

AGRICULTURAL LAND CLASSIFICATION

Arcus Consultancy Services Ltd

*Upper Leigh Solar Farm
Leigh*



Our Ref: SES/AC/LTL/#2

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AGRICULTURAL LAND CLASSIFICATION

***Upper Leigh Solar Farm
Leigh***

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

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DRAWING 1 **ALC Grade and survey points**

APPENDIX A **Soil observation point data**

GENERAL INFORMATION SOURCES

1. INTRODUCTION

An Agricultural Land Classification (ALC) has been carried out on 70 ha of land at [Upper Leigh Solar Farm](#) Leigh, Stoke on Trent, ST10 4PB (Drawing 1). The site is centred on Grid Ref. 400240, 337304. The format of this report follows the 1988 MAFF guidelines for assessing limitations, which still remain the fundamental assessment procedure, but also takes note of recent guidance delivered via DEFRA/ British Society of Soil Science ALC assessment training courses..

The site is currently used for dairy cattle grazing.

1.1 Methodology

Agricultural land is classified into the following grades 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.

The classification includes an initial desktop investigation to examine previously mapped soil types and to note the drift and solid geology followed by the field survey consisting auger borings/observation at e very 100 m in general and a pit excavated at least in each of the main soil types to confirm the structures. Laboratory analysis of soil textures is undertaken if needed in order to confirm textures such the *heavy/medium* clay and *medium/fine* sand categories.

All of the potential limitations are assessed and then the most limiting factor dictating the ALC grade was determined for this site and is detailed in Table 5.

1.2 Previous ALC gradings

The 1:250000 MAFF ALC map (1977) details the entire site as Grade 3.No detailed surveys have been undertaken for the site.

2. CLIMATIC LIMITATIONS

2.1 Overall climate

The climatological data for the entire site centre is detailed in Table 1.

Table 1 Climatological information³		
Factor	Units	Value
Altitude AOD	m	150
Accumulated temperature	day°C (Jan-June)	1296.50
Average Annual Rainfall	mm	829.30
Field Capacity Days	days	203.8
Moisture Deficit Wheat	mm	76.2
Moisture Deficit Potatoes	mm	59.50

Overall climate will not result in a significant limiting factor for this site.

2.2. Local climate

Local climate will not result in a significant limiting factor for this site.

3 SITE LIMITATIONS

3.1 Gradient

The gradient will not result in a significant limiting factor for this site.

3.2 Microrelief

The microrelief will not result in a significant limiting factor for this site.

3.3 Flooding

In general a low risk from flooding from surface water and low risk from rivers and has been identified (<https://flood-warning-information.service.gov.uk/long-term-flood-risk>).

Flooding will not result in a significant limiting factor for this site apart from the areas in the south adjacent to the river.

4 SOIL LIMITATIONS

The soils are noted as reddish clays with impeded drainage across most of the site and overlay the Mercia Mudstone over most of the site and over alluvium in the south near the river.

4.1 Texture and structure

The generalised description of the soil types noted on site are detailed in Table 2.

Table 2. Soil Type descriptions			
Profile Description	Soil types		
	Type 1	Type 2	
Horizon 1 (topsoil)	0-25 cm Dark reddish brown (5YR3/2) slightly stony heavy clay loam or clay*, few ochreous mottles.	0-30 cm Dark reddish brown (5YR3/2) slightly stony heavy clay loam or clay*, few ochreous mottles.	
Horizon 2 (subsoil 1)	25-45 cm Reddish brown (5YR4/4) slightly stony clay, common mottles, weak medium prismatic	30-65 cm Brown (10YR5/3) slightly stony sandy clay, common mottles, weak medium blocky	
Horizon 3 (subsoil 2)	45-120 cm Reddish brown (5YR4/4) slightly stony clay loam, common mottles, moderate coarse prismatic to massive at depth structure	65 cm + Medium gravel. Saturated.	
Wetness Class	IV	IV	
Moisture Balance - Wheat	NL	NL	
Moisture Balance - Potatoes	NL	NL	
Notes: Soil Type 1 Points – all remaining points Soil Type 2 Points - 32,45,52,63,64,66-69 NL – not limiting *-Determined by laboratory analysis			

4.2 Depth

Depth will not result in a significant limiting factor for this site.

4.3 Stoniness

Stoniness is a not a limiting factor for this site.

4.4 Chemical

Chemical contamination will not result in a significant limiting factor for this site.

5. INTERACTIVE LIMITATIONS

5.1 Wetness

Following assessment of the soil characteristics and climatic factors, Soil Type 1 was found to have a Wetness Class (determined using ‘in-field’ assessment) which subsequently when considered with the FCD and topsoil texture resulted in a significant limiting factor in determining the ALC Grade. Wetness Class assessment criteria are listed in Table 3 below for this soil type.

Table 3. In-field Wetness Class Assessment				
Feature	Parameter	Soil Types		
		1	2	
Site conditions	Undisturbed/ disturbed	Undisturbed	NA (see below)	
	FCD	203.8		
Potential Slowly Permeable Layer (SPL)	Horizon depth (cm)	25		
	Texture	HCL		
	Structure	WMP		
	Biopores > 0.5 mm (%)	<0.5		
	Evidence of wetness above	mottles		
	Potential Gleyed/ Slightly Gleyed Horizon	Matrix colour		reddish
Ped faces colour		Na		
Mottles		Na		
Depth to gleying (cm)		Na		
Horizon type		reddish		
ALC guidelines Figure reference		Fig 7		
Wetness Class		IV		
Notes FCD – Field Capacity Days; HCL – heavy clay loam; WMP – weak medium prismatic				

Soil Type 2 is affected by groundwater and not subject to the In-Field Wetness Class assessment system. However due to the slight flood risk in this area, shallow ground water at 0.6 m in hydraulic continuity with the river and evidence of wetness (mottles) in the topsoil, the Wetness Class is considered to be synonymous with Class IV.

5.2. Droughtiness

Following assessment of the soil characteristics and climatic factors, all soils were found to have a soil Moisture Balance which subsequently when considered with respect to wheat and potatoes resulted in no significant limiting factor in determining the ALC Grade.

5.3 Erosion

Erosion will not result in a significant limiting factor for this site.

6. AGRICULTURAL LAND CLASSIFICATION

6.1 Most limiting factor

Grade 3b land – Wetness Limitation

The combination of the topsoil texture (heavy clay loam/ clay), Wetness Class IV and the number of Field Capacity Days (203.6) results in **ALC Grade 3b** for Type 1 and Type 2 soils.

6.2 Current grading

This survey has resulted in an Agricultural Land Classification of the following grades (Drawing 1):

Table 5. ALC gradings and limitations			
Grade	ha	%	Limitation
1			
2			
3a			
3b	70	100	Wetness
4			
5			
Non-agricultural land			
Total	70	100%	

DRAWING 1

ALC Grade

Key

ALC Grades

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Non agricultural land

- Observation point
- Pit

Soil Environment Services

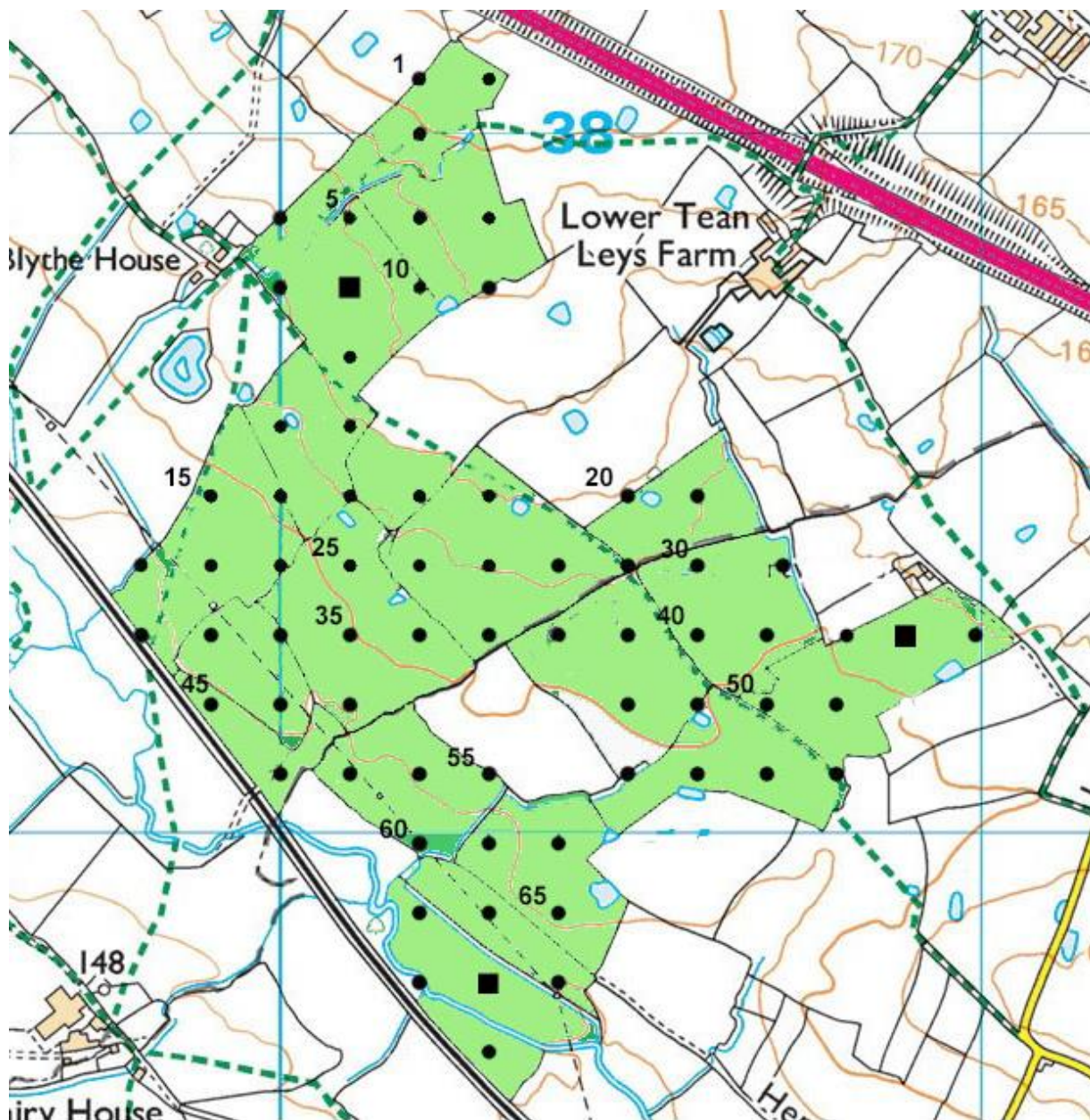
Drawing Title: ALC Grade

Drawing No.: 1

Scale: NA

Date: 25/02/2020

N



APPENDIX A

Soil observation point data

NB All abbreviations are from standard terms detailed in

***Soil Survey Field Handbook*. Technical Monograph No.5.**

Soil Survey of England and Wales.1976.

Obs point	Base depth (cm)	Text.	Col.	Motts. %/ depth	Mott/Ped face colour	Stns %	Stns type	Pores <0.5 mm %	Grad. (deg)	Struct	Calc	Obs point	Base depth (cm)	Text.	Col.	Motts. %/ depth	Mott/Ped face colour	Stns %	Stns type	Pores <0.5 mm %	Grad. (deg)	Struct	Calc
1	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N	16	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
2	30	HCL	7.5YR42	0		<5	MIXED		<7		N	17	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR54	20/25	10YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
3	30	HCL	7.5YR42	0		<5	MIXED		<7		N	18	30	SCL	5YR32	5/10	5YR56	<5	MIXED		<7		N
	45	C	5YR54	20/25	10YR56	<5	MIXED	<0.5		WMP	N		40	SC	7.5YR53	10/30	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	SC	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
4	30	HCL	7.5YR42	0		<5	MIXED		<7		N	19	30	SCL	5YR32	5/10	5YR56	<5	MIXED		<7		N
	45	C	5YR54	20/25	10YR56	<5	MIXED	<0.5		WMP	N		40	SC	7.5YR53	10/30	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	SC	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
5	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N	20	30	SCL	5YR32	5/10	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		40	SC	7.5YR53	10/30	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	SC	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
6	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N	21	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
7	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N	22	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
8	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N	23	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		50	C	10YR35	20/25	10YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	SC	7.5YR45	20/50	10YR56	<5	MIXED	<0.5		WMAB	N
9	25	HCL	5YR32	10/10	10YR56	<5	MIXED				N	24	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
10	25	HCL	5YR32	10/10	10YR56	<5	MIXED				N	25	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		50	C	10YR35	20/25	10YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	SC	7.5YR45	20/50	10YR56	<5	MIXED	<0.5		WMAB	N
11	25	HCL	5YR32	10/10	10YR56	<5	MIXED				N	26	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		50	C	10YR35	20/25	10YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	SC	7.5YR45	20/50	10YR56	<5	MIXED	<0.5		WMAB	N
12	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N	27	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
13	25	C	5YR32	5/15	5YR56	<5	MIXED				N	28	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
14	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N	29	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
15	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N	30	25	HCL	5YR32	5/15	5YR56	<5	MIXED				N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5	<7	WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N

Obs point	Base depth (cm)	Text.	Col.	Motts. %/ depth	Mott/Ped face colour	Stns %	Stns type	Pores ≤0.5 mm %	Grad. (deg)	Struct	Calc	Obs point	Base depth (cm)	Text.	Col.	Motts. %/ depth	Mott/Ped face colour	Stns %	Stns type	Pores ≤0.5 mm %	Grad. (deg)	Struct	Calc
31	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	46	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
32	30	HCL	5YR32	5/10	5YR56	<5	MIXED		<7		N	47	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	50	SC	10YR53	20/30	10YR56	15	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	70	SC	10YR54	20/50	10YR62	20	MIXED	<0.5		M	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
		MG				100	MIXED	<0.5															
33	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	48	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
34	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	49	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
35	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	50	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
36	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	51	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
37	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	52	25	C	5YR32	5/10	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		65	SC	10YR53	20/25	10YR56	15	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N			MG				100	MIXED	<0.5			N
38	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	53	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
39	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	54	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
40	25	C	5YR32	5/10	5YR56	<5	MIXED		<7		N	55	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
41	25	C	5YR32	5/10	5YR56	<5	MIXED		<7		N	56	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
42	25	C	5YR32	5/10	5YR56	<5	MIXED		<7		N	57	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
43	25	C	5YR32	5/10	5YR56	<5	MIXED		<7		N	58	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
44	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N	59	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
	120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N
45	30	HCL	5YR32	5/10	5YR56	<5	MIXED		<7		N	60	25	HCL	5YR32	5/15	5YR56	<5	MIXED		<7		N
	65	SC	10YR53	20/30	10YR56	15	MIXED	<0.5		WMP	N		45	C	5YR44	20/25	5YR56	<5	MIXED	<0.5		WMP	N
		MG				100	MIXED	<0.5			N		120	C	5YR44	20/45	10YR62	<5	MIXED	<0.5		CP	N

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