| TABLE 1: PROPOSED CATCHMENTS MAXIMUM FLOW RATES | | | | | |
|---|---|---|---|---|---|
| CATCHMENT REF | AREA (Ha) | CALCULATION METHOD | FLOW RATE - 1:1 YEAR STORM EVENT | FLOW RATE - 1:30 YEAR STORM EVENT | FLOW RATE - 1:100 YEAR + 40% CC STORM EVENT |
| CATCHMENT PC (LOWER GROUND CP) | 0.332 | 50% BROWNFIELD OF THE EXISTING 1-YEAR STORM EVENT AREA EC (25%) | 7.0 | 7.0 | 7.0 |
| REFER TO DRAWINGS HRD-CUR-XX-00-DR-C-92-621 & 622 FOR DETAILS OF EXISTING AND PROPOSED CATCHMENTS | | | | | |

INFORMATION PROVIDED BY THE CCTV SURVEY DID NOT PROVIDE CONFIRMATION WHERE SOUTH WATERCOURSE IS LOCATED

FOR EXISTING DRAINAGE REFER TO DRAWING NUMBER: HRD-CUR-XX-00-DR-C-92-510

PROPOSED SERVICES SHOULD BE LOCATED OUTSIDE PROPOSED DRAINAGE

RESIDUAL HAZARD REGISTER
HAZARDS THAT SHOULD BE OBVIOUS TO A COMPETENT CONTRACTOR HAVE NOT BEEN INDICATED ON THIS DRAWING. SHOULD ANY ADDITIONAL HAZARDS BE IDENTIFIED, THE CONTRACTOR SHOULD NOTIFY ALL RELEVANT PROJECT TEAM MEMBERS.

| HAZARD REF No. | ITEM (FEATURE, ELEMENT OR ACTIVITY) | RESIDUAL HAZARD |
|---|---|---|
| 5.05 | DEEP EXCAVATION | DEEP EXCAVATION MORE THEN 3M NEAR EXISTING CULVERT AND BRICK WALL |

LEGEND

- SITE BOUNDARY
- PROPOSED DRAINAGE
- PROPOSED SURFACE WATER DRAIN
- PRIVATE SURFACE WATER DIVERSION
- Ø225 GATIC CHANNEL C250 (UNLESS NOTED D400)
- CP CATCHPIT
- HB HYDROBRAKE
- BD BACKDROP
- AB ACCESS BOX
- OU OUTLET BOX

UNITED UTILITIES RECORDS UUPS-ORD-76950 ALL UU ASSETS ARE SHOWN INDICATIVELY

- CW UU FOUL WATER SEWER
- SW UU SURFACE WATER
- SEWER WATERCOURSE
- SW-B2 PRIVATE SURFACE WATER
- FW-B2 PRIVATE FOUL
- CW-B2 PRIVATE COMBINED
- 8M EASEMENT BASED ON SEWER FOR ADOPTION 6TH EDITION
- OIL INTERCEPTOR
- ATTENUATION TANK
- SW PROPOSED SERVICES

GENERAL NOTES:

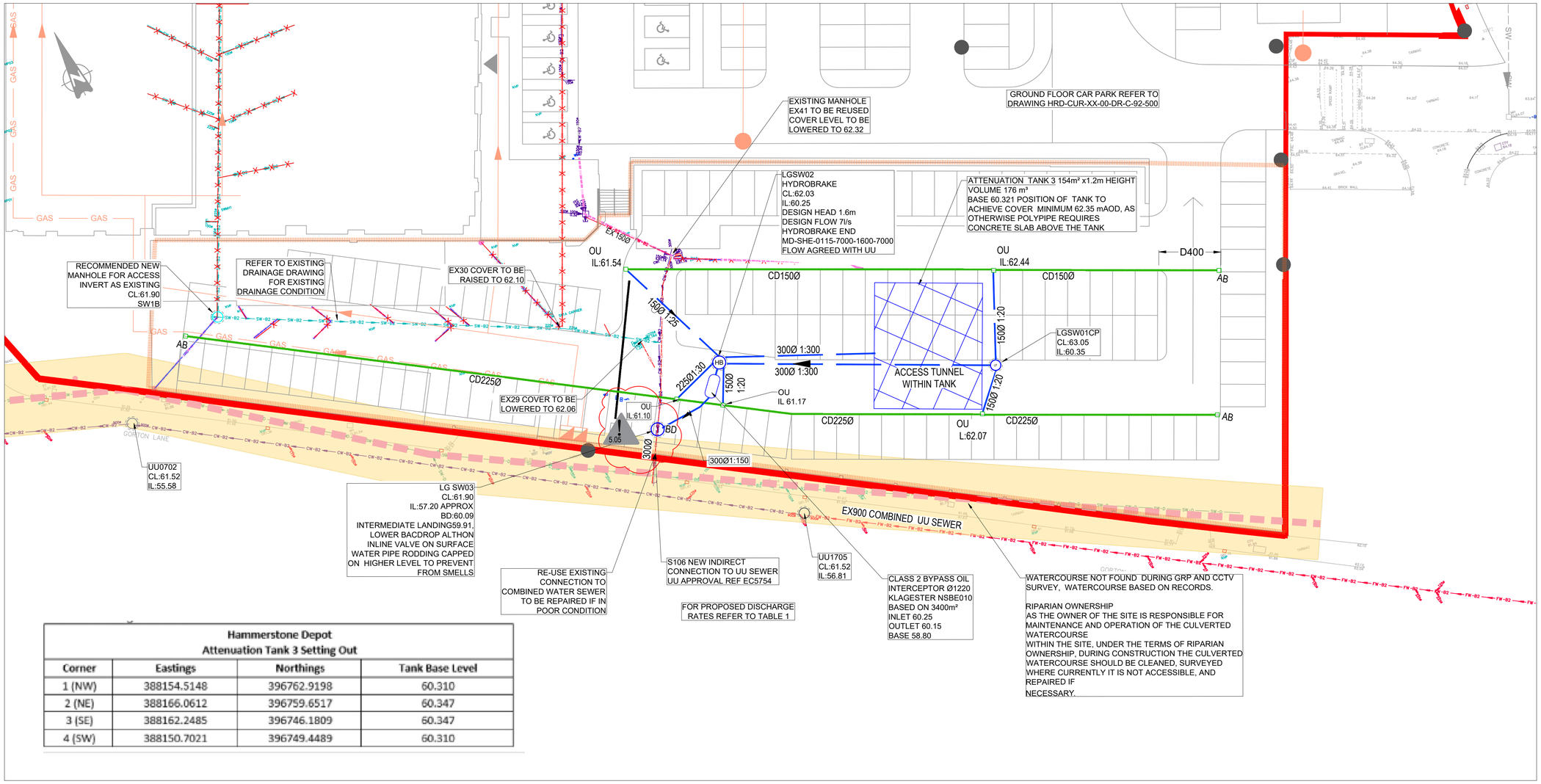
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN. ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
3. DO NOT SCALE THIS DRAWING. ALL DETAILS AND DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
5. WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
6. ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
7. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS. THESE ARE TO BE CONFIRMED ONCE A DETAILED CAPACITY CHECK HAS BEEN UNDERTAKEN AT A LATER DESIGN STAGE.
8. OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.
9. FOR FULL DRAINAGE NOTES REFER TO HRD-CUR-XX-ZZ-DR-C-92-502

DRAWING BASED ON:
TOPOGRAPHICAL SURVEY BY SEP S15724-T
GPR SURVEY BY SEP S17480-U DEC 2018 JUNE 2018
CCTV SURVEY BY SEP DRAINAGE SURVEYS LTD DEC 2018 AND AUG 2020
UU RECORDS UUPS-ORD-76950

**PROPOSED SITE PLAN GA**
HRD-FRA-00-XX-SK-A-90-9006 REV C02

**SIPHONIC DRAINAGE**
STORMSAVER 05.07.22
SAPOFLOW SIPHON SYSTEM 29.06.22

| Lower Ground Surface Water | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MH REF | CL (mAOD) | IL (mAOD) | DEPTH TO SOFFIT (m) | DS PIPE DIA (mm) | MH DIA (mm) | MH TYPE | CATCHPIT | COVER SIZE (mm) | COVER CLASS | COVER TYPE | RECESSED | RESTRICTED ACCESS | BACK DROP | Back drop IL (mAOD) | COMMENTS | EASTING | NORTHING |
| Lower Ground Surface Water | | | | | | | | | | | | | | | | | |
| LGSW01 | 63.05 | 60.35 | 2.55 | 150 | 1200 | TYPE B | Y | 600X600 | D400 | SINGLE SEALED | N | N | N | N/A | CATCHPIT MIN SUMP DEPTH 300mm | 388165.024 | 396750.481 |
| LGSW02 | 62.03 | 60.25 | 1.48 | 300 | 1500 | HYDROBRAKE CHAMBER | N | 1200X675 | D400 | | | N | N | N/A | FLOW CONTROL CHAMBER REFER TO HYDROBRAKE DETAILS FOR SUMP DEPTH | 388135.490 | 396758.968 |
| LGSW03 | 61.90 | 57.20 | 4.4 | 300 | 1500 | TYPE A2 | N | 1200X675 | C250 | | | N | Y | 60.09 | INTERMEDIATE LANDING | 388126.901 | 396753.635 |
| SW1B | 61.90 | 60.30 | 1.38* | 225 | 1500* | TYPE C* | N | 1200X675* | D400 | | | N | N | | MANHOLE TO BE CONSTRUCTED ON EXISTING DRAIN. *INVERT LEVEL INTERPOLATED FROM CCTV SURVEY - TBC ON SITE | 388083.112 | 396778.715 |
| EX29 | 62.06 | EXISTING MANHOLE COVER ADJUSTED TO SUIT PROPOSED LEVELS | | | | | | 600X600 | C250 | | | N | N | N/A | | 388127.742 | 396763.677 |
| EX30 | 62.10 | | | | | | | 600X600 | C250 | | | N | N | N/A | | 388119.157 | 396767.106 |
| EX41 | 62.32 | | | | | | | 600X600 | C250 | | | N | N | N/A | | 388133.251 | 396771.833 |


EXISTING MANHOLE EX41 TO BE REUSED COVER LEVEL TO BE LOWERED TO 62.32
GROUND FLOOR CAR PARK REFER TO DRAWING HRD-CUR-XX-00-DR-C-92-500
LGSW02 HYDROBRAKE CL:62.03 IL:60.25 DESIGN HEAD 1.6m DESIGN FLOW 7l/s HYDROBRAKE END MD-SHE-0115-7000-1600-7000 FLOW AGREED WITH UU
ATTENUATION TANK 3 154m² x1.2m HEIGHT VOLUME 176 m³ BASE 60.321 POSITION OF TANK TO ACHIEVE COVER MINIMUM 62.35 mAOD, AS OTHERWISE POLYPIPE REQUIRES CONCRETE SLAB ABOVE THE TANK
RECOMMENDED NEW MANHOLE FOR ACCESS INVERT AS EXISTING CL:61.90 SW1B
REFER TO EXISTING DRAINAGE DRAWING FOR EXISTING DRAINAGE CONDITION
EX30 COVER TO BE RAISED TO 62.10
EX 150Ø
OU IL:61.54
OU IL:62.44
CD150Ø
CD150Ø
D400
AB
150Ø 1:25
300Ø 1:300
300Ø 1:300
225Ø1:30
HB
1500 1:20
1500 1:20
ACCESS TUNNEL WITHIN TANK
LGSW01CP CL:63.05 IL:60.35
OU IL 61.17
CD225Ø
CD225Ø
OU L:62.07
CD225Ø
AB
EX29 COVER TO BE LOWERED TO 62.06
OU IL:61.10
BD
5.05
3000
300Ø1:150
UU0702 CL:61.52 IL:55.58
LG SW03 CL:61.90 IL:57.20 APPROX BD:60.09 INTERMEDIATE LANDING59.91, LOWER BACDROP ALTHON INLINE VALVE ON SURFACE WATER PIPE RODDING CAPPED ON HIGHER LEVEL TO PREVENT FROM SMELLS
RE-USE EXISTING CONNECTION TO COMBINED WATER SEWER TO BE REPAIRED IF IN POOR CONDITION
S106 NEW INDIRECT CONNECTION TO UU SEWER UU APPROVAL REF EC5754
FOR PROPOSED DISCHARGE RATES REFER TO TABLE 1
UU1705 CL:61.52 IL:56.81
CLASS 2 BYPASS OIL INTERCEPTOR Ø1220 KLAGESTER NSBE010 BASED ON 3400m² INLET 60.25 OUTLET 60.15 BASE 58.80
EX900 COMBINED UU SEWER
WATERCOURSE NOT FOUND DURING GRP AND CCTV SURVEY, WATERCOURSE BASED ON RECORDS.
RIPARIAN OWNERSHIP
AS THE OWNER OF THE SITE IS RESPONSIBLE FOR MAINTENANCE AND OPERATION OF THE CULVERTED WATERCOURSE
WITHIN THE SITE, UNDER THE TERMS OF RIPARIAN OWNERSHIP, DURING CONSTRUCTION THE CULVERTED WATERCOURSE SHOULD BE CLEANED, SURVEYED WHERE CURRENTLY IT IS NOT ACCESSIBLE, AND REPAIRED IF
NECESSARY.
GAS
GAS
GAS

**Appendix G**

Proposed Surface Water Model Building

Proposed Surface Water Model Washdown Area

Proposed Surface Water Model Lower Ground

Proposed Surface Water Model Area previous Cocacola building and additional impermeable area

## STORM SEWER DESIGN by the Modified Rational Method

## Design Criteria for siphon and harvesting

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

| | | | |
|---|---|---|---|
| Return Period (years) | 2 | PIMP (%) | 100 |
| M5-60 (mm) | 18.000 | Add Flow / Climate Change (%) | 0 |
| Ratio R | 0.357 | Minimum Backdrop Height (m) | 0.200 |
| Maximum Rainfall (mm/hr) | 50 | Maximum Backdrop Height (m) | 1.500 |
| Maximum Time of Concentration (mins) | 30 | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha) | 0.000 | Min Vel for Auto Design only (m/s) | 1.00 |
| Volumetric Runoff Coeff. | 1.000 | Min Slope for Optimisation (1:X) | 500 |

Designed with Level Soffits

## Network Design Table for siphon and harvesting

# - Indicates pipe length does not match coordinates
« - 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 | 45.000# | 0.000 | 0.0 | 0.247 | 5.00 | 0.0 | 0.600 | \/ | -4 | Pipe/Conduit | |
| 1.001 | 0.501 | 1.670 | 0.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 200 | Pipe/Conduit | |
| 1.002 | 5.390 | 0.054 | 100.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.003 | 51.315 | 0.128 | 400.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 450 | Pipe/Conduit | |
| 2.000 | 15.000# | 0.005 | 3000.0 | 0.245 | 5.00 | 0.0 | 0.600 | \/ | -4 | Pipe/Conduit | |
| 2.001 | 0.500# | 1.667 | 0.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 200 | Pipe/Conduit | |
| 2.002 | 5.823 | 0.058 | 100.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.004 | 29.243 | 0.073 | 400.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 450 | 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 | 44.73 | 9.34 | 65.700 | 0.247 | 0.0 | 0.0 | 0.0 | 0.17 | 25.9« | 39.9 |
| 1.001 | 44.73 | 9.34 | 65.680 | 0.247 | 0.0 | 0.0 | 0.0 | 22.35 | 702.0 | 39.9 |
| 1.002 | 44.56 | 9.41 | 63.205 | 0.247 | 0.0 | 0.0 | 0.0 | 1.31 | 52.0 | 39.9 |
| 1.003 | 42.61 | 10.26 | 62.926 | 0.247 | 0.0 | 0.0 | 0.0 | 1.01 | 160.7 | 39.9 |
| 2.000 | 50.00 | 5.78 | 65.600 | 0.245 | 0.0 | 0.0 | 0.0 | 0.32 | 48.2 | 44.2 |
| 2.001 | 50.00 | 5.78 | 65.580 | 0.245 | 0.0 | 0.0 | 0.0 | 22.35 | 702.1 | 44.2 |
| 2.002 | 50.00 | 5.85 | 63.488 | 0.245 | 0.0 | 0.0 | 0.0 | 1.30 | 51.9 | 44.2 |
| 1.004 | 41.59 | 10.74 | 62.798 | 0.492 | 0.0 | 0.0 | 0.0 | 1.01 | 160.7 | 73.9 |

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## Network Design Table for siphon and harvesting

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.000 | 35.000# | 0.032 | 1093.8 | 0.235 | 5.00 | 0.0 | 0.600 | \/ | -4 | Pipe/Conduit | |
| 3.001 | 0.500# | 1.667 | 0.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 200 | Pipe/Conduit | |
| 3.002 | 6.390# | 0.064 | 99.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 1.005 | 28.825 | 0.058 | 500.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 600 | Pipe/Conduit | |
| 4.000 | 30.000# | 0.007 | 4285.7 | 0.235 | 5.00 | 0.0 | 0.600 | \/ | -4 | Pipe/Conduit | |
| 4.001 | 0.500# | 1.667 | 0.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 200 | Pipe/Conduit | |
| 4.002 | 5.877 | 0.059 | 99.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 5.000 | 20.000# | 0.007 | 2857.1 | 0.116 | 5.00 | 0.0 | 0.600 | \/ | -4 | Pipe/Conduit | |
| 5.001 | 0.500# | 1.667 | 0.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 160 | Pipe/Conduit | |
| 5.002 | 5.761 | 0.058 | 99.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| 4.003 | 21.481 | 0.054 | 400.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 450 | Pipe/Conduit | |
| 1.006 | 31.179 | 0.052 | 600.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 750 | Pipe/Conduit | |
| 1.007 | 7.723 | 0.026 | 297.0 | 0.000 | 0.00 | 0.0 | 0.600 | ooo | -1 | Pipe/Conduit | |
| 1.008 | 17.634 | 0.059 | 298.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | |
| 1.009 | 18.442 | 0.369 | 50.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.000 | 50.00 | 6.08 | 65.500 | 0.235 | 0.0 | 0.0 | 0.0 | 0.54 | 80.9 | 42.4 |
| 3.001 | 50.00 | 6.08 | 65.468 | 0.235 | 0.0 | 0.0 | 0.0 | 22.35 | 702.1 | 42.4 |
| 3.002 | 50.00 | 6.16 | 63.671 | 0.235 | 0.0 | 0.0 | 0.0 | 1.31 | 52.0 | 42.4 |
| 1.005 | 40.69 | 11.18 | 62.575 | 0.727 | 0.0 | 0.0 | 0.0 | 1.08 | 306.0 | 106.9 |
| 4.000 | 50.00 | 6.87 | 65.400 | 0.235 | 0.0 | 0.0 | 0.0 | 0.27 | 40.1« | 42.5 |
| 4.001 | 50.00 | 6.87 | 65.268 | 0.235 | 0.0 | 0.0 | 0.0 | 22.35 | 702.1 | 42.5 |
| 4.002 | 50.00 | 6.95 | 63.371 | 0.235 | 0.0 | 0.0 | 0.0 | 1.31 | 52.1 | 42.5 |
| 5.000 | 50.00 | 6.01 | 65.700 | 0.116 | 0.0 | 0.0 | 0.0 | 0.33 | 49.5 | 20.9 |
| 5.001 | 50.00 | 6.01 | 65.680 | 0.116 | 0.0 | 0.0 | 0.0 | 19.36 | 389.2 | 20.9 |
| 5.002 | 50.00 | 6.08 | 63.440 | 0.116 | 0.0 | 0.0 | 0.0 | 1.31 | 52.2 | 20.9 |
| 4.003 | 50.00 | 7.30 | 62.898 | 0.351 | 0.0 | 0.0 | 0.0 | 1.01 | 160.7 | 63.4 |
| 1.006 | 39.82 | 11.64 | 62.367 | 1.079 | 0.0 | 0.0 | 0.0 | 1.14 | 501.5 | 155.1 |
| 1.007 | 39.60 | 11.76 | 62.315 | 1.079 | 0.0 | 0.0 | 0.0 | 1.09 | 410.9 | 155.1 |
| 1.008 | 39.01 | 12.08 | 60.980 | 1.079 | 0.0 | 0.0 | 0.0 | 0.90 | 63.9« | 155.1 |
| 1.009 | 38.77 | 12.22 | 60.921 | 1.079 | 0.0 | 0.0 | 0.0 | 2.23 | 157.5 | 155.1 |

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## Area Summary for siphon and harvesting

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|---|---|---|---|---|---|---|
| 1.000 | User | - | 100 | 0.247 | 0.247 | 0.247 |
| 1.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.003 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 2.000 | User | - | 100 | 0.245 | 0.245 | 0.245 |
| 2.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 2.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.004 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 3.000 | - | - | 100 | 0.235 | 0.235 | 0.235 |
| 3.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 3.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.005 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.000 | User | - | 100 | 0.235 | 0.235 | 0.235 |
| 4.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 5.000 | - | - | 100 | 0.116 | 0.116 | 0.116 |
| 5.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 5.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.003 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.006 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.007 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.008 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.009 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| | | | | Total | Total | Total |
| | | | | 1.079 | 1.079 | 1.079 |

## Surcharged Outfall Details for siphon and harvesting

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---|---|---|---|---|---|---|
| 1.009 | SRH | 64.301 | 60.552 | 59.300 | 0 | 0 |

Datum (m) 60.050 Offset (mins) 0

| Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 1.000 | 300 | 1.000 | 540 | 1.000 | 780 | 1.000 | 1020 | 1.000 | 1260 | 1.000 |
| 120 | 1.000 | 360 | 1.000 | 600 | 1.000 | 840 | 1.000 | 1080 | 1.000 | 1320 | 1.000 |
| 180 | 1.000 | 420 | 1.000 | 660 | 1.000 | 900 | 1.000 | 1140 | 1.000 | 1380 | 1.000 |
| 240 | 1.000 | 480 | 1.000 | 720 | 1.000 | 960 | 1.000 | 1200 | 1.000 | 1440 | 1.000 |

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## Simulation Criteria for siphon and harvesting

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

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 6 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 5 | Number of Real Time Controls | 0 |

## Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 2 | Cv (Summer) | 1.000 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 18.000 | Storm Duration (mins) | 30 |
| Ratio R | 0.357 | | |

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## Online Controls for siphon and harvesting

### Siphon Manhole: SRHdp, DS/PN: 1.001, Volume (m³): 6.8

Invert Level (m) 65.680 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

| Depth (m) | Outflow (l/s) | Depth (m) | Outflow (l/s) |
|---|---|---|---|
| 0.020 | 155.5300 | 0.200 | 155.5300 |
| 0.100 | 155.5300 | 0.260 | 155.5300 |

### Siphon Manhole: SRHdp, DS/PN: 2.001, Volume (m³): 2.3

Invert Level (m) 65.580 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

| Depth (m) | Outflow (l/s) | Depth (m) | Outflow (l/s) |
|---|---|---|---|
| 0.020 | 155.5300 | 0.200 | 155.5300 |
| 0.100 | 155.5300 | 0.260 | 155.5300 |

### Siphon Manhole: SRHdp, DS/PN: 3.001, Volume (m³): 5.3

Invert Level (m) 65.468 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

| Depth (m) | Outflow (l/s) | Depth (m) | Outflow (l/s) |
|---|---|---|---|
| 0.020 | 155.5300 | 0.200 | 155.5300 |
| 0.100 | 155.5300 | 0.260 | 155.5300 |

### Siphon Manhole: SRHdp, DS/PN: 4.001, Volume (m³): 4.5

Invert Level (m) 65.268 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

| Depth (m) | Outflow (l/s) | Depth (m) | Outflow (l/s) |
|---|---|---|---|
| 0.020 | 155.5300 | 0.200 | 155.5300 |
| 0.100 | 155.5300 | 0.260 | 155.5300 |

### Siphon Manhole: SRHdp, DS/PN: 5.001, Volume (m³): 3.0

Invert Level (m) 65.680 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

| Depth (m) | Outflow (l/s) | Depth (m) | Outflow (l/s) |
|---|---|---|---|
| 0.020 | 77.7300 | 0.200 | 77.7300 |
| 0.100 | 77.7300 | 0.260 | 77.7300 |

### Hydro-Brake® Optimum Manhole: SRH6, DS/PN: 1.009, Volume (m³): 7.2

Unit Reference MD-SHE-0175-1810-2000-1810
Design Head (m) 2.000

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## Hydro-Brake® Optimum Manhole: SRH6, DS/PN: 1.009, Volume (m³): 7.2

| | |
|---|---|
| Design Flow (l/s) | 18.1 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 175 |
| Invert Level (m) | 60.921 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1800 |

| Control Points | Head (m) | Flow (l/s) |
|---|---|---|
| Design Point (Calculated) | 2.000 | 18.1 |
| Flush-Flo™ | 0.580 | 18.0 |
| Kick-Flo® | 1.220 | 14.3 |
| Mean Flow over Head Range | - | 15.7 |

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 | 6.2 | 1.200 | 14.6 | 3.000 | 21.9 | 7.000 | 33.0 |
| 0.200 | 15.1 | 1.400 | 15.3 | 3.500 | 23.6 | 7.500 | 34.1 |
| 0.300 | 16.7 | 1.600 | 16.3 | 4.000 | 25.2 | 8.000 | 35.2 |
| 0.400 | 17.5 | 1.800 | 17.2 | 4.500 | 26.6 | 8.500 | 36.2 |
| 0.500 | 17.9 | 2.000 | 18.1 | 5.000 | 28.0 | 9.000 | 37.2 |
| 0.600 | 18.0 | 2.200 | 18.9 | 5.500 | 29.3 | 9.500 | 38.2 |
| 0.800 | 17.6 | 2.400 | 19.7 | 6.000 | 30.6 | | |
| 1.000 | 16.7 | 2.600 | 20.5 | 6.500 | 31.8 | | |

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## Offline Controls for siphon and harvesting

### Depth/Flow Relationship Manhole: SRHdp, DS/PN: 1.001, Loop to PN: 1.002

Invert Level (m) 65.680

| Depth (m) | Flow (l/s) |
|---|---|
| 0.020 | 0.5000 |

### Depth/Flow Relationship Manhole: SRHdp, DS/PN: 2.001, Loop to PN: 2.002

Invert Level (m) 65.580

| Depth (m) | Flow (l/s) |
|---|---|
| 0.020 | 0.5000 |

### Depth/Flow Relationship Manhole: SRHdp, DS/PN: 3.001, Loop to PN: 3.002

Invert Level (m) 65.468

| Depth (m) | Flow (l/s) |
|---|---|
| 0.020 | 0.5000 |

### Depth/Flow Relationship Manhole: SRHdp, DS/PN: 4.001, Loop to PN: 4.002

Invert Level (m) 65.580

| Depth (m) | Flow (l/s) |
|---|---|
| 0.020 | 0.5000 |

### Depth/Flow Relationship Manhole: SRHdp, DS/PN: 5.001, Loop to PN: 5.002

Invert Level (m) 65.680

| Depth (m) | Flow (l/s) |
|---|---|
| 0.500 | 0.5000 |

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## Storage Structures for siphon and harvesting

### Cellular Storage Manhole: SRHtank, DS/PN: 1.008

Invert Level (m) 60.980 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 | 420.0 | 0.0 | 1.601 | 0.0 | 0.0 |
| 1.600 | 420.0 | 0.0 | | | |

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

### Simulation Criteria

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

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 6 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 5 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow |
|---|---|---|---|---|---|---|---|
| 1.000 | SRHgutter | 15 Summer | 1 | +0% | | | |
| 1.001 | SRHdp | 60 Summer | 1 | +0% | | | 1/15 Summer |
| 1.002 | SRHsiphon gf | 15 Summer | 1 | +0% | 1/15 Summer | | |
| 1.003 | SRH1 | 15 Summer | 1 | +0% | 100/15 Summer | | |
| 2.000 | SRHgutter | 15 Summer | 1 | +0% | 100/15 Summer | | |
| 2.001 | SRHdp | 360 Winter | 1 | +0% | 100/15 Summer | | 1/15 Summer |
| 2.002 | SRHsiphon gf | 15 Summer | 1 | +0% | 1/15 Summer | | |
| 1.004 | SRH2 | 15 Summer | 1 | +0% | 30/15 Summer | | |
| 3.000 | SRHgutter | 15 Summer | 1 | +0% | 100/15 Summer | | |
| 3.001 | SRHdp | 60 Winter | 1 | +0% | | | 1/15 Summer |
| 3.002 | SRHsiphon gf | 15 Summer | 1 | +0% | 30/15 Summer | | |
| 1.005 | SRH3 | 15 Summer | 1 | +0% | 100/15 Summer | | |
| 4.000 | SRHgutter | 15 Summer | 1 | +0% | 100/15 Summer | | |
| 4.001 | SRHdp | 960 Winter | 1 | +0% | | | |
| 4.002 | SRHsiphon gf | 15 Summer | 1 | +0% | 30/15 Summer | | |
| 5.000 | SRHgutter | 15 Summer | 1 | +0% | | | |
| 5.001 | SRHdp | 120 Summer | 1 | +0% | | | 1/15 Summer |
| 5.002 | SRHsiphon gf | 15 Summer | 1 | +0% | 30/15 Summer | | |

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

| PN | US/MH Name | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | SRHgutter | | 65.793 | -0.167 | 0.000 | 0.46 | | 37.1 | FLOOD RISK* |
| 1.001 | SRHdp | 72 | 65.705 | -0.175 | 0.000 | 0.18 | 0.5 | 25.9 | FLOOD RISK* |
| 1.002 | SRHsiphon gf | | 63.439 | 0.009 | 0.000 | 1.14 | | 37.4 | SURCHARGED* |
| 1.003 | SRH1 | | 63.095 | -0.282 | 0.000 | 0.24 | | 35.9 | OK |
| 2.000 | SRHgutter | | 65.718 | -0.142 | 0.000 | 0.59 | | 36.8 | FLOOD RISK* |
| 2.001 | SRHdp | 72 | 65.605 | -0.175 | 0.000 | 0.04 | 0.5 | 5.5 | OK* |
| 2.002 | SRHsiphon gf | | 63.717 | 0.004 | 0.000 | 1.08 | | 36.7 | SURCHARGED* |
| 1.004 | SRH2 | | 63.023 | -0.225 | 0.000 | 0.49 | | 68.2 | OK |
| 3.000 | SRHgutter | | 65.616 | -0.144 | 0.000 | 0.50 | | 35.5 | OK |
| 3.001 | SRHdp | 72 | 65.493 | -0.175 | 0.000 | 0.12 | 0.5 | 17.7 | OK* |
| 3.002 | SRHsiphon gf | | 63.858 | -0.038 | 0.000 | 0.99 | | 35.5 | OK* |
| 1.005 | SRH3 | | 62.839 | -0.335 | 0.000 | 0.40 | | 98.4 | OK |
| 4.000 | SRHgutter | | 65.516 | -0.144 | 0.000 | 0.55 | | 35.8 | OK |
| 4.001 | SRHdp | 0 | 65.293 | -0.175 | 0.000 | 0.02 | 0.0 | 2.9 | OK* |
| 4.002 | SRHsiphon gf | | 63.596 | 0.000 | 0.000 | 1.03 | | 35.1 | OK* |
| 5.000 | SRHgutter | | 65.771 | -0.189 | 0.000 | 0.33 | | 17.6 | FLOOD RISK* |
| 5.001 | SRHdp | 72 | 65.705 | -0.135 | 0.000 | 0.09 | 0.0 | 8.6 | FLOOD RISK* |
| 5.002 | SRHsiphon gf | | 63.557 | -0.108 | 0.000 | 0.52 | | 17.6 | OK* |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| 1.000 | SRHgutter | |
| 1.001 | SRHdp | |
| 1.002 | SRHsiphon gf | |
| 1.003 | SRH1 | |
| 2.000 | SRHgutter | |
| 2.001 | SRHdp | |
| 2.002 | SRHsiphon gf | |
| 1.004 | SRH2 | |
| 3.000 | SRHgutter | |
| 3.001 | SRHdp | |
| 3.002 | SRHsiphon gf | |
| 1.005 | SRH3 | |
| 4.000 | SRHgutter | |
| 4.001 | SRHdp | |
| 4.002 | SRHsiphon gf | |
| 5.000 | SRHgutter | |
| 5.001 | SRHdp | |
| 5.002 | SRHsiphon gf | |

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 4.003 | SRH5 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 63.097 |
| 1.006 | SRH4 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 62.685 |
| 1.007 | SRH6a | 15 Summer | 1 | +0% | 100/15 Summer | | | | 62.520 |
| 1.008 | SRHtank | 360 Summer | 1 | +0% | 1/240 Summer | | | | 61.289 |
| 1.009 | SRH6 | 360 Summer | 1 | +0% | 1/120 Summer | | | | 61.288 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 4.003 | SRH5 | -0.251 | 0.000 | 0.40 | | 53.0 | OK | |
| 1.006 | SRH4 | -0.432 | 0.000 | 0.37 | | 144.8 | OK | |
| 1.007 | SRH6a | -0.195 | 0.000 | 0.52 | | 144.9 | OK | |
| 1.008 | SRHtank | 0.009 | 0.000 | 0.30 | | 16.4 | SURCHARGED | |
| 1.009 | SRH6 | 0.067 | 0.000 | 0.11 | | 15.2 | SURCHARGED | |

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

### Simulation Criteria

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

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 6 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 5 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow |
|---|---|---|---|---|---|---|---|
| 1.000 | SRHgutter | 15 Summer | 30 | +0% | | | |
| 1.001 | SRHdp | 360 Summer | 30 | +0% | | | 1/15 Summer |
| 1.002 | SRHsiphon gf | 15 Summer | 30 | +0% | 1/15 Summer | | |
| 1.003 | SRH1 | 15 Summer | 30 | +0% | 100/15 Summer | | |
| 2.000 | SRHgutter | 15 Summer | 30 | +0% | 100/15 Summer | | |
| 2.001 | SRHdp | 720 Winter | 30 | +0% | 100/15 Summer | | 1/15 Summer |
| 2.002 | SRHsiphon gf | 15 Summer | 30 | +0% | 1/15 Summer | | |
| 1.004 | SRH2 | 15 Summer | 30 | +0% | 30/15 Summer | | |
| 3.000 | SRHgutter | 15 Summer | 30 | +0% | 100/15 Summer | | |
| 3.001 | SRHdp | 30 Winter | 30 | +0% | | | 1/15 Summer |
| 3.002 | SRHsiphon gf | 15 Winter | 30 | +0% | 30/15 Summer | | |
| 1.005 | SRH3 | 15 Summer | 30 | +0% | 100/15 Summer | | |
| 4.000 | SRHgutter | 15 Summer | 30 | +0% | 100/15 Summer | | |
| 4.001 | SRHdp | 480 Winter | 30 | +0% | | | |
| 4.002 | SRHsiphon gf | 15 Winter | 30 | +0% | 30/15 Summer | | |
| 5.000 | SRHgutter | 15 Summer | 30 | +0% | | | |
| 5.001 | SRHdp | 1440 Summer | 30 | +0% | | | 1/15 Summer |
| 5.002 | SRHsiphon gf | 15 Summer | 30 | +0% | 30/15 Summer | | |

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

| PN | US/MH Name | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | SRHgutter | | 65.848 | -0.112 | 0.000 | 1.15 | | 92.0 | FLOOD RISK* |
| 1.001 | SRHdp | 72 | 65.705 | -0.175 | 0.000 | 0.14 | 0.5 | 20.1 | FLOOD RISK* |
| 1.002 | SRHsiphon gf | | 63.805 | 0.375 | 0.000 | 2.80 | | 91.5 | SURCHARGED* |
| 1.003 | SRH1 | | 63.353 | -0.023 | 0.000 | 0.59 | | 86.8 | OK |
| 2.000 | SRHgutter | | 65.829 | -0.031 | 0.000 | 1.46 | | 90.4 | FLOOD RISK* |
| 2.001 | SRHdp | 72 | 65.605 | -0.175 | 0.000 | 0.05 | 0.5 | 7.4 | OK* |
| 2.002 | SRHsiphon gf | | 64.053 | 0.340 | 0.000 | 2.66 | | 90.3 | FLOOD RISK* |
| 1.004 | SRH2 | | 63.268 | 0.020 | 0.000 | 1.22 | | 167.7 | SURCHARGED |
| 3.000 | SRHgutter | | 65.723 | -0.037 | 0.000 | 1.23 | | 87.4 | FLOOD RISK* |
| 3.001 | SRHdp | 72 | 65.493 | -0.175 | 0.000 | 0.45 | 0.5 | 64.6 | OK* |
| 3.002 | SRHsiphon gf | | 64.001 | 0.105 | 0.000 | 2.27 | | 81.1 | SURCHARGED* |
| 1.005 | SRH3 | | 63.048 | -0.127 | 0.000 | 0.96 | | 237.3 | OK |
| 4.000 | SRHgutter | | 65.624 | -0.036 | 0.000 | 1.34 | | 87.8 | OK |
| 4.001 | SRHdp | 0 | 65.293 | -0.175 | 0.000 | 0.07 | 0.0 | 10.2 | OK* |
| 4.002 | SRHsiphon gf | | 63.801 | 0.205 | 0.000 | 2.37 | | 81.1 | SURCHARGED* |
| 5.000 | SRHgutter | | 65.833 | -0.127 | 0.000 | 0.80 | | 43.1 | FLOOD RISK* |
| 5.001 | SRHdp | 72 | 65.705 | -0.135 | 0.000 | 0.04 | 0.0 | 3.6 | FLOOD RISK* |
| 5.002 | SRHsiphon gf | | 63.690 | 0.025 | 0.000 | 1.27 | | 43.1 | SURCHARGED* |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| 1.000 | SRHgutter | |
| 1.001 | SRHdp | |
| 1.002 | SRHsiphon gf | |
| 1.003 | SRH1 | |
| 2.000 | SRHgutter | |
| 2.001 | SRHdp | |
| 2.002 | SRHsiphon gf | |
| 1.004 | SRH2 | |
| 3.000 | SRHgutter | |
| 3.001 | SRHdp | |
| 3.002 | SRHsiphon gf | |
| 1.005 | SRH3 | |
| 4.000 | SRHgutter | |
| 4.001 | SRHdp | |
| 4.002 | SRHsiphon gf | |
| 5.000 | SRHgutter | |
| 5.001 | SRHdp | |
| 5.002 | SRHsiphon gf | |

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 4.003 | SRH5 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 63.259 |
| 1.006 | SRH4 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 62.926 |
| 1.007 | SRH6a | 30 Summer | 30 | +0% | 100/15 Summer | | | | 62.715 |
| 1.008 | SRHtank | 360 Summer | 30 | +0% | 1/240 Summer | | | | 61.737 |
| 1.009 | SRH6 | 240 Summer | 30 | +0% | 1/120 Summer | | | | 61.982 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 4.003 | SRH5 | -0.089 | 0.000 | 0.99 | | 130.2 | OK | |
| 1.006 | SRH4 | -0.192 | 0.000 | 0.89 | | 348.7 | OK | |
| 1.007 | SRH6a | 0.000 | 0.000 | 1.17 | | 325.7 | OK | |
| 1.008 | SRHtank | 0.457 | 0.000 | 0.46 | | 25.1 | SURCHARGED | |
| 1.009 | SRH6 | 0.761 | 0.000 | 0.13 | | 17.9 | SURCHARGED | |

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

### Simulation Criteria

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

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 6 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 5 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|---|---|---|---|---|---|---|---|---|
| 1.000 | SRHgutter | 15 Summer | 100 | +45% | | | | |
| 1.001 | SRHdp | 15 Summer | 100 | +45% | | | 1/15 Summer | 72 |
| 1.002 | SRHsiphon gf | 15 Winter | 100 | +45% | 1/15 Summer | | | |
| 1.003 | SRH1 | 15 Summer | 100 | +45% | 100/15 Summer | | | |
| 2.000 | SRHgutter | 15 Summer | 100 | +45% | 100/15 Summer | | | |
| 2.001 | SRHdp | 15 Summer | 100 | +45% | 100/15 Summer | | 1/15 Summer | 72 |
| 2.002 | SRHsiphon gf | 15 Winter | 100 | +45% | 1/15 Summer | | | |
| 1.004 | SRH2 | 15 Summer | 100 | +45% | 30/15 Summer | | | |
| 3.000 | SRHgutter | 15 Summer | 100 | +45% | 100/15 Summer | | | |
| 3.001 | SRHdp | 15 Summer | 100 | +45% | | | 1/15 Summer | 72 |
| 3.002 | SRHsiphon gf | 15 Winter | 100 | +45% | 30/15 Summer | | | |
| 1.005 | SRH3 | 15 Summer | 100 | +45% | 100/15 Summer | | | |
| 4.000 | SRHgutter | 15 Summer | 100 | +45% | 100/15 Summer | | | |
| 4.001 | SRHdp | 15 Summer | 100 | +45% | | | | 0 |
| 4.002 | SRHsiphon gf | 15 Winter | 100 | +45% | 30/15 Summer | | | |
| 5.000 | SRHgutter | 15 Summer | 100 | +45% | | | | |
| 5.001 | SRHdp | 15 Summer | 100 | +45% | | | 1/15 Summer | 72 |
| 5.002 | SRHsiphon gf | 15 Summer | 100 | +45% | 30/15 Summer | | | |

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

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | SRHgutter | 65.928 | -0.032 | 0.000 | 2.09 | | 168.2 | FLOOD RISK* | |
| 1.001 | SRHdp | 65.784 | -0.096 | 0.000 | 1.08 | 0.5 | 155.5 | FLOOD RISK* | |
| 1.002 | SRHsiphon gf | 65.000 | 1.570 | 0.000 | 4.77 | | 155.9 | FLOOD RISK* | |
| 1.003 | SRH1 | 63.929 | 0.553 | 0.000 | 1.04 | | 152.8 | FLOOD RISK | |
| 2.000 | SRHgutter | 65.948 | 0.088 | 0.000 | 2.74 | | 169.7 | FLOOD RISK* | |
| 2.001 | SRHdp | 65.788 | 0.008 | 0.000 | 1.08 | 0.5 | 155.5 | FLOOD RISK* | |
| 2.002 | SRHsiphon gf | 64.113 | 0.400 | 0.000 | 4.55 | | 154.5 | FLOOD RISK* | |
| 1.004 | SRH2 | 63.780 | 0.532 | 0.000 | 2.21 | | 303.8 | SURCHARGED | |
| 3.000 | SRHgutter | 65.849 | 0.089 | 0.000 | 2.31 | | 163.4 | FLOOD RISK* | |
| 3.001 | SRHdp | 65.524 | -0.144 | 0.000 | 1.08 | 0.5 | 155.5 | OK* | |
| 3.002 | SRHsiphon gf | 64.001 | 0.105 | 0.000 | 4.27 | | 152.4 | SURCHARGED* | |
| 1.005 | SRH3 | 63.420 | 0.246 | 0.000 | 1.82 | | 451.5 | SURCHARGED | |
| 4.000 | SRHgutter | 65.756 | 0.096 | 0.000 | 2.50 | | 163.8 | FLOOD RISK* | |
| 4.001 | SRHdp | 65.446 | -0.022 | 0.000 | 1.08 | 0.0 | 155.5 | OK* | |
| 4.002 | SRHsiphon gf | 63.801 | 0.205 | 0.000 | 4.44 | | 152.1 | SURCHARGED* | |
| 5.000 | SRHgutter | 65.911 | -0.049 | 0.000 | 1.50 | | 80.5 | FLOOD RISK* | |
| 5.001 | SRHdp | 65.729 | -0.111 | 0.000 | 0.84 | 0.0 | 77.7 | FLOOD RISK* | |
| 5.002 | SRHsiphon gf | 63.902 | 0.237 | 0.000 | 2.29 | | 77.8 | SURCHARGED* | |

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| 4.003 | SRH5 | 15 Summer | 100 | +45% | 100/15 Summer | | | | 63.443 |
| 1.006 | SRH4 | 15 Summer | 100 | +45% | 100/15 Summer | | | | 63.217 |
| 1.007 | SRH6a | 15 Summer | 100 | +45% | 100/15 Summer | | | | 62.925 |
| 1.008 | SRHtank | 360 Winter | 100 | +45% | 1/240 Summer | | | | 62.881 |
| 1.009 | SRH6 | 360 Winter | 100 | +45% | 1/120 Summer | | | | 62.864 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| 4.003 | SRH5 | 0.095 | 0.000 | 1.77 | | 233.2 | SURCHARGED | |
| 1.006 | SRH4 | 0.100 | 0.000 | 1.70 | | 665.8 | SURCHARGED | |
| 1.007 | SRH6a | 0.210 | 0.000 | 2.42 | | 673.2 | SURCHARGED | |
| 1.008 | SRHtank | 1.601 | 0.000 | 0.51 | | 28.2 | SURCHARGED | |
| 1.009 | SRH6 | 1.643 | 0.000 | 0.13 | | 18.0 | SURCHARGED | |

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## STORM SEWER DESIGN by the Modified Rational Method

## Design Criteria for washdown

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

| | | | |
|---|---|---|---|
| Return Period (years) | 2 | PIMP (%) | 100 |
| M5-60 (mm) | 18.000 | Add Flow / Climate Change (%) | 0 |
| Ratio R | 0.357 | Minimum Backdrop Height (m) | 0.200 |
| Maximum Rainfall (mm/hr) | 50 | Maximum Backdrop Height (m) | 1.500 |
| Maximum Time of Concentration (mins) | 30 | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha) | 0.000 | Min Vel for Auto Design only (m/s) | 1.00 |
| Volumetric Runoff Coeff. | 1.000 | Min Slope for Optimisation (1:X) | 500 |

Designed with Level Soffits

## Network Design Table for washdown

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| W4.000 | 5.241 | 0.275 | 19.1 | 0.062 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| W5.000 | 8.834 | 0.275 | 32.1 | 0.062 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| W4.001 | 8.438 | 0.134 | 63.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| W4.002 | 12.708 | 0.150 | 84.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| W6.000 | 14.004 | 0.056 | 250.0 | 0.000 | 5.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | |
| W6.001 | 2.057 | 0.008 | 250.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | |
| W6.002 | 9.200 | 0.037 | 250.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | |
| W4.003 | 3.172 | 0.235 | 13.5 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| W4.004 | 3.637 | 0.364 | 10.0 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| W4.000 | 50.00 | 5.04 | 64.000 | 0.062 | 0.0 | 0.0 | 0.0 | 2.32 | 41.0 | 11.2 |
| W5.000 | 50.00 | 5.08 | 64.000 | 0.062 | 0.0 | 0.0 | 0.0 | 1.78 | 31.5 | 11.2 |
| W4.001 | 50.00 | 5.17 | 63.170 | 0.124 | 0.0 | 0.0 | 0.0 | 1.65 | 65.6 | 22.4 |
| W4.002 | 50.00 | 5.32 | 63.036 | 0.124 | 0.0 | 0.0 | 0.0 | 1.42 | 56.5 | 22.4 |
| W6.000 | 50.00 | 5.24 | 62.840 | 0.000 | 0.0 | 0.0 | 0.0 | 0.99 | 70.0 | 0.0 |
| W6.001 | 50.00 | 5.27 | 62.780 | 0.000 | 0.0 | 0.0 | 0.0 | 0.99 | 70.0 | 0.0 |
| W6.002 | 50.00 | 5.43 | 62.772 | 0.000 | 0.0 | 0.0 | 0.0 | 0.99 | 70.0 | 0.0 |
| W4.003 | 50.00 | 5.44 | 62.729 | 0.124 | 0.0 | 0.0 | 0.0 | 2.76 | 48.7 | 22.4 |
| W4.004 | 50.00 | 5.02 | 62.494 | 0.000 | 5.0 | 0.0 | 0.0 | 3.20 | 56.6 | 5.0 |

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## Area Summary for washdown

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|---|---|---|---|---|---|---|
| 4.000 | - | - | 100 | 0.062 | 0.062 | 0.062 |
| 5.000 | - | - | 100 | 0.062 | 0.062 | 0.062 |
| 4.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.003 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.004 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| | | | | Total | Total | Total |
| | | | | 0.124 | 0.124 | 0.124 |

## Surcharged Outfall Details for washdown

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---|---|---|---|---|---|---|
| W4.004 | WEX BS4 | 64.236 | 62.130 | 62.130 | 1200 | 0 |

Datum (m) 0.000 Offset (mins) 0

| Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 62.275 | 300 | 62.275 | 540 | 62.275 | 780 | 62.275 | 1020 | 62.275 | 1260 | 62.275 |
| 120 | 62.275 | 360 | 62.275 | 600 | 62.275 | 840 | 62.275 | 1080 | 62.275 | 1320 | 62.275 |
| 180 | 62.275 | 420 | 62.275 | 660 | 62.275 | 900 | 62.275 | 1140 | 62.275 | 1380 | 62.275 |
| 240 | 62.275 | 480 | 62.275 | 720 | 62.275 | 960 | 62.275 | 1200 | 62.275 | 1440 | 62.275 |

## Simulation Criteria for washdown

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

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

## Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | M5-60 (mm) | 18.000 |
| Return Period (years) | 2 | Ratio R | 0.357 |
| Region | England and Wales | Profile Type | Summer |

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## Synthetic Rainfall Details

Cv (Summer) 1.000 Storm Duration (mins) 30
Cv (Winter) 0.840

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## Online Controls for washdown

### Hydro-Brake® Optimum Manhole: WW05, DS/PN: W4.003, Volume (m³): 2.7

| | |
|---|---|
| Unit Reference | MD-SHE-0100-5000-1400-5000 |
| Design Head (m) | 1.400 |
| Design Flow (l/s) | 5.0 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 100 |
| Invert Level (m) | 62.729 |
| Minimum Outlet Pipe Diameter (mm) | 150 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) |
|---|---|---|
| Design Point (Calculated) | 1.400 | 5.0 |
| Flush-Flo™ | 0.416 | 5.0 |
| Kick-Flo® | 0.855 | 4.0 |
| Mean Flow over Head Range | - | 4.4 |

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 | 3.3 | 1.200 | 4.7 | 3.000 | 7.1 | 7.000 | 10.7 |
| 0.200 | 4.6 | 1.400 | 5.0 | 3.500 | 7.7 | 7.500 | 11.0 |
| 0.300 | 4.9 | 1.600 | 5.3 | 4.000 | 8.2 | 8.000 | 11.4 |
| 0.400 | 5.0 | 1.800 | 5.6 | 4.500 | 8.6 | 8.500 | 11.7 |
| 0.500 | 5.0 | 2.000 | 5.9 | 5.000 | 9.1 | 9.000 | 12.0 |
| 0.600 | 4.9 | 2.200 | 6.2 | 5.500 | 9.5 | 9.500 | 12.3 |
| 0.800 | 4.3 | 2.400 | 6.4 | 6.000 | 9.9 | | |
| 1.000 | 4.3 | 2.600 | 6.7 | 6.500 | 10.3 | | |

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## Storage Structures for washdown

### Cellular Storage Manhole: WTANK, DS/PN: W6.001

Invert Level (m) 62.780 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 | 52.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 52.0 | 0.0 | | | |

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

### Simulation Criteria

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

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

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| W4.000 | WOU 1 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 64.055 |
| W5.000 | WOU 2 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 64.061 |
| W4.001 | WW01 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 63.265 |
| W4.002 | WW02 | 15 Summer | 1 | +0% | 100/15 Summer | | | | 63.134 |
| W6.000 | WW03 | 30 Summer | 1 | +0% | 100/15 Summer | | | | 62.869 |
| W6.001 | WTANK | 30 Summer | 1 | +0% | 30/30 Summer | | | | 62.869 |
| W6.002 | WW04 | 15 Summer | 1 | +0% | 30/30 Summer | | | | 62.918 |
| W4.003 | WW05 | 15 Summer | 1 | +0% | 1/15 Summer | | | | 63.068 |
| W4.004 | WW06 | 15 Summer | 1 | +0% | | | | | 62.530 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| W4.000 | WOU 1 | -0.095 | 0.000 | 0.29 | | 9.4 | FLOOD RISK | |
| W5.000 | WOU 2 | -0.089 | 0.000 | 0.34 | | 9.4 | FLOOD RISK | |
| W4.001 | WW01 | -0.130 | 0.000 | 0.37 | | 18.8 | OK | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| W4.002 | WW02 | -0.127 | 0.000 | 0.39 | | 18.9 | OK | |
| W6.000 | WW03 | -0.271 | 0.000 | 0.00 | | 0.0 | OK | |
| W6.001 | WTANK | -0.211 | 0.000 | 0.05 | | 3.0 | OK* | |
| W6.002 | WW04 | -0.154 | 0.000 | 0.06 | | 3.1 | OK | |
| W4.003 | WW05 | 0.189 | 0.000 | 0.16 | | 5.0 | SURCHARGED | |
| W4.004 | WW06 | -0.114 | 0.000 | 0.13 | | 5.0 | OK | |

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

### Simulation Criteria

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

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

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| W4.000 | WOU 1 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 64.094 |
| W5.000 | WOU 2 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 64.106 |
| W4.001 | WW01 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 63.354 |
| W4.002 | WW02 | 15 Summer | 30 | +0% | 100/15 Summer | | | | 63.243 |
| W6.000 | WW03 | 60 Summer | 30 | +0% | 100/15 Summer | | | | 63.113 |
| W6.001 | WTANK | 60 Summer | 30 | +0% | 30/30 Summer | | | | 63.113 |
| W6.002 | WW04 | 60 Summer | 30 | +0% | 30/30 Summer | | | | 63.113 |
| W4.003 | WW05 | 60 Summer | 30 | +0% | 1/15 Summer | | | | 63.114 |
| W4.004 | WW06 | 60 Summer | 30 | +0% | | | | | 62.530 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| W4.000 | WOU 1 | -0.056 | 0.000 | 0.70 | | 23.0 | FLOOD RISK | |
| W5.000 | WOU 2 | -0.044 | 0.000 | 0.83 | | 22.9 | FLOOD RISK | |
| W4.001 | WW01 | -0.041 | 0.000 | 0.89 | | 46.2 | OK | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| W4.002 | WW02 | -0.018 | 0.000 | 0.95 | | 46.3 | OK | |
| W6.000 | WW03 | -0.027 | 0.000 | 0.00 | | 0.0 | OK | |
| W6.001 | WTANK | 0.033 | 0.000 | 0.07 | | 4.6 | SURCHARGED* | |
| W6.002 | WW04 | 0.042 | 0.000 | 0.09 | | 4.6 | SURCHARGED | |
| W4.003 | WW05 | 0.235 | 0.000 | 0.16 | | 5.0 | SURCHARGED | |
| W4.004 | WW06 | -0.114 | 0.000 | 0.13 | | 5.0 | OK | |

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

### Simulation Criteria

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

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

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|---|---|---|---|---|---|---|---|---|---|
| W4.000 | WOU 1 | 15 Summer | 100 | +45% | 100/15 Summer | | | | 64.288 |
| W5.000 | WOU 2 | 15 Summer | 100 | +45% | 100/15 Summer | | | | 64.341 |
| W4.001 | WW01 | 120 Winter | 100 | +45% | 100/15 Summer | | | | 64.170 |
| W4.002 | WW02 | 120 Winter | 100 | +45% | 100/15 Summer | | | | 64.164 |
| W6.000 | WW03 | 120 Winter | 100 | +45% | 100/15 Summer | | | | 64.155 |
| W6.001 | WTANK | 240 Summer | 100 | +45% | 30/30 Summer | | | | 63.581 |
| W6.002 | WW04 | 120 Winter | 100 | +45% | 30/30 Summer | | | | 64.156 |
| W4.003 | WW05 | 120 Winter | 100 | +45% | 1/15 Summer | | | | 64.156 |
| W4.004 | WW06 | 120 Winter | 100 | +45% | | | | | 62.530 |

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| W4.000 | WOU 1 | 0.138 | 0.000 | 1.21 | | 39.8 | FLOOD RISK | |
| W5.000 | WOU 2 | 0.191 | 0.000 | 1.31 | | 36.2 | FLOOD RISK | |
| W4.001 | WW01 | 0.775 | 0.000 | 0.53 | | 27.5 | FLOOD RISK | |

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

| PN | US/MH Name | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|---|---|---|
| W4.002 | WW02 | 0.903 | 0.000 | 0.56 | | 27.1 | FLOOD RISK | |
| W6.000 | WW03 | 1.015 | 0.000 | 0.00 | | 0.2 | FLOOD RISK | |
| W6.001 | WTANK | 0.501 | 0.000 | 0.10 | | 6.1 | SURCHARGED* | |
| W6.002 | WW04 | 1.084 | 0.000 | 0.10 | | 5.5 | FLOOD RISK | |
| W4.003 | WW05 | 1.277 | 0.000 | 0.17 | | 5.0 | FLOOD RISK | |
| W4.004 | WW06 | -0.114 | 0.000 | 0.13 | | 5.0 | OK | |

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## 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 | PIMP (%) | 100 |
| M5-60 (mm) | 18.000 | Add Flow / Climate Change (%) | 0 |
| Ratio R | 0.357 | Minimum Backdrop Height (m) | 0.200 |
| Maximum Rainfall (mm/hr) | 50 | Maximum Backdrop Height (m) | 1.500 |
| Maximum Time of Concentration (mins) | 30 | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha) | 0.000 | Min Vel for Auto Design only (m/s) | 1.00 |
| Volumetric Runoff Coeff. | 1.000 | Min Slope for Optimisation (1:X) | 500 |

Designed with Level Soffits

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 0.552 | 0.010 | 55.2 | 0.041 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.001 | 10.487 | 0.525 | 20.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.000 | 0.552 | 0.010 | 55.2 | 0.062 | 5.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S2.001 | 5.584 | 0.279 | 20.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.002 | 9.958 | 0.033 | 301.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | |
| S1.003 | 20.780 | 0.069 | 300.0 | 0.000 | 0.00 | 0.0 | 0.600 | oo | -1 | Pipe/Conduit | |
| S3.000 | 1.029 | 0.010 | 102.9 | 0.115 | 5.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S3.001 | 6.276 | 0.209 | 30.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S4.000 | 1.016 | 0.010 | 101.6 | 0.047 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 50.00 | 5.01 | 62.563 | 0.041 | 0.0 | 0.0 | 0.0 | 1.36 | 24.0 | 7.3 |
| S1.001 | 50.00 | 5.08 | 62.439 | 0.041 | 0.0 | 0.0 | 0.0 | 2.26 | 40.0 | 7.3 |
| S2.000 | 50.00 | 5.01 | 62.130 | 0.062 | 0.0 | 0.0 | 0.0 | 1.76 | 70.1 | 11.2 |
| S2.001 | 50.00 | 5.05 | 62.074 | 0.062 | 0.0 | 0.0 | 0.0 | 2.26 | 40.0 | 11.2 |
| S1.002 | 50.00 | 5.27 | 60.350 | 0.103 | 0.0 | 0.0 | 0.0 | 0.90 | 63.6 | 18.6 |
| S1.003 | 50.00 | 5.65 | 60.317 | 0.103 | 0.0 | 0.0 | 0.0 | 0.90 | 127.6 | 18.6 |
| S3.000 | 50.00 | 5.01 | 61.400 | 0.115 | 0.0 | 0.0 | 0.0 | 1.29 | 51.2 | 20.8 |
| S3.001 | 50.00 | 5.06 | 61.100 | 0.115 | 0.0 | 0.0 | 0.0 | 2.40 | 95.3 | 20.8 |
| S4.000 | 50.00 | 5.02 | 61.878 | 0.047 | 0.0 | 0.0 | 0.0 | 1.00 | 17.6 | 8.6 |

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## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S4.001 | 14.624 | 0.585 | 25.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S5.000 | 0.505 | 0.010 | 50.5 | 0.068 | 5.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S5.001 | 4.674 | 0.234 | 20.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.004 | 7.755 | 0.052 | 149.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 | Pipe/Conduit | |
| S6.000 | 37.854 | 1.352 | 28.0 | 0.012 | 5.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S6.001 | 8.570 | 1.182 | 7.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S6.002 | 5.499 | 0.275 | 20.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |
| S6.003 | 9.192 | 0.065 | 141.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 375 | Pipe/Conduit | |
| S1.005 | 4.986 | 0.033 | 151.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 375 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| S4.001 | 50.00 | 5.14 | 61.494 | 0.047 | 0.0 | 0.0 | 0.0 | 2.02 | 35.7 | 8.6 |
| S5.000 | 50.00 | 5.00 | 61.469 | 0.068 | 0.0 | 0.0 | 0.0 | 1.84 | 73.4 | 12.3 |
| S5.001 | 50.00 | 5.04 | 61.169 | 0.068 | 0.0 | 0.0 | 0.0 | 2.26 | 40.0 | 12.3 |
| S1.004 | 50.00 | 5.75 | 60.247 | 0.334 | 0.0 | 0.0 | 0.0 | 1.29 | 90.8 | 60.3 |
| S6.000 | 50.00 | 5.25 | 60.340 | 0.012 | 0.0 | 0.0 | 0.0 | 2.48 | 98.7 | 2.1 |
| S6.001 | 50.00 | 5.28 | 58.952 | 0.012 | 0.0 | 0.0 | 0.0 | 4.89 | 194.4 | 2.1 |
| S6.002 | 50.00 | 5.31 | 57.760 | 0.012 | 0.0 | 0.0 | 0.0 | 2.94 | 116.9 | 2.1 |
| S6.003 | 50.00 | 5.42 | 57.335 | 0.012 | 0.0 | 0.0 | 0.0 | 1.52 | 168.1 | 2.1 |
| S1.005 | 50.00 | 5.81 | 57.270 | 0.346 | 0.0 | 0.0 | 0.0 | 1.47 | 162.5 | 62.4 |

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## Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|---|---|---|---|---|---|---|
| 1.000 | User | - | 100 | 0.041 | 0.041 | 0.041 |
| 1.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 2.000 | User | - | 100 | 0.062 | 0.062 | 0.062 |
| 2.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.003 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 3.000 | User | - | 100 | 0.002 | 0.002 | 0.002 |
| | User | - | 100 | 0.113 | 0.113 | 0.115 |
| 3.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.000 | User | - | 100 | 0.047 | 0.047 | 0.047 |
| 4.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 5.000 | User | - | 100 | 0.068 | 0.068 | 0.068 |
| 5.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.004 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.000 | User | - | 100 | 0.012 | 0.012 | 0.012 |
| 6.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.003 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.005 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| | | | | Total | Total | Total |
| | | | | 0.346 | 0.346 | 0.346 |

## 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) |
|---|---|---|---|---|---|---|
| S1.005 | S | 61.410 | 57.237 | 0.000 | 0 | 0 |

Datum (m) 57.237 Offset (mins) 0

| Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 1.900 | 300 | 1.900 | 540 | 1.900 | 780 | 1.900 | 1020 | 1.900 | 1260 | 1.900 |
| 120 | 1.900 | 360 | 1.900 | 600 | 1.900 | 840 | 1.900 | 1080 | 1.900 | 1320 | 1.900 |
| 180 | 1.900 | 420 | 1.900 | 660 | 1.900 | 900 | 1.900 | 1140 | 1.900 | 1380 | 1.900 |
| 240 | 1.900 | 480 | 1.900 | 720 | 1.900 | 960 | 1.900 | 1200 | 1.900 | 1440 | 1.900 |

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## Simulation Criteria for Storm

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

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

## Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 2 | Cv (Summer) | 1.000 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 18.000 | Storm Duration (mins) | 30 |
| Ratio R | 0.357 | | |

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## Online Controls for Storm

### Hydro-Brake® Optimum Manhole: S2, DS/PN: S1.004, Volume (m³): 6.5

| | |
|---|---|
| Unit Reference | MD-SHE-0115-7000-1600-7000 |
| Design Head (m) | 1.600 |
| Design Flow (l/s) | 7.0 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 115 |
| Invert Level (m) | 60.247 |
| Minimum Outlet Pipe Diameter (mm) | 150 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) |
|---|---|---|
| Design Point (Calculated) | 1.600 | 7.0 |
| Flush-Flo™ | 0.476 | 7.0 |
| Kick-Flo® | 0.977 | 5.6 |
| Mean Flow over Head Range | - | 6.1 |

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 | 4.0 | 1.200 | 6.1 | 3.000 | 9.4 | 7.000 | 14.1 |
| 0.200 | 6.2 | 1.400 | 6.6 | 3.500 | 10.1 | 7.500 | 14.5 |
| 0.300 | 6.7 | 1.600 | 7.0 | 4.000 | 10.8 | 8.000 | 15.0 |
| 0.400 | 6.9 | 1.800 | 7.4 | 4.500 | 11.4 | 8.500 | 15.4 |
| 0.500 | 7.0 | 2.000 | 7.8 | 5.000 | 12.0 | 9.000 | 15.9 |
| 0.600 | 6.9 | 2.200 | 8.1 | 5.500 | 12.5 | 9.500 | 16.3 |
| 0.800 | 6.5 | 2.400 | 8.5 | 6.000 | 13.1 | | |
| 1.000 | 5.6 | 2.600 | 8.8 | 6.500 | 13.6 | | |

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## Storage Structures for Storm

### Cellular Storage Manhole: Stank, DS/PN: S1.003

Invert Level (m) 60.321 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 | 154.0 | 0.0 | 1.201 | 0.0 | 0.0 |
| 1.200 | 154.0 | 0.0 | | | |

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

### Simulation Criteria

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

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

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow |
|---|---|---|---|---|---|---|---|
| S1.000 | Schannel 1 | 15 Summer | 1 | +0% | 30/15 Summer | | |
| S1.001 | Soutlet 1 | 15 Summer | 1 | +0% | | | |
| S2.000 | Schannel 2 | 15 Summer | 1 | +0% | 100/15 Summer | | |
| S2.001 | Soutlet 2 | 15 Summer | 1 | +0% | 100/15 Summer | | |
| S1.002 | S1 | 15 Summer | 1 | +0% | 30/30 Summer | | |
| S1.003 | Stank | 120 Summer | 1 | +0% | 30/30 Summer | | |
| S3.000 | Schannel 3 | 15 Summer | 1 | +0% | 30/15 Summer | 100/15 Summer | |
| S3.001 | Soutlet 3 | 15 Summer | 1 | +0% | 100/15 Summer | | |
| S4.000 | Schannel 4 | 15 Summer | 1 | +0% | 30/15 Summer | | |
| S4.001 | Soutlet 4 | 15 Summer | 1 | +0% | | | |
| S5.000 | Schannel 5 | 15 Summer | 1 | +0% | 100/15 Summer | | |
| S5.001 | Soutlet 5 | 15 Summer | 1 | +0% | 100/15 Summer | | |
| S1.004 | S2 | 15 Summer | 1 | +0% | 30/15 Summer | | |
| S6.000 | Sjunction | 15 Summer | 1 | +0% | | | |
| S6.001 | Sex30 | 120 Summer | 1 | +0% | | | |
| S6.002 | Sex29 | 120 Summer | 1 | +0% | 1/15 Summer | | |
| S6.003 | Sjunction | 120 Winter | 1 | +0% | | | |
| S1.005 | S3 | 120 Summer | 1 | +0% | 1/15 Summer | | |

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

| PN | US/MH Name | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | Schannel 1 | | 62.643 | -0.070 | 0.000 | 0.55 | | 6.0 | FLOOD RISK |
| S1.001 | Soutlet 1 | | 62.480 | -0.109 | 0.000 | 0.17 | | 6.0 | OK |
| S2.000 | Schannel 2 | | 62.216 | -0.139 | 0.000 | 0.31 | | 9.2 | OK |
| S2.001 | Soutlet 2 | | 62.128 | -0.096 | 0.000 | 0.28 | | 9.2 | OK |
| S1.002 | S1 | | 60.464 | -0.186 | 0.000 | 0.30 | | 15.1 | OK |
| S1.003 | Stank | | 60.454 | -0.163 | 0.000 | 0.04 | | 4.8 | OK |
| S3.000 | Schannel 3 | | 61.518 | -0.107 | 0.000 | 0.53 | | 15.8 | OK |
| S3.001 | Soutlet 3 | | 61.176 | -0.149 | 0.000 | 0.25 | | 15.8 | OK |
| S4.000 | Schannel 4 | | 61.965 | -0.063 | 0.000 | 0.62 | | 6.7 | FLOOD RISK |
| S4.001 | Soutlet 4 | | 61.540 | -0.104 | 0.000 | 0.20 | | 6.7 | OK |
| S5.000 | Schannel 5 | | 61.559 | -0.135 | 0.000 | 0.34 | | 10.1 | OK |
| S5.001 | Soutlet 5 | | 61.229 | -0.090 | 0.000 | 0.33 | | 10.0 | OK |
| S1.004 | S2 | | 60.476 | -0.071 | 0.000 | 0.10 | | 6.4 | OK |
| S6.000 | Sjunction | | 60.359 | -0.206 | 0.000 | 0.02 | | 1.8 | OK* |
| S6.001 | Sex30 | | 59.142 | -0.035 | 0.000 | 0.01 | | 0.9 | OK |
| S6.002 | Sex29 | | 59.140 | 1.155 | 0.000 | 0.01 | | 0.9 | SURCHARGED |
| S6.003 | Sjunction | | 57.710 | 0.000 | 0.000 | 0.01 | | 0.6 | SURCHARGED* |
| S1.005 | S3 | | 59.139 | 1.494 | 0.000 | 0.07 | | 6.9 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | Schannel 1 | |
| S1.001 | Soutlet 1 | |
| S2.000 | Schannel 2 | |
| S2.001 | Soutlet 2 | |
| S1.002 | S1 | |
| S1.003 | Stank | |
| S3.000 | Schannel 3 | 1 |
| S3.001 | Soutlet 3 | |
| S4.000 | Schannel 4 | |
| S4.001 | Soutlet 4 | |
| S5.000 | Schannel 5 | |
| S5.001 | Soutlet 5 | |
| S1.004 | S2 | |
| S6.000 | Sjunction | |
| S6.001 | Sex30 | |
| S6.002 | Sex29 | |
| S6.003 | Sjunction | |
| S1.005 | S3 | |

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

### Simulation Criteria

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

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

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | | FSR | Ratio R 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow |
|---|---|---|---|---|---|---|---|
| S1.000 | Schannel 1 | 15 Summer | 30 | +0% | 30/15 Summer | | |
| S1.001 | Soutlet 1 | 15 Summer | 30 | +0% | | | |
| S2.000 | Schannel 2 | 15 Summer | 30 | +0% | 100/15 Summer | | |
| S2.001 | Soutlet 2 | 15 Summer | 30 | +0% | 100/15 Summer | | |
| S1.002 | S1 | 120 Winter | 30 | +0% | 30/30 Summer | | |
| S1.003 | Stank | 120 Winter | 30 | +0% | 30/30 Summer | | |
| S3.000 | Schannel 3 | 15 Summer | 30 | +0% | 30/15 Summer | 100/15 Summer | |
| S3.001 | Soutlet 3 | 15 Summer | 30 | +0% | 100/15 Summer | | |
| S4.000 | Schannel 4 | 15 Summer | 30 | +0% | 30/15 Summer | | |
| S4.001 | Soutlet 4 | 15 Summer | 30 | +0% | | | |
| S5.000 | Schannel 5 | 15 Summer | 30 | +0% | 100/15 Summer | | |
| S5.001 | Soutlet 5 | 15 Summer | 30 | +0% | 100/15 Summer | | |
| S1.004 | S2 | 120 Summer | 30 | +0% | 30/15 Summer | | |
| S6.000 | Sjunction | 15 Summer | 30 | +0% | | | |
| S6.001 | Sex30 | 120 Summer | 30 | +0% | | | |
| S6.002 | Sex29 | 120 Summer | 30 | +0% | 1/15 Summer | | |
| S6.003 | Sjunction | 120 Winter | 30 | +0% | | | |
| S1.005 | S3 | 120 Summer | 30 | +0% | 1/15 Summer | | |

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

| PN | US/MH Name | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | Schannel 1 | | 62.751 | 0.038 | 0.000 | 1.30 | | 14.1 | FLOOD RISK |
| S1.001 | Soutlet 1 | | 62.506 | -0.083 | 0.000 | 0.40 | | 14.2 | OK |
| S2.000 | Schannel 2 | | 62.279 | -0.076 | 0.000 | 0.76 | | 22.9 | OK |
| S2.001 | Soutlet 2 | | 62.166 | -0.058 | 0.000 | 0.69 | | 22.9 | OK |
| S1.002 | S1 | | 60.794 | 0.144 | 0.000 | 0.24 | | 12.0 | SURCHARGED |
| S1.003 | Stank | | 60.792 | 0.175 | 0.000 | 0.09 | | 9.8 | SURCHARGED |
| S3.000 | Schannel 3 | | 61.670 | 0.045 | 0.000 | 1.18 | | 35.4 | FLOOD RISK |
| S3.001 | Soutlet 3 | | 61.219 | -0.106 | 0.000 | 0.54 | | 35.0 | OK |
| S4.000 | Schannel 4 | | 62.081 | 0.053 | 0.000 | 1.48 | | 16.1 | FLOOD RISK |
| S4.001 | Soutlet 4 | | 61.569 | -0.075 | 0.000 | 0.49 | | 16.2 | OK |
| S5.000 | Schannel 5 | | 61.628 | -0.066 | 0.000 | 0.84 | | 25.0 | FLOOD RISK |
| S5.001 | Soutlet 5 | | 61.273 | -0.046 | 0.000 | 0.82 | | 24.9 | OK |
| S1.004 | S2 | | 60.875 | 0.328 | 0.000 | 0.11 | | 7.0 | SURCHARGED |
| S6.000 | Sjunction | | 60.370 | -0.195 | 0.000 | 0.04 | | 4.4 | OK* |
| S6.001 | Sex30 | | 59.146 | -0.031 | 0.000 | 0.01 | | 2.1 | OK |
| S6.002 | Sex29 | | 59.143 | 1.158 | 0.000 | 0.03 | | 2.1 | SURCHARGED |
| S6.003 | Sjunction | | 57.710 | 0.000 | 0.000 | 0.01 | | 1.4 | SURCHARGED* |
| S1.005 | S3 | | 59.139 | 1.494 | 0.000 | 0.09 | | 8.9 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | Schannel 1 | |
| S1.001 | Soutlet 1 | |
| S2.000 | Schannel 2 | |
| S2.001 | Soutlet 2 | |
| S1.002 | S1 | |
| S1.003 | Stank | |
| S3.000 | Schannel 3 | 1 |
| S3.001 | Soutlet 3 | |
| S4.000 | Schannel 4 | |
| S4.001 | Soutlet 4 | |
| S5.000 | Schannel 5 | |
| S5.001 | Soutlet 5 | |
| S1.004 | S2 | |
| S6.000 | Sjunction | |
| S6.001 | Sex30 | |
| S6.002 | Sex29 | |
| S6.003 | Sjunction | |
| S1.005 | S3 | |

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

### Simulation Criteria

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

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

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.357 |
| Region | England and Wales | Cv (Summer) | 1.000 |
| M5-60 (mm) | 18.000 | Cv (Winter) | 1.000 |

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

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 45 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow |
|---|---|---|---|---|---|---|---|
| S1.000 | Schannel 1 | 15 Summer | 100 | +45% | 30/15 Summer | | |
| S1.001 | Soutlet 1 | 15 Summer | 100 | +45% | | | |
| S2.000 | Schannel 2 | 15 Summer | 100 | +45% | 100/15 Summer | | |
| S2.001 | Soutlet 2 | 15 Summer | 100 | +45% | 100/15 Summer | | |
| S1.002 | S1 | 240 Winter | 100 | +45% | 30/30 Summer | | |
| S1.003 | Stank | 240 Winter | 100 | +45% | 30/30 Summer | | |
| S3.000 | Schannel 3 | 15 Summer | 100 | +45% | 30/15 Summer | 100/15 Summer | |
| S3.001 | Soutlet 3 | 180 Winter | 100 | +45% | 100/15 Summer | | |
| S4.000 | Schannel 4 | 15 Summer | 100 | +45% | 30/15 Summer | | |
| S4.001 | Soutlet 4 | 180 Winter | 100 | +45% | | | |
| S5.000 | Schannel 5 | 15 Summer | 100 | +45% | 100/15 Summer | | |
| S5.001 | Soutlet 5 | 15 Summer | 100 | +45% | 100/15 Summer | | |
| S1.004 | S2 | 180 Winter | 100 | +45% | 30/15 Summer | | |
| S6.000 | Sjunction | 15 Summer | 100 | +45% | | | |
| S6.001 | Sex30 | 120 Summer | 100 | +45% | | | |
| S6.002 | Sex29 | 120 Summer | 100 | +45% | 1/15 Summer | | |
| S6.003 | Sjunction | 120 Winter | 100 | +45% | | | |
| S1.005 | S3 | 120 Summer | 100 | +45% | 1/15 Summer | | |

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

| PN | US/MH Name | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | Schannel 1 | | 62.883 | 0.170 | 0.000 | 2.46 | | 26.7 | FLOOD RISK |
| S1.001 | Soutlet 1 | | 62.537 | -0.052 | 0.000 | 0.74 | | 26.5 | OK |
| S2.000 | Schannel 2 | | 62.445 | 0.090 | 0.000 | 1.35 | | 40.3 | FLOOD RISK |
| S2.001 | Soutlet 2 | | 62.361 | 0.137 | 0.000 | 1.22 | | 40.1 | SURCHARGED |
| S1.002 | S1 | | 61.512 | 0.862 | 0.000 | 0.28 | | 13.9 | SURCHARGED |
| S1.003 | Stank | | 61.511 | 0.894 | 0.000 | 0.08 | | 8.5 | SURCHARGED |
| S3.000 | Schannel 3 | | 61.850 | 0.225 | 0.238 | 2.34 | | 69.8 | FLOOD |
| S3.001 | Soutlet 3 | | 61.591 | 0.266 | 0.000 | 0.30 | | 19.6 | FLOOD RISK |
| S4.000 | Schannel 4 | | 62.237 | 0.209 | 0.000 | 2.71 | | 29.4 | FLOOD RISK |
| S4.001 | Soutlet 4 | | 61.607 | -0.037 | 0.000 | 0.25 | | 8.1 | OK |
| S5.000 | Schannel 5 | | 61.786 | 0.092 | 0.000 | 1.56 | | 46.7 | FLOOD RISK |
| S5.001 | Soutlet 5 | | 61.633 | 0.314 | 0.000 | 1.54 | | 46.5 | FLOOD RISK |
| S1.004 | S2 | | 61.602 | 1.055 | 0.000 | 0.11 | | 7.0 | SURCHARGED |
| S6.000 | Sjunction | | 60.383 | -0.182 | 0.000 | 0.08 | | 8.1 | OK* |
| S6.001 | Sex30 | | 59.150 | -0.027 | 0.000 | 0.03 | | 3.9 | OK |
| S6.002 | Sex29 | | 59.145 | 1.160 | 0.000 | 0.05 | | 3.9 | SURCHARGED |
| S6.003 | Sjunction | | 57.710 | 0.000 | 0.000 | 0.02 | | 2.6 | SURCHARGED* |
| S1.005 | S3 | | 59.140 | 1.495 | 0.000 | 0.11 | | 10.6 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | Schannel 1 | |
| S1.001 | Soutlet 1 | |
| S2.000 | Schannel 2 | |
| S2.001 | Soutlet 2 | |
| S1.002 | S1 | |
| S1.003 | Stank | |
| S3.000 | Schannel 3 | 1 |
| S3.001 | Soutlet 3 | |
| S4.000 | Schannel 4 | |
| S4.001 | Soutlet 4 | |
| S5.000 | Schannel 5 | |
| S5.001 | Soutlet 5 | |
| S1.004 | S2 | |
| S6.000 | Sjunction | |
| S6.001 | Sex30 | |
| S6.002 | Sex29 | |
| S6.003 | Sjunction | |
| S1.005 | S3 | |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | x |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Width (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|---|
| OU2 | 0.096 | 5.00 | 64.363 | 450 | 450 | 388184.011 | 396869.882 | 1.100 |
| OU1 | 0.025 | 5.00 | 64.312 | 450 | 450 | 388243.207 | 396855.808 | 1.000 |
| CP01 | 0.056 | 5.00 | 64.119 | 1200 | | 388224.470 | 396863.140 | 1.129 |
| PI | | | 64.205 | 600 | | 388227.098 | 396873.038 | 1.326 |
| CP02 | | 5.00 | 64.102 | 600 | | 388227.855 | 396864.050 | 1.500 |
| CP03 | | | 64.250 | 1200 | | 388231.194 | 396876.506 | 1.700 |
| CP04 | | | 64.231 | 1200 | | 388228.176 | 396877.310 | 1.693 |
| CP05 | | | 64.233 | 1200 | | 388225.157 | 396878.114 | 2.456 |
| EX MH1 | | | 64.520 | 1200 | | 388234.313 | 396913.353 | 3.332 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | OU2 | CP01 | 41.017 | 0.600 | 63.263 | 62.990 | 0.273 | 150.0 | 225 | 5.64 | 50.0 |
| 2.000 | OU1 | CP01 | 20.120 | 0.600 | 63.312 | 63.111 | 0.201 | 100.0 | 150 | 5.33 | 50.0 |
| 1.001 | CP01 | PI | 10.241 | 0.600 | 62.990 | 62.929 | 0.061 | 167.0 | 225 | 5.81 | 50.0 |
| 1.002 | PI | CP04 | 4.406 | 0.600 | 62.879 | 62.853 | 0.026 | 167.0 | 225 | 5.88 | 50.0 |
| 3.000 | CP02 | CP03 | 12.896 | 0.600 | 62.602 | 62.550 | 0.052 | 250.0 | 300 | 5.22 | 50.0 |
| 3.001 | CP03 | CP04 | 3.123 | 0.600 | 62.550 | 62.538 | 0.012 | 250.0 | 300 | 5.27 | 50.0 |
| 1.003 | CP04 | CP05 | 3.124 | 0.600 | 62.538 | 62.507 | 0.031 | 100.0 | 150 | 5.94 | 50.0 |
| 1.004 | CP05 | EX MH1 | 36.409 | 0.600 | 61.777 | 61.188 | 0.589 | 61.8 | 225 | 6.19 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 45 | 0 | 0 |

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## Node EX MH1 Surcharged Outfall

| | | | | | |
|---|---|---|---|---|---|
| Overrides Design Area | x | Depression Storage Area (m²) | 0 | Evapo-transpiration (mm/day) | 0 |
| Overrides Design Additional Inflow | x | Depression Storage Depth (mm) | 0 | | |

Applies to 100yr+45% CC 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 minute storms

| Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1.750 | 300 | 1.750 | 600 | 1.750 | 900 | 1.750 | 1200 | 1.750 |
| 60 | 1.750 | 360 | 1.750 | 660 | 1.750 | 960 | 1.750 | 1260 | 1.750 |
| 120 | 1.750 | 420 | 1.750 | 720 | 1.750 | 1020 | 1.750 | 1320 | 1.750 |
| 180 | 1.750 | 480 | 1.750 | 780 | 1.750 | 1080 | 1.750 | 1380 | 1.750 |
| 240 | 1.750 | 540 | 1.750 | 840 | 1.750 | 1140 | 1.750 | 1440 | 1.750 |

## Node CP04 Online Hydro-Brake® Control

| | | | |
|---|---|---|---|
| Flap Valve | x | Objective | (HE) Minimise upstream storage |
| Replaces Downstream Link | ✓ | Sump Available | ✓ |
| Invert Level (m) | 62.538 | Product Number | CTL-SHE-0098-5000-1500-5000 |
| Design Depth (m) | 1.500 | Min Outlet Diameter (m) | 0.150 |
| Design Flow (l/s) | 5.0 | Min Node Diameter (mm) | 1200 |

## Node CP03 Depth/Area Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0 | Invert Level (m) | 62.600 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity | 1.00 | Time to half empty (mins) | 204 |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 80.0 | 0.0 | 0.800 | 80.0 | 0.0 | 0.801 | 0.0 | 0.0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 1 year 960 minute winter | 3.745 | 1.489 |
| 1 year 15 minute winter | 64.927 | 26.180 | 1 year 1440 minute summer | 4.127 | 1.106 |
| 1 year 30 minute summer | 60.022 | 16.984 | 1 year 1440 minute winter | 2.773 | 1.106 |
| 1 year 30 minute winter | 42.121 | 16.984 | 30 year 15 minute summer | 226.195 | 64.005 |
| 1 year 60 minute summer | 40.398 | 10.676 | 30 year 15 minute winter | 158.733 | 64.005 |
| 1 year 60 minute winter | 26.839 | 10.676 | 30 year 30 minute summer | 147.452 | 41.724 |
| 1 year 120 minute summer | 24.980 | 6.602 | 30 year 30 minute winter | 103.475 | 41.724 |
| 1 year 120 minute winter | 16.596 | 6.602 | 30 year 60 minute summer | 98.615 | 26.061 |
| 1 year 180 minute summer | 19.271 | 4.959 | 30 year 60 minute winter | 65.517 | 26.061 |
| 1 year 180 minute winter | 12.527 | 4.959 | 30 year 120 minute summer | 59.946 | 15.842 |
| 1 year 240 minute summer | 15.301 | 4.043 | 30 year 120 minute winter | 39.827 | 15.842 |
| 1 year 240 minute winter | 10.165 | 4.043 | 30 year 180 minute summer | 45.598 | 11.734 |
| 1 year 360 minute summer | 11.775 | 3.030 | 30 year 180 minute winter | 29.640 | 11.734 |
| 1 year 360 minute winter | 7.654 | 3.030 | 30 year 240 minute summer | 35.759 | 9.450 |
| 1 year 480 minute summer | 9.342 | 2.469 | 30 year 240 minute winter | 23.758 | 9.450 |
| 1 year 480 minute winter | 6.207 | 2.469 | 30 year 360 minute summer | 26.939 | 6.932 |
| 1 year 600 minute summer | 7.682 | 2.101 | 30 year 360 minute winter | 17.511 | 6.932 |
| 1 year 600 minute winter | 5.249 | 2.101 | 30 year 480 minute summer | 20.981 | 5.545 |
| 1 year 720 minute summer | 6.859 | 1.838 | 30 year 480 minute winter | 13.940 | 5.545 |
| 1 year 720 minute winter | 4.609 | 1.838 | 30 year 600 minute summer | 17.039 | 4.661 |
| 1 year 960 minute summer | 5.653 | 1.489 | 30 year 600 minute winter | 11.642 | 4.661 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 30 year 720 minute summer | 15.093 | 4.045 | 100 year +45% CC 180 minute winter | 56.520 | 22.375 |
| 30 year 720 minute winter | 10.143 | 4.045 | 100 year +45% CC 240 minute summer | 68.114 | 18.001 |
| 30 year 960 minute summer | 12.278 | 3.233 | 100 year +45% CC 240 minute winter | 45.253 | 18.001 |
| 30 year 960 minute winter | 8.133 | 3.233 | 100 year +45% CC 360 minute summer | 51.133 | 13.158 |
| 30 year 1440 minute summer | 8.788 | 2.355 | 100 year +45% CC 360 minute winter | 33.238 | 13.158 |
| 30 year 1440 minute winter | 5.906 | 2.355 | 100 year +45% CC 480 minute summer | 39.658 | 10.480 |
| 100 year +45% CC 15 minute summer | 423.061 | 119.712 | 100 year +45% CC 480 minute winter | 26.348 | 10.480 |
| 100 year +45% CC 15 minute winter | 296.885 | 119.712 | 100 year +45% CC 600 minute summer | 32.099 | 8.780 |
| 100 year +45% CC 30 minute summer | 278.374 | 78.770 | 100 year +45% CC 600 minute winter | 21.932 | 8.780 |
| 100 year +45% CC 30 minute winter | 195.350 | 78.770 | 100 year +45% CC 720 minute summer | 28.365 | 7.602 |
| 100 year +45% CC 60 minute summer | 187.417 | 49.529 | 100 year +45% CC 720 minute winter | 19.063 | 7.602 |
| 100 year +45% CC 60 minute winter | 124.515 | 49.529 | 100 year +45% CC 960 minute summer | 22.984 | 6.052 |
| 100 year +45% CC 120 minute summer | 114.312 | 30.209 | 100 year +45% CC 960 minute winter | 15.225 | 6.052 |
| 100 year +45% CC 120 minute winter | 75.946 | 30.209 | 100 year +45% CC 1440 minute summer | 16.353 | 4.383 |
| 100 year +45% CC 180 minute summer | 86.951 | 22.375 | 100 year +45% CC 1440 minute winter | 10.990 | 4.383 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 98.99%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU2 | 10 | 63.341 | 0.078 | 11.4 | 0.1522 | 0.0000 | OK |
| 15 minute winter | OU1 | 10 | 63.354 | 0.042 | 3.0 | 0.0294 | 0.0000 | OK |
| 15 minute winter | CP01 | 11 | 63.113 | 0.123 | 20.7 | 0.2607 | 0.0000 | OK |
| 15 minute winter | PI | 11 | 63.007 | 0.128 | 20.4 | 0.0362 | 0.0000 | OK |
| 30 minute winter | CP02 | 28 | 62.680 | 0.078 | 0.4 | 0.0222 | 0.0000 | OK |
| 30 minute winter | CP03 | 28 | 62.680 | 0.130 | 12.0 | 6.6212 | 0.0000 | OK |
| 30 minute winter | CP04 | 28 | 62.680 | 0.142 | 15.9 | 0.1610 | 0.0000 | OK |
| 30 minute winter | CP05 | 28 | 61.815 | 0.038 | 4.0 | 0.0430 | 0.0000 | OK |
| 30 minute winter | EX MH1 | 28 | 61.226 | 0.038 | 4.0 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU2 | 1.000 | CP01 | 11.1 | 0.659 | 0.263 | 0.7030 | |
| 15 minute winter | OU1 | 2.000 | CP01 | 2.9 | 0.735 | 0.163 | 0.0794 | |
| 15 minute winter | CP01 | 1.001 | PI | 20.4 | 0.972 | 0.510 | 0.2153 | |
| 15 minute winter | PI | 1.002 | CP04 | 20.5 | 0.945 | 0.510 | 0.0954 | |
| 30 minute winter | CP02 | 3.000 | CP03 | -0.4 | -0.036 | -0.005 | 0.2838 | |
| 30 minute winter | CP03 | 3.001 | CP04 | -12.0 | -0.554 | -0.171 | 0.0973 | |
| 30 minute winter | CP04 | Hydro-Brake® | CP05 | 4.0 | | | | |
| 30 minute winter | CP05 | 1.004 | EX MH1 | 4.0 | 0.923 | 0.061 | 0.1594 | 12.6 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 98.99%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU2 | 10 | 63.394 | 0.131 | 28.0 | 0.2544 | 0.0000 | OK |
| 15 minute winter | OU1 | 10 | 63.378 | 0.066 | 7.3 | 0.0467 | 0.0000 | OK |
| 15 minute winter | CP01 | 11 | 63.266 | 0.276 | 51.0 | 0.5861 | 0.0000 | SURCHARGED |
| 15 minute winter | PI | 11 | 63.132 | 0.253 | 49.5 | 0.0715 | 0.0000 | SURCHARGED |
| 60 minute winter | CP02 | 55 | 62.887 | 0.285 | 0.7 | 0.0806 | 0.0000 | OK |
| 60 minute winter | CP03 | 55 | 62.887 | 0.337 | 21.4 | 23.3580 | 0.0000 | SURCHARGED |
| 60 minute winter | CP04 | 55 | 62.887 | 0.349 | 26.3 | 0.3944 | 0.0000 | SURCHARGED |
| 60 minute winter | CP05 | 55 | 61.819 | 0.042 | 4.9 | 0.0470 | 0.0000 | OK |
| 60 minute winter | EX MH1 | 55 | 61.229 | 0.041 | 4.9 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU2 | 1.000 | CP01 | 27.5 | 0.785 | 0.648 | 1.3056 | |
| 15 minute winter | OU1 | 2.000 | CP01 | 7.2 | 0.849 | 0.406 | 0.2509 | |
| 15 minute winter | CP01 | 1.001 | PI | 49.5 | 1.245 | 1.233 | 0.3966 | |
| 15 minute winter | PI | 1.002 | CP04 | 49.5 | 1.260 | 1.233 | 0.1646 | |
| 60 minute winter | CP02 | 3.000 | CP03 | -0.7 | -0.024 | -0.010 | 0.8996 | |
| 60 minute winter | CP03 | 3.001 | CP04 | -21.4 | -0.484 | -0.306 | 0.2199 | |
| 60 minute winter | CP04 | Hydro-Brake® | CP05 | 4.9 | | | | |
| 60 minute winter | CP05 | 1.004 | EX MH1 | 4.9 | 0.974 | 0.073 | 0.1814 | 38.7 |

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**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.99%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU2 | 11 | 64.149 | 0.886 | 52.3 | 1.7255 | 0.0000 | FLOOD RISK |
| 15 minute winter | OU1 | 11 | 63.859 | 0.547 | 13.6 | 0.3846 | 0.0000 | SURCHARGED |
| 15 minute winter | CP01 | 11 | 63.747 | 0.757 | 88.5 | 1.6073 | 0.0000 | SURCHARGED |
| 240 minute winter | PI | 184 | 63.469 | 0.590 | 17.6 | 0.1669 | 0.0000 | SURCHARGED |
| 240 minute winter | CP02 | 184 | 63.468 | 0.866 | 0.3 | 0.2451 | 0.0000 | SURCHARGED |
| 240 minute winter | CP03 | 184 | 63.467 | 0.917 | 14.2 | 65.1171 | 0.0000 | SURCHARGED |
| 240 minute winter | CP04 | 184 | 63.468 | 0.930 | 17.2 | 1.0515 | 0.0000 | SURCHARGED |
| 60 minute summer | CP05 | 34 | 62.946 | 1.169 | 4.7 | 1.3219 | 0.0000 | SURCHARGED |
| 15 minute summer | EX MH1 | 1 | 62.938 | 1.750 | 2.5 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU2 | 1.000 | CP01 | 47.8 | 1.202 | 1.129 | 1.6313 | |
| 15 minute winter | OU1 | 2.000 | CP01 | 12.2 | 0.829 | 0.689 | 0.3542 | |
| 15 minute winter | CP01 | 1.001 | PI | 87.2 | 2.194 | 2.175 | 0.4073 | |
| 240 minute winter | PI | 1.002 | CP04 | 17.2 | 0.868 | 0.429 | 0.1752 | |
| 240 minute winter | CP02 | 3.000 | CP03 | -0.3 | -0.020 | -0.004 | 0.9081 | |
| 240 minute winter | CP03 | 3.001 | CP04 | -14.2 | -0.248 | -0.203 | 0.2199 | |
| 240 minute winter | CP04 | Hydro-Brake® | CP05 | 4.9 | | | | |
| 60 minute summer | CP05 | 1.004 | EX MH1 | 4.7 | 0.119 | 0.072 | 1.4480 | 32.9 |

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**Appendix H**

Existing Surface Water Flows calculations

## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | ✓ |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| END 1 | 0.035 | 5.00 | 64.560 | | 388153.184 | 396888.711 | 2.550 |
| MH8 | 0.035 | 5.00 | 64.290 | 1200 | 388158.667 | 396939.466 | 0.540 |
| MH9 | 0.035 | 5.00 | 64.280 | 1200 | 388160.137 | 396941.537 | 0.630 |
| END 2 | 0.035 | 5.00 | 64.320 | | 388174.482 | 396937.195 | 1.250 |
| MH10 | 0.035 | 5.00 | 64.440 | 1200 | 388167.198 | 396939.714 | 3.240 |
| OF | | | 64.240 | 1200 | 388169.872 | 396949.660 | 3.143 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | END 1 | MH10 | 52.910 | 0.600 | 62.010 | 61.275 | 0.735 | 72.0 | 150 | 5.74 | 50.0 |
| 2.000 | MH8 | MH9 | 2.540 | 0.600 | 63.750 | 63.650 | 0.100 | 25.4 | 150 | 5.02 | 50.0 |
| 2.001 | MH9 | MH10 | 7.293 | 0.600 | 63.650 | 63.190 | 0.460 | 15.9 | 150 | 5.07 | 50.0 |
| 3.000 | END 2 | MH10 | 7.707 | 0.600 | 63.070 | 62.890 | 0.180 | 42.8 | 150 | 5.08 | 50.0 |
| 1.001 | MH10 | OF | 10.299 | 0.600 | 61.200 | 61.097 | 0.103 | 100.0 | 225 | 5.87 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 30 year 360 minute summer | 26.939 | 6.932 |
| 1 year 15 minute winter | 64.927 | 26.180 | 30 year 360 minute winter | 17.511 | 6.932 |
| 1 year 30 minute summer | 60.022 | 16.984 | 30 year 480 minute summer | 20.981 | 5.545 |
| 1 year 30 minute winter | 42.121 | 16.984 | 30 year 480 minute winter | 13.940 | 5.545 |
| 1 year 60 minute summer | 40.398 | 10.676 | 30 year 600 minute summer | 17.039 | 4.661 |
| 1 year 60 minute winter | 26.839 | 10.676 | 30 year 600 minute winter | 11.642 | 4.661 |
| 1 year 120 minute summer | 24.980 | 6.602 | 30 year 720 minute summer | 15.093 | 4.045 |
| 1 year 120 minute winter | 16.596 | 6.602 | 30 year 720 minute winter | 10.143 | 4.045 |
| 1 year 180 minute summer | 19.271 | 4.959 | 30 year 960 minute summer | 12.278 | 3.233 |
| 1 year 180 minute winter | 12.527 | 4.959 | 30 year 960 minute winter | 8.133 | 3.233 |
| 1 year 240 minute summer | 15.301 | 4.043 | 30 year 1440 minute summer | 8.788 | 2.355 |
| 1 year 240 minute winter | 10.165 | 4.043 | 30 year 1440 minute winter | 5.906 | 2.355 |
| 1 year 360 minute summer | 11.775 | 3.030 | 100 year 15 minute summer | 291.766 | 82.560 |
| 1 year 360 minute winter | 7.654 | 3.030 | 100 year 15 minute winter | 204.748 | 82.560 |
| 1 year 480 minute summer | 9.342 | 2.469 | 100 year 30 minute summer | 191.982 | 54.324 |
| 1 year 480 minute winter | 6.207 | 2.469 | 100 year 30 minute winter | 134.724 | 54.324 |
| 1 year 600 minute summer | 7.682 | 2.101 | 100 year 60 minute summer | 129.253 | 34.158 |
| 1 year 600 minute winter | 5.249 | 2.101 | 100 year 60 minute winter | 85.873 | 34.158 |
| 1 year 720 minute summer | 6.859 | 1.838 | 100 year 120 minute summer | 78.836 | 20.834 |
| 1 year 720 minute winter | 4.609 | 1.838 | 100 year 120 minute winter | 52.377 | 20.834 |
| 1 year 960 minute summer | 5.653 | 1.489 | 100 year 180 minute summer | 59.966 | 15.431 |
| 1 year 960 minute winter | 3.745 | 1.489 | 100 year 180 minute winter | 38.980 | 15.431 |
| 1 year 1440 minute summer | 4.127 | 1.106 | 100 year 240 minute summer | 46.975 | 12.414 |
| 1 year 1440 minute winter | 2.773 | 1.106 | 100 year 240 minute winter | 31.209 | 12.414 |
| 30 year 15 minute summer | 226.195 | 64.005 | 100 year 360 minute summer | 35.264 | 9.075 |
| 30 year 15 minute winter | 158.733 | 64.005 | 100 year 360 minute winter | 22.923 | 9.075 |
| 30 year 30 minute summer | 147.452 | 41.724 | 100 year 480 minute summer | 27.350 | 7.228 |
| 30 year 30 minute winter | 103.475 | 41.724 | 100 year 480 minute winter | 18.171 | 7.228 |
| 30 year 60 minute summer | 98.615 | 26.061 | 100 year 600 minute summer | 22.137 | 6.055 |
| 30 year 60 minute winter | 65.517 | 26.061 | 100 year 600 minute winter | 15.126 | 6.055 |
| 30 year 120 minute summer | 59.946 | 15.842 | 100 year 720 minute summer | 19.562 | 5.243 |
| 30 year 120 minute winter | 39.827 | 15.842 | 100 year 720 minute winter | 13.147 | 5.243 |
| 30 year 180 minute summer | 45.598 | 11.734 | 100 year 960 minute summer | 15.851 | 4.174 |
| 30 year 180 minute winter | 29.640 | 11.734 | 100 year 960 minute winter | 10.500 | 4.174 |
| 30 year 240 minute summer | 35.759 | 9.450 | 100 year 1440 minute summer | 11.278 | 3.023 |
| 30 year 240 minute winter | 23.758 | 9.450 | 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END 1 | 11 | 62.054 | 0.044 | 4.2 | 0.0122 | 0.0000 | OK |
| 15 minute winter | MH8 | 10 | 63.788 | 0.038 | 4.2 | 0.0921 | 0.0000 | OK |
| 15 minute winter | MH9 | 10 | 63.696 | 0.046 | 8.3 | 0.1040 | 0.0000 | OK |
| 15 minute winter | END 2 | 10 | 63.111 | 0.041 | 4.2 | 0.0228 | 0.0000 | OK |
| 15 minute winter | MH10 | 10 | 61.306 | 0.106 | 20.4 | 0.1431 | 0.0000 | OK |
| 15 minute winter | OF | 10 | 61.194 | 0.097 | 20.2 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END 1 | 1.000 | MH10 | 4.0 | 0.917 | 0.191 | 0.2305 | |
| 15 minute winter | MH8 | 2.000 | MH9 | 4.1 | 1.020 | 0.117 | 0.0103 | |
| 15 minute winter | MH9 | 2.001 | MH10 | 8.2 | 1.857 | 0.183 | 0.0323 | |
| 15 minute winter | END 2 | 3.000 | MH10 | 4.1 | 1.097 | 0.152 | 0.0291 | |
| 15 minute winter | MH10 | 1.001 | OF | 20.2 | 1.167 | 0.389 | 0.1788 | 9.6 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END 1 | 10 | 62.083 | 0.073 | 10.2 | 0.0200 | 0.0000 | OK |
| 15 minute winter | MH8 | 10 | 63.816 | 0.066 | 10.2 | 0.1600 | 0.0000 | OK |
| 15 minute winter | MH9 | 10 | 63.729 | 0.079 | 20.3 | 0.1761 | 0.0000 | OK |
| 15 minute winter | END 2 | 10 | 63.136 | 0.066 | 10.2 | 0.0371 | 0.0000 | OK |
| 15 minute winter | MH10 | 11 | 61.403 | 0.203 | 50.4 | 0.2737 | 0.0000 | OK |
| 15 minute winter | OF | 11 | 61.270 | 0.173 | 49.5 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END 1 | 1.000 | MH10 | 10.0 | 0.983 | 0.476 | 0.6445 | |
| 15 minute winter | MH8 | 2.000 | MH9 | 10.1 | 1.202 | 0.284 | 0.0213 | |
| 15 minute winter | MH9 | 2.001 | MH10 | 20.1 | 2.306 | 0.448 | 0.0636 | |
| 15 minute winter | END 2 | 3.000 | MH10 | 10.1 | 1.391 | 0.371 | 0.0561 | |
| 15 minute winter | MH10 | 1.001 | OF | 49.5 | 1.397 | 0.953 | 0.3632 | 23.5 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END 1 | 10 | 62.095 | 0.085 | 13.1 | 0.0233 | 0.0000 | OK |
| 15 minute winter | MH8 | 10 | 63.829 | 0.079 | 13.1 | 0.1910 | 0.0000 | OK |
| 15 minute winter | MH9 | 10 | 63.743 | 0.093 | 26.1 | 0.2088 | 0.0000 | OK |
| 15 minute winter | END 2 | 10 | 63.147 | 0.077 | 13.1 | 0.0431 | 0.0000 | OK |
| 15 minute winter | MH10 | 11 | 61.524 | 0.324 | 64.8 | 0.4364 | 0.0000 | SURCHARGED |
| 15 minute winter | OF | 11 | 61.301 | 0.204 | 63.7 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END 1 | 1.000 | MH10 | 12.9 | 0.971 | 0.614 | 0.7372 | |
| 15 minute winter | MH8 | 2.000 | MH9 | 13.0 | 1.243 | 0.366 | 0.0265 | |
| 15 minute winter | MH9 | 2.001 | MH10 | 25.9 | 2.428 | 0.575 | 0.0776 | |
| 15 minute winter | END 2 | 3.000 | MH10 | 13.0 | 1.479 | 0.477 | 0.0678 | |
| 15 minute winter | MH10 | 1.001 | OF | 63.7 | 1.603 | 1.226 | 0.3996 | 30.2 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | x |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| IS1 | 0.110 | 5.00 | 64.210 | 1200 | 388197.589 | 396883.346 | 0.600 |
| OU | 0.076 | 5.00 | 64.310 | 450 | 388191.325 | 396912.170 | 0.700 |
| JUN | 0.110 | 5.00 | 64.310 | | 388187.662 | 396914.177 | 1.092 |
| MH7 | 0.110 | 5.00 | 64.290 | 1350 | 388184.940 | 396922.689 | 1.180 |
| MH3 | 0.060 | 5.00 | 64.240 | 1200 | 388161.516 | 396964.037 | 0.770 |
| MH4 | 0.060 | 5.00 | 64.250 | 1200 | 388182.456 | 396957.895 | 1.280 |
| MH5 | 0.060 | 5.00 | 64.270 | 1200 | 388185.198 | 396941.912 | 1.590 |
| MH6-OF | | | 64.330 | 1200 | 388191.134 | 396940.020 | 1.830 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | IS1 | JUN | 32.390 | 0.600 | 63.610 | 63.218 | 0.392 | 82.6 | 100 | 5.54 | 50.0 |
| 2.000 | OU | JUN | 4.177 | 0.600 | 63.610 | 63.218 | 0.392 | 10.7 | 100 | 5.07 | 50.0 |
| 1.001 | JUN | MH7 | 8.936 | 0.600 | 63.218 | 63.110 | 0.108 | 82.7 | 100 | 5.69 | 50.0 |
| 1.002 | MH7 | MH5 | 19.225 | 0.600 | 63.110 | 62.680 | 0.430 | 44.7 | 100 | 5.98 | 50.0 |
| 4.000 | MH3 | MH4 | 6.095 | 0.600 | 63.470 | 62.970 | 0.500 | 12.2 | 100 | 5.07 | 50.0 |
| 3.001 | MH4 | MH5 | 21.822 | 0.600 | 62.970 | 62.680 | 0.290 | 75.2 | 100 | 5.53 | 50.0 |
| 1.003 | MH5 | MH6-OF | 6.230 | 0.600 | 62.680 | 62.500 | 0.180 | 34.6 | 100 | 6.08 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 30 year 360 minute summer | 26.939 | 6.932 |
| 1 year 15 minute winter | 64.927 | 26.180 | 30 year 360 minute winter | 17.511 | 6.932 |
| 1 year 30 minute summer | 60.022 | 16.984 | 30 year 480 minute summer | 20.981 | 5.545 |
| 1 year 30 minute winter | 42.121 | 16.984 | 30 year 480 minute winter | 13.940 | 5.545 |
| 1 year 60 minute summer | 40.398 | 10.676 | 30 year 600 minute summer | 17.039 | 4.661 |
| 1 year 60 minute winter | 26.839 | 10.676 | 30 year 600 minute winter | 11.642 | 4.661 |
| 1 year 120 minute summer | 24.980 | 6.602 | 30 year 720 minute summer | 15.093 | 4.045 |
| 1 year 120 minute winter | 16.596 | 6.602 | 30 year 720 minute winter | 10.143 | 4.045 |
| 1 year 180 minute summer | 19.271 | 4.959 | 30 year 960 minute summer | 12.278 | 3.233 |
| 1 year 180 minute winter | 12.527 | 4.959 | 30 year 960 minute winter | 8.133 | 3.233 |
| 1 year 240 minute summer | 15.301 | 4.043 | 30 year 1440 minute summer | 8.788 | 2.355 |
| 1 year 240 minute winter | 10.165 | 4.043 | 30 year 1440 minute winter | 5.906 | 2.355 |
| 1 year 360 minute summer | 11.775 | 3.030 | 100 year 15 minute summer | 291.766 | 82.560 |
| 1 year 360 minute winter | 7.654 | 3.030 | 100 year 15 minute winter | 204.748 | 82.560 |
| 1 year 480 minute summer | 9.342 | 2.469 | 100 year 30 minute summer | 191.982 | 54.324 |
| 1 year 480 minute winter | 6.207 | 2.469 | 100 year 30 minute winter | 134.724 | 54.324 |
| 1 year 600 minute summer | 7.682 | 2.101 | 100 year 60 minute summer | 129.253 | 34.158 |
| 1 year 600 minute winter | 5.249 | 2.101 | 100 year 60 minute winter | 85.873 | 34.158 |
| 1 year 720 minute summer | 6.859 | 1.838 | 100 year 120 minute summer | 78.836 | 20.834 |
| 1 year 720 minute winter | 4.609 | 1.838 | 100 year 120 minute winter | 52.377 | 20.834 |
| 1 year 960 minute summer | 5.653 | 1.489 | 100 year 180 minute summer | 59.966 | 15.431 |
| 1 year 960 minute winter | 3.745 | 1.489 | 100 year 180 minute winter | 38.980 | 15.431 |
| 1 year 1440 minute summer | 4.127 | 1.106 | 100 year 240 minute summer | 46.975 | 12.414 |
| 1 year 1440 minute winter | 2.773 | 1.106 | 100 year 240 minute winter | 31.209 | 12.414 |
| 30 year 15 minute summer | 226.195 | 64.005 | 100 year 360 minute summer | 35.264 | 9.075 |
| 30 year 15 minute winter | 158.733 | 64.005 | 100 year 360 minute winter | 22.923 | 9.075 |
| 30 year 30 minute summer | 147.452 | 41.724 | 100 year 480 minute summer | 27.350 | 7.228 |
| 30 year 30 minute winter | 103.475 | 41.724 | 100 year 480 minute winter | 18.171 | 7.228 |
| 30 year 60 minute summer | 98.615 | 26.061 | 100 year 600 minute summer | 22.137 | 6.055 |
| 30 year 60 minute winter | 65.517 | 26.061 | 100 year 600 minute winter | 15.126 | 6.055 |
| 30 year 120 minute summer | 59.946 | 15.842 | 100 year 720 minute summer | 19.562 | 5.243 |
| 30 year 120 minute winter | 39.827 | 15.842 | 100 year 720 minute winter | 13.147 | 5.243 |
| 30 year 180 minute summer | 45.598 | 11.734 | 100 year 960 minute summer | 15.851 | 4.174 |
| 30 year 180 minute winter | 29.640 | 11.734 | 100 year 960 minute winter | 10.500 | 4.174 |
| 30 year 240 minute summer | 35.759 | 9.450 | 100 year 1440 minute summer | 11.278 | 3.023 |
| 30 year 240 minute winter | 23.758 | 9.450 | 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.53%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 30 minute winter | IS1 | 19 | 64.210 | 0.600 | 11.7 | 2.8788 | 4.0680 | FLOOD |
| 15 minute winter | OU | 12 | 64.310 | 0.700 | 9.2 | 1.6310 | 1.0475 | FLOOD |
| 15 minute winter | JUN | 12 | 64.310 | 1.092 | 16.8 | 2.2155 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH7 | 13 | 64.273 | 1.163 | 20.5 | 3.8327 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH3 | 14 | 63.820 | 0.350 | 7.1 | 0.9420 | 0.0000 | SURCHARGED |
| 15 minute winter | MH4 | 14 | 63.799 | 0.829 | 12.4 | 1.7142 | 0.0000 | SURCHARGED |
| 15 minute winter | MH5 | 13 | 63.544 | 0.864 | 22.5 | 1.6287 | 0.0000 | SURCHARGED |
| 15 minute winter | MH6-OF | 30 | 62.600 | 0.100 | 20.8 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 30 minute winter | IS1 | 1.000 | JUN | 4.4 | 0.574 | 0.668 | 0.2534 | |
| 15 minute winter | OU | 2.000 | JUN | 4.6 | 0.758 | 0.248 | 0.0327 | |
| 15 minute winter | JUN | 1.001 | MH7 | 8.6 | 1.098 | 1.292 | 0.0699 | |
| 15 minute winter | MH7 | 1.002 | MH5 | 10.9 | 1.396 | 1.203 | 0.1504 | |
| 15 minute winter | MH3 | 4.000 | MH4 | 5.7 | 0.855 | 0.325 | 0.0477 | |
| 15 minute winter | MH4 | 3.001 | MH5 | 6.4 | 0.814 | 0.914 | 0.1707 | |
| 15 minute winter | MH5 | 1.003 | MH6-OF | 20.8 | 2.662 | 2.016 | 0.0486 | 28.0 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.53%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 180 minute winter | IS1 | 80 | 64.210 | 0.600 | 10.7 | 2.8788 | 25.3979 | FLOOD |
| 60 minute winter | OU | 26 | 64.310 | 0.700 | 18.1 | 1.6310 | 15.8615 | FLOOD |
| 15 minute summer | JUN | 9 | 64.310 | 1.092 | 30.5 | 2.7305 | 0.0000 | FLOOD RISK |
| 30 minute winter | MH7 | 15 | 64.290 | 1.180 | 32.8 | 3.8893 | 10.7255 | FLOOD |
| 30 minute winter | MH3 | 17 | 64.240 | 0.770 | 15.5 | 2.0705 | 5.3899 | FLOOD |
| 15 minute winter | MH4 | 10 | 64.250 | 1.280 | 17.6 | 2.6470 | 1.6836 | FLOOD |
| 15 minute winter | MH5 | 11 | 64.096 | 1.416 | 31.3 | 2.6707 | 0.0000 | FLOOD RISK |
| 15 minute summer | MH6-OF | 33 | 62.600 | 0.100 | 25.9 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 180 minute winter | IS1 | 1.000 | JUN | 3.4 | 0.472 | 0.519 | 0.2534 | |
| 60 minute winter | OU | 2.000 | JUN | -6.8 | -0.866 | -0.362 | 0.0327 | |
| 15 minute summer | JUN | 1.001 | MH7 | 10.0 | 1.274 | 1.500 | 0.0699 | |
| 30 minute winter | MH7 | 1.002 | MH5 | 10.8 | 1.386 | 1.195 | 0.1504 | |
| 30 minute winter | MH3 | 4.000 | MH4 | 4.7 | 0.772 | 0.266 | 0.0477 | |
| 15 minute winter | MH4 | 3.001 | MH5 | 8.4 | 1.070 | 1.200 | 0.1707 | |
| 15 minute winter | MH5 | 1.003 | MH6-OF | 26.2 | 3.349 | 2.536 | 0.0487 | 36.4 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 99.53%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 240 minute winter | IS1 | 100 | 64.210 | 0.600 | 11.3 | 2.8788 | 38.8735 | FLOOD |
| 60 minute winter | OU | 23 | 64.310 | 0.700 | 24.3 | 1.6310 | 24.6315 | FLOOD |
| 15 minute summer | JUN | 8 | 64.310 | 1.092 | 39.3 | 3.1039 | 0.0000 | FLOOD RISK |
| 30 minute winter | MH7 | 13 | 64.290 | 1.180 | 42.8 | 3.8893 | 18.6544 | FLOOD |
| 60 minute winter | MH3 | 28 | 64.240 | 0.770 | 13.8 | 2.0705 | 10.2711 | FLOOD |
| 15 minute winter | MH4 | 9 | 64.250 | 1.280 | 22.4 | 2.6470 | 4.0610 | FLOOD |
| 15 minute winter | MH5 | 11 | 64.217 | 1.537 | 33.2 | 2.8985 | 0.0000 | FLOOD RISK |
| 120 minute summer | MH6-OF | 126 | 62.600 | 0.100 | 24.4 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 240 minute winter | IS1 | 1.000 | JUN | 3.4 | 0.481 | 0.514 | 0.2534 | |
| 60 minute winter | OU | 2.000 | JUN | -9.4 | -1.206 | -0.505 | 0.0327 | |
| 15 minute summer | JUN | 1.001 | MH7 | 12.8 | 1.638 | 1.928 | 0.0699 | |
| 30 minute winter | MH7 | 1.002 | MH5 | 10.6 | 1.351 | 1.165 | 0.1504 | |
| 60 minute winter | MH3 | 4.000 | MH4 | 4.4 | 0.724 | 0.251 | 0.0477 | |
| 15 minute winter | MH4 | 3.001 | MH5 | 8.4 | 1.072 | 1.203 | 0.1707 | |
| 15 minute winter | MH5 | 1.003 | MH6-OF | 27.2 | 3.481 | 2.637 | 0.0486 | 38.2 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | ✓ |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| OU | 0.067 | 5.00 | 64.350 | 450 | 388197.648 | 396937.189 | 0.700 |
| OF | | | 64.320 | 1200 | 388195.457 | 396937.434 | 5.120 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | OU | OF | 2.205 | 0.600 | 63.650 | 59.200 | 4.450 | 0.5 | 100 | 5.00 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 1 year 180 minute winter | 12.527 | 4.959 |
| 1 year 15 minute winter | 64.927 | 26.180 | 1 year 240 minute summer | 15.301 | 4.043 |
| 1 year 30 minute summer | 60.022 | 16.984 | 1 year 240 minute winter | 10.165 | 4.043 |
| 1 year 30 minute winter | 42.121 | 16.984 | 1 year 360 minute summer | 11.775 | 3.030 |
| 1 year 60 minute summer | 40.398 | 10.676 | 1 year 360 minute winter | 7.654 | 3.030 |
| 1 year 60 minute winter | 26.839 | 10.676 | 1 year 480 minute summer | 9.342 | 2.469 |
| 1 year 120 minute summer | 24.980 | 6.602 | 1 year 480 minute winter | 6.207 | 2.469 |
| 1 year 120 minute winter | 16.596 | 6.602 | 1 year 600 minute summer | 7.682 | 2.101 |
| 1 year 180 minute summer | 19.271 | 4.959 | 1 year 600 minute winter | 5.249 | 2.101 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 720 minute summer | 6.859 | 1.838 | 30 year 960 minute winter | 8.133 | 3.233 |
| 1 year 720 minute winter | 4.609 | 1.838 | 30 year 1440 minute summer | 8.788 | 2.355 |
| 1 year 960 minute summer | 5.653 | 1.489 | 30 year 1440 minute winter | 5.906 | 2.355 |
| 1 year 960 minute winter | 3.745 | 1.489 | 100 year 15 minute summer | 291.766 | 82.560 |
| 1 year 1440 minute summer | 4.127 | 1.106 | 100 year 15 minute winter | 204.748 | 82.560 |
| 1 year 1440 minute winter | 2.773 | 1.106 | 100 year 30 minute summer | 191.982 | 54.324 |
| 30 year 15 minute summer | 226.195 | 64.005 | 100 year 30 minute winter | 134.724 | 54.324 |
| 30 year 15 minute winter | 158.733 | 64.005 | 100 year 60 minute summer | 129.253 | 34.158 |
| 30 year 30 minute summer | 147.452 | 41.724 | 100 year 60 minute winter | 85.873 | 34.158 |
| 30 year 30 minute winter | 103.475 | 41.724 | 100 year 120 minute summer | 78.836 | 20.834 |
| 30 year 60 minute summer | 98.615 | 26.061 | 100 year 120 minute winter | 52.377 | 20.834 |
| 30 year 60 minute winter | 65.517 | 26.061 | 100 year 180 minute summer | 59.966 | 15.431 |
| 30 year 120 minute summer | 59.946 | 15.842 | 100 year 180 minute winter | 38.980 | 15.431 |
| 30 year 120 minute winter | 39.827 | 15.842 | 100 year 240 minute summer | 46.975 | 12.414 |
| 30 year 180 minute summer | 45.598 | 11.734 | 100 year 240 minute winter | 31.209 | 12.414 |
| 30 year 180 minute winter | 29.640 | 11.734 | 100 year 360 minute summer | 35.264 | 9.075 |
| 30 year 240 minute summer | 35.759 | 9.450 | 100 year 360 minute winter | 22.923 | 9.075 |
| 30 year 240 minute winter | 23.758 | 9.450 | 100 year 480 minute summer | 27.350 | 7.228 |
| 30 year 360 minute summer | 26.939 | 6.932 | 100 year 480 minute winter | 18.171 | 7.228 |
| 30 year 360 minute winter | 17.511 | 6.932 | 100 year 600 minute summer | 22.137 | 6.055 |
| 30 year 480 minute summer | 20.981 | 5.545 | 100 year 600 minute winter | 15.126 | 6.055 |
| 30 year 480 minute winter | 13.940 | 5.545 | 100 year 720 minute summer | 19.562 | 5.243 |
| 30 year 600 minute summer | 17.039 | 4.661 | 100 year 720 minute winter | 13.147 | 5.243 |
| 30 year 600 minute winter | 11.642 | 4.661 | 100 year 960 minute summer | 15.851 | 4.174 |
| 30 year 720 minute summer | 15.093 | 4.045 | 100 year 960 minute winter | 10.500 | 4.174 |
| 30 year 720 minute winter | 10.143 | 4.045 | 100 year 1440 minute summer | 11.278 | 3.023 |
| 30 year 960 minute summer | 12.278 | 3.233 | 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 93.60%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 10 | 63.672 | 0.022 | 8.0 | 0.0462 | 0.0000 | OK |
| 15 minute winter | OF | 10 | 59.221 | 0.021 | 8.0 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | OF | 8.0 | 6.497 | 0.092 | 0.0027 | 3.7 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 93.60%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 10 | 63.687 | 0.037 | 19.5 | 0.0768 | 0.0000 | OK |
| 15 minute winter | OF | 10 | 59.232 | 0.032 | 19.5 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | OF | 19.5 | 8.075 | 0.223 | 0.0053 | 9.0 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 93.60%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 10 | 63.693 | 0.043 | 25.2 | 0.0900 | 0.0000 | OK |
| 15 minute winter | OF | 10 | 59.237 | 0.037 | 25.1 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | OF | 25.1 | 8.541 | 0.289 | 0.0065 | 11.6 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | x |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| OU | 0.164 | 5.00 | 64.430 | 405 | 388235.250 | 396926.712 | 0.700 |
| OF | | | 64.520 | 1200 | 388234.428 | 396913.492 | 1.150 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | OU | OF | 13.246 | 0.600 | 63.730 | 63.370 | 0.360 | 36.8 | 150 | 5.10 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 1 year 180 minute winter | 12.527 | 4.959 |
| 1 year 15 minute winter | 64.927 | 26.180 | 1 year 240 minute summer | 15.301 | 4.043 |
| 1 year 30 minute summer | 60.022 | 16.984 | 1 year 240 minute winter | 10.165 | 4.043 |
| 1 year 30 minute winter | 42.121 | 16.984 | 1 year 360 minute summer | 11.775 | 3.030 |
| 1 year 60 minute summer | 40.398 | 10.676 | 1 year 360 minute winter | 7.654 | 3.030 |
| 1 year 60 minute winter | 26.839 | 10.676 | 1 year 480 minute summer | 9.342 | 2.469 |
| 1 year 120 minute summer | 24.980 | 6.602 | 1 year 480 minute winter | 6.207 | 2.469 |
| 1 year 120 minute winter | 16.596 | 6.602 | 1 year 600 minute summer | 7.682 | 2.101 |
| 1 year 180 minute summer | 19.271 | 4.959 | 1 year 600 minute winter | 5.249 | 2.101 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|
| 1 year 720 minute summer | 6.859 | 1.838 |
| 1 year 720 minute winter | 4.609 | 1.838 |
| 1 year 960 minute summer | 5.653 | 1.489 |
| 1 year 960 minute winter | 3.745 | 1.489 |
| 1 year 1440 minute summer | 4.127 | 1.106 |
| 1 year 1440 minute winter | 2.773 | 1.106 |
| 30 year 15 minute summer | 226.195 | 64.005 |
| 30 year 15 minute winter | 158.733 | 64.005 |
| 30 year 30 minute summer | 147.452 | 41.724 |
| 30 year 30 minute winter | 103.475 | 41.724 |
| 30 year 60 minute summer | 98.615 | 26.061 |
| 30 year 60 minute winter | 65.517 | 26.061 |
| 30 year 120 minute summer | 59.946 | 15.842 |
| 30 year 120 minute winter | 39.827 | 15.842 |
| 30 year 180 minute summer | 45.598 | 11.734 |
| 30 year 180 minute winter | 29.640 | 11.734 |
| 30 year 240 minute summer | 35.759 | 9.450 |
| 30 year 240 minute winter | 23.758 | 9.450 |
| 30 year 360 minute summer | 26.939 | 6.932 |
| 30 year 360 minute winter | 17.511 | 6.932 |
| 30 year 480 minute summer | 20.981 | 5.545 |
| 30 year 480 minute winter | 13.940 | 5.545 |
| 30 year 600 minute summer | 17.039 | 4.661 |
| 30 year 600 minute winter | 11.642 | 4.661 |
| 30 year 720 minute summer | 15.093 | 4.045 |
| 30 year 720 minute winter | 10.143 | 4.045 |
| 30 year 960 minute summer | 12.278 | 3.233 |
| 30 year 960 minute winter | 8.133 | 3.233 |
| 30 year 1440 minute summer | 8.788 | 2.355 |
| 30 year 1440 minute winter | 5.906 | 2.355 |
| 100 year 15 minute summer | 291.766 | 82.560 |
| 100 year 15 minute winter | 204.748 | 82.560 |
| 100 year 30 minute summer | 191.982 | 54.324 |
| 100 year 30 minute winter | 134.724 | 54.324 |
| 100 year 60 minute summer | 129.253 | 34.158 |
| 100 year 60 minute winter | 85.873 | 34.158 |
| 100 year 120 minute summer | 78.836 | 20.834 |
| 100 year 120 minute winter | 52.377 | 20.834 |
| 100 year 180 minute summer | 59.966 | 15.431 |
| 100 year 180 minute winter | 38.980 | 15.431 |
| 100 year 240 minute summer | 46.975 | 12.414 |
| 100 year 240 minute winter | 31.209 | 12.414 |
| 100 year 360 minute summer | 35.264 | 9.075 |
| 100 year 360 minute winter | 22.923 | 9.075 |
| 100 year 480 minute summer | 27.350 | 7.228 |
| 100 year 480 minute winter | 18.171 | 7.228 |
| 100 year 600 minute summer | 22.137 | 6.055 |
| 100 year 600 minute winter | 15.126 | 6.055 |
| 100 year 720 minute summer | 19.562 | 5.243 |
| 100 year 720 minute winter | 13.147 | 5.243 |
| 100 year 960 minute summer | 15.851 | 4.174 |
| 100 year 960 minute winter | 10.500 | 4.174 |
| 100 year 1440 minute summer | 11.278 | 3.023 |
| 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.70%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 10 | 63.826 | 0.096 | 19.5 | 0.4599 | 0.0000 | OK |
| 15 minute winter | OF | 10 | 63.458 | 0.088 | 19.1 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | OF | 19.1 | 1.694 | 0.650 | 0.1495 | 9.0 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.70%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 12 | 64.322 | 0.592 | 47.6 | 2.8490 | 0.0000 | FLOOD RISK |
| 30 minute winter | OF | 22 | 63.522 | 0.152 | 33.8 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | OF | 39.7 | 2.258 | 1.351 | 0.2308 | 21.9 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 99.70%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 10 | 64.430 | 0.700 | 61.5 | 3.3691 | 2.4406 | FLOOD |
| 15 minute summer | OF | 8 | 63.522 | 0.152 | 42.3 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | OF | 42.3 | 2.402 | 1.438 | 0.2315 | 26.3 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.040 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | x |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| END | 0.118 | 5.00 | 64.300 | | 388247.767 | 396877.147 | 0.750 |
| MH2 | 0.117 | 5.00 | 64.540 | 1200 | 388256.044 | 396906.014 | 1.050 |
| MH1-OF | | | 64.520 | 1200 | 388234.503 | 396913.381 | 1.150 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | END | MH2 | 30.034 | 0.600 | 63.550 | 63.490 | 0.060 | 500.6 | 150 | 5.41 | 39.6 |
| 1.001 | MH2 | MH1-OF | 22.766 | 0.600 | 63.490 | 63.370 | 0.120 | 189.7 | 150 | 5.81 | 39.4 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.040 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 44.998 | 12.733 | 1 year 120 minute winter | 26.264 | 10.447 |
| 1 year 15 minute winter | 31.578 | 12.733 | 1 year 180 minute summer | 39.584 | 10.186 |
| 1 year 30 minute summer | 40.530 | 11.469 | 1 year 180 minute winter | 25.731 | 10.186 |
| 1 year 30 minute winter | 28.442 | 11.469 | 1 year 240 minute summer | 38.023 | 10.048 |
| 1 year 60 minute summer | 40.398 | 10.676 | 1 year 240 minute winter | 25.261 | 10.048 |
| 1 year 60 minute winter | 26.839 | 10.676 | 1 year 360 minute summer | 38.394 | 9.880 |
| 1 year 120 minute summer | 39.532 | 10.447 | 1 year 360 minute winter | 24.957 | 9.880 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|
| 1 year 480 minute summer | 36.565 | 9.663 |
| 1 year 480 minute winter | 24.293 | 9.663 |
| 1 year 600 minute summer | 34.156 | 9.343 |
| 1 year 600 minute winter | 23.338 | 9.343 |
| 1 year 720 minute summer | 33.887 | 9.082 |
| 1 year 720 minute winter | 22.774 | 9.082 |
| 1 year 960 minute summer | 32.984 | 8.685 |
| 1 year 960 minute winter | 21.849 | 8.685 |
| 1 year 1440 minute summer | 30.427 | 8.155 |
| 1 year 1440 minute winter | 20.449 | 8.155 |
| 30 year 15 minute summer | 103.666 | 29.334 |
| 30 year 15 minute winter | 72.748 | 29.334 |
| 30 year 30 minute summer | 98.135 | 27.769 |
| 30 year 30 minute winter | 68.867 | 27.769 |
| 30 year 60 minute summer | 98.615 | 26.061 |
| 30 year 60 minute winter | 65.517 | 26.061 |
| 30 year 120 minute summer | 87.761 | 23.193 |
| 30 year 120 minute winter | 58.306 | 23.193 |
| 30 year 180 minute summer | 81.976 | 21.095 |
| 30 year 180 minute winter | 53.287 | 21.095 |
| 30 year 240 minute summer | 74.148 | 19.595 |
| 30 year 240 minute winter | 49.262 | 19.595 |
| 30 year 360 minute summer | 67.995 | 17.497 |
| 30 year 360 minute winter | 44.198 | 17.497 |
| 30 year 480 minute summer | 61.172 | 16.166 |
| 30 year 480 minute winter | 40.641 | 16.166 |
| 30 year 600 minute summer | 55.787 | 15.259 |
| 30 year 600 minute winter | 38.117 | 15.259 |
| 30 year 720 minute summer | 54.635 | 14.643 |
| 30 year 720 minute winter | 36.718 | 14.643 |
| 30 year 960 minute summer | 52.567 | 13.842 |
| 30 year 960 minute winter | 34.821 | 13.842 |
| 30 year 1440 minute summer | 47.529 | 12.738 |
| 30 year 1440 minute winter | 31.942 | 12.738 |
| 100 year 15 minute summer | 129.887 | 36.754 |
| 100 year 15 minute winter | 91.149 | 36.754 |
| 100 year 30 minute summer | 125.789 | 35.594 |
| 100 year 30 minute winter | 88.273 | 35.594 |
| 100 year 60 minute summer | 129.253 | 34.158 |
| 100 year 60 minute winter | 85.873 | 34.158 |
| 100 year 120 minute summer | 114.053 | 30.141 |
| 100 year 120 minute winter | 75.774 | 30.141 |
| 100 year 180 minute summer | 104.318 | 26.844 |
| 100 year 180 minute winter | 67.809 | 26.844 |
| 100 year 240 minute summer | 92.595 | 24.470 |
| 100 year 240 minute winter | 61.518 | 24.470 |
| 100 year 360 minute summer | 82.221 | 21.158 |
| 100 year 360 minute winter | 53.446 | 21.158 |
| 100 year 480 minute summer | 72.363 | 19.123 |
| 100 year 480 minute winter | 48.076 | 19.123 |
| 100 year 600 minute summer | 65.032 | 17.788 |
| 100 year 600 minute winter | 44.434 | 17.788 |
| 100 year 720 minute summer | 63.169 | 16.930 |
| 100 year 720 minute winter | 42.453 | 16.930 |
| 100 year 960 minute summer | 60.333 | 15.887 |
| 100 year 960 minute winter | 39.966 | 15.887 |
| 100 year 1440 minute summer | 53.862 | 14.436 |
| 100 year 1440 minute winter | 36.199 | 14.436 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.94%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 480 minute summer | END | 248 | 63.822 | 0.272 | 9.0 | 0.8573 | 0.0000 | SURCHARGED |
| 480 minute summer | MH2 | 248 | 63.737 | 0.247 | 17.8 | 0.8310 | 0.0000 | SURCHARGED |
| 480 minute summer | MH1-OF | 248 | 63.493 | 0.123 | 17.8 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 480 minute summer | END | 1.000 | MH2 | 8.9 | 0.508 | 1.143 | 0.5287 | |
| 480 minute summer | MH2 | 1.001 | MH1-OF | 17.8 | 1.024 | 1.386 | 0.3762 | 136.0 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 30 minute summer | END | 19 | 64.300 | 0.750 | 19.5 | 2.5815 | 0.0000 | FLOOD RISK |
| 120 minute summer | MH2 | 66 | 64.507 | 1.017 | 36.8 | 3.4170 | 0.0000 | FLOOD RISK |
| 30 minute summer | MH1-OF | 20 | 63.512 | 0.142 | 28.2 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 30 minute summer | END | 1.000 | MH2 | 14.0 | 0.794 | 1.788 | 0.5287 | |
| 120 minute summer | MH2 | 1.001 | MH1-OF | 34.9 | 1.980 | 2.717 | 0.3967 | 81.6 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 99.94%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END | 12 | 64.300 | 0.750 | 19.7 | 2.4218 | 0.0000 | FLOOD RISK |
| 120 minute summer | MH2 | 62 | 64.540 | 1.050 | 50.9 | 3.5280 | 6.5771 | FLOOD |
| 30 minute summer | MH1-OF | 18 | 63.512 | 0.142 | 34.2 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END | 1.000 | MH2 | 13.7 | 0.777 | 1.750 | 0.5287 | |
| 120 minute summer | MH2 | 1.001 | MH1-OF | 35.4 | 2.014 | 2.763 | 0.3967 | 99.5 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | x |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| MH15 | 0.039 | 5.00 | 64.500 | 1200 | 388151.340 | 396878.825 | 0.360 |
| MH16 | 0.039 | 5.00 | 64.430 | 1200 | 388162.735 | 396862.174 | 0.720 |
| MH17 | 0.038 | 5.00 | 64.400 | 1200 | 388164.393 | 396853.306 | 0.800 |
| MH18 | 0.038 | 5.00 | 64.470 | 1200 | 388174.551 | 396847.468 | 1.000 |
| MH19 | 0.038 | 5.00 | 64.400 | 1200 | 388192.986 | 396842.927 | 1.060 |
| MH28 | 0.038 | 5.00 | 64.410 | 1200 | 388202.599 | 396841.174 | 1.420 |
| MH26 | 0.038 | 5.00 | 64.420 | 1200 | 388207.230 | 396859.924 | 1.710 |
| MH27 | 0.038 | 5.00 | 64.150 | 1200 | 388221.754 | 396865.013 | 1.936 |
| MH1 | | | 64.520 | 1200 | 388234.313 | 396913.353 | 3.917 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | MH15 | MH16 | 20.177 | 0.600 | 64.140 | 63.710 | 0.430 | 46.9 | 100 | 5.30 | 50.0 |
| 1.001 | MH16 | MH17 | 9.056 | 0.600 | 63.710 | 63.600 | 0.110 | 82.3 | 100 | 5.48 | 50.0 |
| 1.002 | MH17 | MH18 | 11.716 | 0.600 | 63.600 | 63.470 | 0.130 | 90.1 | 100 | 5.72 | 50.0 |
| 1.003 | MH18 | MH19 | 18.986 | 0.600 | 63.470 | 63.340 | 0.130 | 146.0 | 100 | 6.22 | 50.0 |
| 1.004 | MH19 | MH28 | 9.772 | 0.600 | 63.340 | 63.065 | 0.275 | 35.5 | 100 | 6.34 | 50.0 |
| 1.005 | MH28 | MH26 | 19.313 | 0.600 | 62.990 | 62.710 | 0.280 | 69.0 | 150 | 6.61 | 50.0 |
| 1.006 | MH26 | MH27 | 15.390 | 0.600 | 62.710 | 62.214 | 0.496 | 31.0 | 150 | 6.75 | 50.0 |
| 1.007 | MH27 | MH1 | 49.945 | 0.600 | 62.214 | 60.603 | 1.611 | 31.0 | 150 | 7.21 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 30 year 360 minute summer | 26.939 | 6.932 |
| 1 year 15 minute winter | 64.927 | 26.180 | 30 year 360 minute winter | 17.511 | 6.932 |
| 1 year 30 minute summer | 60.022 | 16.984 | 30 year 480 minute summer | 20.981 | 5.545 |
| 1 year 30 minute winter | 42.121 | 16.984 | 30 year 480 minute winter | 13.940 | 5.545 |
| 1 year 60 minute summer | 40.398 | 10.676 | 30 year 600 minute summer | 17.039 | 4.661 |
| 1 year 60 minute winter | 26.839 | 10.676 | 30 year 600 minute winter | 11.642 | 4.661 |
| 1 year 120 minute summer | 24.980 | 6.602 | 30 year 720 minute summer | 15.093 | 4.045 |
| 1 year 120 minute winter | 16.596 | 6.602 | 30 year 720 minute winter | 10.143 | 4.045 |
| 1 year 180 minute summer | 19.271 | 4.959 | 30 year 960 minute summer | 12.278 | 3.233 |
| 1 year 180 minute winter | 12.527 | 4.959 | 30 year 960 minute winter | 8.133 | 3.233 |
| 1 year 240 minute summer | 15.301 | 4.043 | 30 year 1440 minute summer | 8.788 | 2.355 |
| 1 year 240 minute winter | 10.165 | 4.043 | 30 year 1440 minute winter | 5.906 | 2.355 |
| 1 year 360 minute summer | 11.775 | 3.030 | 100 year 15 minute summer | 291.766 | 82.560 |
| 1 year 360 minute winter | 7.654 | 3.030 | 100 year 15 minute winter | 204.748 | 82.560 |
| 1 year 480 minute summer | 9.342 | 2.469 | 100 year 30 minute summer | 191.982 | 54.324 |
| 1 year 480 minute winter | 6.207 | 2.469 | 100 year 30 minute winter | 134.724 | 54.324 |
| 1 year 600 minute summer | 7.682 | 2.101 | 100 year 60 minute summer | 129.253 | 34.158 |
| 1 year 600 minute winter | 5.249 | 2.101 | 100 year 60 minute winter | 85.873 | 34.158 |
| 1 year 720 minute summer | 6.859 | 1.838 | 100 year 120 minute summer | 78.836 | 20.834 |
| 1 year 720 minute winter | 4.609 | 1.838 | 100 year 120 minute winter | 52.377 | 20.834 |
| 1 year 960 minute summer | 5.653 | 1.489 | 100 year 180 minute summer | 59.966 | 15.431 |
| 1 year 960 minute winter | 3.745 | 1.489 | 100 year 180 minute winter | 38.980 | 15.431 |
| 1 year 1440 minute summer | 4.127 | 1.106 | 100 year 240 minute summer | 46.975 | 12.414 |
| 1 year 1440 minute winter | 2.773 | 1.106 | 100 year 240 minute winter | 31.209 | 12.414 |
| 30 year 15 minute summer | 226.195 | 64.005 | 100 year 360 minute summer | 35.264 | 9.075 |
| 30 year 15 minute winter | 158.733 | 64.005 | 100 year 360 minute winter | 22.923 | 9.075 |
| 30 year 30 minute summer | 147.452 | 41.724 | 100 year 480 minute summer | 27.350 | 7.228 |
| 30 year 30 minute winter | 103.475 | 41.724 | 100 year 480 minute winter | 18.171 | 7.228 |
| 30 year 60 minute summer | 98.615 | 26.061 | 100 year 600 minute summer | 22.137 | 6.055 |
| 30 year 60 minute winter | 65.517 | 26.061 | 100 year 600 minute winter | 15.126 | 6.055 |
| 30 year 120 minute summer | 59.946 | 15.842 | 100 year 720 minute summer | 19.562 | 5.243 |
| 30 year 120 minute winter | 39.827 | 15.842 | 100 year 720 minute winter | 13.147 | 5.243 |
| 30 year 180 minute summer | 45.598 | 11.734 | 100 year 960 minute summer | 15.851 | 4.174 |
| 30 year 180 minute winter | 29.640 | 11.734 | 100 year 960 minute winter | 10.500 | 4.174 |
| 30 year 240 minute summer | 35.759 | 9.450 | 100 year 1440 minute summer | 11.278 | 3.023 |
| 30 year 240 minute winter | 23.758 | 9.450 | 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.34%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH15 | 14 | 64.205 | 0.065 | 4.6 | 0.2152 | 0.0000 | OK |
| 15 minute winter | MH16 | 14 | 64.185 | 0.475 | 9.1 | 1.0507 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH17 | 14 | 64.130 | 0.530 | 8.9 | 1.1027 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH18 | 14 | 63.976 | 0.506 | 10.0 | 0.9572 | 0.0000 | SURCHARGED |
| 15 minute winter | MH19 | 13 | 63.556 | 0.216 | 11.9 | 0.3990 | 0.0000 | SURCHARGED |
| 15 minute winter | MH28 | 11 | 63.088 | 0.098 | 15.0 | 0.1633 | 0.0000 | OK |
| 15 minute winter | MH26 | 11 | 62.797 | 0.087 | 19.2 | 0.1372 | 0.0000 | OK |
| 15 minute winter | MH27 | 11 | 62.312 | 0.098 | 23.5 | 0.1493 | 0.0000 | OK |
| 15 minute winter | MH1 | 11 | 60.698 | 0.095 | 23.5 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH15 | 1.000 | MH16 | 4.5 | 0.665 | 0.505 | 0.1335 | |
| 15 minute winter | MH16 | 1.001 | MH17 | 4.7 | 0.723 | 0.706 | 0.0709 | |
| 15 minute winter | MH17 | 1.002 | MH18 | 6.5 | 0.831 | 1.022 | 0.0917 | |
| 15 minute winter | MH18 | 1.003 | MH19 | 8.5 | 1.089 | 1.711 | 0.1486 | |
| 15 minute winter | MH19 | 1.004 | MH28 | 11.2 | 1.429 | 1.097 | 0.0764 | |
| 15 minute winter | MH28 | 1.005 | MH26 | 14.9 | 1.324 | 0.697 | 0.2201 | |
| 15 minute winter | MH26 | 1.006 | MH27 | 19.2 | 1.686 | 0.599 | 0.1753 | |
| 15 minute winter | MH27 | 1.007 | MH1 | 23.5 | 1.959 | 0.733 | 0.5992 | 16.8 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.34%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 30 minute winter | MH15 | 17 | 64.500 | 0.360 | 8.7 | 1.1873 | 1.5443 | FLOOD |
| 60 minute winter | MH16 | 32 | 64.430 | 0.720 | 9.1 | 1.5941 | 3.6785 | FLOOD |
| 15 minute winter | MH17 | 10 | 64.400 | 0.800 | 16.6 | 1.6648 | 3.8411 | FLOOD |
| 15 minute winter | MH18 | 11 | 64.437 | 0.967 | 16.2 | 1.8278 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH19 | 12 | 64.209 | 0.869 | 19.8 | 1.6056 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH28 | 13 | 63.626 | 0.636 | 24.7 | 1.0594 | 0.0000 | SURCHARGED |
| 15 minute winter | MH26 | 13 | 63.313 | 0.603 | 30.5 | 0.9497 | 0.0000 | SURCHARGED |
| 15 minute winter | MH27 | 12 | 62.845 | 0.631 | 37.2 | 0.9624 | 0.0000 | SURCHARGED |
| 30 minute winter | MH1 | 17 | 60.755 | 0.152 | 33.7 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 30 minute winter | MH15 | 1.000 | MH16 | 4.7 | 0.696 | 0.535 | 0.1579 | |
| 60 minute winter | MH16 | 1.001 | MH17 | 5.0 | 0.686 | 0.749 | 0.0709 | |
| 15 minute winter | MH17 | 1.002 | MH18 | 7.1 | 0.908 | 1.116 | 0.0917 | |
| 15 minute winter | MH18 | 1.003 | MH19 | 9.4 | 1.197 | 1.880 | 0.1486 | |
| 15 minute winter | MH19 | 1.004 | MH28 | 14.1 | 1.804 | 1.385 | 0.0765 | |
| 15 minute winter | MH28 | 1.005 | MH26 | 20.6 | 1.405 | 0.963 | 0.3400 | |
| 15 minute winter | MH26 | 1.006 | MH27 | 27.9 | 1.735 | 0.870 | 0.2709 | |
| 15 minute winter | MH27 | 1.007 | MH1 | 35.3 | 2.003 | 1.100 | 0.8792 | 32.8 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 99.34%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 30 minute winter | MH15 | 16 | 64.500 | 0.360 | 11.4 | 1.1873 | 2.9358 | FLOOD |
| 60 minute winter | MH16 | 29 | 64.430 | 0.720 | 10.9 | 1.5941 | 6.2415 | FLOOD |
| 30 minute winter | MH17 | 15 | 64.400 | 0.800 | 18.3 | 1.6648 | 8.6590 | FLOOD |
| 15 minute winter | MH18 | 10 | 64.470 | 1.000 | 16.8 | 1.8910 | 0.7907 | FLOOD |
| 15 minute winter | MH19 | 11 | 64.400 | 1.060 | 21.9 | 1.9589 | 0.5671 | FLOOD |
| 15 minute winter | MH28 | 13 | 64.039 | 1.049 | 27.6 | 1.7480 | 0.0000 | SURCHARGED |
| 15 minute winter | MH26 | 13 | 63.751 | 1.041 | 34.1 | 1.6397 | 0.0000 | SURCHARGED |
| 15 minute winter | MH27 | 13 | 63.238 | 1.024 | 41.7 | 1.5599 | 0.0000 | SURCHARGED |
| 60 minute winter | MH1 | 32 | 60.755 | 0.152 | 33.5 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 30 minute winter | MH15 | 1.000 | MH16 | 4.6 | 0.672 | 0.521 | 0.1579 | |
| 60 minute winter | MH16 | 1.001 | MH17 | 4.9 | 0.681 | 0.741 | 0.0709 | |
| 30 minute winter | MH17 | 1.002 | MH18 | 7.2 | 0.919 | 1.130 | 0.0917 | |
| 15 minute winter | MH18 | 1.003 | MH19 | 9.2 | 1.179 | 1.853 | 0.1486 | |
| 15 minute winter | MH19 | 1.004 | MH28 | 13.9 | 1.772 | 1.360 | 0.0765 | |
| 15 minute winter | MH28 | 1.005 | MH26 | 20.7 | 1.403 | 0.967 | 0.3400 | |
| 15 minute winter | MH26 | 1.006 | MH27 | 29.1 | 1.727 | 0.907 | 0.2709 | |
| 15 minute winter | MH27 | 1.007 | MH1 | 38.4 | 2.184 | 1.199 | 0.8793 | 37.7 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | ✓ |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| OU | 0.028 | 5.00 | 64.180 | 450 | 388278.514 | 396865.534 | 0.700 |
| UU2802 | | | 64.040 | 1200 | 388274.411 | 396862.258 | 1.085 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | OU | UU2802 | 5.250 | 0.600 | 63.480 | 62.955 | 0.525 | 10.0 | 150 | 5.03 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 1 year 180 minute winter | 12.527 | 4.959 |
| 1 year 15 minute winter | 64.927 | 26.180 | 1 year 240 minute summer | 15.301 | 4.043 |
| 1 year 30 minute summer | 60.022 | 16.984 | 1 year 240 minute winter | 10.165 | 4.043 |
| 1 year 30 minute winter | 42.121 | 16.984 | 1 year 360 minute summer | 11.775 | 3.030 |
| 1 year 60 minute summer | 40.398 | 10.676 | 1 year 360 minute winter | 7.654 | 3.030 |
| 1 year 60 minute winter | 26.839 | 10.676 | 1 year 480 minute summer | 9.342 | 2.469 |
| 1 year 120 minute summer | 24.980 | 6.602 | 1 year 480 minute winter | 6.207 | 2.469 |
| 1 year 120 minute winter | 16.596 | 6.602 | 1 year 600 minute summer | 7.682 | 2.101 |
| 1 year 180 minute summer | 19.271 | 4.959 | 1 year 600 minute winter | 5.249 | 2.101 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|
| 1 year 720 minute summer | 6.859 | 1.838 |
| 1 year 720 minute winter | 4.609 | 1.838 |
| 1 year 960 minute summer | 5.653 | 1.489 |
| 1 year 960 minute winter | 3.745 | 1.489 |
| 1 year 1440 minute summer | 4.127 | 1.106 |
| 1 year 1440 minute winter | 2.773 | 1.106 |
| 30 year 15 minute summer | 226.195 | 64.005 |
| 30 year 15 minute winter | 158.733 | 64.005 |
| 30 year 30 minute summer | 147.452 | 41.724 |
| 30 year 30 minute winter | 103.475 | 41.724 |
| 30 year 60 minute summer | 98.615 | 26.061 |
| 30 year 60 minute winter | 65.517 | 26.061 |
| 30 year 120 minute summer | 59.946 | 15.842 |
| 30 year 120 minute winter | 39.827 | 15.842 |
| 30 year 180 minute summer | 45.598 | 11.734 |
| 30 year 180 minute winter | 29.640 | 11.734 |
| 30 year 240 minute summer | 35.759 | 9.450 |
| 30 year 240 minute winter | 23.758 | 9.450 |
| 30 year 360 minute summer | 26.939 | 6.932 |
| 30 year 360 minute winter | 17.511 | 6.932 |
| 30 year 480 minute summer | 20.981 | 5.545 |
| 30 year 480 minute winter | 13.940 | 5.545 |
| 30 year 600 minute summer | 17.039 | 4.661 |
| 30 year 600 minute winter | 11.642 | 4.661 |
| 30 year 720 minute summer | 15.093 | 4.045 |
| 30 year 720 minute winter | 10.143 | 4.045 |
| 30 year 960 minute summer | 12.278 | 3.233 |
| 30 year 960 minute winter | 8.133 | 3.233 |
| 30 year 1440 minute summer | 8.788 | 2.355 |
| 30 year 1440 minute winter | 5.906 | 2.355 |
| 100 year 15 minute summer | 291.766 | 82.560 |
| 100 year 15 minute winter | 204.748 | 82.560 |
| 100 year 30 minute summer | 191.982 | 54.324 |
| 100 year 30 minute winter | 134.724 | 54.324 |
| 100 year 60 minute summer | 129.253 | 34.158 |
| 100 year 60 minute winter | 85.873 | 34.158 |
| 100 year 120 minute summer | 78.836 | 20.834 |
| 100 year 120 minute winter | 52.377 | 20.834 |
| 100 year 180 minute summer | 59.966 | 15.431 |
| 100 year 180 minute winter | 38.980 | 15.431 |
| 100 year 240 minute summer | 46.975 | 12.414 |
| 100 year 240 minute winter | 31.209 | 12.414 |
| 100 year 360 minute summer | 35.264 | 9.075 |
| 100 year 360 minute winter | 22.923 | 9.075 |
| 100 year 480 minute summer | 27.350 | 7.228 |
| 100 year 480 minute winter | 18.171 | 7.228 |
| 100 year 600 minute summer | 22.137 | 6.055 |
| 100 year 600 minute winter | 15.126 | 6.055 |
| 100 year 720 minute summer | 19.562 | 5.243 |
| 100 year 720 minute winter | 13.147 | 5.243 |
| 100 year 960 minute summer | 15.851 | 4.174 |
| 100 year 960 minute winter | 10.500 | 4.174 |
| 100 year 1440 minute summer | 11.278 | 3.023 |
| 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 10 | 63.506 | 0.026 | 3.3 | 0.0245 | 0.0000 | OK |
| 15 minute winter | UU2802 | 10 | 62.980 | 0.025 | 3.3 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | UU2802 | 3.3 | 1.694 | 0.058 | 0.0102 | 1.5 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 10 | 63.521 | 0.041 | 8.1 | 0.0393 | 0.0000 | OK |
| 15 minute winter | UU2802 | 10 | 62.993 | 0.038 | 8.1 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | UU2802 | 8.1 | 2.160 | 0.142 | 0.0196 | 3.7 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 10 | 63.527 | 0.047 | 10.4 | 0.0452 | 0.0000 | OK |
| 15 minute winter | UU2802 | 10 | 62.999 | 0.044 | 10.4 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | OU | 1.000 | UU2802 | 10.4 | 2.302 | 0.183 | 0.0237 | 4.8 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | x |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| MH BS1 | 0.012 | 5.00 | 64.180 | 450 | 388220.099 | 396859.542 | 0.600 |
| MH BS2 | 0.012 | 5.00 | 64.200 | 1200 | 388226.987 | 396858.682 | 0.620 |
| MH-BS3 | 0.012 | 5.00 | 64.260 | 1200 | 388236.550 | 396856.147 | 0.860 |
| MH24 | 0.012 | 5.00 | 64.240 | 1200 | 388230.400 | 396833.577 | 1.400 |
| MH25 | 0.012 | 5.00 | 64.200 | 1200 | 388233.417 | 396850.140 | 1.854 |
| MH-BS4 | 0.012 | 5.00 | 64.280 | 1200 | 388237.274 | 396848.981 | 2.150 |
| UU2801 | | | 64.070 | 1200 | 388247.144 | 396845.498 | 1.960 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | MH BS1 | MH BS2 | 6.941 | 0.600 | 63.580 | 63.580 | 0.000 | 0.0 | 100 | 5.12 | 50.0 |
| 1.001 | MH BS2 | MH-BS3 | 9.896 | 0.600 | 63.580 | 63.400 | 0.180 | 55.0 | 100 | 5.27 | 50.0 |
| 1.002 | MH-BS3 | MH-BS4 | 7.202 | 0.600 | 63.400 | 62.255 | 1.145 | 6.3 | 100 | 5.31 | 50.0 |
| 2.000 | MH24 | MH25 | 16.836 | 0.600 | 62.840 | 62.346 | 0.494 | 34.1 | 100 | 5.21 | 50.0 |
| 2.001 | MH25 | MH-BS4 | 4.027 | 0.600 | 62.346 | 62.228 | 0.118 | 34.1 | 100 | 5.26 | 50.0 |
| 1.003 | MH-BS4 | UU2801 | 10.467 | 0.600 | 62.130 | 62.110 | 0.020 | 523.3 | 225 | 5.62 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 30 year 360 minute summer | 26.939 | 6.932 |
| 1 year 15 minute winter | 64.927 | 26.180 | 30 year 360 minute winter | 17.511 | 6.932 |
| 1 year 30 minute summer | 60.022 | 16.984 | 30 year 480 minute summer | 20.981 | 5.545 |
| 1 year 30 minute winter | 42.121 | 16.984 | 30 year 480 minute winter | 13.940 | 5.545 |
| 1 year 60 minute summer | 40.398 | 10.676 | 30 year 600 minute summer | 17.039 | 4.661 |
| 1 year 60 minute winter | 26.839 | 10.676 | 30 year 600 minute winter | 11.642 | 4.661 |
| 1 year 120 minute summer | 24.980 | 6.602 | 30 year 720 minute summer | 15.093 | 4.045 |
| 1 year 120 minute winter | 16.596 | 6.602 | 30 year 720 minute winter | 10.143 | 4.045 |
| 1 year 180 minute summer | 19.271 | 4.959 | 30 year 960 minute summer | 12.278 | 3.233 |
| 1 year 180 minute winter | 12.527 | 4.959 | 30 year 960 minute winter | 8.133 | 3.233 |
| 1 year 240 minute summer | 15.301 | 4.043 | 30 year 1440 minute summer | 8.788 | 2.355 |
| 1 year 240 minute winter | 10.165 | 4.043 | 30 year 1440 minute winter | 5.906 | 2.355 |
| 1 year 360 minute summer | 11.775 | 3.030 | 100 year 15 minute summer | 291.766 | 82.560 |
| 1 year 360 minute winter | 7.654 | 3.030 | 100 year 15 minute winter | 204.748 | 82.560 |
| 1 year 480 minute summer | 9.342 | 2.469 | 100 year 30 minute summer | 191.982 | 54.324 |
| 1 year 480 minute winter | 6.207 | 2.469 | 100 year 30 minute winter | 134.724 | 54.324 |
| 1 year 600 minute summer | 7.682 | 2.101 | 100 year 60 minute summer | 129.253 | 34.158 |
| 1 year 600 minute winter | 5.249 | 2.101 | 100 year 60 minute winter | 85.873 | 34.158 |
| 1 year 720 minute summer | 6.859 | 1.838 | 100 year 120 minute summer | 78.836 | 20.834 |
| 1 year 720 minute winter | 4.609 | 1.838 | 100 year 120 minute winter | 52.377 | 20.834 |
| 1 year 960 minute summer | 5.653 | 1.489 | 100 year 180 minute summer | 59.966 | 15.431 |
| 1 year 960 minute winter | 3.745 | 1.489 | 100 year 180 minute winter | 38.980 | 15.431 |
| 1 year 1440 minute summer | 4.127 | 1.106 | 100 year 240 minute summer | 46.975 | 12.414 |
| 1 year 1440 minute winter | 2.773 | 1.106 | 100 year 240 minute winter | 31.209 | 12.414 |
| 30 year 15 minute summer | 226.195 | 64.005 | 100 year 360 minute summer | 35.264 | 9.075 |
| 30 year 15 minute winter | 158.733 | 64.005 | 100 year 360 minute winter | 22.923 | 9.075 |
| 30 year 30 minute summer | 147.452 | 41.724 | 100 year 480 minute summer | 27.350 | 7.228 |
| 30 year 30 minute winter | 103.475 | 41.724 | 100 year 480 minute winter | 18.171 | 7.228 |
| 30 year 60 minute summer | 98.615 | 26.061 | 100 year 600 minute summer | 22.137 | 6.055 |
| 30 year 60 minute winter | 65.517 | 26.061 | 100 year 600 minute winter | 15.126 | 6.055 |
| 30 year 120 minute summer | 59.946 | 15.842 | 100 year 720 minute summer | 19.562 | 5.243 |
| 30 year 120 minute winter | 39.827 | 15.842 | 100 year 720 minute winter | 13.147 | 5.243 |
| 30 year 180 minute summer | 45.598 | 11.734 | 100 year 960 minute summer | 15.851 | 4.174 |
| 30 year 180 minute winter | 29.640 | 11.734 | 100 year 960 minute winter | 10.500 | 4.174 |
| 30 year 240 minute summer | 35.759 | 9.450 | 100 year 1440 minute summer | 11.278 | 3.023 |
| 30 year 240 minute winter | 23.758 | 9.450 | 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH BS1 | 10 | 63.642 | 0.062 | 1.4 | 0.0347 | 0.0000 | OK |
| 15 minute winter | MH BS2 | 11 | 63.623 | 0.043 | 2.7 | 0.0650 | 0.0000 | OK |
| 15 minute winter | MH-BS3 | 11 | 63.429 | 0.029 | 4.1 | 0.0403 | 0.0000 | OK |
| 15 minute winter | MH24 | 10 | 62.865 | 0.025 | 1.4 | 0.0320 | 0.0000 | OK |
| 15 minute winter | MH25 | 10 | 62.384 | 0.038 | 2.8 | 0.0474 | 0.0000 | OK |
| 15 minute winter | MH-BS4 | 11 | 62.222 | 0.092 | 8.1 | 0.1143 | 0.0000 | OK |
| 15 minute winter | UU2801 | 11 | 62.183 | 0.073 | 8.1 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH BS1 | 1.000 | MH BS2 | 1.3 | 0.323 | 0.171 | 0.0288 | |
| 15 minute winter | MH BS2 | 1.001 | MH-BS3 | 2.7 | 1.070 | 0.328 | 0.0250 | |
| 15 minute winter | MH-BS3 | 1.002 | MH-BS4 | 4.0 | 2.234 | 0.165 | 0.0129 | |
| 15 minute winter | MH24 | 2.000 | MH25 | 1.4 | 0.660 | 0.131 | 0.0352 | |
| 15 minute winter | MH25 | 2.001 | MH-BS4 | 2.7 | 1.056 | 0.259 | 0.0103 | |
| 15 minute winter | MH-BS4 | 1.003 | UU2801 | 8.1 | 0.613 | 0.360 | 0.1383 | 3.9 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH BS1 | 10 | 63.686 | 0.106 | 3.5 | 0.0591 | 0.0000 | SURCHARGED |
| 15 minute winter | MH BS2 | 11 | 63.658 | 0.078 | 6.9 | 0.1179 | 0.0000 | OK |
| 15 minute winter | MH-BS3 | 10 | 63.448 | 0.048 | 10.2 | 0.0681 | 0.0000 | OK |
| 15 minute winter | MH24 | 10 | 62.880 | 0.040 | 3.5 | 0.0518 | 0.0000 | OK |
| 15 minute winter | MH25 | 10 | 62.414 | 0.068 | 7.0 | 0.0854 | 0.0000 | OK |
| 15 minute winter | MH-BS4 | 10 | 62.283 | 0.153 | 20.5 | 0.1904 | 0.0000 | OK |
| 15 minute winter | UU2801 | 11 | 62.228 | 0.118 | 20.3 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH BS1 | 1.000 | MH BS2 | 3.4 | 0.452 | 0.432 | 0.0498 | |
| 15 minute winter | MH BS2 | 1.001 | MH-BS3 | 6.8 | 1.304 | 0.827 | 0.0508 | |
| 15 minute winter | MH-BS3 | 1.002 | MH-BS4 | 10.1 | 2.832 | 0.416 | 0.0258 | |
| 15 minute winter | MH24 | 2.000 | MH25 | 3.5 | 0.806 | 0.332 | 0.0719 | |
| 15 minute winter | MH25 | 2.001 | MH-BS4 | 6.8 | 1.302 | 0.655 | 0.0211 | |
| 15 minute winter | MH-BS4 | 1.003 | UU2801 | 20.3 | 0.814 | 0.906 | 0.2610 | 9.6 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH BS1 | 11 | 63.742 | 0.162 | 4.5 | 0.0903 | 0.0000 | SURCHARGED |
| 15 minute winter | MH BS2 | 11 | 63.701 | 0.121 | 8.6 | 0.1844 | 0.0000 | SURCHARGED |
| 15 minute winter | MH-BS3 | 10 | 63.455 | 0.055 | 12.2 | 0.0769 | 0.0000 | OK |
| 15 minute winter | MH24 | 10 | 62.886 | 0.046 | 4.5 | 0.0595 | 0.0000 | OK |
| 15 minute winter | MH25 | 10 | 62.430 | 0.084 | 8.9 | 0.1057 | 0.0000 | OK |
| 15 minute winter | MH-BS4 | 10 | 62.306 | 0.176 | 25.6 | 0.2193 | 0.0000 | OK |
| 15 minute winter | UU2801 | 10 | 62.243 | 0.133 | 25.4 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH BS1 | 1.000 | MH BS2 | 4.1 | 0.525 | 0.523 | 0.0543 | |
| 15 minute winter | MH BS2 | 1.001 | MH-BS3 | 7.9 | 1.348 | 0.970 | 0.0603 | |
| 15 minute winter | MH-BS3 | 1.002 | MH-BS4 | 12.4 | 2.951 | 0.509 | 0.0303 | |
| 15 minute winter | MH24 | 2.000 | MH25 | 4.4 | 0.833 | 0.426 | 0.0884 | |
| 15 minute winter | MH25 | 2.001 | MH-BS4 | 8.7 | 1.303 | 0.836 | 0.0274 | |
| 15 minute winter | MH-BS4 | 1.003 | UU2801 | 25.4 | 0.873 | 1.131 | 0.3025 | 12.4 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | x |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| MH31 | 0.042 | 5.00 | 64.370 | 1200 | 388188.463 | 396828.530 | 0.980 |
| MH32 | 0.042 | 5.00 | 64.290 | 1200 | 388181.042 | 396802.263 | 1.150 |
| MH33 | 0.042 | 5.00 | 64.260 | 1200 | 388191.420 | 396798.934 | 1.191 |
| MH34 | 0.042 | 5.00 | 64.180 | 1200 | 388207.113 | 396793.500 | 1.219 |
| MH38 | 0.042 | 5.00 | 64.260 | 1200 | 388224.169 | 396810.152 | 0.910 |
| MH37 | 0.042 | 5.00 | 64.240 | 1200 | 388220.838 | 396797.106 | 1.150 |
| MH36 | 0.042 | 5.00 | 64.190 | 1200 | 388220.780 | 396795.280 | 1.210 |
| FW1B | 0.042 | 5.00 | 64.230 | 1200 | 388221.021 | 396783.307 | 2.600 |
| UU2708 | | | 64.040 | 1200 | 388228.769 | 396779.732 | 4.205 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | MH31 | MH32 | 27.295 | 0.600 | 63.390 | 63.140 | 0.250 | 109.2 | 150 | 5.47 | 50.0 |
| 1.001 | MH32 | MH33 | 10.899 | 0.600 | 63.140 | 63.069 | 0.071 | 153.9 | 150 | 5.70 | 50.0 |
| 1.002 | MH33 | MH34 | 16.607 | 0.600 | 63.069 | 62.961 | 0.108 | 153.8 | 150 | 5.96 | 50.0 |
| 1.003 | MH34 | FW1B | 17.243 | 0.600 | 62.961 | 62.480 | 0.481 | 35.8 | 225 | 6.09 | 50.0 |
| 1.004 | MH38 | MH37 | 7.998 | 0.600 | 63.350 | 63.090 | 0.260 | 30.8 | 100 | 5.49 | 50.0 |
| 2.001 | MH37 | MH36 | 1.827 | 0.600 | 63.090 | 63.050 | 0.040 | 45.7 | 150 | 5.51 | 50.0 |
| 1.005 | MH36 | FW1B | 27.504 | 0.600 | 62.980 | 61.630 | 1.350 | 20.4 | 150 | 5.81 | 50.0 |
| 1.004_1 | FW1B | UU2708 | 8.533 | 0.600 | 61.630 | 59.835 | 1.795 | 4.8 | 225 | 6.11 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 30 year 360 minute summer | 26.939 | 6.932 |
| 1 year 15 minute winter | 64.927 | 26.180 | 30 year 360 minute winter | 17.511 | 6.932 |
| 1 year 30 minute summer | 60.022 | 16.984 | 30 year 480 minute summer | 20.981 | 5.545 |
| 1 year 30 minute winter | 42.121 | 16.984 | 30 year 480 minute winter | 13.940 | 5.545 |
| 1 year 60 minute summer | 40.398 | 10.676 | 30 year 600 minute summer | 17.039 | 4.661 |
| 1 year 60 minute winter | 26.839 | 10.676 | 30 year 600 minute winter | 11.642 | 4.661 |
| 1 year 120 minute summer | 24.980 | 6.602 | 30 year 720 minute summer | 15.093 | 4.045 |
| 1 year 120 minute winter | 16.596 | 6.602 | 30 year 720 minute winter | 10.143 | 4.045 |
| 1 year 180 minute summer | 19.271 | 4.959 | 30 year 960 minute summer | 12.278 | 3.233 |
| 1 year 180 minute winter | 12.527 | 4.959 | 30 year 960 minute winter | 8.133 | 3.233 |
| 1 year 240 minute summer | 15.301 | 4.043 | 30 year 1440 minute summer | 8.788 | 2.355 |
| 1 year 240 minute winter | 10.165 | 4.043 | 30 year 1440 minute winter | 5.906 | 2.355 |
| 1 year 360 minute summer | 11.775 | 3.030 | 100 year 15 minute summer | 291.766 | 82.560 |
| 1 year 360 minute winter | 7.654 | 3.030 | 100 year 15 minute winter | 204.748 | 82.560 |
| 1 year 480 minute summer | 9.342 | 2.469 | 100 year 30 minute summer | 191.982 | 54.324 |
| 1 year 480 minute winter | 6.207 | 2.469 | 100 year 30 minute winter | 134.724 | 54.324 |
| 1 year 600 minute summer | 7.682 | 2.101 | 100 year 60 minute summer | 129.253 | 34.158 |
| 1 year 600 minute winter | 5.249 | 2.101 | 100 year 60 minute winter | 85.873 | 34.158 |
| 1 year 720 minute summer | 6.859 | 1.838 | 100 year 120 minute summer | 78.836 | 20.834 |
| 1 year 720 minute winter | 4.609 | 1.838 | 100 year 120 minute winter | 52.377 | 20.834 |
| 1 year 960 minute summer | 5.653 | 1.489 | 100 year 180 minute summer | 59.966 | 15.431 |
| 1 year 960 minute winter | 3.745 | 1.489 | 100 year 180 minute winter | 38.980 | 15.431 |
| 1 year 1440 minute summer | 4.127 | 1.106 | 100 year 240 minute summer | 46.975 | 12.414 |
| 1 year 1440 minute winter | 2.773 | 1.106 | 100 year 240 minute winter | 31.209 | 12.414 |
| 30 year 15 minute summer | 226.195 | 64.005 | 100 year 360 minute summer | 35.264 | 9.075 |
| 30 year 15 minute winter | 158.733 | 64.005 | 100 year 360 minute winter | 22.923 | 9.075 |
| 30 year 30 minute summer | 147.452 | 41.724 | 100 year 480 minute summer | 27.350 | 7.228 |
| 30 year 30 minute winter | 103.475 | 41.724 | 100 year 480 minute winter | 18.171 | 7.228 |
| 30 year 60 minute summer | 98.615 | 26.061 | 100 year 600 minute summer | 22.137 | 6.055 |
| 30 year 60 minute winter | 65.517 | 26.061 | 100 year 600 minute winter | 15.126 | 6.055 |
| 30 year 120 minute summer | 59.946 | 15.842 | 100 year 720 minute summer | 19.562 | 5.243 |
| 30 year 120 minute winter | 39.827 | 15.842 | 100 year 720 minute winter | 13.147 | 5.243 |
| 30 year 180 minute summer | 45.598 | 11.734 | 100 year 960 minute summer | 15.851 | 4.174 |
| 30 year 180 minute winter | 29.640 | 11.734 | 100 year 960 minute winter | 10.500 | 4.174 |
| 30 year 240 minute summer | 35.759 | 9.450 | 100 year 1440 minute summer | 11.278 | 3.023 |
| 30 year 240 minute winter | 23.758 | 9.450 | 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.93%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH31 | 10 | 63.445 | 0.055 | 5.0 | 0.1089 | 0.0000 | OK |
| 15 minute winter | MH32 | 11 | 63.239 | 0.099 | 9.9 | 0.1845 | 0.0000 | OK |
| 15 minute winter | MH33 | 11 | 63.195 | 0.126 | 14.3 | 0.2311 | 0.0000 | OK |
| 15 minute winter | MH34 | 11 | 63.036 | 0.075 | 19.0 | 0.1360 | 0.0000 | OK |
| 15 minute winter | MH38 | 10 | 63.397 | 0.047 | 5.0 | 0.0968 | 0.0000 | OK |
| 15 minute winter | MH37 | 10 | 63.168 | 0.078 | 9.9 | 0.1455 | 0.0000 | OK |
| 15 minute winter | MH36 | 10 | 63.045 | 0.065 | 14.8 | 0.1180 | 0.0000 | OK |
| 15 minute winter | FW1B | 11 | 61.696 | 0.066 | 38.2 | 0.0958 | 0.0000 | OK |
| 15 minute winter | UU2708 | 11 | 59.895 | 0.060 | 38.3 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH31 | 1.000 | MH32 | 4.9 | 0.549 | 0.286 | 0.2472 | |
| 15 minute winter | MH32 | 1.001 | MH33 | 9.6 | 0.677 | 0.673 | 0.1533 | |
| 15 minute winter | MH33 | 1.002 | MH34 | 14.3 | 1.146 | 1.004 | 0.2038 | |
| 15 minute winter | MH34 | 1.003 | FW1B | 19.1 | 1.712 | 0.219 | 0.1920 | |
| 15 minute winter | MH38 | 1.004 | MH37 | 4.9 | 0.956 | 0.450 | 0.0408 | |
| 15 minute winter | MH37 | 2.001 | MH36 | 9.8 | 1.201 | 0.372 | 0.0149 | |
| 15 minute winter | MH36 | 1.005 | FW1B | 14.7 | 2.006 | 0.370 | 0.2011 | |
| 15 minute winter | FW1B | 1.004_1 | UU2708 | 38.3 | 4.211 | 0.159 | 0.0776 | 18.4 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.93%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH31 | 12 | 63.824 | 0.434 | 12.2 | 0.8627 | 0.0000 | SURCHARGED |
| 15 minute winter | MH32 | 12 | 63.741 | 0.601 | 19.9 | 1.1185 | 0.0000 | SURCHARGED |
| 15 minute winter | MH33 | 12 | 63.590 | 0.521 | 28.9 | 0.9567 | 0.0000 | SURCHARGED |
| 15 minute winter | MH34 | 11 | 63.072 | 0.111 | 38.1 | 0.2027 | 0.0000 | OK |
| 15 minute winter | MH38 | 11 | 63.558 | 0.208 | 12.2 | 0.4271 | 0.0000 | SURCHARGED |
| 15 minute winter | MH37 | 11 | 63.232 | 0.142 | 22.4 | 0.2649 | 0.0000 | OK |
| 15 minute winter | MH36 | 11 | 63.094 | 0.114 | 34.2 | 0.2085 | 0.0000 | OK |
| 15 minute winter | FW1B | 11 | 61.734 | 0.104 | 83.4 | 0.1518 | 0.0000 | OK |
| 15 minute winter | UU2708 | 11 | 59.926 | 0.091 | 83.4 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH31 | 1.000 | MH32 | 9.2 | 0.591 | 0.540 | 0.4805 | |
| 15 minute winter | MH32 | 1.001 | MH33 | 18.2 | 1.035 | 1.277 | 0.1919 | |
| 15 minute winter | MH33 | 1.002 | MH34 | 27.6 | 1.629 | 1.932 | 0.2626 | |
| 15 minute winter | MH34 | 1.003 | FW1B | 37.9 | 2.031 | 0.435 | 0.3217 | |
| 15 minute winter | MH38 | 1.004 | MH37 | 10.8 | 1.384 | 0.988 | 0.0626 | |
| 15 minute winter | MH37 | 2.001 | MH36 | 22.3 | 1.435 | 0.847 | 0.0279 | |
| 15 minute winter | MH36 | 1.005 | FW1B | 34.0 | 2.474 | 0.859 | 0.3780 | |
| 15 minute winter | FW1B | 1.004_1 | UU2708 | 83.4 | 5.061 | 0.347 | 0.1407 | 45.1 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 99.93%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH31 | 12 | 64.179 | 0.789 | 15.8 | 1.5686 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH32 | 12 | 64.058 | 0.918 | 24.9 | 1.7090 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH33 | 12 | 63.835 | 0.766 | 35.8 | 1.4072 | 0.0000 | SURCHARGED |
| 15 minute winter | MH34 | 11 | 63.089 | 0.128 | 47.6 | 0.2335 | 0.0000 | OK |
| 15 minute winter | MH38 | 12 | 63.814 | 0.464 | 15.8 | 0.9530 | 0.0000 | SURCHARGED |
| 15 minute winter | MH37 | 12 | 63.377 | 0.287 | 27.7 | 0.5333 | 0.0000 | SURCHARGED |
| 15 minute winter | MH36 | 12 | 63.284 | 0.304 | 41.8 | 0.5546 | 0.0000 | SURCHARGED |
| 15 minute winter | FW1B | 11 | 61.748 | 0.118 | 100.1 | 0.1710 | 0.0000 | OK |
| 15 minute winter | UU2708 | 11 | 59.935 | 0.100 | 100.0 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | MH31 | 1.000 | MH32 | 11.2 | 0.636 | 0.659 | 0.4805 | |
| 15 minute winter | MH32 | 1.001 | MH33 | 22.3 | 1.265 | 1.561 | 0.1919 | |
| 15 minute winter | MH33 | 1.002 | MH34 | 33.7 | 1.931 | 2.362 | 0.2794 | |
| 15 minute winter | MH34 | 1.003 | FW1B | 47.3 | 2.134 | 0.542 | 0.3818 | |
| 15 minute winter | MH38 | 1.004 | MH37 | 12.6 | 1.608 | 1.147 | 0.0626 | |
| 15 minute winter | MH37 | 2.001 | MH36 | 26.0 | 1.478 | 0.987 | 0.0322 | |
| 15 minute winter | MH36 | 1.005 | FW1B | 38.2 | 2.604 | 0.965 | 0.4459 | |
| 15 minute winter | FW1B | 1.004_1 | UU2708 | 100.0 | 5.257 | 0.416 | 0.1624 | 58.3 |

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## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 30.00 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 |
| Additional Flow (%) | 40 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | England and Wales | Connection Type | Level Soffits |
| M5-60 (mm) | 17.000 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.400 | Preferred Cover Depth (m) | 1.200 |
| CV | 0.750 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | x |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| END | 0.418 | 5.00 | 64.220 | | 388126.920 | 396936.172 | 2.400 |
| MH2 | 0.106 | 5.00 | 64.360 | 1200 | 388097.728 | 396829.987 | 2.570 |
| MH1 | 0.028 | 5.00 | 64.350 | 1200 | 388085.979 | 396788.782 | 3.640 |
| JUN 3 | 0.030 | 5.00 | 61.570 | | 388083.104 | 396778.719 | 2.236 |
| MH30 | 0.030 | 5.00 | 61.880 | 1200 | 388119.728 | 396767.099 | 2.930 |
| MH29 | 0.030 | 5.00 | 62.010 | 1200 | 388127.755 | 396763.706 | 4.250 |
| MH14 | 0.102 | 5.00 | 64.320 | 1200 | 388145.830 | 396861.797 | 0.203 |
| MH BS10 | 0.102 | 5.00 | 64.020 | 1200 | 388127.042 | 396793.844 | 0.370 |
| MH BS11 | 0.102 | 5.00 | 63.990 | 1200 | 388128.654 | 396793.322 | 0.460 |
| G | 0.078 | 5.00 | 64.350 | 450 | 388179.881 | 396774.991 | 0.700 |
| JUN 1 | 0.078 | 5.00 | 64.290 | 1200 | 388127.476 | 396788.679 | 1.003 |
| MH44 | 0.040 | 5.00 | 64.250 | 1200 | 388126.559 | 396785.065 | 4.230 |
| MH20 | 0.040 | 5.00 | 63.420 | 1200 | 388185.970 | 396759.396 | 1.130 |
| MH21 | 0.040 | 5.00 | 62.950 | 1200 | 388172.221 | 396763.322 | 1.120 |
| MH22 | 0.040 | 5.00 | 62.480 | 1200 | 388148.925 | 396769.756 | 0.900 |
| MH23 | 0.040 | 5.00 | 62.390 | 1200 | 388144.151 | 396771.131 | 0.830 |
| MH43 | 0.040 | 5.00 | 62.390 | 1200 | 388136.522 | 396771.336 | 0.870 |
| MH41 | 0.000 | 5.00 | 62.340 | 1200 | 388133.501 | 396771.894 | 4.870 |
| JUN 2 | | | 62.050 | 1200 | 388132.523 | 396761.623 | 4.978 |
| OF | | | 61.620 | 1350 | 388130.278 | 396745.724 | 4.655 |

## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | END | MH2 | 163.436 | 0.600 | 61.820 | 61.790 | 0.030 | 5447.9 | 225 | 7.72 | 50.0 |
| 1.001 | MH2 | MH1 | 42.847 | 0.600 | 61.790 | 61.600 | 0.190 | 225.0 | 225 | 8.54 | 50.0 |
| 1.002_1 | MH1 | JUN 3 | 10.466 | 0.600 | 60.710 | 59.334 | 1.376 | 7.6 | 225 | 8.58 | 50.0 |
| 1.003 | JUN 3 | MH30 | 38.423 | 0.600 | 59.334 | 58.950 | 0.384 | 100.0 | 225 | 9.07 | 50.0 |
| 1.002 | MH30 | MH29 | 8.715 | 0.600 | 58.950 | 57.760 | 1.190 | 7.3 | 225 | 8.06 | 50.0 |
| 1.005 | MH29 | JUN 2 | 5.203 | 0.600 | 57.760 | 57.447 | 0.313 | 16.6 | 225 | 8.09 | 50.0 |
| 3.000 | MH14 | MH BS10 | 70.504 | 0.600 | 64.117 | 63.650 | 0.467 | 151.0 | 100 | 6.89 | 50.0 |
| 2.001 | MH BS10 | MH BS11 | 1.694 | 0.600 | 63.650 | 63.530 | 0.120 | 14.1 | 150 | 6.90 | 50.0 |
| 3.002 | MH BS11 | JUN 1 | 4.790 | 0.600 | 63.530 | 63.287 | 0.243 | 19.7 | 150 | 6.97 | 50.0 |
| 3.000_1 | G | JUN 1 | 54.163 | 0.600 | 63.650 | 63.501 | 0.149 | 363.5 | 225 | 6.33 | 50.0 |
| 3.003 | JUN 1 | MH44 | 3.729 | 0.600 | 63.287 | 63.098 | 0.189 | 19.7 | 150 | 7.03 | 50.0 |
| 3.004 | MH44 | MH41 | 6.283 | 0.600 | 60.020 | 59.957 | 0.063 | 99.7 | 150 | 7.05 | 50.0 |
| 11.001 | MH20 | MH21 | 14.299 | 0.600 | 62.290 | 61.830 | 0.460 | 31.1 | 225 | 5.28 | 50.0 |
| 11.002 | MH21 | MH22 | 24.168 | 0.600 | 61.830 | 61.580 | 0.250 | 96.7 | 225 | 5.84 | 50.0 |
| 11.003 | MH22 | MH23 | 4.968 | 0.600 | 61.580 | 61.560 | 0.020 | 248.4 | 225 | 5.93 | 50.0 |
| 4.003 | MH23 | MH43 | 7.632 | 0.600 | 61.560 | 61.520 | 0.040 | 190.8 | 225 | 6.06 | 50.0 |

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## Links (Input)

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11.005 | MH43 | MH41 | 3.072 | 0.600 | 61.520 | 61.180 | 0.340 | 9.0 | 225 | 6.14 | 50.0 |
| 3.006 | MH41 | JUN 2 | 10.317 | 0.600 | 57.470 | 57.401 | 0.069 | 149.5 | 375 | 6.78 | 50.0 |
| 1.004 | JUN 2 | OF | 16.057 | 0.600 | 57.072 | 56.965 | 0.107 | 150.1 | 375 | 8.35 | 50.0 |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Analysis Speed | Normal |
| FSR Region | England and Wales | Skip Steady State | x |
| M5-60 (mm) | 17.000 | Drain Down Time (mins) | 240 |
| Ratio-R | 0.400 | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Check Discharge Volume | x |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 1 year 15 minute summer | 92.521 | 26.180 | 30 year 30 minute summer | 147.452 | 41.724 |
| 1 year 15 minute winter | 64.927 | 26.180 | 30 year 30 minute winter | 103.475 | 41.724 |
| 1 year 30 minute summer | 60.022 | 16.984 | 30 year 60 minute summer | 98.615 | 26.061 |
| 1 year 30 minute winter | 42.121 | 16.984 | 30 year 60 minute winter | 65.517 | 26.061 |
| 1 year 60 minute summer | 40.398 | 10.676 | 30 year 120 minute summer | 59.946 | 15.842 |
| 1 year 60 minute winter | 26.839 | 10.676 | 30 year 120 minute winter | 39.827 | 15.842 |
| 1 year 120 minute summer | 24.980 | 6.602 | 30 year 180 minute summer | 45.598 | 11.734 |
| 1 year 120 minute winter | 16.596 | 6.602 | 30 year 180 minute winter | 29.640 | 11.734 |
| 1 year 180 minute summer | 19.271 | 4.959 | 30 year 240 minute summer | 35.759 | 9.450 |
| 1 year 180 minute winter | 12.527 | 4.959 | 30 year 240 minute winter | 23.758 | 9.450 |
| 1 year 240 minute summer | 15.301 | 4.043 | 30 year 360 minute summer | 26.939 | 6.932 |
| 1 year 240 minute winter | 10.165 | 4.043 | 30 year 360 minute winter | 17.511 | 6.932 |
| 1 year 360 minute summer | 11.775 | 3.030 | 30 year 480 minute summer | 20.981 | 5.545 |
| 1 year 360 minute winter | 7.654 | 3.030 | 30 year 480 minute winter | 13.940 | 5.545 |
| 1 year 480 minute summer | 9.342 | 2.469 | 30 year 600 minute summer | 17.039 | 4.661 |
| 1 year 480 minute winter | 6.207 | 2.469 | 30 year 600 minute winter | 11.642 | 4.661 |
| 1 year 600 minute summer | 7.682 | 2.101 | 30 year 720 minute summer | 15.093 | 4.045 |
| 1 year 600 minute winter | 5.249 | 2.101 | 30 year 720 minute winter | 10.143 | 4.045 |
| 1 year 720 minute summer | 6.859 | 1.838 | 30 year 960 minute summer | 12.278 | 3.233 |
| 1 year 720 minute winter | 4.609 | 1.838 | 30 year 960 minute winter | 8.133 | 3.233 |
| 1 year 960 minute summer | 5.653 | 1.489 | 30 year 1440 minute summer | 8.788 | 2.355 |
| 1 year 960 minute winter | 3.745 | 1.489 | 30 year 1440 minute winter | 5.906 | 2.355 |
| 1 year 1440 minute summer | 4.127 | 1.106 | 100 year 15 minute summer | 291.766 | 82.560 |
| 1 year 1440 minute winter | 2.773 | 1.106 | 100 year 15 minute winter | 204.748 | 82.560 |
| 30 year 15 minute summer | 226.195 | 64.005 | 100 year 30 minute summer | 191.982 | 54.324 |
| 30 year 15 minute winter | 158.733 | 64.005 | 100 year 30 minute winter | 134.724 | 54.324 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 100 year 60 minute summer | 129.253 | 34.158 | 100 year 480 minute summer | 27.350 | 7.228 |
| 100 year 60 minute winter | 85.873 | 34.158 | 100 year 480 minute winter | 18.171 | 7.228 |
| 100 year 120 minute summer | 78.836 | 20.834 | 100 year 600 minute summer | 22.137 | 6.055 |
| 100 year 120 minute winter | 52.377 | 20.834 | 100 year 600 minute winter | 15.126 | 6.055 |
| 100 year 180 minute summer | 59.966 | 15.431 | 100 year 720 minute summer | 19.562 | 5.243 |
| 100 year 180 minute winter | 38.980 | 15.431 | 100 year 720 minute winter | 13.147 | 5.243 |
| 100 year 240 minute summer | 46.975 | 12.414 | 100 year 960 minute summer | 15.851 | 4.174 |
| 100 year 240 minute winter | 31.209 | 12.414 | 100 year 960 minute winter | 10.500 | 4.174 |
| 100 year 360 minute summer | 35.264 | 9.075 | 100 year 1440 minute summer | 11.278 | 3.023 |
| 100 year 360 minute winter | 22.923 | 9.075 | 100 year 1440 minute winter | 7.579 | 3.023 |

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**Results for 1 year Critical Storm Duration. Lowest mass balance: 97.63%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END | 13 | 62.677 | 0.857 | 49.8 | 2.9842 | 0.0000 | SURCHARGED |
| 15 minute winter | MH2 | 13 | 62.033 | 0.243 | 43.5 | 0.4749 | 0.0000 | SURCHARGED |
| 15 minute winter | MH1 | 13 | 60.781 | 0.071 | 41.3 | 0.0912 | 0.0000 | OK |
| 15 minute winter | JUN 3 | 13 | 59.509 | 0.175 | 43.3 | 0.0468 | 0.0000 | OK |
| 15 minute winter | MH30 | 13 | 59.024 | 0.074 | 45.2 | 0.0992 | 0.0000 | OK |
| 15 minute winter | MH29 | 13 | 57.875 | 0.115 | 47.1 | 0.1458 | 0.0000 | OK |
| 15 minute winter | MH14 | 13 | 64.320 | 0.203 | 12.2 | 2.2695 | 0.0873 | FLOOD |
| 15 minute winter | MH BS10 | 12 | 63.748 | 0.098 | 17.5 | 0.6504 | 0.0000 | OK |
| 15 minute winter | MH BS11 | 12 | 63.727 | 0.197 | 28.2 | 1.0966 | 0.0000 | FLOOD RISK |
| 15 minute winter | G | 11 | 63.740 | 0.090 | 9.3 | 0.2141 | 0.0000 | OK |
| 15 minute winter | JUN 1 | 12 | 63.580 | 0.293 | 41.3 | 0.7880 | 0.0000 | SURCHARGED |
| 15 minute winter | MH44 | 12 | 60.662 | 0.642 | 44.3 | 0.8476 | 0.0000 | SURCHARGED |
| 15 minute winter | MH20 | 10 | 62.324 | 0.034 | 4.8 | 0.0632 | 0.0000 | OK |
| 15 minute winter | MH21 | 10 | 61.894 | 0.064 | 9.5 | 0.1172 | 0.0000 | OK |
| 15 minute winter | MH22 | 11 | 61.698 | 0.118 | 14.1 | 0.2381 | 0.0000 | OK |
| 15 minute winter | MH23 | 11 | 61.672 | 0.112 | 18.4 | 0.2344 | 0.0000 | OK |
| 15 minute winter | MH43 | 11 | 61.586 | 0.066 | 23.0 | 0.1360 | 0.0000 | OK |
| 15 minute winter | MH41 | 11 | 57.655 | 0.185 | 66.5 | 0.2093 | 0.0000 | OK |
| 15 minute winter | JUN 2 | 12 | 57.325 | 0.253 | 112.1 | 0.2859 | 0.0000 | OK |
| 15 minute winter | OF | 12 | 57.189 | 0.224 | 112.2 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | END | 1.000 | MH2 | 32.4 | 0.814 | 4.842 | 6.5000 | |
| 15 minute winter | MH2 | 1.001 | MH1 | 39.4 | 1.051 | 1.142 | 1.5267 | |
| 15 minute winter | MH1 | 1.002_1 | JUN 3 | 41.3 | 1.864 | 0.218 | 0.2292 | |
| 15 minute winter | JUN 3 | 1.003 | MH30 | 43.2 | 1.924 | 0.831 | 0.8548 | |
| 15 minute winter | MH30 | 1.002 | MH29 | 45.1 | 2.858 | 0.233 | 0.1382 | |
| 15 minute winter | MH29 | 1.005 | JUN 2 | 47.2 | 2.621 | 0.368 | 0.0937 | |
| 15 minute winter | MH14 | 3.000 | MH BS10 | 5.6 | 0.884 | 1.148 | 0.5502 | |
| 15 minute winter | MH BS10 | 2.001 | MH BS11 | 16.0 | 1.443 | 0.336 | 0.0252 | |
| 15 minute winter | MH BS11 | 3.002 | JUN 1 | 26.1 | 1.499 | 0.649 | 0.0843 | |
| 15 minute winter | G | 3.000_1 | JUN 1 | 8.4 | 0.644 | 0.313 | 0.7175 | |
| 15 minute winter | JUN 1 | 3.003 | MH44 | 40.2 | 2.284 | 0.999 | 0.0656 | |
| 15 minute winter | MH44 | 3.004 | MH41 | 44.0 | 2.500 | 2.476 | 0.1095 | |
| 15 minute winter | MH20 | 11.001 | MH21 | 4.7 | 0.747 | 0.051 | 0.0930 | |
| 15 minute winter | MH21 | 11.002 | MH22 | 9.3 | 0.629 | 0.176 | 0.3645 | |
| 15 minute winter | MH22 | 11.003 | MH23 | 13.9 | 0.684 | 0.425 | 0.1012 | |
| 15 minute winter | MH23 | 4.003 | MH43 | 18.5 | 1.269 | 0.495 | 0.1124 | |
| 15 minute winter | MH43 | 11.005 | MH41 | 23.1 | 2.680 | 0.133 | 0.0265 | |
| 15 minute winter | MH41 | 3.006 | JUN 2 | 66.4 | 1.323 | 0.406 | 0.5176 | |
| 15 minute winter | JUN 2 | 1.004 | OF | 112.2 | 1.518 | 0.688 | 1.1857 | 71.6 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 97.63%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | END | 10 | 64.220 | 2.400 | 115.8 | 14.9710 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH2 | 13 | 63.296 | 1.506 | 94.9 | 2.9456 | 0.0000 | SURCHARGED |
| 15 minute winter | MH1 | 14 | 61.232 | 0.522 | 98.2 | 0.6705 | 0.0000 | SURCHARGED |
| 15 minute winter | JUN 3 | 14 | 60.809 | 1.475 | 100.1 | 0.3954 | 0.0000 | SURCHARGED |
| 15 minute winter | MH30 | 14 | 59.072 | 0.122 | 100.7 | 0.1632 | 0.0000 | OK |
| 15 minute winter | MH29 | 13 | 58.049 | 0.289 | 105.4 | 0.3671 | 0.0000 | SURCHARGED |
| 30 minute winter | MH14 | 15 | 64.320 | 0.203 | 22.9 | 2.2695 | 8.5516 | FLOOD |
| 15 minute winter | MH BS10 | 10 | 64.020 | 0.370 | 33.4 | 2.4583 | 3.3122 | FLOOD |
| 15 minute winter | MH BS11 | 10 | 63.990 | 0.460 | 44.3 | 2.5604 | 4.6639 | FLOOD |
| 15 minute winter | G | 11 | 64.030 | 0.380 | 22.7 | 0.9071 | 0.0000 | SURCHARGED |
| 15 minute winter | JUN 1 | 11 | 63.931 | 0.644 | 63.3 | 1.7285 | 0.0000 | SURCHARGED |
| 15 minute winter | MH44 | 12 | 61.398 | 1.378 | 68.5 | 1.8189 | 0.0000 | SURCHARGED |
| 15 minute winter | MH20 | 10 | 62.343 | 0.053 | 11.6 | 0.0977 | 0.0000 | OK |
| 15 minute winter | MH21 | 10 | 61.932 | 0.102 | 23.1 | 0.1890 | 0.0000 | OK |
| 15 minute winter | MH22 | 11 | 61.798 | 0.218 | 34.4 | 0.4402 | 0.0000 | OK |
| 15 minute winter | MH23 | 11 | 61.754 | 0.194 | 45.0 | 0.4068 | 0.0000 | OK |
| 15 minute winter | MH43 | 11 | 61.638 | 0.118 | 56.1 | 0.2411 | 0.0000 | OK |
| 15 minute winter | MH41 | 11 | 57.744 | 0.274 | 122.6 | 0.3104 | 0.0000 | OK |
| 15 minute winter | JUN 2 | 12 | 57.601 | 0.529 | 220.3 | 0.5985 | 0.0000 | SURCHARGED |
| 15 minute winter | OF | 12 | 57.300 | 0.335 | 219.6 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | END | 1.000 | MH2 | 68.5 | 1.723 | 10.254 | 6.5000 | |
| 15 minute winter | MH2 | 1.001 | MH1 | 92.5 | 2.326 | 2.682 | 1.6868 | |
| 15 minute winter | MH1 | 1.002_1 | JUN 3 | 95.1 | 2.454 | 0.501 | 0.4162 | |
| 15 minute winter | JUN 3 | 1.003 | MH30 | 97.2 | 2.780 | 1.869 | 1.1868 | |
| 15 minute winter | MH30 | 1.002 | MH29 | 100.9 | 3.150 | 0.521 | 0.2692 | |
| 15 minute winter | MH29 | 1.005 | JUN 2 | 105.0 | 2.939 | 0.819 | 0.1789 | |
| 30 minute winter | MH14 | 3.000 | MH BS10 | 5.6 | 0.886 | 1.154 | 0.5516 | |
| 15 minute winter | MH BS10 | 2.001 | MH BS11 | 17.4 | 1.431 | 0.365 | 0.0298 | |
| 15 minute winter | MH BS11 | 3.002 | JUN 1 | 28.4 | 1.626 | 0.706 | 0.0843 | |
| 15 minute winter | G | 3.000_1 | JUN 1 | 20.7 | 0.633 | 0.767 | 2.1541 | |
| 15 minute winter | JUN 1 | 3.003 | MH44 | 57.5 | 3.265 | 1.428 | 0.0656 | |
| 15 minute winter | MH44 | 3.004 | MH41 | 66.9 | 3.798 | 3.761 | 0.1095 | |
| 15 minute winter | MH20 | 11.001 | MH21 | 11.5 | 0.948 | 0.123 | 0.1767 | |
| 15 minute winter | MH21 | 11.002 | MH22 | 22.8 | 0.760 | 0.431 | 0.6867 | |
| 15 minute winter | MH22 | 11.003 | MH23 | 33.8 | 0.887 | 1.031 | 0.1884 | |
| 15 minute winter | MH23 | 4.003 | MH43 | 45.1 | 1.538 | 1.203 | 0.2191 | |
| 15 minute winter | MH43 | 11.005 | MH41 | 56.3 | 3.199 | 0.323 | 0.0541 | |
| 15 minute winter | MH41 | 3.006 | JUN 2 | 122.5 | 1.529 | 0.750 | 0.8249 | |
| 15 minute winter | JUN 2 | 1.004 | OF | 219.6 | 1.993 | 1.347 | 1.7206 | 160.8 |

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**Results for 100 year Critical Storm Duration. Lowest mass balance: 97.63%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | END | 9 | 64.220 | 2.400 | 149.4 | 22.4251 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH2 | 13 | 64.125 | 2.335 | 116.7 | 4.5676 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH1 | 14 | 61.989 | 1.279 | 120.1 | 1.6435 | 0.0000 | SURCHARGED |
| 15 minute winter | JUN 3 | 14 | 61.378 | 2.044 | 121.4 | 0.5479 | 0.0000 | FLOOD RISK |
| 15 minute winter | MH30 | 13 | 59.124 | 0.174 | 123.1 | 0.2319 | 0.0000 | OK |
| 15 minute winter | MH29 | 13 | 58.342 | 0.582 | 129.6 | 0.7402 | 0.0000 | SURCHARGED |
| 30 minute winter | MH14 | 13 | 64.320 | 0.203 | 29.8 | 2.2695 | 14.1093 | FLOOD |
| 15 minute winter | MH BS10 | 9 | 64.020 | 0.370 | 42.0 | 2.4583 | 6.7393 | FLOOD |
| 15 minute winter | MH BS11 | 9 | 63.990 | 0.460 | 52.9 | 2.5604 | 11.2592 | FLOOD |
| 15 minute winter | G | 11 | 64.168 | 0.518 | 29.3 | 1.2374 | 0.0000 | FLOOD RISK |
| 15 minute winter | JUN 1 | 10 | 63.988 | 0.701 | 68.1 | 1.8831 | 0.0000 | SURCHARGED |
| 15 minute winter | MH44 | 11 | 61.647 | 1.627 | 74.8 | 2.1483 | 0.0000 | SURCHARGED |
| 15 minute winter | MH20 | 10 | 62.350 | 0.060 | 15.0 | 0.1112 | 0.0000 | OK |
| 15 minute winter | MH21 | 11 | 61.959 | 0.129 | 29.9 | 0.2381 | 0.0000 | OK |
| 15 minute winter | MH22 | 11 | 61.895 | 0.315 | 43.5 | 0.6363 | 0.0000 | SURCHARGED |
| 15 minute winter | MH23 | 11 | 61.830 | 0.270 | 56.8 | 0.5666 | 0.0000 | SURCHARGED |
| 15 minute winter | MH43 | 11 | 61.659 | 0.139 | 71.0 | 0.2857 | 0.0000 | OK |
| 15 minute winter | MH41 | 12 | 57.832 | 0.362 | 144.1 | 0.4097 | 0.0000 | OK |
| 15 minute winter | JUN 2 | 12 | 57.746 | 0.674 | 263.5 | 0.7618 | 0.0000 | SURCHARGED |
| 15 minute winter | OF | 12 | 57.317 | 0.352 | 263.3 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | END | 1.000 | MH2 | 83.6 | 2.102 | 12.505 | 6.5000 | |
| 15 minute winter | MH2 | 1.001 | MH1 | 111.9 | 2.813 | 3.244 | 1.7041 | |
| 15 minute winter | MH1 | 1.002_1 | JUN 3 | 113.0 | 2.842 | 0.595 | 0.4162 | |
| 15 minute winter | JUN 3 | 1.003 | MH30 | 116.9 | 3.074 | 2.250 | 1.3956 | |
| 15 minute winter | MH30 | 1.002 | MH29 | 123.1 | 3.221 | 0.636 | 0.3165 | |
| 15 minute winter | MH29 | 1.005 | JUN 2 | 130.2 | 3.275 | 1.016 | 0.2069 | |
| 30 minute winter | MH14 | 3.000 | MH BS10 | 5.5 | 0.894 | 1.119 | 0.5516 | |
| 15 minute winter | MH BS10 | 2.001 | MH BS11 | 16.6 | 1.426 | 0.349 | 0.0298 | |
| 15 minute winter | MH BS11 | 3.002 | JUN 1 | 28.2 | 1.604 | 0.701 | 0.0843 | |
| 15 minute winter | G | 3.000_1 | JUN 1 | 28.5 | 0.717 | 1.055 | 2.1541 | |
| 15 minute winter | JUN 1 | 3.003 | MH44 | 59.8 | 3.398 | 1.486 | 0.0656 | |
| 15 minute winter | MH44 | 3.004 | MH41 | 73.0 | 4.145 | 4.104 | 0.1095 | |
| 15 minute winter | MH20 | 11.001 | MH21 | 14.9 | 1.003 | 0.159 | 0.2275 | |
| 15 minute winter | MH21 | 11.002 | MH22 | 28.5 | 0.819 | 0.539 | 0.7651 | |
| 15 minute winter | MH22 | 11.003 | MH23 | 42.7 | 1.074 | 1.302 | 0.1976 | |
| 15 minute winter | MH23 | 4.003 | MH43 | 56.9 | 1.566 | 1.518 | 0.2502 | |
| 15 minute winter | MH43 | 11.005 | MH41 | 71.1 | 3.325 | 0.408 | 0.0656 | |
| 15 minute winter | MH41 | 3.006 | JUN 2 | 142.9 | 1.556 | 0.875 | 1.1098 | |
| 15 minute winter | JUN 2 | 1.004 | OF | 263.3 | 2.387 | 1.614 | 1.7477 | 199.5 |

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**Appendix I**

Predelelopment flooding exent

Post development flooding extent