

LANDAT

SMALLEY BIGHT FARM and BIRKWOOD FARM

STANLEY FERRY

WAKEFIELD

AGRICULTURAL LAND CLASSIFICATION ASSESSMENT
AND

SOIL CHARACTERISTICS REPORT

August 2019

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<u>Contents</u>		Page
	Executive Summary	3
1	Introduction	4
2	Site Description	8
3	Site Inspection - Soils	9
4	Agricultural Land Classification	11
5	Statement of Soil Characteristics.....	16
6	ALC and Soils Characteristics Summary	17
7	Impact on Existing Agricultural Units	18
8	Sources of Reference	19

Appendices

- 1 Grade According to Flood Risk
- 2 Auger Borehole Details
- 3 Borehole Location Map
- 4 Agricultural Land Classification Map
- 5 Soil Resource Map
- 6 Soil Samples Laboratory Results

EXECUTIVE SUMMARY

- Land Restoration & Management Ltd has been commissioned by MWP Planning Consultants to conduct an Agricultural Land Classification (ALC) survey on land near Stanley Ferry, Wakefield.
- The land is to be included in a planning application for mineral extraction.
- The land comprises 2 fields adjacent to the River Calder totalling 22.2 hectares (54.83 acres) of agricultural land in 2 separate ownerships (Blocks 1 & 2).
- At the time of the survey (August 2019), the land was awaiting harvest following a crop of Winter Wheat in Block 1 and Winter Wheat and Winter Barley in Block 2.
- The published 1/250,000 Provisional ALC Map for Yorkshire and The Humber indicates that the land is in the Ministry of Agriculture (MAFF) ALC Grade 3 but this is inaccurate and unreliable due to the limitations of scale of the map. Furthermore, land indicated as Grade 3 land should be further differentiated as subgrade 3a or 3b.
- The site specific soil report obtained from the National Soils Research Institute (NSRI) at Cranfield University indicates that a soil profile of 25mm topsoil over 80mm subsoil derived from river alluvium is to be expected.
- A field survey was undertaken on 6th and 8th August 2019. This confirmed the actual depth of topsoil to be much thicker.
- Factors influencing the potential ALC Grade have been assessed and initially suggest no limitation to the overall Grade. However, the flooding liability of the site by waterlogging from the River Calder has an overriding effect and has limited the **ALC Grade to be subgrade 3b.**

1. **INTRODUCTION**

1.1 Smalley Bight Farm and Birkwood Farm contain 2 blocks of agricultural land located either side of the River Calder at Stanley Ferry near Wakefield. The Smalley Bight land (shown as Block A on the borehole location plan) lies to the north of the river while the Birkwood land (shown as Block B on the plan) lies on the opposite river bank to the south.

1.2 The centre of the site lies approximately at grid reference SE43524235 at approximately 18 metres above ordnance datum (AOD).

1.3 Further to instructions received from MWP Planning, acting on behalf of the mineral operator Wakefield Sand and Gravel, Land Restoration and Management Limited has prepared a report on the Agricultural Land Classification and Soils Characteristics of the land presently in arable use. The land is to be included in a planning application which is being made to Wakefield Metropolitan District Council (WMDC) for mineral extraction in order to win sand and gravel reserves.

1.4 The Local Plan for Wakefield, adopted in April 2009 indicates the land to be within the Green Belt. The land is also allocated as a Mineral Safeguarded Area in order to protect the known mineral resource from development that may render the minerals unobtainable for future use.

1.5 The land is shown on the 1:250,000 Scale Provisional Agricultural Land Classification Map for Yorkshire and Humber as Grade 3 but the limitation of scale of this map means that this allocation cannot be regarded as accurate. Furthermore, this map predates 1988 so land shown as Grade 3 classification is not subdivided into subgrades 3a and 3b.

1.6 The Wakefield Local Plan Policy regarding minerals, D26 requires:

“Proposals to work minerals on the best and most versatile agricultural land will only be permitted if it can be demonstrated that a high standard of

restoration to good quality agricultural land can be achieved.”

Best and most versatile land comes within the categories Grade 1, 2 and subgrade 3a.

- 1.7 This report assesses the Agricultural Land Classification (ALC) grade, but is not a detailed Land Quality Statement. The ALC and soil characteristics are based on soil samples taken at 100m intervals across the site.
- 1.8 The assessment of the ALC grade was undertaken using the methodology set out in the *‘Agricultural Land Classification of England and Wales’* (MAFF, October 1988).
- 1.9 To compile the required field data, Land Restoration & Management Ltd undertook site inspections on 6th and 8th August 2019 and this report provides a summary of the condition of the soils at the time of the inspection.
- 1.10 Government policy for the protection of the countryside is contained in the National Planning Policy Framework (NPPF), the latest version of which was issued in February 2019. Section 15 is concerned with conserving and enhancing the natural environment and states at paragraph 109 that the planning system should contribute and enhance the natural and local environment by (among other things):
- Protecting and enhancing valued landscapes, geological conservation interests and soils;
 - Recognising the wider benefits of ecosystem services;
 - Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

- Preventing both new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

1.11 Paragraph 170(b) of the NPPF states that local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Footnote 53 requires that local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality.

1.12 Natural England is the Government body responsible for the protection of the countryside. It has issued guidance on the protection of agricultural land in the form of technical note TIN049 first issued in January 2009 and re-issued in 2012. This states that consultations are required on all planning 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 will be 20 hectares or more. Non-agricultural after uses, for example for nature conservation or amenity, can be acceptable even on better quality land, if soil resources are conserved for the long-term potential of best and most versatile land it is safeguarded by careful land restoration and aftercare.

1.13 The conclusions reached in this report are necessarily restricted to those that can be determined from the available information and may be subject to amendment in the light of any additional information becoming available.

1.14 The content of this report is strictly confidential to the addressee and their client, for the specific purpose to which it refers. No responsibility whatsoever is accepted to any third parties for the whole or part of its

contents.

- 1.15 Neither the whole nor any part of our report, nor any reference thereto, may be included in any published document, circular or statement, nor disclosed orally to any third party, without our written approval of the form and context of such publication or disclosure. Such approval is required whether or not Land Restoration & Management Limited is referred to by name and whether or not our report is combined with others.

2.0 **SITE DESCRIPTION**

- 2.1 The proposed mineral extraction land at Smalley Bight Farm (Block A) is located off the A642 Aberford Road, which runs from Wakefield north to the M62 and beyond towards Leeds. The Birkwood Farm land (Block B) is located off Ferry Lane, which runs from Aberford Road eastwards towards Altofts and beyond towards Normanton. Both blocks of land lie approximately 2.5km (1½ miles) north of Wakefield city centre. The site is less than 3km south of the M62 junction 30.
- 2.2 The surveyed land lies within 2 fields. The Smalley Bight land extends to some 10.30 hectares (Block A) while the Birkwood land covers approximately 11.90 hectares (Block B).
- 2.3 Block A comprises an arable field which at the time of inspection contained a crop of Winter Wheat waiting harvesting. Block B contained both Winter Wheat and Winter Barley both waiting harvesting.
- 2.4 The 2 blocks are in different ownerships. Access to the Smalley Bight land is through the farmstead located off Aberford Road. The Birkwood Farm land is accessed through a gated access located off Ferry Lane, approximately 1km east of its junction with Aberford Road.
- 2.5 The land comprising the proposed mineral extraction area is generally level and has been formed within meanders of the River Calder. According to the Environment Agency, the location of the site renders it high risk flood vulnerability. The land north of the river is identified by the Environment Agency as Flood Zone 2 while the land to the south is Flood Storage Area which is regarded the same as Flood Zone 3b. Hence MWP Planning has commissioned a Flood Risk Assessment for the whole site as part of the planning application process.
- 2.6 According to the landowners, flooding has only occurred through groundwater percolating up from below rather than inundation by the river.

3.0 **SITE INSPECTION – SOILS**

3.1 Prevailing climate: So far, the summer of 2019 had been very wet. June rainfall totals were above average across most areas, with double the average in numerous parts of England and Wales; most of the rain fell in the first half of the month. Overall the UK had 152% of average rainfall, provisionally the 11th wettest June in a series since 1910. July also ended up rather wet from the English Midlands northwards, with again more than twice the average monthly rainfall in some places; the UK overall had 114% of average for the month.

3.2 **Smalley Bight Farm:** Area A on the plan was inspected on 6th August 2019. The weather conditions were intermittent bright spells (19°C) with gusting south westerly wind (23 mph). The inspection was carried out following a week with occasional heavy rainfall. The inspection included taking 10 auger borings for the inspection of soil at intervals of approximately 100m across the site.

3.3 **Birkwood Farm:** Area B on the plan was inspected on 8th August 2019. The weather conditions were cloudy, bright and sunny (23°C) with a slight south westerly breeze (3mph). There had been no significant rainfall since the previous site visit. The inspection included taking 14 auger borings for the inspection of soil at intervals of approximately 100m.

3.4 **Soil Types**

The National Soil Research Institute (NSRI) data indicates that the land has a single soil profile across the whole site. This consists of deep stoneless permeable fine loamy soil over subsoil in unconsolidated sands or gravels with relatively high permeability and high storage capacity over river alluvium parent material.

3.5 Soil Profile Depth

Area A: Auger borings revealed an average depth of topsoil of just less than 50cm and just less than 60cm subsoil. However, the landowner indicated that a small area located between boreholes 2 and 3 had a thinner depth of soil before sand and gravel were exposed by ploughing. The auger examinations did not extend into this specific area of the survey.

Area B: Compared with Area A, the auger borings revealed a slightly thinner average depth of topsoil of just under 40cm and 55cm subsoil.

SEE APPENDIX 1 FOR FULL INDIVIDUAL BOREHOLES DESCRIPTION

3.6 Nature of the Soils

The soils have been mapped as Wharfe 561a association by the NSRI. The field survey has confirmed the presence across the whole site of the Wharfe series which is deep, stoneless permeable loamy soil over river alluvium.

3.7 Soil Acidity

For optimum sward productivity, soil pH should be maintained as near as possible to neutral (pH 7.0), as this will help make nutrients more available, improve crumb structure (to help natural drainage), and enhance biological activity in the soil. A slightly acid soil (pH 6.5) is generally considered best for a wide range of crops. The site soil pH ranges from acid (5.2) to alkaline (7.9). The laboratory results suggest that, for optimum crop yield, additional lime will be required across approximately $\frac{1}{4}$ of the site.

Block A: (pH 5.2 – 6.8).

Block B: (pH 5.4 – 7.9).

3.8 Soil contaminants

No assessment for contamination has been carried out.

4.0 **AGRICULTURAL LAND CLASSIFICATION**

- 4.1 The published 1/250,000 Provisional ALC Map for Yorkshire and The Humber shows the land is in the MAFF ALC Grade 3. However, this is inaccurate and unreliable due to the limitations of scale of the map and land indicated as Grade 3 should be further differentiated as either subgrade 3a or 3b.
- 4.2 The most productive and flexible land falls into Grades 1, 2 and subgrade 3a, collectively regarded as *best and most versatile agricultural land* and together comprises about one-third of the agricultural land in England and Wales. However, no land falling into these categories was found within the site.
- 4.3 The survey confirmed that the site falls within **ALC subgrade 3b**. Land having an ALC subgrade 3b is regarded as moderate quality agricultural land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Factors Affecting ALC Grade

4.4 **Climate**

Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics. The climatic criteria are considered first when classifying land, as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of site or soil conditions.

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

The key climatic variables used for grading this site are given in Table 1 below and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

The combination of rainfall and temperature at this site means that there is no overall climatic limitation of ALC grade.

Table 1: Climatic and altitude data

Factor	Units	Values
Grid reference		SE 352 235
Altitude	m, AOD	18
Accumulated temperature	day°C (Jan-Jun)	1380
Average annual rainfall	mm	631
Field capacity days	mm	140
Moisture deficit, wheat	mm	104
Moisture deficit, potatoes	mm	95
Overall climatic grade		Grade 1

4.7 **Site topography and flood risk limitations**

The land is generally level and is free draining through the river alluvium.

Block A is within **Flood Zone 2** Medium Probability of Flooding:

Land having between a 1 in 100 and 1 in 1000 annual probability of river flooding (land shown in light blue on the Flood Map).

Block B is within the recognised **flood storage area**:

Land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map.

- 4.8 MWP Planning have discussed the issue of flooding with both landowners who report that they have never known either field to flood, but the field immediately to the south of Birkwood on the other side of the river, does flood. Apparently, the water comes up through the ground rather than overtopping the river bank. It is assumed from that information that the river is not sealed in its channel.

This assumption is supported by the site geology. The water table in both fields will therefore rise and fall with the river. Peizometers have been installed as part of the site investigations but until these are dipped, the effects of the river on the surrounding land will not be determined.

Further information regarding this issue will be found within the Flood Risk Assessment being presented by SMF Associates.

Nevertheless, based upon the currently available information and the proximity to the river Calder, the consequent waterlogging and flood risk is of overarching significance limiting the ALC to **subgrade 3b**.

4.9 **Soil property limitations**

The main soil properties that affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility. These may act as limitations separately, in combination, or through interactions with climate or site factors. There are also interactive limitations of soil wetness and droughtiness.

4.10 Soil depth

Soil depth is an important factor in determining the available water capacity. Shallow soils affect cropping by influencing the range and type of cultivations that can be carried out and by restricting root growth and nutrient uptake.

Based upon the observed soil depths alone, the potential Grade for the site is 1.

Table 2: Agricultural Land Classification Grade

AREA (Ha)	%age of site	AVE TOTAL SOIL DEPTH	GRADE
A 10.3	46	110cm	Grade 1
B 11.9	54	95cm	Grade 1
22.2	100		Grade 1

4.10 Soil resources

A single type of soil resource occurs within the whole site although having slight difference in thickness.

Area A: This consists of fine textured silt clay or sandy silt loamy topsoil (50cm) overlying a fine textured subsoil (60cm).

Area B: This consists of fine textured silt clay or sandy silt loamy topsoil (40cm) overlying fine textured subsoil (55cm).

Due to the difference in land ownership, it is recommended that the topsoil from Area A is stripped and stored separately from Area B. This is also the most practical method of soils handling and storage due to the separation of the two blocks of land by the river.

Following completion of quarrying, it is recommended that these soils, where required for agricultural restoration, should be reinstated in their original locations. However, the likelihood of non-agricultural afteruse, such as water bodies for leisure purposes, will render some soil as surplus to requirements.

4.11 **Geology and soil parent material**

The Bedrock Geology is described by the British Geological Society as Pennine Middle Coal Measures Formation – mudstone; siltstone; sandstone. This landform outcrops in Nottinghamshire, Derbyshire, South and West Yorkshire and, ultimately, County Durham.

The recorded underlying superficial deposits in this area are river alluvium: clay; silt; sand and gravel.

5.0 **STATEMENT OF SOIL CHARACTERISTICS**

The following is a formal statement of the pre-working physical characteristics of the land. There is no standard format for the provision of such data but the following descriptions give information similar to that normally provided.

A single soil type was identified across the whole site:

Soil Type 1 – Wharfe 561a series occurs across the whole of the site and comprises deep stoneless permeable fine loamy soil overlying river alluvium.

5.1 **Topsoils**

Topsoil T1 occurs within the whole site but with slight thickness difference between Block A and Block B.

Colour:	Dark brown	
Texture:	Fine textured silt/sand/ loamy soil	
Stones:	Stoneless	
Structure:	Weakly to moderately developed sub angular blocky	
Thickness:	Area A	Average 50cm
	Area B	Average 40cm

5.2 **Subsoil**

Subsoil S1 also occurs over the whole of the site but with very slight thickness difference between Block A and Block B.

Colour:	Brown no mottles	
Texture:	Medium textured, consisting of silt/sand/ loamy soil	
Stones:	Stoneless	
Structure:	Weakly developed coarse angular blocky	
Thickness:	Area A	Average 60cm
	Area B	Average 55cm

6.0 AGRICULTURAL LAND CLASSIFICATION

AND SOIL CHARACTERISTICS REPORT

SUMMARY

- 6.1 The 22.2 hectare site surveyed consists of two arable fields on either side of the River Calder, awaiting crop harvest (August 2019) located off Aberford Road and Ferry Lane, Stanley Ferry, Wakefield.
- 6.2 The overall ALC limiting factor is due to the proximity of the River Calder and the water table and the effect upon waterlogging and flooding.
- 6.3 The agricultural land comprises approximately 22.2 hectares with an **ALC subgrade 3b** (moderate quality). This classification falls outside the category "*best and most versatile*" agricultural land.
- 6.4 The soils are developed in Wharfe 561a series over river alluvium and deeper coal measures.
- 6.5 The soil resources consist of;
- Fine textured loam comprising: silt clay/sandy silt/sandy topsoil on average 45cm thick overlying medium textured clay loam subsoil on average 55cm thick.

7 IMPACT ON EXISTING AGRICULTURAL UNITS

7.1 The agricultural land to be taken for the mineral extraction is contained in 2 separate ownerships. The loss will reduce the farming area of Smalley Bight Farm by approximately half but the land is let to an agricultural tenant.

7.2 The loss to Birkwood Farm will reduce the farmed area by less than 5%.

7.3	Area A	Farm size	Land to be taken	%age
	Smalley Bight	22 ha	10.30 ha	46.8

The proposed mineral extraction area comprises approximately half of the total area at Smalley Bight Farm.

7.4	Area B	Farm size	Land to be taken	%age
	Birkwood Farm	250 ha	11.90 ha	4.76

Birkwood Farm is a mixed arable and grassland farm. The proposed mineral extraction area comprises less than 5% of the total farmed area and so would have little or no effect upon the farming regime.

7.5 In the long term, the afteruse of the site is likely to be lakes for leisure activity. There will be a need to retain some soil for restoration purposes around the water margins but some soil will likely become surplus to requirements and will be available for land improvement elsewhere.

Richard F Steadman BSc (Hons)

28th August 2019

8 **SOURCES OF REFERENCE**

- National Soils Resource Institute (NSRI) 2019 Soils Site Report for Location 4355238E 432277N 1km x 1km. National Soils Resources Institute

Cranfield University Accessed Via: <https://www.landis.org.uk/sitereport>
- Ministry of Agriculture Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.*

MAFF London
- Met. Office (1989) *Climatological Data for Agricultural Land Classification.*

Met. Office: Bracknell
- Yorkshire and the Humber Region 1:250,000 Series Provisional ALC map

Natural England
- *Soil Colour Charts* Munsell® 2009 Production
- Ministry of Housing, Communities & Local Government
Advice on how to take account of and address the risks associated with flooding and coastal change in the planning process. Published 6 March 2014 related details as follows:

Zone 2 Medium Probability Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)

Zone 3a High Probability Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)

Zone 3b The Functional Floodplain This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

APPENDIX 1 ALC GRADE ACCORDING TO FLOOD RISK (PAGE 15 MAFF ALC 1988)

Grade according to flood risk in **summer**

Grade /Subgrade	Flood limits	
	frequency	duration
1	very rare	short
2	rare	short
3a	very rare	medium or long
	or rare	medium
	or occasional	short
3b	rare	long
	or <u>occasional</u>	<u>medium</u> *overriding factors
4	occasional	long
	or frequent	short or medium
5	frequent	long

Grade according to flood risk in **winter**

Grade/ Subgrade	Flood limits	
	frequency	duration
1	rare	short
2	rare	medium
	or occasional	short
	rare	long
3a	or occasional	medium
	or frequent	short
	occasional	long
3b	or frequent	medium
	frequent	long

Hence, the overriding “most limiting factor” affecting the ALC Grade is the “occasional” frequency and “medium” duration of flooding occurring in the summer period which limits the classification to subgrade 3b.

APPENDIX 2 AUGER BOREHOLES DESCRIPTION

(FROM SECTION 3.3)

3.3.1 BLOCK ABorehole (1)

Location: SE 350 234

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-50cm Topsoil: Soft, dark reddish grey (2.5YR 3/1) silt clay loam with slightly moist but friable crumbly texture; no mottles; very fine crumb structure; firm; no earthworms present; stoneless; fine fibrous roots

50-70cm Subsoil: Soft brown loamy sand; stoneless; weak coarse subangular blocky; no mottles

70+cm Sand and gravel

Borehole (2)

Location: SE 350 235

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-40cm Topsoil: Soft, reddish black (10YR 2.5/1) sandy loam; stoneless; moist but friable crumbly texture; no mottles; coarse structure; firm; fine roots no earthworms present

40-60cm Subsoil: Soft brown loamy sand; slightly stony; weak coarse subangular blocky; no mottles;

60+cm Sand and gravel

Borehole (3)

Location: SE 351 235

Land use:	Arable (awaiting harvest of oilseed rape)
Slope:	0
<u>Depth:</u>	<u>Horizon description:</u>
0-50cm	Topsoil: Soft, dark brown (5YR 2.5/1) silt clay loam; moist with crumbly texture; no mottles; coarse structure; firm; fine roots present; no earthworms
50-60cm	Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;
65+cm	Sand and gravel

Borehole (4)

Location:	SE 352 235
Land use:	Arable (awaiting harvest of winter wheat)
Slope:	0
<u>Depth:</u>	<u>Horizon description:</u>
0-50cm	Topsoil: Soft, dark brown (7.5YR 3/2) sandy silt loam; moist with friable crumbly texture; no mottles; coarse structure; firm; fine roots no earthworms present
50-70cm	Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;
70cm+	Sand and gravel

Borehole (5)

Location:	SE 352 236
Land use:	Arable (awaiting harvest of winter wheat)
Slope:	0
<u>Depth:</u>	<u>Horizon description:</u>
0-40cm	Topsoil: Soft, very dark greyish brown (10YR 3/2) silt clay loam; moist; crumbly texture; no mottles; coarse structure; firm; few fibrous roots; stoneless; no earthworms present.
40-50cm	Subsoil: Soft brown sandy loam; stoneless; weak coarse

subangular blocky; some gleying

50+ cm Sand and gravel

Borehole (6)

Location: SE 353 235

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-55cm Topsoil: Soft, dark brown (4.5YR 3/1) silt clay loam; moist; crumbly texture; no mottles; coarse structure; firm;

55-65cm Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;

65+cm Sand and gravel

Borehole (7)

Location: SE 353 234

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-50cm Topsoil: Soft, dark brown 7.5YR 3/2) sandy silt loam; moist; crumbly texture; no mottles; coarse structure; firm; no earthworms present

50-65cm Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;

65+cm Sand and gravel

Borehole (8)

Location: SE 354 234

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-55cm	Topsoil: Soft, dark brown (7.5YR 3/2) sandy silt loam; very soft and moist; crumbly texture; no mottles; coarse structure; firm
55-60cm	Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;
60+cm	Sand and gravel

Borehole (9)

Location:	SE 354 235
Land use:	Arable (awaiting harvest of winter wheat)
Slope:	0

Depth: Horizon description:

0-50cm	Topsoil: Soft, very dark grey (5YR 3/1) silt clay loam; very moist; crumbly texture; no mottles; coarse structure; firm;
50-60cm	Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;
40+cm	Sand and gravel

Borehole (10)

Location:	SE 355 235
Land use:	Arable (awaiting harvest of winter wheat)
Slope:	0

Depth: Horizon description:

0-50cm	Topsoil: Soft, black (5YR 2.5/1) sandy loam; very moist; crumbly texture; stoneless; no mottles; coarse structure; firm;
50-58cm	Subsoil: Soft brown sandy loam; weak coarse subangular blocky; no mottles;
58+cm	Sand and gravel

3.3.2 BLOCK B

Borehole (1)

Location: SE 356 234

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-30cm Topsoil: Soft, dark brown (7.5YR 3/3) silt clay loam with dry and friable crumbly texture; no mottles; coarse structure; firm; no earthworms present; stoneless; fibrous roots

30-50cm Subsoil: Soft brown loamy sand; slightly stony; weak coarse subangular blocky; no mottles;

50+cm Sand and gravel

Borehole (2)

Location: SE 356 233

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-25cm Topsoil: Soft, dark reddish brown (5YR 3/2) silt clay loam; stoneless; moist; dry and friable crumbly texture; coarse structure; firm

25-50 Subsoil: Soft brown loamy sand; stoneless; weak coarse subangular blocky; no mottles;

50+cm Sand and gravel

Borehole (3)

Location: SE 356 232

Land use: Edge of field

Slope: 0

Depth: Horizon description:

0-20cm Topsoil: Soft, dark reddish brown (2.5YR 3/3) sandy silt

loam; moist with crumbly texture; no mottles; coarse structure; firm no roots present; no earthworms

20cm Solid, impenetrable – may be rock from canal construction?

Borehole (4)

Location: SE 355 233

Land use: Arable (awaiting harvest of winter barley)

Slope: 0

Depth: Horizon description:

0-50cm Topsoil: Soft, dark reddish brown (5YR 3/3) silty clay loam; moist with friable crumbly texture; no mottles; coarse structure; firm; no earthworms present

50-70cm Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;

70cm+ Sand and gravel

Borehole (5)

Location: SE 355 232

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-40cm Topsoil: Soft, dark reddish brown (5YR 3/4) sandy loam; moist; crumbly texture; no mottles; coarse structure; firm; few fibrous roots; stoneless; no earthworms present.

40-65cm Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;

50+ Sand and gravel

Borehole (6)

Location: SE 355 231

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

<u>Depth:</u>	<u>Horizon description:</u>
0-40cm	Topsoil: Soft, dark reddish brown (5YR 3/4) silt loam; moist; crumbly texture; no mottles; coarse structure; firm; earthworms present
40-55cm	Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;
55+cm	Sand and gravel

Borehole (7)

Location:	SE 353 231
Land use:	Arable (awaiting harvest of winter barley)
Slope:	0

<u>Depth:</u>	<u>Horizon description:</u>
0-30cm	Topsoil: Soft, dusky red (2.5YR 3/2) sandy silt loam; moist; crumbly texture; no mottles; coarse structure; firm; no earthworms
30-50cm	Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;
50+cm	Sand and gravel

Borehole (8)

Location:	SE 354 232
Land use:	Arable (awaiting harvest of winter barley)
Slope:	0

<u>Depth:</u>	<u>Horizon description:</u>
0-35cm	Topsoil: Soft, dark brown (7.5YR 3/2) silt loam; very moist; crumbly texture; no mottles; coarse structure; firm;
35-50cm	Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles
50+cm	Sand and gravel

Borehole (9)

Location: SE 354 233

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-40cm Topsoil: Soft, dark brown (7.5YR 3/4) silt clay loam; very moist; crumbly texture; no mottles; coarse structure; firm;

40-60cm Subsoil: Soft brown sandy loam; stoneless; weak coarse subangular blocky; no mottles;

60+cm Sand and gravel

Borehole (10)

Location: SE 353 233

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-30cm Topsoil: Soft, dark yellowish brown (10YR 3/4) silt clay loam; very moist; crumbly texture; stoneless; no mottles; coarse structure; firm; many earthworms

30-55cm Subsoil: Soft brown sandy loam; weak coarse subangular blocky; no mottles;

55+cm Sand and gravel

Borehole (11)

Location: SE 353 232

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-40cm Topsoil: Soft, dark brown (10YR 3/3) sandy silt loam; very moist; crumbly texture; stoneless; no mottles; coarse structure; firm;

40-55cm Subsoil: Soft brown sandy loam; weak coarse subangular blocky; no mottles;

55+cm Sand and gravel

Borehole (12)

Location: SE 352 232

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-40cm Topsoil: Soft, dark yellowish brown (10YR 3/4) sandy loam; very moist; crumbly texture; stoneless; no mottles; coarse structure; firm;

40-55cm Subsoil: Soft brown sandy loam; weak coarse subangular blocky; no mottles

55+cm Limestone

Borehole (13) SE 352 233

Land use: Arable (awaiting harvest of winter barley)

Slope: 0

Depth: Horizon description:

0-25cm Topsoil: Soft, dark reddish brown (10YR 3/2) silt clay loam; very moist; crumbly texture; stoneless; no mottles; coarse structure; firm;

25-50cm Subsoil: Soft brown sandy loam; weak coarse subangular blocky; no mottles;

50+cm Sand and gravel

Borehole (14) SE 351 233

Land use: Arable (awaiting harvest of winter wheat)

Slope: 0

Depth: Horizon description:

0-40cm Topsoil: Soft, dark brown (7.5YR 3/2) silt loam; very moist;

	crumbly texture; stoneless; no mottles; coarse structure; firm;
40-60cm	Subsoil: Soft brown sandy loam; weak coarse subangular blocky; no mottles;
60+cm	Sand and gravel