grade 4. Land with severe limitations results in a significant restriction in the range of crops and/or level of yields.

Area 5

Climate

63. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Local climatic factors such as exposure and frost risk do not affect land quality at this location. The site is climatically Grade 1. This area has an FCD range in excess of 176 FCD (see para 25) and so is unaffected by changes in FCD zone.

Table 13: Climatic and altitude data, Area 5

Factor	Units	Values	
Grid reference	N/A	SU 518 494	SU 521 493
Altitude	m, AOD	110	122
Accumulated Temperature	day°C (Jan-June)	1413	1399
Average Annual Rainfall	mm	815	827
Field Capacity Days	days	177	179
Moisture Deficit, Wheat	mm	100	97
Moisture Deficit, Potatoes	mm	91	88
Overall climatic grade	N/A	Grade 1	Grade 1

Site

64. The site lies at altitudes 109-122 m AOD. The highest land lies along the south eastern boundary and falls gently to the north-west. The site is not affected by site restrictions (i.e., gradient, micro-relief or flooding).

Geology and soils

65. The most detailed published geological information for the site (BGS, 1975) shows almost all the land to be underlain by clay-with-flints. Along the eastern boundary there is a slither of Upper Chalk.

66. The most detailed published soils information covering the area (SSEW, 1983) shows the entire site to be mapped as soils of the Carstens association. These have been described as, 'well drained fine silty over clayey, clayey and fine silty soils, often very flinty' (SSEW, 1983).

Subgrade 3a

67. The entire agricultural land is mapped as Subgrade 3a (good quality). Limitations include soil droughtiness and in some areas topsoil stoniness is equally restricting.

68. Soils comprise non-calcareous medium silty clay loam topsoils, which may contain up to 25% total flint by volume (7-14% > 2 cm). These overlie similar textured or heavy silty clay loam or clay upper subsoils. Total flints are estimated to be in the region of 25-30%. Such high stone contents make these soils impenetrable to the soil auger from 35-52 cm. Pit 1 (see Appendix II) is typical of these soils and confirmed the existence of these stony layers. From 39 to 80 cm, stone content in the pit increases to 40% total flint. It is assumed that this volume of flint continues down to 120 cm. From pit evidence, these stony soils are considered to be permeable (Wetness Class I). Moisture balance calculations which take account of the relationship between these soil properties, local climatic factors and the moisture requirements of the crops grown indicate that, on this land, Subgrade 3a is appropriate. The effect of a soil droughtiness limitation may cause the level and consistency of yields to be reduced.

69. Of equal significance, in terms of land quality, is the presence of between 11-14% flints by volume, that are greater than 2 cm in size in the topsoil. These will have the effect of increasing production costs by enhancing the wear and tear to farm machinery, and impairing the establishment, growth and quality of crops.

Area 6

Climate

70. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Local climatic factors such as exposure and frost risk do not affect land quality at this location. The site is climatically Grade 1. This area has an FCD range in excess of 176 FCD (see para 25) and so is unaffected by changes in FCD zone.

Table 14: Climatic and altitude data, Area 6

Factor	Units	Values	
Grid reference	N/A	SU 517 491	SU 517 487
Altitude	m, AOD	106	120
Accumulated Temperature	day°C (Jan-June)	1417	1402
Average Annual Rainfall	mm	812	823
Field Capacity Days	days	177	178
Moisture Deficit, Wheat	mm	100	98
Moisture Deficit, Potatoes	mm	92	88
Overall climatic grade	N/A	Grade 1	Grade 1

Site

71. The site lies at altitudes in the range 105–121 m AOD. The highest land occurs along the southern boundary with land falling gently towards the north. A small dry valley, trending

south north, bisects the site with gentle gradients (2°) recorded on the western slopes. The site is not affected by any site restrictions (i.e., gradient, micro-relief or flooding).

Geology and soils

72. The most detailed published geological information for the site (BGS, 1975) shows the entire area to be mapped as clay-with-flints.

73. The most detailed published soils information covering the area (SSEW, 1983) shows the entire site to be shown as soils of the Carstens association. These have been described as, 'well drained fine silty over clayey, clayey and fine silty soils, often very flinty' (SSEW, 1983).

Subgrade 3a

74. Most of the survey area is mapped as good quality agricultural land. The principal limitation is soil wetness with occasional topsoil stoniness equally restricting in places.

75. Soils comprise non-calcareous medium silty clay loam or medium clay loam topsoils. These may contain up to 25% total flints by volume (6-14% > 2 cm). These generally overlie a thin horizon of heavy silty clay loam or clay upper subsoil. Total flints in this layer are estimated to be in the range 15-30%. The stony nature of these soils impedes the use of the soil auger from between 44-93 cm. Soil pit 2 (see Appendix II) confirmed the existence of these stony layers. In addition, where thin slightly gleyed (i.e., not fully gleyed) heavy silty clay loam upper subsoils pass to the clay lower subsoils or where clay upper subsoils are present these proved to be poorly structured and slowly permeable. The presence of shallow slowly permeable subsoils impedes the movement of water through the profile and assigns these soils to Wetness Class III. These imperfectly drained soils, in combination with the topsoil texture and climatic factors, results in a Subgrade 3a classification. Soil wetness may adversely affect crop growth and development, as well as limiting the flexibility of the land due to the reduction in the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

Subgrade 3b

76. A small area of land is limited by topsoil stoniness with the presence of 17% flints by volume greater than 2 cm in size recorded in the topsoil. These will have the effect of increasing production costs by enhancing the wear and tear to farm machinery, and impairing the establishment, growth and quality of crops.

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FRCA Reading

SOURCES OF REFERENCE

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Met. Office (1989) *Climatological Data for Agricultural Land Classification.*
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Soil Survey of England and Wales (1983) *Sheet 6, Soils of South-East England, 1:250,000.*
SSEW: Harpenden.

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

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 DATA

Contents:

Sample location map

Soil abbreviations - explanatory note

Soil boring descriptions (boring and horizon levels)

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database. This uses notations and abbreviations as set out below.

Boring Header Information

1. **GRID REF**: national 100 km grid square and 8 figure grid reference.

2. **USE**: Land use at the time of survey. The following abbreviations are used:

ARA:	Arable	**WHT:**	Wheat	**BAR:**	Barley
CER:	Cereals	**OAT:**	Oats	**MZE:**	Maize
OSR:	Oilseed rape	**BEN:**	Field beans	**BRA:**	Brassicae
POT:	Potatoes	**SBT:**	Sugar beet	**FCD:**	Fodder crops
LIN:	Linseed	**FRT:**	Soft and top fruit	**FLW:**	Fallow
PGR:	Permanent pasture	**LEY:**	Ley grass	**RGR:**	Rough grazing
SCR:	Scrub	**CFW:**	Coniferous woodland	**OTH**	Other
DCW:	Deciduous woodland	**BOG:**	Bog or marsh	**SAS:**	Set-Aside
HTH:	Heathland	**HRT:**	Horticultural crops	**PLO:**	Ploughed

3. **GRDNT**: Gradient as estimated or measured by a hand-held optical clinometer.

4. **GLEY/SPL**: Depth in centimetres (cm) to gleying and/or slowly permeable layers.

5. **AP (WHEAT/POTS)**: Crop-adjusted available water capacity.

6. **MB (WHEAT/POTS)**: Moisture Balance. (Crop adjusted AP - crop adjusted MD)

7. **DRT**: Best grade according to soil droughtiness.

8. If any of the following factors are considered significant, 'Y' will be entered in the relevant column:

MREL:	Microrelief limitation	**FLOOD:**	Flood risk	**EROSN:**	Soil erosion risk
EXP:	Exposure limitation	**FROST:**	Frost prone	**DIST:**	Disturbed land
CHEM:	Chemical limitation				

9. **LIMIT**: The main limitation to land quality. The following abbreviations are used:

OC:	Overall Climate	**AE:**	Aspect	**ST:**	Topsoil Stoniness
FR:	Frost Risk	**GR:**	Gradient	**MR:**	Microrelief
FL:	Flood Risk	**TX:**	Topsoil Texture	**DP:**	Soil Depth
CH:	Chemical	**WE:**	Wetness	**WK:**	Workability
DR:	Drought	**ER:**	Erosion Risk	**WD:**	Soil Wetness/Droughtiness
EX:	Exposure				

Soil Pits and Auger Borings

1. **TEXTURE**: soil texture classes are denoted by the following abbreviations:

S:	Sand	**LS:**	Loamy Sand	**SL:**	Sandy Loam
SZL:	Sandy Silt Loam	**CL:**	Clay Loam	**ZCL:**	Silty Clay Loam
ZL:	Silt Loam	**SCL:**	Sandy Clay Loam	**C:**	Clay
SC:	Sandy Clay	**ZC:**	Silty Clay	**OL:**	Organic Loam
P:	Peat	**SP:**	Sandy Peat	**LP:**	Loamy Peat
PL:	Peaty Loam	**PS:**	Peaty Sand	**MZ:**	Marine Light Silts

For the sand, loamy sand, sandy loam and sandy silt loam classes, the predominant size of sand fraction will be indicated by the use of the following prefixes:

F: Fine (more than 66% of the sand less than 0.2mm)
M: Medium (less than 66% fine sand and less than 33% coarse sand)
C: Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content:
M: Medium (<27% clay) **H:** Heavy (27-35% clay)

2. **MOTTLE COL:** Mottle colour using Munsell notation.

3. **MOTTLE ABUN:** Mottle abundance, expressed as a percentage of the matrix or surface described:

F: few <2% **C:** common 2-20% **M:** many 20-40% **VM:** very many 40% +

4. **MOTTLE CONT:** Mottle contrast:

F: faint - indistinct mottles, evident only on close inspection
D: distinct - mottles are readily seen
P: prominent - mottling is conspicuous and one of the outstanding features of the horizon

5. **PED. COL:** Ped face colour using Munsell notation.

6. **GLEY:** If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

7. **STONE LITH:** Stone Lithology - one of the following is used:

HR:	all hard rocks and stones	**FSST:**	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	**CH:**	chalk
MSST:	soft, medium grained sandstone	**GS:**	gravel with porous (soft) stones
SI:	soft weathered igneous/metamorphic rock	**GH:**	gravel with non-porous (hard) stones

Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

8. **STRUCT:** the degree of development, size and shape of soil peds are described using the following notation:

Degree of development	**WK:**	weakly developed	**MD:**	moderately developed
	ST:	strongly developed		
Ped size	**F:**	fine	**M:**	medium
	C:	coarse		
Ped shape	**S:**	single grain	**M:**	massive
	GR:	granular	**AB:**	angular blocky
	SAB:	sub-angular blocky	**PR:**	prismatic
	PL:	platy		

9. **CONSIST:** Soil consistence is described using the following notation:

L: loose	**FM:** firm	**EH:** extremely hard
VF: very friable	**VM:** very firm	
FR: friable	**EM:** extremely firm	

10. **SUBS STR**: Subsoil structural condition recorded for the purpose of calculating profile droughtiness: **G**: good **M**: moderate **P**: poor

11. **POR**: Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.

12. **IMP**: If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.

13. **SPL**: Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

14. **CALC**: If the soil horizon is calcareous, a 'Y' will appear in this column.

15. Other notations:

APW:	available water capacity (in mm) adjusted for wheat
APP:	available water capacity (in mm) adjusted for potatoes
MBW:	moisture balance, wheat
MBP:	moisture balance, potatoes

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SU51305060	CER	SW	2			1	2	79	-22	81	-12	3B				DR	3B	CH30DR57 1P/94
2	SU50975050	CER	E	7			1	2	109	8	93	-3	2				WD	2	CH70 DR102 7P
3	SU51105050	CER					1	1	86	-18	94	-2	3A				DR	3A	IMPHR 45 8P
4	SU51205050	CER					1	2	90	-15	95	-1	3A				DR	3A	CH40DR67 1P/94
5	SU51305050	CER	SW	2			1	2	74	-27	76	-17	3B				DR	3B	CH28DR55 1P/94
6	SU51005040	CER	E	6			1	2	107	6	91	-5	2				DR	3A	CH80 DR102 7P
7	SU51105040	CER					1	2	43	-62	43	-53	4				TS	3B	IMPHR 30 8P
8	SU51205040	CER	SW	4			1	1	69	-35	69	-27	3B				DR	3B	IMPHR 45 8P
9	SU51305040	CER	SW	6			1	1	76	-26	77	-17	3B				DR	3B	CH28DR55 1P/94
10	SU51305040	CER	SW	3			1	1	74	-28	76	-18	3B				DR	3B	CH28DR55 1P/94
11	SU51065028	CER	E	3			1	3A	81	-21	85	-8	3B				DR	3B	CH80 DR65 7P
12	SU51205030	CER					1	1	69	-35	69	-27	3B				DR	3B	IMPHR 45/8P
13	SU51305030	CER	SW	5			1	1	74	-30	76	-20	3B				DR	3B	CH28DR55 1P/94
14	SU51405030	CER	SW	4			1	1	73	-32	75	-20	3B				DR	3B	CH28DR55 1P/94
15	SU51005020	CER	E	4			1	2	109	7	93	0	2				DR	3A	CH65 DR102
16	SU51205030	CER					1	1	84	-18	88	-5	3A				DR	3A	CH30 DR65 7P
17	SU51305020	CER					1	1	74	-30	74	-22	3B				DR	3A	IMPHR 45 8P
18	SU51405020	CER	S	5			1	1	89	-15	92	-4	3A				DR	3A	IMPHR 55 8P
19	SU51205006	PGR	E	2			1	2	106	4	92	-2	3A				DR	3B	CH28 DR102 7P
20	SU51305008	PGR	NE	2			1	1	79	-23	83	-11	3B				DR	3B	CH27 DR62 7P
21	SU51405010	PGR	NE	3			1	1	106	2	110	14	3A				DR	3A	ICHDRIFT80 7P
22	SU51805010	CER	W	3			1	1	111	7	112	16	2				DR	2	BORDER 2 FCD
25	SU51805000	CER	W	6			1	1	123	21	110	17	2				DR	2	BORDER 2 FCD
26	SU51905000	CER	NW	2			3	3A	63	-39	63	-30	3B				WD	3A	3A TSST DR3P
27	SU52005000	CER	N	2			2	2	78	-24	84	-9	3B				DR	3A	DRT060CMSEE3P
28	SU51804990	CER	W	6			1	1	108	6	103	10	2				DR	2	BORDER 3B GR
29	SU51904990	CER	W	4			2	3A	84	-18	88	-5	3A				WD	3A	4P + 3P
30	SU52004990	CER	N	2			3	3A	65	-37	65	-28	3B				WD	3A	SEE 3P
31	SU51804980	CER	W	5			3	3A	93	-9	105	12	3A				WE	3A	SEE 4P
32	SU51904980	CER	W	4		70	2	3A	117	15	104	11	2				WE	3A	
33	SU52004980	CER	W	4			2	3A	68	-34	68	-25	3B				TS	3A	3A DR + WE
34	SU51804970	CER	W	4			1	2	83	-18	88	-5	3A				DR	3A	SOFT CH
35	SU51904970	CER	W	5			3	3A	55	-47	55	-38	3B				TS	3B	DRT040CMSEE3P
36	SU52004970	CER	W	2			2	3A	58	-44	58	-35	3B				TS	3B	DRT045CMSEE3P
39	SU51904949	LEY	N	1			1	2	63	-38	63	-30	3B				DR	3A	3ATSST DR1P
40	SU52004950	LEY	W	1			1	2	52	-49	52	-41	3B				DR	3A	DRT035CMSEE1P
44	SU51004940	PGR	N	4			1	1	110	7	114	19	2				DR	2	
44A	SU50944952	PGR					1	1	106	3	114	19	3A				DR	2	
45	SU51804940	LEY	W	2			1	2	61	-40	61	-32	3B				DR	3A	3ATSST DR1P
46	SU51904930	LEY	N	1			1	2	65	-36	65	-28	3B				TS	3B	SEE 1P
47	SU52004930	LEY	N	1			1	2	73	-28	74	-19	3B				DR	3A	SEE 1P
51	SU51004930	PGR	N	2			1	1	106	5	110	18	2				DR	2	<175FCD

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	DRT	M.REL FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
51A	SU51004923	PGR	N	7			1	2	104	3	105	22	3A				WE	2	>175FCD+GR
52	SU51904930	LEY	W	2			1	2	130	29	107	14	2				TS	3A	+ WE
52A	SU51914925	LEY	W	2			1	2	49	-52	49	-44	4				DR	3A	3ATSST DR1P
53	SU52004940	LEY	W	1			1	2	63	-38	63	-30	3B				DR	3A	DRT044CMSEE1P
54	SU52104930	LEY	N	1			1	2	52	-49	52	-41	3B				DR	3A	3ATSST DR1P
57	SU51064918	PLO	NE	4			1	2	86	-15	89	-4	3A			Y	WD	2	DISTURBED +CH
59	SU51004910	PLO	NE	1			1	2	113	12	108	15	2			Y	TS	4	DISTURBED +CH
59A	SU50924915	PLO	N	2			2	3A	71	-30	73	-20	3B				WD	3A	DRT055CMSEE1P
60	SU51104910	PLO	N	2			1	2	114	13	108	15	2				WD	2	DRT090CMSEE2P
61	SU51704910	PGR	N	1			1	2	47	-54	47	-46	4				DR	3A	DRT030CMSEE1P
62	SU51004900	PLO	NE	2			1	2	124	23	96	3	2			Y	WD	2	DISTURBED?
63	SU51104900	PLO	N	2			3	3A	94	-7	104	11	3A				WE	3A	DRT075CMSEE2P
64	SU51704900	CER	N	1		25	3	3A	76	-25	83	-10	3B				WE	3A	3ATSST DR1P
65	SU51004890	PLO	N	1		42	3	3A	75	-26	79	-14	3B				WE	3A	3ATSST SEE2P
66	SU51604890	CER	W	2			1	2	120	19	97	4	2				TS	3A	
67	SU51704890	CER	N	1		38	3	3A	103	2	101	8	3A				WE	3A	3ATSST SEE2P
68	SU51804890	CER	N	1		26	3	3A	57	-44	57	-36	3B				WE	3A	3ATSST SEE2P
69	SU51604880	CER	N	2			2	3A	88	-13	96	3	3A				WE	3A	2TSST
70	SU51704880	CER	N	1			3	3A	62	-39	62	-31	3B				TS	3B	DRT045SEE2P
71	SU51804880	CER	E	1		36	3	3A	95	-6	94	1	3A				WE	3A	SPL36CMSEE2P
72	SU51604870	CER	N	1	85	55	3	3A	132	31	110	17	1				WE	3A	SPL55CMSEE2P
73	SU51704870	CER	SW	2			2	3A	77	-24	85	-8	3B				TS	3A	+ WE
74	SU51804870	CER	E	1		35	3	3A	79	-22	90	-3	3B				WE	3A	SPL35CMSEE2P
75	SU51124894	PLO	N	2		40	3	3A	112	10	93	0	2				WE	3A	SPL25CMSEE6P
76	SU50964895	PGR	N	1			1	2	100	-2	106	13	3A				DR	3A	DRT075CMPROB2
77	SU50944901	PGR					1	2	71	-31	74	-19	3B				DR	3B	DISTURBED5P
78	SU50934904	PLO					1	2	72	-31	72	-23	3B			Y	WK	4	LACK OF TSOIL
79	SU50924908	PGR	N	1			1	3A	88	-14	97	4	3A				CH	3B	DISTURBED5P
80	SU50044907	PLO	E	3			3	3A	87	-15	94	1	3A				WE	3A	SPL305CMSEE6P
81	SU50064908	PLO	W	2	28	28	4	4	85	-17	96	3	3A				WE	4	DISTURBED5P
82	SU50084918	PLO	E	3		40	3	3A	69	-33	75	-18	3B				WE	3A	
P	SU52004940	LEY	N	1			1	2	80	-21	85	-8	3B				DR	3A	PIT1 AT AB47
P	SU51804870	CER	E	1			3	3A	96	-4	81	-10	3A				WD	3A	PIT2 AT AB74
3P	SU52004990	CER	N	2		60	3	3A	92	-10	84	-9	3A				WD	3A	3ATSSTATAB30
4P	SU51804980	CER	W	5		73	2	3A	117	15	93	0	2				WE	3A	PIT4 AT AB31
P	SU51004910	PLO					1	2	128	26	102	9	2			Y	CH	4	PIT5 AT AB59
6P	SU51034909	PLO	E	3		40	3	3A	95	-7	79	-14	3A				WD	3A	3ATSSTATAB80
P	SU51005040	CER	E	5			1	2	104	2	89	-4	3A				DR	3A	PIT 80 AUG 100
P	SU51205030	CER					1	1	86	-18	95	-1	3A				DR	3A	DEEPER+3A TSST

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
1	0-30	MZCL	10YR43						5	0	CH	10					Y		+5%HR/SEE 1P(94)
	30-57	CH	10YR81						0	0	HR	2		P			Y		IMPCH60 ROOTS 57
2	0-30	MZCL	10YR43						1	0	CH	10					Y		+5% HR / SEE 7P
	30-102	CH	10YR81						0	0	HR	3		P			Y		IMPCH70 ROOTS 65
3	0-28	MZCL	10YR43						12	0	HR	15					Y		SEE 8P
	28-45	HCL	10YR54						0	0	HR	15		M			Y		IMP FLINTS 45
4	0-27	MZCL	10YR43						1	0	HR	8					Y		SEE 1P (94 SURV)
	27-40	MZCL	10YR53						0	0	HR	5		M			Y		
	40-67	CH	10YR81						0	0	HR	3		P			Y		IMPCH70 ROOTS 67
5	0-28	MZCL	10YR42						10	0	CH	15					Y		+5%HR/SEE 1P(94)
	28-55	CH	10YR81						0	0	HR	2		P			Y		IMPCH58 ROOTS 55
6	0-30	MZCL	10YR43						1	0	CH	12					Y		+5% HR / 7P LOC
	30-102	CH	10YR81						0	0	HR	3		P			Y		IMPCH80 ROOTS 63
7	0-28	MZCL	10YR31						18	8	HR	25					Y		SEE 8P
	28-58	MZCL	10YR32						0	0	HR	35		M			Y		IMP FLINTS 30
8	0-28	MZCL	10YR42						8	0	HR	15					Y		SEE 8P
	28-45	HCL	10YR54						0	0	HR	15		M			Y		IMP FLINTS 45
9	0-28	MZCL	10YR42						8	0	CH	10					Y		+10%HR/SEE1P(94)
	28-55	CH	10YR81						0	0	HR	2		P			Y		IMPCH58 ROOTS 55
10	0-28	MZCL	10YR42						10	0	CH	15					Y		+5%HR/SEE 1P(94)
	28-55	CH	10YR81						0	0	HR	2		P			Y		IMPCH75 ROOTS 55
11	0-30	HZCL	10YR53						2	0	CH	15					Y		+8% HR / SEE 7P
	30-65	CH	10YR81	74					0	0	HR	3		P			Y		IMPCH80 ROOTS 65
12	0-28	MZCL	10YR42						12	0	HR	15					Y		SEE 82P
	28-45	HCL	10YR54						0	0	HR	15		M			Y		IMP FLINTS 45
13	0-28	MZCL	10YR43	\					6	0	HR	10					Y		+5%CH/SEE 1P(94)
	28-55	CH	10YR81						0	0	HR	2		P			Y		IMPCH58 ROOTS 55
14	0-28	MZCL	10YR42						10	0	HR	10					Y		+10%CH/SEE1P(94)
	28-58	CH	10YR81						0	0	HR	2		P			Y		IMPCH58 ROOTS 55
15	0-30	MZCL	10YR43						2	0	CH	10					Y		+5% HR / SEE 7P
	30-102	CH	10YR81						0	0	HR	3		P			Y		CHNOTIMP110RTS65
16	0-30	MZCL	10YR43						1	0	HR	5					Y		+15% CH / SEE 7P
	30-65	CH	10YR81						0	0	HR	3		P			Y		IMPCH100 ROOTS65

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	STONES GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
17	0-28	MZCL	10YR42						6	0	HR	10					Y		SEE 8P
	28-45	HZCL	10YR54						0	0	HR	10		M			Y		IMP FLINTS 45
18	0-30	MZCL	10YR42						2	0	HR	8					Y		SEE 8P
	30-45	HZCL	10YR54						0	0	HR	5		M			Y		+2% CHALK
	45-55	HCL	75YR44						0	0	CH	5		M			Y		+5% HR IMP HR 55
19	0-28	MZCL	10YR43						1	0	HR	5					Y		+10% CH / SEE 7P
	28-100	CH	10YR81 74						0	0	HR	3		P			Y		IMPCH60 ROOTS 63
20	0-27	MZCL	10YR43 53						1	0	HR	5					Y		+10% CH / SEE 7P
	27-62	CH	10YR81						0	0	HR	3		P			Y		IMPCH80 ROOTS 62
21	0-30	MZCL	10YR43						1	0	HR	8					Y		+3% CHALK
	30-65	HZCL	10YR54						0	0	CH	10		M			Y		+10% FLINTS
	65-80	MZCL	10YR64 81						0	0	CH	40		M			Y		+10%HR/ICHDRIFT80
22	0-29	MCL	10YR43						6	0	HR	10							
	29-39	HCL	75YR4446						0	0	HR	2		M					
	39-75	C	75YR46						0	0	HR	2		M					
	75-90	C	75YR46						0	0	HR	10		M					IMP FLINTS 90
25	0-29	MCL	10YR43						6	0	HR	10							
	29-54	C	75YR44						0	0	HR	10		M					
	54-98	HZCL	10YR5456						0	0	CH	10		M			Y		IMP FLINT 98
26	0-27	MCL	10YR43						12	0	HR	16							
	27-45	HCL	10YR54						0	0	HR	25		M					IMP FLINTS 45
27	0-29	MCL	10YR43						9	0	HR	14					Y		
	29-60	C	75YR56						0	0	HR	25		M			Y		IMP FLINTS 60
28	0-29	MCL	10YR43						7	0	HR	12							
	29-39	HZCL	10YR44						0	0	HR	10		M			Y		
	39-60	HZCL	10YR5464						0	0	CH	25		M			Y		
	60-90	CH	10YR81						0	0	HR	5		P			Y		IMP FLINT 90
29	0-29	MCL	10YR43						4	0	HR	8							
	29-39	HCL	10YR54						0	0	HR	2		M					
	39-59	HCL	75YR44						0	0	HR	25		M					IMP FLINTS 59
30	0-30	MCL	10YR43						13	0	HR	18							
	30-45	HCL	10YR54						0	0	HR	20		M					IMP FLINTS 45
31	0-35	MCL	10YR43						7	1	HR	11							
	35-60	HCL	10YR44						0	0	HR	10		M					
	60-70	C	75YR44	75YR46					0	0	HR	25		P		Y	Y		SPLSEE/4P

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
32	0-26	MCL	10YR43						7	0	HR	10							
	26-55	C	75YR46						0	0	HR	20		M					
	55-70	HCL	75YR56						0	0	HR	2		M					
	70-85	HCL	75YR43	75YR54	M			S	0	0	HR	2		P			Y		
	85-100	HCL	75YR44						0	0	HR	2		M					
33	0-30	MCL	10YR43						11	0	HR	15							
	30-45	HCL	10YR54						0	0	HR	20		M					IMP FLINTS 45
34	0-30	MCL	10YR43						7	2	HR	11						Y	
	30-35	MCL	10YR54						0	0	HR	20		M				Y	
	35-70	CH	10YR81						0	0	HR	5		P				Y	ASSUME TO70CM
35	0-25	MZCL	10YR43						16	2	HR	25							
	25-40	MCL	10YR56	75YR56	C	D		S	0	0	HR	25		M					IMP FLINTS 40
36	0-26	MCL	10YR43						16	2	HR	25							
	26-45	HCL	10YR54						0	0	HR	30		M					IMP FLINTS 45
39	0-28	MZCL	10YR43						11	3	HR	20							
	28-44	HZCL	10YR54	10YR56	F				0	0	HR	30		M					IMP FLINTS 44
40	0-30	MZCL	10YR43						7	0	HR	20							
	30-35	MZCL	10YR54						0	0	HR	30		M					IMP FLINTS 35
44	0-28	MZCL	10YR43						0	0	HR	7							
	28-65	MZCL	10YR54						0	0	HR	10		M					
	65-80	HZCL	10YR54						0	0	HR	15		M					
44A	0-25	MZCL	10YR4243						0	0	HR	5							
	25-60	MZCL	10YR54						0	0	HR	10		M					
	60-75	HCL	10YR54						0	0	HR	10		M					
45	0-28	MZCL	10YR43						14	5	HR	25							
	28-45	MZCL	10YR54						0	0	HR	30		M					IMP FLINTS 45
46	0-34	MZCL	10YR43						16	3	HR	25							
	34-48	C	75YR44						0	0	HR	30		M					IMP FLINTS 48
47	0-32	MZCL	10YR43						7	0	HR	22							W-SIEVE ST 22%
	32-37	HZCL	10YR54						0	0	HR	25		M					
	37-52	C	75YR44						0	0	HR	25		M					IMP FLINTS 52
51	0-25	MCL	10YR43						6	0	HR	10							
	25-55	HZCL	10YR4454						0	0	HR	10		M					
	55-80	HZCL	10YR54						0	0	HR	10		M					
51A	0-22	MCL	10YR43						6	0	HR	10							
	22-50	HCL	10YR4454						0	0	HR	10		M					
	50-80	HCL	10YR54						0	0	HR	10		M					

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
52	0-30	MCL	10YR44						12	0	HR	20						Y	
	30-40	C	75YR46						0	0		0		M				Y	
	40-65	C	75YR4656						0	0	CH	5		M				Y	
	65-85	C	75YR4656						0	0	CH	15		M				Y	
	85-120	C	75YR58						0	0	CH	35		M				Y	
52A	0-27	MZCL	10YR43						14	0	HR	25							
	27-35	MZCL	10YR54						0	0	HR	30		M					IMP FLINTS 35
53	0-30	MZCL	10YR43						8	0	HR	20							
	30-44	MZCL	10YR54						0	0	HR	30		M					IMP FLINTS 44
54	0-26	MZCL	10YR43						14	2	HR	25							
	26-38	MZCL	10YR54						0	0	HR	30		M					IMP FLINTS 38
57	0-26	MZCL	10YR43						9	0	HR	20							
	26-36	C	75YR46						0	0	HR	5		M					DISTURBED ?
	36-68	CH	10YR81						0	0	HR	5		P				Y	IMPURE SOFT CH
	68-75	C	75YR46						0	0	HR	5		M				Y	DISTURBEDIMP75
59	0-33	MZCL	10YR43						11	0	HR	20							DISTURBED ?
	33-90	MZCL	10YR31						0	0	HR	10		M					ASH IMP90
59A	0-26	MZCL	10YR43						9	0	HR	20							
	26-55	C	10YR46						0	0	HR	30		M					IMP FLINTS 55
60	0-28	MZCL	10YR53						7	0	HR	15							
	28-55	HZCL	10YR54						0	0	HR	15		M					
	55-90	HZCL	10YR54						0	0	HR	10		M					IMP FLINTS 90
61	0-20	MZCL	10YR43						6	0	HR	10							
	20-30	HZCL	10YR54						0	0	HR	30		M					IMP FLINTS 30
62	0-26	MZCL	10YR43						4	0	CH	16						Y	
	26-44	HZCL	10YR54						0	0	CH	25		M				Y	
	44-120	CH	10YR81						0	0	HR	5		P				Y	IMPURE SOFT CH
63	0-32	MZCL	10YR43						9	0	HR	20							
	32-75	C	75YR46						0	0	HR	10		M					IMP FLINTS 75
64	0-25	MCL	10YR43						14	2	HR	25							
	25-60	C	75YR46	75YR56	M			S	0	0	HR	15		P		Y			IMP FLINTS 60
65	0-31	MZCL	10YR43						12	0	HR	20							
	31-42	HZCL	10YR54						0	0	HR	25		M					
	42-60	C	10YR63	75YR46	M			Y	0	0	HR	30		P		Y			IMP FLINTS 60
66	0-26	MCL	10YR43						12	6	HR	20						Y	
	26-36	HCL	10YR44						0	0	HR	20		M				Y	
	36-60	C	75YR4446						0	0	HR	5		M					
	60-120	CH	10YR81						0	0	HR	5		P				Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
67	0-30	MZCL	10YR43						14	2	HR	20							
	30-38	HZCL	10YR56	10YR54	M			S	0	0	HR	20		P		Y			
	38-93	C	75YR56	10YR58	M	D		S	0	0	HR	15		P		Y			IMP FLINTS 93
68	0-26	MZCL	10YR53						12	0	HR	20							
	26-44	C	75YR56	75YR46	M				0	0	HR	30		P		Y			IMP FLINTS 44
69	0-29	MZCL	10YR53						6	0	HR	12							
	29-63	HZCL	10YR54						0	0	HR	20		M					IMP FLINTS 63
70	0-29	MZCL	10YR53						17	0	HR	25							
	29-45	HZCL	10YR54						0	0	HR	30		M					IMP FLINTS 45
71	0-26	MZCL	10YR53						9	0	HR	18							
	26-36	HZCL	10YR54						0	0	HR	15		M					
	36-90	C	75YR56	75YR46	M			S	0	0	HR	15		P		Y			IMP FLINTS 90
72	0-29	MZCL	10YR53						6	1	HR	12							
	29-55	C	75YR56						0	0		0		M					
	55-85	C	75YR58	75YR46	M			S	0	0		0		P		Y			
	85-120	ZC	75YR63	75YR58	M			Y	0	0		0		P		Y			
73	0-26	MZCL	10YR53						11	2	HR	20							
	26-63	C	10YR54						0	0	HR	25		M					IMP FLINTS 63
74	0-26	MZCL	10YR53						9	0	HR	18							
	26-35	C	10YR54						0	0	HR	25		M					
	35-55	C	75YR56	75YR46	M			S	0	0	HR	25		P		Y			
	55-70	C	75YR56	75YR46	M			S	0	0	HR	10		P		Y			IMP FLINTS 70
75	0-25	MZCL	10YR43						9	0	HR	15							
	25-40	HCL	10YR54	75YR46	C	D		S	0	0	HR	15		M					
	40-120	C	75YR46						0	0	HR	20		P		Y			FIRM CMN
76	0-26	MCL	10YR43						0	0	HR	10							
	26-75	MCL	10YR54						0	0	HR	10		M					IMP FLINTS 75
77	0-28	MCL	10YR43						8	0	HR	18							
	28-60	CH	10YR81						0	0		0		P					SOFT CHALK
78	0-23	MCL	10YR43						6	0	HR	8							
	23-45	MCL							0	0		0		M				Y	
79	0-5	MCL	10YR41						6	0	HR	10							
	5-40	HCL	10YR54	75YR46	C			S	0	0	HR	20		M					
	40-70	CSL							0	0	HR	10		M					ASH
80	0-30	MCL	10YR43						8	0	HR	15							
	30-65	HCL	10YR54	75YR46	C	D		S	0	0	HR	15		M					IMP FLINTS 65

				MOTTLES			PED		STONES				STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
81	0-28	HCL	10YR44						0	0	HR	8						
	28-70	C	10YR53	10YR56	M			Y	0	0	HR	10		P		Y		IMP FLINTS 70
82	0-25	MCL	10YR43						12	0	HR	20						
	25-40	HCL	10YR54						0	0	HR	35		M				
	40-65	C	75YR54	75YR56	C			S	0	0	HR	35		P		Y		
1P	0-26	MZCL	10YR42						7	0	HR	20						
	26-39	ZC	10YR54	75YR56	C			S	0	0	HR	30		M				
	39-80	C	75YR56						0	0	HR	40		M				IMP FLINTS 80
2P	0-26	MZCL	10YR5352						9	0	HR	18						
	26-44	HZCL	10YR5654	10YR58	C	D		S	0	0	HR	25	MDCPR	FM	P	Y		N
	44-75	C	75YR5868	05YR46	M	D		S	0	0	HR	35	WKMAB	FM	P	Y		N
3P	0-29	MZCL	10YR43						13	0	HR	18						
	29-40	MZCL	75YR44						0	0	HR	56	WKCSAB	FR	M			
	40-60	HZCL	75YR5646						0	0	HR	51	WKCSAB	FR	M			
	60-100	C	75YR56	05YR46	M		75YR64	S	0	0	HR	25	WKCAB	FM	P	Y		N
4P	0-25	MCL	10YR42						7	1	HR	11						
	25-43	HCL	10YR43						0	0	HR	37	MDCSAB	FR	M			
	43-73	HCL	10YR4454						0	0	HR	39	MDCSAB	FR	M			
	73-105	C	75YR44	75YR46	C	F	75YR54	S	0	0	HR	13	WKDCAB	FM	P	Y		Y
	105-120	CH	10YR81						0	0	HR	5			P		Y	
5P	0-30	MCL	10YR43						16	0	HR	20						GLASS/BRICKSINTS
	30-105	CSL							0	0	HR	10	S		M			ASH/CLINKER
6P	0-25	MCL	10YR43						12	0	HR	20						
	25-40	HCL	10YR54						0	0	HR	35	WKCSAB	FM	M			
	40-65	C	75YR54	75YR56	C			S	0	0	HR	35		P		Y		
7P	0-28	MZCL	10YR43						3	0	CH	12					Y	+5%HR/PIT @ BOR 6
	28-63	CH	10YR81 64						0	0	HR	1		P			Y	COM ROOTS
	63-100	CH	10YR81 64						0	0	HR	1		P			Y	FEW ROOTS IAUG100
8P	0-28	MZCL	10YR42						14	5	HR	20					Y	PIT NR BOR 12
	28-52	MZCL	10YR44						12	0	HR	20	MCSAB	FR	M		Y	IMP AUG 45
	52-70	MZCL	75YR43						25	0	HR	43			M		Y	SIEVED HR/IMP 70