## GENERAL NOTES

1. All setting out to be in accordance with the Architects drawings. Any discrepancies between the Engineers and the Architects drawings to be referred to the Architect before proceeding. Dimensions must not be scaled.
2. All drainage to be installed in accordance with relevant Building Regulations documents and Current Sewers for Adoption where applicable.
3. Connections to Public sewers to be agreed and inspected by Water Authority.
4. Invert level, size and cover levels to existing manholes and sewers to be checked prior to any construction. Any discrepancies to be reported immediately.
5. Invert to base of soil stack bends to be 450mm below lowest branch connection for up to 3 storeys buildings. For buildings up to 5 storeys the invert to base of soil stack bends should be not less than 750mm.
6. All RWP and Foul Water drain point setting out is to be confirmed by Architect.
7. All RWP & SVP sizes & setting out by Architect / M&E Engineer. All below ground connections to match above ground outlet size, Min 100/110mm diameter.
8. Foul drains to project 100mm above finished floor level.
9. All internal Manholes and Inspection Chambers to have double sealed recessed covers to suit floor finishes by Architect.
10. All external covers in footpaths and roads in non tarmac areas to have recessed trays to suit the paving material.
11. Refer to drainage specification for pipe materials.
12. All pipework to be 100/110Ø UNO. Refer to note 7 connection sizes.
13. All foul and surface water drainage stacks to have above ground rodding access, refer to above ground drainage layout by others.
14. This drawing has been produced in colour and should be reproduced in colour for clarity.
15. A CCTV Survey and report in WINCAN format for all new drainage will be required before the "As Built" drawings will be issued.

### IDENTIFIES RISKS DURING THE CONSTRUCTION PROCESS ON THE DRAWINGS:

NOTE: The list below and notes on the drawing identify risks which are deemed to be unusual, abnormal, residual or unexpected to a competent contractor carrying out the works. These notes relate to risks which we have been unable to design out.

Key

- Road Gully
- Storm Polypropylene Inspection Chamber
- Storm Concrete Inspection Chamber
- Storm Concrete Manhole
- Permeable Sub-base
- Permeable Paving
- Grasscrete Paving
- Foul Polypropylene Inspection Chamber
- Foul Concrete Inspection Chamber
- Foul Concrete Manhole
- FW New Foul Sewer
- New Foul Rising Main
- SW New Surface Water Sewer
- New Linear Drainage System

Existing Drainage

- Existing Manholes
- Ex.FW Existing Foul Sewer
- Ex.SW Existing Surface Water Sewer
- Ex.FW Existing Sewers to be abandoned and grouted up either end
- Ex.SW

| Rev. | Amendment | Drn | Chkd | Date |
|---|---|---|---|---|
| P03 | Drainage updated to suit revised entrance | NJ | GT | 11.07.18 |
| P02 | Preliminary Issue | NJ | GT | 29.06.18 |
| P01 | Preliminary Issue | NJ | GT | 21.06.18 |

Drg. Status: Preliminary — Suitability

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Client: Bicester Heritage Ltd.

Project: Bicester Heritage Hotel

Title: Drainage Layout Sheet 2 of 3

Reviewed Scheme: GT — Date: 21.06.18
Reviewed Final — Date:
Scales at A1: 1:250 — Project No.: X162034

| Project Ref. | Originator | Zone | Level | Type | Role | Drg No. | Rev. |
|---|---|---|---|---|---|---|---|
| BHH | AKSW | XX | GF | DR | C | 9202 | P03 |

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12. All pipework to be 100/110Ø UNO. Refer to note 7 connection sizes.
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**IDENTIFIES RISKS DURING THE CONSTRUCTION PROCESS ON THE DRAWINGS:**

NOTE: The list below and notes on the drawing identify risks which are deemed to be unusual, abnormal, residual or unexpected to a competent contractor carrying out the works. These notes relate to risks which we have been unable to design out.

New cellular soakaway
- Assumed infiltration rate $1.43x10^{-6}$ m/s (TBC)
- Dimensions (TBC): 16.0x40.0x1.2m
- Volume (TBC): 729.6 $m^3$

Car Park 3
- Permeable sub-base min. 300mm thick (TBC). Assumed max. 1:80 fall. Assumed infiltration rate $1.43x10^{-6}$ m/h
- Parking bays with permeable surface
- Access road with impermeable surface. Levels to fall towards parking bays.

Connection to Thames Water foul sewer Pre-development Enquiry and S106 Connection Application required.

Assumed manhole location, to be confirmed on site

Swimming pool backwash tank

Pumping station 24 h storage

Check Dam

Main Access to Hotel

RECEPTION

GYM SWIMMING POOL CHILDREN'S AREA 470m²

Restaurant (openable te 150m²

S07

S08

TW 2802 CL 0.00 IL 0.00

TW 2801 CL 0.00 IL 0.00

TW 1703 CL 84.17 IL 80.85 TBC

TW 1702 CL 84.44 IL 79.84

Key

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- Foul Concrete Inspection Chamber
- Foul Concrete Manhole
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- New Foul Rising Main
- New Surface Water Sewer
- New Linear Drainage System
- Existing Drainage
- Existing Manholes
- Existing Foul Sewer
- Existing Surface Water Sewer
- Existing Sewers to be abandoned and grouted up either end

| Rev. | Amendment | Drn | Chkd | Date |
|---|---|---|---|---|
| P03 | Drainage updated to suit revised entrance | NJ | GT | 11.07.18 |
| P02 | Preliminary Issue | NJ | GT | 29.06.18 |
| P01 | Preliminary Issue | NJ | GT | 21.06.18 |

Drg. Status: Preliminary

Suitability

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Client: Bicester Heritage Ltd.

Project: Bicester Heritage Hotel

Title: Drainage Layout Sheet 3 of 3

Reviewed Scheme: GT Date: 21.06.18

Reviewed Final: Date:

Scales at A1: 1:250 Project No.: X162034

| Project Ref. | Originator | Zone | Level | Type | Role | Drg No. | Rev. |
|---|---|---|---|---|---|---|---|
| BHH | AKSW | XX | GF | DR | C | 9203 | P03 |

## GENERAL NOTES

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2. All drainage to be installed in accordance with relevant Building Regulations documents and Current Sewers for Adoption where applicable.
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Key

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- Foul Concrete Inspection Chamber
- Foul Concrete Manhole
- FW — New Foul Sewer
- New Foul Rising Main
- SW — New Surface Water Sewer
- New Linear Drainage System

Existing Drainage

- Existing Manholes
- Existing Foul Sewer
- Existing Surface Water Sewer
- Existing Sewers to be abandoned and grouted up either end

Flooded Area max. 50mm deep.

| Rev. | Amendment | Drn | Chkd | Date |
|---|---|---|---|---|
| P03 | Drainage updated to suit revised entrance | NJ | GT | 11.07.18 |
| P02 | Preliminary Issue | NJ | GT | 29.06.18 |
| P01 | Preliminary Issue | NJ | GT | 21.06.18 |

Drg. Status: Preliminary
Suitability:

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☐ London ☐ Hitchin ■ Oxford ☐ Southampton ☐ Birmingham

Client: Bicester Heritage Ltd.

Project: Bicester Heritage Hotel

Title: Flooded Areas
1 in 100 Year + 40% CC
Critical Storm

Reviewed Scheme: GT Date: 21.06.18
Reviewed Final: Date:
Scales at A1: 1:250 Project No.: X162034

| Project Ref. | Originator | Zone | Level | Type | Role | Drg No. | Rev. |
|---|---|---|---|---|---|---|---|
| BHH | AKSW | XX | GF | DR | C | 9209 | P03 |

## Appendix D

## Proposed Drainage Calculations

## STORM SEWER DESIGN by the Modified Rational Method

### Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

| | | | |
|---|---|---|---|
| Return Period (years) | 30 | PIMP (%) | 100 |
| M5-60 (mm) | 20.000 | Add Flow / Climate Change (%) | 0 |
| Ratio R | 0.404 | Minimum Backdrop Height (m) | 0.200 |
| Maximum Rainfall (mm/hr) | 50 | Maximum Backdrop Height (m) | 1.500 |
| Maximum Time of Concentration (mins) | 30 | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha) | 0.000 | Min Vel for Auto Design only (m/s) | 1.00 |
| Volumetric Runoff Coeff. | 0.750 | Min Slope for Optimisation (1:X) | 500 |

Designed with Level Soffits

### Simulation Criteria for Storm

| | | | |
|---|---|---|---|
| Volumetric Runoff Coeff | 0.750 | Additional Flow - % of Total Flow | 0.000 |
| Areal Reduction Factor | 1.000 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start (mins) | 0 | Inlet Coeffiecient | 0.800 |
| Hot Start Level (mm) | 0 | Flow per Person per Day (l/per/day) | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins) | 60 |
| Foul Sewage per hectare (l/s) | 0.000 | Output Interval (mins) | 1 |

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 1 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 0 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 30 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Storm Duration (mins) | 30 |
| Ratio R | 0.404 | | |

## Online Controls for Storm

### Pump Manhole: S08_Soakaway, DS/PN: S1.009, Volume (m³): 4.6

Invert Level (m) 80.722

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 0.0000 | 0.900 | 0.0000 | 1.700 | 0.0000 | 2.500 | 0.0000 |
| 0.200 | 0.0000 | 1.000 | 0.0000 | 1.800 | 0.0000 | 2.600 | 0.0000 |
| 0.300 | 0.0000 | 1.100 | 0.0000 | 1.900 | 0.0000 | 2.700 | 0.0000 |
| 0.400 | 0.0000 | 1.200 | 0.0000 | 2.000 | 0.0000 | 2.800 | 0.0000 |
| 0.500 | 0.0000 | 1.300 | 0.0000 | 2.100 | 0.0000 | 2.900 | 0.0000 |
| 0.600 | 0.0000 | 1.400 | 0.0000 | 2.200 | 0.0000 | 3.000 | 0.0000 |
| 0.700 | 0.0000 | 1.500 | 0.0000 | 2.300 | 0.0000 | | |
| 0.800 | 0.0000 | 1.600 | 0.0000 | 2.400 | 0.0000 | | |

## Storage Structures for Storm

### Cellular Storage Manhole: S08_Soakaway, DS/PN: S1.009

Invert Level (m) 79.750 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00515 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00515

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 640.0 | 640.0 | 1.201 | 0.0 | 774.4 |
| 1.200 | 640.0 | 774.4 | | | |

## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 1 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 0 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.404 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 20.000 | Cv (Winter) | 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | OFF |
| DVD Status | ON |
| Inertia Status | ON |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow |
|---|---|---|---|---|---|---|---|
| S1.000 | S01 | 15 Winter | 1 | +0% | 30/15 Winter | 100/15 Summer | |
| S1.001 | S0JT | 15 Winter | 1 | +0% | | | |
| S1.002 | S0JT | 15 Winter | 1 | +0% | | | |
| S1.003 | S0JT | 15 Winter | 1 | +0% | | | |
| S1.004 | S02 | 15 Winter | 1 | +0% | 30/15 Winter | | |
| S1.005 | S0JT | 15 Winter | 1 | +0% | | | |
| S1.006 | S0JT | 15 Winter | 1 | +0% | | | |
| S1.007 | S03 | 15 Winter | 1 | +0% | 100/15 Summer | | |
| S2.000 | S04 | 15 Winter | 1 | +0% | 100/15 Summer | 100/15 Winter | |
| S2.001 | S05 | 15 Winter | 1 | +0% | 100/15 Summer | | |
| S2.002 | S0JT | 15 Winter | 1 | +0% | | | |
| S2.003 | S06 | 15 Winter | 1 | +0% | 30/15 Summer | | |
| S1.008 | S07 | 15 Winter | 1 | +0% | 30/15 Summer | | |
| S1.009 | S08_Soakaway | 2880 Winter | 1 | +0% | 100/2880 Winter | | |

## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S01 | | 82.056 | -0.169 | 0.000 | 0.14 | | 4.9 | OK |
| S1.001 | S0JT | | 82.006 | -0.152 | 0.000 | 0.23 | | 8.3 | OK* |
| S1.002 | S0JT | | 81.955 | -0.136 | 0.000 | 0.33 | | 12.0 | OK* |
| S1.003 | S0JT | | 81.905 | -0.119 | 0.000 | 0.45 | | 16.4 | OK* |
| S1.004 | S02 | | 81.780 | -0.177 | 0.000 | 0.35 | | 24.3 | OK |
| S1.005 | S0JT | | 81.715 | -0.167 | 0.000 | 0.41 | | 28.0 | OK* |
| S1.006 | S0JT | | 81.633 | -0.174 | 0.000 | 0.36 | | 32.9 | OK* |
| S1.007 | S03 | | 81.416 | -0.241 | 0.000 | 0.27 | | 41.2 | OK |
| S2.000 | S04 | | 82.053 | -0.172 | 0.000 | 0.12 | | 4.9 | OK |
| S2.001 | S05 | | 81.719 | -0.199 | 0.000 | 0.25 | | 20.4 | OK |
| S2.002 | S0JT | | 81.501 | -0.191 | 0.000 | 0.28 | | 25.6 | OK* |
| S2.003 | S06 | | 81.300 | -0.166 | 0.000 | 0.40 | | 34.3 | OK |
| S1.008 | S07 | | 81.049 | -0.139 | 0.000 | 0.71 | | 83.8 | OK |
| S1.009 | S08_Soakaway | | 80.035 | -1.062 | 0.000 | 0.00 | | 0.0 | OK |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | S01 | 2 |
| S1.001 | S0JT | |
| S1.002 | S0JT | |
| S1.003 | S0JT | |
| S1.004 | S02 | |
| S1.005 | S0JT | |
| S1.006 | S0JT | |
| S1.007 | S03 | |
| S2.000 | S04 | 1 |
| S2.001 | S05 | |
| S2.002 | S0JT | |
| S2.003 | S06 | |
| S1.008 | S07 | |
| S1.009 | S08_Soakaway | |

## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 1 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 0 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.404 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 20.000 | Cv (Winter) | 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | OFF |
| DVD Status | ON |
| Inertia Status | ON |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow |
|---|---|---|---|---|---|---|---|
| S1.000 | S01 | 15 Winter | 30 | +0% | 30/15 Winter | 100/15 Summer | |
| S1.001 | S0JT | 15 Winter | 30 | +0% | | | |
| S1.002 | S0JT | 15 Winter | 30 | +0% | | | |
| S1.003 | S0JT | 15 Winter | 30 | +0% | | | |
| S1.004 | S02 | 15 Winter | 30 | +0% | 30/15 Winter | | |
| S1.005 | S0JT | 15 Winter | 30 | +0% | | | |
| S1.006 | S0JT | 15 Winter | 30 | +0% | | | |
| S1.007 | S03 | 15 Winter | 30 | +0% | 100/15 Summer | | |
| S2.000 | S04 | 15 Winter | 30 | +0% | 100/15 Summer | 100/15 Winter | |
| S2.001 | S05 | 15 Winter | 30 | +0% | 100/15 Summer | | |
| S2.002 | S0JT | 15 Winter | 30 | +0% | | | |
| S2.003 | S06 | 15 Winter | 30 | +0% | 30/15 Summer | | |
| S1.008 | S07 | 15 Winter | 30 | +0% | 30/15 Summer | | |
| S1.009 | S08_Soakaway | 4320 Winter | 30 | +0% | 100/2880 Winter | | |

## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S01 | | 82.225 | 0.000 | 0.000 | 0.31 | | 10.9 | SURCHARGED |
| S1.001 | S0JT | | 82.158 | 0.000 | 0.000 | 0.53 | | 19.4 | SURCHARGED* |
| S1.002 | S0JT | | 82.091 | 0.000 | 0.000 | 0.76 | | 27.6 | SURCHARGED* |
| S1.003 | S0JT | | 82.024 | 0.000 | 0.000 | 1.04 | | 37.9 | SURCHARGED* |
| S1.004 | S02 | | 81.972 | 0.015 | 0.000 | 0.85 | | 58.6 | SURCHARGED |
| S1.005 | S0JT | | 81.879 | -0.003 | 0.000 | 1.00 | | 68.6 | OK* |
| S1.006 | S0JT | | 81.737 | -0.070 | 0.000 | 0.94 | | 84.9 | OK* |
| S1.007 | S03 | | 81.601 | -0.056 | 0.000 | 0.68 | | 105.3 | OK |
| S2.000 | S04 | | 82.085 | -0.140 | 0.000 | 0.29 | | 11.9 | OK |
| S2.001 | S05 | | 81.808 | -0.110 | 0.000 | 0.70 | | 58.4 | OK |
| S2.002 | S0JT | | 81.692 | 0.000 | 0.000 | 0.73 | | 65.7 | SURCHARGED* |
| S2.003 | S06 | | 81.612 | 0.146 | 0.000 | 0.99 | | 83.9 | SURCHARGED |
| S1.008 | S07 | | 81.377 | 0.189 | 0.000 | 1.80 | | 212.4 | SURCHARGED |
| S1.009 | S08_Soakaway | | 80.406 | -0.691 | 0.000 | 0.00 | | 0.0 | OK |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | S01 | 2 |
| S1.001 | S0JT | |
| S1.002 | S0JT | |
| S1.003 | S0JT | |
| S1.004 | S02 | |
| S1.005 | S0JT | |
| S1.006 | S0JT | |
| S1.007 | S03 | |
| S2.000 | S04 | 1 |
| S2.001 | S05 | |
| S2.002 | S0JT | |
| S2.003 | S06 | |
| S1.008 | S07 | |
| S1.009 | S08_Soakaway | |

## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 1 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 0 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.404 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 20.000 | Cv (Winter) | 0.840 |

| | | | |
|---|---|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status | ON |
| Analysis Timestep | Fine | Inertia Status | ON |
| DTS Status | OFF | | |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080 |
| Return Period(s) (years) | 100 |
| Climate Change (%) | 0 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|---|---|---|---|---|---|---|---|---|
| S1.000 | S01 | 15 Winter | 100 | +0% | 100/15 Summer | | | |
| S1.001 | S0JT | 30 Winter | 100 | +0% | | | | |
| S1.002 | S0JT | 30 Winter | 100 | +0% | | | | |
| S1.003 | S0JT | 30 Winter | 100 | +0% | | | | |
| S1.004 | S02 | 15 Winter | 100 | +0% | 100/15 Summer | | | |
| S1.005 | S0JT | 30 Winter | 100 | +0% | | | | |
| S1.006 | S0JT | 15 Winter | 100 | +0% | | | | |
| S1.007 | S03 | 15 Winter | 100 | +0% | 100/15 Summer | | | |
| S2.000 | S04 | 15 Winter | 100 | +0% | | | | |
| S2.001 | S05 | 15 Winter | 100 | +0% | 100/15 Summer | | | |
| S2.002 | S0JT | 30 Winter | 100 | +0% | | | | |
| S2.003 | S06 | 15 Winter | 100 | +0% | 100/15 Summer | | | |
| S1.008 | S07 | 15 Winter | 100 | +0% | 100/15 Summer | | | |
| S1.009 | S08_Soakaway | 4320 Winter | 100 | +0% | | | | |

## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S01 | 82.506 | 0.281 | 0.000 | 0.40 | | 14.0 | SURCHARGED | |
| S1.001 | S0JT | 82.158 | 0.000 | 0.000 | 0.56 | | 20.5 | SURCHARGED* | |
| S1.002 | S0JT | 82.091 | 0.000 | 0.000 | 0.82 | | 30.0 | SURCHARGED* | |
| S1.003 | S0JT | 82.024 | 0.000 | 0.000 | 1.14 | | 41.7 | SURCHARGED* | |
| S1.004 | S02 | 82.238 | 0.281 | 0.000 | 1.04 | | 71.6 | SURCHARGED | |
| S1.005 | S0JT | 81.882 | 0.000 | 0.000 | 1.08 | | 74.1 | SURCHARGED* | |
| S1.006 | S0JT | 81.807 | 0.000 | 0.000 | 1.09 | | 99.0 | SURCHARGED* | |
| S1.007 | S03 | 81.858 | 0.201 | 0.000 | 0.82 | | 126.6 | SURCHARGED | |
| S2.000 | S04 | 82.156 | -0.069 | 0.000 | 0.37 | | 14.9 | OK | |
| S2.001 | S05 | 82.118 | 0.200 | 0.000 | 0.80 | | 66.1 | SURCHARGED | |
| S2.002 | S0JT | 81.692 | 0.000 | 0.000 | 0.73 | | 65.7 | SURCHARGED* | |
| S2.003 | S06 | 81.854 | 0.388 | 0.000 | 1.18 | | 100.0 | SURCHARGED | |
| S1.008 | S07 | 81.524 | 0.336 | 0.000 | 2.18 | | 257.4 | SURCHARGED | |
| S1.009 | S08_Soakaway | 80.602 | -0.495 | 0.000 | 0.00 | | 0.0 | OK | |

## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 1 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 0 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.404 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 20.000 | Cv (Winter) | 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | OFF |
| DVD Status | ON |
| Inertia Status | ON |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 40 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow |
|---|---|---|---|---|---|---|---|
| S1.000 | S01 | 15 Winter | 100 | +40% | 30/15 Winter | 100/15 Summer | |
| S1.001 | S0JT | 15 Winter | 100 | +40% | | | |
| S1.002 | S0JT | 15 Winter | 100 | +40% | | | |
| S1.003 | S0JT | 15 Winter | 100 | +40% | | | |
| S1.004 | S02 | 15 Winter | 100 | +40% | 30/15 Winter | | |
| S1.005 | S0JT | 5760 Winter | 100 | +40% | | | |
| S1.006 | S0JT | 5760 Winter | 100 | +40% | | | |
| S1.007 | S03 | 15 Winter | 100 | +40% | 100/15 Summer | | |
| S2.000 | S04 | 15 Winter | 100 | +40% | 100/15 Summer | 100/15 Winter | |
| S2.001 | S05 | 15 Winter | 100 | +40% | 100/15 Summer | | |
| S2.002 | S0JT | 4320 Winter | 100 | +40% | | | |
| S2.003 | S06 | 15 Winter | 100 | +40% | 30/15 Summer | | |
| S1.008 | S07 | 5760 Winter | 100 | +40% | 30/15 Summer | | |
| S1.009 | S08_Soakaway | 5760 Winter | 100 | +40% | 100/2880 Winter | | |

## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S01 | | 83.003 | 0.778 | 3.544 | 1.20 | | 42.2 | FLOOD |
| S1.001 | S0JT | | 82.158 | 0.000 | 0.000 | 1.31 | | 47.8 | SURCHARGED* |
| S1.002 | S0JT | | 82.091 | 0.000 | 0.000 | 1.55 | | 56.5 | SURCHARGED* |
| S1.003 | S0JT | | 82.024 | 0.000 | 0.000 | 1.79 | | 65.2 | SURCHARGED* |
| S1.004 | S02 | | 82.916 | 0.959 | 0.000 | 1.20 | | 82.0 | FLOOD RISK |
| S1.005 | S0JT | | 81.882 | 0.000 | 0.000 | 0.03 | | 2.1 | SURCHARGED* |
| S1.006 | S0JT | | 81.807 | 0.000 | 0.000 | 0.03 | | 2.6 | SURCHARGED* |
| S1.007 | S03 | | 82.388 | 0.731 | 0.000 | 1.04 | | 159.9 | SURCHARGED |
| S2.000 | S04 | | 83.000 | 0.775 | 0.120 | 0.53 | | 21.4 | FLOOD |
| S2.001 | S05 | | 82.971 | 1.053 | 0.000 | 0.95 | | 78.7 | FLOOD RISK |
| S2.002 | S0JT | | 81.692 | 0.000 | 0.000 | 0.03 | | 2.5 | SURCHARGED* |
| S2.003 | S06 | | 82.477 | 1.011 | 0.000 | 1.63 | | 137.7 | SURCHARGED |
| S1.008 | S07 | | 82.218 | 1.030 | 0.000 | 0.06 | | 6.8 | SURCHARGED |
| S1.009 | S08_Soakaway | | 82.218 | 1.121 | 0.000 | 0.00 | | 0.0 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | S01 | 2 |
| S1.001 | S0JT | |
| S1.002 | S0JT | |
| S1.003 | S0JT | |
| S1.004 | S02 | |
| S1.005 | S0JT | |
| S1.006 | S0JT | |
| S1.007 | S03 | |
| S2.000 | S04 | 1 |
| S2.001 | S05 | |
| S2.002 | S0JT | |
| S2.003 | S06 | |
| S1.008 | S07 | |
| S1.009 | S08_Soakaway | |

## Summary of Results for 1 year Return Period

Half Drain Time : 220 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.052 | 0.052 | 0.3 | 3.3 | O K |
| 30 min Summer | 0.066 | 0.066 | 0.4 | 5.4 | O K |
| 60 min Summer | 0.078 | 0.078 | 0.5 | 7.5 | O K |
| 120 min Summer | 0.087 | 0.087 | 0.5 | 9.3 | O K |
| 180 min Summer | 0.091 | 0.091 | 0.5 | 10.1 | O K |
| 240 min Summer | 0.093 | 0.093 | 0.5 | 10.6 | O K |
| 360 min Summer | 0.095 | 0.095 | 0.6 | 11.2 | O K |
| 480 min Summer | 0.097 | 0.097 | 0.6 | 11.5 | O K |
| 600 min Summer | 0.097 | 0.097 | 0.6 | 11.6 | O K |
| 720 min Summer | 0.097 | 0.097 | 0.6 | 11.6 | O K |
| 960 min Summer | 0.096 | 0.096 | 0.6 | 11.3 | O K |
| 1440 min Summer | 0.093 | 0.093 | 0.5 | 10.6 | O K |
| 2160 min Summer | 0.087 | 0.087 | 0.5 | 9.3 | O K |
| 2880 min Summer | 0.081 | 0.081 | 0.5 | 8.1 | O K |
| 4320 min Summer | 0.071 | 0.071 | 0.4 | 6.2 | O K |
| 5760 min Summer | 0.064 | 0.064 | 0.4 | 5.0 | O K |
| 7200 min Summer | 0.058 | 0.058 | 0.3 | 4.1 | O K |
| 8640 min Summer | 0.053 | 0.053 | 0.3 | 3.4 | O K |
| 10080 min Summer | 0.050 | 0.050 | 0.3 | 3.0 | O K |
| 15 min Winter | 0.058 | 0.058 | 0.3 | 4.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 31.093 | 0.0 | 19 |
| 30 min Summer | 20.252 | 0.0 | 33 |
| 60 min Summer | 12.800 | 0.0 | 62 |
| 120 min Summer | 7.926 | 0.0 | 120 |
| 180 min Summer | 5.960 | 0.0 | 172 |
| 240 min Summer | 4.862 | 0.0 | 198 |
| 360 min Summer | 3.628 | 0.0 | 260 |
| 480 min Summer | 2.939 | 0.0 | 328 |
| 600 min Summer | 2.495 | 0.0 | 398 |
| 720 min Summer | 2.183 | 0.0 | 464 |
| 960 min Summer | 1.768 | 0.0 | 600 |
| 1440 min Summer | 1.314 | 0.0 | 866 |
| 2160 min Summer | 0.977 | 0.0 | 1252 |
| 2880 min Summer | 0.791 | 0.0 | 1616 |
| 4320 min Summer | 0.588 | 0.0 | 2336 |
| 5760 min Summer | 0.476 | 0.0 | 3056 |
| 7200 min Summer | 0.405 | 0.0 | 3752 |
| 8640 min Summer | 0.354 | 0.0 | 4488 |
| 10080 min Summer | 0.317 | 0.0 | 5144 |
| 15 min Winter | 31.093 | 0.0 | 18 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.073 | 0.073 | 0.4 | 6.5 | O K |
| 60 min Winter | 0.085 | 0.085 | 0.5 | 8.9 | O K |
| 120 min Winter | 0.095 | 0.095 | 0.6 | 11.1 | O K |
| 180 min Winter | 0.099 | 0.099 | 0.6 | 12.0 | O K |
| 240 min Winter | 0.101 | 0.101 | 0.6 | 12.5 | O K |
| 360 min Winter | 0.103 | 0.103 | 0.6 | 13.0 | O K |
| 480 min Winter | 0.103 | 0.103 | 0.6 | 13.1 | O K |
| 600 min Winter | 0.103 | 0.103 | 0.6 | 13.0 | O K |
| 720 min Winter | 0.102 | 0.102 | 0.6 | 12.8 | O K |
| 960 min Winter | 0.100 | 0.100 | 0.6 | 12.2 | O K |
| 1440 min Winter | 0.094 | 0.094 | 0.5 | 10.8 | O K |
| 2160 min Winter | 0.084 | 0.084 | 0.5 | 8.8 | O K |
| 2880 min Winter | 0.076 | 0.076 | 0.4 | 7.1 | O K |
| 4320 min Winter | 0.063 | 0.063 | 0.4 | 4.9 | O K |
| 5760 min Winter | 0.054 | 0.054 | 0.3 | 3.6 | O K |
| 7200 min Winter | 0.048 | 0.048 | 0.3 | 2.9 | O K |
| 8640 min Winter | 0.045 | 0.045 | 0.2 | 2.5 | O K |
| 10080 min Winter | 0.043 | 0.043 | 0.2 | 2.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 20.252 | 0.0 | 33 |
| 60 min Winter | 12.800 | 0.0 | 62 |
| 120 min Winter | 7.926 | 0.0 | 118 |
| 180 min Winter | 5.960 | 0.0 | 174 |
| 240 min Winter | 4.862 | 0.0 | 224 |
| 360 min Winter | 3.628 | 0.0 | 278 |
| 480 min Winter | 2.939 | 0.0 | 356 |
| 600 min Winter | 2.495 | 0.0 | 432 |
| 720 min Winter | 2.183 | 0.0 | 506 |
| 960 min Winter | 1.768 | 0.0 | 646 |
| 1440 min Winter | 1.314 | 0.0 | 922 |
| 2160 min Winter | 0.977 | 0.0 | 1316 |
| 2880 min Winter | 0.791 | 0.0 | 1676 |
| 4320 min Winter | 0.588 | 0.0 | 2416 |
| 5760 min Winter | 0.476 | 0.0 | 3112 |
| 7200 min Winter | 0.405 | 0.0 | 3752 |
| 8640 min Winter | 0.354 | 0.0 | 4416 |
| 10080 min Winter | 0.317 | 0.0 | 5240 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.130

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.130 |

## Model Details

Storage is Online Cover Level (m) 0.450

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 82.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 10.0 |
| Max Percolation (l/s) | 227.8 | Slope (1:X) | 100.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Cap Volume Depth (m) | 0.350 |

## Summary of Results for 30 year Return Period

Half Drain Time : 567 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume ($m^3$) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.107 | 0.107 | 0.6 | 14.1 | O K |
| 30 min Summer | 0.129 | 0.129 | 0.6 | 19.4 | O K |
| 60 min Summer | 0.150 | 0.150 | 0.6 | 24.5 | O K |
| 120 min Summer | 0.169 | 0.169 | 0.6 | 29.3 | Flood Risk |
| 180 min Summer | 0.178 | 0.178 | 0.6 | 31.6 | Flood Risk |
| 240 min Summer | 0.184 | 0.184 | 0.6 | 32.8 | Flood Risk |
| 360 min Summer | 0.188 | 0.188 | 0.6 | 33.9 | Flood Risk |
| 480 min Summer | 0.188 | 0.188 | 0.6 | 34.0 | Flood Risk |
| 600 min Summer | 0.188 | 0.188 | 0.6 | 33.9 | Flood Risk |
| 720 min Summer | 0.187 | 0.187 | 0.6 | 33.7 | Flood Risk |
| 960 min Summer | 0.184 | 0.184 | 0.6 | 33.0 | Flood Risk |
| 1440 min Summer | 0.176 | 0.176 | 0.6 | 31.1 | Flood Risk |
| 2160 min Summer | 0.163 | 0.163 | 0.6 | 27.7 | Flood Risk |
| 2880 min Summer | 0.149 | 0.149 | 0.6 | 24.4 | O K |
| 4320 min Summer | 0.126 | 0.126 | 0.6 | 18.6 | O K |
| 5760 min Summer | 0.108 | 0.108 | 0.6 | 14.2 | O K |
| 7200 min Summer | 0.096 | 0.096 | 0.6 | 11.4 | O K |
| 8640 min Summer | 0.088 | 0.088 | 0.5 | 9.6 | O K |
| 10080 min Summer | 0.081 | 0.081 | 0.5 | 8.1 | O K |
| 15 min Winter | 0.116 | 0.116 | 0.6 | 16.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume ($m^3$) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 76.290 | 0.0 | 19 |
| 30 min Summer | 49.584 | 0.0 | 33 |
| 60 min Summer | 30.811 | 0.0 | 64 |
| 120 min Summer | 18.584 | 0.0 | 122 |
| 180 min Summer | 13.680 | 0.0 | 182 |
| 240 min Summer | 10.960 | 0.0 | 242 |
| 360 min Summer | 8.001 | 0.0 | 360 |
| 480 min Summer | 6.397 | 0.0 | 448 |
| 600 min Summer | 5.375 | 0.0 | 502 |
| 720 min Summer | 4.661 | 0.0 | 562 |
| 960 min Summer | 3.719 | 0.0 | 686 |
| 1440 min Summer | 2.704 | 0.0 | 964 |
| 2160 min Summer | 1.963 | 0.0 | 1364 |
| 2880 min Summer | 1.563 | 0.0 | 1760 |
| 4320 min Summer | 1.133 | 0.0 | 2508 |
| 5760 min Summer | 0.901 | 0.0 | 3176 |
| 7200 min Summer | 0.754 | 0.0 | 3888 |
| 8640 min Summer | 0.652 | 0.0 | 4584 |
| 10080 min Summer | 0.576 | 0.0 | 5344 |
| 15 min Winter | 76.290 | 0.0 | 19 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.140 | 0.140 | 0.6 | 22.2 | O K |
| 60 min Winter | 0.164 | 0.164 | 0.6 | 28.1 | Flood Risk |
| 120 min Winter | 0.186 | 0.186 | 0.6 | 33.5 | Flood Risk |
| 180 min Winter | 0.197 | 0.197 | 0.6 | 36.3 | Flood Risk |
| 240 min Winter | 0.204 | 0.204 | 0.6 | 37.8 | Flood Risk |
| 360 min Winter | 0.210 | 0.210 | 0.6 | 39.3 | Flood Risk |
| 480 min Winter | 0.211 | 0.211 | 0.6 | 39.7 | Flood Risk |
| 600 min Winter | 0.211 | 0.211 | 0.6 | 39.5 | Flood Risk |
| 720 min Winter | 0.208 | 0.208 | 0.6 | 38.9 | Flood Risk |
| 960 min Winter | 0.204 | 0.204 | 0.6 | 37.9 | Flood Risk |
| 1440 min Winter | 0.192 | 0.192 | 0.6 | 35.0 | Flood Risk |
| 2160 min Winter | 0.171 | 0.171 | 0.6 | 29.8 | Flood Risk |
| 2880 min Winter | 0.151 | 0.151 | 0.6 | 24.7 | Flood Risk |
| 4320 min Winter | 0.116 | 0.116 | 0.6 | 16.2 | O K |
| 5760 min Winter | 0.096 | 0.096 | 0.6 | 11.3 | O K |
| 7200 min Winter | 0.084 | 0.084 | 0.5 | 8.7 | O K |
| 8640 min Winter | 0.074 | 0.074 | 0.4 | 6.8 | O K |
| 10080 min Winter | 0.067 | 0.067 | 0.4 | 5.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 49.584 | 0.0 | 33 |
| 60 min Winter | 30.811 | 0.0 | 62 |
| 120 min Winter | 18.584 | 0.0 | 120 |
| 180 min Winter | 13.680 | 0.0 | 178 |
| 240 min Winter | 10.960 | 0.0 | 236 |
| 360 min Winter | 8.001 | 0.0 | 350 |
| 480 min Winter | 6.397 | 0.0 | 460 |
| 600 min Winter | 5.375 | 0.0 | 566 |
| 720 min Winter | 4.661 | 0.0 | 656 |
| 960 min Winter | 3.719 | 0.0 | 742 |
| 1440 min Winter | 2.704 | 0.0 | 1050 |
| 2160 min Winter | 1.963 | 0.0 | 1476 |
| 2880 min Winter | 1.563 | 0.0 | 1876 |
| 4320 min Winter | 1.133 | 0.0 | 2596 |
| 5760 min Winter | 0.901 | 0.0 | 3240 |
| 7200 min Winter | 0.754 | 0.0 | 3968 |
| 8640 min Winter | 0.652 | 0.0 | 4672 |
| 10080 min Winter | 0.576 | 0.0 | 5352 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.130

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.130 |

## Model Details

Storage is Online Cover Level (m) 0.450

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 82.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 10.0 |
| Max Percolation (l/s) | 227.8 | Slope (1:X) | 100.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Cap Volume Depth (m) | 0.350 |

## Summary of Results for 100 year Return Period

Half Drain Time : 803 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume ($m^3$) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.130 | 0.130 | 0.6 | 19.6 | O K |
| 30 min Summer | 0.159 | 0.159 | 0.6 | 26.8 | Flood Risk |
| 60 min Summer | 0.188 | 0.188 | 0.6 | 33.9 | Flood Risk |
| 120 min Summer | 0.215 | 0.215 | 0.6 | 40.5 | Flood Risk |
| 180 min Summer | 0.228 | 0.228 | 0.6 | 43.7 | Flood Risk |
| 240 min Summer | 0.235 | 0.235 | 0.6 | 45.5 | Flood Risk |
| 360 min Summer | 0.242 | 0.242 | 0.6 | 47.2 | Flood Risk |
| 480 min Summer | 0.244 | 0.244 | 0.6 | 47.8 | Flood Risk |
| 600 min Summer | 0.243 | 0.243 | 0.6 | 47.6 | Flood Risk |
| 720 min Summer | 0.242 | 0.242 | 0.6 | 47.1 | Flood Risk |
| 960 min Summer | 0.238 | 0.238 | 0.6 | 46.1 | Flood Risk |
| 1440 min Summer | 0.228 | 0.228 | 0.6 | 43.7 | Flood Risk |
| 2160 min Summer | 0.211 | 0.211 | 0.6 | 39.7 | Flood Risk |
| 2880 min Summer | 0.195 | 0.195 | 0.6 | 35.6 | Flood Risk |
| 4320 min Summer | 0.165 | 0.165 | 0.6 | 28.3 | Flood Risk |
| 5760 min Summer | 0.140 | 0.140 | 0.6 | 22.2 | O K |
| 7200 min Summer | 0.121 | 0.121 | 0.6 | 17.4 | O K |
| 8640 min Summer | 0.106 | 0.106 | 0.6 | 13.8 | O K |
| 10080 min Summer | 0.097 | 0.097 | 0.6 | 11.5 | O K |
| 15 min Winter | 0.142 | 0.142 | 0.6 | 22.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume ($m^3$) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 99.025 | 0.0 | 19 |
| 30 min Summer | 64.904 | 0.0 | 34 |
| 60 min Summer | 40.510 | 0.0 | 64 |
| 120 min Summer | 24.421 | 0.0 | 122 |
| 180 min Summer | 17.920 | 0.0 | 182 |
| 240 min Summer | 14.300 | 0.0 | 242 |
| 360 min Summer | 10.377 | 0.0 | 362 |
| 480 min Summer | 8.265 | 0.0 | 480 |
| 600 min Summer | 6.922 | 0.0 | 594 |
| 720 min Summer | 5.986 | 0.0 | 640 |
| 960 min Summer | 4.756 | 0.0 | 758 |
| 1440 min Summer | 3.434 | 0.0 | 1010 |
| 2160 min Summer | 2.475 | 0.0 | 1408 |
| 2880 min Summer | 1.960 | 0.0 | 1816 |
| 4320 min Summer | 1.409 | 0.0 | 2592 |
| 5760 min Summer | 1.114 | 0.0 | 3344 |
| 7200 min Summer | 0.927 | 0.0 | 4032 |
| 8640 min Summer | 0.798 | 0.0 | 4672 |
| 10080 min Summer | 0.703 | 0.0 | 5344 |
| 15 min Winter | 99.025 | 0.0 | 19 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.174 | 0.174 | 0.6 | 30.6 | Flood Risk |
| 60 min Winter | 0.207 | 0.207 | 0.6 | 38.6 | Flood Risk |
| 120 min Winter | 0.237 | 0.237 | 0.6 | 46.1 | Flood Risk |
| 180 min Winter | 0.253 | 0.253 | 0.6 | 49.9 | Flood Risk |
| 240 min Winter | 0.261 | 0.261 | 0.6 | 52.0 | Flood Risk |
| 360 min Winter | 0.271 | 0.271 | 0.6 | 54.3 | Flood Risk |
| 480 min Winter | 0.274 | 0.274 | 0.6 | 55.2 | Flood Risk |
| 600 min Winter | 0.275 | 0.275 | 0.6 | 55.4 | Flood Risk |
| 720 min Winter | 0.274 | 0.274 | 0.6 | 55.0 | Flood Risk |
| 960 min Winter | 0.267 | 0.267 | 0.6 | 53.5 | Flood Risk |
| 1440 min Winter | 0.254 | 0.254 | 0.6 | 50.2 | Flood Risk |
| 2160 min Winter | 0.230 | 0.230 | 0.6 | 44.4 | Flood Risk |
| 2880 min Winter | 0.206 | 0.206 | 0.6 | 38.3 | Flood Risk |
| 4320 min Winter | 0.161 | 0.161 | 0.6 | 27.3 | Flood Risk |
| 5760 min Winter | 0.126 | 0.126 | 0.6 | 18.6 | O K |
| 7200 min Winter | 0.102 | 0.102 | 0.6 | 12.7 | O K |
| 8640 min Winter | 0.090 | 0.090 | 0.5 | 10.0 | O K |
| 10080 min Winter | 0.081 | 0.081 | 0.5 | 8.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 64.904 | 0.0 | 33 |
| 60 min Winter | 40.510 | 0.0 | 62 |
| 120 min Winter | 24.421 | 0.0 | 122 |
| 180 min Winter | 17.920 | 0.0 | 180 |
| 240 min Winter | 14.300 | 0.0 | 238 |
| 360 min Winter | 10.377 | 0.0 | 354 |
| 480 min Winter | 8.265 | 0.0 | 468 |
| 600 min Winter | 6.922 | 0.0 | 578 |
| 720 min Winter | 5.986 | 0.0 | 686 |
| 960 min Winter | 4.756 | 0.0 | 884 |
| 1440 min Winter | 3.434 | 0.0 | 1096 |
| 2160 min Winter | 2.475 | 0.0 | 1540 |
| 2880 min Winter | 1.960 | 0.0 | 1964 |
| 4320 min Winter | 1.409 | 0.0 | 2768 |
| 5760 min Winter | 1.114 | 0.0 | 3464 |
| 7200 min Winter | 0.927 | 0.0 | 4040 |
| 8640 min Winter | 0.798 | 0.0 | 4752 |
| 10080 min Winter | 0.703 | 0.0 | 5440 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.130

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.130 |

## Model Details

Storage is Online Cover Level (m) 0.450

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 82.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 10.0 |
| Max Percolation (l/s) | 227.8 | Slope (1:X) | 100.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Cap Volume Depth (m) | 0.350 |

## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1213 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.169 | 0.169 | 0.6 | 29.3 | Flood Risk |
| 30 min Summer | 0.210 | 0.210 | 0.6 | 39.4 | Flood Risk |
| 60 min Summer | 0.252 | 0.252 | 0.6 | 49.6 | Flood Risk |
| 120 min Summer | 0.291 | 0.291 | 0.6 | 59.3 | Flood Risk |
| 180 min Summer | 0.311 | 0.311 | 0.6 | 64.3 | Flood Risk |
| 240 min Summer | 0.324 | 0.324 | 0.6 | 67.3 | Flood Risk |
| 360 min Summer | 0.338 | 0.338 | 0.6 | 70.7 | Flood Risk |
| 480 min Summer | 0.345 | 0.345 | 0.6 | 72.5 | Flood Risk |
| 600 min Summer | 0.348 | 0.348 | 0.6 | 73.3 | Flood Risk |
| 720 min Summer | 0.348 | 0.348 | 0.6 | 73.4 | Flood Risk |
| 960 min Summer | 0.344 | 0.344 | 0.6 | 72.4 | Flood Risk |
| 1440 min Summer | 0.333 | 0.333 | 0.6 | 69.5 | Flood Risk |
| 2160 min Summer | 0.314 | 0.314 | 0.6 | 65.0 | Flood Risk |
| 2880 min Summer | 0.295 | 0.295 | 0.6 | 60.3 | Flood Risk |
| 4320 min Summer | 0.260 | 0.260 | 0.6 | 51.6 | Flood Risk |
| 5760 min Summer | 0.228 | 0.228 | 0.6 | 43.7 | Flood Risk |
| 7200 min Summer | 0.199 | 0.199 | 0.6 | 36.7 | Flood Risk |
| 8640 min Summer | 0.174 | 0.174 | 0.6 | 30.6 | Flood Risk |
| 10080 min Summer | 0.153 | 0.153 | 0.6 | 25.3 | Flood Risk |
| 15 min Winter | 0.185 | 0.185 | 0.6 | 33.3 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.634 | 0.0 | 19 |
| 30 min Summer | 90.866 | 0.0 | 34 |
| 60 min Summer | 56.713 | 0.0 | 64 |
| 120 min Summer | 34.190 | 0.0 | 124 |
| 180 min Summer | 25.088 | 0.0 | 182 |
| 240 min Summer | 20.020 | 0.0 | 242 |
| 360 min Summer | 14.528 | 0.0 | 362 |
| 480 min Summer | 11.570 | 0.0 | 482 |
| 600 min Summer | 9.690 | 0.0 | 602 |
| 720 min Summer | 8.380 | 0.0 | 720 |
| 960 min Summer | 6.658 | 0.0 | 916 |
| 1440 min Summer | 4.807 | 0.0 | 1140 |
| 2160 min Summer | 3.465 | 0.0 | 1516 |
| 2880 min Summer | 2.744 | 0.0 | 1928 |
| 4320 min Summer | 1.973 | 0.0 | 2724 |
| 5760 min Summer | 1.559 | 0.0 | 3512 |
| 7200 min Summer | 1.298 | 0.0 | 4256 |
| 8640 min Summer | 1.118 | 0.0 | 5008 |
| 10080 min Summer | 0.985 | 0.0 | 5656 |
| 15 min Winter | 138.634 | 0.0 | 19 |

## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.232 | 0.232 | 0.6 | 44.7 | Flood Risk |
| 60 min Winter | 0.278 | 0.278 | 0.6 | 56.1 | Flood Risk |
| 120 min Winter | 0.323 | 0.323 | 0.6 | 67.2 | Flood Risk |
| 180 min Winter | 0.347 | 0.347 | 0.6 | 73.0 | Flood Risk |
| 240 min Winter | 0.362 | 0.362 | 0.6 | 76.5 | Flood Risk |
| 360 min Winter | 0.384 | 0.384 | 0.6 | 80.8 | Flood Risk |
| 480 min Winter | 0.401 | 0.401 | 0.6 | 83.2 | Flood Risk |
| 600 min Winter | 0.412 | 0.412 | 0.6 | 84.4 | Flood Risk |
| 720 min Winter | 0.418 | 0.418 | 0.6 | 84.9 | Flood Risk |
| 960 min Winter | 0.414 | 0.414 | 0.6 | 84.6 | Flood Risk |
| 1440 min Winter | 0.385 | 0.385 | 0.6 | 81.0 | Flood Risk |
| 2160 min Winter | 0.355 | 0.355 | 0.6 | 75.0 | Flood Risk |
| 2880 min Winter | 0.329 | 0.329 | 0.6 | 68.5 | Flood Risk |
| 4320 min Winter | 0.276 | 0.276 | 0.6 | 55.6 | Flood Risk |
| 5760 min Winter | 0.228 | 0.228 | 0.6 | 43.7 | Flood Risk |
| 7200 min Winter | 0.186 | 0.186 | 0.6 | 33.3 | Flood Risk |
| 8640 min Winter | 0.150 | 0.150 | 0.6 | 24.6 | O K |
| 10080 min Winter | 0.122 | 0.122 | 0.6 | 17.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 90.866 | 0.0 | 33 |
| 60 min Winter | 56.713 | 0.0 | 62 |
| 120 min Winter | 34.190 | 0.0 | 122 |
| 180 min Winter | 25.088 | 0.0 | 180 |
| 240 min Winter | 20.020 | 0.0 | 240 |
| 360 min Winter | 14.528 | 0.0 | 356 |
| 480 min Winter | 11.570 | 0.0 | 472 |
| 600 min Winter | 9.690 | 0.0 | 586 |
| 720 min Winter | 8.380 | 0.0 | 700 |
| 960 min Winter | 6.658 | 0.0 | 924 |
| 1440 min Winter | 4.807 | 0.0 | 1326 |
| 2160 min Winter | 3.465 | 0.0 | 1644 |
| 2880 min Winter | 2.744 | 0.0 | 2104 |
| 4320 min Winter | 1.973 | 0.0 | 2980 |
| 5760 min Winter | 1.559 | 0.0 | 3752 |
| 7200 min Winter | 1.298 | 0.0 | 4536 |
| 8640 min Winter | 1.118 | 0.0 | 5192 |
| 10080 min Winter | 0.985 | 0.0 | 5840 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.130

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.130 |

## Model Details

Storage is Online Cover Level (m) 0.450

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 82.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 10.0 |
| Max Percolation (l/s) | 227.8 | Slope (1:X) | 100.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Cap Volume Depth (m) | 0.350 |

## Summary of Results for 1 year Return Period

Half Drain Time : 324 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.044 | 0.044 | 0.3 | 3.2 | O K |
| 30 min Summer | 0.076 | 0.076 | 0.6 | 9.7 | O K |
| 60 min Summer | 0.100 | 0.100 | 0.8 | 16.5 | O K |
| 120 min Summer | 0.119 | 0.119 | 0.9 | 23.3 | Flood Risk |
| 180 min Summer | 0.127 | 0.127 | 1.0 | 26.8 | Flood Risk |
| 240 min Summer | 0.132 | 0.132 | 1.0 | 28.9 | Flood Risk |
| 360 min Summer | 0.137 | 0.137 | 1.1 | 30.9 | Flood Risk |
| 480 min Summer | 0.139 | 0.139 | 1.1 | 32.2 | Flood Risk |
| 600 min Summer | 0.141 | 0.141 | 1.1 | 33.0 | Flood Risk |
| 720 min Summer | 0.142 | 0.142 | 1.1 | 33.6 | Flood Risk |
| 960 min Summer | 0.143 | 0.143 | 1.1 | 34.0 | Flood Risk |
| 1440 min Summer | 0.142 | 0.142 | 1.1 | 33.6 | Flood Risk |
| 2160 min Summer | 0.138 | 0.138 | 1.1 | 31.5 | Flood Risk |
| 2880 min Summer | 0.132 | 0.132 | 1.0 | 28.9 | Flood Risk |
| 4320 min Summer | 0.120 | 0.120 | 1.0 | 23.9 | Flood Risk |
| 5760 min Summer | 0.109 | 0.109 | 0.9 | 19.9 | Flood Risk |
| 7200 min Summer | 0.101 | 0.101 | 0.8 | 16.8 | Flood Risk |
| 8640 min Summer | 0.093 | 0.093 | 0.7 | 14.3 | O K |
| 10080 min Summer | 0.086 | 0.086 | 0.7 | 12.4 | O K |
| 15 min Winter | 0.060 | 0.060 | 0.5 | 5.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 31.093 | 0.0 | 19 |
| 30 min Summer | 20.252 | 0.0 | 34 |
| 60 min Summer | 12.800 | 0.0 | 64 |
| 120 min Summer | 7.926 | 0.0 | 122 |
| 180 min Summer | 5.960 | 0.0 | 182 |
| 240 min Summer | 4.862 | 0.0 | 240 |
| 360 min Summer | 3.628 | 0.0 | 308 |
| 480 min Summer | 2.939 | 0.0 | 368 |
| 600 min Summer | 2.495 | 0.0 | 432 |
| 720 min Summer | 2.183 | 0.0 | 498 |
| 960 min Summer | 1.768 | 0.0 | 636 |
| 1440 min Summer | 1.314 | 0.0 | 910 |
| 2160 min Summer | 0.977 | 0.0 | 1300 |
| 2880 min Summer | 0.791 | 0.0 | 1700 |
| 4320 min Summer | 0.588 | 0.0 | 2460 |
| 5760 min Summer | 0.476 | 0.0 | 3176 |
| 7200 min Summer | 0.405 | 0.0 | 3896 |
| 8640 min Summer | 0.354 | 0.0 | 4664 |
| 10080 min Summer | 0.317 | 0.0 | 5344 |
| 15 min Winter | 31.093 | 0.0 | 19 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.089 | 0.089 | 0.7 | 13.2 | O K |
| 60 min Winter | 0.113 | 0.113 | 0.9 | 21.0 | Flood Risk |
| 120 min Winter | 0.132 | 0.132 | 1.0 | 28.7 | Flood Risk |
| 180 min Winter | 0.141 | 0.141 | 1.1 | 32.8 | Flood Risk |
| 240 min Winter | 0.146 | 0.146 | 1.2 | 35.3 | Flood Risk |
| 360 min Winter | 0.151 | 0.151 | 1.2 | 37.6 | Flood Risk |
| 480 min Winter | 0.153 | 0.153 | 1.2 | 38.5 | Flood Risk |
| 600 min Winter | 0.154 | 0.154 | 1.2 | 39.2 | Flood Risk |
| 720 min Winter | 0.154 | 0.154 | 1.2 | 39.5 | Flood Risk |
| 960 min Winter | 0.154 | 0.154 | 1.2 | 39.3 | Flood Risk |
| 1440 min Winter | 0.150 | 0.150 | 1.2 | 37.2 | Flood Risk |
| 2160 min Winter | 0.141 | 0.141 | 1.1 | 33.1 | Flood Risk |
| 2880 min Winter | 0.132 | 0.132 | 1.0 | 28.9 | Flood Risk |
| 4320 min Winter | 0.115 | 0.115 | 0.9 | 21.9 | Flood Risk |
| 5760 min Winter | 0.101 | 0.101 | 0.8 | 16.8 | Flood Risk |
| 7200 min Winter | 0.089 | 0.089 | 0.7 | 13.0 | O K |
| 8640 min Winter | 0.079 | 0.079 | 0.6 | 10.3 | O K |
| 10080 min Winter | 0.071 | 0.071 | 0.6 | 8.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 20.252 | 0.0 | 33 |
| 60 min Winter | 12.800 | 0.0 | 62 |
| 120 min Winter | 7.926 | 0.0 | 120 |
| 180 min Winter | 5.960 | 0.0 | 176 |
| 240 min Winter | 4.862 | 0.0 | 232 |
| 360 min Winter | 3.628 | 0.0 | 338 |
| 480 min Winter | 2.939 | 0.0 | 382 |
| 600 min Winter | 2.495 | 0.0 | 458 |
| 720 min Winter | 2.183 | 0.0 | 534 |
| 960 min Winter | 1.768 | 0.0 | 684 |
| 1440 min Winter | 1.314 | 0.0 | 980 |
| 2160 min Winter | 0.977 | 0.0 | 1388 |
| 2880 min Winter | 0.791 | 0.0 | 1788 |
| 4320 min Winter | 0.588 | 0.0 | 2552 |
| 5760 min Winter | 0.476 | 0.0 | 3288 |
| 7200 min Winter | 0.405 | 0.0 | 3968 |
| 8640 min Winter | 0.354 | 0.0 | 4680 |
| 10080 min Winter | 0.317 | 0.0 | 5440 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.395

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.395 |

## Model Details

Storage is Online Cover Level (m) 0.400

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 138.1 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 28.4 |
| Max Percolation (l/s) | 1089.5 | Slope (1:X) | 80.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Membrane Depth (m) | 100 |

## Summary of Results for 30 year Return Period

Half Drain Time : 546 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.148 | 0.148 | 1.2 | 36.1 | Flood Risk |
| 30 min Summer | 0.177 | 0.177 | 1.4 | 52.2 | Flood Risk |
| 60 min Summer | 0.203 | 0.203 | 1.6 | 68.1 | Flood Risk |
| 120 min Summer | 0.224 | 0.224 | 1.8 | 82.9 | Flood Risk |
| 180 min Summer | 0.233 | 0.233 | 1.8 | 90.0 | Flood Risk |
| 240 min Summer | 0.238 | 0.238 | 1.9 | 93.9 | Flood Risk |
| 360 min Summer | 0.242 | 0.242 | 1.9 | 97.2 | Flood Risk |
| 480 min Summer | 0.243 | 0.243 | 1.9 | 98.3 | Flood Risk |
| 600 min Summer | 0.244 | 0.244 | 1.9 | 98.8 | Flood Risk |
| 720 min Summer | 0.244 | 0.244 | 1.9 | 99.0 | Flood Risk |
| 960 min Summer | 0.244 | 0.244 | 1.9 | 98.6 | Flood Risk |
| 1440 min Summer | 0.240 | 0.240 | 1.9 | 95.7 | Flood Risk |
| 2160 min Summer | 0.232 | 0.232 | 1.8 | 89.3 | Flood Risk |
| 2880 min Summer | 0.223 | 0.223 | 1.8 | 82.3 | Flood Risk |
| 4320 min Summer | 0.205 | 0.205 | 1.6 | 69.6 | Flood Risk |
| 5760 min Summer | 0.189 | 0.189 | 1.5 | 59.2 | Flood Risk |
| 7200 min Summer | 0.175 | 0.175 | 1.4 | 50.8 | Flood Risk |
| 8640 min Summer | 0.163 | 0.163 | 1.3 | 43.9 | Flood Risk |
| 10080 min Summer | 0.152 | 0.152 | 1.2 | 38.3 | Flood Risk |
| 15 min Winter | 0.161 | 0.161 | 1.3 | 42.8 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 76.290 | 0.0 | 19 |
| 30 min Summer | 49.584 | 0.0 | 34 |
| 60 min Summer | 30.811 | 0.0 | 64 |
| 120 min Summer | 18.584 | 0.0 | 122 |
| 180 min Summer | 13.680 | 0.0 | 182 |
| 240 min Summer | 10.960 | 0.0 | 242 |
| 360 min Summer | 8.001 | 0.0 | 360 |
| 480 min Summer | 6.397 | 0.0 | 416 |
| 600 min Summer | 5.375 | 0.0 | 476 |
| 720 min Summer | 4.661 | 0.0 | 540 |
| 960 min Summer | 3.719 | 0.0 | 672 |
| 1440 min Summer | 2.704 | 0.0 | 940 |
| 2160 min Summer | 1.963 | 0.0 | 1360 |
| 2880 min Summer | 1.563 | 0.0 | 1756 |
| 4320 min Summer | 1.133 | 0.0 | 2512 |
| 5760 min Summer | 0.901 | 0.0 | 3288 |
| 7200 min Summer | 0.754 | 0.0 | 4032 |
| 8640 min Summer | 0.652 | 0.0 | 4752 |
| 10080 min Summer | 0.576 | 0.0 | 5448 |
| 15 min Winter | 76.290 | 0.0 | 19 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.192 | 0.192 | 1.5 | 60.9 | Flood Risk |
| 60 min Winter | 0.218 | 0.218 | 1.7 | 78.8 | Flood Risk |
| 120 min Winter | 0.240 | 0.240 | 1.9 | 95.6 | Flood Risk |
| 180 min Winter | 0.250 | 0.250 | 2.0 | 103.8 | Flood Risk |
| 240 min Winter | 0.256 | 0.256 | 2.0 | 108.5 | Flood Risk |
| 360 min Winter | 0.261 | 0.261 | 2.1 | 112.9 | Flood Risk |
| 480 min Winter | 0.262 | 0.262 | 2.1 | 114.1 | Flood Risk |
| 600 min Winter | 0.262 | 0.262 | 2.1 | 113.8 | Flood Risk |
| 720 min Winter | 0.262 | 0.262 | 2.1 | 113.7 | Flood Risk |
| 960 min Winter | 0.260 | 0.260 | 2.1 | 112.3 | Flood Risk |
| 1440 min Winter | 0.254 | 0.254 | 2.0 | 106.7 | Flood Risk |
| 2160 min Winter | 0.241 | 0.241 | 1.9 | 96.1 | Flood Risk |
| 2880 min Winter | 0.227 | 0.227 | 1.8 | 85.7 | Flood Risk |
| 4320 min Winter | 0.202 | 0.202 | 1.6 | 67.7 | Flood Risk |
| 5760 min Winter | 0.180 | 0.180 | 1.4 | 54.0 | Flood Risk |
| 7200 min Winter | 0.162 | 0.162 | 1.3 | 43.5 | Flood Risk |
| 8640 min Winter | 0.146 | 0.146 | 1.2 | 35.6 | Flood Risk |
| 10080 min Winter | 0.133 | 0.133 | 1.1 | 29.4 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 49.584 | 0.0 | 33 |
| 60 min Winter | 30.811 | 0.0 | 62 |
| 120 min Winter | 18.584 | 0.0 | 120 |
| 180 min Winter | 13.680 | 0.0 | 178 |
| 240 min Winter | 10.960 | 0.0 | 236 |
| 360 min Winter | 8.001 | 0.0 | 348 |
| 480 min Winter | 6.397 | 0.0 | 454 |
| 600 min Winter | 5.375 | 0.0 | 506 |
| 720 min Winter | 4.661 | 0.0 | 566 |
| 960 min Winter | 3.719 | 0.0 | 720 |
| 1440 min Winter | 2.704 | 0.0 | 1024 |
| 2160 min Winter | 1.963 | 0.0 | 1452 |
| 2880 min Winter | 1.563 | 0.0 | 1872 |
| 4320 min Winter | 1.133 | 0.0 | 2676 |
| 5760 min Winter | 0.901 | 0.0 | 3408 |
| 7200 min Winter | 0.754 | 0.0 | 4176 |
| 8640 min Winter | 0.652 | 0.0 | 4920 |
| 10080 min Winter | 0.576 | 0.0 | 5640 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.395

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.395 |

## Model Details

Storage is Online Cover Level (m) 0.400

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 138.1 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 28.4 |
| Max Percolation (l/s) | 1089.5 | Slope (1:X) | 80.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Membrane Depth (m) | 100 |

## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 805 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.222 | 0.222 | 1.8 | 81.9 | Flood Risk |
| 30 min Summer | 0.261 | 0.261 | 2.1 | 112.5 | Flood Risk |
| 60 min Summer | 0.294 | 0.294 | 2.3 | 143.1 | Flood Risk |
| 120 min Summer | 0.323 | 0.323 | 2.6 | 171.6 | Flood Risk |
| 180 min Summer | 0.337 | 0.337 | 2.7 | 185.7 | Flood Risk |
| 240 min Summer | 0.345 | 0.345 | 2.7 | 193.5 | Flood Risk |
| 360 min Summer | 0.352 | 0.352 | 2.8 | 201.2 | Flood Risk |
| 480 min Summer | 0.355 | 0.355 | 2.8 | 203.7 | Flood Risk |
| 600 min Summer | 0.355 | 0.355 | 2.8 | 203.8 | Flood Risk |
| 720 min Summer | 0.355 | 0.355 | 2.8 | 203.6 | Flood Risk |
| 960 min Summer | 0.353 | 0.353 | 2.8 | 202.3 | Flood Risk |
| 1440 min Summer | 0.348 | 0.348 | 2.8 | 197.2 | Flood Risk |
| 2160 min Summer | 0.337 | 0.337 | 2.7 | 186.4 | Flood Risk |
| 2880 min Summer | 0.325 | 0.325 | 2.6 | 174.5 | Flood Risk |
| 4320 min Summer | 0.303 | 0.303 | 2.4 | 152.0 | Flood Risk |
| 5760 min Summer | 0.283 | 0.283 | 2.2 | 132.8 | Flood Risk |
| 7200 min Summer | 0.266 | 0.266 | 2.1 | 116.9 | Flood Risk |
| 8640 min Summer | 0.250 | 0.250 | 2.0 | 103.5 | Flood Risk |
| 10080 min Summer | 0.236 | 0.236 | 1.9 | 92.3 | Flood Risk |
| 15 min Winter | 0.238 | 0.238 | 1.9 | 94.1 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.634 | 0.0 | 19 |
| 30 min Summer | 90.866 | 0.0 | 34 |
| 60 min Summer | 56.713 | 0.0 | 64 |
| 120 min Summer | 34.190 | 0.0 | 122 |
| 180 min Summer | 25.088 | 0.0 | 182 |
| 240 min Summer | 20.020 | 0.0 | 242 |
| 360 min Summer | 14.528 | 0.0 | 360 |
| 480 min Summer | 11.570 | 0.0 | 480 |
| 600 min Summer | 9.690 | 0.0 | 546 |
| 720 min Summer | 8.380 | 0.0 | 600 |
| 960 min Summer | 6.658 | 0.0 | 722 |
| 1440 min Summer | 4.807 | 0.0 | 982 |
| 2160 min Summer | 3.465 | 0.0 | 1404 |
| 2880 min Summer | 2.744 | 0.0 | 1816 |
| 4320 min Summer | 1.973 | 0.0 | 2596 |
| 5760 min Summer | 1.559 | 0.0 | 3400 |
| 7200 min Summer | 1.298 | 0.0 | 4112 |
| 8640 min Summer | 1.118 | 0.0 | 4848 |
| 10080 min Summer | 0.985 | 0.0 | 5640 |
| 15 min Winter | 138.634 | 0.0 | 19 |

## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.278 | 0.278 | 2.2 | 128.5 | Flood Risk |
| 60 min Winter | 0.314 | 0.314 | 2.5 | 163.0 | Flood Risk |
| 120 min Winter | 0.346 | 0.346 | 2.7 | 195.2 | Flood Risk |
| 180 min Winter | 0.363 | 0.363 | 2.8 | 211.4 | Flood Risk |
| 240 min Winter | 0.372 | 0.372 | 2.8 | 220.7 | Flood Risk |
| 360 min Winter | 0.383 | 0.383 | 2.8 | 230.9 | Flood Risk |
| 480 min Winter | 0.389 | 0.389 | 2.8 | 235.5 | Flood Risk |
| 600 min Winter | 0.390 | 0.390 | 2.8 | 236.7 | Flood Risk |
| 720 min Winter | 0.389 | 0.389 | 2.8 | 235.9 | Flood Risk |
| 960 min Winter | 0.385 | 0.385 | 2.8 | 232.1 | Flood Risk |
| 1440 min Winter | 0.375 | 0.375 | 2.8 | 223.4 | Flood Risk |
| 2160 min Winter | 0.357 | 0.357 | 2.8 | 205.8 | Flood Risk |
| 2880 min Winter | 0.339 | 0.339 | 2.7 | 188.2 | Flood Risk |
| 4320 min Winter | 0.307 | 0.307 | 2.4 | 156.5 | Flood Risk |
| 5760 min Winter | 0.280 | 0.280 | 2.2 | 130.4 | Flood Risk |
| 7200 min Winter | 0.257 | 0.257 | 2.0 | 109.5 | Flood Risk |
| 8640 min Winter | 0.237 | 0.237 | 1.9 | 92.7 | Flood Risk |
| 10080 min Winter | 0.218 | 0.218 | 1.7 | 79.1 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 90.866 | 0.0 | 33 |
| 60 min Winter | 56.713 | 0.0 | 62 |
| 120 min Winter | 34.190 | 0.0 | 120 |
| 180 min Winter | 25.088 | 0.0 | 180 |
| 240 min Winter | 20.020 | 0.0 | 238 |
| 360 min Winter | 14.528 | 0.0 | 352 |
| 480 min Winter | 11.570 | 0.0 | 464 |
| 600 min Winter | 9.690 | 0.0 | 574 |
| 720 min Winter | 8.380 | 0.0 | 678 |
| 960 min Winter | 6.658 | 0.0 | 770 |
| 1440 min Winter | 4.807 | 0.0 | 1068 |
| 2160 min Winter | 3.465 | 0.0 | 1512 |
| 2880 min Winter | 2.744 | 0.0 | 1956 |
| 4320 min Winter | 1.973 | 0.0 | 2768 |
| 5760 min Winter | 1.559 | 0.0 | 3576 |
| 7200 min Winter | 1.298 | 0.0 | 4328 |
| 8640 min Winter | 1.118 | 0.0 | 5096 |
| 10080 min Winter | 0.985 | 0.0 | 5848 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.395

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.395 |

## Model Details

Storage is Online Cover Level (m) 0.400

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 138.1 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 28.4 |
| Max Percolation (l/s) | 1089.5 | Slope (1:X) | 80.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Membrane Depth (m) | 100 |

## Summary of Results for 100 year Return Period

Half Drain Time : 649 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume ($m^3$) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.179 | 0.179 | 1.4 | 52.8 | Flood Risk |
| 30 min Summer | 0.212 | 0.212 | 1.7 | 74.6 | Flood Risk |
| 60 min Summer | 0.241 | 0.241 | 1.9 | 96.2 | Flood Risk |
| 120 min Summer | 0.265 | 0.265 | 2.1 | 115.9 | Flood Risk |
| 180 min Summer | 0.275 | 0.275 | 2.2 | 125.4 | Flood Risk |
| 240 min Summer | 0.280 | 0.280 | 2.2 | 130.4 | Flood Risk |
| 360 min Summer | 0.285 | 0.285 | 2.3 | 134.7 | Flood Risk |
| 480 min Summer | 0.286 | 0.286 | 2.3 | 135.6 | Flood Risk |
| 600 min Summer | 0.286 | 0.286 | 2.3 | 135.8 | Flood Risk |
| 720 min Summer | 0.286 | 0.286 | 2.3 | 135.6 | Flood Risk |
| 960 min Summer | 0.285 | 0.285 | 2.3 | 134.5 | Flood Risk |
| 1440 min Summer | 0.280 | 0.280 | 2.2 | 130.1 | Flood Risk |
| 2160 min Summer | 0.271 | 0.271 | 2.1 | 121.3 | Flood Risk |
| 2880 min Summer | 0.260 | 0.260 | 2.1 | 112.1 | Flood Risk |
| 4320 min Summer | 0.240 | 0.240 | 1.9 | 95.3 | Flood Risk |
| 5760 min Summer | 0.222 | 0.222 | 1.8 | 81.4 | Flood Risk |
| 7200 min Summer | 0.206 | 0.206 | 1.6 | 70.3 | Flood Risk |
| 8640 min Summer | 0.192 | 0.192 | 1.5 | 61.1 | Flood Risk |
| 10080 min Summer | 0.180 | 0.180 | 1.4 | 53.6 | Flood Risk |
| 15 min Winter | 0.193 | 0.193 | 1.5 | 61.5 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume ($m^3$) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 99.025 | 0.0 | 19 |
| 30 min Summer | 64.904 | 0.0 | 34 |
| 60 min Summer | 40.510 | 0.0 | 64 |
| 120 min Summer | 24.421 | 0.0 | 122 |
| 180 min Summer | 17.920 | 0.0 | 182 |
| 240 min Summer | 14.300 | 0.0 | 242 |
| 360 min Summer | 10.377 | 0.0 | 360 |
| 480 min Summer | 8.265 | 0.0 | 450 |
| 600 min Summer | 6.922 | 0.0 | 502 |
| 720 min Summer | 5.986 | 0.0 | 562 |
| 960 min Summer | 4.756 | 0.0 | 690 |
| 1440 min Summer | 3.434 | 0.0 | 964 |
| 2160 min Summer | 2.475 | 0.0 | 1364 |
| 2880 min Summer | 1.960 | 0.0 | 1784 |
| 4320 min Summer | 1.409 | 0.0 | 2552 |
| 5760 min Summer | 1.114 | 0.0 | 3336 |
| 7200 min Summer | 0.927 | 0.0 | 4040 |
| 8640 min Summer | 0.798 | 0.0 | 4760 |
| 10080 min Summer | 0.703 | 0.0 | 5544 |
| 15 min Winter | 99.025 | 0.0 | 19 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.228 | 0.228 | 1.8 | 86.0 | Flood Risk |
| 60 min Winter | 0.258 | 0.258 | 2.0 | 110.3 | Flood Risk |
| 120 min Winter | 0.283 | 0.283 | 2.2 | 132.7 | Flood Risk |
| 180 min Winter | 0.294 | 0.294 | 2.3 | 143.6 | Flood Risk |
| 240 min Winter | 0.300 | 0.300 | 2.4 | 149.5 | Flood Risk |
| 360 min Winter | 0.306 | 0.306 | 2.4 | 155.2 | Flood Risk |
| 480 min Winter | 0.308 | 0.308 | 2.4 | 157.0 | Flood Risk |
| 600 min Winter | 0.307 | 0.307 | 2.4 | 156.6 | Flood Risk |
| 720 min Winter | 0.306 | 0.306 | 2.4 | 155.4 | Flood Risk |
| 960 min Winter | 0.304 | 0.304 | 2.4 | 153.3 | Flood Risk |
| 1440 min Winter | 0.297 | 0.297 | 2.3 | 145.9 | Flood Risk |
| 2160 min Winter | 0.282 | 0.282 | 2.2 | 132.2 | Flood Risk |
| 2880 min Winter | 0.267 | 0.267 | 2.1 | 118.6 | Flood Risk |
| 4320 min Winter | 0.239 | 0.239 | 1.9 | 95.0 | Flood Risk |
| 5760 min Winter | 0.215 | 0.215 | 1.7 | 76.7 | Flood Risk |
| 7200 min Winter | 0.194 | 0.194 | 1.5 | 62.6 | Flood Risk |
| 8640 min Winter | 0.176 | 0.176 | 1.4 | 51.6 | Flood Risk |
| 10080 min Winter | 0.161 | 0.161 | 1.3 | 43.0 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 64.904 | 0.0 | 33 |
| 60 min Winter | 40.510 | 0.0 | 62 |
| 120 min Winter | 24.421 | 0.0 | 120 |
| 180 min Winter | 17.920 | 0.0 | 178 |
| 240 min Winter | 14.300 | 0.0 | 236 |
| 360 min Winter | 10.377 | 0.0 | 350 |
| 480 min Winter | 8.265 | 0.0 | 458 |
| 600 min Winter | 6.922 | 0.0 | 560 |
| 720 min Winter | 5.986 | 0.0 | 586 |
| 960 min Winter | 4.756 | 0.0 | 732 |
| 1440 min Winter | 3.434 | 0.0 | 1038 |
| 2160 min Winter | 2.475 | 0.0 | 1476 |
| 2880 min Winter | 1.960 | 0.0 | 1904 |
| 4320 min Winter | 1.409 | 0.0 | 2720 |
| 5760 min Winter | 1.114 | 0.0 | 3464 |
| 7200 min Winter | 0.927 | 0.0 | 4248 |
| 8640 min Winter | 0.798 | 0.0 | 4936 |
| 10080 min Winter | 0.703 | 0.0 | 5656 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.395

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.395 |

## Model Details

Storage is Online Cover Level (m) 0.400

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 138.1 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 28.4 |
| Max Percolation (l/s) | 1089.5 | Slope (1:X) | 80.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Membrane Depth (m) | 100 |

## Summary of Results for 1 year Return Period

Half Drain Time : 264 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.064 | 0.064 | 0.1 | 1.7 | O K |
| 30 min Summer | 0.081 | 0.081 | 0.2 | 2.8 | O K |
| 60 min Summer | 0.095 | 0.095 | 0.2 | 3.9 | O K |
| 120 min Summer | 0.107 | 0.107 | 0.2 | 4.9 | O K |
| 180 min Summer | 0.112 | 0.112 | 0.2 | 5.3 | O K |
| 240 min Summer | 0.115 | 0.115 | 0.2 | 5.6 | O K |
| 360 min Summer | 0.118 | 0.118 | 0.2 | 5.9 | O K |
| 480 min Summer | 0.119 | 0.119 | 0.2 | 6.1 | O K |
| 600 min Summer | 0.120 | 0.120 | 0.2 | 6.1 | O K |
| 720 min Summer | 0.120 | 0.120 | 0.2 | 6.2 | O K |
| 960 min Summer | 0.120 | 0.120 | 0.2 | 6.1 | O K |
| 1440 min Summer | 0.117 | 0.117 | 0.2 | 5.8 | O K |
| 2160 min Summer | 0.111 | 0.111 | 0.2 | 5.2 | O K |
| 2880 min Summer | 0.105 | 0.105 | 0.2 | 4.7 | O K |
| 4320 min Summer | 0.093 | 0.093 | 0.2 | 3.7 | O K |
| 5760 min Summer | 0.084 | 0.084 | 0.2 | 3.0 | O K |
| 7200 min Summer | 0.077 | 0.077 | 0.2 | 2.5 | O K |
| 8640 min Summer | 0.070 | 0.070 | 0.1 | 2.1 | O K |
| 10080 min Summer | 0.065 | 0.065 | 0.1 | 1.8 | O K |
| 15 min Winter | 0.071 | 0.071 | 0.1 | 2.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 31.093 | 0.0 | 19 |
| 30 min Summer | 20.252 | 0.0 | 33 |
| 60 min Summer | 12.800 | 0.0 | 62 |
| 120 min Summer | 7.926 | 0.0 | 122 |
| 180 min Summer | 5.960 | 0.0 | 180 |
| 240 min Summer | 4.862 | 0.0 | 216 |
| 360 min Summer | 3.628 | 0.0 | 276 |
| 480 min Summer | 2.939 | 0.0 | 340 |
| 600 min Summer | 2.495 | 0.0 | 410 |
| 720 min Summer | 2.183 | 0.0 | 478 |
| 960 min Summer | 1.768 | 0.0 | 616 |
| 1440 min Summer | 1.314 | 0.0 | 882 |
| 2160 min Summer | 0.977 | 0.0 | 1276 |
| 2880 min Summer | 0.791 | 0.0 | 1648 |
| 4320 min Summer | 0.588 | 0.0 | 2380 |
| 5760 min Summer | 0.476 | 0.0 | 3112 |
| 7200 min Summer | 0.405 | 0.0 | 3824 |
| 8640 min Summer | 0.354 | 0.0 | 4576 |
| 10080 min Summer | 0.317 | 0.0 | 5248 |
| 15 min Winter | 31.093 | 0.0 | 18 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.089 | 0.089 | 0.2 | 3.4 | O K |
| 60 min Winter | 0.104 | 0.104 | 0.2 | 4.6 | O K |
| 120 min Winter | 0.116 | 0.116 | 0.2 | 5.7 | O K |
| 180 min Winter | 0.122 | 0.122 | 0.2 | 6.3 | O K |
| 240 min Winter | 0.124 | 0.124 | 0.3 | 6.6 | O K |
| 360 min Winter | 0.127 | 0.127 | 0.3 | 6.8 | O K |
| 480 min Winter | 0.128 | 0.128 | 0.3 | 7.0 | O K |
| 600 min Winter | 0.128 | 0.128 | 0.3 | 7.0 | O K |
| 720 min Winter | 0.127 | 0.127 | 0.3 | 6.9 | O K |
| 960 min Winter | 0.125 | 0.125 | 0.3 | 6.7 | O K |
| 1440 min Winter | 0.120 | 0.120 | 0.2 | 6.1 | O K |
| 2160 min Winter | 0.110 | 0.110 | 0.2 | 5.2 | O K |
| 2880 min Winter | 0.101 | 0.101 | 0.2 | 4.3 | O K |
| 4320 min Winter | 0.085 | 0.085 | 0.2 | 3.1 | O K |
| 5760 min Winter | 0.073 | 0.073 | 0.1 | 2.3 | O K |
| 7200 min Winter | 0.064 | 0.064 | 0.1 | 1.8 | O K |
| 8640 min Winter | 0.057 | 0.057 | 0.1 | 1.4 | O K |
| 10080 min Winter | 0.052 | 0.052 | 0.1 | 1.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 20.252 | 0.0 | 33 |
| 60 min Winter | 12.800 | 0.0 | 62 |
| 120 min Winter | 7.926 | 0.0 | 118 |
| 180 min Winter | 5.960 | 0.0 | 174 |
| 240 min Winter | 4.862 | 0.0 | 228 |
| 360 min Winter | 3.628 | 0.0 | 288 |
| 480 min Winter | 2.939 | 0.0 | 364 |
| 600 min Winter | 2.495 | 0.0 | 440 |
| 720 min Winter | 2.183 | 0.0 | 516 |
| 960 min Winter | 1.768 | 0.0 | 664 |
| 1440 min Winter | 1.314 | 0.0 | 950 |
| 2160 min Winter | 0.977 | 0.0 | 1344 |
| 2880 min Winter | 0.791 | 0.0 | 1732 |
| 4320 min Winter | 0.588 | 0.0 | 2464 |
| 5760 min Winter | 0.476 | 0.0 | 3176 |
| 7200 min Winter | 0.405 | 0.0 | 3896 |
| 8640 min Winter | 0.354 | 0.0 | 4584 |
| 10080 min Winter | 0.317 | 0.0 | 5240 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.065

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.065 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 28.4 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 14.0 |
| Max Percolation (l/s) | 110.4 | Slope (1:X) | 100.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Cap Volume Depth (m) | 0.400 |

## Summary of Results for 30 year Return Period

Half Drain Time : 592 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume ($m^3$) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.130 | 0.130 | 0.3 | 7.1 | O K |
| 30 min Summer | 0.152 | 0.152 | 0.3 | 9.8 | O K |
| 60 min Summer | 0.174 | 0.174 | 0.3 | 12.4 | O K |
| 120 min Summer | 0.194 | 0.194 | 0.3 | 14.8 | O K |
| 180 min Summer | 0.204 | 0.204 | 0.3 | 16.0 | Flood Risk |
| 240 min Summer | 0.209 | 0.209 | 0.3 | 16.6 | Flood Risk |
| 360 min Summer | 0.214 | 0.214 | 0.3 | 17.2 | Flood Risk |
| 480 min Summer | 0.215 | 0.215 | 0.3 | 17.3 | Flood Risk |
| 600 min Summer | 0.215 | 0.215 | 0.3 | 17.3 | Flood Risk |
| 720 min Summer | 0.215 | 0.215 | 0.3 | 17.2 | Flood Risk |
| 960 min Summer | 0.212 | 0.212 | 0.3 | 17.0 | Flood Risk |
| 1440 min Summer | 0.205 | 0.205 | 0.3 | 16.2 | Flood Risk |
| 2160 min Summer | 0.193 | 0.193 | 0.3 | 14.6 | O K |
| 2880 min Summer | 0.180 | 0.180 | 0.3 | 13.1 | O K |
| 4320 min Summer | 0.157 | 0.157 | 0.3 | 10.3 | O K |
| 5760 min Summer | 0.140 | 0.140 | 0.3 | 8.3 | O K |
| 7200 min Summer | 0.128 | 0.128 | 0.3 | 7.0 | O K |
| 8640 min Summer | 0.118 | 0.118 | 0.2 | 6.0 | O K |
| 10080 min Summer | 0.110 | 0.110 | 0.2 | 5.2 | O K |
| 15 min Winter | 0.139 | 0.139 | 0.3 | 8.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume ($m^3$) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 76.290 | 0.0 | 19 |
| 30 min Summer | 49.584 | 0.0 | 33 |
| 60 min Summer | 30.811 | 0.0 | 64 |
| 120 min Summer | 18.584 | 0.0 | 122 |
| 180 min Summer | 13.680 | 0.0 | 182 |
| 240 min Summer | 10.960 | 0.0 | 242 |
| 360 min Summer | 8.001 | 0.0 | 360 |
| 480 min Summer | 6.397 | 0.0 | 458 |
| 600 min Summer | 5.375 | 0.0 | 510 |
| 720 min Summer | 4.661 | 0.0 | 570 |
| 960 min Summer | 3.719 | 0.0 | 694 |
| 1440 min Summer | 2.704 | 0.0 | 966 |
| 2160 min Summer | 1.963 | 0.0 | 1364 |
| 2880 min Summer | 1.563 | 0.0 | 1760 |
| 4320 min Summer | 1.133 | 0.0 | 2508 |
| 5760 min Summer | 0.901 | 0.0 | 3224 |
| 7200 min Summer | 0.754 | 0.0 | 3960 |
| 8640 min Summer | 0.652 | 0.0 | 4672 |
| 10080 min Summer | 0.576 | 0.0 | 5352 |
| 15 min Winter | 76.290 | 0.0 | 19 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.164 | 0.164 | 0.3 | 11.2 | O K |
| 60 min Winter | 0.189 | 0.189 | 0.3 | 14.1 | O K |
| 120 min Winter | 0.212 | 0.212 | 0.3 | 16.9 | Flood Risk |
| 180 min Winter | 0.223 | 0.223 | 0.3 | 18.3 | Flood Risk |
| 240 min Winter | 0.230 | 0.230 | 0.3 | 19.1 | Flood Risk |
| 360 min Winter | 0.237 | 0.237 | 0.3 | 19.9 | Flood Risk |
| 480 min Winter | 0.239 | 0.239 | 0.3 | 20.2 | Flood Risk |
| 600 min Winter | 0.239 | 0.239 | 0.3 | 20.2 | Flood Risk |
| 720 min Winter | 0.237 | 0.237 | 0.3 | 19.9 | Flood Risk |
| 960 min Winter | 0.233 | 0.233 | 0.3 | 19.5 | Flood Risk |
| 1440 min Winter | 0.223 | 0.223 | 0.3 | 18.2 | Flood Risk |
| 2160 min Winter | 0.203 | 0.203 | 0.3 | 15.9 | Flood Risk |
| 2880 min Winter | 0.183 | 0.183 | 0.3 | 13.5 | O K |
| 4320 min Winter | 0.150 | 0.150 | 0.3 | 9.5 | O K |
| 5760 min Winter | 0.130 | 0.130 | 0.3 | 7.2 | O K |
| 7200 min Winter | 0.115 | 0.115 | 0.2 | 5.7 | O K |
| 8640 min Winter | 0.103 | 0.103 | 0.2 | 4.6 | O K |
| 10080 min Winter | 0.093 | 0.093 | 0.2 | 3.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 49.584 | 0.0 | 33 |
| 60 min Winter | 30.811 | 0.0 | 62 |
| 120 min Winter | 18.584 | 0.0 | 120 |
| 180 min Winter | 13.680 | 0.0 | 178 |
| 240 min Winter | 10.960 | 0.0 | 236 |
| 360 min Winter | 8.001 | 0.0 | 350 |
| 480 min Winter | 6.397 | 0.0 | 462 |
| 600 min Winter | 5.375 | 0.0 | 568 |
| 720 min Winter | 4.661 | 0.0 | 664 |
| 960 min Winter | 3.719 | 0.0 | 750 |
| 1440 min Winter | 2.704 | 0.0 | 1054 |
| 2160 min Winter | 1.963 | 0.0 | 1492 |
| 2880 min Winter | 1.563 | 0.0 | 1900 |
| 4320 min Winter | 1.133 | 0.0 | 2636 |
| 5760 min Winter | 0.901 | 0.0 | 3344 |
| 7200 min Winter | 0.754 | 0.0 | 4040 |
| 8640 min Winter | 0.652 | 0.0 | 4760 |
| 10080 min Winter | 0.576 | 0.0 | 5456 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.065

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.065 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 28.4 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 14.0 |
| Max Percolation (l/s) | 110.4 | Slope (1:X) | 100.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Cap Volume Depth (m) | 0.400 |

## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1262 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.193 | 0.193 | 0.3 | 14.7 | O K |
| 30 min Summer | 0.236 | 0.236 | 0.3 | 19.8 | Flood Risk |
| 60 min Summer | 0.279 | 0.279 | 0.3 | 24.9 | Flood Risk |
| 120 min Summer | 0.320 | 0.320 | 0.3 | 29.8 | Flood Risk |
| 180 min Summer | 0.341 | 0.341 | 0.3 | 32.3 | Flood Risk |
| 240 min Summer | 0.354 | 0.354 | 0.3 | 33.9 | Flood Risk |
| 360 min Summer | 0.369 | 0.369 | 0.3 | 35.7 | Flood Risk |
| 480 min Summer | 0.377 | 0.377 | 0.3 | 36.7 | Flood Risk |
| 600 min Summer | 0.381 | 0.381 | 0.3 | 37.1 | Flood Risk |
| 720 min Summer | 0.382 | 0.382 | 0.3 | 37.3 | Flood Risk |
| 960 min Summer | 0.379 | 0.379 | 0.3 | 36.9 | Flood Risk |
| 1440 min Summer | 0.369 | 0.369 | 0.3 | 35.6 | Flood Risk |
| 2160 min Summer | 0.351 | 0.351 | 0.3 | 33.5 | Flood Risk |
| 2880 min Summer | 0.333 | 0.333 | 0.3 | 31.4 | Flood Risk |
| 4320 min Summer | 0.298 | 0.298 | 0.3 | 27.2 | Flood Risk |
| 5760 min Summer | 0.266 | 0.266 | 0.3 | 23.4 | Flood Risk |
| 7200 min Summer | 0.238 | 0.238 | 0.3 | 20.0 | Flood Risk |
| 8640 min Summer | 0.213 | 0.213 | 0.3 | 17.0 | Flood Risk |
| 10080 min Summer | 0.191 | 0.191 | 0.3 | 14.4 | O K |
| 15 min Winter | 0.210 | 0.210 | 0.3 | 16.7 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.634 | 0.0 | 19 |
| 30 min Summer | 90.866 | 0.0 | 34 |
| 60 min Summer | 56.713 | 0.0 | 64 |
| 120 min Summer | 34.190 | 0.0 | 124 |
| 180 min Summer | 25.088 | 0.0 | 182 |
| 240 min Summer | 20.020 | 0.0 | 242 |
| 360 min Summer | 14.528 | 0.0 | 362 |
| 480 min Summer | 11.570 | 0.0 | 482 |
| 600 min Summer | 9.690 | 0.0 | 602 |
| 720 min Summer | 8.380 | 0.0 | 720 |
| 960 min Summer | 6.658 | 0.0 | 936 |
| 1440 min Summer | 4.807 | 0.0 | 1152 |
| 2160 min Summer | 3.465 | 0.0 | 1532 |
| 2880 min Summer | 2.744 | 0.0 | 1932 |
| 4320 min Summer | 1.973 | 0.0 | 2728 |
| 5760 min Summer | 1.559 | 0.0 | 3520 |
| 7200 min Summer | 1.298 | 0.0 | 4320 |
| 8640 min Summer | 1.118 | 0.0 | 5016 |
| 10080 min Summer | 0.985 | 0.0 | 5744 |
| 15 min Winter | 138.634 | 0.0 | 19 |

## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.258 | 0.258 | 0.3 | 22.4 | Flood Risk |
| 60 min Winter | 0.306 | 0.306 | 0.3 | 28.2 | Flood Risk |
| 120 min Winter | 0.353 | 0.353 | 0.3 | 33.7 | Flood Risk |
| 180 min Winter | 0.378 | 0.378 | 0.3 | 36.7 | Flood Risk |
| 240 min Winter | 0.393 | 0.393 | 0.3 | 38.5 | Flood Risk |
| 360 min Winter | 0.411 | 0.411 | 0.3 | 40.7 | Flood Risk |
| 480 min Winter | 0.424 | 0.424 | 0.3 | 42.0 | Flood Risk |
| 600 min Winter | 0.431 | 0.431 | 0.3 | 42.7 | Flood Risk |
| 720 min Winter | 0.435 | 0.435 | 0.3 | 43.0 | Flood Risk |
| 960 min Winter | 0.434 | 0.434 | 0.3 | 43.0 | Flood Risk |
| 1440 min Winter | 0.419 | 0.419 | 0.3 | 41.5 | Flood Risk |
| 2160 min Winter | 0.394 | 0.394 | 0.3 | 38.7 | Flood Risk |
| 2880 min Winter | 0.369 | 0.369 | 0.3 | 35.7 | Flood Risk |
| 4320 min Winter | 0.318 | 0.318 | 0.3 | 29.5 | Flood Risk |
| 5760 min Winter | 0.270 | 0.270 | 0.3 | 23.8 | Flood Risk |
| 7200 min Winter | 0.227 | 0.227 | 0.3 | 18.8 | Flood Risk |
| 8640 min Winter | 0.191 | 0.191 | 0.3 | 14.5 | O K |
| 10080 min Winter | 0.162 | 0.162 | 0.3 | 11.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 90.866 | 0.0 | 33 |
| 60 min Winter | 56.713 | 0.0 | 64 |
| 120 min Winter | 34.190 | 0.0 | 122 |
| 180 min Winter | 25.088 | 0.0 | 180 |
| 240 min Winter | 20.020 | 0.0 | 240 |
| 360 min Winter | 14.528 | 0.0 | 356 |
| 480 min Winter | 11.570 | 0.0 | 472 |
| 600 min Winter | 9.690 | 0.0 | 588 |
| 720 min Winter | 8.380 | 0.0 | 700 |
| 960 min Winter | 6.658 | 0.0 | 924 |
| 1440 min Winter | 4.807 | 0.0 | 1340 |
| 2160 min Winter | 3.465 | 0.0 | 1648 |
| 2880 min Winter | 2.744 | 0.0 | 2104 |
| 4320 min Winter | 1.973 | 0.0 | 2984 |
| 5760 min Winter | 1.559 | 0.0 | 3800 |
| 7200 min Winter | 1.298 | 0.0 | 4544 |
| 8640 min Winter | 1.118 | 0.0 | 5272 |
| 10080 min Winter | 0.985 | 0.0 | 5856 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.065

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.065 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 28.4 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 14.0 |
| Max Percolation (l/s) | 110.4 | Slope (1:X) | 100.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Cap Volume Depth (m) | 0.400 |

## Summary of Results for 100 year Return Period

Half Drain Time : 837 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume ($m^3$) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.153 | 0.153 | 0.3 | 9.9 | O K |
| 30 min Summer | 0.183 | 0.183 | 0.3 | 13.5 | O K |
| 60 min Summer | 0.213 | 0.213 | 0.3 | 17.0 | Flood Risk |
| 120 min Summer | 0.241 | 0.241 | 0.3 | 20.4 | Flood Risk |
| 180 min Summer | 0.255 | 0.255 | 0.3 | 22.0 | Flood Risk |
| 240 min Summer | 0.262 | 0.262 | 0.3 | 22.9 | Flood Risk |
| 360 min Summer | 0.270 | 0.270 | 0.3 | 23.9 | Flood Risk |
| 480 min Summer | 0.273 | 0.273 | 0.3 | 24.2 | Flood Risk |
| 600 min Summer | 0.273 | 0.273 | 0.3 | 24.2 | Flood Risk |
| 720 min Summer | 0.272 | 0.272 | 0.3 | 24.0 | Flood Risk |
| 960 min Summer | 0.268 | 0.268 | 0.3 | 23.6 | Flood Risk |
| 1440 min Summer | 0.259 | 0.259 | 0.3 | 22.6 | Flood Risk |
| 2160 min Summer | 0.243 | 0.243 | 0.3 | 20.7 | Flood Risk |
| 2880 min Summer | 0.228 | 0.228 | 0.3 | 18.8 | Flood Risk |
| 4320 min Summer | 0.198 | 0.198 | 0.3 | 15.3 | O K |
| 5760 min Summer | 0.174 | 0.174 | 0.3 | 12.4 | O K |
| 7200 min Summer | 0.154 | 0.154 | 0.3 | 10.0 | O K |
| 8640 min Summer | 0.140 | 0.140 | 0.3 | 8.3 | O K |
| 10080 min Summer | 0.130 | 0.130 | 0.3 | 7.2 | O K |
| 15 min Winter | 0.165 | 0.165 | 0.3 | 11.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume ($m^3$) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 99.025 | 0.0 | 19 |
| 30 min Summer | 64.904 | 0.0 | 34 |
| 60 min Summer | 40.510 | 0.0 | 64 |
| 120 min Summer | 24.421 | 0.0 | 122 |
| 180 min Summer | 17.920 | 0.0 | 182 |
| 240 min Summer | 14.300 | 0.0 | 242 |
| 360 min Summer | 10.377 | 0.0 | 362 |
| 480 min Summer | 8.265 | 0.0 | 480 |
| 600 min Summer | 6.922 | 0.0 | 600 |
| 720 min Summer | 5.986 | 0.0 | 656 |
| 960 min Summer | 4.756 | 0.0 | 762 |
| 1440 min Summer | 3.434 | 0.0 | 1012 |
| 2160 min Summer | 2.475 | 0.0 | 1424 |
| 2880 min Summer | 1.960 | 0.0 | 1820 |
| 4320 min Summer | 1.409 | 0.0 | 2596 |
| 5760 min Summer | 1.114 | 0.0 | 3344 |
| 7200 min Summer | 0.927 | 0.0 | 4040 |
| 8640 min Summer | 0.798 | 0.0 | 4680 |
| 10080 min Summer | 0.703 | 0.0 | 5440 |
| 15 min Winter | 99.025 | 0.0 | 19 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.199 | 0.199 | 0.3 | 15.4 | O K |
| 60 min Winter | 0.233 | 0.233 | 0.3 | 19.4 | Flood Risk |
| 120 min Winter | 0.264 | 0.264 | 0.3 | 23.2 | Flood Risk |
| 180 min Winter | 0.280 | 0.280 | 0.3 | 25.1 | Flood Risk |
| 240 min Winter | 0.290 | 0.290 | 0.3 | 26.2 | Flood Risk |
| 360 min Winter | 0.300 | 0.300 | 0.3 | 27.4 | Flood Risk |
| 480 min Winter | 0.305 | 0.305 | 0.3 | 28.0 | Flood Risk |
| 600 min Winter | 0.306 | 0.306 | 0.3 | 28.1 | Flood Risk |
| 720 min Winter | 0.305 | 0.305 | 0.3 | 28.0 | Flood Risk |
| 960 min Winter | 0.300 | 0.300 | 0.3 | 27.4 | Flood Risk |
| 1440 min Winter | 0.287 | 0.287 | 0.3 | 25.9 | Flood Risk |
| 2160 min Winter | 0.265 | 0.265 | 0.3 | 23.2 | Flood Risk |
| 2880 min Winter | 0.241 | 0.241 | 0.3 | 20.4 | Flood Risk |
| 4320 min Winter | 0.197 | 0.197 | 0.3 | 15.2 | O K |
| 5760 min Winter | 0.162 | 0.162 | 0.3 | 11.0 | O K |
| 7200 min Winter | 0.139 | 0.139 | 0.3 | 8.2 | O K |
| 8640 min Winter | 0.125 | 0.125 | 0.3 | 6.6 | O K |
| 10080 min Winter | 0.113 | 0.113 | 0.2 | 5.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 64.904 | 0.0 | 33 |
| 60 min Winter | 40.510 | 0.0 | 62 |
| 120 min Winter | 24.421 | 0.0 | 122 |
| 180 min Winter | 17.920 | 0.0 | 180 |
| 240 min Winter | 14.300 | 0.0 | 238 |
| 360 min Winter | 10.377 | 0.0 | 354 |
| 480 min Winter | 8.265 | 0.0 | 468 |
| 600 min Winter | 6.922 | 0.0 | 580 |
| 720 min Winter | 5.986 | 0.0 | 688 |
| 960 min Winter | 4.756 | 0.0 | 892 |
| 1440 min Winter | 3.434 | 0.0 | 1098 |
| 2160 min Winter | 2.475 | 0.0 | 1556 |
| 2880 min Winter | 1.960 | 0.0 | 1988 |
| 4320 min Winter | 1.409 | 0.0 | 2768 |
| 5760 min Winter | 1.114 | 0.0 | 3512 |
| 7200 min Winter | 0.927 | 0.0 | 4112 |
| 8640 min Winter | 0.798 | 0.0 | 4840 |
| 10080 min Winter | 0.703 | 0.0 | 5544 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.065

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.065 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Width (m) | 28.4 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 14.0 |
| Max Percolation (l/s) | 110.4 | Slope (1:X) | 100.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 0.000 | Cap Volume Depth (m) | 0.400 |

## Summary of Results for 1 year Return Period

Half Drain Time : 1736 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.088 | 0.088 | 0.0 | 3.4 | O K |
| 30 min Summer | 0.106 | 0.106 | 0.0 | 4.4 | O K |
| 60 min Summer | 0.125 | 0.125 | 0.0 | 5.6 | O K |
| 120 min Summer | 0.143 | 0.143 | 0.1 | 6.8 | O K |
| 180 min Summer | 0.154 | 0.154 | 0.1 | 7.5 | O K |
| 240 min Summer | 0.161 | 0.161 | 0.1 | 8.1 | O K |
| 360 min Summer | 0.171 | 0.171 | 0.1 | 8.8 | O K |
| 480 min Summer | 0.177 | 0.177 | 0.1 | 9.3 | O K |
| 600 min Summer | 0.181 | 0.181 | 0.1 | 9.6 | O K |
| 720 min Summer | 0.184 | 0.184 | 0.1 | 9.9 | O K |
| 960 min Summer | 0.188 | 0.188 | 0.1 | 10.2 | O K |
| 1440 min Summer | 0.191 | 0.191 | 0.1 | 10.4 | O K |
| 2160 min Summer | 0.193 | 0.193 | 0.1 | 10.6 | O K |
| 2880 min Summer | 0.193 | 0.193 | 0.1 | 10.6 | O K |
| 4320 min Summer | 0.190 | 0.190 | 0.1 | 10.4 | O K |
| 5760 min Summer | 0.186 | 0.186 | 0.1 | 10.0 | O K |
| 7200 min Summer | 0.182 | 0.182 | 0.1 | 9.7 | O K |
| 8640 min Summer | 0.177 | 0.177 | 0.1 | 9.3 | O K |
| 10080 min Summer | 0.172 | 0.172 | 0.1 | 8.9 | O K |
| 15 min Winter | 0.096 | 0.096 | 0.0 | 3.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 31.093 | 0.0 | 19 |
| 30 min Summer | 20.252 | 0.0 | 34 |
| 60 min Summer | 12.800 | 0.0 | 64 |
| 120 min Summer | 7.926 | 0.0 | 124 |
| 180 min Summer | 5.960 | 0.0 | 184 |
| 240 min Summer | 4.862 | 0.0 | 242 |
| 360 min Summer | 3.628 | 0.0 | 362 |
| 480 min Summer | 2.939 | 0.0 | 482 |
| 600 min Summer | 2.495 | 0.0 | 602 |
| 720 min Summer | 2.183 | 0.0 | 722 |
| 960 min Summer | 1.768 | 0.0 | 960 |
| 1440 min Summer | 1.314 | 0.0 | 1254 |
| 2160 min Summer | 0.977 | 0.0 | 1624 |
| 2880 min Summer | 0.791 | 0.0 | 2020 |
| 4320 min Summer | 0.588 | 0.0 | 2856 |
| 5760 min Summer | 0.476 | 0.0 | 3688 |
| 7200 min Summer | 0.405 | 0.0 | 4536 |
| 8640 min Summer | 0.354 | 0.0 | 5280 |
| 10080 min Summer | 0.317 | 0.0 | 6144 |
| 15 min Winter | 31.093 | 0.0 | 19 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.115 | 0.115 | 0.0 | 5.0 | O K |
| 60 min Winter | 0.135 | 0.135 | 0.0 | 6.2 | O K |
| 120 min Winter | 0.155 | 0.155 | 0.1 | 7.6 | O K |
| 180 min Winter | 0.166 | 0.166 | 0.1 | 8.5 | O K |
| 240 min Winter | 0.175 | 0.175 | 0.1 | 9.1 | O K |
| 360 min Winter | 0.185 | 0.185 | 0.1 | 9.9 | O K |
| 480 min Winter | 0.192 | 0.192 | 0.1 | 10.5 | O K |
| 600 min Winter | 0.197 | 0.197 | 0.1 | 10.9 | O K |
| 720 min Winter | 0.200 | 0.200 | 0.1 | 11.2 | Flood Risk |
| 960 min Winter | 0.205 | 0.205 | 0.1 | 11.6 | Flood Risk |
| 1440 min Winter | 0.209 | 0.209 | 0.1 | 12.0 | Flood Risk |
| 2160 min Winter | 0.210 | 0.210 | 0.1 | 12.0 | Flood Risk |
| 2880 min Winter | 0.209 | 0.209 | 0.1 | 12.0 | Flood Risk |
| 4320 min Winter | 0.205 | 0.205 | 0.1 | 11.6 | Flood Risk |
| 5760 min Winter | 0.198 | 0.198 | 0.1 | 11.0 | O K |
| 7200 min Winter | 0.191 | 0.191 | 0.1 | 10.4 | O K |
| 8640 min Winter | 0.184 | 0.184 | 0.1 | 9.8 | O K |
| 10080 min Winter | 0.177 | 0.177 | 0.1 | 9.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 20.252 | 0.0 | 34 |
| 60 min Winter | 12.800 | 0.0 | 64 |
| 120 min Winter | 7.926 | 0.0 | 122 |
| 180 min Winter | 5.960 | 0.0 | 180 |
| 240 min Winter | 4.862 | 0.0 | 240 |
| 360 min Winter | 3.628 | 0.0 | 356 |
| 480 min Winter | 2.939 | 0.0 | 474 |
| 600 min Winter | 2.495 | 0.0 | 590 |
| 720 min Winter | 2.183 | 0.0 | 702 |
| 960 min Winter | 1.768 | 0.0 | 930 |
| 1440 min Winter | 1.314 | 0.0 | 1358 |
| 2160 min Winter | 0.977 | 0.0 | 1708 |
| 2880 min Winter | 0.791 | 0.0 | 2164 |
| 4320 min Winter | 0.588 | 0.0 | 3108 |
| 5760 min Winter | 0.476 | 0.0 | 3984 |
| 7200 min Winter | 0.405 | 0.0 | 4832 |
| 8640 min Winter | 0.354 | 0.0 | 5704 |
| 10080 min Winter | 0.317 | 0.0 | 6552 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.059

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.059 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 50.9 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 30 year Return Period

Half Drain Time : 2686 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume ($m^3$) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.166 | 0.166 | 0.1 | 8.4 | O K |
| 30 min Summer | 0.196 | 0.196 | 0.1 | 10.9 | O K |
| 60 min Summer | 0.225 | 0.225 | 0.1 | 13.5 | Flood Risk |
| 120 min Summer | 0.252 | 0.252 | 0.1 | 16.1 | Flood Risk |
| 180 min Summer | 0.266 | 0.266 | 0.1 | 17.6 | Flood Risk |
| 240 min Summer | 0.276 | 0.276 | 0.1 | 18.6 | Flood Risk |
| 360 min Summer | 0.288 | 0.288 | 0.1 | 20.0 | Flood Risk |
| 480 min Summer | 0.297 | 0.297 | 0.1 | 21.0 | Flood Risk |
| 600 min Summer | 0.303 | 0.303 | 0.1 | 21.7 | Flood Risk |
| 720 min Summer | 0.307 | 0.307 | 0.1 | 22.2 | Flood Risk |
| 960 min Summer | 0.313 | 0.313 | 0.1 | 22.9 | Flood Risk |
| 1440 min Summer | 0.317 | 0.317 | 0.1 | 23.5 | Flood Risk |
| 2160 min Summer | 0.317 | 0.317 | 0.1 | 23.4 | Flood Risk |
| 2880 min Summer | 0.316 | 0.316 | 0.1 | 23.2 | Flood Risk |
| 4320 min Summer | 0.311 | 0.311 | 0.1 | 22.7 | Flood Risk |
| 5760 min Summer | 0.305 | 0.305 | 0.1 | 21.9 | Flood Risk |
| 7200 min Summer | 0.298 | 0.298 | 0.1 | 21.1 | Flood Risk |
| 8640 min Summer | 0.291 | 0.291 | 0.1 | 20.3 | Flood Risk |
| 10080 min Summer | 0.284 | 0.284 | 0.1 | 19.5 | Flood Risk |
| 15 min Winter | 0.179 | 0.179 | 0.1 | 9.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume ($m^3$) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 76.290 | 0.0 | 19 |
| 30 min Summer | 49.584 | 0.0 | 34 |
| 60 min Summer | 30.811 | 0.0 | 64 |
| 120 min Summer | 18.584 | 0.0 | 124 |
| 180 min Summer | 13.680 | 0.0 | 184 |
| 240 min Summer | 10.960 | 0.0 | 244 |
| 360 min Summer | 8.001 | 0.0 | 362 |
| 480 min Summer | 6.397 | 0.0 | 482 |
| 600 min Summer | 5.375 | 0.0 | 602 |
| 720 min Summer | 4.661 | 0.0 | 722 |
| 960 min Summer | 3.719 | 0.0 | 962 |
| 1440 min Summer | 2.704 | 0.0 | 1440 |
| 2160 min Summer | 1.963 | 0.0 | 1884 |
| 2880 min Summer | 1.563 | 0.0 | 2276 |
| 4320 min Summer | 1.133 | 0.0 | 3028 |
| 5760 min Summer | 0.901 | 0.0 | 3864 |
| 7200 min Summer | 0.754 | 0.0 | 4688 |
| 8640 min Summer | 0.652 | 0.0 | 5528 |
| 10080 min Summer | 0.576 | 0.0 | 6352 |
| 15 min Winter | 76.290 | 0.0 | 19 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.211 | 0.211 | 0.1 | 12.2 | Flood Risk |
| 60 min Winter | 0.242 | 0.242 | 0.1 | 15.1 | Flood Risk |
| 120 min Winter | 0.270 | 0.270 | 0.1 | 18.0 | Flood Risk |
| 180 min Winter | 0.286 | 0.286 | 0.1 | 19.8 | Flood Risk |
| 240 min Winter | 0.296 | 0.296 | 0.1 | 20.9 | Flood Risk |
| 360 min Winter | 0.310 | 0.310 | 0.1 | 22.5 | Flood Risk |
| 480 min Winter | 0.319 | 0.319 | 0.1 | 23.7 | Flood Risk |
| 600 min Winter | 0.326 | 0.326 | 0.1 | 24.5 | Flood Risk |
| 720 min Winter | 0.331 | 0.331 | 0.1 | 25.1 | Flood Risk |
| 960 min Winter | 0.337 | 0.337 | 0.1 | 25.9 | Flood Risk |
| 1440 min Winter | 0.343 | 0.343 | 0.1 | 26.7 | Flood Risk |
| 2160 min Winter | 0.344 | 0.344 | 0.1 | 26.9 | Flood Risk |
| 2880 min Winter | 0.341 | 0.341 | 0.1 | 26.5 | Flood Risk |
| 4320 min Winter | 0.335 | 0.335 | 0.1 | 25.7 | Flood Risk |
| 5760 min Winter | 0.327 | 0.327 | 0.1 | 24.6 | Flood Risk |
| 7200 min Winter | 0.317 | 0.317 | 0.1 | 23.5 | Flood Risk |
| 8640 min Winter | 0.308 | 0.308 | 0.1 | 22.3 | Flood Risk |
| 10080 min Winter | 0.298 | 0.298 | 0.1 | 21.1 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 49.584 | 0.0 | 34 |
| 60 min Winter | 30.811 | 0.0 | 64 |
| 120 min Winter | 18.584 | 0.0 | 122 |
| 180 min Winter | 13.680 | 0.0 | 182 |
| 240 min Winter | 10.960 | 0.0 | 240 |
| 360 min Winter | 8.001 | 0.0 | 358 |
| 480 min Winter | 6.397 | 0.0 | 476 |
| 600 min Winter | 5.375 | 0.0 | 594 |
| 720 min Winter | 4.661 | 0.0 | 708 |
| 960 min Winter | 3.719 | 0.0 | 942 |
| 1440 min Winter | 2.704 | 0.0 | 1396 |
| 2160 min Winter | 1.963 | 0.0 | 2036 |
| 2880 min Winter | 1.563 | 0.0 | 2368 |
| 4320 min Winter | 1.133 | 0.0 | 3244 |
| 5760 min Winter | 0.901 | 0.0 | 4160 |
| 7200 min Winter | 0.754 | 0.0 | 5048 |
| 8640 min Winter | 0.652 | 0.0 | 5968 |
| 10080 min Winter | 0.576 | 0.0 | 6856 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.059

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.059 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 50.9 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 100 year Return Period

Half Drain Time : 3041 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.197 | 0.197 | 0.1 | 10.9 | O K |
| 30 min Summer | 0.233 | 0.233 | 0.1 | 14.3 | Flood Risk |
| 60 min Summer | 0.267 | 0.267 | 0.1 | 17.7 | Flood Risk |
| 120 min Summer | 0.298 | 0.298 | 0.1 | 21.2 | Flood Risk |
| 180 min Summer | 0.315 | 0.315 | 0.1 | 23.1 | Flood Risk |
| 240 min Summer | 0.325 | 0.325 | 0.1 | 24.4 | Flood Risk |
| 360 min Summer | 0.339 | 0.339 | 0.1 | 26.2 | Flood Risk |
| 480 min Summer | 0.348 | 0.348 | 0.1 | 27.4 | Flood Risk |
| 600 min Summer | 0.355 | 0.355 | 0.1 | 28.3 | Flood Risk |
| 720 min Summer | 0.360 | 0.360 | 0.1 | 28.9 | Flood Risk |
| 960 min Summer | 0.366 | 0.366 | 0.1 | 29.8 | Flood Risk |
| 1440 min Summer | 0.371 | 0.371 | 0.1 | 30.5 | Flood Risk |
| 2160 min Summer | 0.371 | 0.371 | 0.1 | 30.4 | Flood Risk |
| 2880 min Summer | 0.368 | 0.368 | 0.1 | 30.1 | Flood Risk |
| 4320 min Summer | 0.362 | 0.362 | 0.1 | 29.2 | Flood Risk |
| 5760 min Summer | 0.355 | 0.355 | 0.1 | 28.2 | Flood Risk |
| 7200 min Summer | 0.347 | 0.347 | 0.1 | 27.2 | Flood Risk |
| 8640 min Summer | 0.339 | 0.339 | 0.1 | 26.1 | Flood Risk |
| 10080 min Summer | 0.331 | 0.331 | 0.1 | 25.1 | Flood Risk |
| 15 min Winter | 0.212 | 0.212 | 0.1 | 12.2 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 99.025 | 0.0 | 19 |
| 30 min Summer | 64.904 | 0.0 | 34 |
| 60 min Summer | 40.510 | 0.0 | 64 |
| 120 min Summer | 24.421 | 0.0 | 124 |
| 180 min Summer | 17.920 | 0.0 | 184 |
| 240 min Summer | 14.300 | 0.0 | 244 |
| 360 min Summer | 10.377 | 0.0 | 364 |
| 480 min Summer | 8.265 | 0.0 | 482 |
| 600 min Summer | 6.922 | 0.0 | 602 |
| 720 min Summer | 5.986 | 0.0 | 722 |
| 960 min Summer | 4.756 | 0.0 | 962 |
| 1440 min Summer | 3.434 | 0.0 | 1440 |
| 2160 min Summer | 2.475 | 0.0 | 2056 |
| 2880 min Summer | 1.960 | 0.0 | 2368 |
| 4320 min Summer | 1.409 | 0.0 | 3112 |
| 5760 min Summer | 1.114 | 0.0 | 3928 |
| 7200 min Summer | 0.927 | 0.0 | 4760 |
| 8640 min Summer | 0.798 | 0.0 | 5616 |
| 10080 min Summer | 0.703 | 0.0 | 6448 |
| 15 min Winter | 99.025 | 0.0 | 19 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.251 | 0.251 | 0.1 | 16.0 | Flood Risk |
| 60 min Winter | 0.287 | 0.287 | 0.1 | 19.9 | Flood Risk |
| 120 min Winter | 0.320 | 0.320 | 0.1 | 23.8 | Flood Risk |
| 180 min Winter | 0.337 | 0.337 | 0.1 | 26.0 | Flood Risk |
| 240 min Winter | 0.349 | 0.349 | 0.1 | 27.4 | Flood Risk |
| 360 min Winter | 0.364 | 0.364 | 0.1 | 29.4 | Flood Risk |
| 480 min Winter | 0.374 | 0.374 | 0.1 | 30.8 | Flood Risk |
| 600 min Winter | 0.381 | 0.381 | 0.1 | 31.8 | Flood Risk |
| 720 min Winter | 0.386 | 0.386 | 0.1 | 32.6 | Flood Risk |
| 960 min Winter | 0.394 | 0.394 | 0.1 | 33.7 | Flood Risk |
| 1440 min Winter | 0.401 | 0.401 | 0.1 | 34.7 | Flood Risk |
| 2160 min Winter | 0.402 | 0.402 | 0.1 | 34.9 | Flood Risk |
| 2880 min Winter | 0.399 | 0.399 | 0.1 | 34.4 | Flood Risk |
| 4320 min Winter | 0.391 | 0.391 | 0.1 | 33.2 | Flood Risk |
| 5760 min Winter | 0.381 | 0.381 | 0.1 | 31.9 | Flood Risk |
| 7200 min Winter | 0.371 | 0.371 | 0.1 | 30.4 | Flood Risk |
| 8640 min Winter | 0.360 | 0.360 | 0.1 | 29.0 | Flood Risk |
| 10080 min Winter | 0.349 | 0.349 | 0.1 | 27.5 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 64.904 | 0.0 | 34 |
| 60 min Winter | 40.510 | 0.0 | 64 |
| 120 min Winter | 24.421 | 0.0 | 122 |
| 180 min Winter | 17.920 | 0.0 | 182 |
| 240 min Winter | 14.300 | 0.0 | 240 |
| 360 min Winter | 10.377 | 0.0 | 358 |
| 480 min Winter | 8.265 | 0.0 | 476 |
| 600 min Winter | 6.922 | 0.0 | 594 |
| 720 min Winter | 5.986 | 0.0 | 710 |
| 960 min Winter | 4.756 | 0.0 | 942 |
| 1440 min Winter | 3.434 | 0.0 | 1400 |
| 2160 min Winter | 2.475 | 0.0 | 2056 |
| 2880 min Winter | 1.960 | 0.0 | 2676 |
| 4320 min Winter | 1.409 | 0.0 | 3324 |
| 5760 min Winter | 1.114 | 0.0 | 4256 |
| 7200 min Winter | 0.927 | 0.0 | 5120 |
| 8640 min Winter | 0.798 | 0.0 | 6048 |
| 10080 min Winter | 0.703 | 0.0 | 6952 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.059

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.059 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 50.9 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 3698 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.244 | 0.244 | 0.1 | 15.3 | Flood Risk |
| 30 min Summer | 0.288 | 0.288 | 0.1 | 20.0 | Flood Risk |
| 60 min Summer | 0.329 | 0.329 | 0.1 | 24.9 | Flood Risk |
| 120 min Summer | 0.366 | 0.366 | 0.1 | 29.8 | Flood Risk |
| 180 min Summer | 0.386 | 0.386 | 0.1 | 32.5 | Flood Risk |
| 240 min Summer | 0.399 | 0.399 | 0.1 | 34.4 | Flood Risk |
| 360 min Summer | 0.416 | 0.416 | 0.1 | 37.0 | Flood Risk |
| 480 min Summer | 0.427 | 0.427 | 0.1 | 38.8 | Flood Risk |
| 600 min Summer | 0.436 | 0.436 | 0.1 | 40.1 | Flood Risk |
| 720 min Summer | 0.442 | 0.442 | 0.1 | 41.1 | Flood Risk |
| 960 min Summer | 0.451 | 0.451 | 0.1 | 42.5 | Flood Risk |
| 1440 min Summer | 0.460 | 0.460 | 0.1 | 44.0 | Flood Risk |
| 2160 min Summer | 0.463 | 0.463 | 0.1 | 44.4 | Flood Risk |
| 2880 min Summer | 0.460 | 0.460 | 0.1 | 44.0 | Flood Risk |
| 4320 min Summer | 0.454 | 0.454 | 0.1 | 43.1 | Flood Risk |
| 5760 min Summer | 0.448 | 0.448 | 0.1 | 42.0 | Flood Risk |
| 7200 min Summer | 0.440 | 0.440 | 0.1 | 40.8 | Flood Risk |
| 8640 min Summer | 0.432 | 0.432 | 0.1 | 39.5 | Flood Risk |
| 10080 min Summer | 0.424 | 0.424 | 0.1 | 38.3 | Flood Risk |
| 15 min Winter | 0.262 | 0.262 | 0.1 | 17.1 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.634 | 0.0 | 19 |
| 30 min Summer | 90.866 | 0.0 | 34 |
| 60 min Summer | 56.713 | 0.0 | 64 |
| 120 min Summer | 34.190 | 0.0 | 124 |
| 180 min Summer | 25.088 | 0.0 | 184 |
| 240 min Summer | 20.020 | 0.0 | 244 |
| 360 min Summer | 14.528 | 0.0 | 364 |
| 480 min Summer | 11.570 | 0.0 | 482 |
| 600 min Summer | 9.690 | 0.0 | 602 |
| 720 min Summer | 8.380 | 0.0 | 722 |
| 960 min Summer | 6.658 | 0.0 | 962 |
| 1440 min Summer | 4.807 | 0.0 | 1442 |
| 2160 min Summer | 3.465 | 0.0 | 2160 |
| 2880 min Summer | 2.744 | 0.0 | 2568 |
| 4320 min Summer | 1.973 | 0.0 | 3288 |
| 5760 min Summer | 1.559 | 0.0 | 4088 |
| 7200 min Summer | 1.298 | 0.0 | 4896 |
| 8640 min Summer | 1.118 | 0.0 | 5712 |
| 10080 min Summer | 0.985 | 0.0 | 6552 |
| 15 min Winter | 138.634 | 0.0 | 19 |

## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.309 | 0.309 | 0.1 | 22.4 | Flood Risk |
| 60 min Winter | 0.352 | 0.352 | 0.1 | 27.9 | Flood Risk |
| 120 min Winter | 0.392 | 0.392 | 0.1 | 33.4 | Flood Risk |
| 180 min Winter | 0.413 | 0.413 | 0.1 | 36.5 | Flood Risk |
| 240 min Winter | 0.426 | 0.426 | 0.1 | 38.6 | Flood Risk |
| 360 min Winter | 0.445 | 0.445 | 0.1 | 41.5 | Flood Risk |
| 480 min Winter | 0.457 | 0.457 | 0.1 | 43.6 | Flood Risk |
| 600 min Winter | 0.467 | 0.467 | 0.1 | 45.1 | Flood Risk |
| 720 min Winter | 0.474 | 0.474 | 0.1 | 46.3 | Flood Risk |
| 960 min Winter | 0.483 | 0.483 | 0.1 | 48.0 | Flood Risk |
| 1440 min Winter | 0.494 | 0.494 | 0.1 | 49.8 | Flood Risk |
| 2160 min Winter | 0.499 | 0.499 | 0.1 | 50.7 | Flood Risk |
| 2880 min Winter | 0.498 | 0.498 | 0.1 | 50.5 | Flood Risk |
| 4320 min Winter | 0.490 | 0.490 | 0.1 | 49.1 | Flood Risk |
| 5760 min Winter | 0.481 | 0.481 | 0.1 | 47.6 | Flood Risk |
| 7200 min Winter | 0.472 | 0.472 | 0.1 | 46.0 | Flood Risk |
| 8640 min Winter | 0.461 | 0.461 | 0.1 | 44.2 | Flood Risk |
| 10080 min Winter | 0.450 | 0.450 | 0.1 | 42.4 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 90.866 | 0.0 | 34 |
| 60 min Winter | 56.713 | 0.0 | 64 |
| 120 min Winter | 34.190 | 0.0 | 122 |
| 180 min Winter | 25.088 | 0.0 | 182 |
| 240 min Winter | 20.020 | 0.0 | 242 |
| 360 min Winter | 14.528 | 0.0 | 360 |
| 480 min Winter | 11.570 | 0.0 | 478 |
| 600 min Winter | 9.690 | 0.0 | 596 |
| 720 min Winter | 8.380 | 0.0 | 714 |
| 960 min Winter | 6.658 | 0.0 | 944 |
| 1440 min Winter | 4.807 | 0.0 | 1410 |
| 2160 min Winter | 3.465 | 0.0 | 2076 |
| 2880 min Winter | 2.744 | 0.0 | 2736 |
| 4320 min Winter | 1.973 | 0.0 | 3456 |
| 5760 min Winter | 1.559 | 0.0 | 4328 |
| 7200 min Winter | 1.298 | 0.0 | 5264 |
| 8640 min Winter | 1.118 | 0.0 | 6144 |
| 10080 min Winter | 0.985 | 0.0 | 7064 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.059

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.059 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 50.9 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 1 year Return Period

Half Drain Time : 1685 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.084 | 0.084 | 0.0 | 2.0 | O K |
| 30 min Summer | 0.102 | 0.102 | 0.0 | 2.6 | O K |
| 60 min Summer | 0.120 | 0.120 | 0.0 | 3.3 | O K |
| 120 min Summer | 0.138 | 0.138 | 0.0 | 4.0 | O K |
| 180 min Summer | 0.148 | 0.148 | 0.0 | 4.5 | O K |
| 240 min Summer | 0.155 | 0.155 | 0.0 | 4.8 | O K |
| 360 min Summer | 0.164 | 0.164 | 0.0 | 5.2 | O K |
| 480 min Summer | 0.170 | 0.170 | 0.0 | 5.5 | O K |
| 600 min Summer | 0.174 | 0.174 | 0.0 | 5.7 | O K |
| 720 min Summer | 0.177 | 0.177 | 0.0 | 5.8 | O K |
| 960 min Summer | 0.180 | 0.180 | 0.0 | 6.0 | O K |
| 1440 min Summer | 0.183 | 0.183 | 0.0 | 6.1 | O K |
| 2160 min Summer | 0.185 | 0.185 | 0.0 | 6.2 | O K |
| 2880 min Summer | 0.185 | 0.185 | 0.0 | 6.2 | O K |
| 4320 min Summer | 0.182 | 0.182 | 0.0 | 6.1 | O K |
| 5760 min Summer | 0.178 | 0.178 | 0.0 | 5.9 | O K |
| 7200 min Summer | 0.173 | 0.173 | 0.0 | 5.6 | O K |
| 8640 min Summer | 0.168 | 0.168 | 0.0 | 5.4 | O K |
| 10080 min Summer | 0.163 | 0.163 | 0.0 | 5.2 | O K |
| 15 min Winter | 0.092 | 0.092 | 0.0 | 2.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 31.093 | 0.0 | 19 |
| 30 min Summer | 20.252 | 0.0 | 34 |
| 60 min Summer | 12.800 | 0.0 | 64 |
| 120 min Summer | 7.926 | 0.0 | 124 |
| 180 min Summer | 5.960 | 0.0 | 184 |
| 240 min Summer | 4.862 | 0.0 | 242 |
| 360 min Summer | 3.628 | 0.0 | 362 |
| 480 min Summer | 2.939 | 0.0 | 482 |
| 600 min Summer | 2.495 | 0.0 | 602 |
| 720 min Summer | 2.183 | 0.0 | 722 |
| 960 min Summer | 1.768 | 0.0 | 960 |
| 1440 min Summer | 1.314 | 0.0 | 1238 |
| 2160 min Summer | 0.977 | 0.0 | 1620 |
| 2880 min Summer | 0.791 | 0.0 | 2016 |
| 4320 min Summer | 0.588 | 0.0 | 2852 |
| 5760 min Summer | 0.476 | 0.0 | 3688 |
| 7200 min Summer | 0.405 | 0.0 | 4472 |
| 8640 min Summer | 0.354 | 0.0 | 5280 |
| 10080 min Summer | 0.317 | 0.0 | 6056 |
| 15 min Winter | 31.093 | 0.0 | 19 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.111 | 0.111 | 0.0 | 2.9 | O K |
| 60 min Winter | 0.130 | 0.130 | 0.0 | 3.7 | O K |
| 120 min Winter | 0.149 | 0.149 | 0.0 | 4.5 | O K |
| 180 min Winter | 0.160 | 0.160 | 0.0 | 5.0 | O K |
| 240 min Winter | 0.168 | 0.168 | 0.0 | 5.4 | O K |
| 360 min Winter | 0.178 | 0.178 | 0.0 | 5.9 | O K |
| 480 min Winter | 0.184 | 0.184 | 0.0 | 6.2 | O K |
| 600 min Winter | 0.189 | 0.189 | 0.0 | 6.4 | O K |
| 720 min Winter | 0.192 | 0.192 | 0.0 | 6.6 | O K |
| 960 min Winter | 0.196 | 0.196 | 0.0 | 6.8 | O K |
| 1440 min Winter | 0.200 | 0.200 | 0.0 | 7.0 | O K |
| 2160 min Winter | 0.201 | 0.201 | 0.0 | 7.1 | Flood Risk |
| 2880 min Winter | 0.200 | 0.200 | 0.0 | 7.0 | Flood Risk |
| 4320 min Winter | 0.195 | 0.195 | 0.0 | 6.8 | O K |
| 5760 min Winter | 0.188 | 0.188 | 0.0 | 6.4 | O K |
| 7200 min Winter | 0.181 | 0.181 | 0.0 | 6.1 | O K |
| 8640 min Winter | 0.174 | 0.174 | 0.0 | 5.7 | O K |
| 10080 min Winter | 0.167 | 0.167 | 0.0 | 5.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 20.252 | 0.0 | 34 |
| 60 min Winter | 12.800 | 0.0 | 64 |
| 120 min Winter | 7.926 | 0.0 | 122 |
| 180 min Winter | 5.960 | 0.0 | 180 |
| 240 min Winter | 4.862 | 0.0 | 240 |
| 360 min Winter | 3.628 | 0.0 | 356 |
| 480 min Winter | 2.939 | 0.0 | 472 |
| 600 min Winter | 2.495 | 0.0 | 588 |
| 720 min Winter | 2.183 | 0.0 | 702 |
| 960 min Winter | 1.768 | 0.0 | 926 |
| 1440 min Winter | 1.314 | 0.0 | 1356 |
| 2160 min Winter | 0.977 | 0.0 | 1692 |
| 2880 min Winter | 0.791 | 0.0 | 2160 |
| 4320 min Winter | 0.588 | 0.0 | 3072 |
| 5760 min Winter | 0.476 | 0.0 | 3976 |
| 7200 min Winter | 0.405 | 0.0 | 4832 |
| 8640 min Winter | 0.354 | 0.0 | 5704 |
| 10080 min Winter | 0.317 | 0.0 | 6552 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.035

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.035 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 32.0 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 30 year Return Period

Half Drain Time : 2571 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.159 | 0.159 | 0.0 | 5.0 | O K |
| 30 min Summer | 0.189 | 0.189 | 0.0 | 6.5 | O K |
| 60 min Summer | 0.217 | 0.217 | 0.0 | 8.0 | Flood Risk |
| 120 min Summer | 0.243 | 0.243 | 0.0 | 9.5 | Flood Risk |
| 180 min Summer | 0.257 | 0.257 | 0.0 | 10.4 | Flood Risk |
| 240 min Summer | 0.266 | 0.266 | 0.1 | 11.0 | Flood Risk |
| 360 min Summer | 0.278 | 0.278 | 0.1 | 11.9 | Flood Risk |
| 480 min Summer | 0.286 | 0.286 | 0.1 | 12.4 | Flood Risk |
| 600 min Summer | 0.292 | 0.292 | 0.1 | 12.8 | Flood Risk |
| 720 min Summer | 0.296 | 0.296 | 0.1 | 13.1 | Flood Risk |
| 960 min Summer | 0.301 | 0.301 | 0.1 | 13.5 | Flood Risk |
| 1440 min Summer | 0.305 | 0.305 | 0.1 | 13.8 | Flood Risk |
| 2160 min Summer | 0.305 | 0.305 | 0.1 | 13.8 | Flood Risk |
| 2880 min Summer | 0.303 | 0.303 | 0.1 | 13.7 | Flood Risk |
| 4320 min Summer | 0.298 | 0.298 | 0.1 | 13.3 | Flood Risk |
| 5760 min Summer | 0.292 | 0.292 | 0.1 | 12.8 | Flood Risk |
| 7200 min Summer | 0.285 | 0.285 | 0.1 | 12.3 | Flood Risk |
| 8640 min Summer | 0.278 | 0.278 | 0.1 | 11.8 | Flood Risk |
| 10080 min Summer | 0.271 | 0.271 | 0.1 | 11.4 | Flood Risk |
| 15 min Winter | 0.172 | 0.172 | 0.0 | 5.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 76.290 | 0.0 | 19 |
| 30 min Summer | 49.584 | 0.0 | 34 |
| 60 min Summer | 30.811 | 0.0 | 64 |
| 120 min Summer | 18.584 | 0.0 | 124 |
| 180 min Summer | 13.680 | 0.0 | 184 |
| 240 min Summer | 10.960 | 0.0 | 244 |
| 360 min Summer | 8.001 | 0.0 | 362 |
| 480 min Summer | 6.397 | 0.0 | 482 |
| 600 min Summer | 5.375 | 0.0 | 602 |
| 720 min Summer | 4.661 | 0.0 | 722 |
| 960 min Summer | 3.719 | 0.0 | 962 |
| 1440 min Summer | 2.704 | 0.0 | 1440 |
| 2160 min Summer | 1.963 | 0.0 | 1860 |
| 2880 min Summer | 1.563 | 0.0 | 2224 |
| 4320 min Summer | 1.133 | 0.0 | 3024 |
| 5760 min Summer | 0.901 | 0.0 | 3856 |
| 7200 min Summer | 0.754 | 0.0 | 4680 |
| 8640 min Summer | 0.652 | 0.0 | 5528 |
| 10080 min Summer | 0.576 | 0.0 | 6344 |
| 15 min Winter | 76.290 | 0.0 | 19 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume ($m^3$) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.204 | 0.204 | 0.0 | 7.2 | Flood Risk |
| 60 min Winter | 0.233 | 0.233 | 0.0 | 8.9 | Flood Risk |
| 120 min Winter | 0.261 | 0.261 | 0.0 | 10.7 | Flood Risk |
| 180 min Winter | 0.276 | 0.276 | 0.1 | 11.7 | Flood Risk |
| 240 min Winter | 0.286 | 0.286 | 0.1 | 12.4 | Flood Risk |
| 360 min Winter | 0.299 | 0.299 | 0.1 | 13.3 | Flood Risk |
| 480 min Winter | 0.308 | 0.308 | 0.1 | 14.0 | Flood Risk |
| 600 min Winter | 0.314 | 0.314 | 0.1 | 14.5 | Flood Risk |
| 720 min Winter | 0.318 | 0.318 | 0.1 | 14.8 | Flood Risk |
| 960 min Winter | 0.325 | 0.325 | 0.1 | 15.3 | Flood Risk |
| 1440 min Winter | 0.330 | 0.330 | 0.1 | 15.8 | Flood Risk |
| 2160 min Winter | 0.331 | 0.331 | 0.1 | 15.8 | Flood Risk |
| 2880 min Winter | 0.328 | 0.328 | 0.1 | 15.6 | Flood Risk |
| 4320 min Winter | 0.321 | 0.321 | 0.1 | 15.1 | Flood Risk |
| 5760 min Winter | 0.313 | 0.313 | 0.1 | 14.4 | Flood Risk |
| 7200 min Winter | 0.303 | 0.303 | 0.1 | 13.7 | Flood Risk |
| 8640 min Winter | 0.293 | 0.293 | 0.1 | 13.0 | Flood Risk |
| 10080 min Winter | 0.284 | 0.284 | 0.1 | 12.3 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume ($m^3$) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 49.584 | 0.0 | 34 |
| 60 min Winter | 30.811 | 0.0 | 64 |
| 120 min Winter | 18.584 | 0.0 | 122 |
| 180 min Winter | 13.680 | 0.0 | 182 |
| 240 min Winter | 10.960 | 0.0 | 240 |
| 360 min Winter | 8.001 | 0.0 | 358 |
| 480 min Winter | 6.397 | 0.0 | 476 |
| 600 min Winter | 5.375 | 0.0 | 592 |
| 720 min Winter | 4.661 | 0.0 | 708 |
| 960 min Winter | 3.719 | 0.0 | 942 |
| 1440 min Winter | 2.704 | 0.0 | 1388 |
| 2160 min Winter | 1.963 | 0.0 | 2032 |
| 2880 min Winter | 1.563 | 0.0 | 2336 |
| 4320 min Winter | 1.133 | 0.0 | 3240 |
| 5760 min Winter | 0.901 | 0.0 | 4152 |
| 7200 min Winter | 0.754 | 0.0 | 5048 |
| 8640 min Winter | 0.652 | 0.0 | 5960 |
| 10080 min Winter | 0.576 | 0.0 | 6760 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.035

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.035 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 32.0 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 3547 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.235 | 0.235 | 0.0 | 9.1 | Flood Risk |
| 30 min Summer | 0.278 | 0.278 | 0.1 | 11.9 | Flood Risk |
| 60 min Summer | 0.317 | 0.317 | 0.1 | 14.7 | Flood Risk |
| 120 min Summer | 0.353 | 0.353 | 0.1 | 17.6 | Flood Risk |
| 180 min Summer | 0.373 | 0.373 | 0.1 | 19.3 | Flood Risk |
| 240 min Summer | 0.385 | 0.385 | 0.1 | 20.4 | Flood Risk |
| 360 min Summer | 0.401 | 0.401 | 0.1 | 21.9 | Flood Risk |
| 480 min Summer | 0.413 | 0.413 | 0.1 | 23.0 | Flood Risk |
| 600 min Summer | 0.421 | 0.421 | 0.1 | 23.7 | Flood Risk |
| 720 min Summer | 0.427 | 0.427 | 0.1 | 24.3 | Flood Risk |
| 960 min Summer | 0.435 | 0.435 | 0.1 | 25.1 | Flood Risk |
| 1440 min Summer | 0.443 | 0.443 | 0.1 | 26.0 | Flood Risk |
| 2160 min Summer | 0.445 | 0.445 | 0.1 | 26.2 | Flood Risk |
| 2880 min Summer | 0.443 | 0.443 | 0.1 | 25.9 | Flood Risk |
| 4320 min Summer | 0.437 | 0.437 | 0.1 | 25.3 | Flood Risk |
| 5760 min Summer | 0.430 | 0.430 | 0.1 | 24.6 | Flood Risk |
| 7200 min Summer | 0.422 | 0.422 | 0.1 | 23.9 | Flood Risk |
| 8640 min Summer | 0.414 | 0.414 | 0.1 | 23.1 | Flood Risk |
| 10080 min Summer | 0.406 | 0.406 | 0.1 | 22.3 | Flood Risk |
| 15 min Winter | 0.252 | 0.252 | 0.0 | 10.2 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.634 | 0.0 | 19 |
| 30 min Summer | 90.866 | 0.0 | 34 |
| 60 min Summer | 56.713 | 0.0 | 64 |
| 120 min Summer | 34.190 | 0.0 | 124 |
| 180 min Summer | 25.088 | 0.0 | 184 |
| 240 min Summer | 20.020 | 0.0 | 244 |
| 360 min Summer | 14.528 | 0.0 | 364 |
| 480 min Summer | 11.570 | 0.0 | 482 |
| 600 min Summer | 9.690 | 0.0 | 602 |
| 720 min Summer | 8.380 | 0.0 | 722 |
| 960 min Summer | 6.658 | 0.0 | 962 |
| 1440 min Summer | 4.807 | 0.0 | 1442 |
| 2160 min Summer | 3.465 | 0.0 | 2160 |
| 2880 min Summer | 2.744 | 0.0 | 2508 |
| 4320 min Summer | 1.973 | 0.0 | 3244 |
| 5760 min Summer | 1.559 | 0.0 | 4040 |
| 7200 min Summer | 1.298 | 0.0 | 4896 |
| 8640 min Summer | 1.118 | 0.0 | 5704 |
| 10080 min Summer | 0.985 | 0.0 | 6464 |
| 15 min Winter | 138.634 | 0.0 | 19 |

## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.298 | 0.298 | 0.1 | 13.3 | Flood Risk |
| 60 min Winter | 0.340 | 0.340 | 0.1 | 16.5 | Flood Risk |
| 120 min Winter | 0.378 | 0.378 | 0.1 | 19.8 | Flood Risk |
| 180 min Winter | 0.399 | 0.399 | 0.1 | 21.6 | Flood Risk |
| 240 min Winter | 0.412 | 0.412 | 0.1 | 22.9 | Flood Risk |
| 360 min Winter | 0.430 | 0.430 | 0.1 | 24.6 | Flood Risk |
| 480 min Winter | 0.442 | 0.442 | 0.1 | 25.8 | Flood Risk |
| 600 min Winter | 0.451 | 0.451 | 0.1 | 26.7 | Flood Risk |
| 720 min Winter | 0.457 | 0.457 | 0.1 | 27.4 | Flood Risk |
| 960 min Winter | 0.467 | 0.467 | 0.1 | 28.4 | Flood Risk |
| 1440 min Winter | 0.477 | 0.477 | 0.1 | 29.4 | Flood Risk |
| 2160 min Winter | 0.481 | 0.481 | 0.1 | 29.9 | Flood Risk |
| 2880 min Winter | 0.479 | 0.479 | 0.1 | 29.7 | Flood Risk |
| 4320 min Winter | 0.471 | 0.471 | 0.1 | 28.8 | Flood Risk |
| 5760 min Winter | 0.462 | 0.462 | 0.1 | 27.9 | Flood Risk |
| 7200 min Winter | 0.452 | 0.452 | 0.1 | 26.9 | Flood Risk |
| 8640 min Winter | 0.442 | 0.442 | 0.1 | 25.8 | Flood Risk |
| 10080 min Winter | 0.431 | 0.431 | 0.1 | 24.7 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 90.866 | 0.0 | 34 |
| 60 min Winter | 56.713 | 0.0 | 64 |
| 120 min Winter | 34.190 | 0.0 | 122 |
| 180 min Winter | 25.088 | 0.0 | 182 |
| 240 min Winter | 20.020 | 0.0 | 240 |
| 360 min Winter | 14.528 | 0.0 | 360 |
| 480 min Winter | 11.570 | 0.0 | 478 |
| 600 min Winter | 9.690 | 0.0 | 596 |
| 720 min Winter | 8.380 | 0.0 | 712 |
| 960 min Winter | 6.658 | 0.0 | 944 |
| 1440 min Winter | 4.807 | 0.0 | 1402 |
| 2160 min Winter | 3.465 | 0.0 | 2076 |
| 2880 min Winter | 2.744 | 0.0 | 2712 |
| 4320 min Winter | 1.973 | 0.0 | 3412 |
| 5760 min Winter | 1.559 | 0.0 | 4328 |
| 7200 min Winter | 1.298 | 0.0 | 5256 |
| 8640 min Winter | 1.118 | 0.0 | 6144 |
| 10080 min Winter | 0.985 | 0.0 | 7056 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.035

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.035 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 32.0 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 100 year Return Period

Half Drain Time : 2949 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.189 | 0.189 | 0.0 | 6.5 | O K |
| 30 min Summer | 0.225 | 0.225 | 0.0 | 8.5 | Flood Risk |
| 60 min Summer | 0.258 | 0.258 | 0.0 | 10.5 | Flood Risk |
| 120 min Summer | 0.288 | 0.288 | 0.1 | 12.6 | Flood Risk |
| 180 min Summer | 0.304 | 0.304 | 0.1 | 13.7 | Flood Risk |
| 240 min Summer | 0.314 | 0.314 | 0.1 | 14.5 | Flood Risk |
| 360 min Summer | 0.327 | 0.327 | 0.1 | 15.5 | Flood Risk |
| 480 min Summer | 0.336 | 0.336 | 0.1 | 16.2 | Flood Risk |
| 600 min Summer | 0.342 | 0.342 | 0.1 | 16.7 | Flood Risk |
| 720 min Summer | 0.347 | 0.347 | 0.1 | 17.1 | Flood Risk |
| 960 min Summer | 0.353 | 0.353 | 0.1 | 17.6 | Flood Risk |
| 1440 min Summer | 0.358 | 0.358 | 0.1 | 18.0 | Flood Risk |
| 2160 min Summer | 0.357 | 0.357 | 0.1 | 17.9 | Flood Risk |
| 2880 min Summer | 0.354 | 0.354 | 0.1 | 17.7 | Flood Risk |
| 4320 min Summer | 0.348 | 0.348 | 0.1 | 17.2 | Flood Risk |
| 5760 min Summer | 0.340 | 0.340 | 0.1 | 16.6 | Flood Risk |
| 7200 min Summer | 0.332 | 0.332 | 0.1 | 15.9 | Flood Risk |
| 8640 min Summer | 0.324 | 0.324 | 0.1 | 15.3 | Flood Risk |
| 10080 min Summer | 0.316 | 0.316 | 0.1 | 14.7 | Flood Risk |
| 15 min Winter | 0.204 | 0.204 | 0.0 | 7.2 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 99.025 | 0.0 | 19 |
| 30 min Summer | 64.904 | 0.0 | 34 |
| 60 min Summer | 40.510 | 0.0 | 64 |
| 120 min Summer | 24.421 | 0.0 | 124 |
| 180 min Summer | 17.920 | 0.0 | 184 |
| 240 min Summer | 14.300 | 0.0 | 244 |
| 360 min Summer | 10.377 | 0.0 | 364 |
| 480 min Summer | 8.265 | 0.0 | 482 |
| 600 min Summer | 6.922 | 0.0 | 602 |
| 720 min Summer | 5.986 | 0.0 | 722 |
| 960 min Summer | 4.756 | 0.0 | 962 |
| 1440 min Summer | 3.434 | 0.0 | 1440 |
| 2160 min Summer | 2.475 | 0.0 | 2012 |
| 2880 min Summer | 1.960 | 0.0 | 2336 |
| 4320 min Summer | 1.409 | 0.0 | 3108 |
| 5760 min Summer | 1.114 | 0.0 | 3920 |
| 7200 min Summer | 0.927 | 0.0 | 4752 |
| 8640 min Summer | 0.798 | 0.0 | 5536 |
| 10080 min Summer | 0.703 | 0.0 | 6360 |
| 15 min Winter | 99.025 | 0.0 | 19 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.242 | 0.242 | 0.0 | 9.5 | Flood Risk |
| 60 min Winter | 0.277 | 0.277 | 0.1 | 11.8 | Flood Risk |
| 120 min Winter | 0.309 | 0.309 | 0.1 | 14.1 | Flood Risk |
| 180 min Winter | 0.326 | 0.326 | 0.1 | 15.4 | Flood Risk |
| 240 min Winter | 0.337 | 0.337 | 0.1 | 16.3 | Flood Risk |
| 360 min Winter | 0.351 | 0.351 | 0.1 | 17.4 | Flood Risk |
| 480 min Winter | 0.361 | 0.361 | 0.1 | 18.3 | Flood Risk |
| 600 min Winter | 0.367 | 0.367 | 0.1 | 18.8 | Flood Risk |
| 720 min Winter | 0.373 | 0.373 | 0.1 | 19.3 | Flood Risk |
| 960 min Winter | 0.379 | 0.379 | 0.1 | 19.9 | Flood Risk |
| 1440 min Winter | 0.386 | 0.386 | 0.1 | 20.5 | Flood Risk |
| 2160 min Winter | 0.387 | 0.387 | 0.1 | 20.5 | Flood Risk |
| 2880 min Winter | 0.383 | 0.383 | 0.1 | 20.2 | Flood Risk |
| 4320 min Winter | 0.375 | 0.375 | 0.1 | 19.5 | Flood Risk |
| 5760 min Winter | 0.365 | 0.365 | 0.1 | 18.7 | Flood Risk |
| 7200 min Winter | 0.355 | 0.355 | 0.1 | 17.8 | Flood Risk |
| 8640 min Winter | 0.344 | 0.344 | 0.1 | 16.9 | Flood Risk |
| 10080 min Winter | 0.333 | 0.333 | 0.1 | 16.0 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 64.904 | 0.0 | 34 |
| 60 min Winter | 40.510 | 0.0 | 64 |
| 120 min Winter | 24.421 | 0.0 | 122 |
| 180 min Winter | 17.920 | 0.0 | 182 |
| 240 min Winter | 14.300 | 0.0 | 240 |
| 360 min Winter | 10.377 | 0.0 | 358 |
| 480 min Winter | 8.265 | 0.0 | 476 |
| 600 min Winter | 6.922 | 0.0 | 594 |
| 720 min Winter | 5.986 | 0.0 | 710 |
| 960 min Winter | 4.756 | 0.0 | 942 |
| 1440 min Winter | 3.434 | 0.0 | 1398 |
| 2160 min Winter | 2.475 | 0.0 | 2056 |
| 2880 min Winter | 1.960 | 0.0 | 2652 |
| 4320 min Winter | 1.409 | 0.0 | 3288 |
| 5760 min Winter | 1.114 | 0.0 | 4208 |
| 7200 min Winter | 0.927 | 0.0 | 5120 |
| 8640 min Winter | 0.798 | 0.0 | 6048 |
| 10080 min Winter | 0.703 | 0.0 | 6864 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.035

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.035 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 32.0 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 1 year Return Period

Half Drain Time : 992 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.045 | 0.045 | 0.0 | 0.6 | O K |
| 30 min Summer | 0.056 | 0.056 | 0.0 | 0.7 | O K |
| 60 min Summer | 0.067 | 0.067 | 0.0 | 0.9 | O K |
| 120 min Summer | 0.077 | 0.077 | 0.0 | 1.1 | O K |
| 180 min Summer | 0.083 | 0.083 | 0.0 | 1.2 | O K |
| 240 min Summer | 0.087 | 0.087 | 0.0 | 1.3 | O K |
| 360 min Summer | 0.092 | 0.092 | 0.0 | 1.4 | O K |
| 480 min Summer | 0.094 | 0.094 | 0.0 | 1.5 | O K |
| 600 min Summer | 0.096 | 0.096 | 0.0 | 1.5 | O K |
| 720 min Summer | 0.097 | 0.097 | 0.0 | 1.5 | O K |
| 960 min Summer | 0.098 | 0.098 | 0.0 | 1.6 | O K |
| 1440 min Summer | 0.099 | 0.099 | 0.0 | 1.6 | O K |
| 2160 min Summer | 0.099 | 0.099 | 0.0 | 1.6 | O K |
| 2880 min Summer | 0.097 | 0.097 | 0.0 | 1.5 | O K |
| 4320 min Summer | 0.093 | 0.093 | 0.0 | 1.4 | O K |
| 5760 min Summer | 0.088 | 0.088 | 0.0 | 1.3 | O K |
| 7200 min Summer | 0.083 | 0.083 | 0.0 | 1.3 | O K |
| 8640 min Summer | 0.079 | 0.079 | 0.0 | 1.2 | O K |
| 10080 min Summer | 0.075 | 0.075 | 0.0 | 1.1 | O K |
| 15 min Winter | 0.050 | 0.050 | 0.0 | 0.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 31.093 | 0.0 | 19 |
| 30 min Summer | 20.252 | 0.0 | 34 |
| 60 min Summer | 12.800 | 0.0 | 64 |
| 120 min Summer | 7.926 | 0.0 | 122 |
| 180 min Summer | 5.960 | 0.0 | 182 |
| 240 min Summer | 4.862 | 0.0 | 242 |
| 360 min Summer | 3.628 | 0.0 | 362 |
| 480 min Summer | 2.939 | 0.0 | 480 |
| 600 min Summer | 2.495 | 0.0 | 600 |
| 720 min Summer | 2.183 | 0.0 | 672 |
| 960 min Summer | 1.768 | 0.0 | 788 |
| 1440 min Summer | 1.314 | 0.0 | 1040 |
| 2160 min Summer | 0.977 | 0.0 | 1452 |
| 2880 min Summer | 0.791 | 0.0 | 1872 |
| 4320 min Summer | 0.588 | 0.0 | 2680 |
| 5760 min Summer | 0.476 | 0.0 | 3464 |
| 7200 min Summer | 0.405 | 0.0 | 4256 |
| 8640 min Summer | 0.354 | 0.0 | 5016 |
| 10080 min Summer | 0.317 | 0.0 | 5752 |
| 15 min Winter | 31.093 | 0.0 | 19 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.061 | 0.061 | 0.0 | 0.8 | O K |
| 60 min Winter | 0.073 | 0.073 | 0.0 | 1.0 | O K |
| 120 min Winter | 0.084 | 0.084 | 0.0 | 1.3 | O K |
| 180 min Winter | 0.091 | 0.091 | 0.0 | 1.4 | O K |
| 240 min Winter | 0.095 | 0.095 | 0.0 | 1.5 | O K |
| 360 min Winter | 0.101 | 0.101 | 0.0 | 1.6 | O K |
| 480 min Winter | 0.104 | 0.104 | 0.0 | 1.7 | O K |
| 600 min Winter | 0.105 | 0.105 | 0.0 | 1.7 | O K |
| 720 min Winter | 0.107 | 0.107 | 0.0 | 1.7 | O K |
| 960 min Winter | 0.108 | 0.108 | 0.0 | 1.8 | O K |
| 1440 min Winter | 0.108 | 0.108 | 0.0 | 1.8 | O K |
| 2160 min Winter | 0.107 | 0.107 | 0.0 | 1.8 | O K |
| 2880 min Winter | 0.104 | 0.104 | 0.0 | 1.7 | O K |
| 4320 min Winter | 0.097 | 0.097 | 0.0 | 1.5 | O K |
| 5760 min Winter | 0.090 | 0.090 | 0.0 | 1.4 | O K |
| 7200 min Winter | 0.083 | 0.083 | 0.0 | 1.2 | O K |
| 8640 min Winter | 0.076 | 0.076 | 0.0 | 1.1 | O K |
| 10080 min Winter | 0.070 | 0.070 | 0.0 | 1.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 20.252 | 0.0 | 33 |
| 60 min Winter | 12.800 | 0.0 | 62 |
| 120 min Winter | 7.926 | 0.0 | 122 |
| 180 min Winter | 5.960 | 0.0 | 180 |
| 240 min Winter | 4.862 | 0.0 | 238 |
| 360 min Winter | 3.628 | 0.0 | 354 |
| 480 min Winter | 2.939 | 0.0 | 468 |
| 600 min Winter | 2.495 | 0.0 | 578 |
| 720 min Winter | 2.183 | 0.0 | 688 |
| 960 min Winter | 1.768 | 0.0 | 892 |
| 1440 min Winter | 1.314 | 0.0 | 1110 |
| 2160 min Winter | 0.977 | 0.0 | 1576 |
| 2880 min Winter | 0.791 | 0.0 | 2020 |
| 4320 min Winter | 0.588 | 0.0 | 2896 |
| 5760 min Winter | 0.476 | 0.0 | 3744 |
| 7200 min Winter | 0.405 | 0.0 | 4536 |
| 8640 min Winter | 0.354 | 0.0 | 5280 |
| 10080 min Winter | 0.317 | 0.0 | 6048 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.010

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.010 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 20.0 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 30 year Return Period

Half Drain Time : 1612 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.092 | 0.092 | 0.0 | 1.4 | O K |
| 30 min Summer | 0.111 | 0.111 | 0.0 | 1.8 | O K |
| 60 min Summer | 0.128 | 0.128 | 0.0 | 2.3 | O K |
| 120 min Summer | 0.144 | 0.144 | 0.0 | 2.7 | O K |
| 180 min Summer | 0.153 | 0.153 | 0.0 | 2.9 | O K |
| 240 min Summer | 0.158 | 0.158 | 0.0 | 3.1 | O K |
| 360 min Summer | 0.165 | 0.165 | 0.0 | 3.3 | O K |
| 480 min Summer | 0.169 | 0.169 | 0.0 | 3.4 | O K |
| 600 min Summer | 0.172 | 0.172 | 0.0 | 3.5 | O K |
| 720 min Summer | 0.174 | 0.174 | 0.0 | 3.5 | O K |
| 960 min Summer | 0.175 | 0.175 | 0.0 | 3.6 | O K |
| 1440 min Summer | 0.175 | 0.175 | 0.0 | 3.6 | O K |
| 2160 min Summer | 0.173 | 0.173 | 0.0 | 3.5 | O K |
| 2880 min Summer | 0.170 | 0.170 | 0.0 | 3.4 | O K |
| 4320 min Summer | 0.164 | 0.164 | 0.0 | 3.3 | O K |
| 5760 min Summer | 0.157 | 0.157 | 0.0 | 3.1 | O K |
| 7200 min Summer | 0.150 | 0.150 | 0.0 | 2.9 | O K |
| 8640 min Summer | 0.144 | 0.144 | 0.0 | 2.7 | O K |
| 10080 min Summer | 0.138 | 0.138 | 0.0 | 2.5 | O K |
| 15 min Winter | 0.100 | 0.100 | 0.0 | 1.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 76.290 | 0.0 | 19 |
| 30 min Summer | 49.584 | 0.0 | 34 |
| 60 min Summer | 30.811 | 0.0 | 64 |
| 120 min Summer | 18.584 | 0.0 | 124 |
| 180 min Summer | 13.680 | 0.0 | 184 |
| 240 min Summer | 10.960 | 0.0 | 242 |
| 360 min Summer | 8.001 | 0.0 | 362 |
| 480 min Summer | 6.397 | 0.0 | 482 |
| 600 min Summer | 5.375 | 0.0 | 602 |
| 720 min Summer | 4.661 | 0.0 | 722 |
| 960 min Summer | 3.719 | 0.0 | 960 |
| 1440 min Summer | 2.704 | 0.0 | 1212 |
| 2160 min Summer | 1.963 | 0.0 | 1580 |
| 2880 min Summer | 1.563 | 0.0 | 1988 |
| 4320 min Summer | 1.133 | 0.0 | 2812 |
| 5760 min Summer | 0.901 | 0.0 | 3632 |
| 7200 min Summer | 0.754 | 0.0 | 4464 |
| 8640 min Summer | 0.652 | 0.0 | 5272 |
| 10080 min Summer | 0.576 | 0.0 | 6048 |
| 15 min Winter | 76.290 | 0.0 | 19 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.120 | 0.120 | 0.0 | 2.1 | O K |
| 60 min Winter | 0.139 | 0.139 | 0.0 | 2.5 | O K |
| 120 min Winter | 0.156 | 0.156 | 0.0 | 3.0 | O K |
| 180 min Winter | 0.165 | 0.165 | 0.0 | 3.3 | O K |
| 240 min Winter | 0.171 | 0.171 | 0.0 | 3.5 | O K |
| 360 min Winter | 0.179 | 0.179 | 0.0 | 3.7 | O K |
| 480 min Winter | 0.184 | 0.184 | 0.0 | 3.9 | O K |
| 600 min Winter | 0.187 | 0.187 | 0.0 | 4.0 | O K |
| 720 min Winter | 0.189 | 0.189 | 0.0 | 4.0 | O K |
| 960 min Winter | 0.191 | 0.191 | 0.0 | 4.1 | O K |
| 1440 min Winter | 0.191 | 0.191 | 0.0 | 4.1 | O K |
| 2160 min Winter | 0.188 | 0.188 | 0.0 | 4.0 | O K |
| 2880 min Winter | 0.185 | 0.185 | 0.0 | 3.9 | O K |
| 4320 min Winter | 0.176 | 0.176 | 0.0 | 3.6 | O K |
| 5760 min Winter | 0.166 | 0.166 | 0.0 | 3.3 | O K |
| 7200 min Winter | 0.156 | 0.156 | 0.0 | 3.0 | O K |
| 8640 min Winter | 0.147 | 0.147 | 0.0 | 2.8 | O K |
| 10080 min Winter | 0.139 | 0.139 | 0.0 | 2.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 49.584 | 0.0 | 34 |
| 60 min Winter | 30.811 | 0.0 | 64 |
| 120 min Winter | 18.584 | 0.0 | 122 |
| 180 min Winter | 13.680 | 0.0 | 180 |
| 240 min Winter | 10.960 | 0.0 | 240 |
| 360 min Winter | 8.001 | 0.0 | 356 |
| 480 min Winter | 6.397 | 0.0 | 472 |
| 600 min Winter | 5.375 | 0.0 | 588 |
| 720 min Winter | 4.661 | 0.0 | 702 |
| 960 min Winter | 3.719 | 0.0 | 924 |
| 1440 min Winter | 2.704 | 0.0 | 1352 |
| 2160 min Winter | 1.963 | 0.0 | 1684 |
| 2880 min Winter | 1.563 | 0.0 | 2136 |
| 4320 min Winter | 1.133 | 0.0 | 3028 |
| 5760 min Winter | 0.901 | 0.0 | 3920 |
| 7200 min Winter | 0.754 | 0.0 | 4760 |
| 8640 min Winter | 0.652 | 0.0 | 5616 |
| 10080 min Winter | 0.576 | 0.0 | 6448 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.010

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.010 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 20.0 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 100 year Return Period

Half Drain Time : 1862 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.111 | 0.111 | 0.0 | 1.8 | O K |
| 30 min Summer | 0.134 | 0.134 | 0.0 | 2.4 | O K |
| 60 min Summer | 0.155 | 0.155 | 0.0 | 3.0 | O K |
| 120 min Summer | 0.174 | 0.174 | 0.0 | 3.6 | O K |
| 180 min Summer | 0.184 | 0.184 | 0.0 | 3.9 | O K |
| 240 min Summer | 0.190 | 0.190 | 0.0 | 4.1 | O K |
| 360 min Summer | 0.198 | 0.198 | 0.0 | 4.3 | O K |
| 480 min Summer | 0.202 | 0.202 | 0.0 | 4.5 | Flood Risk |
| 600 min Summer | 0.205 | 0.205 | 0.0 | 4.6 | Flood Risk |
| 720 min Summer | 0.207 | 0.207 | 0.0 | 4.6 | Flood Risk |
| 960 min Summer | 0.209 | 0.209 | 0.0 | 4.7 | Flood Risk |
| 1440 min Summer | 0.208 | 0.208 | 0.0 | 4.7 | Flood Risk |
| 2160 min Summer | 0.206 | 0.206 | 0.0 | 4.6 | Flood Risk |
| 2880 min Summer | 0.203 | 0.203 | 0.0 | 4.5 | Flood Risk |
| 4320 min Summer | 0.195 | 0.195 | 0.0 | 4.2 | O K |
| 5760 min Summer | 0.187 | 0.187 | 0.0 | 4.0 | O K |
| 7200 min Summer | 0.180 | 0.180 | 0.0 | 3.7 | O K |
| 8640 min Summer | 0.172 | 0.172 | 0.0 | 3.5 | O K |
| 10080 min Summer | 0.165 | 0.165 | 0.0 | 3.3 | O K |
| 15 min Winter | 0.120 | 0.120 | 0.0 | 2.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 99.025 | 0.0 | 19 |
| 30 min Summer | 64.904 | 0.0 | 34 |
| 60 min Summer | 40.510 | 0.0 | 64 |
| 120 min Summer | 24.421 | 0.0 | 124 |
| 180 min Summer | 17.920 | 0.0 | 184 |
| 240 min Summer | 14.300 | 0.0 | 242 |
| 360 min Summer | 10.377 | 0.0 | 362 |
| 480 min Summer | 8.265 | 0.0 | 482 |
| 600 min Summer | 6.922 | 0.0 | 602 |
| 720 min Summer | 5.986 | 0.0 | 722 |
| 960 min Summer | 4.756 | 0.0 | 960 |
| 1440 min Summer | 3.434 | 0.0 | 1310 |
| 2160 min Summer | 2.475 | 0.0 | 1664 |
| 2880 min Summer | 1.960 | 0.0 | 2044 |
| 4320 min Summer | 1.409 | 0.0 | 2856 |
| 5760 min Summer | 1.114 | 0.0 | 3688 |
| 7200 min Summer | 0.927 | 0.0 | 4536 |
| 8640 min Summer | 0.798 | 0.0 | 5280 |
| 10080 min Summer | 0.703 | 0.0 | 6056 |
| 15 min Winter | 99.025 | 0.0 | 19 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.145 | 0.145 | 0.0 | 2.7 | O K |
| 60 min Winter | 0.167 | 0.167 | 0.0 | 3.3 | O K |
| 120 min Winter | 0.188 | 0.188 | 0.0 | 4.0 | O K |
| 180 min Winter | 0.198 | 0.198 | 0.0 | 4.3 | O K |
| 240 min Winter | 0.205 | 0.205 | 0.0 | 4.6 | Flood Risk |
| 360 min Winter | 0.213 | 0.213 | 0.0 | 4.9 | Flood Risk |
| 480 min Winter | 0.219 | 0.219 | 0.0 | 5.1 | Flood Risk |
| 600 min Winter | 0.222 | 0.222 | 0.0 | 5.2 | Flood Risk |
| 720 min Winter | 0.224 | 0.224 | 0.0 | 5.3 | Flood Risk |
| 960 min Winter | 0.227 | 0.227 | 0.0 | 5.4 | Flood Risk |
| 1440 min Winter | 0.227 | 0.227 | 0.0 | 5.4 | Flood Risk |
| 2160 min Winter | 0.223 | 0.223 | 0.0 | 5.2 | Flood Risk |
| 2880 min Winter | 0.220 | 0.220 | 0.0 | 5.1 | Flood Risk |
| 4320 min Winter | 0.210 | 0.210 | 0.0 | 4.7 | Flood Risk |
| 5760 min Winter | 0.199 | 0.199 | 0.0 | 4.4 | O K |
| 7200 min Winter | 0.189 | 0.189 | 0.0 | 4.0 | O K |
| 8640 min Winter | 0.179 | 0.179 | 0.0 | 3.7 | O K |
| 10080 min Winter | 0.169 | 0.169 | 0.0 | 3.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 64.904 | 0.0 | 34 |
| 60 min Winter | 40.510 | 0.0 | 64 |
| 120 min Winter | 24.421 | 0.0 | 122 |
| 180 min Winter | 17.920 | 0.0 | 180 |
| 240 min Winter | 14.300 | 0.0 | 240 |
| 360 min Winter | 10.377 | 0.0 | 358 |
| 480 min Winter | 8.265 | 0.0 | 474 |
| 600 min Winter | 6.922 | 0.0 | 590 |
| 720 min Winter | 5.986 | 0.0 | 706 |
| 960 min Winter | 4.756 | 0.0 | 932 |
| 1440 min Winter | 3.434 | 0.0 | 1370 |
| 2160 min Winter | 2.475 | 0.0 | 1728 |
| 2880 min Winter | 1.960 | 0.0 | 2188 |
| 4320 min Winter | 1.409 | 0.0 | 3108 |
| 5760 min Winter | 1.114 | 0.0 | 3984 |
| 7200 min Winter | 0.927 | 0.0 | 4832 |
| 8640 min Winter | 0.798 | 0.0 | 5704 |
| 10080 min Winter | 0.703 | 0.0 | 6552 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.010

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.010 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 20.0 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2258 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 15 min Summer | 0.140 | 0.140 | 0.0 | 2.6 | O K |
| 30 min Summer | 0.168 | 0.168 | 0.0 | 3.4 | O K |
| 60 min Summer | 0.194 | 0.194 | 0.0 | 4.2 | O K |
| 120 min Summer | 0.217 | 0.217 | 0.0 | 5.0 | Flood Risk |
| 180 min Summer | 0.229 | 0.229 | 0.0 | 5.4 | Flood Risk |
| 240 min Summer | 0.237 | 0.237 | 0.0 | 5.7 | Flood Risk |
| 360 min Summer | 0.247 | 0.247 | 0.0 | 6.1 | Flood Risk |
| 480 min Summer | 0.253 | 0.253 | 0.0 | 6.4 | Flood Risk |
| 600 min Summer | 0.257 | 0.257 | 0.0 | 6.5 | Flood Risk |
| 720 min Summer | 0.260 | 0.260 | 0.0 | 6.7 | Flood Risk |
| 960 min Summer | 0.263 | 0.263 | 0.0 | 6.8 | Flood Risk |
| 1440 min Summer | 0.265 | 0.265 | 0.0 | 6.8 | Flood Risk |
| 2160 min Summer | 0.262 | 0.262 | 0.0 | 6.7 | Flood Risk |
| 2880 min Summer | 0.259 | 0.259 | 0.0 | 6.6 | Flood Risk |
| 4320 min Summer | 0.252 | 0.252 | 0.0 | 6.3 | Flood Risk |
| 5760 min Summer | 0.244 | 0.244 | 0.0 | 6.0 | Flood Risk |
| 7200 min Summer | 0.236 | 0.236 | 0.0 | 5.7 | Flood Risk |
| 8640 min Summer | 0.229 | 0.229 | 0.0 | 5.4 | Flood Risk |
| 10080 min Summer | 0.221 | 0.221 | 0.0 | 5.1 | Flood Risk |
| 15 min Winter | 0.152 | 0.152 | 0.0 | 2.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|---|---|---|---|
| 15 min Summer | 138.634 | 0.0 | 19 |
| 30 min Summer | 90.866 | 0.0 | 34 |
| 60 min Summer | 56.713 | 0.0 | 64 |
| 120 min Summer | 34.190 | 0.0 | 124 |
| 180 min Summer | 25.088 | 0.0 | 184 |
| 240 min Summer | 20.020 | 0.0 | 244 |
| 360 min Summer | 14.528 | 0.0 | 362 |
| 480 min Summer | 11.570 | 0.0 | 482 |
| 600 min Summer | 9.690 | 0.0 | 602 |
| 720 min Summer | 8.380 | 0.0 | 722 |
| 960 min Summer | 6.658 | 0.0 | 962 |
| 1440 min Summer | 4.807 | 0.0 | 1440 |
| 2160 min Summer | 3.465 | 0.0 | 1772 |
| 2880 min Summer | 2.744 | 0.0 | 2136 |
| 4320 min Summer | 1.973 | 0.0 | 2940 |
| 5760 min Summer | 1.559 | 0.0 | 3752 |
| 7200 min Summer | 1.298 | 0.0 | 4608 |
| 8640 min Summer | 1.118 | 0.0 | 5440 |
| 10080 min Summer | 0.985 | 0.0 | 6248 |
| 15 min Winter | 138.634 | 0.0 | 19 |

## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume ($m^3$) | Status |
|---|---|---|---|---|---|
| 30 min Winter | 0.181 | 0.181 | 0.0 | 3.8 | O K |
| 60 min Winter | 0.209 | 0.209 | 0.0 | 4.7 | Flood Risk |
| 120 min Winter | 0.234 | 0.234 | 0.0 | 5.6 | Flood Risk |
| 180 min Winter | 0.247 | 0.247 | 0.0 | 6.1 | Flood Risk |
| 240 min Winter | 0.255 | 0.255 | 0.0 | 6.4 | Flood Risk |
| 360 min Winter | 0.266 | 0.266 | 0.0 | 6.9 | Flood Risk |
| 480 min Winter | 0.272 | 0.272 | 0.0 | 7.2 | Flood Risk |
| 600 min Winter | 0.277 | 0.277 | 0.0 | 7.4 | Flood Risk |
| 720 min Winter | 0.281 | 0.281 | 0.0 | 7.5 | Flood Risk |
| 960 min Winter | 0.285 | 0.285 | 0.0 | 7.7 | Flood Risk |
| 1440 min Winter | 0.287 | 0.287 | 0.0 | 7.8 | Flood Risk |
| 2160 min Winter | 0.285 | 0.285 | 0.0 | 7.7 | Flood Risk |
| 2880 min Winter | 0.281 | 0.281 | 0.0 | 7.5 | Flood Risk |
| 4320 min Winter | 0.272 | 0.272 | 0.0 | 7.1 | Flood Risk |
| 5760 min Winter | 0.261 | 0.261 | 0.0 | 6.7 | Flood Risk |
| 7200 min Winter | 0.251 | 0.251 | 0.0 | 6.3 | Flood Risk |
| 8640 min Winter | 0.240 | 0.240 | 0.0 | 5.9 | Flood Risk |
| 10080 min Winter | 0.230 | 0.230 | 0.0 | 5.5 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume ($m^3$) | Time-Peak (mins) |
|---|---|---|---|
| 30 min Winter | 90.866 | 0.0 | 34 |
| 60 min Winter | 56.713 | 0.0 | 64 |
| 120 min Winter | 34.190 | 0.0 | 122 |
| 180 min Winter | 25.088 | 0.0 | 182 |
| 240 min Winter | 20.020 | 0.0 | 240 |
| 360 min Winter | 14.528 | 0.0 | 358 |
| 480 min Winter | 11.570 | 0.0 | 476 |
| 600 min Winter | 9.690 | 0.0 | 592 |
| 720 min Winter | 8.380 | 0.0 | 708 |
| 960 min Winter | 6.658 | 0.0 | 936 |
| 1440 min Winter | 4.807 | 0.0 | 1384 |
| 2160 min Winter | 3.465 | 0.0 | 2008 |
| 2880 min Winter | 2.744 | 0.0 | 2252 |
| 4320 min Winter | 1.973 | 0.0 | 3160 |
| 5760 min Winter | 1.559 | 0.0 | 4088 |
| 7200 min Winter | 1.298 | 0.0 | 4968 |
| 8640 min Winter | 1.118 | 0.0 | 5800 |
| 10080 min Winter | 0.985 | 0.0 | 6656 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.404 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.010

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.010 |

## Model Details

Storage is Online Cover Level (m) 0.500

## Swale Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00515 | Length (m) | 20.0 |
| Infiltration Coefficient Side (m/hr) | 0.00515 | Side Slope (1:X) | 3.0 |
| Safety Factor | 2.0 | Slope (1:X) | 0.0 |
| Porosity | 1.00 | Cap Volume Depth (m) | 0.000 |
| Invert Level (m) | 0.000 | Cap Infiltration Depth (m) | 0.000 |
| Base Width (m) | 0.5 | | |

## Appendix E

## Surface Water Drainage Pro-Forma

# Surface Water Drainage Pro-forma for new developments

This pro-forma accompanies our “Surface Water Drainage; Local Guidance for Planning Applications” note. It is expected that applicants/developers should complete and submit the pro-forma to present a summary of the surface water drainage strategy for the site and demonstrate compliance with the National Planning Policy Guidance and Non-Statutory Technical Standards. The pro-forma will then be used to support the LPA in making a decision on the suitability of the proposal and, if the LPA is minded to find the completed pro-forma acceptable, then it may be used as an evidence base for a relevant surface water condition to be appended to the decision notice, stating that the developments drainage proposal will be constructed in accordance with the details set out in the relevant pro-forma.

It must however be noted that this pro-forma submitted alone, will not be considered a suitable surface water drainage strategy. It should be clearly referenced within the pro-forma where in the other submission documents the details provided are taken from.

The pro-forma is supported by the Defra/EA guidance on Rainfall Runoff Management. and uses the storage calculator on www.UKsuds.com. The pro-forma should be considered alongside other supporting SuDS Guidance, but focuses on ensuring flood risk is not made worse elsewhere. This proforma is based upon current industry standard practice.

## 1. Site Details

| | |
|---|---|
| **Site** | Bicester Heritage Hotel |
| **Address & post code or LPA reference** | A4421, Bicester OX26 5HA |
| **Grid reference** | SP 59258 24680 |
| **Is the existing site developed or Greenfield?** | Greenfield |
| **Total Site Area** | 3.34 Hectares |
| **Total Site Area served by drainage system (excluding open space) (Ha)*** | 1.80 Hectares |
| **Pre-application sought? (Ref)** | |

***** The Greenfield runoff off rate from the development which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage from a site should be calculated for the area that forms the drainage network for the site whatever size of site and type of drainage technique. Please refer to the Rainfall Runoff Management document or CIRIA manual for detail on this.

## 2. Impermeable Area

| | Existing | Proposed | Difference (Proposed-Existing) | Notes for developers |
|---|---|---|---|---|
| **Impermeable area (ha)** | 0 Hectares | 1.80 Hectares | 1.80 Hectares | If proposed > existing, then runoff rates and volumes will be increasing. Section 6 must be filled in. If proposed ≤ existing, then section 6 can be skipped & section 7 filled in. |
| **Drainage Method** (infiltration/sewer/watercourse) | Infiltration | Infiltration | N/A | If different from the existing, please fill in section 3. If existing drainage is by infiltration and the proposed is not, discharge volumes may increase. Fill in section 6. |

## 3. Proposing to Discharge Surface Water via

| | Yes | No | Justification and Evidence that this is possible | Notes for developers |
|---|---|---|---|---|
| **Infiltration** | X | | Soakage tests have been carried out within Bicester Heritage. Infiltration rate $1.43x10^{-6}$ m/s | Soakage tests will need to be provided and results included in drainage strategy.<br>Section 7 (infiltration) must be filled in if infiltration is proposed. |
| **To watercourse** | X | | | If infiltration is not possible - is there a watercourse nearby?<br>Have the EA or IDB provided input where necessary? |
| **To surface water sewer** | X | | . | This should be a last resort. If required, has sewer provider confirmed that sufficient capacity exists for this connection? Has an appropriate connection detail been agreed? |
| **Combination of above** | X | | | e.g. part infiltration, part discharge to sewer or watercourse. Provide evidence as above. |

**4. Peak Discharge Rates** – This is the maximum flow rate at which storm water runoff leaves the site during a particular storm event.

| | Existing Rates (l/s) | Proposed Rates (l/s) | Difference (l/s) (Proposed-Existing) | Notes for developers |
|---|---|---|---|---|
| **Greenfield QBAR** | 0.7 l/s | N/A | N/A | QBAR is approx. 1 in 2 storm event. Provide this if Section 7 (QBAR) is proposed. |
| **1 in 1** | 0.6 l/s | 0 l/s | -0.6 l/s | Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. E.g. discharging all flow from site at the existing 1 in 100 event increases flood risk during smaller events. |
| **1 in 30** | 1.6 l/s | 0 l/s | -1.6 l/s | |
| **1in 100** | 2.3 l/s | 0 l/s | -2.3 l/s | |
| **1 in 100 plus climate change** | N/A | 0 l/s | -2.3 l/s | To mitigate for climate change the proposed 1 in 100 +CC must be no greater than the existing 1 in 100 runoff rate. If not, flood risk increases under climate change.<br>- Where lifetime of development is 100 years (residential) 30% should be added to the peak rainfall intensity.<br>- Where lifetime of development is 60 years (residential) 20% should be added to the peak rainfall intensity. |

**5. Calculate additional volumes for storage** –The total volume of water leaving the development site. New hard surfaces potentially restrict the amount of storm water that can go to the ground, so this needs to be controlled so not to make flood risk worse to properties downstream.

| | Existing Volume ($m^3$) | Proposed Volume ($m^3$) | Difference ($m^3$) (Proposed-Existing) | Notes for developers |
|---|---|---|---|---|
| **1 in 1** | 16.946 $m^3$ | 0 $m^3$ | -16.946 $m^3$ | Proposed discharge volumes (without mitigation) should be no greater than existing volumes for all corresponding storm events. Any increase in volume increases flood risk elsewhere. Where volumes are increased section 6 must be filled in. |
| **1 in 30** | 54.053 $m^3$ | 0 $m^3$ | -54.053 $m^3$ | |
| **1in 100** | 92.734 $m^3$ | 0 $m^3$ | -92.734 $m^3$ | |
| **1 in 100 plus climate change** | N/A | 0 $m^3$ | -92.734 $m^3$ | To mitigate for climate change the volume discharge from site must be no greater than the existing 1 in 100 storm event. If not, flood risk will increase under climate change. |

**6. Calculate attenuation storage –** Attenuation storage is provided to enable the rate of runoff from the site into the receiving watercourse to be limited to an acceptable rate to protect against erosion and flooding downstream. The attenuation storage volume is a function of the degree of development relative to the greenfield discharge rate.

| | | **Notes for developers** |
|---|---|---|
| **What Storage Attenuation volume (Flow rate control) is required to retain rates as existing ($m^3$)**<br>**Where is the storage to be accommodated on site?** | New cellular soakaway will be installed under parking area to attenuate and infiltrate runoff volume from roof area and adjacent hard paving.<br><br>In addition, permeable paving for all car parks will drain and infiltrate runoff water from this area.<br><br>New access road will drain into 3 No. swales and infiltrate into the ground | Volume of water to attenuate on site if discharging at existing rates. Can't be used where discharge volumes are increasing |

**7. How is Storm Water stored on site?**

Storage is required for the additional volume from site but also for holding back water to slow down the rate from the site. This is known as attenuation storage and long term storage. The idea is that the additional volume does not get into the watercourses, or if it does it is at an exceptionally low rate. You can either infiltrate the stored water back to ground, or if this isn't possible hold it back with on site storage. Firstly, can infiltration work on site?

| | | | **Notes for developers** |
|---|---|---|---|
| **Infiltration** | **State the Site's Geology and known Source Protection Zones (SPZ)** | Outside SPZ | - Infiltration rates are highly variable, soakage tests should be comprehensive.<br>- Avoid infiltrating in made ground.<br>- Refer to Environment Agency website to identify and source protection zones (SPZ) |
| | **Infiltration Rate (m/s)?** | $1.43x10^{-6}$ m/s | Infiltration rates should be no lower than $1x10^{-6}$ m/s. |
| | **State the distance between a proposed infiltration device base and the ground water (GW) level** | No recorded | Need 1m (min) between the base of the infiltration device & the water table to protect Groundwater quality & ensure GW doesn't enter infiltration devices. Avoid infiltration where this isn't possible. |

| | | | |
|---|---|---|---|
| | **Were infiltration rates obtained by desk study or infiltration test?** | Infiltration test. | Infiltration rates can be estimated from desk studies at most stages of the planning system if a back up attenuation scheme is provided. |
| | **Is the site contaminated? If yes, consider advice from others on whether infiltration can happen.** | No. | Water should not be infiltrated through land that is contaminated. The Environment Agency may provide bespoke advice in planning consultations for contaminated sites that should be considered. |
| **In light of the above, is infiltration feasible?** | **Yes/No? If the answer is No, please identify how the storm water will be stored prior to release** | Yes. | If infiltration is not feasible how will the additional volume be stored? The applicant should consider the following options in the next section. |

**Storage requirements**

The developer must confirm one of the two methods for dealing with the amount of water that needs to be stored on site.

**Option 1 Simple** – Store both the additional volume and attenuation volume in order to make a final discharge from site at **QBAR** (Mean annual flow rate). This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.

**Option 2 Complex** – If some of the additional volume of water can be infiltrated back into the ground, the remainder can be discharged at a very low rate of 2 l/sec/hectare. A combined storage calculation using the partial permissible rate of 2 l/sec/hectare and the attenuation rate used to slow the runoff from site.

| | | **Notes for developers** |
|---|---|---|
| **Please confirm what option has been chosen and how much storage is required on site.** | New cellular soakaway with a capacity of 729.6 $m^3$ will be installed under soft landscape area to attenuate and infiltrate runoff volume from roof and adjacent.<br><br>In addition, permeable sub-base in car parks will drain and infiltrate runoff water from this area. | The developer at this stage should have an idea of the site characteristics and be able to explain what the storage requirements are on site and how it will be achieved. |

| | | |
|---|---|---|
| | The new access road will drain into 3No. swales located to both sides of the road. | |

## 8. Please confirm

| | | Notes for developers |
|---|---|---|
| **1. Which Drainage Systems measures have been used?**<br>Provide an overview of the SuDS design scheme used?<br>- Is the runoff managed at, or close to, the surface wherever possible.<br>- Where the system serves more than one property, is public space used and integrated with the drainage system in an appropriate and beneficial way? | - Permeable paving<br>- Cellular tank<br>- Swales | SUDS can be adapted for most situations even where infiltration isn't feasible e.g. impermeable liners beneath some SUDS devices allows treatment but not infiltration. See CIRIA SUDS Manual C697. |
| **2. Functionality**<br>Are the design features sufficiently durable to ensure structural integrity over the system design life (residential 100 years and commercial 60 years), with reasonable maintenance requirements? | Yes | |
| Are all parts of the SuDS system outside any areas of flood risk? | Yes | If not, provide justification and evidence that performance will not be adversely affected. |
| Has runoff and flooding from all sources (both on and off site) been considered and taken into account in the design? | Yes | |
| Has residual risk been addressed? | Yes refer Drainage strategy | • Does the drainage system contain the 1 in 30 storm event without any flooding (include description of how any exceedance of surface water systems will be routed exceptional rain fall away from property)?<br>• Are 1 in 100 year flows contained or stored on-site within safe exceedance storage areas and flow paths?<br>• Is any flooding between 1 in 30 and 100 +CC storm events safely contained on site, without causing property flooding or a hazard to site users?<br>• Has it been ensured that there is no flooding from the system to downstream property or access routes for the 100 year + climate change event? |
| How are rates being restricted (hydro brakes etc.)? | No rates to be restricted | - Hydrobrakes to be used where rates are between 2l/s to 5l/s.<br>- Orifices not to be used below 5l/s as the pipes may |

| | | |
|---|---|---|
| | | block.<br>- Pipes with flows < 2l/s are prone to blockage. |
| **3. Please confirm the owners/adopters of the entire drainage systems throughout the development. Please list all the owners.** | Bicester Heritage Hotel | If these are multiple owners then a drawing illustrating exactly what features will be within each owner's remit must be submitted with this Proforma. |
| **How is the entire drainage system to be maintained?** An acceptable maintenance plan, clearly defining the operating and maintenance requirements of the drainage system will need to be submitted and approved. | The drainage drawings and schedules will form part of the O&M manual along with a post completion CCTV survey to ensure the system if fully operational at handover. | If the features are to be maintained directly by the owners as stated in answer to the above question please answer yes to this question and submit the relevant maintenance schedule for each feature. If it is to be maintained by others than those above, please give details of each feature and the maintenance schedule.<br>Clear details of the maintenance proposals of all element of the proposed drainage system must be provided.<br>Poorly maintained drainage can lead to increased flooding problems in the future. |

**9. Evidence** Please identify where the details quoted in the sections above were taken from. i.e. Plans, reports etc. Please also provide relevant drawings that need to accompany your pro-forma, in particular exceedance routes, ownership and location of SuDS (maintenance access strips etc.)

| Pro-forma Section | Document reference where details quoted above are taken from | Page Number |
|---|---|---|
| **Section 2** | Drainage Strategy | 1, Appendix A &C |
| **Section 3** | Drainage Strategy | Appendix C |
| **Section 4** | Drainage Strategy | Appendix B &D |
| **Section 5** | Drainage Strategy | Appendix B&D |
| **Section 6** | Drainage Strategy | Appendix C |
| **Section 7** | Drainage Strategy | Appendix A & C |
| | | |

**The above form is completed using factual information and evidence from the Surface Water Drainage Strategy, Flood Risk Assessment and site plans and can be used as a summary of the surface water drainage strategy on this site, clearly showing that the proposed surface water rate and volume will not be increasing as a result of the development. Where an increase in rate or volume is shown the appropriate sections of the pro-forma have been completed setting out how the additional rate/volume is being dealt with, to ensure no increased flood risk on or off site.**

**Where the pro-forma is found to be acceptable to the Local Planning Authority then the surface water drainage system design must be built in accordance with the details provided here.**

**Form completed by: Graham Taylor**

**Qualification of person responsible for signing of this pro-forma: IEng MICE**

**Company: AKS Ward**

**On behalf of (Client's details): Bicester Heritage**

**Date 11.07.18**

## Appendix F

## SuDS Maintenance Schedule

**Cellular Tanks Operation & Maintenance Requirements**

Regular inspection and maintenance is required to ensure the effective long-term operation of below ground modular storage systems.

Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements.

Modular systems – operation and maintenance requirements

| **Maintenance schedule** | **Required action** | **Recommended Frequency** |
|---|---|---|
| Regular maintenance | Inspect and identify any areas that are not operating correctly. If required, take remedial action. | Monthly for 3 months, then six monthly |
| | Debris removal from catchment surface (where may cause risks to performance) | Monthly |
| | Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary. | Monthly (and after large storms) |
| | Remove sediment from pre-treatment structures | Annually, or as required |
| Remedial actions | Repair/rehabilitation of inlets, outlet , overflows and vents | As required |
| Monitoring | Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed | Annually and after large storms |

Maintenance activities should be detailed in the health and safety plan and a risk assessment should be undertaken.

**Permeable Paving Operation & Maintenance Requirements**

Regular inspection and maintenance is important for the effective operation of pervious pavements. The facility should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding.

Pervious surfaces need to be regularly cleaned of silt and other sediments to preserve their infiltration capability. Manufacturers' recommendations should always be followed.

A brush cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:

1. End of winter (April) – to collect winter debris.
2. Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
3. After autumn leaf fall (November).

Care should be taken in using vacuuming equipment to avoid removal of jointing material. Any lost material should be replaced.

If reconstruction is necessary, the following procedure should be followed:

1. Lift surface layer and laying course.
2. Remove any geo-textile filter layer.
3. Inspect sub-base and remove, and replace if required.
4. Renew any geo-textile layers.
5. Renew laying course, jointing material and concrete block paving.

The reconstruction of failed areas of concrete block pavement should be less costly and disruptive than the rehabilitation of continuous concrete or asphalt porous surfaces due to the reduced area that is likely to be affected. Materials removed from the voids or the layers below the surface may contain heavy metals and hydrocarbons and may need to be disposed of as controlled waste. Sediment testing should be carried out before disposal to confirm its classification and appropriate disposal methods.

Pervious pavement operation and maintenance requirements

| **Maintenance schedule** | **Required action** | **Frequency** |
|---|---|---|
| Regular maintenance | Brushing | Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment |
| Occasional maintenance | Stabilize and mow contributing and adjacent areas | As required |
| | Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying | As required – once per year on less frequently used pavements |

| Maintenance schedule | Required action | Frequency |
|---|---|---|
| Remedial actions | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving | As required |
| | Remedial work to any depressions, rutting, and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material | As required |
| | Rehabilitation of surface and upper substructure by remedial sweeping | Every ten to fifteen years or as required (if infiltration performance is reduced due to significant clogging) |
| Monitoring | Initial inspection | Monthly for three months after installation |
| | Inspect for evidence of poor operation and/or weed growth – if required, take remedial action | Three-monthly, 48hrs after large storms in first six months |
| | Inspect silt accumulation rates and establish appropriate brushing frequencies | Annually |
| | Monitor inspection chambers | Annually |

Maintenance activities should be detailed in the Health and Safety Plan and a risk assessment should be undertaken.

**Swales Operation & Maintenance Requirements**

Regular inspection and maintenance is important for the effective operation of swales as designed.

Adequate access must be provided to all swale areas for inspection and maintenance, including for appropriate equipment and vehicles. Operation and maintenance requirements for swales are described below.

Swales operation and maintenance requirements

| Maintenance schedule | Required action | Frequency |
|---|---|---|
| Regular maintenance | Remove litter and debris | Monthly, or as required |
| | Cut grass – to retain grass height within specified design range | Monthly (during growing season), or as required |
| | Manage other vegetation and remove nuisance plants | Monthly at start, then as required |
| | Inspect inlets, outlets, and overflows for blockages and clear of required | Monthly |
| | Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for >48hrs | Monthly, or when required |
| | Inspect vegetation coverage | Monthly for six months, quarterly for two years, then bi-annually |
| | Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies | |
| Occasional maintenance | Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required | As required or if bare soil is exposed over 10% or more of the swale treatment area |
| Remedial actions | Repair erosion or other damage by re-turfing or reseeding | As required |
| | Re-level uneven surfaces and reinstate design levels | As required |
| | Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits, and prevent compaction of the soil surface | As required |
| | Remove buildup of sediment on upstream gravel trench, flow spreader of the soil surface | As required |
| | Remove and dispose of oils or petrol residues using safe standard practices | As required |
| Monitoring | Inspect inlets, outlets and overflows for blockages, and clear if required | Monthly |

| Maintenance schedule | Required action | Frequency |
|---|---|---|
| | Inspect infiltration surfaces for ponding, compaction, silt accumulation. Record areas where water is ponding for >48 hours | Monthly, or when required |
| | Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies | Half yearly |

Sediments excavated from swales that receive runoff from residential or standard road and roof areas are generally not toxic or hazardous material and can be safely disposed of by either land application or land filling. However, consultation should take place with the environmental regulator to confirm appropriate protocols. Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff, sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on site if there is an appropriate safe and acceptable location to do so.

Many of the specific maintenance activities for swales can be undertaken as part of a general landscaping contract and so if landscape management is already required at site, should have marginal cost implications.

Maintenance activities should be detailed in the health and safety plan and a risk assessment should be undertaken.

# APPENDIX C

Geotechnical Report
(Infiltration test results)