

Design Settings

|                       |                   |                                      |               |
|-----------------------|-------------------|--------------------------------------|---------------|
| Rainfall Methodology  | FSR               | Maximum Time of Concentration (mins) | 30.00         |
| Return Period (years) | 2                 | Maximum Rainfall (mm/hr)             | 50.0          |
| Additional Flow (%)   | 0                 | Minimum Velocity (m/s)               | 1.00          |
| FSR Region            | England and Wales | Connection Type                      | Level Soffits |
| M5-60 (mm)            | 17.000            | Minimum Backdrop Height (m)          | 2.000         |
| Ratio-R               | 0.300             | Preferred Cover Depth (m)            | 1.200         |
| CV                    | 0.750             | Include Intermediate Ground          | ✓             |
| Time of Entry (mins)  | 5.00              | Enforce best practice design rules   | ✓             |

Adoptable Manhole Type

| Max Width (mm) | Diameter (mm) | Max Width (mm) | Diameter (mm) |
|----------------|---------------|----------------|---------------|
| 374            | 1200          | 749            | 1500          |
| 499            | 1350          | 900            | 1800          |

>900 Link+900 mm

| Max Depth (m) | Diameter (mm) | Max Depth (m) | Diameter (mm) |
|---------------|---------------|---------------|---------------|
| 1.500         | 1050          | 99.999        | 1200          |

Circular Default Sewer Type Link Type

|                     |          |               |                 |
|---------------------|----------|---------------|-----------------|
| Shape               | Circular | Follow Ground | x               |
| Barrels             | 1        | Velocity      | Colebrook-White |
| Auto Increment (mm) | 75       | ks (mm) / n   | 0.600           |

Available Diameters (mm)

100 | 150

Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|------|-----------|---------------|-----------------|---------------|-------------|--------------|-----------|
| 7    | 0.000     | 5.00          | 105.875         | 1350          | 387913.326  | 404214.917   | 2.055     |
| 6    | 0.000     |               | 105.457         | 1350          | 387937.973  | 404199.144   | 1.734     |
| 5    | 0.000     |               | 104.984         | 1350          | 387961.446  | 404235.847   | 1.413     |
| 3    | 0.000     |               | 105.400         | 1350          | 387930.065  | 404256.574   | 1.973     |
| 13   | 0.118     | 5.00          | 105.002         | 2400          | 387920.364  | 404168.708   | 1.262     |
| 12   | 0.163     | 5.00          | 105.493         | 2700          | 387936.167  | 404193.310   | 1.826     |
| 11   | 0.125     | 5.00          | 104.953         | 2400          | 387964.092  | 404236.300   | 1.414     |
| 10   | 0.000     |               | 104.871         | 2100          | 387934.441  | 404255.807   | 1.421     |
| 2    | 0.000     |               | 105.076         | 1500          | 387934.064  | 404262.696   | 1.676     |
| 1    |           |               | 104.733         | 1350          | 387939.421  | 404270.854   | 1.373     |



Links

| 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 | 7       | 6       | 29.262     | 0.600       | 103.820   | 103.723   | 0.097    | 301.7       | 300      | 5.54          | 49.7         |
| 1.001 | 6       | 5       | 43.567     | 0.600       | 103.723   | 103.571   | 0.152    | 286.6       | 300      | 6.33          | 47.2         |
| 1.002 | 5       | 3       | 37.608     | 0.600       | 103.571   | 103.427   | 0.144    | 261.2       | 300      | 6.98          | 45.3         |
| 1.003 | 3       | 2       | 7.313      | 0.600       | 103.427   | 103.400   | 0.027    | 270.9       | 300      | 7.10          | 47.4         |
| 2.000 | 13      | 12      | 29.241     | 0.600       | 103.740   | 103.667   | 0.073    | 400.6       | 600      | 5.40          | 50.0         |
| 2.001 | 12      | 11      | 51.263     | 0.600       | 103.667   | 103.539   | 0.128    | 400.5       | 600      | 6.11          | 47.1         |
| 2.002 | 11      | 10      | 35.492     | 0.600       | 103.539   | 103.450   | 0.089    | 398.8       | 600      | 6.60          | 45.3         |
| 2.003 | 10      | 2       | 6.900      | 0.600       | 103.450   | 103.400   | 0.050    | 138.0       | 300      | 6.68          | 46.1         |
| 1.005 | 2       | 1       | 9.758      | 0.600       | 103.400   | 103.360   | 0.040    | 244.0       | 300      | 7.27          | 45.4         |

| Name  | Vel (m/s) | Cap (l/s) | Flow (l/s) | US Depth (m) | DS Depth (m) | Σ Area (ha) | Σ Add Inflow (l/s) | Pro Depth (mm) | Pro Velocity (m/s) |
|-------|-----------|-----------|------------|--------------|--------------|-------------|--------------------|----------------|--------------------|
| 1.000 | 0.900     | 63.6      | 0.0        | 1.755        | 1.434        | 0.000       | 0.0                | 0              | 0.000              |
| 1.001 | 0.923     | 65.3      | 0.0        | 1.434        | 1.113        | 0.000       | 0.0                | 0              | 0.000              |
| 1.002 | 0.968     | 68.4      | 0.0        | 1.113        | 1.673        | 0.000       | 0.0                | 0              | 0.000              |
| 1.003 | 0.950     | 67.2      | 0.0        | 1.673        | 1.376        | 0.000       | 0.0                | 0              | 0.000              |
| 2.000 | 1.210     | 342.2     | 16.0       | 0.662        | 1.226        | 0.118       | 0.0                | 87             | 0.630              |
| 2.001 | 1.210     | 342.2     | 35.9       | 1.226        | 0.814        | 0.281       | 0.0                | 130            | 0.796              |
| 2.002 | 1.213     | 343.0     | 49.9       | 0.814        | 0.821        | 0.406       | 0.0                | 153            | 0.875              |
| 2.003 | 1.336     | 94.5      | 50.7       | 1.121        | 1.376        | 0.406       | 0.0                | 157            | 1.360              |
| 1.005 | 1.002     | 70.8      | 50.0       | 1.376        | 1.073        | 0.406       | 0.0                | 186            | 1.083              |

Pipeline Schedule

| Link  | Length (m) | Slope (1:X) | Dia (mm) | Link Type                   | US CL (m) | US IL (m) | US Depth (m) | DS CL (m) | DS IL (m) | DS Depth (m) |
|-------|------------|-------------|----------|-----------------------------|-----------|-----------|--------------|-----------|-----------|--------------|
| 1.000 | 29.262     | 301.7       | 300      | Circular_Default Sewer Type | 105.875   | 103.820   | 1.755        | 105.457   | 103.723   | 1.434        |
| 1.001 | 43.567     | 286.6       | 300      | Circular_Default Sewer Type | 105.457   | 103.723   | 1.434        | 104.984   | 103.571   | 1.113        |
| 1.002 | 37.608     | 261.2       | 300      | Circular_Default Sewer Type | 104.984   | 103.571   | 1.113        | 105.400   | 103.427   | 1.673        |
| 1.003 | 7.313      | 270.9       | 300      | Circular_Default Sewer Type | 105.400   | 103.427   | 1.673        | 105.076   | 103.400   | 1.376        |
| 2.000 | 29.241     | 400.6       | 600      | Circular_Default Sewer Type | 105.002   | 103.740   | 0.662        | 105.493   | 103.667   | 1.226        |
| 2.001 | 51.263     | 400.5       | 600      | Circular_Default Sewer Type | 105.493   | 103.667   | 1.226        | 104.953   | 103.539   | 0.814        |
| 2.002 | 35.492     | 398.8       | 600      | Circular_Default Sewer Type | 104.953   | 103.539   | 0.814        | 104.871   | 103.450   | 0.821        |
| 2.003 | 6.900      | 138.0       | 300      | Circular_Default Sewer Type | 104.871   | 103.450   | 1.121        | 105.076   | 103.400   | 1.376        |
| 1.005 | 9.758      | 244.0       | 300      | Circular_Default Sewer Type | 105.076   | 103.400   | 1.376        | 104.733   | 103.360   | 1.073        |

| Link  | US Node | Dia (mm) | Node Type | MH Type   | DS Node | Dia (mm) | Node Type | MH Type   |
|-------|---------|----------|-----------|-----------|---------|----------|-----------|-----------|
| 1.000 | 7       | 1350     | Manhole   | Adoptable | 6       | 1350     | Manhole   | Adoptable |
| 1.001 | 6       | 1350     | Manhole   | Adoptable | 5       | 1350     | Manhole   | Adoptable |
| 1.002 | 5       | 1350     | Manhole   | Adoptable | 3       | 1350     | Manhole   | Adoptable |
| 1.003 | 3       | 1350     | Manhole   | Adoptable | 2       | 1500     | Manhole   | Adoptable |
| 2.000 | 13      | 2400     | Manhole   | Adoptable | 12      | 2700     | Manhole   | Adoptable |
| 2.001 | 12      | 2700     | Manhole   | Adoptable | 11      | 2400     | Manhole   | Adoptable |
| 2.002 | 11      | 2400     | Manhole   | Adoptable | 10      | 2100     | Manhole   | Adoptable |
| 2.003 | 10      | 2100     | Manhole   | Adoptable | 2       | 1500     | Manhole   | Adoptable |
| 1.005 | 2       | 1500     | Manhole   | Adoptable | 1       | 1350     | Manhole   | Adoptable |

### Manhole Schedule

| Node | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                          | Link | IL<br>(m) | Dia<br>(mm) |     |
|------|----------------|-----------------|-----------|--------------|-------------|--------------------------------------------------------------------------------------|------|-----------|-------------|-----|
| 7    | 387913.326     | 404214.917      | 105.875   | 2.055        | 1350        |    | 0    | 1.000     | 103.820     | 300 |
| 6    | 387937.973     | 404199.144      | 105.457   | 1.734        | 1350        |     | 1    | 1.000     | 103.723     | 300 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.001     | 103.723     | 300 |
| 5    | 387961.446     | 404235.847      | 104.984   | 1.413        | 1350        |     | 1    | 1.001     | 103.571     | 300 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.002     | 103.571     | 300 |
| 3    | 387930.065     | 404256.574      | 105.400   | 1.973        | 1350        |    | 1    | 1.002     | 103.427     | 300 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.003     | 103.427     | 300 |
| 13   | 387920.364     | 404168.708      | 105.002   | 1.262        | 2400        |     | 0    | 2.000     | 103.740     | 600 |
| 12   | 387936.167     | 404193.310      | 105.493   | 1.826        | 2700        |   | 1    | 2.000     | 103.667     | 600 |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.001     | 103.667     | 600 |
| 11   | 387964.092     | 404236.300      | 104.953   | 1.414        | 2400        |   | 1    | 2.001     | 103.539     | 600 |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.002     | 103.539     | 600 |
| 10   | 387934.441     | 404255.807      | 104.871   | 1.421        | 2100        |  | 1    | 2.002     | 103.450     | 600 |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.003     | 103.450     | 300 |
| 2    | 387934.064     | 404262.696      | 105.076   | 1.676        | 1500        |   | 1    | 2.003     | 103.400     | 300 |
|      |                |                 |           |              |             |                                                                                      | 2    | 1.003     | 103.400     | 300 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.005     | 103.400     | 300 |
| 1    | 387939.421     | 404270.854      | 104.733   | 1.373        | 1350        |   | 1    | 1.005     | 103.360     | 300 |

### Simulation Settings

|                      |                   |                            |      |
|----------------------|-------------------|----------------------------|------|
| Rainfall Methodology | FSR               | Drain Down Time (mins)     | 240  |
| FSR Region           | England and Wales | Additional Storage (m³/ha) | 20.0 |
| M5-60 (mm)           | 17.000            | Check Discharge Rate(s)    | ✓    |
| Ratio-R              | 0.300             | 1 year (l/s)               | 5.0  |
| Summer CV            | 0.750             | 30 year (l/s)              | 5.0  |
| Winter CV            | 0.840             | 100 year (l/s)             | 5.0  |
| Analysis Speed       | Normal            | Check Discharge Volume     | x    |
| Skip Steady State    | ✓                 |                            |      |



| Storm Durations          |    |    |                          |     |                          |     |                          |     |     |     |      |
|--------------------------|----|----|--------------------------|-----|--------------------------|-----|--------------------------|-----|-----|-----|------|
| 15                       | 30 | 60 | 120                      | 180 | 240                      | 360 | 480                      | 600 | 720 | 960 | 1440 |
| Return Period<br>(years) |    |    | Climate Change<br>(CC %) |     | Additional Area<br>(A %) |     | Additional Flow<br>(Q %) |     |     |     |      |
| 1                        |    |    | 0                        |     | 0                        |     | 0                        |     |     |     |      |
| 30                       |    |    | 0                        |     | 0                        |     | 0                        |     |     |     |      |
| 100                      |    |    | 40                       |     | 0                        |     | 0                        |     |     |     |      |

Pre-development Discharge Rate

|                              |            |                        |      |
|------------------------------|------------|------------------------|------|
| Site Makeup                  | Greenfield | Growth Factor 30 year  | 1.70 |
| Greenfield Method            | IH124      | Growth Factor 100 year | 2.08 |
| Positively Drained Area (ha) | 0.766      | Betterment (%)         | 0    |
| SAAR (mm)                    | 999        | QBar                   | 0.2  |
| Soil Index                   | 1          | Q 1 year (l/s)         | 0.2  |
| SPR                          | 0.10       | Q 30 year (l/s)        | 0.3  |
| Region                       | 10         | Q 100 year (l/s)       | 0.4  |
| Growth Factor 1 year         | 0.87       |                        |      |

Node 1 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 All storms              |   |                               |   |                              |   |

| Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) |
|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|
| 0              | 1.000        | 140            | 1.000        | 280            | 1.000        | 420            | 1.000        | 560            | 1.000        | 700            | 1.000        |
| 5              | 1.000        | 145            | 1.000        | 285            | 1.000        | 425            | 1.000        | 565            | 1.000        | 705            | 1.000        |
| 10             | 1.000        | 150            | 1.000        | 290            | 1.000        | 430            | 1.000        | 570            | 1.000        | 710            | 1.000        |
| 15             | 1.000        | 155            | 1.000        | 295            | 1.000        | 435            | 1.000        | 575            | 1.000        | 715            | 1.000        |
| 20             | 1.000        | 160            | 1.000        | 300            | 1.000        | 440            | 1.000        | 580            | 1.000        | 720            | 1.000        |
| 25             | 1.000        | 165            | 1.000        | 305            | 1.000        | 445            | 1.000        | 585            | 1.000        | 725            | 1.000        |
| 30             | 1.000        | 170            | 1.000        | 310            | 1.000        | 450            | 1.000        | 590            | 1.000        | 730            | 1.000        |
| 35             | 1.000        | 175            | 1.000        | 315            | 1.000        | 455            | 1.000        | 595            | 1.000        | 735            | 1.000        |
| 40             | 1.000        | 180            | 1.000        | 320            | 1.000        | 460            | 1.000        | 600            | 1.000        | 740            | 1.000        |
| 45             | 1.000        | 185            | 1.000        | 325            | 1.000        | 465            | 1.000        | 605            | 1.000        | 745            | 1.000        |
| 50             | 1.000        | 190            | 1.000        | 330            | 1.000        | 470            | 1.000        | 610            | 1.000        | 750            | 1.000        |
| 55             | 1.000        | 195            | 1.000        | 335            | 1.000        | 475            | 1.000        | 615            | 1.000        | 755            | 1.000        |
| 60             | 1.000        | 200            | 1.000        | 340            | 1.000        | 480            | 1.000        | 620            | 1.000        | 760            | 1.000        |
| 65             | 1.000        | 205            | 1.000        | 345            | 1.000        | 485            | 1.000        | 625            | 1.000        | 765            | 1.000        |
| 70             | 1.000        | 210            | 1.000        | 350            | 1.000        | 490            | 1.000        | 630            | 1.000        | 770            | 1.000        |
| 75             | 1.000        | 215            | 1.000        | 355            | 1.000        | 495            | 1.000        | 635            | 1.000        | 775            | 1.000        |
| 80             | 1.000        | 220            | 1.000        | 360            | 1.000        | 500            | 1.000        | 640            | 1.000        | 780            | 1.000        |
| 85             | 1.000        | 225            | 1.000        | 365            | 1.000        | 505            | 1.000        | 645            | 1.000        | 785            | 1.000        |
| 90             | 1.000        | 230            | 1.000        | 370            | 1.000        | 510            | 1.000        | 650            | 1.000        | 790            | 1.000        |
| 95             | 1.000        | 235            | 1.000        | 375            | 1.000        | 515            | 1.000        | 655            | 1.000        | 795            | 1.000        |
| 100            | 1.000        | 240            | 1.000        | 380            | 1.000        | 520            | 1.000        | 660            | 1.000        | 800            | 1.000        |
| 105            | 1.000        | 245            | 1.000        | 385            | 1.000        | 525            | 1.000        | 665            | 1.000        | 805            | 1.000        |
| 110            | 1.000        | 250            | 1.000        | 390            | 1.000        | 530            | 1.000        | 670            | 1.000        | 810            | 1.000        |
| 115            | 1.000        | 255            | 1.000        | 395            | 1.000        | 535            | 1.000        | 675            | 1.000        | 815            | 1.000        |
| 120            | 1.000        | 260            | 1.000        | 400            | 1.000        | 540            | 1.000        | 680            | 1.000        | 820            | 1.000        |
| 125            | 1.000        | 265            | 1.000        | 405            | 1.000        | 545            | 1.000        | 685            | 1.000        | 825            | 1.000        |
| 130            | 1.000        | 270            | 1.000        | 410            | 1.000        | 550            | 1.000        | 690            | 1.000        | 830            | 1.000        |
| 135            | 1.000        | 275            | 1.000        | 415            | 1.000        | 555            | 1.000        | 695            | 1.000        | 835            | 1.000        |

| Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) |
|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| 840         | 1.000     | 945         | 1.000     | 1050        | 1.000     | 1155        | 1.000     | 1260        | 1.000     | 1365        | 1.000     |
| 845         | 1.000     | 950         | 1.000     | 1055        | 1.000     | 1160        | 1.000     | 1265        | 1.000     | 1370        | 1.000     |
| 850         | 1.000     | 955         | 1.000     | 1060        | 1.000     | 1165        | 1.000     | 1270        | 1.000     | 1375        | 1.000     |
| 855         | 1.000     | 960         | 1.000     | 1065        | 1.000     | 1170        | 1.000     | 1275        | 1.000     | 1380        | 1.000     |
| 860         | 1.000     | 965         | 1.000     | 1070        | 1.000     | 1175        | 1.000     | 1280        | 1.000     | 1385        | 1.000     |
| 865         | 1.000     | 970         | 1.000     | 1075        | 1.000     | 1180        | 1.000     | 1285        | 1.000     | 1390        | 1.000     |
| 870         | 1.000     | 975         | 1.000     | 1080        | 1.000     | 1185        | 1.000     | 1290        | 1.000     | 1395        | 1.000     |
| 875         | 1.000     | 980         | 1.000     | 1085        | 1.000     | 1190        | 1.000     | 1295        | 1.000     | 1400        | 1.000     |
| 880         | 1.000     | 985         | 1.000     | 1090        | 1.000     | 1195        | 1.000     | 1300        | 1.000     | 1405        | 1.000     |
| 885         | 1.000     | 990         | 1.000     | 1095        | 1.000     | 1200        | 1.000     | 1305        | 1.000     | 1410        | 1.000     |
| 890         | 1.000     | 995         | 1.000     | 1100        | 1.000     | 1205        | 1.000     | 1310        | 1.000     | 1415        | 1.000     |
| 895         | 1.000     | 1000        | 1.000     | 1105        | 1.000     | 1210        | 1.000     | 1315        | 1.000     | 1420        | 1.000     |
| 900         | 1.000     | 1005        | 1.000     | 1110        | 1.000     | 1215        | 1.000     | 1320        | 1.000     | 1425        | 1.000     |
| 905         | 1.000     | 1010        | 1.000     | 1115        | 1.000     | 1220        | 1.000     | 1325        | 1.000     | 1430        | 1.000     |
| 910         | 1.000     | 1015        | 1.000     | 1120        | 1.000     | 1225        | 1.000     | 1330        | 1.000     | 1435        | 1.000     |
| 915         | 1.000     | 1020        | 1.000     | 1125        | 1.000     | 1230        | 1.000     | 1335        | 1.000     | 1440        | 1.000     |
| 920         | 1.000     | 1025        | 1.000     | 1130        | 1.000     | 1235        | 1.000     | 1340        | 1.000     |             |           |
| 925         | 1.000     | 1030        | 1.000     | 1135        | 1.000     | 1240        | 1.000     | 1345        | 1.000     |             |           |
| 930         | 1.000     | 1035        | 1.000     | 1140        | 1.000     | 1245        | 1.000     | 1350        | 1.000     |             |           |
| 935         | 1.000     | 1040        | 1.000     | 1145        | 1.000     | 1250        | 1.000     | 1355        | 1.000     |             |           |
| 940         | 1.000     | 1045        | 1.000     | 1150        | 1.000     | 1255        | 1.000     | 1360        | 1.000     |             |           |

#### Node 10 Online Hydro-Brake® Control

|                          |         |                         |                                |
|--------------------------|---------|-------------------------|--------------------------------|
| Flap Valve               | x       | Objective               | (HE) Minimise upstream storage |
| Replaces Downstream Link | ✓       | Sump Available          | ✓                              |
| Invert Level (m)         | 103.450 | Product Number          | CTL-SHE-0102-4900-1200-4900    |
| Design Depth (m)         | 1.200   | Min Outlet Diameter (m) | 0.150                          |
| Design Flow (l/s)        | 4.9     | Min Node Diameter (mm)  | 1200                           |

#### Node 12 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 103.667 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.95 | Time to half empty (mins) | 0       |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|-----------|-----------|---------------|-----------|-----------|---------------|-----------|-----------|---------------|
| 0.000     | 180.0     | 0.0           | 0.800     | 180.0     | 0.0           | 0.801     | 0.0       | 0.0           |

#### Node 13 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 103.740 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.95 | Time to half empty (mins) | 0       |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|-----------|-----------|---------------|-----------|-----------|---------------|-----------|-----------|---------------|
| 0.000     | 100.0     | 0.0           | 0.800     | 100.0     | 0.0           | 0.801     | 0.0       | 0.0           |

#### Node 11 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 103.539 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.95 | Time to half empty (mins) |         |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 95.0                      | 0.0                           | 0.400        | 95.0                      | 0.0                           | 0.401        | 0.0                       | 0.0                           |

#### Other (defaults)

|                      |       |                       |       |                          |       |
|----------------------|-------|-----------------------|-------|--------------------------|-------|
| Entry Loss (manhole) | 0.250 | Entry Loss (junction) | 0.000 | Apply Recommended Losses | ✓     |
| Exit Loss (manhole)  | 0.250 | Exit Loss (junction)  | 0.000 | Flood Risk (m)           | 0.300 |

#### Approval Results

The network has been designed for a 1 in 2 year storm using FSR rainfall  
It contains 10 nodes (1 outfall) and 9 links  
The total impermeable area is 0.406 ha  
A surcharged outfall has been defined  
1 online control has been defined  
3 structures have been defined, providing 249m<sup>3</sup> of storage below the flood risk level  
Infiltration has not been utilised  
Simulations have been completed using FSR summer and winter storms from 15 to 1440 minute duration

No manholes are smaller than that required by the library

The node losses test has not been completed

No circular links have diameters < 150mm

No links have lengths > 100.000m

No links have lengths that differ from their coordinated length by more than 1.000m

1 link crosses one or more other links

| US Node | DS Node | Link  | Network        | Link  | Easting<br>(m) | Northing<br>(m) |
|---------|---------|-------|----------------|-------|----------------|-----------------|
| 7       | 6       | 1.000 | Foul Network 1 | 1.001 | 387936.934     | 404199.809      |

No links have cover depth outside the range 0.600-3.000m

No nodes have backdrops outside the range 2.000-1.500m

No links have full bore velocity outside the range 0.900-3.000m/s

3 links have peak proportional velocity outside the range 0.750-3.000m/s during the 2 year return period

| US Node | DS Node | Link  | Velocity<br>(m/s) | Event                   |
|---------|---------|-------|-------------------|-------------------------|
| 13      | 12      | 2.000 | 0.486             | 2 year 30 minute winter |
| 12      | 11      | 2.001 | 0.449             | 2 year 30 minute winter |
| 11      | 10      | 2.002 | 0.431             | 2 year 15 minute summer |

2 links have a surcharged depth greater than 0.100m during the 2 year return period

| US Node | DS Node | Link  | Surcharged<br>Depth (m) | Event                     |
|---------|---------|-------|-------------------------|---------------------------|
| 3       | 2       | 1.003 | 0.208                   | 2 year 1440 minute winter |
| 2       | 1       | 1.005 | 0.235                   | 2 year 1440 minute winter |

No nodes flood during the 30 year return period

No infiltrating structures failed to half empty in 1440 minutes during the 2 year return period

No outfalls have a discharge rate greater than 5.0l/s during the 1 year return period

No outfalls have a discharge rate greater than 5.0l/s during the 30 year return period

No outfalls have a discharge rate greater than 5.0l/s during the 100 year return period

The discharge volume test has not been completed

### Rainfall

| Event                     | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event                              | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---------------------------|------------------------|---------------------------|------------------------------------|------------------------|---------------------------|
| 1 year 15 minute summer   | 84.280                 | 23.848                    | 2 year 600 minute summer           | 11.170                 | 3.055                     |
| 1 year 15 minute winter   | 59.144                 | 23.848                    | 2 year 600 minute winter           | 7.632                  | 3.055                     |
| 1 year 30 minute summer   | 57.102                 | 16.158                    | 2 year 720 minute summer           | 10.095                 | 2.706                     |
| 1 year 30 minute winter   | 40.072                 | 16.158                    | 2 year 720 minute winter           | 6.784                  | 2.706                     |
| 1 year 60 minute summer   | 40.398                 | 10.676                    | 2 year 960 minute summer           | 8.482                  | 2.233                     |
| 1 year 60 minute winter   | 26.839                 | 10.676                    | 2 year 960 minute winter           | 5.619                  | 2.233                     |
| 1 year 120 minute summer  | 26.432                 | 6.985                     | 2 year 1440 minute summer          | 6.362                  | 1.705                     |
| 1 year 120 minute winter  | 17.561                 | 6.985                     | 2 year 1440 minute winter          | 4.276                  | 1.705                     |
| 1 year 180 minute summer  | 21.115                 | 5.434                     | 30 year 15 minute summer           | 205.071                | 58.028                    |
| 1 year 180 minute winter  | 13.725                 | 5.434                     | 30 year 15 minute winter           | 143.910                | 58.028                    |
| 1 year 240 minute summer  | 17.197                 | 4.545                     | 30 year 30 minute summer           | 140.191                | 39.669                    |
| 1 year 240 minute winter  | 11.425                 | 4.545                     | 30 year 30 minute winter           | 98.380                 | 39.669                    |
| 1 year 360 minute summer  | 13.694                 | 3.524                     | 30 year 60 minute summer           | 98.615                 | 26.061                    |
| 1 year 360 minute winter  | 8.901                  | 3.524                     | 30 year 60 minute winter           | 65.517                 | 26.061                    |
| 1 year 480 minute summer  | 11.066                 | 2.925                     | 30 year 120 minute summer          | 63.038                 | 16.659                    |
| 1 year 480 minute winter  | 7.352                  | 2.925                     | 30 year 120 minute winter          | 41.881                 | 16.659                    |
| 1 year 600 minute summer  | 9.254                  | 2.531                     | 30 year 180 minute summer          | 49.285                 | 12.683                    |
| 1 year 600 minute winter  | 6.323                  | 2.531                     | 30 year 180 minute winter          | 32.037                 | 12.683                    |
| 1 year 720 minute summer  | 8.394                  | 2.250                     | 30 year 240 minute summer          | 39.344                 | 10.398                    |
| 1 year 720 minute winter  | 5.641                  | 2.250                     | 30 year 240 minute winter          | 26.139                 | 10.398                    |
| 1 year 960 minute summer  | 7.097                  | 1.869                     | 30 year 360 minute summer          | 30.343                 | 7.808                     |
| 1 year 960 minute winter  | 4.701                  | 1.869                     | 30 year 360 minute winter          | 19.724                 | 7.808                     |
| 1 year 1440 minute summer | 5.374                  | 1.440                     | 30 year 480 minute summer          | 24.111                 | 6.372                     |
| 1 year 1440 minute winter | 3.611                  | 1.440                     | 30 year 480 minute winter          | 16.019                 | 6.372                     |
| 2 year 15 minute summer   | 109.066                | 30.862                    | 30 year 600 minute summer          | 19.882                 | 5.438                     |
| 2 year 15 minute winter   | 76.538                 | 30.862                    | 30 year 600 minute winter          | 13.585                 | 5.438                     |
| 2 year 30 minute summer   | 73.782                 | 20.878                    | 30 year 720 minute summer          | 17.819                 | 4.776                     |
| 2 year 30 minute winter   | 51.777                 | 20.878                    | 30 year 720 minute winter          | 11.975                 | 4.776                     |
| 2 year 60 minute summer   | 51.720                 | 13.668                    | 30 year 960 minute summer          | 14.763                 | 3.887                     |
| 2 year 60 minute winter   | 34.361                 | 13.668                    | 30 year 960 minute winter          | 9.779                  | 3.887                     |
| 2 year 120 minute summer  | 33.252                 | 8.787                     | 30 year 1440 minute summer         | 10.836                 | 2.904                     |
| 2 year 120 minute winter  | 22.092                 | 8.787                     | 30 year 1440 minute winter         | 7.282                  | 2.904                     |
| 2 year 180 minute summer  | 26.258                 | 6.757                     | 100 year +40% CC 15 minute summer  | 368.854                | 104.373                   |
| 2 year 180 minute winter  | 17.069                 | 6.757                     | 100 year +40% CC 15 minute winter  | 258.845                | 104.373                   |
| 2 year 240 minute summer  | 21.199                 | 5.602                     | 100 year +40% CC 30 minute summer  | 255.101                | 72.185                    |
| 2 year 240 minute winter  | 14.084                 | 5.602                     | 100 year +40% CC 30 minute winter  | 179.018                | 72.185                    |
| 2 year 360 minute summer  | 16.686                 | 4.294                     | 100 year +40% CC 60 minute summer  | 180.954                | 47.821                    |
| 2 year 360 minute winter  | 10.846                 | 4.294                     | 100 year +40% CC 60 minute winter  | 120.222                | 47.821                    |
| 2 year 480 minute summer  | 13.415                 | 3.545                     | 100 year +40% CC 120 minute summer | 116.088                | 30.679                    |
| 2 year 480 minute winter  | 8.912                  | 3.545                     | 100 year +40% CC 120 minute winter | 77.126                 | 30.679                    |

Rainfall

| Event                              | Peak<br>Intensity<br>(mm/hr) | Average<br>Intensity<br>(mm/hr) | Event                               | Peak<br>Intensity<br>(mm/hr) | Average<br>Intensity<br>(mm/hr) |
|------------------------------------|------------------------------|---------------------------------|-------------------------------------|------------------------------|---------------------------------|
| 100 year +40% CC 180 minute summer | 90.626                       | 23.321                          | 100 year +40% CC 600 minute summer  | 35.816                       | 9.797                           |
| 100 year +40% CC 180 minute winter | 58.909                       | 23.321                          | 100 year +40% CC 600 minute winter  | 24.472                       | 9.797                           |
| 100 year +40% CC 240 minute summer | 72.104                       | 19.055                          | 100 year +40% CC 720 minute summer  | 31.983                       | 8.572                           |
| 100 year +40% CC 240 minute winter | 47.904                       | 19.055                          | 100 year +40% CC 720 minute winter  | 21.495                       | 8.572                           |
| 100 year +40% CC 360 minute summer | 55.175                       | 14.198                          | 100 year +40% CC 960 minute summer  | 26.337                       | 6.935                           |
| 100 year +40% CC 360 minute winter | 35.865                       | 14.198                          | 100 year +40% CC 960 minute winter  | 17.446                       | 6.935                           |
| 100 year +40% CC 480 minute summer | 43.619                       | 11.527                          | 100 year +40% CC 1440 minute summer | 19.151                       | 5.133                           |
| 100 year +40% CC 480 minute winter | 28.979                       | 11.527                          | 100 year +40% CC 1440 minute winter | 12.870                       | 5.133                           |

**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.66%**

| Node Event         | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|--------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 1440 minute winter | 7          | 1440           | 103.889      | 0.069        | 0.0             | 0.0988           | 0.0000        | OK         |
| 1440 minute winter | 6          | 1440           | 103.889      | 0.166        | 0.1             | 0.2376           | 0.0000        | OK         |
| 1440 minute winter | 5          | 1440           | 103.889      | 0.318        | 0.2             | 0.4551           | 0.0000        | SURCHARGED |
| 1440 minute winter | 3          | 1440           | 103.889      | 0.462        | 0.2             | 0.6612           | 0.0000        | SURCHARGED |
| 1440 minute winter | 13         | 1440           | 103.892      | 0.152        | 1.0             | 15.4518          | 0.0000        | OK         |
| 1440 minute winter | 12         | 1440           | 103.892      | 0.225        | 2.4             | 40.2312          | 0.0000        | OK         |
| 1440 minute winter | 11         | 1440           | 103.892      | 0.353        | 2.0             | 34.1098          | 0.0000        | OK         |
| 1440 minute winter | 10         | 1440           | 103.892      | 0.442        | 0.5             | 1.5322           | 0.0000        | SURCHARGED |
| 1440 minute winter | 2          | 1440           | 103.889      | 0.489        | 0.3             | 0.8642           | 0.0000        | SURCHARGED |
| 15 minute summer   | 1          | 1              | 104.360      | 1.000        | 0.0             | 0.0000           | 0.0000        | OK         |

  

| Link Event<br>(Upstream Depth) | US<br>Node | Link         | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|--------------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 1440 minute winter             | 7          | 1.000        | 6          | 0.0              | -0.002            | 0.000    | 0.7642           |                       |
| 1440 minute winter             | 6          | 1.001        | 5          | -0.1             | -0.004            | -0.001   | 2.4055           |                       |
| 1440 minute winter             | 5          | 1.002        | 3          | -0.2             | -0.004            | -0.003   | 2.6483           |                       |
| 1440 minute winter             | 3          | 1.003        | 2          | -0.2             | -0.010            | -0.004   | 0.5150           |                       |
| 1440 minute winter             | 13         | 2.000        | 12         | 1.0              | 0.180             | 0.003    | 2.2354           |                       |
| 1440 minute winter             | 12         | 2.001        | 11         | 1.3              | 0.162             | 0.004    | 6.9013           |                       |
| 1440 minute winter             | 11         | 2.002        | 10         | 0.5              | 0.112             | 0.001    | 7.0149           |                       |
| 1440 minute winter             | 10         | Hydro-Brake® | 2          | 0.3              |                   |          |                  |                       |
| 1440 minute winter             | 2          | 1.005        | 1          | 0.0              | 0.000             | 0.000    | 0.6872           | 0.0                   |

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.66%**

| Node Event         | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|--------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 1440 minute winter | 7          | 1470           | 103.935      | 0.115        | 0.0             | 0.1652           | 0.0000        | OK         |
| 1440 minute winter | 6          | 1470           | 103.935      | 0.212        | 0.1             | 0.3040           | 0.0000        | OK         |
| 1440 minute winter | 5          | 1470           | 103.935      | 0.364        | 0.2             | 0.5215           | 0.0000        | SURCHARGED |
| 1440 minute winter | 3          | 1470           | 103.935      | 0.508        | 0.2             | 0.7276           | 0.0000        | SURCHARGED |
| 1440 minute winter | 13         | 1470           | 103.938      | 0.198        | 1.2             | 20.0882          | 0.0000        | OK         |
| 1440 minute winter | 12         | 1470           | 103.938      | 0.271        | 2.5             | 48.3992          | 0.0000        | OK         |
| 1440 minute winter | 11         | 1470           | 103.938      | 0.399        | 2.1             | 38.5352          | 0.0000        | OK         |
| 1440 minute winter | 10         | 1470           | 103.938      | 0.488        | 0.5             | 1.6910           | 0.0000        | SURCHARGED |
| 1440 minute winter | 2          | 1470           | 103.935      | 0.535        | 0.3             | 0.9461           | 0.0000        | SURCHARGED |
| 15 minute summer   | 1          | 1              | 104.360      | 1.000        | 0.0             | 0.0000           | 0.0000        | OK         |

  

| Link Event<br>(Upstream Depth) | US<br>Node | Link         | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|--------------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 1440 minute winter             | 7          | 1.000        | 6          | 0.0              | -0.004            | -0.001   | 1.1457           |                       |
| 1440 minute winter             | 6          | 1.001        | 5          | -0.1             | -0.004            | -0.002   | 2.6960           |                       |
| 1440 minute winter             | 5          | 1.002        | 3          | -0.2             | -0.004            | -0.003   | 2.6483           |                       |
| 1440 minute winter             | 3          | 1.003        | 2          | -0.2             | -0.022            | -0.004   | 0.5150           |                       |
| 1440 minute winter             | 13         | 2.000        | 12         | 1.0              | 0.178             | 0.003    | 2.9926           |                       |
| 1440 minute winter             | 12         | 2.001        | 11         | 1.4              | 0.184             | 0.004    | 8.2712           |                       |
| 1440 minute winter             | 11         | 2.002        | 10         | 0.5              | 0.118             | 0.001    | 7.8907           |                       |
| 1440 minute winter             | 10         | Hydro-Brake® | 2          | 0.3              |                   |          |                  |                       |
| 1440 minute winter             | 2          | 1.005        | 1          | 0.0              | 0.000             | 0.000    | 0.6872           | 0.0                   |

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.66%**

| Node Event         | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|--------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 1440 minute winter | 7       | 1470        | 104.224   | 0.404     | 0.1          | 0.5788        | 0.0000     | SURCHARGED |
| 1440 minute winter | 6       | 1470        | 104.224   | 0.501     | 0.3          | 0.7176        | 0.0000     | SURCHARGED |
| 1440 minute winter | 5       | 1470        | 104.224   | 0.653     | 0.3          | 0.9351        | 0.0000     | SURCHARGED |
| 1440 minute winter | 3       | 1470        | 104.224   | 0.797     | 0.4          | 1.1411        | 0.0000     | SURCHARGED |
| 1440 minute winter | 13      | 1470        | 104.225   | 0.485     | 2.7          | 49.2098       | 0.0000     | OK         |
| 1440 minute winter | 12      | 1470        | 104.225   | 0.558     | 3.9          | 99.6829       | 0.0000     | OK         |
| 1440 minute winter | 11      | 1470        | 104.225   | 0.686     | 2.5          | 40.4641       | 0.0000     | SURCHARGED |
| 1440 minute winter | 10      | 1470        | 104.225   | 0.775     | 0.7          | 2.6861        | 0.0000     | SURCHARGED |
| 1440 minute winter | 2       | 1470        | 104.224   | 0.824     | 0.4          | 1.4568        | 0.0000     | SURCHARGED |
| 15 minute summer   | 1       | 1           | 104.360   | 1.000     | 0.0          | 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) |
|-----------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 1440 minute winter          | 7       | 1.000        | 6       | -0.1          | -0.006         | -0.002   | 2.0606        |                    |
| 1440 minute winter          | 6       | 1.001        | 5       | -0.3          | -0.005         | -0.004   | 3.0680        |                    |
| 1440 minute winter          | 5       | 1.002        | 3       | -0.3          | -0.005         | -0.005   | 2.6483        |                    |
| 1440 minute winter          | 3       | 1.003        | 2       | -0.4          | -0.028         | -0.005   | 0.5150        |                    |
| 1440 minute winter          | 13      | 2.000        | 12      | 1.1           | 0.167          | 0.003    | 7.5654        |                    |
| 1440 minute winter          | 12      | 2.001        | 11      | 1.2           | 0.197          | 0.004    | 14.2233       |                    |
| 1440 minute winter          | 11      | 2.002        | 10      | 0.7           | 0.125          | 0.002    | 9.9973        |                    |
| 1440 minute winter          | 10      | Hydro-Brake® | 2       | 0.4           |                |          |               |                    |
| 1440 minute winter          | 2       | 1.005        | 1       | 0.0           | 0.000          | 0.000    | 0.6872        | 0.0                |

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.66%**

| Node Event         | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|--------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 960 minute winter  | 7       | 630         | 104.361   | 0.541     | 0.3          | 0.7738        | 0.0000     | SURCHARGED |
| 960 minute winter  | 6       | 630         | 104.361   | 0.638     | 0.7          | 0.9125        | 0.0000     | SURCHARGED |
| 960 minute winter  | 5       | 690         | 104.361   | 0.789     | 0.8          | 1.1297        | 0.0000     | SURCHARGED |
| 1440 minute winter | 3       | 1020        | 104.360   | 0.933     | 0.6          | 1.3356        | 0.0000     | SURCHARGED |
| 1440 minute winter | 13      | 1020        | 104.634   | 0.894     | 4.7          | 81.7655       | 0.0000     | SURCHARGED |
| 1440 minute winter | 12      | 1020        | 104.634   | 0.967     | 8.0          | 144.1513      | 0.0000     | SURCHARGED |
| 1440 minute winter | 11      | 1020        | 104.635   | 1.096     | 5.2          | 43.0386       | 0.0000     | SURCHARGED |
| 1440 minute winter | 10      | 1020        | 104.635   | 1.185     | 5.0          | 4.1035        | 0.0000     | FLOOD RISK |
| 960 minute winter  | 2       | 795         | 104.360   | 0.960     | 4.4          | 1.6968        | 0.0000     | SURCHARGED |
| 15 minute summer   | 1       | 1           | 104.360   | 1.000     | 0.0          | 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) |
|-----------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 960 minute winter           | 7       | 1.000        | 6       | -0.3          | -0.009         | -0.004   | 2.0606        |                    |
| 960 minute winter           | 6       | 1.001        | 5       | -0.7          | -0.010         | -0.010   | 3.0680        |                    |
| 960 minute winter           | 5       | 1.002        | 3       | -0.8          | -0.011         | -0.011   | 2.6483        |                    |
| 1440 minute winter          | 3       | 1.003        | 2       | -0.6          | -0.016         | -0.008   | 0.5150        |                    |
| 1440 minute winter          | 13      | 2.000        | 12      | 2.2           | 0.186          | 0.006    | 8.2365        |                    |
| 1440 minute winter          | 12      | 2.001        | 11      | 3.6           | 0.224          | 0.011    | 14.4396       |                    |
| 1440 minute winter          | 11      | 2.002        | 10      | 5.0           | 0.144          | 0.015    | 9.9973        |                    |
| 1440 minute winter          | 10      | Hydro-Brake® | 2       | 4.8           |                |          |               |                    |
| 960 minute winter           | 2       | 1.005        | 1       | 4.4           | 0.062          | 0.062    | 0.6872        | 92.9               |