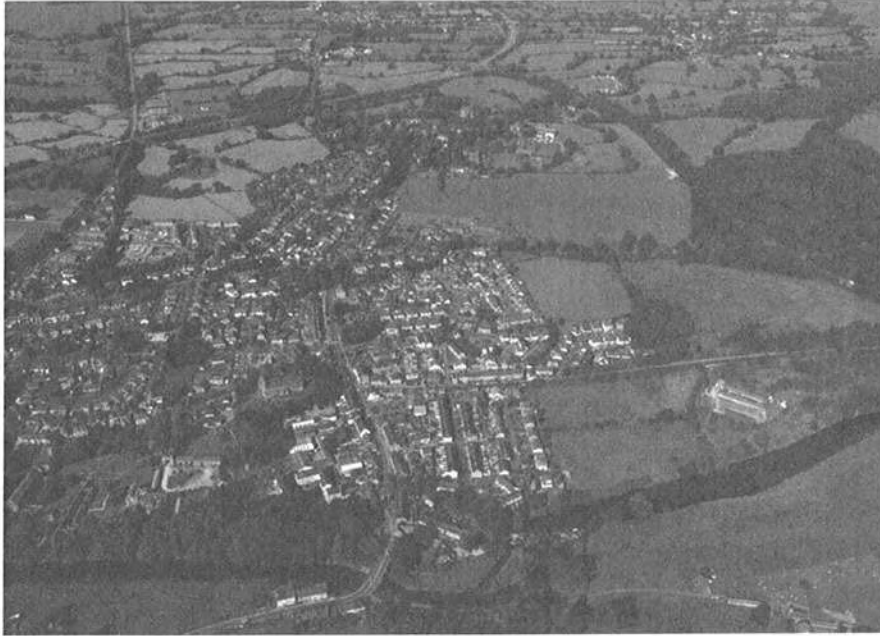




Agricultural Land Classification Report

Submitted as part of the Outline Planning Application for
Land to the east of Clitheroe Road (Lawsonsteads Farm), Whalley

COMMERCIAL ESTATES GROUP

Our Ref: SES/CEG/LEC/2#1

Date: 26th March 2011

Client:

Commercial Estates Group
The Exchange
1st Floor
Station Parade
Harrogate
HG1 1TS

AGRICULTURAL LAND CLASSIFICATION

**Land to the east of Clitheroe Road
(Lawsonsteads), Whalley**

A report prepared on behalf of *Soil Environment Services* by:



Mike Palmer BSc. MSc.
Environmental Consultant

Checked by:



Dr Robin S Davies BSc PhD MSoilSci CSci PGC *Contaminated Land Management*
Chartered Scientist

Date: 26th March 2011



INSTITUTE OF PROFESSIONAL SOIL SCIENTISTS

This report has been prepared by Soil Environment Services with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The report is the property of the client and Soil Environment Services accept no responsibility of whatever nature to third parties to whom this report may be made known.

No part of this document may be reproduced without prior written approval of the Client.

Soil Environment Services

Agricultural Land Classification, Contaminated Land
Risk Assessment, Mineral Extraction Soil Planning
The Nanotechnology Centre, Herschel Building, Kings Rd, Newcastle upon Tyne NE1 7RU
Tel: 0191 243 0686 Fax: 0191 222 3528 Email: rd@soilenvironmentalservices.co.uk
www.soilenvironmentalservices.co.uk

CONTENTS

	Page
1. INTRODUCTION	4
2. METHODOLOGY	5
3. BASELINE CONDITIONS	6
3.1. Climate and flooding	6
3.2. Geology soils and topography	6
3.3. Agriculture	7
4. AGRICULTURAL LAND CLASSIFICATION	8
4.1. National 1:250 000 map grading	8
4.2. Current grading	8
 DRAWINGS	
ALC/1	Survey locations and soil types
 APPENDIX A	Climatological data for agricultural land classification

1. INTRODUCTION

An Agricultural Land Classification (ALC)^{1,2} has been carried out on land to the east of Clitheroe Road (Lawsonsteads), Whalley, Lancashire. The site is centred on Grid Ref. 373574 436634.

The survey was conducted on the 4th of October 2011 and consisted of a number of hand auger borings to a depth of 1.2 m (where possible) to examine soil profiles, using standard soil survey methods³ (Drawing ALC/1).

Climatological data⁴ was used to determine the overriding site limitation and for interaction with soil parameters (Appendix A). The above information was cross referenced with geological surveys⁸, previous soil surveys⁶ and the national 1:250 000 series ALC survey⁷ relevant for this site to substantiate the findings. The ALC grade was then determined for this site and for the current survey, and is detailed on Drawing ALC/2.

Other factors used for ALC grading, but which give no limitation at this site, are not discussed.

Agricultural land is classified into the following categories according to the 1988 guidelines¹:

Grade	Description
1	Excellent quality agricultural land with no or very minor limitations to agricultural use.
2	Very good quality agricultural land with minor limitations which affect crop yield, cultivation or harvesting.
3a	Good quality agricultural land capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops.
3b	Moderate quality agricultural land capable of producing moderate yields of a narrow range of crops or lower yields of a wider range of crops.
4	Poor quality agricultural land with severe limitations which significantly restrict the range of crops and/or level of yields.
5	Very poor quality agricultural land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

2. METHODOLOGY

Agricultural Land Classification (ALC) is undertaken strictly in accordance with:

*Agricultural Land Classification of England and Wales
Guidelines and criteria for grading the quality of agricultural land
(Revised guidelines 1988 and Draft second revision 1996, MAFF, London)*

The classification includes an initial desktop investigation to examine previously mapped soil types and to note the drift and solid geology. This included consultation of:

Soil Survey of England and Wales 1:250 000

All soil horizons and cropping surfaces removed were carefully replaced following excavation.

The soil removed during the augering was examined in accordance with:

*Soil Survey Field Handbook
Describing and Sampling Soil Profiles
Soil Survey of England and Wales, Technical Monograph No. 5, 1976*

*Soil Classification for Soil Survey
Monographs on Soil Survey
Butler, B E (1980) Clarendon Press, Oxford*

3. BASELINE CONDITIONS

3.1. Climate and flooding

The climatological data (Table 1) indicates average temperature, average rainfall and therefore an average number of field capacity days for the site.

Table 1 Climatological information		
Factor	Units	Value
Altitude AOD	m	65
Accumulated temperature	day°C (Jan-June)	1355.5
Average Annual Rainfall	mm	1108.6
Field Capacity Days	days	252.4
Moisture Deficit Wheat	mm	63.3
Moisture Deficit Potatoes	mm	44.1

Grading according to climate is **ALC Grade 2**.

The site is mainly flat and low lying and bisected by a small stream. The site would therefore appear likely to be susceptible to flooding. However, it is unlikely flood risk would present a greater restriction to agriculture than the limitations described below and hence, in the absence of quantitative evidence this land is not downgraded according to flood risk.

3.2. Geology, Topography and Soils

The site is located on the foot slopes of the valley sides of the River Calder (located approximately 350 m to the south of the site). To the east and south of the site the valley sides rise steeply to over 200 m OD.

Solid geology of the site consists of Lower Carboniferous mudstones of the Bowland Formation. Thick Devensian glacial till (boulder clay) is recorded to overlay solid geology over the entire site⁸.

Soils at the site have previously been recorded as slowly permeable fine textured soils formed in deep till of the Brickfield Association with better drained soils formed in similar material found on more freely drained sites⁵.

This soil survey found similar soils formed in glacial drift at the site, although with greater clay content (resulting in a greater limitation to agriculture) than those previously described⁵. These soils cover the whole site and consist of heavy clay loam or silty clay loams over slowly permeable clay sub soil at relatively shallow depth. Evidence of waterlogging is observed to the surface, particularly on the lower slopes where lateral flow of water from upslope increases the wetness caused by slow permeability.

A summary of the features of each soil type is listed in Table 2.

Table 2. Soil type profile descriptions			
Profile description	Soil types		
	1	2	3
Horizon 1 (topsoil)	0-25 cm Very dark greyish brown (10YR 3/2) heavy silty clay loam with 5% yellowish red (5YR 5/6) mottles. Medium sub-angular blocky structure. <5% stones.		
Horizon 2 (subsoil 1)	25-45 cm Greyish brown (10YR 5/2) silty clay with 20% yellowish red (5YR 5/6) mottles. Moderate Coarse angular blocky structure. <5% stones.		
Horizon 3 (subsoil 2)	45-65 cm Grey (10YR 5/1) silty clay. Coarse angular blocky structure. <5% stones.		
Horizon 4 (subsoil 3)	65-120 cm+ Reddish brown (5YR 4/3) stiff clay with 30% dark grey (5YR 4/1) mottles and ped faces. <5% stones. Coarse prismatic to massive structure.		

3.3. Agriculture

At the time of survey the site was in permanent pasture. The site also includes a small area of non-agricultural land comprising a small stream and a farm track.

4. AGRICULTURAL LAND CLASSIFICATION

4.1. National 1:250 000 map grading

Grading on the MAFF (1983) 1:250 000 map indicated **ALC Grade 3** across the site.

4.2. Current grading

This survey has resulted in an Agricultural Land Classification of the following grades (Drawing ALC/2):

Table 3. Site ALC gradings and limitations		
Grade		Limitation
1		
2		
3a		
3b		
4	3.40	Wetness
5		
Non-Agricultural Land	0.14	

Wetness limitation

The combination of wet climatic conditions (Table 1) and restricted drainage due to the shallow depth to slowly permeable sub soil present significant limitations to agriculture (Wetness Class IV). Additional wetness appears to be caused by lateral flow from upslope at this site. Combined with the low trafficability and susceptibility to cultivation damage of the fine textured top soil, these soils are of very limited capability for arable production. They are also limited for winter grazing by their susceptibility to poaching: **ALC Grade 4**.

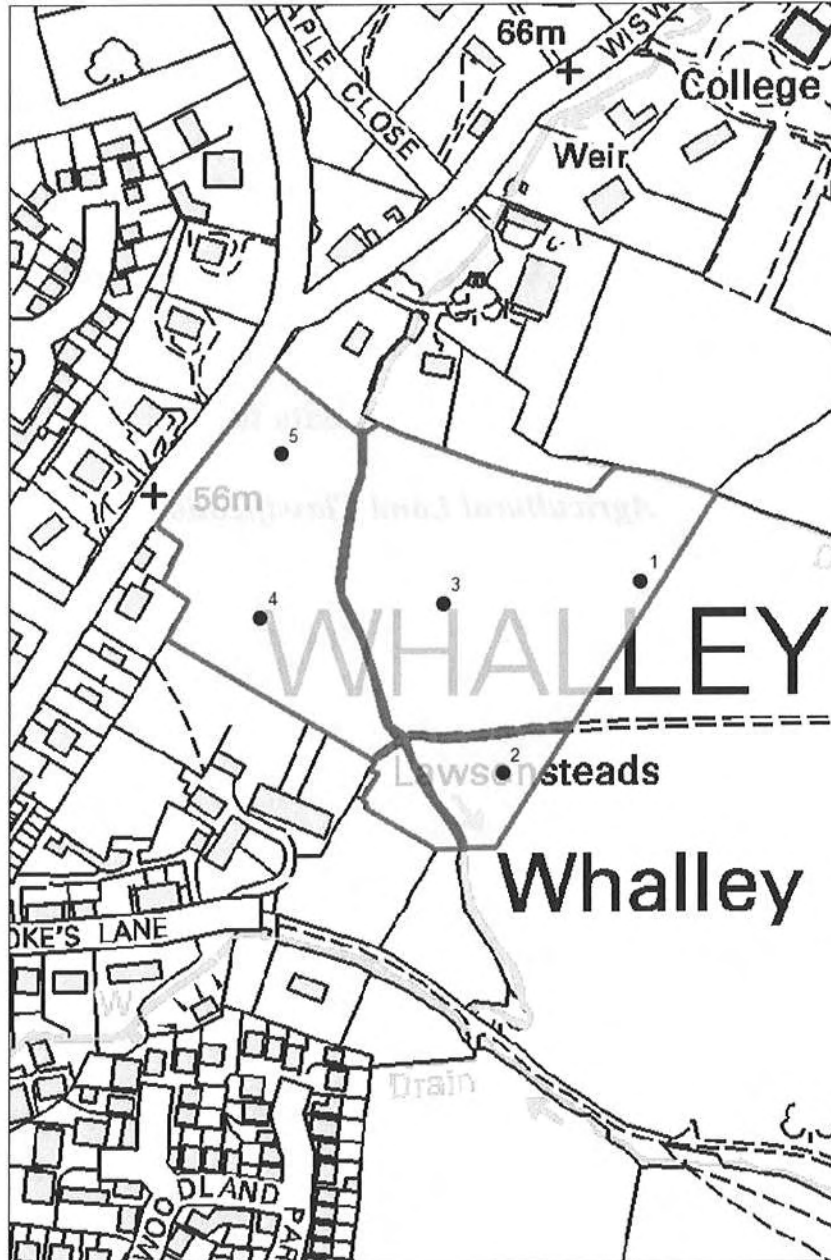
INFORMATION SOURCES

1. ***Agricultural Land Classification of England and Wales***. Guidance and criteria for grading the quality of agricultural land. MAFF. 1988.
2. ***Agricultural Land Classification of England and Wales***. Guidance and criteria for grading the quality of agricultural land. Second Revision MAFF. DRAFT May 1996.
3. ***Soil Survey Field Handbook***. Technical Monograph No.5. Soil Survey of England and Wales. 1976.
4. ***Climatological Data for Agricultural Land Classification***, The Met. Office 1989.
5. ***Soils and their Use in Northern England***. Soil Survey of England and Wales, Harpenden 1984.
6. ***Soil Map of England and Wales***: Soil Survey and Land Research Centre, Silsoe 1997.
7. ***Agricultural Land Classification Map*** 1:250 000. MAFF 1983.
8. ***British Geological Survey*** 1:50 000 national map

DRAWING ALC/1

Soil Types and Sample Points

www.soilenvironmentservices.co.uk

Date: 26th March 2011

APPENDIX A

Climatological data for

Agricultural Land Classification

Agricultural Land Classification						- Met. Information & droughtiness				
Data and adjustment calculations from: The Met. Office, <i>Climatological Data for Agricultural Land Classification</i> 1989.										
Input data in box cells only, results in shaded cells.										
Site name		Land east of Clitheroe								
Site altitude =		65 m								
Site GR		3737 4365								
Meteorological information for surrounding national grid reference points										
	Easting	Northing	ALT	AAR	LR_AAR	ATO	MDMWHT	MDMPOT	FCD	
NW	3700	4400	69	1200	0.8	1350	59	39	266	
NE	3750	4400	104	1170	0.7	1309	56	34	263	
SW	3700	4350	63	1023	0.9	1359	65	47	240	
SE	3750	4350	86	1123	0.8	1332	61	41	254	
Altitude adjustment of surrounding meteorological information with respect to site.										
Adjusted	surrounding points									
		AAR	ATO	FCD						
NW		1196.8	1354.6	265.5						
NE		1142.7	1353.5	259.1						
SW		1024.8	1356.7	240.3						
SE		1106.2	1355.9	251.6						
Site adjusted meteorological information										
		1 Dsg	2 Wg	Wp						
NW		50.93133	0.000386	0.090318						
NE		37.33631	0.000717	0.168067						
SW		39.92493	0.000627	0.146980						
SE		19.84943	0.002538	0.594634						
	Sum		0.004268							
	Site	AAR	ATO	FCD						
		1108.6	1355.5	252.4						
Soil moisture deficit of surrounding points										
		Cw	Cp	Adjusted						
NW		-0.3312	-0.4356	64.6688		46.56				
NE		5.912	7.7922	61.9124		41.79				
SW		0.634	0.835	59.6344		39.84				
SE		3.3306	4.3848	64.3306		45.38				
Soil results for soil moisture deficit										
		MDMWHT		MDMPOT						
		63.3		44.1						
ALC according to climate										
Grade		2								
Soil wetness class (drained)										
Type 1		IV								
Type 2										
Type 3										
Type 4										
ALC according to wetness/climate/texture										
Type 1		4								
Type 2										
Type 3										
Type 4										

Adjustment data for stone type and content

	Soil Type 1			Soil Type 2			Soil Type 3		
	Top	Sub1	Sub2	Top	Sub1	Sub2	Top	Sub1	Sub2
% volume	5	5	5	5	5	10	0	5	5
TAv for stone type	1	1	1	1	1	1	0	1	1
EAv for stone type	0.5	0.5	0.5	0.5	0.5	0.5	0	0.5	0.5
	Sub 3			Sub 3			Sub 3		
	5	na	na	20	na	na	na	na	na
TAv for stone type	1	na	na	1	na	na	na	na	na
EAv for stone type	0.5	na	na	0.5	na	na	na	na	na

Droughtiness (moisture balance) determination for each soil type and restored profile

Moisture availability data for each texture from MAFF ALC Guidelines 1996

Moisture Balance (MB) = AP - MD for wheat and potatoes (adjusted for stones)

Horizon		Type 1		Type 2		Type 3	
		texture	water	texture	water	texture	water
TAvt - Topsoil water available (mm)		HCL	18.10	0	0.00	0	0.00
LTt - Topsoil thickness (cm)		0	25.00	0	0.00	0	0.00
TAvs - Subsoil total available	1	ZC	14.30	0	0.00	0	0.00
	2	ZC	11.45	0	0.00	0	0.00
	3	C	12.40	0	0.00	0	0.00
EAvs -	1	ZC	7.63	0	0.00	0	0.00
Subsoil (SS) easily available	2	ZC	6.68	0	0.00	0	0.00
	3	C	6.68	0	0.00	0	0.00
LT50 -	1	ZC	20.00	0	0.00	0	0.00
Thickness ss layers to 50cm	2	ZC	0.00	0	0.00	0	0.00
	3	C	0.00	0	0.00	0	0.00
LT120 -	1	ZC	0.00	0	0.00	0	0.00
Thickness ss layers 50 to 120cm	2	ZC	20.00	0	0.00	0	0.00
	3	C	55.00	0	0.00	0	0.00
LT0 -	1	ZC	20.00	0	0.00	0	0.00
Thickness ss layers to 70cm	2	ZC	20.00	0	0.00	0	0.00
	3	C	5.00	0	0.00	0	0.00
Total profile thickness for soil type cm		0	120		0	0	0

SOIL Droughtiness (moisture balance) results
Notes
Type 1
Grade
Results

AP wheat =	123.9	
Moisture balance wheat =	60.6	1
AP potatoes =	102.5	
Moisture balance potatoes =	58.4	1

ALC Grade	Moisture Balance Limits	
	wheat	potatoes
1	30	10
2	5	-10
3a	-20	-30
3b	-50	-55
4	<-50	<-55