Document 6.2

The West Midlands Rail Freight Interchange Order 201X

Technical Appendix 6.1 - Agricultural Land Classification

Regulation 5(2)(a)

Askew Land and Soil Ltd - March 2018

West Midlands Interchange

Four Ashes Ltd

Agricultural Land Classification:

West Midlands Interchange,
Four Ashes, Staffordshire

Prepared for:
Ramboll Environ UK Ltd

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Four Ashes Ltd

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Our interpretation of the site characteristics is based on available data made during our desktop study and soil survey. This desktop study and soil survey has assessed the characteristics of the site in relation to the assessment of its Agricultural Land Classification. It should not be relied on for alternative end-uses or for other schemes. This report has been prepared solely for the benefit of Ramboll Environ UK Ltd and Four Ashes Ltd. No warranty is provided to any third party and no responsibility or liability will be accepted for any loss or damage in the event that this report is relied upon by a third party or is used in circumstances for which it was not originally intended.

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1 INTRODUCTION

1.1 Background

1.1.1 This report was commissioned by Ramboll Environ UK Ltd on behalf of Four Ashes Ltd to determine the quality of agricultural land at an approximately 296.9 hectare (ha) Site proposed for the West Midlands Interchange at Four Ashes, Staffordshire ('the Site'). The assessment is made in accordance with the Agricultural Land Classification (ALC) system for England and Wales (see 'Methodology' below). A detailed description of the Site is provided in Section 2.3.

1.2 Methodology

1.2.1 The work has been carried out by experienced Agricultural Land Classification (ALC) surveyors and led by a Chartered Scientist (CSci), who is a Member of the Institute of Professional Soil Scientists (IPSS). The IPSS is the chartered and professional body of the British Society of Soil Science (BSSS). In addition, this ALC survey has been carried out by soil scientists who meet the requirements of the IPSS Professional Competency Scheme for ALC (see IPSS PCSS Document 2 'Agricultural Land Classification of England and Wales', given as Appendix A). The IPSS Professional Competency Scheme is endorsed, amongst others, by the Department for Environment, Food and Rural Affairs (Defra), Natural England, the Science Council, and the Institute of Environmental Assessment and Management (IEMA) (see Appendix A also).

1.2.2 This assessment is based upon the findings of a study of published information on climate, geology and soil in combination with a soil investigation carried out in accordance with the Ministry of Agriculture, Fisheries and Food (MAFF)[1] 'Agricultural Land Classification of England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land', October, 1988 (henceforth referred to as the 'the ALC Guidelines').

1.2.3 The ALC system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The ALC system divides agricultural land into five grades (Grade 1 'Excellent' to Grade 5 'Very Poor'), with Grade 3 subdivided into Subgrade 3a 'Good' and Subgrade 3b 'Moderate'. Agricultural land classified as Grade 1, 2 and Subgrade 3a falls in the 'best and most versatile' category in Paragraph 112 and Annex 2 of the National Planning Policy Framework (NPPF) of March 2012. Further details of the ALC system and national planning policy implications are set out by Natural England in its Technical Information Note 049, given as Appendix B, and in Section 2.0 of this report.

[1] The Ministry of Agriculture, Fisheries and Food (MAFF) was incorporated within the Department for Environment, Food and Rural Affairs (Defra) in June 2001

1.2.4 A detailed ALC survey of the Site was completed in three parts on (i) the 24th and 25th August 2016, (ii) 8th and 9th September 2016, and (iii) 24th and 25th April 2017. The detailed survey involved examination of the soil's physical properties at 182 locations on previously un-surveyed agricultural land, at a density of one auger boring per hectare (ha), as shown on Figure 1. The remainder of the study area is either non-agricultural land (i.e. buildings, roads, woodland, water bodies), or has be the subject of a previous, detailed ALC survey carried out by the former MAFF in connection with a mineral quarry in the south east of the Site (this described in more detail in Section 2.0 of this report).

1.2.5 The sample locations were located using a hand-held Garmin E-Trec Geographic Information System (GIS) to enable the sample locations to be relocated for verification, if necessary.

1.2.6 The soil profile was examined at each sample location to a maximum depth of approximately 1.2 m by hand with the use of a 5 cm diameter Dutch (Edleman) soil auger.

1.2.7 The soil profile at each sample location was assessed and described using the 'Soil Survey Field Handbook: Describing and Sampling Soil Profiles' (Ed. J.M. Hodgson, Cranfield University, 1997). Each soil profile was ascribed an Agricultural Land Classification (ALC) grade following the MAFF ALC Guidelines.

1.2.8 A sample of topsoil was collected at auger locations 56, 72, 108, 124, 158, 162, and 179. All seven samples were sent to an accredited laboratory for analysis of particle size distribution (PSD), i.e. the proportions of sand, silt and clay. This is to determine the definitive texture class of the topsoil, especially with regard to distinguishing between medium clay loams (i.e. <27% clay), heavy clay loams (27% to 35% clay) and clays (>35% clay). The results of the laboratory PSD analysis are presented in Section 2.4, and on Certificates of Analysis given in Appendix D.

1.3 Structure of the Remainder of this Report

1.3.1 The remainder of this report is structured as follows:

- Section 2 – Agricultural Land Classification;
  - Climate;
  - Site (Gradient, Micro-relief, Risk of Flooding);
  - Soil (Geology, Soil Properties);
  - Interactive Limitations (Soil Droughtiness, Soil Wetness);
  - ALC Grading at the Site.
- Section 3 – ALC at the Site in a Wider Geographical Context; and
- Section 4 – Summary and Conclusions.

2 AGRICULTURAL LAND CLASSIFICATION

2.1 Background

2.1.1 This section of the report sets out the findings of the Agricultural Land Classification (ALC). It is based on a desktop study of relevant published information on climate, topography, geology, and soil in conjunction with a soil survey carried out on Site by experienced ALC surveyors, led by a Chartered Soil Scientist, in three parts on (i) the 24th and 25th August 2016, (ii) 8th and 9th September 2016, and (iii) 24th and 25th April 2017. The detailed survey involved examination of the soil's physical properties at 182 locations, as shown on Figure 1 (see 'Methodology' above).

2.1.2 As described in the ALC Guidelines, the main physical factors influencing agricultural land quality are:

- climate;
- site;
- soil; and
- interactive limitations.

2.1.3 These factors are considered in turn below.

2.2 Climate

2.2.1 Interpolated climate data relevant to the determination of the Agricultural Land Classification (ALC) grade of land at the Site is given in Table 2.1 below.

Table 2.1: Interpolated ALC Climate Data for the land at Four Ashes, Staffordshire

Climate Parameter	National Grid Reference SJ 920 098
Average Altitude (m)	107
Average Annual Rainfall (mm)	700
Accumulated Temperature above 0˚C (January – June)	1360
Moisture Deficit (mm) Wheat	93
Moisture Deficit (mm) Potatoes	80
Field Capacity Days (FCD)	164
Best ALC Grade According to Climate Limitation	1

2.2.2 With reference to Figure 1 '*Grade according to climate*' on page 6 of the ALC Guidelines, the quality of agricultural land at the Site is not limited by overall climate, meaning that agricultural land at the Site could be graded as high as Grade 1 in the absence of any other limiting factor, i.e. site, soil, and/or interactive limitations (as described below).

2.2.3 The average annual rainfall at the Site (i.e. 700 mm) is comparable to the mean for central, lowland England (i.e. 700 mm). Likewise, agricultural land at the Site is predicted to be at field capacity (i.e. near saturation point) for 164 days per year, mainly over the late autumn, winter and early spring. This is also comparable to central, lowland England (i.e. approximately 150 FCD)[2] and may, in combination with heavier topsoil textures and slowly permeable subsoils, cause an 'interactive' soil wetness limitation.

2.2.4 Corresponding with the average amounts of precipitation, the predicted soil moisture deficits (MD) for the two reference crops used for ALC (i.e. MD for winter wheat is 93 mm, and the MD for maincrop potatoes is 80 mm) are comparable to those found in central, lowland England (i.e. the mean MD for winter wheat is approximately 100 mm – no mean data for maincrop potatoes)[3]. In combination with lighter profile textures, higher stone content and poor subsoil structure, this may cause an 'interactive' soil droughtiness limitation.

2.3 Site

2.3.1 The approximately 296 ha Site is located directly to the north of Four Ashes, Staffordshire and 10 km north of Wolverhampton, as shown on Figure 1. It is centred at National Grid Reference SJ 920 098. The Site is bordered by the A5 to the north, Calf Heath Reservoir and the M6 to the east, the Staffordshire and Worcestershire Canal to the south, and the A449 Stafford Road to the west. At the time of the ALC survey the Site was mainly under arable (including barley or barley stubble), with some areas of potatoes, rough grassland and set-aside land. The Rugby–Birmingham–Stafford railway line passes from north to south through the western half of the Site.

2.3.2 With regard to the ALC Guidelines, agricultural land quality can be limited by one or more of three main site factors as follows:

- Gradient;
- Micro-relief (i.e. complex change in slope angle over short distances); and
- Risk of flooding.

I. Gradient and Micro-Relief

[2] J.M.Ragg et al. Soil Survey of England and Wales (1984). *Soils and the Use in Midland and Western England. Bulletin No. 12. Harpenden*

3 J.M.Ragg et al. Soil Survey of England and Wales (1984). *Soils and the Use in South Eastern England. Bulletin No. 15. Harpenden*

2.3.3 The Site lies on generally level ground, with elevation ranging between approximately 115 metres (m) Above Ordnance Datum (AOD) at the highest central and eastern parts of the Site, and 100 mAOD at the lowest points towards the west and south of the Site.

2.3.4 Gradient has been assessed on Site with the use of an Abney Level and the Site has been determined to be not limited by gradient, as no slopes exceed an angle of 7°.

2.3.5 Micro-relief, i.e. complex changes in slope angle and direction over short distances, does not limit the grading of the agricultural land at the Site.

II. Risk of Flooding

2.3.6 From an Environment Agency (EA) Flood Map[4], the entire Site falls within Flood Zone 1 (land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)). Combined with the Site investigation, it is considered that the risk of flooding is not a limitation to agricultural land quality at this Site in terms of Table 2 of the ALC Guidelines '*Grade according to flood risk in summer*', and Table 3 '*Grade according to flood risk in winter*'.

2.4 Soil

I. Geology/Soil Parent Material

2.4.1 British Geological Survey (BGS) information available online has been utilised to show the Superficial Deposits (Drift) and Bedrock underlying the Site[5]. This provides information on the geological materials in which the soil has formed.

2.4.2 The bedrock underlying most of the site is described by the BGS (1:50,000) as sandstone of the Wildmoor Sandstone Formation. The bedrock underlying the north western tip of the site, to Croft Lane along the northern edge and to 300m south of Gravelly Way along the southern edge, is described as sandstone, pebbly (gravelly), of the Bromsgrove Sandstone Formation.

2.4.3 The BGS Superficial Deposit map (1:50,000) indicates that the bedrock underlying much of the Site is covered by sand and gravel from Devensian Glaciofluvial Deposits. Devensian Glacial Till covers areas of bedrock at the north east and south of the Site. An area to the north west of the Site is covered by clay, silt, sand and gravel from Alluvium and small areas at the south east and west of the Site are not covered by any recorded deposits.

II. Published Information on Soil

[4] Environment Agency Flood Risk Map. Available online @ http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=floodmap&layerGroups=default&lang=_e&ep=map&scale=7&x=531500&y=181500#x=392266&y=309471&lg=1,2,10,&scale=9 Last viewed March 2018

[5] British Geological Survey 'Geology of Britain Viewer'. Available online @ http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html Last viewed March 2018

2.4.4 Provisional information for soils at the Site was gathered from the Soil Survey of England and Wales (SSEW) soil map of Midland and Western England (Sheet 3) at a scale of 1:250,000 and accompanying Bulletin No. 12 '*Soils and their Use in Midland and Western England*' (J. M. Ragg *et al*, Harpenden, 1984). The provisional information indicates that agricultural land over most of the Site is covered by soils of the Clifton Association, with soils of the Wick 1 Association covering parts of the west of the Site.

2.4.5 The Clifton association includes slowly permeable, seasonally waterlogged, reddish, fine and coarse loamy soils, and similar soils with slight seasonal waterlogging, with some deep, coarse loamy soils, seasonally affected by groundwater. The association is extensive south and west of the Pennines, from south Staffordshire and Clwyd to the Scottish border. The principal Clifton series are typical stagnogley soils comprised of reddish medium loamy drift with siliceous stones. A typical profile consists of dark greyish brown, slightly stony, clay loam or sandy clay loam topsoil; over greyish brown, mottled, slightly stony, sandy loam or sandy clay loam upper subsoil, with weakly developed, medium sub-angular blocky structure; over reddish brown, mottled, slightly stony, clay loam or sandy clay loam lower subsoil, with moderately developed, coarse prismatic structure; over reddish brown, mottled, slightly stony, clay loam, with weakly developed, coarse prismatic or massive structure. The main soils have slowly permeable subsoils and are seasonally waterlogged for long periods in winter (Wetness Class IV), though drainage measures significantly reduce the duration of waterlogging (Wetness Class III). These soils have small or moderate reserves of profile available water and, in the driest areas, potatoes may suffer slightly from drought and grassland tends to scorch in dry summers.

2.4.6 The Wick 1 association includes deep, well drained, coarse loamy and sandy soils, locally over gravel, with some similar soils affected by groundwater. These soils have a slight risk of water erosion. The association occurs widely throughout Northern England, the Midlands and Wales. The principal Wick series soils are deep, well drained, coarse loamy, typical brown earths. A typical profile consists of dark brown, slightly stony, sandy loam or sandy silty loam topsoil; over brown, slightly stony, sandy loam or sandy silty loam upper subsoil with moderately developed, medium subangular blocky structure; over yellowish brown, slightly or moderately stony, loamy sand or sandy loam lower subsoil with weakly developed, medium angular blocky or single grain structure; over brownish yellow, slightly or moderately stony, sand or loamy sand with weakly developed, coarse angular blocky or single grain structure. The main soils are well drained (Wetness Class I) and readily absorb winter rain. Droughtiness varies with climate.

III. Soil Survey

2.4.7 The findings of the detailed soil survey determined that the soil across the Site is variable but can be broadly categorised under two types. A log of the soil profiles recorded on Site is given as Appendix C.

Soil type 1

2.4.8 Soil profiles over most of the Site consist of very dark greyish brown, very dark grey or dark brown (Munsell colours 10YR 3/2, 3/1 and 7.5YR 3/2), slightly to moderately stony (8-30% hard stones), non-calcareous, medium sandy loam, sandy clay loam or loamy medium sand topsoil. The upper subsoil consists of brown, yellowish brown or dark yellowish brown (Munsell colours 7.5YR 5/4, 4/4 or 10YR 5/3, 4/3, 5/4, 4/4), often ochreous mottled (Munsell colours 7.5YR 5/6, 5/8, 6/6, 6/8 or 10YR 5/6, 5/8), very slightly to very stony (2-60% hard stones), non-calcareous, medium sandy loam, loamy medium sand or sandy clay loam with moderate structural condition. The lower subsoil consists of variably coloured, light grey to light yellowish brown to strong brown to reddish brown (Munsell colours 10YR 7/2, 64, 7.5YR 4/6, 5YR 5/4), often ochreous and grey mottled, stoneless to very stony (0-60% hard stones), non-calcareous, loamy medium sand, medium sandy loam or medium sand, with moderate structural condition. Many of these profiles become impossible to auger at variable depth due to very stony or iron pan layers. Type 1 profiles are usually well drained and placed in Wetness Class I.

Soil type 2

2.4.9 Some profiles across the Site include a slowly permeable layer within the upper or lower subsoil consisting of reddish brown (Munsell colours 5YR 4/4, 5/3, 5/4 or 2.5YR 44), grey mottled (Munsell colours 2.5Y 6/1, 6/2 and 10YR 6/1), stoneless to slightly stony (0-10% hard stone), non-calcareous, clay or sandy clay, with poor structural condition. These profiles often have similar, moderately structured, sandy clay loam or heavy clay loam layers immediately above or below the slowly permeable layer. Type 2 profiles range between well drained profiles placed in Wetness Class I and profiles which are waterlogged for long periods over the winter and placed in Wetness Class IV, depending on the depth to the slowly permeable clay layer.

2.4.10 A large area of land at the east of the Site lies within the boundaries of a working quarry and has not been surveyed. Auger points 38, 174 and 175 are located in areas that were inaccessible at the time of the survey.

2.4.11 Woodland, including Calf Heath Wood, covers a large area at the centre of the Site and several smaller areas over the Site. The rail line transecting the Site, Gravelly Way, buildings and structures at Woodside Farm, the end of Croft Lane and the southwest of the Site, and several other small areas across the Site are covered by infrastructure or hardstanding. A canal crosses the centre of the Site, and is included along with several smaller bodies of water at the Site. These areas covered by woodland, infrastructure and hardstanding, or water have been assessed as non-agricultural land.

2.4.12 In order to substantiate topsoil texture determined during the ALC survey by hand-texturing, seven samples of topsoil were collected over the Site (i.e. Auger Locations 56, 72, 108, 124, 158, 162 and 179). The topsoil samples were sent to an accredited laboratory for analysis of particle size distribution (PSD), based on the British Standard Institution particle size grades. The certificate of analysis is provided as Appendix D. The findings of the PSD analysis are shown in Table 2.3 below:

Table 2.3: Topsoil Texture (re Table 10, ALC Guidelines)

Topsoil Sample Location (See Fig. 1)	% sand 0.063-2.0 mm	% silt 0.002-0.063 mm	% clay <0.002 mm	ALC Soil Texture Class
56	65	15	20	Sandy Clay Loam
72	79	13	8	Loamy Sand
108	80	11	9	Loamy Sand
124	63	21	16	Sandy Loam
158	70	18	12	Sandy Loam
162	79	12	9	Loamy Sand/Sandy Loam
179	78	12	10	Sandy Loam

2.5 Interactive Limitations

2.5.1 From the published information above, together with the findings of the detailed soil survey, it has been determined that the quality of agricultural land over the Site could be limited by soil wetness or soil droughtiness.

I. Soil Wetness

2.5.2 From the ALC Guidelines, a soil wetness limitation exists where '*the soil water regime adversely affects plant growth or imposes restrictions on cultivations or grazing by livestock*'. Agricultural land quality is limited by soil wetness as per Table 3.3 below (based on Table 6 'Grade According to Soil Wetness – Mineral Soils' in the ALC Guidelines):

Table 3.3: ALC Grade According to Soil Wetness

Wetness Class	Texture of the Top 25 cm	151-175 Field Capacity Days

I	Sand, **Loamy Sand**, **Sandy Loam**, Sandy Silty Loam Silty Loam, Medium Silty Clay Loam*, Medium Clay Loam*, **Sandy Clay Loam** Heavy Silty Clay Loam**, Heavy Clay Loam** Sandy Clay, Silty Clay, Clay	**1** **1** 2 3a
II	Sand, **Loamy Sand**, **Sandy Loam**, Sandy Silty Loam Silty Loam, Medium Silty Clay Loam*, Medium Clay Loam*, **Sandy Clay Loam** Heavy Silty Clay Loam**, Heavy Clay Loam** Sandy Clay, Silty Clay, Clay	**1** **2** 3a 3b
III	Sand, Loamy Sand, **Sandy Loam**, Sandy Silty Loam Silty Loam, Medium Silty Clay Loam*, **Medium Clay Loam***, Sandy Clay Loam Heavy Silty Clay Loam**, Heavy Clay Loam** Sandy Clay, Silty Clay, Clay	**2** **3a** 3b 3b
IV	Sand, Loamy Sand, **Sandy Loam**, Sandy Silty Loam Silty Loam, Medium Silty Clay Loam*, Medium Clay Loam*, **Sandy Clay Loam** Heavy Silty Clay Loam**, Heavy Clay Loam** Sandy Clay, Silty Clay, Clay	**3a** **3b** 3b 3b
Key: * <27% clay ** >27% clay *** grade for naturally calcareous soils with more than 1% CaCO3 and between 18% and 50% clay content in the top 25cm is shown in brackets		

2.5.3 Therefore, soil profiles at the Site with loamy sand, sandy loam or sandy clay loam topsoil texture and well drained subsoil (Wetness Class I) or loamy sand or sandy loam topsoil texture and slightly seasonally waterlogged subsoil (Wetness Class II) are not limited by soil wetness and can be graded as Grade 1 in this climate area (151-175 field capacity days), in the absence of any other limiting factor.

2.5.4 Soil profiles with sandy clay loam topsoil and slightly seasonally waterlogged subsoil (Wetness Class II) or sandy loam topsoil and seasonally waterlogged subsoil (Wetness Class III) are limited by soil wetness to Grade 2.

2.5.5 Soil profiles with medium clay loam topsoil and seasonally waterlogged subsoil (Wetness Class III) or sandy loam topsoil and subsoil which is waterlogged for long periods in winter (Wetness Class IV) are limited by soil wetness to Subgrade 3a.

2.5.6 Soil profiles with sandy clay loam topsoil and subsoil which is waterlogged for long periods in winter (Wetness Class IV) are limited by soil wetness to Subgrade 3b.

II. Soil droughtiness

2.5.7 From the ALC Guidelines, a soil droughtiness limitation exists '*in areas with relatively low rainfall or high evapotranspiration, or where the soil holds only small reserves of moisture available to plant roots.'* The ALC grade according to soil droughtiness is shown in Table 2.4 below (based on Table 8 'Grade According to Droughtiness' in the ALC Guidelines). To be eligible for Grades 1 to 3b the moisture balances (MBs) must be equal to, or exceed, the stated minimum values for *both* wheat and potatoes. If the MB for *either* crop is less (i.e. more negative) than that shown for Subgrade 3b, the soil is Grade 4 on droughtiness):

Table 2.4: ALC Grade According to Soil Droughtiness

Grade/Subgrade	Moisture Balance (MB) Limits (mm)	
	Wheat	Potatoes
1	+30	+10
2	+5	-10
3a	-20	-30
3b	-50	-55
4	<-50	<-55

2.5.8 Soil profiles across the Site are very varied, with stoneless to moderately stony, loamy medium sand, medium sandy loam, sandy clay loam or medium clay loam topsoil. Subsoil horizons range from stoneless to very stony, with textures ranging from medium sand to clay, and moderate to poor structural condition. It has been determined by calculation (re Appendix 4 of the ALC Guidelines) that soil moisture balance (MB) values across the Site range between +51 and -35mm for winter wheat (i.e. ranging between Grade 2 and Subgrade 3b where limited by soil droughtiness), and between +29 and -32mm for potatoes (i.e. ranging between Grade 2 and Subgrade 3b where limited by soil droughtiness).

2.6 Stoniness Limitation

2.6.1 From the ALC Guidelines, a stoniness limitation is concerned with mechanical limitations caused by stone content within the top 25cm of the soil profile. Increased stone content *'can increase production costs by causing extra wear and tear to implements and tyres. Crop quality may also be reduced in stony soil by causing, for example, the distortion of root crops or bruising of potatoes during harvesting. Stones can impair crop establishment by causing reduced plant populations in precision-drilled crops, and they reduce the nutrient capacity of*

the soil'. The ALC grade according to stoniness is shown in Table 3.5 below (based on Table 5 'Grade according to stoniness' in the ALC Guidelines). The size limits specified are for volumes of stones which will not pass through sieves with 2 cm or 6 cm square mesh. Grade limits have been specified for stones retained on a 6 cm sieve because they usually have a more detrimental effect than smaller stones. The limits apply to hard stones, and where the stones are of soft lithology, such as soft chalk, weakly cemented sandstones or siltstones, the limits are relaxed by one grade or subgrade. Both stone percentage columns are expressed in terms of the percentage of total volume of the top 25 cm of the soil, and either can be most limiting and determine the grade. Thus, if 30% of the top 25 cm comprises hard stones larger than 2 cm, the land cannot be graded higher than 3b. However, if that same soil layer contains 25% stones larger than 6 cm the land cannot be graded higher than Grade 4. Small numbers of large boulders or stones which can be removed easily should be ignored. Stones smaller than 2 cm, which have no or only minor effects on cultivation, should also be ignored.

Table 2.5: ALC Grade According to Stoniness

Grade/Subgrade	Limiting percentages (volume) of hard stones in the top 25cm of soil	
	Stones larger than 2cm	Stones larger than 6cm
1	5	5
2	10	5
3a	15	10
3b	35	20
4	50	35
5	>50	>35

2.6.2 Most profiles across the Site have a topsoil stone content of greater than or equal to 6% hard stones larger than 2 cm, therefore limiting the grade by stoniness to Grade 2 at best. These profiles ranged in stone content between 6% and 25% hard stones greater than 2cm (i.e. limited by stoniness to between Grade 2 and Subgrade 3b), and between 6% and 12% hard stones greater than 6cm (i.e. limited by stoniness to between Subgrades 3a and 3b).

2.7 ALC Grading at the Site

Grade 2

2.7.1 Agricultural land at this Site is limited to Grade 2 due to several factors or combinations of them, as follows: (i) where the volumetric content of hard stones greater than 2cm size in the

top 25cm of the profile is estimated to be between 6% and 10%, the profiles are limited by stone content to Grade 2 (re Table 5 of the ALC Guidelines) (ii) where profiles have MB values for wheat greater than or equal to +5mm and MB values for potatoes greater than or equal to -10mm and either MB values for wheat less than +30mm and/or MB values for potatoes less than +10mm, the profiles are limited by soil droughtiness to Grade 2 (re Table 8 of the ALC Guidelines), (iii) where profiles have sandy clay loam topsoil and slightly seasonally waterlogged subsoil (Wetness Class II) or sandy loam topsoil and seasonally waterlogged subsoil (Wetness Class III), the profiles are limited by soil wetness to Grade 2 in this climate area (151-175 field capacity days). Grade 2 land is the predominant map unit over the southwest of the Site, and areas are found throughout rest of the Site.

Subgrade 3a

2.7.2 Agricultural land at this Site is limited to Subgrade 3a due to several factors or combinations of them, as follows: (i) where the volumetric content of hard stones greater than 2cm size in the top 25cm of the profile is estimated to be between 11% and 15%, the profiles are limited by stone content to Subgrade 3a (re Table 5 of the ALC Guidelines) (ii) where profiles have MB values for wheat greater than or equal to -20mm and MB values for potatoes greater than or equal to -30mm and either MB values for wheat less than +5mm and/or MB values for potatoes less than -10mm, the profiles are limited by soil droughtiness to Subgrade 3a (re Table 8 of the ALC Guidelines), (iii) where profiles have medium clay loam topsoil and seasonally waterlogged subsoil (Wetness Class III) or sandy loam topsoil and subsoil which is waterlogged for long periods in winter (Wetness Class IV), the profiles are limited by soil wetness to Subgrade 3a. Isolated profiles of Grade 2 and Subgrade 3b (i.e. auger points 28, 52, 85, 117 and 139 have been subsumed within contiguous areas of Subgrade 3a as it would be unreasonable to manage them differentially to the surrounding land. Subgrade 3a land is the predominant map unit over the north of the Site and areas are found throughout the rest of the Site.

Subgrade 3b

2.7.3 Agricultural land at this Site is limited to Subgrade 3b due to several factors or combinations of them, as follows: (i) where the volumetric content of hard stones greater than 2cm size in the top 25cm of the profile is estimated to be between 16% and 35%, the profiles are limited by stone content to Subgrade 3b (re Table 5 of the ALC Guidelines) (ii) where profiles have MB values for wheat greater than or equal to -50mm and MB values for potatoes greater than or equal to -55mm and either MB values for wheat less than -20mm and/or MB values for potatoes less than -30mm, the profiles are limited by soil droughtiness to Subgrade 3b (re Table 8 of the ALC Guidelines), (iii) where profiles have sandy clay loam topsoil and subsoil

which is waterlogged for long periods in winter (Wetness Class IV), the profiles are limited by soil wetness to Subgrade 3b. Areas of this land are found throughout the north of the Site.

Non-agricultural

2.7.4 Areas across the Site covered by woodland, infrastructure and hardstanding, or water, including Calf Heath Wood, the railway line transecting the Site, Gravelly Way, and a section of canal, have been classified as non-agricultural land.

2.7.5 The area and proportion of agricultural land in each ALC grade has been measured from an ALC map given as Figure 2. The findings are reported in Table 2.6 below.

Table 2.6: Agricultural Land Classification – WMI, Four Ashes, Staffordshire

ALC Grade	Total (Ha)	Total (% of Site)
Grade 1 (Excellent)	0	0
Grade 2 (Very Good)	51.1	17.2
Subgrade 3a (Good)	121.9	41.0
Best and Most Versatile (BMV) Agricultural Land (i.e. ALC Grades 1, 2 and Subgrade 3a)	*173.0*	*58.2*
Subgrade 3b (Moderate)	38.2	12.9
Grade 4 (Poor)	0	0
Grade 5 (Very Poor)	0	0
Other Land / Non-agricultural	85.7	28.9
Total	**296.9**	**100.0**

3 ALC AT THE SITE IN A WIDER GEOGRAPHICAL CONTEXT

3.1 Introduction

3.1.1 The aim of this section is to examine agricultural land quality at the Site in a national, regional, county and local context.

3.2 Pre-1988 ALC Information

3.2.1 As described in Appendix B, during the 1960's and 1970's MAFF produced a series of maps to show the provisional ALC grade of agricultural land over the whole of England and Wales at a scale of 1:250,000. These provisional ALC maps are suitable for strategic land use planning only, i.e. they appropriate for land areas greater than 80 ha.

3.2.2 The provisional MAFF ALC map of the Midlands Region (1:250,000, 1984) indicates that the quality of agricultural land at the Site is entirely ALC Grade 3 (not differentiated between Subgrades 3a and 3b). The proportion of agricultural land in each of the ALC grades (derived from MAFF provisional or pre-1988 ALC information) in England, West Midlands Region, Staffordshire County, and South Staffordshire District is shown for comparison in Table 3.1 below.

Table 3.1: Provisional ALC – National, Regional and Local Context (Proportion of ALC Grades as % of Total Land Area)[6]

ALC Grade	England	West Midlands	Staffordshire	South Staffordshire District
1 (excellent)	2.7	1.1	0.1	0.6
2 (very good)	14.2	17.1	10.2	18.4
3 (good to moderate)	48.2	53.3	52.1	69.4
4 (poor)	14.1	14.6	24.9	5.7
5 (very poor)	8.4	2.5	3.9	0.0
Non-Agricultural	5.0	2.3	3.3	2.2
Urban	7.3	8.6	5.5	3.7

[6] Ministry of Agriculture, Fisheries and Food, Land and Water Service, Technical Notes, Resource Planning (February 1983) 'Agricultural Land Classification of England and Wales – The Distribution of the Grades' (TN/RP/01 TFS 846)

3.3 Post-1988 ALC Information

3.3.1 From the MAGIC[7] website, and Appendix E 'MAFF Agricultural Land Classification: Four Ashes (Site 64), Staffordshire Aggregates Local Plan (Ref. 079/94)', part of the Site in the east has been covered by a Post 1988 ALC survey. The MAFF Post 1988 ALC survey determined mainly Grade 2 and Subgrade 3a, with a small amount of Subgrade 3b on the eastern tip.

3.4 Overview

3.4.1 South Staffordshire District has no Grade 1 agricultural land. Approximately 18.4 % of the District comprises Grade 2, which is higher than the national average (14.2 %). The majority (i.e. 69.4 %) of agricultural land in the District is in Grade 3 (not differentiated between Subgrade 3a and 3b), which is also higher than the national average (48.2 %). Therefore, the presence of Grade 2 and Grade 3 agricultural land at the Site is to be expected, as these grades of agricultural land are widespread in the District.

[7] MAGIC.gov.uk Last viewed May 2017

4 SUMMARY AND CONCLUSIONS

4.1.1 An assessment of agricultural land quality, involving a desktop study and a detailed Agricultural Land Classification (ALC) survey, has been undertaken to determine quality of agricultural land at a site proposed for the West Midlands Interchange at Four Ashes, Staffordshire ('the Site'). The assessment was made in accordance with the Agricultural Land Classification (ALC) system for England and Wales, October 1988 ('the ALC Guidelines').

4.1.2 The approximately 296.9 ha Site is located directly to the north of Four Ashes, Staffordshire and 10km north of Wolverhampton, as shown on Figure 1. It is centred at National Grid Reference SJ 920 098. The Site is bordered by the A5 to the north, Calf Heath Reservoir and the M6 to the east, the Staffordshire and Worcestershire Canal to the south, and the A449 Stafford Road to the west. At the time of the ALC survey the Site was mainly under arable (including barley or barley stubble), with some areas of potatoes, rough grassland and set-aside land. The Rugby–Birmingham–Stafford railway line passes from north to south through the western half of the Site.

4.1.3 Bedrock underlying most of the site is described by the BGS (1:50,000) as sandstone of the Wildmoor Sandstone Formation. The bedrock underlying the north-western tip of the site, to Croft Lane along the northern edge and to 300m south of Gravelly Way along the southern edge, is described as sandstone, pebbly (gravelly), of the Bromsgrove Sandstone Formation. The BGS Superficial Deposit map (1:50,000) indicates that the bedrock underlying much of the Site is covered by sand and gravel from Devensian Glaciofluvial Deposits. Devensian Glacial Till covers areas of bedrock at the north east and south of the Site. An area to the north west of the Site is covered by clay, silt, sand and gravel from Alluvium and small areas at the south east and west of the Site are not covered by any recorded deposits.

4.1.4 Provisional information for soils at the Site was gathered from the Soil Survey of England and Wales (SSEW) soil map of Midland and Western England (Sheet 3) at a scale of 1:250,000 and accompanying Bulletin No. 12 '*Soils and their Use in Midland and Western England*' (J. M. Ragg *et al*, Harpenden, 1984). The provisional information indicates that agricultural land over most of the Site is covered by soils of the Clifton Association, with soils of the Wick 1 Association covering parts of the west of the Site.

4.1.5 The findings of a detailed soil/ALC survey at 182 locations determined that the soil across the Site is variable, but can be broadly categorised under two types.

4.1.6 Soil profiles over most of the Site consist of very dark greyish brown, very dark grey or dark brown (Munsell colours 10YR 3/2, 3/1 and 7.5YR 3/2), slightly to moderately stony (8-30% hard stones), non-calcareous, medium sandy loam, sandy clay loam or loamy medium sand topsoil. The upper subsoil consists of brown, yellowish brown or dark yellowish brown

(Munsell colours 7.5YR 5/4, 4/4 or 10YR 5/3, 4/3, 5/4, 4/4), often ochreous mottled (Munsell colours 7.5YR 5/6, 5/8, 6/6, 6/8 or 10YR 5/6, 5/8), very slightly to very stony (2-60% hard stones), non-calcareous, medium sandy loam, loamy medium sand or sandy clay loam with moderate structural condition. The lower subsoil consists of variably coloured, light grey to light yellowish brown to strong brown to reddish brown (Munsell colours 10YR 7/2, 64, 7.5YR 4/6, 5YR 5/4), often ochreous and grey mottled, stoneless to very stony (0-60% hard stones), non-calcareous, loamy medium sand, medium sandy loam or medium sand, with moderate structural condition. Many of these profiles become impossible to auger at variable depth due to very stony or iron pan layers. Type 1 profiles are usually well drained and placed in Wetness Class I.

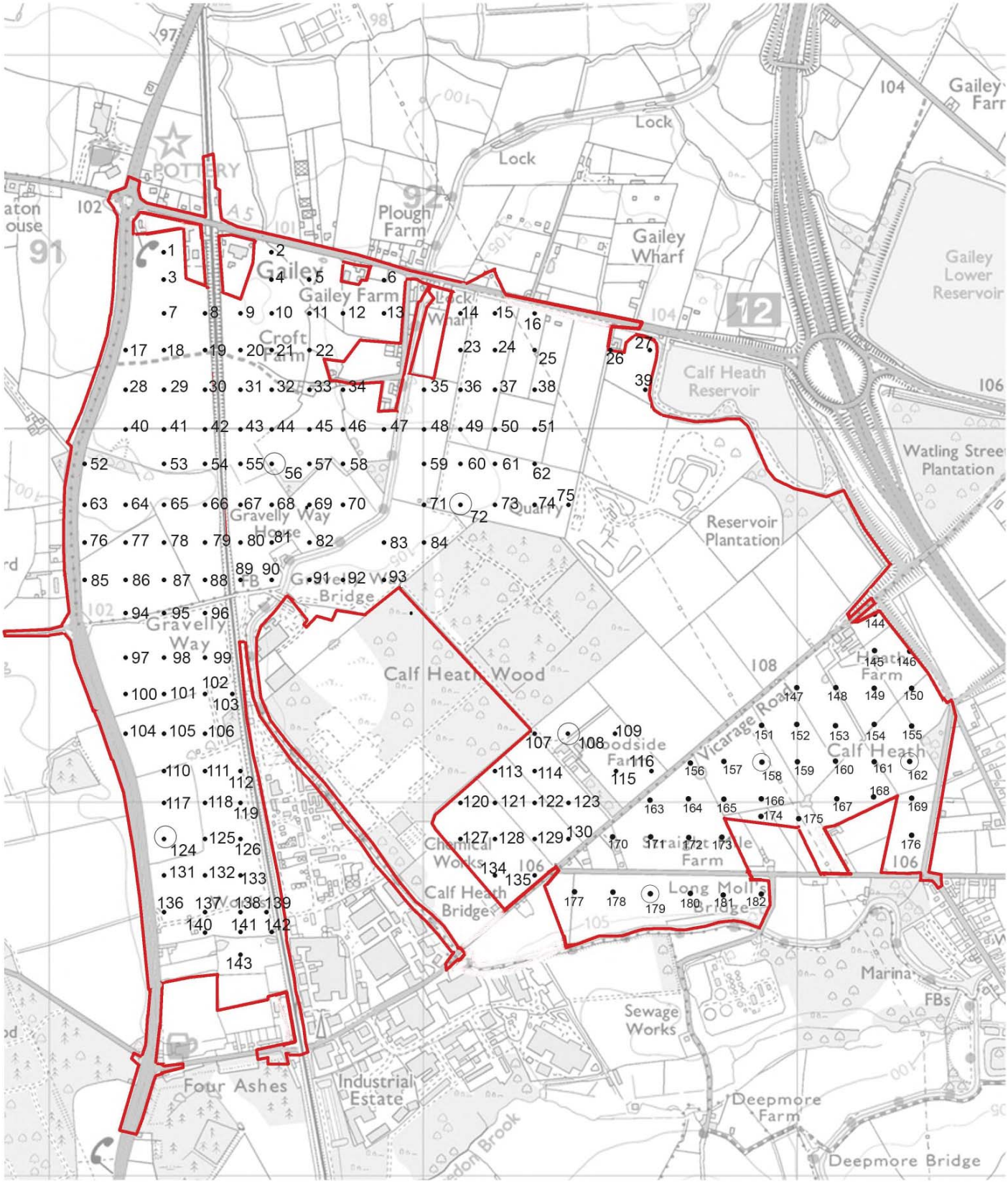
4.1.7 Some profiles across the Site include a slowly permeable layer within the upper or lower subsoil consisting of reddish brown (Munsell colours 5YR 4/4, 5/3, 5/4 or 2.5YR 44), grey mottled (Munsell colours 2.5Y 6/1, 6/2 and 10YR 6/1), stoneless to slightly stony (0-10% hard stone), non-calcareous, clay or sandy clay, with poor structural condition. These profiles often have similar, moderately structured, sandy clay loam or heavy clay loam layers immediately above or below the slowly permeable layer. Type 2 profiles range between well drained profiles placed in Wetness Class I and profiles which are waterlogged for long periods over the winter and placed in Wetness Class IV, depending on the depth to the slowly permeable clay layer.

4.1.8 The detailed ALC survey, combined with post-1988 survey data for part of the Site, has determined that 51.1 ha (17.2%) of the Site is limited to Grade 2 by combinations of slight soil droughtiness, soil wetness, or stoniness. Approximately 121.9 ha (41.0%) of the Site is limited to Subgrade 3a by combinations of moderate soil droughtiness, soil wetness, or stoniness. A further 38.2 ha (12.9%) is limited to Subgrade 3b by combinations of more severe soil droughtiness, soil wetness, or stoniness. Approximately 85.7 ha (28.9%) of the Site has been classified as non-agricultural land (i.e. working mineral quarry, railway line, buildings, hard-standing, road, woodland and water-bodies).

4.1.9 South Staffordshire District has no Grade 1 agricultural land. Approximately 18.4 % of the District comprises Grade 2, which is higher than the national average (14.2 %). The majority (i.e. 69.4 %) of agricultural land in the District is in Grade 3 (not differentiated between Subgrade 3a and 3b), which is also higher than the national average (48.2 %). Therefore, the presence of Grade 2 and Grade 3 agricultural land at the Site is to be expected, as these grades of agricultural land are widespread in the District.

4.1.10 In terms of mitigating for the loss of agricultural land at the Site, and disturbing the soil resources thereon, current best practice set out in the Department for Environment, Food and Rural Affairs' (DEFRA) 'Construction Code of Practice for the Sustainable Management of Soil on Construction Sites, September 2009. Opportunities exist to strip and store soil resources (i.e. topsoil and subsoil) on Site for re-use in landscaping areas and open space.

Figures



Site boundary

Sample location

Top soil Sample

N

Client

Four Ashes Ltd

Figure 1:

Sample Locations

Project Name

West Midlands Interchange,
Four Ashes, Staffordshire

Project No C497

Dwg. No 9

Scale NTS

Date 6/03/2018

Drawn By RWA

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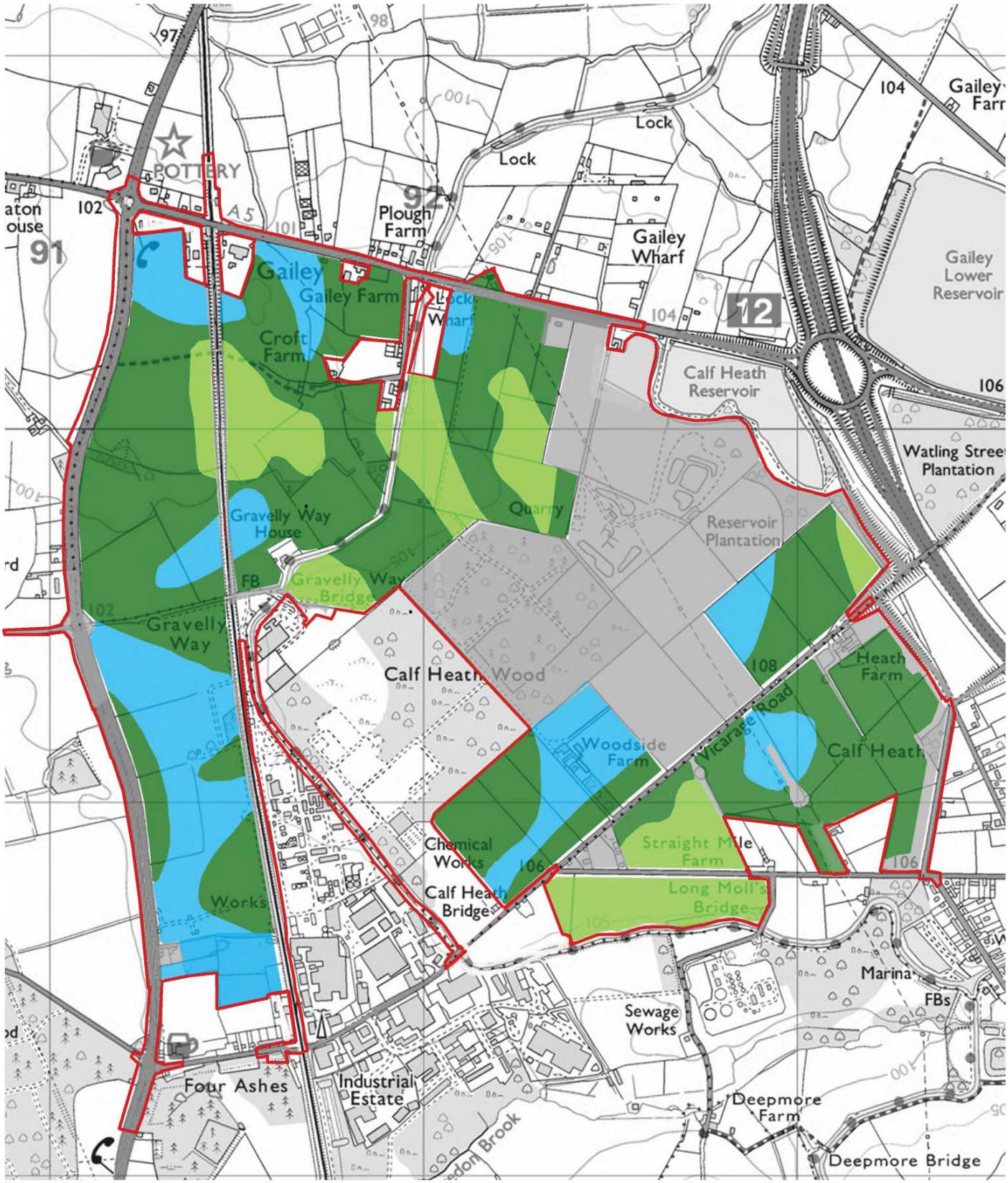
The Old Stables, Upexe, Exeter, EX5 5ND
Tel: 07753 227 224
Email: rw.askew@btinternet.com



ALC Grade

- Grade 1
- Grade 2
- Subgrade 3a
- Subgrade 3b
- Grade 4
- Grade 5
- Other land

Site boundary

N

Client

West Midlands Interchange

Figure 2:

Agricultural Land Classification

Project Name

West Midlands Interchange
Four Ashes, Staffordshire

Project No	C497
Dwg. No	10
Scale	NTS
Date	6\03\2018
Drawn By	RWA

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Appendix A:
IPSS Professional Competency Scheme Doc. 2 – Agricultural Land Classification

DOCUMENT 2

Agricultural Land Classification (England and Wales)

Background

The evaluation of land for its agricultural potential in England and Wales[1] is accomplished by application of the Agricultural Land Classification[2] (ALC). Professional competence in Agricultural Land Classification builds upon foundation skills in field soil investigation, description and interpretation (IPSS PCSS Document 1). This system of professional competence is based upon a detailed written procedures document developed by the Farming and Rural Conservation Agency[3].

Qualifications

Professional soil scientists with competence in Agricultural Land Classification will have graduated in a relevant science subject. They will also have a number of years of relevant field experience and will have, or be adequately qualified for, membership of a relevant professional body such as the Institute of Professional Soil Scientists.

Minimum competencies

Skills and Knowledge:

These are described under a number of subheadings that relate to different tasks. A professionally competent contractor should have the skills and knowledge identified under the **General heading** and **all other headings that are relevant** to the tasks required.

General

1. A general knowledge and understanding of natural soil development and of world, European and national soil taxonomy
2. A detailed knowledge and understanding of the Agricultural Land Classification system relevant to the site and of the classification of land according to the current published Guidelines and other documents[1, 2] and the ability to apply it accurately and consistently in the classification of an area of land

[1] Similar systems are employed in Scotland and Northern Ireland

[2] ALC Revised Guidelines and Criteria for the Grading the Quality of Agricultural Land (MAFF, 1988) and Climatological Datasets for ALC (Met. Office, 1989)

[3] A former Executive Agency of the Ministry of Agriculture , Fisheries and Food (now Defra)

DOCUMENT 2

Agricultural Land classification (England and Wales)

Institute of Professional Soil Scientists

3. An awareness and knowledge of existing published and unpublished, paper-based and digital ALC information and sources
4. A knowledge of paper and digital topographic, geology and soil maps, mineral assessment reports and memoirs and other technical sources of reference; and of their role in ALC work
5. An understanding of map scales and of the Ordnance Survey National Grid
6. The ability to investigate, sample, describe and interpret soils in the field in a consistent manner and to professional standards (IPSS PCSS Document 1)
7. Knowledge of relevant European and national regulations and policies including national and local land use planning policy and guidance, and soil protection policy
8. The ability to effectively communicate soil information in a simple and relevant form to developers, planners and other relevant professionals with clear statements as to the reliability and certainty of the results
9. The ability to write accurate, concise reports in clear English and in line with best practice examples of ALC survey that communicate the relevant information to all relevant communicants
10. An awareness of the importance of systems of quality assurance and control in all aspects of professional work

Preparations prior to field survey

1. The ability to compile background site physical data (e.g. relief, geology, soils, climate, flood-risk, exposure and grade from published and unpublished sources) and understanding of the limitations of the data obtained
2. An understanding of scale and of how different survey sampling densities may impact on the certainty of results obtained. A knowledge of how to tailor survey density appropriately to the requirements of the client, and understanding of the limitations that might impose
3. The ability to compute gradients from map contours
4. A thorough knowledge of climatic data interpolation procedures (and any available associated bespoke computer software), and the ability to obtain representative site values
5. An understanding of soil maps, the concepts of soil associations and soil series and their limitations as a background to ALC grading
6. A knowledge of GPS and data logger technology and its uses and limitations for field survey work
7. A knowledge and understanding of relevant Health and Safety legislation requirements for work in the field
8. An understanding of basic biosecurity requirements and any animal or plant health restrictions which may be in force

Field survey for Agricultural Land Classification

1. The ability to determine, lay out and work to a relevant sampling strategy
2. Competency in the Foundation Skills (field soil investigation, sampling, description and interpretation) as per IPSS PCSS Document 1
3. The ability to accurately and consistently apply the ALC system to soil and other data collected during the field survey

Reporting

1. The knowledge and ability to compile an ALC map from background information and data collected during the field survey
2. The ability to write an ALC survey report according to an agreed format
3. Understanding of the principles of quality assurance and the ability to apply these as required by the client
4. The ability to convey the findings of the survey verbally such that they are understood by the client

SUPPORTING ORGANISATIONS

The following organisations have given their support to the Institute of Professional Soil Scientist's Working with Soils Professional Competency Initiative:

iPSS
Institute of Professional Soil Scientists

'Defra welcomes initiatives, such as the IPSS Working with Soils Competency Statements, that aim to improve the quality of professional soils advice'

ADAS

afbi Agri-Food and Biosciences Institute

AHDB Agriculture & Horticulture Development Board

AICC Association of Independent Crop Consultants

National Parks Britain's breathing spaces
Parciau Cenedlaethol Prydain
Ile i enaid gael llonydd
Pàircean Nàiseanta na h-Alba

BALI British Association of Landscape Industries

BIAC

CEH Centre for Ecology & Hydrology
Natural Environment Research Council

CIWEM

The co-operative farms

CPRE Campaign to Protect Rural England
Standing up for your countryside

Cresswell
a Hyder Consulting group company

Earthcare Technical

Asiantaeth yr Amgylchedd Cymru
Environment Agency Wales

ENPAA English National Park Authorities Association

FWAG Farming & Wildlife Advisory Group

Comisiwn Coedwigaeth Cymru
Forestry Commission Wales

Game & Wildlife Conservation Trust

Greenvale AP
Natural choice for fresh potatoes

IAgrE

iema
Institute of Environmental Management & Assessment

The James Hutton Institute

Landscape Institute
Inspiring great places

Land Research Associates

defra
Department for Environment Food and Rural Affairs

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IPSS
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LEAF
LINKING ENVIRONMENT AND FARMING
Integrated Farm Management

NIAB TAG

NFU

National Trust

NATURAL ENGLAND

PRODUCE WORLD
GROWING TRUST

ROTHAMSTED RESEARCH

Royal Agricultural College

ROYAL AGRICULTURAL SOCIETY of ENGLAND

SAC

Sainsbury's

SALMON & TROUT ASSOCIATION

SEPA
Scottish Environment Protection Agency

SOCIETY OF Biology

Soil Association

SNIFFER
SCOTLAND & NORTHERN IRELAND FORUM FOR ENVIRONMENTAL RESEARCH

The Scottish Government

the SCIENCE council

THE wildlife TRUSTS

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

TOPSOIL The Sustainable Choice from British Sugar

Unilever

Llywodraeth Cymru
Welsh Assembly Government

Waitrose

wrap
Working together for a world without waste

Appendix B:
Natural England
Technical Information Note 049 –
Agricultural Land Classification

Natural England Technical Information Note TIN049

Agricultural Land Classification: protecting the best and most versatile agricultural land

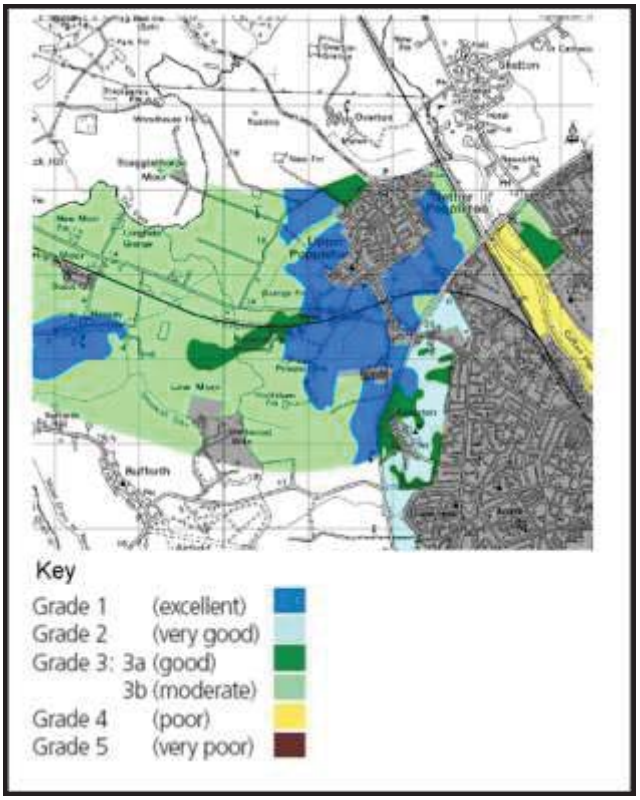
Most of our land area is in agricultural use. How this important natural resource is used is vital to sustainable development. This includes taking the right decisions about protecting it from inappropriate development.

Policy to protect agricultural land

Government policy for England is set out in the National Planning Policy Framework (NPPF) published in March 2012 (paragraph 112). Decisions rest with the relevant planning authorities who should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of higher quality. The Government has also re-affirmed the importance of protecting our soils and the services they provide in the Natural Environment White Paper The Natural Choice:securing the value of nature (June 2011), including the protection of best and most versatile agricultural land (paragraph 2.35).

The ALC system: purpose & uses

Land quality varies from place to place. The Agricultural Land Classification (ALC) provides a method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system. It helps underpin the principles of sustainable development.



Agricultural Land Classification - map and key

Second edition 19 December 2012
www.naturalengland.org.uk

The ALC system classifies land into five grades, with Grade 3 subdivided into Subgrades 3a and 3b. The best and most versatile land is defined as Grades 1, 2 and 3a by policy guidance (see Annex 2 of NPPF). This is the land which is most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non food uses such as biomass, fibres and pharmaceuticals. Current estimates are that Grades 1 and 2 together form about 21% of all farmland in England; Subgrade 3a also covers about 21%.

The ALC system is used by Natural England and others to give advice to planning authorities, developers and the public if development is proposed on agricultural land or other greenfield sites that could potentially grow crops. The Town and Country Planning (Development Management Procedure) (England) Order 2010 (as amended) refers to the best and most versatile land policy in requiring statutory consultations with Natural England. Natural England is also responsible for Minerals and Waste Consultations where reclamation to agriculture is proposed under Schedule 5 of the Town and Country Planning Act 1990 (as amended). The ALC grading system is also used by commercial consultants to advise clients on land uses and planning issues.

Criteria and guidelines

The Classification is based on the long term physical limitations of land for agricultural use. Factors affecting the grade are climate, site and soil characteristics, and the important interactions between them. Detailed guidance for classifying land can be found in: *Agricultural Land Classification of England and Wales: revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988):

- **Climate:** temperature and rainfall, aspect, exposure and frost risk.
- **Site:** gradient, micro-relief and flood risk.
- **Soil:** texture, structure, depth and stoniness, chemical properties which cannot be corrected.

The combination of climate and soil factors determines soil wetness and droughtiness. Wetness and droughtiness influence the choice of crops grown and the level and consistency of yields, as well as use of land for grazing livestock. The Classification is concerned with the inherent potential of land under a range of farming systems. The current agricultural use, or intensity of use, does not affect the ALC grade.

Versatility and yield

The physical limitations of land have four main effects on the way land is farmed. These are:

- the range of crops which can be grown;
- the level of yield;
- the consistency of yield; and
- the cost of obtaining the crop.

The ALC gives a high grading to land which allows more flexibility in the range of crops that can be grown (its 'versatility') and which requires lower inputs, but also takes into account ability to produce consistently high yields of a narrower range of crops.

Availability of ALC information

After the introduction of the ALC system in 1966 the whole of England and Wales was mapped from reconnaissance field surveys, to provide general strategic guidance on land quality for planners. This Provisional Series of maps was published on an Ordnance Survey base at a scale of One Inch to One Mile in the period 1967 to 1974. These maps are not sufficiently accurate for use in assessment of individual fields or development sites, and should not be used other than as general guidance. They show only five grades: their preparation preceded the subdivision of Grade 3 and the refinement of criteria, which occurred after 1976. They have not been updated and are out of print. A 1:250 000 scale map series based on the same information is available. These are more appropriate for the strategic use originally intended and can be downloaded from the Natural England **website**. This data is also available on ‘Magic’, an interactive, geographical information website **http://magic.defra.gov.uk/**.

Since 1976, selected areas have been re-surveyed in greater detail and to revised

guidelines and criteria. Information based on detailed ALC field surveys in accordance with current guidelines (MAFF, 1988) is the most definitive source. Data from the former Ministry of Agriculture, Fisheries and Food (MAFF) archive of more detailed ALC survey information (from 1988) is also available on **http://magic.defra.gov.uk/**. Revisions to the ALC guidelines and criteria have been limited and kept to the original principles, but some assessments made prior to the most recent revision in 1988 need to be checked against current criteria. More recently, strategic scale maps showing the likely occurrence of best and most versatile land have been prepared. Mapped information of all types is available from Natural England (see *Further information* below).

New field survey

Digital mapping and geographical information systems have been introduced to facilitate the provision of up-to-date information. ALC surveys are undertaken, according to the published Guidelines, by field surveyors using handheld augers to examine soils to a depth of 1.2 metres, at a frequency of one boring per hectare for a detailed assessment. This is usually supplemented by digging occasional small pits (usually by hand) to inspect the soil profile. Information obtained by these methods is combined with climatic and other data to produce an ALC map and report. ALC maps are normally produced on an Ordnance Survey base at varying scales from 1:10,000 for detailed work to 1:50 000 for reconnaissance survey

There is no comprehensive programme to survey all areas in detail. Private consultants may survey land where it is under consideration for development, especially around the edge of towns, to allow comparisons between areas and to inform environmental assessments. ALC field surveys are usually time consuming and should be initiated well in advance of planning decisions. Planning authorities should ensure that sufficient detailed site specific ALC survey data is available to inform decision making.

Consultations

Natural England is consulted by planning authorities on the preparation of all development plans as part of its remit for the natural environment. For planning applications, specific consultations with Natural England are required under the Development Management Procedure Order in relation to best and most versatile agricultural land. These are for non agricultural development proposals that are not consistent with an adopted local plan and involve the loss of twenty hectares or more of the best and most versatile land. The land protection policy is relevant to all planning applications, including those on smaller areas, but it is for the planning authority to decide how significant the agricultural land issues are, and the need for field information. The planning authority may contact Natural England if it needs technical information or advice.

Consultations with Natural England are required on all applications for mineral working or waste disposal if the proposed afteruse is for agriculture or where the loss of best and most versatile agricultural land agricultural land will be 20 ha or more. Non-agricultural afteruse, for example for nature conservation or amenity, can be acceptable even on better quality land if soil resources are conserved and the long term potential of best and most versatile land is safeguarded by careful land restoration and aftercare.

Other factors

The ALC is a basis for assessing how development proposals affect agricultural land within the planning system, but it is not the sole consideration. Planning authorities are guided by the National Planning Policy Framework to protect and enhance soils more widely. This could include, for example, conserving soil resources during mineral working or construction, not granting permission for peat extraction from new or extended mineral sites, or preventing soil from being adversely affected by pollution. For information on the application of ALC in Wales, please see below.

Further information

Details of the system of grading can be found in: *Agricultural Land Classification of England and Wales: revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

Please note that planning authorities should send all planning related consultations and enquiries to Natural England by e-mail to **consultations@naturalengland.org.uk**. If it is not possible to consult us electronically then consultations should be sent to the following postal address:

Natural England
Consultation Service
Hornbeam House
Electra Way
Crewe Business Park
CREWE
Cheshire
CW1 6GJ

ALC information for Wales is held by Welsh Government. Detailed information and advice is available on request from Ian Rugg (**ian.rugg@wales.gsi.gov.uk**) or David Martyn (**david.martyn@wales.gsi.gov.uk**). If it is not possible to consult us electronically then consultations should be sent to the following postal address:

Welsh Government
Rhodfa Padarn
Llanbadarn Fawr
Aberystwyth
Ceredigion
SY23 3UR

Natural England publications are available to download from the Natural England website: **www.naturalengland.org.uk**.

For further information contact the Natural England Enquiry Service on 0300 060 0863 or e-mail **enquiries@naturalengland.org.uk**.

Copyright

Appendix C:
Soil Profile Log

Code	Location	Parcel
C497	Four Ashes, Staffordshire	Application Site

Date(s)	Surveyor(s)	Company
(i) 24-25 Aug16; (ii) 07-08Sep16; (iii) 24-25Apr17	Adrian Rochford, Tim Bearder, Rob Askew	Askew Land and Soil Ltd

Weather	Relief	Land use and vegetation
Fair	Gently undulating	Arable, grass, some non-agricultural

Grid square	Easting	Northing	Postcode	Altitude	Area
SJ	920	98	ST19 5PY	107	268.2

MAFF prov	MAFF detailed	Flooding
3	Eastern end: 2 and 3a, with some 3b	Flood Zone 1 (<0.1%)

AAR	AT0	MDw	MDp	FCD	Climate grade
700	1360	93	80	164	1

Bedrock	Superficial deposits
Sandstone; Sandstone, pebbly (gravelly)	Glacio-fluvial drift, glacial till, alluvium

Soil data	Soil association(s)
1:250,000	Clifton Association; Wick 1 Association

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
1	SJ	913	105		0		STB	0	38	38	10YR32						MSL	12	HR		N			16	8	2	I	1	2	ST,DR	8>2
								38	50	12	7.5YR72	CD	7.5YR56				MSL	10	HR	M	N									
								50	70	20	7.5YR72	CD	7.5YR56				MS	0		M	N									
								70	120	50	5YR54	CD	5YR71				MS	0		M	N									
										0																				
										0																				
										0																				
2	SJ	916	105		3	E	BAR	0	30	30	10YR31						MSL	8	HR		N			28	26	2	I	1	2	DR	4>2
								30	55	25	7.5YR44						MSL	2	HR	M	N	F								
								55	75	20	10YR41						MSL	2	HR	M	N									Buried topsoil? Disturbed?
								75	90	15	10YR62						LMS	2	HR	M	N									
								90	120	30							LMS	60	HR	M										
										0																				
										0																				
3	SJ	913	104		0		STB	0	40	40	10YR42						MSL	15	HR		N			28	18	2	III	2	2	WD,ST	10>2,5>6
								40	45	5	7.5YR72	CD	7.5YR56			Y	MSL	10	HR	M	N									
								45	120	75	5YR54	CD	2.5Y62				C	0		P	N		Y							
										0																				
										0																				
										0																				
4	SJ	916	104		1	N	BAR	0	30	30	10YR42						MSL	10	HR		N			3	-2	3a	I	1	3a	DR	6>2
								30	65	35	7.5YR44						LMS	10	HR	M	N									
								65	120	55	7.5YR56						MS	10	HR	M	N									
										0																				
										0																				
										0																				
5	SJ	917	104		3	W	BAR	0	35	35	10YR32						MSL	12	HR		N			6	0	2	I	1	2	ST,DR	8>2
								35	60	25	10YR62						LMS	10	HR	M	N									
								60	120	60	10YR72						MS	5	HR	M	N									
										0																				
										0																				
										0																				
6	SJ	919	104		0		BAR	0	40	40	10YR31						MSL	15	HR		N			26	29	2	I	1	3a	ST	12>2
								40	60	20	10YR42						LMS	10	HR	M	N									
								60	80	20	7.5YR44						LMS	10	HR	M	N									
								8	120	112							LMS	60	HR	M										
										0																				
										0																				
										0																				
7	SJ	913	103	106	1	S	ARA	0	30	30	10YR32						SCL	18	HR		N			7	16	2	II?	2	2	WD,ST	10>2,2>6
								30	50	20	7.5YR53	CD	7.5YR56	FD	7.5YR51	Y	MSL	10	HR	M	N									
								50	65	15	5YR44	CD	5YR52	FD	7.5YR56	S	SCL	5	HR	M	N									
								65	70	5	5YR54						LMS	0		M	N									
								70	120	50							LMS	60	HR	M										
										0																				
8	SJ	914	103		0		STB	0	50	50	10YR31						MSL	12	HR		N			28	21	2	III	2	2	WD,ST	8>2,1>6
								50	90	40	5YR54,53	CD	2.5Y62				C	0		P	N		Y							
								90	120	30	5YR54,53						LMS	2	HR	M	N									
										0																				
										0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
9	SJ	915	103	106	1	S	BAR	0	30	30	10YR31						MSL	15	HR		N			5	-1	2	I	1	2	DR,ST	10>2,2>6
								30	45	15	7.5YR53	CD	7.5YR56	CD	7.5YR51		MSL	20	HR	M	N										
								45	120	75							MSL	60	HR	M											
										0																				
										0																				
										0																				
										0																				
10	SJ	916	103	106	1	S	BAR	0	30	30	7.5YR32						MSL	18	HR		N			-11	-8	3a	I	1	3a	DR,ST	12>2,2>6
								30	40	10	7.5YR44						MSL	20	HR	M	N										
								40	55	15	7.5YR53	CD	7.5YR56	FD	7.5YR51		LMS	20	HR	M	N										
								55	120	65							LMS	60	HR	M											
										0																				
										0																				
										0																				
11	SJ	917	103		3	E	BAR	0	50	50	10YR31						MSL	10	HR		N			25	21	2	I	1	2	DR,ST	6>2
								50	70	20	7.5YR44,56						MSL	20	HR	M	N										
								70	120	50							MSL	60	HR	M											
										0																				
										0																				
										0																				
12	SJ	918	103		0		BAR	0	40	40	10YR31						MSL	15	HR		N			-8	-5	3a	I	1	3a	DR,ST	11>2,5>6
								40	50	10	7.5YR31,44						LMS	15	HR	M	N										
								50	120	70							LMS	60	HR	M											
										0																				
										0																				
										0																				
13	SJ	919	103		0		BAR	0	36	36	10YR31						MSL	10	HR		N			-10	-7	3a	I	1	3a	DR	6>2
								36	45	9	10YR44						LMS	15	HR	M	N										
								45	120	75							LMS	60	HR	M											
										0																				
										0																				
										0																				
14	SJ	921	103		0		POT	0	30	30	10YR32						MSL	12	HR		N			15	8	2	I	1	2	DR,ST	6>2
								30	50	20	7.5YR54						MSL	5	HR	M	N										
								50	120	70	5YR54						MS	2	HR	M	N										
										0																				
										0																				
										0																				
15	SJ	922	103	104	0		BAR	0	40	40	10YR31						LMS	12	HR		N			-1	-7	3a	I	1	3a	DR	7>2
								40	70	30	10YR53	FD	10YR56			S	LMS	3	HR	M	N										
								70	120	50	7.5YR72	CD	7.5YR56			Y	MS	0		M	N										
										0																				
										0																				
										0																				
16	SJ	923	103	103	0		BAR	0	25	25	10YR32						MSL	12	HR		N			22	18	2	IV	3a	3a	WE	8>2,0>6
								25	40	15	7.5YR53	CD	7.5YR51	CD	7.5YR56		SCL	4	HR	M	N										
								40	85	45	5YR44	CD	5Y61,71				C	1	HR	P	N	C	Y								
								85	110	25	5YR44						C	10	HR	P	N	C	Y								
								110	120	10							C	60	HR	P			Y								

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
17	SJ	912	102	104	1	S	ARA	0	30	30	10YR32						SCL	18	HR		N			-6	-2	3a	I	1	3a	DR	10>2,3>6
								30	45	15	7.5YR53	CD	7.5YR56	CD	10YR61	Y	MSL	10	HR	M	N	C								
								45	55	10	7.5YR43	CD	7.5YR52				LMS	5	HR	M	N									
								55	120	65							LMS	60	HR	M										
										0																				
										0																				
										0																				
18	SJ	913	102	106	0		ARA	0	35	35	10YR32						MCL	18	HR		S			31	21	1	III	3a	3a	WE,ST	12>2,4>6
								35	62	27	10YR42						HCL	10	HR	M	N									
								62	100	38	5YR44,54	CD	10YR61			Y	C	5	HR	P	N		Y							
								100	110	10	5YR54	CD	10YR61				SCL	5	HR	M	N									
								110	120	10							SCL	60	HR	M										
										0																				
										0																				
19	SJ	914	102		0		STB	0	34	34	10YR32						SCL	18	HR		N			24	14	2	IV	3b	3b	WE	12>2,4>6
								34	40	6	10YR72	CD	10YR56			Y	C	10	HR	P	N									
								40	120	80	5YR54,44	CD	2.5Y62				C	0		P	N	F	Y							
										0																				
										0																				
										0																				
20	SJ	915	102	105	1	S	BAR	0	30	30	10YR32						MSL	18	HR		N			-7	-4	3a	I	1	3a	DR	10>2,2>6
								30	50	20	10YR53	CD	10YR61	CD	10YR56	Y	SCL	20	HR	M	N									
								50	55	5	7.5YR46	CD	10YR52			S	LMS	30	HR	M	N									
								55	120	65							LMS	60	HR	M										
										0																				
										0																				
										0																				
21	SJ	916	102	106	1	S	BAR	0	30	30	10YR32						MSL	15	HR		N			-16	-14	3a	I	1	3a	DR	10>2,2>6
								30	47	17	7.5YR54	CD	7.5YR56			S	LMS	20	HR	M	N									
								47	120	73							LMS	60	HR	M										
										0																				
										0																				
										0																				
22	SJ	917	102	106	2	SE	BAR	0	32	32	10YR32						MSL	15	HR		N			12	7	2	I	1	2	DR,ST	8>2,1>6
								32	55	23	10YR43						MSL	20	HR	M	N									
								55	60	5	10YR64	CD	10YR58	FD	10YR51	S	MSL	30	HR	M	N									
								60	120	60							MSL	60	HR	M										
										0																				
										0																				
										0																				
23	SJ	921	102		0		POT	0	30	30	10YR32						MSL	14	HR		N			27	17	2	III	2	2	WD,ST	7>2
								30	55	25	10YR54						MSL	10	HR	M	N									
								55	120	65	5YR54	CD	2.5Y62				C	5	HR	P	N	F	Y							
										0																				
										0																				
										0																				
24	SJ	922	102	100	0		BAR	0	35	35	10YR31						MSL	14	HR		N			-15	-12	3a	I	1	3a	DR	7>2
								35	40	5	10YR44						LMS	20	HR	M	N									
								40	120	80							LMS	60	HR	M										
										0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
										0																				
25	SJ	923	102	104	0		BAR	0	32	32	10YR32						MSL	15	HR		N			37	26	1	IV	3a	3a	WE	10>2
								32	38	6	10YR53						MSL	5	HR	M	N									
								38	120	82	5YR54	CD	2.5Y62			Y	C	1	HR	M	N		Y							
										0																				
										0																				
										0																				
										0																				
26	SJ	925	102	109	0		SAS/RGR	0	45	45	10YR32						MSL	10	HR		N			33	22	1	III	2	2	WE	5>2
								45	55	10	10YR72	CD	10YR56			Y	MSL	15	HR	M	N									
								55	120	65	5YR54,53	CD	10YR62			Y	C	0		P	N	C	Y							
										0																				
										0																				
										0																				
27	SJ	926	102	108	0		SAS/RGR	0	30	30	10YR32						MSL	10	HR		N			20	5	2	I	1	2	DR,ST	7>2
								30	45	15	10YR53	CD	7.5YR56			Y	MSL	5	HR	M	N									
								45	85	40	7.5YR62	CD	7.5YR56			Y	MS	0		M	N									
								85	120	35	2.5YR54	CD	2.5Y62			Y	C	0		P	N		Y							
										0																				
										0																				
										0																				
28	SJ	912	101	104	0		ARA	0	38	38	10YR32						SCL	15	HR		S			13	13	2	II	2	2	WD,ST	10>2,1>6
								38	50	12	7.5YR54	CD	7.5YR56	FD	7.5YR51	S	LMS	10	HR	M	N									
								50	80	30	10YR61	CD	10YR64	CD	7.5YR66	Y	SCL	10	HR	M	N									
								80	100	20	7.5YR54						MS	10	HR	M	N									
								100	120	20							MS	60	HR	M										
										0																				
										0																				
29	SJ	913	101	105	0		ARA	0	27	27	10YR32						SCL	18	HR		S			-18	-13	3a	I	1	3a	DR,ST	12>2,1>6
								27	40	13	10YR43	CD	10YR51			S	LMS	10	HR	M	N									10YR68 sandy lenses
								40	55	15	7.5YR54	CD	7.5YR58			Y	MS	10	HR	M	N									
								55	65	10	7.5YR64,56						MS	5	HR	M	N									
								65	120	55							MS	60	HR	M										
										0																				
										0																				
30	SJ	914	101		0		STB	0	38	38	7.5YR32						MSL	22	HR		N			6	-1	2	I	1	3b	ST	16>2,6>6
								38	50	12	7.5YR44,56						MSL	20	HR	M	N									
								50	120	70							MSL	60	HR	M										
										0																				
										0																				
										0																				
31	SJ	915	101	99	0		STB	0	32	32	10YR31						MSL	25	HR		N			-23	-20	3b	I	1	3b	DR,ST	18>2
								32	40	8	7.5YR62	CD	7.5YR56				LMS	25	HR	M	N									
								40	120	80							LMS	60	HR	M										
										0																				
										0																				
										0																				
32	SJ	916	101	103	2	S	STB	0	30	30	10YR32						MSL	18	HR		N			-17	-12	3a	I	1	3a	DR,ST	12>2,2>6
								30	55	25	7.5YR53	CD	7.5YR66				LMS	30	HR	M	N									
								55	67	12	10YR64	CD	10YR62	CD	10YR56	Y	MS	0		M	N									

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
								67	120	53							MS	60	HR	M											
										0																					
										0																					
										0																					
33	SJ	917	101	96	1	W	STB	0	34	34	10YR31						MSL	18	HR		N			-7	-5	3a	I	1	3a	DR,ST	12>2,4>6
								34	80	46	10YR62,63	CD	10YR56				LMS	18	HR	M	N										
								80	120	40							LMS	60	HR	M											
										0																					
										0																					
										0																					
34	SJ	918	101	103	2	S	STB	0	30	30	10YR32						MSL	20	HR		N			-2	-8	3a	I	1	3a	DR,ST	12>2,2>6
								30	39	9	7.5YR53	CD	7.5YR58				MSL	30	HR	M	N										+Z?
								39	120	81							MSL	60	HR	M											
										0																					
										0																					
										0																					
35	SJ	920	101	105	1	S	POT	0	20	20	10YR32						MSL	20	HR					-33	-30	3b	I	1	3b	DR	12>2,2>6
								20	26	6	7.5YR43						LMS	40	HR	M											
								26	120	94							LMS	60	HR	M											
										0																					
										0																					
										0																					
36	SJ	921	101	107	1	S	BAR	0	35	35	10YR32						MSL	20	HR		N			0	-7	3a	I	1	3a	DR,ST	12>2,1>6
								35	42	7	10YR53	CD	7.5YR66				MSL	40	HR	M	N										
								42	120	78							MSL	60	HR	M											
										0																					
										0																					
										0																					
37	SJ	922	101	107	1	S	BAR	0	25	25	10YR32						MSL	22	HR		N			-29	-27	3b	I	1	3b	DR	14>2,3>6
								25	30	5	7.5YR43						LMS	40	HR	M	N										
								30	120	90							LMS	60	HR	M											
										0																					
										0																					
										0																					
38	SJ	923	101							0																					Inaccessible
										0																					
										0																					
										0																					
										0																					
										0																					
										0																					
39	SJ	926	101	112	0		SAS/RGR	0	32	32	10YR32						MSL	7	HR		N			18	17	2	I?	1	2	DR	4>2
								32	50	18	10YR52	CP	7.5YR56			Y	MSL	7	HR	M	N										
								50	60	10	10YR52	CP	7.5YR56			Y	SCL	7	HR	M	N										
								60	120	60							SCL	60	HR	M											
										0																					
										0																					
										0																					
40	SJ	912	100	104	1	SSW	ARA	0	35	35	10YR32						MCL	18	HR		S			35	21	1	III	3a	3a	WE,ST	12>2,2>6
								35	62	27	5YR53	CD	10YR61	CD	7.5YR58	Y	SCL	10	HR	M	N										Limed topsoil

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
								62	120	58	5YR54	CD	10YR61	FD	7.5YR56		C	4	HR	M	N	C									
										0																					
										0																					
										0																					
										0																					
41	SJ	913	100	107	1	S	ARA	0	40	40	10YR32						MSL	15	HR		S			-1	2	3a	I	1	3a	DR,ST	12>2,2>6
								40	55	15	10YR43	CD	10YR51	FD	10YR56		LMS	10	HR	M	N										Limed topsoil
								55	65	10	10YR43	CD	10YR51	CD	10YR56	Y	LMS	10	HR	M	N										
								65	87	22	7.5YR68	CD	10YR64				MS	10	HR	M	N										
								87	120	33							MS	60	HR	M											
										0																					
										0																					
42	SJ	914	100		1	S	STB	0	35	35	7.5YR32						MSL	25	HR		N			4	-3	3a	I	1	3b	ST	18>2,6>6
								35	50	15	7.5YR46,56						MSL	20	HR	M	N										
								50	120	70							MSL	60	HR	M											
										0																					
										0																					
										0																					
43	SJ	915	100	98	1	S	STB	0	32	32	10YR31						MSL	30	HR		N			-24	-21	3b	I	1	3b	DR,ST	20>2,8>6
								32	45	13	10YR44						LMS	25	HR	M	N										
								45	120	75							LMS	60	HR	M											
										0																					
										0																					
										0																					
44	SJ	916	100	104	2	S	BAR	0	30	30	10YR32						MSL	24	HR		N			-20	-15	3b	I	1	3b	ST	18>2,2>6
								30	55	25	7.5YR53	CD	7.5YR58				LMS	30	HR	M	N										
								55	65	10	7.5YR66	MD	10YR64				MS	0		M	N										
								65	120	55							MS	60	HR	M											
										0																					
										0																					
										0																					
45	SJ	917	100	102	1	SW	BAR	0	35	35	10YR31						LMS	20	HR		N			-30	-27	3b	I	1	3b	DR	15>2
								35	50	15	10YR32						LMS	50	HR	M	N										
								50	120	70							LMS	60	HR	M											
										0																					
										0																					
										0																					
46	SJ	918	100	107	1	S	STB	0	50	50	10YR32						MSL	20	HR		N			-4	-1	3a	I	1	3a	DR,ST	12>2,2>6
								50	55	5	10YR64	CD	10YR68				LMS	30	HR	M	N										
								55	120	65							LMS	60	HR	M											
										0																					
										0																					
										0																					
47	SJ	919	100	105	0		FLW	0	25	25	10YR32						MSL	22	HR		N			-28	-26	3b	I	1	3b	DR	12>2,2>6
								25	35	10	7.5YR43	FF	7.5YR66				LMS	40	HR	M	N										
								35	120	85							LMS	60	HR	M											
										0																					
										0																					
										0																					
48	SJ	920	100	104	1	S	POT	0	25	25	10YR32						MSL	18	HR		N			-27	-24	3b	I	1	3b	DR	12>2,1>6

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
								25	35	10	7.5YR43						LMS	40	HR	M	N										
								35	120	85							LMS	60	HR	M											
										0																				
										0																				
										0																				
										0																				
49	SJ	921	100		0		BAR	0	30	30	10YR31						MSL	18	HR		N			30	11	1	I	1	3a	ST	11>2
								30	120	90	10YR52,53						SCL	20	HR	M	N										
										0																				
										0																				
										0																				
										0																				
50	SJ	922	100		0		BAR	0	30	30	10YR31						MSL	10	HR		N			-17	-15	3a	I	1	3a	DR	6>2
								30	35	5	10YR44						LMS	0		M	N										
								35	120	85							LMS	60	HR	M											
										0																				
										0																				
										0																				
51	SJ	923	100		0		FLW	0	30	30	10YR31						MSL	18	HR		N			-22	-19	3b	I	1	3b	DR	11>2
								30	35	5	10YR44						LMS	18	HR	M	N										
								35	120	85							LMS	60	HR	M											
										0																				
										0																				
										0																				
52	SJ	911	099		0		SAS	0	30	30	7.5YR31						MSL	25	HR		N			-8	-15	3a	I	1	3b	ST	18>2,10>6
								30	120	90							MSL	60	HR	M											
										0																				
										0																				
										0																				
										0																				
53	SJ	913	099	103	3	S	ARA	0	35	35	10YR32						SCL	18	HR		S			23	19	2	II	2	3a	ST	12>2,2>6
								35	40	5	10YR64	CD	10YR68			Y	SCL	15	HR	M	N										Limed topsoil
								40	80	40	5YR54	CD	2.5Y61	CD	7.5YR56	Y	SC	5	HR	M	N	F									
								80	120	40							SC	60	HR	M											
										0																				
										0																				
										0																				
54	SJ	914	099		5	S	STB	0	30	30	10YR32						MSL	28	HR		N			-9	-16	3a	I	1	3b	ST	18>2,8>6
								30	120	90							MSL	60	HR	M											
										0																				
										0																				
										0																				
										0																				
55	SJ	915	099	99	0		STB	0	34	34	10YR31						MSL	20	HR		N			-19	-16	3a	I	1	3b	ST	16>2,5>6
								34	40	6	10YR62						LMS	25	HR	M	N										
								40	120	80							LMS	60	HR	M											
										0																				
										0																				
										0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
56	SJ	91610	099	104	0		FLW	0	30	30	10YR32						SCL	15	HR		N			-10	-10	3a	I	1	3a	DR	Moved due to ditch
								30	95	65	10YR61	CF	10YR56			Y	LMS	30	HR	M	N									8>2,1>6
								95	120	25							LMS	60	HR	M										Water table @ 45cm
										0																				Topsoil sample
										0																				
										0																				
										0																				
57	SJ	917	099	99	0		BAR	0	35	35	10YR31						MSL	20	HR		N			4	-3	3a	I	1	3b	ST	16>2,6>6
								35	45	10	10YR62	CD	10YR56				MSL	20	HR	M	N									
								45	120	75							MSL	60	HR	M										
										0																				
										0																				
										0																				
										0																				
58	SJ	918	099	107	2	S	STB	0	33	33	10YR32						MSL	15	HR		N			2	-4	3a	I	1	3a	DR	10>2,1>6
								33	40	7	10YR43						MSL	30	HR	M	N									
								40	120	80							MSL	60	HR	M										
										0																				
										0																				
										0																				
59	SJ	920	099	106	0		POT	0	30	30	10YR32						MSL	20	HR		N			-27	-24	3b	I	1	3b	DR	12>2,2>6
								30	41	11	10YR51						MS	40	HR	M	N									
								41	120	79							MS	60	HR	M										
										0																				
										0																				
										0																				
60	SJ	921	099	107	0		STB	0	30	30	10YR32						MSL	20	HR		N			-3	-9	3a	I	1	3a	DR,ST	12>2,2>6
								30	40	10	7.5YR53	CD	7.5YR66				MSL	40	HR	M	N									
								40	120	80							MSL	60	HR	M										
										0																				
										0																				
										0																				
61	SJ	922	099	108	0		STB	0	30	30	10YR32						MSL	20	HR		N			-21	-19	3b	I	1	3b	DR	10>2,1>6
								30	50	20	7.5YR43	FF	7.5YR66				LMS	40	HR	M	N									
								50	120	70							LMS	60	HR	M										
										0																				
										0																				
										0																				
62	SJ	923	099	107	0		STB	0	30	30	10YR32						MSL	20	HR		N			-22	-20	3b	I	1	3b	DR	12>2,1>6
								30	42	12	7.5YR43	FF	7.5YR66				LMS	40	HR	M	N									
								42	120	78							LMS	60	HR	M										
										0																				
										0																				
										0																				
63	SJ	911	098		0		SAS	0	30	30	10YR32						MSL	12	HR		N			1	-7	3a	I	1	3a	DR	8>2,4>6
								30	120	90	7.5YR61,62						MS	0		M	N									Clay lenses, 40-50cm
										0																				Water table?
										0																				
										0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
64	SJ	912	098		0		STB	0	30	30	10YR32						MSL	15	HR		N			-7	-8	3a	I	1	3a	DR,ST	12>2,6>6
								30	50	20	10YR61	CD	10YR56			Y	MS	0		M	N									
								50	95	45	10YR61					Y	MS	0		M	N									
								95	120	25							MS	60	HR	M										
										0																				
										0																				
										0																				
65	SJ	913	098	103	2	N	ARA	0	32	32	10YR32						SCL	20	HR		N			32	19	1	II	1	3a	ST	12>2,3>6
								32	60	28	10YR64,56	CD	10YR52	CD	7.5YR46	Y	SCL	4	HR	M	N									
								60	75	15	10YR61	CD	10YR56			Y	SCL	4	HR	M	N									
								75	120	45	5YR44	CD	2.5Y61				C	2	HR	P	N		Y							
										0																				
										0																				
										0																				
66	SJ	914	098	107	2	N	ARA	0	30	30	10YR32						SCL	15	HR		N			-19	-16	3a	I	1	3a	DR	8>2,2>6
								30	40	10	10YR56	CD	10YR64	CD	10YR68	Y	LMS	20	HR	M	N									
								40	120	80							LMS	60	HR	M										
										0																				
										0																				
										0																				
67	SJ	915	098	97	3	N	STB	0	36	36	10YR31						MSL	12	HR		N			13	1	2	I	1	2	DR,ST	8>2,2>6
								36	55	19	10YR53	CD	10YR56				MS	0		M	N									
								55	90	35	2.5Y62	MP	7.5YR56				LMS	0		M	N									
								90	120	30	5Y54	CD	10YR72				LMS	0		M	N									
										0																				
										0																				
										0																				
68	SJ	916	098	106	0		BAR	0	30	30	10YR32						MSL	20	HR		N			5	-2	3a	I	1	3a	ST	12>2,1>6
								30	48	18	7.5YR53	CD	7.5YR66				MSL	20	HR	M	N									
								48	120	72							MSL	60	HR	M										
										0																				
										0																				
										0																				
69	SJ	917	098	103	0		BAR	0	38	38	10YR31						LMS	18	HR		N			20	-13	3a	I	1	3a	DR,ST	12>2
								38	65	27	7.5YR63	CD	5YR56				MS	5	HR	M	N									
								65	80	15	7.5YR53	CD	7.5YR56	CD	2.5Y62		MSL	0		M	N									
								80	120	40	5YR53	CD	2.5Y61				SCL	0		M	N									
										0																				
										0																				
										0																				
70	SJ	918	098	105	0		BAR	0	30	30	10YR32						MSL	22	HR		N			24	0	2	I	1	3a	ST	14>2,4>6
								30	60	30	10YR64	CD	10YR58				MSL	30	HR	M	N									Water table @87
								60	70	10	10YR64	CD	10YR61	CD	10YR58		LMS	20	HR	M	N									
								70	90	20	10YR64	CD	10YR61	CD	10YR58		MSL	10	HR	M	N									
								90	105	15	10YR61	MD	10YR58				SCL	10	HR	M	N									
								105	120	15	7.5YR63						LMS	0		M	N									
										0																				
71	SJ	920	098		0		FLW	0	38	38	10YR31						LMS	20	HR		N			-27	-24	3b	I	1	3b	DR	12>2,6>6
								38	45	7	7.5YR44						LMS	20	HR	M	N									
								45	120	75							LMS	60	HR	M										
										0																				
										0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
72	SJ	921	098	0			FLW	0	30	30	10YR31						LMS	20	HR		N			-28	-25	3b	I	1	3b	DR	12>2,5>6
								30	50	20	7.5YR54,56						LMS	20	HR	M	N									
								50	120	70							LMS	60	HR	M										
										0																				
										0																				
										0																				
										0																				
73	SJ	922	098	0			FLW	0	30	30	10YR31						MSL	15	HR		N			-19	-16	3a	I	1	3a	DR	10>2
								30	40	10	10YR44						LMS	20	HR	M	N									
								40	120	80							LMS	60	HR	M										
										0																				
										0																				
										0																				
										0																				
74	SJ	923	098	0			FLW	0	30	30	10YR31						MSL	25	HR		N			-24	-21	3b	I	1	3b	DR	15>2,8>6
								30	40	10	10YR44						LMS	20	HR	M	N									
								40	120	80							LMS	60	HR	M										
										0																				
										0																				
										0																				
										0																				
75	SJ	924	098	0			FLW	0	38	38	10YR32						MSL	15	HR		N			11	4	2	I	1	2	DR,ST	10>2
								38	50	12	10YR53,62	CD	7.5YR56				MSL	15	HR	M	N									
								50	120	70							MSL	60	HR	M										
										0																				
										0																				
										0																				
76	SJ	911	097	0			STB	0	35	35	10YR32						SCL	18	HR		N			21	13	2	II	2	3a	ST	12>2,6>6
								35	50	15	7.5YR63	CD	7.5YR56			Y	LMS	0		M	N									
								50	80	30	7.5YR46,56						SCL	0		M	N									
								80	90	10	2.5Y61						SCL	15	HR	M	N									
								90	120	30							SCL	60	HR	M										
										0																				
										0																				
77	SJ	912	097	0			STB	0	34	34	10YR32						MSL	18	HR		N			27	17	2	IV	3a	3a	WE,ST	12>2,6>6
								34	40	6	10YR71,72	CD	10YR56,58			Y	HCL	0		M	N									Sandy
								40	120	80	5YR54	CD	2.5Y61			Y	C	0		P	N		Y							Sandy
										0																				
										0																				
										0																				
78	SJ	913	097	0			STB	0	35	35	10YR32						MSL	18	HR		N			40	-3	2	I	1	3a	ST	12>2,6>6
								35	50	15	7.5YR43						LMS	0		M	N									
								50	70	20	7.5YR44,46						MS	0		M	N									
								70	120	50	7.5YR72,73	MD	5YR56			Y	FS	0		M	N									
										0																				
										0																				
										0																				
79	SJ	914	097	108	0		ARA	0	31	31	10YR32						MSL	15	HR		N			11	17	2	I	1	2	DR,ST	10>2,3>6
								31	62	31	10YR53	CD	10YR64	CD	10YR68		SCL	4	HR	M	N									
								62	75	13	10YR64	CD	10YR58				LMS	8	HR	M	N									
								75	85	10	10YR64						MS	15	HR	M	N									

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
								85	120	35							MS	60	HR	M										
										0																				
										0																				
80	SJ	915	097	99	0		STB	0	35	35	10YR31						MSL	15	HR		N			28	-6	2	I	1	2	DR,ST	10>2,4>6
								35	45	10	10YR44						LMS	15	HR	M	N									
								45	80	35	10YR54,52						MS	15	HR	M	N									
								80	120	40	10YR71						FS	5	HR	M	N									
										0																				
										0																				
										0																				
81	SJ	916	097	107	0		BAR	0	30	30	10YR32						MSL	20	HR		N			7	5	2	I	1	3a	ST	12>2,2>6
								30	45	15	7.5YR53	CD	7.5YR66				MSL	20	HR	M	N									
								45	58	13	10YR64	CD	10YR62	CD	10YR56	Y	SCL	10	HR	M	N									
								58	120	62							SCL	60	HR	M										
										0																				
										0																				
										0																				
82	SJ	917	097	103	0		BAR	0	35	35	10YR31						MSL	20	HR		N			-15	-12	3a	I	1	3a	DR,ST	15>2,6>6
								35	50	15	7.5YR44						LMS	20	HR	M	N									
								50	120	70							LMS	60	HR	M										
										0																				
										0																				
										0																				
										0																				
83	SJ	919	097	105	0		FLW	0	20	20	10YR32						MSL	22	HR		N			27	9	2	I	1	3a	ST	14>2,1>6
								20	40	20	7.5YR53	CD	7.5YR66				MSL	20	HR	M	N									
								40	65	25	10YR63	CD	7.5YR56	FF	10YR51		MSL	20	HR	M	N									
								65	95	30	5YR53,31						MSL	6	HR	M	N									
								95	120	25							MSL	60	HR	M										
										0																				
										0																				
84	SJ	920	097	107	0		FLW	0	30	30	10YR32						MSL	18	HR		N			3	-4	3a	I	1	3a	DR,ST	12>2,1>6
								30	48	18	10YR53	MD	7.5YR66				MSL	30	HR	M	N									
								48	120	72							MSL	60	HR	M										
										0																				
										0																				
										0																				
										0																				
85	SJ	911	096		0		STB	0	40	40	10YR32						MSL	25	HR		N			22	12	2	III	2	3b	ST	18>2,8>6
								40	50	10	2.5Y61	CD	10YR56			Y	SCL	10	HR	M	N									
								50	120	70	5YR54	CD	2.5Y71,72			Y	C	0		P	N		Y							Plastic clay
										0																				
										0																				
										0																				
86	SJ	912	096		0		STB	0	30	30	7.5YR31						MSL	18	HR		N			-18	-14	3a	I	1	3a	DR,ST	12>2,5>6
								30	50	20	7.5YR42	CD	10YR72	CD	10YR56	Y	LMS	25	HR	M	N									
								50	65	15	7.5YR42	CD	10YR72	CD	10YR56	Y	MS	25	HR	M	N									
								65	120	55							MS	60	HR	M										
										0																				
										0																				
										0																				
87	SJ	913	096		0		STB	0	35	35	10YR32						MSL	10	HR		N			51	22	1	I	1	2	ST	6>2,2>6
								35	120	85	10YR72	CD	10YR56,58			Y	MSL	10	HR	M	N	F								
										0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
										0																				
										0																				
88	SJ	914	096	107	0		ARA	0	31	31	10YR32						MSL	12	HR		N			-12	-8	3a	I	1	3a	DR	10>2,2>6
								31	50	19	10YR54,64						LMS	5	HR	M	N									
								50	55	5	7.5YR53	CD	7.5YR58				MS	0		M	N									
								55	120	65							MS	60	HR	M										
										0																				
										0																				
										0																				
89	SJ	915	096	?	0		STB	0	30	30	10YR31						MSL	18	HR		N			22	13	2	III	2	3a	ST	12>2,4>6
								30	48	18	7.5YR63,64	CD	7.5YR56			Y	MSL	18	HR	M	N									
								48	120	72	5YR44,54	CD	10YR62			Y	C	2	HR	P	N	C	Y							Slightly sandy
										0																				
										0																				
										0																				
90	SJ	916	096	108	0		BAR	0	35	35	10YR32						MSL	22	HR		N			-14	-11	3a	I	1	3a	DR,ST	12>2,3>6
								35	66	31	10YR53	MD	7.5YR66				LMS	30	HR	M	N									
								66	120	54							LMS	60	HR	M										
										0																				
										0																				
										0																				
91	SJ	917	096	96	0		POT	0	35	35	10YR32						LMS	20	HR		N			-16	-15	3a	I	1	3b	ST	16>2
								35	60	25	10YR43						LMS	15	HR	M	N									
								60	85	25	7.5YR53						LMS	10	HR	M	N									
								85	120	35							LMS	60	HR	M										
										0																				
										0																				
										0																				
92	SJ	918	096		0		FLW?	0	35	35	7.5YR32						LMS	35	HR		N			-35	-32	3b	I	1	3b	DR,ST	25>2,12>6
								35	45	10	7.5YR44						LMS	35	HR	M	N									
								45	120	75							LMS	60	HR	M										
										0																				
										0																				
										0																				
93	SJ	919	096		0		FLW	0	30	30	10YR31						LMS	20	HR		N			3	-11	3a	II	1	3a	DR,ST	12>2,5>6
								30	45	15	10YR54						LMS	10	HR	M	N									
								45	65	20	10YR62	CD	10YR56				LMS	0		M	N									Clay lenses
								65	120	55	5YR54,53						C	0		P	N		Y							
										0																				
										0																				
										0																				
94	SJ	912	095		0		STB	0	38	38	7.5YR32						MSL	18	HR		N			27	17	2	III	2	3a	ST	12>2,5>6
								38	50	12	10YR62,63	MD	7.5YR56			Y	MSL	2	HR	M	N									
								50	120	70	5YR44,54	CD	10YR61,62			Y	C	0		P	N	F	Y							
										0																				
										0																				
										0																				
95	SJ	913	095		0		STB	0	30	30	7.5YR3/1						MSL	15	HR		N			35	18	1	I	1	3a	ST	12>2
								30	48	18	10YR73	CD	10YR56				MSL	5	HR	M	N									

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
								48	120	72	5YR44,54,53	FD	2.5Y62				SC	0		P	N	C									
										0																					
										0																					
										0																					
										0																					
96	SJ	914	095	106	0		STB	0	30	30	10YR32						MSL	14	HR		N			35	17	1	III	2	3a	ST	11>2
								30	45	15	10YR63						MSL	10	HR	M	N										
								45	95	50	5YR44	CD	2.5Y52			Y	C	0		P	N	C	Y								
								95	120	25	5YR54						MSL	8	HR	M	N										
										0																					
										0																					
										0																					
97	SJ	912	094		0		STB	0	40	40	7.5YR31						MSL	10	HR		N			23	5	2	I	1	2	DR,ST	8>2,3>6
								40	50	10	7.5YR43,53	CD	7.5YR56				LMS	0	HR	M	N										
								50	100	50	5YR44						MS	0	HR	M	N										
								100	120	20	5YR44	CD	2.5Y62	CD	10YR56	Y	SCL	0	HR	M	N										
										0																					
										0																					
										0																					
98	SJ	913	094		0		STB	0	35	35	7.5YR31						MSL	10	HR		N			24	20	2	I	1	2	DR,ST	8>2,5>6
								35	65	30	10YR54,44	CD	10YR56				MSL	5	HR	M		F									
								65	120	55							MSL	60	HR	M											
										0																					
										0																					
										0																					
99	SJ	914	094	108	0		ARA	0	27	27	10YR32						MSL	14	HR		N			10	21	2	I	1	3a	ST	11>2
								27	65	38	5YR54	CD	10YR62			S	HCL	4	HR	M	N										
								65	70	5	7.5YR64						MS	20	HR	M	N										
								70	120	50							MS	60	HR	M											
										0																					
										0																					
										0																					
100	SJ	912	093		0		STB	0	36	36	10YR32						MSL	8	HR		N			35	24	1	III	2	2	WE	5>2,1>6
								36	55	19	10YR63	CD	10YR56				MSL	1	HR	M	N										
								55	80	25	5YR44	CD	2.5Y62				C	1	HR	P	N	C	Y								Slightly sandy
								80	120	40	2.5YR44						C	1	HR	P	N		Y								
										0																					
										0																					
										0																					
101	SJ	913	093		0		STB	0	32	32	10YR32						MSL	10	HR		N			25	22	2	I	1	2	DR,ST	6>2,2>6
								32	70	38	10YR63	CP	7.5YR56				MSL	8	HR	M	N										
								70	120	50							MSL	60	HR	M											
										0																					
										0																					
										0																					
102	SJ	914	093	107	0		ARA	0	32	32	10YR32						MSL	12	HR		N			11	22	2	I	1	2	DR,ST	10>2
								32	65	33	5YR54	CD	10YR62			S	HCL	4	HR	M	N										
								65	70	5	7.5YR54						MS	30	HR	M	N										
								70	120	50							MS	60	HR	M											
										0																					
										0																					
										0																					
103	SJ	915	093	108	0		FLW	0	30	30	10YR22						MSL	12	HR		N			12	18	2	I	1	2	DR,ST	10>2

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
								30	65	35	10YR33	CD	10YR56			S	MSL	8	HR	M	N									
								65	75	10	10YR53	CD	2.5Y71	CD	7.5YR66	Y	LMS	20	HR	M	N									
								75	120	45							LMS	60	HR	M										
										0																				
										0																				
										0																				
104	SJ	912	092		0		STB	0	40	40	10YR32						MSL	18	HR		N			20	17	2	I	1	3a	ST	12>2,8>6
								40	55	15	2.5YR62	CD	5YR53	CD	7.5YR58	Y	MSL	3	HR	M	N									
								55	80	25	2.5YR44						SC	5	HR	P	N		N							
								80	120	40							SC	60	HR	M										
										0																				
										0																				
										0																				
105	SJ	913	092		0		STB	0	35	35	10YR32						MSL	12	HR		N			21	21	2	I	1	2	DR,ST	10>2,5>6
								35	55	20	10YR58,54	FF	10YR56				MSL	5	HR	M	N									
								55	80	25	5YR44	FF	2.5Y62				SC	0		P	N	C	N							OR Clay
								80	100	20	5YR46						MS	5	HR	M	N									
								100	120	20							MS	60	HR	M										
										0																				
										0																				
106	SJ	914	092	106	0		ARA	0	30	30	10YR32						MSL	12	HR		N			26	19	2	III	2	2	WD,ST	10>2
								30	40	10	7.5YR32						MSL	8	HR	M	N									
								40	50	10	7.5YR54	CD	7.5YR52	CD	7.5YR58	Y	SCL	4	HR	M	N									
								50	110	60	5YR54	FD	10YR62				C	2	MSST	P	N		Y							
								110	120	10	7.5YR64						MS	20	MSST	M	N									
										0																				
										0																				
107	SJ	923	092	110	0		STB	0	32	32	10YR31						MSL	10	HR		N			7	0	2	I	1	2	DR,ST	6>2
								32	40	8	10YR44						LMS	10	HR	M	N									
								40	60	20	7.5YR54						LMS	3	HR	M	N									
								60	120	60	5YR54						MS	3	HR	M	N									
										0																				
										0																				
										0																				
108	SJ	924	092	98	0		STB	0	55	55	10YR31						LMS	15	HR		N			8	3	2	I	1	2	DR,ST	8>2,4>6
								55	70	15	10YR44						MSL	5	HR	M	N									Buried topsoil?
								70	120	50							MSL	60	HR	M										????? Check layer
										0																				Topsoil sample
										0																				
										0																				
109	SJ	925	092	99	0		BAR	0	38	38	10YR31						MSL	8	HR		N			14	8	2	I	1	2	DR	5>2
								38	70	32	2.5Y72	CP	7.5YR56				LMS	2	HR	M	N									Clay lenses
								70	120	50	5YR54	CD	10YR72				MS	0		M										
										0																				
										0																				
										0																				
110	SJ	913	091		0		STB	0	35	35	10YR32						MSL	12	HR		N			38	21	1	III	2	2	WE,ST	8>2,4>6
								35	50	15	10YR53,63	FD	10YR56				SCL	0		M	N	F								
								50	120	70	5YR44	CD	2.5Y61				SC	0		P	N	C	Y							
										0																				
										0																				
										0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
111	SJ	914	091	105	0		ARA	0	35	35	10YR32						MSL	12	HR		N			-12	-8	3a	I	1	3a	DR	10>2
								35	50	15	10YR54	CD	10YR52				LMS	20	HR	M	N									
								50	55	5	7.5YR54						MS	2	HR	M	N									
								55	120	65							MS	60	HR	M										
										0																				
										0																				
										0																				
112	SJ	915	091	105	0		ARA	0	32	32	10YR32						MSL	10	HR		N			-17	-13	3a	I	1	3a	DR	10>2
								32	50	18	10YR64	CD	10YR62	CD	10YR66		MS	20	HR	M	N									
								50	120	70							MS	60	HR	M										
										0																				
										0																				
										0																				
										0																				
113	SJ	922	091	113	0		BAR	0	33	33	10YR32						MSL	18	HR		N			25	15	2	III	2	3a	ST	11>2
								33	55	22	10YR62	CP	7.5YR56				MSL	10	HR	M	N									
								55	120	65	5YR54	CD	2.5Y62	CD	10YR56	Y	C	5	HR	P	N		Y							
										0																				
										0																				
										0																				
										0																				
114	SJ	923	091	111	0		BAR	0	35	35	10YR31						LMS	15	HR		N			-6	-14	3a	I	1	3a	DR	10>2
								35	55	20	7.5YR46						LMS	10	HR	M	N									
								55	120	65	7.5YR72						MS	0	HR	M	N									
										0																				
										0																				
										0																				
115	SJ	925	091	98	0		BAR	0	34	34	10YR31						MSL	12	HR		N			8	4	2	I	1	2	DR,ST	8>2
								34	40	6	10YR53	CD	7.5YR56				MSL	10	HR	M	N									
								40	70	30	10YR62	CP	7.5YR56				LMS	10	HR	M	N									Clay lenses
								70	120	50	7.5YR73,72						MS	10	HR	M	N									
										0																				
										0																				
										0																				
116	SJ	926	091	97	0		BAR	0	32	32	10YR31						MSL	18	HR		N			10	-2	2	I	1	3a	ST	12>2
								32	40	8	10YR44						MSL	18	HR	M	N									
								40	50	10	10YR54						LMS	1	HR	M	N									
								50	80	30	10YR62	CD	10YR56				MS	1	HR	M	N									
								80	120	40	2.5Y62	CD	10YR56				LMS	1	HR	M	N									SC lenses
										0																				
										0																				
117	SJ	913	090		1	S	STB	0	38	38	10YR32						SCL	12	HR		N			35	19	1	IV	3b	3b	WE	8>2,3>6
								38	120	82	5YR54	CD	2.5Y62	CD	2.5Y56	Y	SC	1	HR	P	N		Y							
										0																				
										0																				
										0																				
										0																				
118	SJ	914	090	105	0		ARA	0	30	30	10YR32						MSL	15	HR		N			26	18	2	III	2	2	WD,ST	10>2
								30	42	12	10YR32						SCL	10	HR	M	N									
								42	55	13	10YR64	CD	10YR61	CD	10YR66	Y	SCL	5	HR	M	N									
								55	80	25	5YR54	CD	2.5YR61			S	C	2	HR	P	N		Y							
								80	100	20	5YR44	MD	2.5YR61	CD	10YR68	Y	C	2	HR	P	N		Y							Plastic clay
								100	105	5	7.5YR52						MSL	10	HR	M	N									

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
								105	120	15							MSL	60	HR	M											
119	SJ	915	090	108	0		ARA	0	30	30	10YR32						MSL	10	HR		N			8	17	2	III	2	2	WD,ST	8>2
								30	45	15	10YR64	CD	10YR62	CD	10YR66	Y	HCL	5	HR	M	N									
								45	63	18	5YR54	CD	10YR61				C	2	HR	P	N		Y							
								63	75	12	5YR54						MS	0		M	N									
								75	120	45							MS	60	HR	M										
										0																				
										0																				
120	SJ	921	090	106	0		PAS	0	40	40	10YR31						MSL	18	HR		N			13	8	2	I	1	3a	ST	12>2
								40	60	20	10YR42						MSL	18	HR	M	N									
								60	120	60							MSL	60	HR	M										
										0																				
										0																				
										0																				
										0																				
121	SJ	922	090	104	0		BAR	0	30	30	10YR32						MSL	18	HR		N			25	15	2	III	2	3a	ST	11>2
								30	45	15	10YR62	CD	10YR56			Y	MSL	10	HR	M	N									
								45	120	75	5Y53,54	CD	2.5Y61			Y	C	0		P	N	F	Y							
										0																				
										0																				
										0																				
										0																				
122	SJ	923	090	105	0		BAR	0	35	35	10YR31						MSL	18	HR		N			5	-2	2	I	1	3a	ST	12>2
								35	45	10	10YR54	CF	10YR56				MSL	18	HR	M	N									
								45	120	75							MSL	60	HR	M										
										0																				
										0																				
										0																				
										0																				
123	SJ	924	090	106	0		BAR	0	32	32	10YR31						MSL	10	HR		N			31	20	1	III	2	2	WE,ST	7>2
								32	55	23	2.5Y72	CD	7.5YR56				MSL	10	HR	M	N									
								55	120	65	5Y54,53	CD	2.5Y62				C	0		P	N	F	Y							
										0																				
										0																				
										0																				
124	SJ	913	089		0		STB	0	34	34	10YR32						MSL	15	HR		N			26	16	2	IV	3a	3a	WE,ST	12>2,4>6
								34	45	11	5YR54	CD	7.5YR54				C	5	HR	P	N		Y							Topsoil sample
								45	120	75	5YR54						C	0	HR	P	N	F	Y							
										0																				
										0																				
										0																				
125	SJ	914	089		0		STB	0	38	38	10YR32						MSL	8	HR		N			20	19	2	III	2	2	WD	5>2,2>6
								38	50	12	10YR63	MP	7.5YR56				SCL	5	HR	P	N									
								50	70	20	5YR54	CD	2.5YR62				SC	5	HR	P	N		Y							
								70	75	5							SCL	20	HR	M	N									
								75	120	45							SCL	60	HR	M										
										0																				
										0																				
126	SJ	915	089	107	0		ARA	0	40	40	10YR32						MSL	12	HR		N			-5	-2	3a	I	1	3a	DR	10>2
								40	55	15	10YR43						LMS	20	HR	M	N									
								55	120	65							LMS	60	HR	M										
										0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
127	SJ	921	089	103	0		PAS	0	35	35	10YR31						MSL	18	HR		N			8	1	2	I	1	3a	ST	12>2
								35	50	15	10YR42						MSL	20	HR	M	N										
								50	120	70							MSL	60	HR	M											
										0																				
										0																				
										0																				
										0																				
128	SJ	922	089	92	0		PAS	0	50	50	10YR31						MSL	15	HR		N			46	19	1	I	1	3a	ST6	10>2,6>6
								50	120	70	10YR44						MSL	15	HR	M	N										
										0																				
										0																				
										0																				
										0																				
										0																				
129	SJ	923	089	101	0		BAR	0	32	32	10YR32						MSL	15	HR		N			16	16	2	I	1	2	DR,ST	8>2
								32	55	23	10YR62	CD	10YR56				MSL	15	HR	M	N										
								55	70	15	10YR62	MD	7.5YR56				SCL	15	HR	M	N										
								70	120	50							SCL	60	HR	M											
										0																				
										0																				
										0																				
130		924	089	105	0		BAR	0	45	45	10YR31						MSL	18	HR		N			10	3	2	I	1	3a	ST	12>2
								45	50	5	7.5YR46						MSL	18	HR	M	N										
								50	120	70							MSL	60	HR	M											
										0																				
										0																				
										0																				
131	SJ	913	088		0		STB	0	35	35	10YR32						MSL	12	HR		N			27	7	2	II	1	2	DR,ST	8>2,2>6
								35	45	10	7.5YR53	CD	7.5YR56				MSL	10	HR	M	N										
								45	75	30	7.5YR53	CD	7.5YR56				LMS	10	HR	M	N										
								75	120	45	5YR54	CD	7.5YR63				SC	0		P	N										
										0																				
										0																				
										0																				
132	SJ	914	088		0		STB	0	38	38	10YR32						MSL	15	HR		N			12	5	2	I	1	3a	ST	12>2,4>6
								38	50	12	10YR44						MSL	10	HR	M	N										
								50	120	70							MSL	60	HR	M											
										0																				
										0																				
										0																				
133	SJ	915	088	107	0		ARA	0	30	30	10YR32						MSL	15	HR		N			-13	-9	3a	I	1	3a	DR,ST	12>2
								30	50	20	5YR54						LMS	5	HR	M	N										
								50	75	25	5YR54						MS	30	HR	M	N										
								75	120	45							MS	60	HR	M											
										0																				
										0																				
										0																				
134	SJ	922	088	104	0		PAS	0	40	40	10YR31						MSL	20	HR		N			9	7	2	I	1	2	DR,ST	10>2
								40	55	15	7.5YR44						MSL	20	HR	M	N										
								55	60	5	7.5YR44,56						SCL	10	HR	M	N										
								60	120	60							SCL	60	HR	M											

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
										0																				
135	SJ	923	088	104	0		PAS	0	30	30	10YR32						MSL	18	HR		N			1	-5	3a	I	1	3a	DR	10>2
								30	40	10	5YR44						MSL	18	HR	M	N										
								40	120	80							MSL	60	HR	M											
										0																				
										0																				
										0																				
										0																				
136	SJ	913	087		0		STB	0	45	45	10YR32						SCL	8	HR		N			38	26	1	II	2	2	WE	5>2,1>6
								45	60	15	10YR62	CD	10YR56				MSL	2	HR	M	N										
								60	120	60	5YR44	CD	2.5Y61				C	1	HR	P	N	C	Y								
										0																				
										0																				
										0																				
										0																				
137	SJ	914	087	105	0		ARA	0	35	35	10YR32						SCL	12	HR		N			-15	-11	3a	I	1	3a	DR	8>2
								35	55	20	5YR54						MS	20	HR	M	N										
								55	120	65							MS	60	HR	M											
										0																				
										0																				
										0																				
										0																				
138	SJ	915	087	106	0		ARA	0	35	35	10YR32						SCL	12	HR		N			-3	1	3a	I	1	3a	DR	10>2
								35	50	15	10YR33						MSL	15	HR	M	N										
								50	75	25	5YR54						MS	40	HR	M	N										
								75	120	45							MS	60	HR	M											
										0																				
										0																				
										0																				
139	SJ	9159	087	107	0		ARA	0	27	27	10YR32						SCL	10	HR		N			31	21	1	IV	3b	3b	WE	Moved due to track
								27	40	13	5YR54	CD	10YR62	CD	10YR64		HCL	2	HR	M	N										8>2
								40	120	80	5YR54	CD	10YR61				C	0		P	N		Y								
										0																				
										0																				
										0																				
										0																				
140	SJ	914	086	101	0		RGR	0	45	45	10YR32						MSL	0			N			41	29	1	III	2	2	WE	
								45	70	25	2.5Y62	MP	10YR56				SC	0		P	N		Y								
								70	120	50	10YR44,54	CD	2.5Y61				C	0		P	N	C	Y								
										0																				
										0																				
										0																				
141	SJ	915	086	102	0		PAS	0	35	35	10YR32						MSL	8	HR		N			26	23	2	II	1	2	DR	
								35	45	10	10YR42						MSL	8	HR	M	N										
								45	60	15	10YR61,62	MD	10YR56				SCL	5	HR	M	N										
								60	80	20	5YR54	CD	2.5Y61				SC	1	HR	P	N		Y								
								80	120	40							SC	60	HR	M											
										0																				
										0																				
142	SJ	916	086	103	0		PAS	0	35	35	10YR42						SCL	5	HR		N			40	24	1	III	3a	3a	WE	
								35	45	10	10YR43						SCL	5	HR	M	N										
								45	120	75	5YR44	CD	2.5Y62	CD	10YR56	Y	SC	0		P	N	F	Y								

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
										0																				
										0																				
143	SJ	915	085	103	0		PAS	0	38	38	10YR32						MSL	5	HR		N			-14	-1	3a	III	2	2	WE	
								38	50	12	7.5YR54,53	CD	7.5YR56				SCL	5	HR	M	N									
									120	120	5YR54,53	CD	2.5Y62				C	1	HR	P	N	F	Y							
								50																						
144	SJ 93200	09500	393200	309500	111	0		RGR			0																		Non-Ag	Heath Farm buildings / curtilage
											0																			
											0																			
											0																			
											0																			
145	SJ 93200	09400	393200	309400	113	0		PAS	0	27	27	10YR 3/2						MSL	11	HR					-5	-10	3a	I	1	3a	DR/ST	
									27	48	21	5YR 3/2						LMS	16	HR	M	N									
									48	120	72	5YR 4/6						MS	18	HR	M	N									
											0																				
											0																				
											0																				
146	SJ 93300	09400	393300	309400	113	0		PAS	0	27	27	10YR 3/2						MSL	12	HR					-5	-9	3a	I	1	3a	DR/ST	
									27	48	21	5YR 3/2						LMS	12	HR	M	N									
									48	120	72	5YR 4/6						MS	18	HR	M	N									
											0																				
											0																				
											0																				
147	SJ 93000	09300	393000	309300	109	0		PAS	0	32	32	10YR 3/2						MSL	12	HR					4	-3	3a	I	1	3a	DR/ST	
									32	57	25	5YR 3/2						LMS	18	HR	M	N									
									57	120	63	5YR 4/6						LMS	18	HR	M	N									
											0																				
											0																				
											0																				
148	SJ 93100	09300	393100	309300	109	0		PAS	0	26	26	10YR 3/2						MSL	10	HR					-6	-10	3a	I	1	3a	DR/ST	
									26	42	16	5YR 3/2						LMS	10	HR	M	N									
									42	120	78	5YR 4/6						MS	18	HR	M	N									
											0																				
											0																				
											0																				
149	SJ 93200	09300	393200	309300	110	0		PAS	0	27	27	10YR 3/2						MSL	12	HR					-5	-9	3a	I	1	3a	DR/ST	
									27	48	21	5YR 3/2						LMS	12	HR	M	N									
									48	120	72	5YR 4/6						MS	18	HR	M	N									
											0																				
											0																				
											0																				
150	SJ 93300	09300	393300	309300	111	0		PAS	0	31	31	10YR 3/2						MSL	14	HR					-5	-9	3a	I	1	3a	DR/ST	
									31	47	16	5YR 3/2						LMS	18	HR	M	N									
									47	120	73	5YR 4/6						MS	20	HR	M	N									
											0																				
											0																				
											0																				
151	SJ 92900	09200	392900	309200	109	0		CER	0	32	32	10YR31						MSL	8	HR		N			34	19	1	III	2	2	WE,ST	
									32	55	23	2.5Y72	CD	7.5YR56				MSL	10	HR	M	N									

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
								55	120	65	5Y54,53	CD	2.5Y62				SCL	10	HR	P	N	F	Y								
										0																					
										0																					
										0																					
152	SJ 93000	09200	393000	309200	109	0		MZE	0	27	27	10YR31						MSL	5	HR		N			-1	-6	3a	I	1	3a	DR	
									27	50	23	5YR 3/2						LMS	12	HR	M	N										
									50	120	70	5YR 4/6						MS	18	HR	M	N										
											0																					
											0																					
											0																					
153	SJ 93100	09200	393100	309200	109	0		MZE	0	29	29	10YR 2/1						MSL	12	HR		N			-4	-9	3a	I	1	3a	DR/ST	
									29	45	16	5YR 3/2						LMS	12	HR	M	N										
									45	120	75	5YR 4/6						MS	18	HR	M	N										
											0																					
											0																					
											0																					
154	SJ 93200	09200	393200	309200	110	0		PAS	0	30	30	10YR 2/1						MSL	11	HR		N			-4	-8	3a	I	1	3a	DR/ST	
									30	45	15	5YR 3/2						LMS	18	HR	M	N										
									45	120	75	5YR 4/6						MS	18	HR	M	N										
											0																					
											0																					
											0																					
155	SJ 93300	09200	393300	309200	111	0		PAS	0	28	28	10YR 3/2						MSL	12	HR		N			-2	-6	3a	I	1	3a	DR/ST	
									27	56	29	5YR 3/2						LMS	12	HR	M	N										
									56	120	64	5YR 4/6						MS	18	HR	M	N										
											0																					
											0																					
											0																					
156	SJ 92700	09100	392700	309100	110	0		PAS	0	32	32	10YR31						MSL	12	HR		N			9	1	2	I	1	3a	ST	
									32	40	8	10YR44						MSL	18	HR	M	N										
									40	50	10	10YR54						LMS	1	HR	M	N										
									50	120	70	10YR62	CD	10YR56				MS	1	HR	M	N										
											0																					
											0																					
157	SJ 92800	09100	392800	309100	110	0		CER	0	30	30	10YR32						MSL	12	HR		N			9	1	2	I	1	3a	ST	
									30	45	15	10YR43						MSL	18	HR	M	N										
									45	60	15	10YR54						MS	1	HR	M	N										
									60	120	60	10YR62	CD	10YR58				MS	1	HR	M	N										
											0																					
											0																					
158	SJ 92900	09100	392900	309100	109	0		CER	0	32	32	10YR31						MSL	8	HR		N			32	21	1	III	2	2	WE,ST	
									32	55	23	2.5Y72	CD	7.5YR56				MSL	10	HR	M	N										
									55	120	65	5Y54,53	CD	2.5Y62				C	0		P	N	F	Y								
											0																					
											0																					
											0																					
159	SJ 93000	09100	393000	309100	110	0		CER	0	30	30	10YR31						MSL	8	HR		N			33	21	1	III	2	2	WE,ST	
									30	60	30	2.5Y72	CD	7.5YR56				MSL	10	HR	M	N										
									60	120	60	5Y54,53	CD	2.5Y62				C	0		P	N	F	Y								
											0																					
											0																					
											0																					
160	SJ 93100	09100	393100	309100	110	0		PAS	0	30	30	10YR 2/1						MSL	14	HR		N			-5	-9	3a	I	1	3a	DR/ST	
									30	50	20	5YR 3/2						LMS	18	HR	M	N										
									50	120	70	5YR 4/6						MS	20	HR	M	N										

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
										0																				
161	SJ 93200	09100	393200	309100	108	0		PAS	0	28	28	10YR 2/1					MSL	12	HR					-5	-9	3a	I	1	3a	DR/ST	
									28	45	17	5YR 3/2					LMS	12	HR	M	N										
									45	120	75	5YR 4/6					MS	18	HR	M	N										
											0																				
											0																				
											0																				
162	SJ 93300	09100	393300	309100	110	0		PAS	0	30	30	10YR 2/1					MSL	11	HR					-3	-8	3a	I	1	3a	DR/ST	
									30	50	20	5YR 3/2					LMS	18	HR	M	N										
									50	120	70	5YR 4/6					MS	20	HR	M	N										
											0																				
											0																				
											0																				
163	SJ 92600	09000	392600	309000	109	0		PAS	0	30	30	10YR32					MSL	12	HR		N			10	3	2	I	1	3a	ST	
									30	45	15	10YR43					MSL	12	HR	M	N										
									45	60	15	10YR54					MS	1	HR	M	N										
									60	120	60	10YR62	CD	10YR58			MS	1	HR	M	N										
											0																				
											0																				
164	SJ 92700	09000	392700	309000	108	0		PAS	0	30	30	10YR32					MSL	16	HR		N			-22	-6	3b	II	2	3b	DR/ST	
									30	41	11	10YR43					MSL	18	HR	M	N										
									41	70	29	10YR54					MS	20	HR	M	N										
									70	120	50	10YR62	CD	10YR58			MS	20	HR	P	N		Y								
											0																				
											0																				
165	SJ 92800	09000	392800	309000	109	0		PAS	0	30	30	10YR32					MSL	11	HR		N			-35	-22	3b	III	2	3a	ST	
									30	45	15	10YR43	CD	10YR56			LMS	12	HR	M	N										
									45	60	15	10YR54	CD	10YR58			LMS	12	HR	P	N		Y								
									60	120	60	10YR62	CD	10YR58			MS	12	HR	P	N		Y								
											0																				
											0																				
166	SJ 92900	09000	392900	309000	109	0		CER	0	29	29	10YR 2/1					MSL	11	HR					-2	-7	3a	I	1	3a	DR/ST	
									29	54	25	5YR 3/2					LMS	15	HR	M	N										
									54	120	66	5YR 4/6					MS	15	HR	M	N										
											0																				
											0																				
											0																				
167	SJ 93100	09000	393100	309000	108	0		PAS	0	27	27	10YR 2/1					MSL	12	HR					-4	-8	3a	I	1	3a	DR/ST	
									27	55	28	5YR 3/2					LMS	14	HR	M	N										
									55	120	65	5YR 4/6					MS	16	HR	M	N										
											0																				
											0																				
											0																				
168	SJ 93200	09000	393200	309000	109	0		PAS	0	32	32	10YR 2/1					MSL	12	HR					1	-5	3a	I	1	3a	DR/ST	
									32	47	15	5YR 3/2					LMS	12	HR	M	N										
									47	120	73	5YR 4/6					MS	10	HR	M	N										
											0																				
											0																				
											0																				
169	SJ 93300	09000	393300	309000	109	0		PAS	0	31	31	10YR 2/1					MSL	12	HR					38	8	2	I	1	3a	ST	
									31	52	21	5YR 3/2					LMS	10	HR	M	N										
									52	120	68	5YR 4/6					MSL	10	HR	M	N										
											0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
										0																				
170	SJ 92500	08900	392500	308900	108	0		RES			0																			Non-Agric	Non-agricultural land. Residential/garden
										0																				
										0																				
										0																				
										0																				
										0																				
171	SJ 92600	08900	392600	308900	108	0		PAS	0	27	27	10YR32						MSL	16	HR		N			-19	-3	3a	II	2	3b	ST	
									27	46	19	10YR43						MSL	18	HR	M	N									
									46	70	24	10YR54						MS	20	HR	M	N									
									70	120	50	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				
											0																				
172	SJ 92700	08900	392700	308900	109	0		PAS	0	27	27	10YR32						MSL	16	HR		N			-19	-3	3a	II	2	3b	ST	
									27	46	19	10YR43						MSL	18	HR	M	N									
									46	70	24	10YR54						MS	20	HR	M	N									
									70	120	50	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				
											0																				
173	SJ 92800	08900	392800	308900	109	0		PAS	0	30	30	10YR32						MSL	16	HR		N			-15	1	3a	II	2	3b	ST	
									30	52	22	10YR43						MSL	18	HR	M	N									
									52	70	18	10YR54						MS	20	HR	M	N									
									70	120	50	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				
											0																				
174	SJ 92900	08950	392900	308950	109	0		PAS			0																				Access not permitted Land use and soil similar to adjacent 3a land to east
											0																				
											0																				
											0																				
											0																				
											0																				
175	SJ 93000	08950	393000	308950	109	0		PAS			0																				Access not permitted Land use and soil similar to adjacent 3a land to east
											0																				
											0																				
											0																				
											0																				
											0																				
176	SJ 93300	08900	393300	308900	109	0		PAS	0	27	27	10YR 2/1						MSL	10	HR		N			35	10	2	I	1	3a	ST	
									27	40	13	5YR 3/2						LMS	10	HR	M	N									
									40	120	80	5YR 4/6						MSL	18	HR	M	N									
											0																				
											0																				
											0																				
177	SJ 92400	08750	392400	308750	107	0		PAS	0	30	30	10YR32						MSL	16	HR		N			-15	-1	3a	II	2	3b	ST	
									30	48	18	10YR43						MSL	18	HR	M	N									
									48	77	29	10YR54						MS	20	HR	M	N									
									77	120	43	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				
											0																				
178	SJ 92500	08750	392500	308750	107	0		PAS	0	26	26	10YR32						MSL	20	HR		N			-25	-9	3b	II	2	3b	DR/ST	
									26	42	16	10YR43						MSL	20	HR	M	N									
									42	68	26	10YR54						MS	20	HR	M	N									
									68	120	52	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				

Point	Grid ref.			Alt	Grad	Aspect	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		SUBS STR	Calc.	Mn C	SPL	Drought			Wet		ALC GRADE		Point notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
										0																				
179	SJ 92600	08750	392600	308750	107	0		PAS	0	28	28	10YR32						MSL	16	HR		N			-20	-5	3b	II	2	3b	DR/ST	
									28	44	16	10YR43						MSL	18	HR	M	N									
									44	70	26	10YR54						MS	20	HR	M	N									
									70	120	50	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				
											0																				
180	SJ 92700	08750	392700	308750	106	0		PAS	0	30	30	10YR32						MSL	16	HR		N			-22	-6	3b	II	2	3b	DR/ST	
									30	41	11	10YR43						MSL	18	HR	M	N									
									41	70	29	10YR54						MS	20	HR	M	N									
									70	120	50	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				
											0																				
181	SJ 92800	08750	392800	308750	106	0		PAS	0	32	32	10YR32						MSL	15	HR		N			-15	1	3a	II	2	3b	ST	
									32	50	18	10YR43						MSL	18	HR	M	N									
									50	70	20	10YR54						MS	20	HR	M	N									
									70	120	50	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				
											0																				
182	SJ 92900	08750	392900	308750	106	0		PAS	0	28	28	10YR32						MSL	18	HR		N			-19	-4	3a	II	2	3b	ST	
									28	46	18	10YR43						MSL	18	HR	M	N									
									46	73	27	10YR54						MS	20	HR	M	N									
									73	120	47	10YR62	CD	10YR58				MS	20	HR	P	N		Y							
											0																				
											0																				
											0																				
End																															

Depth

xx	Underlining denotes depth to a slowly permeable layer

Texture

CS	Coarse Sand
MS	Medium sand
FS	Fine Sand
LCS	Loamy Coarse Sand
LMS	Loamy Medium Sand
LFS	Loamy Fine Sand
CSL	Coarse Sandy Loam
MSL	Medium sandy loam
FSL	Fine Sandy Loam
CSZL	Coarse Sandy Silt Loam
MSZL	Medium Sandy Silt Loam
FSZL	Fine Sandy Silt Loam
ZL	Silt Loam
SCL	Sandy Clay Loam
MCL	Medium Clay Loam
HCL	Heavy Clay Loam
MZCL	Medium Silty Clay loam
HZCL	Heavy Silty Clay Loam
SC	Sandy Clay
ZL	Silty Clay
C	Clay
P	Peat
SP	Sandy Peat
LP	Loamy Peat
PL	Peaty Loam
PS	Peaty Sand
MZ	Marine Light Silts
IMP: xx	Impenetrable by auger/spade: Reason

Colour

B	Brown/Brownish
G	Grey/Greyish
Y	Yellow/Yellowish
R	Red/Reddish
O	Olive
Bk	Black
Pk	Pink/Pinkish
W	White
Gn	Green/Greenish
Bl	Blue/Bluish
D	Dark
L	Light
P	Pale
V	Very
S	Strong
Wk	Weak
Dy	Dusky

Mottle form

FF	Few Feint
FD	Few Distinct
FP	Few Prominent
CF	Common Feint
CD	Common Distinct
CP	Common Prominent
MF	Many Feint
MD	Many Distinct
MP	Many Prominent
VF	Very many Feint
VD	Very many Distinct
VP	Very many Prominent

MnC (Ferrimanganous concretions)

F	Few
C	Common
M	Many
V	Very many

Calcareousness

N	Non-calcareous (<0.5% CaCO3)
VS	Very slightly calcareous (0.5 - 1% CaCO3)
S	Slightly calcareous (1 - 5% CaCO3)
M	Moderately calcareous (5 - 10% CaCO3)
V	Very calcareous (>10% CaCO3)
Y	Calcareous (>1% CaCO3)

Stone type

HR	All hard rocks and stones
MSST	Soft, medium or coarse grained sandstone
SI	Soft weathered igneous or metamorphic rock
SLST	Soft oolitic or dolomitic limestone
FSST	Soft, fine grained sandstone
ZR	Soft, argillaceous or silty rocks
CH	Chalk or chalk stones
GH	Gravel composed of non-porous (hard) stones
GS	Gravel composed of porous (soft) stones

Limitations

NN	None
OC	Overall climate
AE	Aspect
EX	Exposure
FR	Frost risk
GR	Gradient
MR	Microrelief
FL	Flood risk
TX	Texture
DP	Soil depth
CH	Chemical
WT	Wetness
WK	Workability
DR	Droughtiness
ER	Erosion risk
WD	Wetness/Droughtiness
ST	Topsoil stoniness

Appendix D:
Topsoil Particle Size Distribution (PSD)

ANALYTICAL REPORT

Report Number	**32506-16**	**N717**
Date Received	**19-SEP-2016**	
Date Reported	**26-SEP-2016**	
Project	**SOIL**	
Reference	**ROB ASKEW**	
Order Number		

Laboratory Reference		**SOIL319719**	**SOIL319720**	**SOIL319721**	**SOIL319722**
Sample Reference		**C497-AB56**	**C497-AB72**	**C497-AB108**	**C497-AB124**
Determinand	**Unit**	**SOIL**	**SOIL**	**SOIL**	**SOIL**
Sand 2.00-0.063mm	% w/w	65	79	80	63
Silt 0.063-0.002mm	% w/w	15	13	11	21
Clay <0.002mm	% w/w	20	8	9	16
Textural Class **		O-SCL	LS	LS	SL

Notes

Analysis Notes

The sample submitted was of adequate size to complete all analysis requested.
The results as reported relate only to the item(s) submitted for testing.
The results are presented on a dry matter basis unless otherwise stipulated.

** Please see the attached document for the definition of textural classes.

Reported by

Darren Whitbread

Natural Resource Management, a trading division of Cawood Scientific Ltd.
Coopers Bridge, Braziers Lane, Bracknell, Berkshire, RG42 6NS
Tel: 01344 886338
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ANALYTICAL REPORT

Report Number	**57594-17**	**N717**	**Client C497 FOURASHES WMI**
Date Received	**27-APR-2017 04-**		**STAFFS**
Date Reported	**MAY-2017 SOIL**		
Project	**C497 FOURASHES WM1**		
Reference			
Order Number			

Laboratory Reference		**SOIL340823**	**SOIL340824**	**SOIL340825**							
Sample Reference		162	158	179							
Determinand	**Unit**	**SOIL**	**SOIL**	**SOIL**							
Sand 2.00-0.063mm	% w/w	79	70	78							
Silt 0.063-0.002mm	% w/w	12	18	12							
Clay <0.002mm	% w/w	9	12	10							
Textural Class **		LS/SL	SL	SL							

Notes

Analysis Notes

The sample submitted was of adequate size to complete all analysis requested.
The results as reported relate only to the item(s) submitted for testing.
The results are presented on a dry matter basis unless otherwise stipulated.

** Please see the attached document for the definition of textural classes.

Reported by *Darren Whitbread*

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Tel: 01344 886338
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Textural Class Abbreviations

The texture classes are denoted by the following abbreviations:

Class	Code
Sand	S
Loamy sand	LS
Sandy loam	SL
Sandy Silt loam	SZL
Silt loam	ZL
Sandy clay loam	SCL
Clay loam	CL
Silt clay loam	ZCL
Clay	C
Silty clay	ZC
Sandy clay	SC

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

- vf Very Fine (more than 2/3's of sand less than 0.106 mm)
- f Fine (more than 2/3's of sand less than 0.212 mm)
- c Coarse (more than 1/3 of sand greater than 0.6 mm)
- m Medium (less than 2/3's fine sand and less than 1/3 coarse sand).

The subdivisions of *clay loam* and *silty clay loam classes* according to clay content are indicated as follows:

- M medium (less than 27% clay)
- H heavy (27-35% clay)

Organic soils i.e. those with an organic matter greater than 10% will be preceded with a letter O.

Peaty soils i.e. those with an organic matter greater than 20% will be preceded with a letter P.

Appendix E:
MAFF Agricultural Land Classification:
Four Ashes (Site 64),
Staffordshire Aggregates Local Plan
(Ref. 079/94)

AGRICULTURAL LAND CLASSIFICATION

FOUR ASHES (SITE 64)

STAFFORDSHIRE AGGREGATES LOCAL PLAN

M J W Wood
Resource Planning Team
ADAS Statutory Group
WOLVERHAMPTON

ADAS Ref: 25/RPT/0043
Job No: 079/94
MAFF Ref: EL 37/00034A

AGRICULTURAL LAND CLASSIFICATION REPORT FOR FOUR ASHES (SITE 64), STAFFORDSHIRE AGGREGATES LOCAL PLAN

1. SUMMARY

1.1 The Agricultural Land Classification (ALC) Survey for this site shows that the following proportions of ALC grades are present:

Grade/Subgrade	ha	% of site
2	18.5	57
3a	12.5	39
3b	1.1	3
Other Land		
Non-agricultural	0.3	1

1.2 The main limitations to the agricultural use of land in Grade 2 are topsoil stone content, soil wetness and soil droughtiness.

1.3 The main limitations to the agricultural use of land in Subgrade 3a are topsoil stone content and soil droughtiness.

1.4 The main limitation to the agricultural use of land in Subgrade 3b is soil wetness.

2. INTRODUCTION

2.1 The site was surveyed by the Resource Planning Team in November 1994. An Agricultural Land Classification survey was undertaken according to the guidelines laid down in the "Agricultural Land Classification of England and Wales - Revised Guidelines and Criteria for Grading the Quality of Agricultural Land" (MAFF 1988).

2.2 The 32.4 ha site is situated to the south west of Calf Heath Reservoir and Junction 12 of the M6 motorway. The land immediately to the south and west of the site is predominantly in agricultural use. The land immediately to the north is occupied by a reservoir and the east is bounded by an access road and the motorway.

2.3 The survey was requested by MAFF in connection with the Staffordshire Aggregates Local Plan.

2.4 At the request of the MAFF Land Use Planning Unit this was a detailed grid survey at 1: 10 000 scale with a minimum auger boring density of 1 per hectare. The attached map is only accurate at the base map scale and any enlargement would be misleading.

2.5 At the time of the survey the site was under cereals and grass.

3. CLIMATE

3.1 The following interpolated data are relevant for the site (SJ 928 097):

Average Annual Rainfall (mm)	702
Accumulated Temperature above $0^{o}C$ January to June (day ^{o}C)	1367

3.2 There is no overall climatic limitation on the site.

3.3 Other relevant data for classifying land include:

Field Capacity Days (days)	165
Moisture Deficit Wheat (mm)	94
Moisture Deficit Potatoes (mm)	81

4. SITE

4.1 Three site factors of gradient, micro-relief and flooding are considered when classifying land.

4.2 These factors do not impose any limitations on the agricultural use of this land.

5. GEOLOGY AND SOILS

5.1 The geology of the area is comprised of Upper Mottled Sandstone (British Geological Survey, Sheet 153 Wolverhampton 1 Inch). This is overlain with deposits of Quaternary boulder clay.

5.2 The underlying geology influences the soils which have a sandy or a clay texture.

6. AGRICULTURAL LAND CLASSIFICATION

6.1 Grade 2 - occupies 18.5 ha (57 %) of the survey area and is found in the west of the site.

6.1.1 These soils typically have a sandy loam texture overlying loamy sand and / or sandy clay loam and clay to depth, with profiles being slightly stony. Occasionally there may be lenses of lighter material such as sandy clay loam or sand in the subsoil which may be very stony in nature. Observations of gleying and the depth to the slowly permeable layer places these soils in to Wetness Class III. The moisture balance places these soils in Grade 2.

6.1.2 The main limitations to the agricultural use of this land are topsoil stone content greater than 2cm, soil wetness and soil droughtiness.

6.2 Subgrade 3a occupies 12.5 ha (39 %) of the survey area and is found mainly in the south and east of the site.

6.2.1 These soils typically have a sandy loam texture over loamy sand and sand to depth, with common to many stones within the profile. In places the lower subsoil texture includes sandy clay loam and clay. Observations of gleying and the depth to the slowly permeable layer places these soils in to Wetness Class III. The moisture balance places these soils in Subgrade 3a.

6.2.2 The main limitation to the agricultural use of this land is topsoil stone content greater than 2cm in size and soil droughtiness.

6.3 Subgrade 3b occupies 1.1 ha (3 %) of the survey area.

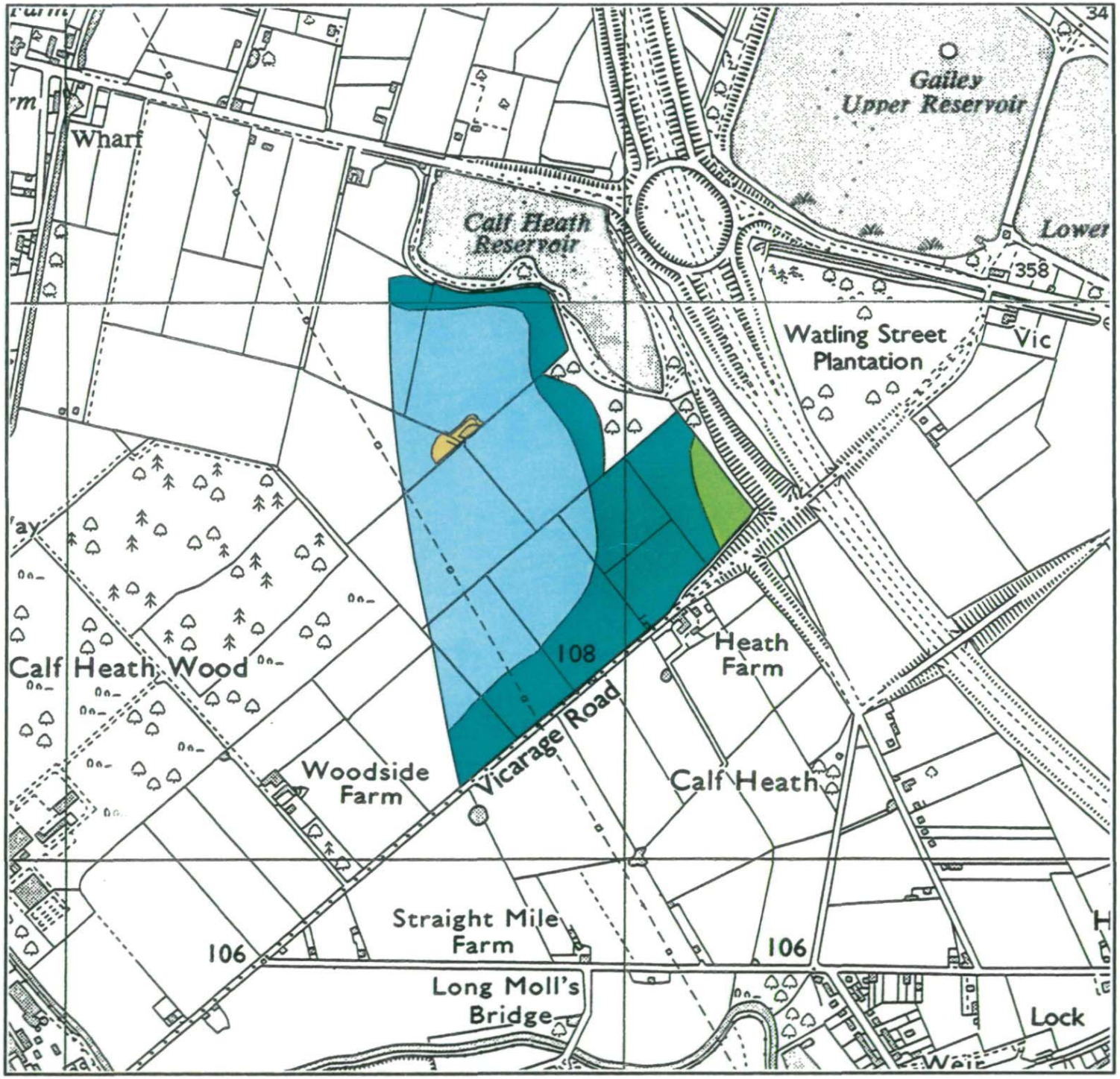
6.3.1 These waterlogged soils were difficult to texture in the field. The soil had a sandy loam texture overlying saturated ground.

6.3.2 The main limitation to the agricultural use of this land is soil wetness.

6.4 Other land includes non-agricultural land which occupies 0.3 ha (1 %) of the survey area and is found in the north of the site as a hollow containing scrub.

6.5 SUMMARY OF AGRICULTURAL LAND CLASSIFICATION GRADES

Grade/Subgrade	Area (Ha)	% of survey area	% of agricultural land
2	18.5	57	58
3a	12.5	39	39
3b	1.1	3	3
Other Land Non Agricultural	0.3	1	
Totals	32.4	100	100



MAFF Ministry of Agriculture Fisheries and Food

Agricultural Land Classification

Four Ashes - Site 64 - Staffs Aggregates Local Plan

Agricultural Land

Grade		Quality	Area (ha)
1	*	Excellent	nil
2		Very Good	18.5
3a		Good	12.5
3b		Moderate	1.1
4	*	Poor	nil
5	*	Very Poor	nil

Other Land Categories

		Area (ha)
*	Urban	nil
	Non-Agricultural	0.3
W	Woodland	nil
*	Agricultural Buildings	nil
*	Open Water	nil
*	Not Surveyed	nil
	Total agricultural land area	32.1
	Total survey area	32.4

* Grade/category not present within survey area

Scale 1:10,000

0 100 200 300 400 500 600 Metres

Further details contained in MAFF (1988) Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land. MAFF (Publications), London SE99 7TP.

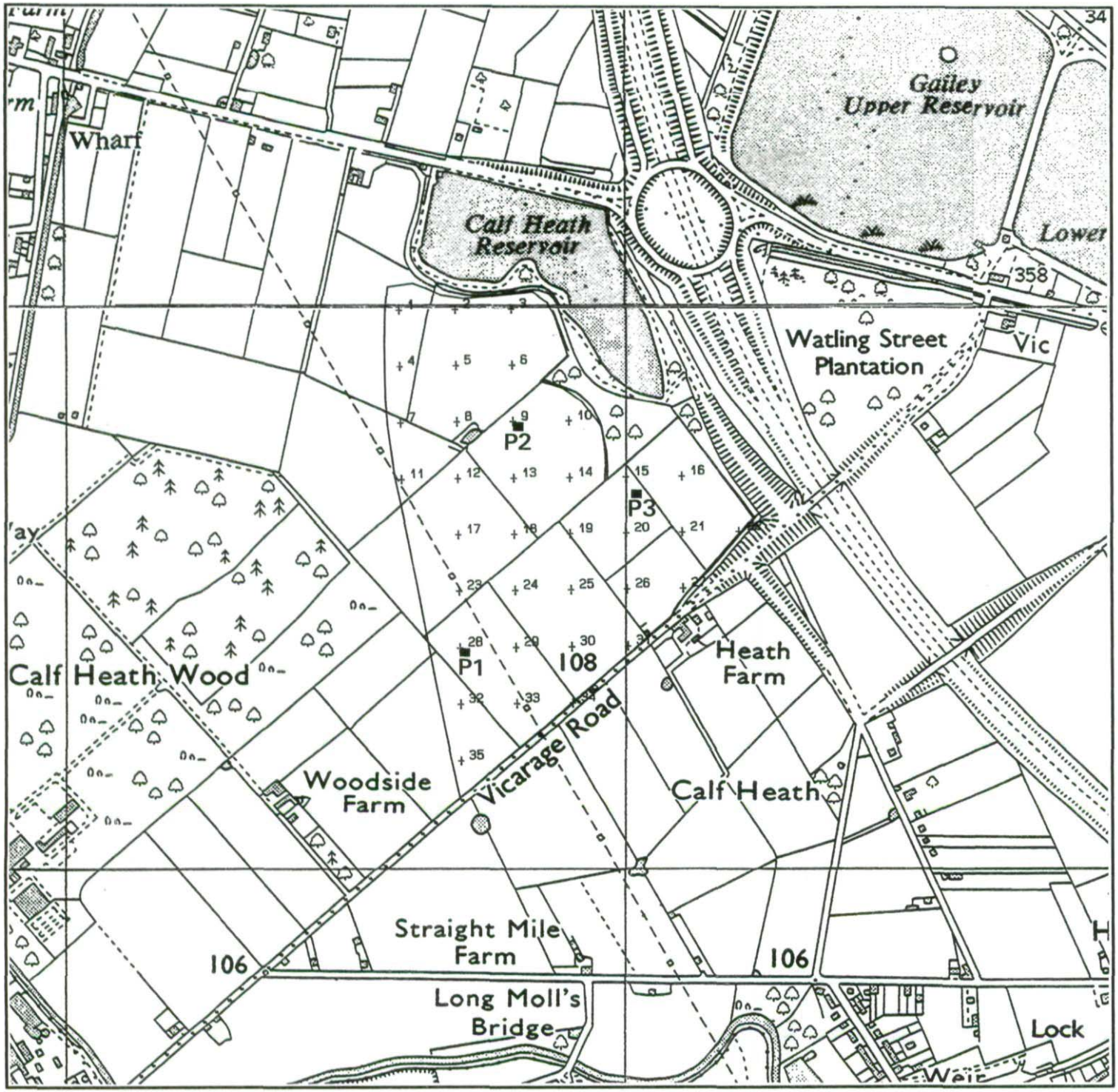
The information is accurate at the base map scale but any enlargement would be misleading.

Surveyed and drawn by the Resource Planning Team, ADAS Statutory Unit Wolverhampton

Based on the 1989 Ordnance Survey 1:25,000 map with the permission of the Controller of Her Majesty's Stationery Office.

Source Map/sh SO8090

Reference no. 07994



MAFF Ministry of Agriculture Fisheries and Food

Agricultural Land Classification

Four Ashes - Site 64 - Staffs Aggregates Local Plan

AUGER BORINGS

Soil Pits ■

Scale 1:10,000

0 100 200 300 400 500 600 Metres

Further details contained in MAFF (1988) Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land. MAFF (Publications), London SE99 7TP.

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