

Hemsley Consulting Ltd Unit 18, Park Farm Hundred Acre Lane, Wivelsfield Green West Sussex, RH17 7RU	Project 122 High Street, Hurstpierpoint				Job no. 6481	
	Calcs for Attenuation for New Dwelling				Start page no./Revision 1	
	Calcs by TJH	Calcs date 24/02/2026	Checked by	Checked date	Approved by	Approved date

ATTENUATION DESIGN

Generally In accordance with CIRIA publication C753 - The SUDS Manual

Tedds calculation version 1.0.04

Allowable discharge method

Site characteristics

Location;	Brighton
Hydrological region;	7
Soil type (Wallingford Procedure W.R.A.P map);	4
Standard percentage runoff;	SPR = 0.47
Average annual rainfall;	SAAR = 720 mm
5 year return period rainfall of 60 minute duration;	M5_60min = 20.0 mm
Ratio 60-minute to 2 day rainfalls of 5 year return;	r = 0.35
Rainfall intensity increase due to global warming;	p _{climate} = 40%

Catchment details

Subcatchment	Name	Area (ha)	PIMP (%);	Impermeable. area (ha)
1	Dwelling	0.0083	100	0.0083
2	Garden	0.0084	100	0.0084
Total		0.0167	100.0;	0.0167

Greenfield runoff rates

Catchment area;	AREA = 50.00 hectare
Greenfield runoff rate (50 hectare site);	$\bar{Q}_{\text{rural}} = 0.00108 \text{ m}^3/\text{s} \times (\text{AREA}/1 \text{ km}^2)^{0.89} \times (\text{SAAR}/1 \text{ mm})^{1.17} \times \text{SPR}^{2.17} =$ 249.5 l / s
Greenfield runoff rate;	$\bar{Q} = \bar{Q}_{\text{rural}} / \text{AREA} \times A =$ 0.1 l / s
Greenfield runoff rate per unit area;	$\bar{Q}_A = \bar{Q} / A =$ 5.0 l / s / hectare

Estimated site discharges

FSR growth rate (2 year);	FSR _{2yr} = 0.96	
Discharge (2 year);		$Q_{2\text{yr}} = \bar{Q} \times \text{FSR}_{2\text{yr}} =$ 0.1 l/s
FSR growth rate (30 year);	FSR _{30yr} = 2.30	
Discharge (30 year);		$Q_{30\text{yr}} = \bar{Q} \times \text{FSR}_{30\text{yr}} =$ 0.2 l/s
FSR growth rate (100 year);	FSR _{100yr} = 3.19	
Discharge (100 year);		$Q_{100\text{yr}} = \bar{Q} \times \text{FSR}_{100\text{yr}} =$ 0.3 l/s

Table equations

Total surface water;	$V_w = A_{\text{imp}} \times M$
Permitted discharge;	$Q_{\text{allow}} = Q_{2\text{yr}} \times D$
Storage volume required;	$V_{\text{req}} = V_w - Q_{\text{allow}}$

Flow Restriction.

Due to site restriction it is not possible to restrict the flow to the above rates.

Using a minimum orifice plate opening of 25mm dia and a head of water of 0.4m (standard crate height)

$$\text{Max Outflow } Q = C_d A_o \sqrt{(2gh)}$$

Coefficient of Discharge – C = 0.6

Head – h = 0.40m

$$Q = 0.6 \times (\pi \times (.025/2)^2) \times \sqrt{(2 \times 9.81 \times 0.4)} = \mathbf{8.25 \times 10^{-4} \text{ m}^3/\text{s} = 0.825 \text{ l/s}}$$

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Attenuation storage

Duration (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall (mm)	Total surf water (m³)	Permit dischrge (2 years) (m³)	Storage vol. reqd (m³)
5	0.36	9.6	1.9	18.24	3.05	0.25	2.8
10	0.51	13.6	1.97	26.79	4.47	0.5	3.97
15	0.62	16.5	2	33	5.51	0.74	4.77
30	0.79	21	2.03	42.63	7.12	1.49	5.63
60	1	26.6	2	53.2	8.88	2.97	5.91
120	1.22	32.5	1.95	63.38	10.58	5.94	4.64
240	1.5	39.4	1.9	74.86	12.5	11.88	0.62
360	1.69	44.4	1.85	82.14	13.72	17.82	-4.1
600	1.95	50.5	1.81	91.41	15.27	29.7	-14.43
1440	2.48	64.4	1.71	110.12	18.39	71.29	-52.9

Attenuation storage required

Vol. increase due to head discharge relationship

$$p_{\text{hydro}} = 1.1$$

Maximum attenuation storage required

$$V_{\text{req_max}} = V_{\text{max}} \times p_{\text{hydro}} = \mathbf{6.5 \text{ m}^3}$$

Using Storm Crates (single crate high) - 0.4m

Percentage free volume;

$$V_{\text{free}} = 95 \%$$

Total Volume required

$$V_{\text{Total}} = 6.5/0.95 = 6.8 \text{ m}^3$$

Min Plan Area Required

$$A_{\text{min}} = 6.8/0.4 = 17\text{m}^2$$

Limiting width to 4m - Length Required

$$L_{\text{min}} = 17/4 = \mathbf{4.25m}$$

Conclusion

Use – 25mm Ø Orifice Plate in flow control chamber
Storm Crate storage system min 4 x 4.25m on plan x 0.4m deep
Crates to be laid and wrap with membrane as per manufacturers guidelines
Overflow pipe to be positioned 0.5m above orifice opening.
Silt trap and debris screen to be placed on feed to attenuation tank.

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