



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

AGRICULTURAL LAND CLASSIFICATION

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

Commercial Estates Group Ltd



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

Date: 12th October 2011

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AGRICULTURAL LAND CLASSIFICATION

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

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1. INTRODUCTION

An Agricultural Land Classification (ALC)^{1,2} has been carried out on land to the east of Clitheroe (Lawsonsteads), Whalley, Lancashire. The site is centred on Grid Ref. 37770 436481.

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). Pit excavations were undertaken where necessary to assess subsoil structure. This data was used to map the principal soil types for determining the ALC.

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*

Reporting includes separate colour maps for soil types.

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 lower lying areas of the site to the west and north of Lawsonsteads farmhouse appear likely to be susceptible to flooding due to their proximity to the brook and slope position. It is unlikely flood risk would present a greater restriction than those restrictions described below in this area of the site and hence, in the absence of quantitative evidence this land is not downgraded according to flood risk.



Photo 1: Easterly view of site

3.2. Geology, Topography and Soils

The site is located on the foot slopes of the valley sides of the River Calder (located approximately 250 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 and associated 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, exhibiting restricted drainage.

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

Soil Type 1

These soils are dominant at the site and consisted of heavy clay loam or silty clay loams over slowly permeable clay subsoil 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.

Soil Type 2

These soils are a variation on Soil Type 1 and occur in a limited area on the steeper slopes to the east of the site. Although underlain by the same slowly permeable clay subsoil, the topsoil is of coarser texture and evidence of waterlogging occurs further below the surface than Soil Type 1 indicating better drainage.

Soil Type 3

These soils occur exclusively in the small field to the south of the site. They soils are better drained than Soil Types 1 and 2, having fine loamy rather than clayey subsoil and no slowly permeable layer. Despite this, imperfect drainage is exhibited, apparently due to the moderate structure of the subsoil combined with the very wet local climate.

Table 2. Soil type profile descriptions					
Profile description	Soil types				
	1	2	3	4	

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.	0-25 cm Very dark greyish brown (10YR 3/2) clay loam. Medium sub-angular blocky structure. <5% stones.	0-25 cm Very dark greyish brown (10YR 3/2) silty clay loam. Stoneless.		
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.	25-55 cm Brown (10YR 4/3) clay loam with 5% yellowish brown (10YR 5/6) mottles. Medium to coarse sub-angular blocky structure. <5% stones.	25-50 cm Yellowish brown (10YR 5/4) silty clay loam with greyish brown (10 YR 5/2) ped faces. Coarse sub angular blocky structure. <5% stones.		
Horizon 3 (subsoil 2)	45-65 cm Grey (10YR 5/1) silty clay. Coarse angular blocky structure. <5% stones.	55-80 cm Greyish brown (10YR 5/2) heavy clay loam with 10% strong brown (7.5YR 5/6) mottles. Coarse angular blocky structure. 10% gravel sized stones.	50-120 cm+ Yellowish brown (10 YR 5/6) silty clay loam with 10% greyish brown (10 YR 5/2) mottles and ped faces. Porous angular blocky structure.		
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.	80-120 cm+ Reddish brown (5YR 4/3) stiff clay with 20% dark grey (5YR 4/1) mottles. Coarse prismatic to massive structure. 20% gravel sized stones			
Associated borehole and test-pit numbers on Drawing ALC/1: Soil types 1: 2, 3, 4, 5, 6, 7, 10, 11, 12, 18, 19, 20 2: 1, 8, 9 3: 13, 14, 15, 16, 17					



Photo 1: Soil Type 1 (sample point 7, left) and Soil Type 3 (sample point 16) in pit excavations

3.3. Agriculture

At the time of survey the site was in permanent pasture. The site also includes a metalled track (Brook Lane) with an adjoining area of wet scrub and woodland. The site also includes an area of hard standing adjoining Lawsonsteads farm house (apparently the former steading).

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	4.13	Wetness
4	9.17	Wetness
5		
Non-Agricultural Land	1.33	

Wetness limitation

The combination of very wet climatic conditions (Table 1) and restricted drainage present significant limitations to agriculture. Soil Type 1 is most limited due to the shallow depth of the slowly permeable material (Wetness Class IV) plus the additional wetness caused by lateral flow from upslope. Combined with low trafficability and susceptibility to cultivation damage of the fine textured topsoil, 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**.

The better drainage of Soil Types 2 and 3 (Wetness Class III and II respectively) and lower topsoil clay content mean these soils are better suited for arable production. However, the very wet climate means that the soils stand wet for a very long winter period, and the clay loam

topsoil makes them susceptible to cultivation damage. They are unlikely to dry sufficiently to allow spring access and cropping, but are suitable for a limited range of autumn sown crops in normal years: **ALC Grade 3b.**

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

● Borehole

■ Test Pit

Soil Type

<Null>

1

2

3

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Drawing Title: Soil Types and sample points

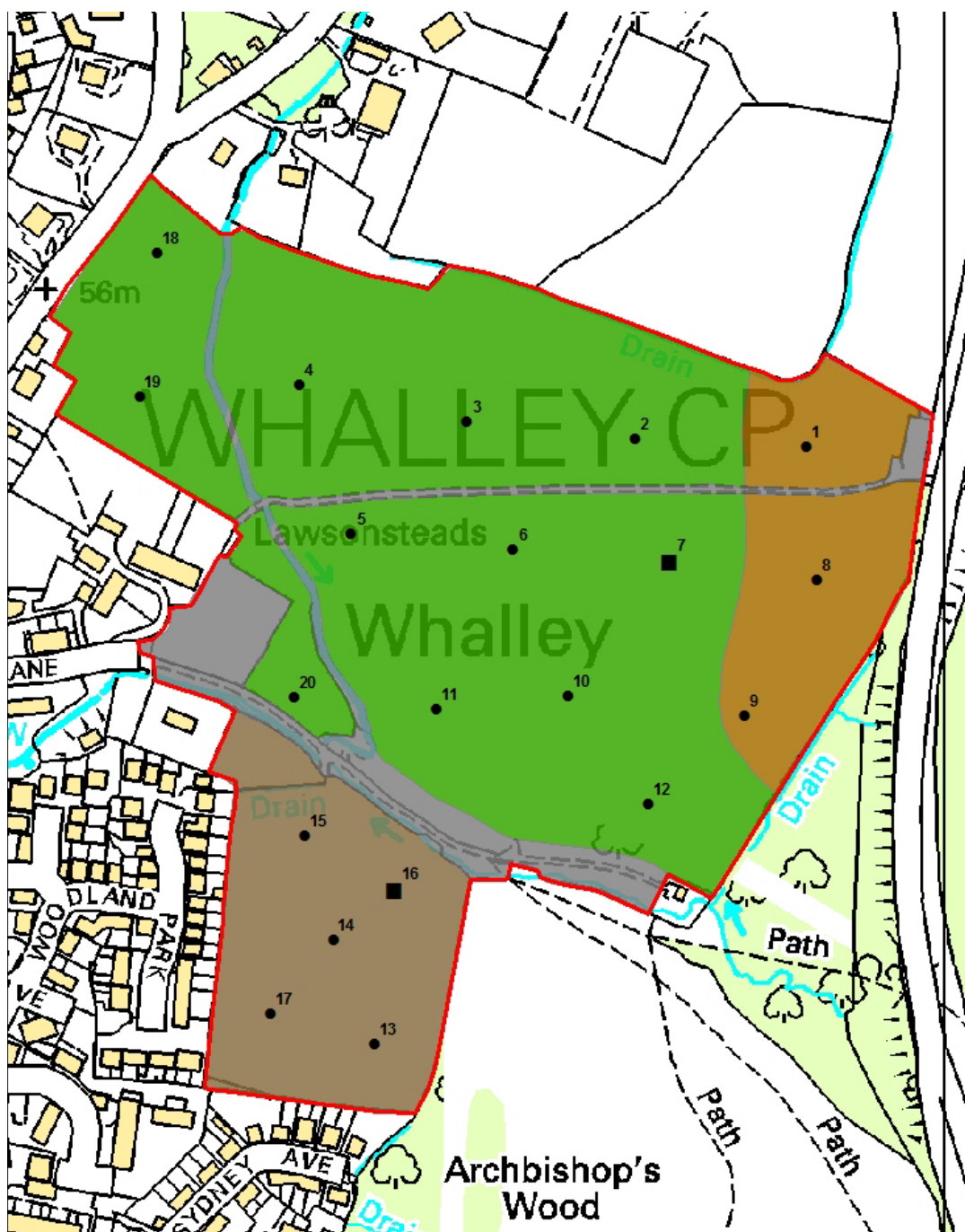
Drawing No.: ALC/1

Client: CEG

Project: Land east of Clitheroe

Scale: na

Date: 12th October 2011



DRAWING ALC/2

Agricultural Land Classification Grades

ALC Grade

	Non agricultural
	3b
	4

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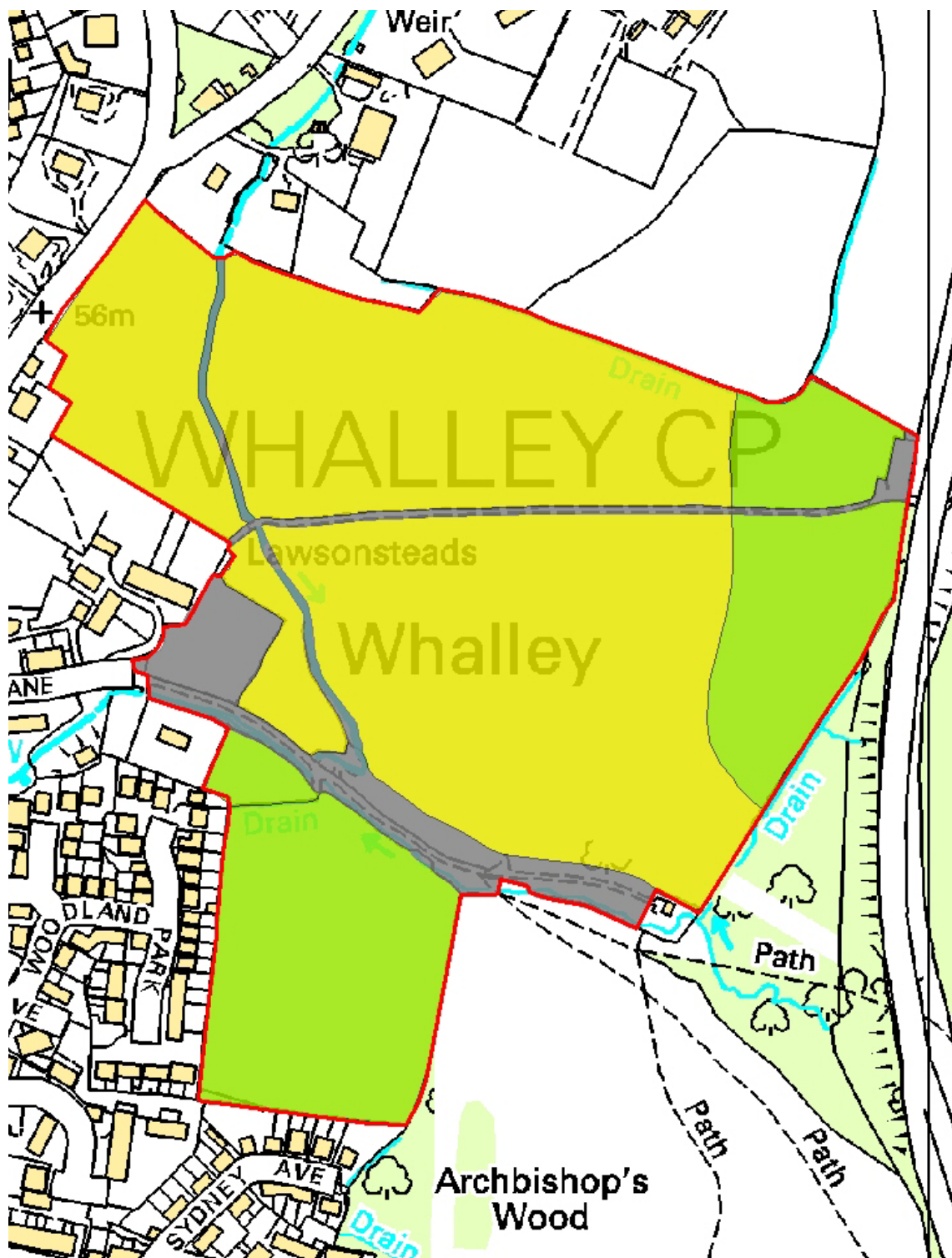
Drawing Title: ALC Grades

Drawing No.: ALC/2

Client: CEG

Project: Land east of Clitheroe

Scale: na

Date: 8th October 2011

APPENDIX A

Climatological data for

Agricultural Land Classification

Agricultural Land Classification

- Met. Information & droughtiness

Data and adjustment calculations from: The Met. Office, *Climatological Data for Agricultural Land Classification* 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
NW	3700	4400	69	1200	0.8	1350	59	39
NE	3750	4400	104	1170	0.7	1309	56	34
SW	3700	4350	63	1023	0.9	1359	65	47
SE	3750	4350	86	1123	0.8	1332	61	41

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	50.931326	0.000386	0.090318
NE	37.336309	0.000717	0.168067
SW	39.92493	0.000627	0.146980
SE	19.849433	0.002538	0.594634
Sum		0.004268	
Site	AAR	ATO	FCD
	1108.6	1355.5	252.4

ALC according to climate

Grade **2**

Soil wetness class (drained)

Type 1	IV
Type 2	III
Type 3	II
Type 4	

ALC according to wetness/climate/
texture

Type 1	4
Type 2	3b
Type 3	3b
Type 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

Site results for soil moisture deficit

MDMWHT	MDMPOT
63.3	44.1

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
TA _v for stone type	1	1	1	1	1	1	0	1	1
EA _v 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		
% volume	5	na	na	20	na	na	na	na	na
TA _v for stone type	1	na	na	1	na	na	na	na	na
EA _v for stone type	0.5	na	na	0.5	na	na	na	na	na

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
TA _v for stone type	1	1	1	1	1	1	0	1	1
EA _v 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		
	Top	Sub1	Sub2	Top	Sub1	Sub2	Top	Sub1	Sub2
% volume	5	na	na	20	na	na	na	na	na
TA _v for stone type	1	na	na	1	na	na	na	na	na
EA _v 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
TA _v t - Topsoil water available (mm)		HCL	18.10	CL	17.15	CL	18.00
LT _t - Topsoil thickness (cm)		0	25.00	0	25.00	0	25.00
TA _v s - Subsoil total available	1	ZC	14.30	CL	15.25	CL	20.00
	2	ZC	11.45	CL	10.90	CL	15.25
	3	C	12.40	C	10.60	0	0.00
EA _v s -	1	ZC	7.63	CL	9.53	CL	13.33
Subsoil (SS) easily available	2	ZC	6.68	CL	6.35	CL	9.53
	3	C	6.68	C	5.70	0	0.00
LT50 -	1	ZC	20.00	CL	25.00	CL	25.00
Thickness ss layers to 50cm	2	ZC	0.00	CL	0.00	CL	0.00
	3	C	0.00	C	0.00	0	0.00
LT120 -	1	ZC	0.00	CL	5.00	CL	0.00
Thickness ss layers 50 to 120cm	2	ZC	20.00	CL	25.00	CL	70.00
	3	C	55.00	C	40.00	0	0.00
LT0 -	1	ZC	20.00	CL	30.00	CL	25.00
Thickness ss layers to 70cm	2	ZC	20.00	CL	25.00	CL	20.00
	3	C	5.00	C	0.00	0	0.00
Total profile thickness for soil type cm		0	120		120	0	120

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

Type 2

Results	
AP wheat =	124.4
Moisture balance wheat =	61.2 1
AP potatoes =	126.8
Moisture balance potatoes =	82.7 1

Type 3

Results	
AP wheat =	161.7
Moisture balance wheat =	98.4 1
AP potatoes =	135.0
Moisture balance potatoes =	90.9 1

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