



E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

Manchester / London / Edinburgh

info@E3P.co.uk
<http://www.E3P.co.uk>

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Date: 25th July 2017

Mr Kevin Williams
Macbryde Homes Ltd
Macbryde House
28 St Asaph Business Park
St Asaph
Denbighshire
LL17 0LJ

BY Email (kevin@macbryde-homes.co.uk)

Dear Sirs,

BRE365 Soakaway Tests **Land off Top Road, Summerhill, Wrexham, LL11 4SP**

Background & Objectives

E3P was instructed by Macbryde Homes to undertake BRE365 Soakaway Tests across the above mentioned site at pre-determined locations spatially distributed across the site in order to determine whether SUDS infrastructure would be suitable for the low rise residential housing with associated adopted estate roads and utility infrastructure.

General

Four soakaway permeability tests were undertaken within TP101-TP104 in order to assess the likely permeability of the underlying strata to determine the potential suitability for soakaway drainage within the proposed development. The results are presented in Table 1.0 and the test certificates are attached.

BRE365 Soakaway Tests

BRE365 Soakaway Tests were undertaken within TP101-TP104. Groundwater was not encountered during the advancement of the pits, therefore the tests were undertaken within the unsaturated zone. The results are presented in Table 1.0 overleaf and the test certificates are attached.



Table 1.0 Soil Infiltration Results

LOCATION	DEPTH (m)	MATERIAL	TEST NO.	SOIL INFILTRATION RATE (m/s)
TP101	2.5	Gravelly medium to coarse SAND	Test No.1	1.38E ⁻²
TP102	2.6	Gravelly clayey fine to medium SAND	Test No.1	Fail
TP103	2.5	Gravelly medium to coarse SAND	Test No.2	1.52E ⁻³
TP104	2.7	Gravelly medium to coarse SAND	Test No.1	2.79E ⁻³

Soil infiltration was taken over the wetted area from between 75% and 25% of the effective depth. All tests where drift deposits are purely granular have good soakage potential, however in locations where drift deposits are more cohesive in nature, soakage potential was significantly reduced.

It is considered that soakaway drainage would be suitable for the majority of the proposed development, however in areas where bands of cohesive drift deposits are present such as the south west of the site, soakaway drainage would not be appropriate. The application of soakaway drainage will ultimately be dependent on the specific requirements of the development, all soakaways should be designed in accordance with BRE Special Digest 365 – *Soakaway Design*.

I trust the above is acceptable and if you require anything further please do not hesitate to contact me.

Yours sincerely,
For and on behalf of E3P Ltd

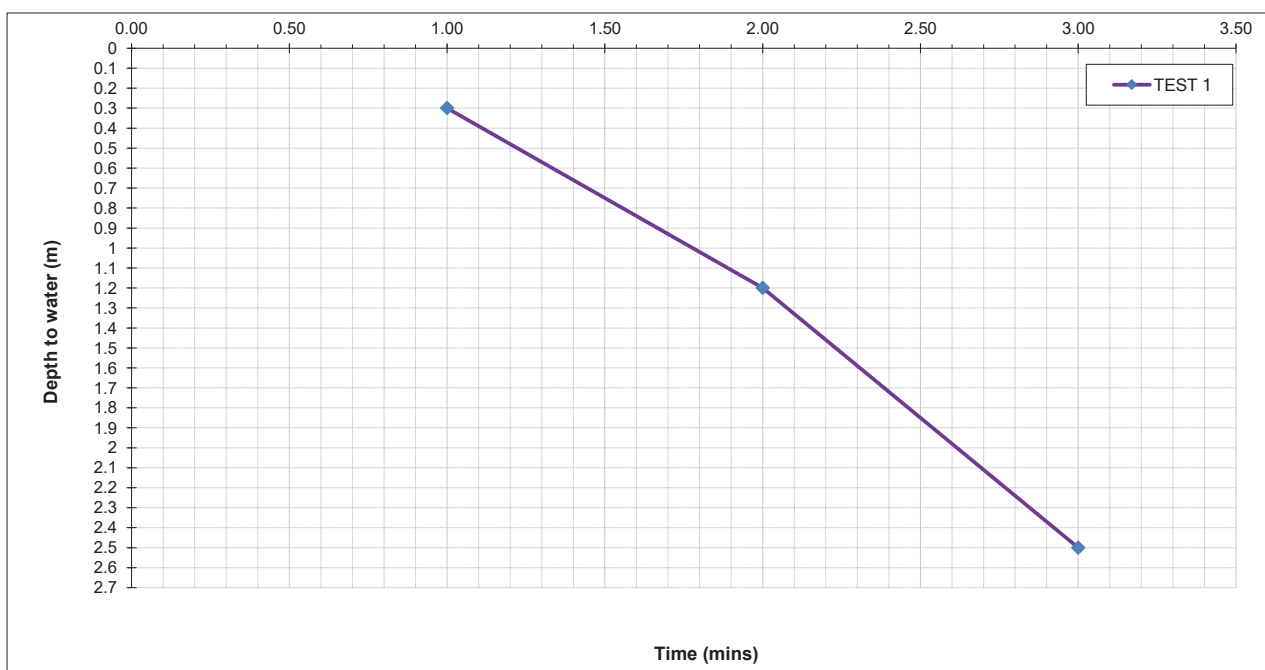


Stephanie Cox
Associate Director



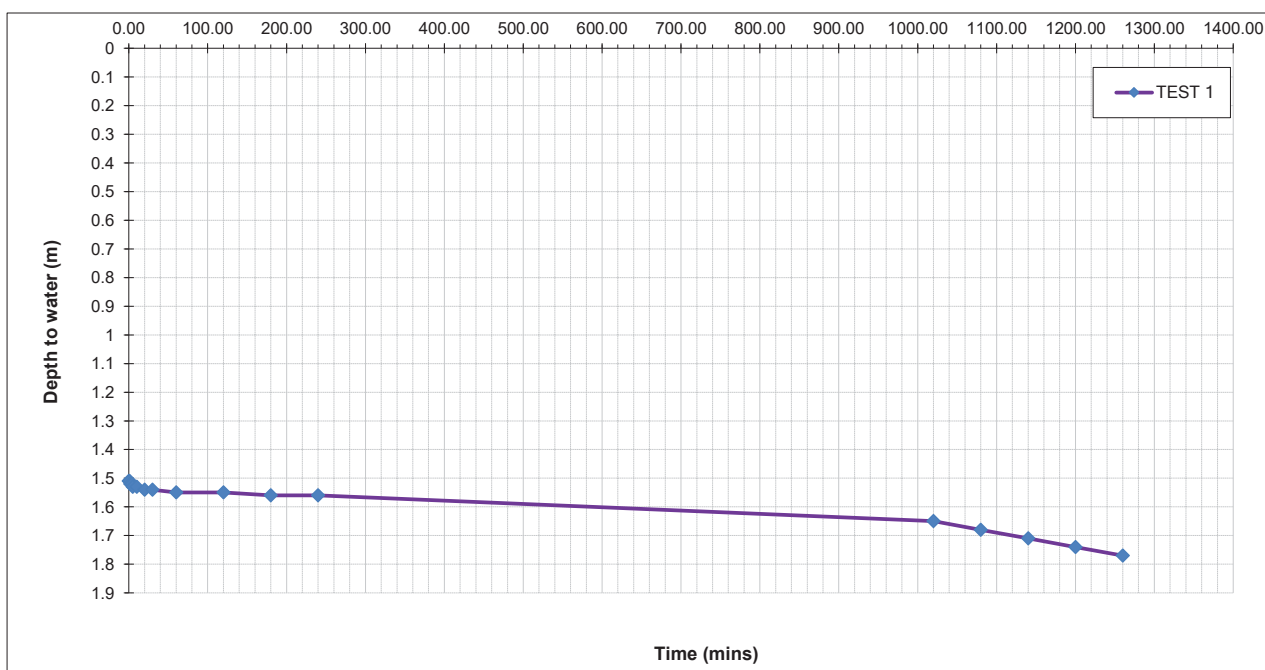
		Site: Top Road, Wrexham Job Number: 11-780 Date of Test: 23/05/2017		Trial Pit Number: SA102 Length: 1.80 m Width: 0.50 m Depth: 2.50 m Groundwater Level: N/A m			
		TEST 1		TEST 2		TEST 3	
		Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
		1.00	0.3				
		2.00	1.2				
		3.00	2.50				
Effective Storage Depth		m	2.20				
75% Effective Storage Depth		m	1.65				
(i.e. depth below GL)		m	0.85				
25% Effective Storage Depth		m	0.55				
(i.e. depth below GL)		m	1.95				
Effective Storage Depth 75%-25%		m	1.10				
Time to fall to 75% effective depth		mins	2.35				
Time to fall to 25% effective depth		mins	2.55				
V (75%-25%)		m3	0.99				
a (50%)		m2	5.96				
t (75%-25%)		mins	0.20				
SOIL INFILTRATION RATE		m/s	1.38E-02				

DESIGN SOIL INFILTRATION RATE, f	1.38E-02
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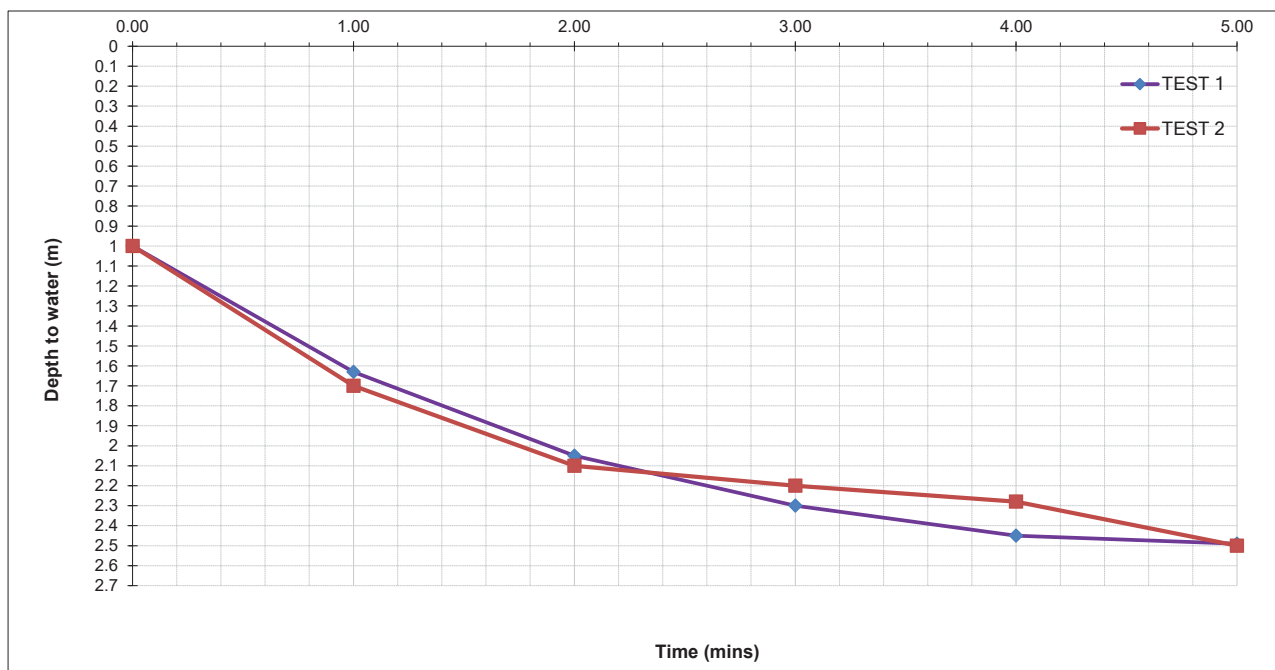
		Site: Top Road, Wrexham Job Number: 11-780 Date of Test: 23/05/2017		Trial Pit Number: SA103 Length: 1.80 m Width: 0.50 m Depth: 2.60 m Groundwater Level: N/A m			
Water soaked to 1.50m immediately then there was no further suitable soakage to determine a design infiltration rate.		TEST 1		TEST 2		TEST 3	
		Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
		0.00	1.51				
		1.00	1.51				
		2.00	1.52				
		3.00	1.52				
		4.00	1.52				
		5.00	1.53				
		10.00	1.53				
		20.00	1.54				
		30.00	1.54				
		60.00	1.55				
		120.00	1.55				
		180.00	1.56				
		240.00	1.56				
		1020.00	1.65				
		1080.00	1.68				
1140.00	1.71						
1200.00	1.74						
1260.00	1.77						
Effective Storage Depth		m	1.09				
75% Effective Storage Depth		m	0.82				
(i.e. depth below GL)		m	1.78				
25% Effective Storage Depth		m	0.27				
(i.e. depth below GL)		m	2.33				
Effective Storage Depth 75%-25%		m	0.55				
Time to fall to 75% effective depth		mins	0.00				
Time to fall to 25% effective depth		mins	N/A				
V (75%-25%)		m3	0.49				
a (50%)		m2	3.41				
t (75%-25%)		mins	N/A				
SOIL INFILTRATION RATE		m/s	N/A				

DESIGN SOIL INFILTRATION RATE, f	N/A
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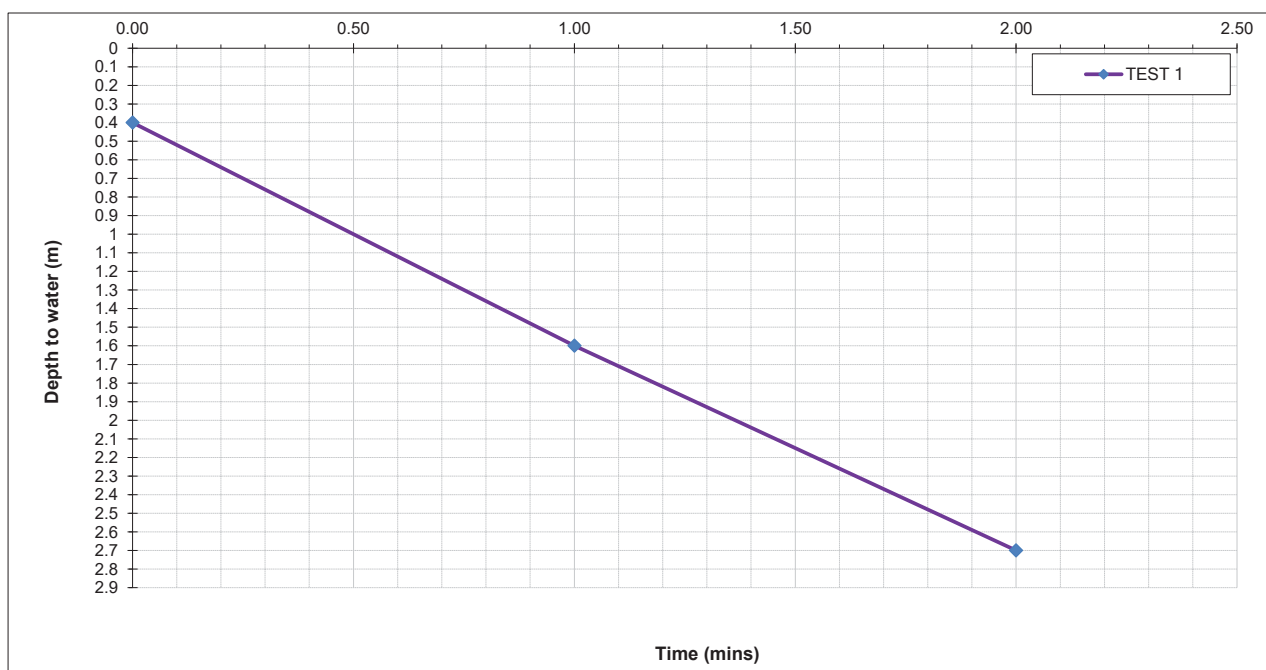
		Site: Top Road, Wrexham Job Number: 11-780 Date of Test: 23/05/2017		Trial Pit Number: SA104 Length: 1.80 m Width: 0.50 m Depth: 2.50 m Groundwater Level: N/A m		
	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.00	1	0.00	1		
	1.00	1.63	1.00	1.7		
	2.00	2.05	2.00	2.1		
	3.00	2.3	3.00	2.2		
	4.00	2.45	4.00	2.28		
	5.00	2.49	5.00	2.50		
Effective Storage Depth	m	1.50	1.50			
75% Effective Storage Depth	m	1.13	1.13			
(i.e. depth below GL)	m	1.38	1.38			
25% Effective Storage Depth	m	0.38	0.38			
(i.e. depth below GL)	m	2.13	2.13			
Effective Storage Depth 75%-25%	m	0.75	0.75			
Time to fall to 75% effective depth	mins	0.60	0.50			
Time to fall to 25% effective depth	mins	2.20	2.20			
V (75%-25%)	m3	0.68	0.68			
a (50%)	m2	4.35	4.35			
t (75%-25%)	mins	1.60	1.70			
SOIL INFILTRATION RATE	m/s	1.62E-03	1.52E-03			

DESIGN SOIL INFILTRATION RATE, f	1.52E-03
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		Site: Top Road, Wrexham Job Number: 11-780 Date of Test: 23/05/2017		Trial Pit Number: SA101 Length: 1.80 m Width: 0.50 m Depth: 2.70 m Groundwater Level: N/A m			
		TEST 1		TEST 2		TEST 3	
		Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
		0.00	0.4				
		1.00	1.6				
		2.00	2.70				
Effective Storage Depth		m	2.30				
75% Effective Storage Depth		m	1.73				
(i.e. depth below GL)		m	0.98				
25% Effective Storage Depth		m	0.58				
(i.e. depth below GL)		m	2.13				
Effective Storage Depth 75%-25%		m	1.15				
Time to fall to 75% effective depth		mins	0.50				
Time to fall to 25% effective depth		mins	1.50				
V (75%-25%)		m3	1.04				
a (50%)		m2	6.19				
t (75%-25%)		mins	1.00				
SOIL INFILTRATION RATE		m/s	2.79E-03				

DESIGN SOIL INFILTRATION RATE, f	2.79E-03
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Trial Pit Log

Trialpit No

TP101

Sheet 1 of 1

Project Name: Top Road

Project No.
11780Co-ords: -
Level:Date
23/05/2017

Location: Wrexham

Dimensions
(m):

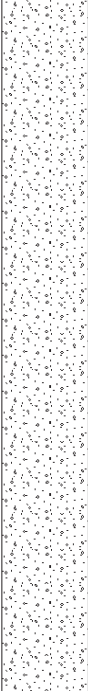
1.80

Client: Macbryde Homes Ltd

Depth
2.50

0.50

Scale
1:25Logged
G. Hirst**Samples and In Situ Testing**

Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
0.10	ES		0.20			Dark brown gravelly fine to medium SAND (Topsoil) with rootlets. Gravel is fine to coarse angular to sub-rounded of sandstone and coal.
						Light brown gravelly medium to coarse SAND with frequent cobbles and boulders. Gravel is medium to coarse angular to sub-angular of sandstone.
			2.50			End of pit at 2.50 m

1

2

3

4

5

Remarks: 1. Collapsing slightly from 1.80m bgl. 2. BRE365 Soakaway test completed within pit.

Stability: Unstable.





Trial Pit Log

Trialpit No

TP102

Sheet 1 of 1

Project Name: Top Road

Project No.
11780Co-ords: -
Level:Date
23/05/2017

Location: Wrexham

Dimensions
(m):

1.80

Client: Macbryde Homes Ltd

Depth
2.60

0.50

Scale
1:25Logged
G. Hirst**Samples and In Situ Testing**

Depth

Type

Results

Depth
(m)Level
(m)

Legend

Stratum Description

0.30

0.90

1.60

1.90

ES

2.60

Dark brown gravelly fine to medium SAND (Topsoil) with rootlets. Gravel is fine to coarse angular to sub-rounded of sandstone and coal.

Orange brown gravelly fine to medium SAND. Gravel is fine to medium angular to sub-rounded of sandstone.

Cream light brown slightly gravelly clayey fine to medium SAND. Gravel is fine to medium angular to sub-rounded of sandstone.

Light brown gravelly fine to medium SAND. Gravel is fine to medium angular to sub-rounded of sandstone,

End of pit at 2.60 m

1

2

3

4

5

Remarks: 1. Complete. 2. BRE365 Soakaway test completed within pit.

Stability: Stable.





Trial Pit Log

Trialpit No

TP103

Sheet 1 of 1

Project Name: Top Road

Project No.
11780Co-ords: -
Level:Date
23/05/2017

Location: Wrexham

Dimensions
(m):

1.80

Client: Macbryde Homes Ltd

Depth
2.50

0.50

Scale
1:25Logged
G. Hirst**Samples and In Situ Testing**

Depth Type Results

Depth
(m)Level
(m)

Legend

Stratum Description

0.70

ES

0.30

1.30

2.50

Dark brown gravelly fine to medium SAND (Topsoil) with rootlets. Gravel is fine to coarse angular to sub-rounded of sandstone and coal.

Firm to stiff red brown slightly gravelly very sandy CLAY. Gravel is fine to coarse angular to sub-rounded of sandstone.

Light brown gravelly medium to coarse SAND with frequent cobbles and boulders. Gravel is fine to coarse angular to sub-angular of sandstone.

End of pit at 2.50 m

1

2

3

4

5

Remarks: 1. Complete. 2. BRE365 Soakaway test completed within pit.

Stability: Stable.





Trial Pit Log

Trialpit No

TP104

Sheet 1 of 1

Project Name: Top Road

Project No.
11780Co-ords: -
Level:Date
23/05/2017

Location: Wrexham

Dimensions
(m):

1.80

Client: Macbryde Homes Ltd

Depth
2.70

0.50

Scale
1:25Logged
G. Hirst**Samples and In Situ Testing**

Depth

Type

Results

Depth
(m)Level
(m)

Legend

Stratum Description

0.30

1.10

2.70

Dark brown gravelly fine to medium SAND (Topsoil) with rootlets. Gravel is fine to medium angular to sub-rounded of sandstone.

Orange brown gravelly fine to medium SAND with cobbles. Gravel is fine to coarse angular to sub-rounded of sandstone.

Light brown gravelly medium to coarse SAND with frequent cobbles and boulders. Gravel is medium to coarse angular to sub-rounded of sandstone.

End of pit at 2.70 m

1

2

3

4

5

Remarks: 1. Complete. 2. BRE365 Soakaway test completed within pit.

Stability: Stable.

