# TECHNICAL DESIGN NOTE

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| Project name | Former Nestle Site, Nestles Avenue, Hayes. |
| Design note title | Drainage Strategy Statement (for Barratt London Residential Development Only) |
| Document reference | C151867/R-001 |
| Author | J Hayden |
| Revision | B |
| Date | 15 February 2018 |

## 1. INTRODUCTION

This statement supersedes previously issued statements.

This drainage statement has been developed to support the drainage strategy for the Barratt London Residential Site only and should be read in conjunction with the following drawings and calculations:

C151867/C/001 – Proposed Drainage Strategy Sheet 1

C151867/C/002 – Proposed Drainage Strategy Sheet 2

C151867/C/100 – Existing Drainage Catchment Areas

C151867/C/101 – Proposed Drainage catchment areas to Thames Water

C151867/C/102 – Proposed surface water Attenuation Locations

C151867/C/104 – Proposed Drainage catchment areas to canal

C151867/C/109 - Sections

C151867/C/110 - Exceedance Floodwater Storage Locations

C151867/C/111 - Ingress/ Egress and Flood Water flow paths

Appendices that can be found at the back of the document contain:

Appendix A - Calculations including microdrainage output

Appendix B - Completed LBH proformas

Appendix C - Correspondence

## 2. SURFACE WATER DRAINAGE STRATEGY

The proposed Barratt residential development is bound to the north by the Grand Union Canal and to the south by Nestles Avenue, Thames Water surface and foul water sewers are located within Nestles Avenue.

It is proposed to split the drainage catchment; draining the northern half of the site to the canal and the southern half to the Thames water surface water sewer. Drawing C151867/C/100 shows how the existing catchment is currently split between the canal and the Thames Water sewers.

## 2.1 Proposed Discharge to the Canal

An application was made to the Canal and River Trust (C&RT) to obtain permission to drain to the canal. The current factory site has a number of outfalls to the canal. A proposed flow rate was calculated in accordance with the Code of Practice for Works Affecting the Canal & River Trust Parts 1 and 2. Through this process consent to discharge a total of 85.8l/s to the canal has been obtained for all storm events. Following comments received from London Borough of Hillingdon (LBH) dated 3rd July 2017 30% betterment was proposed. The proposed flow rate to the canal is now 60l/s. The flow shall be restricted to a velocity of 0.3m/s as stipulated by the C&RT. It is proposed to construct two new outfalls. The existing outfalls shall be abandoned and either removed or infilled with grout. Confirmation on the CRT approval can be found in Appendix C.

While CRT did not stipulate that we restrict to different rates for the different storms, the calculated rates for each storm are as follows:

| Event | CRT Approved rate | Proposed rate after providing 30 % betterment |
|---|---|---|
| 1 in 1 yr | 22.9 | 16.0 |
| QBAR | 26.9 | 18.8 |
| 1 in 30 yr | 61.9 | 43.3 |
| 1 in 100 yr | 85.8 | 60.0 |
| 1 in 100 yr +40% | 85.8 | 60.0 |

## 2.2 Proposed Discharge to Thames Water Sewers in Nestles Avenue

An existing catchment of 3.52ha currently drains towards TW sewers. In accordance with LBH requirements it is proposed to drain the southern half of the site to the Thames Water sewers at the existing greenfield run off rate. Please refer to Calculations of Proposed Discharge rate to Thames Water Sewers located in Appendix A. A summary of the proposed discharge rates is as tabulated below:

| Return Period | Greenfield run off rate l/s/ha | Existing discharge to TW sewers based on 3.52ha existing catchment | Proposed discharge rate to TW sewers l/s | Equivalent discharge rate in l/s/ha for proposed catchment of 3.93ha |
|---|---|---|---|---|
| 1 in 1 year | 3.4 | 12.0 | 12.0 | 3.1 |
| QBAR | 4.0 | 14.1 | 14.1 | 3.6 |
| 1 in 30 year | 9.0 | 31.7 | 31.7 | 8.1 |
| 1 in 100 year | 12.6 | 44.5 | 44.5 | 11.3 |
| 1 in 100 year +40% CC | - | 44.5 | 44.5 | 11.3 |

Complex flow controls shall be used to ensure that the rates are restricted to GFR for all the above events. Details of these shall be provided at detailed design to discharge conditions.

As shown on the drainage plans new connections are proposed from the site to the TW sewers in all but one location. In this one location an existing pipe is proposed for reuse. Prior to reuse this shall be surveyed and condition assessed. If condition is poor pipe shall be replaced.

## 2.3 Methodology for the Provision of Attenuation

To enable sufficient attenuation to be provided and to meet SUDS requirements, varied attenuation methods have been proposed, locating them close to source of run off.

All new buildings shall have attenuation provided within a blue roof system. While a green roof shall be provided on top of the blue roof, the green roof has not been included within the attenuation calculations. The blue roofs shall be restricted at roof level with the use of orifices.

For the purpose of drainage modelling at this stage 75% of the roof area of the new builds has been assumed to have blue roof attenuation. This is a conservative figure equating to 10,434m$^2$ of blue roof throughout the site. During detailed design when more is known about the roof layout this figure shall increase allowing for greater blue roof extents. Green roofs overlying the blue roof shall also have PV cells located over them. Appropriate green roof planting shall be used. Detailed plans of blue roof extents will be provided to discharge the planning condition at the detailed design stage.

Blue roof attenuation shall be used on the podiums (2500m2), allowing surplus water from the landscaping above to drain down into it as well as to drain the external footways located on the podium. The blue roof podium attenuation shall be restricted at podium level via orifices and shall be conveyed to the site discharge point via permeable paving. Refer drawing C151867/C/109 for an indicative section through the podium drainage.

All blue roof orifices shall have a secondary outlet which shall act as an overflow in case of orifice blockage or exceedance event.

Attenuation shall also be provided within permeable paving. These areas shall attenuate themselves and external areas that drain to them. Additionally, blue roofs shall drain to the permeable paving, the paving subbase being used as conveyance to the site discharge point. The discharge from the permeable paving shall be restricted with the use of vortex flow controls (E.g. Hydrobrake Optimum). The permeable paving design at detailed stage shall be provided by Marshalls who specialise in permeable paving design.

Further attenuation is provided within rain gardens. These run parallel to the roads on either side and take the run off from the footways. The outlet is restricted with the use of orifice plates. All orifice plates shall have an emergency pull handle that allows the orifice to be opened up if a blockage occurs. A typical cross section of the rain garden construction can be found on the drawing C151867/C/109. Rain gardens either use pipework or the permeable paving as conveyance to the site discharge point.

Blue roofs are not proposed for the existing buildings. In this case due to the invert level required for the attenuation (in excess of 1m BGL), below ground crates are proposed.

### 2.4 Design Criteria

Design criteria used for modelling purposes has been as follows:

- FSR data has been used as accepted by LBH
- Run Off Coefficients:
  - » Green roofs - 0.84 winter, 0.75 summer (microdrainage default) as agreed
  - » Non-green roofs - 0.95
  - » External hardstanding - 0.90
  - » Where a model contains both external area and non-green roof for modelling purposes 0.925 has been used.
  - » Surcharged outfalls have been used where required. Refer proformas for details.

### 2.5 Results

The surface water drainage networks (Outfalls 1 to 5) have been modelled using Microdrainage. The networks have been modelled for a QBAR, 1 in 1 year, 1 in 30 year, 1 in 100 year and 1 in 100 year + 40% return period storms. Due to the site being residential it has been designed to not flood in a 1 in 100 year + 40% event. The modelling results can be found within Appendix A. The results have also been used to complete the LBH proformas as required, these can be found in Appendix B.

The results confirm that the total discharge to the canal during a 1 in 100 +40% event is compliant with the proposed allowable rate of 60l/s. They also show the total discharge to the Thames sewers is compliant with the proposed allowable 44.5l/s.

Where discharges for lesser storms are greater than proposed a complex flow control shall be used to restrict the flows as required. Details of this shall be provided at detailed design as part of the discharge of planning conditions.

## 3. EXCEEDANCE EVENTS

The drainage networks consist of various forms of attenuation; blue roofs, permeable paving, rain gardens and below ground crates. The networks are designed to not flood during a 1 in 100 year + 40% climate change event. During an exceedance event where a storm greater than the design storm occurs resilience has been built into the attenuation features to provide additional storage and prevent flood water from leaving the site. Refer drawing C151867/C/109 and 110. The details of this are as follows:

- Permeable paving - this is designed to attenuate the water within its subbase. During an event where the 1 in 100 year +40% climate change event is exceeded the water shall be able to rise above the permeable paving subbase a further 220mm before it reaches the surface and flooding occurs.
- Blue roofs/ podium drainage - the water may rise above the top of the blue roof attenuation and into the substrate of the green roof during exceedance events. The increase in water level shall also mean an increase in head which shall allow additional flow out via the orifices, the additional flows shall drain to the permeable paving and be stored as mentioned above.

- Rain gardens - these are able to store an additional 150mm of water above their surface before they overtop the kerb on to the road.
- External pedestrian areas are graded away from buildings. During an exceedance event water shall sit at low point until it is able to enter the network.

## 4. THE DRAINAGE HIERARCHY

The drainage hierarchy specified within Policy 5.13 of the London Plan sets out the preference for managing surface water run-off. This has been followed to provide a compliant design.

The hierarchy and reasoning for using or not using each level is as follows:

| Level | Hierarchy Description | Included? |
|---|---|---|
| 1 | Store Water for later use | Green roofs/ rain gardens are to be used, water shall be reused by the vegetation. Water storage for irrigation purposes. |
| 2 | Use infiltration | Infiltration testing have shown infiltration to be unsuitable |
| 3 | Attenuate in open water features for gradual release | Rain gardens are proposed as an alternative to a swale. |
| 4 | Attenuate by storing in tanks or sealed water features for gradual release | This has been included with use of permeable paving and below ground attenuation crates |
| 5 | Discharge to watercourse | Surface water from the northern section of the site shall be discharged at an agreed gradual release rate to the Grand Union Canal |
| 6 | Discharge to surface water sewer | Surface water from the southern section of the site shall be discharged at an agreed gradual release rate to the Thames water sewers |
| 7 | Discharge to combined sewer | This shall not be required. |

### 4.1 Suitability of Infiltration

Infiltration testing in accordance with BRE 365 has been carried out by Capita in four locations. The results found the infiltration rate to be insufficient to use infiltration methods.

### 4.2 Suitability of SUDS features

The following SUDS features have been considered during the design process, the table states which features have been incorporated and which have been excluded and reasons for their exclusion.

| SUDS feature | Incorporated within design | Reasoning |
|---|---|---|
| Rain Gardens | Yes | Rain Gardens are located on either side of the road as shown on the drainage layout plan. They shall capture run off from footways. |
| Infiltration methods | No | As stated above infiltration tests have proved the site to be unsuitable for infiltration |
| Permeable paving | Yes | Permeable paving has been incorporated within the design, it shall be a tanked system as infiltration is not possible. |
| Attenuation Pond | No | The size of ponds required would compromise the developable space and by a safety risk, this precludes their use. |
| Blue roof | Yes | Blue roofs shall be located on all new builds to attenuate water close to source before slow release. |
| Green Roof | Yes | Green roofs shall be incorporated within the design of the new builds, they shall not be used on the existing buildings. |
| Rainwater storage for irrigation | Yes | The runoff from the running track is to be stored for irrigation of the allotment area. |

## 5. WATER QUALITY

With reference to the SUDS Manual 2016, the water treatment benefits offered by the components provided within the proposed network have been considered in parallel with the risk of pollution imposed by the nature of the site and its usage.

The site shall be frequented by mainly by cars, though delivery and refuse vehicles would also visit the site. The use of permeable paving is known to provide water quality enhancement and precludes the need for light liquid separators. Where the catchment drains to the canal, permission shall be sought during detailed design to design out the light liquid separators (shown on the drainage layout plans) that are drained to via permeable paving.

Where interceptors are used they shall be fitted with high level audible and visual alarms which will alert the need for maintenance. The separator shall be inspected every six months as per the manufacturer's instructions.

Further treatment shall be provided with the use of catchpits and trapped gullies located close to source which shall reduce suspended solids within the network.

## 6. WHOLE LIFE MAINTENANCE OF THE NETWORK

To enable the water treatment process to occur as intended and be efficiently restricted the drainage network shall require maintenance. The maintenance strategy and responsibilities are as set out in the table below.

| Drainage component | Actions | Action carried out by and Frequency |
|---|---|---|
| External areas | Site to be generally kept free from litter and debris which may enter the drainage system. | Site management- continual |
| Permeable Paving | Brush/ suction cleaner, replacing and lost material and remove weeds<br><br>Inspect for poor operation<br><br>Inspect silt accumulation within upstream catchpits<br><br>Remedial works to depressions/ cracked blocks<br><br>Litter management required through site<br><br>Remedial measures to structure of pavement | Specialist contractor - Annually<br><br>Site management – 3 times a year following heavy rain<br><br>Site management – may require a specialist if issue found - annually<br><br>Specialist contractor - as required<br><br>Site management – continual<br><br>Specialist contractor – every 10-15 years |
| Green roof | Inspection substrate, all components, vegetations<br><br>Remove debris and litter to prevent clogging. Replace dead plants, remove nuisance plants. Mow/ prune as required.<br><br>Stabilise any erosion channels | Specialist Contractor - annually<br><br>Specialist Contractor - Six monthly<br><br>Will occur as required during the above specialist inspections |
| Attenuation - blue roof | Inspect inlet/ outlets for condition and remove silt if needed<br><br>CCTV survey the attenuation internally, remove sediment as required | Site management – annually<br><br>Blue roof specialist – annually – to be combined with green roof inspection |

| | | |
|---|---|---|
| Attenuation - below ground crates | Inspect inlet/ outlet for condition and remove silt if needed<br><br>CCTV survey the attenuation internally, remove sediment as required | Site management – annually<br><br>CCTV drainage specialist – Every 5 years |
| Bypass Separator | Inspect, remove litter/ debris and sediment<br><br>Change filter<br><br>Remove oils/ grease etc. | Site management - 6 monthly, more regularly for first 6 months to establish sediment build up rate<br><br>Specialist - As recommended by manufacturer<br><br>Specialist - 6 monthly or after spill. Frequency may be varied dependant on finding of inspections. |
| General network inc. pipes/ manholes/ catchpits | Manholes covers to be lifted and inspected for sediment build up, remove as required | Site management – annually. If issues found specialist contractor may be required for remedial works |

This development is not being offered for adoption. It shall be managed by a site management company.

There is a requirement to provide a Maintenance and Management plan to discharge the planning condition. Further information shall be provided at this stage.

## 7. THAMES WATER

Although we do not have confirmation of their acceptance, Thames Water have been consulted during the design process. Thames Water have been contacted to provide a formal acceptance of the surface water discharge. This shall be forwarded to the LLFA as soon as it is available.

## 8. FOUL WATER DRAINAGE STRATEGY

The foul water is to discharge by gravity from the development into the Nestles Avenue Thames Water Sewers. Thames Water were contacted with regards to this proposal. They confirmed that they would need to do a foul

capacity assessment for the existing foul sewer within Nestles Avenue. The purpose of this was to ascertain whether the existing sewers would have sufficient capacity to cope with the proposed development.

Thames Water have now completed their assessment and have confirmed that their existing sewers have sufficient capacity. Correspondence from Thames Water confirming this can be found in Appendix C.

## 9. DETAILED DESIGN AND DEVELOPEMENT PHASING

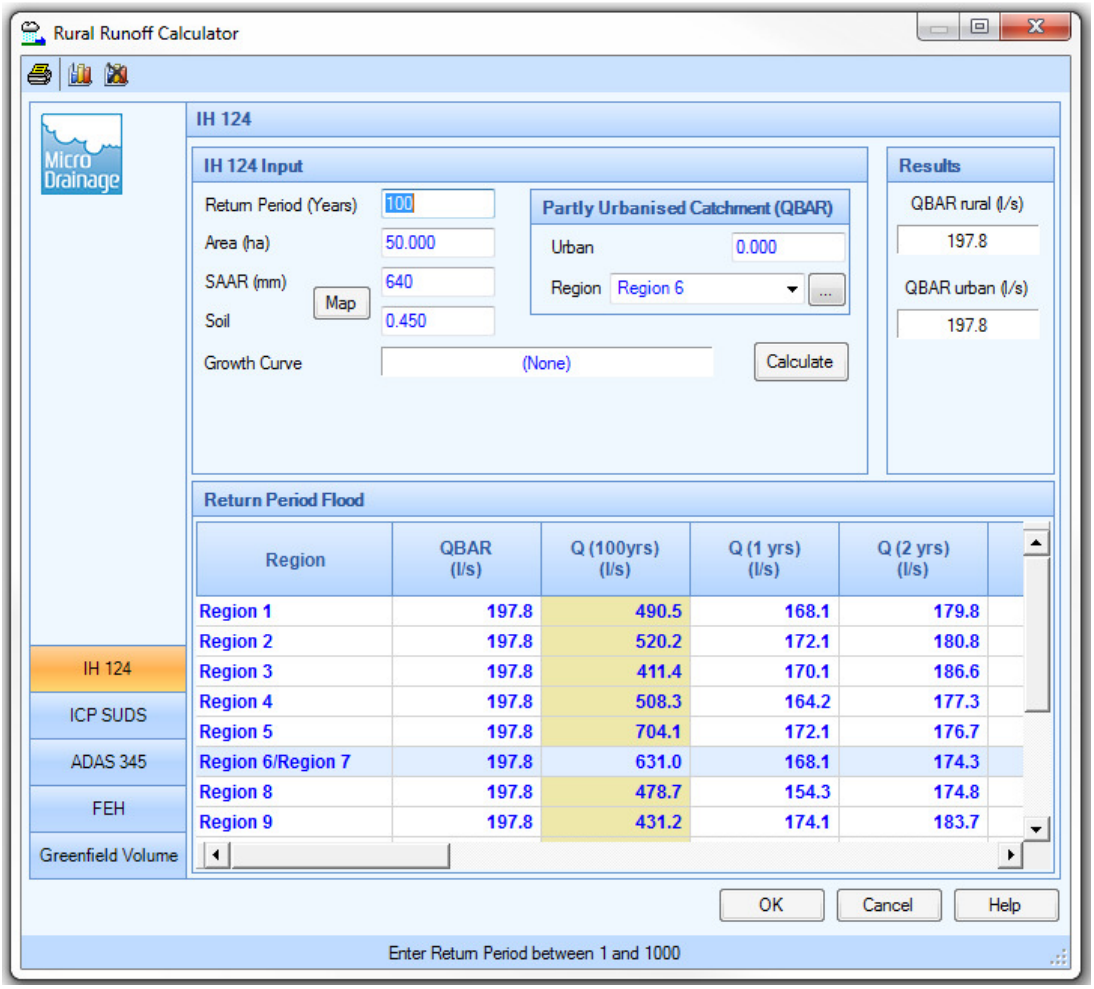
The information provided is outline design information on which the detailed design shall be based. The overall development is to be built in phases over a number of years. There are Planning conditions for each phase. Detailed design information shall be provided on a phase by phase basis to sign off the conditions.

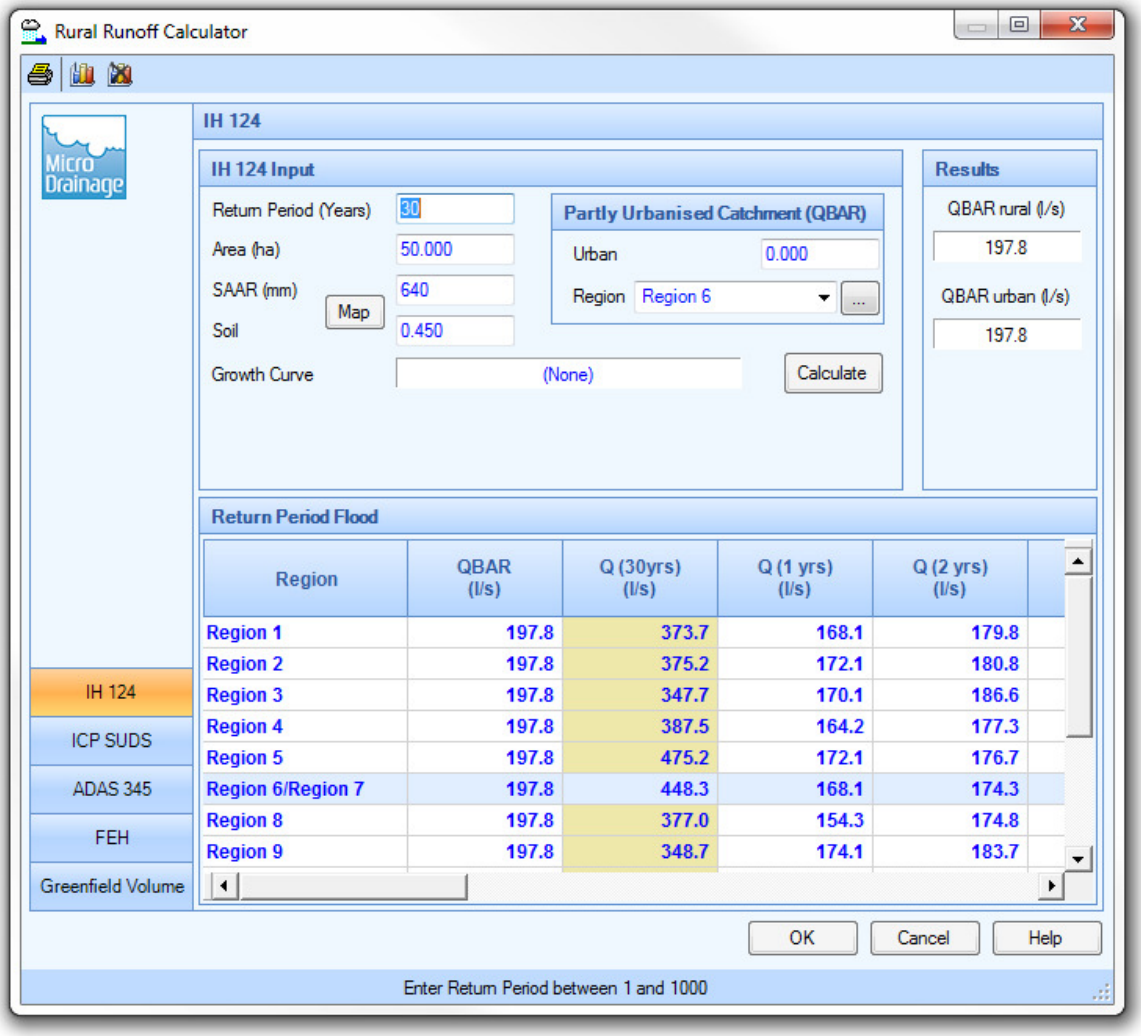
# APPENDIX A - Calculations

- Calculation of proposed Discharge to Thames water Sewers
- Microdrainage output

# Calculation of Proposed Discharge Rate to Thames Water Sewers

Greenfield Run off Rate for QBAR, 1 in 1, 1 in 30 and 1 in 100 year return periods based on 50Ha.






In line with the requirements of IH124 the above calculation is for an area of 50ha. To find the green field rate for the site concerned the above values shall be pro-rated on an area basis.

The pro-rated results are as tabulated:

| Return Period | Greenfield run off rate for 50 ha l/s | Greenfield run off rate for the site per Ha l/s/ha | Existing greenfield discharge to TW sewers based on 3.5229ha catchment (Existing catchment) l/s | Proposed discharge rate to TW sewers l/s | Proposed Equivalent discharge rate in l/s/ha for proposed catchment of 3.93ha |
|---|---|---|---|---|---|
| 1 in 1 year | 168.1 | 3.4 | 12.0 | 12.0 | 3.1 |
| QBAR | 197.8 | 4.0 | 14.1 | 14.1 | 3.6 |
| 1 in 30 year | 448.3 | 9.0 | 31.7 | 31.7 | 8.1 |
| 1 in 100 year | 631.0 | 12.6 | 44.5 | 44.5 | 11.3 |
| 1 in 100 year +40% CC | 631.0 | - | 44.5 | 44.5 | 11.3 |

## 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) | 2 | Add Flow / Climate Change (%) | 0 |
| M5-60 (mm) | 20.100 | Minimum Backdrop Height (m) | 0.200 |
| Ratio R | 0.406 | Maximum Backdrop Height (m) | 1.500 |
| Maximum Rainfall (mm/hr) | 500 | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30 | Min Vel for Auto Design only (m/s) | 1.00 |
| Foul Sewage (l/s/ha) | 0.000 | Min Slope for Optimisation (1:X) | 500 |
| Volumetric Runoff Coeff. | 0.900 | | |

Designed with Level Soffits

### Network Design Table for Storm

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 5.000 | 0.050 | 100.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.001 | 5.000 | 0.050 | 100.0 | 0.189 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 2.000 | 5.000 | 0.050 | 100.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 2.001 | 5.000 | 0.050 | 100.0 | 0.164 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.002 | 1.000 | 0.175 | 5.7 | 0.170 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 3.000 | 5.000 | 0.050 | 100.0 | 0.026 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 3.001 | 5.200 | 0.050 | 104.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 4.000 | 5.000 | 0.050 | 100.0 | 0.015 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 70.66 | 5.08 | 31.050 | 0.000 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 0.0 |
| 1.001 | 70.17 | 5.17 | 31.000 | 0.189 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8« | 43.1 |
| 2.000 | 70.66 | 5.08 | 31.050 | 0.000 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 0.0 |
| 2.001 | 70.17 | 5.17 | 31.000 | 0.164 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8« | 37.4 |
| 1.002 | 70.14 | 5.17 | 30.900 | 0.523 | 0.0 | 0.0 | 0.0 | 4.24 | 75.0« | 119.2 |
| 3.000 | 70.66 | 5.08 | 30.850 | 0.026 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 6.0 |
| 3.001 | 70.14 | 5.17 | 30.800 | 0.026 | 0.0 | 0.0 | 0.0 | 0.99 | 17.4 | 6.0 |
| 4.000 | 70.66 | 5.08 | 30.900 | 0.015 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 3.4 |

## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.001 | 14.600 | 0.100 | 146.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.003 | 29.100 | 0.200 | 145.5 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 5.000 | 5.000 | 0.050 | 100.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 5.001 | 33.200 | 0.700 | 47.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.004 | 49.500 | 0.330 | 150.0 | 0.020 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.005 | 22.200 | 0.150 | 148.0 | 0.020 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 6.000 | 5.000 | 0.050 | 100.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 6.001 | 27.700 | 0.280 | 98.9 | 0.262 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 6.002 | 22.800 | 1.150 | 19.8 | 0.041 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.006 | 32.400 | 0.220 | 147.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 7.000 | 5.000 | 0.050 | 100.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 7.001 | 5.000 | 0.100 | 50.0 | 0.241 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 7.002 | 2.700 | 0.050 | 54.0 | 0.302 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 7.003 | 4.500 | 0.150 | 30.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 8.000 | 5.000 | 0.050 | 100.0 | 0.027 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 8.001 | 11.000 | 0.110 | 100.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4.001 | 68.96 | 5.38 | 30.850 | 0.015 | 0.0 | 0.0 | 0.0 | 0.83 | 14.7 | 3.4 |
| 1.003 | 65.85 | 5.96 | 30.750 | 0.564 | 0.0 | 0.0 | 0.0 | 0.83 | 14.7« | 120.7 |
| 5.000 | 70.66 | 5.08 | 31.300 | 0.000 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 0.0 |
| 5.001 | 68.49 | 5.46 | 31.250 | 0.000 | 0.0 | 0.0 | 0.0 | 1.46 | 25.9 | 0.0 |
| 1.004 | 61.17 | 6.97 | 30.550 | 0.584 | 0.0 | 0.0 | 0.0 | 0.82 | 14.5« | 120.7 |
| 1.005 | 59.32 | 7.42 | 30.220 | 0.604 | 0.0 | 0.0 | 0.0 | 0.82 | 14.6« | 120.7 |
| 6.000 | 70.66 | 5.08 | 31.550 | 0.000 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 0.0 |
| 6.001 | 68.05 | 5.54 | 31.500 | 0.262 | 0.0 | 0.0 | 0.0 | 1.01 | 17.9« | 57.9 |
| 6.002 | 67.15 | 5.71 | 31.220 | 0.303 | 0.0 | 0.0 | 0.0 | 2.27 | 40.2« | 66.1 |
| 1.006 | 56.85 | 8.07 | 30.070 | 0.907 | 0.0 | 0.0 | 0.0 | 0.83 | 14.6« | 167.6 |
| 7.000 | 70.66 | 5.08 | 30.600 | 0.000 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 0.0 |
| 7.001 | 70.31 | 5.14 | 30.550 | 0.241 | 0.0 | 0.0 | 0.0 | 1.43 | 25.2« | 55.1 |
| 7.002 | 70.16 | 5.17 | 30.450 | 0.543 | 0.0 | 0.0 | 0.0 | 1.78 | 70.9« | 123.8 |
| 7.003 | 69.98 | 5.20 | 30.400 | 0.543 | 0.0 | 0.0 | 0.0 | 2.40 | 95.3« | 123.8 |
| 8.000 | 70.66 | 5.08 | 30.410 | 0.027 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 6.2 |
| 8.001 | 69.59 | 5.27 | 30.360 | 0.027 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 6.2 |

## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.004 | 7.100 | 0.070 | 101.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 9.000 | 5.000 | 0.050 | 100.0 | 0.044 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 9.001 | 2.300 | 0.050 | 46.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 7.005 | 28.200 | 0.330 | 85.5 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.007 | 16.300 | 0.170 | 95.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.008 | 3.100 | 0.180 | 17.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 7.004 | 69.07 | 5.36 | 30.250 | 0.570 | 0.0 | 0.0 | 0.0 | 1.30 | 51.6« | 127.9 |
| 9.000 | 70.66 | 5.08 | 30.280 | 0.044 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 10.1 |
| 9.001 | 70.50 | 5.11 | 30.230 | 0.044 | 0.0 | 0.0 | 0.0 | 1.49 | 26.3 | 10.1 |
| 7.005 | 67.25 | 5.69 | 30.180 | 0.614 | 0.0 | 0.0 | 0.0 | 1.42 | 56.3« | 134.2 |
| 1.007 | 56.12 | 8.27 | 29.850 | 1.521 | 0.0 | 0.0 | 0.0 | 1.34 | 53.1« | 277.4 |
| 1.008 | 56.07 | 8.29 | 29.680 | 1.521 | 0.0 | 0.0 | 0.0 | 3.17 | 126.0« | 277.4 |

## Simulation Criteria for Storm

| | | | |
|---|---|---|---|
| Volumetric Runoff Coeff | 0.900 | 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 | 10 |
| Number of Online Controls | 10 | 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) | 2 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.100 | Storm Duration (mins) | 30 |
| Ratio R | 0.406 | | |

## Online Controls for Storm

### Orifice Manhole: 1, DS/PN: 1.001, Volume (m³): 1.0

Diameter (m) 0.039 Discharge Coefficient 0.600 Invert Level (m) 31.000

### Orifice Manhole: 4, DS/PN: 2.001, Volume (m³): 1.3

Diameter (m) 0.039 Discharge Coefficient 0.600 Invert Level (m) 31.000

### Hydro-Brake Optimum® Manhole: 2, DS/PN: 1.002, Volume (m³): 0.9

| | |
|---|---|
| Unit Reference | MD-SFP-0149-1040-0350-1040 |
| Design Head (m) | 0.350 |
| Design Flow (l/s) | 10.4 |
| Flush-Flo™ | Calculated |
| Objective | Future Proof |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 149 |
| Invert Level (m) | 30.900 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---|---|---|---|---|---|
| Design Point (Calculated) | 0.350 | 10.4 | Kick-Flo® | 0.296 | 9.6 |
| Flush-Flo™ | 0.192 | 10.4 | Mean Flow over Head Range | - | 7.5 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 5.7 | 1.200 | 18.6 | 3.000 | 28.9 | 7.000 | 43.8 |
| 0.200 | 10.4 | 1.400 | 20.0 | 3.500 | 31.1 | 7.500 | 45.3 |
| 0.300 | 9.7 | 1.600 | 21.4 | 4.000 | 32.9 | 8.000 | 46.8 |
| 0.400 | 11.1 | 1.800 | 22.6 | 4.500 | 35.0 | 8.500 | 48.3 |
| 0.500 | 12.3 | 2.000 | 23.8 | 5.000 | 36.9 | 9.000 | 49.7 |
| 0.600 | 13.4 | 2.200 | 24.9 | 5.500 | 38.7 | 9.500 | 51.1 |
| 0.800 | 15.3 | 2.400 | 25.9 | 6.000 | 40.5 | | |
| 1.000 | 17.1 | 2.600 | 27.0 | 6.500 | 42.2 | | |

### Orifice Manhole: 7, DS/PN: 3.001, Volume (m³): 1.1

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 30.800

### Orifice Manhole: 9, DS/PN: 4.001, Volume (m³): 1.0

Diameter (m) 0.017 Discharge Coefficient 0.600 Invert Level (m) 30.850

## Orifice Manhole: 16, DS/PN: 6.001, Volume (m³): 0.5

Diameter (m) 0.072 Discharge Coefficient 0.600 Invert Level (m) 31.500

## Orifice Manhole: 20, DS/PN: 7.001, Volume (m³): 1.6

Diameter (m) 0.046 Discharge Coefficient 0.600 Invert Level (m) 30.550

## Hydro-Brake Optimum® Manhole: 21, DS/PN: 7.002, Volume (m³): 0.8

| | |
|---|---|
| Unit Reference | MD-SHE-0208-2000-0350-2000 |
| Design Head (m) | 0.350 |
| Design Flow (l/s) | 20.0 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 208 |
| Invert Level (m) | 30.450 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---|---|---|---|---|---|
| Design Point (Calculated) | 0.350 | 20.0 | Kick-Flo® | 0.334 | 19.6 |
| Flush-Flo™ | 0.267 | 20.0 | Mean Flow over Head Range | - | 13.2 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 7.1 | 1.200 | 36.1 | 3.000 | 56.2 | 7.000 | 85.0 |
| 0.200 | 19.5 | 1.400 | 38.8 | 3.500 | 60.6 | 7.500 | 88.1 |
| 0.300 | 19.9 | 1.600 | 41.4 | 4.000 | 63.9 | 8.000 | 91.0 |
| 0.400 | 21.3 | 1.800 | 43.9 | 4.500 | 67.9 | 8.500 | 93.8 |
| 0.500 | 23.7 | 2.000 | 46.2 | 5.000 | 71.7 | 9.000 | 96.6 |
| 0.600 | 25.9 | 2.200 | 48.3 | 5.500 | 75.2 | 9.500 | 99.3 |
| 0.800 | 29.7 | 2.400 | 50.4 | 6.000 | 78.6 | | |
| 1.000 | 33.0 | 2.600 | 52.4 | 6.500 | 81.9 | | |

## Orifice Manhole: 24, DS/PN: 8.001, Volume (m³): 1.0

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.360

## Orifice Manhole: 27, DS/PN: 9.001, Volume (m³): 1.7

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.230

## Storage Structures for Storm

### Cellular Storage Manhole: 1, DS/PN: 1.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 31.000 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.95 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1420.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1420.0 | 0.0 | | | |

### Cellular Storage Manhole: 4, DS/PN: 2.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 31.000 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.95 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1230.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1230.0 | 0.0 | | | |

### Porous Car Park Manhole: 2, DS/PN: 1.002

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 91.0 |
| Max Percolation (l/s) | 394.3 | Slope (1:X) | 10000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.900 | Cap Volume Depth (m) | 0.400 |

### Cellular Storage Manhole: 7, DS/PN: 3.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 30.800 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.30 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 90.0 | 0.0 | 0.601 | 0.0 | 0.0 |
| 0.600 | 90.0 | 0.0 | | | |

### Cellular Storage Manhole: 9, DS/PN: 4.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 30.850 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.30 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

## Cellular Storage Manhole: 9, DS/PN: 4.001

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 77.0 | 0.0 | 0.600 | 77.0 | 0.0 |

## Cellular Storage Manhole: 16, DS/PN: 6.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 31.500 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.95 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 2105.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 2105.0 | 0.0 | | | |

## Cellular Storage Manhole: 20, DS/PN: 7.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 30.550 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.95 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1800.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1800.0 | 0.0 | | | |

## Porous Car Park Manhole: 21, DS/PN: 7.002

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 104.0 |
| Max Percolation (l/s) | 450.7 | Slope (1:X) | 10000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.450 | Cap Volume Depth (m) | 0.350 |

## Cellular Storage Manhole: 24, DS/PN: 8.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 30.360 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.30 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 140.0 | 0.0 | 0.601 | 0.0 | 0.0 |
| 0.600 | 140.0 | 0.0 | | | |

## Cellular Storage Manhole: 27, DS/PN: 9.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 30.230 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.30 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

## Cellular Storage Manhole: 27, DS/PN: 9.001

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 140.0 | 0.0 | 0.601 | 0.0 | 0.0 |
| 0.600 | 140.0 | 0.0 | | | |

## 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 | 10 |
| Number of Online Controls | 10 | 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 0.406 |
| Region | England and Wales | Cv (Summer) | 0.900 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.900 |

| | | | |
|---|---|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status | ON |
| Analysis Timestep | Fine | Inertia Status | ON |
| DTS 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 360 Winter | 1 | +0% | | | | | 31.050 |
| 1.001 | 1 | 4320 Summer | 1 | +0% | | | | | 31.034 |
| 2.000 | 3 | 360 Winter | 1 | +0% | | | | | 31.050 |
| 2.001 | 4 | 4320 Summer | 1 | +0% | | | | | 31.033 |
| 1.002 | 2 | 960 Summer | 1 | +0% | 100/60 Summer | | | | 30.947 |
| 3.000 | 6 | 360 Summer | 1 | +0% | 30/60 Summer | | | | 30.908 |
| 3.001 | 7 | 360 Summer | 1 | +0% | 30/30 Summer | | | | 30.908 |
| 4.000 | 8 | 15 Summer | 1 | +0% | 100/30 Summer | | | | 30.942 |
| 4.001 | 9 | 240 Summer | 1 | +0% | 30/120 Summer | | | | 30.918 |
| 1.003 | 5 | 960 Summer | 1 | +0% | 100/15 Summer | | | | 30.785 |
| 5.000 | 11 | 360 Winter | 1 | +0% | | | | | 31.300 |
| 5.001 | 12 | 360 Winter | 1 | +0% | | | | | 31.250 |
| 1.004 | 6 | 15 Summer | 1 | +0% | 30/15 Summer | | | | 30.595 |
| 1.005 | 7 | 15 Summer | 1 | +0% | 30/15 Summer | | | | 30.283 |
| 6.000 | 15 | 360 Winter | 1 | +0% | | | | | 31.550 |
| 6.001 | 16 | 5760 Summer | 1 | +0% | | | | | 31.533 |
| 6.002 | 17 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 31.258 |
| 1.006 | 8 | 15 Summer | 1 | +0% | 30/15 Summer | | | | 30.167 |
| 7.000 | 19 | 360 Winter | 1 | +0% | | | | | 30.600 |
| 7.001 | 20 | 5760 Summer | 1 | +0% | | | | | 30.585 |
| 7.002 | 21 | 480 Summer | 1 | +0% | 100/120 Summer | | | | 30.515 |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 1.001 | 1 | -0.116 | 0.000 | 0.02 | | 0.3 | OK | |
| 2.000 | 3 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 2.001 | 4 | -0.117 | 0.000 | 0.02 | | 0.3 | OK | |
| 1.002 | 2 | -0.103 | 0.000 | 0.06 | | 1.5 | OK | |
| 3.000 | 6 | -0.092 | 0.000 | 0.06 | | 0.9 | OK | |
| 3.001 | 7 | -0.042 | 0.000 | 0.01 | | 0.2 | OK | |
| 4.000 | 8 | -0.108 | 0.000 | 0.17 | | 2.4 | OK | |
| 4.001 | 9 | -0.082 | 0.000 | 0.01 | | 0.1 | OK | |
| 1.003 | 5 | -0.115 | 0.000 | 0.13 | | 1.8 | OK | |
| 5.000 | 11 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 5.001 | 12 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 1.004 | 6 | -0.105 | 0.000 | 0.18 | | 2.6 | OK | |
| 1.005 | 7 | -0.087 | 0.000 | 0.37 | | 5.1 | OK | |
| 6.000 | 15 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 6.001 | 16 | -0.117 | 0.000 | 0.02 | | 0.4 | OK | |
| 6.002 | 17 | -0.112 | 0.000 | 0.15 | | 5.6 | OK | |
| 1.006 | 8 | -0.053 | 0.000 | 0.73 | | 10.3 | OK | |
| 7.000 | 19 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 7.001 | 20 | -0.115 | 0.000 | 0.02 | | 0.4 | OK | |
| 7.002 | 21 | -0.160 | 0.000 | 0.10 | | 3.3 | OK | |

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 7.003 | 22 | 480 Summer | 1 | +0% | | | | | 30.435 |
| 8.000 | 23 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 30.467 |
| 8.001 | 24 | 240 Summer | 1 | +0% | 30/120 Summer | | | | 30.428 |
| 7.004 | 25 | 480 Summer | 1 | +0% | | | | | 30.296 |
| 9.000 | 26 | 15 Summer | 1 | +0% | 30/15 Summer | | | | 30.356 |
| 9.001 | 27 | 240 Summer | 1 | +0% | 30/15 Summer | | | | 30.342 |
| 7.005 | 28 | 480 Summer | 1 | +0% | | | | | 30.221 |
| 1.007 | 29 | 15 Summer | 1 | +0% | | | | | 29.922 |
| 1.008 | 30 | 15 Summer | 1 | +0% | | | | | 29.744 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 7.003 | 22 | -0.190 | 0.000 | 0.06 | | 3.3 | OK | |
| 8.000 | 23 | -0.093 | 0.000 | 0.31 | | 4.3 | OK | |
| 8.001 | 24 | -0.082 | 0.000 | 0.02 | | 0.3 | OK | |
| 7.004 | 25 | -0.179 | 0.000 | 0.10 | | 3.6 | OK | |
| 9.000 | 26 | -0.074 | 0.000 | 0.50 | | 7.0 | OK | |
| 9.001 | 27 | -0.038 | 0.000 | 0.03 | | 0.4 | OK | |
| 7.005 | 28 | -0.184 | 0.000 | 0.08 | | 4.0 | OK | |
| 1.007 | 29 | -0.153 | 0.000 | 0.22 | | 10.6 | OK | |
| 1.008 | 30 | -0.161 | 0.000 | 0.18 | | 10.5 | OK | |

## 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 | 10 |
| Number of Online Controls | 10 | 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 0.406 |
| Region | England and Wales | Cv (Summer) | 0.900 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.900 |

| | | | |
|---|---|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status | ON |
| Analysis Timestep | Fine | Inertia Status | ON |
| DTS 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 2160 Summer | 30 | +0% | | | | | 31.063 |
| 1.001 | 1 | 2160 Summer | 30 | +0% | | | | | 31.063 |
| 2.000 | 3 | 2160 Summer | 30 | +0% | | | | | 31.062 |
| 2.001 | 4 | 2160 Summer | 30 | +0% | | | | | 31.061 |
| 1.002 | 2 | 360 Summer | 30 | +0% | 100/60 Summer | | | | 30.993 |
| 3.000 | 6 | 240 Winter | 30 | +0% | 30/60 Summer | | | | 31.071 |
| 3.001 | 7 | 240 Winter | 30 | +0% | 30/30 Summer | | | | 31.070 |
| 4.000 | 8 | 180 Summer | 30 | +0% | 100/30 Summer | | | | 31.010 |
| 4.001 | 9 | 180 Summer | 30 | +0% | 30/120 Summer | | | | 31.010 |
| 1.003 | 5 | 360 Summer | 30 | +0% | 100/15 Summer | | | | 30.815 |
| 5.000 | 11 | 360 Winter | 30 | +0% | | | | | 31.300 |
| 5.001 | 12 | 360 Winter | 30 | +0% | | | | | 31.250 |
| 1.004 | 6 | 15 Summer | 30 | +0% | 30/15 Summer | | | | 30.759 |
| 1.005 | 7 | 15 Summer | 30 | +0% | 30/15 Summer | | | | 30.726 |
| 6.000 | 15 | 2160 Summer | 30 | +0% | | | | | 31.558 |
| 6.001 | 16 | 2160 Summer | 30 | +0% | | | | | 31.557 |
| 6.002 | 17 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 31.293 |
| 1.006 | 8 | 15 Summer | 30 | +0% | 30/15 Summer | | | | 30.643 |
| 7.000 | 19 | 2880 Summer | 30 | +0% | | | | | 30.614 |
| 7.001 | 20 | 2160 Summer | 30 | +0% | | | | | 30.614 |
| 7.002 | 21 | 180 Summer | 30 | +0% | 100/120 Summer | | | | 30.584 |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | -0.137 | 0.000 | 0.00 | | 0.0 | OK | |
| 1.001 | 1 | -0.087 | 0.000 | 0.05 | | 0.7 | OK | |
| 2.000 | 3 | -0.138 | 0.000 | 0.00 | | 0.0 | OK | |
| 2.001 | 4 | -0.089 | 0.000 | 0.05 | | 0.6 | OK | |
| 1.002 | 2 | -0.057 | 0.000 | 0.19 | | 5.0 | OK | |
| 3.000 | 6 | 0.071 | 0.000 | 0.12 | | 1.7 | SURCHARGED | |
| 3.001 | 7 | 0.120 | 0.000 | 0.02 | | 0.3 | SURCHARGED | |
| 4.000 | 8 | -0.040 | 0.000 | 0.13 | | 1.9 | OK | |
| 4.001 | 9 | 0.010 | 0.000 | 0.02 | | 0.2 | SURCHARGED | |
| 1.003 | 5 | -0.085 | 0.000 | 0.39 | | 5.5 | OK | |
| 5.000 | 11 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 5.001 | 12 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 1.004 | 6 | 0.059 | 0.000 | 0.54 | | 7.6 | SURCHARGED | |
| 1.005 | 7 | 0.356 | 0.000 | 0.96 | | 13.3 | SURCHARGED | |
| 6.000 | 15 | -0.142 | 0.000 | 0.00 | | 0.0 | OK | |
| 6.001 | 16 | -0.093 | 0.000 | 0.06 | | 1.1 | OK | |
| 6.002 | 17 | -0.077 | 0.000 | 0.48 | | 18.2 | OK | |
| 1.006 | 8 | 0.423 | 0.000 | 1.68 | | 23.6 | SURCHARGED | |
| 7.000 | 19 | -0.136 | 0.000 | 0.00 | | 0.0 | OK | |
| 7.001 | 20 | -0.086 | 0.000 | 0.04 | | 0.9 | OK | |
| 7.002 | 21 | -0.091 | 0.000 | 0.31 | | 9.6 | OK | |

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 7.003 | 22 | 180 Summer | 30 | +0% | | | | | 30.463 |
| 8.000 | 23 | 180 Summer | 30 | +0% | 100/15 Summer | | | | 30.520 |
| 8.001 | 24 | 180 Summer | 30 | +0% | 30/120 Summer | | | | 30.519 |
| 7.004 | 25 | 180 Summer | 30 | +0% | | | | | 30.329 |
| 9.000 | 26 | 180 Winter | 30 | +0% | 30/15 Summer | | | | 30.513 |
| 9.001 | 27 | 180 Winter | 30 | +0% | 30/15 Summer | | | | 30.512 |
| 7.005 | 28 | 180 Summer | 30 | +0% | | | | | 30.249 |
| 1.007 | 29 | 30 Summer | 30 | +0% | | | | | 29.974 |
| 1.008 | 30 | 30 Summer | 30 | +0% | | | | | 29.787 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 7.003 | 22 | -0.162 | 0.000 | 0.18 | | 9.6 | OK | |
| 8.000 | 23 | -0.040 | 0.000 | 0.24 | | 3.4 | OK | |
| 8.001 | 24 | 0.009 | 0.000 | 0.03 | | 0.5 | SURCHARGED | |
| 7.004 | 25 | -0.146 | 0.000 | 0.27 | | 10.1 | OK | |
| 9.000 | 26 | 0.083 | 0.000 | 0.26 | | 3.6 | SURCHARGED | |
| 9.001 | 27 | 0.132 | 0.000 | 0.05 | | 0.6 | SURCHARGED | |
| 7.005 | 28 | -0.156 | 0.000 | 0.20 | | 10.6 | OK | |
| 1.007 | 29 | -0.101 | 0.000 | 0.59 | | 27.6 | OK | |
| 1.008 | 30 | -0.118 | 0.000 | 0.46 | | 27.5 | 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 | 10 |
| Number of Online Controls | 10 | 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 0.406 |
| Region | England and Wales | Cv (Summer) | 0.900 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.900 |

| | | | |
|---|---|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status | ON |
| Analysis Timestep | Fine | Inertia Status | ON |
| DTS 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 960 Winter | 100 | +40% | | | | | 31.116 |
| 1.001 | 1 | 960 Winter | 100 | +40% | | | | | 31.116 |
| 2.000 | 3 | 960 Winter | 100 | +40% | | | | | 31.114 |
| 2.001 | 4 | 960 Winter | 100 | +40% | | | | | 31.114 |
| 1.002 | 2 | 180 Summer | 100 | +40% | 100/60 Summer | | | | 31.063 |
| 3.000 | 6 | 240 Winter | 100 | +40% | 30/60 Summer | | | | 31.315 |
| 3.001 | 7 | 240 Winter | 100 | +40% | 30/30 Summer | | | | 31.314 |
| 4.000 | 8 | 180 Winter | 100 | +40% | 100/30 Summer | | | | 31.164 |
| 4.001 | 9 | 180 Winter | 100 | +40% | 30/120 Summer | | | | 31.163 |
| 1.003 | 5 | 15 Summer | 100 | +40% | 100/15 Summer | | | | 31.188 |
| 5.000 | 11 | 360 Winter | 100 | +40% | | | | | 31.300 |
| 5.001 | 12 | 15 Summer | 100 | +40% | | | | | 31.287 |
| 1.004 | 6 | 15 Summer | 100 | +40% | 30/15 Summer | | | | 31.333 |
| 1.005 | 7 | 15 Summer | 100 | +40% | 30/15 Summer | | | | 31.339 |
| 6.000 | 15 | 1440 Summer | 100 | +40% | | | | | 31.595 |
| 6.001 | 16 | 1440 Summer | 100 | +40% | | | | | 31.595 |
| 6.002 | 17 | 15 Summer | 100 | +40% | 100/15 Summer | | | | 31.632 |
| 1.006 | 8 | 15 Summer | 100 | +40% | 30/15 Summer | | | | 31.223 |
| 7.000 | 19 | 960 Winter | 100 | +40% | | | | | 30.670 |
| 7.001 | 20 | 960 Winter | 100 | +40% | | | | | 30.670 |
| 7.002 | 21 | 180 Summer | 100 | +40% | 100/120 Summer | | | | 30.687 |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | -0.084 | 0.000 | 0.00 | | 0.0 | OK | |
| 1.001 | 1 | -0.034 | 0.000 | 0.07 | | 1.0 | OK | |
| 2.000 | 3 | -0.086 | 0.000 | 0.00 | | 0.0 | OK | |
| 2.001 | 4 | -0.036 | 0.000 | 0.07 | | 1.0 | OK | |
| 1.002 | 2 | 0.013 | 0.000 | 0.39 | | 10.3 | SURCHARGED | |
| 3.000 | 6 | 0.315 | 0.000 | 0.22 | | 3.1 | SURCHARGED | |
| 3.001 | 7 | 0.364 | 0.000 | 0.03 | | 0.4 | SURCHARGED | |
| 4.000 | 8 | 0.114 | 0.000 | 0.16 | | 2.2 | SURCHARGED | |
| 4.001 | 9 | 0.163 | 0.000 | 0.02 | | 0.3 | SURCHARGED | |
| 1.003 | 5 | 0.288 | 0.000 | 0.60 | | 8.4 | SURCHARGED | |
| 5.000 | 11 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 5.001 | 12 | -0.113 | 0.000 | 0.02 | | 0.6 | OK | |
| 1.004 | 6 | 0.633 | 0.000 | 0.82 | | 11.5 | SURCHARGED | |
| 1.005 | 7 | 0.969 | 0.000 | 1.06 | | 14.6 | SURCHARGED | |
| 6.000 | 15 | -0.105 | 0.000 | 0.00 | | 0.0 | OK | |
| 6.001 | 16 | -0.055 | 0.000 | 0.15 | | 2.5 | OK | |
| 6.002 | 17 | 0.262 | 0.000 | 0.71 | | 27.0 | FLOOD RISK | |
| 1.006 | 8 | 1.003 | 0.000 | 2.32 | | 32.6 | SURCHARGED | |
| 7.000 | 19 | -0.080 | 0.000 | 0.00 | | 0.0 | OK | |
| 7.001 | 20 | -0.030 | 0.000 | 0.07 | | 1.4 | OK | |
| 7.002 | 21 | 0.012 | 0.000 | 0.60 | | 18.9 | SURCHARGED | |

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 7.003 | 22 | 180 Summer | 100 | +40% | | | | | 30.491 |
| 8.000 | 23 | 180 Winter | 100 | +40% | 100/15 Summer | | | | 30.669 |
| 8.001 | 24 | 180 Winter | 100 | +40% | 30/120 Summer | | | | 30.667 |
| 7.004 | 25 | 180 Summer | 100 | +40% | | | | | 30.366 |
| 9.000 | 26 | 180 Winter | 100 | +40% | 30/15 Summer | | | | 30.772 |
| 9.001 | 27 | 180 Winter | 100 | +40% | 30/15 Summer | | | | 30.770 |
| 7.005 | 28 | 180 Summer | 100 | +40% | | | | | 30.277 |
| 1.007 | 29 | 30 Summer | 100 | +40% | | | | | 30.024 |
| 1.008 | 30 | 30 Summer | 100 | +40% | | | | | 29.826 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 7.003 | 22 | -0.134 | 0.000 | 0.35 | | 18.9 | OK | |
| 8.000 | 23 | 0.109 | 0.000 | 0.29 | | 4.1 | SURCHARGED | |
| 8.001 | 24 | 0.157 | 0.000 | 0.04 | | 0.7 | SURCHARGED | |
| 7.004 | 25 | -0.109 | 0.000 | 0.52 | | 19.6 | OK | |
| 9.000 | 26 | 0.342 | 0.000 | 0.48 | | 6.7 | SURCHARGED | |
| 9.001 | 27 | 0.390 | 0.000 | 0.06 | | 0.9 | SURCHARGED | |
| 7.005 | 28 | -0.128 | 0.000 | 0.39 | | 20.4 | OK | |
| 1.007 | 29 | -0.051 | 0.000 | 0.95 | | 44.9 | OK | |
| 1.008 | 30 | -0.079 | 0.000 | 0.75 | | 44.9 | 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 | 10 |
| Number of Online Controls | 10 | 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 0.406 |
| Region | England and Wales | Cv (Summer) | 0.900 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.900 |

| | | | |
|---|---|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status | ON |
| Analysis Timestep | Fine | Inertia Status | ON |
| DTS 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) | 100 |
| Climate Change (%) | 0 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 2160 Summer | 100 | +0% | | | | | 31.079 |
| 1.001 | 1 | 1440 Summer | 100 | +0% | | | | | 31.079 |
| 2.000 | 3 | 720 Summer | 100 | +0% | | | | | 31.078 |
| 2.001 | 4 | 720 Summer | 100 | +0% | | | | | 31.078 |
| 1.002 | 2 | 240 Summer | 100 | +0% | | | | | 31.015 |
| 3.000 | 6 | 240 Winter | 100 | +0% | 100/30 Summer | | | | 31.158 |
| 3.001 | 7 | 240 Winter | 100 | +0% | 100/15 Summer | | | | 31.158 |
| 4.000 | 8 | 180 Winter | 100 | +0% | 100/120 Summer | | | | 31.065 |
| 4.001 | 9 | 180 Winter | 100 | +0% | 100/30 Summer | | | | 31.064 |
| 1.003 | 5 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 31.003 |
| 5.000 | 11 | 360 Winter | 100 | +0% | | | | | 31.300 |
| 5.001 | 12 | 360 Winter | 100 | +0% | | | | | 31.250 |
| 1.004 | 6 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 31.032 |
| 1.005 | 7 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 31.006 |
| 6.000 | 15 | 1440 Summer | 100 | +0% | | | | | 31.570 |
| 6.001 | 16 | 1440 Summer | 100 | +0% | | | | | 31.570 |
| 6.002 | 17 | 15 Summer | 100 | +0% | | | | | 31.306 |
| 1.006 | 8 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 30.916 |
| 7.000 | 19 | 1440 Summer | 100 | +0% | | | | | 30.632 |
| 7.001 | 20 | 1440 Summer | 100 | +0% | | | | | 30.632 |
| 7.002 | 21 | 180 Summer | 100 | +0% | | | | | 30.622 |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | -0.121 | 0.000 | 0.00 | | 0.0 | OK | |
| 1.001 | 1 | -0.071 | 0.000 | 0.06 | | 0.8 | OK | |
| 2.000 | 3 | -0.122 | 0.000 | 0.00 | | 0.0 | OK | |
| 2.001 | 4 | -0.072 | 0.000 | 0.05 | | 0.8 | OK | |
| 1.002 | 2 | -0.035 | 0.000 | 0.27 | | 7.0 | OK | |
| 3.000 | 6 | 0.158 | 0.000 | 0.16 | | 2.2 | SURCHARGED | |
| 3.001 | 7 | 0.208 | 0.000 | 0.02 | | 0.3 | SURCHARGED | |
| 4.000 | 8 | 0.015 | 0.000 | 0.11 | | 1.6 | SURCHARGED | |
| 4.001 | 9 | 0.064 | 0.000 | 0.02 | | 0.3 | SURCHARGED | |
| 1.003 | 5 | 0.103 | 0.000 | 0.38 | | 5.4 | SURCHARGED | |
| 5.000 | 11 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 5.001 | 12 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 1.004 | 6 | 0.332 | 0.000 | 0.73 | | 10.2 | SURCHARGED | |
| 1.005 | 7 | 0.636 | 0.000 | 1.04 | | 14.3 | SURCHARGED | |
| 6.000 | 15 | -0.130 | 0.000 | 0.00 | | 0.0 | OK | |
| 6.001 | 16 | -0.080 | 0.000 | 0.09 | | 1.6 | OK | |
| 6.002 | 17 | -0.064 | 0.000 | 0.62 | | 23.7 | OK | |
| 1.006 | 8 | 0.696 | 0.000 | 2.01 | | 28.2 | SURCHARGED | |
| 7.000 | 19 | -0.118 | 0.000 | 0.00 | | 0.0 | OK | |
| 7.001 | 20 | -0.068 | 0.000 | 0.05 | | 1.1 | OK | |
| 7.002 | 21 | -0.053 | 0.000 | 0.41 | | 13.0 | OK | |

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 7.003 | 22 | 180 Summer | 100 | +0% | | | | | 30.474 |
| 8.000 | 23 | 180 Summer | 100 | +0% | 100/120 Summer | | | | 30.573 |
| 8.001 | 24 | 180 Summer | 100 | +0% | 100/30 Summer | | | | 30.572 |
| 7.004 | 25 | 180 Summer | 100 | +0% | | | | | 30.344 |
| 9.000 | 26 | 180 Winter | 100 | +0% | 100/15 Summer | | | | 30.607 |
| 9.001 | 27 | 180 Winter | 100 | +0% | 100/15 Summer | | | | 30.605 |
| 7.005 | 28 | 180 Summer | 100 | +0% | | | | | 30.260 |
| 1.007 | 29 | 30 Summer | 100 | +0% | | | | | 29.994 |
| 1.008 | 30 | 30 Summer | 100 | +0% | | | | | 29.803 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 7.003 | 22 | -0.151 | 0.000 | 0.24 | | 13.0 | OK | |
| 8.000 | 23 | 0.013 | 0.000 | 0.31 | | 4.4 | SURCHARGED | |
| 8.001 | 24 | 0.062 | 0.000 | 0.04 | | 0.6 | SURCHARGED | |
| 7.004 | 25 | -0.131 | 0.000 | 0.36 | | 13.6 | OK | |
| 9.000 | 26 | 0.177 | 0.000 | 0.34 | | 4.8 | SURCHARGED | |
| 9.001 | 27 | 0.225 | 0.000 | 0.05 | | 0.7 | SURCHARGED | |
| 7.005 | 28 | -0.145 | 0.000 | 0.27 | | 14.3 | OK | |
| 1.007 | 29 | -0.081 | 0.000 | 0.73 | | 34.6 | OK | |
| 1.008 | 30 | -0.102 | 0.000 | 0.58 | | 34.6 | OK | |

## 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) | 2 | Add Flow / Climate Change (%) | 0 |
| M5-60 (mm) | 20.100 | Minimum Backdrop Height (m) | 0.200 |
| Ratio R | 0.406 | Maximum Backdrop Height (m) | 1.500 |
| Maximum Rainfall (mm/hr) | 500 | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30 | Min Vel for Auto Design only (m/s) | 1.00 |
| Foul Sewage (l/s/ha) | 0.000 | Min Slope for Optimisation (1:X) | 500 |
| Volumetric Runoff Coeff. | 0.900 | | |

Designed with Level Soffits

### Network Design Table for Storm

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 32.850 | 0.320 | 102.7 | 0.034 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.001 | 40.400 | 0.380 | 106.3 | 0.049 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.002 | 10.600 | 0.100 | 106.0 | 0.033 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 2.000 | 20.000 | 0.200 | 100.0 | 0.038 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 2.001 | 10.500 | 0.500 | 21.0 | 0.038 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 3.000 | 30.700 | 0.205 | 149.8 | 0.200 | 5.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | |
| 1.003 | 5.000 | 0.030 | 166.7 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.004 | 15.000 | 0.090 | 166.7 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.005 | 8.400 | 0.050 | 168.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 67.99 | 5.55 | 30.700 | 0.034 | 0.0 | 0.0 | 0.0 | 0.99 | 17.5 | 7.5 |
| 1.001 | 65.23 | 6.08 | 30.380 | 0.083 | 0.0 | 0.0 | 0.0 | 1.27 | 50.4 | 17.6 |
| 1.002 | 64.55 | 6.22 | 30.000 | 0.116 | 0.0 | 0.0 | 0.0 | 1.27 | 50.5 | 24.3 |
| 2.000 | 69.21 | 5.33 | 30.600 | 0.038 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 8.5 |
| 2.001 | 68.87 | 5.39 | 30.400 | 0.076 | 0.0 | 0.0 | 0.0 | 2.87 | 114.0 | 17.0 |
| 3.000 | 68.83 | 5.40 | 30.105 | 0.200 | 0.0 | 0.0 | 0.0 | 1.28 | 90.7 | 44.7 |
| 1.003 | 64.15 | 6.30 | 29.900 | 0.392 | 0.0 | 0.0 | 0.0 | 1.01 | 40.2« | 81.7 |
| 1.004 | 63.00 | 6.55 | 29.880 | 0.392 | 0.0 | 0.0 | 0.0 | 1.01 | 40.2« | 81.7 |
| 1.005 | 62.37 | 6.69 | 29.790 | 0.392 | 0.0 | 0.0 | 0.0 | 1.01 | 40.0« | 81.7 |

## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.006 | 21.000 | 0.140 | 150.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 4.000 | 5.000 | 0.050 | 100.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 4.001 | 39.600 | 0.790 | 50.1 | 0.104 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.007 | 10.800 | 0.110 | 98.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.006 | 60.95 | 7.02 | 29.750 | 0.392 | 0.0 | 0.0 | 0.0 | 1.07 | 42.4« | 81.7 |
| 4.000 | 70.66 | 5.08 | 30.450 | 0.000 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 0.0 |
| 4.001 | 68.02 | 5.55 | 30.400 | 0.104 | 0.0 | 0.0 | 0.0 | 1.42 | 25.2 | 23.0 |
| 1.007 | 60.38 | 7.16 | 29.610 | 0.496 | 0.0 | 0.0 | 0.0 | 1.32 | 52.5« | 97.3 |

## Simulation Criteria for Storm

| | | | |
|---|---|---|---|
| Volumetric Runoff Coeff | 0.900 | 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

## Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 2 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.100 | Storm Duration (mins) | 30 |
| Ratio R | 0.406 | | |

## Online Controls for Storm

### Orifice Manhole: 9, DS/PN: 4.001, Volume (m³): 0.9

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 30.400

### Hydro-Brake Optimum® Manhole: 10, DS/PN: 1.007, Volume (m³): 3.2

| | |
|---|---|
| Unit Reference | MD-SHE-0171-1500-1300-1500 |
| Design Head (m) | 1.300 |
| Design Flow (l/s) | 15.0 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 171 |
| Invert Level (m) | 29.610 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1500 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---|---|---|---|---|---|
| Design Point (Calculated) | 1.300 | 15.0 | Kick-Flo® | 0.854 | 12.3 |
| Flush-Flo™ | 0.388 | 15.0 | Mean Flow over Head Range | - | 12.9 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 6.1 | 1.200 | 14.4 | 3.000 | 22.3 | 7.000 | 33.6 |
| 0.200 | 13.9 | 1.400 | 15.5 | 3.500 | 24.0 | 7.500 | 34.7 |
| 0.300 | 14.8 | 1.600 | 16.5 | 4.000 | 25.6 | 8.000 | 35.8 |
| 0.400 | 15.0 | 1.800 | 17.5 | 4.500 | 27.1 | 8.500 | 36.9 |
| 0.500 | 14.8 | 2.000 | 18.4 | 5.000 | 28.5 | 9.000 | 37.9 |
| 0.600 | 14.6 | 2.200 | 19.3 | 5.500 | 29.9 | 9.500 | 38.9 |
| 0.800 | 13.2 | 2.400 | 20.1 | 6.000 | 31.2 | | |
| 1.000 | 13.2 | 2.600 | 20.9 | 6.500 | 32.4 | | |

## Storage Structures for Storm

### Cellular Storage Manhole: 5, DS/PN: 1.003

Invert Level (m) 29.900 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 400.0 | 0.0 | 0.401 | 0.0 | 0.0 |
| 0.400 | 400.0 | 0.0 | | | |

### Cellular Storage Manhole: 9, DS/PN: 4.001

Invert Level (m) 30.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 780.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 780.0 | 0.0 | | | |

## 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.406 |
| Region | England and Wales | Cv (Summer) | 0.920 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.920 |

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 30.760 |
| 1.001 | 1 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 30.457 |
| 1.002 | 2 | 15 Summer | 1 | +0% | 30/15 Summer | | | | 30.097 |
| 2.000 | 4 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 30.664 |
| 2.001 | 4 | 15 Summer | 1 | +0% | 100/60 Summer | | | | 30.452 |
| 3.000 | 6 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 30.237 |
| 1.003 | 5 | 120 Summer | 1 | +0% | 100/15 Summer | | | | 29.991 |
| 1.004 | 6 | 120 Summer | 1 | +0% | 100/15 Summer | | | | 29.962 |
| 1.005 | 7 | 120 Summer | 1 | +0% | 30/15 Summer | | | | 29.877 |
| 1.006 | 8 | 120 Summer | 1 | +0% | 30/15 Summer | | | | 29.828 |
| 4.000 | 11 | 360 Winter | 1 | +0% | | | | | 30.450 |
| 4.001 | 9 | 2880 Summer | 1 | +0% | | | | | 30.432 |
| 1.007 | 10 | 120 Summer | 1 | +0% | 30/15 Summer | | | | 29.750 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | -0.090 | 0.000 | 0.33 | | 5.5 | OK | |
| 1.001 | 1 | -0.148 | 0.000 | 0.25 | | 12.1 | OK | |
| 1.002 | 2 | -0.128 | 0.000 | 0.39 | | 16.4 | OK | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 2.000 | 4 | -0.086 | 0.000 | 0.37 | | 6.2 | OK | |
| 2.001 | 4 | -0.173 | 0.000 | 0.12 | | 11.3 | OK | |
| 3.000 | 6 | -0.168 | 0.000 | 0.40 | | 32.6 | OK | |
| 1.003 | 5 | -0.134 | 0.000 | 0.35 | | 10.1 | OK | |
| 1.004 | 6 | -0.143 | 0.000 | 0.29 | | 10.1 | OK | |
| 1.005 | 7 | -0.138 | 0.000 | 0.32 | | 10.1 | OK | |
| 1.006 | 8 | -0.147 | 0.000 | 0.26 | | 10.1 | OK | |
| 4.000 | 11 | -0.150 | 0.000 | 0.00 | | 0.0 | OK | |
| 4.001 | 9 | -0.118 | 0.000 | 0.01 | | 0.2 | OK | |
| 1.007 | 10 | -0.085 | 0.000 | 0.23 | | 10.2 | OK | |

## 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.406 |
| Region | England and Wales | Cv (Summer) | 0.920 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.920 |

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 30.804 |
| 1.001 | 1 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 30.525 |
| 1.002 | 2 | 15 Summer | 30 | +0% | 30/15 Summer | | | | 30.246 |
| 2.000 | 4 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 30.713 |
| 2.001 | 4 | 15 Summer | 30 | +0% | 100/60 Summer | | | | 30.491 |
| 3.000 | 6 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 30.343 |
| 1.003 | 5 | 120 Summer | 30 | +0% | 100/15 Summer | | | | 30.111 |
| 1.004 | 6 | 120 Summer | 30 | +0% | 100/15 Summer | | | | 30.096 |
| 1.005 | 7 | 180 Summer | 30 | +0% | 30/15 Summer | | | | 30.064 |
| 1.006 | 8 | 360 Summer | 30 | +0% | 30/15 Summer | | | | 30.051 |
| 4.000 | 11 | 1440 Summer | 30 | +0% | | | | | 30.461 |
| 4.001 | 9 | 1440 Summer | 30 | +0% | | | | | 30.460 |
| 1.007 | 10 | 180 Summer | 30 | +0% | 30/15 Summer | | | | 30.023 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | -0.046 | 0.000 | 0.80 | | 13.5 | OK | |
| 1.001 | 1 | -0.080 | 0.000 | 0.71 | | 33.9 | OK | |
| 1.002 | 2 | 0.021 | 0.000 | 1.12 | | 47.6 | SURCHARGED | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 2.000 | 4 | -0.037 | 0.000 | 0.91 | | 15.1 | OK | |
| 2.001 | 4 | -0.134 | 0.000 | 0.34 | | 32.1 | OK | |
| 3.000 | 6 | -0.062 | 0.000 | 0.97 | | 79.7 | OK | |
| 1.003 | 5 | -0.014 | 0.000 | 0.69 | | 20.2 | OK | |
| 1.004 | 6 | -0.009 | 0.000 | 0.57 | | 20.3 | OK | |
| 1.005 | 7 | 0.049 | 0.000 | 0.57 | | 17.9 | SURCHARGED | |
| 1.006 | 8 | 0.076 | 0.000 | 0.40 | | 15.4 | SURCHARGED | |
| 4.000 | 11 | -0.139 | 0.000 | 0.00 | | 0.0 | OK | |
| 4.001 | 9 | -0.090 | 0.000 | 0.02 | | 0.4 | OK | |
| 1.007 | 10 | 0.188 | 0.000 | 0.34 | | 15.0 | SURCHARGED | |

## 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.406 |
| Region | England and Wales | Cv (Summer) | 0.920 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.920 |

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 15 Summer | 100 | +40% | 100/15 Summer | | | | 31.383 |
| 1.001 | 1 | 120 Summer | 100 | +40% | 100/15 Summer | | | | 30.974 |
| 1.002 | 2 | 120 Summer | 100 | +40% | 30/15 Summer | | | | 30.964 |
| 2.000 | 4 | 15 Summer | 100 | +40% | 100/15 Summer | | | | 31.040 |
| 2.001 | 4 | 120 Summer | 100 | +40% | 100/60 Summer | | | | 30.958 |
| 3.000 | 6 | 120 Summer | 100 | +40% | 100/15 Summer | | | | 30.969 |
| 1.003 | 5 | 120 Summer | 100 | +40% | 100/15 Summer | | | | 30.961 |
| 1.004 | 6 | 120 Summer | 100 | +40% | 100/15 Summer | | | | 30.926 |
| 1.005 | 7 | 120 Summer | 100 | +40% | 30/15 Summer | | | | 30.885 |
| 1.006 | 8 | 120 Summer | 100 | +40% | 30/15 Summer | | | | 30.869 |
| 4.000 | 11 | 960 Winter | 100 | +40% | | | | | 30.510 |
| 4.001 | 9 | 960 Winter | 100 | +40% | | | | | 30.510 |
| 1.007 | 10 | 120 Summer | 100 | +40% | 30/15 Summer | | | | 30.835 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 0.533 | 0.000 | 1.32 | | 22.3 | FLOOD RISK | |
| 1.001 | 1 | 0.369 | 0.000 | 0.53 | | 25.5 | SURCHARGED | |
| 1.002 | 2 | 0.739 | 0.000 | 0.79 | | 33.6 | SURCHARGED | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 2.000 | 4 | 0.290 | 0.000 | 1.55 | | 25.8 | FLOOD RISK | |
| 2.001 | 4 | 0.333 | 0.000 | 0.25 | | 23.5 | SURCHARGED | |
| 3.000 | 6 | 0.564 | 0.000 | 0.74 | | 61.4 | FLOOD RISK | |
| 1.003 | 5 | 0.836 | 0.000 | 0.66 | | 19.3 | SURCHARGED | |
| 1.004 | 6 | 0.821 | 0.000 | 0.55 | | 19.5 | FLOOD RISK | |
| 1.005 | 7 | 0.870 | 0.000 | 0.57 | | 17.8 | FLOOD RISK | |
| 1.006 | 8 | 0.894 | 0.000 | 0.44 | | 17.0 | FLOOD RISK | |
| 4.000 | 11 | -0.090 | 0.000 | 0.00 | | 0.0 | OK | |
| 4.001 | 9 | -0.040 | 0.000 | 0.03 | | 0.7 | OK | |
| 1.007 | 10 | 1.000 | 0.000 | 0.34 | | 15.0 | SURCHARGED | |

## 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.406 |
| Region | England and Wales | Cv (Summer) | 0.920 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.920 |

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS 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) | 100 |
| Climate Change (%) | 0 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 30.913 |
| 1.001 | 1 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 30.610 |
| 1.002 | 2 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 30.316 |
| 2.000 | 4 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 30.807 |
| 2.001 | 4 | 15 Summer | 100 | +0% | | | | | 30.503 |
| 3.000 | 6 | 15 Summer | 100 | +0% | 100/15 Summer | | | | 30.515 |
| 1.003 | 5 | 120 Summer | 100 | +0% | 100/30 Summer | | | | 30.192 |
| 1.004 | 6 | 120 Summer | 100 | +0% | 100/30 Summer | | | | 30.184 |
| 1.005 | 7 | 120 Summer | 100 | +0% | 100/15 Summer | | | | 30.164 |
| 1.006 | 8 | 480 Summer | 100 | +0% | 100/15 Summer | | | | 30.154 |
| 4.000 | 11 | 960 Summer | 100 | +0% | | | | | 30.477 |
| 4.001 | 9 | 960 Summer | 100 | +0% | | | | | 30.477 |
| 1.007 | 10 | 480 Summer | 100 | +0% | 100/15 Summer | | | | 30.142 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 0.063 | 0.000 | 1.01 | | 17.0 | SURCHARGED | |
| 1.001 | 1 | 0.005 | 0.000 | 0.87 | | 41.6 | SURCHARGED | |
| 1.002 | 2 | 0.091 | 0.000 | 1.40 | | 59.2 | SURCHARGED | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 2.000 | 4 | 0.057 | 0.000 | 1.14 | | 19.1 | SURCHARGED | |
| 2.001 | 4 | -0.122 | 0.000 | 0.42 | | 40.0 | OK | |
| 3.000 | 6 | 0.110 | 0.000 | 1.25 | | 102.8 | SURCHARGED | |
| 1.003 | 5 | 0.067 | 0.000 | 0.70 | | 20.5 | SURCHARGED | |
| 1.004 | 6 | 0.079 | 0.000 | 0.58 | | 20.5 | SURCHARGED | |
| 1.005 | 7 | 0.149 | 0.000 | 0.59 | | 18.6 | SURCHARGED | |
| 1.006 | 8 | 0.179 | 0.000 | 0.40 | | 15.6 | SURCHARGED | |
| 4.000 | 11 | -0.123 | 0.000 | 0.00 | | 0.0 | OK | |
| 4.001 | 9 | -0.073 | 0.000 | 0.02 | | 0.5 | OK | |
| 1.007 | 10 | 0.307 | 0.000 | 0.34 | | 14.9 | SURCHARGED | |

## Summary of Results for 1 year Return Period

Half Drain Time : 1002 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.616 | 0.016 | 0.0 | 0.1 | 0.1 | 14.0 | O K |
| 30 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 18.2 | O K |
| 60 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 22.8 | O K |
| 120 min Summer | 99.632 | 0.032 | 0.0 | 0.3 | 0.3 | 27.8 | O K |
| 180 min Summer | 99.636 | 0.036 | 0.0 | 0.3 | 0.3 | 30.8 | O K |
| 240 min Summer | 99.638 | 0.038 | 0.0 | 0.3 | 0.3 | 32.9 | O K |
| 360 min Summer | 99.641 | 0.041 | 0.0 | 0.4 | 0.4 | 35.3 | O K |
| 480 min Summer | 99.643 | 0.043 | 0.0 | 0.4 | 0.4 | 36.7 | O K |
| 600 min Summer | 99.644 | 0.044 | 0.0 | 0.4 | 0.4 | 37.5 | O K |
| 720 min Summer | 99.645 | 0.045 | 0.0 | 0.4 | 0.4 | 38.1 | O K |
| 960 min Summer | 99.646 | 0.046 | 0.0 | 0.5 | 0.5 | 39.1 | O K |
| 1440 min Summer | 99.647 | 0.047 | 0.0 | 0.5 | 0.5 | 40.5 | O K |
| 2160 min Summer | 99.648 | 0.048 | 0.0 | 0.5 | 0.5 | 41.2 | O K |
| 2880 min Summer | 99.648 | 0.048 | 0.0 | 0.5 | 0.5 | 41.2 | O K |
| 4320 min Summer | 99.647 | 0.047 | 0.0 | 0.5 | 0.5 | 40.3 | O K |
| 5760 min Summer | 99.646 | 0.046 | 0.0 | 0.5 | 0.5 | 39.1 | O K |
| 7200 min Summer | 99.644 | 0.044 | 0.0 | 0.4 | 0.4 | 37.8 | O K |
| 8640 min Summer | 99.643 | 0.043 | 0.0 | 0.4 | 0.4 | 36.5 | O K |
| 10080 min Summer | 99.641 | 0.041 | 0.0 | 0.4 | 0.4 | 35.4 | O K |
| 15 min Winter | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 15.6 | O K |
| 30 min Winter | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 20.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 32.769 | 0.0 | 4.4 | 19 |
| 30 min Summer | 21.394 | 0.0 | 6.7 | 34 |
| 60 min Summer | 13.524 | 0.0 | 13.8 | 64 |
| 120 min Summer | 8.376 | 0.0 | 18.4 | 124 |
| 180 min Summer | 6.298 | 0.0 | 21.4 | 182 |
| 240 min Summer | 5.136 | 0.0 | 23.8 | 242 |
| 360 min Summer | 3.818 | 0.0 | 27.1 | 362 |
| 480 min Summer | 3.092 | 0.0 | 29.7 | 480 |
| 600 min Summer | 2.625 | 0.0 | 31.7 | 572 |
| 720 min Summer | 2.297 | 0.0 | 33.4 | 612 |
| 960 min Summer | 1.860 | 0.0 | 36.1 | 724 |
| 1440 min Summer | 1.382 | 0.0 | 39.6 | 982 |
| 2160 min Summer | 1.027 | 0.0 | 54.2 | 1384 |
| 2880 min Summer | 0.831 | 0.0 | 58.1 | 1788 |
| 4320 min Summer | 0.617 | 0.0 | 62.6 | 2592 |
| 5760 min Summer | 0.500 | 0.0 | 76.6 | 3344 |
| 7200 min Summer | 0.425 | 0.0 | 80.8 | 4112 |
| 8640 min Summer | 0.372 | 0.0 | 83.8 | 4848 |
| 10080 min Summer | 0.332 | 0.0 | 85.7 | 5640 |
| 15 min Winter | 32.769 | 0.0 | 5.3 | 19 |
| 30 min Winter | 21.394 | 0.0 | 8.0 | 34 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.630 | 0.030 | 0.0 | 0.2 | 0.2 | 25.5 | O K |
| 120 min Winter | 99.636 | 0.036 | 0.0 | 0.3 | 0.3 | 31.1 | O K |
| 180 min Winter | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 34.5 | O K |
| 240 min Winter | 99.643 | 0.043 | 0.0 | 0.4 | 0.4 | 36.8 | O K |
| 360 min Winter | 99.646 | 0.046 | 0.0 | 0.5 | 0.5 | 39.5 | O K |
| 480 min Winter | 99.648 | 0.048 | 0.0 | 0.5 | 0.5 | 41.0 | O K |
| 600 min Winter | 99.649 | 0.049 | 0.0 | 0.5 | 0.5 | 41.9 | O K |
| 720 min Winter | 99.650 | 0.050 | 0.0 | 0.5 | 0.5 | 42.4 | O K |
| 960 min Winter | 99.651 | 0.051 | 0.0 | 0.5 | 0.5 | 43.4 | O K |
| 1440 min Winter | 99.652 | 0.052 | 0.0 | 0.6 | 0.6 | 44.4 | O K |
| 2160 min Winter | 99.652 | 0.052 | 0.0 | 0.6 | 0.6 | 44.2 | O K |
| 2880 min Winter | 99.651 | 0.051 | 0.0 | 0.5 | 0.5 | 43.4 | O K |
| 4320 min Winter | 99.648 | 0.048 | 0.0 | 0.5 | 0.5 | 41.2 | O K |
| 5760 min Winter | 99.646 | 0.046 | 0.0 | 0.5 | 0.5 | 39.0 | O K |
| 7200 min Winter | 99.643 | 0.043 | 0.0 | 0.4 | 0.4 | 37.0 | O K |
| 8640 min Winter | 99.641 | 0.041 | 0.0 | 0.4 | 0.4 | 35.3 | O K |
| 10080 min Winter | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 33.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 13.524 | 0.0 | 16.1 | 64 |
| 120 min Winter | 8.376 | 0.0 | 21.3 | 122 |
| 180 min Winter | 6.298 | 0.0 | 24.8 | 180 |
| 240 min Winter | 5.136 | 0.0 | 27.5 | 238 |
| 360 min Winter | 3.818 | 0.0 | 31.3 | 352 |
| 480 min Winter | 3.092 | 0.0 | 34.2 | 462 |
| 600 min Winter | 2.625 | 0.0 | 36.5 | 566 |
| 720 min Winter | 2.297 | 0.0 | 38.4 | 658 |
| 960 min Winter | 1.860 | 0.0 | 41.5 | 742 |
| 1440 min Winter | 1.382 | 0.0 | 45.5 | 1040 |
| 2160 min Winter | 1.027 | 0.0 | 61.5 | 1488 |
| 2880 min Winter | 0.831 | 0.0 | 65.9 | 1904 |
| 4320 min Winter | 0.617 | 0.0 | 71.2 | 2724 |
| 5760 min Winter | 0.500 | 0.0 | 86.4 | 3520 |
| 7200 min Winter | 0.425 | 0.0 | 91.1 | 4320 |
| 8640 min Winter | 0.372 | 0.0 | 94.6 | 5096 |
| 10080 min Winter | 0.332 | 0.0 | 96.9 | 5848 |

## 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) | 21.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.228

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.228 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 900.0 | 0.0 | 0.201 | 0.0 | 0.0 |
| 0.200 | 900.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.048 Discharge Coefficient 0.500 Invert Level (m) 99.600

## Summary of Results for 30 year Return Period

Half Drain Time : 884 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 34.2 | O K |
| 30 min Summer | 99.652 | 0.052 | 0.0 | 0.6 | 0.6 | 44.2 | O K |
| 60 min Summer | 99.663 | 0.063 | 0.0 | 0.8 | 0.8 | 54.1 | O K |
| 120 min Summer | 99.674 | 0.074 | 0.0 | 0.9 | 0.9 | 63.5 | O K |
| 180 min Summer | 99.680 | 0.080 | 0.0 | 0.9 | 0.9 | 68.3 | O K |
| 240 min Summer | 99.683 | 0.083 | 0.0 | 1.0 | 1.0 | 71.2 | O K |
| 360 min Summer | 99.687 | 0.087 | 0.0 | 1.0 | 1.0 | 74.6 | O K |
| 480 min Summer | 99.689 | 0.089 | 0.0 | 1.0 | 1.0 | 76.1 | O K |
| 600 min Summer | 99.690 | 0.090 | 0.0 | 1.0 | 1.0 | 76.8 | O K |
| 720 min Summer | 99.691 | 0.091 | 0.0 | 1.0 | 1.0 | 77.4 | O K |
| 960 min Summer | 99.691 | 0.091 | 0.0 | 1.0 | 1.0 | 78.2 | O K |
| 1440 min Summer | 99.692 | 0.092 | 0.0 | 1.0 | 1.0 | 78.4 | O K |
| 2160 min Summer | 99.690 | 0.090 | 0.0 | 1.0 | 1.0 | 77.0 | O K |
| 2880 min Summer | 99.687 | 0.087 | 0.0 | 1.0 | 1.0 | 74.7 | O K |
| 4320 min Summer | 99.681 | 0.081 | 0.0 | 1.0 | 1.0 | 69.4 | O K |
| 5760 min Summer | 99.675 | 0.075 | 0.0 | 0.9 | 0.9 | 64.5 | O K |
| 7200 min Summer | 99.670 | 0.070 | 0.0 | 0.9 | 0.9 | 60.2 | O K |
| 8640 min Summer | 99.667 | 0.067 | 0.0 | 0.8 | 0.8 | 56.9 | O K |
| 10080 min Summer | 99.663 | 0.063 | 0.0 | 0.8 | 0.8 | 54.1 | O K |
| 15 min Winter | 99.645 | 0.045 | 0.0 | 0.4 | 0.4 | 38.3 | O K |
| 30 min Winter | 99.658 | 0.058 | 0.0 | 0.7 | 0.7 | 49.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 80.466 | 0.0 | 17.7 | 19 |
| 30 min Summer | 52.218 | 0.0 | 25.3 | 34 |
| 60 min Summer | 32.372 | 0.0 | 42.4 | 64 |
| 120 min Summer | 19.460 | 0.0 | 52.6 | 122 |
| 180 min Summer | 14.290 | 0.0 | 58.7 | 182 |
| 240 min Summer | 11.432 | 0.0 | 63.0 | 242 |
| 360 min Summer | 8.348 | 0.0 | 69.5 | 360 |
| 480 min Summer | 6.671 | 0.0 | 74.2 | 478 |
| 600 min Summer | 5.602 | 0.0 | 77.9 | 524 |
| 720 min Summer | 4.856 | 0.0 | 81.0 | 584 |
| 960 min Summer | 3.873 | 0.0 | 85.6 | 704 |
| 1440 min Summer | 2.813 | 0.0 | 91.0 | 970 |
| 2160 min Summer | 2.040 | 0.0 | 115.0 | 1384 |
| 2880 min Summer | 1.624 | 0.0 | 121.2 | 1788 |
| 4320 min Summer | 1.176 | 0.0 | 128.2 | 2556 |
| 5760 min Summer | 0.934 | 0.0 | 147.4 | 3336 |
| 7200 min Summer | 0.782 | 0.0 | 153.3 | 4040 |
| 8640 min Summer | 0.675 | 0.0 | 157.6 | 4760 |
| 10080 min Summer | 0.597 | 0.0 | 159.9 | 5544 |
| 15 min Winter | 80.466 | 0.0 | 20.7 | 19 |
| 30 min Winter | 52.218 | 0.0 | 29.4 | 33 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.671 | 0.071 | 0.0 | 0.9 | 0.9 | 60.5 | O K |
| 120 min Winter | 99.683 | 0.083 | 0.0 | 1.0 | 1.0 | 71.2 | O K |
| 180 min Winter | 99.690 | 0.090 | 0.0 | 1.0 | 1.0 | 76.7 | O K |
| 240 min Winter | 99.694 | 0.094 | 0.0 | 1.1 | 1.1 | 80.1 | O K |
| 360 min Winter | 99.698 | 0.098 | 0.0 | 1.1 | 1.1 | 84.2 | O K |
| 480 min Winter | 99.701 | 0.101 | 0.0 | 1.1 | 1.1 | 86.1 | Flood Risk |
| 600 min Winter | 99.702 | 0.102 | 0.0 | 1.1 | 1.1 | 86.9 | Flood Risk |
| 720 min Winter | 99.702 | 0.102 | 0.0 | 1.1 | 1.1 | 87.0 | Flood Risk |
| 960 min Winter | 99.702 | 0.102 | 0.0 | 1.1 | 1.1 | 87.4 | Flood Risk |
| 1440 min Winter | 99.701 | 0.101 | 0.0 | 1.1 | 1.1 | 86.4 | Flood Risk |
| 2160 min Winter | 99.697 | 0.097 | 0.0 | 1.1 | 1.1 | 82.8 | O K |
| 2880 min Winter | 99.692 | 0.092 | 0.0 | 1.0 | 1.0 | 78.5 | O K |
| 4320 min Winter | 99.682 | 0.082 | 0.0 | 1.0 | 1.0 | 70.0 | O K |
| 5760 min Winter | 99.674 | 0.074 | 0.0 | 0.9 | 0.9 | 62.9 | O K |
| 7200 min Winter | 99.667 | 0.067 | 0.0 | 0.8 | 0.8 | 57.6 | O K |
| 8640 min Winter | 99.663 | 0.063 | 0.0 | 0.7 | 0.7 | 53.7 | O K |
| 10080 min Winter | 99.659 | 0.059 | 0.0 | 0.7 | 0.7 | 50.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 32.372 | 0.0 | 48.5 | 62 |
| 120 min Winter | 19.460 | 0.0 | 60.0 | 120 |
| 180 min Winter | 14.290 | 0.0 | 66.8 | 180 |
| 240 min Winter | 11.432 | 0.0 | 71.6 | 236 |
| 360 min Winter | 8.348 | 0.0 | 78.9 | 350 |
| 480 min Winter | 6.671 | 0.0 | 84.2 | 462 |
| 600 min Winter | 5.602 | 0.0 | 88.4 | 566 |
| 720 min Winter | 4.856 | 0.0 | 91.8 | 658 |
| 960 min Winter | 3.873 | 0.0 | 96.8 | 742 |
| 1440 min Winter | 2.813 | 0.0 | 102.7 | 1052 |
| 2160 min Winter | 2.040 | 0.0 | 129.6 | 1492 |
| 2880 min Winter | 1.624 | 0.0 | 136.7 | 1908 |
| 4320 min Winter | 1.176 | 0.0 | 144.8 | 2724 |
| 5760 min Winter | 0.934 | 0.0 | 165.7 | 3464 |
| 7200 min Winter | 0.782 | 0.0 | 172.5 | 4184 |
| 8640 min Winter | 0.675 | 0.0 | 177.4 | 4936 |
| 10080 min Winter | 0.597 | 0.0 | 180.3 | 5712 |

## 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) | 21.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.228

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.228 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 900.0 | 0.0 | 0.201 | 0.0 | 0.0 |
| 0.200 | 900.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.048 Discharge Coefficient 0.500 Invert Level (m) 99.600

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

Half Drain Time : 1003 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.673 | 0.073 | 0.0 | 0.9 | 0.9 | 62.2 | O K |
| 30 min Summer | 99.695 | 0.095 | 0.0 | 1.1 | 1.1 | 80.9 | O K |
| 60 min Summer | 99.716 | 0.116 | 0.0 | 1.2 | 1.2 | 99.6 | Flood Risk |
| 120 min Summer | 99.737 | 0.137 | 0.0 | 1.3 | 1.3 | 117.1 | Flood Risk |
| 180 min Summer | 99.747 | 0.147 | 0.0 | 1.4 | 1.4 | 126.0 | Flood Risk |
| 240 min Summer | 99.754 | 0.154 | 0.0 | 1.4 | 1.4 | 131.3 | Flood Risk |
| 360 min Summer | 99.761 | 0.161 | 0.0 | 1.5 | 1.5 | 137.7 | Flood Risk |
| 480 min Summer | 99.765 | 0.165 | 0.0 | 1.5 | 1.5 | 140.8 | Flood Risk |
| 600 min Summer | 99.766 | 0.166 | 0.0 | 1.5 | 1.5 | 142.0 | Flood Risk |
| 720 min Summer | 99.766 | 0.166 | 0.0 | 1.5 | 1.5 | 142.2 | Flood Risk |
| 960 min Summer | 99.767 | 0.167 | 0.0 | 1.5 | 1.5 | 142.5 | Flood Risk |
| 1440 min Summer | 99.766 | 0.166 | 0.0 | 1.5 | 1.5 | 141.7 | Flood Risk |
| 2160 min Summer | 99.762 | 0.162 | 0.0 | 1.5 | 1.5 | 138.1 | Flood Risk |
| 2880 min Summer | 99.756 | 0.156 | 0.0 | 1.5 | 1.5 | 133.2 | Flood Risk |
| 4320 min Summer | 99.743 | 0.143 | 0.0 | 1.4 | 1.4 | 122.6 | Flood Risk |
| 5760 min Summer | 99.731 | 0.131 | 0.0 | 1.3 | 1.3 | 112.4 | Flood Risk |
| 7200 min Summer | 99.721 | 0.121 | 0.0 | 1.2 | 1.2 | 103.5 | Flood Risk |
| 8640 min Summer | 99.712 | 0.112 | 0.0 | 1.2 | 1.2 | 95.6 | Flood Risk |
| 10080 min Summer | 99.704 | 0.104 | 0.0 | 1.1 | 1.1 | 88.9 | Flood Risk |
| 15 min Winter | 99.681 | 0.081 | 0.0 | 1.0 | 1.0 | 69.6 | O K |
| 30 min Winter | 99.706 | 0.106 | 0.0 | 1.1 | 1.1 | 90.6 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 146.491 | 0.0 | 39.2 | 19 |
| 30 min Summer | 95.823 | 0.0 | 53.6 | 34 |
| 60 min Summer | 59.609 | 0.0 | 85.3 | 64 |
| 120 min Summer | 35.761 | 0.0 | 103.8 | 124 |
| 180 min Summer | 26.143 | 0.0 | 114.3 | 182 |
| 240 min Summer | 20.816 | 0.0 | 121.4 | 242 |
| 360 min Summer | 15.119 | 0.0 | 132.1 | 362 |
| 480 min Summer | 12.032 | 0.0 | 139.5 | 480 |
| 600 min Summer | 10.072 | 0.0 | 145.2 | 600 |
| 720 min Summer | 8.705 | 0.0 | 149.7 | 656 |
| 960 min Summer | 6.911 | 0.0 | 156.1 | 762 |
| 1440 min Summer | 4.985 | 0.0 | 162.1 | 1022 |
| 2160 min Summer | 3.589 | 0.0 | 207.5 | 1428 |
| 2880 min Summer | 2.840 | 0.0 | 217.5 | 1844 |
| 4320 min Summer | 2.040 | 0.0 | 228.4 | 2636 |
| 5760 min Summer | 1.611 | 0.0 | 257.9 | 3408 |
| 7200 min Summer | 1.341 | 0.0 | 267.3 | 4184 |
| 8640 min Summer | 1.154 | 0.0 | 274.2 | 4928 |
| 10080 min Summer | 1.016 | 0.0 | 278.3 | 5656 |
| 15 min Winter | 146.491 | 0.0 | 44.9 | 19 |
| 30 min Winter | 95.823 | 0.0 | 60.8 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.731 | 0.131 | 0.0 | 1.3 | 1.3 | 111.6 | Flood Risk |
| 120 min Winter | 99.754 | 0.154 | 0.0 | 1.4 | 1.4 | 131.4 | Flood Risk |
| 180 min Winter | 99.766 | 0.166 | 0.0 | 1.5 | 1.5 | 141.5 | Flood Risk |
| 240 min Winter | 99.773 | 0.173 | 0.0 | 1.5 | 1.5 | 147.5 | Flood Risk |
| 360 min Winter | 99.781 | 0.181 | 0.0 | 1.6 | 1.6 | 155.1 | Flood Risk |
| 480 min Winter | 99.786 | 0.186 | 0.0 | 1.6 | 1.6 | 159.0 | Flood Risk |
| 600 min Winter | 99.788 | 0.188 | 0.0 | 1.6 | 1.6 | 160.9 | Flood Risk |
| 720 min Winter | 99.789 | 0.189 | 0.0 | 1.6 | 1.6 | 161.4 | Flood Risk |
| 960 min Winter | 99.788 | 0.188 | 0.0 | 1.6 | 1.6 | 160.4 | Flood Risk |
| 1440 min Winter | 99.785 | 0.185 | 0.0 | 1.6 | 1.6 | 158.1 | Flood Risk |
| 2160 min Winter | 99.777 | 0.177 | 0.0 | 1.6 | 1.6 | 151.4 | Flood Risk |
| 2880 min Winter | 99.768 | 0.168 | 0.0 | 1.5 | 1.5 | 143.3 | Flood Risk |
| 4320 min Winter | 99.749 | 0.149 | 0.0 | 1.4 | 1.4 | 127.0 | Flood Risk |
| 5760 min Winter | 99.732 | 0.132 | 0.0 | 1.3 | 1.3 | 112.6 | Flood Risk |
| 7200 min Winter | 99.717 | 0.117 | 0.0 | 1.2 | 1.2 | 100.4 | Flood Risk |
| 8640 min Winter | 99.705 | 0.105 | 0.0 | 1.1 | 1.1 | 90.1 | Flood Risk |
| 10080 min Winter | 99.695 | 0.095 | 0.0 | 1.1 | 1.1 | 81.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 59.609 | 0.0 | 96.6 | 62 |
| 120 min Winter | 35.761 | 0.0 | 117.1 | 122 |
| 180 min Winter | 26.143 | 0.0 | 128.7 | 180 |
| 240 min Winter | 20.816 | 0.0 | 136.6 | 238 |
| 360 min Winter | 15.119 | 0.0 | 148.3 | 354 |
| 480 min Winter | 12.032 | 0.0 | 156.5 | 466 |
| 600 min Winter | 10.072 | 0.0 | 162.7 | 578 |
| 720 min Winter | 8.705 | 0.0 | 167.5 | 686 |
| 960 min Winter | 6.911 | 0.0 | 174.3 | 866 |
| 1440 min Winter | 4.985 | 0.0 | 179.6 | 1084 |
| 2160 min Winter | 3.589 | 0.0 | 233.2 | 1540 |
| 2880 min Winter | 2.840 | 0.0 | 244.3 | 1988 |
| 4320 min Winter | 2.040 | 0.0 | 256.1 | 2812 |
| 5760 min Winter | 1.611 | 0.0 | 289.5 | 3632 |
| 7200 min Winter | 1.341 | 0.0 | 300.1 | 4400 |
| 8640 min Winter | 1.154 | 0.0 | 308.1 | 5184 |
| 10080 min Winter | 1.016 | 0.0 | 313.0 | 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) | 21.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.228

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.228 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 900.0 | 0.0 | 0.201 | 0.0 | 0.0 |
| 0.200 | 900.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.048 Discharge Coefficient 0.500 Invert Level (m) 99.600

## Summary of Results for 100 year Return Period

Half Drain Time : 902 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.652 | 0.052 | 0.0 | 0.6 | 0.6 | 44.5 | O K |
| 30 min Summer | 99.668 | 0.068 | 0.0 | 0.8 | 0.8 | 57.8 | O K |
| 60 min Summer | 99.683 | 0.083 | 0.0 | 1.0 | 1.0 | 71.0 | O K |
| 120 min Summer | 99.698 | 0.098 | 0.0 | 1.1 | 1.1 | 83.4 | O K |
| 180 min Summer | 99.705 | 0.105 | 0.0 | 1.1 | 1.1 | 89.5 | Flood Risk |
| 240 min Summer | 99.709 | 0.109 | 0.0 | 1.2 | 1.2 | 93.1 | Flood Risk |
| 360 min Summer | 99.714 | 0.114 | 0.0 | 1.2 | 1.2 | 97.2 | Flood Risk |
| 480 min Summer | 99.716 | 0.116 | 0.0 | 1.2 | 1.2 | 99.0 | Flood Risk |
| 600 min Summer | 99.716 | 0.116 | 0.0 | 1.2 | 1.2 | 99.5 | Flood Risk |
| 720 min Summer | 99.717 | 0.117 | 0.0 | 1.2 | 1.2 | 99.9 | Flood Risk |
| 960 min Summer | 99.717 | 0.117 | 0.0 | 1.2 | 1.2 | 100.2 | Flood Risk |
| 1440 min Summer | 99.717 | 0.117 | 0.0 | 1.2 | 1.2 | 99.7 | Flood Risk |
| 2160 min Summer | 99.714 | 0.114 | 0.0 | 1.2 | 1.2 | 97.1 | Flood Risk |
| 2880 min Summer | 99.709 | 0.109 | 0.0 | 1.2 | 1.2 | 93.6 | Flood Risk |
| 4320 min Summer | 99.701 | 0.101 | 0.0 | 1.1 | 1.1 | 86.0 | Flood Risk |
| 5760 min Summer | 99.692 | 0.092 | 0.0 | 1.0 | 1.0 | 78.9 | O K |
| 7200 min Summer | 99.685 | 0.085 | 0.0 | 1.0 | 1.0 | 72.9 | O K |
| 8640 min Summer | 99.679 | 0.079 | 0.0 | 0.9 | 0.9 | 67.7 | O K |
| 10080 min Summer | 99.674 | 0.074 | 0.0 | 0.9 | 0.9 | 63.4 | O K |
| 15 min Winter | 99.658 | 0.058 | 0.0 | 0.7 | 0.7 | 49.8 | O K |
| 30 min Winter | 99.676 | 0.076 | 0.0 | 0.9 | 0.9 | 64.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 104.637 | 0.0 | 25.4 | 19 |
| 30 min Summer | 68.445 | 0.0 | 35.9 | 34 |
| 60 min Summer | 42.578 | 0.0 | 58.5 | 64 |
| 120 min Summer | 25.544 | 0.0 | 71.8 | 122 |
| 180 min Summer | 18.673 | 0.0 | 79.3 | 182 |
| 240 min Summer | 14.869 | 0.0 | 84.6 | 242 |
| 360 min Summer | 10.799 | 0.0 | 92.4 | 362 |
| 480 min Summer | 8.594 | 0.0 | 98.1 | 480 |
| 600 min Summer | 7.194 | 0.0 | 102.5 | 560 |
| 720 min Summer | 6.218 | 0.0 | 105.9 | 608 |
| 960 min Summer | 4.937 | 0.0 | 111.0 | 724 |
| 1440 min Summer | 3.560 | 0.0 | 116.5 | 984 |
| 2160 min Summer | 2.564 | 0.0 | 146.3 | 1404 |
| 2880 min Summer | 2.029 | 0.0 | 153.4 | 1812 |
| 4320 min Summer | 1.457 | 0.0 | 161.1 | 2596 |
| 5760 min Summer | 1.151 | 0.0 | 182.7 | 3352 |
| 7200 min Summer | 0.958 | 0.0 | 189.2 | 4104 |
| 8640 min Summer | 0.824 | 0.0 | 193.8 | 4840 |
| 10080 min Summer | 0.726 | 0.0 | 196.2 | 5552 |
| 15 min Winter | 104.637 | 0.0 | 29.5 | 19 |
| 30 min Winter | 68.445 | 0.0 | 41.3 | 33 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.693 | 0.093 | 0.0 | 1.1 | 1.1 | 79.6 | O K |
| 120 min Winter | 99.709 | 0.109 | 0.0 | 1.2 | 1.2 | 93.6 | Flood Risk |
| 180 min Winter | 99.718 | 0.118 | 0.0 | 1.2 | 1.2 | 100.6 | Flood Risk |
| 240 min Winter | 99.722 | 0.122 | 0.0 | 1.3 | 1.3 | 104.6 | Flood Risk |
| 360 min Winter | 99.728 | 0.128 | 0.0 | 1.3 | 1.3 | 109.6 | Flood Risk |
| 480 min Winter | 99.731 | 0.131 | 0.0 | 1.3 | 1.3 | 111.9 | Flood Risk |
| 600 min Winter | 99.732 | 0.132 | 0.0 | 1.3 | 1.3 | 112.8 | Flood Risk |
| 720 min Winter | 99.732 | 0.132 | 0.0 | 1.3 | 1.3 | 112.8 | Flood Risk |
| 960 min Winter | 99.731 | 0.131 | 0.0 | 1.3 | 1.3 | 112.3 | Flood Risk |
| 1440 min Winter | 99.729 | 0.129 | 0.0 | 1.3 | 1.3 | 110.4 | Flood Risk |
| 2160 min Winter | 99.723 | 0.123 | 0.0 | 1.3 | 1.3 | 105.2 | Flood Risk |
| 2880 min Winter | 99.716 | 0.116 | 0.0 | 1.2 | 1.2 | 99.1 | Flood Risk |
| 4320 min Winter | 99.702 | 0.102 | 0.0 | 1.1 | 1.1 | 87.4 | Flood Risk |
| 5760 min Winter | 99.691 | 0.091 | 0.0 | 1.0 | 1.0 | 77.5 | O K |
| 7200 min Winter | 99.681 | 0.081 | 0.0 | 1.0 | 1.0 | 69.4 | O K |
| 8640 min Winter | 99.674 | 0.074 | 0.0 | 0.9 | 0.9 | 62.9 | O K |
| 10080 min Winter | 99.668 | 0.068 | 0.0 | 0.8 | 0.8 | 58.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 42.578 | 0.0 | 66.6 | 62 |
| 120 min Winter | 25.544 | 0.0 | 81.4 | 122 |
| 180 min Winter | 18.673 | 0.0 | 89.9 | 180 |
| 240 min Winter | 14.869 | 0.0 | 95.7 | 238 |
| 360 min Winter | 10.799 | 0.0 | 104.5 | 352 |
| 480 min Winter | 8.594 | 0.0 | 110.8 | 464 |
| 600 min Winter | 7.194 | 0.0 | 115.6 | 572 |
| 720 min Winter | 6.218 | 0.0 | 119.3 | 672 |
| 960 min Winter | 4.937 | 0.0 | 124.8 | 760 |
| 1440 min Winter | 3.560 | 0.0 | 130.8 | 1066 |
| 2160 min Winter | 2.564 | 0.0 | 164.7 | 1512 |
| 2880 min Winter | 2.029 | 0.0 | 172.7 | 1936 |
| 4320 min Winter | 1.457 | 0.0 | 181.7 | 2764 |
| 5760 min Winter | 1.151 | 0.0 | 205.3 | 3520 |
| 7200 min Winter | 0.958 | 0.0 | 212.6 | 4256 |
| 8640 min Winter | 0.824 | 0.0 | 218.0 | 5016 |
| 10080 min Winter | 0.726 | 0.0 | 221.1 | 5744 |

## 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) | 21.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.228

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.228 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 900.0 | 0.0 | 0.201 | 0.0 | 0.0 |
| 0.200 | 900.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.048 Discharge Coefficient 0.500 Invert Level (m) 99.600

## Summary of Results for 1 year Return Period

Half Drain Time : 1633 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.608 | 0.008 | 0.0 | 0.0 | 0.0 | 9.0 | O K |
| 30 min Summer | 99.610 | 0.010 | 0.0 | 0.0 | 0.0 | 11.7 | O K |
| 60 min Summer | 99.613 | 0.013 | 0.0 | 0.1 | 0.1 | 14.8 | O K |
| 120 min Summer | 99.616 | 0.016 | 0.0 | 0.1 | 0.1 | 18.1 | O K |
| 180 min Summer | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 20.3 | O K |
| 240 min Summer | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 21.8 | O K |
| 360 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 23.9 | O K |
| 480 min Summer | 99.622 | 0.022 | 0.0 | 0.2 | 0.2 | 25.3 | O K |
| 600 min Summer | 99.623 | 0.023 | 0.0 | 0.2 | 0.2 | 26.2 | O K |
| 720 min Summer | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 26.9 | O K |
| 960 min Summer | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 27.6 | O K |
| 1440 min Summer | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 28.6 | O K |
| 2160 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 29.7 | O K |
| 2880 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 30.2 | O K |
| 4320 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 30.5 | O K |
| 5760 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 30.2 | O K |
| 7200 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 29.9 | O K |
| 8640 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 29.4 | O K |
| 10080 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 28.9 | O K |
| 15 min Winter | 99.609 | 0.009 | 0.0 | 0.0 | 0.0 | 10.1 | O K |
| 30 min Winter | 99.612 | 0.012 | 0.0 | 0.0 | 0.0 | 13.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 1.5 | 19 |
| 30 min Summer | 20.382 | 0.0 | 2.4 | 34 |
| 60 min Summer | 12.872 | 0.0 | 5.9 | 64 |
| 120 min Summer | 7.964 | 0.0 | 8.1 | 124 |
| 180 min Summer | 5.985 | 0.0 | 9.7 | 184 |
| 240 min Summer | 4.881 | 0.0 | 10.9 | 244 |
| 360 min Summer | 3.639 | 0.0 | 12.7 | 362 |
| 480 min Summer | 2.946 | 0.0 | 14.0 | 482 |
| 600 min Summer | 2.501 | 0.0 | 15.1 | 602 |
| 720 min Summer | 2.188 | 0.0 | 16.0 | 720 |
| 960 min Summer | 1.771 | 0.0 | 17.3 | 934 |
| 1440 min Summer | 1.316 | 0.0 | 19.1 | 1112 |
| 2160 min Summer | 0.978 | 0.0 | 29.8 | 1476 |
| 2880 min Summer | 0.792 | 0.0 | 31.8 | 1876 |
| 4320 min Summer | 0.587 | 0.0 | 33.6 | 2684 |
| 5760 min Summer | 0.476 | 0.0 | 45.6 | 3464 |
| 7200 min Summer | 0.404 | 0.0 | 47.8 | 4256 |
| 8640 min Summer | 0.354 | 0.0 | 49.3 | 5016 |
| 10080 min Summer | 0.316 | 0.0 | 49.9 | 5752 |
| 15 min Winter | 31.306 | 0.0 | 1.9 | 19 |
| 30 min Winter | 20.382 | 0.0 | 3.0 | 34 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.615 | 0.015 | 0.0 | 0.1 | 0.1 | 16.5 | O K |
| 120 min Winter | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 20.3 | O K |
| 180 min Winter | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 22.7 | O K |
| 240 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 24.4 | O K |
| 360 min Winter | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 26.7 | O K |
| 480 min Winter | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 28.1 | O K |
| 600 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 29.1 | O K |
| 720 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 29.8 | O K |
| 960 min Winter | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 30.7 | O K |
| 1440 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 31.7 | O K |
| 2160 min Winter | 99.629 | 0.029 | 0.0 | 0.3 | 0.3 | 32.5 | O K |
| 2880 min Winter | 99.629 | 0.029 | 0.0 | 0.3 | 0.3 | 32.6 | O K |
| 4320 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 32.1 | O K |
| 5760 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 31.2 | O K |
| 7200 min Winter | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 30.4 | O K |
| 8640 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 29.5 | O K |
| 10080 min Winter | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 28.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 7.0 | 64 |
| 120 min Winter | 7.964 | 0.0 | 9.7 | 122 |
| 180 min Winter | 5.985 | 0.0 | 11.5 | 180 |
| 240 min Winter | 4.881 | 0.0 | 12.9 | 240 |
| 360 min Winter | 3.639 | 0.0 | 15.0 | 356 |
| 480 min Winter | 2.946 | 0.0 | 16.5 | 472 |
| 600 min Winter | 2.501 | 0.0 | 17.8 | 584 |
| 720 min Winter | 2.188 | 0.0 | 18.8 | 694 |
| 960 min Winter | 1.771 | 0.0 | 20.5 | 904 |
| 1440 min Winter | 1.316 | 0.0 | 22.5 | 1110 |
| 2160 min Winter | 0.978 | 0.0 | 34.3 | 1560 |
| 2880 min Winter | 0.792 | 0.0 | 36.7 | 2016 |
| 4320 min Winter | 0.587 | 0.0 | 38.9 | 2856 |
| 5760 min Winter | 0.476 | 0.0 | 51.7 | 3680 |
| 7200 min Winter | 0.404 | 0.0 | 54.3 | 4472 |
| 8640 min Winter | 0.354 | 0.0 | 56.0 | 5192 |
| 10080 min Winter | 0.316 | 0.0 | 56.8 | 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.154

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.154 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1191.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1191.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.047 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 30 year Return Period

Half Drain Time : 1096 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 22.1 | O K |
| 30 min Summer | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 28.6 | O K |
| 60 min Summer | 99.631 | 0.031 | 0.0 | 0.3 | 0.3 | 35.3 | O K |
| 120 min Summer | 99.637 | 0.037 | 0.0 | 0.4 | 0.4 | 41.9 | O K |
| 180 min Summer | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 45.5 | O K |
| 240 min Summer | 99.642 | 0.042 | 0.0 | 0.5 | 0.5 | 47.7 | O K |
| 360 min Summer | 99.645 | 0.045 | 0.0 | 0.5 | 0.5 | 50.5 | O K |
| 480 min Summer | 99.646 | 0.046 | 0.0 | 0.5 | 0.5 | 51.9 | O K |
| 600 min Summer | 99.647 | 0.047 | 0.0 | 0.6 | 0.6 | 52.6 | O K |
| 720 min Summer | 99.647 | 0.047 | 0.0 | 0.6 | 0.6 | 53.1 | O K |
| 960 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 53.8 | O K |
| 1440 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 54.6 | O K |
| 2160 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 54.7 | O K |
| 2880 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 54.2 | O K |
| 4320 min Summer | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 52.3 | O K |
| 5760 min Summer | 99.644 | 0.044 | 0.0 | 0.5 | 0.5 | 50.3 | O K |
| 7200 min Summer | 99.643 | 0.043 | 0.0 | 0.5 | 0.5 | 48.3 | O K |
| 8640 min Summer | 99.641 | 0.041 | 0.0 | 0.5 | 0.5 | 46.5 | O K |
| 10080 min Summer | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 44.8 | O K |
| 15 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 24.8 | O K |
| 30 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 32.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 7.2 | 19 |
| 30 min Summer | 49.886 | 0.0 | 10.9 | 34 |
| 60 min Summer | 30.968 | 0.0 | 21.6 | 64 |
| 120 min Summer | 18.658 | 0.0 | 27.7 | 124 |
| 180 min Summer | 13.726 | 0.0 | 31.4 | 182 |
| 240 min Summer | 10.992 | 0.0 | 34.0 | 242 |
| 360 min Summer | 8.021 | 0.0 | 37.9 | 362 |
| 480 min Summer | 6.411 | 0.0 | 40.7 | 480 |
| 600 min Summer | 5.385 | 0.0 | 42.9 | 596 |
| 720 min Summer | 4.668 | 0.0 | 44.6 | 642 |
| 960 min Summer | 3.724 | 0.0 | 47.3 | 750 |
| 1440 min Summer | 2.706 | 0.0 | 50.4 | 998 |
| 2160 min Summer | 1.964 | 0.0 | 68.5 | 1408 |
| 2880 min Summer | 1.563 | 0.0 | 71.9 | 1816 |
| 4320 min Summer | 1.132 | 0.0 | 75.0 | 2596 |
| 5760 min Summer | 0.900 | 0.0 | 91.8 | 3400 |
| 7200 min Summer | 0.753 | 0.0 | 95.2 | 4176 |
| 8640 min Summer | 0.651 | 0.0 | 97.2 | 4928 |
| 10080 min Summer | 0.575 | 0.0 | 98.0 | 5656 |
| 15 min Winter | 76.822 | 0.0 | 8.6 | 19 |
| 30 min Winter | 49.886 | 0.0 | 13.1 | 34 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.635 | 0.035 | 0.0 | 0.3 | 0.3 | 39.5 | O K |
| 120 min Winter | 99.641 | 0.041 | 0.0 | 0.5 | 0.5 | 46.9 | O K |
| 180 min Winter | 99.645 | 0.045 | 0.0 | 0.5 | 0.5 | 50.8 | O K |
| 240 min Winter | 99.647 | 0.047 | 0.0 | 0.6 | 0.6 | 53.4 | O K |
| 360 min Winter | 99.650 | 0.050 | 0.0 | 0.6 | 0.6 | 56.4 | O K |
| 480 min Winter | 99.651 | 0.051 | 0.0 | 0.7 | 0.7 | 58.0 | O K |
| 600 min Winter | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 58.9 | O K |
| 720 min Winter | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 59.3 | O K |
| 960 min Winter | 99.653 | 0.053 | 0.0 | 0.7 | 0.7 | 59.7 | O K |
| 1440 min Winter | 99.653 | 0.053 | 0.0 | 0.7 | 0.7 | 60.1 | O K |
| 2160 min Winter | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 59.1 | O K |
| 2880 min Winter | 99.651 | 0.051 | 0.0 | 0.6 | 0.6 | 57.5 | O K |
| 4320 min Winter | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 54.0 | O K |
| 5760 min Winter | 99.645 | 0.045 | 0.0 | 0.5 | 0.5 | 50.8 | O K |
| 7200 min Winter | 99.642 | 0.042 | 0.0 | 0.5 | 0.5 | 48.0 | O K |
| 8640 min Winter | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 45.5 | O K |
| 10080 min Winter | 99.638 | 0.038 | 0.0 | 0.4 | 0.4 | 43.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 25.2 | 64 |
| 120 min Winter | 18.658 | 0.0 | 32.1 | 122 |
| 180 min Winter | 13.726 | 0.0 | 36.3 | 180 |
| 240 min Winter | 10.992 | 0.0 | 39.3 | 238 |
| 360 min Winter | 8.021 | 0.0 | 43.7 | 352 |
| 480 min Winter | 6.411 | 0.0 | 46.9 | 464 |
| 600 min Winter | 5.385 | 0.0 | 49.4 | 572 |
| 720 min Winter | 4.668 | 0.0 | 51.4 | 672 |
| 960 min Winter | 3.724 | 0.0 | 54.5 | 758 |
| 1440 min Winter | 2.706 | 0.0 | 58.0 | 1054 |
| 2160 min Winter | 1.964 | 0.0 | 77.9 | 1512 |
| 2880 min Winter | 1.563 | 0.0 | 81.8 | 1932 |
| 4320 min Winter | 1.132 | 0.0 | 85.5 | 2768 |
| 5760 min Winter | 0.900 | 0.0 | 103.7 | 3576 |
| 7200 min Winter | 0.753 | 0.0 | 107.5 | 4392 |
| 8640 min Winter | 0.651 | 0.0 | 110.0 | 5112 |
| 10080 min Winter | 0.575 | 0.0 | 110.9 | 5952 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.154

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.154 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1191.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1191.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.047 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 100 year Return Period

Half Drain Time : 988 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 28.7 | O K |
| 30 min Summer | 99.633 | 0.033 | 0.0 | 0.3 | 0.3 | 37.4 | O K |
| 60 min Summer | 99.641 | 0.041 | 0.0 | 0.4 | 0.4 | 46.3 | O K |
| 120 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 54.7 | O K |
| 180 min Summer | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 59.1 | O K |
| 240 min Summer | 99.654 | 0.054 | 0.0 | 0.7 | 0.7 | 61.6 | O K |
| 360 min Summer | 99.657 | 0.057 | 0.0 | 0.8 | 0.8 | 64.5 | O K |
| 480 min Summer | 99.658 | 0.058 | 0.0 | 0.8 | 0.8 | 65.8 | O K |
| 600 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 66.2 | O K |
| 720 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 66.7 | O K |
| 960 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 67.2 | O K |
| 1440 min Summer | 99.660 | 0.060 | 0.0 | 0.8 | 0.8 | 67.6 | O K |
| 2160 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 67.0 | O K |
| 2880 min Summer | 99.658 | 0.058 | 0.0 | 0.8 | 0.8 | 65.7 | O K |
| 4320 min Summer | 99.655 | 0.055 | 0.0 | 0.7 | 0.7 | 62.6 | O K |
| 5760 min Summer | 99.653 | 0.053 | 0.0 | 0.7 | 0.7 | 59.4 | O K |
| 7200 min Summer | 99.650 | 0.050 | 0.0 | 0.6 | 0.6 | 56.6 | O K |
| 8640 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 54.0 | O K |
| 10080 min Summer | 99.646 | 0.046 | 0.0 | 0.5 | 0.5 | 51.8 | O K |
| 15 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 32.1 | O K |
| 30 min Winter | 99.637 | 0.037 | 0.0 | 0.4 | 0.4 | 41.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 11.0 | 19 |
| 30 min Summer | 65.311 | 0.0 | 16.7 | 34 |
| 60 min Summer | 40.718 | 0.0 | 31.2 | 64 |
| 120 min Summer | 24.517 | 0.0 | 39.4 | 124 |
| 180 min Summer | 17.977 | 0.0 | 44.3 | 182 |
| 240 min Summer | 14.339 | 0.0 | 47.6 | 242 |
| 360 min Summer | 10.402 | 0.0 | 52.4 | 362 |
| 480 min Summer | 8.281 | 0.0 | 55.9 | 480 |
| 600 min Summer | 6.934 | 0.0 | 58.7 | 558 |
| 720 min Summer | 5.995 | 0.0 | 60.8 | 606 |
| 960 min Summer | 4.761 | 0.0 | 64.1 | 722 |
| 1440 min Summer | 3.436 | 0.0 | 67.7 | 982 |
| 2160 min Summer | 2.476 | 0.0 | 89.0 | 1388 |
| 2880 min Summer | 1.960 | 0.0 | 93.0 | 1792 |
| 4320 min Summer | 1.408 | 0.0 | 96.5 | 2592 |
| 5760 min Summer | 1.113 | 0.0 | 115.2 | 3352 |
| 7200 min Summer | 0.927 | 0.0 | 118.9 | 4112 |
| 8640 min Summer | 0.798 | 0.0 | 121.1 | 4920 |
| 10080 min Summer | 0.702 | 0.0 | 121.8 | 5648 |
| 15 min Winter | 99.739 | 0.0 | 13.2 | 19 |
| 30 min Winter | 65.311 | 0.0 | 19.7 | 34 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.646 | 0.046 | 0.0 | 0.5 | 0.5 | 51.8 | O K |
| 120 min Winter | 99.654 | 0.054 | 0.0 | 0.7 | 0.7 | 61.2 | O K |
| 180 min Winter | 99.658 | 0.058 | 0.0 | 0.8 | 0.8 | 66.1 | O K |
| 240 min Winter | 99.661 | 0.061 | 0.0 | 0.8 | 0.8 | 68.9 | O K |
| 360 min Winter | 99.664 | 0.064 | 0.0 | 0.9 | 0.9 | 72.1 | O K |
| 480 min Winter | 99.665 | 0.065 | 0.0 | 0.9 | 0.9 | 73.6 | O K |
| 600 min Winter | 99.666 | 0.066 | 0.0 | 0.9 | 0.9 | 74.3 | O K |
| 720 min Winter | 99.666 | 0.066 | 0.0 | 0.9 | 0.9 | 74.3 | O K |
| 960 min Winter | 99.666 | 0.066 | 0.0 | 0.9 | 0.9 | 74.7 | O K |
| 1440 min Winter | 99.666 | 0.066 | 0.0 | 0.9 | 0.9 | 74.3 | O K |
| 2160 min Winter | 99.664 | 0.064 | 0.0 | 0.9 | 0.9 | 72.1 | O K |
| 2880 min Winter | 99.661 | 0.061 | 0.0 | 0.8 | 0.8 | 69.3 | O K |
| 4320 min Winter | 99.657 | 0.057 | 0.0 | 0.8 | 0.8 | 64.1 | O K |
| 5760 min Winter | 99.653 | 0.053 | 0.0 | 0.7 | 0.7 | 59.5 | O K |
| 7200 min Winter | 99.649 | 0.049 | 0.0 | 0.6 | 0.6 | 55.7 | O K |
| 8640 min Winter | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 52.5 | O K |
| 10080 min Winter | 99.644 | 0.044 | 0.0 | 0.5 | 0.5 | 49.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 36.1 | 62 |
| 120 min Winter | 24.517 | 0.0 | 45.4 | 122 |
| 180 min Winter | 17.977 | 0.0 | 50.9 | 180 |
| 240 min Winter | 14.339 | 0.0 | 54.7 | 238 |
| 360 min Winter | 10.402 | 0.0 | 60.1 | 352 |
| 480 min Winter | 8.281 | 0.0 | 64.2 | 462 |
| 600 min Winter | 6.934 | 0.0 | 67.3 | 566 |
| 720 min Winter | 5.995 | 0.0 | 69.7 | 656 |
| 960 min Winter | 4.761 | 0.0 | 73.5 | 742 |
| 1440 min Winter | 3.436 | 0.0 | 77.5 | 1042 |
| 2160 min Winter | 2.476 | 0.0 | 100.9 | 1492 |
| 2880 min Winter | 1.960 | 0.0 | 105.6 | 1908 |
| 4320 min Winter | 1.408 | 0.0 | 109.6 | 2728 |
| 5760 min Winter | 1.113 | 0.0 | 129.8 | 3520 |
| 7200 min Winter | 0.927 | 0.0 | 134.1 | 4320 |
| 8640 min Winter | 0.798 | 0.0 | 136.8 | 5104 |
| 10080 min Winter | 0.702 | 0.0 | 137.7 | 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.154

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.154 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1191.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1191.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.047 Discharge Coefficient 0.600 Invert Level (m) 99.600

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

Half Drain Time : 1009 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.635 | 0.035 | 0.0 | 0.4 | 0.4 | 40.1 | O K |
| 30 min Summer | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 52.3 | O K |
| 60 min Summer | 99.657 | 0.057 | 0.0 | 0.8 | 0.8 | 64.6 | O K |
| 120 min Summer | 99.667 | 0.067 | 0.0 | 1.0 | 1.0 | 76.1 | O K |
| 180 min Summer | 99.672 | 0.072 | 0.0 | 1.0 | 1.0 | 82.0 | O K |
| 240 min Summer | 99.675 | 0.075 | 0.0 | 1.0 | 1.0 | 85.4 | O K |
| 360 min Summer | 99.679 | 0.079 | 0.0 | 1.1 | 1.1 | 89.3 | O K |
| 480 min Summer | 99.681 | 0.081 | 0.0 | 1.1 | 1.1 | 91.1 | O K |
| 600 min Summer | 99.681 | 0.081 | 0.0 | 1.1 | 1.1 | 91.8 | O K |
| 720 min Summer | 99.682 | 0.082 | 0.0 | 1.1 | 1.1 | 92.3 | O K |
| 960 min Summer | 99.682 | 0.082 | 0.0 | 1.1 | 1.1 | 92.9 | O K |
| 1440 min Summer | 99.682 | 0.082 | 0.0 | 1.1 | 1.1 | 93.1 | O K |
| 2160 min Summer | 99.681 | 0.081 | 0.0 | 1.1 | 1.1 | 91.6 | O K |
| 2880 min Summer | 99.679 | 0.079 | 0.0 | 1.1 | 1.1 | 89.0 | O K |
| 4320 min Summer | 99.674 | 0.074 | 0.0 | 1.0 | 1.0 | 83.3 | O K |
| 5760 min Summer | 99.669 | 0.069 | 0.0 | 1.0 | 1.0 | 77.9 | O K |
| 7200 min Summer | 99.665 | 0.065 | 0.0 | 0.9 | 0.9 | 73.5 | O K |
| 8640 min Summer | 99.662 | 0.062 | 0.0 | 0.9 | 0.9 | 69.7 | O K |
| 10080 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 66.4 | O K |
| 15 min Winter | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 44.9 | O K |
| 30 min Winter | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 58.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 18.5 | 19 |
| 30 min Summer | 91.435 | 0.0 | 27.1 | 34 |
| 60 min Summer | 57.005 | 0.0 | 47.8 | 64 |
| 120 min Summer | 34.324 | 0.0 | 59.7 | 122 |
| 180 min Summer | 25.168 | 0.0 | 66.6 | 182 |
| 240 min Summer | 20.074 | 0.0 | 71.4 | 242 |
| 360 min Summer | 14.562 | 0.0 | 78.3 | 362 |
| 480 min Summer | 11.594 | 0.0 | 83.4 | 480 |
| 600 min Summer | 9.707 | 0.0 | 87.3 | 560 |
| 720 min Summer | 8.393 | 0.0 | 90.4 | 608 |
| 960 min Summer | 6.666 | 0.0 | 94.9 | 724 |
| 1440 min Summer | 4.811 | 0.0 | 99.7 | 984 |
| 2160 min Summer | 3.466 | 0.0 | 128.9 | 1388 |
| 2880 min Summer | 2.744 | 0.0 | 134.9 | 1792 |
| 4320 min Summer | 1.972 | 0.0 | 140.7 | 2592 |
| 5760 min Summer | 1.558 | 0.0 | 164.1 | 3344 |
| 7200 min Summer | 1.297 | 0.0 | 169.7 | 4104 |
| 8640 min Summer | 1.117 | 0.0 | 173.4 | 4840 |
| 10080 min Summer | 0.983 | 0.0 | 174.8 | 5552 |
| 15 min Winter | 139.635 | 0.0 | 21.8 | 19 |
| 30 min Winter | 91.435 | 0.0 | 31.7 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.664 | 0.064 | 0.0 | 0.9 | 0.9 | 72.3 | O K |
| 120 min Winter | 99.675 | 0.075 | 0.0 | 1.0 | 1.0 | 85.3 | O K |
| 180 min Winter | 99.681 | 0.081 | 0.0 | 1.1 | 1.1 | 92.0 | O K |
| 240 min Winter | 99.685 | 0.085 | 0.0 | 1.1 | 1.1 | 96.0 | O K |
| 360 min Winter | 99.689 | 0.089 | 0.0 | 1.2 | 1.2 | 100.6 | O K |
| 480 min Winter | 99.691 | 0.091 | 0.0 | 1.2 | 1.2 | 102.9 | O K |
| 600 min Winter | 99.692 | 0.092 | 0.0 | 1.2 | 1.2 | 103.9 | O K |
| 720 min Winter | 99.692 | 0.092 | 0.0 | 1.2 | 1.2 | 104.1 | O K |
| 960 min Winter | 99.692 | 0.092 | 0.0 | 1.2 | 1.2 | 104.1 | O K |
| 1440 min Winter | 99.691 | 0.091 | 0.0 | 1.2 | 1.2 | 103.0 | O K |
| 2160 min Winter | 99.688 | 0.088 | 0.0 | 1.2 | 1.2 | 99.1 | O K |
| 2880 min Winter | 99.683 | 0.083 | 0.0 | 1.1 | 1.1 | 94.3 | O K |
| 4320 min Winter | 99.675 | 0.075 | 0.0 | 1.0 | 1.0 | 85.0 | O K |
| 5760 min Winter | 99.668 | 0.068 | 0.0 | 1.0 | 1.0 | 77.2 | O K |
| 7200 min Winter | 99.663 | 0.063 | 0.0 | 0.9 | 0.9 | 71.5 | O K |
| 8640 min Winter | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 66.8 | O K |
| 10080 min Winter | 99.656 | 0.056 | 0.0 | 0.7 | 0.7 | 62.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 54.9 | 62 |
| 120 min Winter | 34.324 | 0.0 | 68.3 | 122 |
| 180 min Winter | 25.168 | 0.0 | 76.1 | 180 |
| 240 min Winter | 20.074 | 0.0 | 81.4 | 238 |
| 360 min Winter | 14.562 | 0.0 | 89.2 | 352 |
| 480 min Winter | 11.594 | 0.0 | 94.8 | 464 |
| 600 min Winter | 9.707 | 0.0 | 99.1 | 572 |
| 720 min Winter | 8.393 | 0.0 | 102.6 | 672 |
| 960 min Winter | 6.666 | 0.0 | 107.5 | 760 |
| 1440 min Winter | 4.811 | 0.0 | 112.8 | 1066 |
| 2160 min Winter | 3.466 | 0.0 | 145.5 | 1512 |
| 2880 min Winter | 2.744 | 0.0 | 152.5 | 1932 |
| 4320 min Winter | 1.972 | 0.0 | 159.4 | 2764 |
| 5760 min Winter | 1.558 | 0.0 | 184.7 | 3512 |
| 7200 min Winter | 1.297 | 0.0 | 191.0 | 4256 |
| 8640 min Winter | 1.117 | 0.0 | 195.4 | 5016 |
| 10080 min Winter | 0.983 | 0.0 | 197.4 | 5752 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.154

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.154 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1191.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1191.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.047 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 1 year Return Period

Half Drain Time : 696 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.608 | 0.008 | 0.0 | 0.0 | 0.0 | 1.8 | O K |
| 30 min Summer | 99.611 | 0.011 | 0.0 | 0.0 | 0.0 | 2.3 | O K |
| 60 min Summer | 99.613 | 0.013 | 0.0 | 0.0 | 0.0 | 2.8 | O K |
| 120 min Summer | 99.616 | 0.016 | 0.0 | 0.0 | 0.0 | 3.4 | O K |
| 180 min Summer | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 3.8 | O K |
| 240 min Summer | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 4.0 | O K |
| 360 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 4.2 | O K |
| 480 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 4.3 | O K |
| 600 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 4.4 | O K |
| 720 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 4.5 | O K |
| 960 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 4.6 | O K |
| 1440 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 4.7 | O K |
| 2160 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 4.7 | O K |
| 2880 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 4.6 | O K |
| 4320 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 4.4 | O K |
| 5760 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 4.2 | O K |
| 7200 min Summer | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 4.0 | O K |
| 8640 min Summer | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 3.8 | O K |
| 10080 min Summer | 99.617 | 0.017 | 0.0 | 0.1 | 0.1 | 3.7 | O K |
| 15 min Winter | 99.609 | 0.009 | 0.0 | 0.0 | 0.0 | 2.0 | O K |
| 30 min Winter | 99.612 | 0.012 | 0.0 | 0.0 | 0.0 | 2.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 0.7 | 19 |
| 30 min Summer | 20.382 | 0.0 | 1.1 | 34 |
| 60 min Summer | 12.872 | 0.0 | 2.0 | 64 |
| 120 min Summer | 7.964 | 0.0 | 2.7 | 122 |
| 180 min Summer | 5.985 | 0.0 | 3.1 | 182 |
| 240 min Summer | 4.881 | 0.0 | 3.4 | 242 |
| 360 min Summer | 3.639 | 0.0 | 3.8 | 360 |
| 480 min Summer | 2.946 | 0.0 | 4.2 | 418 |
| 600 min Summer | 2.501 | 0.0 | 4.5 | 476 |
| 720 min Summer | 2.188 | 0.0 | 4.7 | 528 |
| 960 min Summer | 1.771 | 0.0 | 5.1 | 658 |
| 1440 min Summer | 1.316 | 0.0 | 5.6 | 936 |
| 2160 min Summer | 0.978 | 0.0 | 7.2 | 1340 |
| 2880 min Summer | 0.792 | 0.0 | 7.7 | 1728 |
| 4320 min Summer | 0.587 | 0.0 | 8.4 | 2504 |
| 5760 min Summer | 0.476 | 0.0 | 9.8 | 3232 |
| 7200 min Summer | 0.404 | 0.0 | 10.4 | 4032 |
| 8640 min Summer | 0.354 | 0.0 | 10.8 | 4760 |
| 10080 min Summer | 0.316 | 0.0 | 11.1 | 5456 |
| 15 min Winter | 31.306 | 0.0 | 0.9 | 19 |
| 30 min Winter | 20.382 | 0.0 | 1.3 | 33 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.615 | 0.015 | 0.0 | 0.0 | 0.0 | 3.2 | O K |
| 120 min Winter | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 3.8 | O K |
| 180 min Winter | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 4.2 | O K |
| 240 min Winter | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 4.5 | O K |
| 360 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 4.7 | O K |
| 480 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 4.8 | O K |
| 600 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 4.9 | O K |
| 720 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 5.0 | O K |
| 960 min Winter | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 5.0 | O K |
| 1440 min Winter | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 5.0 | O K |
| 2160 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 4.9 | O K |
| 2880 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 4.7 | O K |
| 4320 min Winter | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 4.4 | O K |
| 5760 min Winter | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 4.1 | O K |
| 7200 min Winter | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 3.8 | O K |
| 8640 min Winter | 99.617 | 0.017 | 0.0 | 0.1 | 0.1 | 3.6 | O K |
| 10080 min Winter | 99.616 | 0.016 | 0.0 | 0.0 | 0.0 | 3.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 2.3 | 62 |
| 120 min Winter | 7.964 | 0.0 | 3.0 | 120 |
| 180 min Winter | 5.985 | 0.0 | 3.5 | 178 |
| 240 min Winter | 4.881 | 0.0 | 3.9 | 236 |
| 360 min Winter | 3.639 | 0.0 | 4.4 | 346 |
| 480 min Winter | 2.946 | 0.0 | 4.8 | 446 |
| 600 min Winter | 2.501 | 0.0 | 5.1 | 478 |
| 720 min Winter | 2.188 | 0.0 | 5.4 | 550 |
| 960 min Winter | 1.771 | 0.0 | 5.8 | 702 |
| 1440 min Winter | 1.316 | 0.0 | 6.4 | 996 |
| 2160 min Winter | 0.978 | 0.0 | 8.1 | 1408 |
| 2880 min Winter | 0.792 | 0.0 | 8.7 | 1820 |
| 4320 min Winter | 0.587 | 0.0 | 9.5 | 2628 |
| 5760 min Winter | 0.476 | 0.0 | 11.1 | 3392 |
| 7200 min Winter | 0.404 | 0.0 | 11.7 | 4176 |
| 8640 min Winter | 0.354 | 0.0 | 12.2 | 4936 |
| 10080 min Winter | 0.316 | 0.0 | 12.5 | 5744 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.030

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.030 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 225.0 | 0.0 | 0.101 | 0.0 | 0.0 |
| 0.100 | 225.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 30 year Return Period

Half Drain Time : 647 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 4.3 | O K |
| 30 min Summer | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 5.5 | O K |
| 60 min Summer | 99.632 | 0.032 | 0.0 | 0.1 | 0.1 | 6.7 | O K |
| 120 min Summer | 99.637 | 0.037 | 0.0 | 0.1 | 0.1 | 7.9 | O K |
| 180 min Summer | 99.639 | 0.039 | 0.0 | 0.2 | 0.2 | 8.4 | O K |
| 240 min Summer | 99.641 | 0.041 | 0.0 | 0.2 | 0.2 | 8.7 | O K |
| 360 min Summer | 99.642 | 0.042 | 0.0 | 0.2 | 0.2 | 9.0 | O K |
| 480 min Summer | 99.643 | 0.043 | 0.0 | 0.2 | 0.2 | 9.1 | O K |
| 600 min Summer | 99.643 | 0.043 | 0.0 | 0.2 | 0.2 | 9.2 | O K |
| 720 min Summer | 99.643 | 0.043 | 0.0 | 0.2 | 0.2 | 9.2 | O K |
| 960 min Summer | 99.643 | 0.043 | 0.0 | 0.2 | 0.2 | 9.3 | O K |
| 1440 min Summer | 99.643 | 0.043 | 0.0 | 0.2 | 0.2 | 9.2 | O K |
| 2160 min Summer | 99.641 | 0.041 | 0.0 | 0.2 | 0.2 | 8.8 | O K |
| 2880 min Summer | 99.639 | 0.039 | 0.0 | 0.2 | 0.2 | 8.4 | O K |
| 4320 min Summer | 99.635 | 0.035 | 0.0 | 0.1 | 0.1 | 7.5 | O K |
| 5760 min Summer | 99.632 | 0.032 | 0.0 | 0.1 | 0.1 | 6.8 | O K |
| 7200 min Summer | 99.630 | 0.030 | 0.0 | 0.1 | 0.1 | 6.3 | O K |
| 8640 min Summer | 99.628 | 0.028 | 0.0 | 0.1 | 0.1 | 5.9 | O K |
| 10080 min Summer | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 5.6 | O K |
| 15 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 4.8 | O K |
| 30 min Winter | 99.629 | 0.029 | 0.0 | 0.1 | 0.1 | 6.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 2.7 | 19 |
| 30 min Summer | 49.886 | 0.0 | 3.8 | 34 |
| 60 min Summer | 30.968 | 0.0 | 5.9 | 64 |
| 120 min Summer | 18.658 | 0.0 | 7.2 | 122 |
| 180 min Summer | 13.726 | 0.0 | 8.0 | 182 |
| 240 min Summer | 10.992 | 0.0 | 8.6 | 242 |
| 360 min Summer | 8.021 | 0.0 | 9.5 | 358 |
| 480 min Summer | 6.411 | 0.0 | 10.1 | 406 |
| 600 min Summer | 5.385 | 0.0 | 10.6 | 466 |
| 720 min Summer | 4.668 | 0.0 | 11.1 | 528 |
| 960 min Summer | 3.724 | 0.0 | 11.7 | 662 |
| 1440 min Summer | 2.706 | 0.0 | 12.6 | 936 |
| 2160 min Summer | 1.964 | 0.0 | 15.1 | 1340 |
| 2880 min Summer | 1.563 | 0.0 | 15.9 | 1732 |
| 4320 min Summer | 1.132 | 0.0 | 17.0 | 2504 |
| 5760 min Summer | 0.900 | 0.0 | 19.0 | 3232 |
| 7200 min Summer | 0.753 | 0.0 | 19.8 | 3960 |
| 8640 min Summer | 0.651 | 0.0 | 20.4 | 4672 |
| 10080 min Summer | 0.575 | 0.0 | 20.7 | 5440 |
| 15 min Winter | 76.822 | 0.0 | 3.1 | 19 |
| 30 min Winter | 49.886 | 0.0 | 4.4 | 33 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.635 | 0.035 | 0.0 | 0.1 | 0.1 | 7.5 | O K |
| 120 min Winter | 99.641 | 0.041 | 0.0 | 0.2 | 0.2 | 8.8 | O K |
| 180 min Winter | 99.644 | 0.044 | 0.0 | 0.2 | 0.2 | 9.5 | O K |
| 240 min Winter | 99.646 | 0.046 | 0.0 | 0.2 | 0.2 | 9.8 | O K |
| 360 min Winter | 99.648 | 0.048 | 0.0 | 0.2 | 0.2 | 10.2 | O K |
| 480 min Winter | 99.648 | 0.048 | 0.0 | 0.2 | 0.2 | 10.3 | O K |
| 600 min Winter | 99.648 | 0.048 | 0.0 | 0.2 | 0.2 | 10.3 | O K |
| 720 min Winter | 99.648 | 0.048 | 0.0 | 0.2 | 0.2 | 10.3 | O K |
| 960 min Winter | 99.648 | 0.048 | 0.0 | 0.2 | 0.2 | 10.3 | O K |
| 1440 min Winter | 99.646 | 0.046 | 0.0 | 0.2 | 0.2 | 9.9 | O K |
| 2160 min Winter | 99.643 | 0.043 | 0.0 | 0.2 | 0.2 | 9.2 | O K |
| 2880 min Winter | 99.640 | 0.040 | 0.0 | 0.2 | 0.2 | 8.5 | O K |
| 4320 min Winter | 99.634 | 0.034 | 0.0 | 0.1 | 0.1 | 7.3 | O K |
| 5760 min Winter | 99.630 | 0.030 | 0.0 | 0.1 | 0.1 | 6.4 | O K |
| 7200 min Winter | 99.628 | 0.028 | 0.0 | 0.1 | 0.1 | 5.9 | O K |
| 8640 min Winter | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 5.4 | O K |
| 10080 min Winter | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 5.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 6.7 | 62 |
| 120 min Winter | 18.658 | 0.0 | 8.2 | 120 |
| 180 min Winter | 13.726 | 0.0 | 9.1 | 178 |
| 240 min Winter | 10.992 | 0.0 | 9.8 | 236 |
| 360 min Winter | 8.021 | 0.0 | 10.7 | 346 |
| 480 min Winter | 6.411 | 0.0 | 11.4 | 450 |
| 600 min Winter | 5.385 | 0.0 | 12.0 | 484 |
| 720 min Winter | 4.668 | 0.0 | 12.5 | 556 |
| 960 min Winter | 3.724 | 0.0 | 13.2 | 712 |
| 1440 min Winter | 2.706 | 0.0 | 14.2 | 1010 |
| 2160 min Winter | 1.964 | 0.0 | 16.9 | 1432 |
| 2880 min Winter | 1.563 | 0.0 | 17.9 | 1844 |
| 4320 min Winter | 1.132 | 0.0 | 19.1 | 2596 |
| 5760 min Winter | 0.900 | 0.0 | 21.3 | 3336 |
| 7200 min Winter | 0.753 | 0.0 | 22.2 | 4072 |
| 8640 min Winter | 0.651 | 0.0 | 22.9 | 4840 |
| 10080 min Winter | 0.575 | 0.0 | 23.3 | 5552 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.030

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.030 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 225.0 | 0.0 | 0.101 | 0.0 | 0.0 |
| 0.100 | 225.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 100 year Return Period

Half Drain Time : 671 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 5.6 | O K |
| 30 min Summer | 99.634 | 0.034 | 0.0 | 0.1 | 0.1 | 7.2 | O K |
| 60 min Summer | 99.641 | 0.041 | 0.0 | 0.2 | 0.2 | 8.9 | O K |
| 120 min Summer | 99.648 | 0.048 | 0.0 | 0.2 | 0.2 | 10.4 | O K |
| 180 min Summer | 99.652 | 0.052 | 0.0 | 0.2 | 0.2 | 11.1 | O K |
| 240 min Summer | 99.654 | 0.054 | 0.0 | 0.2 | 0.2 | 11.5 | O K |
| 360 min Summer | 99.655 | 0.055 | 0.0 | 0.2 | 0.2 | 11.8 | O K |
| 480 min Summer | 99.656 | 0.056 | 0.0 | 0.2 | 0.2 | 11.9 | O K |
| 600 min Summer | 99.656 | 0.056 | 0.0 | 0.2 | 0.2 | 11.9 | O K |
| 720 min Summer | 99.656 | 0.056 | 0.0 | 0.2 | 0.2 | 12.0 | O K |
| 960 min Summer | 99.656 | 0.056 | 0.0 | 0.2 | 0.2 | 11.9 | O K |
| 1440 min Summer | 99.655 | 0.055 | 0.0 | 0.2 | 0.2 | 11.7 | O K |
| 2160 min Summer | 99.652 | 0.052 | 0.0 | 0.2 | 0.2 | 11.1 | O K |
| 2880 min Summer | 99.649 | 0.049 | 0.0 | 0.2 | 0.2 | 10.5 | O K |
| 4320 min Summer | 99.644 | 0.044 | 0.0 | 0.2 | 0.2 | 9.4 | O K |
| 5760 min Summer | 99.639 | 0.039 | 0.0 | 0.2 | 0.2 | 8.4 | O K |
| 7200 min Summer | 99.636 | 0.036 | 0.0 | 0.1 | 0.1 | 7.6 | O K |
| 8640 min Summer | 99.633 | 0.033 | 0.0 | 0.1 | 0.1 | 7.0 | O K |
| 10080 min Summer | 99.630 | 0.030 | 0.0 | 0.1 | 0.1 | 6.5 | O K |
| 15 min Winter | 99.629 | 0.029 | 0.0 | 0.1 | 0.1 | 6.2 | O K |
| 30 min Winter | 99.638 | 0.038 | 0.0 | 0.2 | 0.2 | 8.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 3.8 | 19 |
| 30 min Summer | 65.311 | 0.0 | 5.3 | 34 |
| 60 min Summer | 40.718 | 0.0 | 8.0 | 64 |
| 120 min Summer | 24.517 | 0.0 | 9.7 | 122 |
| 180 min Summer | 17.977 | 0.0 | 10.8 | 182 |
| 240 min Summer | 14.339 | 0.0 | 11.5 | 242 |
| 360 min Summer | 10.402 | 0.0 | 12.5 | 360 |
| 480 min Summer | 8.281 | 0.0 | 13.3 | 428 |
| 600 min Summer | 6.934 | 0.0 | 13.9 | 484 |
| 720 min Summer | 5.995 | 0.0 | 14.4 | 544 |
| 960 min Summer | 4.761 | 0.0 | 15.2 | 674 |
| 1440 min Summer | 3.436 | 0.0 | 16.2 | 950 |
| 2160 min Summer | 2.476 | 0.0 | 19.2 | 1360 |
| 2880 min Summer | 1.960 | 0.0 | 20.1 | 1756 |
| 4320 min Summer | 1.408 | 0.0 | 21.4 | 2512 |
| 5760 min Summer | 1.113 | 0.0 | 23.6 | 3280 |
| 7200 min Summer | 0.927 | 0.0 | 24.4 | 3968 |
| 8640 min Summer | 0.798 | 0.0 | 25.1 | 4680 |
| 10080 min Summer | 0.702 | 0.0 | 25.5 | 5440 |
| 15 min Winter | 99.739 | 0.0 | 4.4 | 19 |
| 30 min Winter | 65.311 | 0.0 | 6.0 | 33 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.646 | 0.046 | 0.0 | 0.2 | 0.2 | 9.9 | O K |
| 120 min Winter | 99.654 | 0.054 | 0.0 | 0.2 | 0.2 | 11.6 | O K |
| 180 min Winter | 99.658 | 0.058 | 0.0 | 0.2 | 0.2 | 12.5 | O K |
| 240 min Winter | 99.660 | 0.060 | 0.0 | 0.2 | 0.2 | 12.9 | O K |
| 360 min Winter | 99.662 | 0.062 | 0.0 | 0.2 | 0.2 | 13.3 | O K |
| 480 min Winter | 99.663 | 0.063 | 0.0 | 0.2 | 0.2 | 13.5 | O K |
| 600 min Winter | 99.663 | 0.063 | 0.0 | 0.2 | 0.2 | 13.4 | O K |
| 720 min Winter | 99.663 | 0.063 | 0.0 | 0.2 | 0.2 | 13.4 | O K |
| 960 min Winter | 99.662 | 0.062 | 0.0 | 0.2 | 0.2 | 13.3 | O K |
| 1440 min Winter | 99.660 | 0.060 | 0.0 | 0.2 | 0.2 | 12.8 | O K |
| 2160 min Winter | 99.655 | 0.055 | 0.0 | 0.2 | 0.2 | 11.8 | O K |
| 2880 min Winter | 99.651 | 0.051 | 0.0 | 0.2 | 0.2 | 10.8 | O K |
| 4320 min Winter | 99.643 | 0.043 | 0.0 | 0.2 | 0.2 | 9.2 | O K |
| 5760 min Winter | 99.637 | 0.037 | 0.0 | 0.1 | 0.1 | 7.9 | O K |
| 7200 min Winter | 99.632 | 0.032 | 0.0 | 0.1 | 0.1 | 6.9 | O K |
| 8640 min Winter | 99.629 | 0.029 | 0.0 | 0.1 | 0.1 | 6.3 | O K |
| 10080 min Winter | 99.627 | 0.027 | 0.0 | 0.1 | 0.1 | 5.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 9.0 | 62 |
| 120 min Winter | 24.517 | 0.0 | 11.0 | 120 |
| 180 min Winter | 17.977 | 0.0 | 12.2 | 178 |
| 240 min Winter | 14.339 | 0.0 | 13.0 | 236 |
| 360 min Winter | 10.402 | 0.0 | 14.1 | 348 |
| 480 min Winter | 8.281 | 0.0 | 15.0 | 456 |
| 600 min Winter | 6.934 | 0.0 | 15.7 | 548 |
| 720 min Winter | 5.995 | 0.0 | 16.3 | 570 |
| 960 min Winter | 4.761 | 0.0 | 17.1 | 722 |
| 1440 min Winter | 3.436 | 0.0 | 18.2 | 1024 |
| 2160 min Winter | 2.476 | 0.0 | 21.5 | 1452 |
| 2880 min Winter | 1.960 | 0.0 | 22.7 | 1872 |
| 4320 min Winter | 1.408 | 0.0 | 24.0 | 2676 |
| 5760 min Winter | 1.113 | 0.0 | 26.4 | 3408 |
| 7200 min Winter | 0.927 | 0.0 | 27.4 | 4112 |
| 8640 min Winter | 0.798 | 0.0 | 28.2 | 4840 |
| 10080 min Winter | 0.702 | 0.0 | 28.7 | 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.030

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.030 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 225.0 | 0.0 | 0.101 | 0.0 | 0.0 |
| 0.100 | 225.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 99.600

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

Half Drain Time : 748 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.636 | 0.036 | 0.0 | 0.1 | 0.1 | 7.8 | O K |
| 30 min Summer | 99.647 | 0.047 | 0.0 | 0.2 | 0.2 | 10.1 | O K |
| 60 min Summer | 99.658 | 0.058 | 0.0 | 0.2 | 0.2 | 12.4 | O K |
| 120 min Summer | 99.668 | 0.068 | 0.0 | 0.2 | 0.2 | 14.6 | O K |
| 180 min Summer | 99.673 | 0.073 | 0.0 | 0.2 | 0.2 | 15.6 | O K |
| 240 min Summer | 99.676 | 0.076 | 0.0 | 0.2 | 0.2 | 16.2 | O K |
| 360 min Summer | 99.678 | 0.078 | 0.0 | 0.2 | 0.2 | 16.8 | O K |
| 480 min Summer | 99.679 | 0.079 | 0.0 | 0.2 | 0.2 | 17.0 | O K |
| 600 min Summer | 99.680 | 0.080 | 0.0 | 0.2 | 0.2 | 17.0 | O K |
| 720 min Summer | 99.680 | 0.080 | 0.0 | 0.2 | 0.2 | 17.0 | O K |
| 960 min Summer | 99.679 | 0.079 | 0.0 | 0.2 | 0.2 | 17.0 | O K |
| 1440 min Summer | 99.678 | 0.078 | 0.0 | 0.2 | 0.2 | 16.7 | O K |
| 2160 min Summer | 99.674 | 0.074 | 0.0 | 0.2 | 0.2 | 15.9 | O K |
| 2880 min Summer | 99.670 | 0.070 | 0.0 | 0.2 | 0.2 | 15.1 | O K |
| 4320 min Summer | 99.663 | 0.063 | 0.0 | 0.2 | 0.2 | 13.4 | O K |
| 5760 min Summer | 99.656 | 0.056 | 0.0 | 0.2 | 0.2 | 12.0 | O K |
| 7200 min Summer | 99.651 | 0.051 | 0.0 | 0.2 | 0.2 | 10.8 | O K |
| 8640 min Summer | 99.646 | 0.046 | 0.0 | 0.2 | 0.2 | 9.8 | O K |
| 10080 min Summer | 99.642 | 0.042 | 0.0 | 0.2 | 0.2 | 9.0 | O K |
| 15 min Winter | 99.641 | 0.041 | 0.0 | 0.2 | 0.2 | 8.7 | O K |
| 30 min Winter | 99.653 | 0.053 | 0.0 | 0.2 | 0.2 | 11.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 5.7 | 19 |
| 30 min Summer | 91.435 | 0.0 | 7.8 | 34 |
| 60 min Summer | 57.005 | 0.0 | 11.5 | 64 |
| 120 min Summer | 34.324 | 0.0 | 14.0 | 122 |
| 180 min Summer | 25.168 | 0.0 | 15.4 | 182 |
| 240 min Summer | 20.074 | 0.0 | 16.4 | 242 |
| 360 min Summer | 14.562 | 0.0 | 17.9 | 360 |
| 480 min Summer | 11.594 | 0.0 | 19.0 | 468 |
| 600 min Summer | 9.707 | 0.0 | 19.8 | 516 |
| 720 min Summer | 8.393 | 0.0 | 20.5 | 574 |
| 960 min Summer | 6.666 | 0.0 | 21.6 | 700 |
| 1440 min Summer | 4.811 | 0.0 | 22.8 | 968 |
| 2160 min Summer | 3.466 | 0.0 | 27.1 | 1384 |
| 2880 min Summer | 2.744 | 0.0 | 28.5 | 1788 |
| 4320 min Summer | 1.972 | 0.0 | 30.3 | 2556 |
| 5760 min Summer | 1.558 | 0.0 | 33.2 | 3344 |
| 7200 min Summer | 1.297 | 0.0 | 34.4 | 4104 |
| 8640 min Summer | 1.117 | 0.0 | 35.4 | 4832 |
| 10080 min Summer | 0.983 | 0.0 | 36.0 | 5544 |
| 15 min Winter | 139.635 | 0.0 | 6.5 | 19 |
| 30 min Winter | 91.435 | 0.0 | 8.8 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.665 | 0.065 | 0.0 | 0.2 | 0.2 | 13.9 | O K |
| 120 min Winter | 99.677 | 0.077 | 0.0 | 0.2 | 0.2 | 16.4 | O K |
| 180 min Winter | 99.682 | 0.082 | 0.0 | 0.2 | 0.2 | 17.6 | O K |
| 240 min Winter | 99.685 | 0.085 | 0.0 | 0.3 | 0.3 | 18.3 | O K |
| 360 min Winter | 99.689 | 0.089 | 0.0 | 0.3 | 0.3 | 19.0 | O K |
| 480 min Winter | 99.690 | 0.090 | 0.0 | 0.3 | 0.3 | 19.2 | O K |
| 600 min Winter | 99.690 | 0.090 | 0.0 | 0.3 | 0.3 | 19.3 | O K |
| 720 min Winter | 99.690 | 0.090 | 0.0 | 0.3 | 0.3 | 19.2 | O K |
| 960 min Winter | 99.689 | 0.089 | 0.0 | 0.3 | 0.3 | 19.0 | O K |
| 1440 min Winter | 99.686 | 0.086 | 0.0 | 0.3 | 0.3 | 18.4 | O K |
| 2160 min Winter | 99.680 | 0.080 | 0.0 | 0.2 | 0.2 | 17.1 | O K |
| 2880 min Winter | 99.674 | 0.074 | 0.0 | 0.2 | 0.2 | 15.8 | O K |
| 4320 min Winter | 99.663 | 0.063 | 0.0 | 0.2 | 0.2 | 13.4 | O K |
| 5760 min Winter | 99.654 | 0.054 | 0.0 | 0.2 | 0.2 | 11.5 | O K |
| 7200 min Winter | 99.647 | 0.047 | 0.0 | 0.2 | 0.2 | 10.0 | O K |
| 8640 min Winter | 99.641 | 0.041 | 0.0 | 0.2 | 0.2 | 8.8 | O K |
| 10080 min Winter | 99.637 | 0.037 | 0.0 | 0.1 | 0.1 | 7.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 12.9 | 62 |
| 120 min Winter | 34.324 | 0.0 | 15.7 | 120 |
| 180 min Winter | 25.168 | 0.0 | 17.3 | 178 |
| 240 min Winter | 20.074 | 0.0 | 18.5 | 236 |
| 360 min Winter | 14.562 | 0.0 | 20.1 | 350 |
| 480 min Winter | 11.594 | 0.0 | 21.3 | 460 |
| 600 min Winter | 9.707 | 0.0 | 22.2 | 566 |
| 720 min Winter | 8.393 | 0.0 | 23.0 | 650 |
| 960 min Winter | 6.666 | 0.0 | 24.1 | 740 |
| 1440 min Winter | 4.811 | 0.0 | 25.5 | 1050 |
| 2160 min Winter | 3.466 | 0.0 | 30.4 | 1492 |
| 2880 min Winter | 2.744 | 0.0 | 32.0 | 1908 |
| 4320 min Winter | 1.972 | 0.0 | 34.0 | 2724 |
| 5760 min Winter | 1.558 | 0.0 | 37.2 | 3512 |
| 7200 min Winter | 1.297 | 0.0 | 38.6 | 4248 |
| 8640 min Winter | 1.117 | 0.0 | 39.7 | 5008 |
| 10080 min Winter | 0.983 | 0.0 | 40.5 | 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.030

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.030 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 225.0 | 0.0 | 0.101 | 0.0 | 0.0 |
| 0.100 | 225.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 1 year Return Period

Half Drain Time : 1669 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.608 | 0.008 | 0.0 | 0.0 | 0.0 | 9.5 | O K |
| 30 min Summer | 99.610 | 0.010 | 0.0 | 0.0 | 0.0 | 12.4 | O K |
| 60 min Summer | 99.613 | 0.013 | 0.0 | 0.1 | 0.1 | 15.5 | O K |
| 120 min Summer | 99.616 | 0.016 | 0.0 | 0.1 | 0.1 | 19.1 | O K |
| 180 min Summer | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 21.3 | O K |
| 240 min Summer | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 23.0 | O K |
| 360 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 25.2 | O K |
| 480 min Summer | 99.622 | 0.022 | 0.0 | 0.2 | 0.2 | 26.7 | O K |
| 600 min Summer | 99.623 | 0.023 | 0.0 | 0.2 | 0.2 | 27.7 | O K |
| 720 min Summer | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 28.4 | O K |
| 960 min Summer | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 29.3 | O K |
| 1440 min Summer | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 30.3 | O K |
| 2160 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 31.4 | O K |
| 2880 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 32.0 | O K |
| 4320 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 32.3 | O K |
| 5760 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 32.2 | O K |
| 7200 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 31.8 | O K |
| 8640 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 31.3 | O K |
| 10080 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 30.8 | O K |
| 15 min Winter | 99.609 | 0.009 | 0.0 | 0.0 | 0.0 | 10.6 | O K |
| 30 min Winter | 99.612 | 0.012 | 0.0 | 0.0 | 0.0 | 13.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 1.6 | 19 |
| 30 min Summer | 20.382 | 0.0 | 2.5 | 34 |
| 60 min Summer | 12.872 | 0.0 | 6.1 | 64 |
| 120 min Summer | 7.964 | 0.0 | 8.4 | 124 |
| 180 min Summer | 5.985 | 0.0 | 10.0 | 184 |
| 240 min Summer | 4.881 | 0.0 | 11.3 | 244 |
| 360 min Summer | 3.639 | 0.0 | 13.2 | 362 |
| 480 min Summer | 2.946 | 0.0 | 14.5 | 482 |
| 600 min Summer | 2.501 | 0.0 | 15.6 | 602 |
| 720 min Summer | 2.188 | 0.0 | 16.5 | 720 |
| 960 min Summer | 1.771 | 0.0 | 17.9 | 932 |
| 1440 min Summer | 1.316 | 0.0 | 19.6 | 1138 |
| 2160 min Summer | 0.978 | 0.0 | 31.0 | 1492 |
| 2880 min Summer | 0.792 | 0.0 | 33.1 | 1900 |
| 4320 min Summer | 0.587 | 0.0 | 35.0 | 2684 |
| 5760 min Summer | 0.476 | 0.0 | 47.7 | 3512 |
| 7200 min Summer | 0.404 | 0.0 | 50.0 | 4256 |
| 8640 min Summer | 0.354 | 0.0 | 51.5 | 5016 |
| 10080 min Summer | 0.316 | 0.0 | 52.1 | 5840 |
| 15 min Winter | 31.306 | 0.0 | 1.9 | 19 |
| 30 min Winter | 20.382 | 0.0 | 3.0 | 34 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.615 | 0.015 | 0.0 | 0.1 | 0.1 | 17.4 | O K |
| 120 min Winter | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 21.4 | O K |
| 180 min Winter | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 23.9 | O K |
| 240 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 25.7 | O K |
| 360 min Winter | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 28.2 | O K |
| 480 min Winter | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 29.7 | O K |
| 600 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 30.8 | O K |
| 720 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 31.6 | O K |
| 960 min Winter | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 32.5 | O K |
| 1440 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 33.5 | O K |
| 2160 min Winter | 99.629 | 0.029 | 0.0 | 0.3 | 0.3 | 34.4 | O K |
| 2880 min Winter | 99.629 | 0.029 | 0.0 | 0.3 | 0.3 | 34.6 | O K |
| 4320 min Winter | 99.629 | 0.029 | 0.0 | 0.3 | 0.3 | 34.1 | O K |
| 5760 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 33.3 | O K |
| 7200 min Winter | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 32.4 | O K |
| 8640 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 31.5 | O K |
| 10080 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 30.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 7.3 | 64 |
| 120 min Winter | 7.964 | 0.0 | 10.0 | 122 |
| 180 min Winter | 5.985 | 0.0 | 11.9 | 182 |
| 240 min Winter | 4.881 | 0.0 | 13.4 | 240 |
| 360 min Winter | 3.639 | 0.0 | 15.5 | 356 |
| 480 min Winter | 2.946 | 0.0 | 17.1 | 472 |
| 600 min Winter | 2.501 | 0.0 | 18.4 | 584 |
| 720 min Winter | 2.188 | 0.0 | 19.5 | 696 |
| 960 min Winter | 1.771 | 0.0 | 21.1 | 906 |
| 1440 min Winter | 1.316 | 0.0 | 23.2 | 1112 |
| 2160 min Winter | 0.978 | 0.0 | 35.8 | 1576 |
| 2880 min Winter | 0.792 | 0.0 | 38.2 | 2016 |
| 4320 min Winter | 0.587 | 0.0 | 40.5 | 2852 |
| 5760 min Winter | 0.476 | 0.0 | 54.2 | 3688 |
| 7200 min Winter | 0.404 | 0.0 | 56.9 | 4464 |
| 8640 min Winter | 0.354 | 0.0 | 58.6 | 5280 |
| 10080 min Winter | 0.316 | 0.0 | 59.4 | 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.162

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.162 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1258.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1258.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.049 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 30 year Return Period

Half Drain Time : 1120 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 23.3 | O K |
| 30 min Summer | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 30.1 | O K |
| 60 min Summer | 99.631 | 0.031 | 0.0 | 0.3 | 0.3 | 37.1 | O K |
| 120 min Summer | 99.637 | 0.037 | 0.0 | 0.4 | 0.4 | 44.1 | O K |
| 180 min Summer | 99.640 | 0.040 | 0.0 | 0.5 | 0.5 | 47.9 | O K |
| 240 min Summer | 99.642 | 0.042 | 0.0 | 0.5 | 0.5 | 50.3 | O K |
| 360 min Summer | 99.645 | 0.045 | 0.0 | 0.5 | 0.5 | 53.2 | O K |
| 480 min Summer | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 54.8 | O K |
| 600 min Summer | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 55.6 | O K |
| 720 min Summer | 99.647 | 0.047 | 0.0 | 0.6 | 0.6 | 56.0 | O K |
| 960 min Summer | 99.647 | 0.047 | 0.0 | 0.6 | 0.6 | 56.7 | O K |
| 1440 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 57.6 | O K |
| 2160 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 57.8 | O K |
| 2880 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 57.3 | O K |
| 4320 min Summer | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 55.4 | O K |
| 5760 min Summer | 99.645 | 0.045 | 0.0 | 0.5 | 0.5 | 53.3 | O K |
| 7200 min Summer | 99.643 | 0.043 | 0.0 | 0.5 | 0.5 | 51.3 | O K |
| 8640 min Summer | 99.641 | 0.041 | 0.0 | 0.5 | 0.5 | 49.4 | O K |
| 10080 min Summer | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 47.6 | O K |
| 15 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 26.1 | O K |
| 30 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 33.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 7.4 | 19 |
| 30 min Summer | 49.886 | 0.0 | 11.2 | 34 |
| 60 min Summer | 30.968 | 0.0 | 22.4 | 64 |
| 120 min Summer | 18.658 | 0.0 | 28.8 | 124 |
| 180 min Summer | 13.726 | 0.0 | 32.6 | 182 |
| 240 min Summer | 10.992 | 0.0 | 35.4 | 242 |
| 360 min Summer | 8.021 | 0.0 | 39.4 | 362 |
| 480 min Summer | 6.411 | 0.0 | 42.4 | 480 |
| 600 min Summer | 5.385 | 0.0 | 44.7 | 600 |
| 720 min Summer | 4.668 | 0.0 | 46.5 | 646 |
| 960 min Summer | 3.724 | 0.0 | 49.3 | 760 |
| 1440 min Summer | 2.706 | 0.0 | 52.5 | 1008 |
| 2160 min Summer | 1.964 | 0.0 | 71.6 | 1408 |
| 2880 min Summer | 1.563 | 0.0 | 75.2 | 1816 |
| 4320 min Summer | 1.132 | 0.0 | 78.5 | 2636 |
| 5760 min Summer | 0.900 | 0.0 | 96.3 | 3400 |
| 7200 min Summer | 0.753 | 0.0 | 99.8 | 4176 |
| 8640 min Summer | 0.651 | 0.0 | 102.0 | 4928 |
| 10080 min Summer | 0.575 | 0.0 | 102.7 | 5656 |
| 15 min Winter | 76.822 | 0.0 | 8.9 | 19 |
| 30 min Winter | 49.886 | 0.0 | 13.5 | 34 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.635 | 0.035 | 0.0 | 0.4 | 0.4 | 41.5 | O K |
| 120 min Winter | 99.641 | 0.041 | 0.0 | 0.5 | 0.5 | 49.3 | O K |
| 180 min Winter | 99.645 | 0.045 | 0.0 | 0.5 | 0.5 | 53.5 | O K |
| 240 min Winter | 99.647 | 0.047 | 0.0 | 0.6 | 0.6 | 56.2 | O K |
| 360 min Winter | 99.650 | 0.050 | 0.0 | 0.6 | 0.6 | 59.4 | O K |
| 480 min Winter | 99.651 | 0.051 | 0.0 | 0.7 | 0.7 | 61.2 | O K |
| 600 min Winter | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 62.1 | O K |
| 720 min Winter | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 62.5 | O K |
| 960 min Winter | 99.653 | 0.053 | 0.0 | 0.7 | 0.7 | 63.0 | O K |
| 1440 min Winter | 99.653 | 0.053 | 0.0 | 0.7 | 0.7 | 63.4 | O K |
| 2160 min Winter | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 62.5 | O K |
| 2880 min Winter | 99.651 | 0.051 | 0.0 | 0.7 | 0.7 | 60.8 | O K |
| 4320 min Winter | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 57.3 | O K |
| 5760 min Winter | 99.645 | 0.045 | 0.0 | 0.6 | 0.6 | 53.9 | O K |
| 7200 min Winter | 99.643 | 0.043 | 0.0 | 0.5 | 0.5 | 50.9 | O K |
| 8640 min Winter | 99.640 | 0.040 | 0.0 | 0.5 | 0.5 | 48.4 | O K |
| 10080 min Winter | 99.639 | 0.039 | 0.0 | 0.4 | 0.4 | 46.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 26.2 | 64 |
| 120 min Winter | 18.658 | 0.0 | 33.4 | 122 |
| 180 min Winter | 13.726 | 0.0 | 37.8 | 180 |
| 240 min Winter | 10.992 | 0.0 | 40.9 | 238 |
| 360 min Winter | 8.021 | 0.0 | 45.5 | 352 |
| 480 min Winter | 6.411 | 0.0 | 48.9 | 464 |
| 600 min Winter | 5.385 | 0.0 | 51.5 | 572 |
| 720 min Winter | 4.668 | 0.0 | 53.6 | 674 |
| 960 min Winter | 3.724 | 0.0 | 56.8 | 760 |
| 1440 min Winter | 2.706 | 0.0 | 60.5 | 1056 |
| 2160 min Winter | 1.964 | 0.0 | 81.5 | 1512 |
| 2880 min Winter | 1.563 | 0.0 | 85.6 | 1936 |
| 4320 min Winter | 1.132 | 0.0 | 89.4 | 2768 |
| 5760 min Winter | 0.900 | 0.0 | 108.8 | 3576 |
| 7200 min Winter | 0.753 | 0.0 | 112.8 | 4392 |
| 8640 min Winter | 0.651 | 0.0 | 115.3 | 5184 |
| 10080 min Winter | 0.575 | 0.0 | 116.3 | 5952 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.162

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.162 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1258.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1258.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.049 Discharge Coefficient 0.600 Invert Level (m) 99.600

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

Half Drain Time : 986 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.635 | 0.035 | 0.0 | 0.4 | 0.4 | 42.2 | O K |
| 30 min Summer | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 55.0 | O K |
| 60 min Summer | 99.657 | 0.057 | 0.0 | 0.8 | 0.8 | 67.9 | O K |
| 120 min Summer | 99.667 | 0.067 | 0.0 | 1.0 | 1.0 | 80.1 | O K |
| 180 min Summer | 99.672 | 0.072 | 0.0 | 1.1 | 1.1 | 86.2 | O K |
| 240 min Summer | 99.675 | 0.075 | 0.0 | 1.1 | 1.1 | 89.8 | O K |
| 360 min Summer | 99.678 | 0.078 | 0.0 | 1.2 | 1.2 | 93.8 | O K |
| 480 min Summer | 99.680 | 0.080 | 0.0 | 1.2 | 1.2 | 95.6 | O K |
| 600 min Summer | 99.681 | 0.081 | 0.0 | 1.2 | 1.2 | 96.3 | O K |
| 720 min Summer | 99.681 | 0.081 | 0.0 | 1.2 | 1.2 | 96.9 | O K |
| 960 min Summer | 99.682 | 0.082 | 0.0 | 1.2 | 1.2 | 97.6 | O K |
| 1440 min Summer | 99.682 | 0.082 | 0.0 | 1.2 | 1.2 | 97.8 | O K |
| 2160 min Summer | 99.680 | 0.080 | 0.0 | 1.2 | 1.2 | 96.2 | O K |
| 2880 min Summer | 99.678 | 0.078 | 0.0 | 1.2 | 1.2 | 93.6 | O K |
| 4320 min Summer | 99.673 | 0.073 | 0.0 | 1.1 | 1.1 | 87.7 | O K |
| 5760 min Summer | 99.669 | 0.069 | 0.0 | 1.0 | 1.0 | 82.3 | O K |
| 7200 min Summer | 99.665 | 0.065 | 0.0 | 1.0 | 1.0 | 77.8 | O K |
| 8640 min Summer | 99.662 | 0.062 | 0.0 | 0.9 | 0.9 | 73.9 | O K |
| 10080 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 70.4 | O K |
| 15 min Winter | 99.640 | 0.040 | 0.0 | 0.4 | 0.4 | 47.3 | O K |
| 30 min Winter | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 61.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 19.1 | 19 |
| 30 min Summer | 91.435 | 0.0 | 28.2 | 34 |
| 60 min Summer | 57.005 | 0.0 | 49.8 | 64 |
| 120 min Summer | 34.324 | 0.0 | 62.3 | 122 |
| 180 min Summer | 25.168 | 0.0 | 69.7 | 182 |
| 240 min Summer | 20.074 | 0.0 | 74.7 | 242 |
| 360 min Summer | 14.562 | 0.0 | 81.9 | 362 |
| 480 min Summer | 11.594 | 0.0 | 87.3 | 480 |
| 600 min Summer | 9.707 | 0.0 | 91.4 | 548 |
| 720 min Summer | 8.393 | 0.0 | 94.7 | 602 |
| 960 min Summer | 6.666 | 0.0 | 99.6 | 722 |
| 1440 min Summer | 4.811 | 0.0 | 104.7 | 982 |
| 2160 min Summer | 3.466 | 0.0 | 135.2 | 1388 |
| 2880 min Summer | 2.744 | 0.0 | 141.5 | 1792 |
| 4320 min Summer | 1.972 | 0.0 | 147.5 | 2592 |
| 5760 min Summer | 1.558 | 0.0 | 172.4 | 3344 |
| 7200 min Summer | 1.297 | 0.0 | 178.2 | 4104 |
| 8640 min Summer | 1.117 | 0.0 | 182.0 | 4840 |
| 10080 min Summer | 0.983 | 0.0 | 183.5 | 5552 |
| 15 min Winter | 139.635 | 0.0 | 22.6 | 19 |
| 30 min Winter | 91.435 | 0.0 | 32.9 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.664 | 0.064 | 0.0 | 0.9 | 0.9 | 76.0 | O K |
| 120 min Winter | 99.675 | 0.075 | 0.0 | 1.1 | 1.1 | 89.7 | O K |
| 180 min Winter | 99.681 | 0.081 | 0.0 | 1.2 | 1.2 | 96.7 | O K |
| 240 min Winter | 99.684 | 0.084 | 0.0 | 1.2 | 1.2 | 100.9 | O K |
| 360 min Winter | 99.688 | 0.088 | 0.0 | 1.3 | 1.3 | 105.6 | O K |
| 480 min Winter | 99.690 | 0.090 | 0.0 | 1.3 | 1.3 | 108.0 | O K |
| 600 min Winter | 99.691 | 0.091 | 0.0 | 1.3 | 1.3 | 109.0 | O K |
| 720 min Winter | 99.691 | 0.091 | 0.0 | 1.3 | 1.3 | 109.2 | O K |
| 960 min Winter | 99.691 | 0.091 | 0.0 | 1.3 | 1.3 | 109.2 | O K |
| 1440 min Winter | 99.690 | 0.090 | 0.0 | 1.3 | 1.3 | 108.1 | O K |
| 2160 min Winter | 99.687 | 0.087 | 0.0 | 1.3 | 1.3 | 104.0 | O K |
| 2880 min Winter | 99.683 | 0.083 | 0.0 | 1.2 | 1.2 | 99.0 | O K |
| 4320 min Winter | 99.675 | 0.075 | 0.0 | 1.1 | 1.1 | 89.3 | O K |
| 5760 min Winter | 99.668 | 0.068 | 0.0 | 1.0 | 1.0 | 81.6 | O K |
| 7200 min Winter | 99.663 | 0.063 | 0.0 | 0.9 | 0.9 | 75.7 | O K |
| 8640 min Winter | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 70.9 | O K |
| 10080 min Winter | 99.656 | 0.056 | 0.0 | 0.8 | 0.8 | 66.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 57.3 | 62 |
| 120 min Winter | 34.324 | 0.0 | 71.4 | 120 |
| 180 min Winter | 25.168 | 0.0 | 79.6 | 180 |
| 240 min Winter | 20.074 | 0.0 | 85.2 | 238 |
| 360 min Winter | 14.562 | 0.0 | 93.4 | 352 |
| 480 min Winter | 11.594 | 0.0 | 99.3 | 464 |
| 600 min Winter | 9.707 | 0.0 | 104.0 | 570 |
| 720 min Winter | 8.393 | 0.0 | 107.6 | 670 |
| 960 min Winter | 6.666 | 0.0 | 112.9 | 752 |
| 1440 min Winter | 4.811 | 0.0 | 118.6 | 1054 |
| 2160 min Winter | 3.466 | 0.0 | 152.7 | 1496 |
| 2880 min Winter | 2.744 | 0.0 | 160.0 | 1932 |
| 4320 min Winter | 1.972 | 0.0 | 167.1 | 2724 |
| 5760 min Winter | 1.558 | 0.0 | 194.0 | 3512 |
| 7200 min Winter | 1.297 | 0.0 | 200.6 | 4256 |
| 8640 min Winter | 1.117 | 0.0 | 205.2 | 5016 |
| 10080 min Winter | 0.983 | 0.0 | 207.2 | 5760 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.162

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.162 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1258.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1258.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.049 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 100 year Return Period

Half Drain Time : 992 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 30.2 | O K |
| 30 min Summer | 99.633 | 0.033 | 0.0 | 0.3 | 0.3 | 39.4 | O K |
| 60 min Summer | 99.641 | 0.041 | 0.0 | 0.5 | 0.5 | 48.7 | O K |
| 120 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 57.6 | O K |
| 180 min Summer | 99.652 | 0.052 | 0.0 | 0.7 | 0.7 | 62.2 | O K |
| 240 min Summer | 99.654 | 0.054 | 0.0 | 0.7 | 0.7 | 64.9 | O K |
| 360 min Summer | 99.657 | 0.057 | 0.0 | 0.8 | 0.8 | 67.9 | O K |
| 480 min Summer | 99.658 | 0.058 | 0.0 | 0.8 | 0.8 | 69.3 | O K |
| 600 min Summer | 99.658 | 0.058 | 0.0 | 0.8 | 0.8 | 69.9 | O K |
| 720 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 70.3 | O K |
| 960 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 70.9 | O K |
| 1440 min Summer | 99.660 | 0.060 | 0.0 | 0.9 | 0.9 | 71.4 | O K |
| 2160 min Summer | 99.659 | 0.059 | 0.0 | 0.8 | 0.8 | 70.8 | O K |
| 2880 min Summer | 99.658 | 0.058 | 0.0 | 0.8 | 0.8 | 69.4 | O K |
| 4320 min Summer | 99.655 | 0.055 | 0.0 | 0.8 | 0.8 | 66.2 | O K |
| 5760 min Summer | 99.653 | 0.053 | 0.0 | 0.7 | 0.7 | 62.9 | O K |
| 7200 min Summer | 99.650 | 0.050 | 0.0 | 0.7 | 0.7 | 60.0 | O K |
| 8640 min Summer | 99.648 | 0.048 | 0.0 | 0.6 | 0.6 | 57.4 | O K |
| 10080 min Summer | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 55.0 | O K |
| 15 min Winter | 99.628 | 0.028 | 0.0 | 0.3 | 0.3 | 33.8 | O K |
| 30 min Winter | 99.637 | 0.037 | 0.0 | 0.4 | 0.4 | 44.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 11.3 | 19 |
| 30 min Summer | 65.311 | 0.0 | 17.2 | 34 |
| 60 min Summer | 40.718 | 0.0 | 32.4 | 64 |
| 120 min Summer | 24.517 | 0.0 | 41.1 | 124 |
| 180 min Summer | 17.977 | 0.0 | 46.1 | 182 |
| 240 min Summer | 14.339 | 0.0 | 49.6 | 242 |
| 360 min Summer | 10.402 | 0.0 | 54.7 | 362 |
| 480 min Summer | 8.281 | 0.0 | 58.4 | 480 |
| 600 min Summer | 6.934 | 0.0 | 61.2 | 562 |
| 720 min Summer | 5.995 | 0.0 | 63.5 | 608 |
| 960 min Summer | 4.761 | 0.0 | 66.9 | 724 |
| 1440 min Summer | 3.436 | 0.0 | 70.7 | 982 |
| 2160 min Summer | 2.476 | 0.0 | 93.2 | 1388 |
| 2880 min Summer | 1.960 | 0.0 | 97.4 | 1792 |
| 4320 min Summer | 1.408 | 0.0 | 101.0 | 2596 |
| 5760 min Summer | 1.113 | 0.0 | 120.9 | 3352 |
| 7200 min Summer | 0.927 | 0.0 | 124.7 | 4112 |
| 8640 min Summer | 0.798 | 0.0 | 127.1 | 4904 |
| 10080 min Summer | 0.702 | 0.0 | 127.7 | 5648 |
| 15 min Winter | 99.739 | 0.0 | 13.5 | 19 |
| 30 min Winter | 65.311 | 0.0 | 20.4 | 34 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.646 | 0.046 | 0.0 | 0.6 | 0.6 | 54.5 | O K |
| 120 min Winter | 99.654 | 0.054 | 0.0 | 0.7 | 0.7 | 64.4 | O K |
| 180 min Winter | 99.658 | 0.058 | 0.0 | 0.8 | 0.8 | 69.6 | O K |
| 240 min Winter | 99.661 | 0.061 | 0.0 | 0.9 | 0.9 | 72.6 | O K |
| 360 min Winter | 99.664 | 0.064 | 0.0 | 0.9 | 0.9 | 76.0 | O K |
| 480 min Winter | 99.665 | 0.065 | 0.0 | 1.0 | 1.0 | 77.6 | O K |
| 600 min Winter | 99.666 | 0.066 | 0.0 | 1.0 | 1.0 | 78.3 | O K |
| 720 min Winter | 99.666 | 0.066 | 0.0 | 1.0 | 1.0 | 78.4 | O K |
| 960 min Winter | 99.666 | 0.066 | 0.0 | 1.0 | 1.0 | 78.8 | O K |
| 1440 min Winter | 99.666 | 0.066 | 0.0 | 1.0 | 1.0 | 78.4 | O K |
| 2160 min Winter | 99.664 | 0.064 | 0.0 | 0.9 | 0.9 | 76.1 | O K |
| 2880 min Winter | 99.661 | 0.061 | 0.0 | 0.9 | 0.9 | 73.3 | O K |
| 4320 min Winter | 99.657 | 0.057 | 0.0 | 0.8 | 0.8 | 67.8 | O K |
| 5760 min Winter | 99.653 | 0.053 | 0.0 | 0.7 | 0.7 | 63.1 | O K |
| 7200 min Winter | 99.650 | 0.050 | 0.0 | 0.6 | 0.6 | 59.2 | O K |
| 8640 min Winter | 99.647 | 0.047 | 0.0 | 0.6 | 0.6 | 55.7 | O K |
| 10080 min Winter | 99.644 | 0.044 | 0.0 | 0.5 | 0.5 | 52.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 37.6 | 62 |
| 120 min Winter | 24.517 | 0.0 | 47.4 | 122 |
| 180 min Winter | 17.977 | 0.0 | 53.1 | 180 |
| 240 min Winter | 14.339 | 0.0 | 57.1 | 238 |
| 360 min Winter | 10.402 | 0.0 | 62.8 | 352 |
| 480 min Winter | 8.281 | 0.0 | 67.0 | 462 |
| 600 min Winter | 6.934 | 0.0 | 70.2 | 566 |
| 720 min Winter | 5.995 | 0.0 | 72.9 | 658 |
| 960 min Winter | 4.761 | 0.0 | 76.8 | 742 |
| 1440 min Winter | 3.436 | 0.0 | 81.0 | 1042 |
| 2160 min Winter | 2.476 | 0.0 | 105.8 | 1492 |
| 2880 min Winter | 1.960 | 0.0 | 110.6 | 1928 |
| 4320 min Winter | 1.408 | 0.0 | 114.8 | 2728 |
| 5760 min Winter | 1.113 | 0.0 | 136.3 | 3528 |
| 7200 min Winter | 0.927 | 0.0 | 140.7 | 4320 |
| 8640 min Winter | 0.798 | 0.0 | 143.5 | 5104 |
| 10080 min Winter | 0.702 | 0.0 | 144.4 | 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.162

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.162 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1258.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 1258.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.049 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 1 year Return Period

Half Drain Time : 1469 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.609 | 0.009 | 0.0 | 0.0 | 0.0 | 7.1 | O K |
| 30 min Summer | 99.611 | 0.011 | 0.0 | 0.0 | 0.0 | 9.2 | O K |
| 60 min Summer | 99.614 | 0.014 | 0.0 | 0.1 | 0.1 | 11.6 | O K |
| 120 min Summer | 99.617 | 0.017 | 0.0 | 0.1 | 0.1 | 14.2 | O K |
| 180 min Summer | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 15.8 | O K |
| 240 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 17.0 | O K |
| 360 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 18.4 | O K |
| 480 min Summer | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 19.4 | O K |
| 600 min Summer | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 20.0 | O K |
| 720 min Summer | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 20.5 | O K |
| 960 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 21.0 | O K |
| 1440 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 21.9 | O K |
| 2160 min Summer | 99.628 | 0.028 | 0.0 | 0.2 | 0.2 | 22.6 | O K |
| 2880 min Summer | 99.628 | 0.028 | 0.0 | 0.2 | 0.2 | 22.9 | O K |
| 4320 min Summer | 99.628 | 0.028 | 0.0 | 0.2 | 0.2 | 23.0 | O K |
| 5760 min Summer | 99.628 | 0.028 | 0.0 | 0.2 | 0.2 | 22.7 | O K |
| 7200 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 22.2 | O K |
| 8640 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 21.7 | O K |
| 10080 min Summer | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 21.2 | O K |
| 15 min Winter | 99.610 | 0.010 | 0.0 | 0.0 | 0.0 | 7.9 | O K |
| 30 min Winter | 99.613 | 0.013 | 0.0 | 0.0 | 0.0 | 10.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 32.769 | 0.0 | 1.5 | 19 |
| 30 min Summer | 21.394 | 0.0 | 2.3 | 34 |
| 60 min Summer | 13.524 | 0.0 | 5.3 | 64 |
| 120 min Summer | 8.376 | 0.0 | 7.3 | 124 |
| 180 min Summer | 6.298 | 0.0 | 8.6 | 184 |
| 240 min Summer | 5.136 | 0.0 | 9.7 | 242 |
| 360 min Summer | 3.818 | 0.0 | 11.2 | 362 |
| 480 min Summer | 3.092 | 0.0 | 12.4 | 482 |
| 600 min Summer | 2.625 | 0.0 | 13.3 | 600 |
| 720 min Summer | 2.297 | 0.0 | 14.0 | 720 |
| 960 min Summer | 1.860 | 0.0 | 15.2 | 838 |
| 1440 min Summer | 1.382 | 0.0 | 16.6 | 1068 |
| 2160 min Summer | 1.027 | 0.0 | 24.8 | 1468 |
| 2880 min Summer | 0.831 | 0.0 | 26.5 | 1872 |
| 4320 min Summer | 0.617 | 0.0 | 28.2 | 2680 |
| 5760 min Summer | 0.500 | 0.0 | 36.9 | 3464 |
| 7200 min Summer | 0.425 | 0.0 | 38.7 | 4248 |
| 8640 min Summer | 0.372 | 0.0 | 40.0 | 5016 |
| 10080 min Summer | 0.332 | 0.0 | 40.7 | 5752 |
| 15 min Winter | 32.769 | 0.0 | 1.8 | 19 |
| 30 min Winter | 21.394 | 0.0 | 2.8 | 34 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.616 | 0.016 | 0.0 | 0.1 | 0.1 | 13.0 | O K |
| 120 min Winter | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 15.9 | O K |
| 180 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 17.7 | O K |
| 240 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 19.0 | O K |
| 360 min Winter | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 20.6 | O K |
| 480 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 21.7 | O K |
| 600 min Winter | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 22.4 | O K |
| 720 min Winter | 99.628 | 0.028 | 0.0 | 0.2 | 0.2 | 22.9 | O K |
| 960 min Winter | 99.629 | 0.029 | 0.0 | 0.2 | 0.2 | 23.5 | O K |
| 1440 min Winter | 99.630 | 0.030 | 0.0 | 0.2 | 0.2 | 24.3 | O K |
| 2160 min Winter | 99.630 | 0.030 | 0.0 | 0.2 | 0.2 | 24.8 | O K |
| 2880 min Winter | 99.630 | 0.030 | 0.0 | 0.2 | 0.2 | 24.7 | O K |
| 4320 min Winter | 99.629 | 0.029 | 0.0 | 0.2 | 0.2 | 24.2 | O K |
| 5760 min Winter | 99.628 | 0.028 | 0.0 | 0.2 | 0.2 | 23.3 | O K |
| 7200 min Winter | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 22.4 | O K |
| 8640 min Winter | 99.626 | 0.026 | 0.0 | 0.2 | 0.2 | 21.5 | O K |
| 10080 min Winter | 99.625 | 0.025 | 0.0 | 0.2 | 0.2 | 20.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 13.524 | 0.0 | 6.3 | 64 |
| 120 min Winter | 8.376 | 0.0 | 8.6 | 122 |
| 180 min Winter | 6.298 | 0.0 | 10.2 | 180 |
| 240 min Winter | 5.136 | 0.0 | 11.4 | 238 |
| 360 min Winter | 3.818 | 0.0 | 13.1 | 356 |
| 480 min Winter | 3.092 | 0.0 | 14.4 | 470 |
| 600 min Winter | 2.625 | 0.0 | 15.5 | 582 |
| 720 min Winter | 2.297 | 0.0 | 16.3 | 692 |
| 960 min Winter | 1.860 | 0.0 | 17.6 | 896 |
| 1440 min Winter | 1.382 | 0.0 | 19.3 | 1098 |
| 2160 min Winter | 1.027 | 0.0 | 28.3 | 1556 |
| 2880 min Winter | 0.831 | 0.0 | 30.3 | 1992 |
| 4320 min Winter | 0.617 | 0.0 | 32.3 | 2852 |
| 5760 min Winter | 0.500 | 0.0 | 41.7 | 3688 |
| 7200 min Winter | 0.425 | 0.0 | 43.9 | 4472 |
| 8640 min Winter | 0.372 | 0.0 | 45.4 | 5272 |
| 10080 min Winter | 0.332 | 0.0 | 46.2 | 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) | 21.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.115

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.115 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 865.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 865.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.036 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 30 year Return Period

Half Drain Time : 1073 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 17.3 | O K |
| 30 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 22.4 | O K |
| 60 min Summer | 99.633 | 0.033 | 0.0 | 0.3 | 0.3 | 27.5 | O K |
| 120 min Summer | 99.640 | 0.040 | 0.0 | 0.3 | 0.3 | 32.5 | O K |
| 180 min Summer | 99.643 | 0.043 | 0.0 | 0.4 | 0.4 | 35.1 | O K |
| 240 min Summer | 99.645 | 0.045 | 0.0 | 0.4 | 0.4 | 36.8 | O K |
| 360 min Summer | 99.647 | 0.047 | 0.0 | 0.4 | 0.4 | 38.8 | O K |
| 480 min Summer | 99.648 | 0.048 | 0.0 | 0.5 | 0.5 | 39.8 | O K |
| 600 min Summer | 99.649 | 0.049 | 0.0 | 0.5 | 0.5 | 40.2 | O K |
| 720 min Summer | 99.649 | 0.049 | 0.0 | 0.5 | 0.5 | 40.6 | O K |
| 960 min Summer | 99.650 | 0.050 | 0.0 | 0.5 | 0.5 | 41.1 | O K |
| 1440 min Summer | 99.651 | 0.051 | 0.0 | 0.5 | 0.5 | 41.6 | O K |
| 2160 min Summer | 99.650 | 0.050 | 0.0 | 0.5 | 0.5 | 41.5 | O K |
| 2880 min Summer | 99.650 | 0.050 | 0.0 | 0.5 | 0.5 | 40.9 | O K |
| 4320 min Summer | 99.648 | 0.048 | 0.0 | 0.4 | 0.4 | 39.2 | O K |
| 5760 min Summer | 99.646 | 0.046 | 0.0 | 0.4 | 0.4 | 37.4 | O K |
| 7200 min Summer | 99.643 | 0.043 | 0.0 | 0.4 | 0.4 | 35.7 | O K |
| 8640 min Summer | 99.642 | 0.042 | 0.0 | 0.4 | 0.4 | 34.2 | O K |
| 10080 min Summer | 99.640 | 0.040 | 0.0 | 0.3 | 0.3 | 32.9 | O K |
| 15 min Winter | 99.624 | 0.024 | 0.0 | 0.2 | 0.2 | 19.4 | O K |
| 30 min Winter | 99.630 | 0.030 | 0.0 | 0.2 | 0.2 | 25.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 80.466 | 0.0 | 6.6 | 19 |
| 30 min Summer | 52.218 | 0.0 | 9.9 | 34 |
| 60 min Summer | 32.372 | 0.0 | 18.4 | 64 |
| 120 min Summer | 19.460 | 0.0 | 23.1 | 124 |
| 180 min Summer | 14.290 | 0.0 | 26.0 | 182 |
| 240 min Summer | 11.432 | 0.0 | 28.1 | 242 |
| 360 min Summer | 8.348 | 0.0 | 31.2 | 362 |
| 480 min Summer | 6.671 | 0.0 | 33.4 | 480 |
| 600 min Summer | 5.602 | 0.0 | 35.2 | 574 |
| 720 min Summer | 4.856 | 0.0 | 36.6 | 616 |
| 960 min Summer | 3.873 | 0.0 | 38.7 | 738 |
| 1440 min Summer | 2.813 | 0.0 | 41.0 | 984 |
| 2160 min Summer | 2.040 | 0.0 | 54.8 | 1404 |
| 2880 min Summer | 1.624 | 0.0 | 57.6 | 1812 |
| 4320 min Summer | 1.176 | 0.0 | 60.2 | 2596 |
| 5760 min Summer | 0.934 | 0.0 | 72.3 | 3392 |
| 7200 min Summer | 0.782 | 0.0 | 75.0 | 4176 |
| 8640 min Summer | 0.675 | 0.0 | 76.8 | 4920 |
| 10080 min Summer | 0.597 | 0.0 | 77.6 | 5648 |
| 15 min Winter | 80.466 | 0.0 | 7.9 | 19 |
| 30 min Winter | 52.218 | 0.0 | 11.7 | 34 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.637 | 0.037 | 0.0 | 0.3 | 0.3 | 30.8 | O K |
| 120 min Winter | 99.644 | 0.044 | 0.0 | 0.4 | 0.4 | 36.3 | O K |
| 180 min Winter | 99.648 | 0.048 | 0.0 | 0.4 | 0.4 | 39.3 | O K |
| 240 min Winter | 99.650 | 0.050 | 0.0 | 0.5 | 0.5 | 41.1 | O K |
| 360 min Winter | 99.653 | 0.053 | 0.0 | 0.5 | 0.5 | 43.4 | O K |
| 480 min Winter | 99.654 | 0.054 | 0.0 | 0.5 | 0.5 | 44.6 | O K |
| 600 min Winter | 99.655 | 0.055 | 0.0 | 0.5 | 0.5 | 45.3 | O K |
| 720 min Winter | 99.655 | 0.055 | 0.0 | 0.5 | 0.5 | 45.5 | O K |
| 960 min Winter | 99.656 | 0.056 | 0.0 | 0.5 | 0.5 | 45.8 | O K |
| 1440 min Winter | 99.656 | 0.056 | 0.0 | 0.5 | 0.5 | 45.9 | O K |
| 2160 min Winter | 99.655 | 0.055 | 0.0 | 0.5 | 0.5 | 44.9 | O K |
| 2880 min Winter | 99.653 | 0.053 | 0.0 | 0.5 | 0.5 | 43.3 | O K |
| 4320 min Winter | 99.649 | 0.049 | 0.0 | 0.5 | 0.5 | 40.3 | O K |
| 5760 min Winter | 99.646 | 0.046 | 0.0 | 0.4 | 0.4 | 37.5 | O K |
| 7200 min Winter | 99.643 | 0.043 | 0.0 | 0.4 | 0.4 | 35.2 | O K |
| 8640 min Winter | 99.640 | 0.040 | 0.0 | 0.3 | 0.3 | 33.2 | O K |
| 10080 min Winter | 99.638 | 0.038 | 0.0 | 0.3 | 0.3 | 31.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 32.372 | 0.0 | 21.2 | 62 |
| 120 min Winter | 19.460 | 0.0 | 26.7 | 122 |
| 180 min Winter | 14.290 | 0.0 | 29.9 | 180 |
| 240 min Winter | 11.432 | 0.0 | 32.3 | 238 |
| 360 min Winter | 8.348 | 0.0 | 35.8 | 352 |
| 480 min Winter | 6.671 | 0.0 | 38.3 | 464 |
| 600 min Winter | 5.602 | 0.0 | 40.3 | 572 |
| 720 min Winter | 4.856 | 0.0 | 41.9 | 672 |
| 960 min Winter | 3.873 | 0.0 | 44.2 | 758 |
| 1440 min Winter | 2.813 | 0.0 | 46.7 | 1064 |
| 2160 min Winter | 2.040 | 0.0 | 62.1 | 1512 |
| 2880 min Winter | 1.624 | 0.0 | 65.3 | 1932 |
| 4320 min Winter | 1.176 | 0.0 | 68.4 | 2764 |
| 5760 min Winter | 0.934 | 0.0 | 81.5 | 3568 |
| 7200 min Winter | 0.782 | 0.0 | 84.6 | 4328 |
| 8640 min Winter | 0.675 | 0.0 | 86.7 | 5104 |
| 10080 min Winter | 0.597 | 0.0 | 87.7 | 5856 |

## 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) | 21.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.115

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.115 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 865.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 865.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.036 Discharge Coefficient 0.600 Invert Level (m) 99.600

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

Half Drain Time : 1103 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.638 | 0.038 | 0.0 | 0.3 | 0.3 | 31.4 | O K |
| 30 min Summer | 99.650 | 0.050 | 0.0 | 0.5 | 0.5 | 40.9 | O K |
| 60 min Summer | 99.661 | 0.061 | 0.0 | 0.6 | 0.6 | 50.4 | O K |
| 120 min Summer | 99.672 | 0.072 | 0.0 | 0.6 | 0.6 | 59.4 | O K |
| 180 min Summer | 99.678 | 0.078 | 0.0 | 0.7 | 0.7 | 64.0 | O K |
| 240 min Summer | 99.681 | 0.081 | 0.0 | 0.7 | 0.7 | 66.8 | O K |
| 360 min Summer | 99.686 | 0.086 | 0.0 | 0.7 | 0.7 | 70.4 | O K |
| 480 min Summer | 99.688 | 0.088 | 0.0 | 0.7 | 0.7 | 72.2 | O K |
| 600 min Summer | 99.689 | 0.089 | 0.0 | 0.7 | 0.7 | 73.0 | O K |
| 720 min Summer | 99.689 | 0.089 | 0.0 | 0.7 | 0.7 | 73.3 | O K |
| 960 min Summer | 99.690 | 0.090 | 0.0 | 0.7 | 0.7 | 73.7 | O K |
| 1440 min Summer | 99.690 | 0.090 | 0.0 | 0.7 | 0.7 | 73.7 | O K |
| 2160 min Summer | 99.688 | 0.088 | 0.0 | 0.7 | 0.7 | 72.6 | O K |
| 2880 min Summer | 99.686 | 0.086 | 0.0 | 0.7 | 0.7 | 70.8 | O K |
| 4320 min Summer | 99.681 | 0.081 | 0.0 | 0.7 | 0.7 | 66.3 | O K |
| 5760 min Summer | 99.675 | 0.075 | 0.0 | 0.6 | 0.6 | 61.8 | O K |
| 7200 min Summer | 99.670 | 0.070 | 0.0 | 0.6 | 0.6 | 57.6 | O K |
| 8640 min Summer | 99.666 | 0.066 | 0.0 | 0.6 | 0.6 | 53.9 | O K |
| 10080 min Summer | 99.662 | 0.062 | 0.0 | 0.6 | 0.6 | 50.7 | O K |
| 15 min Winter | 99.643 | 0.043 | 0.0 | 0.4 | 0.4 | 35.2 | O K |
| 30 min Winter | 99.656 | 0.056 | 0.0 | 0.5 | 0.5 | 45.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 146.491 | 0.0 | 16.0 | 19 |
| 30 min Summer | 95.823 | 0.0 | 22.7 | 34 |
| 60 min Summer | 59.609 | 0.0 | 39.1 | 64 |
| 120 min Summer | 35.761 | 0.0 | 48.1 | 124 |
| 180 min Summer | 26.143 | 0.0 | 53.2 | 182 |
| 240 min Summer | 20.816 | 0.0 | 56.7 | 242 |
| 360 min Summer | 15.119 | 0.0 | 61.8 | 362 |
| 480 min Summer | 12.032 | 0.0 | 65.4 | 480 |
| 600 min Summer | 10.072 | 0.0 | 68.1 | 600 |
| 720 min Summer | 8.705 | 0.0 | 70.2 | 686 |
| 960 min Summer | 6.911 | 0.0 | 73.2 | 788 |
| 1440 min Summer | 4.985 | 0.0 | 76.0 | 1036 |
| 2160 min Summer | 3.589 | 0.0 | 100.8 | 1448 |
| 2880 min Summer | 2.840 | 0.0 | 105.4 | 1844 |
| 4320 min Summer | 2.040 | 0.0 | 109.7 | 2640 |
| 5760 min Summer | 1.611 | 0.0 | 127.8 | 3456 |
| 7200 min Summer | 1.341 | 0.0 | 132.2 | 4184 |
| 8640 min Summer | 1.154 | 0.0 | 135.2 | 4936 |
| 10080 min Summer | 1.016 | 0.0 | 136.7 | 5656 |
| 15 min Winter | 146.491 | 0.0 | 18.6 | 19 |
| 30 min Winter | 95.823 | 0.0 | 26.2 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.669 | 0.069 | 0.0 | 0.6 | 0.6 | 56.5 | O K |
| 120 min Winter | 99.681 | 0.081 | 0.0 | 0.7 | 0.7 | 66.6 | O K |
| 180 min Winter | 99.687 | 0.087 | 0.0 | 0.7 | 0.7 | 71.9 | O K |
| 240 min Winter | 99.691 | 0.091 | 0.0 | 0.7 | 0.7 | 75.0 | O K |
| 360 min Winter | 99.696 | 0.096 | 0.0 | 0.8 | 0.8 | 79.2 | O K |
| 480 min Winter | 99.699 | 0.099 | 0.0 | 0.8 | 0.8 | 81.4 | O K |
| 600 min Winter | 99.701 | 0.101 | 0.0 | 0.8 | 0.8 | 82.6 | Flood Risk |
| 720 min Winter | 99.701 | 0.101 | 0.0 | 0.8 | 0.8 | 83.1 | Flood Risk |
| 960 min Winter | 99.701 | 0.101 | 0.0 | 0.8 | 0.8 | 83.0 | Flood Risk |
| 1440 min Winter | 99.700 | 0.100 | 0.0 | 0.8 | 0.8 | 82.3 | Flood Risk |
| 2160 min Winter | 99.697 | 0.097 | 0.0 | 0.8 | 0.8 | 79.7 | O K |
| 2880 min Winter | 99.693 | 0.093 | 0.0 | 0.7 | 0.7 | 76.3 | O K |
| 4320 min Winter | 99.684 | 0.084 | 0.0 | 0.7 | 0.7 | 69.0 | O K |
| 5760 min Winter | 99.676 | 0.076 | 0.0 | 0.7 | 0.7 | 62.3 | O K |
| 7200 min Winter | 99.669 | 0.069 | 0.0 | 0.6 | 0.6 | 56.5 | O K |
| 8640 min Winter | 99.663 | 0.063 | 0.0 | 0.6 | 0.6 | 51.6 | O K |
| 10080 min Winter | 99.658 | 0.058 | 0.0 | 0.5 | 0.5 | 47.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 59.609 | 0.0 | 44.6 | 62 |
| 120 min Winter | 35.761 | 0.0 | 54.6 | 122 |
| 180 min Winter | 26.143 | 0.0 | 60.3 | 180 |
| 240 min Winter | 20.816 | 0.0 | 64.1 | 238 |
| 360 min Winter | 15.119 | 0.0 | 69.7 | 354 |
| 480 min Winter | 12.032 | 0.0 | 73.7 | 468 |
| 600 min Winter | 10.072 | 0.0 | 76.6 | 578 |
| 720 min Winter | 8.705 | 0.0 | 78.9 | 686 |
| 960 min Winter | 6.911 | 0.0 | 82.2 | 886 |
| 1440 min Winter | 4.985 | 0.0 | 85.0 | 1098 |
| 2160 min Winter | 3.589 | 0.0 | 113.5 | 1556 |
| 2880 min Winter | 2.840 | 0.0 | 118.7 | 1992 |
| 4320 min Winter | 2.040 | 0.0 | 123.4 | 2852 |
| 5760 min Winter | 1.611 | 0.0 | 143.7 | 3640 |
| 7200 min Winter | 1.341 | 0.0 | 148.7 | 4400 |
| 8640 min Winter | 1.154 | 0.0 | 152.2 | 5184 |
| 10080 min Winter | 1.016 | 0.0 | 154.0 | 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) | 21.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.115

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.115 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 865.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 865.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.036 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 100 year Return Period

Half Drain Time : 1089 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.627 | 0.027 | 0.0 | 0.2 | 0.2 | 22.5 | O K |
| 30 min Summer | 99.636 | 0.036 | 0.0 | 0.3 | 0.3 | 29.3 | O K |
| 60 min Summer | 99.644 | 0.044 | 0.0 | 0.4 | 0.4 | 36.1 | O K |
| 120 min Summer | 99.652 | 0.052 | 0.0 | 0.5 | 0.5 | 42.4 | O K |
| 180 min Summer | 99.656 | 0.056 | 0.0 | 0.5 | 0.5 | 45.6 | O K |
| 240 min Summer | 99.658 | 0.058 | 0.0 | 0.5 | 0.5 | 47.5 | O K |
| 360 min Summer | 99.661 | 0.061 | 0.0 | 0.6 | 0.6 | 49.9 | O K |
| 480 min Summer | 99.662 | 0.062 | 0.0 | 0.6 | 0.6 | 51.1 | O K |
| 600 min Summer | 99.663 | 0.063 | 0.0 | 0.6 | 0.6 | 51.5 | O K |
| 720 min Summer | 99.663 | 0.063 | 0.0 | 0.6 | 0.6 | 51.8 | O K |
| 960 min Summer | 99.663 | 0.063 | 0.0 | 0.6 | 0.6 | 52.1 | O K |
| 1440 min Summer | 99.664 | 0.064 | 0.0 | 0.6 | 0.6 | 52.3 | O K |
| 2160 min Summer | 99.663 | 0.063 | 0.0 | 0.6 | 0.6 | 51.6 | O K |
| 2880 min Summer | 99.661 | 0.061 | 0.0 | 0.6 | 0.6 | 50.4 | O K |
| 4320 min Summer | 99.658 | 0.058 | 0.0 | 0.5 | 0.5 | 47.4 | O K |
| 5760 min Summer | 99.654 | 0.054 | 0.0 | 0.5 | 0.5 | 44.4 | O K |
| 7200 min Summer | 99.651 | 0.051 | 0.0 | 0.5 | 0.5 | 41.9 | O K |
| 8640 min Summer | 99.648 | 0.048 | 0.0 | 0.5 | 0.5 | 39.9 | O K |
| 10080 min Summer | 99.646 | 0.046 | 0.0 | 0.4 | 0.4 | 38.0 | O K |
| 15 min Winter | 99.631 | 0.031 | 0.0 | 0.2 | 0.2 | 25.2 | O K |
| 30 min Winter | 99.640 | 0.040 | 0.0 | 0.3 | 0.3 | 32.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 104.637 | 0.0 | 9.9 | 19 |
| 30 min Summer | 68.445 | 0.0 | 14.6 | 34 |
| 60 min Summer | 42.578 | 0.0 | 26.0 | 64 |
| 120 min Summer | 25.544 | 0.0 | 32.4 | 122 |
| 180 min Summer | 18.673 | 0.0 | 36.1 | 182 |
| 240 min Summer | 14.869 | 0.0 | 38.6 | 242 |
| 360 min Summer | 10.799 | 0.0 | 42.4 | 362 |
| 480 min Summer | 8.594 | 0.0 | 45.1 | 480 |
| 600 min Summer | 7.194 | 0.0 | 47.2 | 586 |
| 720 min Summer | 6.218 | 0.0 | 48.8 | 628 |
| 960 min Summer | 4.937 | 0.0 | 51.1 | 750 |
| 1440 min Summer | 3.560 | 0.0 | 53.5 | 1008 |
| 2160 min Summer | 2.564 | 0.0 | 70.4 | 1408 |
| 2880 min Summer | 2.029 | 0.0 | 73.6 | 1816 |
| 4320 min Summer | 1.457 | 0.0 | 76.5 | 2596 |
| 5760 min Summer | 1.151 | 0.0 | 90.1 | 3392 |
| 7200 min Summer | 0.958 | 0.0 | 93.0 | 4112 |
| 8640 min Summer | 0.824 | 0.0 | 95.0 | 4848 |
| 10080 min Summer | 0.726 | 0.0 | 95.7 | 5648 |
| 15 min Winter | 104.637 | 0.0 | 11.7 | 19 |
| 30 min Winter | 68.445 | 0.0 | 17.0 | 33 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.649 | 0.049 | 0.0 | 0.5 | 0.5 | 40.4 | O K |
| 120 min Winter | 99.658 | 0.058 | 0.0 | 0.5 | 0.5 | 47.5 | O K |
| 180 min Winter | 99.662 | 0.062 | 0.0 | 0.6 | 0.6 | 51.2 | O K |
| 240 min Winter | 99.665 | 0.065 | 0.0 | 0.6 | 0.6 | 53.4 | O K |
| 360 min Winter | 99.668 | 0.068 | 0.0 | 0.6 | 0.6 | 56.2 | O K |
| 480 min Winter | 99.670 | 0.070 | 0.0 | 0.6 | 0.6 | 57.6 | O K |
| 600 min Winter | 99.671 | 0.071 | 0.0 | 0.6 | 0.6 | 58.3 | O K |
| 720 min Winter | 99.671 | 0.071 | 0.0 | 0.6 | 0.6 | 58.5 | O K |
| 960 min Winter | 99.671 | 0.071 | 0.0 | 0.6 | 0.6 | 58.5 | O K |
| 1440 min Winter | 99.671 | 0.071 | 0.0 | 0.6 | 0.6 | 58.1 | O K |
| 2160 min Winter | 99.668 | 0.068 | 0.0 | 0.6 | 0.6 | 56.2 | O K |
| 2880 min Winter | 99.665 | 0.065 | 0.0 | 0.6 | 0.6 | 53.7 | O K |
| 4320 min Winter | 99.659 | 0.059 | 0.0 | 0.5 | 0.5 | 48.7 | O K |
| 5760 min Winter | 99.654 | 0.054 | 0.0 | 0.5 | 0.5 | 44.4 | O K |
| 7200 min Winter | 99.650 | 0.050 | 0.0 | 0.5 | 0.5 | 41.1 | O K |
| 8640 min Winter | 99.647 | 0.047 | 0.0 | 0.4 | 0.4 | 38.4 | O K |
| 10080 min Winter | 99.644 | 0.044 | 0.0 | 0.4 | 0.4 | 36.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 42.578 | 0.0 | 29.9 | 62 |
| 120 min Winter | 25.544 | 0.0 | 37.1 | 122 |
| 180 min Winter | 18.673 | 0.0 | 41.2 | 180 |
| 240 min Winter | 14.869 | 0.0 | 44.1 | 238 |
| 360 min Winter | 10.799 | 0.0 | 48.3 | 352 |
| 480 min Winter | 8.594 | 0.0 | 51.3 | 466 |
| 600 min Winter | 7.194 | 0.0 | 53.6 | 576 |
| 720 min Winter | 6.218 | 0.0 | 55.3 | 680 |
| 960 min Winter | 4.937 | 0.0 | 57.9 | 776 |
| 1440 min Winter | 3.560 | 0.0 | 60.5 | 1070 |
| 2160 min Winter | 2.564 | 0.0 | 79.5 | 1516 |
| 2880 min Winter | 2.029 | 0.0 | 83.2 | 1960 |
| 4320 min Winter | 1.457 | 0.0 | 86.7 | 2768 |
| 5760 min Winter | 1.151 | 0.0 | 101.4 | 3568 |
| 7200 min Winter | 0.958 | 0.0 | 104.8 | 4320 |
| 8640 min Winter | 0.824 | 0.0 | 107.1 | 5096 |
| 10080 min Winter | 0.726 | 0.0 | 108.1 | 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) | 21.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.115

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.115 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 865.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 865.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.036 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 1 year Return Period

Half Drain Time : 340 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.610 | 0.010 | 0.0 | 0.0 | 0.0 | 1.0 | O K |
| 30 min Summer | 99.613 | 0.013 | 0.0 | 0.0 | 0.0 | 1.3 | O K |
| 60 min Summer | 99.616 | 0.016 | 0.0 | 0.0 | 0.0 | 1.7 | O K |
| 120 min Summer | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 1.9 | O K |
| 180 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 2.1 | O K |
| 240 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 2.1 | O K |
| 360 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 2.2 | O K |
| 480 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 600 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 720 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 960 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 1440 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 2160 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 2.2 | O K |
| 2880 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 2.1 | O K |
| 4320 min Summer | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 1.9 | O K |
| 5760 min Summer | 99.617 | 0.017 | 0.0 | 0.1 | 0.1 | 1.7 | O K |
| 7200 min Summer | 99.615 | 0.015 | 0.0 | 0.0 | 0.0 | 1.6 | O K |
| 8640 min Summer | 99.615 | 0.015 | 0.0 | 0.0 | 0.0 | 1.5 | O K |
| 10080 min Summer | 99.614 | 0.014 | 0.0 | 0.0 | 0.0 | 1.4 | O K |
| 15 min Winter | 99.611 | 0.011 | 0.0 | 0.0 | 0.0 | 1.2 | O K |
| 30 min Winter | 99.614 | 0.014 | 0.0 | 0.0 | 0.0 | 1.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 0.7 | 19 |
| 30 min Summer | 20.382 | 0.0 | 1.0 | 33 |
| 60 min Summer | 12.872 | 0.0 | 1.5 | 62 |
| 120 min Summer | 7.964 | 0.0 | 1.9 | 122 |
| 180 min Summer | 5.985 | 0.0 | 2.2 | 180 |
| 240 min Summer | 4.881 | 0.0 | 2.4 | 210 |
| 360 min Summer | 3.639 | 0.0 | 2.7 | 266 |
| 480 min Summer | 2.946 | 0.0 | 2.9 | 330 |
| 600 min Summer | 2.501 | 0.0 | 3.1 | 398 |
| 720 min Summer | 2.188 | 0.0 | 3.2 | 464 |
| 960 min Summer | 1.771 | 0.0 | 3.5 | 598 |
| 1440 min Summer | 1.316 | 0.0 | 3.9 | 866 |
| 2160 min Summer | 0.978 | 0.0 | 4.6 | 1252 |
| 2880 min Summer | 0.792 | 0.0 | 4.9 | 1616 |
| 4320 min Summer | 0.587 | 0.0 | 5.4 | 2376 |
| 5760 min Summer | 0.476 | 0.0 | 6.1 | 3112 |
| 7200 min Summer | 0.404 | 0.0 | 6.4 | 3824 |
| 8640 min Summer | 0.354 | 0.0 | 6.7 | 4576 |
| 10080 min Summer | 0.316 | 0.0 | 6.9 | 5248 |
| 15 min Winter | 31.306 | 0.0 | 0.8 | 19 |
| 30 min Winter | 20.382 | 0.0 | 1.1 | 33 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 1.9 | O K |
| 120 min Winter | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 2.2 | O K |
| 180 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 240 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 2.4 | O K |
| 360 min Winter | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 480 min Winter | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 600 min Winter | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 720 min Winter | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 960 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 1440 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 2160 min Winter | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 2.2 | O K |
| 2880 min Winter | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 2.0 | O K |
| 4320 min Winter | 99.617 | 0.017 | 0.0 | 0.1 | 0.1 | 1.8 | O K |
| 5760 min Winter | 99.615 | 0.015 | 0.0 | 0.0 | 0.0 | 1.6 | O K |
| 7200 min Winter | 99.614 | 0.014 | 0.0 | 0.0 | 0.0 | 1.4 | O K |
| 8640 min Winter | 99.613 | 0.013 | 0.0 | 0.0 | 0.0 | 1.3 | O K |
| 10080 min Winter | 99.612 | 0.012 | 0.0 | 0.0 | 0.0 | 1.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 1.7 | 62 |
| 120 min Winter | 7.964 | 0.0 | 2.1 | 118 |
| 180 min Winter | 5.985 | 0.0 | 2.4 | 174 |
| 240 min Winter | 4.881 | 0.0 | 2.7 | 224 |
| 360 min Winter | 3.639 | 0.0 | 3.0 | 274 |
| 480 min Winter | 2.946 | 0.0 | 3.3 | 352 |
| 600 min Winter | 2.501 | 0.0 | 3.5 | 424 |
| 720 min Winter | 2.188 | 0.0 | 3.6 | 498 |
| 960 min Winter | 1.771 | 0.0 | 3.9 | 642 |
| 1440 min Winter | 1.316 | 0.0 | 4.4 | 910 |
| 2160 min Winter | 0.978 | 0.0 | 5.1 | 1300 |
| 2880 min Winter | 0.792 | 0.0 | 5.5 | 1676 |
| 4320 min Winter | 0.587 | 0.0 | 6.1 | 2464 |
| 5760 min Winter | 0.476 | 0.0 | 6.8 | 3176 |
| 7200 min Winter | 0.404 | 0.0 | 7.2 | 3960 |
| 8640 min Winter | 0.354 | 0.0 | 7.5 | 4664 |
| 10080 min Winter | 0.316 | 0.0 | 7.8 | 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.018

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.018 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 110.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 110.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 30 year Return Period

Half Drain Time : 311 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 30 min Summer | 99.631 | 0.031 | 0.0 | 0.1 | 0.1 | 3.2 | O K |
| 60 min Summer | 99.637 | 0.037 | 0.0 | 0.2 | 0.2 | 3.9 | O K |
| 120 min Summer | 99.642 | 0.042 | 0.0 | 0.2 | 0.2 | 4.4 | O K |
| 180 min Summer | 99.644 | 0.044 | 0.0 | 0.2 | 0.2 | 4.6 | O K |
| 240 min Summer | 99.645 | 0.045 | 0.0 | 0.2 | 0.2 | 4.7 | O K |
| 360 min Summer | 99.645 | 0.045 | 0.0 | 0.2 | 0.2 | 4.7 | O K |
| 480 min Summer | 99.646 | 0.046 | 0.0 | 0.2 | 0.2 | 4.8 | O K |
| 600 min Summer | 99.645 | 0.045 | 0.0 | 0.2 | 0.2 | 4.8 | O K |
| 720 min Summer | 99.645 | 0.045 | 0.0 | 0.2 | 0.2 | 4.7 | O K |
| 960 min Summer | 99.644 | 0.044 | 0.0 | 0.2 | 0.2 | 4.6 | O K |
| 1440 min Summer | 99.641 | 0.041 | 0.0 | 0.2 | 0.2 | 4.3 | O K |
| 2160 min Summer | 99.637 | 0.037 | 0.0 | 0.1 | 0.1 | 3.9 | O K |
| 2880 min Summer | 99.634 | 0.034 | 0.0 | 0.1 | 0.1 | 3.5 | O K |
| 4320 min Summer | 99.629 | 0.029 | 0.0 | 0.1 | 0.1 | 3.0 | O K |
| 5760 min Summer | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 2.7 | O K |
| 7200 min Summer | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 8640 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 10080 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 2.2 | O K |
| 15 min Winter | 99.627 | 0.027 | 0.0 | 0.1 | 0.1 | 2.8 | O K |
| 30 min Winter | 99.635 | 0.035 | 0.0 | 0.1 | 0.1 | 3.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 2.1 | 19 |
| 30 min Summer | 49.886 | 0.0 | 2.8 | 33 |
| 60 min Summer | 30.968 | 0.0 | 3.9 | 62 |
| 120 min Summer | 18.658 | 0.0 | 4.7 | 122 |
| 180 min Summer | 13.726 | 0.0 | 5.3 | 178 |
| 240 min Summer | 10.992 | 0.0 | 5.6 | 204 |
| 360 min Summer | 8.021 | 0.0 | 6.2 | 264 |
| 480 min Summer | 6.411 | 0.0 | 6.6 | 332 |
| 600 min Summer | 5.385 | 0.0 | 6.9 | 400 |
| 720 min Summer | 4.668 | 0.0 | 7.2 | 468 |
| 960 min Summer | 3.724 | 0.0 | 7.7 | 606 |
| 1440 min Summer | 2.706 | 0.0 | 8.3 | 866 |
| 2160 min Summer | 1.964 | 0.0 | 9.4 | 1252 |
| 2880 min Summer | 1.563 | 0.0 | 9.9 | 1616 |
| 4320 min Summer | 1.132 | 0.0 | 10.6 | 2336 |
| 5760 min Summer | 0.900 | 0.0 | 11.6 | 3064 |
| 7200 min Summer | 0.753 | 0.0 | 12.1 | 3816 |
| 8640 min Summer | 0.651 | 0.0 | 12.5 | 4504 |
| 10080 min Summer | 0.575 | 0.0 | 12.8 | 5248 |
| 15 min Winter | 76.822 | 0.0 | 2.4 | 18 |
| 30 min Winter | 49.886 | 0.0 | 3.2 | 33 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.642 | 0.042 | 0.0 | 0.2 | 0.2 | 4.4 | O K |
| 120 min Winter | 99.648 | 0.048 | 0.0 | 0.2 | 0.2 | 5.0 | O K |
| 180 min Winter | 99.650 | 0.050 | 0.0 | 0.2 | 0.2 | 5.2 | O K |
| 240 min Winter | 99.650 | 0.050 | 0.0 | 0.2 | 0.2 | 5.3 | O K |
| 360 min Winter | 99.651 | 0.051 | 0.0 | 0.2 | 0.2 | 5.3 | O K |
| 480 min Winter | 99.651 | 0.051 | 0.0 | 0.2 | 0.2 | 5.3 | O K |
| 600 min Winter | 99.650 | 0.050 | 0.0 | 0.2 | 0.2 | 5.2 | O K |
| 720 min Winter | 99.649 | 0.049 | 0.0 | 0.2 | 0.2 | 5.1 | O K |
| 960 min Winter | 99.647 | 0.047 | 0.0 | 0.2 | 0.2 | 4.9 | O K |
| 1440 min Winter | 99.642 | 0.042 | 0.0 | 0.2 | 0.2 | 4.4 | O K |
| 2160 min Winter | 99.636 | 0.036 | 0.0 | 0.1 | 0.1 | 3.7 | O K |
| 2880 min Winter | 99.631 | 0.031 | 0.0 | 0.1 | 0.1 | 3.3 | O K |
| 4320 min Winter | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 2.7 | O K |
| 5760 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 2.4 | O K |
| 7200 min Winter | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 2.2 | O K |
| 8640 min Winter | 99.619 | 0.019 | 0.0 | 0.1 | 0.1 | 2.0 | O K |
| 10080 min Winter | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 1.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 4.4 | 62 |
| 120 min Winter | 18.658 | 0.0 | 5.3 | 118 |
| 180 min Winter | 13.726 | 0.0 | 5.9 | 174 |
| 240 min Winter | 10.992 | 0.0 | 6.3 | 226 |
| 360 min Winter | 8.021 | 0.0 | 6.9 | 280 |
| 480 min Winter | 6.411 | 0.0 | 7.4 | 356 |
| 600 min Winter | 5.385 | 0.0 | 7.8 | 432 |
| 720 min Winter | 4.668 | 0.0 | 8.1 | 506 |
| 960 min Winter | 3.724 | 0.0 | 8.6 | 648 |
| 1440 min Winter | 2.706 | 0.0 | 9.3 | 924 |
| 2160 min Winter | 1.964 | 0.0 | 10.5 | 1316 |
| 2880 min Winter | 1.563 | 0.0 | 11.1 | 1672 |
| 4320 min Winter | 1.132 | 0.0 | 12.0 | 2416 |
| 5760 min Winter | 0.900 | 0.0 | 13.0 | 3112 |
| 7200 min Winter | 0.753 | 0.0 | 13.5 | 3896 |
| 8640 min Winter | 0.651 | 0.0 | 14.0 | 4584 |
| 10080 min Winter | 0.575 | 0.0 | 14.3 | 5328 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.018

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.018 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 110.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 110.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 99.600

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

Half Drain Time : 375 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.644 | 0.044 | 0.0 | 0.2 | 0.2 | 4.6 | O K |
| 30 min Summer | 99.657 | 0.057 | 0.0 | 0.2 | 0.2 | 6.0 | O K |
| 60 min Summer | 99.669 | 0.069 | 0.0 | 0.2 | 0.2 | 7.2 | O K |
| 120 min Summer | 99.679 | 0.079 | 0.0 | 0.2 | 0.2 | 8.3 | O K |
| 180 min Summer | 99.683 | 0.083 | 0.0 | 0.2 | 0.2 | 8.7 | O K |
| 240 min Summer | 99.684 | 0.084 | 0.0 | 0.2 | 0.2 | 8.8 | O K |
| 360 min Summer | 99.685 | 0.085 | 0.0 | 0.3 | 0.3 | 8.9 | O K |
| 480 min Summer | 99.685 | 0.085 | 0.0 | 0.3 | 0.3 | 8.9 | O K |
| 600 min Summer | 99.684 | 0.084 | 0.0 | 0.2 | 0.2 | 8.8 | O K |
| 720 min Summer | 99.683 | 0.083 | 0.0 | 0.2 | 0.2 | 8.7 | O K |
| 960 min Summer | 99.681 | 0.081 | 0.0 | 0.2 | 0.2 | 8.5 | O K |
| 1440 min Summer | 99.676 | 0.076 | 0.0 | 0.2 | 0.2 | 7.9 | O K |
| 2160 min Summer | 99.667 | 0.067 | 0.0 | 0.2 | 0.2 | 7.0 | O K |
| 2880 min Summer | 99.660 | 0.060 | 0.0 | 0.2 | 0.2 | 6.3 | O K |
| 4320 min Summer | 99.650 | 0.050 | 0.0 | 0.2 | 0.2 | 5.2 | O K |
| 5760 min Summer | 99.642 | 0.042 | 0.0 | 0.2 | 0.2 | 4.4 | O K |
| 7200 min Summer | 99.637 | 0.037 | 0.0 | 0.1 | 0.1 | 3.8 | O K |
| 8640 min Summer | 99.633 | 0.033 | 0.0 | 0.1 | 0.1 | 3.4 | O K |
| 10080 min Summer | 99.630 | 0.030 | 0.0 | 0.1 | 0.1 | 3.1 | O K |
| 15 min Winter | 99.650 | 0.050 | 0.0 | 0.2 | 0.2 | 5.2 | O K |
| 30 min Winter | 99.664 | 0.064 | 0.0 | 0.2 | 0.2 | 6.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 4.1 | 19 |
| 30 min Summer | 91.435 | 0.0 | 5.5 | 33 |
| 60 min Summer | 57.005 | 0.0 | 7.4 | 62 |
| 120 min Summer | 34.324 | 0.0 | 8.9 | 122 |
| 180 min Summer | 25.168 | 0.0 | 9.8 | 180 |
| 240 min Summer | 20.074 | 0.0 | 10.5 | 236 |
| 360 min Summer | 14.562 | 0.0 | 11.4 | 288 |
| 480 min Summer | 11.594 | 0.0 | 12.1 | 350 |
| 600 min Summer | 9.707 | 0.0 | 12.7 | 418 |
| 720 min Summer | 8.393 | 0.0 | 13.2 | 486 |
| 960 min Summer | 6.666 | 0.0 | 13.9 | 624 |
| 1440 min Summer | 4.811 | 0.0 | 15.0 | 894 |
| 2160 min Summer | 3.466 | 0.0 | 16.6 | 1296 |
| 2880 min Summer | 2.744 | 0.0 | 17.5 | 1672 |
| 4320 min Summer | 1.972 | 0.0 | 18.8 | 2420 |
| 5760 min Summer | 1.558 | 0.0 | 20.1 | 3120 |
| 7200 min Summer | 1.297 | 0.0 | 20.9 | 3824 |
| 8640 min Summer | 1.117 | 0.0 | 21.5 | 4576 |
| 10080 min Summer | 0.983 | 0.0 | 22.0 | 5248 |
| 15 min Winter | 139.635 | 0.0 | 4.7 | 18 |
| 30 min Winter | 91.435 | 0.0 | 6.2 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.678 | 0.078 | 0.0 | 0.2 | 0.2 | 8.1 | O K |
| 120 min Winter | 99.690 | 0.090 | 0.0 | 0.3 | 0.3 | 9.4 | O K |
| 180 min Winter | 99.694 | 0.094 | 0.0 | 0.3 | 0.3 | 9.8 | O K |
| 240 min Winter | 99.696 | 0.096 | 0.0 | 0.3 | 0.3 | 10.0 | O K |
| 360 min Winter | 99.695 | 0.095 | 0.0 | 0.3 | 0.3 | 10.0 | O K |
| 480 min Winter | 99.695 | 0.095 | 0.0 | 0.3 | 0.3 | 9.9 | O K |
| 600 min Winter | 99.694 | 0.094 | 0.0 | 0.3 | 0.3 | 9.8 | O K |
| 720 min Winter | 99.692 | 0.092 | 0.0 | 0.3 | 0.3 | 9.6 | O K |
| 960 min Winter | 99.688 | 0.088 | 0.0 | 0.3 | 0.3 | 9.2 | O K |
| 1440 min Winter | 99.680 | 0.080 | 0.0 | 0.2 | 0.2 | 8.3 | O K |
| 2160 min Winter | 99.668 | 0.068 | 0.0 | 0.2 | 0.2 | 7.1 | O K |
| 2880 min Winter | 99.658 | 0.058 | 0.0 | 0.2 | 0.2 | 6.1 | O K |
| 4320 min Winter | 99.644 | 0.044 | 0.0 | 0.2 | 0.2 | 4.6 | O K |
| 5760 min Winter | 99.636 | 0.036 | 0.0 | 0.1 | 0.1 | 3.7 | O K |
| 7200 min Winter | 99.630 | 0.030 | 0.0 | 0.1 | 0.1 | 3.2 | O K |
| 8640 min Winter | 99.628 | 0.028 | 0.0 | 0.1 | 0.1 | 2.9 | O K |
| 10080 min Winter | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 2.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 8.3 | 62 |
| 120 min Winter | 34.324 | 0.0 | 10.0 | 120 |
| 180 min Winter | 25.168 | 0.0 | 11.1 | 176 |
| 240 min Winter | 20.074 | 0.0 | 11.8 | 232 |
| 360 min Winter | 14.562 | 0.0 | 12.8 | 328 |
| 480 min Winter | 11.594 | 0.0 | 13.6 | 372 |
| 600 min Winter | 9.707 | 0.0 | 14.3 | 448 |
| 720 min Winter | 8.393 | 0.0 | 14.8 | 526 |
| 960 min Winter | 6.666 | 0.0 | 15.6 | 674 |
| 1440 min Winter | 4.811 | 0.0 | 16.9 | 964 |
| 2160 min Winter | 3.466 | 0.0 | 18.7 | 1364 |
| 2880 min Winter | 2.744 | 0.0 | 19.7 | 1756 |
| 4320 min Winter | 1.972 | 0.0 | 21.1 | 2504 |
| 5760 min Winter | 1.558 | 0.0 | 22.5 | 3224 |
| 7200 min Winter | 1.297 | 0.0 | 23.4 | 3888 |
| 8640 min Winter | 1.117 | 0.0 | 24.1 | 4568 |
| 10080 min Winter | 0.983 | 0.0 | 24.7 | 5344 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.018

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.018 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 110.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 110.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 100 year Return Period

Half Drain Time : 335 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.632 | 0.032 | 0.0 | 0.1 | 0.1 | 3.3 | O K |
| 30 min Summer | 99.641 | 0.041 | 0.0 | 0.2 | 0.2 | 4.3 | O K |
| 60 min Summer | 99.649 | 0.049 | 0.0 | 0.2 | 0.2 | 5.2 | O K |
| 120 min Summer | 99.656 | 0.056 | 0.0 | 0.2 | 0.2 | 5.9 | O K |
| 180 min Summer | 99.658 | 0.058 | 0.0 | 0.2 | 0.2 | 6.1 | O K |
| 240 min Summer | 99.659 | 0.059 | 0.0 | 0.2 | 0.2 | 6.2 | O K |
| 360 min Summer | 99.659 | 0.059 | 0.0 | 0.2 | 0.2 | 6.2 | O K |
| 480 min Summer | 99.659 | 0.059 | 0.0 | 0.2 | 0.2 | 6.2 | O K |
| 600 min Summer | 99.659 | 0.059 | 0.0 | 0.2 | 0.2 | 6.2 | O K |
| 720 min Summer | 99.658 | 0.058 | 0.0 | 0.2 | 0.2 | 6.1 | O K |
| 960 min Summer | 99.657 | 0.057 | 0.0 | 0.2 | 0.2 | 5.9 | O K |
| 1440 min Summer | 99.653 | 0.053 | 0.0 | 0.2 | 0.2 | 5.5 | O K |
| 2160 min Summer | 99.647 | 0.047 | 0.0 | 0.2 | 0.2 | 4.9 | O K |
| 2880 min Summer | 99.642 | 0.042 | 0.0 | 0.2 | 0.2 | 4.4 | O K |
| 4320 min Summer | 99.635 | 0.035 | 0.0 | 0.1 | 0.1 | 3.6 | O K |
| 5760 min Summer | 99.630 | 0.030 | 0.0 | 0.1 | 0.1 | 3.2 | O K |
| 7200 min Summer | 99.627 | 0.027 | 0.0 | 0.1 | 0.1 | 2.9 | O K |
| 8640 min Summer | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 2.6 | O K |
| 10080 min Summer | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 15 min Winter | 99.635 | 0.035 | 0.0 | 0.1 | 0.1 | 3.7 | O K |
| 30 min Winter | 99.646 | 0.046 | 0.0 | 0.2 | 0.2 | 4.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 2.8 | 19 |
| 30 min Summer | 65.311 | 0.0 | 3.8 | 33 |
| 60 min Summer | 40.718 | 0.0 | 5.2 | 62 |
| 120 min Summer | 24.517 | 0.0 | 6.3 | 122 |
| 180 min Summer | 17.977 | 0.0 | 7.0 | 180 |
| 240 min Summer | 14.339 | 0.0 | 7.4 | 216 |
| 360 min Summer | 10.402 | 0.0 | 8.1 | 274 |
| 480 min Summer | 8.281 | 0.0 | 8.6 | 338 |
| 600 min Summer | 6.934 | 0.0 | 9.0 | 406 |
| 720 min Summer | 5.995 | 0.0 | 9.3 | 476 |
| 960 min Summer | 4.761 | 0.0 | 9.9 | 610 |
| 1440 min Summer | 3.436 | 0.0 | 10.6 | 880 |
| 2160 min Summer | 2.476 | 0.0 | 11.8 | 1260 |
| 2880 min Summer | 1.960 | 0.0 | 12.5 | 1644 |
| 4320 min Summer | 1.408 | 0.0 | 13.3 | 2376 |
| 5760 min Summer | 1.113 | 0.0 | 14.3 | 3056 |
| 7200 min Summer | 0.927 | 0.0 | 14.9 | 3816 |
| 8640 min Summer | 0.798 | 0.0 | 15.3 | 4504 |
| 10080 min Summer | 0.702 | 0.0 | 15.6 | 5240 |
| 15 min Winter | 99.739 | 0.0 | 3.2 | 18 |
| 30 min Winter | 65.311 | 0.0 | 4.3 | 33 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.655 | 0.055 | 0.0 | 0.2 | 0.2 | 5.8 | O K |
| 120 min Winter | 99.663 | 0.063 | 0.0 | 0.2 | 0.2 | 6.6 | O K |
| 180 min Winter | 99.666 | 0.066 | 0.0 | 0.2 | 0.2 | 6.9 | O K |
| 240 min Winter | 99.667 | 0.067 | 0.0 | 0.2 | 0.2 | 7.0 | O K |
| 360 min Winter | 99.667 | 0.067 | 0.0 | 0.2 | 0.2 | 7.0 | O K |
| 480 min Winter | 99.666 | 0.066 | 0.0 | 0.2 | 0.2 | 6.9 | O K |
| 600 min Winter | 99.665 | 0.065 | 0.0 | 0.2 | 0.2 | 6.8 | O K |
| 720 min Winter | 99.664 | 0.064 | 0.0 | 0.2 | 0.2 | 6.7 | O K |
| 960 min Winter | 99.661 | 0.061 | 0.0 | 0.2 | 0.2 | 6.3 | O K |
| 1440 min Winter | 99.654 | 0.054 | 0.0 | 0.2 | 0.2 | 5.7 | O K |
| 2160 min Winter | 99.646 | 0.046 | 0.0 | 0.2 | 0.2 | 4.8 | O K |
| 2880 min Winter | 99.639 | 0.039 | 0.0 | 0.2 | 0.2 | 4.1 | O K |
| 4320 min Winter | 99.631 | 0.031 | 0.0 | 0.1 | 0.1 | 3.2 | O K |
| 5760 min Winter | 99.627 | 0.027 | 0.0 | 0.1 | 0.1 | 2.8 | O K |
| 7200 min Winter | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 2.5 | O K |
| 8640 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 2.3 | O K |
| 10080 min Winter | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 2.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 5.9 | 62 |
| 120 min Winter | 24.517 | 0.0 | 7.1 | 118 |
| 180 min Winter | 17.977 | 0.0 | 7.8 | 176 |
| 240 min Winter | 14.339 | 0.0 | 8.3 | 228 |
| 360 min Winter | 10.402 | 0.0 | 9.1 | 286 |
| 480 min Winter | 8.281 | 0.0 | 9.6 | 362 |
| 600 min Winter | 6.934 | 0.0 | 10.1 | 438 |
| 720 min Winter | 5.995 | 0.0 | 10.5 | 514 |
| 960 min Winter | 4.761 | 0.0 | 11.1 | 658 |
| 1440 min Winter | 3.436 | 0.0 | 12.0 | 938 |
| 2160 min Winter | 2.476 | 0.0 | 13.3 | 1340 |
| 2880 min Winter | 1.960 | 0.0 | 14.0 | 1704 |
| 4320 min Winter | 1.408 | 0.0 | 15.0 | 2420 |
| 5760 min Winter | 1.113 | 0.0 | 16.0 | 3120 |
| 7200 min Winter | 0.927 | 0.0 | 16.7 | 3880 |
| 8640 min Winter | 0.798 | 0.0 | 17.2 | 4592 |
| 10080 min Winter | 0.702 | 0.0 | 17.5 | 5344 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.018

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.018 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 110.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 110.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.021 Discharge Coefficient 0.600 Invert Level (m) 99.600

## Summary of Results for 1 year Return Period

Half Drain Time : 865 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.609 | 0.009 | 0.0 | 0.0 | 0.0 | 3.0 | O K |
| 30 min Summer | 99.612 | 0.012 | 0.0 | 0.0 | 0.0 | 3.9 | O K |
| 60 min Summer | 99.615 | 0.015 | 0.0 | 0.0 | 0.0 | 4.9 | O K |
| 120 min Summer | 99.618 | 0.018 | 0.0 | 0.1 | 0.1 | 5.9 | O K |
| 180 min Summer | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 6.5 | O K |
| 240 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 6.9 | O K |
| 360 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 7.4 | O K |
| 480 min Summer | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 7.6 | O K |
| 600 min Summer | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 7.8 | O K |
| 720 min Summer | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 7.9 | O K |
| 960 min Summer | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 8.1 | O K |
| 1440 min Summer | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 8.4 | O K |
| 2160 min Summer | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 8.5 | O K |
| 2880 min Summer | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 8.4 | O K |
| 4320 min Summer | 99.624 | 0.024 | 0.0 | 0.1 | 0.1 | 8.1 | O K |
| 5760 min Summer | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 7.8 | O K |
| 7200 min Summer | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 7.5 | O K |
| 8640 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 7.2 | O K |
| 10080 min Summer | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 6.9 | O K |
| 15 min Winter | 99.610 | 0.010 | 0.0 | 0.0 | 0.0 | 3.3 | O K |
| 30 min Winter | 99.613 | 0.013 | 0.0 | 0.0 | 0.0 | 4.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 1.0 | 19 |
| 30 min Summer | 20.382 | 0.0 | 1.6 | 34 |
| 60 min Summer | 12.872 | 0.0 | 3.1 | 64 |
| 120 min Summer | 7.964 | 0.0 | 4.1 | 122 |
| 180 min Summer | 5.985 | 0.0 | 4.8 | 182 |
| 240 min Summer | 4.881 | 0.0 | 5.3 | 242 |
| 360 min Summer | 3.639 | 0.0 | 6.0 | 360 |
| 480 min Summer | 2.946 | 0.0 | 6.6 | 478 |
| 600 min Summer | 2.501 | 0.0 | 7.1 | 518 |
| 720 min Summer | 2.188 | 0.0 | 7.4 | 572 |
| 960 min Summer | 1.771 | 0.0 | 8.0 | 694 |
| 1440 min Summer | 1.316 | 0.0 | 8.8 | 954 |
| 2160 min Summer | 0.978 | 0.0 | 11.8 | 1364 |
| 2880 min Summer | 0.792 | 0.0 | 12.6 | 1760 |
| 4320 min Summer | 0.587 | 0.0 | 13.6 | 2552 |
| 5760 min Summer | 0.476 | 0.0 | 16.5 | 3336 |
| 7200 min Summer | 0.404 | 0.0 | 17.4 | 4040 |
| 8640 min Summer | 0.354 | 0.0 | 18.0 | 4760 |
| 10080 min Summer | 0.316 | 0.0 | 18.4 | 5544 |
| 15 min Winter | 31.306 | 0.0 | 1.2 | 19 |
| 30 min Winter | 20.382 | 0.0 | 1.9 | 34 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.616 | 0.016 | 0.0 | 0.1 | 0.1 | 5.4 | O K |
| 120 min Winter | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 6.6 | O K |
| 180 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 7.3 | O K |
| 240 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 7.7 | O K |
| 360 min Winter | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 8.3 | O K |
| 480 min Winter | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 8.5 | O K |
| 600 min Winter | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 8.7 | O K |
| 720 min Winter | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 8.8 | O K |
| 960 min Winter | 99.627 | 0.027 | 0.0 | 0.1 | 0.1 | 9.0 | O K |
| 1440 min Winter | 99.627 | 0.027 | 0.0 | 0.1 | 0.1 | 9.1 | O K |
| 2160 min Winter | 99.627 | 0.027 | 0.0 | 0.1 | 0.1 | 9.0 | O K |
| 2880 min Winter | 99.626 | 0.026 | 0.0 | 0.1 | 0.1 | 8.7 | O K |
| 4320 min Winter | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 8.2 | O K |
| 5760 min Winter | 99.623 | 0.023 | 0.0 | 0.1 | 0.1 | 7.7 | O K |
| 7200 min Winter | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 7.2 | O K |
| 8640 min Winter | 99.621 | 0.021 | 0.0 | 0.1 | 0.1 | 6.8 | O K |
| 10080 min Winter | 99.620 | 0.020 | 0.0 | 0.1 | 0.1 | 6.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 3.6 | 62 |
| 120 min Winter | 7.964 | 0.0 | 4.7 | 120 |
| 180 min Winter | 5.985 | 0.0 | 5.5 | 180 |
| 240 min Winter | 4.881 | 0.0 | 6.1 | 236 |
| 360 min Winter | 3.639 | 0.0 | 7.0 | 350 |
| 480 min Winter | 2.946 | 0.0 | 7.6 | 458 |
| 600 min Winter | 2.501 | 0.0 | 8.1 | 552 |
| 720 min Winter | 2.188 | 0.0 | 8.5 | 576 |
| 960 min Winter | 1.771 | 0.0 | 9.2 | 722 |
| 1440 min Winter | 1.316 | 0.0 | 10.1 | 1024 |
| 2160 min Winter | 0.978 | 0.0 | 13.4 | 1452 |
| 2880 min Winter | 0.792 | 0.0 | 14.3 | 1872 |
| 4320 min Winter | 0.587 | 0.0 | 15.5 | 2680 |
| 5760 min Winter | 0.476 | 0.0 | 18.6 | 3456 |
| 7200 min Winter | 0.404 | 0.0 | 19.6 | 4184 |
| 8640 min Winter | 0.354 | 0.0 | 20.3 | 4944 |
| 10080 min Winter | 0.316 | 0.0 | 20.8 | 5648 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.051

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.051 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 350.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 350.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.031 Discharge Coefficient 0.500 Invert Level (m) 99.600

## Summary of Results for 30 year Return Period

Half Drain Time : 661 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.622 | 0.022 | 0.0 | 0.1 | 0.1 | 7.3 | O K |
| 30 min Summer | 99.628 | 0.028 | 0.0 | 0.1 | 0.1 | 9.4 | O K |
| 60 min Summer | 99.635 | 0.035 | 0.0 | 0.2 | 0.2 | 11.5 | O K |
| 120 min Summer | 99.640 | 0.040 | 0.0 | 0.2 | 0.2 | 13.4 | O K |
| 180 min Summer | 99.643 | 0.043 | 0.0 | 0.3 | 0.3 | 14.4 | O K |
| 240 min Summer | 99.645 | 0.045 | 0.0 | 0.3 | 0.3 | 14.9 | O K |
| 360 min Summer | 99.646 | 0.046 | 0.0 | 0.3 | 0.3 | 15.3 | O K |
| 480 min Summer | 99.647 | 0.047 | 0.0 | 0.3 | 0.3 | 15.5 | O K |
| 600 min Summer | 99.647 | 0.047 | 0.0 | 0.3 | 0.3 | 15.7 | O K |
| 720 min Summer | 99.648 | 0.048 | 0.0 | 0.3 | 0.3 | 15.8 | O K |
| 960 min Summer | 99.648 | 0.048 | 0.0 | 0.3 | 0.3 | 15.9 | O K |
| 1440 min Summer | 99.647 | 0.047 | 0.0 | 0.3 | 0.3 | 15.8 | O K |
| 2160 min Summer | 99.646 | 0.046 | 0.0 | 0.3 | 0.3 | 15.3 | O K |
| 2880 min Summer | 99.644 | 0.044 | 0.0 | 0.3 | 0.3 | 14.7 | O K |
| 4320 min Summer | 99.641 | 0.041 | 0.0 | 0.3 | 0.3 | 13.5 | O K |
| 5760 min Summer | 99.638 | 0.038 | 0.0 | 0.2 | 0.2 | 12.6 | O K |
| 7200 min Summer | 99.636 | 0.036 | 0.0 | 0.2 | 0.2 | 11.8 | O K |
| 8640 min Summer | 99.634 | 0.034 | 0.0 | 0.2 | 0.2 | 11.1 | O K |
| 10080 min Summer | 99.632 | 0.032 | 0.0 | 0.2 | 0.2 | 10.6 | O K |
| 15 min Winter | 99.625 | 0.025 | 0.0 | 0.1 | 0.1 | 8.2 | O K |
| 30 min Winter | 99.632 | 0.032 | 0.0 | 0.2 | 0.2 | 10.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 4.1 | 19 |
| 30 min Summer | 49.886 | 0.0 | 5.8 | 34 |
| 60 min Summer | 30.968 | 0.0 | 9.4 | 64 |
| 120 min Summer | 18.658 | 0.0 | 11.7 | 122 |
| 180 min Summer | 13.726 | 0.0 | 13.1 | 182 |
| 240 min Summer | 10.992 | 0.0 | 14.0 | 240 |
| 360 min Summer | 8.021 | 0.0 | 15.5 | 346 |
| 480 min Summer | 6.411 | 0.0 | 16.6 | 396 |
| 600 min Summer | 5.385 | 0.0 | 17.4 | 454 |
| 720 min Summer | 4.668 | 0.0 | 18.1 | 518 |
| 960 min Summer | 3.724 | 0.0 | 19.2 | 654 |
| 1440 min Summer | 2.706 | 0.0 | 20.7 | 924 |
| 2160 min Summer | 1.964 | 0.0 | 25.1 | 1320 |
| 2880 min Summer | 1.563 | 0.0 | 26.5 | 1704 |
| 4320 min Summer | 1.132 | 0.0 | 28.2 | 2468 |
| 5760 min Summer | 0.900 | 0.0 | 32.0 | 3232 |
| 7200 min Summer | 0.753 | 0.0 | 33.3 | 3968 |
| 8640 min Summer | 0.651 | 0.0 | 34.2 | 4680 |
| 10080 min Summer | 0.575 | 0.0 | 34.8 | 5448 |
| 15 min Winter | 76.822 | 0.0 | 4.7 | 19 |
| 30 min Winter | 49.886 | 0.0 | 6.7 | 33 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.639 | 0.039 | 0.0 | 0.2 | 0.2 | 12.9 | O K |
| 120 min Winter | 99.645 | 0.045 | 0.0 | 0.3 | 0.3 | 15.1 | O K |
| 180 min Winter | 99.648 | 0.048 | 0.0 | 0.3 | 0.3 | 16.1 | O K |
| 240 min Winter | 99.650 | 0.050 | 0.0 | 0.3 | 0.3 | 16.7 | O K |
| 360 min Winter | 99.652 | 0.052 | 0.0 | 0.3 | 0.3 | 17.3 | O K |
| 480 min Winter | 99.653 | 0.053 | 0.0 | 0.3 | 0.3 | 17.5 | O K |
| 600 min Winter | 99.653 | 0.053 | 0.0 | 0.3 | 0.3 | 17.6 | O K |
| 720 min Winter | 99.653 | 0.053 | 0.0 | 0.3 | 0.3 | 17.6 | O K |
| 960 min Winter | 99.653 | 0.053 | 0.0 | 0.3 | 0.3 | 17.5 | O K |
| 1440 min Winter | 99.651 | 0.051 | 0.0 | 0.3 | 0.3 | 17.0 | O K |
| 2160 min Winter | 99.648 | 0.048 | 0.0 | 0.3 | 0.3 | 16.0 | O K |
| 2880 min Winter | 99.645 | 0.045 | 0.0 | 0.3 | 0.3 | 14.9 | O K |
| 4320 min Winter | 99.640 | 0.040 | 0.0 | 0.2 | 0.2 | 13.3 | O K |
| 5760 min Winter | 99.636 | 0.036 | 0.0 | 0.2 | 0.2 | 12.1 | O K |
| 7200 min Winter | 99.634 | 0.034 | 0.0 | 0.2 | 0.2 | 11.1 | O K |
| 8640 min Winter | 99.631 | 0.031 | 0.0 | 0.2 | 0.2 | 10.4 | O K |
| 10080 min Winter | 99.629 | 0.029 | 0.0 | 0.2 | 0.2 | 9.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 10.8 | 62 |
| 120 min Winter | 18.658 | 0.0 | 13.3 | 120 |
| 180 min Winter | 13.726 | 0.0 | 14.9 | 178 |
| 240 min Winter | 10.992 | 0.0 | 16.0 | 234 |
| 360 min Winter | 8.021 | 0.0 | 17.6 | 344 |
| 480 min Winter | 6.411 | 0.0 | 18.8 | 444 |
| 600 min Winter | 5.385 | 0.0 | 19.8 | 476 |
| 720 min Winter | 4.668 | 0.0 | 20.6 | 550 |
| 960 min Winter | 3.724 | 0.0 | 21.8 | 702 |
| 1440 min Winter | 2.706 | 0.0 | 23.5 | 996 |
| 2160 min Winter | 1.964 | 0.0 | 28.3 | 1424 |
| 2880 min Winter | 1.563 | 0.0 | 29.9 | 1816 |
| 4320 min Winter | 1.132 | 0.0 | 31.8 | 2592 |
| 5760 min Winter | 0.900 | 0.0 | 35.9 | 3352 |
| 7200 min Winter | 0.753 | 0.0 | 37.4 | 4104 |
| 8640 min Winter | 0.651 | 0.0 | 38.5 | 4848 |
| 10080 min Winter | 0.575 | 0.0 | 39.2 | 5648 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.051

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.051 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 350.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 350.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.031 Discharge Coefficient 0.500 Invert Level (m) 99.600

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

Half Drain Time : 696 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.640 | 0.040 | 0.0 | 0.2 | 0.2 | 13.2 | O K |
| 30 min Summer | 99.652 | 0.052 | 0.0 | 0.3 | 0.3 | 17.2 | O K |
| 60 min Summer | 99.663 | 0.063 | 0.0 | 0.4 | 0.4 | 21.1 | O K |
| 120 min Summer | 99.674 | 0.074 | 0.0 | 0.4 | 0.4 | 24.7 | O K |
| 180 min Summer | 99.680 | 0.080 | 0.0 | 0.4 | 0.4 | 26.5 | O K |
| 240 min Summer | 99.682 | 0.082 | 0.0 | 0.4 | 0.4 | 27.4 | O K |
| 360 min Summer | 99.685 | 0.085 | 0.0 | 0.4 | 0.4 | 28.3 | O K |
| 480 min Summer | 99.686 | 0.086 | 0.0 | 0.4 | 0.4 | 28.5 | O K |
| 600 min Summer | 99.686 | 0.086 | 0.0 | 0.4 | 0.4 | 28.7 | O K |
| 720 min Summer | 99.686 | 0.086 | 0.0 | 0.4 | 0.4 | 28.7 | O K |
| 960 min Summer | 99.686 | 0.086 | 0.0 | 0.4 | 0.4 | 28.7 | O K |
| 1440 min Summer | 99.685 | 0.085 | 0.0 | 0.4 | 0.4 | 28.2 | O K |
| 2160 min Summer | 99.681 | 0.081 | 0.0 | 0.4 | 0.4 | 26.9 | O K |
| 2880 min Summer | 99.677 | 0.077 | 0.0 | 0.4 | 0.4 | 25.5 | O K |
| 4320 min Summer | 99.668 | 0.068 | 0.0 | 0.4 | 0.4 | 22.8 | O K |
| 5760 min Summer | 99.661 | 0.061 | 0.0 | 0.4 | 0.4 | 20.4 | O K |
| 7200 min Summer | 99.656 | 0.056 | 0.0 | 0.3 | 0.3 | 18.6 | O K |
| 8640 min Summer | 99.651 | 0.051 | 0.0 | 0.3 | 0.3 | 17.0 | O K |
| 10080 min Summer | 99.647 | 0.047 | 0.0 | 0.3 | 0.3 | 15.8 | O K |
| 15 min Winter | 99.645 | 0.045 | 0.0 | 0.3 | 0.3 | 14.8 | O K |
| 30 min Winter | 99.658 | 0.058 | 0.0 | 0.3 | 0.3 | 19.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 9.0 | 19 |
| 30 min Summer | 91.435 | 0.0 | 12.5 | 34 |
| 60 min Summer | 57.005 | 0.0 | 18.9 | 64 |
| 120 min Summer | 34.324 | 0.0 | 23.1 | 122 |
| 180 min Summer | 25.168 | 0.0 | 25.6 | 182 |
| 240 min Summer | 20.074 | 0.0 | 27.3 | 242 |
| 360 min Summer | 14.562 | 0.0 | 29.8 | 360 |
| 480 min Summer | 11.594 | 0.0 | 31.6 | 446 |
| 600 min Summer | 9.707 | 0.0 | 33.0 | 496 |
| 720 min Summer | 8.393 | 0.0 | 34.2 | 556 |
| 960 min Summer | 6.666 | 0.0 | 36.1 | 684 |
| 1440 min Summer | 4.811 | 0.0 | 38.3 | 954 |
| 2160 min Summer | 3.466 | 0.0 | 45.5 | 1364 |
| 2880 min Summer | 2.744 | 0.0 | 47.9 | 1760 |
| 4320 min Summer | 1.972 | 0.0 | 50.8 | 2548 |
| 5760 min Summer | 1.558 | 0.0 | 56.1 | 3288 |
| 7200 min Summer | 1.297 | 0.0 | 58.1 | 4032 |
| 8640 min Summer | 1.117 | 0.0 | 59.7 | 4752 |
| 10080 min Summer | 0.983 | 0.0 | 60.6 | 5448 |
| 15 min Winter | 139.635 | 0.0 | 10.3 | 19 |
| 30 min Winter | 91.435 | 0.0 | 14.3 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.671 | 0.071 | 0.0 | 0.4 | 0.4 | 23.7 | O K |
| 120 min Winter | 99.684 | 0.084 | 0.0 | 0.4 | 0.4 | 27.8 | O K |
| 180 min Winter | 99.690 | 0.090 | 0.0 | 0.5 | 0.5 | 29.8 | O K |
| 240 min Winter | 99.693 | 0.093 | 0.0 | 0.5 | 0.5 | 30.9 | O K |
| 360 min Winter | 99.696 | 0.096 | 0.0 | 0.5 | 0.5 | 32.0 | O K |
| 480 min Winter | 99.697 | 0.097 | 0.0 | 0.5 | 0.5 | 32.4 | O K |
| 600 min Winter | 99.697 | 0.097 | 0.0 | 0.5 | 0.5 | 32.3 | O K |
| 720 min Winter | 99.697 | 0.097 | 0.0 | 0.5 | 0.5 | 32.2 | O K |
| 960 min Winter | 99.696 | 0.096 | 0.0 | 0.5 | 0.5 | 32.0 | O K |
| 1440 min Winter | 99.693 | 0.093 | 0.0 | 0.5 | 0.5 | 30.9 | O K |
| 2160 min Winter | 99.686 | 0.086 | 0.0 | 0.4 | 0.4 | 28.7 | O K |
| 2880 min Winter | 99.680 | 0.080 | 0.0 | 0.4 | 0.4 | 26.5 | O K |
| 4320 min Winter | 99.668 | 0.068 | 0.0 | 0.4 | 0.4 | 22.5 | O K |
| 5760 min Winter | 99.658 | 0.058 | 0.0 | 0.3 | 0.3 | 19.4 | O K |
| 7200 min Winter | 99.651 | 0.051 | 0.0 | 0.3 | 0.3 | 17.0 | O K |
| 8640 min Winter | 99.646 | 0.046 | 0.0 | 0.3 | 0.3 | 15.3 | O K |
| 10080 min Winter | 99.642 | 0.042 | 0.0 | 0.3 | 0.3 | 14.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 21.4 | 62 |
| 120 min Winter | 34.324 | 0.0 | 26.1 | 120 |
| 180 min Winter | 25.168 | 0.0 | 28.9 | 178 |
| 240 min Winter | 20.074 | 0.0 | 30.8 | 236 |
| 360 min Winter | 14.562 | 0.0 | 33.5 | 350 |
| 480 min Winter | 11.594 | 0.0 | 35.6 | 458 |
| 600 min Winter | 9.707 | 0.0 | 37.2 | 558 |
| 720 min Winter | 8.393 | 0.0 | 38.5 | 578 |
| 960 min Winter | 6.666 | 0.0 | 40.6 | 730 |
| 1440 min Winter | 4.811 | 0.0 | 43.0 | 1036 |
| 2160 min Winter | 3.466 | 0.0 | 51.2 | 1472 |
| 2880 min Winter | 2.744 | 0.0 | 53.8 | 1876 |
| 4320 min Winter | 1.972 | 0.0 | 57.1 | 2680 |
| 5760 min Winter | 1.558 | 0.0 | 62.9 | 3456 |
| 7200 min Winter | 1.297 | 0.0 | 65.3 | 4176 |
| 8640 min Winter | 1.117 | 0.0 | 67.1 | 4848 |
| 10080 min Winter | 0.983 | 0.0 | 68.2 | 5552 |

## 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.051

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.051 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 350.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 350.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.031 Discharge Coefficient 0.500 Invert Level (m) 99.600

## Summary of Results for 100 year Return Period

Half Drain Time : 656 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.628 | 0.028 | 0.0 | 0.1 | 0.1 | 9.5 | O K |
| 30 min Summer | 99.637 | 0.037 | 0.0 | 0.2 | 0.2 | 12.3 | O K |
| 60 min Summer | 99.645 | 0.045 | 0.0 | 0.3 | 0.3 | 15.1 | O K |
| 120 min Summer | 99.653 | 0.053 | 0.0 | 0.3 | 0.3 | 17.6 | O K |
| 180 min Summer | 99.657 | 0.057 | 0.0 | 0.3 | 0.3 | 18.8 | O K |
| 240 min Summer | 99.658 | 0.058 | 0.0 | 0.3 | 0.3 | 19.4 | O K |
| 360 min Summer | 99.660 | 0.060 | 0.0 | 0.4 | 0.4 | 19.9 | O K |
| 480 min Summer | 99.660 | 0.060 | 0.0 | 0.4 | 0.4 | 20.1 | O K |
| 600 min Summer | 99.661 | 0.061 | 0.0 | 0.4 | 0.4 | 20.2 | O K |
| 720 min Summer | 99.661 | 0.061 | 0.0 | 0.4 | 0.4 | 20.3 | O K |
| 960 min Summer | 99.661 | 0.061 | 0.0 | 0.4 | 0.4 | 20.3 | O K |
| 1440 min Summer | 99.660 | 0.060 | 0.0 | 0.4 | 0.4 | 20.0 | O K |
| 2160 min Summer | 99.657 | 0.057 | 0.0 | 0.3 | 0.3 | 19.1 | O K |
| 2880 min Summer | 99.654 | 0.054 | 0.0 | 0.3 | 0.3 | 18.1 | O K |
| 4320 min Summer | 99.649 | 0.049 | 0.0 | 0.3 | 0.3 | 16.3 | O K |
| 5760 min Summer | 99.645 | 0.045 | 0.0 | 0.3 | 0.3 | 14.8 | O K |
| 7200 min Summer | 99.641 | 0.041 | 0.0 | 0.3 | 0.3 | 13.8 | O K |
| 8640 min Summer | 99.639 | 0.039 | 0.0 | 0.2 | 0.2 | 12.9 | O K |
| 10080 min Summer | 99.637 | 0.037 | 0.0 | 0.2 | 0.2 | 12.2 | O K |
| 15 min Winter | 99.632 | 0.032 | 0.0 | 0.2 | 0.2 | 10.6 | O K |
| 30 min Winter | 99.641 | 0.041 | 0.0 | 0.3 | 0.3 | 13.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 5.8 | 19 |
| 30 min Summer | 65.311 | 0.0 | 8.2 | 34 |
| 60 min Summer | 40.718 | 0.0 | 12.9 | 64 |
| 120 min Summer | 24.517 | 0.0 | 16.0 | 122 |
| 180 min Summer | 17.977 | 0.0 | 17.7 | 182 |
| 240 min Summer | 14.339 | 0.0 | 18.9 | 242 |
| 360 min Summer | 10.402 | 0.0 | 20.7 | 360 |
| 480 min Summer | 8.281 | 0.0 | 22.0 | 412 |
| 600 min Summer | 6.934 | 0.0 | 23.0 | 470 |
| 720 min Summer | 5.995 | 0.0 | 23.9 | 530 |
| 960 min Summer | 4.761 | 0.0 | 25.2 | 664 |
| 1440 min Summer | 3.436 | 0.0 | 26.9 | 938 |
| 2160 min Summer | 2.476 | 0.0 | 32.1 | 1340 |
| 2880 min Summer | 1.960 | 0.0 | 33.7 | 1732 |
| 4320 min Summer | 1.408 | 0.0 | 35.6 | 2504 |
| 5760 min Summer | 1.113 | 0.0 | 39.8 | 3224 |
| 7200 min Summer | 0.927 | 0.0 | 41.2 | 3968 |
| 8640 min Summer | 0.798 | 0.0 | 42.2 | 4672 |
| 10080 min Summer | 0.702 | 0.0 | 42.8 | 5448 |
| 15 min Winter | 99.739 | 0.0 | 6.7 | 19 |
| 30 min Winter | 65.311 | 0.0 | 9.5 | 33 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.651 | 0.051 | 0.0 | 0.3 | 0.3 | 16.9 | O K |
| 120 min Winter | 99.659 | 0.059 | 0.0 | 0.3 | 0.3 | 19.8 | O K |
| 180 min Winter | 99.664 | 0.064 | 0.0 | 0.4 | 0.4 | 21.1 | O K |
| 240 min Winter | 99.666 | 0.066 | 0.0 | 0.4 | 0.4 | 21.9 | O K |
| 360 min Winter | 99.668 | 0.068 | 0.0 | 0.4 | 0.4 | 22.5 | O K |
| 480 min Winter | 99.668 | 0.068 | 0.0 | 0.4 | 0.4 | 22.7 | O K |
| 600 min Winter | 99.668 | 0.068 | 0.0 | 0.4 | 0.4 | 22.7 | O K |
| 720 min Winter | 99.668 | 0.068 | 0.0 | 0.4 | 0.4 | 22.7 | O K |
| 960 min Winter | 99.668 | 0.068 | 0.0 | 0.4 | 0.4 | 22.5 | O K |
| 1440 min Winter | 99.665 | 0.065 | 0.0 | 0.4 | 0.4 | 21.7 | O K |
| 2160 min Winter | 99.660 | 0.060 | 0.0 | 0.4 | 0.4 | 20.1 | O K |
| 2880 min Winter | 99.656 | 0.056 | 0.0 | 0.3 | 0.3 | 18.5 | O K |
| 4320 min Winter | 99.648 | 0.048 | 0.0 | 0.3 | 0.3 | 15.9 | O K |
| 5760 min Winter | 99.643 | 0.043 | 0.0 | 0.3 | 0.3 | 14.1 | O K |
| 7200 min Winter | 99.639 | 0.039 | 0.0 | 0.2 | 0.2 | 12.9 | O K |
| 8640 min Winter | 99.636 | 0.036 | 0.0 | 0.2 | 0.2 | 11.9 | O K |
| 10080 min Winter | 99.634 | 0.034 | 0.0 | 0.2 | 0.2 | 11.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 14.7 | 62 |
| 120 min Winter | 24.517 | 0.0 | 18.1 | 120 |
| 180 min Winter | 17.977 | 0.0 | 20.1 | 178 |
| 240 min Winter | 14.339 | 0.0 | 21.4 | 236 |
| 360 min Winter | 10.402 | 0.0 | 23.4 | 346 |
| 480 min Winter | 8.281 | 0.0 | 24.9 | 452 |
| 600 min Winter | 6.934 | 0.0 | 26.1 | 488 |
| 720 min Winter | 5.995 | 0.0 | 27.0 | 558 |
| 960 min Winter | 4.761 | 0.0 | 28.5 | 712 |
| 1440 min Winter | 3.436 | 0.0 | 30.4 | 1010 |
| 2160 min Winter | 2.476 | 0.0 | 36.1 | 1444 |
| 2880 min Winter | 1.960 | 0.0 | 38.0 | 1844 |
| 4320 min Winter | 1.408 | 0.0 | 40.2 | 2596 |
| 5760 min Winter | 1.113 | 0.0 | 44.6 | 3344 |
| 7200 min Winter | 0.927 | 0.0 | 46.3 | 4104 |
| 8640 min Winter | 0.798 | 0.0 | 47.5 | 4840 |
| 10080 min Winter | 0.702 | 0.0 | 48.2 | 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) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.051

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.051 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 350.0 | 0.0 | 0.151 | 0.0 | 0.0 |
| 0.150 | 350.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.031 Discharge Coefficient 0.500 Invert Level (m) 99.600

## 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.406 |
| Region | England and Wales | Cv (Summer) | 0.920 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.920 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| 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) | 100 |
| Climate Change (%) | 0 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 120 Summer | 100 | +0% | 100/15 Summer | | | | 30.405 |
| 1.001 | 1 | 120 Summer | 100 | +0% | 100/15 Summer | | | | 30.405 |
| 2.000 | 3 | 120 Summer | 100 | +0% | 100/15 Summer | | | | 30.257 |
| 2.001 | 3 | 120 Summer | 100 | +0% | 100/30 Summer | | | | 30.257 |
| 1.002 | 2 | 15 Summer | 100 | +0% | | | | | 29.789 |
| 1.003 | 3 | 180 Summer | 100 | +0% | 100/15 Summer | | | | 29.544 |
| 3.000 | 7 | 180 Summer | 100 | +0% | 100/180 Summer | | | | 29.539 |
| 1.004 | 4 | 180 Summer | 100 | +0% | 100/15 Summer | | | | 29.531 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 0.105 | 0.000 | 0.00 | | 0.0 | SURCHARGED | |
| 1.001 | 1 | 0.155 | 0.000 | 0.19 | | 4.3 | SURCHARGED | |
| 2.000 | 3 | 0.107 | 0.000 | 0.00 | | 0.1 | SURCHARGED | |
| 2.001 | 3 | 0.082 | 0.000 | 0.13 | | 11.5 | SURCHARGED | |
| 1.002 | 2 | -0.021 | 0.000 | 0.92 | | 37.9 | OK | |
| 1.003 | 3 | 0.269 | 0.000 | 0.56 | | 17.8 | SURCHARGED | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 3.000 | 7 | 0.004 | 0.000 | 0.08 | | 1.3 | SURCHARGED | |
| 1.004 | 4 | 0.306 | 0.000 | 0.38 | | 18.0 | SURCHARGED | |

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Date 23/01/2018 17:42 | Designed by johnhayden
File Network 6.mdx | Checked by
XP Solutions | Network 2016.1

## 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) | 2 | Add Flow / Climate Change (%) | 0 |
| M5-60 (mm) | 20.100 | Minimum Backdrop Height (m) | 0.200 |
| Ratio R | 0.406 | Maximum Backdrop Height (m) | 1.500 |
| Maximum Rainfall (mm/hr) | 500 | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30 | Min Vel for Auto Design only (m/s) | 1.00 |
| Foul Sewage (l/s/ha) | 0.000 | Min Slope for Optimisation (1:X) | 500 |
| Volumetric Runoff Coeff. | 0.900 | | |

Designed with Level Soffits

### Network Design Table for Storm

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 5.000 | 0.050 | 100.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.001 | 30.000 | 0.515 | 58.3 | 0.113 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 2.000 | 5.000 | 0.050 | 100.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| 2.001 | 5.000 | 0.365 | 13.7 | 0.298 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.002 | 80.300 | 0.535 | 150.1 | 0.054 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.003 | 5.080 | 0.050 | 101.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 3.000 | 31.000 | 0.310 | 100.0 | 0.000 | 5.00 | 1.2 | 0.600 | o | 150 | Pipe/Conduit | |
| 1.004 | 18.600 | 0.190 | 97.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 70.66 | 5.08 | 30.150 | 0.000 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 0.0 |
| 1.001 | 68.48 | 5.46 | 30.100 | 0.113 | 0.0 | 0.0 | 0.0 | 1.32 | 23.3« | 25.1 |
| 2.000 | 70.66 | 5.08 | 30.000 | 0.000 | 0.0 | 0.0 | 0.0 | 1.00 | 17.8 | 0.0 |
| 2.001 | 70.52 | 5.11 | 29.950 | 0.298 | 0.0 | 0.0 | 0.0 | 3.55 | 141.3 | 68.3 |
| 1.002 | 62.25 | 6.72 | 29.585 | 0.465 | 0.0 | 0.0 | 0.0 | 1.06 | 42.3« | 94.1 |
| 1.003 | 61.97 | 6.78 | 29.050 | 0.465 | 0.0 | 0.0 | 0.0 | 1.30 | 51.6« | 94.1 |
| 3.000 | 68.19 | 5.51 | 29.385 | 0.000 | 1.2 | 0.0 | 0.0 | 1.00 | 17.8 | 1.2 |
| 1.004 | 60.95 | 7.02 | 29.000 | 0.465 | 1.2 | 0.0 | 0.0 | 1.32 | 52.5« | 94.1 |

## Surcharged Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---|---|---|---|---|---|---|
| 1.004 | | 30.700 | 28.810 | 0.000 | 0 | 0 |

Datum (m) 28.000 Offset (mins) 0

| Time (mins) | Depth (m) |
|---|---|
| 15 | 2.000 |

## Simulation Criteria for Storm

| | | | |
|---|---|---|---|
| Volumetric Runoff Coeff | 0.900 | 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

## Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 2 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.100 | Storm Duration (mins) | 30 |
| Ratio R | 0.406 | | |

## Online Controls for Storm

### Hydro-Brake Optimum® Manhole: 1, DS/PN: 1.001, Volume (m³): 1.0

| | |
|---|---|
| Unit Reference | MD-SHE-0103-4500-0850-4500 |
| Design Head (m) | 0.850 |
| Design Flow (l/s) | 4.5 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 103 |
| Invert Level (m) | 30.100 |
| Minimum Outlet Pipe Diameter (mm) | 150 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---|---|---|---|---|---|
| Design Point (Calculated) | 0.850 | 4.5 | Kick-Flo® | 0.555 | 3.7 |
| Flush-Flo™ | 0.252 | 4.5 | Mean Flow over Head Range | - | 3.9 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 3.4 | 1.200 | 5.3 | 3.000 | 8.1 | 7.000 | 12.1 |
| 0.200 | 4.5 | 1.400 | 5.7 | 3.500 | 8.7 | 7.500 | 12.5 |
| 0.300 | 4.5 | 1.600 | 6.0 | 4.000 | 9.3 | 8.000 | 12.9 |
| 0.400 | 4.3 | 1.800 | 6.4 | 4.500 | 9.8 | 8.500 | 13.3 |
| 0.500 | 4.1 | 2.000 | 6.7 | 5.000 | 10.3 | 9.000 | 13.7 |
| 0.600 | 3.8 | 2.200 | 7.0 | 5.500 | 10.8 | 9.500 | 14.0 |
| 0.800 | 4.4 | 2.400 | 7.3 | 6.000 | 11.3 | | |
| 1.000 | 4.9 | 2.600 | 7.6 | 6.500 | 11.7 | | |

### Hydro-Brake Optimum® Manhole: 3, DS/PN: 2.001, Volume (m³): 1.3

| | |
|---|---|
| Unit Reference | MD-SHE-0161-1150-0550-1150 |
| Design Head (m) | 0.550 |
| Design Flow (l/s) | 11.5 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 161 |
| Invert Level (m) | 29.950 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---|---|---|---|---|---|
| Design Point (Calculated) | 0.550 | 11.5 | Kick-Flo® | 0.431 | 10.3 |
| Flush-Flo™ | 0.242 | 11.5 | Mean Flow over Head Range | - | 9.2 |

The hydrological calculations have been based on the Head/Discharge relationship for the

## Hydro-Brake Optimum® Manhole: 3, DS/PN: 2.001, Volume (m³): 1.3

Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 5.8 | 1.200 | 16.6 | 3.000 | 25.8 | 7.000 | 38.8 |
| 0.200 | 11.4 | 1.400 | 17.9 | 3.500 | 27.8 | 7.500 | 40.1 |
| 0.300 | 11.4 | 1.600 | 19.1 | 4.000 | 29.6 | 8.000 | 41.5 |
| 0.400 | 10.7 | 1.800 | 20.2 | 4.500 | 31.4 | 8.500 | 42.8 |
| 0.500 | 11.0 | 2.000 | 21.2 | 5.000 | 33.0 | 9.000 | 44.0 |
| 0.600 | 12.0 | 2.200 | 22.2 | 5.500 | 34.5 | 9.500 | 45.2 |
| 0.800 | 13.7 | 2.400 | 23.2 | 6.000 | 35.9 | | |
| 1.000 | 15.3 | 2.600 | 24.1 | 6.500 | 37.3 | | |

## Hydro-Brake Optimum® Manhole: 4, DS/PN: 1.004, Volume (m³): 2.2

| | |
|---|---|
| Unit Reference | MD-SHE-0185-1800-1300-1800 |
| Design Head (m) | 1.300 |
| Design Flow (l/s) | 18.0 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 185 |
| Invert Level (m) | 29.000 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1500 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---|---|---|---|---|---|
| Design Point (Calculated) | 1.300 | 18.0 | Kick-Flo® | 0.869 | 14.9 |
| Flush-Flo™ | 0.394 | 18.0 | Mean Flow over Head Range | - | 15.5 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 6.5 | 1.200 | 17.3 | 3.000 | 26.8 | 7.000 | 40.4 |
| 0.200 | 16.7 | 1.400 | 18.6 | 3.500 | 28.9 | 7.500 | 41.7 |
| 0.300 | 17.7 | 1.600 | 19.9 | 4.000 | 30.8 | 8.000 | 43.1 |
| 0.400 | 18.0 | 1.800 | 21.0 | 4.500 | 32.6 | 8.500 | 44.3 |
| 0.500 | 17.8 | 2.000 | 22.1 | 5.000 | 34.3 | 9.000 | 45.6 |
| 0.600 | 17.5 | 2.200 | 23.1 | 5.500 | 35.9 | 9.500 | 46.8 |
| 0.800 | 16.1 | 2.400 | 24.1 | 6.000 | 37.5 | | |
| 1.000 | 15.9 | 2.600 | 25.1 | 6.500 | 38.9 | | |

## Storage Structures for Storm

### Cellular Storage Manhole: 1, DS/PN: 1.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 30.100 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.30 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 345.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 345.0 | 0.0 | | | |

### Porous Car Park Manhole: 3, DS/PN: 2.001

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 17.5 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 50.0 |
| Max Percolation (l/s) | 243.1 | Slope (1:X) | 10000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 29.950 | Cap Volume Depth (m) | 0.500 |

### Cellular Storage Manhole: 3, DS/PN: 1.003

| | | | |
|---|---|---|---|
| Invert Level (m) | 29.050 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.95 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 35.0 | 0.0 | 0.401 | 0.0 | 0.0 |
| 0.400 | 35.0 | 0.0 | | | |

## 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.406 |
| Region | England and Wales | Cv (Summer) | 0.920 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.920 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 120 Summer | 1 | +0% | 30/60 Summer | | | | 30.189 |
| 1.001 | 1 | 120 Summer | 1 | +0% | 30/15 Summer | | | | 30.189 |
| 2.000 | 3 | 240 Summer | 1 | +0% | 30/60 Summer | | | | 30.047 |
| 2.001 | 3 | 240 Summer | 1 | +0% | 100/15 Summer | | | | 30.047 |
| 1.002 | 2 | 120 Summer | 1 | +0% | 100/15 Summer | | | | 29.659 |
| 1.003 | 3 | 15 Summer | 1 | +0% | 30/15 Summer | | | | 29.160 |
| 3.000 | 7 | 360 Winter | 1 | +0% | 100/15 Summer | | | | 29.411 |
| 1.004 | 4 | 15 Summer | 1 | +0% | 30/15 Summer | | | | 29.164 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | -0.111 | 0.000 | 0.00 | | 0.0 | OK | |
| 1.001 | 1 | -0.061 | 0.000 | 0.14 | | 3.0 | OK | |
| 2.000 | 3 | -0.103 | 0.000 | 0.00 | | 0.0 | OK | |
| 2.001 | 3 | -0.128 | 0.000 | 0.06 | | 5.5 | OK | |
| 1.002 | 2 | -0.151 | 0.000 | 0.24 | | 9.7 | OK | |
| 1.003 | 3 | -0.115 | 0.000 | 0.32 | | 10.1 | OK | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 3.000 | 7 | -0.124 | 0.000 | 0.07 | | 1.2 | OK | |
| 1.004 | 4 | -0.061 | 0.000 | 0.25 | | 11.7 | OK | |

## 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.406 |
| Region | England and Wales | Cv (Summer) | 0.920 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.920 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 120 Summer | 30 | +0% | 30/60 Summer | | | | 30.321 |
| 1.001 | 1 | 120 Summer | 30 | +0% | 30/15 Summer | | | | 30.321 |
| 2.000 | 3 | 120 Summer | 30 | +0% | 30/60 Summer | | | | 30.172 |
| 2.001 | 3 | 120 Summer | 30 | +0% | 100/15 Summer | | | | 30.172 |
| 1.002 | 2 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 29.738 |
| 1.003 | 3 | 15 Summer | 30 | +0% | 30/15 Summer | | | | 29.366 |
| 3.000 | 7 | 360 Winter | 30 | +0% | 100/15 Summer | | | | 29.411 |
| 1.004 | 4 | 15 Summer | 30 | +0% | 30/15 Summer | | | | 29.360 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 0.021 | 0.000 | 0.00 | | 0.0 | SURCHARGED | |
| 1.001 | 1 | 0.071 | 0.000 | 0.19 | | 4.2 | SURCHARGED | |
| 2.000 | 3 | 0.022 | 0.000 | 0.00 | | 0.0 | SURCHARGED | |
| 2.001 | 3 | -0.003 | 0.000 | 0.13 | | 11.4 | OK | |
| 1.002 | 2 | -0.072 | 0.000 | 0.70 | | 28.8 | OK | |
| 1.003 | 3 | 0.091 | 0.000 | 0.58 | | 18.3 | SURCHARGED | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 3.000 | 7 | -0.124 | 0.000 | 0.07 | | 1.2 | OK | |
| 1.004 | 4 | 0.135 | 0.000 | 0.38 | | 17.9 | SURCHARGED | |

## 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.406 |
| Region | England and Wales | Cv (Summer) | 0.920 |
| M5-60 (mm) | 20.100 | Cv (Winter) | 0.920 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | ON |
| 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 | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 120 Summer | 100 | +40% | 30/60 Summer | | | | 30.556 |
| 1.001 | 1 | 120 Summer | 100 | +40% | 30/15 Summer | | | | 30.556 |
| 2.000 | 3 | 120 Summer | 100 | +40% | 30/60 Summer | | | | 30.430 |
| 2.001 | 3 | 120 Summer | 100 | +40% | 100/15 Summer | | | | 30.430 |
| 1.002 | 2 | 120 Summer | 100 | +40% | 100/15 Summer | | | | 30.287 |
| 1.003 | 3 | 120 Summer | 100 | +40% | 30/15 Summer | | | | 30.210 |
| 3.000 | 7 | 120 Summer | 100 | +40% | 100/15 Summer | | | | 30.205 |
| 1.004 | 4 | 120 Summer | 100 | +40% | 30/15 Summer | | | | 30.198 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 1 | 0.256 | 0.000 | 0.00 | | 0.0 | SURCHARGED | |
| 1.001 | 1 | 0.306 | 0.000 | 0.20 | | 4.5 | SURCHARGED | |
| 2.000 | 3 | 0.280 | 0.000 | 0.00 | | 0.0 | SURCHARGED | |
| 2.001 | 3 | 0.255 | 0.000 | 0.13 | | 11.4 | SURCHARGED | |
| 1.002 | 2 | 0.477 | 0.000 | 0.80 | | 32.8 | SURCHARGED | |
| 1.003 | 3 | 0.935 | 0.000 | 0.64 | | 20.3 | FLOOD RISK | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 3.000 | 7 | 0.670 | 0.000 | 0.08 | | 1.3 | FLOOD RISK | |
| 1.004 | 4 | 0.973 | 0.000 | 0.38 | | 18.0 | FLOOD RISK | |

## Summary of Results for 30 year Return Period

Half Drain Time : 579 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.938 | 0.048 | 0.0 | 0.2 | 0.2 | 5.7 | O K |
| 30 min Summer | 30.949 | 0.059 | 0.0 | 0.2 | 0.2 | 8.5 | O K |
| 60 min Summer | 30.960 | 0.070 | 0.0 | 0.2 | 0.2 | 11.2 | O K |
| 120 min Summer | 30.971 | 0.081 | 0.0 | 0.3 | 0.3 | 13.8 | O K |
| 180 min Summer | 30.976 | 0.086 | 0.0 | 0.3 | 0.3 | 15.1 | O K |
| 240 min Summer | 30.979 | 0.089 | 0.0 | 0.3 | 0.3 | 15.8 | O K |
| 360 min Summer | 30.982 | 0.092 | 0.0 | 0.3 | 0.3 | 16.5 | O K |
| 480 min Summer | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.7 | O K |
| 600 min Summer | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.8 | O K |
| 720 min Summer | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.9 | O K |
| 960 min Summer | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.8 | O K |
| 1440 min Summer | 30.981 | 0.091 | 0.0 | 0.3 | 0.3 | 16.4 | O K |
| 2160 min Summer | 30.977 | 0.087 | 0.0 | 0.3 | 0.3 | 15.5 | O K |
| 2880 min Summer | 30.973 | 0.083 | 0.0 | 0.3 | 0.3 | 14.3 | O K |
| 4320 min Summer | 30.964 | 0.074 | 0.0 | 0.2 | 0.2 | 12.1 | O K |
| 5760 min Summer | 30.956 | 0.066 | 0.0 | 0.2 | 0.2 | 10.2 | O K |
| 7200 min Summer | 30.950 | 0.060 | 0.0 | 0.2 | 0.2 | 8.7 | O K |
| 8640 min Summer | 30.945 | 0.055 | 0.0 | 0.2 | 0.2 | 7.4 | O K |
| 10080 min Summer | 30.940 | 0.050 | 0.0 | 0.2 | 0.2 | 6.3 | O K |
| 15 min Winter | 30.938 | 0.048 | 0.0 | 0.2 | 0.2 | 5.7 | O K |
| 30 min Winter | 30.949 | 0.059 | 0.0 | 0.2 | 0.2 | 8.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 5.8 | 19 |
| 30 min Summer | 49.886 | 0.0 | 8.6 | 34 |
| 60 min Summer | 30.968 | 0.0 | 11.7 | 64 |
| 120 min Summer | 18.658 | 0.0 | 14.8 | 122 |
| 180 min Summer | 13.726 | 0.0 | 16.6 | 182 |
| 240 min Summer | 10.992 | 0.0 | 17.9 | 242 |
| 360 min Summer | 8.021 | 0.0 | 19.8 | 360 |
| 480 min Summer | 6.411 | 0.0 | 21.2 | 458 |
| 600 min Summer | 5.385 | 0.0 | 22.3 | 506 |
| 720 min Summer | 4.668 | 0.0 | 23.2 | 568 |
| 960 min Summer | 3.724 | 0.0 | 24.6 | 692 |
| 1440 min Summer | 2.706 | 0.0 | 26.3 | 966 |
| 2160 min Summer | 1.964 | 0.0 | 28.3 | 1380 |
| 2880 min Summer | 1.563 | 0.0 | 29.3 | 1784 |
| 4320 min Summer | 1.132 | 0.0 | 30.3 | 2552 |
| 5760 min Summer | 0.900 | 0.0 | 30.5 | 3336 |
| 7200 min Summer | 0.753 | 0.0 | 30.2 | 4040 |
| 8640 min Summer | 0.651 | 0.0 | 29.5 | 4760 |
| 10080 min Summer | 0.575 | 0.0 | 28.7 | 5456 |
| 15 min Winter | 76.822 | 0.0 | 5.8 | 19 |
| 30 min Winter | 49.886 | 0.0 | 8.6 | 33 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.960 | 0.070 | 0.0 | 0.2 | 0.2 | 11.2 | O K |
| 120 min Winter | 30.971 | 0.081 | 0.0 | 0.3 | 0.3 | 13.8 | O K |
| 180 min Winter | 30.976 | 0.086 | 0.0 | 0.3 | 0.3 | 15.1 | O K |
| 240 min Winter | 30.979 | 0.089 | 0.0 | 0.3 | 0.3 | 15.8 | O K |
| 360 min Winter | 30.982 | 0.092 | 0.0 | 0.3 | 0.3 | 16.6 | O K |
| 480 min Winter | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.8 | O K |
| 600 min Winter | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.8 | O K |
| 720 min Winter | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.8 | O K |
| 960 min Winter | 30.982 | 0.092 | 0.0 | 0.3 | 0.3 | 16.6 | O K |
| 1440 min Winter | 30.979 | 0.089 | 0.0 | 0.3 | 0.3 | 15.8 | O K |
| 2160 min Winter | 30.972 | 0.082 | 0.0 | 0.3 | 0.3 | 14.2 | O K |
| 2880 min Winter | 30.966 | 0.076 | 0.0 | 0.3 | 0.3 | 12.6 | O K |
| 4320 min Winter | 30.954 | 0.064 | 0.0 | 0.2 | 0.2 | 9.8 | O K |
| 5760 min Winter | 30.945 | 0.055 | 0.0 | 0.2 | 0.2 | 7.5 | O K |
| 7200 min Winter | 30.938 | 0.048 | 0.0 | 0.2 | 0.2 | 5.7 | O K |
| 8640 min Winter | 30.932 | 0.042 | 0.0 | 0.2 | 0.2 | 4.4 | O K |
| 10080 min Winter | 30.927 | 0.037 | 0.0 | 0.2 | 0.2 | 3.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 11.7 | 62 |
| 120 min Winter | 18.658 | 0.0 | 14.8 | 120 |
| 180 min Winter | 13.726 | 0.0 | 16.6 | 178 |
| 240 min Winter | 10.992 | 0.0 | 17.9 | 236 |
| 360 min Winter | 8.021 | 0.0 | 19.8 | 348 |
| 480 min Winter | 6.411 | 0.0 | 21.2 | 458 |
| 600 min Winter | 5.385 | 0.0 | 22.3 | 558 |
| 720 min Winter | 4.668 | 0.0 | 23.2 | 578 |
| 960 min Winter | 3.724 | 0.0 | 24.6 | 730 |
| 1440 min Winter | 2.706 | 0.0 | 26.4 | 1038 |
| 2160 min Winter | 1.964 | 0.0 | 28.4 | 1472 |
| 2880 min Winter | 1.563 | 0.0 | 29.4 | 1900 |
| 4320 min Winter | 1.132 | 0.0 | 30.4 | 2680 |
| 5760 min Winter | 0.900 | 0.0 | 30.7 | 3456 |
| 7200 min Winter | 0.753 | 0.0 | 30.5 | 4176 |
| 8640 min Winter | 0.651 | 0.0 | 30.0 | 4840 |
| 10080 min Winter | 0.575 | 0.0 | 29.4 | 5544 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.056

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.056 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.360

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 49.4 |
| Max Percolation (l/s) | 214.1 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.890 | Cap Volume Depth (m) | 0.250 |

## Orifice Outflow Control

Diameter (m) 0.024 Discharge Coefficient 0.500 Invert Level (m) 30.890

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

Half Drain Time : 882 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.970 | 0.080 | 0.0 | 0.3 | 0.3 | 13.6 | O K |
| 30 min Summer | 30.991 | 0.101 | 0.0 | 0.3 | 0.3 | 18.8 | O K |
| 60 min Summer | 31.012 | 0.122 | 0.0 | 0.3 | 0.3 | 24.1 | O K |
| 120 min Summer | 31.033 | 0.143 | 0.0 | 0.4 | 0.4 | 29.1 | O K |
| 180 min Summer | 31.043 | 0.153 | 0.0 | 0.4 | 0.4 | 31.6 | O K |
| 240 min Summer | 31.049 | 0.159 | 0.0 | 0.4 | 0.4 | 33.1 | O K |
| 360 min Summer | 31.055 | 0.165 | 0.0 | 0.4 | 0.4 | 34.7 | O K |
| 480 min Summer | 31.058 | 0.168 | 0.0 | 0.4 | 0.4 | 35.4 | O K |
| 600 min Summer | 31.059 | 0.169 | 0.0 | 0.4 | 0.4 | 35.6 | O K |
| 720 min Summer | 31.059 | 0.169 | 0.0 | 0.4 | 0.4 | 35.6 | O K |
| 960 min Summer | 31.058 | 0.168 | 0.0 | 0.4 | 0.4 | 35.4 | O K |
| 1440 min Summer | 31.055 | 0.165 | 0.0 | 0.4 | 0.4 | 34.6 | O K |
| 2160 min Summer | 31.049 | 0.159 | 0.0 | 0.4 | 0.4 | 33.0 | O K |
| 2880 min Summer | 31.041 | 0.151 | 0.0 | 0.4 | 0.4 | 31.1 | O K |
| 4320 min Summer | 31.026 | 0.136 | 0.0 | 0.4 | 0.4 | 27.5 | O K |
| 5760 min Summer | 31.013 | 0.123 | 0.0 | 0.3 | 0.3 | 24.2 | O K |
| 7200 min Summer | 31.001 | 0.111 | 0.0 | 0.3 | 0.3 | 21.4 | O K |
| 8640 min Summer | 30.992 | 0.102 | 0.0 | 0.3 | 0.3 | 19.0 | O K |
| 10080 min Summer | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.9 | O K |
| 15 min Winter | 30.970 | 0.080 | 0.0 | 0.3 | 0.3 | 13.6 | O K |
| 30 min Winter | 30.991 | 0.101 | 0.0 | 0.3 | 0.3 | 18.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 13.4 | 19 |
| 30 min Summer | 91.435 | 0.0 | 17.8 | 34 |
| 60 min Summer | 57.005 | 0.0 | 24.8 | 64 |
| 120 min Summer | 34.324 | 0.0 | 30.5 | 124 |
| 180 min Summer | 25.168 | 0.0 | 33.8 | 182 |
| 240 min Summer | 20.074 | 0.0 | 36.1 | 242 |
| 360 min Summer | 14.562 | 0.0 | 39.3 | 362 |
| 480 min Summer | 11.594 | 0.0 | 41.5 | 480 |
| 600 min Summer | 9.707 | 0.0 | 43.1 | 600 |
| 720 min Summer | 8.393 | 0.0 | 44.2 | 660 |
| 960 min Summer | 6.666 | 0.0 | 45.4 | 770 |
| 1440 min Summer | 4.811 | 0.0 | 45.4 | 1024 |
| 2160 min Summer | 3.466 | 0.0 | 55.6 | 1432 |
| 2880 min Summer | 2.744 | 0.0 | 57.9 | 1844 |
| 4320 min Summer | 1.972 | 0.0 | 60.7 | 2640 |
| 5760 min Summer | 1.558 | 0.0 | 62.3 | 3456 |
| 7200 min Summer | 1.297 | 0.0 | 63.1 | 4184 |
| 8640 min Summer | 1.117 | 0.0 | 63.3 | 4936 |
| 10080 min Summer | 0.983 | 0.0 | 63.2 | 5744 |
| 15 min Winter | 139.635 | 0.0 | 13.4 | 19 |
| 30 min Winter | 91.435 | 0.0 | 17.9 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.012 | 0.122 | 0.0 | 0.3 | 0.3 | 24.1 | O K |
| 120 min Winter | 31.033 | 0.143 | 0.0 | 0.4 | 0.4 | 29.1 | O K |
| 180 min Winter | 31.043 | 0.153 | 0.0 | 0.4 | 0.4 | 31.6 | O K |
| 240 min Winter | 31.049 | 0.159 | 0.0 | 0.4 | 0.4 | 33.1 | O K |
| 360 min Winter | 31.056 | 0.166 | 0.0 | 0.4 | 0.4 | 34.8 | O K |
| 480 min Winter | 31.059 | 0.169 | 0.0 | 0.4 | 0.4 | 35.6 | O K |
| 600 min Winter | 31.060 | 0.170 | 0.0 | 0.4 | 0.4 | 35.8 | Flood Risk |
| 720 min Winter | 31.060 | 0.170 | 0.0 | 0.4 | 0.4 | 35.8 | O K |
| 960 min Winter | 31.058 | 0.168 | 0.0 | 0.4 | 0.4 | 35.3 | O K |
| 1440 min Winter | 31.054 | 0.164 | 0.0 | 0.4 | 0.4 | 34.2 | O K |
| 2160 min Winter | 31.044 | 0.154 | 0.0 | 0.4 | 0.4 | 31.9 | O K |
| 2880 min Winter | 31.034 | 0.144 | 0.0 | 0.4 | 0.4 | 29.3 | O K |
| 4320 min Winter | 31.014 | 0.124 | 0.0 | 0.3 | 0.3 | 24.5 | O K |
| 5760 min Winter | 30.997 | 0.107 | 0.0 | 0.3 | 0.3 | 20.3 | O K |
| 7200 min Winter | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 16.9 | O K |
| 8640 min Winter | 30.972 | 0.082 | 0.0 | 0.3 | 0.3 | 14.1 | O K |
| 10080 min Winter | 30.962 | 0.072 | 0.0 | 0.2 | 0.2 | 11.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 24.8 | 62 |
| 120 min Winter | 34.324 | 0.0 | 30.5 | 122 |
| 180 min Winter | 25.168 | 0.0 | 33.8 | 180 |
| 240 min Winter | 20.074 | 0.0 | 36.1 | 238 |
| 360 min Winter | 14.562 | 0.0 | 39.3 | 352 |
| 480 min Winter | 11.594 | 0.0 | 41.5 | 466 |
| 600 min Winter | 9.707 | 0.0 | 43.1 | 576 |
| 720 min Winter | 8.393 | 0.0 | 44.2 | 684 |
| 960 min Winter | 6.666 | 0.0 | 45.4 | 792 |
| 1440 min Winter | 4.811 | 0.0 | 45.5 | 1082 |
| 2160 min Winter | 3.466 | 0.0 | 55.6 | 1536 |
| 2880 min Winter | 2.744 | 0.0 | 58.0 | 1988 |
| 4320 min Winter | 1.972 | 0.0 | 60.8 | 2812 |
| 5760 min Winter | 1.558 | 0.0 | 62.4 | 3632 |
| 7200 min Winter | 1.297 | 0.0 | 63.3 | 4400 |
| 8640 min Winter | 1.117 | 0.0 | 63.6 | 5184 |
| 10080 min Winter | 0.983 | 0.0 | 63.6 | 5856 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.056

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.056 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.360

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 49.4 |
| Max Percolation (l/s) | 214.1 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.890 | Cap Volume Depth (m) | 0.250 |

## Orifice Outflow Control

Diameter (m) 0.024 Discharge Coefficient 0.500 Invert Level (m) 30.890

## Summary of Results for 100 year Return Period

Half Drain Time : 698 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.949 | 0.059 | 0.0 | 0.2 | 0.2 | 8.6 | O K |
| 30 min Summer | 30.965 | 0.075 | 0.0 | 0.3 | 0.3 | 12.3 | O K |
| 60 min Summer | 30.980 | 0.090 | 0.0 | 0.3 | 0.3 | 16.0 | O K |
| 120 min Summer | 30.994 | 0.104 | 0.0 | 0.3 | 0.3 | 19.5 | O K |
| 180 min Summer | 31.001 | 0.111 | 0.0 | 0.3 | 0.3 | 21.2 | O K |
| 240 min Summer | 31.004 | 0.114 | 0.0 | 0.3 | 0.3 | 22.1 | O K |
| 360 min Summer | 31.008 | 0.118 | 0.0 | 0.3 | 0.3 | 23.1 | O K |
| 480 min Summer | 31.010 | 0.120 | 0.0 | 0.3 | 0.3 | 23.4 | O K |
| 600 min Summer | 31.010 | 0.120 | 0.0 | 0.3 | 0.3 | 23.4 | O K |
| 720 min Summer | 31.010 | 0.120 | 0.0 | 0.3 | 0.3 | 23.4 | O K |
| 960 min Summer | 31.009 | 0.119 | 0.0 | 0.3 | 0.3 | 23.2 | O K |
| 1440 min Summer | 31.006 | 0.116 | 0.0 | 0.3 | 0.3 | 22.6 | O K |
| 2160 min Summer | 31.001 | 0.111 | 0.0 | 0.3 | 0.3 | 21.3 | O K |
| 2880 min Summer | 30.995 | 0.105 | 0.0 | 0.3 | 0.3 | 19.8 | O K |
| 4320 min Summer | 30.983 | 0.093 | 0.0 | 0.3 | 0.3 | 17.0 | O K |
| 5760 min Summer | 30.973 | 0.083 | 0.0 | 0.3 | 0.3 | 14.5 | O K |
| 7200 min Summer | 30.965 | 0.075 | 0.0 | 0.3 | 0.3 | 12.4 | O K |
| 8640 min Summer | 30.958 | 0.068 | 0.0 | 0.2 | 0.2 | 10.7 | O K |
| 10080 min Summer | 30.952 | 0.062 | 0.0 | 0.2 | 0.2 | 9.3 | O K |
| 15 min Winter | 30.949 | 0.059 | 0.0 | 0.2 | 0.2 | 8.6 | O K |
| 30 min Winter | 30.965 | 0.075 | 0.0 | 0.3 | 0.3 | 12.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 8.6 | 19 |
| 30 min Summer | 65.311 | 0.0 | 12.3 | 34 |
| 60 min Summer | 40.718 | 0.0 | 16.6 | 64 |
| 120 min Summer | 24.517 | 0.0 | 20.7 | 122 |
| 180 min Summer | 17.977 | 0.0 | 23.0 | 182 |
| 240 min Summer | 14.339 | 0.0 | 24.7 | 242 |
| 360 min Summer | 10.402 | 0.0 | 27.0 | 360 |
| 480 min Summer | 8.281 | 0.0 | 28.7 | 480 |
| 600 min Summer | 6.934 | 0.0 | 30.1 | 548 |
| 720 min Summer | 5.995 | 0.0 | 31.1 | 600 |
| 960 min Summer | 4.761 | 0.0 | 32.7 | 722 |
| 1440 min Summer | 3.436 | 0.0 | 34.2 | 984 |
| 2160 min Summer | 2.476 | 0.0 | 37.6 | 1404 |
| 2880 min Summer | 1.960 | 0.0 | 38.9 | 1812 |
| 4320 min Summer | 1.408 | 0.0 | 40.3 | 2596 |
| 5760 min Summer | 1.113 | 0.0 | 40.8 | 3352 |
| 7200 min Summer | 0.927 | 0.0 | 40.6 | 4112 |
| 8640 min Summer | 0.798 | 0.0 | 40.2 | 4848 |
| 10080 min Summer | 0.702 | 0.0 | 39.4 | 5552 |
| 15 min Winter | 99.739 | 0.0 | 8.6 | 19 |
| 30 min Winter | 65.311 | 0.0 | 12.3 | 33 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.980 | 0.090 | 0.0 | 0.3 | 0.3 | 16.0 | O K |
| 120 min Winter | 30.994 | 0.104 | 0.0 | 0.3 | 0.3 | 19.5 | O K |
| 180 min Winter | 31.001 | 0.111 | 0.0 | 0.3 | 0.3 | 21.2 | O K |
| 240 min Winter | 31.004 | 0.114 | 0.0 | 0.3 | 0.3 | 22.1 | O K |
| 360 min Winter | 31.008 | 0.118 | 0.0 | 0.3 | 0.3 | 23.1 | O K |
| 480 min Winter | 31.010 | 0.120 | 0.0 | 0.3 | 0.3 | 23.5 | O K |
| 600 min Winter | 31.010 | 0.120 | 0.0 | 0.3 | 0.3 | 23.5 | O K |
| 720 min Winter | 31.009 | 0.119 | 0.0 | 0.3 | 0.3 | 23.4 | O K |
| 960 min Winter | 31.008 | 0.118 | 0.0 | 0.3 | 0.3 | 23.0 | O K |
| 1440 min Winter | 31.004 | 0.114 | 0.0 | 0.3 | 0.3 | 22.0 | O K |
| 2160 min Winter | 30.996 | 0.106 | 0.0 | 0.3 | 0.3 | 20.1 | O K |
| 2880 min Winter | 30.988 | 0.098 | 0.0 | 0.3 | 0.3 | 18.0 | O K |
| 4320 min Winter | 30.973 | 0.083 | 0.0 | 0.3 | 0.3 | 14.3 | O K |
| 5760 min Winter | 30.961 | 0.071 | 0.0 | 0.2 | 0.2 | 11.3 | O K |
| 7200 min Winter | 30.951 | 0.061 | 0.0 | 0.2 | 0.2 | 8.9 | O K |
| 8640 min Winter | 30.943 | 0.053 | 0.0 | 0.2 | 0.2 | 7.0 | O K |
| 10080 min Winter | 30.937 | 0.047 | 0.0 | 0.2 | 0.2 | 5.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 16.6 | 62 |
| 120 min Winter | 24.517 | 0.0 | 20.7 | 120 |
| 180 min Winter | 17.977 | 0.0 | 23.0 | 180 |
| 240 min Winter | 14.339 | 0.0 | 24.7 | 238 |
| 360 min Winter | 10.402 | 0.0 | 27.0 | 352 |
| 480 min Winter | 8.281 | 0.0 | 28.7 | 462 |
| 600 min Winter | 6.934 | 0.0 | 30.1 | 568 |
| 720 min Winter | 5.995 | 0.0 | 31.1 | 664 |
| 960 min Winter | 4.761 | 0.0 | 32.7 | 750 |
| 1440 min Winter | 3.436 | 0.0 | 34.3 | 1054 |
| 2160 min Winter | 2.476 | 0.0 | 37.6 | 1496 |
| 2880 min Winter | 1.960 | 0.0 | 39.0 | 1932 |
| 4320 min Winter | 1.408 | 0.0 | 40.4 | 2728 |
| 5760 min Winter | 1.113 | 0.0 | 41.0 | 3520 |
| 7200 min Winter | 0.927 | 0.0 | 40.9 | 4256 |
| 8640 min Winter | 0.798 | 0.0 | 40.6 | 5008 |
| 10080 min Winter | 0.702 | 0.0 | 40.0 | 5648 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.056

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.056 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.360

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 49.4 |
| Max Percolation (l/s) | 214.1 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.890 | Cap Volume Depth (m) | 0.250 |

## Orifice Outflow Control

Diameter (m) 0.024 Discharge Coefficient 0.500 Invert Level (m) 30.890

## Summary of Results for 1 year Return Period

Half Drain Time : 85 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.702 | 0.072 | 0.0 | 2.4 | 2.4 | 13.0 | O K |
| 30 min Summer | 30.715 | 0.085 | 0.0 | 2.6 | 2.6 | 18.1 | O K |
| 60 min Summer | 30.725 | 0.095 | 0.0 | 2.7 | 2.7 | 22.4 | O K |
| 120 min Summer | 30.731 | 0.101 | 0.0 | 2.8 | 2.8 | 25.0 | O K |
| 180 min Summer | 30.734 | 0.104 | 0.0 | 2.8 | 2.8 | 26.0 | O K |
| 240 min Summer | 30.734 | 0.104 | 0.0 | 2.8 | 2.8 | 26.2 | O K |
| 360 min Summer | 30.732 | 0.102 | 0.0 | 2.8 | 2.8 | 25.3 | O K |
| 480 min Summer | 30.728 | 0.098 | 0.0 | 2.7 | 2.7 | 23.8 | O K |
| 600 min Summer | 30.725 | 0.095 | 0.0 | 2.7 | 2.7 | 22.1 | O K |
| 720 min Summer | 30.721 | 0.091 | 0.0 | 2.6 | 2.6 | 20.5 | O K |
| 960 min Summer | 30.714 | 0.084 | 0.0 | 2.5 | 2.5 | 17.4 | O K |
| 1440 min Summer | 30.701 | 0.071 | 0.0 | 2.4 | 2.4 | 12.6 | O K |
| 2160 min Summer | 30.686 | 0.056 | 0.0 | 2.2 | 2.2 | 7.8 | O K |
| 2880 min Summer | 30.675 | 0.045 | 0.0 | 2.0 | 2.0 | 5.1 | O K |
| 4320 min Summer | 30.662 | 0.032 | 0.0 | 1.6 | 1.6 | 2.5 | O K |
| 5760 min Summer | 30.653 | 0.023 | 0.0 | 1.3 | 1.3 | 1.3 | O K |
| 7200 min Summer | 30.646 | 0.016 | 0.0 | 1.1 | 1.1 | 0.7 | O K |
| 8640 min Summer | 30.641 | 0.011 | 0.0 | 1.0 | 1.0 | 0.3 | O K |
| 10080 min Summer | 30.637 | 0.007 | 0.0 | 0.9 | 0.9 | 0.1 | O K |
| 15 min Winter | 30.702 | 0.072 | 0.0 | 2.4 | 2.4 | 13.1 | O K |
| 30 min Winter | 30.715 | 0.085 | 0.0 | 2.6 | 2.6 | 18.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 14.4 | 18 |
| 30 min Summer | 20.382 | 0.0 | 20.8 | 32 |
| 60 min Summer | 12.872 | 0.0 | 27.9 | 60 |
| 120 min Summer | 7.964 | 0.0 | 36.1 | 98 |
| 180 min Summer | 5.985 | 0.0 | 41.4 | 130 |
| 240 min Summer | 4.881 | 0.0 | 45.5 | 164 |
| 360 min Summer | 3.639 | 0.0 | 51.4 | 234 |
| 480 min Summer | 2.946 | 0.0 | 55.8 | 302 |
| 600 min Summer | 2.501 | 0.0 | 59.3 | 368 |
| 720 min Summer | 2.188 | 0.0 | 62.4 | 434 |
| 960 min Summer | 1.771 | 0.0 | 67.4 | 560 |
| 1440 min Summer | 1.316 | 0.0 | 74.8 | 808 |
| 2160 min Summer | 0.978 | 0.0 | 82.6 | 1152 |
| 2880 min Summer | 0.792 | 0.0 | 88.1 | 1500 |
| 4320 min Summer | 0.587 | 0.0 | 95.8 | 2208 |
| 5760 min Summer | 0.476 | 0.0 | 100.9 | 2936 |
| 7200 min Summer | 0.404 | 0.0 | 104.5 | 3672 |
| 8640 min Summer | 0.354 | 0.0 | 107.0 | 4368 |
| 10080 min Summer | 0.316 | 0.0 | 108.8 | 5040 |
| 15 min Winter | 31.306 | 0.0 | 14.4 | 18 |
| 30 min Winter | 20.382 | 0.0 | 20.8 | 32 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.725 | 0.095 | 0.0 | 2.7 | 2.7 | 22.4 | O K |
| 120 min Winter | 30.731 | 0.101 | 0.0 | 2.7 | 2.7 | 24.8 | O K |
| 180 min Winter | 30.732 | 0.102 | 0.0 | 2.8 | 2.8 | 25.4 | O K |
| 240 min Winter | 30.732 | 0.102 | 0.0 | 2.8 | 2.8 | 25.2 | O K |
| 360 min Winter | 30.727 | 0.097 | 0.0 | 2.7 | 2.7 | 23.4 | O K |
| 480 min Winter | 30.722 | 0.092 | 0.0 | 2.6 | 2.6 | 21.0 | O K |
| 600 min Winter | 30.716 | 0.086 | 0.0 | 2.6 | 2.6 | 18.5 | O K |
| 720 min Winter | 30.711 | 0.081 | 0.0 | 2.5 | 2.5 | 16.2 | O K |
| 960 min Winter | 30.700 | 0.070 | 0.0 | 2.4 | 2.4 | 12.3 | O K |
| 1440 min Winter | 30.682 | 0.052 | 0.0 | 2.1 | 2.1 | 6.9 | O K |
| 2160 min Winter | 30.667 | 0.037 | 0.0 | 1.7 | 1.7 | 3.3 | O K |
| 2880 min Winter | 30.656 | 0.026 | 0.0 | 1.4 | 1.4 | 1.7 | O K |
| 4320 min Winter | 30.644 | 0.014 | 0.0 | 1.1 | 1.1 | 0.5 | O K |
| 5760 min Winter | 30.636 | 0.006 | 0.0 | 0.9 | 0.9 | 0.1 | O K |
| 7200 min Winter | 30.630 | 0.000 | 0.0 | 0.7 | 0.7 | 0.0 | O K |
| 8640 min Winter | 30.630 | 0.000 | 0.0 | 0.6 | 0.6 | 0.0 | O K |
| 10080 min Winter | 30.630 | 0.000 | 0.0 | 0.6 | 0.6 | 0.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 28.0 | 60 |
| 120 min Winter | 7.964 | 0.0 | 36.1 | 100 |
| 180 min Winter | 5.985 | 0.0 | 41.4 | 138 |
| 240 min Winter | 4.881 | 0.0 | 45.5 | 176 |
| 360 min Winter | 3.639 | 0.0 | 51.4 | 250 |
| 480 min Winter | 2.946 | 0.0 | 55.8 | 320 |
| 600 min Winter | 2.501 | 0.0 | 59.4 | 388 |
| 720 min Winter | 2.188 | 0.0 | 62.4 | 454 |
| 960 min Winter | 1.771 | 0.0 | 67.3 | 578 |
| 1440 min Winter | 1.316 | 0.0 | 74.8 | 810 |
| 2160 min Winter | 0.978 | 0.0 | 82.6 | 1148 |
| 2880 min Winter | 0.792 | 0.0 | 88.2 | 1500 |
| 4320 min Winter | 0.587 | 0.0 | 95.9 | 2200 |
| 5760 min Winter | 0.476 | 0.0 | 101.1 | 2928 |
| 7200 min Winter | 0.404 | 0.0 | 104.8 | 0 |
| 8640 min Winter | 0.354 | 0.0 | 107.6 | 0 |
| 10080 min Winter | 0.316 | 0.0 | 109.5 | 0 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.301

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.301 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.300

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 86.3 |
| Max Percolation (l/s) | 374.0 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.630 | Cap Volume Depth (m) | 0.450 |

## Orifice Outflow Control

Diameter (m) 0.068 Discharge Coefficient 0.500 Invert Level (m) 30.580

## Summary of Results for 30 year Return Period

Half Drain Time : 185 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.773 | 0.143 | 0.0 | 3.2 | 3.2 | 43.1 | O K |
| 30 min Summer | 30.804 | 0.174 | 0.0 | 3.5 | 3.5 | 56.5 | O K |
| 60 min Summer | 30.831 | 0.201 | 0.0 | 3.7 | 3.7 | 68.1 | O K |
| 120 min Summer | 30.849 | 0.219 | 0.0 | 3.9 | 3.9 | 75.6 | O K |
| 180 min Summer | 30.851 | 0.221 | 0.0 | 3.9 | 3.9 | 76.6 | O K |
| 240 min Summer | 30.850 | 0.220 | 0.0 | 3.9 | 3.9 | 76.3 | O K |
| 360 min Summer | 30.846 | 0.216 | 0.0 | 3.9 | 3.9 | 74.6 | O K |
| 480 min Summer | 30.840 | 0.210 | 0.0 | 3.8 | 3.8 | 72.0 | O K |
| 600 min Summer | 30.833 | 0.203 | 0.0 | 3.8 | 3.8 | 69.0 | O K |
| 720 min Summer | 30.826 | 0.196 | 0.0 | 3.7 | 3.7 | 66.1 | O K |
| 960 min Summer | 30.813 | 0.183 | 0.0 | 3.6 | 3.6 | 60.3 | O K |
| 1440 min Summer | 30.790 | 0.160 | 0.0 | 3.4 | 3.4 | 50.3 | O K |
| 2160 min Summer | 30.762 | 0.132 | 0.0 | 3.1 | 3.1 | 38.2 | O K |
| 2880 min Summer | 30.741 | 0.111 | 0.0 | 2.9 | 2.9 | 29.1 | O K |
| 4320 min Summer | 30.712 | 0.082 | 0.0 | 2.5 | 2.5 | 16.7 | O K |
| 5760 min Summer | 30.692 | 0.062 | 0.0 | 2.2 | 2.2 | 9.7 | O K |
| 7200 min Summer | 30.679 | 0.049 | 0.0 | 2.0 | 2.0 | 5.9 | O K |
| 8640 min Summer | 30.670 | 0.040 | 0.0 | 1.8 | 1.8 | 4.0 | O K |
| 10080 min Summer | 30.663 | 0.033 | 0.0 | 1.6 | 1.6 | 2.8 | O K |
| 15 min Winter | 30.773 | 0.143 | 0.0 | 3.2 | 3.2 | 43.1 | O K |
| 30 min Winter | 30.804 | 0.174 | 0.0 | 3.5 | 3.5 | 56.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 45.3 | 18 |
| 30 min Summer | 49.886 | 0.0 | 60.7 | 33 |
| 60 min Summer | 30.968 | 0.0 | 77.0 | 62 |
| 120 min Summer | 18.658 | 0.0 | 94.0 | 120 |
| 180 min Summer | 13.726 | 0.0 | 104.3 | 160 |
| 240 min Summer | 10.992 | 0.0 | 111.6 | 190 |
| 360 min Summer | 8.021 | 0.0 | 122.7 | 254 |
| 480 min Summer | 6.411 | 0.0 | 130.9 | 324 |
| 600 min Summer | 5.385 | 0.0 | 137.5 | 392 |
| 720 min Summer | 4.668 | 0.0 | 143.0 | 462 |
| 960 min Summer | 3.724 | 0.0 | 152.0 | 598 |
| 1440 min Summer | 2.706 | 0.0 | 165.2 | 864 |
| 2160 min Summer | 1.964 | 0.0 | 178.7 | 1236 |
| 2880 min Summer | 1.563 | 0.0 | 188.4 | 1612 |
| 4320 min Summer | 1.132 | 0.0 | 202.0 | 2296 |
| 5760 min Summer | 0.900 | 0.0 | 211.2 | 3000 |
| 7200 min Summer | 0.753 | 0.0 | 217.9 | 3680 |
| 8640 min Summer | 0.651 | 0.0 | 223.0 | 4408 |
| 10080 min Summer | 0.575 | 0.0 | 226.9 | 5136 |
| 15 min Winter | 76.822 | 0.0 | 45.3 | 18 |
| 30 min Winter | 49.886 | 0.0 | 60.8 | 32 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.831 | 0.201 | 0.0 | 3.7 | 3.7 | 68.2 | O K |
| 120 min Winter | 30.850 | 0.220 | 0.0 | 3.9 | 3.9 | 76.0 | O K |
| 180 min Winter | 30.852 | 0.222 | 0.0 | 3.9 | 3.9 | 77.1 | O K |
| 240 min Winter | 30.850 | 0.220 | 0.0 | 3.9 | 3.9 | 76.2 | O K |
| 360 min Winter | 30.844 | 0.214 | 0.0 | 3.9 | 3.9 | 73.6 | O K |
| 480 min Winter | 30.835 | 0.205 | 0.0 | 3.8 | 3.8 | 69.9 | O K |
| 600 min Winter | 30.826 | 0.196 | 0.0 | 3.7 | 3.7 | 65.8 | O K |
| 720 min Winter | 30.816 | 0.186 | 0.0 | 3.6 | 3.6 | 61.6 | O K |
| 960 min Winter | 30.798 | 0.168 | 0.0 | 3.4 | 3.4 | 53.7 | O K |
| 1440 min Winter | 30.767 | 0.137 | 0.0 | 3.1 | 3.1 | 40.4 | O K |
| 2160 min Winter | 30.733 | 0.103 | 0.0 | 2.8 | 2.8 | 25.7 | O K |
| 2880 min Winter | 30.709 | 0.079 | 0.0 | 2.5 | 2.5 | 15.7 | O K |
| 4320 min Winter | 30.678 | 0.048 | 0.0 | 2.0 | 2.0 | 5.8 | O K |
| 5760 min Winter | 30.664 | 0.034 | 0.0 | 1.7 | 1.7 | 2.9 | O K |
| 7200 min Winter | 30.655 | 0.025 | 0.0 | 1.4 | 1.4 | 1.5 | O K |
| 8640 min Winter | 30.648 | 0.018 | 0.0 | 1.2 | 1.2 | 0.8 | O K |
| 10080 min Winter | 30.643 | 0.013 | 0.0 | 1.0 | 1.0 | 0.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 77.0 | 60 |
| 120 min Winter | 18.658 | 0.0 | 94.0 | 118 |
| 180 min Winter | 13.726 | 0.0 | 104.3 | 170 |
| 240 min Winter | 10.992 | 0.0 | 111.7 | 194 |
| 360 min Winter | 8.021 | 0.0 | 122.6 | 270 |
| 480 min Winter | 6.411 | 0.0 | 130.9 | 346 |
| 600 min Winter | 5.385 | 0.0 | 137.5 | 422 |
| 720 min Winter | 4.668 | 0.0 | 143.0 | 494 |
| 960 min Winter | 3.724 | 0.0 | 152.0 | 636 |
| 1440 min Winter | 2.706 | 0.0 | 165.1 | 908 |
| 2160 min Winter | 1.964 | 0.0 | 178.7 | 1276 |
| 2880 min Winter | 1.563 | 0.0 | 188.5 | 1640 |
| 4320 min Winter | 1.132 | 0.0 | 202.1 | 2284 |
| 5760 min Winter | 0.900 | 0.0 | 211.4 | 2944 |
| 7200 min Winter | 0.753 | 0.0 | 218.2 | 3672 |
| 8640 min Winter | 0.651 | 0.0 | 223.3 | 4344 |
| 10080 min Winter | 0.575 | 0.0 | 227.3 | 5136 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.301

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.301 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.300

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 86.3 |
| Max Percolation (l/s) | 374.0 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.630 | Cap Volume Depth (m) | 0.450 |

## Orifice Outflow Control

Diameter (m) 0.068 Discharge Coefficient 0.500 Invert Level (m) 30.580

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

Half Drain Time : 296 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.870 | 0.240 | 0.0 | 4.1 | 4.1 | 84.9 | O K |
| 30 min Summer | 30.931 | 0.301 | 0.0 | 4.5 | 4.5 | 111.3 | O K |
| 60 min Summer | 30.988 | 0.358 | 0.0 | 4.9 | 4.9 | 135.5 | O K |
| 120 min Summer | 31.030 | 0.400 | 0.0 | 5.2 | 5.2 | 153.7 | Flood Risk |
| 180 min Summer | 31.042 | 0.412 | 0.0 | 5.3 | 5.3 | 159.0 | Flood Risk |
| 240 min Summer | 31.042 | 0.412 | 0.0 | 5.3 | 5.3 | 158.9 | Flood Risk |
| 360 min Summer | 31.037 | 0.407 | 0.0 | 5.2 | 5.2 | 156.6 | Flood Risk |
| 480 min Summer | 31.029 | 0.399 | 0.0 | 5.2 | 5.2 | 153.4 | Flood Risk |
| 600 min Summer | 31.020 | 0.390 | 0.0 | 5.1 | 5.1 | 149.5 | Flood Risk |
| 720 min Summer | 31.010 | 0.380 | 0.0 | 5.1 | 5.1 | 145.3 | Flood Risk |
| 960 min Summer | 30.990 | 0.360 | 0.0 | 4.9 | 4.9 | 136.6 | O K |
| 1440 min Summer | 30.953 | 0.323 | 0.0 | 4.7 | 4.7 | 120.6 | O K |
| 2160 min Summer | 30.907 | 0.277 | 0.0 | 4.4 | 4.4 | 100.7 | O K |
| 2880 min Summer | 30.869 | 0.239 | 0.0 | 4.1 | 4.1 | 84.6 | O K |
| 4320 min Summer | 30.813 | 0.183 | 0.0 | 3.6 | 3.6 | 60.4 | O K |
| 5760 min Summer | 30.774 | 0.144 | 0.0 | 3.2 | 3.2 | 43.6 | O K |
| 7200 min Summer | 30.746 | 0.116 | 0.0 | 2.9 | 2.9 | 31.5 | O K |
| 8640 min Summer | 30.726 | 0.096 | 0.0 | 2.7 | 2.7 | 22.6 | O K |
| 10080 min Summer | 30.711 | 0.081 | 0.0 | 2.5 | 2.5 | 16.2 | O K |
| 15 min Winter | 30.870 | 0.240 | 0.0 | 4.1 | 4.1 | 85.0 | O K |
| 30 min Winter | 30.932 | 0.302 | 0.0 | 4.5 | 4.5 | 111.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 87.8 | 19 |
| 30 min Summer | 91.435 | 0.0 | 117.0 | 33 |
| 60 min Summer | 57.005 | 0.0 | 147.5 | 62 |
| 120 min Summer | 34.324 | 0.0 | 178.9 | 122 |
| 180 min Summer | 25.168 | 0.0 | 197.3 | 180 |
| 240 min Summer | 20.074 | 0.0 | 210.1 | 228 |
| 360 min Summer | 14.562 | 0.0 | 228.9 | 284 |
| 480 min Summer | 11.594 | 0.0 | 243.2 | 348 |
| 600 min Summer | 9.707 | 0.0 | 254.5 | 416 |
| 720 min Summer | 8.393 | 0.0 | 264.1 | 484 |
| 960 min Summer | 6.666 | 0.0 | 279.5 | 620 |
| 1440 min Summer | 4.811 | 0.0 | 302.0 | 894 |
| 2160 min Summer | 3.466 | 0.0 | 325.2 | 1296 |
| 2880 min Summer | 2.744 | 0.0 | 342.0 | 1672 |
| 4320 min Summer | 1.972 | 0.0 | 365.8 | 2420 |
| 5760 min Summer | 1.558 | 0.0 | 382.3 | 3120 |
| 7200 min Summer | 1.297 | 0.0 | 394.8 | 3824 |
| 8640 min Summer | 1.117 | 0.0 | 404.6 | 4576 |
| 10080 min Summer | 0.983 | 0.0 | 412.6 | 5248 |
| 15 min Winter | 139.635 | 0.0 | 87.8 | 18 |
| 30 min Winter | 91.435 | 0.0 | 117.0 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.988 | 0.358 | 0.0 | 4.9 | 4.9 | 135.7 | O K |
| 120 min Winter | 31.031 | 0.401 | 0.0 | 5.2 | 5.2 | 154.3 | Flood Risk |
| 180 min Winter | 31.045 | 0.415 | 0.0 | 5.3 | 5.3 | 160.0 | Flood Risk |
| 240 min Winter | 31.045 | 0.415 | 0.0 | 5.3 | 5.3 | 160.3 | Flood Risk |
| 360 min Winter | 31.037 | 0.407 | 0.0 | 5.2 | 5.2 | 156.6 | Flood Risk |
| 480 min Winter | 31.027 | 0.397 | 0.0 | 5.2 | 5.2 | 152.6 | Flood Risk |
| 600 min Winter | 31.015 | 0.385 | 0.0 | 5.1 | 5.1 | 147.4 | Flood Risk |
| 720 min Winter | 31.002 | 0.372 | 0.0 | 5.0 | 5.0 | 141.7 | Flood Risk |
| 960 min Winter | 30.975 | 0.345 | 0.0 | 4.8 | 4.8 | 130.1 | O K |
| 1440 min Winter | 30.926 | 0.296 | 0.0 | 4.5 | 4.5 | 108.7 | O K |
| 2160 min Winter | 30.866 | 0.236 | 0.0 | 4.0 | 4.0 | 83.1 | O K |
| 2880 min Winter | 30.821 | 0.191 | 0.0 | 3.7 | 3.7 | 63.6 | O K |
| 4320 min Winter | 30.759 | 0.129 | 0.0 | 3.1 | 3.1 | 36.9 | O K |
| 5760 min Winter | 30.721 | 0.091 | 0.0 | 2.6 | 2.6 | 20.5 | O K |
| 7200 min Winter | 30.696 | 0.066 | 0.0 | 2.3 | 2.3 | 10.9 | O K |
| 8640 min Winter | 30.679 | 0.049 | 0.0 | 2.0 | 2.0 | 5.9 | O K |
| 10080 min Winter | 30.670 | 0.040 | 0.0 | 1.8 | 1.8 | 4.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 147.5 | 62 |
| 120 min Winter | 34.324 | 0.0 | 178.9 | 118 |
| 180 min Winter | 25.168 | 0.0 | 197.3 | 176 |
| 240 min Winter | 20.074 | 0.0 | 210.1 | 230 |
| 360 min Winter | 14.562 | 0.0 | 229.0 | 290 |
| 480 min Winter | 11.594 | 0.0 | 243.2 | 366 |
| 600 min Winter | 9.707 | 0.0 | 254.6 | 442 |
| 720 min Winter | 8.393 | 0.0 | 264.0 | 520 |
| 960 min Winter | 6.666 | 0.0 | 279.5 | 666 |
| 1440 min Winter | 4.811 | 0.0 | 302.0 | 952 |
| 2160 min Winter | 3.466 | 0.0 | 325.2 | 1360 |
| 2880 min Winter | 2.744 | 0.0 | 342.0 | 1732 |
| 4320 min Winter | 1.972 | 0.0 | 365.8 | 2468 |
| 5760 min Winter | 1.558 | 0.0 | 382.4 | 3168 |
| 7200 min Winter | 1.297 | 0.0 | 394.9 | 3824 |
| 8640 min Winter | 1.117 | 0.0 | 404.8 | 4488 |
| 10080 min Winter | 0.983 | 0.0 | 412.8 | 5144 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.301

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.301 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.300

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 86.3 |
| Max Percolation (l/s) | 374.0 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.630 | Cap Volume Depth (m) | 0.450 |

## Orifice Outflow Control

Diameter (m) 0.068 Discharge Coefficient 0.500 Invert Level (m) 30.580

## Summary of Results for 100 year Return Period

Half Drain Time : 229 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.809 | 0.179 | 0.0 | 3.5 | 3.5 | 58.4 | O K |
| 30 min Summer | 30.851 | 0.221 | 0.0 | 3.9 | 3.9 | 76.8 | O K |
| 60 min Summer | 30.889 | 0.259 | 0.0 | 4.2 | 4.2 | 93.2 | O K |
| 120 min Summer | 30.916 | 0.286 | 0.0 | 4.4 | 4.4 | 104.5 | O K |
| 180 min Summer | 30.921 | 0.291 | 0.0 | 4.5 | 4.5 | 106.6 | O K |
| 240 min Summer | 30.919 | 0.289 | 0.0 | 4.4 | 4.4 | 105.9 | O K |
| 360 min Summer | 30.914 | 0.284 | 0.0 | 4.4 | 4.4 | 103.5 | O K |
| 480 min Summer | 30.906 | 0.276 | 0.0 | 4.3 | 4.3 | 100.5 | O K |
| 600 min Summer | 30.898 | 0.268 | 0.0 | 4.3 | 4.3 | 96.9 | O K |
| 720 min Summer | 30.889 | 0.259 | 0.0 | 4.2 | 4.2 | 93.2 | O K |
| 960 min Summer | 30.873 | 0.243 | 0.0 | 4.1 | 4.1 | 86.1 | O K |
| 1440 min Summer | 30.844 | 0.214 | 0.0 | 3.9 | 3.9 | 73.4 | O K |
| 2160 min Summer | 30.808 | 0.178 | 0.0 | 3.5 | 3.5 | 58.2 | O K |
| 2880 min Summer | 30.781 | 0.151 | 0.0 | 3.3 | 3.3 | 46.3 | O K |
| 4320 min Summer | 30.741 | 0.111 | 0.0 | 2.9 | 2.9 | 29.3 | O K |
| 5760 min Summer | 30.716 | 0.086 | 0.0 | 2.6 | 2.6 | 18.5 | O K |
| 7200 min Summer | 30.698 | 0.068 | 0.0 | 2.3 | 2.3 | 11.7 | O K |
| 8640 min Summer | 30.685 | 0.055 | 0.0 | 2.1 | 2.1 | 7.4 | O K |
| 10080 min Summer | 30.675 | 0.045 | 0.0 | 2.0 | 2.0 | 5.1 | O K |
| 15 min Winter | 30.809 | 0.179 | 0.0 | 3.5 | 3.5 | 58.4 | O K |
| 30 min Winter | 30.851 | 0.221 | 0.0 | 3.9 | 3.9 | 76.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 60.8 | 18 |
| 30 min Summer | 65.311 | 0.0 | 81.6 | 33 |
| 60 min Summer | 40.718 | 0.0 | 103.4 | 62 |
| 120 min Summer | 24.517 | 0.0 | 125.7 | 122 |
| 180 min Summer | 17.977 | 0.0 | 138.9 | 178 |
| 240 min Summer | 14.339 | 0.0 | 148.0 | 204 |
| 360 min Summer | 10.402 | 0.0 | 161.3 | 266 |
| 480 min Summer | 8.281 | 0.0 | 171.4 | 332 |
| 600 min Summer | 6.934 | 0.0 | 179.4 | 402 |
| 720 min Summer | 5.995 | 0.0 | 186.1 | 470 |
| 960 min Summer | 4.761 | 0.0 | 197.0 | 608 |
| 1440 min Summer | 3.436 | 0.0 | 212.6 | 878 |
| 2160 min Summer | 2.476 | 0.0 | 228.7 | 1256 |
| 2880 min Summer | 1.960 | 0.0 | 240.1 | 1640 |
| 4320 min Summer | 1.408 | 0.0 | 255.9 | 2340 |
| 5760 min Summer | 1.113 | 0.0 | 266.6 | 3056 |
| 7200 min Summer | 0.927 | 0.0 | 274.3 | 3752 |
| 8640 min Summer | 0.798 | 0.0 | 280.2 | 4416 |
| 10080 min Summer | 0.702 | 0.0 | 284.7 | 5144 |
| 15 min Winter | 99.739 | 0.0 | 60.8 | 18 |
| 30 min Winter | 65.311 | 0.0 | 81.6 | 32 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.890 | 0.260 | 0.0 | 4.2 | 4.2 | 93.3 | O K |
| 120 min Winter | 30.917 | 0.287 | 0.0 | 4.4 | 4.4 | 105.0 | O K |
| 180 min Winter | 30.923 | 0.293 | 0.0 | 4.5 | 4.5 | 107.5 | O K |
| 240 min Winter | 30.920 | 0.290 | 0.0 | 4.5 | 4.5 | 106.4 | O K |
| 360 min Winter | 30.912 | 0.282 | 0.0 | 4.4 | 4.4 | 103.1 | O K |
| 480 min Winter | 30.903 | 0.273 | 0.0 | 4.3 | 4.3 | 98.9 | O K |
| 600 min Winter | 30.891 | 0.261 | 0.0 | 4.2 | 4.2 | 94.1 | O K |
| 720 min Winter | 30.880 | 0.250 | 0.0 | 4.1 | 4.1 | 89.1 | O K |
| 960 min Winter | 30.857 | 0.227 | 0.0 | 4.0 | 4.0 | 79.4 | O K |
| 1440 min Winter | 30.819 | 0.189 | 0.0 | 3.6 | 3.6 | 62.7 | O K |
| 2160 min Winter | 30.774 | 0.144 | 0.0 | 3.2 | 3.2 | 43.6 | O K |
| 2880 min Winter | 30.742 | 0.112 | 0.0 | 2.9 | 2.9 | 29.9 | O K |
| 4320 min Winter | 30.702 | 0.072 | 0.0 | 2.4 | 2.4 | 13.0 | O K |
| 5760 min Winter | 30.677 | 0.047 | 0.0 | 2.0 | 2.0 | 5.6 | O K |
| 7200 min Winter | 30.666 | 0.036 | 0.0 | 1.7 | 1.7 | 3.2 | O K |
| 8640 min Winter | 30.658 | 0.028 | 0.0 | 1.5 | 1.5 | 1.9 | O K |
| 10080 min Winter | 30.652 | 0.022 | 0.0 | 1.3 | 1.3 | 1.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 103.4 | 62 |
| 120 min Winter | 24.517 | 0.0 | 125.7 | 118 |
| 180 min Winter | 17.977 | 0.0 | 138.9 | 174 |
| 240 min Winter | 14.339 | 0.0 | 148.0 | 224 |
| 360 min Winter | 10.402 | 0.0 | 161.4 | 278 |
| 480 min Winter | 8.281 | 0.0 | 171.4 | 354 |
| 600 min Winter | 6.934 | 0.0 | 179.5 | 430 |
| 720 min Winter | 5.995 | 0.0 | 186.1 | 506 |
| 960 min Winter | 4.761 | 0.0 | 197.0 | 648 |
| 1440 min Winter | 3.436 | 0.0 | 212.6 | 924 |
| 2160 min Winter | 2.476 | 0.0 | 228.7 | 1316 |
| 2880 min Winter | 1.960 | 0.0 | 240.1 | 1676 |
| 4320 min Winter | 1.408 | 0.0 | 255.9 | 2376 |
| 5760 min Winter | 1.113 | 0.0 | 266.7 | 3000 |
| 7200 min Winter | 0.927 | 0.0 | 274.5 | 3672 |
| 8640 min Winter | 0.798 | 0.0 | 280.5 | 4408 |
| 10080 min Winter | 0.702 | 0.0 | 285.0 | 5096 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.301

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.301 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.300

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 86.3 |
| Max Percolation (l/s) | 374.0 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.630 | Cap Volume Depth (m) | 0.450 |

## Orifice Outflow Control

Diameter (m) 0.068 Discharge Coefficient 0.500 Invert Level (m) 30.580

## Summary of Results for 1 year Return Period

Half Drain Time : 71 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.320 | 0.090 | 0.0 | 4.3 | 4.3 | 20.0 | O K |
| 30 min Summer | 30.334 | 0.104 | 0.0 | 4.6 | 4.6 | 26.3 | O K |
| 60 min Summer | 30.345 | 0.115 | 0.0 | 4.8 | 4.8 | 31.1 | O K |
| 120 min Summer | 30.352 | 0.122 | 0.0 | 4.9 | 4.9 | 33.8 | O K |
| 180 min Summer | 30.353 | 0.123 | 0.0 | 4.9 | 4.9 | 34.2 | O K |
| 240 min Summer | 30.352 | 0.122 | 0.0 | 4.9 | 4.9 | 33.8 | O K |
| 360 min Summer | 30.346 | 0.116 | 0.0 | 4.8 | 4.8 | 31.5 | O K |
| 480 min Summer | 30.340 | 0.110 | 0.0 | 4.7 | 4.7 | 28.8 | O K |
| 600 min Summer | 30.334 | 0.104 | 0.0 | 4.6 | 4.6 | 26.2 | O K |
| 720 min Summer | 30.328 | 0.098 | 0.0 | 4.4 | 4.4 | 23.8 | O K |
| 960 min Summer | 30.319 | 0.089 | 0.0 | 4.2 | 4.2 | 19.7 | O K |
| 1440 min Summer | 30.305 | 0.075 | 0.0 | 3.9 | 3.9 | 14.0 | O K |
| 2160 min Summer | 30.291 | 0.061 | 0.0 | 3.3 | 3.3 | 9.2 | O K |
| 2880 min Summer | 30.280 | 0.050 | 0.0 | 2.8 | 2.8 | 6.3 | O K |
| 4320 min Summer | 30.267 | 0.037 | 0.0 | 2.2 | 2.2 | 3.3 | O K |
| 5760 min Summer | 30.257 | 0.027 | 0.0 | 1.8 | 1.8 | 1.9 | O K |
| 7200 min Summer | 30.251 | 0.021 | 0.0 | 1.6 | 1.6 | 1.1 | O K |
| 8640 min Summer | 30.244 | 0.014 | 0.0 | 1.4 | 1.4 | 0.5 | O K |
| 10080 min Summer | 30.239 | 0.009 | 0.0 | 1.2 | 1.2 | 0.2 | O K |
| 15 min Winter | 30.319 | 0.089 | 0.0 | 4.2 | 4.2 | 20.0 | O K |
| 30 min Winter | 30.334 | 0.104 | 0.0 | 4.6 | 4.6 | 26.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 22.4 | 17 |
| 30 min Summer | 20.382 | 0.0 | 31.1 | 31 |
| 60 min Summer | 12.872 | 0.0 | 41.0 | 56 |
| 120 min Summer | 7.964 | 0.0 | 52.2 | 88 |
| 180 min Summer | 5.985 | 0.0 | 59.7 | 122 |
| 240 min Summer | 4.881 | 0.0 | 65.3 | 158 |
| 360 min Summer | 3.639 | 0.0 | 73.6 | 226 |
| 480 min Summer | 2.946 | 0.0 | 79.8 | 292 |
| 600 min Summer | 2.501 | 0.0 | 84.8 | 356 |
| 720 min Summer | 2.188 | 0.0 | 89.1 | 420 |
| 960 min Summer | 1.771 | 0.0 | 96.2 | 540 |
| 1440 min Summer | 1.316 | 0.0 | 106.9 | 780 |
| 2160 min Summer | 0.978 | 0.0 | 118.4 | 1144 |
| 2880 min Summer | 0.792 | 0.0 | 126.7 | 1500 |
| 4320 min Summer | 0.587 | 0.0 | 138.7 | 2204 |
| 5760 min Summer | 0.476 | 0.0 | 147.3 | 2936 |
| 7200 min Summer | 0.404 | 0.0 | 153.7 | 3672 |
| 8640 min Summer | 0.354 | 0.0 | 158.7 | 4392 |
| 10080 min Summer | 0.316 | 0.0 | 162.8 | 5032 |
| 15 min Winter | 31.306 | 0.0 | 22.4 | 17 |
| 30 min Winter | 20.382 | 0.0 | 31.1 | 31 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.345 | 0.115 | 0.0 | 4.8 | 4.8 | 31.1 | O K |
| 120 min Winter | 30.350 | 0.120 | 0.0 | 4.9 | 4.9 | 33.2 | O K |
| 180 min Winter | 30.350 | 0.120 | 0.0 | 4.9 | 4.9 | 33.0 | O K |
| 240 min Winter | 30.347 | 0.117 | 0.0 | 4.8 | 4.8 | 31.8 | O K |
| 360 min Winter | 30.338 | 0.108 | 0.0 | 4.6 | 4.6 | 28.0 | O K |
| 480 min Winter | 30.329 | 0.099 | 0.0 | 4.5 | 4.5 | 24.1 | O K |
| 600 min Winter | 30.321 | 0.091 | 0.0 | 4.3 | 4.3 | 20.6 | O K |
| 720 min Winter | 30.314 | 0.084 | 0.0 | 4.1 | 4.1 | 17.5 | O K |
| 960 min Winter | 30.303 | 0.073 | 0.0 | 3.8 | 3.8 | 13.1 | O K |
| 1440 min Winter | 30.287 | 0.057 | 0.0 | 3.1 | 3.1 | 8.0 | O K |
| 2160 min Winter | 30.271 | 0.041 | 0.0 | 2.4 | 2.4 | 4.2 | O K |
| 2880 min Winter | 30.261 | 0.031 | 0.0 | 2.0 | 2.0 | 2.3 | O K |
| 4320 min Winter | 30.247 | 0.017 | 0.0 | 1.5 | 1.5 | 0.8 | O K |
| 5760 min Winter | 30.238 | 0.008 | 0.0 | 1.2 | 1.2 | 0.2 | O K |
| 7200 min Winter | 30.232 | 0.002 | 0.0 | 1.0 | 1.0 | 0.0 | O K |
| 8640 min Winter | 30.230 | 0.000 | 0.0 | 0.9 | 0.9 | 0.0 | O K |
| 10080 min Winter | 30.230 | 0.000 | 0.0 | 0.8 | 0.8 | 0.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 41.1 | 58 |
| 120 min Winter | 7.964 | 0.0 | 52.3 | 92 |
| 180 min Winter | 5.985 | 0.0 | 59.7 | 132 |
| 240 min Winter | 4.881 | 0.0 | 65.4 | 168 |
| 360 min Winter | 3.639 | 0.0 | 73.6 | 240 |
| 480 min Winter | 2.946 | 0.0 | 79.7 | 306 |
| 600 min Winter | 2.501 | 0.0 | 84.8 | 372 |
| 720 min Winter | 2.188 | 0.0 | 89.1 | 434 |
| 960 min Winter | 1.771 | 0.0 | 96.2 | 550 |
| 1440 min Winter | 1.316 | 0.0 | 106.9 | 792 |
| 2160 min Winter | 0.978 | 0.0 | 118.4 | 1144 |
| 2880 min Winter | 0.792 | 0.0 | 126.8 | 1496 |
| 4320 min Winter | 0.587 | 0.0 | 138.9 | 2204 |
| 5760 min Winter | 0.476 | 0.0 | 147.5 | 2936 |
| 7200 min Winter | 0.404 | 0.0 | 154.0 | 3608 |
| 8640 min Winter | 0.354 | 0.0 | 159.2 | 0 |
| 10080 min Winter | 0.316 | 0.0 | 163.3 | 0 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.414

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.414 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.000

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 86.4 |
| Max Percolation (l/s) | 374.4 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.230 | Cap Volume Depth (m) | 0.550 |

## Orifice Outflow Control

Diameter (m) 0.089 Discharge Coefficient 0.500 Invert Level (m) 30.180

## Summary of Results for 30 year Return Period

Half Drain Time : 132 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.414 | 0.184 | 0.0 | 6.0 | 6.0 | 60.9 | O K |
| 30 min Summer | 30.454 | 0.224 | 0.0 | 6.6 | 6.6 | 78.2 | O K |
| 60 min Summer | 30.486 | 0.256 | 0.0 | 7.0 | 7.0 | 91.9 | O K |
| 120 min Summer | 30.501 | 0.271 | 0.0 | 7.2 | 7.2 | 98.1 | O K |
| 180 min Summer | 30.502 | 0.272 | 0.0 | 7.3 | 7.3 | 98.6 | O K |
| 240 min Summer | 30.499 | 0.269 | 0.0 | 7.2 | 7.2 | 97.3 | O K |
| 360 min Summer | 30.489 | 0.259 | 0.0 | 7.1 | 7.1 | 93.1 | O K |
| 480 min Summer | 30.477 | 0.247 | 0.0 | 6.9 | 6.9 | 88.1 | O K |
| 600 min Summer | 30.466 | 0.236 | 0.0 | 6.8 | 6.8 | 83.0 | O K |
| 720 min Summer | 30.454 | 0.224 | 0.0 | 6.6 | 6.6 | 78.1 | O K |
| 960 min Summer | 30.434 | 0.204 | 0.0 | 6.3 | 6.3 | 69.2 | O K |
| 1440 min Summer | 30.400 | 0.170 | 0.0 | 5.8 | 5.8 | 54.7 | O K |
| 2160 min Summer | 30.364 | 0.134 | 0.0 | 5.1 | 5.1 | 39.1 | O K |
| 2880 min Summer | 30.339 | 0.109 | 0.0 | 4.7 | 4.7 | 28.3 | O K |
| 4320 min Summer | 30.309 | 0.079 | 0.0 | 4.0 | 4.0 | 15.5 | O K |
| 5760 min Summer | 30.293 | 0.063 | 0.0 | 3.4 | 3.4 | 10.0 | O K |
| 7200 min Summer | 30.283 | 0.053 | 0.0 | 2.9 | 2.9 | 6.9 | O K |
| 8640 min Summer | 30.274 | 0.044 | 0.0 | 2.6 | 2.6 | 4.9 | O K |
| 10080 min Summer | 30.268 | 0.038 | 0.0 | 2.3 | 2.3 | 3.5 | O K |
| 15 min Winter | 30.414 | 0.184 | 0.0 | 6.0 | 6.0 | 60.9 | O K |
| 30 min Winter | 30.455 | 0.225 | 0.0 | 6.6 | 6.6 | 78.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 64.8 | 18 |
| 30 min Summer | 49.886 | 0.0 | 86.1 | 32 |
| 60 min Summer | 30.968 | 0.0 | 108.5 | 62 |
| 120 min Summer | 18.658 | 0.0 | 131.9 | 108 |
| 180 min Summer | 13.726 | 0.0 | 146.2 | 138 |
| 240 min Summer | 10.992 | 0.0 | 156.4 | 172 |
| 360 min Summer | 8.021 | 0.0 | 171.6 | 240 |
| 480 min Summer | 6.411 | 0.0 | 183.0 | 308 |
| 600 min Summer | 5.385 | 0.0 | 192.2 | 378 |
| 720 min Summer | 4.668 | 0.0 | 199.9 | 444 |
| 960 min Summer | 3.724 | 0.0 | 212.5 | 578 |
| 1440 min Summer | 2.706 | 0.0 | 231.2 | 834 |
| 2160 min Summer | 1.964 | 0.0 | 250.6 | 1192 |
| 2880 min Summer | 1.563 | 0.0 | 264.7 | 1556 |
| 4320 min Summer | 1.132 | 0.0 | 284.9 | 2248 |
| 5760 min Summer | 0.900 | 0.0 | 299.1 | 2944 |
| 7200 min Summer | 0.753 | 0.0 | 309.8 | 3672 |
| 8640 min Summer | 0.651 | 0.0 | 318.3 | 4408 |
| 10080 min Summer | 0.575 | 0.0 | 325.1 | 5136 |
| 15 min Winter | 76.822 | 0.0 | 64.8 | 18 |
| 30 min Winter | 49.886 | 0.0 | 86.1 | 32 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.487 | 0.257 | 0.0 | 7.1 | 7.1 | 92.3 | O K |
| 120 min Winter | 30.502 | 0.272 | 0.0 | 7.3 | 7.3 | 98.9 | O K |
| 180 min Winter | 30.501 | 0.271 | 0.0 | 7.2 | 7.2 | 98.3 | O K |
| 240 min Winter | 30.496 | 0.266 | 0.0 | 7.2 | 7.2 | 96.2 | O K |
| 360 min Winter | 30.482 | 0.252 | 0.0 | 7.0 | 7.0 | 89.9 | O K |
| 480 min Winter | 30.465 | 0.235 | 0.0 | 6.8 | 6.8 | 82.8 | O K |
| 600 min Winter | 30.449 | 0.219 | 0.0 | 6.5 | 6.5 | 75.8 | O K |
| 720 min Winter | 30.434 | 0.204 | 0.0 | 6.3 | 6.3 | 69.2 | O K |
| 960 min Winter | 30.407 | 0.177 | 0.0 | 5.9 | 5.9 | 57.6 | O K |
| 1440 min Winter | 30.365 | 0.135 | 0.0 | 5.2 | 5.2 | 39.8 | O K |
| 2160 min Winter | 30.326 | 0.096 | 0.0 | 4.4 | 4.4 | 22.6 | O K |
| 2880 min Winter | 30.304 | 0.074 | 0.0 | 3.8 | 3.8 | 13.6 | O K |
| 4320 min Winter | 30.281 | 0.051 | 0.0 | 2.9 | 2.9 | 6.6 | O K |
| 5760 min Winter | 30.268 | 0.038 | 0.0 | 2.3 | 2.3 | 3.6 | O K |
| 7200 min Winter | 30.259 | 0.029 | 0.0 | 1.9 | 1.9 | 2.1 | O K |
| 8640 min Winter | 30.253 | 0.023 | 0.0 | 1.7 | 1.7 | 1.3 | O K |
| 10080 min Winter | 30.247 | 0.017 | 0.0 | 1.5 | 1.5 | 0.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 108.5 | 60 |
| 120 min Winter | 18.658 | 0.0 | 132.0 | 114 |
| 180 min Winter | 13.726 | 0.0 | 146.2 | 144 |
| 240 min Winter | 10.992 | 0.0 | 156.4 | 182 |
| 360 min Winter | 8.021 | 0.0 | 171.5 | 258 |
| 480 min Winter | 6.411 | 0.0 | 183.0 | 332 |
| 600 min Winter | 5.385 | 0.0 | 192.3 | 404 |
| 720 min Winter | 4.668 | 0.0 | 200.0 | 472 |
| 960 min Winter | 3.724 | 0.0 | 212.6 | 606 |
| 1440 min Winter | 2.706 | 0.0 | 231.2 | 864 |
| 2160 min Winter | 1.964 | 0.0 | 250.6 | 1212 |
| 2880 min Winter | 1.563 | 0.0 | 264.7 | 1532 |
| 4320 min Winter | 1.132 | 0.0 | 284.9 | 2248 |
| 5760 min Winter | 0.900 | 0.0 | 299.2 | 2936 |
| 7200 min Winter | 0.753 | 0.0 | 310.0 | 3672 |
| 8640 min Winter | 0.651 | 0.0 | 318.5 | 4368 |
| 10080 min Winter | 0.575 | 0.0 | 325.4 | 5056 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.414

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.414 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.000

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 86.4 |
| Max Percolation (l/s) | 374.4 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.230 | Cap Volume Depth (m) | 0.550 |

## Orifice Outflow Control

Diameter (m) 0.089 Discharge Coefficient 0.500 Invert Level (m) 30.180

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

Half Drain Time : 204 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.547 | 0.317 | 0.0 | 7.8 | 7.8 | 117.9 | O K |
| 30 min Summer | 30.627 | 0.397 | 0.0 | 8.7 | 8.7 | 152.6 | O K |
| 60 min Summer | 30.697 | 0.467 | 0.0 | 9.5 | 9.5 | 182.7 | O K |
| 120 min Summer | 30.740 | 0.510 | 0.0 | 9.9 | 9.9 | 201.4 | Flood Risk |
| 180 min Summer | 30.744 | 0.514 | 0.0 | 9.9 | 9.9 | 203.2 | Flood Risk |
| 240 min Summer | 30.741 | 0.511 | 0.0 | 9.9 | 9.9 | 201.8 | Flood Risk |
| 360 min Summer | 30.728 | 0.498 | 0.0 | 9.8 | 9.8 | 196.3 | Flood Risk |
| 480 min Summer | 30.713 | 0.483 | 0.0 | 9.6 | 9.6 | 189.5 | Flood Risk |
| 600 min Summer | 30.695 | 0.465 | 0.0 | 9.5 | 9.5 | 182.0 | O K |
| 720 min Summer | 30.678 | 0.448 | 0.0 | 9.3 | 9.3 | 174.5 | O K |
| 960 min Summer | 30.644 | 0.414 | 0.0 | 8.9 | 8.9 | 160.1 | O K |
| 1440 min Summer | 30.587 | 0.357 | 0.0 | 8.3 | 8.3 | 135.5 | O K |
| 2160 min Summer | 30.521 | 0.291 | 0.0 | 7.5 | 7.5 | 107.0 | O K |
| 2880 min Summer | 30.472 | 0.242 | 0.0 | 6.9 | 6.9 | 85.7 | O K |
| 4320 min Summer | 30.404 | 0.174 | 0.0 | 5.8 | 5.8 | 56.6 | O K |
| 5760 min Summer | 30.362 | 0.132 | 0.0 | 5.1 | 5.1 | 38.2 | O K |
| 7200 min Summer | 30.334 | 0.104 | 0.0 | 4.6 | 4.6 | 26.1 | O K |
| 8640 min Summer | 30.315 | 0.085 | 0.0 | 4.2 | 4.2 | 18.0 | O K |
| 10080 min Summer | 30.304 | 0.074 | 0.0 | 3.8 | 3.8 | 13.6 | O K |
| 15 min Winter | 30.547 | 0.317 | 0.0 | 7.8 | 7.8 | 118.0 | O K |
| 30 min Winter | 30.628 | 0.398 | 0.0 | 8.7 | 8.7 | 152.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 123.3 | 18 |
| 30 min Summer | 91.435 | 0.0 | 163.5 | 33 |
| 60 min Summer | 57.005 | 0.0 | 205.5 | 62 |
| 120 min Summer | 34.324 | 0.0 | 248.7 | 120 |
| 180 min Summer | 25.168 | 0.0 | 274.1 | 160 |
| 240 min Summer | 20.074 | 0.0 | 291.8 | 190 |
| 360 min Summer | 14.562 | 0.0 | 317.8 | 254 |
| 480 min Summer | 11.594 | 0.0 | 337.5 | 324 |
| 600 min Summer | 9.707 | 0.0 | 353.2 | 392 |
| 720 min Summer | 8.393 | 0.0 | 366.5 | 462 |
| 960 min Summer | 6.666 | 0.0 | 388.0 | 598 |
| 1440 min Summer | 4.811 | 0.0 | 419.5 | 864 |
| 2160 min Summer | 3.466 | 0.0 | 452.0 | 1236 |
| 2880 min Summer | 2.744 | 0.0 | 475.9 | 1612 |
| 4320 min Summer | 1.972 | 0.0 | 510.1 | 2336 |
| 5760 min Summer | 1.558 | 0.0 | 534.4 | 3056 |
| 7200 min Summer | 1.297 | 0.0 | 553.1 | 3752 |
| 8640 min Summer | 1.117 | 0.0 | 568.1 | 4416 |
| 10080 min Summer | 0.983 | 0.0 | 580.5 | 5144 |
| 15 min Winter | 139.635 | 0.0 | 123.3 | 18 |
| 30 min Winter | 91.435 | 0.0 | 163.5 | 32 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.698 | 0.468 | 0.0 | 9.5 | 9.5 | 183.0 | O K |
| 120 min Winter | 30.743 | 0.513 | 0.0 | 9.9 | 9.9 | 202.7 | Flood Risk |
| 180 min Winter | 30.748 | 0.518 | 0.0 | 10.0 | 10.0 | 204.8 | Flood Risk |
| 240 min Winter | 30.741 | 0.511 | 0.0 | 9.9 | 9.9 | 201.8 | Flood Risk |
| 360 min Winter | 30.724 | 0.494 | 0.0 | 9.7 | 9.7 | 194.5 | Flood Risk |
| 480 min Winter | 30.702 | 0.472 | 0.0 | 9.5 | 9.5 | 185.0 | Flood Risk |
| 600 min Winter | 30.678 | 0.448 | 0.0 | 9.3 | 9.3 | 174.7 | O K |
| 720 min Winter | 30.655 | 0.425 | 0.0 | 9.0 | 9.0 | 164.5 | O K |
| 960 min Winter | 30.610 | 0.380 | 0.0 | 8.6 | 8.6 | 145.4 | O K |
| 1440 min Winter | 30.537 | 0.307 | 0.0 | 7.7 | 7.7 | 113.8 | O K |
| 2160 min Winter | 30.458 | 0.228 | 0.0 | 6.7 | 6.7 | 79.8 | O K |
| 2880 min Winter | 30.404 | 0.174 | 0.0 | 5.8 | 5.8 | 56.6 | O K |
| 4320 min Winter | 30.339 | 0.109 | 0.0 | 4.7 | 4.7 | 28.5 | O K |
| 5760 min Winter | 30.307 | 0.077 | 0.0 | 3.9 | 3.9 | 14.6 | O K |
| 7200 min Winter | 30.292 | 0.062 | 0.0 | 3.3 | 3.3 | 9.6 | O K |
| 8640 min Winter | 30.281 | 0.051 | 0.0 | 2.9 | 2.9 | 6.6 | O K |
| 10080 min Winter | 30.274 | 0.044 | 0.0 | 2.5 | 2.5 | 4.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 205.5 | 60 |
| 120 min Winter | 34.324 | 0.0 | 248.7 | 118 |
| 180 min Winter | 25.168 | 0.0 | 274.1 | 170 |
| 240 min Winter | 20.074 | 0.0 | 291.8 | 194 |
| 360 min Winter | 14.562 | 0.0 | 317.8 | 270 |
| 480 min Winter | 11.594 | 0.0 | 337.6 | 346 |
| 600 min Winter | 9.707 | 0.0 | 353.3 | 422 |
| 720 min Winter | 8.393 | 0.0 | 366.5 | 494 |
| 960 min Winter | 6.666 | 0.0 | 387.9 | 636 |
| 1440 min Winter | 4.811 | 0.0 | 419.3 | 908 |
| 2160 min Winter | 3.466 | 0.0 | 452.1 | 1296 |
| 2880 min Winter | 2.744 | 0.0 | 475.9 | 1648 |
| 4320 min Winter | 1.972 | 0.0 | 510.1 | 2376 |
| 5760 min Winter | 1.558 | 0.0 | 534.4 | 3000 |
| 7200 min Winter | 1.297 | 0.0 | 553.1 | 3744 |
| 8640 min Winter | 1.117 | 0.0 | 568.2 | 4408 |
| 10080 min Winter | 0.983 | 0.0 | 580.7 | 5136 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.414

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.414 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.000

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 86.4 |
| Max Percolation (l/s) | 374.4 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.230 | Cap Volume Depth (m) | 0.550 |

## Orifice Outflow Control

Diameter (m) 0.089 Discharge Coefficient 0.500 Invert Level (m) 30.180

## Summary of Results for 100 year Return Period

Half Drain Time : 174 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.463 | 0.233 | 0.0 | 6.3 | 6.3 | 81.9 | O K |
| 30 min Summer | 30.519 | 0.289 | 0.0 | 7.0 | 7.0 | 106.2 | O K |
| 60 min Summer | 30.567 | 0.337 | 0.0 | 7.5 | 7.5 | 126.8 | O K |
| 120 min Summer | 30.594 | 0.364 | 0.0 | 7.8 | 7.8 | 138.2 | O K |
| 180 min Summer | 30.595 | 0.365 | 0.0 | 7.8 | 7.8 | 138.9 | O K |
| 240 min Summer | 30.592 | 0.362 | 0.0 | 7.8 | 7.8 | 137.4 | O K |
| 360 min Summer | 30.581 | 0.351 | 0.0 | 7.7 | 7.7 | 132.6 | O K |
| 480 min Summer | 30.567 | 0.337 | 0.0 | 7.5 | 7.5 | 126.9 | O K |
| 600 min Summer | 30.553 | 0.323 | 0.0 | 7.4 | 7.4 | 120.8 | O K |
| 720 min Summer | 30.540 | 0.310 | 0.0 | 7.2 | 7.2 | 114.9 | O K |
| 960 min Summer | 30.514 | 0.284 | 0.0 | 6.9 | 6.9 | 104.0 | O K |
| 1440 min Summer | 30.472 | 0.242 | 0.0 | 6.4 | 6.4 | 85.5 | O K |
| 2160 min Summer | 30.423 | 0.193 | 0.0 | 5.8 | 5.8 | 64.7 | O K |
| 2880 min Summer | 30.388 | 0.158 | 0.0 | 5.2 | 5.2 | 49.6 | O K |
| 4320 min Summer | 30.342 | 0.112 | 0.0 | 4.4 | 4.4 | 29.7 | O K |
| 5760 min Summer | 30.315 | 0.085 | 0.0 | 3.9 | 3.9 | 18.2 | O K |
| 7200 min Summer | 30.300 | 0.070 | 0.0 | 3.5 | 3.5 | 12.1 | O K |
| 8640 min Summer | 30.289 | 0.059 | 0.0 | 3.1 | 3.1 | 8.8 | O K |
| 10080 min Summer | 30.281 | 0.051 | 0.0 | 2.8 | 2.8 | 6.5 | O K |
| 15 min Winter | 30.463 | 0.233 | 0.0 | 6.3 | 6.3 | 81.9 | O K |
| 30 min Winter | 30.520 | 0.290 | 0.0 | 7.0 | 7.0 | 106.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 86.1 | 18 |
| 30 min Summer | 65.311 | 0.0 | 114.8 | 33 |
| 60 min Summer | 40.718 | 0.0 | 144.8 | 62 |
| 120 min Summer | 24.517 | 0.0 | 175.6 | 120 |
| 180 min Summer | 17.977 | 0.0 | 193.7 | 152 |
| 240 min Summer | 14.339 | 0.0 | 206.3 | 182 |
| 360 min Summer | 10.402 | 0.0 | 224.8 | 248 |
| 480 min Summer | 8.281 | 0.0 | 238.8 | 318 |
| 600 min Summer | 6.934 | 0.0 | 249.9 | 386 |
| 720 min Summer | 5.995 | 0.0 | 259.3 | 456 |
| 960 min Summer | 4.761 | 0.0 | 274.3 | 588 |
| 1440 min Summer | 3.436 | 0.0 | 296.5 | 850 |
| 2160 min Summer | 2.476 | 0.0 | 319.3 | 1228 |
| 2880 min Summer | 1.960 | 0.0 | 335.7 | 1588 |
| 4320 min Summer | 1.408 | 0.0 | 359.0 | 2292 |
| 5760 min Summer | 1.113 | 0.0 | 375.2 | 3000 |
| 7200 min Summer | 0.927 | 0.0 | 387.4 | 3680 |
| 8640 min Summer | 0.798 | 0.0 | 397.0 | 4408 |
| 10080 min Summer | 0.702 | 0.0 | 404.7 | 5136 |
| 15 min Winter | 99.739 | 0.0 | 86.1 | 18 |
| 30 min Winter | 65.311 | 0.0 | 114.8 | 32 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.568 | 0.338 | 0.0 | 7.6 | 7.6 | 127.1 | O K |
| 120 min Winter | 30.596 | 0.366 | 0.0 | 7.9 | 7.9 | 139.2 | O K |
| 180 min Winter | 30.596 | 0.366 | 0.0 | 7.9 | 7.9 | 139.3 | O K |
| 240 min Winter | 30.591 | 0.361 | 0.0 | 7.8 | 7.8 | 137.1 | O K |
| 360 min Winter | 30.576 | 0.346 | 0.0 | 7.6 | 7.6 | 130.4 | O K |
| 480 min Winter | 30.557 | 0.327 | 0.0 | 7.4 | 7.4 | 122.5 | O K |
| 600 min Winter | 30.538 | 0.308 | 0.0 | 7.2 | 7.2 | 114.2 | O K |
| 720 min Winter | 30.520 | 0.290 | 0.0 | 7.0 | 7.0 | 106.3 | O K |
| 960 min Winter | 30.486 | 0.256 | 0.0 | 6.6 | 6.6 | 91.7 | O K |
| 1440 min Winter | 30.432 | 0.202 | 0.0 | 5.9 | 5.9 | 68.4 | O K |
| 2160 min Winter | 30.376 | 0.146 | 0.0 | 5.0 | 5.0 | 44.3 | O K |
| 2880 min Winter | 30.339 | 0.109 | 0.0 | 4.4 | 4.4 | 28.5 | O K |
| 4320 min Winter | 30.300 | 0.070 | 0.0 | 3.5 | 3.5 | 12.2 | O K |
| 5760 min Winter | 30.283 | 0.053 | 0.0 | 2.8 | 2.8 | 7.0 | O K |
| 7200 min Winter | 30.272 | 0.042 | 0.0 | 2.4 | 2.4 | 4.3 | O K |
| 8640 min Winter | 30.263 | 0.033 | 0.0 | 2.0 | 2.0 | 2.8 | O K |
| 10080 min Winter | 30.257 | 0.027 | 0.0 | 1.8 | 1.8 | 1.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 144.8 | 60 |
| 120 min Winter | 24.517 | 0.0 | 175.6 | 116 |
| 180 min Winter | 17.977 | 0.0 | 193.8 | 166 |
| 240 min Winter | 14.339 | 0.0 | 206.3 | 188 |
| 360 min Winter | 10.402 | 0.0 | 224.8 | 266 |
| 480 min Winter | 8.281 | 0.0 | 238.7 | 340 |
| 600 min Winter | 6.934 | 0.0 | 250.0 | 414 |
| 720 min Winter | 5.995 | 0.0 | 259.2 | 486 |
| 960 min Winter | 4.761 | 0.0 | 274.5 | 626 |
| 1440 min Winter | 3.436 | 0.0 | 296.4 | 892 |
| 2160 min Winter | 2.476 | 0.0 | 319.3 | 1260 |
| 2880 min Winter | 1.960 | 0.0 | 335.7 | 1616 |
| 4320 min Winter | 1.408 | 0.0 | 359.0 | 2272 |
| 5760 min Winter | 1.113 | 0.0 | 375.3 | 2968 |
| 7200 min Winter | 0.927 | 0.0 | 387.5 | 3672 |
| 8640 min Winter | 0.798 | 0.0 | 397.1 | 4408 |
| 10080 min Winter | 0.702 | 0.0 | 404.9 | 5080 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.414

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.414 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.000

## Porous Car Park Structure

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 15.6 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 86.4 |
| Max Percolation (l/s) | 374.4 | Slope (1:X) | 1000.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.32 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 30.230 | Cap Volume Depth (m) | 0.550 |

## Orifice Outflow Control

Diameter (m) 0.086 Discharge Coefficient 0.500 Invert Level (m) 30.180

## Summary of Results for 1 year Return Period

Half Drain Time : 150 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.836 | 0.036 | 0.0 | 0.1 | 0.1 | 1.3 | O K |
| 30 min Summer | 30.845 | 0.045 | 0.0 | 0.1 | 0.1 | 1.6 | O K |
| 60 min Summer | 30.853 | 0.053 | 0.0 | 0.1 | 0.1 | 1.9 | O K |
| 120 min Summer | 30.859 | 0.059 | 0.0 | 0.2 | 0.2 | 2.1 | O K |
| 180 min Summer | 30.862 | 0.062 | 0.0 | 0.2 | 0.2 | 2.2 | O K |
| 240 min Summer | 30.863 | 0.063 | 0.0 | 0.2 | 0.2 | 2.3 | O K |
| 360 min Summer | 30.863 | 0.063 | 0.0 | 0.2 | 0.2 | 2.3 | O K |
| 480 min Summer | 30.862 | 0.062 | 0.0 | 0.2 | 0.2 | 2.2 | O K |
| 600 min Summer | 30.861 | 0.061 | 0.0 | 0.2 | 0.2 | 2.2 | O K |
| 720 min Summer | 30.859 | 0.059 | 0.0 | 0.2 | 0.2 | 2.1 | O K |
| 960 min Summer | 30.855 | 0.055 | 0.0 | 0.1 | 0.1 | 2.0 | O K |
| 1440 min Summer | 30.849 | 0.049 | 0.0 | 0.1 | 0.1 | 1.8 | O K |
| 2160 min Summer | 30.841 | 0.041 | 0.0 | 0.1 | 0.1 | 1.5 | O K |
| 2880 min Summer | 30.835 | 0.035 | 0.0 | 0.1 | 0.1 | 1.3 | O K |
| 4320 min Summer | 30.828 | 0.028 | 0.0 | 0.1 | 0.1 | 1.0 | O K |
| 5760 min Summer | 30.824 | 0.024 | 0.0 | 0.1 | 0.1 | 0.9 | O K |
| 7200 min Summer | 30.822 | 0.022 | 0.0 | 0.1 | 0.1 | 0.8 | O K |
| 8640 min Summer | 30.820 | 0.020 | 0.0 | 0.1 | 0.1 | 0.7 | O K |
| 10080 min Summer | 30.819 | 0.019 | 0.0 | 0.1 | 0.1 | 0.7 | O K |
| 15 min Winter | 30.836 | 0.036 | 0.0 | 0.1 | 0.1 | 1.3 | O K |
| 30 min Winter | 30.845 | 0.045 | 0.0 | 0.1 | 0.1 | 1.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 1.3 | 18 |
| 30 min Summer | 20.382 | 0.0 | 1.7 | 32 |
| 60 min Summer | 12.872 | 0.0 | 2.2 | 62 |
| 120 min Summer | 7.964 | 0.0 | 2.7 | 104 |
| 180 min Summer | 5.985 | 0.0 | 3.0 | 136 |
| 240 min Summer | 4.881 | 0.0 | 3.3 | 170 |
| 360 min Summer | 3.639 | 0.0 | 3.7 | 238 |
| 480 min Summer | 2.946 | 0.0 | 4.0 | 306 |
| 600 min Summer | 2.501 | 0.0 | 4.2 | 374 |
| 720 min Summer | 2.188 | 0.0 | 4.4 | 440 |
| 960 min Summer | 1.771 | 0.0 | 4.8 | 570 |
| 1440 min Summer | 1.316 | 0.0 | 5.3 | 824 |
| 2160 min Summer | 0.978 | 0.0 | 6.0 | 1192 |
| 2880 min Summer | 0.792 | 0.0 | 6.5 | 1556 |
| 4320 min Summer | 0.587 | 0.0 | 7.2 | 2252 |
| 5760 min Summer | 0.476 | 0.0 | 7.8 | 2992 |
| 7200 min Summer | 0.404 | 0.0 | 8.3 | 3680 |
| 8640 min Summer | 0.354 | 0.0 | 8.7 | 4416 |
| 10080 min Summer | 0.316 | 0.0 | 9.0 | 5144 |
| 15 min Winter | 31.306 | 0.0 | 1.3 | 18 |
| 30 min Winter | 20.382 | 0.0 | 1.7 | 32 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.854 | 0.054 | 0.0 | 0.1 | 0.1 | 1.9 | O K |
| 120 min Winter | 30.859 | 0.059 | 0.0 | 0.2 | 0.2 | 2.1 | O K |
| 180 min Winter | 30.861 | 0.061 | 0.0 | 0.2 | 0.2 | 2.2 | O K |
| 240 min Winter | 30.862 | 0.062 | 0.0 | 0.2 | 0.2 | 2.2 | O K |
| 360 min Winter | 30.861 | 0.061 | 0.0 | 0.2 | 0.2 | 2.2 | O K |
| 480 min Winter | 30.859 | 0.059 | 0.0 | 0.2 | 0.2 | 2.1 | O K |
| 600 min Winter | 30.856 | 0.056 | 0.0 | 0.1 | 0.1 | 2.0 | O K |
| 720 min Winter | 30.854 | 0.054 | 0.0 | 0.1 | 0.1 | 1.9 | O K |
| 960 min Winter | 30.848 | 0.048 | 0.0 | 0.1 | 0.1 | 1.7 | O K |
| 1440 min Winter | 30.840 | 0.040 | 0.0 | 0.1 | 0.1 | 1.4 | O K |
| 2160 min Winter | 30.831 | 0.031 | 0.0 | 0.1 | 0.1 | 1.1 | O K |
| 2880 min Winter | 30.826 | 0.026 | 0.0 | 0.1 | 0.1 | 0.9 | O K |
| 4320 min Winter | 30.822 | 0.022 | 0.0 | 0.1 | 0.1 | 0.8 | O K |
| 5760 min Winter | 30.819 | 0.019 | 0.0 | 0.1 | 0.1 | 0.7 | O K |
| 7200 min Winter | 30.817 | 0.017 | 0.0 | 0.0 | 0.0 | 0.6 | O K |
| 8640 min Winter | 30.816 | 0.016 | 0.0 | 0.0 | 0.0 | 0.6 | O K |
| 10080 min Winter | 30.815 | 0.015 | 0.0 | 0.0 | 0.0 | 0.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 2.2 | 60 |
| 120 min Winter | 7.964 | 0.0 | 2.7 | 114 |
| 180 min Winter | 5.985 | 0.0 | 3.0 | 142 |
| 240 min Winter | 4.881 | 0.0 | 3.3 | 180 |
| 360 min Winter | 3.639 | 0.0 | 3.7 | 256 |
| 480 min Winter | 2.946 | 0.0 | 4.0 | 328 |
| 600 min Winter | 2.501 | 0.0 | 4.2 | 398 |
| 720 min Winter | 2.188 | 0.0 | 4.4 | 468 |
| 960 min Winter | 1.771 | 0.0 | 4.8 | 600 |
| 1440 min Winter | 1.316 | 0.0 | 5.3 | 852 |
| 2160 min Winter | 0.978 | 0.0 | 6.0 | 1216 |
| 2880 min Winter | 0.792 | 0.0 | 6.5 | 1556 |
| 4320 min Winter | 0.587 | 0.0 | 7.2 | 2248 |
| 5760 min Winter | 0.476 | 0.0 | 7.8 | 3040 |
| 7200 min Winter | 0.404 | 0.0 | 8.3 | 3680 |
| 8640 min Winter | 0.354 | 0.0 | 8.7 | 4496 |
| 10080 min Winter | 0.316 | 0.0 | 9.0 | 5248 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.019

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.019 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.018 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 30 year Return Period

Half Drain Time : 216 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.888 | 0.088 | 0.0 | 0.2 | 0.2 | 3.2 | O K |
| 30 min Summer | 30.912 | 0.112 | 0.0 | 0.2 | 0.2 | 4.0 | O K |
| 60 min Summer | 30.933 | 0.133 | 0.0 | 0.2 | 0.2 | 4.8 | O K |
| 120 min Summer | 30.947 | 0.147 | 0.0 | 0.3 | 0.3 | 5.3 | O K |
| 180 min Summer | 30.950 | 0.150 | 0.0 | 0.3 | 0.3 | 5.4 | O K |
| 240 min Summer | 30.951 | 0.151 | 0.0 | 0.3 | 0.3 | 5.4 | O K |
| 360 min Summer | 30.950 | 0.150 | 0.0 | 0.3 | 0.3 | 5.4 | O K |
| 480 min Summer | 30.947 | 0.147 | 0.0 | 0.3 | 0.3 | 5.3 | O K |
| 600 min Summer | 30.943 | 0.143 | 0.0 | 0.2 | 0.2 | 5.2 | O K |
| 720 min Summer | 30.939 | 0.139 | 0.0 | 0.2 | 0.2 | 5.0 | O K |
| 960 min Summer | 30.931 | 0.131 | 0.0 | 0.2 | 0.2 | 4.7 | O K |
| 1440 min Summer | 30.915 | 0.115 | 0.0 | 0.2 | 0.2 | 4.1 | O K |
| 2160 min Summer | 30.896 | 0.096 | 0.0 | 0.2 | 0.2 | 3.4 | O K |
| 2880 min Summer | 30.882 | 0.082 | 0.0 | 0.2 | 0.2 | 2.9 | O K |
| 4320 min Summer | 30.862 | 0.062 | 0.0 | 0.2 | 0.2 | 2.2 | O K |
| 5760 min Summer | 30.849 | 0.049 | 0.0 | 0.1 | 0.1 | 1.8 | O K |
| 7200 min Summer | 30.841 | 0.041 | 0.0 | 0.1 | 0.1 | 1.5 | O K |
| 8640 min Summer | 30.835 | 0.035 | 0.0 | 0.1 | 0.1 | 1.3 | O K |
| 10080 min Summer | 30.831 | 0.031 | 0.0 | 0.1 | 0.1 | 1.1 | O K |
| 15 min Winter | 30.888 | 0.088 | 0.0 | 0.2 | 0.2 | 3.2 | O K |
| 30 min Winter | 30.912 | 0.112 | 0.0 | 0.2 | 0.2 | 4.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 3.2 | 18 |
| 30 min Summer | 49.886 | 0.0 | 4.2 | 33 |
| 60 min Summer | 30.968 | 0.0 | 5.3 | 62 |
| 120 min Summer | 18.658 | 0.0 | 6.3 | 120 |
| 180 min Summer | 13.726 | 0.0 | 7.0 | 158 |
| 240 min Summer | 10.992 | 0.0 | 7.5 | 188 |
| 360 min Summer | 8.021 | 0.0 | 8.2 | 254 |
| 480 min Summer | 6.411 | 0.0 | 8.7 | 322 |
| 600 min Summer | 5.385 | 0.0 | 9.2 | 392 |
| 720 min Summer | 4.668 | 0.0 | 9.5 | 458 |
| 960 min Summer | 3.724 | 0.0 | 10.1 | 596 |
| 1440 min Summer | 2.706 | 0.0 | 11.0 | 854 |
| 2160 min Summer | 1.964 | 0.0 | 12.1 | 1236 |
| 2880 min Summer | 1.563 | 0.0 | 12.8 | 1612 |
| 4320 min Summer | 1.132 | 0.0 | 13.9 | 2336 |
| 5760 min Summer | 0.900 | 0.0 | 14.8 | 3056 |
| 7200 min Summer | 0.753 | 0.0 | 15.4 | 3752 |
| 8640 min Summer | 0.651 | 0.0 | 16.0 | 4496 |
| 10080 min Summer | 0.575 | 0.0 | 16.5 | 5152 |
| 15 min Winter | 76.822 | 0.0 | 3.2 | 18 |
| 30 min Winter | 49.886 | 0.0 | 4.2 | 32 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.933 | 0.133 | 0.0 | 0.2 | 0.2 | 4.8 | O K |
| 120 min Winter | 30.948 | 0.148 | 0.0 | 0.3 | 0.3 | 5.3 | O K |
| 180 min Winter | 30.951 | 0.151 | 0.0 | 0.3 | 0.3 | 5.4 | O K |
| 240 min Winter | 30.950 | 0.150 | 0.0 | 0.3 | 0.3 | 5.4 | O K |
| 360 min Winter | 30.948 | 0.148 | 0.0 | 0.3 | 0.3 | 5.3 | O K |
| 480 min Winter | 30.943 | 0.143 | 0.0 | 0.2 | 0.2 | 5.2 | O K |
| 600 min Winter | 30.937 | 0.137 | 0.0 | 0.2 | 0.2 | 4.9 | O K |
| 720 min Winter | 30.931 | 0.131 | 0.0 | 0.2 | 0.2 | 4.7 | O K |
| 960 min Winter | 30.920 | 0.120 | 0.0 | 0.2 | 0.2 | 4.3 | O K |
| 1440 min Winter | 30.899 | 0.099 | 0.0 | 0.2 | 0.2 | 3.6 | O K |
| 2160 min Winter | 30.877 | 0.077 | 0.0 | 0.2 | 0.2 | 2.8 | O K |
| 2880 min Winter | 30.861 | 0.061 | 0.0 | 0.2 | 0.2 | 2.2 | O K |
| 4320 min Winter | 30.842 | 0.042 | 0.0 | 0.1 | 0.1 | 1.5 | O K |
| 5760 min Winter | 30.832 | 0.032 | 0.0 | 0.1 | 0.1 | 1.2 | O K |
| 7200 min Winter | 30.826 | 0.026 | 0.0 | 0.1 | 0.1 | 0.9 | O K |
| 8640 min Winter | 30.824 | 0.024 | 0.0 | 0.1 | 0.1 | 0.8 | O K |
| 10080 min Winter | 30.822 | 0.022 | 0.0 | 0.1 | 0.1 | 0.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 5.3 | 60 |
| 120 min Winter | 18.658 | 0.0 | 6.3 | 118 |
| 180 min Winter | 13.726 | 0.0 | 7.0 | 170 |
| 240 min Winter | 10.992 | 0.0 | 7.5 | 194 |
| 360 min Winter | 8.021 | 0.0 | 8.2 | 270 |
| 480 min Winter | 6.411 | 0.0 | 8.7 | 346 |
| 600 min Winter | 5.385 | 0.0 | 9.2 | 420 |
| 720 min Winter | 4.668 | 0.0 | 9.5 | 492 |
| 960 min Winter | 3.724 | 0.0 | 10.1 | 634 |
| 1440 min Winter | 2.706 | 0.0 | 11.0 | 898 |
| 2160 min Winter | 1.964 | 0.0 | 12.1 | 1280 |
| 2880 min Winter | 1.563 | 0.0 | 12.8 | 1648 |
| 4320 min Winter | 1.132 | 0.0 | 13.9 | 2376 |
| 5760 min Winter | 0.900 | 0.0 | 14.8 | 3056 |
| 7200 min Winter | 0.753 | 0.0 | 15.4 | 3744 |
| 8640 min Winter | 0.651 | 0.0 | 16.0 | 4440 |
| 10080 min Winter | 0.575 | 0.0 | 16.5 | 5144 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.019

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.019 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.018 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 100 year Return Period

Half Drain Time : 257 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.915 | 0.115 | 0.0 | 0.2 | 0.2 | 4.1 | O K |
| 30 min Summer | 30.947 | 0.147 | 0.0 | 0.3 | 0.3 | 5.3 | O K |
| 60 min Summer | 30.976 | 0.176 | 0.0 | 0.3 | 0.3 | 6.4 | O K |
| 120 min Summer | 30.997 | 0.197 | 0.0 | 0.3 | 0.3 | 7.1 | O K |
| 180 min Summer | 31.001 | 0.201 | 0.0 | 0.3 | 0.3 | 7.2 | O K |
| 240 min Summer | 31.001 | 0.201 | 0.0 | 0.3 | 0.3 | 7.3 | O K |
| 360 min Summer | 30.999 | 0.199 | 0.0 | 0.3 | 0.3 | 7.2 | O K |
| 480 min Summer | 30.996 | 0.196 | 0.0 | 0.3 | 0.3 | 7.0 | O K |
| 600 min Summer | 30.991 | 0.191 | 0.0 | 0.3 | 0.3 | 6.9 | O K |
| 720 min Summer | 30.986 | 0.186 | 0.0 | 0.3 | 0.3 | 6.7 | O K |
| 960 min Summer | 30.975 | 0.175 | 0.0 | 0.3 | 0.3 | 6.3 | O K |
| 1440 min Summer | 30.954 | 0.154 | 0.0 | 0.3 | 0.3 | 5.5 | O K |
| 2160 min Summer | 30.929 | 0.129 | 0.0 | 0.2 | 0.2 | 4.6 | O K |
| 2880 min Summer | 30.910 | 0.110 | 0.0 | 0.2 | 0.2 | 4.0 | O K |
| 4320 min Summer | 30.883 | 0.083 | 0.0 | 0.2 | 0.2 | 3.0 | O K |
| 5760 min Summer | 30.866 | 0.066 | 0.0 | 0.2 | 0.2 | 2.4 | O K |
| 7200 min Summer | 30.854 | 0.054 | 0.0 | 0.1 | 0.1 | 1.9 | O K |
| 8640 min Summer | 30.846 | 0.046 | 0.0 | 0.1 | 0.1 | 1.6 | O K |
| 10080 min Summer | 30.839 | 0.039 | 0.0 | 0.1 | 0.1 | 1.4 | O K |
| 15 min Winter | 30.915 | 0.115 | 0.0 | 0.2 | 0.2 | 4.1 | O K |
| 30 min Winter | 30.947 | 0.147 | 0.0 | 0.3 | 0.3 | 5.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 4.2 | 18 |
| 30 min Summer | 65.311 | 0.0 | 5.5 | 33 |
| 60 min Summer | 40.718 | 0.0 | 6.9 | 62 |
| 120 min Summer | 24.517 | 0.0 | 8.3 | 120 |
| 180 min Summer | 17.977 | 0.0 | 9.2 | 172 |
| 240 min Summer | 14.339 | 0.0 | 9.8 | 198 |
| 360 min Summer | 10.402 | 0.0 | 10.6 | 260 |
| 480 min Summer | 8.281 | 0.0 | 11.3 | 328 |
| 600 min Summer | 6.934 | 0.0 | 11.8 | 398 |
| 720 min Summer | 5.995 | 0.0 | 12.2 | 466 |
| 960 min Summer | 4.761 | 0.0 | 13.0 | 604 |
| 1440 min Summer | 3.436 | 0.0 | 14.0 | 866 |
| 2160 min Summer | 2.476 | 0.0 | 15.2 | 1256 |
| 2880 min Summer | 1.960 | 0.0 | 16.1 | 1616 |
| 4320 min Summer | 1.408 | 0.0 | 17.3 | 2340 |
| 5760 min Summer | 1.113 | 0.0 | 18.3 | 3064 |
| 7200 min Summer | 0.927 | 0.0 | 19.0 | 3816 |
| 8640 min Summer | 0.798 | 0.0 | 19.6 | 4496 |
| 10080 min Summer | 0.702 | 0.0 | 20.1 | 5240 |
| 15 min Winter | 99.739 | 0.0 | 4.2 | 18 |
| 30 min Winter | 65.311 | 0.0 | 5.5 | 32 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.977 | 0.177 | 0.0 | 0.3 | 0.3 | 6.4 | O K |
| 120 min Winter | 30.998 | 0.198 | 0.0 | 0.3 | 0.3 | 7.1 | O K |
| 180 min Winter | 31.003 | 0.203 | 0.0 | 0.3 | 0.3 | 7.3 | O K |
| 240 min Winter | 31.002 | 0.202 | 0.0 | 0.3 | 0.3 | 7.3 | O K |
| 360 min Winter | 30.998 | 0.198 | 0.0 | 0.3 | 0.3 | 7.1 | O K |
| 480 min Winter | 30.992 | 0.192 | 0.0 | 0.3 | 0.3 | 6.9 | O K |
| 600 min Winter | 30.985 | 0.185 | 0.0 | 0.3 | 0.3 | 6.7 | O K |
| 720 min Winter | 30.978 | 0.178 | 0.0 | 0.3 | 0.3 | 6.4 | O K |
| 960 min Winter | 30.963 | 0.163 | 0.0 | 0.3 | 0.3 | 5.9 | O K |
| 1440 min Winter | 30.936 | 0.136 | 0.0 | 0.2 | 0.2 | 4.9 | O K |
| 2160 min Winter | 30.906 | 0.106 | 0.0 | 0.2 | 0.2 | 3.8 | O K |
| 2880 min Winter | 30.885 | 0.085 | 0.0 | 0.2 | 0.2 | 3.0 | O K |
| 4320 min Winter | 30.858 | 0.058 | 0.0 | 0.2 | 0.2 | 2.1 | O K |
| 5760 min Winter | 30.843 | 0.043 | 0.0 | 0.1 | 0.1 | 1.6 | O K |
| 7200 min Winter | 30.834 | 0.034 | 0.0 | 0.1 | 0.1 | 1.2 | O K |
| 8640 min Winter | 30.828 | 0.028 | 0.0 | 0.1 | 0.1 | 1.0 | O K |
| 10080 min Winter | 30.825 | 0.025 | 0.0 | 0.1 | 0.1 | 0.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 6.9 | 62 |
| 120 min Winter | 24.517 | 0.0 | 8.3 | 118 |
| 180 min Winter | 17.977 | 0.0 | 9.2 | 172 |
| 240 min Winter | 14.339 | 0.0 | 9.8 | 220 |
| 360 min Winter | 10.402 | 0.0 | 10.6 | 274 |
| 480 min Winter | 8.281 | 0.0 | 11.3 | 352 |
| 600 min Winter | 6.934 | 0.0 | 11.8 | 428 |
| 720 min Winter | 5.995 | 0.0 | 12.2 | 500 |
| 960 min Winter | 4.761 | 0.0 | 13.0 | 644 |
| 1440 min Winter | 3.436 | 0.0 | 14.0 | 920 |
| 2160 min Winter | 2.476 | 0.0 | 15.2 | 1300 |
| 2880 min Winter | 1.960 | 0.0 | 16.1 | 1676 |
| 4320 min Winter | 1.408 | 0.0 | 17.3 | 2380 |
| 5760 min Winter | 1.113 | 0.0 | 18.3 | 3112 |
| 7200 min Winter | 0.927 | 0.0 | 19.0 | 3816 |
| 8640 min Winter | 0.798 | 0.0 | 19.6 | 4496 |
| 10080 min Winter | 0.702 | 0.0 | 20.1 | 5208 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.019

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.019 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.018 Discharge Coefficient 0.600 Invert Level (m) 30.800

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

Half Drain Time : 304 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.961 | 0.161 | 0.0 | 0.3 | 0.3 | 5.8 | O K |
| 30 min Summer | 31.007 | 0.207 | 0.0 | 0.3 | 0.3 | 7.5 | O K |
| 60 min Summer | 31.050 | 0.250 | 0.0 | 0.3 | 0.3 | 9.0 | O K |
| 120 min Summer | 31.082 | 0.282 | 0.0 | 0.4 | 0.4 | 10.2 | O K |
| 180 min Summer | 31.091 | 0.291 | 0.0 | 0.4 | 0.4 | 10.5 | O K |
| 240 min Summer | 31.092 | 0.292 | 0.0 | 0.4 | 0.4 | 10.5 | O K |
| 360 min Summer | 31.090 | 0.290 | 0.0 | 0.4 | 0.4 | 10.4 | O K |
| 480 min Summer | 31.086 | 0.286 | 0.0 | 0.4 | 0.4 | 10.3 | O K |
| 600 min Summer | 31.081 | 0.281 | 0.0 | 0.4 | 0.4 | 10.1 | O K |
| 720 min Summer | 31.074 | 0.274 | 0.0 | 0.3 | 0.3 | 9.9 | O K |
| 960 min Summer | 31.061 | 0.261 | 0.0 | 0.3 | 0.3 | 9.4 | O K |
| 1440 min Summer | 31.034 | 0.234 | 0.0 | 0.3 | 0.3 | 8.4 | O K |
| 2160 min Summer | 31.000 | 0.200 | 0.0 | 0.3 | 0.3 | 7.2 | O K |
| 2880 min Summer | 30.973 | 0.173 | 0.0 | 0.3 | 0.3 | 6.2 | O K |
| 4320 min Summer | 30.934 | 0.134 | 0.0 | 0.2 | 0.2 | 4.8 | O K |
| 5760 min Summer | 30.907 | 0.107 | 0.0 | 0.2 | 0.2 | 3.9 | O K |
| 7200 min Summer | 30.888 | 0.088 | 0.0 | 0.2 | 0.2 | 3.2 | O K |
| 8640 min Summer | 30.874 | 0.074 | 0.0 | 0.2 | 0.2 | 2.7 | O K |
| 10080 min Summer | 30.864 | 0.064 | 0.0 | 0.2 | 0.2 | 2.3 | O K |
| 15 min Winter | 30.961 | 0.161 | 0.0 | 0.3 | 0.3 | 5.8 | O K |
| 30 min Winter | 31.008 | 0.208 | 0.0 | 0.3 | 0.3 | 7.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 5.9 | 19 |
| 30 min Summer | 91.435 | 0.0 | 7.7 | 33 |
| 60 min Summer | 57.005 | 0.0 | 9.7 | 62 |
| 120 min Summer | 34.324 | 0.0 | 11.7 | 122 |
| 180 min Summer | 25.168 | 0.0 | 12.9 | 180 |
| 240 min Summer | 20.074 | 0.0 | 13.7 | 214 |
| 360 min Summer | 14.562 | 0.0 | 14.9 | 274 |
| 480 min Summer | 11.594 | 0.0 | 15.8 | 340 |
| 600 min Summer | 9.707 | 0.0 | 16.5 | 410 |
| 720 min Summer | 8.393 | 0.0 | 17.2 | 478 |
| 960 min Summer | 6.666 | 0.0 | 18.2 | 616 |
| 1440 min Summer | 4.811 | 0.0 | 19.7 | 882 |
| 2160 min Summer | 3.466 | 0.0 | 21.3 | 1276 |
| 2880 min Summer | 2.744 | 0.0 | 22.5 | 1648 |
| 4320 min Summer | 1.972 | 0.0 | 24.2 | 2380 |
| 5760 min Summer | 1.558 | 0.0 | 25.6 | 3112 |
| 7200 min Summer | 1.297 | 0.0 | 26.6 | 3824 |
| 8640 min Summer | 1.117 | 0.0 | 27.5 | 4576 |
| 10080 min Summer | 0.983 | 0.0 | 28.2 | 5248 |
| 15 min Winter | 139.635 | 0.0 | 5.9 | 18 |
| 30 min Winter | 91.435 | 0.0 | 7.7 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.050 | 0.250 | 0.0 | 0.3 | 0.3 | 9.0 | O K |
| 120 min Winter | 31.083 | 0.283 | 0.0 | 0.4 | 0.4 | 10.2 | O K |
| 180 min Winter | 31.093 | 0.293 | 0.0 | 0.4 | 0.4 | 10.5 | O K |
| 240 min Winter | 31.094 | 0.294 | 0.0 | 0.4 | 0.4 | 10.6 | O K |
| 360 min Winter | 31.089 | 0.289 | 0.0 | 0.4 | 0.4 | 10.4 | O K |
| 480 min Winter | 31.083 | 0.283 | 0.0 | 0.4 | 0.4 | 10.2 | O K |
| 600 min Winter | 31.075 | 0.275 | 0.0 | 0.3 | 0.3 | 9.9 | O K |
| 720 min Winter | 31.066 | 0.266 | 0.0 | 0.3 | 0.3 | 9.6 | O K |
| 960 min Winter | 31.047 | 0.247 | 0.0 | 0.3 | 0.3 | 8.9 | O K |
| 1440 min Winter | 31.012 | 0.212 | 0.0 | 0.3 | 0.3 | 7.6 | O K |
| 2160 min Winter | 30.969 | 0.169 | 0.0 | 0.3 | 0.3 | 6.1 | O K |
| 2880 min Winter | 30.938 | 0.138 | 0.0 | 0.2 | 0.2 | 5.0 | O K |
| 4320 min Winter | 30.896 | 0.096 | 0.0 | 0.2 | 0.2 | 3.5 | O K |
| 5760 min Winter | 30.872 | 0.072 | 0.0 | 0.2 | 0.2 | 2.6 | O K |
| 7200 min Winter | 30.856 | 0.056 | 0.0 | 0.1 | 0.1 | 2.0 | O K |
| 8640 min Winter | 30.845 | 0.045 | 0.0 | 0.1 | 0.1 | 1.6 | O K |
| 10080 min Winter | 30.838 | 0.038 | 0.0 | 0.1 | 0.1 | 1.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 9.7 | 62 |
| 120 min Winter | 34.324 | 0.0 | 11.7 | 118 |
| 180 min Winter | 25.168 | 0.0 | 12.9 | 174 |
| 240 min Winter | 20.074 | 0.0 | 13.7 | 228 |
| 360 min Winter | 14.562 | 0.0 | 14.9 | 284 |
| 480 min Winter | 11.594 | 0.0 | 15.8 | 360 |
| 600 min Winter | 9.707 | 0.0 | 16.5 | 436 |
| 720 min Winter | 8.393 | 0.0 | 17.2 | 512 |
| 960 min Winter | 6.666 | 0.0 | 18.2 | 656 |
| 1440 min Winter | 4.811 | 0.0 | 19.7 | 938 |
| 2160 min Winter | 3.466 | 0.0 | 21.3 | 1340 |
| 2880 min Winter | 2.744 | 0.0 | 22.5 | 1728 |
| 4320 min Winter | 1.972 | 0.0 | 24.2 | 2464 |
| 5760 min Winter | 1.558 | 0.0 | 25.6 | 3168 |
| 7200 min Winter | 1.297 | 0.0 | 26.6 | 3888 |
| 8640 min Winter | 1.117 | 0.0 | 27.5 | 4584 |
| 10080 min Winter | 0.983 | 0.0 | 28.2 | 5248 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.019

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.019 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.018 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 1 year Return Period

Half Drain Time : 106 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.870 | 0.070 | 0.0 | 0.3 | 0.3 | 2.5 | O K |
| 30 min Summer | 30.887 | 0.087 | 0.0 | 0.4 | 0.4 | 3.1 | O K |
| 60 min Summer | 30.900 | 0.100 | 0.0 | 0.4 | 0.4 | 3.6 | O K |
| 120 min Summer | 30.909 | 0.109 | 0.0 | 0.4 | 0.4 | 3.9 | O K |
| 180 min Summer | 30.912 | 0.112 | 0.0 | 0.4 | 0.4 | 4.0 | O K |
| 240 min Summer | 30.912 | 0.112 | 0.0 | 0.4 | 0.4 | 4.0 | O K |
| 360 min Summer | 30.909 | 0.109 | 0.0 | 0.4 | 0.4 | 3.9 | O K |
| 480 min Summer | 30.905 | 0.105 | 0.0 | 0.4 | 0.4 | 3.8 | O K |
| 600 min Summer | 30.900 | 0.100 | 0.0 | 0.4 | 0.4 | 3.6 | O K |
| 720 min Summer | 30.895 | 0.095 | 0.0 | 0.4 | 0.4 | 3.4 | O K |
| 960 min Summer | 30.886 | 0.086 | 0.0 | 0.4 | 0.4 | 3.1 | O K |
| 1440 min Summer | 30.871 | 0.071 | 0.0 | 0.3 | 0.3 | 2.6 | O K |
| 2160 min Summer | 30.857 | 0.057 | 0.0 | 0.3 | 0.3 | 2.0 | O K |
| 2880 min Summer | 30.847 | 0.047 | 0.0 | 0.2 | 0.2 | 1.7 | O K |
| 4320 min Summer | 30.837 | 0.037 | 0.0 | 0.2 | 0.2 | 1.3 | O K |
| 5760 min Summer | 30.832 | 0.032 | 0.0 | 0.2 | 0.2 | 1.2 | O K |
| 7200 min Summer | 30.829 | 0.029 | 0.0 | 0.1 | 0.1 | 1.0 | O K |
| 8640 min Summer | 30.827 | 0.027 | 0.0 | 0.1 | 0.1 | 1.0 | O K |
| 10080 min Summer | 30.825 | 0.025 | 0.0 | 0.1 | 0.1 | 0.9 | O K |
| 15 min Winter | 30.870 | 0.070 | 0.0 | 0.3 | 0.3 | 2.5 | O K |
| 30 min Winter | 30.887 | 0.087 | 0.0 | 0.4 | 0.4 | 3.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 2.6 | 18 |
| 30 min Summer | 20.382 | 0.0 | 3.4 | 32 |
| 60 min Summer | 12.872 | 0.0 | 4.4 | 60 |
| 120 min Summer | 7.964 | 0.0 | 5.4 | 92 |
| 180 min Summer | 5.985 | 0.0 | 6.1 | 126 |
| 240 min Summer | 4.881 | 0.0 | 6.6 | 160 |
| 360 min Summer | 3.639 | 0.0 | 7.4 | 228 |
| 480 min Summer | 2.946 | 0.0 | 8.0 | 296 |
| 600 min Summer | 2.501 | 0.0 | 8.5 | 362 |
| 720 min Summer | 2.188 | 0.0 | 8.9 | 426 |
| 960 min Summer | 1.771 | 0.0 | 9.7 | 552 |
| 1440 min Summer | 1.316 | 0.0 | 10.7 | 796 |
| 2160 min Summer | 0.978 | 0.0 | 12.0 | 1164 |
| 2880 min Summer | 0.792 | 0.0 | 13.0 | 1524 |
| 4320 min Summer | 0.587 | 0.0 | 14.4 | 2208 |
| 5760 min Summer | 0.476 | 0.0 | 15.6 | 2936 |
| 7200 min Summer | 0.404 | 0.0 | 16.6 | 3672 |
| 8640 min Summer | 0.354 | 0.0 | 17.4 | 4408 |
| 10080 min Summer | 0.316 | 0.0 | 18.1 | 5144 |
| 15 min Winter | 31.306 | 0.0 | 2.6 | 18 |
| 30 min Winter | 20.382 | 0.0 | 3.4 | 31 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.901 | 0.101 | 0.0 | 0.4 | 0.4 | 3.6 | O K |
| 120 min Winter | 30.908 | 0.108 | 0.0 | 0.4 | 0.4 | 3.9 | O K |
| 180 min Winter | 30.910 | 0.110 | 0.0 | 0.4 | 0.4 | 4.0 | O K |
| 240 min Winter | 30.909 | 0.109 | 0.0 | 0.4 | 0.4 | 3.9 | O K |
| 360 min Winter | 30.903 | 0.103 | 0.0 | 0.4 | 0.4 | 3.7 | O K |
| 480 min Winter | 30.895 | 0.095 | 0.0 | 0.4 | 0.4 | 3.4 | O K |
| 600 min Winter | 30.888 | 0.088 | 0.0 | 0.4 | 0.4 | 3.2 | O K |
| 720 min Winter | 30.881 | 0.081 | 0.0 | 0.3 | 0.3 | 2.9 | O K |
| 960 min Winter | 30.870 | 0.070 | 0.0 | 0.3 | 0.3 | 2.5 | O K |
| 1440 min Winter | 30.854 | 0.054 | 0.0 | 0.3 | 0.3 | 2.0 | O K |
| 2160 min Winter | 30.840 | 0.040 | 0.0 | 0.2 | 0.2 | 1.5 | O K |
| 2880 min Winter | 30.834 | 0.034 | 0.0 | 0.2 | 0.2 | 1.2 | O K |
| 4320 min Winter | 30.828 | 0.028 | 0.0 | 0.1 | 0.1 | 1.0 | O K |
| 5760 min Winter | 30.825 | 0.025 | 0.0 | 0.1 | 0.1 | 0.9 | O K |
| 7200 min Winter | 30.822 | 0.022 | 0.0 | 0.1 | 0.1 | 0.8 | O K |
| 8640 min Winter | 30.821 | 0.021 | 0.0 | 0.1 | 0.1 | 0.7 | O K |
| 10080 min Winter | 30.819 | 0.019 | 0.0 | 0.1 | 0.1 | 0.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 4.4 | 58 |
| 120 min Winter | 7.964 | 0.0 | 5.4 | 96 |
| 180 min Winter | 5.985 | 0.0 | 6.1 | 134 |
| 240 min Winter | 4.881 | 0.0 | 6.6 | 172 |
| 360 min Winter | 3.639 | 0.0 | 7.4 | 244 |
| 480 min Winter | 2.946 | 0.0 | 8.0 | 314 |
| 600 min Winter | 2.501 | 0.0 | 8.5 | 380 |
| 720 min Winter | 2.188 | 0.0 | 8.9 | 448 |
| 960 min Winter | 1.771 | 0.0 | 9.7 | 576 |
| 1440 min Winter | 1.316 | 0.0 | 10.7 | 822 |
| 2160 min Winter | 0.978 | 0.0 | 12.0 | 1172 |
| 2880 min Winter | 0.792 | 0.0 | 13.0 | 1524 |
| 4320 min Winter | 0.587 | 0.0 | 14.4 | 2248 |
| 5760 min Winter | 0.476 | 0.0 | 15.6 | 2928 |
| 7200 min Winter | 0.404 | 0.0 | 16.6 | 3672 |
| 8640 min Winter | 0.354 | 0.0 | 17.4 | 4400 |
| 10080 min Winter | 0.316 | 0.0 | 18.1 | 5096 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.038

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.038 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 30 year Return Period

Half Drain Time : 162 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.974 | 0.174 | 0.0 | 0.5 | 0.5 | 6.2 | O K |
| 30 min Summer | 31.018 | 0.218 | 0.0 | 0.6 | 0.6 | 7.9 | O K |
| 60 min Summer | 31.055 | 0.255 | 0.0 | 0.6 | 0.6 | 9.2 | O K |
| 120 min Summer | 31.073 | 0.273 | 0.0 | 0.7 | 0.7 | 9.8 | O K |
| 180 min Summer | 31.076 | 0.276 | 0.0 | 0.7 | 0.7 | 9.9 | O K |
| 240 min Summer | 31.075 | 0.275 | 0.0 | 0.7 | 0.7 | 9.9 | O K |
| 360 min Summer | 31.067 | 0.267 | 0.0 | 0.7 | 0.7 | 9.6 | O K |
| 480 min Summer | 31.056 | 0.256 | 0.0 | 0.6 | 0.6 | 9.2 | O K |
| 600 min Summer | 31.045 | 0.245 | 0.0 | 0.6 | 0.6 | 8.8 | O K |
| 720 min Summer | 31.034 | 0.234 | 0.0 | 0.6 | 0.6 | 8.4 | O K |
| 960 min Summer | 31.013 | 0.213 | 0.0 | 0.6 | 0.6 | 7.7 | O K |
| 1440 min Summer | 30.979 | 0.179 | 0.0 | 0.5 | 0.5 | 6.4 | O K |
| 2160 min Summer | 30.941 | 0.141 | 0.0 | 0.5 | 0.5 | 5.1 | O K |
| 2880 min Summer | 30.916 | 0.116 | 0.0 | 0.4 | 0.4 | 4.2 | O K |
| 4320 min Summer | 30.883 | 0.083 | 0.0 | 0.3 | 0.3 | 3.0 | O K |
| 5760 min Summer | 30.864 | 0.064 | 0.0 | 0.3 | 0.3 | 2.3 | O K |
| 7200 min Summer | 30.852 | 0.052 | 0.0 | 0.3 | 0.3 | 1.9 | O K |
| 8640 min Summer | 30.844 | 0.044 | 0.0 | 0.2 | 0.2 | 1.6 | O K |
| 10080 min Summer | 30.838 | 0.038 | 0.0 | 0.2 | 0.2 | 1.4 | O K |
| 15 min Winter | 30.974 | 0.174 | 0.0 | 0.5 | 0.5 | 6.2 | O K |
| 30 min Winter | 31.019 | 0.219 | 0.0 | 0.6 | 0.6 | 7.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 6.5 | 18 |
| 30 min Summer | 49.886 | 0.0 | 8.5 | 33 |
| 60 min Summer | 30.968 | 0.0 | 10.6 | 62 |
| 120 min Summer | 18.658 | 0.0 | 12.7 | 108 |
| 180 min Summer | 13.726 | 0.0 | 14.0 | 140 |
| 240 min Summer | 10.992 | 0.0 | 15.0 | 172 |
| 360 min Summer | 8.021 | 0.0 | 16.4 | 240 |
| 480 min Summer | 6.411 | 0.0 | 17.5 | 308 |
| 600 min Summer | 5.385 | 0.0 | 18.4 | 376 |
| 720 min Summer | 4.668 | 0.0 | 19.1 | 444 |
| 960 min Summer | 3.724 | 0.0 | 20.3 | 578 |
| 1440 min Summer | 2.706 | 0.0 | 22.2 | 834 |
| 2160 min Summer | 1.964 | 0.0 | 24.2 | 1192 |
| 2880 min Summer | 1.563 | 0.0 | 25.6 | 1560 |
| 4320 min Summer | 1.132 | 0.0 | 27.8 | 2288 |
| 5760 min Summer | 0.900 | 0.0 | 29.5 | 3000 |
| 7200 min Summer | 0.753 | 0.0 | 30.9 | 3680 |
| 8640 min Summer | 0.651 | 0.0 | 32.0 | 4408 |
| 10080 min Summer | 0.575 | 0.0 | 33.0 | 5144 |
| 15 min Winter | 76.822 | 0.0 | 6.5 | 18 |
| 30 min Winter | 49.886 | 0.0 | 8.5 | 32 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.056 | 0.256 | 0.0 | 0.6 | 0.6 | 9.2 | O K |
| 120 min Winter | 31.075 | 0.275 | 0.0 | 0.7 | 0.7 | 9.9 | O K |
| 180 min Winter | 31.075 | 0.275 | 0.0 | 0.7 | 0.7 | 9.9 | O K |
| 240 min Winter | 31.072 | 0.272 | 0.0 | 0.7 | 0.7 | 9.8 | O K |
| 360 min Winter | 31.059 | 0.259 | 0.0 | 0.6 | 0.6 | 9.3 | O K |
| 480 min Winter | 31.043 | 0.243 | 0.0 | 0.6 | 0.6 | 8.8 | O K |
| 600 min Winter | 31.028 | 0.228 | 0.0 | 0.6 | 0.6 | 8.2 | O K |
| 720 min Winter | 31.013 | 0.213 | 0.0 | 0.6 | 0.6 | 7.7 | O K |
| 960 min Winter | 30.986 | 0.186 | 0.0 | 0.5 | 0.5 | 6.7 | O K |
| 1440 min Winter | 30.944 | 0.144 | 0.0 | 0.5 | 0.5 | 5.2 | O K |
| 2160 min Winter | 30.904 | 0.104 | 0.0 | 0.4 | 0.4 | 3.7 | O K |
| 2880 min Winter | 30.879 | 0.079 | 0.0 | 0.3 | 0.3 | 2.8 | O K |
| 4320 min Winter | 30.852 | 0.052 | 0.0 | 0.3 | 0.3 | 1.9 | O K |
| 5760 min Winter | 30.839 | 0.039 | 0.0 | 0.2 | 0.2 | 1.4 | O K |
| 7200 min Winter | 30.833 | 0.033 | 0.0 | 0.2 | 0.2 | 1.2 | O K |
| 8640 min Winter | 30.830 | 0.030 | 0.0 | 0.2 | 0.2 | 1.1 | O K |
| 10080 min Winter | 30.828 | 0.028 | 0.0 | 0.1 | 0.1 | 1.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 10.6 | 60 |
| 120 min Winter | 18.658 | 0.0 | 12.7 | 114 |
| 180 min Winter | 13.726 | 0.0 | 14.0 | 144 |
| 240 min Winter | 10.992 | 0.0 | 15.0 | 182 |
| 360 min Winter | 8.021 | 0.0 | 16.4 | 258 |
| 480 min Winter | 6.411 | 0.0 | 17.5 | 330 |
| 600 min Winter | 5.385 | 0.0 | 18.4 | 402 |
| 720 min Winter | 4.668 | 0.0 | 19.1 | 470 |
| 960 min Winter | 3.724 | 0.0 | 20.3 | 606 |
| 1440 min Winter | 2.706 | 0.0 | 22.2 | 866 |
| 2160 min Winter | 1.964 | 0.0 | 24.2 | 1232 |
| 2880 min Winter | 1.563 | 0.0 | 25.6 | 1588 |
| 4320 min Winter | 1.132 | 0.0 | 27.8 | 2292 |
| 5760 min Winter | 0.900 | 0.0 | 29.5 | 3000 |
| 7200 min Winter | 0.753 | 0.0 | 30.9 | 3672 |
| 8640 min Winter | 0.651 | 0.0 | 32.0 | 4368 |
| 10080 min Winter | 0.575 | 0.0 | 33.0 | 5136 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.038

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.038 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 100 year Return Period

Half Drain Time : 171 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 31.026 | 0.226 | 0.0 | 0.6 | 0.6 | 8.1 | O K |
| 30 min Summer | 31.088 | 0.288 | 0.0 | 0.7 | 0.7 | 10.4 | O K |
| 60 min Summer | 31.140 | 0.340 | 0.0 | 0.7 | 0.7 | 12.2 | Flood Risk |
| 120 min Summer | 31.168 | 0.368 | 0.0 | 0.8 | 0.8 | 13.3 | Flood Risk |
| 180 min Summer | 31.172 | 0.372 | 0.0 | 0.8 | 0.8 | 13.4 | Flood Risk |
| 240 min Summer | 31.169 | 0.369 | 0.0 | 0.8 | 0.8 | 13.3 | Flood Risk |
| 360 min Summer | 31.159 | 0.359 | 0.0 | 0.8 | 0.8 | 12.9 | Flood Risk |
| 480 min Summer | 31.146 | 0.346 | 0.0 | 0.8 | 0.8 | 12.4 | Flood Risk |
| 600 min Summer | 31.131 | 0.331 | 0.0 | 0.7 | 0.7 | 11.9 | Flood Risk |
| 720 min Summer | 31.117 | 0.317 | 0.0 | 0.7 | 0.7 | 11.4 | Flood Risk |
| 960 min Summer | 31.090 | 0.290 | 0.0 | 0.7 | 0.7 | 10.4 | O K |
| 1440 min Summer | 31.044 | 0.244 | 0.0 | 0.6 | 0.6 | 8.8 | O K |
| 2160 min Summer | 30.995 | 0.195 | 0.0 | 0.6 | 0.6 | 7.0 | O K |
| 2880 min Summer | 30.959 | 0.159 | 0.0 | 0.5 | 0.5 | 5.7 | O K |
| 4320 min Summer | 30.914 | 0.114 | 0.0 | 0.4 | 0.4 | 4.1 | O K |
| 5760 min Summer | 30.887 | 0.087 | 0.0 | 0.4 | 0.4 | 3.1 | O K |
| 7200 min Summer | 30.869 | 0.069 | 0.0 | 0.3 | 0.3 | 2.5 | O K |
| 8640 min Summer | 30.857 | 0.057 | 0.0 | 0.3 | 0.3 | 2.1 | O K |
| 10080 min Summer | 30.849 | 0.049 | 0.0 | 0.3 | 0.3 | 1.8 | O K |
| 15 min Winter | 31.026 | 0.226 | 0.0 | 0.6 | 0.6 | 8.2 | O K |
| 30 min Winter | 31.089 | 0.289 | 0.0 | 0.7 | 0.7 | 10.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 8.5 | 18 |
| 30 min Summer | 65.311 | 0.0 | 11.1 | 33 |
| 60 min Summer | 40.718 | 0.0 | 13.9 | 62 |
| 120 min Summer | 24.517 | 0.0 | 16.7 | 118 |
| 180 min Summer | 17.977 | 0.0 | 18.4 | 146 |
| 240 min Summer | 14.339 | 0.0 | 19.6 | 178 |
| 360 min Summer | 10.402 | 0.0 | 21.3 | 246 |
| 480 min Summer | 8.281 | 0.0 | 22.6 | 314 |
| 600 min Summer | 6.934 | 0.0 | 23.7 | 382 |
| 720 min Summer | 5.995 | 0.0 | 24.6 | 450 |
| 960 min Summer | 4.761 | 0.0 | 26.0 | 584 |
| 1440 min Summer | 3.436 | 0.0 | 28.1 | 838 |
| 2160 min Summer | 2.476 | 0.0 | 30.5 | 1212 |
| 2880 min Summer | 1.960 | 0.0 | 32.1 | 1584 |
| 4320 min Summer | 1.408 | 0.0 | 34.6 | 2292 |
| 5760 min Summer | 1.113 | 0.0 | 36.5 | 3000 |
| 7200 min Summer | 0.927 | 0.0 | 38.0 | 3744 |
| 8640 min Summer | 0.798 | 0.0 | 39.3 | 4416 |
| 10080 min Summer | 0.702 | 0.0 | 40.3 | 5144 |
| 15 min Winter | 99.739 | 0.0 | 8.5 | 18 |
| 30 min Winter | 65.311 | 0.0 | 11.1 | 32 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.141 | 0.341 | 0.0 | 0.7 | 0.7 | 12.3 | Flood Risk |
| 120 min Winter | 31.171 | 0.371 | 0.0 | 0.8 | 0.8 | 13.4 | Flood Risk |
| 180 min Winter | 31.171 | 0.371 | 0.0 | 0.8 | 0.8 | 13.4 | Flood Risk |
| 240 min Winter | 31.167 | 0.367 | 0.0 | 0.8 | 0.8 | 13.2 | Flood Risk |
| 360 min Winter | 31.151 | 0.351 | 0.0 | 0.8 | 0.8 | 12.7 | Flood Risk |
| 480 min Winter | 31.132 | 0.332 | 0.0 | 0.7 | 0.7 | 12.0 | Flood Risk |
| 600 min Winter | 31.112 | 0.312 | 0.0 | 0.7 | 0.7 | 11.2 | Flood Risk |
| 720 min Winter | 31.093 | 0.293 | 0.0 | 0.7 | 0.7 | 10.5 | O K |
| 960 min Winter | 31.058 | 0.258 | 0.0 | 0.6 | 0.6 | 9.3 | O K |
| 1440 min Winter | 31.002 | 0.202 | 0.0 | 0.6 | 0.6 | 7.3 | O K |
| 2160 min Winter | 30.947 | 0.147 | 0.0 | 0.5 | 0.5 | 5.3 | O K |
| 2880 min Winter | 30.912 | 0.112 | 0.0 | 0.4 | 0.4 | 4.0 | O K |
| 4320 min Winter | 30.872 | 0.072 | 0.0 | 0.3 | 0.3 | 2.6 | O K |
| 5760 min Winter | 30.852 | 0.052 | 0.0 | 0.3 | 0.3 | 1.9 | O K |
| 7200 min Winter | 30.841 | 0.041 | 0.0 | 0.2 | 0.2 | 1.5 | O K |
| 8640 min Winter | 30.835 | 0.035 | 0.0 | 0.2 | 0.2 | 1.2 | O K |
| 10080 min Winter | 30.832 | 0.032 | 0.0 | 0.2 | 0.2 | 1.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 13.9 | 60 |
| 120 min Winter | 24.517 | 0.0 | 16.7 | 116 |
| 180 min Winter | 17.977 | 0.0 | 18.4 | 150 |
| 240 min Winter | 14.339 | 0.0 | 19.6 | 186 |
| 360 min Winter | 10.402 | 0.0 | 21.3 | 262 |
| 480 min Winter | 8.281 | 0.0 | 22.6 | 336 |
| 600 min Winter | 6.934 | 0.0 | 23.7 | 410 |
| 720 min Winter | 5.995 | 0.0 | 24.6 | 480 |
| 960 min Winter | 4.761 | 0.0 | 26.0 | 616 |
| 1440 min Winter | 3.436 | 0.0 | 28.1 | 880 |
| 2160 min Winter | 2.476 | 0.0 | 30.5 | 1252 |
| 2880 min Winter | 1.960 | 0.0 | 32.1 | 1616 |
| 4320 min Winter | 1.408 | 0.0 | 34.6 | 2332 |
| 5760 min Winter | 1.113 | 0.0 | 36.5 | 3048 |
| 7200 min Winter | 0.927 | 0.0 | 38.0 | 3744 |
| 8640 min Winter | 0.798 | 0.0 | 39.3 | 4400 |
| 10080 min Winter | 0.702 | 0.0 | 40.3 | 5136 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.038

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.038 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

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

Half Drain Time : 212 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 31.119 | 0.319 | 0.0 | 0.7 | 0.7 | 11.5 | Flood Risk |
| 30 min Summer | 31.207 | 0.407 | 0.0 | 0.8 | 0.8 | 14.7 | Flood Risk |
| 60 min Summer | 31.285 | 0.485 | 0.0 | 0.9 | 0.9 | 17.5 | Flood Risk |
| 120 min Summer | 31.333 | 0.533 | 0.0 | 0.9 | 0.9 | 19.2 | Flood Risk |
| 180 min Summer | 31.340 | 0.540 | 0.0 | 0.9 | 0.9 | 19.4 | Flood Risk |
| 240 min Summer | 31.338 | 0.538 | 0.0 | 0.9 | 0.9 | 19.4 | Flood Risk |
| 360 min Summer | 31.327 | 0.527 | 0.0 | 0.9 | 0.9 | 19.0 | Flood Risk |
| 480 min Summer | 31.312 | 0.512 | 0.0 | 0.9 | 0.9 | 18.4 | Flood Risk |
| 600 min Summer | 31.294 | 0.494 | 0.0 | 0.9 | 0.9 | 17.8 | Flood Risk |
| 720 min Summer | 31.276 | 0.476 | 0.0 | 0.9 | 0.9 | 17.2 | Flood Risk |
| 960 min Summer | 31.241 | 0.441 | 0.0 | 0.9 | 0.9 | 15.9 | Flood Risk |
| 1440 min Summer | 31.180 | 0.380 | 0.0 | 0.8 | 0.8 | 13.7 | Flood Risk |
| 2160 min Summer | 31.109 | 0.309 | 0.0 | 0.7 | 0.7 | 11.1 | Flood Risk |
| 2880 min Summer | 31.058 | 0.258 | 0.0 | 0.6 | 0.6 | 9.3 | O K |
| 4320 min Summer | 30.988 | 0.188 | 0.0 | 0.5 | 0.5 | 6.8 | O K |
| 5760 min Summer | 30.944 | 0.144 | 0.0 | 0.5 | 0.5 | 5.2 | O K |
| 7200 min Summer | 30.915 | 0.115 | 0.0 | 0.4 | 0.4 | 4.2 | O K |
| 8640 min Summer | 30.895 | 0.095 | 0.0 | 0.4 | 0.4 | 3.4 | O K |
| 10080 min Summer | 30.880 | 0.080 | 0.0 | 0.3 | 0.3 | 2.9 | O K |
| 15 min Winter | 31.119 | 0.319 | 0.0 | 0.7 | 0.7 | 11.5 | Flood Risk |
| 30 min Winter | 31.208 | 0.408 | 0.0 | 0.8 | 0.8 | 14.7 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 11.9 | 18 |
| 30 min Summer | 91.435 | 0.0 | 15.6 | 33 |
| 60 min Summer | 57.005 | 0.0 | 19.5 | 62 |
| 120 min Summer | 34.324 | 0.0 | 23.4 | 120 |
| 180 min Summer | 25.168 | 0.0 | 25.8 | 156 |
| 240 min Summer | 20.074 | 0.0 | 27.4 | 188 |
| 360 min Summer | 14.562 | 0.0 | 29.8 | 252 |
| 480 min Summer | 11.594 | 0.0 | 31.7 | 322 |
| 600 min Summer | 9.707 | 0.0 | 33.2 | 390 |
| 720 min Summer | 8.393 | 0.0 | 34.4 | 458 |
| 960 min Summer | 6.666 | 0.0 | 36.4 | 594 |
| 1440 min Summer | 4.811 | 0.0 | 39.4 | 854 |
| 2160 min Summer | 3.466 | 0.0 | 42.7 | 1236 |
| 2880 min Summer | 2.744 | 0.0 | 45.0 | 1612 |
| 4320 min Summer | 1.972 | 0.0 | 48.5 | 2332 |
| 5760 min Summer | 1.558 | 0.0 | 51.1 | 3056 |
| 7200 min Summer | 1.297 | 0.0 | 53.2 | 3752 |
| 8640 min Summer | 1.117 | 0.0 | 55.0 | 4488 |
| 10080 min Summer | 0.983 | 0.0 | 56.5 | 5152 |
| 15 min Winter | 139.635 | 0.0 | 11.9 | 18 |
| 30 min Winter | 91.435 | 0.0 | 15.6 | 32 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.286 | 0.486 | 0.0 | 0.9 | 0.9 | 17.5 | Flood Risk |
| 120 min Winter | 31.336 | 0.536 | 0.0 | 0.9 | 0.9 | 19.3 | Flood Risk |
| 180 min Winter | 31.342 | 0.542 | 0.0 | 0.9 | 0.9 | 19.5 | Flood Risk |
| 240 min Winter | 31.337 | 0.537 | 0.0 | 0.9 | 0.9 | 19.3 | Flood Risk |
| 360 min Winter | 31.321 | 0.521 | 0.0 | 0.9 | 0.9 | 18.7 | Flood Risk |
| 480 min Winter | 31.298 | 0.498 | 0.0 | 0.9 | 0.9 | 17.9 | Flood Risk |
| 600 min Winter | 31.274 | 0.474 | 0.0 | 0.9 | 0.9 | 17.1 | Flood Risk |
| 720 min Winter | 31.249 | 0.449 | 0.0 | 0.9 | 0.9 | 16.2 | Flood Risk |
| 960 min Winter | 31.203 | 0.403 | 0.0 | 0.8 | 0.8 | 14.5 | Flood Risk |
| 1440 min Winter | 31.125 | 0.325 | 0.0 | 0.7 | 0.7 | 11.7 | Flood Risk |
| 2160 min Winter | 31.043 | 0.243 | 0.0 | 0.6 | 0.6 | 8.8 | O K |
| 2880 min Winter | 30.988 | 0.188 | 0.0 | 0.5 | 0.5 | 6.8 | O K |
| 4320 min Winter | 30.922 | 0.122 | 0.0 | 0.4 | 0.4 | 4.4 | O K |
| 5760 min Winter | 30.887 | 0.087 | 0.0 | 0.4 | 0.4 | 3.1 | O K |
| 7200 min Winter | 30.866 | 0.066 | 0.0 | 0.3 | 0.3 | 2.4 | O K |
| 8640 min Winter | 30.853 | 0.053 | 0.0 | 0.3 | 0.3 | 1.9 | O K |
| 10080 min Winter | 30.845 | 0.045 | 0.0 | 0.2 | 0.2 | 1.6 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 19.5 | 60 |
| 120 min Winter | 34.324 | 0.0 | 23.4 | 118 |
| 180 min Winter | 25.168 | 0.0 | 25.8 | 170 |
| 240 min Winter | 20.074 | 0.0 | 27.4 | 192 |
| 360 min Winter | 14.562 | 0.0 | 29.8 | 268 |
| 480 min Winter | 11.594 | 0.0 | 31.7 | 344 |
| 600 min Winter | 9.707 | 0.0 | 33.2 | 418 |
| 720 min Winter | 8.393 | 0.0 | 34.4 | 492 |
| 960 min Winter | 6.666 | 0.0 | 36.4 | 634 |
| 1440 min Winter | 4.811 | 0.0 | 39.4 | 896 |
| 2160 min Winter | 3.466 | 0.0 | 42.7 | 1280 |
| 2880 min Winter | 2.744 | 0.0 | 45.0 | 1644 |
| 4320 min Winter | 1.972 | 0.0 | 48.5 | 2376 |
| 5760 min Winter | 1.558 | 0.0 | 51.1 | 3056 |
| 7200 min Winter | 1.297 | 0.0 | 53.2 | 3752 |
| 8640 min Winter | 1.117 | 0.0 | 55.0 | 4496 |
| 10080 min Winter | 0.983 | 0.0 | 56.5 | 5144 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.038

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.038 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 30 year Return Period

Half Drain Time : 150 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.983 | 0.183 | 0.0 | 0.5 | 0.5 | 6.6 | O K |
| 30 min Summer | 31.030 | 0.230 | 0.0 | 0.6 | 0.6 | 8.3 | O K |
| 60 min Summer | 31.069 | 0.269 | 0.0 | 0.7 | 0.7 | 9.7 | O K |
| 120 min Summer | 31.089 | 0.289 | 0.0 | 0.7 | 0.7 | 10.4 | O K |
| 180 min Summer | 31.092 | 0.292 | 0.0 | 0.7 | 0.7 | 10.5 | O K |
| 240 min Summer | 31.091 | 0.291 | 0.0 | 0.7 | 0.7 | 10.5 | O K |
| 360 min Summer | 31.083 | 0.283 | 0.0 | 0.7 | 0.7 | 10.2 | O K |
| 480 min Summer | 31.072 | 0.272 | 0.0 | 0.7 | 0.7 | 9.8 | O K |
| 600 min Summer | 31.061 | 0.261 | 0.0 | 0.7 | 0.7 | 9.4 | O K |
| 720 min Summer | 31.049 | 0.249 | 0.0 | 0.6 | 0.6 | 9.0 | O K |
| 960 min Summer | 31.027 | 0.227 | 0.0 | 0.6 | 0.6 | 8.2 | O K |
| 1440 min Summer | 30.991 | 0.191 | 0.0 | 0.6 | 0.6 | 6.9 | O K |
| 2160 min Summer | 30.952 | 0.152 | 0.0 | 0.5 | 0.5 | 5.5 | O K |
| 2880 min Summer | 30.924 | 0.124 | 0.0 | 0.4 | 0.4 | 4.5 | O K |
| 4320 min Summer | 30.889 | 0.089 | 0.0 | 0.4 | 0.4 | 3.2 | O K |
| 5760 min Summer | 30.869 | 0.069 | 0.0 | 0.3 | 0.3 | 2.5 | O K |
| 7200 min Summer | 30.855 | 0.055 | 0.0 | 0.3 | 0.3 | 2.0 | O K |
| 8640 min Summer | 30.847 | 0.047 | 0.0 | 0.2 | 0.2 | 1.7 | O K |
| 10080 min Summer | 30.841 | 0.041 | 0.0 | 0.2 | 0.2 | 1.5 | O K |
| 15 min Winter | 30.983 | 0.183 | 0.0 | 0.5 | 0.5 | 6.6 | O K |
| 30 min Winter | 31.031 | 0.231 | 0.0 | 0.6 | 0.6 | 8.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 6.8 | 18 |
| 30 min Summer | 49.886 | 0.0 | 8.9 | 33 |
| 60 min Summer | 30.968 | 0.0 | 11.1 | 62 |
| 120 min Summer | 18.658 | 0.0 | 13.4 | 110 |
| 180 min Summer | 13.726 | 0.0 | 14.8 | 140 |
| 240 min Summer | 10.992 | 0.0 | 15.8 | 172 |
| 360 min Summer | 8.021 | 0.0 | 17.3 | 242 |
| 480 min Summer | 6.411 | 0.0 | 18.4 | 310 |
| 600 min Summer | 5.385 | 0.0 | 19.3 | 378 |
| 720 min Summer | 4.668 | 0.0 | 20.1 | 446 |
| 960 min Summer | 3.724 | 0.0 | 21.4 | 578 |
| 1440 min Summer | 2.706 | 0.0 | 23.3 | 836 |
| 2160 min Summer | 1.964 | 0.0 | 25.4 | 1208 |
| 2880 min Summer | 1.563 | 0.0 | 27.0 | 1560 |
| 4320 min Summer | 1.132 | 0.0 | 29.3 | 2292 |
| 5760 min Summer | 0.900 | 0.0 | 31.1 | 3000 |
| 7200 min Summer | 0.753 | 0.0 | 32.5 | 3680 |
| 8640 min Summer | 0.651 | 0.0 | 33.7 | 4416 |
| 10080 min Summer | 0.575 | 0.0 | 34.7 | 5144 |
| 15 min Winter | 76.822 | 0.0 | 6.8 | 18 |
| 30 min Winter | 49.886 | 0.0 | 8.9 | 32 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.070 | 0.270 | 0.0 | 0.7 | 0.7 | 9.7 | O K |
| 120 min Winter | 31.091 | 0.291 | 0.0 | 0.7 | 0.7 | 10.5 | O K |
| 180 min Winter | 31.091 | 0.291 | 0.0 | 0.7 | 0.7 | 10.5 | O K |
| 240 min Winter | 31.088 | 0.288 | 0.0 | 0.7 | 0.7 | 10.4 | O K |
| 360 min Winter | 31.075 | 0.275 | 0.0 | 0.7 | 0.7 | 9.9 | O K |
| 480 min Winter | 31.059 | 0.259 | 0.0 | 0.6 | 0.6 | 9.3 | O K |
| 600 min Winter | 31.043 | 0.243 | 0.0 | 0.6 | 0.6 | 8.7 | O K |
| 720 min Winter | 31.027 | 0.227 | 0.0 | 0.6 | 0.6 | 8.2 | O K |
| 960 min Winter | 30.999 | 0.199 | 0.0 | 0.6 | 0.6 | 7.2 | O K |
| 1440 min Winter | 30.955 | 0.155 | 0.0 | 0.5 | 0.5 | 5.6 | O K |
| 2160 min Winter | 30.912 | 0.112 | 0.0 | 0.4 | 0.4 | 4.0 | O K |
| 2880 min Winter | 30.885 | 0.085 | 0.0 | 0.4 | 0.4 | 3.1 | O K |
| 4320 min Winter | 30.856 | 0.056 | 0.0 | 0.3 | 0.3 | 2.0 | O K |
| 5760 min Winter | 30.842 | 0.042 | 0.0 | 0.2 | 0.2 | 1.5 | O K |
| 7200 min Winter | 30.835 | 0.035 | 0.0 | 0.2 | 0.2 | 1.2 | O K |
| 8640 min Winter | 30.831 | 0.031 | 0.0 | 0.2 | 0.2 | 1.1 | O K |
| 10080 min Winter | 30.829 | 0.029 | 0.0 | 0.1 | 0.1 | 1.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 11.1 | 60 |
| 120 min Winter | 18.658 | 0.0 | 13.4 | 114 |
| 180 min Winter | 13.726 | 0.0 | 14.8 | 144 |
| 240 min Winter | 10.992 | 0.0 | 15.8 | 182 |
| 360 min Winter | 8.021 | 0.0 | 17.3 | 258 |
| 480 min Winter | 6.411 | 0.0 | 18.4 | 332 |
| 600 min Winter | 5.385 | 0.0 | 19.3 | 404 |
| 720 min Winter | 4.668 | 0.0 | 20.1 | 472 |
| 960 min Winter | 3.724 | 0.0 | 21.4 | 608 |
| 1440 min Winter | 2.706 | 0.0 | 23.3 | 866 |
| 2160 min Winter | 1.964 | 0.0 | 25.4 | 1236 |
| 2880 min Winter | 1.563 | 0.0 | 27.0 | 1588 |
| 4320 min Winter | 1.132 | 0.0 | 29.3 | 2292 |
| 5760 min Winter | 0.900 | 0.0 | 31.1 | 3000 |
| 7200 min Winter | 0.753 | 0.0 | 32.5 | 3672 |
| 8640 min Winter | 0.651 | 0.0 | 33.7 | 4400 |
| 10080 min Winter | 0.575 | 0.0 | 34.8 | 5152 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.040

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.040 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 100 year Return Period

Half Drain Time : 177 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 31.038 | 0.238 | 0.0 | 0.6 | 0.6 | 8.6 | O K |
| 30 min Summer | 31.104 | 0.304 | 0.0 | 0.7 | 0.7 | 10.9 | Flood Risk |
| 60 min Summer | 31.159 | 0.359 | 0.0 | 0.8 | 0.8 | 12.9 | Flood Risk |
| 120 min Summer | 31.190 | 0.390 | 0.0 | 0.8 | 0.8 | 14.0 | Flood Risk |
| 180 min Summer | 31.193 | 0.393 | 0.0 | 0.8 | 0.8 | 14.2 | Flood Risk |
| 240 min Summer | 31.191 | 0.391 | 0.0 | 0.8 | 0.8 | 14.1 | Flood Risk |
| 360 min Summer | 31.181 | 0.381 | 0.0 | 0.8 | 0.8 | 13.7 | Flood Risk |
| 480 min Summer | 31.167 | 0.367 | 0.0 | 0.8 | 0.8 | 13.2 | Flood Risk |
| 600 min Summer | 31.152 | 0.352 | 0.0 | 0.8 | 0.8 | 12.7 | Flood Risk |
| 720 min Summer | 31.137 | 0.337 | 0.0 | 0.7 | 0.7 | 12.1 | Flood Risk |
| 960 min Summer | 31.109 | 0.309 | 0.0 | 0.7 | 0.7 | 11.1 | Flood Risk |
| 1440 min Summer | 31.061 | 0.261 | 0.0 | 0.7 | 0.7 | 9.4 | O K |
| 2160 min Summer | 31.009 | 0.209 | 0.0 | 0.6 | 0.6 | 7.5 | O K |
| 2880 min Summer | 30.972 | 0.172 | 0.0 | 0.5 | 0.5 | 6.2 | O K |
| 4320 min Summer | 30.923 | 0.123 | 0.0 | 0.4 | 0.4 | 4.4 | O K |
| 5760 min Summer | 30.894 | 0.094 | 0.0 | 0.4 | 0.4 | 3.4 | O K |
| 7200 min Summer | 30.875 | 0.075 | 0.0 | 0.3 | 0.3 | 2.7 | O K |
| 8640 min Summer | 30.862 | 0.062 | 0.0 | 0.3 | 0.3 | 2.2 | O K |
| 10080 min Summer | 30.853 | 0.053 | 0.0 | 0.3 | 0.3 | 1.9 | O K |
| 15 min Winter | 31.039 | 0.239 | 0.0 | 0.6 | 0.6 | 8.6 | O K |
| 30 min Winter | 31.104 | 0.304 | 0.0 | 0.7 | 0.7 | 11.0 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 8.9 | 18 |
| 30 min Summer | 65.311 | 0.0 | 11.7 | 33 |
| 60 min Summer | 40.718 | 0.0 | 14.6 | 62 |
| 120 min Summer | 24.517 | 0.0 | 17.6 | 120 |
| 180 min Summer | 17.977 | 0.0 | 19.4 | 148 |
| 240 min Summer | 14.339 | 0.0 | 20.6 | 178 |
| 360 min Summer | 10.402 | 0.0 | 22.4 | 246 |
| 480 min Summer | 8.281 | 0.0 | 23.8 | 314 |
| 600 min Summer | 6.934 | 0.0 | 24.9 | 384 |
| 720 min Summer | 5.995 | 0.0 | 25.9 | 450 |
| 960 min Summer | 4.761 | 0.0 | 27.4 | 586 |
| 1440 min Summer | 3.436 | 0.0 | 29.6 | 840 |
| 2160 min Summer | 2.476 | 0.0 | 32.1 | 1212 |
| 2880 min Summer | 1.960 | 0.0 | 33.8 | 1584 |
| 4320 min Summer | 1.408 | 0.0 | 36.5 | 2292 |
| 5760 min Summer | 1.113 | 0.0 | 38.4 | 3000 |
| 7200 min Summer | 0.927 | 0.0 | 40.0 | 3744 |
| 8640 min Summer | 0.798 | 0.0 | 41.3 | 4416 |
| 10080 min Summer | 0.702 | 0.0 | 42.4 | 5144 |
| 15 min Winter | 99.739 | 0.0 | 8.9 | 18 |
| 30 min Winter | 65.311 | 0.0 | 11.7 | 32 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.160 | 0.360 | 0.0 | 0.8 | 0.8 | 13.0 | Flood Risk |
| 120 min Winter | 31.193 | 0.393 | 0.0 | 0.8 | 0.8 | 14.1 | Flood Risk |
| 180 min Winter | 31.193 | 0.393 | 0.0 | 0.8 | 0.8 | 14.2 | Flood Risk |
| 240 min Winter | 31.189 | 0.389 | 0.0 | 0.8 | 0.8 | 14.0 | Flood Risk |
| 360 min Winter | 31.173 | 0.373 | 0.0 | 0.8 | 0.8 | 13.4 | Flood Risk |
| 480 min Winter | 31.153 | 0.353 | 0.0 | 0.8 | 0.8 | 12.7 | Flood Risk |
| 600 min Winter | 31.133 | 0.333 | 0.0 | 0.7 | 0.7 | 12.0 | Flood Risk |
| 720 min Winter | 31.113 | 0.313 | 0.0 | 0.7 | 0.7 | 11.3 | Flood Risk |
| 960 min Winter | 31.076 | 0.276 | 0.0 | 0.7 | 0.7 | 9.9 | O K |
| 1440 min Winter | 31.018 | 0.218 | 0.0 | 0.6 | 0.6 | 7.8 | O K |
| 2160 min Winter | 30.959 | 0.159 | 0.0 | 0.5 | 0.5 | 5.7 | O K |
| 2880 min Winter | 30.921 | 0.121 | 0.0 | 0.4 | 0.4 | 4.3 | O K |
| 4320 min Winter | 30.878 | 0.078 | 0.0 | 0.3 | 0.3 | 2.8 | O K |
| 5760 min Winter | 30.856 | 0.056 | 0.0 | 0.3 | 0.3 | 2.0 | O K |
| 7200 min Winter | 30.844 | 0.044 | 0.0 | 0.2 | 0.2 | 1.6 | O K |
| 8640 min Winter | 30.836 | 0.036 | 0.0 | 0.2 | 0.2 | 1.3 | O K |
| 10080 min Winter | 30.833 | 0.033 | 0.0 | 0.2 | 0.2 | 1.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 14.6 | 60 |
| 120 min Winter | 24.517 | 0.0 | 17.6 | 116 |
| 180 min Winter | 17.977 | 0.0 | 19.4 | 152 |
| 240 min Winter | 14.339 | 0.0 | 20.6 | 186 |
| 360 min Winter | 10.402 | 0.0 | 22.4 | 264 |
| 480 min Winter | 8.281 | 0.0 | 23.8 | 338 |
| 600 min Winter | 6.934 | 0.0 | 24.9 | 410 |
| 720 min Winter | 5.995 | 0.0 | 25.9 | 482 |
| 960 min Winter | 4.761 | 0.0 | 27.4 | 618 |
| 1440 min Winter | 3.436 | 0.0 | 29.6 | 880 |
| 2160 min Winter | 2.476 | 0.0 | 32.1 | 1256 |
| 2880 min Winter | 1.960 | 0.0 | 33.8 | 1616 |
| 4320 min Winter | 1.408 | 0.0 | 36.5 | 2332 |
| 5760 min Winter | 1.113 | 0.0 | 38.4 | 3024 |
| 7200 min Winter | 0.927 | 0.0 | 40.0 | 3744 |
| 8640 min Winter | 0.798 | 0.0 | 41.3 | 4408 |
| 10080 min Winter | 0.702 | 0.0 | 42.4 | 5136 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +0 |

## Time Area Diagram

Total Area (ha) 0.040

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.040 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

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

Half Drain Time : 219 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 31.136 | 0.336 | 0.0 | 0.7 | 0.7 | 12.1 | Flood Risk |
| 30 min Summer | 31.229 | 0.429 | 0.0 | 0.8 | 0.8 | 15.5 | Flood Risk |
| 60 min Summer | 31.312 | 0.512 | 0.0 | 0.9 | 0.9 | 18.4 | Flood Risk |
| 120 min Summer | 31.364 | 0.564 | 0.0 | 1.0 | 1.0 | 20.3 | Flood Risk |
| 180 min Summer | 31.371 | 0.571 | 0.0 | 1.0 | 1.0 | 20.6 | Flood Risk |
| 240 min Summer | 31.369 | 0.569 | 0.0 | 1.0 | 1.0 | 20.5 | Flood Risk |
| 360 min Summer | 31.359 | 0.559 | 0.0 | 1.0 | 1.0 | 20.1 | Flood Risk |
| 480 min Summer | 31.343 | 0.543 | 0.0 | 1.0 | 1.0 | 19.6 | Flood Risk |
| 600 min Summer | 31.325 | 0.525 | 0.0 | 0.9 | 0.9 | 18.9 | Flood Risk |
| 720 min Summer | 31.307 | 0.507 | 0.0 | 0.9 | 0.9 | 18.3 | Flood Risk |
| 960 min Summer | 31.270 | 0.470 | 0.0 | 0.9 | 0.9 | 16.9 | Flood Risk |
| 1440 min Summer | 31.206 | 0.406 | 0.0 | 0.8 | 0.8 | 14.6 | Flood Risk |
| 2160 min Summer | 31.132 | 0.332 | 0.0 | 0.7 | 0.7 | 12.0 | Flood Risk |
| 2880 min Summer | 31.077 | 0.277 | 0.0 | 0.7 | 0.7 | 10.0 | O K |
| 4320 min Summer | 31.003 | 0.203 | 0.0 | 0.6 | 0.6 | 7.3 | O K |
| 5760 min Summer | 30.956 | 0.156 | 0.0 | 0.5 | 0.5 | 5.6 | O K |
| 7200 min Summer | 30.925 | 0.125 | 0.0 | 0.4 | 0.4 | 4.5 | O K |
| 8640 min Summer | 30.903 | 0.103 | 0.0 | 0.4 | 0.4 | 3.7 | O K |
| 10080 min Summer | 30.886 | 0.086 | 0.0 | 0.4 | 0.4 | 3.1 | O K |
| 15 min Winter | 31.136 | 0.336 | 0.0 | 0.7 | 0.7 | 12.1 | Flood Risk |
| 30 min Winter | 31.230 | 0.430 | 0.0 | 0.8 | 0.8 | 15.5 | Flood Risk |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 12.5 | 18 |
| 30 min Summer | 91.435 | 0.0 | 16.4 | 33 |
| 60 min Summer | 57.005 | 0.0 | 20.5 | 62 |
| 120 min Summer | 34.324 | 0.0 | 24.7 | 120 |
| 180 min Summer | 25.168 | 0.0 | 27.1 | 158 |
| 240 min Summer | 20.074 | 0.0 | 28.9 | 190 |
| 360 min Summer | 14.562 | 0.0 | 31.4 | 254 |
| 480 min Summer | 11.594 | 0.0 | 33.3 | 322 |
| 600 min Summer | 9.707 | 0.0 | 34.9 | 392 |
| 720 min Summer | 8.393 | 0.0 | 36.2 | 460 |
| 960 min Summer | 6.666 | 0.0 | 38.3 | 596 |
| 1440 min Summer | 4.811 | 0.0 | 41.5 | 854 |
| 2160 min Summer | 3.466 | 0.0 | 44.9 | 1236 |
| 2880 min Summer | 2.744 | 0.0 | 47.4 | 1612 |
| 4320 min Summer | 1.972 | 0.0 | 51.1 | 2336 |
| 5760 min Summer | 1.558 | 0.0 | 53.8 | 3056 |
| 7200 min Summer | 1.297 | 0.0 | 56.0 | 3752 |
| 8640 min Summer | 1.117 | 0.0 | 57.9 | 4496 |
| 10080 min Summer | 0.983 | 0.0 | 59.4 | 5152 |
| 15 min Winter | 139.635 | 0.0 | 12.5 | 18 |
| 30 min Winter | 91.435 | 0.0 | 16.4 | 32 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.312 | 0.512 | 0.0 | 0.9 | 0.9 | 18.4 | Flood Risk |
| 120 min Winter | 31.367 | 0.567 | 0.0 | 1.0 | 1.0 | 20.4 | Flood Risk |
| 180 min Winter | 31.375 | 0.575 | 0.0 | 1.0 | 1.0 | 20.7 | Flood Risk |
| 240 min Winter | 31.369 | 0.569 | 0.0 | 1.0 | 1.0 | 20.5 | Flood Risk |
| 360 min Winter | 31.353 | 0.553 | 0.0 | 1.0 | 1.0 | 19.9 | Flood Risk |
| 480 min Winter | 31.330 | 0.530 | 0.0 | 0.9 | 0.9 | 19.1 | Flood Risk |
| 600 min Winter | 31.305 | 0.505 | 0.0 | 0.9 | 0.9 | 18.2 | Flood Risk |
| 720 min Winter | 31.279 | 0.479 | 0.0 | 0.9 | 0.9 | 17.3 | Flood Risk |
| 960 min Winter | 31.231 | 0.431 | 0.0 | 0.8 | 0.8 | 15.5 | Flood Risk |
| 1440 min Winter | 31.149 | 0.349 | 0.0 | 0.8 | 0.8 | 12.6 | Flood Risk |
| 2160 min Winter | 31.062 | 0.262 | 0.0 | 0.7 | 0.7 | 9.4 | O K |
| 2880 min Winter | 31.004 | 0.204 | 0.0 | 0.6 | 0.6 | 7.3 | O K |
| 4320 min Winter | 30.933 | 0.133 | 0.0 | 0.5 | 0.5 | 4.8 | O K |
| 5760 min Winter | 30.895 | 0.095 | 0.0 | 0.4 | 0.4 | 3.4 | O K |
| 7200 min Winter | 30.872 | 0.072 | 0.0 | 0.3 | 0.3 | 2.6 | O K |
| 8640 min Winter | 30.858 | 0.058 | 0.0 | 0.3 | 0.3 | 2.1 | O K |
| 10080 min Winter | 30.848 | 0.048 | 0.0 | 0.2 | 0.2 | 1.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 20.5 | 60 |
| 120 min Winter | 34.324 | 0.0 | 24.7 | 118 |
| 180 min Winter | 25.168 | 0.0 | 27.1 | 170 |
| 240 min Winter | 20.074 | 0.0 | 28.9 | 194 |
| 360 min Winter | 14.562 | 0.0 | 31.4 | 270 |
| 480 min Winter | 11.594 | 0.0 | 33.3 | 346 |
| 600 min Winter | 9.707 | 0.0 | 34.9 | 420 |
| 720 min Winter | 8.393 | 0.0 | 36.2 | 492 |
| 960 min Winter | 6.666 | 0.0 | 38.3 | 634 |
| 1440 min Winter | 4.811 | 0.0 | 41.5 | 906 |
| 2160 min Winter | 3.466 | 0.0 | 44.9 | 1280 |
| 2880 min Winter | 2.744 | 0.0 | 47.4 | 1648 |
| 4320 min Winter | 1.972 | 0.0 | 51.1 | 2376 |
| 5760 min Winter | 1.558 | 0.0 | 53.8 | 3064 |
| 7200 min Winter | 1.297 | 0.0 | 56.0 | 3752 |
| 8640 min Winter | 1.117 | 0.0 | 57.9 | 4488 |
| 10080 min Winter | 0.983 | 0.0 | 59.4 | 5240 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.040

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.040 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.600 | 120.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 1 year Return Period

Half Drain Time : 797 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.687 | 0.087 | 0.0 | 0.0 | 0.0 | 4.2 | O K |
| 30 min Summer | 30.713 | 0.113 | 0.0 | 0.0 | 0.0 | 5.4 | O K |
| 60 min Summer | 30.742 | 0.142 | 0.0 | 0.0 | 0.0 | 6.8 | O K |
| 120 min Summer | 30.776 | 0.176 | 0.0 | 0.0 | 0.0 | 8.5 | O K |
| 180 min Summer | 30.799 | 0.199 | 0.0 | 0.0 | 0.0 | 9.5 | O K |
| 240 min Summer | 30.815 | 0.215 | 0.0 | 0.1 | 0.1 | 10.3 | O K |
| 360 min Summer | 30.828 | 0.228 | 0.0 | 0.1 | 0.1 | 10.9 | O K |
| 480 min Summer | 30.831 | 0.231 | 0.0 | 0.2 | 0.2 | 11.1 | O K |
| 600 min Summer | 30.833 | 0.233 | 0.0 | 0.2 | 0.2 | 11.2 | O K |
| 720 min Summer | 30.836 | 0.236 | 0.0 | 0.2 | 0.2 | 11.3 | O K |
| 960 min Summer | 30.841 | 0.241 | 0.0 | 0.2 | 0.2 | 11.6 | O K |
| 1440 min Summer | 30.848 | 0.248 | 0.0 | 0.2 | 0.2 | 11.9 | O K |
| 2160 min Summer | 30.850 | 0.250 | 0.0 | 0.3 | 0.3 | 12.0 | O K |
| 2880 min Summer | 30.850 | 0.250 | 0.0 | 0.3 | 0.3 | 12.0 | O K |
| 4320 min Summer | 30.846 | 0.246 | 0.0 | 0.2 | 0.2 | 11.8 | O K |
| 5760 min Summer | 30.842 | 0.242 | 0.0 | 0.2 | 0.2 | 11.6 | O K |
| 7200 min Summer | 30.838 | 0.238 | 0.0 | 0.2 | 0.2 | 11.4 | O K |
| 8640 min Summer | 30.835 | 0.235 | 0.0 | 0.2 | 0.2 | 11.3 | O K |
| 10080 min Summer | 30.833 | 0.233 | 0.0 | 0.2 | 0.2 | 11.2 | O K |
| 15 min Winter | 30.687 | 0.087 | 0.0 | 0.0 | 0.0 | 4.2 | O K |
| 30 min Winter | 30.713 | 0.113 | 0.0 | 0.0 | 0.0 | 5.4 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 31.306 | 0.0 | 0.0 | 19 |
| 30 min Summer | 20.382 | 0.0 | 0.0 | 34 |
| 60 min Summer | 12.872 | 0.0 | 0.0 | 64 |
| 120 min Summer | 7.964 | 0.0 | 0.0 | 124 |
| 180 min Summer | 5.985 | 0.0 | 0.0 | 184 |
| 240 min Summer | 4.881 | 0.0 | 0.7 | 244 |
| 360 min Summer | 3.639 | 0.0 | 1.9 | 360 |
| 480 min Summer | 2.946 | 0.0 | 2.9 | 436 |
| 600 min Summer | 2.501 | 0.0 | 3.6 | 468 |
| 720 min Summer | 2.188 | 0.0 | 4.3 | 514 |
| 960 min Summer | 1.771 | 0.0 | 5.4 | 638 |
| 1440 min Summer | 1.316 | 0.0 | 7.1 | 896 |
| 2160 min Summer | 0.978 | 0.0 | 9.1 | 1276 |
| 2880 min Summer | 0.792 | 0.0 | 10.5 | 1644 |
| 4320 min Summer | 0.587 | 0.0 | 12.8 | 2340 |
| 5760 min Summer | 0.476 | 0.0 | 14.6 | 3056 |
| 7200 min Summer | 0.404 | 0.0 | 16.1 | 3744 |
| 8640 min Summer | 0.354 | 0.0 | 17.4 | 4408 |
| 10080 min Summer | 0.316 | 0.0 | 18.5 | 5136 |
| 15 min Winter | 31.306 | 0.0 | 0.0 | 19 |
| 30 min Winter | 20.382 | 0.0 | 0.0 | 34 |

## Summary of Results for 1 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.742 | 0.142 | 0.0 | 0.0 | 0.0 | 6.8 | O K |
| 120 min Winter | 30.776 | 0.176 | 0.0 | 0.0 | 0.0 | 8.5 | O K |
| 180 min Winter | 30.799 | 0.199 | 0.0 | 0.0 | 0.0 | 9.5 | O K |
| 240 min Winter | 30.815 | 0.215 | 0.0 | 0.1 | 0.1 | 10.3 | O K |
| 360 min Winter | 30.829 | 0.229 | 0.0 | 0.1 | 0.1 | 11.0 | O K |
| 480 min Winter | 30.833 | 0.233 | 0.0 | 0.2 | 0.2 | 11.2 | O K |
| 600 min Winter | 30.835 | 0.235 | 0.0 | 0.2 | 0.2 | 11.3 | O K |
| 720 min Winter | 30.839 | 0.239 | 0.0 | 0.2 | 0.2 | 11.5 | O K |
| 960 min Winter | 30.843 | 0.243 | 0.0 | 0.2 | 0.2 | 11.7 | O K |
| 1440 min Winter | 30.846 | 0.246 | 0.0 | 0.2 | 0.2 | 11.8 | O K |
| 2160 min Winter | 30.845 | 0.245 | 0.0 | 0.2 | 0.2 | 11.7 | O K |
| 2880 min Winter | 30.841 | 0.241 | 0.0 | 0.2 | 0.2 | 11.6 | O K |
| 4320 min Winter | 30.835 | 0.235 | 0.0 | 0.2 | 0.2 | 11.3 | O K |
| 5760 min Winter | 30.832 | 0.232 | 0.0 | 0.2 | 0.2 | 11.1 | O K |
| 7200 min Winter | 30.829 | 0.229 | 0.0 | 0.1 | 0.1 | 11.0 | O K |
| 8640 min Winter | 30.827 | 0.227 | 0.0 | 0.1 | 0.1 | 10.9 | O K |
| 10080 min Winter | 30.825 | 0.225 | 0.0 | 0.1 | 0.1 | 10.8 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 12.872 | 0.0 | 0.0 | 64 |
| 120 min Winter | 7.964 | 0.0 | 0.0 | 124 |
| 180 min Winter | 5.985 | 0.0 | 0.0 | 184 |
| 240 min Winter | 4.881 | 0.0 | 0.7 | 240 |
| 360 min Winter | 3.639 | 0.0 | 1.9 | 350 |
| 480 min Winter | 2.946 | 0.0 | 2.9 | 448 |
| 600 min Winter | 2.501 | 0.0 | 3.6 | 468 |
| 720 min Winter | 2.188 | 0.0 | 4.3 | 536 |
| 960 min Winter | 1.771 | 0.0 | 5.4 | 682 |
| 1440 min Winter | 1.316 | 0.0 | 7.1 | 952 |
| 2160 min Winter | 0.978 | 0.0 | 9.1 | 1340 |
| 2880 min Winter | 0.792 | 0.0 | 10.5 | 1704 |
| 4320 min Winter | 0.587 | 0.0 | 12.8 | 2380 |
| 5760 min Winter | 0.476 | 0.0 | 14.6 | 3064 |
| 7200 min Winter | 0.404 | 0.0 | 16.1 | 3768 |
| 8640 min Winter | 0.354 | 0.0 | 17.4 | 4416 |
| 10080 min Winter | 0.316 | 0.0 | 18.5 | 5096 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 1 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | 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 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 160.0 | 0.0 | 0.800 | 160.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 30 year Return Period

Half Drain Time : 543 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.812 | 0.212 | 0.0 | 0.0 | 0.0 | 10.2 | O K |
| 30 min Summer | 30.872 | 0.272 | 0.0 | 0.3 | 0.3 | 13.0 | O K |
| 60 min Summer | 30.929 | 0.329 | 0.0 | 0.4 | 0.4 | 15.8 | O K |
| 120 min Summer | 30.978 | 0.378 | 0.0 | 0.5 | 0.5 | 18.1 | O K |
| 180 min Summer | 30.998 | 0.398 | 0.0 | 0.6 | 0.6 | 19.1 | O K |
| 240 min Summer | 31.007 | 0.407 | 0.0 | 0.6 | 0.6 | 19.5 | O K |
| 360 min Summer | 31.018 | 0.418 | 0.0 | 0.6 | 0.6 | 20.0 | O K |
| 480 min Summer | 31.025 | 0.425 | 0.0 | 0.6 | 0.6 | 20.4 | O K |
| 600 min Summer | 31.029 | 0.429 | 0.0 | 0.6 | 0.6 | 20.6 | O K |
| 720 min Summer | 31.031 | 0.431 | 0.0 | 0.6 | 0.6 | 20.7 | O K |
| 960 min Summer | 31.031 | 0.431 | 0.0 | 0.6 | 0.6 | 20.7 | O K |
| 1440 min Summer | 31.021 | 0.421 | 0.0 | 0.6 | 0.6 | 20.2 | O K |
| 2160 min Summer | 31.000 | 0.400 | 0.0 | 0.6 | 0.6 | 19.2 | O K |
| 2880 min Summer | 30.977 | 0.377 | 0.0 | 0.5 | 0.5 | 18.1 | O K |
| 4320 min Summer | 30.940 | 0.340 | 0.0 | 0.5 | 0.5 | 16.3 | O K |
| 5760 min Summer | 30.912 | 0.312 | 0.0 | 0.4 | 0.4 | 15.0 | O K |
| 7200 min Summer | 30.892 | 0.292 | 0.0 | 0.4 | 0.4 | 14.0 | O K |
| 8640 min Summer | 30.877 | 0.277 | 0.0 | 0.3 | 0.3 | 13.3 | O K |
| 10080 min Summer | 30.866 | 0.266 | 0.0 | 0.3 | 0.3 | 12.8 | O K |
| 15 min Winter | 30.812 | 0.212 | 0.0 | 0.0 | 0.0 | 10.2 | O K |
| 30 min Winter | 30.872 | 0.272 | 0.0 | 0.3 | 0.3 | 13.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 76.822 | 0.0 | 0.5 | 19 |
| 30 min Summer | 49.886 | 0.0 | 3.5 | 33 |
| 60 min Summer | 30.968 | 0.0 | 6.8 | 62 |
| 120 min Summer | 18.658 | 0.0 | 10.2 | 122 |
| 180 min Summer | 13.726 | 0.0 | 12.2 | 180 |
| 240 min Summer | 10.992 | 0.0 | 13.7 | 226 |
| 360 min Summer | 8.021 | 0.0 | 15.9 | 280 |
| 480 min Summer | 6.411 | 0.0 | 17.6 | 340 |
| 600 min Summer | 5.385 | 0.0 | 18.9 | 410 |
| 720 min Summer | 4.668 | 0.0 | 20.1 | 476 |
| 960 min Summer | 3.724 | 0.0 | 22.0 | 610 |
| 1440 min Summer | 2.706 | 0.0 | 24.8 | 878 |
| 2160 min Summer | 1.964 | 0.0 | 27.9 | 1256 |
| 2880 min Summer | 1.563 | 0.0 | 30.2 | 1620 |
| 4320 min Summer | 1.132 | 0.0 | 33.6 | 2336 |
| 5760 min Summer | 0.900 | 0.0 | 36.3 | 3056 |
| 7200 min Summer | 0.753 | 0.0 | 38.4 | 3752 |
| 8640 min Summer | 0.651 | 0.0 | 40.1 | 4496 |
| 10080 min Summer | 0.575 | 0.0 | 41.6 | 5240 |
| 15 min Winter | 76.822 | 0.0 | 0.5 | 19 |
| 30 min Winter | 49.886 | 0.0 | 3.5 | 33 |

## Summary of Results for 30 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 30.930 | 0.330 | 0.0 | 0.4 | 0.4 | 15.8 | O K |
| 120 min Winter | 30.980 | 0.380 | 0.0 | 0.5 | 0.5 | 18.2 | O K |
| 180 min Winter | 31.002 | 0.402 | 0.0 | 0.6 | 0.6 | 19.3 | O K |
| 240 min Winter | 31.011 | 0.411 | 0.0 | 0.6 | 0.6 | 19.7 | O K |
| 360 min Winter | 31.019 | 0.419 | 0.0 | 0.6 | 0.6 | 20.1 | O K |
| 480 min Winter | 31.024 | 0.424 | 0.0 | 0.6 | 0.6 | 20.3 | O K |
| 600 min Winter | 31.025 | 0.425 | 0.0 | 0.6 | 0.6 | 20.4 | O K |
| 720 min Winter | 31.023 | 0.423 | 0.0 | 0.6 | 0.6 | 20.3 | O K |
| 960 min Winter | 31.015 | 0.415 | 0.0 | 0.6 | 0.6 | 19.9 | O K |
| 1440 min Winter | 30.994 | 0.394 | 0.0 | 0.6 | 0.6 | 18.9 | O K |
| 2160 min Winter | 30.962 | 0.362 | 0.0 | 0.5 | 0.5 | 17.4 | O K |
| 2880 min Winter | 30.934 | 0.334 | 0.0 | 0.5 | 0.5 | 16.1 | O K |
| 4320 min Winter | 30.895 | 0.295 | 0.0 | 0.4 | 0.4 | 14.2 | O K |
| 5760 min Winter | 30.871 | 0.271 | 0.0 | 0.3 | 0.3 | 13.0 | O K |
| 7200 min Winter | 30.856 | 0.256 | 0.0 | 0.3 | 0.3 | 12.3 | O K |
| 8640 min Winter | 30.846 | 0.246 | 0.0 | 0.2 | 0.2 | 11.8 | O K |
| 10080 min Winter | 30.839 | 0.239 | 0.0 | 0.2 | 0.2 | 11.5 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 30.968 | 0.0 | 6.8 | 62 |
| 120 min Winter | 18.658 | 0.0 | 10.2 | 120 |
| 180 min Winter | 13.726 | 0.0 | 12.2 | 176 |
| 240 min Winter | 10.992 | 0.0 | 13.7 | 228 |
| 360 min Winter | 8.021 | 0.0 | 15.9 | 286 |
| 480 min Winter | 6.411 | 0.0 | 17.6 | 362 |
| 600 min Winter | 5.385 | 0.0 | 18.9 | 436 |
| 720 min Winter | 4.668 | 0.0 | 20.1 | 512 |
| 960 min Winter | 3.724 | 0.0 | 22.0 | 654 |
| 1440 min Winter | 2.706 | 0.0 | 24.8 | 926 |
| 2160 min Winter | 1.964 | 0.0 | 27.9 | 1320 |
| 2880 min Winter | 1.563 | 0.0 | 30.2 | 1696 |
| 4320 min Winter | 1.132 | 0.0 | 33.6 | 2380 |
| 5760 min Winter | 0.900 | 0.0 | 36.3 | 3112 |
| 7200 min Winter | 0.753 | 0.0 | 38.4 | 3816 |
| 8640 min Winter | 0.651 | 0.0 | 40.1 | 4496 |
| 10080 min Winter | 0.575 | 0.0 | 41.6 | 5240 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 30 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | 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 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 160.0 | 0.0 | 0.800 | 160.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

## Summary of Results for 100 year Return Period

Half Drain Time : 407 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.873 | 0.273 | 0.0 | 0.3 | 0.3 | 13.1 | O K |
| 30 min Summer | 30.953 | 0.353 | 0.0 | 0.5 | 0.5 | 16.9 | O K |
| 60 min Summer | 31.030 | 0.430 | 0.0 | 0.6 | 0.6 | 20.6 | O K |
| 120 min Summer | 31.094 | 0.494 | 0.0 | 0.7 | 0.7 | 23.7 | O K |
| 180 min Summer | 31.119 | 0.519 | 0.0 | 0.7 | 0.7 | 24.9 | Flood Risk |
| 240 min Summer | 31.128 | 0.528 | 0.0 | 0.7 | 0.7 | 25.3 | Flood Risk |
| 360 min Summer | 31.137 | 0.537 | 0.0 | 0.7 | 0.7 | 25.8 | Flood Risk |
| 480 min Summer | 31.143 | 0.543 | 0.0 | 0.8 | 0.8 | 26.1 | Flood Risk |
| 600 min Summer | 31.146 | 0.546 | 0.0 | 0.8 | 0.8 | 26.2 | Flood Risk |
| 720 min Summer | 31.146 | 0.546 | 0.0 | 0.8 | 0.8 | 26.2 | Flood Risk |
| 960 min Summer | 31.141 | 0.541 | 0.0 | 0.7 | 0.7 | 26.0 | Flood Risk |
| 1440 min Summer | 31.121 | 0.521 | 0.0 | 0.7 | 0.7 | 25.0 | Flood Risk |
| 2160 min Summer | 31.085 | 0.485 | 0.0 | 0.7 | 0.7 | 23.3 | O K |
| 2880 min Summer | 31.051 | 0.451 | 0.0 | 0.6 | 0.6 | 21.6 | O K |
| 4320 min Summer | 30.994 | 0.394 | 0.0 | 0.6 | 0.6 | 18.9 | O K |
| 5760 min Summer | 30.954 | 0.354 | 0.0 | 0.5 | 0.5 | 17.0 | O K |
| 7200 min Summer | 30.926 | 0.326 | 0.0 | 0.4 | 0.4 | 15.6 | O K |
| 8640 min Summer | 30.905 | 0.305 | 0.0 | 0.4 | 0.4 | 14.6 | O K |
| 10080 min Summer | 30.889 | 0.289 | 0.0 | 0.4 | 0.4 | 13.9 | O K |
| 15 min Winter | 30.873 | 0.273 | 0.0 | 0.3 | 0.3 | 13.1 | O K |
| 30 min Winter | 30.954 | 0.354 | 0.0 | 0.5 | 0.5 | 17.0 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 99.739 | 0.0 | 3.5 | 19 |
| 30 min Summer | 65.311 | 0.0 | 7.6 | 33 |
| 60 min Summer | 40.718 | 0.0 | 12.0 | 62 |
| 120 min Summer | 24.517 | 0.0 | 16.4 | 122 |
| 180 min Summer | 17.977 | 0.0 | 19.0 | 180 |
| 240 min Summer | 14.339 | 0.0 | 20.8 | 230 |
| 360 min Summer | 10.402 | 0.0 | 23.5 | 282 |
| 480 min Summer | 8.281 | 0.0 | 25.5 | 344 |
| 600 min Summer | 6.934 | 0.0 | 27.1 | 410 |
| 720 min Summer | 5.995 | 0.0 | 28.5 | 478 |
| 960 min Summer | 4.761 | 0.0 | 30.8 | 616 |
| 1440 min Summer | 3.436 | 0.0 | 34.1 | 880 |
| 2160 min Summer | 2.476 | 0.0 | 37.7 | 1272 |
| 2880 min Summer | 1.960 | 0.0 | 40.3 | 1644 |
| 4320 min Summer | 1.408 | 0.0 | 44.2 | 2376 |
| 5760 min Summer | 1.113 | 0.0 | 47.1 | 3104 |
| 7200 min Summer | 0.927 | 0.0 | 49.4 | 3816 |
| 8640 min Summer | 0.798 | 0.0 | 51.3 | 4504 |
| 10080 min Summer | 0.702 | 0.0 | 53.0 | 5240 |
| 15 min Winter | 99.739 | 0.0 | 3.5 | 19 |
| 30 min Winter | 65.311 | 0.0 | 7.6 | 33 |

## Summary of Results for 100 year Return Period

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.031 | 0.431 | 0.0 | 0.6 | 0.6 | 20.7 | O K |
| 120 min Winter | 31.096 | 0.496 | 0.0 | 0.7 | 0.7 | 23.8 | O K |
| 180 min Winter | 31.122 | 0.522 | 0.0 | 0.7 | 0.7 | 25.1 | Flood Risk |
| 240 min Winter | 31.132 | 0.532 | 0.0 | 0.7 | 0.7 | 25.5 | Flood Risk |
| 360 min Winter | 31.137 | 0.537 | 0.0 | 0.7 | 0.7 | 25.8 | Flood Risk |
| 480 min Winter | 31.140 | 0.540 | 0.0 | 0.7 | 0.7 | 25.9 | Flood Risk |
| 600 min Winter | 31.138 | 0.538 | 0.0 | 0.7 | 0.7 | 25.8 | Flood Risk |
| 720 min Winter | 31.133 | 0.533 | 0.0 | 0.7 | 0.7 | 25.6 | Flood Risk |
| 960 min Winter | 31.119 | 0.519 | 0.0 | 0.7 | 0.7 | 24.9 | Flood Risk |
| 1440 min Winter | 31.084 | 0.484 | 0.0 | 0.7 | 0.7 | 23.3 | O K |
| 2160 min Winter | 31.034 | 0.434 | 0.0 | 0.6 | 0.6 | 20.9 | O K |
| 2880 min Winter | 30.993 | 0.393 | 0.0 | 0.6 | 0.6 | 18.9 | O K |
| 4320 min Winter | 30.935 | 0.335 | 0.0 | 0.5 | 0.5 | 16.1 | O K |
| 5760 min Winter | 30.899 | 0.299 | 0.0 | 0.4 | 0.4 | 14.3 | O K |
| 7200 min Winter | 30.876 | 0.276 | 0.0 | 0.3 | 0.3 | 13.3 | O K |
| 8640 min Winter | 30.861 | 0.261 | 0.0 | 0.3 | 0.3 | 12.5 | O K |
| 10080 min Winter | 30.851 | 0.251 | 0.0 | 0.3 | 0.3 | 12.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 40.718 | 0.0 | 12.0 | 62 |
| 120 min Winter | 24.517 | 0.0 | 16.4 | 120 |
| 180 min Winter | 17.977 | 0.0 | 19.0 | 176 |
| 240 min Winter | 14.339 | 0.0 | 20.8 | 230 |
| 360 min Winter | 10.402 | 0.0 | 23.5 | 290 |
| 480 min Winter | 8.281 | 0.0 | 25.5 | 364 |
| 600 min Winter | 6.934 | 0.0 | 27.1 | 440 |
| 720 min Winter | 5.995 | 0.0 | 28.5 | 514 |
| 960 min Winter | 4.761 | 0.0 | 30.8 | 662 |
| 1440 min Winter | 3.436 | 0.0 | 34.1 | 938 |
| 2160 min Winter | 2.476 | 0.0 | 37.7 | 1324 |
| 2880 min Winter | 1.960 | 0.0 | 40.3 | 1700 |
| 4320 min Winter | 1.408 | 0.0 | 44.2 | 2420 |
| 5760 min Winter | 1.113 | 0.0 | 47.1 | 3120 |
| 7200 min Winter | 0.927 | 0.0 | 49.4 | 3824 |
| 8640 min Winter | 0.798 | 0.0 | 51.3 | 4504 |
| 10080 min Winter | 0.702 | 0.0 | 53.0 | 5240 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | 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 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 160.0 | 0.0 | 0.800 | 160.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

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

Half Drain Time : 409 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 30.981 | 0.381 | 0.0 | 0.5 | 0.5 | 18.3 | O K |
| 30 min Summer | 31.093 | 0.493 | 0.0 | 0.7 | 0.7 | 23.7 | O K |
| 60 min Summer | 31.201 | 0.601 | 0.0 | 0.8 | 0.8 | 28.8 | Flood Risk |
| 120 min Summer | 31.293 | 0.693 | 0.0 | 0.9 | 0.9 | 33.2 | Flood Risk |
| 180 min Summer | 31.329 | 0.729 | 0.0 | 0.9 | 0.9 | 35.0 | Flood Risk |
| 240 min Summer | 31.343 | 0.743 | 0.0 | 0.9 | 0.9 | 35.7 | Flood Risk |
| 360 min Summer | 31.354 | 0.754 | 0.0 | 1.0 | 1.0 | 36.2 | Flood Risk |
| 480 min Summer | 31.360 | 0.760 | 0.0 | 1.0 | 1.0 | 36.5 | Flood Risk |
| 600 min Summer | 31.362 | 0.762 | 0.0 | 1.0 | 1.0 | 36.6 | Flood Risk |
| 720 min Summer | 31.361 | 0.761 | 0.0 | 1.0 | 1.0 | 36.5 | Flood Risk |
| 960 min Summer | 31.351 | 0.751 | 0.0 | 1.0 | 1.0 | 36.0 | Flood Risk |
| 1440 min Summer | 31.318 | 0.718 | 0.0 | 0.9 | 0.9 | 34.5 | Flood Risk |
| 2160 min Summer | 31.261 | 0.661 | 0.0 | 0.9 | 0.9 | 31.7 | Flood Risk |
| 2880 min Summer | 31.206 | 0.606 | 0.0 | 0.8 | 0.8 | 29.1 | Flood Risk |
| 4320 min Summer | 31.118 | 0.518 | 0.0 | 0.7 | 0.7 | 24.9 | Flood Risk |
| 5760 min Summer | 31.056 | 0.456 | 0.0 | 0.6 | 0.6 | 21.9 | O K |
| 7200 min Summer | 31.010 | 0.410 | 0.0 | 0.6 | 0.6 | 19.7 | O K |
| 8640 min Summer | 30.976 | 0.376 | 0.0 | 0.5 | 0.5 | 18.1 | O K |
| 10080 min Summer | 30.950 | 0.350 | 0.0 | 0.5 | 0.5 | 16.8 | O K |
| 15 min Winter | 30.981 | 0.381 | 0.0 | 0.5 | 0.5 | 18.3 | O K |
| 30 min Winter | 31.093 | 0.493 | 0.0 | 0.7 | 0.7 | 23.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 8.8 | 19 |
| 30 min Summer | 91.435 | 0.0 | 14.5 | 33 |
| 60 min Summer | 57.005 | 0.0 | 20.6 | 62 |
| 120 min Summer | 34.324 | 0.0 | 26.8 | 122 |
| 180 min Summer | 25.168 | 0.0 | 30.4 | 180 |
| 240 min Summer | 20.074 | 0.0 | 33.0 | 240 |
| 360 min Summer | 14.562 | 0.0 | 36.7 | 292 |
| 480 min Summer | 11.594 | 0.0 | 39.6 | 354 |
| 600 min Summer | 9.707 | 0.0 | 41.9 | 420 |
| 720 min Summer | 8.393 | 0.0 | 43.8 | 488 |
| 960 min Summer | 6.666 | 0.0 | 46.9 | 624 |
| 1440 min Summer | 4.811 | 0.0 | 51.6 | 894 |
| 2160 min Summer | 3.466 | 0.0 | 56.6 | 1280 |
| 2880 min Summer | 2.744 | 0.0 | 60.3 | 1672 |
| 4320 min Summer | 1.972 | 0.0 | 65.7 | 2416 |
| 5760 min Summer | 1.558 | 0.0 | 69.8 | 3120 |
| 7200 min Summer | 1.297 | 0.0 | 73.0 | 3824 |
| 8640 min Summer | 1.117 | 0.0 | 75.7 | 4576 |
| 10080 min Summer | 0.983 | 0.0 | 78.0 | 5248 |
| 15 min Winter | 139.635 | 0.0 | 8.8 | 19 |
| 30 min Winter | 91.435 | 0.0 | 14.5 | 33 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 31.202 | 0.602 | 0.0 | 0.8 | 0.8 | 28.9 | Flood Risk |
| 120 min Winter | 31.294 | 0.694 | 0.0 | 0.9 | 0.9 | 33.3 | Flood Risk |
| 180 min Winter | 31.332 | 0.732 | 0.0 | 0.9 | 0.9 | 35.1 | Flood Risk |
| 240 min Winter | 31.347 | 0.747 | 0.0 | 1.0 | 1.0 | 35.9 | Flood Risk |
| 360 min Winter | 31.352 | 0.752 | 0.0 | 1.0 | 1.0 | 36.1 | Flood Risk |
| 480 min Winter | 31.355 | 0.755 | 0.0 | 1.0 | 1.0 | 36.2 | Flood Risk |
| 600 min Winter | 31.351 | 0.751 | 0.0 | 1.0 | 1.0 | 36.1 | Flood Risk |
| 720 min Winter | 31.344 | 0.744 | 0.0 | 1.0 | 1.0 | 35.7 | Flood Risk |
| 960 min Winter | 31.322 | 0.722 | 0.0 | 0.9 | 0.9 | 34.6 | Flood Risk |
| 1440 min Winter | 31.268 | 0.668 | 0.0 | 0.9 | 0.9 | 32.1 | Flood Risk |
| 2160 min Winter | 31.191 | 0.591 | 0.0 | 0.8 | 0.8 | 28.4 | Flood Risk |
| 2880 min Winter | 31.126 | 0.526 | 0.0 | 0.7 | 0.7 | 25.2 | Flood Risk |
| 4320 min Winter | 31.031 | 0.431 | 0.0 | 0.6 | 0.6 | 20.7 | O K |
| 5760 min Winter | 30.971 | 0.371 | 0.0 | 0.5 | 0.5 | 17.8 | O K |
| 7200 min Winter | 30.931 | 0.331 | 0.0 | 0.4 | 0.4 | 15.9 | O K |
| 8640 min Winter | 30.905 | 0.305 | 0.0 | 0.4 | 0.4 | 14.6 | O K |
| 10080 min Winter | 30.886 | 0.286 | 0.0 | 0.4 | 0.4 | 13.7 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 20.6 | 62 |
| 120 min Winter | 34.324 | 0.0 | 26.8 | 120 |
| 180 min Winter | 25.168 | 0.0 | 30.4 | 176 |
| 240 min Winter | 20.074 | 0.0 | 33.0 | 232 |
| 360 min Winter | 14.562 | 0.0 | 36.7 | 304 |
| 480 min Winter | 11.594 | 0.0 | 39.6 | 370 |
| 600 min Winter | 9.707 | 0.0 | 41.9 | 446 |
| 720 min Winter | 8.393 | 0.0 | 43.8 | 522 |
| 960 min Winter | 6.666 | 0.0 | 46.9 | 672 |
| 1440 min Winter | 4.811 | 0.0 | 51.6 | 952 |
| 2160 min Winter | 3.466 | 0.0 | 56.6 | 1360 |
| 2880 min Winter | 2.744 | 0.0 | 60.3 | 1732 |
| 4320 min Winter | 1.972 | 0.0 | 65.7 | 2464 |
| 5760 min Winter | 1.558 | 0.0 | 69.8 | 3176 |
| 7200 min Winter | 1.297 | 0.0 | 73.0 | 3896 |
| 8640 min Winter | 1.117 | 0.0 | 75.7 | 4584 |
| 10080 min Winter | 0.983 | 0.0 | 78.0 | 5336 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | 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 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 31.400

## Cellular Storage Structure

Invert Level (m) 30.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 160.0 | 0.0 | 0.800 | 160.0 | 0.0 |

## Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 30.800

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

Half Drain Time : 1853 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 99.388 | 0.188 | 0.0 | 0.2 | 0.2 | 26.9 | O K |
| 30 min Summer | 99.446 | 0.246 | 0.0 | 0.3 | 0.3 | 35.1 | O K |
| 60 min Summer | 99.504 | 0.304 | 0.0 | 0.3 | 0.3 | 43.5 | O K |
| 120 min Summer | 99.562 | 0.362 | 0.0 | 0.3 | 0.3 | 51.7 | O K |
| 180 min Summer | 99.594 | 0.394 | 0.0 | 0.3 | 0.3 | 56.2 | O K |
| 240 min Summer | 99.614 | 0.414 | 0.0 | 0.3 | 0.3 | 59.1 | O K |
| 360 min Summer | 99.640 | 0.440 | 0.0 | 0.4 | 0.4 | 62.9 | O K |
| 480 min Summer | 99.658 | 0.458 | 0.0 | 0.4 | 0.4 | 65.3 | O K |
| 600 min Summer | 99.669 | 0.469 | 0.0 | 0.4 | 0.4 | 67.0 | O K |
| 720 min Summer | 99.676 | 0.476 | 0.0 | 0.4 | 0.4 | 68.0 | O K |
| 960 min Summer | 99.684 | 0.484 | 0.0 | 0.4 | 0.4 | 69.1 | O K |
| 1440 min Summer | 99.683 | 0.483 | 0.0 | 0.4 | 0.4 | 69.0 | O K |
| 2160 min Summer | 99.677 | 0.477 | 0.0 | 0.4 | 0.4 | 68.0 | O K |
| 2880 min Summer | 99.668 | 0.468 | 0.0 | 0.4 | 0.4 | 66.8 | O K |
| 4320 min Summer | 99.645 | 0.445 | 0.0 | 0.4 | 0.4 | 63.6 | O K |
| 5760 min Summer | 99.622 | 0.422 | 0.0 | 0.3 | 0.3 | 60.2 | O K |
| 7200 min Summer | 99.598 | 0.398 | 0.0 | 0.3 | 0.3 | 56.9 | O K |
| 8640 min Summer | 99.576 | 0.376 | 0.0 | 0.3 | 0.3 | 53.7 | O K |
| 10080 min Summer | 99.556 | 0.356 | 0.0 | 0.3 | 0.3 | 50.8 | O K |
| 15 min Winter | 99.388 | 0.188 | 0.0 | 0.2 | 0.2 | 26.9 | O K |
| 30 min Winter | 99.446 | 0.246 | 0.0 | 0.3 | 0.3 | 35.1 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 15 min Summer | 139.635 | 0.0 | 15.9 | 19 |
| 30 min Summer | 91.435 | 0.0 | 18.7 | 34 |
| 60 min Summer | 57.005 | 0.0 | 35.5 | 64 |
| 120 min Summer | 34.324 | 0.0 | 40.3 | 124 |
| 180 min Summer | 25.168 | 0.0 | 42.8 | 184 |
| 240 min Summer | 20.074 | 0.0 | 44.4 | 244 |
| 360 min Summer | 14.562 | 0.0 | 46.4 | 362 |
| 480 min Summer | 11.594 | 0.0 | 47.6 | 482 |
| 600 min Summer | 9.707 | 0.0 | 48.4 | 602 |
| 720 min Summer | 8.393 | 0.0 | 48.9 | 722 |
| 960 min Summer | 6.666 | 0.0 | 49.3 | 960 |
| 1440 min Summer | 4.811 | 0.0 | 48.5 | 1340 |
| 2160 min Summer | 3.466 | 0.0 | 85.1 | 1668 |
| 2880 min Summer | 2.744 | 0.0 | 85.6 | 2048 |
| 4320 min Summer | 1.972 | 0.0 | 82.2 | 2892 |
| 5760 min Summer | 1.558 | 0.0 | 115.1 | 3696 |
| 7200 min Summer | 1.297 | 0.0 | 119.4 | 4536 |
| 8640 min Summer | 1.117 | 0.0 | 122.3 | 5352 |
| 10080 min Summer | 0.983 | 0.0 | 122.1 | 6144 |
| 15 min Winter | 139.635 | 0.0 | 15.9 | 19 |
| 30 min Winter | 91.435 | 0.0 | 18.7 | 34 |

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

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 60 min Winter | 99.504 | 0.304 | 0.0 | 0.3 | 0.3 | 43.5 | O K |
| 120 min Winter | 99.562 | 0.362 | 0.0 | 0.3 | 0.3 | 51.7 | O K |
| 180 min Winter | 99.594 | 0.394 | 0.0 | 0.3 | 0.3 | 56.2 | O K |
| 240 min Winter | 99.614 | 0.414 | 0.0 | 0.3 | 0.3 | 59.1 | O K |
| 360 min Winter | 99.641 | 0.441 | 0.0 | 0.4 | 0.4 | 63.0 | O K |
| 480 min Winter | 99.658 | 0.458 | 0.0 | 0.4 | 0.4 | 65.4 | O K |
| 600 min Winter | 99.670 | 0.470 | 0.0 | 0.4 | 0.4 | 67.1 | O K |
| 720 min Winter | 99.678 | 0.478 | 0.0 | 0.4 | 0.4 | 68.2 | O K |
| 960 min Winter | 99.686 | 0.486 | 0.0 | 0.4 | 0.4 | 69.4 | O K |
| 1440 min Winter | 99.687 | 0.487 | 0.0 | 0.4 | 0.4 | 69.6 | O K |
| 2160 min Winter | 99.676 | 0.476 | 0.0 | 0.4 | 0.4 | 68.0 | O K |
| 2880 min Winter | 99.664 | 0.464 | 0.0 | 0.4 | 0.4 | 66.3 | O K |
| 4320 min Winter | 99.634 | 0.434 | 0.0 | 0.3 | 0.3 | 62.0 | O K |
| 5760 min Winter | 99.602 | 0.402 | 0.0 | 0.3 | 0.3 | 57.4 | O K |
| 7200 min Winter | 99.571 | 0.371 | 0.0 | 0.3 | 0.3 | 53.0 | O K |
| 8640 min Winter | 99.543 | 0.343 | 0.0 | 0.3 | 0.3 | 49.0 | O K |
| 10080 min Winter | 99.517 | 0.317 | 0.0 | 0.3 | 0.3 | 45.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 57.005 | 0.0 | 35.5 | 64 |
| 120 min Winter | 34.324 | 0.0 | 40.4 | 122 |
| 180 min Winter | 25.168 | 0.0 | 42.8 | 180 |
| 240 min Winter | 20.074 | 0.0 | 44.4 | 240 |
| 360 min Winter | 14.562 | 0.0 | 46.4 | 358 |
| 480 min Winter | 11.594 | 0.0 | 47.7 | 474 |
| 600 min Winter | 9.707 | 0.0 | 48.4 | 590 |
| 720 min Winter | 8.393 | 0.0 | 48.9 | 706 |
| 960 min Winter | 6.666 | 0.0 | 49.3 | 932 |
| 1440 min Winter | 4.811 | 0.0 | 48.5 | 1368 |
| 2160 min Winter | 3.466 | 0.0 | 85.1 | 1712 |
| 2880 min Winter | 2.744 | 0.0 | 85.7 | 2164 |
| 4320 min Winter | 1.972 | 0.0 | 82.3 | 3072 |
| 5760 min Winter | 1.558 | 0.0 | 115.1 | 3976 |
| 7200 min Winter | 1.297 | 0.0 | 119.4 | 4832 |
| 8640 min Winter | 1.117 | 0.0 | 122.3 | 5696 |
| 10080 min Winter | 0.983 | 0.0 | 122.2 | 6456 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.900 |
| Region | England and Wales | Cv (Winter) | 0.900 |
| M5-60 (mm) | 20.100 | Shortest Storm (mins) | 15 |
| Ratio R | 0.406 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 0.086

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.086 |

## Time Area Diagram

Total Area (ha) 0.000

| Time (mins) From: | To: | Area (ha) |
|---|---|---|
| 0 | 4 | 0.000 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Cellular Storage Structure

Invert Level (m) 99.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 476.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 476.0 | 0.0 | | | |

## Orifice Outflow Control

Diameter (m) 0.016 Discharge Coefficient 0.600 Invert Level (m) 99.200

# APPENDIX B - Completed LBH proformas

- Thames Water Catchment Proforma
- Canal Catchment Proforma
- Combined Proforma

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

*This form identifies the information required by the LLFA to enable technical assessment of flows and volumes determined as part of drainage / SuDS calculations.*

*Note : * means delete as appropriate; Numbers in brackets refer to accompanying notes.*

**COMBINATION CATCHMENT Rev B dated 12.02.18**

1.1 Planning application reference 1331/APP/2017/1883

1.2 Site name FORMER NESTLE FACTORY SITE, NESTLES AVE – RESIDENTIAL APPLICATION ONLY

1.3 Total application site area (1) 71607 $m^2$ 7.16ha

1.4 Is the site located in a CDA or LFRZ Y/N NO

1.5 Is the site located in a SPZ Y/N NO

**VOLUME AND FLOW DESIGN INPUTS**

2.1 Site area which is positively drained by SuDS (2) 57,899$m^2$

2.2 Impermeable area drained pre development (3) 48,528$m^2$

2.3 Impermeable area drained post development (3) 49,250$m^2$

2.4 Additional impermeable area (2.3 minus 2.2) 722 $m^2$

2.5 Predevelopment use (4) ~~Greenfield~~ / Brownfield / ~~Mixed*~~

2.6 Method of discharge (5) ~~Infiltration~~ / waterbody / storm sewer / combined sewer*

2.7 Infiltration rate (where applicable) …N/A…m/hr

2.8 Influencing factors on infiltration Ground conditions . Testing carried out show ground to be unsuitable.

2.9 Depth to highest known ground water table……2m

2.10 Coefficient of runoff (Cv) (6) Green Roofs 0.84, Non Green Roofs 0.95, External hardstandings 0.90, Combination of Non Green Roofs and External area 0.925 used for modelling purposes

2.11 Justification for Cv used As required by LBH

2.12 FEH rainfall data used (Note that FSR is no longer the preferred rainfall calculation method) Y/N N -as agreed

2.13 Will storage be subject to surcharge by elevated water levels in watercourse / ~~sewer~~ Y/N. Please see individual proformas

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

2.14 Invert level at outlet (invert level of final flow control) Please see individual pro formas

2.15 Design level used for surcharge water level at point of discharge(14 N/A

## CALCULATION OUTPUTS

*Sections 3 and 4 refer to site where storage is provided by attenuation and / or partial infiltration. Where all flows are infiltrated to ground omit Sections 3 -5 and complete Section 6.*

**3.0 Defining rate of runoff from the site Below figures are those achieved during modelling, figures are taken from the results.**

3.2 Max. discharge for 1 in 1 year rainfall 6.1 l/s/ha, 43.5l/s for the site (7.16ha site)

3.2 Max. discharge for $Q_{med}$ rainfall …… 4.6 l/s/ha, 32.9 l/s for the site

3.3 Max. discharge for 1 in 30 year rainfall 10.2 l/s/ha, 78.2l/s for the site

3.4 Max. discharge for 1 in 100 year rainfall 12.3l/s/ha, 88.3l/s for the site

3.5 Max. discharge for 1 in 100 year plus 40%CC 14.4l/s/ha, 103.4 l/s for the site

**4.0 Attenuation storage to manage peak runoff rates from the site**

4.1 Storage - 1 in 1 year 656.4$m^3$ 0.013$m^3/m^2$ (of developed impermeable area)

4.2 Storage - 1in 30 year (7) 1352.1$m^3$ 0.027$m^3/m^2$

4.3 Storage - 1in 100 year (8) 1769.9$m^3$ 0.036$m^3/m^2$

4.4 Storage - 1 in 100 year plus 40%CC (9) 2555.2$m^3$ 0.052$m^3/m^2$

**5.0 Controlling volume of runoff from the site**

5.1 Pre development runoff volume(10) 2725.4 $m^3$ for the site

5.2 Post development runoff volume (unmitigated) (10) 1727 $m^3$ for the site

5.3 Volume to be controlled/does not leave site (5.2 - 5.1) 998.4 $m^3$ for the site (reduction)

5.4 Volume control provided by

- Interception losses(11) 130.1$m^3$ (with use of Rain Garden, green roof and permeable paving)
- Rain harvesting(12) 0$m^3$ ( 5m3 stored for irrigation but does not form part of calculations)
- Infiltration (even at very low rates) 0$m^3$
- Separate area designated as long term storage(13) 0$m^3$

5.5 Total volume control (sum of inputs for 5.4) 37.7$m^3$ (15) (130.1+58.8-92.4, therefore total reduction 1036.1$m^3$ )

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

**6.0 Site storage volumes (full infiltration only) N/A**

| | | | |
|---|---|---|---|
| 6.1 | Storage - 1in 30 year (7) | ……$m^3$ | ……$m^3/m^2$ (of developed impermeable area) |
| 6.2 | Storage - 1 in 100 year plus CC (9) | ……$m^3$ | ……$m^3/m^2$ |

**Notes**

1. All area with the proposed application site boundary to be included.

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

2. The site area which is positively drained includes all green areas which drain to the SuDS system and area of surface SuDS features. It excludes large open green spaces which do not drain to the SuDS system.
3. Impermeable area should be measured pre and post development. Impermeable surfaces includes, roofs, pavements, driveways and paths where runoff is conveyed to the drainage system.
4. Predevelopment use may impact on the allowable discharge rate. The LLFA will seek for reduction in flow rates to GF status in all instances. The design statement and drawings explain / demonstrate how flows will be managed from the site.
5. Runoff may be discharge via one or a number of means.
6. Sewers for Adoption 6th Edition recommends a Cv of 100% when designing drainage for impermeable area (assumes no loss of runoff from impermeable surfaces) and 0% for permeable areas. Where lower Cv's are used the application should justify the selection of Cv.
7. Storage for the 1 in 30 year must be fully contained within the SuDS components. Note that standing water within SuDS components such as ponds, basins and swales is not classified as flooding. Storage should be calculated for the critical duration rainfall event.
8. Runoff generated from rainfall events up to the 1 in 100 year will not be allowed to leave the site in an uncontrolled way. Temporary flooding of specified areas to shallow depths (150-300mm) may be permitted in agreement with the LLFA.
9. Climate change is specified as 30% increase to rainfall intensity, unless otherwise agreed with the LLFA / EA.
10. To be determined using the 100 year return period 6 hour duration rainfall event.
11. Where Source Control is provided Interception losses will occur. An allowance of 5mm rainfall depth can be subtracted from the net inflow to the storage calculation where interception losses are demonstrated. The Applicant should demonstrate use of subcatchments and source control techniques.
12. Please refer to Rain harvesting BS for guidance on available storage.
13. Flow diverted to Long term storage areas should be infiltrated to the ground, or where this is not possible, discharged to the receiving water at slow flow rates (maximum 2 l/s/ha). LT storage would not be allowed to empty directly back into attenuation storage and would be expected to drain away over 5-10 days. Typically LT storage may be provided on multi-functional open space or sacrificial car parking areas.
14. Careful consideration should be used for calculations where flow control / storage is likely to be influenced by surcharged sewer or peak levels within a watercourse. Storm sewers are designed for pipe full capacity for 1 in 1 to 1 in 5year return period. Beyond this, the pipe network will usually be in conditions of surcharge. Where information cannot be gathered from Thames Water, engineering judgement should be used to evaluate potential impact (using sensitivity analysis for example).
15. In controlling the volume of runoff the total volume from mitigation measures should be greater than or equal to the additional volume generated.

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

*This form identifies the information required by the LLFA to enable technical assessment of flows and volumes determined as part of drainage / SuDS calculations.*

*Note : * means delete as appropriate; Numbers in brackets refer to accompanying notes.*

**CANAL CATCHMENT REV B DATE 12.02.18**

1.1 Planning application reference 1331/APP/2017/1883

1.2 Site name FORMER NESTLE FACTORY SITE, NESTLES AVE – RESIDENTIAL APPLICATION ONLY

1.3 Total application site area (1) 32300 $m^2$ 3.23ha (CANAL catchment only)

1.4 Is the site located in a CDA or LFRZ Y/N NO

1.5 Is the site located in a SPZ Y/N NO

**VOLUME AND FLOW DESIGN INPUTS**

2.1 Site area which is positively drained by SuDS (2) 29,571$m^2$

2.2 Impermeable area drained pre development (3) 32,391$m^2$

2.3 Impermeable area drained post development (3) 25,819$m^2$

2.4 Additional impermeable area (2.3 minus 2.2) -6572 $m^2$ (A reduction)

2.5 Predevelopment use (4) ~~Greenfield~~ / Brownfield / ~~Mixed*~~

2.6 Method of discharge (5) ~~Infiltration~~ / waterbody ~~/ storm sewer~~ / combined sewer*

2.7 Infiltration rate (where applicable) …N/A…m/hr

2.8 Influencing factors on infiltration Ground conditions . Testing carried out show ground to be unsuitable.

2.9 Depth to highest known ground water table……2m

2.10 Coefficient of runoff (Cv) (6) Green Roofs 0.84, Non Green Roofs 0.95, External hardstandings 0.90, Combination of Non Green Roofs and External area 0.925 used for modelling purposes

2.11 Justification for Cv used As required by LBH

2.12 FEH rainfall data used (Note that FSR is no longer the preferred rainfall calculation method) Y/N N -as agreed

2.13 Will storage be subject to surcharge by elevated water levels in watercourse / ~~sewer~~ Y/N. No Invert of outfall 29.50. Water level is also 29.50. Water level data provided by CRT shows a fluctuation of up to 18mm only.

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

2.14 Invert level at outlet (invert level of final flow control) IL 29.50

2.15 Design level used for surcharge water level at point of discharge(14 N/A

## CALCULATION OUTPUTS

*Sections 3 and 4 refer to site where storage is provided by attenuation and / or partial infiltration. Where all flows are infiltrated to ground omit Sections 3 -5 and complete Section 6.*

**3.0 Defining rate of runoff from the site Below figures are those achieved during modelling, figures are taken from the results.**

3.2 Max. discharge for 1 in 1 year rainfall 6.4 l/s/ha, 20.7l/s for the site (3.23ha Canal site)

3.2 Max. discharge for $Q_{med}$ rainfall 5.8 l/s/ha, 18.8 l/s for the site – This figure is a proposed figure rather than outputted from calcs hence it is lower than the 1 in 1 year.

3.3 Max. discharge for 1 in 30 year rainfall 13.2 l/s/ha, 42.5l/s for the site

3.4 Max. discharge for 1 in 100 year rainfall 15.4l/s/ha, 49.6l/s for the site (60.0 l/s allowable)

3.5 Max. discharge for 1 in 100 year plus 40%CC 18.6l/s/ha, 60.0 l/s for the site (60.0 l/s allowable).

**4.0 Attenuation storage to manage peak runoff rates from the site**

4.1 Storage - 1 in 1 year 335.9$m^3$ 0.013$m^3/m^2$ (of developed impermeable area)

4.2 Storage - 1in 30 year (7) 652.5$m^3$ 0.025$m^3/m^2$

4.3 Storage - 1in 100 year (8) 841.8$m^3$ 0.033$m^3/m^2$

4.4 Storage - 1 in 100 year plus 40%CC (9) 1199.7$m^3$ 0.046$m^3/m^2$

**5.0 Controlling volume of runoff from the site**

5.1 Pre development runoff volume(10) 1819 $m^3$ for the site

5.2 Post development runoff volume (unmitigated) (10) 656.9 $m^3$ for the site

5.3 Volume to be controlled/does not leave site (5.2 - 5.1) 1162.1 $m^3$ for the site (reduction)

5.4 Volume control provided by

- Interception losses(11) 58.8$m^3$ (with use of Rain Garden, green roof and permeable paving)
- Rain harvesting(12) 0$m^3$ ( 5m3 stored for irrigation but does not form part of calculations)

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

- Infiltration (even at very low rates) 0m$^3$
- Separate area designated as long term storage[13] 0m$^3$

5.5 Total volume control (sum of inputs for 5.4) 58.8m$^3$ [15] (therefore total reduction 1220.9m$^3$ )

**6.0 Site storage volumes (full infiltration only) N/A**

6.1 Storage - 1in 30 year [7] ……m$^3$ ……m$^3$/m$^2$ (of developed impermeable area)

6.2 Storage - 1 in 100 year plus CC [9] ……m$^3$ ……m$^3$/m$^2$

**Notes**

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

1. All area with the proposed application site boundary to be included.
2. The site area which is positively drained includes all green areas which drain to the SuDS system and area of surface SuDS features. It excludes large open green spaces which do not drain to the SuDS system.
3. Impermeable area should be measured pre and post development. Impermeable surfaces includes, roofs, pavements, driveways and paths where runoff is conveyed to the drainage system.
4. Predevelopment use may impact on the allowable discharge rate. The LLFA will seek for reduction in flow rates to GF status in all instances. The design statement and drawings explain / demonstrate how flows will be managed from the site.
5. Runoff may be discharge via one or a number of means.
6. Sewers for Adoption 6th Edition recommends a Cv of 100% when designing drainage for impermeable area (assumes no loss of runoff from impermeable surfaces) and 0% for permeable areas. Where lower Cv's are used the application should justify the selection of Cv.
7. Storage for the 1 in 30 year must be fully contained within the SuDS components. Note that standing water within SuDS components such as ponds, basins and swales is not classified as flooding. Storage should be calculated for the critical duration rainfall event.
8. Runoff generated from rainfall events up to the 1 in 100 year will not be allowed to leave the site in an uncontrolled way. Temporary flooding of specified areas to shallow depths (150-300mm) may be permitted in agreement with the LLFA.
9. Climate change is specified as 30% increase to rainfall intensity, unless otherwise agreed with the LLFA / EA.
10. To be determined using the 100 year return period 6 hour duration rainfall event.
11. Where Source Control is provided Interception losses will occur. An allowance of 5mm rainfall depth can be subtracted from the net inflow to the storage calculation where interception losses are demonstrated. The Applicant should demonstrate use of subcatchments and source control techniques.
12. Please refer to Rain harvesting BS for guidance on available storage.
13. Flow diverted to Long term storage areas should be infiltrated to the ground, or where this is not possible, discharged to the receiving water at slow flow rates (maximum 2 l/s/ha). LT storage would not be allowed to empty directly back into attenuation storage and would be expected to drain away over 5-10 days. Typically LT storage may be provided on multi-functional open space or sacrificial car parking areas.
14. Careful consideration should be used for calculations where flow control / storage is likely to be influenced by surcharged sewer or peak levels within a watercourse. Storm sewers are designed for pipe full capacity for 1 in 1 to 1 in 5year return period. Beyond this, the pipe network will usually be in conditions of surcharge. Where information cannot be gathered from Thames Water, engineering judgement should be used to evaluate potential impact (using sensitivity analysis for example).
15. In controlling the volume of runoff the total volume from mitigation measures should be greater than or equal to the additional volume generated.

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

*This form identifies the information required by the LLFA to enable technical assessment of flows and volumes determined as part of drainage / SuDS calculations.*

*Note : * means delete as appropriate; Numbers in brackets refer to accompanying notes.*

**NESTLES AVENUE CATCHMENT Rev B date 12.02.18**

**SITE DETAILS**

1.1 Planning application reference 1331/APP/2017/1883

1.2 Site name FORMER NESTLE FACTORY SITE, NESTLES AVE – RESIDENTIAL APPLICATION ONLY

1.3 Total application site area (1) 39,346 $m^2$ 3.93ha (TW catchment only)

1.4 Is the site located in a CDA or LFRZ Y/N NO

1.5 Is the site located in a SPZ Y/N NO

**VOLUME AND FLOW DESIGN INPUTS**

2.1 Site area which is positively drained by SuDS (2) 28,328$m^2$

2.2 Impermeable area drained pre development (3) 16,137$m^2$

2.3 Impermeable area drained post development (3) 23,431$m^2$

2.4 Additional impermeable area (2.3 minus 2.2) 7294 $m^2$

2.5 Predevelopment use (4) ~~Greenfield~~ / Brownfield / ~~Mixed*~~

2.6 Method of discharge (5) ~~Infiltration / waterbody /~~ storm sewer / ~~combined sewer*~~

2.7 Infiltration rate (where applicable) …N/A…m/hr

2.8 Influencing factors on infiltration Ground conditions . Testing carried out show ground to be unsuitable.

2.9 Depth to highest known ground water table……2m

2.10 Coefficient of runoff (Cv) (6) Green Roofs 0.84, Non Green Roofs 0.95, External hardstandings 0.90, Combination of Non Green Roofs and External area 0.925 used for modelling purposes

2.11 Justification for Cv used As required by LBH

2.12 FEH rainfall data used (Note that FSR is no longer the preferred rainfall calculation method) Y/N N -as agreed

2.13 Will storage be subject to surcharge by elevated water levels in watercourse / sewer Y/N. As follows:

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

Outfall 3:Storage IL 30.65. Invert at connection to TW sewers:29.60. Level difference of 1.05m. Surcharging is not anticipated.
Outfall 4: Storage IL30.30. Invert at connection to TW sewer:29.18. 1.12m level difference . Surcharging is not anticipated.
Outfall 5: Storage IL 29.05. Invert at connection to TW sewers: 28.86 Approx. Level difference of 190mm implies that at times the outfall may be surcharged. This network has therefore been designed with a surcharged outfall.

2.14 Invert level at outlet (invert level of final flow control) .Outfall 3: 30.60. Outfall 4: 30.25 Outfall 5: 29.00…mAOD

2.15 Design level used for surcharge water level at point of discharge(14 Outfall 5: 30.7mAOD

**CALCULATION OUTPUTS**

*Sections 3 and 4 refer to site where storage is provided by attenuation and / or partial infiltration. Where all flows are infiltrated to ground omit Sections 3 -5 and complete Section 6.*

**3.0 Defining rate of runoff from the site Below figures are those achieved during modelling, figures are taken from the results.**

3.2 Max. discharge for 1 in 1 year rainfall 5.8 l/s/ha, 22.8l/s for the site (allowable 12.0l/s) (based on 3.93ha TW site). WHERE THE ALLOWABLE DISCHARGE IS LESS THAN THE CALCULATED OUTPUT A COMPLEX FLOW CONTROL SHALL BE USED TO RESTRICT THE FLOW AS REQUIRED.

3.2 Max. discharge for $Q_{med}$ rainfall 3.6 l/s/ha, 14.1 l/s for the site – This is a proposed allowable figure rather than from calculation outputs.

3.3 Max. discharge for 1 in 30 year rainfall 9.1 l/s/ha, 35.7l/s for the site (31.7l/s allowable)

3.4 Max. discharge for 1 in 100 year rainfall 9.8l/s/ha, 38.7l/s for the site (44.2 l/s allowable)

3.5 Max. discharge for 1 in 100 year plus 40%CC 11.0l/s/ha, 43.4 l/s for the site (44.2 l/s allowable)

**4.0 Attenuation storage to manage peak runoff rates from the site**

4.1 Storage - 1 in 1 year 320.5$m^3$ 0.014$m^3/m^2$ (of developed impermeable area)

4.2 Storage - 1in 30 year (7) 699.6$m^3$ 0.030$m^3/m^2$

4.3 Storage - 1in 100 year (8) 928.1$m^3$ 0.040$m^3/m^2$

4.4 Storage - 1 in 100 year plus 40%CC (9) 1335.5$m^3$ 0.057$m^3/m^2$

**5.0 Controlling volume of runoff from the site**

5.1 Pre development runoff volume(10) 906.4 $m^3$ for the site

5.2 Post development runoff volume (unmitigated) (10) 1070.1 $m^3$ for the site

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

5.3 Volume to be controlled/does not leave site (5.2 - 5.1) 163.7 $m^3$ for the site

5.4 Volume control provided by

- Interception losses(11) 71.3$m^3$ (with use of Rain Garden, green roof and permeable paving)
- Rain harvesting(12) 0$m^3$
- Infiltration (even at very low rates) 0$m^3$
- Separate area designated as long term storage(13) Remaining volume of 92.4m3 equates to 1645m2 when considering a 6hr 100 yr storm at 10.4mm/hr . Based on 2/s/ha the discharge rate to TW sewers to be reduced by 0.3l/s to mitigate against this.

5.5 Total volume control (sum of inputs for 5.4) 71.3$m^3$ (15)

**6.0 Site storage volumes (full infiltration only) N/A**

6.1 Storage - 1in 30 year (7) ……$m^3$ ……$m^3/m^2$ (of developed impermeable area)

6.2 Storage - 1 in 100 year plus CC (9) ……$m^3$ ……$m^3/m^2$

# SuDS Flows and Volumes – LLFA Technical Assessment Proforma

**Notes**

1. All area with the proposed application site boundary to be included.
2. The site area which is positively drained includes all green areas which drain to the SuDS system and area of surface SuDS features. It excludes large open green spaces which do not drain to the SuDS system.
3. Impermeable area should be measured pre and post development. Impermeable surfaces includes, roofs, pavements, driveways and paths where runoff is conveyed to the drainage system.
4. Predevelopment use may impact on the allowable discharge rate. The LLFA will seek for reduction in flow rates to GF status in all instances. The design statement and drawings explain / demonstrate how flows will be managed from the site.
5. Runoff may be discharge via one or a number of means.
6. Sewers for Adoption 6th Edition recommends a Cv of 100% when designing drainage for impermeable area (assumes no loss of runoff from impermeable surfaces) and 0% for permeable areas. Where lower Cv's are used the application should justify the selection of Cv.
7. Storage for the 1 in 30 year must be fully contained within the SuDS components. Note that standing water within SuDS components such as ponds, basins and swales is not classified as flooding. Storage should be calculated for the critical duration rainfall event.
8. Runoff generated from rainfall events up to the 1 in 100 year will not be allowed to leave the site in an uncontrolled way. Temporary flooding of specified areas to shallow depths (150-300mm) may be permitted in agreement with the LLFA.
9. Climate change is specified as 30% increase to rainfall intensity, unless otherwise agreed with the LLFA / EA.
10. To be determined using the 100 year return period 6 hour duration rainfall event.
11. Where Source Control is provided Interception losses will occur. An allowance of 5mm rainfall depth can be subtracted from the net inflow to the storage calculation where interception losses are demonstrated. The Applicant should demonstrate use of subcatchments and source control techniques.
12. Please refer to Rain harvesting BS for guidance on available storage.
13. Flow diverted to Long term storage areas should be infiltrated to the ground, or where this is not possible, discharged to the receiving water at slow flow rates (maximum 2 l/s/ha). LT storage would not be allowed to empty directly back into attenuation storage and would be expected to drain away over 5-10 days. Typically LT storage may be provided on multi-functional open space or sacrificial car parking areas.
14. Careful consideration should be used for calculations where flow control / storage is likely to be influenced by surcharged sewer or peak levels within a watercourse. Storm sewers are designed for pipe full capacity for 1 in 1 to 1 in 5year return period. Beyond this, the pipe network will usually be in conditions of surcharge. Where information cannot be gathered from Thames Water, engineering judgement should be used to evaluate potential impact (using sensitivity analysis for example).
15. In controlling the volume of runoff the total volume from mitigation measures should be greater than or equal to the additional volume generated.

# APPENDIX C - Correspondence

- Canal and River Trust discharge approval
- Thames Water Foul discharge approval

# NESTLÉ DRIVE, HAYES STAGE THREE ASSESSMENT PRO-FORMA


## HYDROLOGIST

Stewart Smith
**DD:** 3066 **Ext:** 01926 626166 **Mobile:** 07824 473869

**Email** Stewart.Smith@canalrivertrust.org.uk

## WORKS ENGINEER

Toby Pearce
**Mobile:** 07717225772
**Email** Toby.Pearce@canalrivertrust.org.uk


**GATEWAY LINK**

## DATE ENQUIRY RECEIVED BY WATER MANAGEMENT

09/11/2016 (when **all** appropriate supporting information received)

## SUMMARY OF PROPOSAL

The existing Nestlé factory, located alongside the Grand Union Canal in Hayes, London Borough of Hillingdon, is to be demolished. Barratt's are proposing a residential development comprising of apartment blocks to be constructed on their area of the site. The remainder of the site is to be developed by others. The Barratt's site is adjacent to the Grand Union Canal, GU-211. It is proposed to discharge to the canal via existing or possibly new outfalls.

## PRE-DEVELOPMENT

The surface water from the site drains partly to the Grand Union Canal and partly to the Thames Water Sewers in Nestlés Avenue. A drainage survey of the existing site has been used to determine the existing catchment which drains into the canal through the existing 14 outfalls. Three of these are within the Barratt's area of the site.

- Total area draining to canal = 36,282$m^2$
- The Pre-development peak run-off (1:100 yr, excluding +30% cc) is estimated at 0.086 $m^3s^{-1}$ (85.9 l/s).

## POST-DEVELOPMENT

The existing site is to be split between two developers. This application is for the proposed Barratt's development only. The development shall comprise 1400 residential units. They are proposing to drain the surface water from the residential site partly to the canal and partly to the Thames Water Sewers. Infiltration testing has shown the ground conditions to be unsuitable for

infiltration. The post-development peak run-off flow is proposed to match the existing pre-developed flows to the canal. Currently, it is proposed to discharge via three outfalls, though this is subject to further design development. The existing outfalls will be reused if feasible.

Flow controls and attenuation shall be used to restrict the flows to the permitted discharge rates. The Barratt's development shall result in a 1.25ha reduction of impermeable area draining to the canal. From conversations with the neighbouring developer it is understood that they are currently proposing to abandon the existing outfalls to the canal within their section of the site in favour of draining to Thames Water Sewers. This will reduce the impermeable area draining to the canal by an additional 2.4ha. SUD's will be implemented, including permeable paving and green roofing.

- Total area draining to canal = 28,600$m^2$
- The Post-development peak run-off (1:100 yr, +20% cc) is estimated at 0.086 $m^3s^{-1}$ (85.9 l/s). The proposed flows to match existing. No urban creep allowed for, as site to be fully developed with apartments, allowing no scope for extensions etc.

## METHODOLOGY

The surface water discharge from the existing site, has been calculated as required by Part 2 of the Code of Practice. Pre-development flows were calculated using QMED with adjusted URBEXT. Growth Factors were used to establish 1 in 100 year flows.

According to the developer, the drainage survey information shown on drawing 909-4-GEN-0019 does not have sufficient information to enable accurate modelling of the network. The Greenfield methods have therefore been used with an URBEXT adjustment in compliance with Part 2.

The discharge calculated is based on the Barratt's site only.

## RISK REGISTER SCORE

Likelihood = 0
Consequence = 3
Risk = 0

## MAXIMUM DISCHARGE VELOCITY

Stated by developer as "to be confirmed".

In terms of the Code of Practice for Third Party Works, high discharge velocities can be a problem for navigational safety. High flow velocities can also cause scouring. It is the responsibility of the Works Engineer to agree a final design that does not exceed a maximum outfall velocity of 0.3 $ms^{-1}$, whilst also ensuring this does not affect ability of the drainage system to achieve the agreed flow rate of 0.086 $m^3s^{-1}$.

## WATER ENGINEER COMMENTS

"I note the following: "The Post-development peak run-off (1:100 yr, +20% cc) is estimated at 0.086 $m^3s^{-1}$ (85.9 l/s). The proposed flows to match existing". Should not the developer be encouraged to seek ways to reduce peak run off?"

Mike Wheeler, Senior Water Engineer, 15/11/16

### ENVIRONMENT TEAM COMMENTS

"I have reviewed the various documents and would like the applicant to provide the following information or assurances:

1. There are three surface water outfalls to the canal. How many car parking spaces are served by each outfall?

2. The application states that the site exhibits soil contamination and that there will be removal of contaminated soil and site remediation. Can the developer please confirm that the surface water drains will only be laid in uncontaminated soils and that the sub-surface attenuation tanks will be resistant to the inward migration of any contaminants remaining in the surrounding soils."

Dr Lise Andreassen, Senior Environmental Scientist, 14/11/16

Response from developer:

1. "As per C151867/C/104 there were 63 parking spots draining to Canal Outlet 1, 68 parking spots to Canal Outlet 2 and 46 parking spots draining to Canal Outlet 3. These design plans have since been adjusted slightly and now there is 67, 67 and 51 parking spots draining to Canal Outlet 1,2 and 3 respectively. These may change again slightly (+/- 2) as the design plans have not yet been finalised.

2. The surface water drains will only be laid in uncontaminated soils and the proposed sub-surface attenuation systems will be lined with an impermeable membrane to prevent water infiltrating/ the inward migration of any contaminants.

Alex Badek, Senior Infrastructure Engineer, Hydrock, 15/11/16

Response from the environment team:

1. "As the number of car parking spaces exceeds 50 for each of the three outfalls to the canal, CRT requires that the Environment Agency's PPG3 guidance note on oil separators is followed:https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290142/pmho0406biyl-e-e.pdf.

Although PPG3 has been withdrawn by the EA due to resource shortages, it is still used by CRT to establish the required standards of pollution prevention for discharges entering its waterways.

Given the nature of the site (i.e. general car parking), potential spills would be expected to be small. As such, Class 1 by-pass separators (with an alarm) are acceptable and need to be located prior to **each** of the three outfalls. Class 1 separators are required as the discharge is to a surface water (i.e. the canal).

The applicant needs to:

- demonstrate that the selected separators are of the type specified and are sized in accordance with PPG3 (shown via submitted calculations)
- account for how silt storage is to be provided for
- provide sufficient access points in the design to allow for inspection and cleaning of the interceptors' internal chambers
- label the separators above ground and show their presence on a revised drainage plan
- submit an adequate maintenance procedure for the separators."

Dr Lise Andreassen, Senior Environmental Scientist, 16/11/16

## RESPONSE SUMMARY

On the basis of the information provided a maximum discharge rate of 0.086 $m^3s^{-1}$ (in a 1:100 yr +20% cc return period event) to the Grand Union Canal is acceptable. The Works Engineer needs to ensure the outfall velocity does not exceed the Trusts maximum of 0.3 $ms^{-1}$.

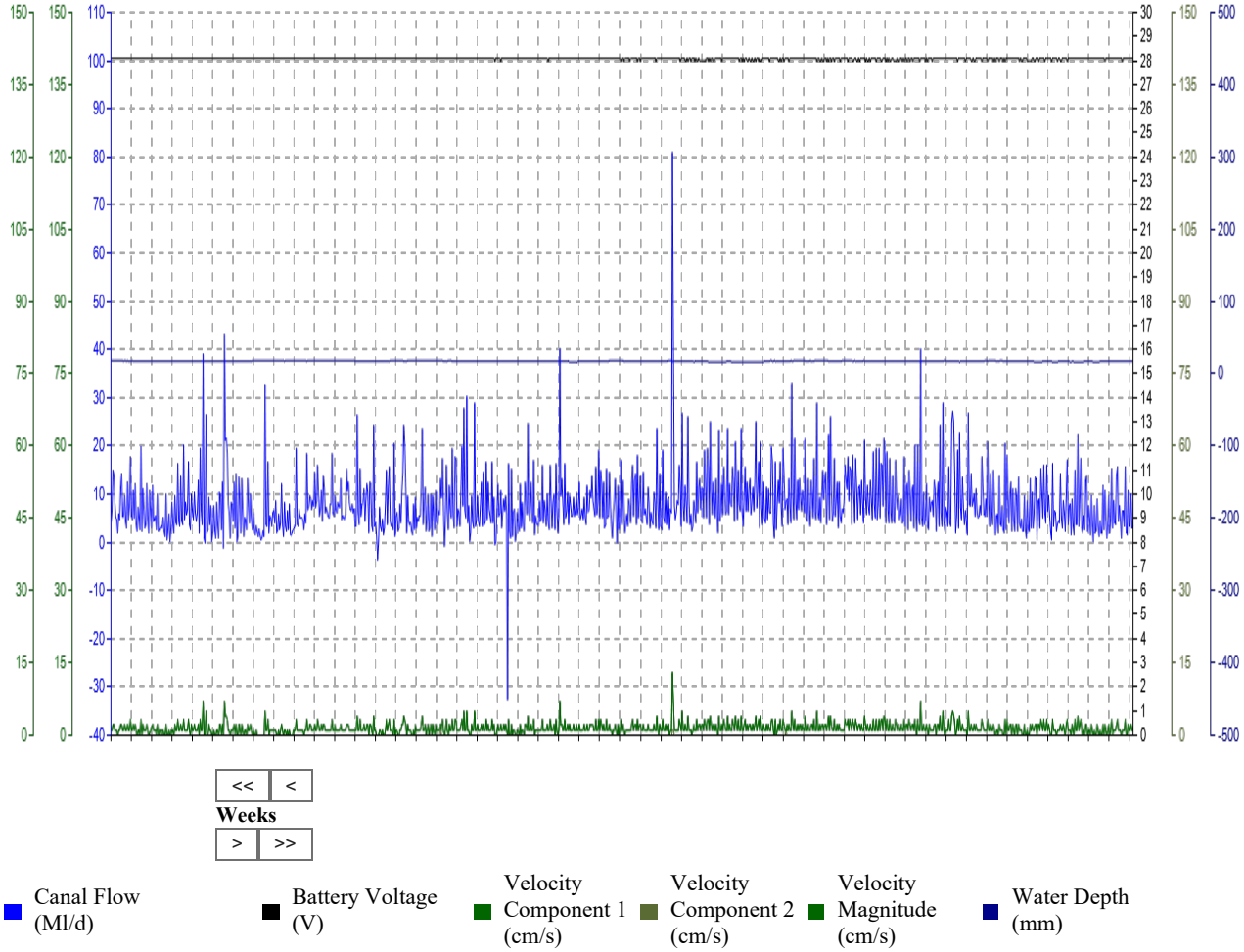
With regards to environmental risk please see comments from the Environment Team (Lise Andreassen's comments).

## SIGN OFF

Endorsed by Adam Comerford, National Hydrology Manager 09/12/2016

**COMPLETED WITHIN FOUR WEEKS?** Yes

SCADA Chart Viewer: Bridge 202, North Hyde Bridge




<< < **Weeks** > >>

Canal Flow (Ml/d)

Battery Voltage (V)

Velocity Component 1 (cm/s)

Velocity Component 2 (cm/s)

Velocity Magnitude (cm/s)

Water Depth (mm)

## John Hayden

**From:** Siva Sivarajan <Siva.Sivarajan@thameswater.co.uk>
**Sent:** 22 May 2017 11:24
**To:** John Hayden; Alex Badek
**Subject:** SMG2153 NESTLES AVE- Impact Study

Dear Sir,

I refer to the above impact study related to the proposed development at Nestles Avenue. TW Asset Planners and Modellers have come back with the following response after progressing the study.

- TW Asset Planners:- ***''Thank you for your recent application to undertake an impact study, whilst completing preparatory works in relation to the Impact study, we have determined that the proposed development will not cause detriment to the public sewer system. We therefore deem it unnecessary to continue with our investigation.''***

  - It would appear that TW Asset Planners have determined that during the early stages of the Impact study, there is no detriment as a result of the proposed development and hence their response above.
  - As such you can proceed with your development and discharge to TW network as you had initially indicated to TW in your original Pre Development application
  - Also as only a part of the Impact study was progressed in determining the above, a proportion of the payment made for this Impact study will be refunded. I will take this up with TW Modellers and pass it to TW Admin to process the refund in due course.

Any queries please come back to me,

Regs,

**Siva Sivarajan**
**Senior Adoptions Engineer**
**Strategic Partnering**
**Thames Water Infrastructure Alliance**
0800 009 3921 siva.sivarajan@thameswater.co.uk
Thames Water Utilities Ltd, Clearwater Court, Vastern Road, Reading, Berkshire, RG1 8DB


We provide the essential service that's at the heart of daily life.

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From:
siva.sivarajan@thameswater.co.uk

*You received this message because the sender is on your allow list.*