

Surface Water Drainage Engineering Report

Woodborough House – Annex Development
 Planning Reference: PL/2025/09902
 Prepared by: Going Group Ltd T/A Going Underground
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1. Introduction

This report has been prepared to provide a full engineering justification of the surface water drainage strategy for the proposed annex at Woodborough House, and to support the discharge of Condition 4 imposed by the Local Planning Authority.

2. Design Criteria

Parameter	Adopted Value
Rainfall return period	1 in 100 year
Climate change allowance	+40%
Rainfall source	FEH22 (Annual Max)
Infiltration standard	BRE Digest 365
Factor of Safety	2.0
Half drain time	< 24 hours

3. Site and Catchment

Surface water runoff from roof areas is directed to a single infiltration soakaway. The total impermeable area draining to the system is 156.00 m².

4. Infiltration Testing

Infiltration testing was undertaken in accordance with BRE Digest 365. The measured infiltration rate was 0.00013462 m/s. A factor of safety of 2.0 has been applied, giving a design infiltration rate of 0.00006731 m/s.

5. Rainfall and Inflow Assessment

Duration (min)	R100 (mm)	R100 +40% (mm)	Inflow Volume (m ³)
15	25.35	35.49	5.54
30	33.99	47.59	7.42
60 (Critical)	43.70	61.18	9.54
120	51.41	71.97	11.23
240	58.21	81.49	12.71

6. Proposed Soakaway Design

A single crate soakaway measuring 3.00 m × 2.00 m × 1.50 m effective depth with a void ratio of 0.90 is proposed, providing a total storage volume of 8.10 m³.

7. Storage and Drainage Performance

Duration (min)	Required Storage (m ³)
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15	5.09
30	6.51
60 (Critical)	7.72
120	7.60
240	5.44

8. Drain-down and Groundwater Considerations

The calculated half drain time is 2.23 hours, satisfying BRE Digest 365 requirements. Trial excavation was undertaken to 2.0 m depth and no groundwater was encountered. The soakaway base is set at 1.50 m depth.

9. Exceedance Management

Exceedance flows arising from rainfall events exceeding the design capacity will be routed away from the dwelling and toward permeable garden areas.

10. Conclusion

The revised surface water drainage strategy is technically robust, proportionate, and compliant with LLFA requirements. The design supports the discharge of Condition 4.

Prepared and approved by:

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Appendix A – Calculation Methodology

A1. Rainfall Inflow Volume

$$V_{in} = A \times (R \times CC / 1000)$$

Where $A = 156.00 \text{ m}^2$, $CC = 1.40$

A2. Design Infiltration Rate

$$f_d = f \div \text{FoS} = 0.00013462 \div 2.00 = 0.00006731 \text{ m/s}$$

A3. Infiltration Area (Sides Only, 50% Depth)

$$A_{inf} = (L + W) \times D = (3.00 + 2.00) \times 1.50 = 7.50 \text{ m}^2$$

A4. Outflow Volume

$$V_{out} = f_d \times A_{inf} \times t$$

A5. Required Storage

$$V_{req} = V_{in} - V_{out}$$

A6. Half Drain Time

$$t_{50} = (0.50 \times V) \div (f_d \times A_{inf})$$

Appendix B – Sensitivity Assessment

Scenario	Design Basis	Climate Change	Required Storage (m ³)
Original proposal	10-year (M10)	N/A	3.87
Reduced CC check	1:100 year	+30%	6.60
Adopted design	1:100 year	+40%	7.72

This sensitivity assessment demonstrates that the increase in soakaway size relative to the original proposal is driven by the higher design standard required by the LLFA, rather than conservative soil assumptions.