

ARCH ASSOCIATES
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

Our ref: AWR/VW/AAL 057

15th November 2017

MJH Property Development Ltd
MJH House
Unit 54, Rudford Estate
Ford Road
Arundel
BN18 0BF

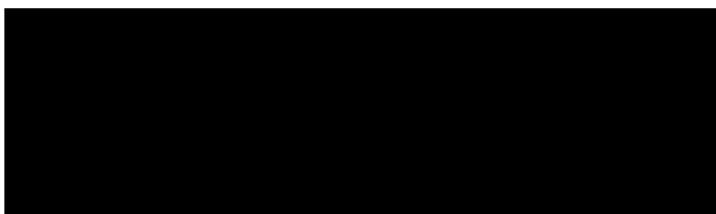
Dear Maurice

Re: Deans Yard, Orchard Way, Fontwell, West Sussex – 2 Detached Chalets

As per your letter of 31st October 2017, please find enclosed soakaway calculations for the above project.

If we can be of further assistance do not hesitate to contact us.

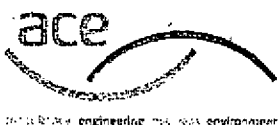
Kind regards



Allen Rushby IEng, AMIStructE
For and on behalf of Arch Associates

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Associates: Daniel Widdow 6Eng (Hons), CEng, MIStructE, Jason Bentley
Arch Associates Limited Registered in England: 3432290





SOAKAWAY DESIGN

for

Deans Yard
Orchard Way
Fontwell
West Sussex

Client:

MJH Property Developments Ltd
MJH House
Unit S4
Rudford Estate
Ford Road
Arundel
BN18 0BF

Issue		A	B
Issued By	Allen Rushby		
Date	November 2017		
Purpose	For Information		
Approved By			

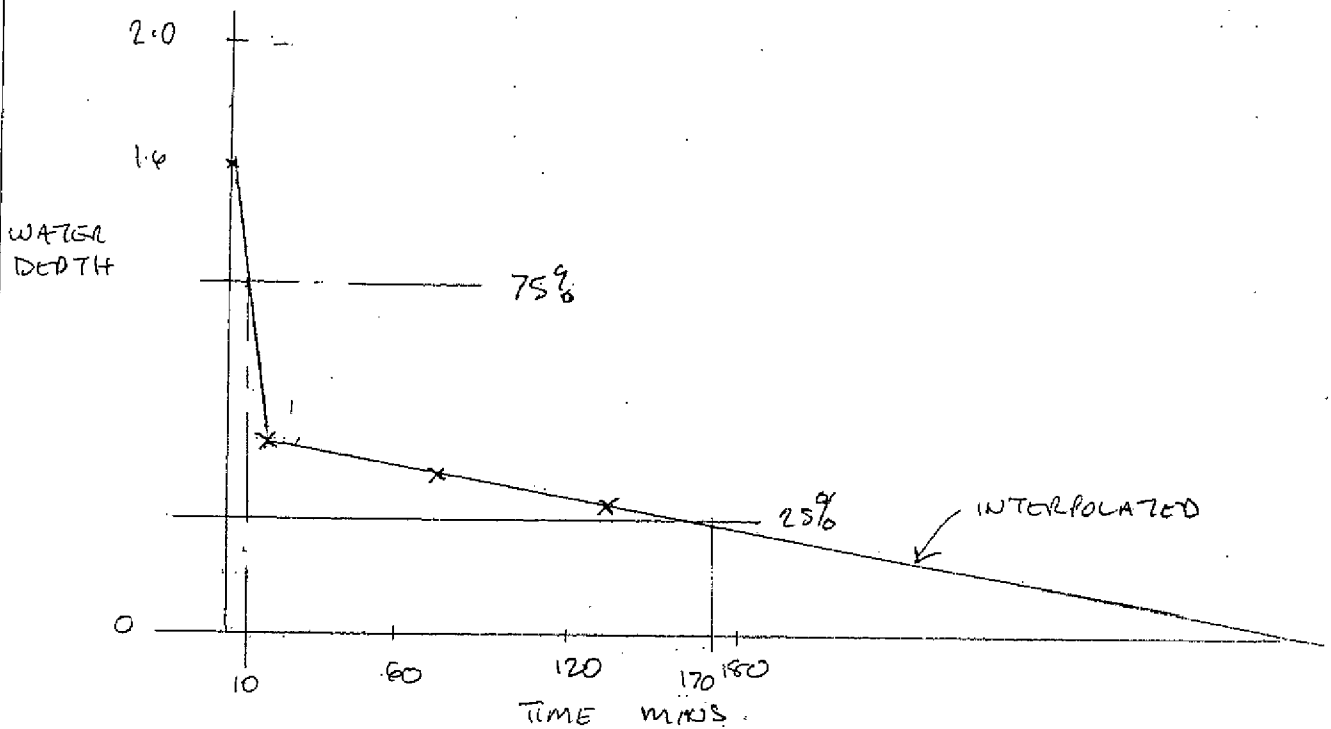
Project No. AAL 057

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CALCULATIONS

Job Title	DEANS YARD FOOTWAY	Job No.	HAL 057	Sht. No.	S1
Element	SOAKAWAYS	Prepared	DR	Date	Nov 17
		Checked		Date	



SOAKAGE TEST RESULT.

SEE 'TEDDS' COMPUTER ANALYSIS.

SOIL INFILTRATION RATE = 2.5×10^{-5}

PROVIDE 2.0m x 2.0m x 1.2m DEEP (BELOW INVERT OF
INCOMING DRAIN). CELLULAR SOAKAWAY
WITHIN AQUIFER OR SIMILAR.

Project Deans Yard Fontwell				Job no. AAL057	
Calcs for Soakaway				Start page no./Revision 1	
Calcs by AWR	Calcs date 14/11/2017	Checked by	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area Brighton
Impermeable area drained to the system $A = 96.0 \text{ m}^2$
Return period Period = 100 yr
Ratio 60 min to 2 day rainfall of 5 yr return period $r = 0.350$
5-year return period rainfall of 60 minutes duration $M5_{60\text{min}} = 20.0 \text{ mm}$
Increase of rainfall intensity due to global warming $p_{\text{climate}} = 0 \%$

Soakaway / infiltration trench details

Soakaway type Rectangular
Minimum depth of pit (below incoming invert) $d = 1071 \text{ mm}$
Width of pit $w = 2000 \text{ mm}$
Length of pit $l = 2000 \text{ mm}$
Percentage free volume $V_{\text{free}} = 95 \%$

Soil infiltration rate (BRE digest 365)

Length of trial pit $l_{\text{trial}} = 1600 \text{ mm}$
Width of trial pit $b_{\text{trial}} = 1300 \text{ mm}$
Depth of trial pit (below invert) $d_{\text{trial}} = 1600 \text{ mm}$
Free volume (if fill used) $V_{\text{trial}} = 100 \%$
75% depth of pit $d_{75} = (d_{\text{trial}} \times 0.75) = 1200.00 \text{ mm}$
50% depth of pit $d_{50} = (d_{\text{trial}} \times 0.50) = 800.00 \text{ mm}$
25% depth of pit $d_{25} = (d_{\text{trial}} \times 0.25) = 400.00 \text{ mm}$
Test 1 - time to fall from 75% depth to 25% depth $T1 = 160 \text{ min}$
Test 2 - time to fall from 75% depth to 25% depth $T2 = 160 \text{ min}$
Test 3 - time to fall from 75% depth to 25% depth $T3 = 160 \text{ min}$
Longest time to fall from 75% depth to 25% depth $t_{\text{lg}} = \max(T1, T2, T3) = 160 \text{ min}$
Storage volume from 75% to 25% depth $V_{p75_25} = (l_{\text{trial}} \times b_{\text{trial}} \times (d_{75} - d_{25})) \times V_{\text{trial}} = 1.66 \text{ m}^3$
Internal surface area to 50% depth $a_{p50} = ((l_{\text{trial}} \times b_{\text{trial}}) + (l_{\text{trial}} + b_{\text{trial}}) \times 2 \times d_{50}) = 6.72 \text{ m}^2$
Surface area of soakaway to 50% storage depth $A_{s50} = 2 \times (l_{\text{trial}} + b_{\text{trial}}) \times d_{\text{trial}} / 2 = 4.640 \text{ m}^2$
Soil infiltration rate $f = V_{p75_25} / (a_{p50} \times t_{\text{lg}}) = 25.8 \times 10^{-6} \text{ m/s}$
Wetted area of pit 50% full $a_{s50} = l \times d + w \times d = 4285154 \text{ mm}^2$

Table equations

Inflow $I = M100 \times A$
Outflow $O = a_{s50} \times f \times D$
Storage $S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m³)
5	0.36	7.1	1.84	13.1	1.26	0.03	1.23
10	0.51	10.1	1.91	19.4	1.86	0.07	1.79
15	0.62	12.3	1.95	24.0	2.31	0.10	2.21

Project Deans Yard Fontwell				Job no. AAL057	
Calcs for Soakaway				Start page no./Revision 2	
Calcs by AWR	Calcs date 14/11/2017	Checked by	Checked date	Approved by	Approved date

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100. (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
30	0.79	15.7	2.00	31.4	3.01	0.20	2.82
60	1.00	20.0	2.03	40.6	3.90	0.40	3.50
120	1.22	24.5	2.01	49.2	4.73	0.80	3.93
240	1.50	29.9	1.97	59.0	5.66	1.59	4.07
360	1.69	33.8	1.94	65.6	6.29	2.39	3.91
600	1.95	38.9	1.90	73.9	7.10	3.98	3.12
1440	2.48	49.6	1.81	89.9	8.63	9.55	0.00

Required storage volume

$$S_{req} = 4.07 \text{ m}^3$$

Soakaway storage volume

$$S_{act} = l \times d \times w \times V_{free} = 4.07 \text{ m}^3$$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume

$$t_{50} = S_{req} \times 0.5 / (a_{50} \times f) = 5 \text{ hr } 6 \text{ min } 52 \text{ s}$$

PASS - Soakaway discharge time less than or equal to 24 hours