

12692/FG/Nov Revision

22 November 2023

Bloor Homes Western  
Rudgeway House  
Celandine Road  
Walton Cardiff  
Tewkesbury  
Gloucestershire GL20 7FU

*For the attention of Jon Launchbury,*

## **Bretch Hill, Phase 4, (Withycombe Farm), Banbury–Soil Infiltration Testing Letter Report – November 2023 Revision**

Further to your recent instruction, and subsequent to our previous Soil Infiltration Testing Letter Report of 28 September 2023, we have now completed the supplementary BRE 365 compliant soil infiltration testing at the above site and have revised and updated our previous report..

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### ***Background***

As part of the ongoing development, Bloor Homes Western are proposing to construct three attenuation basins at Breth Hill, Phase 4, otherwise referred to as Withycombe Farm Site, Banbury.

Intégral Géotechnique were initially instructed to undertake soil infiltration testing at the site at specified locations of the proposed attenuation basins to determine the soil infiltration rate. We attended site on the 21<sup>st</sup> September 2023 to carry out BRE 365 compliant soakaway testing at four locations (referenced SA01, SA02, SA03 and SA04). The findings of these initial soakaway tests were reported in our Soil Infiltration Testing Letter Report of 28 September 2023.

Supplementary testing was then instructed to be undertaken within the vicinity of the previously excavated SA02 to confirm the design infiltration rates within this area of the site.

It should be noted that during the first infiltration tests, the locations and depths of the soil infiltration testing to be carried out was supplied by Bloor Homes Western.

During the subsequent works the supplemental locations and respective depths were determined by the qualified engineer from Intégral Géotechnique.

### ***Fieldworks***

We attended site initially on 21<sup>st</sup> September 2023 to carry out BRE 365 compliant soil infiltration testing at four locations (referenced SA01, SA02, SA03 and SA04).

Soil infiltration tests SA01 and SA02 were undertaken at the approximate locations of two of the attenuation basins. SA03 was undertaken at the proposed location of the third basin and SA04 was undertaken as an additional location if the results for SA03 were not sufficient.

Supplementary works were then conducted on 23<sup>rd</sup> October 2023 to carry out further ground investigation and BRE 365 compliant soil infiltration testing at additional locations), within the vicinity of the previously excavated SA02.

Four additional trial pits were excavated, references SA101, SA102, SA103 and SA104. However, it should be noted that soil infiltration testing was only carried out in three of these locations (SA102, SA103 and SA104). The ground conditions observed within SA101 were comparable to those encountered in SA102 and hence a soil infiltration test was only carried out in one of these locations (SA102).

During the two phases of investigations the trial pits were excavated using a 20-tonne and an 8 Tonne tracked excavator respectively, supplied by Bloor Homes Western.

The initial trial pits (SA01 to SA04 inclusive) were excavated to maximum depths of approximately 1.3m, as specified by Bloor Homes Western. The supplementary trial pits (SA101 to SA104 inclusive) were excavated to depths ranging from 1.5m to 2.3m below existing ground level.

Upon reaching the final excavation depth, the trial pits were rapidly filled with water from a 2000-gallon water bowser, and the water level was monitored over a period of time. Repeat cycle testing was undertaken in accordance with the requirements of BRE365 where infiltration rates allowed.

The fieldworks were supervised by a qualified geotechnical engineer from Intégral Géotechnique who logged the trial pits and monitored the soil infiltration tests.

The location of the site is presented in Figure 1, while the approximate locations of the trial pit/ soil infiltration tests over the two investigations are shown in Figure 2.

The trial pit logs, and soil infiltration test calculation sheets are presented in Appendices A and B respectively.

### ***Ground Conditions***

The ground conditions encountered within the trial pits remained reasonably consistent with the sites respective underlying geology and previous investigations.

#### **Initial Site Investigation (September 2023)**

The ground conditions typically comprised a surface covering of cohesive topsoil comprising soft brown and locally orangish brown, slightly sandy slightly gravelly silt, up to approximately 0.3m thick. Local to SA04 the topsoil comprised soft brown organic rich silt. The topsoil was recorded as organic, rich with generally common roots and rootlets.

Underlying the topsoil, an upper mantle of soft to firm brown and orangish brown slightly sandy and gravelly silt was recorded, proven to a depth of approximately 0.6m to 0.8m bgl. Stiff brown, slightly silty gravelly clay, were generally encountered from 0.6m to 1.3m bgl.

Local to SA01, dense brown silty slightly sandy clayey gravel was encountered from 0.6m below existing ground level.

#### Supplementary Site Investigation (November 2023)

Soil infiltration test pits SA101 to SA104 inclusive are defined by a surface covering of reworked made ground, comprised of soft to firm, brown, slightly sandy slightly silty slightly gravelly clay between approximately 0.0m to 0.3m depth. Gravels constitute fine to coarse angular mudstone.

The reworked material is the result of the backfilling of the site after a 150mm to 600mm field wide site strip was undertaken by a team of archaeologists.

Underlying the surface covering of reworked material the ground conditions remained reasonably consistent with the previous investigations. The natural soils encountered generally comprised an upper mantle of sub-soil comprising either a firm brown slightly silty slightly gravelly clay or a medium dense orange, brown slightly silty slightly gravelly sand. No subsoil was identified within SA104.

A localized outlier in the ground conditions across the site was encountered within SA103 which encountered generally cohesive soils underlying the reworked made ground. Between the depths of 0.2m and 0.6m a sub-soil comprising soft brown clayey sandy silt was encountered. Underlying the sub-soil, the natural soils generally comprised a firm to stiff brownish grey gravelly clay.

Within the remaining pits the natural soils encountered generally comprised loose to dense brown silty sandy, locally clayey gravel/ cobble.

Locally, a moderate to high cobble content was recorded throughout the trial pit locations. The cobbles generally comprised angular to sub-rounded ferruginous limestone.

All trial pits were terminated at depths between of 1.3m and 2.3m bgl in accordance with soil infiltration test depths provided by Bloor Homes and specified by Integral Geotechnique's Engineer during current investigation.

Groundwater was not encountered within the excavated depths of the soakaway test pits SA01 to SA04 inclusive and supplementary soil infiltration test pits SA101 to SA104 inclusive.

A copy of the trial pit logs is presented in Appendix A.

#### ***Soil Infiltration Testing Results***

The results of the soil infiltration testing have been summarised below in Table 1.

**Table 1: Soil Infiltration Test Results**

Soil Infiltration Test Location	Excavation Depth (m bgl)	Soil Infiltration Rate (ms <sup>-1</sup> )			Design Soil Infiltration Rate (ms <sup>-1</sup> )
		Cycle 1	Cycle 2	Cycle 3	
SA01	1.3	4.2x10 <sup>-5</sup>	3.1x10 <sup>-5</sup>	n/a	3.1x10 <sup>-5</sup>
SA02	1.3	n/a	n/a	n/a	n/a
SA03	1.3	n/a	n/a	n/a	n/a
SA04	1.3	1.2x10 <sup>-4</sup>	7.2x10 <sup>-5</sup>	5.6x10 <sup>-5</sup>	5.6x10 <sup>-5</sup>
SA102	2.3	1.3x10 <sup>-4</sup>	8.9x10 <sup>-5</sup>	8.7x10 <sup>-5</sup>	8.7x10 <sup>-5</sup>
SA103	1.9	n/a	n/a	n/a	n/a
SA104	1.5	1.2x10 <sup>-4</sup>	7.5x10 <sup>-5</sup>	7.2x10 <sup>-5</sup>	7.2x10 <sup>-5</sup>

The soil infiltration test calculation sheets are presented in Appendix B.

The results indicate a design soil infiltration rate of approximately between 3.1x10<sup>-5</sup>m/sec at the location of SA01 and 8.7x10<sup>-5</sup>m/sec at the location of SA102.

Insufficient infiltration was observed in soil infiltration test locations SA02, SA03 and SA103 and therefore it was not possible to calculate a soil infiltration rate at these locations. Due to time constraints, it was not possible undertake a third test cycle in SA01.

Note that the soakaway test results are specific to the location and depth of the tests undertaken.

The soil infiltration test results should be provided to a suitably qualified drainage engineer.

It is recommended that allowances are made for silt protection within the construction of any soak away drainage system at the site.

We trust the above and enclosed are to your satisfaction. However, if you have any queries or require any further information, please do not hesitate to contact us.

Yours faithfully,




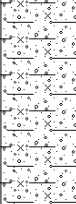









**Finn Guilfoyle**  
**For**  
**Intégral Géotechnique (Wales) Limited**




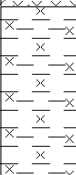

Encl.  
Appendix A – Trial Pit Logs  
Appendix B – Soil Infiltration Test Calculation Sheets  
Figures

## **APPENDIX A**




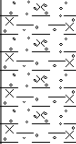

### **TRIAL PIT LOGS**




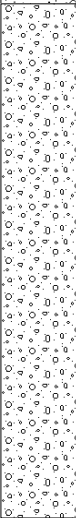

			Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			<b>Project Name:</b> <b>Bretch Hill, Banbury</b>			<b>Project No.:</b> <b>12692</b>		<b>Trial Pit No.:</b> <b>SA01</b> Sheet 1 of 1	
<b>Location:</b> Banbury			<b>Client:</b> Bloor Homes Western			<b>Logged By:</b> FG		<b>Scale:</b> 1:25				
<b>Equipment:</b> 20-tonne tracked excavator			<b>Coordinates:</b> 240353.69mE - 443256.13mN			<b>Dimensions</b> 3.00m						
<b>Date Excavated:</b> 21/09/2023			<b>Level:</b>			<b>Depth :</b> 1.30m		0.70m <span style="border: 1px solid black; display: inline-block; width: 40px; height: 20px; vertical-align: middle;"></span>				
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
			0.30			Grass over soft brown and slightly orangish brown slightly sandy very slightly gravelly organic rich SILT with common roots and rootlets. Gravel is fine to coarse sub-rounded to rounded ferruginous limestone. [Topsoil]						
			0.60			Firm orangish brown slightly sandy gravelly SILT with moderate cobble content of sub-angular to sub-rounded ferruginous limestone. Gravel is fine to coarse sub-angular to sub-rounded ferruginous limestone.						
			1.30			Dense brown silty slightly sandy clayey GRAVEL. Gravel is fine to coarse sub-angular to rounded ferruginous sandstone and limestone.						
						End of Trialpit at 1.30 m						
<b>Remarks:</b>			<b>Groundwater:</b>			<b>Key:</b>						
1. Trial pit depth specified by client. 2. Soil infiltration testing undertaken in pit.			1. No groundwater encountered.			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample						
			<b>Stability:</b>			1. Generally stable in the short term with local instability associated with cobble removal.						




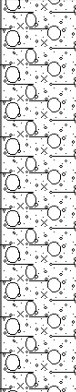

			Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			<b>Project Name:</b> <b>Bretch Hill, Banbury</b>			<b>Project No.:</b> <b>12692</b>		<b>Trial Pit No.:</b> <b>SA02</b> Sheet 1 of 1	
<b>Location:</b> Banbury			<b>Client:</b> Bloor Homes Western			<b>Logged By:</b> FG		<b>Scale:</b> 1:25				
<b>Equipment:</b> 20-tonne tracked excavator			<b>Coordinates:</b> 240312.49mE - 443527.88mN			<b>Dimensions</b> 2.80m						
<b>Date Excavated:</b> 21/09/2023			<b>Level:</b>			<b>Depth :</b> 1.30m		0.70m <span style="border: 1px solid black; display: inline-block; width: 40px; height: 20px; vertical-align: middle;"></span>				
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
			0.30			Grass over soft brown slightly gravelly organic rich SILT with frequent roots and rootlets. Gravel is fine to coarse sub-rounded ferruginous limestone.						
			0.60			Soft orangish brown slightly sandy very slightly gravelly SILT. Gravel is fine to medium sub-rounded ferruginous limestone.						
			1.10			Stiff brown very slightly gravelly CLAY. Gravel is fine and medium ferruginous limestone.						
			1.30			Stiff brown gravelly CLAY with moderate cobble content of sub-angular to sub-rounded limestone. Gravel is fine to coarse sub-rounded ferruginous limestone and rare angular shell fragments.						
						----- End of Trialpit at 1.30 m						
<b>Remarks:</b> 1. Trial pit depth specified by client. 2. Soil infiltration testing undertaken in pit.			<b>Groundwater:</b> 1. No groundwater encountered.			<b>Key:</b> D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample						
			<b>Stability:</b> 1. Generally stable in the short term with local instability associated with cobble removal.									



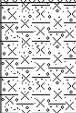
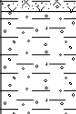
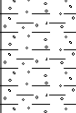

			Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			<b>Project Name:</b> <b>Bretch Hill, Banbury</b>			<b>Project No.:</b> <b>12692</b>		<b>Trial Pit No.:</b> <b>SA03</b> Sheet 1 of 1	
<b>Location:</b> Banbury			<b>Client:</b> Bloor Homes Western			<b>Logged By:</b> FG		<b>Scale:</b> 1:25				
<b>Equipment:</b> 20-tonne tracked excavator			<b>Coordinates:</b> 240078.36mE - 443337.97mN			<b>Dimensions</b> 2.90m			Depth : 1.30m 0.70m			
<b>Date Excavated:</b> 21/09/2023			<b>Level:</b>									
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
			0.30			Grass over soft brown and orangish brown slightly gravelly organic rich SILT with frequent roots and rootlets. Gravel is fine to coarse sub-rounded ferruginous limestone and sandstone.						
			0.70			Soft to firm orangish brown very slightly gravelly SILT. Gravel is fine to coarse sub-angular ferruginous sandstone.						
			1.30			Stiff brown mottled red and orange silty CLAY.						
						End of Trialpit at 1.30 m						
<b>Remarks:</b> 1. Trial pit depth specified by client. 2. Soil infiltration testing undertaken in pit.			<b>Groundwater:</b> 1. No groundwater encountered.			<b>Key:</b> D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample						
			<b>Stability:</b> 1. Generally stable in the short term with local instability associated with cobble removal.									



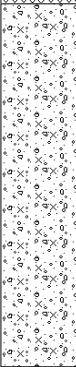



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		Location: <b>Banbury</b>			Client: <b>Bloor Homes Western</b>	Logged By: FG
Equipment: 20-tonne tracked excavator		Coordinates: 240115.93mE - 443327.03mN			Dimensions 2.70m	
Date Excavated: 21/09/2023		Level:			Depth : 1.30m	0.70m
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.30			Grass over soft brown organic rich SILT wit common roots and rootlets.
			0.80			Soft brown and orangish brown slightly sandy very slightly gravelly SILT. Gravel is fine and medium rounded sandstone.
			1.30			Stiff brown slightly silty slightly gravelly CLAY with high cobble content of angular ferruginous sandstone. Gravel is fine to coarse, angular ferruginous sandstone.
						End of Trialpit at 1.30 m
<b>Remarks:</b> 1. Trial pit depth specified by client. 2. Soil infiltration testing undertaken in pit.		Groundwater: 1. No groundwater encountered.			<b>Key:</b> D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample	
		Stability: 1. Generally stable in the short term with local instability associated with cobble removal.				

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<b>Location:</b> Banbury			<b>Client:</b> Bloor Homes Western			<b>Logged By:</b> FG		<b>Scale:</b> 1:25				
<b>Equipment:</b> 8-tonne Tracked Excavator			<b>Coordinates:</b>			<b>Dimensions:</b> 2.80m		Depth : 2.00m 0.70m				
<b>Date Excavated:</b> 14/11/2023			<b>Level:</b>									
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
			0.20			MADE GROUND: Soft to firm brown slightly sandy slightly silty slightly gravelly CLAY. Gravel is fine to coarse angular of mudstone (Reworked ground).						
			0.30			Medium dense orange brown slightly silty slightly gravelly SAND. Gravel is fine to coarse sub-angular ferruginous limestone.						
						Dense orange brown silty slightly sandy to sandy gravelly COBBLES with moderate boulder content of angular ferruginous limestone. Gravels and cobbles are fine to coarse angular to sub-rounded of ferruginous limestone.						
			2.00			End of Trialpit at 2.00 m						
<b>Remarks:</b> 1. Trial pit terminated a 2.0m due to slow progress of excavation.			<b>Groundwater:</b> 1. No groundwater encountered.			<b>Key:</b> D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample						
			<b>Stability:</b> 1. Generally stable with local instability associated with cobble removal.									

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<b>Location:</b> Banbury		<b>Client:</b> Bloor Homes Western		<b>Logged By:</b> FG		<b>Scale:</b> 1:25			
<b>Equipment:</b> 8-tonne Tracked Excavator		<b>Coordinates:</b>		<b>Dimensions:</b> 3.00m		Depth : 2.30m		0.65m	
<b>Date Excavated:</b> 14/11/2023		<b>Level:</b>							
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
			0.30			MADE GROUND: Soft to firm brown slightly sandy slightly silty slightly gravelly CLAY. Gravel is fine to coarse angular of mudstone (Reworked ground).			
			1.00			Firm brown slightly silty slightly gravelly CLAY with low cobble content of sub-angular ferruginous limestone. Gravel is fine to coarse sub-angular ferruginous limestone.			
			2.30			Loose to medium dense orange brown slightly silty slightly sandy very clayey GRAVEL with high cobble and boulder content of angular ferruginous limestone. Gravel is fine to coarse angular and sub-angular of ferruginous limestone.			
						End of Trialpit at 2.30 m			
<b>Remarks:</b>			<b>Groundwater:</b>			<b>Key:</b>			
1. Trial pit terminated at 2.0m due to slow progress of excavation. 2. Soil infiltration testing undertaken within pit.			1. No groundwater encountered.			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			<b>Stability:</b>						
			1. Generally stable with local instability associated with cobble removal.						

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: <b>Bretch Hill, Banbury</b>		Project No.: <b>12692</b>		Trial Pit No.: <b>SA103</b> Sheet 1 of 1	
Location: <b>Banbury</b>		Client: <b>Bloor Homes Western</b>		Logged By: FG		Scale 1:25			
Equipment: <b>8-tonne Tracked Excavator</b>		Coordinates:		<b>Dimensions</b> 2.10m					
Date Excavated: <b>14/11/2023</b>		Level:		Depth : 1.90m		0.65m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
			0.20			MADE GROUND: Soft to firm brown slightly sandy slightly silty slightly gravelly CLAY. Gravel is fine to coarse angular of mudstone (Reworked ground).			
			0.60			Soft brown clayey sandy SILT.			
			1.75			Firm to stiff brownish grey gravelly CLAY with moderate cobble content of angular limestone. Gravel is fine to coarse angular to sub-angular limestone.			
			1.90			Suspected limestone bedrock.			
						End of Trialpit at 1.90 m			
<b>Remarks:</b> 1. Trial pit terminated at 2.0m due to slow progress of excavation. 2. Soil infiltration testing undertaken within pit.			Groundwater: <b>1. No groundwater encountered.</b>			<b>Key:</b> D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: <b>1. Generally stable with local instability associated with cobble removal.</b>						

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		<b>Project Name:</b> <b>Bretch Hill, Banbury</b>		<b>Project No.:</b> <b>12692</b>		<b>Trial Pit No.:</b> <b>SA104</b> Sheet 1 of 1	
<b>Location:</b> Banbury		<b>Client:</b> Bloor Homes Western		<b>Logged By:</b> FG		<b>Scale:</b> 1:25			
<b>Equipment:</b> 8-tonne Tracked Excavator		<b>Coordinates:</b>		<b>Dimensions:</b> 2.70m		<b>Depth:</b> 1.50m 0.75m			
<b>Date Excavated:</b> 14/11/2023		<b>Level:</b>							
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
			0.30			MADE GROUND: Soft to firm brown slightly sandy slightly silty slightly gravelly CLAY. Gravel is fine to coarse angular of mudstone (Reworked ground).			
			1.50			Medium dense brown silty sandy GRAVEL with high cobble and boulder content of sub-angular ferruginous limestone. Gravel is fine to coarse angular and sub-angular of ferruginous limestone.			
						End of Trialpit at 1.50 m			
<b>Remarks:</b>				<b>Groundwater:</b>		<b>Key:</b>			
1. Trial pit terminated at 2.0m due to slow progress of excavation. 2. Soil infiltration testing undertaken within pit.				1. No groundwater encountered.		D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
				<b>Stability:</b>					
				1. Generally stable with local instability associated with cobble removal.					

## **APPENDIX B**

### **SOIL INFILTRATION TEST CALCULATION SHEETS**

# BRE365 SOIL INFILTRATION RATE TEST - SA01

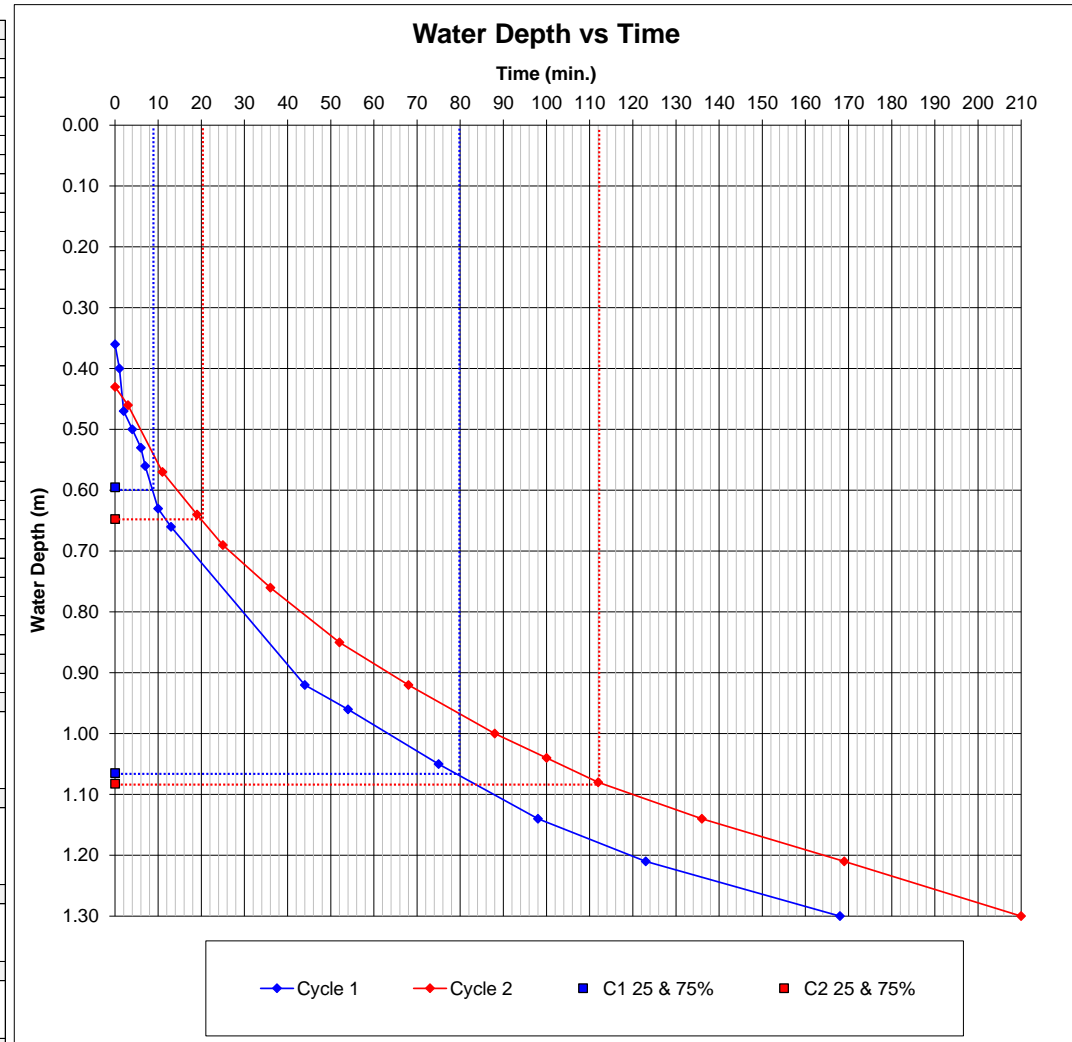
12692 Phase 4 Withycombe Farm, Banbury

Trial Pit Information	
Length (m)	3.00
Width (m)	0.70
Depth (m)	1.30
Groundwater	dry
Weather Conditions	sunny
Date	21-Sep-23

Remarks
1. Test undertaken within natural cohesive deposits.

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	0.36	0	0.43		
1	0.40	3	0.46		
2	0.47	11	0.57		
4	0.50	19	0.64		
6	0.53	25	0.69		
7	0.56	36	0.76		
10	0.63	52	0.85		
13	0.66	68	0.92		
44	0.92	88	1.00		
54	0.96	100	1.04		
75	1.05	112	1.08		
98	1.14	136	1.14		
123	1.21	169	1.21		
168	1.30	210	1.30		

	Cycle 1	Cycle 2	Cycle 3
<b>Final Excavation Depth (m)</b>			
At end of testing cycle	1.30	1.30	
<b>Water Depths (m)</b>			
Water depth at start of test	0.36	0.43	
Water depth at end of test	1.30	1.30	
Effective depth (measured)	0.94	0.87	
% Effective storage depth	1.00	1.00	
<b>Effective Storage Depths (m)</b>			
Effective storage depth (100%)	0.94	0.87	
Effective storage depth (75%)	0.71	0.65	
Effective storage depth (50%)	0.47	0.44	
Effective storage depth (25%)	0.24	0.22	
<b>Outflow Time (min)</b>			
Time for measured outflow	168	210	
Time for 100% outflow	168	210	
Time for 75-25% outflow	71	92	
<b>Volume of Outflow (m<sup>3</sup>)</b>			
Over measured effective depth	1.97	1.83	
Over 100% effective depth	1.97	1.83	
From 75% - 25% effective depth	0.99	0.91	
<b>Surface Area (m<sup>2</sup>)</b>			
For 100% effective storage	9.06	8.54	
For 50% effective storage	5.58	5.32	
Over measured depth	9.06	8.54	
<b>Soil Infiltration Rate (m/s)</b>			
Over 100% effective depth	2.2E-05	1.7E-05	
Over measured depth	2.2E-05	1.7E-05	
Over 75% - 25% effective depth	4.2E-05	3.1E-05	



Design Soil Infiltration Rate: 3.1E-05 m/s

# BRE365 SOIL INFILTRATION RATE TEST - SA02

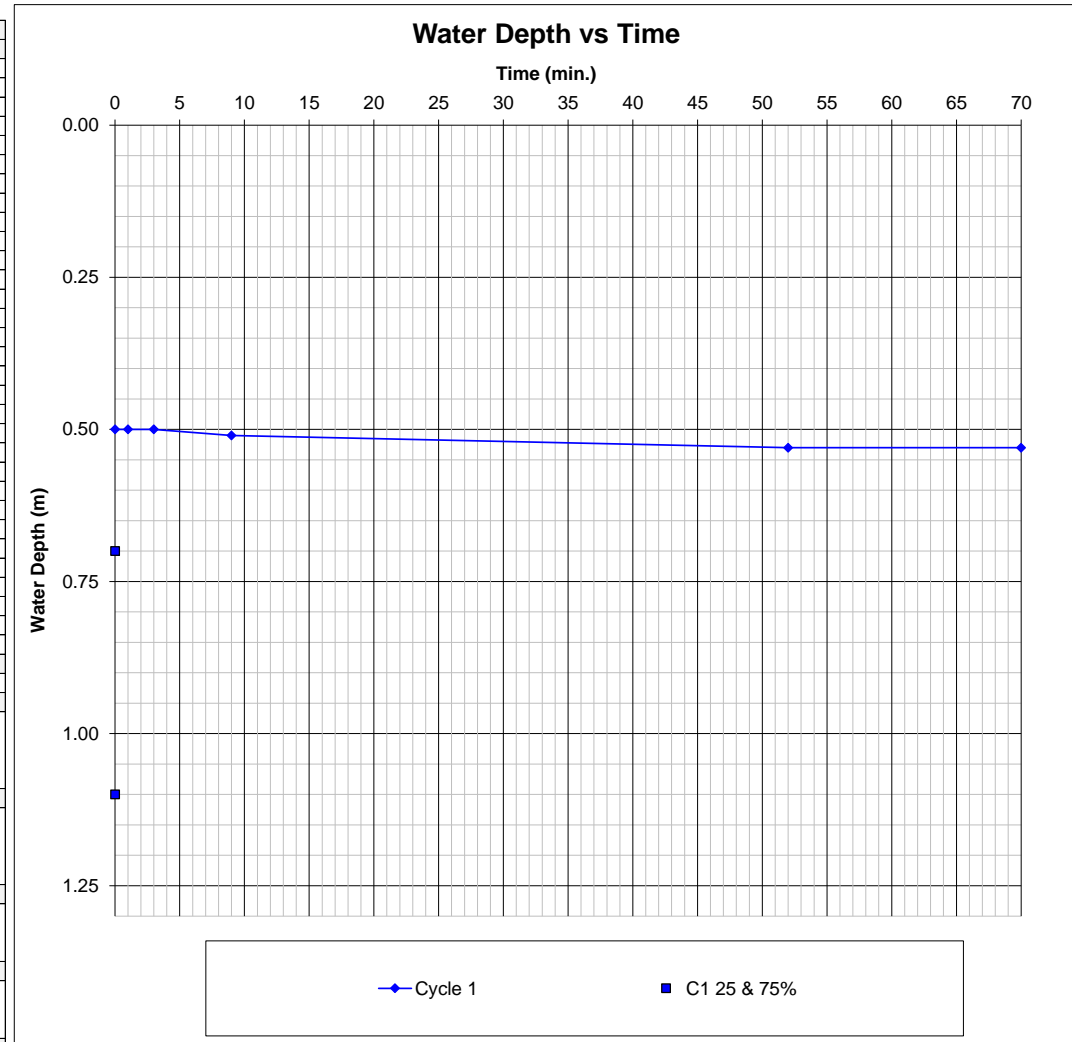
12692 Phase 4 Withycombe Farm, Banbury

Trial Pit Information	
Length (m)	2.80
Width (m)	0.70
Depth (m)	1.30
Groundwater	dry
Weather Conditions	sunny
Date	21-Sep-23

Remarks
1. Insufficient infiltration in order to calculate design infiltration rate.

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	0.50				
1	0.50				
3	0.50				
9	0.51				
52	0.53				
70	0.53				

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	1.30		
<b>Water Depths (m)</b>			
Water depth at start of test	0.50		
Water depth at end of test	0.53		
Effective depth (measured)	0.03		
% Effective storage depth	0.04		
<b>Effective Storage Depths (m)</b>			
Effective storage depth (100%)	0.80		
Effective storage depth (75%)	0.60		
Effective storage depth (50%)	0.40		
Effective storage depth (25%)	0.20		
<b>Outflow Time (min)</b>			
Time for measured outflow	70		
Time for 100% outflow			
Time for 75-25% outflow			
<b>Volume of Outflow (m<sup>3</sup>)</b>			
Over measured effective depth	0.06		
Over 100% effective depth	1.57		
From 75% - 25% effective depth	0.78		
<b>Surface Area (m<sup>2</sup>)</b>			
For 100% effective storage	7.56		
For 50% effective storage	4.76		
Over measured depth	2.17		
<b>Soil Infiltration Rate (m/s)</b>	Cycle 1	Cycle 2	Cycle 3
Over 100% effective depth			
Over measured depth			
Over 75% - 25% effective depth			







# BRE365 SOIL INFILTRATION RATE TEST - SA04

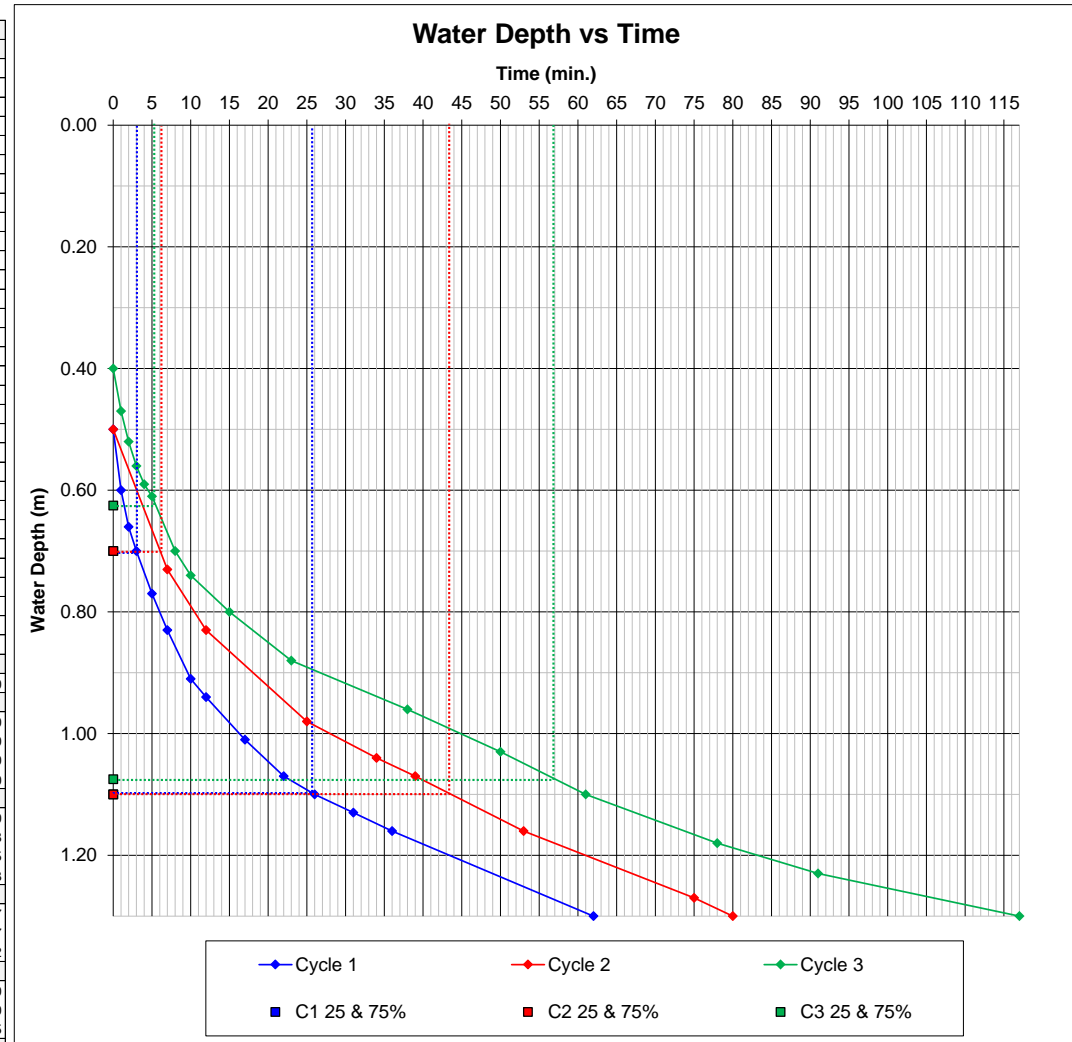
12692 Phase 4 Withycombe Farm, Banbury

Trial Pit Information	
Length (m)	2.70
Width (m)	0.70
Depth (m)	1.30
Groundwater	dry
Weather Conditions	sunny
Date	21-Sep-23

Remarks	
1. Test undertaken within natural cohesive deposits.	

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	0.50	0	0.50	0	0.40
1	0.60	7	0.73	1	0.47
2	0.66	12	0.83	2	0.52
3	0.70	25	0.98	3	0.56
5	0.77	34	1.04	4	0.59
7	0.83	39	1.07	5	0.61
10	0.91	53	1.16	8	0.70
12	0.94	75	1.27	10	0.74
17	1.01	80	1.30	15	0.80
22	1.07			23	0.88
26	1.10			38	0.96
31	1.13			50	1.03
36	1.16			61	1.10
62	1.30			78	1.18
				91	1.23
				117	1.30

	Cycle 1	Cycle 2	Cycle 3
<b>Final Excavation Depth (m)</b>			
At end of testing cycle	1.30	1.30	1.30
<b>Water Depths (m)</b>			
Water depth at start of test	0.50	0.50	0.40
Water depth at end of test	1.30	1.30	1.30
Effective depth (measured)	0.80	0.80	0.90
% Effective storage depth	1.00	1.00	1.00
<b>Effective Storage Depths (m)</b>			
Effective storage depth (100%)	0.80	0.80	0.90
Effective storage depth (75%)	0.60	0.60	0.68
Effective storage depth (50%)	0.40	0.40	0.45
Effective storage depth (25%)	0.20	0.20	0.23
<b>Outflow Time (min)</b>			
Time for measured outflow	62	80	117
Time for 100% outflow	62	80	117
Time for 75-25% outflow	23	38	52
<b>Volume of Outflow (m³)</b>			
Over measured effective depth	1.51	1.51	1.70
Over 100% effective depth	1.51	1.51	1.70
From 75% - 25% effective depth	0.76	0.76	0.85
<b>Surface Area (m²)</b>			
For 100% effective storage	7.33	7.33	8.01
For 50% effective storage	4.61	4.61	4.95
Over measured depth	7.33	7.33	8.01
<b>Soil Infiltration Rate (m/s)</b>			
Over 100% effective depth	5.5E-05	4.3E-05	3.0E-05
Over measured depth	5.5E-05	4.3E-05	3.0E-05
Over 75% - 25% effective depth	1.2E-04	7.2E-05	5.6E-05



Design Soil Infiltration Rate: 5.5E-05 m/s

# BRE365 SOIL INFILTRATION RATE TEST - SA102

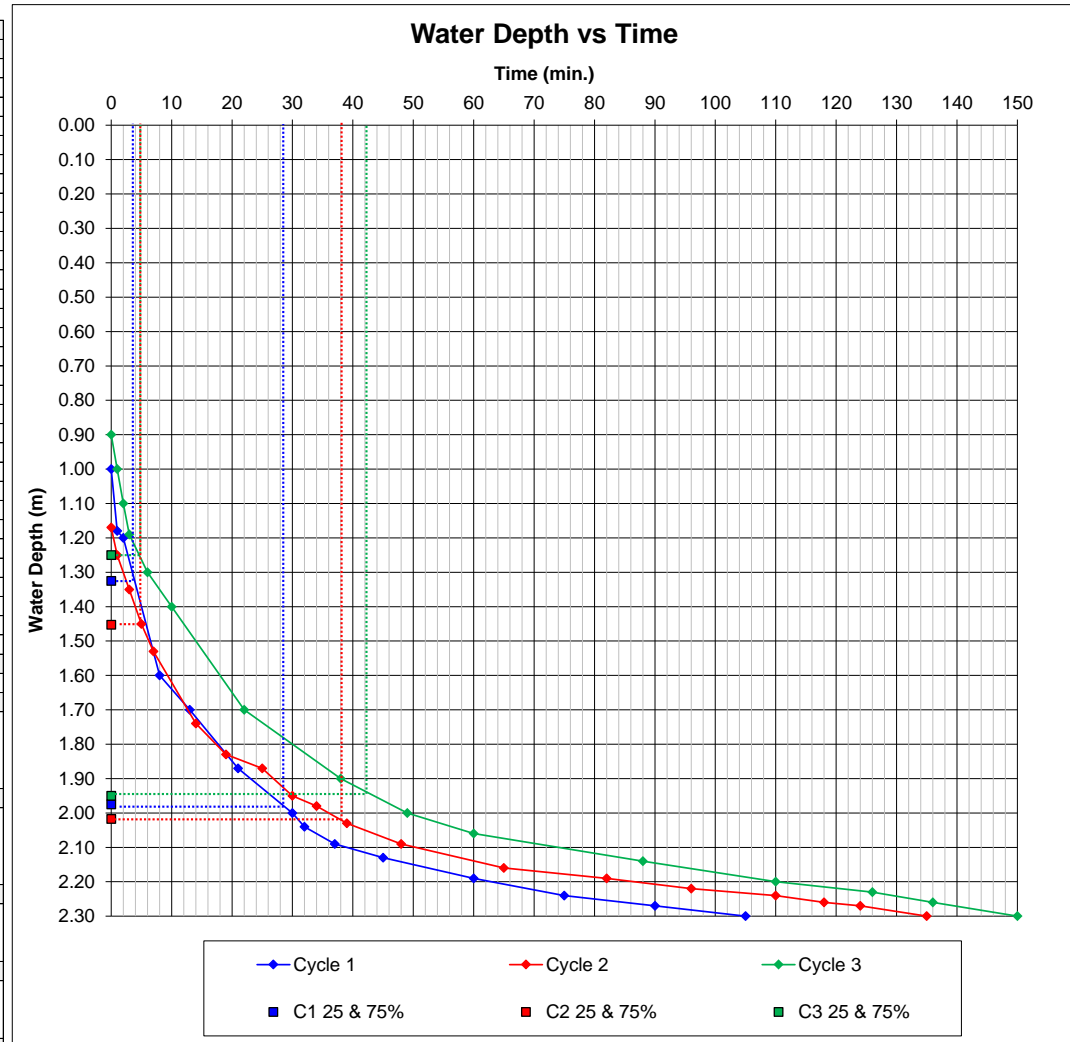
12692 Phase 4 Withycombe Farm, Banbury

Trial Pit Information	
Length (m)	3.00
Width (m)	0.65
Depth (m)	2.30
Groundwater	Dry
Weather Conditions	Cloudy
Date	23-Oct-23

Remarks	
1. Test undertaken within granular natural soil deposits.	

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	1.00	0	1.17	0	0.90
1	1.18	1	1.25	1	1.00
2	1.20	3	1.35	2	1.10
8	1.60	5	1.45	3	1.19
13	1.70	7	1.53	6	1.30
21	1.87	14	1.74	10	1.40
30	2.00	19	1.83	22	1.70
32	2.04	25	1.87	38	1.90
37	2.09	30	1.95	49	2.00
45	2.13	34	1.98	60	2.06
60	2.19	39	2.03	88	2.14
75	2.24	48	2.09	110	2.20
90	2.27	65	2.16	126	2.23
105	2.30	82	2.19	136	2.26
		96	2.22	150	2.30
		110	2.24		
		118	2.26		
		124	2.27		
		135	2.3		

	Cycle 1	Cycle 2	Cycle 3
<b>Final Excavation Depth (m)</b>			
At end of testing cycle	2.30	2.30	2.30
<b>Water Depths (m)</b>			
Water depth at start of test	1.00	1.17	0.90
Water depth at end of test	2.30	2.30	2.30
Effective depth (measured)	1.30	1.13	1.40
% Effective storage depth	1.00	1.00	1.00
<b>Effective Storage Depths (m)</b>			
Effective storage depth (100%)	1.30	1.13	1.40
Effective storage depth (75%)	0.98	0.85	1.05
Effective storage depth (50%)	0.65	0.57	0.70
Effective storage depth (25%)	0.33	0.28	0.35
<b>Outflow Time (min)</b>			
Time for measured outflow	105	135	150
Time for 100% outflow	105	135	150
Time for 75-25% outflow	25	33	37
<b>Volume of Outflow (m<sup>3</sup>)</b>			
Over measured effective depth	2.54	2.20	2.73
Over 100% effective depth	2.54	2.20	2.73
From 75% - 25% effective depth	1.27	1.10	1.37
<b>Surface Area (m<sup>2</sup>)</b>			
For 100% effective storage	11.44	10.20	12.17
For 50% effective storage	6.70	6.07	7.06
Over measured depth	11.44	10.20	12.17
<b>Soil Infiltration Rate (m/s)</b>			
Over 100% effective depth	3.5E-05	2.7E-05	2.5E-05
Over measured depth	3.5E-05	2.7E-05	2.5E-05
Over 75% - 25% effective depth	1.3E-04	9.2E-05	8.7E-05



Design Soil Infiltration Rate: 8.7E-05 m/s

# BRE365 SOIL INFILTRATION RATE TEST - SA103

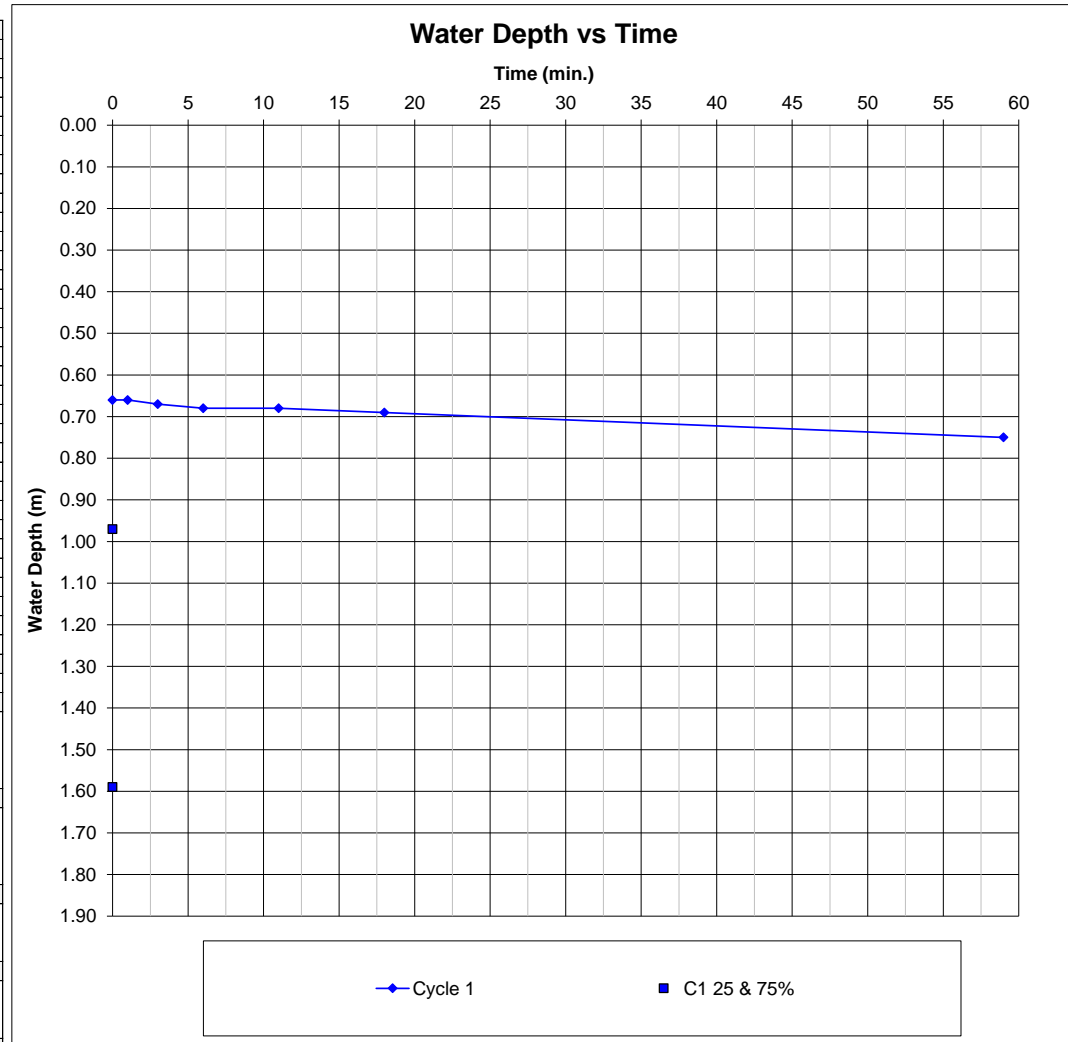
12692 Phase 4 Withycombe Farm, Banbury

Trial Pit Information	
Length (m)	2.10
Width (m)	0.65
Depth (m)	1.90
Groundwater	Standing at 1.2m
Weather Conditions	Cloudy
Date	23-Oct-23

Remarks	
1. Insufficient infiltration in order to calculate design infiltration rate.	

	Cycle 1	Cycle 2	Cycle 3
<b>Final Excavation Depth (m)</b>			
At end of testing cycle	1.90		
<b>Water Depths (m)</b>			
Water depth at start of test	0.66		
Water depth at end of test	0.75		
Effective depth (measured)	0.09		
% Effective storage depth	0.07		
<b>Effective Storage Depths (m)</b>			
Effective storage depth (100%)	1.24		
Effective storage depth (75%)	0.93		
Effective storage depth (50%)	0.62		
Effective storage depth (25%)	0.31		
<b>Outflow Time (min)</b>			
Time for measured outflow	N/A		
Time for 100% outflow	N/A		
Time for 75-25% outflow	N/A		
<b>Volume of Outflow (m³)</b>			
Over measured effective depth			
Over 100% effective depth			
From 75% - 25% effective depth			
<b>Surface Area (m²)</b>			
For 100% effective storage			
For 50% effective storage			
Over measured depth			
<b>Soil Infiltration Rate (m/s)</b>			
Over 100% effective depth	N/A		
Over measured depth	N/A		
Over 75% - 25% effective depth	N/A		

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	0.66				
1	0.66				
3	0.67				
6	0.68				
11	0.68				
18	0.69				
59	0.75				



Design Soil Infiltration Rate: 0.0E+00 m/s

# BRE365 SOIL INFILTRATION RATE TEST - SA104

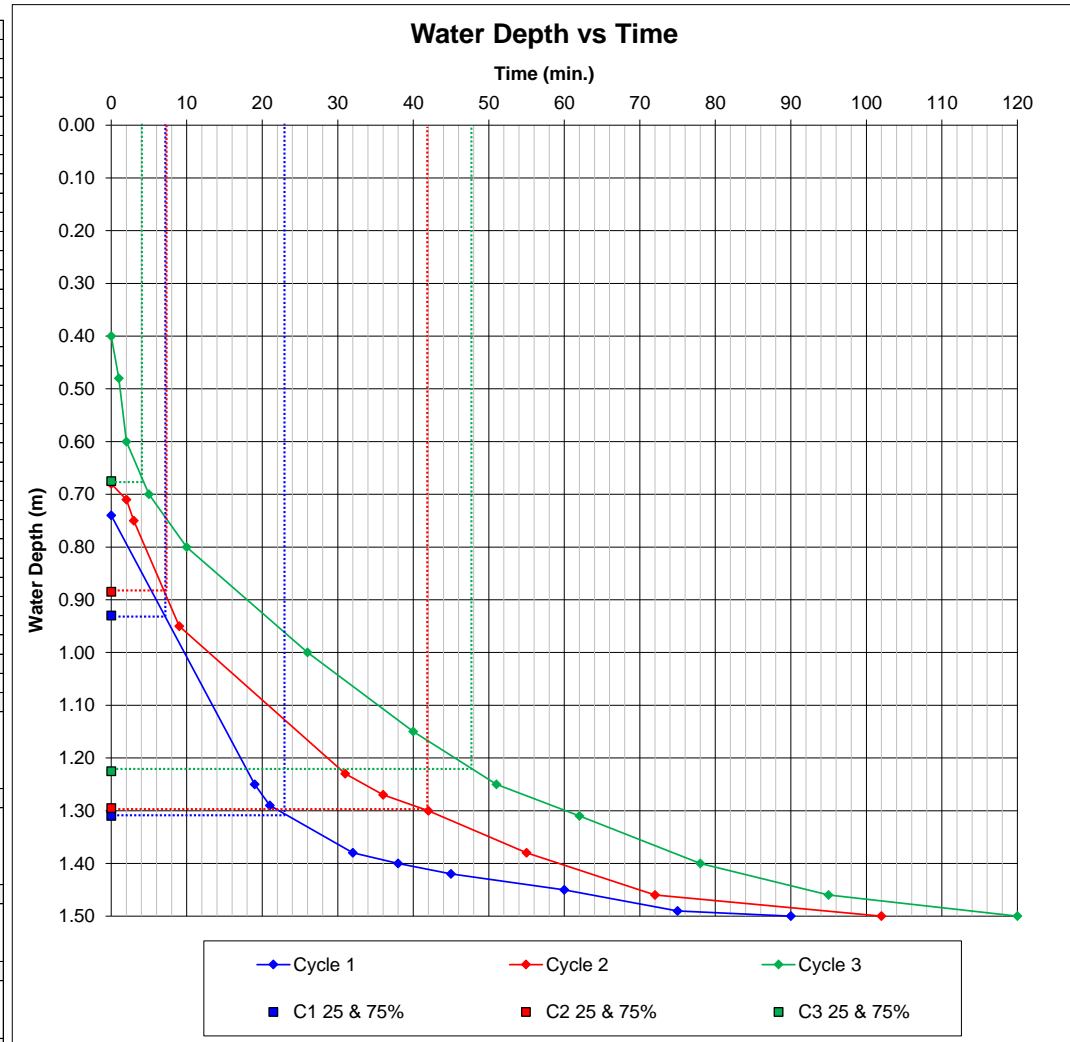
12692 Phase 4 Withycombe Farm, Banbury

Trial Pit Information	
Length (m)	2.70
Width (m)	0.75
Depth (m)	1.50
Groundwater	Dry
Weather Conditions	Cloudy
Date	23-Oct-23

Remarks	
1. Test undertaken within granular natural soil deposits.	

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	0.74	0	0.68	0	0.40
19	1.25	2	0.71	1	0.48
21	1.29	3	0.75	2	0.60
32	1.38	9	0.95	5	0.70
38	1.40	31	1.23	10	0.80
45	1.42	36	1.27	26	1.00
60	1.45	42	1.30	40	1.15
75	1.49	55	1.38	51	1.25
90	1.50	72	1.46	62	1.31
		102	1.50	78	1.40
				95	1.46
				120	1.50

	Cycle 1	Cycle 2	Cycle 3
<b>Final Excavation Depth (m)</b>			
At end of testing cycle	1.50	1.50	1.50
<b>Water Depths (m)</b>			
Water depth at start of test	0.74	0.68	0.40
Water depth at end of test	1.50	1.50	1.50
Effective depth (measured)	0.76	0.82	1.10
% Effective storage depth	1.00	1.00	1.00
<b>Effective Storage Depths (m)</b>			
Effective storage depth (100%)	0.76	0.82	1.10
Effective storage depth (75%)	0.57	0.62	0.83
Effective storage depth (50%)	0.38	0.41	0.55
Effective storage depth (25%)	0.19	0.21	0.28
<b>Outflow Time (min)</b>			
Time for measured outflow	90	102	120
Time for 100% outflow	90	102	120
Time for 75-25% outflow	16	34	44
<b>Volume of Outflow (m³)</b>			
Over measured effective depth	1.54	1.66	2.23
Over 100% effective depth	1.54	1.66	2.23
From 75% - 25% effective depth	0.77	0.83	1.11
<b>Surface Area (m²)</b>			
For 100% effective storage	7.27	7.68	9.62
For 50% effective storage	4.65	4.85	5.82
Over measured depth	7.27	7.68	9.62
<b>Soil Infiltration Rate (m/s)</b>			
Over 100% effective depth	3.9E-05	3.5E-05	3.2E-05
Over measured depth	3.9E-05	3.5E-05	3.2E-05
Over 75% - 25% effective depth	1.7E-04	8.4E-05	7.2E-05



Design Soil Infiltration Rate: 7.2E-05 m/s

## FIGURES

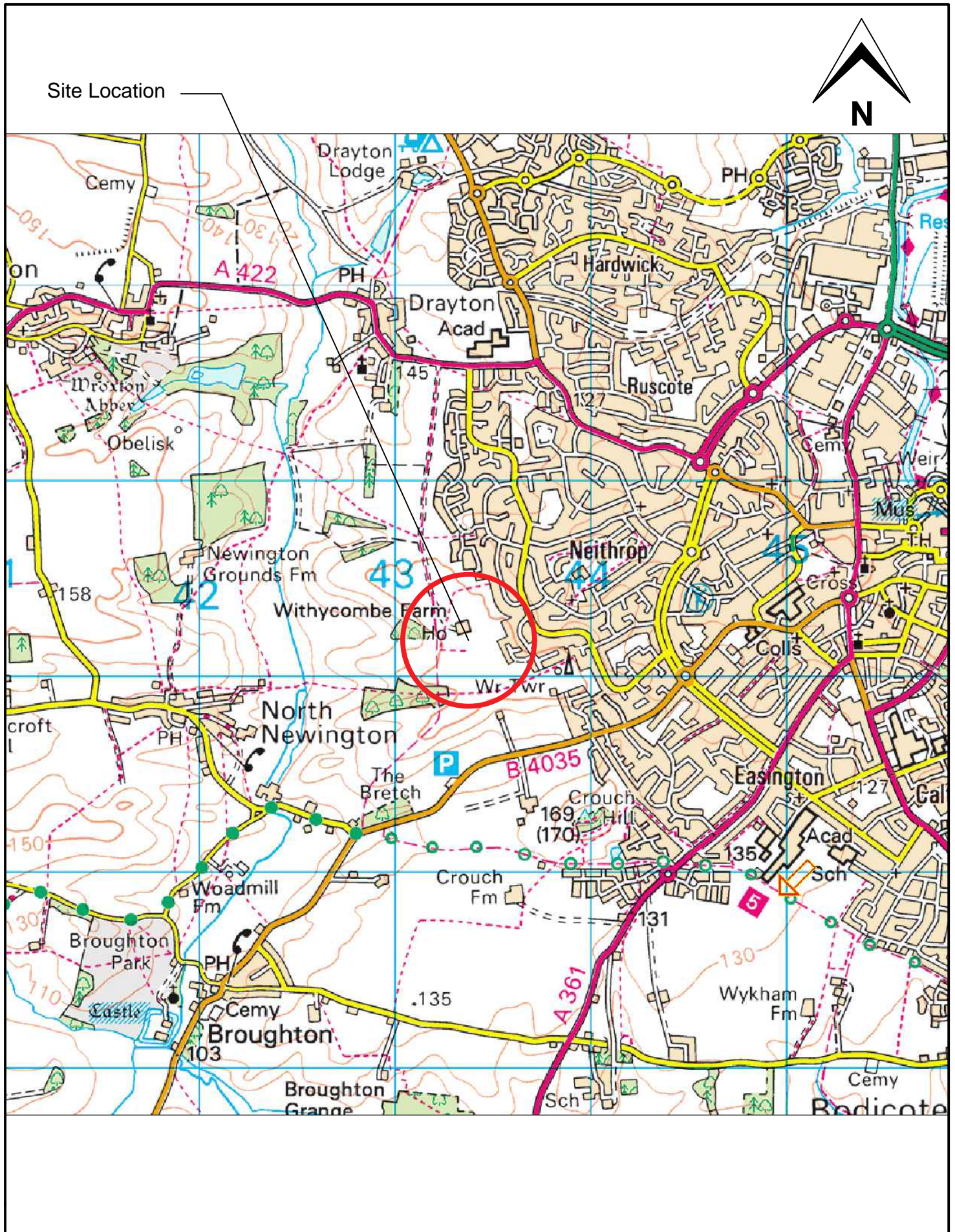


Figure 1: Site Location

Project: Bretch Hill, Phase 4

Job no.: 12692

Client: Bloor Homes Western

Scale: 1:25,000 at A4

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Géotechnique

Integral House,  
7 Beddau Way,  
Castlegate Business Park,  
Caerphilly,  
CF83 2AX.  
Tel: 029 2080 7991

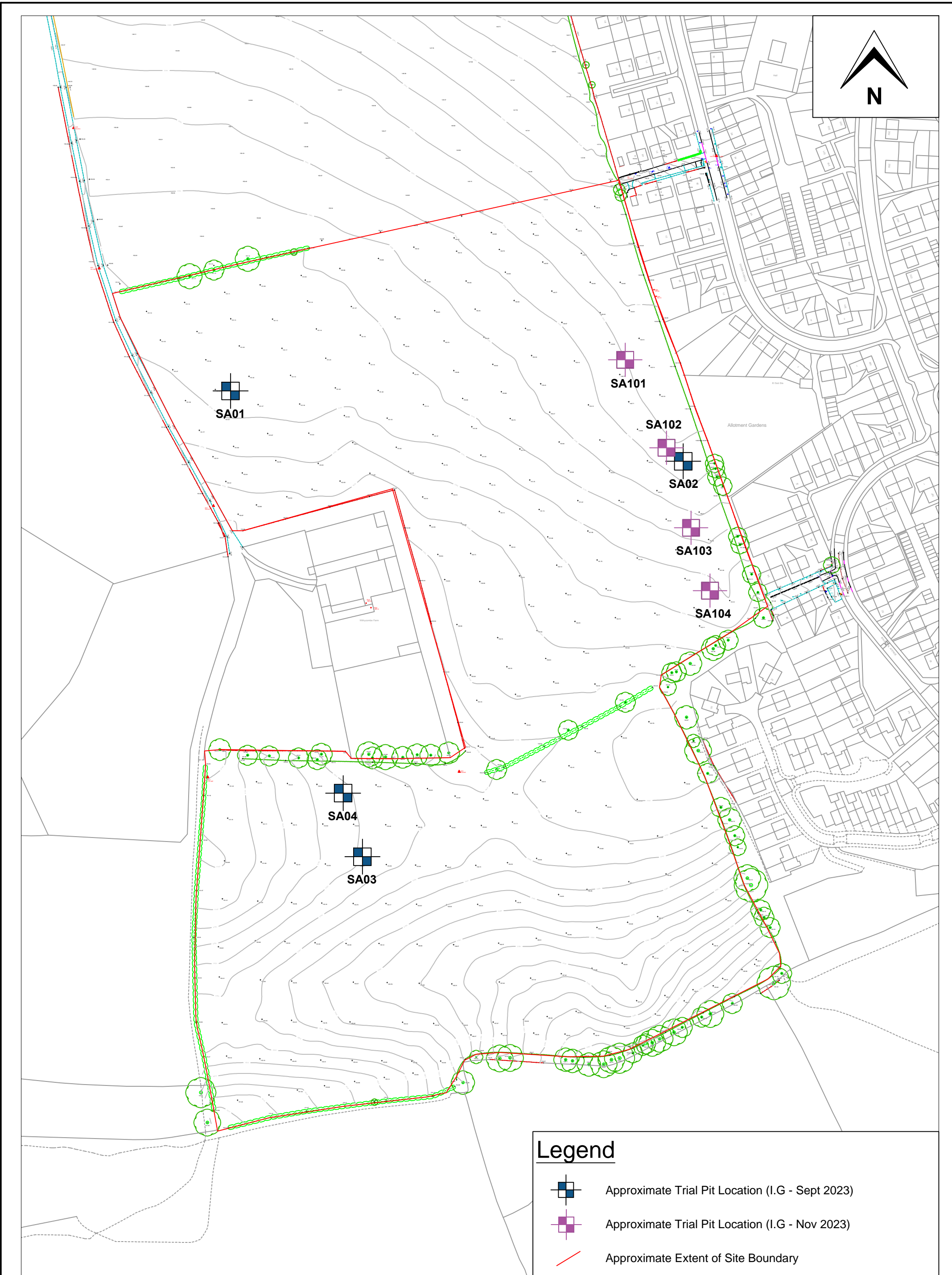


Figure 2: Site Plan

Project: Bretch Hill, Phase 4

Client: Bloor Homes Western

Job No.: 12692

Scale: 1:2,000 at A3

**Intégral**  
Géotechnique

Integral House,  
7 Beddau Way,  
Castlegate Business Park,  
Caerphilly,  
CF83 2AX.  
Tel: 029 2080 7991