

PRELIMINARY SUMMARY

CLIENT	Miller Homes Limited																				
SITE ADDRESS	Land south-west of Smugglers Lane, Barn Green, West Sussex RH13 0PS																				
REPORT REFERENCE	GWPR6092 Preliminary Summary The conditions and limitations of this preliminary summary can be viewed within Appendix A.																				
ENGINEER	Rob Terrell, Senior Geotechnical Engineer, Ground and Water Limited																				
EXISTING DEVELOPMENT	At the time of reporting, September 2024, the site comprised an undeveloped field.																				
ANTICIPATED GEOLOGY AND HYDROGEOLOGY	The site was anticipated to be located on the Weald Clay Formation, classified as Unproductive Bedrock Strata. Based on this, groundwater was anticipated at depth, below the aquifer; however, perched water may be encountered at shallower depths, within silty/sandy bands, or within the shallow surface soils (i.e. Topsoil, Made Ground etc.), especially after periods of prolonged or intense rainfall.																				
SCOPE OF WORKS	Site works were undertaken on 30 th August 2024 and comprised the drilling of 5No. Dynamic (Windowless) Sampler Borehole (WS1 – WS5) to depths between 3.50 – 5.00m bgl, with in-situ strength testing (SPTs) was undertaken at 1.00m intervals. WS2, WS3 and WS5 refused between 3.50 – 4.00 where drilling reached technical refusal due to claystone. Super Heavy Dynamic Probing (DP2, DP3 and DP5) was then undertaken from the base of these boreholes, before later reaching technical refusal at deeper depths. A trial hole location plan has been provided within Figure 1.																				
GROUND CONDITIONS ENCOUNTERED	<div>A summary of the ground conditions encountered can be viewed within the following table. The trial hole logs can be seen within Appendix B.</div> <table><tr><th colspan="4">Summary of Strata Encountered</th></tr><tr><th>Strata</th><th>Top Depth (m bgl)</th><th>Base Depth (m bgl)</th><th>Thickness (m)</th></tr><tr><td>TOPSOIL: Brown sandy gravelly silty CLAY. Sand was fine. Gravel was fine to coarse, sub-angular to sub-rounded flint.</td><td>GL</td><td>0.20 – 0.60</td><td>0.20 – 0.60</td></tr><tr><td>WEALD CLAY FORMATION: Brown/orange/grey silty CLAY.</td><td>0.20 – 0.60</td><td>2.40 – 3.90</td><td>2.10 – >3.30</td></tr><tr><td>WEALD CLAY FORMATION: Brown/orange/grey mottled CLAYSTONE. Desiccated. (WS1, WS2, WS4 and WS5)</td><td>2.40 – 3.90</td><td>>4.00 – >5.00</td><td>>1.10 – >1.60</td></tr></table>	Summary of Strata Encountered				Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)	TOPSOIL: Brown sandy gravelly silty CLAY. Sand was fine. Gravel was fine to coarse, sub-angular to sub-rounded flint.	GL	0.20 – 0.60	0.20 – 0.60	WEALD CLAY FORMATION: Brown/orange/grey silty CLAY.	0.20 – 0.60	2.40 – 3.90	2.10 – >3.30	WEALD CLAY FORMATION: Brown/orange/grey mottled CLAYSTONE. Desiccated. (WS1, WS2, WS4 and WS5)	2.40 – 3.90	>4.00 – >5.00	>1.10 – >1.60
Summary of Strata Encountered																					
Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)																		
TOPSOIL: Brown sandy gravelly silty CLAY. Sand was fine. Gravel was fine to coarse, sub-angular to sub-rounded flint.	GL	0.20 – 0.60	0.20 – 0.60																		
WEALD CLAY FORMATION: Brown/orange/grey silty CLAY.	0.20 – 0.60	2.40 – 3.90	2.10 – >3.30																		
WEALD CLAY FORMATION: Brown/orange/grey mottled CLAYSTONE. Desiccated. (WS1, WS2, WS4 and WS5)	2.40 – 3.90	>4.00 – >5.00	>1.10 – >1.60																		
GROUNDWATER	No groundwater strikes were noted during the site investigation. It should be noted that groundwater strikes may have been obscured by the drilling process. Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was undertaken in August 2024 when groundwater levels are likely to be at their annual lowest elevation. Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.																				
ROOTS	Fresh roots were noted within all trial holes to 0.80 – 1.00m bgl. It should be noted that the accuracy of determining the depth of root penetration through narrow diameter boreholes is considered low. It should be noted that roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.																				

PRELIMINARY SUMMARY

IN-SITU STRENGTH TESTING

A summary of the in-situ strength testing (SPTs and SHDP) conducted within WS1 – WS5 and DP2, DP3 and DP5 has been summarised in the following table.

Interpretation of In-situ Geotechnical Testing Results				
Strata	Strata	SPT/SHDP "N" Value	Equivalent Undrained Shear Strength	Cohesive Soil Type (Cu Classification)
Cohesive Weald Clay Formation	WS1/0.60 – 3.90m bgl	10 – 24	50 – 120	Medium to Extremely High
	WS2/0.30 – 2.40m bgl	15 – 20	75 – 20	
	WS3/0.20 – 3.50m bgl	8 – >48	40 – >240	
	WS4/0.40 – 3.50m bgl	9 – 22	45 – 110	
	WS5/0.30 – 3.60m bgl	10 – >57	10 – >285	
Weald Clay Formation Claystone	WS1/3.90 – 5.00m bgl	29 – 56	145 – 280	High to Extremely High
	WS2/2.40 – 4.00m bgl	22 – >46	110 – >220	
	WS4/3.50 – 5.00m bgl	33 – 98	165 – 490	
Inferred Weald Clay Formation Claystone*	DP2/4.00 – 5.00m bgl	29 – 60	145 – 300	High to Extremely High
	DP3/3.50 – 4.10m bgl	81 – 156	405 – 780	
	DP5/4.00 – 4.90m bgl	69 – 152	345 – 760	

*It should be noted that super heavy dynamic probing may underestimate the strength of shallow surface soils. No samples are obtained during super heavy dynamic probing, so the soil texture was also assumed/inferred.

ANTICIPATED VOLUME CHANGE POTENTIAL

The following volume change potential was anticipated based on a physical and visual appraisal of the soils encountered and was subject to confirmation of results of geotechnical classification testing:

- **Weald Clay Formation (cohesive):** Likely to have medium to high volume change potential in accordance with NHBC Standards Chapter 4.2 and BRE240.

FOUNDATION DESIGN

Foundations should be taken through any Topsoil/Made Ground before founding onto competent, moisture stable soils. Should soils have volume change potential, foundations must also extent 300mm below the proven depth of roots (max proven root depth of 0.80 – 1.00m bgl). In the absence of roots (and before confirmation of laboratory testing results), foundations should be placed at 1.00m bgl, the minimum recommended depth for soils of high volume change potential. Therefore, foundations are recommended to be founded at a minimum depth of 1.10 – 1.30m bgl and onto competent, moisture stable soils of the Weald Clay Formation. Foundations at this depth can be designed based on a presumed allowable bearing capacity of ~80 – 100kN/m². This is based on trial hole records, the results of in-situ testing, inspection of samples recovered, and referral to BS 8004:2015, Code of Practice for Foundations.

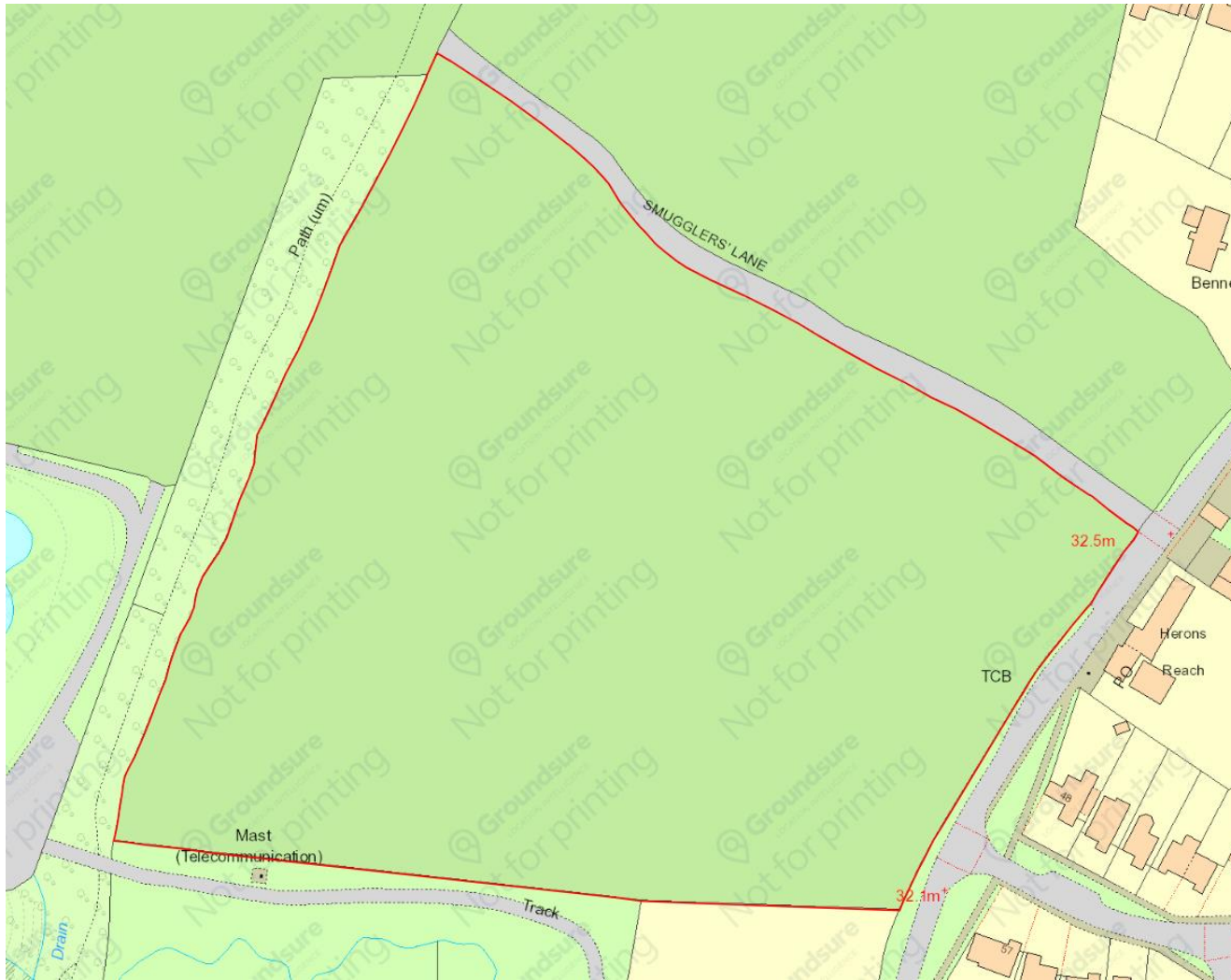
LABORATORY TESTING

A number of samples were sent to the laboratory for geotechnical and chemical testing. The results were not available at the time of writing the preliminary summary and will be included within the final report. There were no visual or olfactory evidence of contamination noted during the site works.

Figure 1 Trial Hole Location Plan
Appendix A Conditions and Limitations
Appendix B Trial Hole Logs

This preliminary information may be subject to amendment in the final report and no liability can be accepted for any actions based on this preliminary information.

FIGURES



Site boundary

Not to Scale

Land south-west of Smugglers Lane, Barn Green, West Sussex RH13 0PS

Nigel Grace c/o Mass Studio


September 2024

Figure 2: Site Development Area

GWPR6192





 Site boundary

Not to Scale

Land south-west of Smugglers Lane, Barn Green, West Sussex RH13 0PS

Nigel Grace c/o Mass Studio

September 2024

Figure 3: Aerial View of the Site

GWPR6192





Not to Scale

Land south-west of Smugglers Lane, Barn Green, West Sussex RH13 0PS

Nigel Grace c/o Mass Studio

September 2024

Figure 4: Existing Plan View – Ground Floor

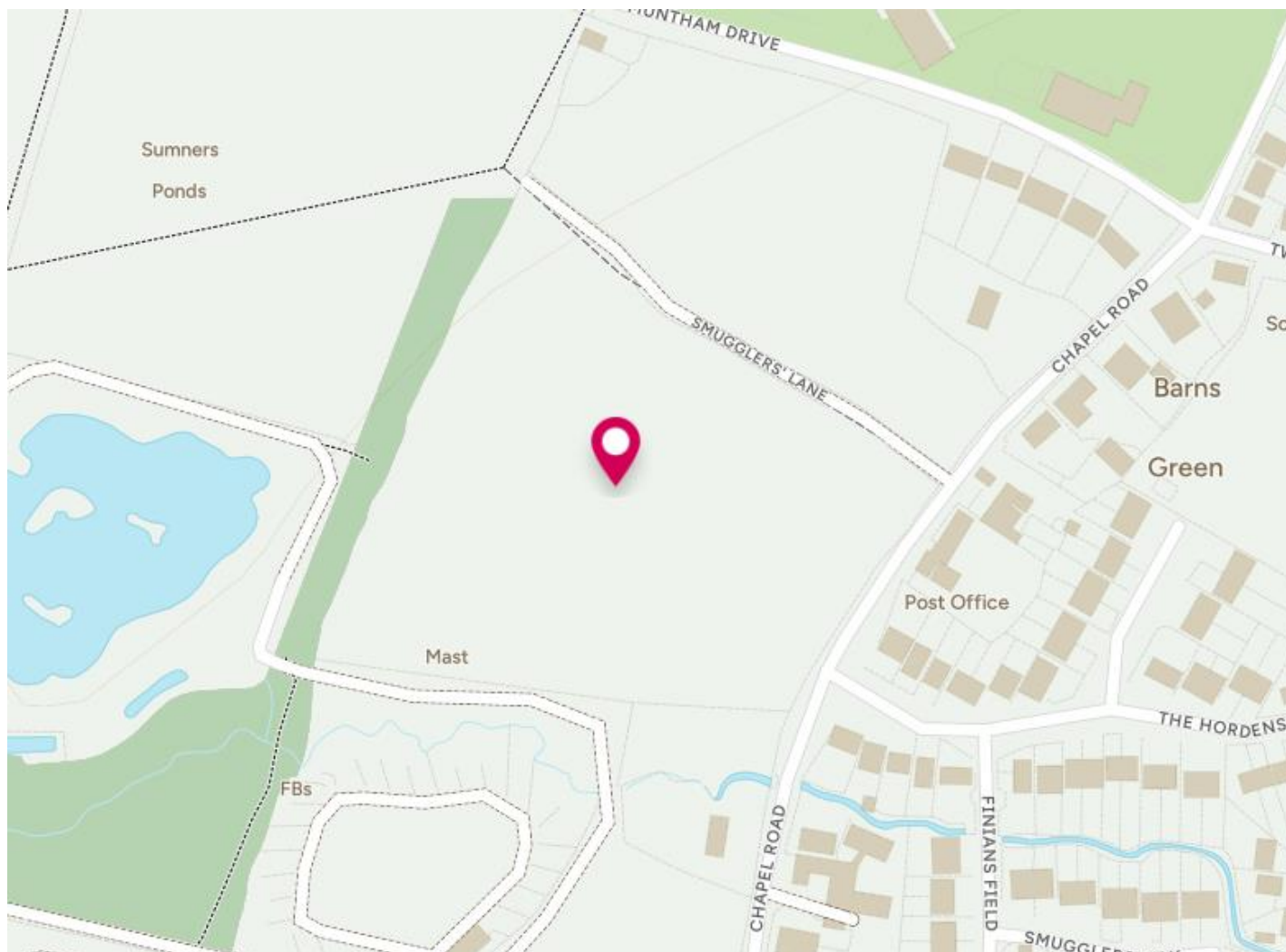
GWPR6192





 Site Location

Not to Scale



Land south-west of Smugglers Lane, Barn Green, West Sussex RH13 0PS

Nigel Grace c/o Mass Studio

September 2024

Figure 1: Site Location Plan

GWPR6192



APPENDIX A: Conditions and Limitations

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations of this report relate to Land south-west of Smugglers Lane, Barn Green, West Sussex RH13 0PS.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B: Trial Hole Logs



Date: 30/08/2024

Contractor:

Drilling Equipment:

Page Number
Sheet 1 of 1

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation



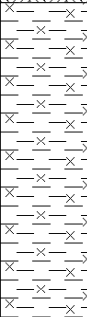


Fresh roots noted to 0.80m bgl. No groundwater encountered.





Percussion Drilling Log

Project Name: Land south-west of Smugglers Lane, Barn Green		Client: Miller Homes Limited		Date: 30/08/2024	
Location: Horsham, West Sussex RH13 0PS		Contractor:			
Project No. : GWPR6192		Crew Name:		Drilling Equipment:	
Borehole Number WS2	Hole Type WLS	Level	Logged By	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30			TOPSOIL: Brown sandy gravelly silty CLAY. Sand was fine. Gravel was fine to coarse, sub-angular to sub-rounded flint. WEALD CLAY FORMATION: Brown/orange/grey silty CLAY.	
		1.00	SPT	N=15 (1,2/3,4,4,4)			1		
		2.00	SPT	N=20 (4,5/5,4,5,6)			2		
		2.40							
		3.00	SPT	N=22 (5,5/5,5,6,6)				WEALD CLAY FORMATION: Brown/orange/grey mottled CLAYSTONE. Desiccated	3
		4.00	SPT	46 (10,14/46 for 150mm)	4.00			End of Borehole at 4.000m	4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
Fresh roots noted to 1.00m bgl. No groundwater encountered. Refused on claystone. Dynamic probing (DP2) was undertaken from 4.00m bgl.





Probe Log

Probe No
DP2
Sheet 1 of 1

Project Name: Land south-west of Smugglers Lane, Barn Green

Project No.
GWPR6192

Co-ords:

Hole Type
DP

Location: Horsham, West Sussex RH13 0PS

Level:

Scale
1:25

Client: Miller Homes Limited

Dates:

Logged By

Depth (m)	Blows/100mm																								Torque (Nm)
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	
1																									
2																									
3																									
4	9																								
	10																								
	10																								
	11																								
	11																								
	15																								
	19																								
	19																								
	19																								
	22																								

Remarks:	Fall Height	Cone Base Diameter
	Hammer Wt	Final Depth
	Probe Type DPSH-B	



Percussion Drilling Log

Project Name: Land south-west of Smugglers Lane, Barn Green		Client: Miller Homes Limited		Date: 30/08/2024	
Location: Horsham, West Sussex RH13 0PS		Contractor:			
Project No. : GWPR6192		Crew Name:		Drilling Equipment:	
Borehole Number WS3	Hole Type WLS	Level	Logged By	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			TOPSOIL: Brown sandy gravelly silty CLAY. Sand was fine. Gravel was fine to coarse, sub-angular to sub-rounded flint. WEALD CLAY FORMATION: Brown/orange/grey silty CLAY.	
		1.00	SPT	N=8 (1,0/2,2,2,2)					1
		2.00	SPT	N=17 (1,2/4,4,4,5)					2
		3.00	SPT	N=31 (4,6/6,8,8,9)					3
		3.50	SPT	48 (14, 14/48 for 150mm)	3.50			End of Borehole at 3.500m	4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
Fresh roots noted to 0.80m bgl. No groundwater encountered. Refused on claystone. Dynamic probing (DP3) was undertaken from 3.50m bgl.





Probe Log

Probe No
DP3
Sheet 1 of 1

Project Name: Land south-west of Smugglers Lane, Barn Green

Project No.
GWPR6192

Co-ords:

Hole Type
DP

Location: Horsham, West Sussex RH13 0PS

Level:

Scale
1:25






Client: Miller Homes Limited




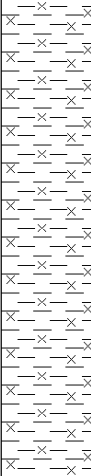
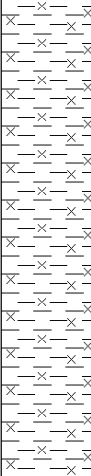
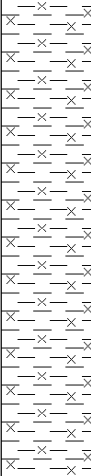
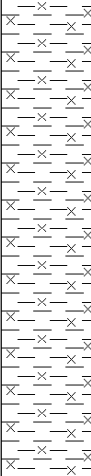



Dates:

Logged By

Depth (m)	Blows/100mm																								Torque (Nm)
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	
1																									
2																									
3																									
4	19																								
	32																								
	30																								
	44																								
	55																								
	57																								
Remarks:		Fall Height												Cone Base Diameter											
		Hammer Wt												Final Depth											
		Probe Type												DPSH-B											



		<h1>Percussion Drilling Log</h1>									
Project Name: Land south-west of Smugglers Lane, Barn Green				Client: Miller Homes Limited				Date: 30/08/2024			
Location: Horsham, West Sussex RH13 0PS				Contractor:							
Project No. : GWPR6192				Crew Name:				Drilling Equipment:			
Borehole Number WS4		Hole Type WLS		Level		Logged By		Scale 1:50		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
					0.40			TOPSOIL: Brown sandy gravelly silty CLAY. Sand was fine. Gravel was fine to coarse, sub-angular to sub-rounded flint. WEALD CLAY FORMATION: Brown/orange/grey silty CLAY.		1	
		1.00	SPT	N=9 (2,2/2,2,2,3)							
		2.00	SPT	N=14 (2,3/3,3,4,4)			2				
		3.00	SPT	N=22 (5,6/5,5,6,6)			3				
		4.00	SPT	N=33 (5,6/6,7,9,11)	3.50			WEALD CLAY FORMATION: Brown/orange/grey mottled CLAYSTONE. Desiccated		4	
5.00	SPT	N=98 (10,16/20,20,29,29)	5.00								
								End of Borehole at 5.000m		5	
										6	
										7	
										8	
										9	
										10	
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks											
Fresh roots noted to 0.80m bgl. No groundwater encountered.											

		<h1>Percussion Drilling Log</h1>									
Project Name: Land south-west of Smugglers Lane, Barn Green				Client: Miller Homes Limited				Date: 30/08/2024			
Location: Horsham, West Sussex RH13 0PS				Contractor:							
Project No. : GWPR6192				Crew Name:				Drilling Equipment:			
Borehole Number WS5		Hole Type WLS		Level		Logged By		Scale 1:50		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
					0.30			TOPSOIL: Brown sandy gravelly silty CLAY. Sand was fine. Gravel was fine to coarse, sub-angular to sub-rounded flint. WEALD CLAY FORMATION: Brown/orange/grey silty CLAY.		1	
		1.00	SPT	N=10 (2,2/2,2,3,3)							
		2.00	SPT	N=14 (2,3/3,4,3,4)							
		3.00	SPT	57 (10,10/57 for 225mm)							
											
					3.60			WEALD CLAY FORMATION: Brown/orange/grey mottled CLAYSTONE. Desiccated		4	
					4.00						
								End of Borehole at 4.000m		4	
										5	
										6	
										7	
										8	
										9	
										10	
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks											
Fresh roots noted to 1.00m bgl. No groundwater encountered. Refused on claystone. Dynamic probing (DP5) was undertaken from 4.00m bgl.											

