

From: [REDACTED]
Sent: 29 August 2019 07:14
To: Amber Willard <Amber.Willard@arun.gov.uk>
Subject: Re: BN/69/19/DOC

Dear Amber

I have contacted the engineer who thinks that this is the missing document. If any further information is required, let me know and I'll get him to forward it on.

With kind regards

Julia
Architectura Design

On 28 Aug 2019, at 16:55, Amber Willard <Amber.Willard@arun.gov.uk> wrote:

Dear Ms Davies,

I have received comments from our drainage department regarding BN/69/19/DOC at 37 Hill Lane, Barnham.

I copy below their comments

'I have previously been in direct consultation with the applicants engineer, some of the documents submitted do not appear to be the latest, in particular I have noticed the latest calculations have not been submitted. Please can the applicant check that the latest revisions of all documents are submitted. Please re-consult me once this has occurred.'

Please can you submit the latest calculations you have and I will re-consult.

Thank you
Amber

Amber Willard | Planning Officer, Planning Department, Directorate of Place, Arun District Council | Location:
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Please note this information is given without prejudice and represents the informal view of the officer and not an official opinion of Arun District Council.

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**STONE CONSULTING
ENGINEERS LTD.**

**CONSULTING CIVIL, STRUCTURAL AND
FOUNDATION ENGINEERS**

Hundred Acres House
Wickham
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PO17 4ED

117 Barrack Lane
Aldwick
West Sussex
PO21 4ED

Job No. 1870

Date: July 2019

QA INFORMATION

CLIENT:	Aaron Millar
JOB ID:	37 Hill Lane. Barnham
SCOPE OF WORK:	Surface water run-off
DESIGN CODES AND REFERENCES:	BRE 365 The Building Regulations
SOFTWARE:	MS EXCEL
SUB-SOIL/ FOUNDATION DATA:	N/A

MATERIAL DATA

CONCRETE:	
REINFORCEMENT:	
STEELWORK:	
TIMBER:	
OTHER:	

OTHER INFORMATION / NOTES

Rev A	Scheme based on minimal infiltration and direct discharge to watercourse
Rev B	Attenuation and discharge scheme.

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Project:	37 Hill Lane, Barnham	Date:	July 2019	Made by:	KS	Sheet No.	1
CALCULATION SHEET		Job No.	1870	Chkd:	-	Rev.	B

Summary:

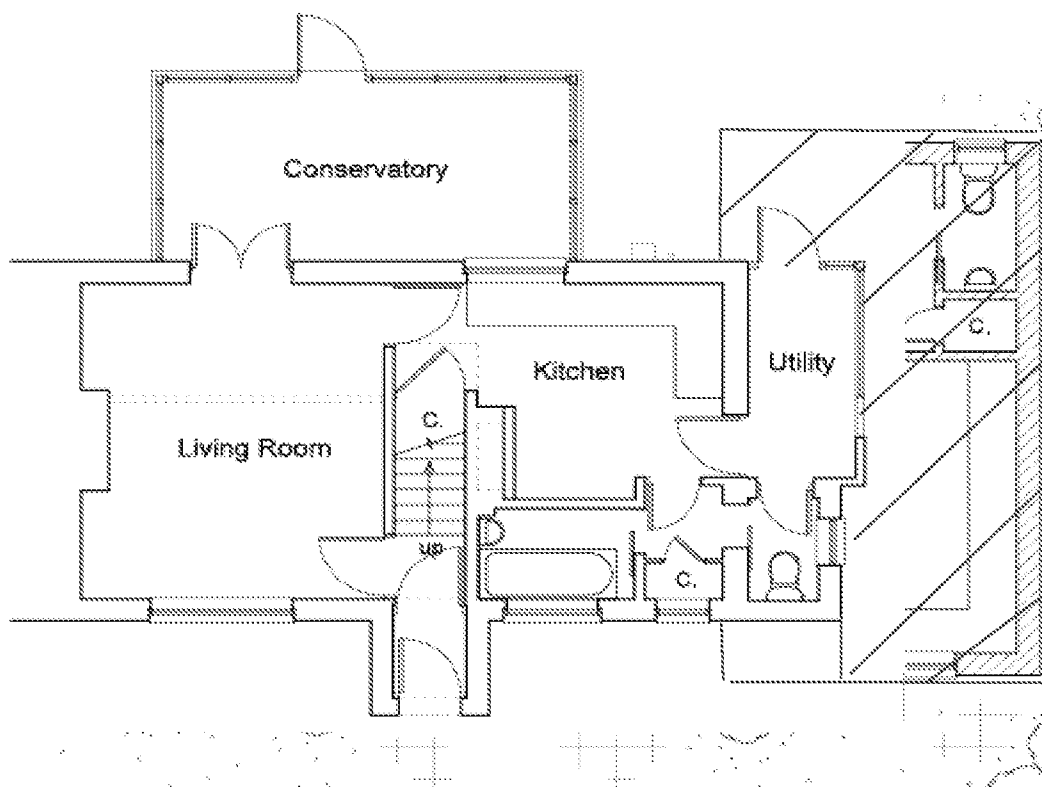
The site is underlain by 'Brickearth'. Winter groundwater monitoring recorded a maximum winter (march) water table at a depth of 3.6m bgl. Infiltration testing recorded very poor drainage with an infiltration rate into the natural ground of 3.50E-07 m/sec.

The existing property drains to soakaways.

The calculation is based on a 100 year return period with a 40% allowance for Climate Change.

The attenuation/soakaway tank is sized assuming no infiltration into the ground.

An overflow pipe connects the attenuation/soakaway tank to a drainage ditch along Hill Lane. The maximum discharge rate into the watercourse is estimated at 1.43 l/s.



New roof area (shown hatched) = 23.20 m2

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Project: 37 Hill Lane. Barnham	Date: July 2019	Made by: KS	Sheet No. 2
CALCULATION SHEET	JobNo. 1870	Chkd: -	Rev. B

SOAKAWAY DESIGN TO BRE(1991)

SOAKAWAY DETAILS

Ring		Pit/crates	
Soakaway size, Ds =	0.00 m	Length =	2.00 m
Depth of below invert, Hs =	0.00 m	Width =	2.00 m
		Depth below invert =	0.80 m
Free volume, S =	0.00 m ³	=	3.20 m ³
Rubble filled volume, S' =	0.00 m ³	=	1.06 m ³

INITIAL SOAKAWAY SIZING

Drained area =	23.20 m ²
Climate change allowance =	40 %

INFLOW

Inflow, I = (run off area) x (design rainfall)
= A x (M10-D)

DESIGN RAINFALL

Return period = 100 yrs
Ratio of 60 min to 2-Day rainfalls of 5 year return period, r = 0.35 BRE(1991) Fig 1.

M5 rainfalls are calculated from table 1 (BRE 365) using Z1 factor

Storm duration (hrs)	Storm duration (mins)	Z1	M5-D (mm)	Z2 M10 (cor. Fac)	M10-D* rainfall	Z2 M100 Design	100 yr + 40%	
							rainfall	
0	5	0.36	7.2	1.19	12.00	1.84	18.55	
0	10	0.54	10.8	1.22	18.45	1.92	29.03	
0	15	0.65	13	1.23	22.39	1.96	35.67	
1	30	0.82	16.4	1.24	28.47	2.00	45.92	
1	60	1	20	1.24	34.72	2.03	56.84	
2	120	1.19	23.8	1.24	41.32	2.01	66.97	
4	240	1.39	27.8	1.23	47.87	1.97	76.67	
6	360	1.53	30.6	1.22	52.26	1.94	83.11	
10	600	1.7	34	1.21	57.60	1.90	90.44	
24	1440	2.07	41.4	1.19	68.97	1.81	104.91	

* including 40% for climate change

OUTFLOW

Outflow via regulator = 0.00E+00 l/sec

Outflow /sec = 0.00E+00 m3/sec (ring)

Outflow /sec = 0.00E+00 m3/sec (pit)

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Project: 37 Hill Lane, Barnham	Date: July 2019	Made by: KS	Sheet No. 3
CALCULATION SHEET	JobNo. 1870	Chkd: -	Rev. B

STORAGE CAPACITY

$$\text{Storage capacity, } S = \text{Inflow} - \text{Outflow}$$

$$= I - O = [A \times (M10-D)] - O$$

Ring soakaway					Pit/crates soakaway			
Storm duration (hrs)	Storm duration (mins)	Inflow S(1) m ³	Outflow Max m ³	Required capacity m ³	Inflow rate l/sec	Outflow Max m ³	Outflow rate l/sec	Required capacity m ³
0	5	0.43	0.00	0.43	1.43	0.00	0.00	0.43
0	10	0.67	0.00	0.67	0.81	0.00	0.00	0.67
0	15	0.83	0.00	0.83	0.51	0.00	0.00	0.83
1	30	1.07	0.00	1.07	0.26	0.00	0.00	1.07
1	60	1.32	0.00	1.32	0.14	0.00	0.00	1.32
2	120	1.55	0.00	1.55	0.07	0.00	0.00	1.55
4	240	1.78	0.00	1.78	0.03	0.00	0.00	1.78
6	360	1.93	0.00	1.93	0.02	0.00	0.00	1.93
10	600	2.10	0.00	2.10	0.01	0.00	0.00	2.10
24	1440	2.43	0.00	2.43	0.01	0.00	0.00	2.43

Max required capacity =	2.43		=	2.43	
Max ring capacity =	0.00	FAIL	Free volume =	3.20	OK
Rubble filled volume =	0.00	FAIL			

Location of overflow outlet to be above maximum water level in tank

$$\text{Maximum depth of water in soakaway/tank, } H = (2.43/(2 \times 2)) = 0.61 \text{ m}$$

Height of soakaway =	0.80 m
Soil cover to soakaway =	0.30 m
Depth below ground to base of soakaway =	1.10 m

Locate overflow pipe invert 100mm below top of soakaway

$$\text{Invert level 75m overflow pipe} = (1.1 - 0.4) = 0.70 \text{ m above base of soakaway}$$

$$= 0.40 \text{ m below ground level}$$

Overflow pipe invert level =	7.30 mOD
Invert at discharge =	6.90 mOD

Total length of pipe ~	31.30 m
Fall to pipe ~	0.01 m
=	1:100