Our Ref: 11116/LO.002/GD

Mr. C. Jones
David Wilson Homes (Mercia)
Building 2020
Meriden Business Park
Copse Drive
Meriden
COVENTRY
CV5 9RG

30 August 2011

By e-mail

Dear Chris

KM8 AND KM12 KINGSMERE, BICESTER
SOAKAWAY TEST RESULTS

Further to your e-mail of 17 August 2011 we have attended the above sites and have undertaken infiltration testing in trial pits across the two areas.

Please find attached the logs of 6 No trial pits annotated TP1 to TP6. Trial Pits 1 to 4 were located in Zone KM 12 whilst Trial Pits 5 and 6 were located within Zone KM 8. You will note from the trial pit logs that the ground generally comprised topsoil over stiff clays which in turn lay over limestone at varying depth. The limestone was generally located between 1.4 and 2.1m below ground level in Zone KM12 and at 2.6 to 2.7m below ground level in KM8.

The clays encountered across the site at shallow depth (which were in general stiff) made the use of soakaways in these strata problematic however the existence of the limestone did provide some possibility that the use of soakaways in the development may be feasible. Consequently each pit was excavated so as to penetrate the clay and expose the limestone at the base of each pit. Significantly deepening the pits in the limestone proved beyond the capability of the JCB 3CX as the limestone is strong and intact and consequently very difficult to excavate.

Water was added to each pit and the soakage rate through the top of the limestone noted in accordance with BRE Digest 365:2007. Please find attached the soakaway test results.

You will note that the soakaway tests conducted in Zone KM12 provided a range of results from 5.81×10^{-6} m/s to 9.9×10^{-7} m/s: however the water in those tests conducted in KM 8 failed to soak away sufficiently for a permeability to be calculated.

We trust that the above and attached is self explanatory however should you have any queries please do not hesitate to contact us

Yours sincerely

Geoff Davies
Director

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Trialpit No
TP1
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kingsmere, Bicester	11116	Level: -	24/08/2011
Equipment: JCB 3CX		Dimensions: 1.70m, Depth 1.90m, 0.45m	Scale 1:25
Client: David Wilson Homes Mercia			Logged By GD

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						Vegetation over stiff pale brown clayey TOPSOIL with many rootlets.
			0.20			Stiff orange-brown and grey CLAY with occasional subangular gravel of limestone.
			0.80			Stiff grey locally brown CLAY with occasional orange-brown sandy gravel pockets. Gravel is angular to subangular fine to coarse limestone.
			1.40			Orange-brown and grey clayey locally very clayey gravelly SAND. Gravel is subangular fine to coarse limestone.
			1.70			Very closely fractured light grey LIMESTONE; strong. Recovered as angular to subangular fine to coarse gravel and cobble of limestone with occasional sandy matrix.
			1.90			Trialpit Complete at 1.90 m

Remarks: Pit sides stable.

Groundwater: Groundwater not encountered during excavation.

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Trialpit No
TP2
Sheet 1 of 1

Project Name Kingsmere, Bicester	Project No. 11116	Co-ords: - Level: -	Date 24/08/2011
Equipment: JCB 3CX		Dimensions: 2.10m Depth 2.20m 0.45m	Scale 1:25
Client: David Wilson Homes Mercia			Logged By GD

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						Rough grass over brown clayey TOPSOIL with rare gravel of subrounded fine to medium limestone.
			0.20			Stiff brown and grey locally orange-brown slightly gravelly CLAY. Gravel is angular fine limestone.
			2.00			Orange-brown clayey gravelly SAND with occasional cobble. Gravel/cobble is angular fine to medium limestone..
			2.10			Closely fractured light grey locally yellow-brown LIMESTONE; strong. Recovered as angular to subangular fine to coarse gravel and cobble of limestone with occasional sandy matrix.
			2.20			Trialpit Complete at 2.20 m

Remarks: Pit sides stable.

Groundwater: Groundwater not encountered during excavation.

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Trialpit No
TP3
Sheet 1 of 1

Project Name Kingsmere, Bicester	Project No. 11116	Co-ords: - Level: -	Date 24/08/2011
Equipment: JCB 3CX		Dimensions: 2.10m Depth 1.80m 0.45m	Scale 1:25
Client: David Wilson Homes Mercia			Logged By GD

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						Rough grass over brown clayey TOPSOIL.
			0.20			Stiff brown mottled grey CLAY.
			0.50			Stiff grey locally mottled brown CLAY with rare gravel of angular fine to medium limestone.Occasional pocket of orange-brown sandy gravelly clay. Gravel is angular fine to medium limestone.
			1.60			Orange-brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse limestone.
			1.70			Closely fractured LIMESTONE; strong. Recovered as angular to subangular fine to coarse gravel and cobble of limestone with occasional sandy matrix.
			1.80			Trialpit Complete at 1.80 m

Remarks: Pit sides stable.

Groundwater: Groundwater not encountered during excavation.

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Trialpit No
TP4
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kingsmere, Bicester	11116	Level: -	24/08/2011
Equipment: JCB 3CX		Dimensions: 2.20m (Depth 1.50m, 0.45m)	Scale 1:25
Client: David Wilson Homes Mercia			Logged By GD

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						Grass over stiff brown clayey TOPSOIL.
			0.25			Stiff to very stiff brown and orange-brown locally sandy CLAY.
			0.60			Stiff to very stiff grey and orange-brown locally slightly gravelly CLAY. Gravel is subangular fine limestone.
			1.00			Firm to stiff orange-brown sandy gravelly CLAY. Gravel is angular fine to coarse limestone.
			1.40			Extremely closely fractured light grey LIMESTONE; strong. Recovered as angular to subangular fine to coarse gravel and cobble of limestone with occasional sandy matrix.
			1.50			Trialpit Complete at 1.50 m

Remarks: Pit sides stable.

Groundwater: Groundwater not encountered during excavation.

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Trialpit No
TP5
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kingsmere, Bicester	11116	Level: -	24/08/2011
Equipment: JCB 3CX		Dimensions: 2.10m, Depth 2.80m, 0.45m	Scale 1:25
Client: David Wilson Homes Mercia			Logged By GD

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						Brown clayey TOPSOIL with rare angular fine gravel of limestone.
			0.40			Stiff orange-brown locally gravelly CLAY and clayey gravel.. Gravel is angular fine to medium limestone.
			0.90			Stiff blue-grey locally sandy CLAY. Occasional pockets of orange-brown sandy gravelly clay. Gravel is angular fine to medium limestone.
			2.60			Very closely fractured pale grey LIMESTONE; strong. Recovered as angular to subangular fine to coarse gravel and cobble of limestone with occasional sandy matrix.
			2.80			Trialpit Complete at 2.80 m

Remarks: Pit sides stable.

Groundwater: Groundwater not encountered during excavation.

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Trialpit No
TP6
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
Kingsmere, Bicester	11116	Level: -	24/08/2011
Equipment: JCB 3CX		Dimensions: 2.10m, Depth 2.80m, 0.45m	Scale 1:25
Client: David Wilson Homes Mercia			Logged By GD

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						Stiff brown clayey TOPSOIL.
			0.25			Firm to stiff sandy gravelly CLAY. Gravel is angular fine to coarse limestone.
			0.90			Stiff blue-grey CLAY. Rare pockets of orange-brown sandy gravelly clay. Gravel is angular fine limestone.
			2.70			Closely fractured pale grey LIMESTONE; strong. Recovered as angular to subangular fine to coarse gravel and cobble of limestone with occasional sandy matrix.
			2.80			Trialpit Complete at 2.80 m

1
2
3
4

Remarks: Pit sides stable.

Groundwater: Groundwater not encountered during excavation.

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SOIL INFILTRATION RATE IN ACCORDANCE WITH BRE DIGEST 365: 2007

Client: David Wilson Homes Mercia
Job Name: Kingsmere, Bicester
Job No.: 11116

Trial Pit No.	TP1
Test No.	1

Time	Elapsed Time	Depth to water from ground level	
	(min)	(m)	(mm)
	0	1.400	1400
	2	1.42	1420
	4	1.440	1440
	15	1.490	1490
	67	1.580	1580
	119	1.63	1630
	277	1.69	1690
	297	1.70	1700

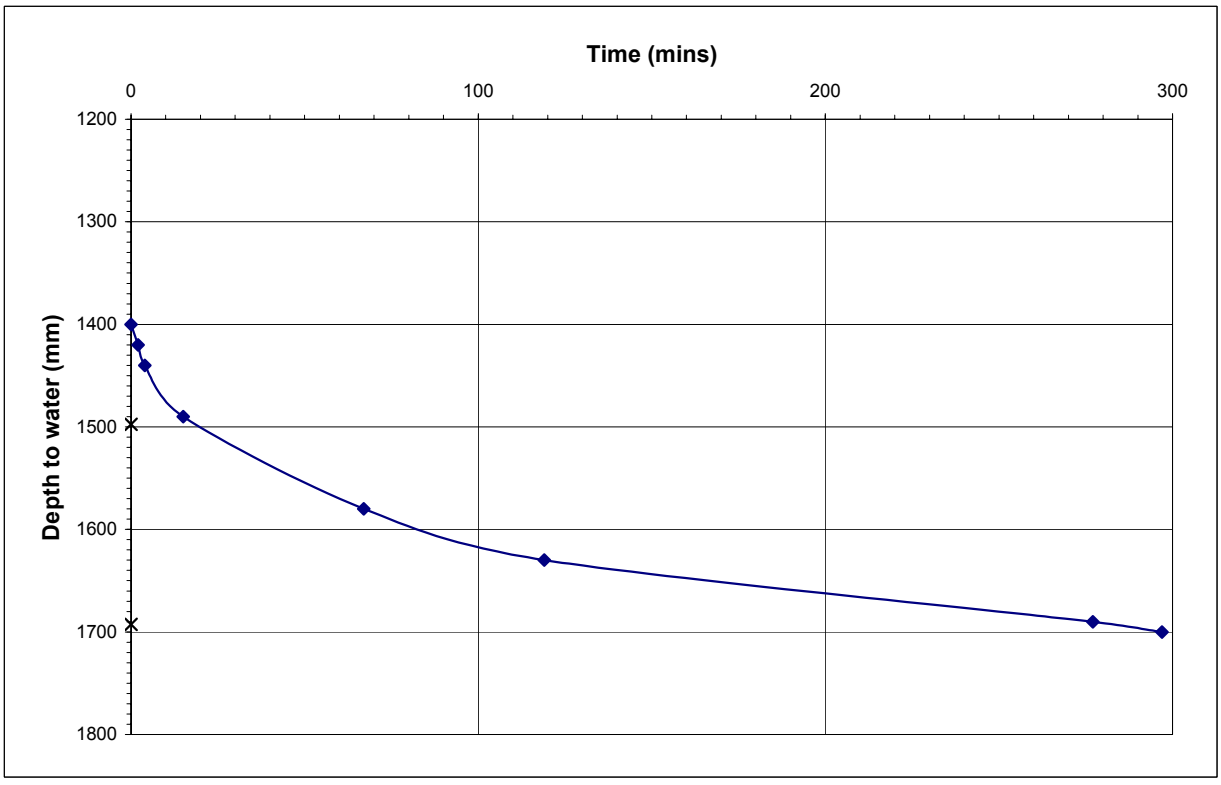
Soakaway Dimensions		(m)	(mm)
Length	=	1.70	1700
Width	=	0.45	450
Depth	=	1.79	1790

Effective depth (empty)		mm	m
75%	=	1692.5	1.69
50%	=	1595.0	1.60
25%	=	1497.5	1.50

Depth at start of test (mm)	=	1400
Depth at end of test (mm)	=	1700

Base area of pit	=	0.765
a_{p50} - 50% internal surface area inc. base	=	1.604
V_{p75-25} - Volume 75 - 25%	=	0.149175

Read from the graph:		
$t_{p\ 75}$ (min)	=	19
$t_{p\ 25}$ (min)	=	286



Soil infiltration rate, f, (m/s) = 5.81E-06 (normal test)

SOIL INFILTRATION RATE IN ACCORDANCE WITH BRE DIGEST 365: 2007

Client: David Wilson Homes Mercia
Job Name: Kingsmere, Bicester
Job No.: 11116

Trial Pit No.	TP2
Test No.	1

Time	Elapsed Time	Depth to water from ground level	
	(min)	(m)	(mm)
	0	1.890	1890
	7	1.90	1900
	22	1.950	1950
	53	2.000	2000
	112	2.040	2040
	200	2.06	2060
	295	2.08	2080

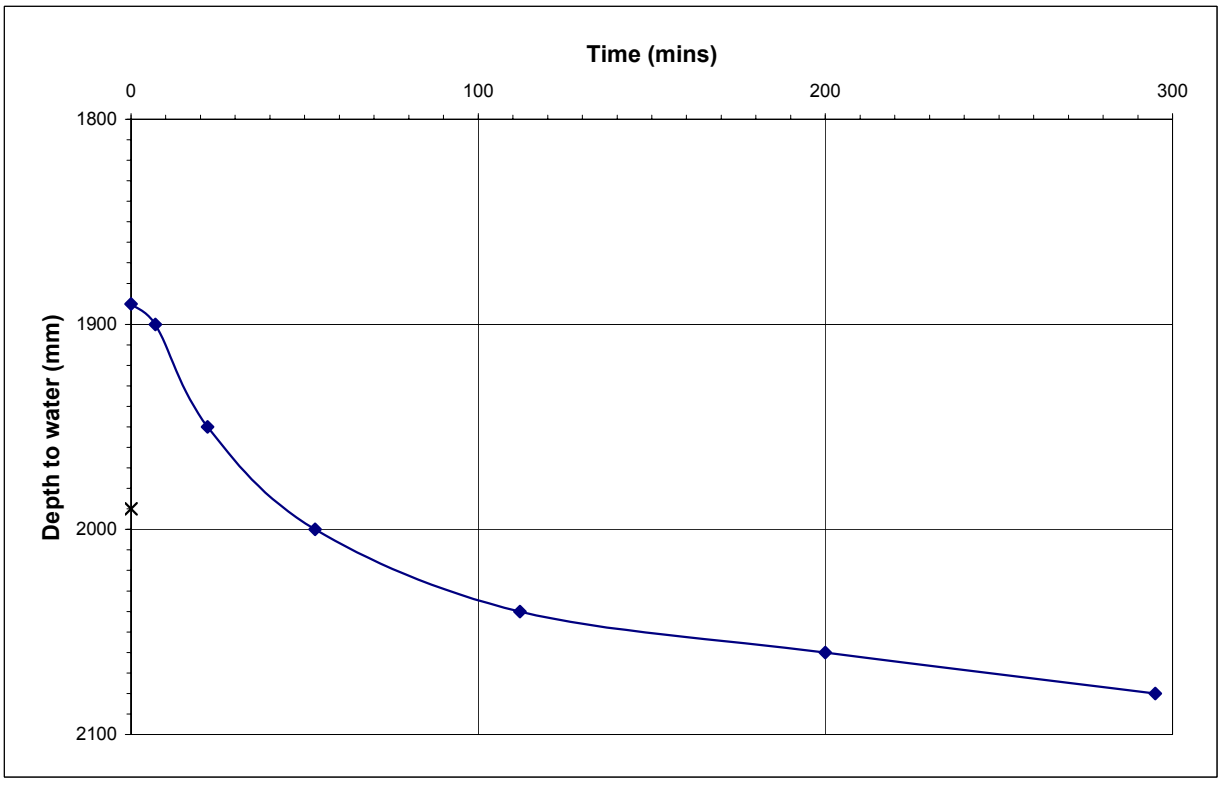
Soakaway Dimensions		(m)	(mm)
Length	=	2.10	2100
Width	=	0.45	450
Depth	=	2.29	2290

Effective depth (empty)		mm	m
75%	=	2190.0	2.19
50%	=	2090.0	2.09
25%	=	1990.0	1.99

Depth at start of test (mm)	=	1890
Depth at end of test (mm)	=	2080

Base area of pit	=	0.945
a_{p50} - 50% internal surface area inc. base	=	1.965
V_{p75-25} - Volume 75 - 25%	=	0.189

Read from the graph:			
$t_{p\ 75}$ (min)	=	45	
$t_{p\ 25}$ (min)	=	860	extrapolated



Soil infiltration rate, f, (m/s) = 1.97E-06 (extrapolated test)

SOIL INFILTRATION RATE IN ACCORDANCE WITH BRE DIGEST 365: 2007

Client: David Wilson Homes Mercia
Job Name: Kingsmere, Bicester
Job No.: 11116

Trial Pit No.	TP3
Test No.	1

Time	Elapsed Time	Depth to water from ground level	
	(min)	(m)	(mm)
	0	1.580	1580
	10	1.59	1585
	20	1.590	1590
	45	1.640	1640
	90	1.700	1700
	120	1.72	1720
	163	1.73	1730
	205	1.74	1735
	272	1.740	1740

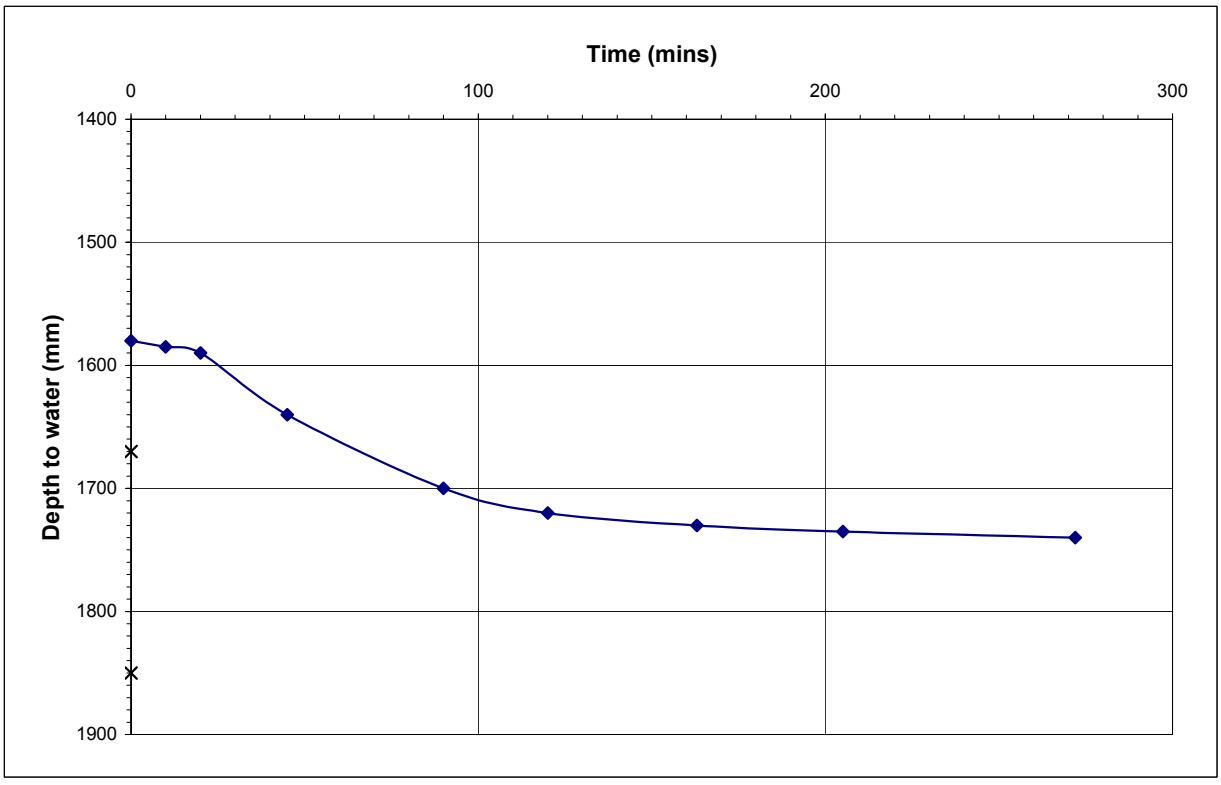
Soakaway Dimensions		(m)	(mm)
Length	=	2.00	2000
Width	=	0.45	450
Depth	=	1.94	1940

Effective depth (empty)		mm	m
75%	=	1850.0	1.85
50%	=	1760.0	1.76
25%	=	1670.0	1.67

Depth at start of test (mm)	=	1580
Depth at end of test (mm)	=	1740

Base area of pit	=	0.9
a_{p50} - 50% internal surface area inc. base	=	1.782
V_{p75-25} - Volume 75 - 25%	=	0.162

Read from the graph:			
$t_{p\ 75}$ (min)	=	60	
$t_{p\ 25}$ (min)	=	1590	extrapolated



Soil infiltration rate, f, (m/s) = 9.90E-07 (extrapolated test)

SOIL INFILTRATION RATE IN ACCORDANCE WITH BRE DIGEST 365: 2007

Client: David Wilson Homes Mercia
Job Name: Kingsmere, Bicester
Job No.: 11116

Trial Pit No.	TP4
Test No.	1

Time	Elapsed Time	Depth to water from ground level	
	(min)	(m)	(mm)
	0	1.340	1340
	15	1.36	1360
	35	1.380	1380
	74	1.400	1400
	124	1.420	1420
	184	1.44	1440
	269	1.45	1450

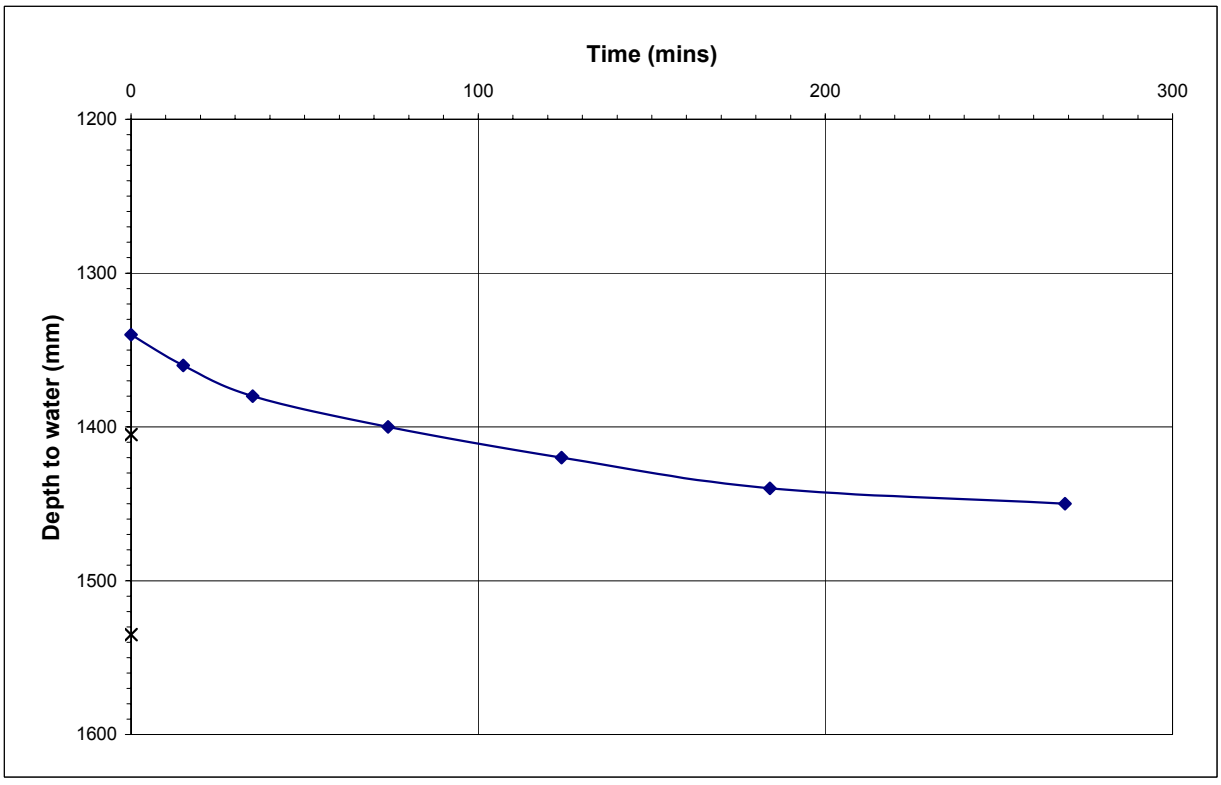
Soakaway Dimensions		(m)	(mm)
Length	=	2.20	2200
Width	=	0.45	450
Depth	=	1.60	1600

Effective depth (empty)		mm	m
75%	=	1535.0	1.54
50%	=	1470.0	1.47
25%	=	1405.0	1.41

Depth at start of test (mm)	=	1340
Depth at end of test (mm)	=	1450

Base area of pit	=	0.99
a_{p50} - 50% internal surface area inc. base	=	1.679
V_{p75-25} - Volume 75 - 25%	=	0.1287

Read from the graph:			
$t_{p\ 75}$ (min)	=	88	
$t_{p\ 25}$ (min)	=	680	extrapolated



Soil infiltration rate, f, (m/s) = 2.16E-06 (normal test)

SOIL INFILTRATION RATE IN ACCORDANCE WITH BRE DIGEST 365: 2007

Client: David Wilson Homes Mercia
Job Name: Kingsmere, Bicester
Job No.: 11116

Trial Pit No.	TP5
Test No.	1

Time	Elapsed Time	Depth to water from ground level	
	(min)	(m)	(mm)
	0	2.410	2410
	10	2.41	2410
	18	2.420	2420
	40	2.420	2420
	85	2.420	2420
	126	2.43	2425
	206	2.44	2440
	302	2.44	2440

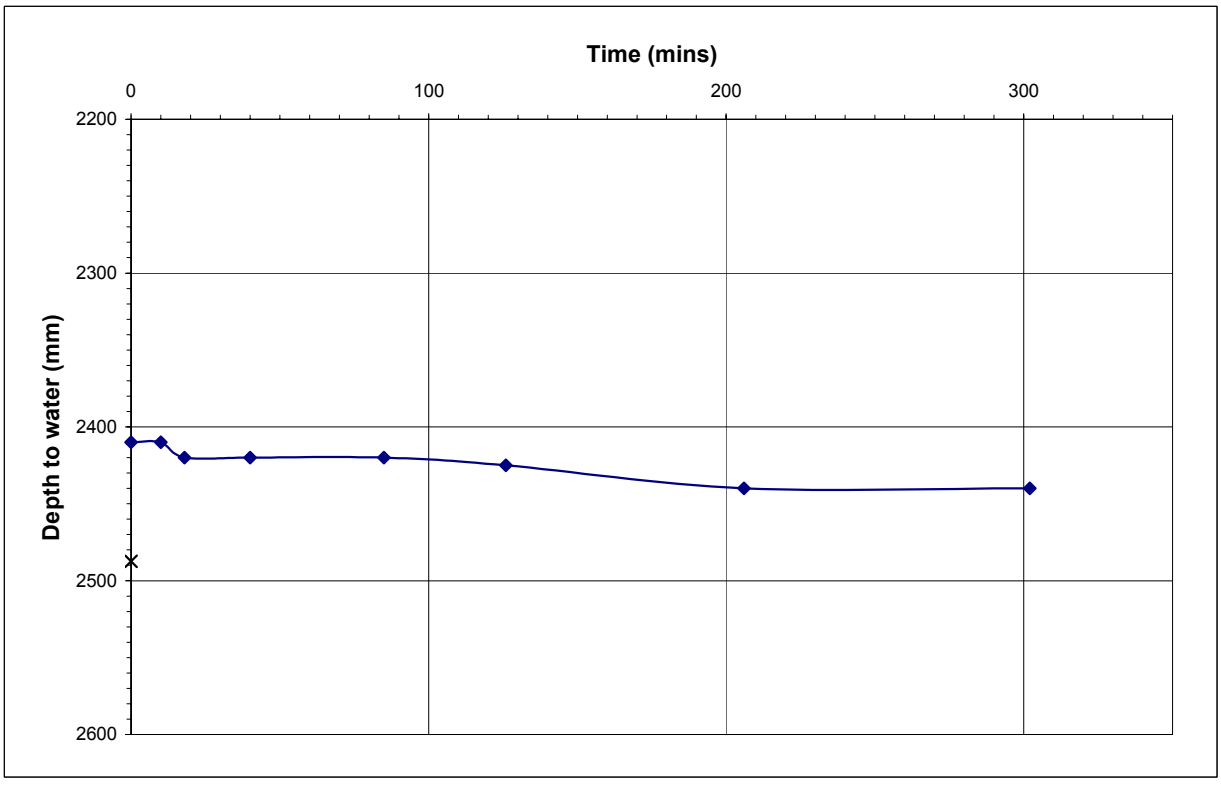
Soakaway Dimensions		(m)	(mm)
Length	=	2.10	2100
Width	=	0.45	450
Depth	=	2.72	2720

Effective depth (empty)		mm	m
75%	=	2642.5	2.64
50%	=	2565.0	2.57
25%	=	2487.5	2.49

Depth at start of test (mm)	=	2410
Depth at end of test (mm)	=	2440

Base area of pit	=	0.945
a_{p50} - 50% internal surface area inc. base	=	1.736
V_{p75-25} - Volume 75 - 25%	=	0.146475

Read from the graph:			
$t_{p\ 75}$ (min)	=	0	
$t_{p\ 25}$ (min)	=	0	extrapolated



Insufficient soakage to calculate permeability

SOIL INFILTRATION RATE IN ACCORDANCE WITH BRE DIGEST 365: 2007

Client: David Wilson Homes Mercia
Job Name: Kingsmere, Bicester
Job No.: 11116

Trial Pit No.	TP6
Test No.	1

Time	Elapsed Time	Depth to water from ground level	
	(min)	(m)	(mm)
	0	2.510	2510
	15	2.51	2510
	35	2.510	2510
	74	2.510	2510
	127	2.520	2520
	184	2.52	2520
	269	2.53	2530
	306	2.53	2530

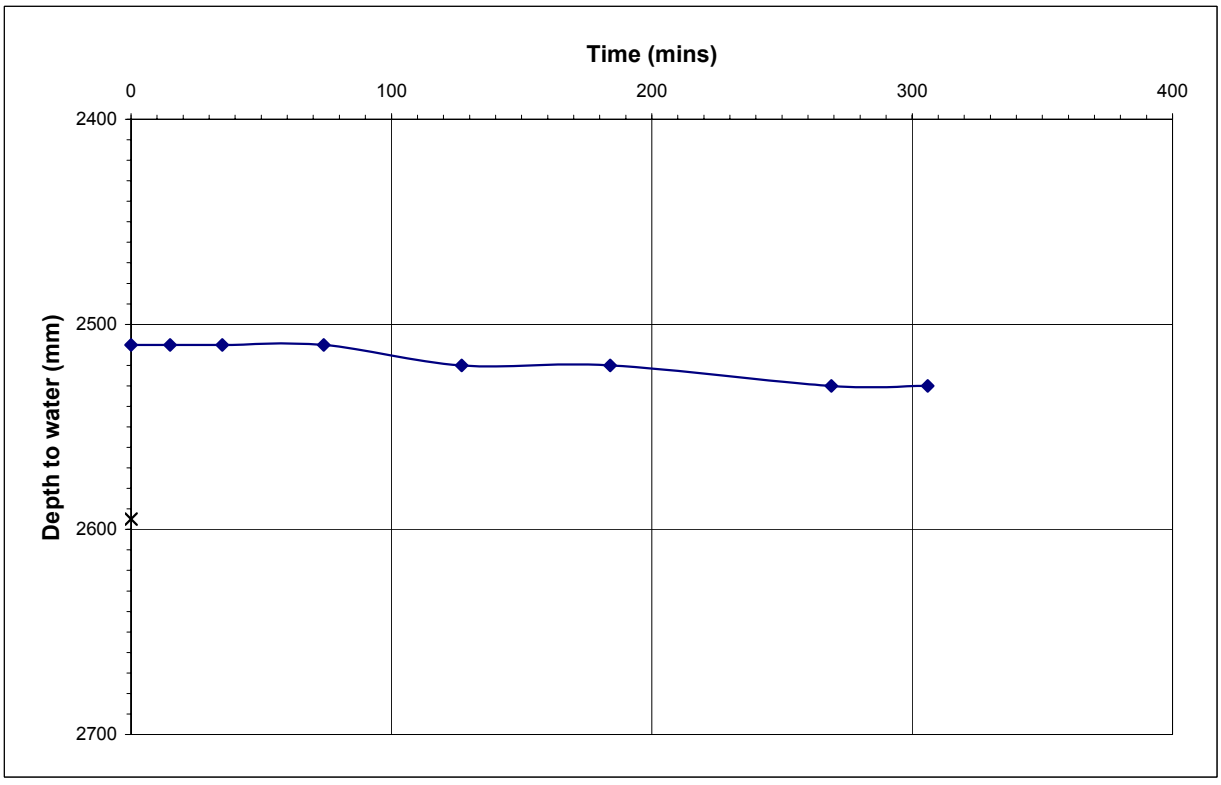
Soakaway Dimensions		(m)	(mm)
Length	=	2.00	2000
Width	=	0.45	450
Depth	=	2.85	2850

Effective depth (empty)		mm	m
75%	=	2765.0	2.77
50%	=	2680.0	2.68
25%	=	2595.0	2.60

Depth at start of test (mm)	=	2510
Depth at end of test (mm)	=	2530

Base area of pit	=	0.9
a_{p50} - 50% internal surface area inc. base	=	1.733
V_{p75-25} - Volume 75 - 25%	=	0.153

Read from the graph:			
$t_{p\ 75}$ (min)	=	0	
$t_{p\ 25}$ (min)	=	0	extrapolated



Insufficient Soakage to calculate permeability