

Technical Note

Site: Boorley Green Phase B5

Ref: GE18071

Client: Linden Homes

Date: March 15, 2019

The Phase B5 area at Boorley Green has been the subject of ground level reprofiling to form the current development levels. At the south-eastern end of the site, i.e. the highest elevation, the reprofiling comprised a shallow reduced dig as observed by the ground level difference at the development parcel boundary. The remainder of Parcel B5, i.e. that which extended downslope towards the north-west, has undergone ground level raising through the deposition of soils, which are understood to have been won from the wider Boorley Green development site and placed as an engineered fill material. The presence and depth of the fill has potentially significant implications for foundation options (including type, depth, constructability and spoil generation).

Whilst it is assumed that the earthworks filling operation was undertaken in accordance with an earthworks specification, Geo-Environmental was not involved in preparation of a specification for this particular parcel, nor involved in oversight of the earthworks process either during or following placement. It should be noted that the compaction process removes air from the soil and reduces the overall air voids content to produce a more uniform fill. Compacted fill is still susceptible to settlement following compaction.

The fill would be susceptible to settlement due to self-weight, the magnitude of settlement typically being c. 0.5-1.0% of the placed fill thickness, e.g. 12-25mm for fill 2.5m thick. In addition, further settlement would occur as a result of imposed loading and the magnitude of such settlement would generally be proportional to the applied load, i.e. the greater the load, the greater the settlement. Moreover, given a likely variation in the degree of compaction achieved (based on review of outcome on other parcels) and likely variation in fill composition, differential settlement would also be likely to occur and could readily be c. 50% of the total settlement value. Both total and differential settlement could exceed tolerable limits for conventional construction. As such, it is considered that the engineered fill would not be suitable for use as a bearing stratum for conventional foundations.

Previous investigation

A review of pre-existing ground investigation records was undertaken to clarify the encountered ground conditions during the site's former use as a golf course. The relevant exploratory hole logs for positions within the B5 development parcel (WS292-294, WS297-WS298 and TP5084) and two deeper boreholes (BH205 and BH209) near to parcel B5 are enclosed together with a plan as Figure 1 showing the location of these exploratory holes.

The ground conditions encountered within or in close proximity to parcel B5 comprised Topsoil 0.3-0.7m thick overlying firm to stiff becoming stiff, or stiff silty clay. The clay strata would have been considered suitable, in general, for conventional foundations with foundation depth likely to be governed by tree influence. Based on the results of laboratory testing, a high volume change potential would be applicable for foundation design, thereby requiring a minimum founding depth of 1.0m bgl (Linden standard minimum foundation construction depth is typically 1.2m so deeper than the minimum for volume change potential). Heave protection and deepening to account for tree influence would be applicable.

Post-earthworks investigation

A series of trial pit positions were identified by Morgan Structural, Linden's Structural Engineer, to provide coverage across parcel B5 and to investigate the areas of reduced dig and raised ground. Positions were marked out and current

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ground levels provided by the Client's on-site Contractor. Trial pit positions are presented on Figure 2 (overlain on pre-development aerial photography) and Figure 2 (overlain on development layout plan).

A Geotechnical Engineer from Geo-Environmental attended site on 6th March 2019 to inspect and record the conditions exposed in excavations to be formed on the Phase B5 development parcel. The purpose of the site visit was to confirm the existing ground conditions, depth of fill (where present) and liaise with the Structural Engineer (also in attendance) to agree foundation options based on the conditions encountered.

Whilst, a total of 7No. trial pit positions were proposed, one position referenced TP2 could not be excavated due to the presence of live services in the verge at or close to the proposed trial pit position. Given the proximity of TP2 to positions TP1 and TP3, coupled with the conditions encountered in those locations, TP4 and TP5, it was agreed on site that TP2 would not be excavated in the planned location, nor relocated to an alternative position. As such, TP2 was not dug.

A total of six trial pits (TP1 & TP3-TP7) were excavated at the proposed locations. The Client's Structural Engineer was also present for the excavations. The Geotechnical Engineer recorded the ground conditions exposed in each of the trial pits and copies of the trial pit logs are enclosed.

In trial pits TP1, TP3, TP4 and TP5, the ground conditions comprised gravelly clay Made Ground to depths in the range 1.3-2.2m bgl overlying firm silty clay, which became firm to stiff, or stiff at depth in all pits except TP1 where it remained firm to the base of the pit at 2.4m bgl. The gravelly clay Made Ground was understood to comprise soils won from elsewhere across the site which were deposited as engineered fill to raise ground levels, nonetheless, fragments of brick, breeze block and concrete were encountered in the clay Made Ground in several locations. The elevation of the base of the Made Ground was similar to the elevation of the base of the Topsoil encountered during the previous investigation phases and thus it would appear that Topsoil had been stripped and fill placed on the exposed subsoil strata. The recorded strength of the subsoil strata immediately below the clay Made Ground was slightly lower in some areas than recorded during previous investigations and this could be due to a combination of factors such as disturbance and softening due to vegetation removal, exposure following Topsoil strip as well as the time of year when the investigations were undertaken, e.g. early autumn for the previous investigation and mid-winter for the current pitting exercise.

Trial Pit TP6 was located in a narrow, artificial valley gap formed between two soil stockpiles. The ground conditions encountered in this pit comprised loose and unstable stockpiled soils (likely to be stockpiled Topsoil based on the soils exposed) to 1.3m bgl overlying stiff clay. Given that these stockpiles would presumably be removed prior to development, the actual final depth of cover over the stiff clay would be likely to reduce substantially. It should be noted that a land drain comprising a plastic pipe and pea shingle surround was encountered in TP6 at 1.6m bgl. Initially water discharged from the land drain as a rapid flow which reduced slightly to a steady and constant flow. The land drain appeared to cross through the pit in an approximately south-west to north-east alignment.

Trial pit TP7 was located in an area where a reduced dig had been undertaken, as evident when observing the site boundary and the step change in ground level (reduced level within the boundary). It was estimated that the reduced dig was approximately 0.3-0.5m deep and this appeared to correlate approximately with the depth of Topsoil encountered during the previous investigation. The ground conditions encountered in TP7 comprised firm to stiff clay exposed at ground surface, becoming stiff with depth.

In addition to the water ingress via land drain in TP6, groundwater ingress was also observed in TP7 at 2.0m bgl as a seepage and running sand. Groundwater was also encountered during drilling of WS293 during the previous investigation, with groundwater ingress at 2.0m bgl. WS293 was located approximately mid-point between the locations of TP1, TP2 and TP5 (approximately Plot 356 based on the development layout plan provided).

Each pit was excavated through the engineered fill, Made Ground or stockpiles soils and into the natural strata. The excavations were formed with vertical sides which were stable during excavation. Given that this site was not fenced off

or secured, each pit was backfilled following completion of excavation at that location. Therefore, longer term observations of stability could not be made.

Geotechnical Assessment

On the basis of the ground conditions encountered within the trial pits, the engineered fill is not suitable as a bearing stratum and thus if conventional foundations are to be used on this development phase, they will need to extend into the underlying natural strata.

In the portion of the site where trial pits TP6 and TP7 were located (approximately Plots 340-352), it is considered that conventional foundations would be suitable and could be constructed to terminate in undisturbed, natural stiff clay soils at depths of c. 1.5m bgl.

A net allowable bearing capacity of 125kPa is recommended for the stiff clay, for which total settlement should remain within tolerable limits.

Deepening may be required to account for tree influence including where trees have been removed recently, albeit that no visual evidence of desiccation was observed in TP6 or TP7. Heave precautions (to account of high volume change potential soils) would be required for all foundations which extend to depths in excess of 1.5m bgl. The suitability of conventional foundations for Plots 340-342 should be reviewed following removal of the stockpiled soil over these plots. If Made Ground is absent or of very limited thickness and underlying natural soils are consistent with those in TP6 and TP7, it is possible that conventional foundations would be suitable. The cut off between earthworks fill (clay Made Ground) and stockpile was masked by the stockpile, hence why this should be verified in due course.

In the portion of the site downslope of the stockpiles, i.e. Plots 334-339 and 354-361, covered by trial pits TP1 and TP3-TP5, it is considered that the depth of Made Ground encountered, presence of lower strength clay soils and tree influence at TP1 (and likely for TP2) would require conventional foundations to extend to depths in excess of 2.5m bgl. Whilst technical approval for deep strip foundations could be dependent on which Building Control organisation is engaged for this site, it is considered that there could be constructability issues such as overdig and side collapse in the clay Made Ground, coupled with possible increased foundation width, generation of excessive spoil volumes and a substantial increase in concrete costs due to increase in volume of concrete required.

Whilst the trial pits remained stable during the site inspection, they were formed in relatively short lengths (c. 2-3m long) compared to the trenches likely to be excavated for foundations. It should also be noted that these trenches were excavated at locations remote from any existing ground works, structures or construction activity, each of which could reduce stability substantially. The construction strategy should look wherever possible to reduce the potential for trench instability by measures such as limiting the total depth of excavation, the length of trench left open at any given time and keeping unsupported trenches open for as short a time period as possible prior to mass filling with concrete.

Heave protection measures would be required on any foundations in excess of 1.5m bgl. In addition, given the variation in composition of the natural strata underlying the engineered fill, it is recommended that reinforcement is included in foundations. Both the inclusion of heave protection and reinforcement would require a safe system of work to be developed and followed to protect construction personnel.

Suspended floor slabs would be required throughout due to the depth of engineered cohesive fill.

Ground works should be designed in such a manner to avoid any requirement for construction or maintenance personnel to enter into or work within excavations. If such work cannot be avoided, then it should only be permitted once a safe system of work, supported by a robust risk assessment, has been determined and implemented. The Ground Works Contractor's risk assessment should include continuous observation of excavation stability and if any excavations become unstable (including indicators such as trench side bulging, settlement of adjacent ground, tension cracks at ground level,

spalling or the like) works should stop immediately and the trench be backfilled to prevent further instability. Further advice should then be sought.

Based on the conditions encountered in TP1 and TP3-TP5, a piled foundation solution would be recommended. Whilst driven piles could be utilised, their installation tends to induce some level of groundborne vibration which could impact existing buried services. A CFA pile would generally induce far less vibration. Both CFA and driven pile solutions have been used on other parcels on the Boorley Green development. Use of a conventional piling rig may require construction of a temporary working platform and this should be accounted for. The actual thickness of the working platform would be dependent on the rig used. Logs are enclosed for two cable percussion boreholes constructed as part of the pre-development ground investigation and these may assist in informing the design of piled foundations. If these boreholes are not considered, by the designer, not to be suitable due to their location out of the development parcel, then additional investigation would be required in due course to inform the design of piled foundations.

In conclusion, it is considered that conventional foundations may be suitable for the portion of the site around and upslope of the stockpiles (approximately Plots 340-352), subject to clarification for Plots 340-342 following stockpile removal. A piled foundation solution is recommended for the remainder of the site, i.e. Plots 334-339 and 354-361).

For and on Behalf of Geo-Environmental

GAVIN ROBERTS CGeol, BEng (Hons), MSc, FGS

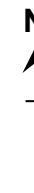
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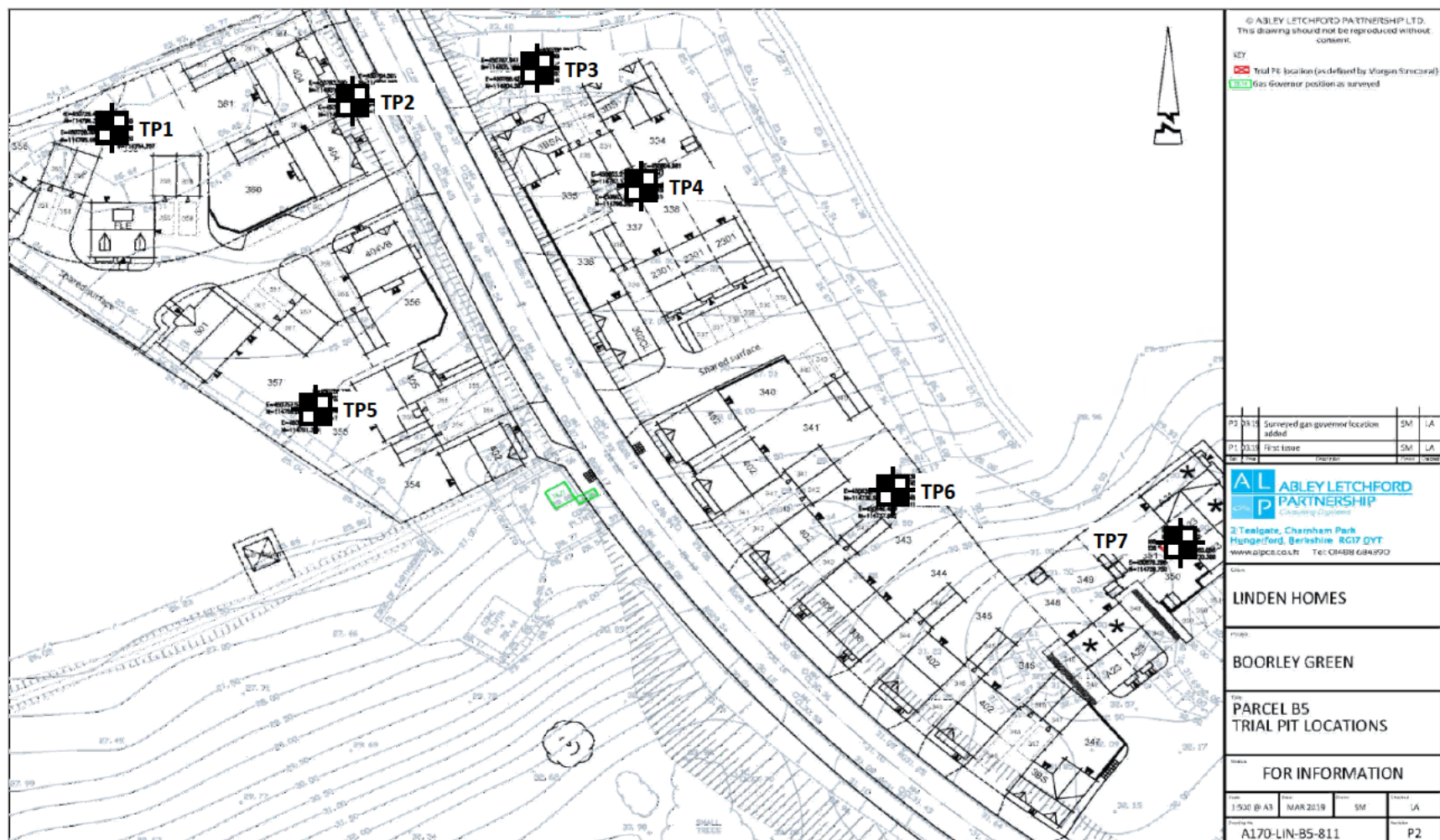
Enc. Figure 1 Previous Ground Investigation Plan
 Figure 2 Trial Pit locations overlain on predevelopment aerial photograph
 Figure 3 Trial Pit locations on proposed layout
 Previous ground investigation logs (TP5804, WS292-294, WS297-298, BH205, BH209)
 Trial Pit Logs TP1-TP7



Project:	Boorley Green - Parcel B5			Title	Previous Ground Investigation Plan	
Client:	Linden Homes			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	 Geo-Environmental	
Ref No:	GE18071	Version:	1.0			
Drawn:	GR	Date:	15/03/2019			
Figure:	1	Scale:	Not To Scale			



Project:	Boorley Green - Parcel B5			Title	Trial Pit locations on predevelopment aerial photograph		
Client:	Linden Homes			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net		 Geo-Environmental	
Ref No:	GE18071	Version:	1.0				
Drawn:	GR	Date:	15/03/2019				
Figure:	2	Scale:	Not To Scale				



Project:	Boorley Green - Parcel B5			Title	Trial Pit locations on proposed layout		
Client:	Linden Homes			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net  Geo-Environmental			
Ref No:	GE18071	Version:	1.0				
Drawn:	GR	Date:	15/03/2019				
Figure:	3	Scale:	Not To Scale				



Trial Pit Log

TrialPit No
TP5804
Sheet 1 of 1

Project Name:	Boorley Green - Combined
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Project No.	GE15030A
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Co-ords: 450842.00 - 114713.00
Level: 30.80

Date
20/11/2015

Location: Boorley Green, Hampshire

Dimensions
(m):

Depth 3.00

0.60 1.80

Scale
1:25

Logged
CA

Client:

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30	30.50		Dark brown sandy clay with occasional rootlets and flint gravels.	1 -
							Stiff dark grey mottled orange very sandy silty CLAY.	
				3.00	27.80		End of Pit at 3.00m	3 -
								4 -
								5 -

Remarks Groundwater not encountered.

Stability



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Borehole Log

Borehole No.

WS298

Sheet 1 of 1

Project Name: Boorley Green - Combined

Project No.
GE15030A

Co-ords: 450864E - 114736N

Hole Type
WS

Location: Boorley Green, Hampshire

Level: 30.25

Scale
1:25

Client:

Dates: 11/09/2013

Logged By
JK/T

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	J					Dark brown silty sand with frequent rootlets, occasional roots (12mm) and flint gravel TOPSOIL	
		0.50	J		0.60	29.65		Very stiff orange/brown and grey slightly sandy CLAY with occasional roots (2mm) WITTERING FORMATION	
		1.00	D		1.00	29.25		Very stiff orange/brown and grey slightly sandy CLAY WITTERING FORMATION	1
		1.00	PP	4.0kg/cm2	1.10	29.15		Stiff light orange/brown and light grey silty CLAY WITTERING FORMATION	
		1.50	D						
		1.50	PP	2.8kg/cm2					
		2.00	D						2
		2.00	PP	2.5kg/cm2					
		2.50	D						
		2.50	PP	3.3kg/cm2					
		3.00	D						3
		3.00	PP	3.8kg/cm2					
		3.50	D		3.70	26.55		Dark brown CLAYSTONE WITTERING FORMATION	
		3.50	PP	3.8kg/cm2	4.00	26.25		End of Borehole at 4.00m	4
									5
Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks			
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				





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Borehole Log

Borehole No.

WS297

Sheet 1 of 1

Project Name: Boorley Green - Combined

Project No.
GE15030A

Co-ords: 450784E - 114705N

Hole Type
WS

Location: Boorley Green, Hampshire

Level: 30.66

Scale
1:25

Client:

Dates: 12/09/2013

Logged By
JK/T

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	J		0.40	30.26		Dark brown silty sand with frequent flint gravel and occasional rootlets TOPSOIL	
		0.50	D						Firm to stiff orange/brown and grey mottled slightly sandy CLAY WITTERING FORMATION
		1.00 1.00	D PP	1.5kg/cm2					1
		1.50 1.50 1.50	D PP	1.3kg/cm2					
		2.00	PP	1.5kg/cm2	2.00	28.66		End of Borehole at 2.00m	2
									3
									4
									5

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	



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Borehole Log

Borehole No.

WS294

Sheet 1 of 1

Project Name: Boorley Green - Combined

Project No.
GE15030A

Co-ords: 450736E - 114719N

Hole Type
WS

Location: Boorley Green, Hampshire

Level: 26.55

Scale
1:25

Client:

Dates: 12/09/2013

Logged By
JK/T

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	J		0.30	26.25		Dark brown silty sand with frequent flint gravel and occasional rootlets TOPSOIL	
		0.50	D					Stiff orange/brown and grey mottled silty CLAY with occasional rootlets WITTERING FORMATION	
		1.00 1.00	D PP	1.3kg/cm2					1
		1.50 1.50	D PP	1.5kg/cm2					
		2.00	PP	1.5kg/cm2	2.00	24.55		End of Borehole at 2.00m	2
									3
									4
									5
Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks			
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				





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Borehole Log

Borehole No.

WS293

Sheet 1 of 1

Project Name: Boorley Green - Combined

Project No.
GE15030A

Co-ords: 450766E - 114777N

Hole Type
WS

Location: Boorley Green, Hampshire

Level: 24.26

Scale
1:25

Client:

Dates: 12/09/2013

Logged By
JK/T

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.20	J		0.30	23.96		Dark brown silty sand with frequent flint gravel and rootlets TOPSOIL	1	
		0.50	D							
		1.00 1.00 1.00	D PP	1.0kg/cm2	1.20	23.06				
		1.50 1.50	D PP	10.0kg/cm2	1.80	22.46		Firm to stiff grey/brown and occasionally orange/brown mottled silty CLAY with abundant claystone inclusions WITTERING FORMATION		
		2.00 2.00	D PP	1.5kg/cm2	3.10	21.16			Stiff grey CLAY WITTERING FORMATION	3
		2.50 2.50	D PP	10.0kg/cm2			4.00		20.26	
		3.00 3.00	D PP	1.8kg/cm2	4.00	20.26				
		3.50 3.50	D PP	2.8kg/cm2			4.00		20.26	
		4.00	PP	3.0kg/cm2	4.00	20.26				
							4.00		20.26	
			4.00	20.26				5		

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to		
		2.00	2.40				





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BN6 9GL

Borehole Log

Borehole No.

WS292

Sheet 1 of 1

Project Name: Boorley Green - Combined

Project No.
GE15030A

Co-ords: 450831E - 114791N

Hole Type
WS

Location: Boorley Green, Hampshire

Level: 23.65

Scale
1:25

Client:

Dates: 11/09/2013

Logged By
JK/T

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	J					Dark brown sandy clay with occasional roots (2mm) and flint gravel TOPSOIL	
		0.50	J						
		1.00	D		0.70	22.95		Very stiff light orange/brown and grey mottled silty CLAY with occasional claystone inclusions and rootlets WITTERING FORMATION	1
		1.00	PP	2.8kg/cm2					
		1.50	D						
		1.50	PP	3.5kg/cm2					
		2.00	D						2
		2.00	PP	2.8kg/cm2					
		2.50	D						
		2.50	PP	2.5kg/cm2					
		3.00	D		3.25	20.40		Stiff dark grey and occasionally brown mottled CLAY with occasional fine sandy partings WITTERING FORMATION	3
		3.00	PP	3.0kg/cm2					
		3.50	D						
		3.50	PP	3.3kg/cm2					
		4.00	PP	2.5kg/cm2	4.00	19.65		End of Borehole at 4.00m	4
									5
Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks			
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to				



 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log		Borehole No. BH205 Sheet 1 of 2	
Project Name: Boorley Green - Combined		Project No. GE15030A		Co-ords: 451010E - 114833N	
Location: Boorley Green, Hampshire		Level: 24.35		Hole Type CP	
Client:		Dates: 06/09/2013		Scale 1:50	
Logged By PL					

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	24.25		Dark brown silty sand with frequent rootlets and occasional flint gravel (TOPSOIL).	
		0.50 - 1.00	B					Stiff brown sandy silty CLAY with occasional fine to medium sub-angular flint gravel (WITTERING FORMATION).	
		1.00						WITTERING FORMATION	
		1.00 - 1.50	U						
		1.30			1.30	23.05		Stiff brown/grey silty CLAY (WITTERING FORMATION).	
		1.50	D					WITTERING FORMATION	
		1.50 - 2.00	B						
		2.00	S	N=18 (3,2/4,4,5,5)					
		2.45	D						
		2.50 - 3.00	B						
		2.90			2.90	21.45		Stiff brown CLAY with occasional sandy partings (WITTERING FORMATION).	
		3.00	U					WITTERING FORMATION	
		3.00 - 3.50							
		3.50	D						
		3.80	S	N=24 (4,3/5,6,6,7)					
		4.00							
		4.45	D						
		4.45							
	5.00	S	N=28 (4,3/6,7,8,7)						
	5.45	D							
	5.50			5.50	18.85		Dense orange/brown fine to medium SAND with occasional ferruginous lenses (WITTERING FORMATION).		
	6.00	D					WITTERING FORMATION		
	6.00								
	6.50	S	N=34 (5,4/8,8,9,9)						
	6.95	D							
	7.40	D							
	7.50								
	8.00	S	N=38 (5,5/8,9,10,11)						
	8.45	D							
	8.45								
	9.00	D							
	9.50	S	N=42 (6,5/9,10,11,12)						
	9.95	D							
Continued on Next Sheet									

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
		9.50	7.60			Standpipe installed to 4.00m bgl

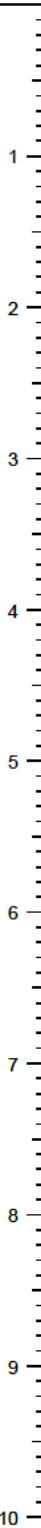


 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. BH205 Sheet 2 of 2	
Project Name: Boorley Green - Combined		Project No. GE15030A		Co-ords: 451010E - 114833N		Hole Type CP	
Location: Boorley Green, Hampshire				Level: 24.35		Scale 1:50	
Client:				Dates: 06/09/2013		Logged By PL	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50 10.50	D						
		11.00	S	N=44 (6,5/10,10,11,13)					11
		11.45	D						
		12.00	D						12
		12.50	S	N=49 (6,6/10,11,13,15)					
		12.95 12.95	D						13
		13.50	D						
		14.10	S	N=48 (6,5/10,12,14,12)					14
		14.55	D						
		15.00 15.00	D		15.00	9.35		End of Borehole at 15.00m	15
									16
									17
									18
									19
									20

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks Standpipe installed to 4.00m bgl	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to		
		9.50	7.60				

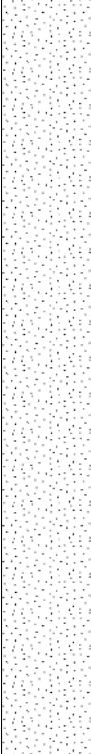
 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. BH209 Sheet 1 of 2	
Project Name: Boorley Green - Combined		Project No. GE15030A		Co-ords: 450864E - 114967N		Hole Type CP	
Location: Boorley Green, Hampshire				Level: 25.51		Scale 1:50	
Client:				Dates: 04/09/2013		Logged By PL	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50 - 1.00	B		0.15	25.36		Dark brown silty sand with frequent rootlets and occasional flint gravel (TOPSOIL).	
		1.00			0.85	24.66		Stiff brown silty CLAY (WITTERING FORMATION).	
		1.00 - 1.50	U		1.30	24.21		Stiff dark brown silty CLAY (WITTERING FORMATION).	
		1.50	D					Stiff brown/grey silty CLAY (WITTERING FORMATION).	
		1.50 - 2.00	B					Stiff brown/grey silty CLAY (WITTERING FORMATION).	
		2.00	S	N=10 (2,1/2,2,3,3)				Stiff brown sandy silty CLAY with occasional clayey bands (WITTERING FORMATION).	
		2.45	D		2.40	23.11		Stiff brown sandy silty CLAY with occasional clayey bands (WITTERING FORMATION).	
		2.50 - 3.00	B					Dense brown fine to medium SAND (WITTERING FORMATION).	
		3.00						Dense brown fine to medium SAND (WITTERING FORMATION).	
		3.00 - 3.50	U					Dense brown fine to medium SAND (WITTERING FORMATION).	
		3.45	D					Dense brown fine to medium SAND (WITTERING FORMATION).	
		4.00	S	N=15 (3,2/4,4,3,4)				Dense brown fine to medium SAND (WITTERING FORMATION).	
		4.45	D		4.70	20.81		Dense brown fine to medium SAND (WITTERING FORMATION).	
		5.00	S	N=28 (4,3/6,7,8,7)				Dense brown fine to medium SAND (WITTERING FORMATION).	
		5.45	D					Dense brown fine to medium SAND (WITTERING FORMATION).	
		5.45	D					Dense brown fine to medium SAND (WITTERING FORMATION).	
		6.00	D					Dense brown fine to medium SAND (WITTERING FORMATION).	
		6.50	S	N=31 (4,4/7,7,8,9)				Dense brown fine to medium SAND (WITTERING FORMATION).	
	6.95	D					Dense brown fine to medium SAND (WITTERING FORMATION).		
	7.50	D					Dense brown fine to medium SAND (WITTERING FORMATION).		
	8.00	S	N=34 (5,4/7,8,9,10)				Dense brown fine to medium SAND (WITTERING FORMATION).		
	8.45	D					Dense brown fine to medium SAND (WITTERING FORMATION).		
	8.45	D					Dense brown fine to medium SAND (WITTERING FORMATION).		
	9.00	D					Dense brown fine to medium SAND (WITTERING FORMATION).		
	9.50	S	N=37 (5,4/8,9,9,11)				Dense brown fine to medium SAND (WITTERING FORMATION).		
	9.95	D					Dense brown fine to medium SAND (WITTERING FORMATION).		
Continued on Next Sheet								10	

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
		6.20	6.20			Standpipe installed to 4.00m bgl



 Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net		Borehole Log				Borehole No. BH209 Sheet 2 of 2	
Project Name: Boorley Green - Combined		Project No. GE15030A		Co-ords: 450864E - 114967N		Hole Type CP	
Location: Boorley Green, Hampshire				Level: 25.51		Scale 1:50	
Client:				Dates: 04/09/2013		Logged By PL	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		10.50	D	N=39 (5,5/9,9,10,11)	15.00	10.51			11	
		11.00	S							12
		11.45 11.45	D							13
		12.00	D						14	
		12.50	S	N=43 (5,5/9,10,11,13)					15	
		12.95	D						16	
		13.50 13.50	D						17	
		14.10	S	N=49 (6,6/10,11,13,15)					18	
		14.55	D						19	
		15.00	D						20	
End of Borehole at 15.00m										

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks Standpipe installed to 4.00m bgl	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to		
		6.20	6.20				



Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

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Trial Pit Log

Trial Pit No

TP1

Sheet 1 of 1

Project Name: Boorley Green B5

Project No.
GE18071

Co-ords: 450729.00 - 114795.50
Level: 25.00

Date
06/03/2019

Location: Boorley Green, Hampshire

Dimensions
(m):



Scale
1:25

Client: Linden Homes

Depth
2.40

Logged
GR

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				1.30	23.70		Brown, grey and dark brown silty sandy clay with some fine to coarse flint gravel and fine to coarse gravel to cobble size fragments of concrete red brick breezeblock and occasional wood MADE GROUND	1
				2.40	22.60		Firm orange brown and light grey mottled silty CLAY WITTERING FORMATION	2
							End of Pit at 2.40m	3
								4
								5

Water Strike	Remarks
Depth Strike	Stability





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

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Trial Pit Log

Trial Pit No

TP2

Sheet 1 of 1

Project Name: Boorley Green B5

Project No.
GE18071

Co-ords: 450764.50 - 114801.00
Level: 25.00

Date
06/03/2019

Location: Boorley Green, Hampshire

Dimensions
(m):

Scale
1:25

Client: Linden Homes

Depth

Logged

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.00	25.00		TRIAL PIT NOT EXCAVATED DUE TO PROXIMITY OF SERVICES	
								1
								2
								3
								4
								5

Water Strikes		Remarks	Pit not excavated due to proximity of live services
Depth Strike	Rose to (m/bgl)		
		Stability	





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environmental www.gesl.net

Trial Pit Log

Trial Pit No

TP3

Sheet 1 of 1

Project Name: Boorley Green B5

Project No.
GE18071

Co-ords: 450789.00 - 114805.50
Level: 25.00

Date
06/03/2019

Location: Boorley Green, Hampshire

Dimensions
(m):



Scale
1:25

Client: Linden Homes

Depth
2.60

Logged
GR

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
							Brown, grey and dark brown silty sandy clay with some fine to coarse flint gravel and fine to coarse gravel to cobble size fragments of concrete red brick breezeblock and occasional wood MADE GROUND	1
				2.20	22.80			2
				2.60	22.40		Firm orange brown and light grey mottled silty CLAY. Becoming firm to stiff from 2.5m bgl WITTERING FORMATION	
							End of Pit at 2.60m	3
								4
								5

Water Strike	Remarks
Depth Strike	Stability





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

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Trial Pit Log

Trial Pit No

TP4

Sheet 1 of 1

Project Name: Boorley Green B5

Project No.
GE18071

Co-ords: 450803.50 - 114786.50
Level: 26.00

Date
06/03/2019

Location: Boorley Green, Hampshire

Dimensions
(m):



Scale
1:25

Client: Linden Homes

Depth
2.60

Logged
GR

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				2.00	24.00		Grass over brown and grey sandy clay with some fine to coarse flint gravel, occasional coarse gravel to cobble sized red brick fragments cloth/fabric and occasional pockets of grey gravelly clay MADE GROUND	1
				2.60	23.40		Firm to stiff becoming stiff light grey and orange brown mottled slightly silty CLAY with pockets of closely fissured silty clay WITTERING FORMATION	2
							End of Pit at 2.60m	3
								4
								5

Water Strike	Remarks
Depth Strike	Stability





Unit 7, Danworth Farm
Hurstpierpoint
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Trial Pit Log

Trial Pit No

TP5

Sheet 1 of 1

Project Name: Boorley Green B5

Project No.
GE18071

Co-ords: 450757.50 - 114752.00
Level: 26.50

Date
06/03/2019

Location: Boorley Green, Hampshire

Dimensions
(m):



Scale
1:25

Client: Linden Homes

Depth
2.70

Logged
GR

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				2.20	24.30		Brown, grey and dark brown silty sandy clay with some fine to coarse flint gravel and fine to coarse gravel to cobble size fragments of concrete red brick breezeblock and occasional wood MADE GROUND	1
				2.70	23.80		Firm to stiff becoming stiff light grey and orange brown mottled slightly silty CLAY WITTERING FORMATION	2
							End of Pit at 2.70m	3
								4
								5

Water Strike	Remarks
Depth Strike	Stability





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environmental www.gesl.net

Trial Pit Log

Trial Pit No
TP6
Sheet 1 of 1

Project Name: Boorley Green B5

Project No.
GE18071

Co-ords: 450839.50 - 114738.50
Level: 29.50

Date
06/03/2019

Location: Boorley Green, Hampshire

Dimensions
(m):



Scale
1:25

Client: Linden Homes

Depth
2.40

Logged
GR

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				1.30	28.20		Brown clay with roots and organic odour MADE GROUND	1
				2.40	27.10		Stiff light grey and orange brown mottled slightly silty CLAY WITTERING FORMATION	2
							End of Pit at 2.40m	3
								4
								5
Water Strike		Remarks		Plastic land drain and pea shingle backfill at 1.6m with initially rapid becoming steady water ingress				
Depth Strike		Stability						





Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL

Geo-Environmental www.gesl.net

Trial Pit Log

Trial Pit No

TP7

Sheet 1 of 1

Project Name: Boorley Green B5

Project No.
GE18071

Co-ords: 450879.50 - 114730.50
Level: 31.75

Date
06/03/2019

Location: Boorley Green, Hampshire

Dimensions
(m):



Scale
1:25

Client: Linden Homes

Depth
2.10

Logged
GR

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.50	31.25		Firm light brown orange brown and light grey mottled sandy to very sandy silty CLAY WITTERING FORMATION	
				1.10	30.65		Firm to stiff light brown orange brown and light grey mottled silty CLAY WITTERING FORMATION	1
				1.30	30.45		Light brown orange brown and light grey clayey SAND WITTERING FORMATION	
				2.10	29.65		Firm to stiff becoming stiff light grey orange brown and light brown mottled fine sandy CLAY with occasional ironstone nodules WITTERING FORMATION	2
							End of Pit at 2.10m	3
								4
								5
Water Strike		Remarks						
Depth Strike		Stability						

