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AGRICULTURAL LAND CLASSIFICATION

LAND AT RETFORD

SITE C

October 2013

Prepared for:

Planning Department

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Executive Summary

Bassetlaw District Council is undertaking an appraisal of potential development sites in the Retford area which are to be allocated for future housing and employment.

A consideration in the site appraisal methodology is, in the case of green field sites, the quality of agricultural land that will be affected.

LDCL has been commissioned by Bassetlaw District Council to undertake an Agricultural Land Classification assessment on an area of land to the north Retford, Nottinghamshire.

A 22.20 hectare area of agricultural land, reference Site C, was surveyed to assess its Agricultural Land Classification (ALC) Grade.

Soils were found to be slightly variable across the site ranging from light to medium textured and free draining sandy profiles through to medium and heavy textured and imperfectly profiles overlying clay within 40-70cm depth.

The site area was occupied by 3.37 ha of very good quality land (ALC grade 2), 13.69 ha of good quality land (ALC subgrade 3a) and 4.87 ha of moderate quality land (ALC subgrade 3b). Two further non agricultural categories occupied 0.27ha of the site.

Lighter textured and freely draining soils to the south of the site were limited, in terms of agricultural land classification, by slight seasonal drought issues, in particular for root crops (e.g. potatoes and sugar beet) to ALC Grade 2.

Medium textured and imperfectly drained soils occupied the north, east and west of the site and were limited to ALC subgrade 3a by slight to moderate seasonal wetness and workability issues.

The best and most versatile land (ALC grade 2 and subgrade 3a) is capable of producing consistently high yields of a wide range of agricultural crops including cereals, oilseed rape, root crops and/or grass (ALC grade 2). The heavier textured moderate quality (ALC subgrade 3b) land is slightly limited in its potential and will produce variable yields of a more limited range of crops, particularly in wetter years.

1.0 BACKGROUND

LDCL was commissioned by Bassetlaw District Council to undertake an Agricultural Land Classification (ALC) assessment on an area of land to the north of Retford, Nottinghamshire.

The area surveyed is shown on the plan at Appendix 1 and extends to approximately 22.20 hectares (ha) of land in agricultural and non agricultural use. The site (Retford C) consists of eight agricultural enclosures centred over OS National Grid Reference SK 71500 82200. The site is bordered to the north by a ditch and field boundaries. The western boundary comprises of a ditch and field boundaries in the north, residential gardens in the centre and The Drive to the south. The eastern boundary is formed by a field boundary in the north, Longholme Farm and Lane in the centre and grass paddocks to the south. The southern boundary abuts residential gardens to the rear of Park Lane and Longholme Road.

2.0 REPORT OBJECTIVES

The objective of this report is to assess the Agricultural Land Classification of the site.

The findings are based on information provided by field survey work completed by LDCL during October 2013.

3.0 AGRICULTURAL LAND CLASSIFICATION (ALC)

All land quality assessments have been made using the method described in “Revised Guidelines and Criteria for Grading the Quality of Agricultural Land” (ALC, MAFF 1988). This system grades agricultural land according to the degree to which its physical characteristics impose long term limitations on agricultural use and cropping flexibility.

The principal physical factors influencing land quality and agricultural production are climate particularly temperature and rainfall, site including gradient, micro-relief and flood risk and soil characteristics such as texture, structure, depth, stoniness and erosion potential. These factors, together with interaction between them, form the basis of classifying land into 1 of 5 ALC grades with Grade 3 being subdivided into Subgrades 3a and 3b. ALC grades 1, 2 and 3a are defined as the best and most versatile (BMV), Subgrade 3b as being of moderate quality with Grade 4 land being poor and Grade 5 being of very poor quality.

3.1 Methodology

Prior to the field survey a desk study was undertaken. This included an examination of published soil and ALC maps, geology maps (British Geological Survey website map viewers) and aerial photographs (Google Earth imagery). A review of DEFRA’s MAGIC website indicated that there have been no detailed ALC survey’s undertaken by statutory agencies on this land in recent years.

Following the desk study, soils across the remaining 2.50 ha of the site were examined using a hand held Dutch auger and spade to a maximum depth of 1.2 m. Auger borings were made at 100 m intervals at points predetermined by the Ordnance Survey National Grid. Information on topsoil and subsoil depth, soil texture, stone content and drainage characteristics were collected

at each point. Small-scale hand dug profile pits were excavated in each of the soil types identified to record more detailed information on soil profile characteristics. A plan showing the location of soil auger borings and profile pits is shown at Appendix 1. The distribution of ALC grades is shown at Appendix 2. Individual soil auger borings are described at Appendix 3 and soil profile pit descriptions are shown at Appendix 4.

3.2 Climatic limitations

Climate has an overriding influence on crop production and hence land flexibility and quality. It is assessed in the ALC system by considering rainfall and the sum of daily air temperatures above 0°C between January and June (Accumulated Temperature). This area has an Accumulated Temperature (January to June) of 1,408 day°C and a long-term average annual rainfall of approximately 573 mm. This combination of rainfall and temperature is a mild, albeit slightly dry, climatic regime and places no significant limitations on cropping flexibility and does not limit the ALC grade in this area.

3.3 Site limitations

The British Geological Survey (BGS) web site shows this area to be underlain by bedrock of the Tarporley Siltstone Formation formed approximately 237 to 250 million years ago in the Triassic Period. There is a superficial covering of coarse (sandy) and fine (clayey) Mid Pleistocene fluvioglacial and lacustrine drift, formed in the Quaternary Period up to 2 million years ago.

Gradients across the site are generally slight (2-3°) rising from around 17m Above Ordnance Datum (AOD) in the northeast on gentle and undulated slopes to 20-25m in the west and southwest. The slopes do not exceed 7° and therefore impose no limitation on ALC grade.

Interrogation of the Environment Agency flood risk maps, shown at Appendix 5, demonstrate that the lower areas of the site to the east of The Drive may be prone to flooding during extreme flood events. The potential for flooding in these areas is localised and will contribute marginally and not be an overriding influence to the ALC grade in this area.

3.4 Soil limitations

The 1:250,000 map 'Soils of England and Wales, Sheet 4, Eastern England' shows the area to be covered by soils of the Dunnington Heath, Whimble and Enborne Soil Associations. These Associations include a range of component soil series ranging from free or imperfectly drained Dunnington Heath and Whimble series through to heavier textured and poorly drained Fladbury series on the lower lying areas of the site.

Limitations on ALC grade on this site therefore relate to soil droughtiness where sandier profiles predominate to the south and wetness and workability on the medium to heavier textured soils in centre and north.

Topsoil and subsoil depths across the site are good and more than adequate for continuous arable production. Soil profile stone contents are locally elevated on the upslope in the south and extreme west and may exceed 5% with hardstones and gravels larger than 2cm in size. This will limit the ALC grade to 2 in more stony areas of the site.

3.5 Interactive limitations

The physical limitations which result from the interactions between climate, site and soil are soil wetness, droughtiness and erosion. This area has a low to moderate annual rainfall and the soils will typically be at field capacity (as wet as they can be after drainage has occurred), for 111 days per year.

Soil wetness expresses the extent to which excess water imposes restrictions on crop growth, workability and cultivations. Soil wetness is a limiting factor across most of this site with the exception of the southern boundary above 20m AOD. Wetness and workability problems caused by the heavy subsoil textures, low gradients and imperfect drainage provide an overriding limitation to ALC grade 2, subgrade 3a and also 3b in these areas.

Soil droughtiness indicates the degree to which a shortage of soil water influences the range of crops which may be grown and the level of yield which may be achieved. Summer moisture deficits at this site are 114mm for wheat and 108mm for potatoes. The low to moderate rainfall and light textured stony nature of some of the soils on the upslope at this site indicate that drought, in particular for potatoes, will be a slight limitation and restrict the land to ALC Grade 2.

The slightly undulated topography and medium topsoil texture mean that soil erosion through water/wind activity is not considered a major limitation on agricultural land quality.

3.6 Land use and published land quality

The agricultural land at this site was mixed with Short Rotation Coppice (SRC) willow to the north, grassland in the centre and extreme west and arable use (maize) to the southeast.

The site has been mapped (1:250,000 Provisional ALC maps) as land of principally grade 3 quality. This provisional grading pre-dates the 1988 ALC system and does not include a subdivision of ALC into subgrade 3a or 3b.

3.7 Agricultural Land Classification grades

3.7.1 Grade 2: Very good quality agricultural land (3.37 ha or 15% of the site area)

This grade occupied two discrete areas to the south and west of the site. It is found on the upslope and lies approximately to the south of the 20m (AOD) contour.

Soil profiles consisted of a medium sandy loam or sandy clay loam topsoil with a mean depth of 29cm (range 25-30cm). The topsoil contained few or common (2-5%) sub rounded hard sandstones and gravels, quartzite pebbles, siltstones, mudstones or coal fragments. Subsoils were comprised of a sandy clay loam or medium sandy loam usually grading into a heavy clay loam within 70cm of the surface. Subsoils were slightly or moderately stony containing few to common (2-5%) small and medium gravels and quartzite pebbles. Soil profile drainage was good to imperfect (Wetness Classes and I and II) and the reddish brown subsoils showed evidence of mottling and gleying with slowly permeable subsoil horizons within 58-70cm of the surface. These soils were limited to this ALC grade by slight soil wetness and workability issues and more locally by a slightly elevated (>5%) topsoil stone content.

This land is very good quality and capable of producing consistently high yields of a wide range of agricultural crops including cereals, oilseed rape, root crops and/or grass. With irrigation and stonepicking it may also support moderate to high yielding fruit and vegetable crops but the distribution and shape of this grade within the field system would not be practical for such intensive uses.

3.7.2 Subgrade 3a: Good quality agricultural land (13.69 ha or 62% of the survey area)

This subgrade occupied the northwest, northeast and centre south of the site.

Soils consisted of a transitional soil type between the lighter textured and more freely drained soils on the upslope and poorly drained clayey soils in the lower lying areas. Profiles consisted of a sandy clay loam or medium clay loam topsoil with a mean depth of 27cm (range 25-35cm). The topsoil contained few or common (2-7%) sub rounded hard sandstones and gravels, quartzite pebbles, siltstones, mudstones and coal fragments. This overlay a medium clay loam, sandy clay loam or heavy clay loam subsoil to depth. Subsoil stone content was slightly variable with profiles becoming less stony in the lower lying areas of the site. Soil profile drainage was generally imperfect to poor (Wetness Class III) with reddish brown subsoils containing mottling and gleying within 40cm and slowly permeable subsoil horizons within 55cm of the surface. These soils were limited to this subgrade by slight to moderate soil wetness and workability issues.

This land is good quality and capable of producing consistently high yields of a wide range of agricultural crops including cereals, oilseed rape, root crops and/or grass. It is less likely to support consistently higher yielding fruit and/or vegetable crops.

3.7.3 Subgrade 3b: Moderate quality agricultural land (4.87 ha or 22% of survey area)

This subgrade occurred to the centre north of the site and in the east.

Soil profiles occupied the lower lying areas of the site and were developed in heavier textured lacustrine deposits. They consisted of a slightly organic heavy clay loam or clay topsoil with a mean depth of 22cm (range 18-25cm). This shallower topsoil depth reflects an inability to easily plough and regularly cultivate this land. The topsoil contained rare (0-1%) sub rounded hard sandstones, gravels, quartzite pebbles and coal fragments and was strongly mottled and gleyed under grass. This overlay a stoneless or very slightly stony clay or silty clay subsoil to depth. Soil profile drainage was generally poor (Wetness Class III) with strongly mottled, gleyed and slowly permeable subsoil horizons almost immediately below the topsoil and within 30-40cm depth. These soils were limited to this subgrade by moderate to severe wetness and workability issues caused by the heavy soil textures. Flood risk on the lower lying areas to the east presents a further contributory factor in ALC grade.

This land is moderate quality and capable of producing consistently high yields of a narrow range of agricultural crops including combinable crops of cereals, oilseed rape and/or grass. It is unlikely to support root or vegetable crops and is unsuitable for fruit and/or vegetable cropping.

3.7.4 Non agricultural land use

Two land use types occur in this category as follows.

- **Urban (0.23 ha or 1% of survey area)**

This area consists of an access track, stables and ménage located in the centre of the site.

- **Ponds (0.04 ha or 0.10% of site area)**

Two small ponds located in the centre and east of the site

Table 1: Summary of ALC Grades on Survey Area

ALC Grade	Area (Ha)	% Total Area
Grade 2	3.37	15
Subgrade 3a	13.69	62
Subgrade 3b	4.87	22
Urban	0.23	1
Ponds	0.04	<0.25
Total	22.20	100

3.8 National, regional and district spatial context of ALC grading

The ALC grade distribution for this site is compared in Table 2 with the grades occurring in Bassetlaw District, Nottinghamshire County and National distribution. The figures represent a comparison with DEFRA statistics for the areas compiled from the digital 1:250,000 scale Provisional ALC map, originally published as a regional series of paper maps in 1977, and Ordnance Survey Boundary Line 2003. These have been adjusted to take account of the areas only of agricultural land and do not include agricultural or urban use.

Table 2 Comparison of ALC grade distribution with DEFRA statistics

ALC Grade	% of Agricultural Area			
	Site	Bassetlaw District	Nottinghamshire County	National
Grade 1	0	1	0.30	3.10
Grade 2	15	20	21	16.20
Subgrade 3a/3b	85	76	73	55.10
Grade 4	0	3	5.70	16.10
Grade 5	0	0	0	9.50
Total	100	100	100	100

NB: The reference data were created prior to the sub-division of Grade 3 into Sub-grades 3a and 3b. Consequently, there may be limitations to the statistics which reflect the high level mapping from these statistics were derived.

3.8.1 Grade 2

Development proposals have the potential to impact on up to 3.37 ha of ALC grade 2 BMV land. The proportion of land in this category at the site (15%) is slightly lower than that in the geographical area (20-21%) and similar to that found at a National scale (16%). In the overall local and regional context the proportion of Grade 2 land impacted is less than might be expected on a development of this size.

3.8.2 Grade 3

Development proposals have the potential to impact on up to 18.56 ha of ALC grade 3 land, of which 13.69 ha is subgrade 3a BMV. The proportion of land in this category at the site (85%) is slightly more than that in the geographical area (73-76%) and more than that at a National scale (55%). In the overall local and regional context the proportion of grade 3 impacted is slightly more than might reasonably be expected on a development of this size but it should be noted that this is due primarily to the slightly lower proportion of grade 2 and absence of lower grades of land. Overall, the proportion of subgrade 3a BMV land on this site is, in the author's opinion, slightly greater than might usually be expected for a 22.20 ha site in this geographical area.

Appendix 1

Agricultural Land Classification

Location of Soil Auger Borings and Soil Profile Pit

Retford - Site C

Client

Bassetlaw District Council
Queens Buildings
Potter Street
Worksop
Nottinghamshire
S80 2AH

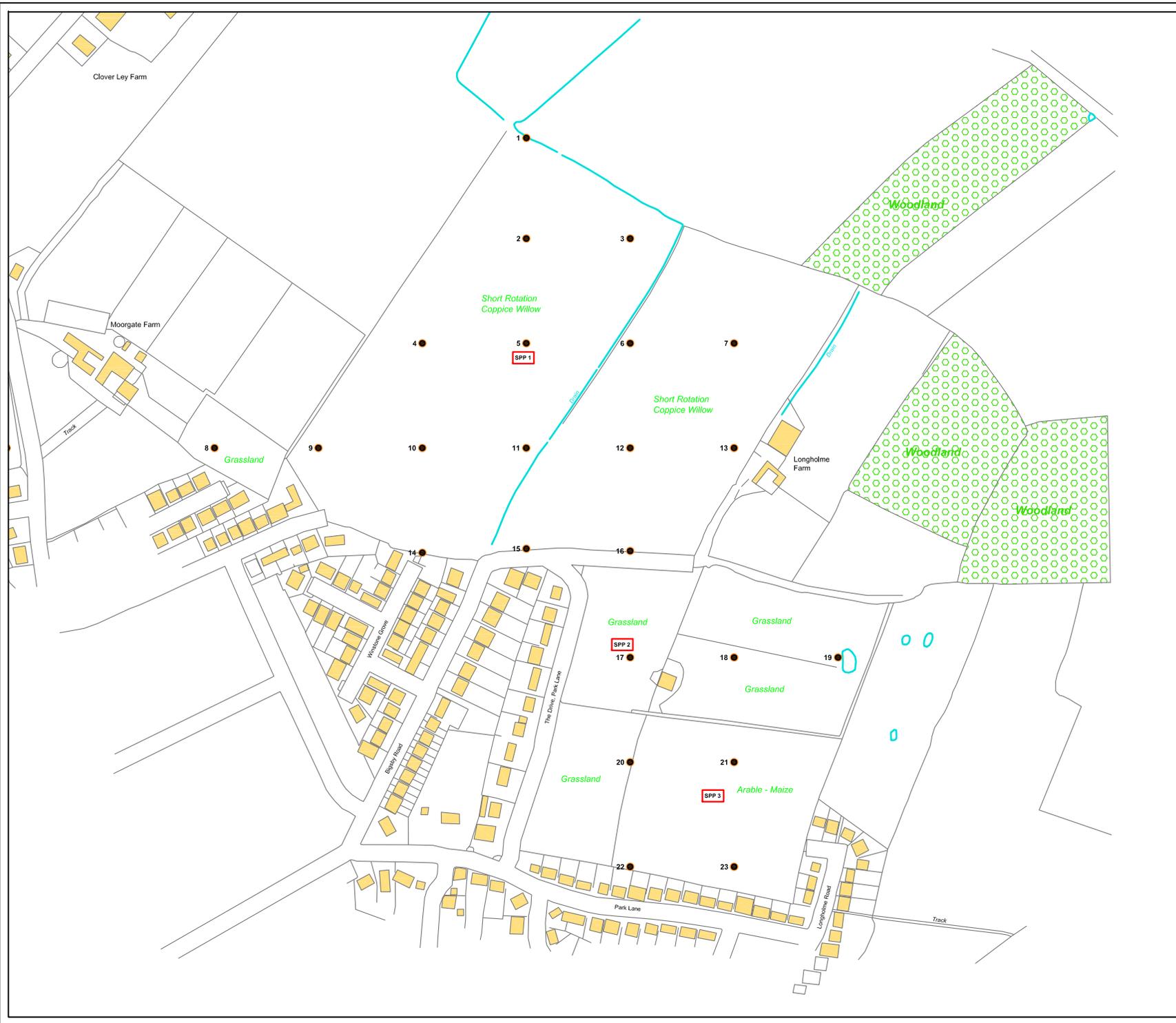
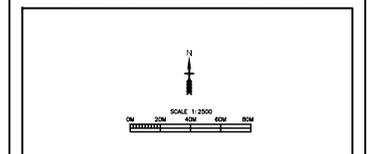
Key

-  Location of Soil Auger Boring
-  Location of Soil Profile Pit

Scale 1:5,000 @ A4

OS Grid Reference: SK 71500 82200

Revision: A
Date Drawn: 23 / 10 / 2013



Agricultural Land Classification

Distribution of ALC Grades

Retford - Site C

Client

Bassetlaw District Council
Queens Buildings
Potter Street
Worksop
Nottinghamshire
S80 2AH

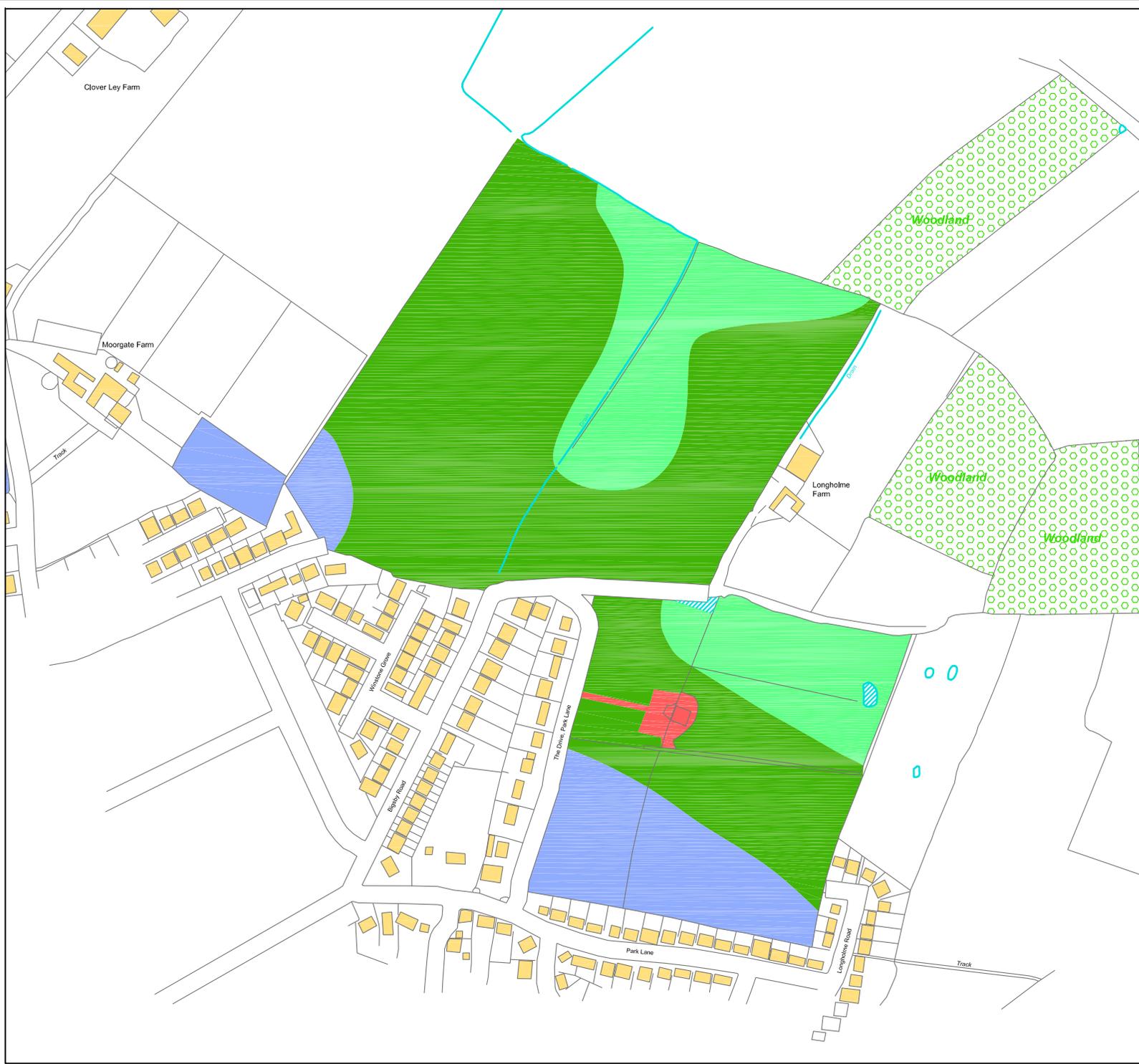
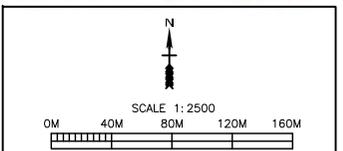
Key

-  Grade 2 (3.37 ha)
-  Subgrade 3a (13.69 ha)
-  Subgrade 3b (4.87 ha)
-  Urban (0.23 ha)
-  Pond (0.04 ha)

Scale 1:5,000 @ A4

OS Grid Reference: SK 71500 82200

Revision: B
Date Drawn: 28 / 10 / 2013



Appendix 3

Details of Individual Soil Auger Borings

BORE No.	LAND USE	DEPTH (cm)	TEXTURE	MOTTLES		STONES		WETNESS CLASS	ALC Limitation
				Col	Ab.	Ab.	Type		
1	SRC	0-30	mcl			0-1	grvl+sst+c	III	3a
		30-55	mcl	o	c	0-1	grvl+sst	SPL>55	
		55-120	hcl/c	o+g	m	0-1	grvl+sst		
2	SRC	0-30	mcl			0-1	grvl+sst+c	III/II	3a/2
		30-60	mcl	o	c	0-1	grvl+sst	SPL>60?	
Impenetrable> 60cm due to stones and roots in a dry clay loam matrix									
3	SRC	0-27	hcl			0-1	hdsst+c	III	3b
		27-40	hcl	o	c	0-1	grvl+sst	SPL>40	
		40-120	c	o+g	m	0-1	grvl+sst		
4	SRC	0-28	scl			0-1	grvl+sst+c	III	3a
		28-50	scl	o	c	2-5	grvl+sst	SPL>55	
		50-120	hcl/c	o+g	m	2-5	grvl+sst		
5	SRC	0-24	mcl			0-1	hdsst+c	III	3a
		24-40	mcl	o+g	c/m	0-1	grvl+sst	SPL>40	
		40-120	c	o+g	m	0-1	grvl+sst		
6	SRC	0-25	hcl			0-1	hdsst+c	III	3b
		25-40	hcl	o+g	m	0-1	grvl+sst	SPL>40	
		40-120	c	o+g	m	0-1	grvl+sst		
7	SRC	0-30	mcl			0-1	grvl+sst+c	III/II	3a/2
		30-55	scl	o	c	0-1	grvl+sst	SPL>60	
		55-120	hcl	o+g	m	0-1	grvl+sst		
8	PGR	0-22	msl			0-1	grvl+sst+c	II	2
		22-70	scl	o	c	2-5	grvl+sst	SPL>70	
		70-120	hcl	o+g	m	0-1	grvl+sst		
9	SRC	0-28	scl/msl			0-1	grvl+sst+c	II/III	2/3a
		28-70	scl/msl	o+g	c	2-5	grvl+sst	SPL>60	
		70-120	hcl	o+g	m	0-1	grvl+sst		
10	SRC	0-28	scl			0-1	grvl+sst+c	III/II	3a/2
		28-60	scl	o	f	0-1	grvl+sst	SPL>60	
		60-120	c	o+g	m	0-1	grvl+sst		
11	SRC	0-25	scl			0-1	grvl+sst+c	III/II	3a
		25-55	scl	o	c	0-1	grvl+sst	SPL>55	
		55-120	c	o+g	m	0-1	grvl+sst		
12	SRC	0-26	scl			0-1	grvl+sst+c	II	2
		26-35	scl	o	f	2-5	grvl+sst	SPL>60	
		35-60	mcl	o+g	c	2-5	grvl+sst		
		60-120	hcl	o+g	m	2-5	grvl+sst		
13	SRC Headland	0-24	scl			0-1	grvl+sst+c	III	3a
		24-60	scl	o+g	c	0-1	grvl+sst	SPL>55	
Impenetrable> 60cm due to stones and roots in a heavy clay loam matrix									
14	SRC Headland	0-25	mcl			0-1	grvl+sst+c	III	3a
		25-55	mcl	o+g	c	2-5	grvl+sst	SPL>55	
		55-120	hcl	o+g	m	2-5	grvl+sst		
15	SRC Headland	0-27	mcl			0-1	grvl+sst+c	III	3a
		27-45	mcl	o+g	c	0-1	grvl+sst	SPL>45	
		45-120	hcl/c	o+g	m	0-1	grvl+sst		

Details of Individual Soil Auger Borings

BORE No.	LAND USE	DEPTH (cm)	TEXTURE	MOTTLES		STONES		WETNESS CLASS	ALC Limitation
				Col	Ab.	Ab.	Type		
16	SRC Headland	0-25	mcl			0-1	grvl+sst+c	III	3a
		25-45	mcl	o+g	c	0-1	grvl+sst	SPL>45	
		45-120	hcl/c	o+g	m	0-1	grvl+sst		
17	PGR Grazing	0-24	mcl (o)	o	c	0-1	grvl+sst+c	III	3a
		24-40	mcl	o+g	m	2-5	grvl+sst	SPL>40	
		40-120	hcl/c	o+g	ab	2-5	grvl+sst		
18	PGR Grazing	0-26	hcl (o)	o	m	0-1	grvl+sst+c	III	3b
		26-40	hcl	o+g	m	1-2	grvl+sst	SPL>30	
		40-120	c	o+g	ab	1-2	grvl+sst		
19	PGR Grazing	0-24	hcl (o)	o	m	0-1	grvl+sst+c	III	3b
		24-40	hcl	o+g	m	1-2	grvl+sst	SPL>35	
		40-120	c	o+g	ab	1-2	grvl+sst		
20	PGR Grazing	0-26	scl	o	f	0-1	grvl+sst+c	II	2/3a
		26-40	msl	o+g+Mn	c	1-2	grvl+sst	SPL>70	
		40-120	m/hcl	o+g	ab	1-2	grvl+sst		
21	Mz	0-26	scl	o	f	0-1	grvl+sst+c	II	2/3a
		26-40	msl	o+g+Mn	c	1-2	grvl+sst	SPL>70	
		40-120	m/hcl	o+g	ab	1-2	grvl+sst		
22	Mz	0-26	scl	o	f	2-5	grvl+sst+c	I	2
		26-40	scl	Mn	f/c	2-5	grvl+sst	SPL>100	
		40-120	msl	o+g	c	2-5	grvl+sst		
23	Mz	0-26	mcl	o	f	2-5	grvl+sst+c	II	2
		26-50	scl	o	f	0-1	grvl+sst	SPL>50	
		50-100	hcl	o+g	ab	2-5	grvl+sst		

Key to Abbreviations

Soil Textures			Mottle Colour		
zc	-	silty clay	o	-	ochrous
c	-	clay	g	-	grey
hcl	-	heavy clay loam	Mn	-	manganese concretions
hzcl	-	heavy silty clay loam	Fe	-	Iron concretions
mcl	-	medium clay loam	br	-	brown/brownish yellow
scl	-	sandy clay loam	Abundance (Mottles and Stones)		
msl	-	medium sandy loam	r	-	rare
mszl	-	medium sandy silt loam	f	-	few
scl	-	sandy clay loam	c	-	common
csl	-	coarse sandy loam	m	-	many
msl	-	medium sandy loam	vm	-	very many
mszl	-	medium sandy silt loam	ab	-	abundant
fsl	-	fine sandy loam	Stones		
fszl	-	fine sandy silt loam	grvl	-	gravel
lcs	-	loamy coarse sand	c	-	coal
lms	-	loamy medium sand	sst	-	sandstones
lfs	-	loamy fine sand	p	-	pottery
cs	-	coarse sand	Land Use		
ms	-	medium sand	Fallow	-	Fallow/set aside
fs	-	fine sand	Plough	-	Ploughed/cultivated pending drilling
o	-	prefix 'o' = organic	PGR	-	Grassland
pl	-	peaty loam	SRC	-	Short Rotation Coppice (Willow)
p	-	peaty	Mz	-	Maize

Appendix 4

**Soil Profile Pit Description
Retford – Site C**

Soil Profile Pit 1	
Location:	Close to auger boring 5
OS Grid Reference:	SK 71400 82500
Land Use:	Short Rotation Willow Coppice
Aspect:	Flat to very slight northeast (1-2°)
Soil type:	Deep medium to heavy textured and imperfectly drained soils.
Land Quality:	ALC Subgrade 3a

Depth (m)	Description
0-0.25	Very dark greyish brown (10YR3/2) medium clay loam with a shallow litter layer in upper 2-3cm; slightly moist at surface dry below 5cm; few (1-2%) small and medium and rare large rounded gravels, hard sun angular sandstones and rare angular coal fragments; weakly developed medium and coarse sub angular blocky structure; medium packing density; friable; slightly sticky and plastic when wet; common fine pores and common fine/medium fissures; abundant fine fibrous and fleshy roots near coppice stools; rare large earthworms; clear smooth boundary.
0.25-0.52	Light brown (7.5YR 6/4) medium to heavy clay loam; common to many coarse distinct reddish yellow, pale grey mottles and rare black manganese concretions; gleyed but not slowly permeable; slightly moist; few (1-2%) small and medium and rare large gravels and hard sandstones; weakly developed medium to coarse angular blocky structure; medium packing density; firm; moderately sticky; plastic when wet; rare fine and medium pores and large earthworm channels; few fine and medium fissures; common fine fibrous roots; merging boundary.
0.52-1.20	Brown 7.5YR 5/3 heavy clay loam; abundant coarse distinct reddish brown, pale grey, light olive grey and reddish yellow mottles; slightly moist; rare (<2%) small and medium and rare large gravels; moderately developed coarse angular to prismatic structure (slowly permeable layer); medium to high packing density; hard; very sticky and plastic when wet; rare fine and medium pores and fissures; no earthworms.

Soil Profile Pit Description Retford – Site C

Soil Profile Pit 2	
Location:	Auger boring 17
OS Grid Reference:	SK 71500 82200
Land Use:	Grassland – horse paddock
Aspect:	Slight northeast (1-2°)
Soil type:	Deep heavy textured and imperfectly drained soils.
Land Quality:	ALC Subgrade 3a (3b with heavy topsoil)

Depth (m)	Description
0-0.27	Very dark greyish brown (10YR3/2) medium clay loam (locally heavy clay loam to east) with a slightly organic upper 8cm; slightly mottled and gleyed around grass roots; moist; rare (0-1%) small and medium rounded gravels, hard sandstones coal fragments; moderate to well developed fine and medium sub angular blocky structure; medium packing density; friable; slightly sticky and plastic when wet; common fine pores and common fine/medium fissures; abundant fine fibrous roots; few medium and large earthworms; clear smooth boundary.
0.27-1.20	Dark yellowish brown (10 4/4) clay containing clay loam inclusions; abundant coarse distinct reddish brown, pale grey and yellowish brown mottles becoming increasingly grey at depth; slightly moist; very rare small, medium and large gravels; weakly developed coarse prismatic structure (slowly permeable layer); medium to high packing density; very firm to hard; very sticky and plastic when wet; rare fine and medium pores and fissures; no earthworms.

Soil Profile Pit Description Land at Retford – Site C

Soil Profile Pit 3	
Location:	South of auger boring 21
OS Grid Reference:	SK 71554 82677
Land Use:	Arable - Maize stubble
Aspect:	North northeast (1-2°)
Soil type:	Deep light to medium textured soils. Wetness Class II
Land Quality:	ALC Grade 2 bordering 3a on downslope

Depth (m)	Description
0-0.26	Dark brown (10YR 3/3) sandy clay loam bordering medium sandy loam; few (2-5%) small, medium and rare large sub rounded hard gravels, quartzite pebbles and rare small glass fragments; very moist at surface becoming slightly moist below 10cm; compact and weak platy structure in upper 10cm improving to moderately developed fine and medium sub angular blocky structure below; low to medium packing density; soft; non plastic; slightly sticky; common fine pores and many small and medium fissures; abundant fine fibrous and fleshy maize roots; few medium and large earthworms; clear wavy boundary.
0.26-0.60	Brown (7.5YR 4/4) sandy clay loam; few distinct ochrous and black manganese concretions; few (2-5%) small and medium sub rounded gravels and quartzite pebbles concentrated at topsoil/subsoil interface; slightly moist; weakly developed fine and medium sub angular blocky structure; medium packing density; friable to firm; non plastic; slightly sticky; few fine and medium pores, micropores and common fine and medium fissures; common to many fine fibrous roots; rare large earthworm channels filled with illuviated topsoil; clear smooth boundary.
0.60-1.20	Strong brown (7.5YR 5/6) medium to heavy clay loam; many coarse distinct ochrous, grey and olive grey mottles; rare (1-2%) small and medium soft weathering sandstones and mudstones; slightly moist; weak to moderately well developed prismatic structure; high packing density; very firm; rare fine micropores and common medium and large fissures along ped faces; rare fine fibrous roots; no earthworms.

Click on the map to see what is the Risk of Flooding at a particular location.

Flood Maps 

-  Flooding from rivers or sea without defences
-  Extent of extreme flood
-  Flood defences (Not all may be shown*)
-  Areas benefiting from flood defences (Not all may be shown*)
-  Main rivers

