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Our Ref: OR/26275/SWD

SURFACE WATER DRAINAGE

ON:	77 Marlborough Road, Lancing
FOR:	Industrial IT Solutions
DATE:	November 2026
PREPARED BY:	Eur Ing O Riha
CHECKED BY:	J Bray B.Eng (Hons)

It is a requirement of the Client to check their roles and responsibilities in accordance with CDM 2015 and the Building Safety Act 2022.
N.B. PGA is NOT a Principal Designer as defined therein.

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JOB TITLE				
77 Marlborough Road, Lancing				
Design by OR	Checked by JB	Date November 2026	Job No 26275	Data Sheet No DP

DRAINAGE STRATEGY

1. Introduction

This Drainage Strategy has been prepared in support of the redevelopment of 77 Marlborough Road, Lancing and is submitted to discharge the planning condition relating to surface water drainage. The report sets out the proposed means of managing surface water runoff from the development and demonstrates that the scheme has been designed in accordance with the principles of sustainable drainage and will not increase flood risk on or off the site.

The strategy has been developed having regard to:

- The Non-Statutory Technical Standards for Sustainable Drainage Systems (SuDS);
- CIRIA C753 *The SuDS Manual*;
- Approved Document H of the Building Regulations;
- BRE Digest 365 *Soakaway Design*; and
- Relevant Environment Agency guidance relating to climate change allowances.

The proposed drainage design follows the drainage hierarchy set out within Approved Document H, with infiltration to ground identified as the preferred and most sustainable means of surface water disposal. Ground investigation works, including infiltration testing, have been undertaken to assess the suitability of infiltration drainage at the site. In addition, groundwater monitoring data from the immediately adjacent site at 75 Marlborough Road has been reviewed and considered as part of the drainage assessment.

The proposed development comprises a replacement building and associated external works on a previously developed site. The overall impermeable area remains broadly comparable to the existing. The new infrastructure will be provided to serve the building roof and external hardstanding areas, with design calculations undertaken for the 100% AEP (1 in 1 year), 3.33% AEP (1 in 30 year), 3.33% AEP plus climate change, 1% AEP (1 in 100 year) and 1% AEP plus climate change storm events. The strategy demonstrates that the proposed drainage system can accommodate the required design events while ensuring there is no increase in flood risk as a result of the development.

2. Existing Arrangement

The site comprises previously developed land which slopes generally from south to north and was developed prior to the widespread implementation of Sustainable Drainage Systems (SuDS).

There is no known direct connection to a public surface water sewer. Based on the available information, including CCTV survey records and site investigations, surface water runoff from the frontage of the former building and a part of the existing side access track discharged towards the public highway via overland flow. Surface water runoff from the roof of the former building, the rear parking area and part of the side access track discharged to an infiltration soakaway located to the south of the building.
The site has historically relied upon infiltration drainage for part of its surface water management and there are no known records of surface water flooding, groundwater emergence or drainage failure associated with the existing drainage arrangements.

3. Proposed Arrangement

In accordance with the drainage hierarchy set out within Approved Document H of the Building Regulations and CIRIA C753 The SuDS Manual, the potential drainage options have been considered in order of preference. Based upon the available information and site constraints, infiltration drainage has been identified as the most appropriate method of surface water disposal for the southern and eastern parts of the site due to the favourable ground conditions identified during the site investigation works and the absence of a suitable alternative discharge point.

At the northern frontage of the site, surface water runoff currently drains towards the public highway via overland flow. The proposed development will maintain a broadly similar arrangement. However, runoff from the side access track will be diverted to the proposed infiltration drainage system at the rear of the site, resulting in a reduction in the volume of runoff reaching the highway compared with the existing situation.

The proposed drainage arrangement is illustrated on Drawing 26275 – DR1C. The proposed redevelopment will result in a broadly comparable impermeable area to the existing site and therefore is not expected to increase runoff rates or runoff volumes.

Surface water generated by the proposed development will be managed through a combination of infiltration soakaways and associated surface water collection infrastructure. Roof runoff will be collected via rainwater downpipes and discharged to a dedicated infiltration soakaway located to the south of the building. Surface water runoff from the rear parking area and side access track will be collected via road gullies and linear drainage channels before discharging to a separate infiltration soakaway system.
As such, the development will not increase flood risk either within or outside the site.

The proposed development will result in a broadly similar impermeable area as the existing site. A geotechnical investigation has been undertaken at 77 Marlborough Road, including infiltration testing at both the front and rear of the site. The requested winter groundwater monitoring was not undertaken due to the timing of the investigation, however monitoring data has been taken from the adjacent site at 75 Marlborough Road, where monitoring was undertaken immediately adjacent to the shared boundary. The investigations completed at both sites indicate similar geology, stratigraphy and groundwater conditions, and we consider this information appropriate for informing the drainage design.

The existing site has historically operated with infiltration drainage, and we are not aware of any history of flooding, groundwater emergence or drainage failure.

The design of soakaways has been carried according to BRE 365 and SuDS methodology using the Wallingford Procedure given slightly more conservative results than the FEH22 rainfall model. The minimum infiltration rate of 3.58×10^{-5} as determined by the geotechnical testing for lower gravel deposits and incorporating design situations for the 100% AEP (1 in 1 year), 3.33% AEP (1 in 30 year), 3.33% AEP (1 in 30 year) plus climate change, the 1% AEP (1 in 100 year) and the 1% AEP (1 in 100) plus climate change critical storms. The climate change increase of 20% has been determined using Department for Environment Food & Rural Affairs data.

4. Ground Conditions and Infiltration Testing

A geotechnical investigation was undertaken at 77 Marlborough Road which included infiltration testing at locations representative of the proposed drainage infrastructure.

Groundwater monitoring was not undertaken at the site during the winter period due to the timing of the investigation works. However, groundwater monitoring data has been reviewed from the adjoining site at 75 Marlborough Road, where monitoring boreholes were installed immediately adjacent to the shared boundary. The investigations undertaken at both sites identified comparable geology, stratigraphy and groundwater conditions, and it is therefore considered that the data is representative of conditions at the application site.

Groundwater monitoring undertaken within boreholes BH2 and BH3 at 75 Marlborough Road recorded groundwater levels over the period October 2023 to March 2024. The boreholes, installed to depths of approximately 4.1 m and 3.0 m respectively, remained dry throughout the monitoring period, indicating that groundwater levels are below the depth of the proposed infiltration systems.

Infiltration testing undertaken at 77 Marlborough Road confirmed that the underlying strata are capable of accommodating infiltration drainage. The site has historically operated with infiltration drainage and there

are no known records of flooding, groundwater emergence or drainage failure associated with these arrangements.

On the basis of the site investigation, infiltration testing results, historic site performance and adjacent groundwater monitoring data, the use of infiltration soakaways is considered to be a suitable and sustainable method of surface water disposal for the proposed development.

5. Conclusion

This drainage strategy has been prepared to support the redevelopment of 77 Marlborough Road, Lancing and to discharge the planning condition relating to surface water drainage. The strategy has been developed in accordance with the drainage hierarchy contained within Approved Document H of the Building Regulations, the Non-Statutory Technical Standards for SuDS, CIRIA C753 The SuDS Manual and BRE Digest 365.

Ground investigation works, infiltration testing and groundwater monitoring data from the adjacent site demonstrate that infiltration drainage is a viable method of surface water disposal for the development. The proposed surface water drainage system comprises infiltration soakaways serving the roof and external hardstanding areas, together with associated collection infrastructure.

The drainage infrastructure has been designed using site-specific infiltration data and assessed for the 100% AEP (1 in 1 year), 3.33% AEP (1 in 30 year), 3.33% AEP plus climate change, 1% AEP (1 in 100 year) and 1% AEP plus climate change rainfall events. The proposed drainage strategy provides effective management of surface water runoff.

Based on the assessment undertaken, the proposed development will not result in an increase in surface water runoff or flood risk on-site or elsewhere and is considered to satisfy the requirements of the planning condition.

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DESIGNER RISK ASSESSMENT

Project Title 77 Marlborough Road, Lancing	**Project No.** 26275	**Sheet No.** DRA01
	Engineer: OR	Checked by: JB
Client Industrial IT Solutions	Date: Nov' 2026	Date: Nov' 2026

The following specific risks have been identified:

Ref	Risk	Action
1	Temporary works	The contractor is to provide all necessary temporary propping & temporary works to safely undertake the work and maintain structural stability. The contractor is to be aware that the property may be occupied during construction and temporary works loading to consider this.
2	Confirmation of Layout	The assumptions made within the calculations and drawing should be confirmed on site, prior to commencement of works. Any differences should be discussed with Engineer.
3	Services	Appropriate checks are to be completed by contractor prior to commencement of work to ensure no services are in the local vicinity of the works. Excavators are not to be used near suspected buried services. The electricity and other services supply must be turned off before drilling into walls.
4	Demolition	Contractor to take all measures to control noise and dust. Prevent dust by using wet cutting and vacuum extraction on tools; use a vacuum cleaner rather than sweeping; use a suitable, well-fitting mask.
5	Public areas	Where works are undertaken in public areas, the site must be secured, scaffold netted, ladders lifted/removed outside working hours, rubbish shutes used and safety checked, etc., to protect members of public, the client, and others. The general public must be protected and re-directed away from the works at all times.
6	Safety in excavations	All practicable steps must be taken to prevent danger of collapse in excavations. Safety in excavations must be in accordance with HSE Guidance and CDM (2015). Shoring and temporary works to be provided based on ground conditions, and not solely based on excavation depths. Excavations left unfilled and unsupported for over 48 hours must be appropriately protected, shored and covered to alleviate the risk of collapse. Excavations to be protected and covered to prevent people or vehicles falling in.

Notes:
1. The works are to be carried out by an experienced competent contractor capable of managing general construction hazards.
2. The following list is limited to specific risks associated with the structural design and is to be read in conjunction with other relevant designer risk assessments.
3. The following list is not necessarily exhaustive and the contractor should carry out their own assessment of potential risks.
4. Comment is made in the Risk Assessment for future demolition and use of the building as a work place only if it is considered to be out of the ordinary.
5. The Client, designers and contractor shall be mindful of their Health and Safety obligations under the CDM (2015) Regulations.

Check list: (Delete if not applicable or considered a general site risk)

Temp. stability / propping	Access	Risks to General Public	Asbestos	Confined spaces	Future maintenance
Hidden / buried services	Material handling	Hot works	Working at height	COSHH	Dismantling / demolition

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Project	Job no.
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SOAKAWAY FOR ROOF - 1y storm	DR0 1

Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
OR	11/11/2026	JB	NOV '26		

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.06

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = **440.0** m^2
Return period	Period = **1** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1500** mm
Width of pit	w = **2600** mm
Length of pit	l = **1524** mm
Percentage free volume	V_{free} = **95** %
Soil infiltration rate	f = **35.8×10^{-6}** m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **6186018** mm^2

Table equations

Inflow (cl.3.3.1)	I = M1 × A
Outflow (cl.3.3.2)	O = a_{s50} × f × D
Storage (cl.3.3.3)	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	1 year rainfall, M1 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.36;	7.2;	0.62;	4.4;	1.95;	0.07;	1.88
10	0.51;	10.2;	0.61;	6.2;	2.74;	0.13;	2.61
15	0.62;	12.4;	0.61;	7.6;	3.35;	0.20;	3.16
30	0.79;	15.8;	0.62;	9.8;	4.33;	0.40;	3.93
60	1.00;	20.0;	0.64;	12.8;	5.63;	0.80;	4.83
120	1.22;	24.4;	0.66;	16.0;	7.06;	1.59;	5.47
240	1.48;	29.6;	0.68;	20.1;	8.84;	3.19;	5.65
360	1.67;	33.4;	0.69;	22.9;	10.09;	4.78;	5.31
600	1.90;	38.0;	0.70;	26.4;	11.64;	7.97;	3.66
1440	2.42;	48.4;	0.72;	34.7;	15.26;	19.13;	0.00

Required storage volume	S_{req} = **5.65** m^3
Soakaway storage volume	S_{act} = l × d × w × V_{free} = **5.65** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume	t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 3hr 32min 37s

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

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SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.06

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = **440.0** m^2
Return period	Period = **30** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1500** mm
Width of pit	w = **2600** mm
Length of pit	l = **3957** mm
Percentage free volume	V_{free} = **95** %
Soil infiltration rate	f = **35.8×10^{-6}** m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **9835302** mm^2

Table equations

Inflow (cl.3.3.1)	I = M30 × A
Outflow (cl.3.3.2)	O = a_{s50} × f × D
Storage (cl.3.3.3)	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	30 year rainfall, M30 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.36;	7.2;	1.45;	10.5;	4.61;	0.11;	4.50
10	0.51;	10.2;	1.49;	15.2;	6.69;	0.21;	6.48
15	0.62;	12.4;	1.51;	18.7;	8.23;	0.32;	7.91
30	0.79;	15.8;	1.53;	24.2;	10.63;	0.63;	10.00
60	1.00;	20.0;	1.54;	30.9;	13.58;	1.27;	12.31
120	1.22;	24.4;	1.53;	37.4;	16.47;	2.54;	13.94
240	1.48;	29.6;	1.51;	44.8;	19.73;	5.07;	14.66
360	1.67;	33.4;	1.50;	50.0;	22.01;	7.61;	14.40
600	1.90;	38.0;	1.48;	56.1;	24.68;	12.68;	12.00
1440	2.42;	48.4;	1.43;	69.1;	30.40;	30.42;	0.00

Required storage volume	S_{req} = **14.66** m^3
Soakaway storage volume	S_{act} = l × d × w × V_{free} = **14.66** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume	t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 5hr 46min 58s

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

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	Calcs for SOAKAWAY FOR ROOF - 30y storm + climate change				Start page no./Revision DR0 3	
	Calcs by OR	Calcs date 11/11/2026	Checked by JB	Checked date NOV '26	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.06

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = **440.0** m^2
Return period	Period = **30** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1500** mm
Width of pit	w = **2600** mm
Length of pit	l = **4743** mm
Percentage free volume	V_{free} = **95** %
Soil infiltration rate	f = **35.8×10^{-6}** m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **11013822** mm^2

Table equations

Inflow (cl.3.3.1)	I = M30 × A
Outflow (cl.3.3.2)	O = a_{s50} × f × D
Storage (cl.3.3.3)	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	30 year rainfall, M30 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.36;	8.6;	1.47;	12.7;	5.60;	0.12;	5.48
10	0.51;	12.2;	1.51;	18.4;	8.11;	0.24;	7.88
15	0.62;	14.9;	1.53;	22.7;	9.99;	0.35;	9.63
30	0.79;	19.0;	1.54;	29.2;	12.85;	0.71;	12.14
60	1.00;	24.0;	1.54;	36.8;	16.21;	1.42;	14.79
120	1.22;	29.3;	1.52;	44.4;	19.53;	2.84;	16.69
240	1.48;	35.5;	1.49;	52.8;	23.25;	5.68;	17.57
360	1.67;	40.1;	1.47;	58.8;	25.86;	8.52;	17.34
600	1.90;	45.6;	1.44;	65.7;	28.90;	14.19;	14.71
1440	2.42;	58.1;	1.40;	81.0;	35.66;	34.07;	1.59

Required storage volume	S_{req} = **17.57** m^3
Soakaway storage volume	S_{act} = l × d × w × V_{free} = **17.57** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume	t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 6hr 11min 21s

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

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SOAKAWAY FOR ROOF - 100y storm	DR0 4

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OR	11/11/2026	JB	NOV '26		

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.06

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = **440.0** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1500** mm
Width of pit	w = **2600** mm
Length of pit	l = **5290** mm
Percentage free volume	V_{free} = **95** %
Soil infiltration rate	f = **35.8×10^{-6}** m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **11834440** mm^2

Table equations

Inflow (cl.3.3.1)	I = M100 × A
Outflow (cl.3.3.2)	O = a_{s50} × f × D
Storage (cl.3.3.3)	S = I - O

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)
5	0.36;	7.2;	1.84;	13.3;	5.84;	0.13;	5.71
10	0.51;	10.2;	1.91;	19.5;	8.59;	0.25;	8.33
15	0.62;	12.4;	1.95;	24.2;	10.63;	0.38;	10.25
30	0.79;	15.8;	2.00;	31.5;	13.88;	0.76;	13.12
60	1.00;	20.0;	2.03;	40.6;	17.86;	1.53;	16.34
120	1.22;	24.4;	2.01;	49.1;	21.61;	3.05;	18.55
240	1.48;	29.6;	1.97;	58.4;	25.70;	6.10;	19.60
360	1.67;	33.4;	1.94;	64.9;	28.55;	9.15;	19.40
600	1.90;	38.0;	1.91;	72.4;	31.87;	15.25;	16.62
1440	2.42;	48.4;	1.82;	88.2;	38.82;	36.61;	2.21

Required storage volume	S_{req} = **19.60** m^3
Soakaway storage volume	S_{act} = l × d × w × V_{free} = **19.60** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume	t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 6hr 25min 32s

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

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SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.06

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = **440.0** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1500** mm
Width of pit	w = **2600** mm
Length of pit	l = **6272** mm
Percentage free volume	V_{free} = **95** %
Soil infiltration rate	f = **35.8×10^{-6}** m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **13308090** mm^2

Table equations

Inflow (cl.3.3.1)	I = M100 × A
Outflow (cl.3.3.2)	O = a_{s50} × f × D
Storage (cl.3.3.3)	S = I - O

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)
5	0.36;	8.6;	1.88;	16.2;	7.14;	0.14;	6.99
10	0.51;	12.2;	1.95;	23.8;	10.48;	0.29;	10.19
15	0.62;	14.9;	1.99;	29.6;	13.02;	0.43;	12.59
30	0.79;	19.0;	2.02;	38.3;	16.87;	0.86;	16.01
60	1.00;	24.0;	2.01;	48.3;	21.27;	1.72;	19.55
120	1.22;	29.3;	1.98;	57.9;	25.45;	3.43;	22.02
240	1.48;	35.5;	1.93;	68.4;	30.10;	6.86;	23.24
360	1.67;	40.1;	1.89;	75.7;	33.32;	10.29;	23.03
600	1.90;	45.6;	1.85;	84.1;	37.02;	17.15;	19.87
1440	2.42;	58.1;	1.76;	101.9;	44.85;	41.16;	3.69

Required storage volume S_{req} = **23.24** m^3

Soakaway storage volume S_{act} = l × d × w × V_{free} = **23.24** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 6hr 46min 30s

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

PHILIP GOACHER ASSOCIATES Philip Goacher Associates 122A Newland Road Worthing West Sussex BN11 1LB	Project 77 Marlborough Road, Lancing				Job no. 26275	
	Calcs for SOAKAWAY FOR SIDE DRIVEWAY- 100y storm + climate				Start page no./Revision DR0 6	
	Calcs by OR	Calcs date 11/11/2026	Checked by JB	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with CIRIA C753 SUDS

Tedds calculation version 2.0.06

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = **76.0** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Width of pit	w = **1500** mm
Length of pit	l =**2000** mm
Percentage free volume	V_{free} = **95** %
Soil infiltration rate	f = **35.8×10^{-6}** m/s
Factor of safety	FOS = **1.5**
Infiltration coefficient	q = f / FOS = **23.9×10^{-6}** m/s
Base area	A_b = w × l = **3000000** mm^2
Perimeter	P = 2 × (w + l) = **7000** mm
Coefficient b	b = P × q / (A_b × V_{free}) = **0.21** hr^{-1}

Table equations (Eq. 25.4)

Rainfall intensity	i = M100 / D
Coefficient a	a = A_b / P - (A × i / (P × q))
Minimum depth required	H = a × ($e^{(-bD)}$ - 1)

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Intensity, i (mm/hr)	a (mm)	Min depth req (mm)
5	0.36;	8.6;	1.88;	16.2;	194.64;	-24167;	421
10	0.51;	12.2;	1.95;	23.8;	142.90;	-17629;	609
15	0.62;	14.9;	1.99;	29.6;	118.33;	-14524;	746
30	0.79;	19.0;	2.02;	38.3;	76.66;	-9259;	927
60	1.00;	24.0;	2.01;	48.3;	48.34;	-5679;	1081
120	1.22;	29.3;	1.98;	57.9;	28.93;	-3227;	1111
240	1.48;	35.5;	1.93;	68.4;	17.10;	-1732;	988
360	1.67;	40.1;	1.89;	75.7;	12.62;	-1166;	837
600	1.90;	45.6;	1.85;	84.1;	8.41;	-635;	558
1440	2.42;	58.1;	1.76;	101.9;	4.25;	-108;	107

Minimum depth of soakaway	H_{max} = **1111** mm
Time to empty soakaway to half vol. - Eq.24.6(2)	t_{s50} = V_{free} × A_b / (q × P) × Ln((H_{max} + A_b / P) / (H_{max} / 2 + A_b / P)) = 2hr 7min 15s

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

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Project	Job no.
77 Marlborough Road, Lancing	26275
Calcs for: SOAKAWAY FOR ROOF & CAR PARK - 100y storm + climate	Start page no./Revision: DR0 7

Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
OR	14/11/2026	JB			

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.06

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = **677.0** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1500** mm
Width of pit	w = **2600** mm
Length of pit	l = **9918** mm
Percentage free volume	V_{free} = **95** %
Soil infiltration rate	f = **35.8×10^{-6}** m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **18777039** mm^2

Table equations

Inflow (cl.3.3.1)	I = M100 × A
Outflow (cl.3.3.2)	O = a_{s50} × f × D
Storage (cl.3.3.3)	S = I - O

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)
5	0.36;	8.6;	1.88;	16.2;	10.98;	0.20;	10.78
10	0.51;	12.2;	1.95;	23.8;	16.12;	0.40;	15.72
15	0.62;	14.9;	1.99;	29.6;	20.03;	0.60;	19.42
30	0.79;	19.0;	2.02;	38.3;	25.95;	1.21;	24.74
60	1.00;	24.0;	2.01;	48.3;	32.72;	2.42;	30.30
120	1.22;	29.3;	1.98;	57.9;	39.16;	4.84;	34.32
240	1.48;	35.5;	1.93;	68.4;	46.31;	9.68;	36.63
360	1.67;	40.1;	1.89;	75.7;	51.27;	14.52;	36.75
600	1.90;	45.6;	1.85;	84.1;	56.96;	24.20;	32.76
1440	2.42;	58.1;	1.76;	101.9;	69.01;	58.08;	10.93

Required storage volume	S_{req} = **36.75** m^3
Soakaway storage volume	S_{act} = l × d × w × V_{free} = **36.75** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume	t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 7hr 35min 35s

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

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Job Title: 77 HAMBOROUGH ROAD, NORTHAM

Designed by	Checked by	Date	Job no.	Sheet no.
DR	VB	10/1/26	4277	DR08

SURFACE WATER DRAINAGE

1) ROOF DRAINAGE

FLOW RATE = I x 1000 /(D x 60)

5min RAIN : FL = 7.14 x 1000 /(5x60) = 23.8 l/s
(MOST INTENSIVE)

FOR EACH RUN - 11.9 l/s

ACCORDING TO DIAGRAM 3 IN APPENDIX DOC H:

100 mm 1:80 - 6.7 l/s
1:100 - 5.8 l/s

150 mm 1:80 - 20 l/s
1:100 - 18.8 l/s

2) RETAINING DRAINAGE

A_{REC} = 263 x 0.9 = 236.7 m2

FL = 236.7 /220 x 11.9 = 12.8 l/s

3) ROOF GULLIES

A_{REC} = 84 x 0.9/3 = 25.2 m2

FL = 84 x 0.9 /220 x 11.9 = 4.09 l/s

ACO HYDRAULIC DESIGN

+ SUMMARY REPORT - Page 1

Project Name: 26275 - 77 Marlborough Road **Designer:** Philip Goacher **Project Date:** 14th November 2026

Location: Business Park, 77 Marlborough Rd, Lancing BN15 8UF, UK **Print Date:** 14th November 2026

+ INPUTS

M5-60: 20mm/hr **Ratio R:** 0.34

RUN / OPTION	LENGTH (m)	AREA (m2)	SLOPE (%)	IMPERM. FACTOR	CALC. EQUATION	RETURN PERIOD (years)	CLIMATE CHANGE (%)	STORM DURATION (mins)	RAINFALL INTENSITY (mm/hr)	INFLOW CONTROL (l/s/m)	Point Inflow Interlinked from	Cumulative Point Inflows (l/s)	Discharge control (l/s)
1A	17.10	262.38	1.00	0.9	SVF	100	0	N/A	194.64	Free	None	0.00	None

+ OUTPUTS

M5-60: 20mm/hr **Ratio R:** 0.34

RUN / OPTION	ACO PRODUCT	Part No.	METERAGE (m)	OUTFLOW (l/s)	CAPACITY (%)	MAX* VELOCITY (m/s)	MIN FREEBOARD (m)	EXCAVATION VOLUME (m3)	CONCRETE VOLUME (m3)
1A	Monodrain PD100D 20.0	20620	17.10	11.00	85.14	0.99	0.03	2.19	1.50

*ACO would typically suggest flow velocities of 0.7m/s or greater in channels to be considered self-cleansing velocities. Flow velocities in the upper reaches of linear drainage systems are not likely to achieve self-cleansing velocities.

+ SUMMARY OF PARTS

ACO PRODUCT	Cumulative Product Meterage (m)	Part Number	CUMULATIVE OUTFLOW (l/s)	EXCAVATION VOLUME (m3)	CONCRETE VOLUME (m3)
Monodrain PD100D 20.0	17.10	20620	11.00	2.19	1.50

ACO HYDRAULIC DESIGN

+ DETAILED RUN REPORT - Page 1

Project Name: 26275 - 77 Marlborough Road **Designer:** Philip Goacher **Project Date:** 14th November 2026

Location: Business Park, 77 Marlborough Rd, Lancing BN15 8UF, UK **Print Date:** 14th November 2026

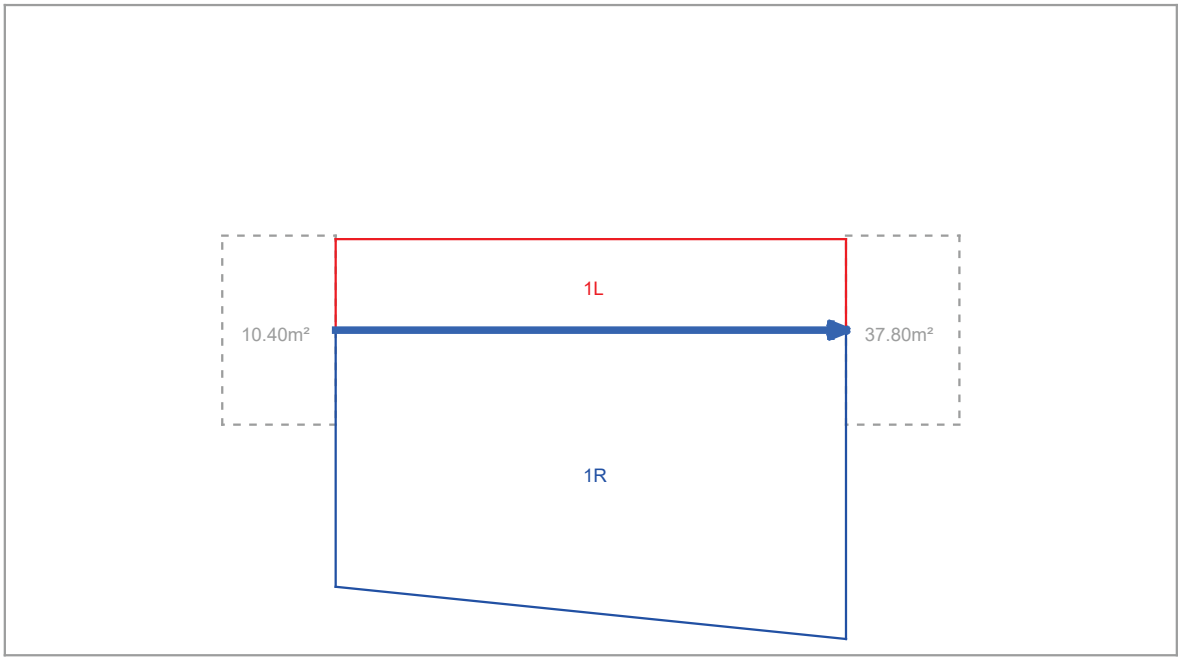
Project Notes:

+ INPUT DATA:- Run 1: 'rear car park', Option A 'New Option'

M5-60: 20mm/hr **Ratio R:** 0.34

LENGTH (m)	AREA (m2)	SLOPE (%)	IMPERM. FACTOR	CALC. EQUATION	RETURN PERIOD (years)	CLIMATE CHANGE (%)	STORM DURATION (mins)	RAINFALL INTENSITY (mm/hr)	INFLOW CONTROL (l/s/m)	Point Inflow Interlinked from	Cumulative Point Inflows l/s
17.10	262.38	1.00	0.90	SVF	100	0.00	-	194.64	None	None	0.00

+ CHANNEL LAYOUT



+ RAINFALL DATA

Duration	Intensity (mm/h)
5 mins	137.47
10 mins	114.61
15 mins	94.48
30 mins	63.12
1 hour	39.80
2 hours	24.83
4 hours	14.65
6 hours	10.71
10 hours	7.28
24 hours	3.73
48 hours	2.07



ACO HYDRAULIC DESIGN

+ DETAILED RUN REPORT - Page 2

Project Name: 26275 - 77 Marlborough Road **Designer:** Philip Goacher **Project Date:** 14th November 2026

Location: Business Park, 77 Marlborough Rd, Lancing BN15 8UF, UK **Print Date:** 14th November 2026

+ OUTPUTS:- Run 1: 'rear car park', Option A 'New Option'

OUTFLOW (l/s)	CAPACITY (%)	MAX* VELOCITY (m/s)	MIN FREEBOARD (m)	EXCAVATION VOLUME (m3)	CONCRETE VOLUME (m3)
11.00	85.14	0.99	0.03	2.19	1.50

Monodrain

	1
System	PD100D 20.0
W - Width (mm)	100
H - Invert (mm)	240
Length (m)	17.10

