Barratt Homes South Wales

Land at Boverton,

The Vale of Glamorgan

Agricultural Land Classification

and

Soil Resources

August 2014

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Contents

1. Introduction

1.1. Instruction

1.1.1. Reading Agricultural Consultants Ltd (RAC) is instructed by Barratt Homes South Wales to investigate the Agricultural Land Classification (ALC) and soil resources of a site at Boverton, Vale of Glamorgan, by means of a detailed survey of soil and site characteristics. The site is allocated for 70 residential units in the emerging Vale of Glamorgan Deposit LDP (November 2013).

2. Site and Climatic Conditions

2.1. General Features, Land Form and Drainage

2.1.1. The allocated site extends to around 2.4ha of agricultural land, as outlined in Figure RAC6367-1, of which 1.8ha is the subject of the current planning application. The site is bounded to the north by the Vale of Glamorgan railway line, to the east by an overgrown parcel of land, and to the south by the B4265.

2.1.2. Topography is very gently sloping, falling from around 45m above Ordnance Datum (AOD) in the east to around 35m AOD in the west.

2.2. Agro-Climatic Conditions

2.2.1. Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point data set at a representative altitude of 45m AOD. The data are given in Table 1. The site is warm and very wet with moderate to moderately small crop moisture deficits. The number of Field Capacity Days is larger than is typical for lowland England and Wales and is considered to be unfavourable for providing opportunities for agricultural field work.

Table 1: Local climatic factors

Average Annual Rainfall	1004mm
Accumulated Temperature >0°C	1513 day°
Field Capacity Days	206 days
Average Moisture Deficit, wheat	85mm
Average Moisture Deficit, potatoes	73mm

2.3. Soil Parent Material and Soil Types

2.3.1. The principal underlying geology is that of the Porthkerry Member which comprises interbedded limestone and calcareous mudstone or siltstone.

2.3.2. The Soil Survey of England and Wales soil series mapping of Bridgend (Sheets 261 and 262, 1:63,360 scale) shows the Ston Easton series to be present at this site. These soils are characterised by well drained silty clay loam profiles of limited depth, with clay content increasing in the subsoils. Inclusions of more clayey profiles are common to the east of the Vale of Glamorgan.

3. Agricultural Land Quality

3.1. Soil Survey Methods

3.1.1. Three soil profiles were examined using an Edelman (Dutch) auger at an observation density of 1 per hectare in accordance with the recommendations set out in Natural England's Technical Information Note 049, 'Agricultural Land Classification: protecting the best and most versatile agricultural land' (the guidance within this document applies also to Wales). An observation pit was also excavated with a spade to examine subsoil structures. The locations of observations are indicated on Figure RAC6367-1. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120cm or any impenetrable layer:

- soil texture;
- significant stoniness;
- colour (including local gley and mottle colours);
- consistency;
- structural condition;
- free carbonate; and
- depth.

3.1.2. One soil sample was submitted for laboratory determination of particle size distribution, pH, organic matter content and nutrient contents (P, K, Mg). Results are given in Appendix 1.

3.1.3. Soil Wetness Class (WC) was inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling and/or poorly permeable subsoil layers at least 15cm thick**.**

3.1.4. Soil droughtiness was investigated by the calculation of moisture balance equations (given in Appendix 2). Crop-adjusted Available Profile Water (AP) is estimated from texture, stoniness and depth, and then compared to a calculated moisture deficit (MD) for the standard crops wheat and potatoes. The MD is a function of potential evapotranspiration and rainfall. Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs. When a profile is found with significant stoniness, sufficient to prevent penetration of a hand auger, then it is assumed, for the purposes of calculating droughtiness, that similar levels of stoniness continues to the full 1.2m depth considered.

3.2. Agricultural Land Classification and Site Limitations

3.2.1. Assessment of quality has been carried out according to the MAFF revised guidelines (1988[1]). Soil profiles have been described according to Hodgson (1997[2]).

3.1.2. The main limitation to land quality at this site is soil wetness and workability due to the interaction of climate and clay textured topsoil. The limitation is moderate, to Subgrade 3b.

3.1.3. Soil profiles comprise brown (10YR4/3) clay topsoil of 33cm average thickness. The structure is well developed with fine subangular blocky to crumb-like peds, which promotes aeration through high pore density, root growth and worm activity.

3.1.4. Subsoil is of dark yellowish brown (10YR4/4) clay which is moderately well developed, forming fine subangular blocky peds, and is therefore permeable, of WC I. Stone content is between 5 and 10% by volume. The profiles are of restricted depth, averaging 51cm in total.

3.1.5. The agricultural land quality of the site is shown in Figure RAC6367-2.

[1] **MAFF (1988)** *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land.* MAFF Publications.

[2] **Hodgson, J. M. (Ed.) (1997).** *Soil survey field handbook*. Soil Survey Technical Monograph No. 5, Silsoe.

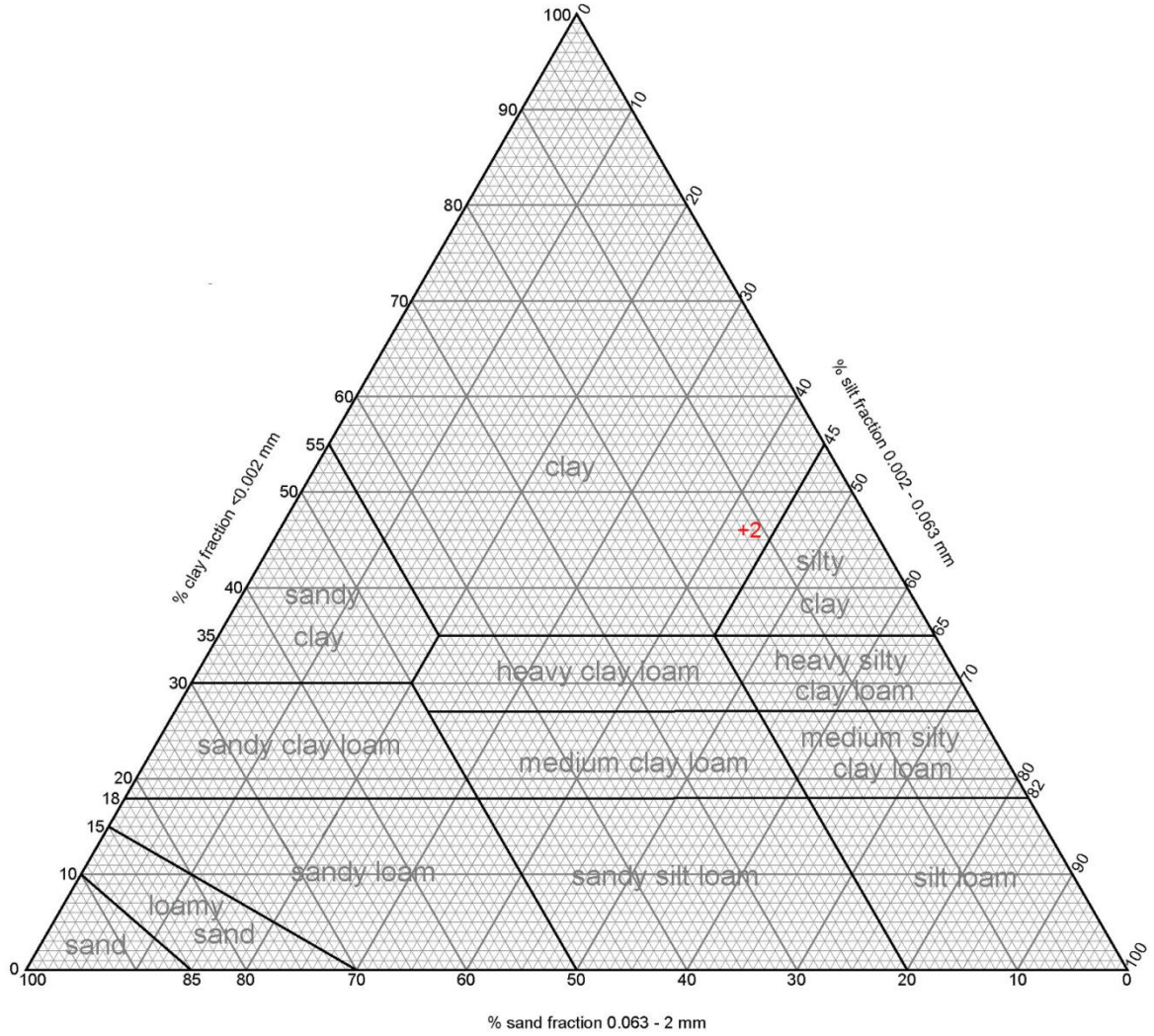
Appendix 1: Laboratory Data

Determinand	Site 2	Units
Sand 2.00-0.063 mm	12	% w/w
Silt 0.063-0.002 mm	42	%w/w
Clay <0.002 mm	46	% w/w
Organic Matter WB	8.4	% w/w
Texture	Clay	% w/w

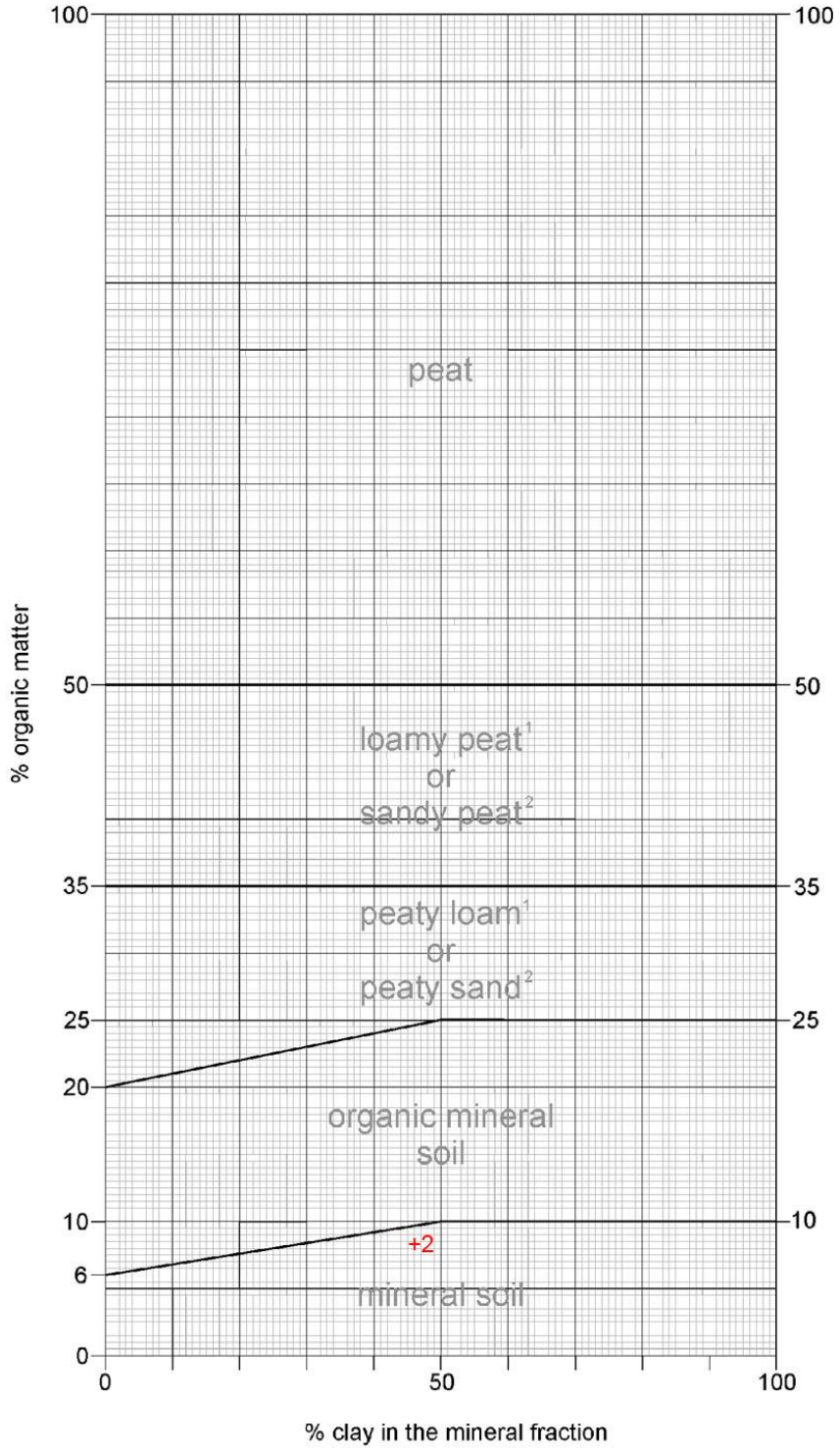
Determinand	Site 2	Units
Soil pH	6.1	
Phosphorus (P)	4.6	mg/l (av)
Potassium (K)	84.8	mg/l (av)
Magnesium (Mg)	181	mg/l (av)

Determinand	Site 2	Units
Phosphorus (P)	0	ADAS Index
Potassium (K)	1	ADAS Index
Magnesium (Mg)	4	ADAS Index

Soil Texture by Particle Size Distribution



Organic Matter Class



[1] Less than 50% sand in the mineral fraction

[2] 50% sand or more in the mineral fraction

Appendix 2: Soil Profile Summaries and Droughtiness Calculations

Droughtiness calculations are made according to the methodology given in Appendix 4 of the ALC guidelines, MAFF 1988.
The following grades represent the extent of the limitation posed by droughtiness only. Other factors will also influence the final grading.

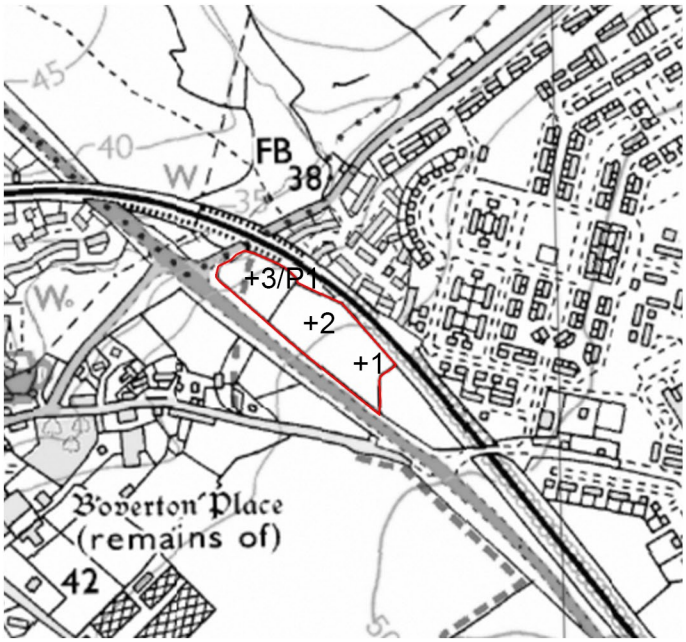
MDw= 85 MDp= 73

							Wheat Calculation			Potato Calculation		
Site No.	Depth (cm)		Texture	Colour	Mottle	stones %	TAv or EAv (stones) %	TAv or EAv (soil) %	AP (wheat) mm	TAv (stones) %	TAv (soil) %	AP (potatoes) mm
1	0	36	C	10YR4/3		0	1	17	61.2	1	17	61.2
	36	50	C	10YR4/4 and 5/4		0	0.5	16	22.4	0.5	16	22.4
	50	66	C	10YR4/4 and 5/4		0	0.5	8	12.8	0.5	16	25.6
								Total (mm) =	96.4		Total (mm) =	109.2
								MBw=	11.4		MBp=	36.2
								Grade =	2		Grade =	1

							Wheat Calculation			Potato Calculation		
Site No.	Depth (cm)		Texture	Colour	Mottle	stones %	TAv or EAv (stones) %	TAv or EAv (soil) %	AP (wheat) mm	TAv (stones) %	TAv (soil) %	AP (potatoes) mm
2	0	32	C	10YR4/3		0	1	17	54.4	1	17	54.4
	32	45	C	10YR4/4		7	0.5	16	19.4	0.5	16	19.4
								Total (mm) =	73.8		Total (mm) =	73.8
								MBw=	-11.2		MBp=	0.8
								Grade =	3a		Grade =	2

							Wheat Calculation			Potato Calculation		

Site No.	Depth (cm)		Texture	Colour	Mottle	stones %	TAv or EAv (stones) %	TAv or EAv (soil) %	AP (wheat) mm	TAv (stones) %	TAv (soil) %	AP (potatoes) mm
3	0	32	C	10YR4/3		0	1	17	54.4	1	17	54.4
	32	42	C	10YR4/4		7	0.5	16	14.9	0.5	16	14.9
								Total (mm) =	69.3		Total (mm) =	69.3
								MBw=	-15.7		MBp=	-3.7
								Grade =	3a		Grade =	2



Survey Area
+1 Observation
+P1 Pit Observation

N

Scale 1:10,000@A4 July/2014

Figure RAC6367-1: Observations

Site: Land at Boverton, Vale of Glamorgan

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Grade 1 - excellent quality	Best and most versatile land	Subgrade 3b - moderate quality	
Grade 2 - very good quality		Grade 4 - poor quality	
Subgrade 3a - good quality		Grade 5 - very poor quality	
Not Present			

N

Scale 1:10,000@A4 July/2014

Figure RAC6367-2: Agricultural Land Classification

Site: Land at Boverton, Vale of Glamorgan

Client: Barratt Homes South Wales

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