## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FEH-22 | Minimum Velocity (m/s) | 1.00 |
| Return Period (years) | 2 | Connection Type | Level Soffits |
| Additional Flow (%) | 0 | Minimum Backdrop Height (m) | 0.200 |
| CV | 1.000 | Preferred Cover Depth (m) | 1.200 |
| Time of Entry (mins) | 4.00 | Include Intermediate Ground | ✓ |
| Maximum Time of Concentration (mins) | 30.00 | Enforce best practice design rules | ✓ |
| Maximum Rainfall (mm/hr) | 50.0 | | |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| SAA | 0.000 | | 10.600 | 1200 | 513200.912 | 103651.470 | 0.900 |
| RE | 0.003 | 4.00 | 10.650 | 150 | 513206.338 | 103636.332 | 0.500 |
| S2 | 0.000 | 4.00 | 10.650 | 600 | 513198.118 | 103650.686 | 0.805 |
| S1 | 0.003 | 4.00 | 10.650 | 450 | 513200.307 | 103635.545 | 0.652 |

## 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 | RE | S1 | 6.082 | 0.600 | 10.150 | 9.998 | 0.152 | 40.0 | 100 | 4.08 | 50.0 |
| 1.002 | S2 | SAA | 2.902 | 0.600 | 9.845 | 9.700 | 0.145 | 20.0 | 100 | 4.44 | 50.0 |
| 1.001 | S1 | S2 | 15.298 | 0.600 | 9.998 | 9.845 | 0.153 | 100.0 | 100 | 4.41 | 50.0 |

| 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 | 1.223 | 9.6 | 0.5 | 0.400 | 0.552 | 0.003 | 0.0 | 16 | 0.651 |
| 1.002 | 1.734 | 13.6 | 1.1 | 0.705 | 0.800 | 0.006 | 0.0 | 19 | 1.034 |
| 1.001 | 0.769 | 6.0 | 1.1 | 0.552 | 0.705 | 0.006 | 0.0 | 29 | 0.579 |

## 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 | 6.082 | 40.0 | 100 | Circular | 10.650 | 10.150 | 0.400 | 10.650 | 9.998 | 0.552 |
| 1.002 | 2.902 | 20.0 | 100 | Circular | 10.650 | 9.845 | 0.705 | 10.600 | 9.700 | 0.800 |
| 1.001 | 15.298 | 100.0 | 100 | Circular | 10.650 | 9.998 | 0.552 | 10.650 | 9.845 | 0.705 |

| Link | US Node | Dia (mm) | Node Type | MH Type | DS Node | Dia (mm) | Node Type | MH Type |
|---|---|---|---|---|---|---|---|---|
| 1.000 | RE | 150 | Manhole | Adoptable | S1 | 450 | Manhole | Adoptable |
| 1.002 | S2 | 600 | Manhole | Adoptable | SAA | 1200 | Manhole | Adoptable |
| 1.001 | S1 | 450 | Manhole | Adoptable | S2 | 600 | Manhole | Adoptable |

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## Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections | Link | IL (m) | Dia (mm) |
|---|---|---|---|---|---|---|---|---|---|
| SAA | 513200.912 | 103651.470 | 10.600 | 0.900 | 1200 | 1 | 1.002 | 9.700 | 100 |
| RE | 513206.338 | 103636.332 | 10.650 | 0.500 | 150 | 0 | 1.000 | 10.150 | 100 |
| S2 | 513198.118 | 103650.686 | 10.650 | 0.805 | 600 | 1 | 1.001 | 9.845 | 100 |
| | | | | | | 0 | 1.002 | 9.845 | 100 |
| S1 | 513200.307 | 103635.545 | 10.650 | 0.652 | 450 | 1 | 1.000 | 9.998 | 100 |
| | | | | | | 0 | 1.001 | 9.998 | 100 |

## Simulation Settings

| | | | | | |
|---|---|---|---|---|---|
| Rainfall Methodology | FEH-22 | Analysis Speed | Detailed | Starting Level (m) | |
| Rainfall Events | Singular | Skip Steady State | x | Check Discharge Rate(s) | x |
| Summer CV | 1.000 | Drain Down Time (mins) | 1440 | Check Discharge Volume | x |
| Winter CV | 1.000 | Additional Storage (m³/ha) | 0.0 | | |

### 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 %) |
|---|---|---|---|
| 10 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 30 | 40 | 0 | 0 |
| 100 | 0 | 0 | 0 |
| 100 | 45 | 0 | 0 |

## Node SAA Soakaway Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Invert Level (m) | 9.700 | Depth (m) | 0.400 |
| Side Inf Coefficient (m/hr) | 0.08280 | Time to half empty (mins) | 688 | Inf Depth (m) | |
| Safety Factor | 1.5 | Pit Width (m) | 4.000 | Number Required | 1 |
| Porosity | 0.95 | Pit Length (m) | 2.000 | | |

## Approval Settings

| | | | |
|---|---|---|---|
| Node Size | ✓ | Cover Depth | ✓ |
| Node Losses | ✓ | Minimum Cover Depth (m) | |
| Link Size | ✓ | Maximum Cover Depth (m) | 3.000 |
| Minimum Diameter (mm) | 150 | Backdrops | ✓ |
| Link Length | ✓ | Minimum Backdrop Height (m) | |
| Maximum Length (m) | 100.000 | Maximum Backdrop Height (m) | 1.500 |
| Coordinates | ✓ | Full Bore Velocity | ✓ |
| Accuracy (m) | 1.000 | Minimum Full Bore Velocity (m/s) | |
| Crossings | ✓ | Maximum Full Bore Velocity (m/s) | 3.000 |

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## Approval Settings

| | | | |
|---|---|---|---|
| Proportional Velocity | ✓ | Flooding | ✓ |
| Return Period (years) | | Return Period (years) | 30 |
| Minimum Proportional Velocity (m/s) | 0.750 | Time to Half Empty | x |
| Maximum Proportional Velocity (m/s) | 3.000 | Discharge Rates | ✓ |
| Surcharged Depth | ✓ | Discharge Volume | ✓ |
| Return Period (years) | | 100 year 360 minute ($m^3$) | |
| Maximum Surcharged Depth (m) | 0.100 | | |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 10 year 15 minute summer | 232.669 | 65.837 | 30 year 720 minute summer | 20.419 | 5.472 |
| 10 year 15 minute winter | 163.277 | 65.837 | 30 year 720 minute winter | 13.723 | 5.472 |
| 10 year 30 minute summer | 153.068 | 43.313 | 30 year 960 minute summer | 16.340 | 4.303 |
| 10 year 30 minute winter | 107.416 | 43.313 | 30 year 960 minute winter | 10.824 | 4.303 |
| 10 year 60 minute summer | 103.814 | 27.435 | 30 year 1440 minute summer | 11.433 | 3.064 |
| 10 year 60 minute winter | 68.971 | 27.435 | 30 year 1440 minute winter | 7.684 | 3.064 |
| 10 year 120 minute summer | 65.944 | 17.427 | 30 year +40% CC 15 minute summer | 426.459 | 120.673 |
| 10 year 120 minute winter | 43.811 | 17.427 | 30 year +40% CC 15 minute winter | 299.269 | 120.673 |
| 10 year 180 minute summer | 50.811 | 13.075 | 30 year +40% CC 30 minute summer | 284.069 | 80.382 |
| 10 year 180 minute winter | 33.028 | 13.075 | 30 year +40% CC 30 minute winter | 199.347 | 80.382 |
| 10 year 240 minute summer | 39.970 | 10.563 | 30 year +40% CC 60 minute summer | 193.258 | 51.073 |
| 10 year 240 minute winter | 26.555 | 10.563 | 30 year +40% CC 60 minute winter | 128.396 | 51.073 |
| 10 year 360 minute summer | 29.968 | 7.712 | 30 year +40% CC 120 minute summer | 118.850 | 31.408 |
| 10 year 360 minute winter | 19.480 | 7.712 | 30 year +40% CC 120 minute winter | 78.961 | 31.408 |
| 10 year 480 minute summer | 23.161 | 6.121 | 30 year +40% CC 180 minute summer | 90.398 | 23.263 |
| 10 year 480 minute winter | 15.388 | 6.121 | 30 year +40% CC 180 minute winter | 58.761 | 23.263 |
| 10 year 600 minute summer | 18.656 | 5.103 | 30 year +40% CC 240 minute summer | 70.636 | 18.667 |
| 10 year 600 minute winter | 12.747 | 5.103 | 30 year +40% CC 240 minute winter | 46.929 | 18.667 |
| 10 year 720 minute summer | 16.391 | 4.393 | 30 year +40% CC 360 minute summer | 52.640 | 13.546 |
| 10 year 720 minute winter | 11.016 | 4.393 | 30 year +40% CC 360 minute winter | 34.217 | 13.546 |
| 10 year 960 minute summer | 13.157 | 3.465 | 30 year +40% CC 480 minute summer | 40.556 | 10.718 |
| 10 year 960 minute winter | 8.715 | 3.465 | 30 year +40% CC 480 minute winter | 26.944 | 10.718 |
| 10 year 1440 minute summer | 9.260 | 2.482 | 30 year +40% CC 600 minute summer | 32.596 | 8.916 |
| 10 year 1440 minute winter | 6.223 | 2.482 | 30 year +40% CC 600 minute winter | 22.272 | 8.916 |
| 30 year 15 minute summer | 304.613 | 86.195 | 30 year +40% CC 720 minute summer | 28.586 | 7.661 |
| 30 year 15 minute winter | 213.764 | 86.195 | 30 year +40% CC 720 minute winter | 19.212 | 7.661 |
| 30 year 30 minute summer | 202.907 | 57.416 | 30 year +40% CC 960 minute summer | 22.876 | 6.024 |
| 30 year 30 minute winter | 142.391 | 57.416 | 30 year +40% CC 960 minute winter | 15.154 | 6.024 |
| 30 year 60 minute summer | 138.042 | 36.480 | 30 year +40% CC 1440 minute summer | 16.006 | 4.290 |
| 30 year 60 minute winter | 91.712 | 36.480 | 30 year +40% CC 1440 minute winter | 10.757 | 4.290 |
| 30 year 120 minute summer | 84.893 | 22.435 | 100 year 15 minute summer | 383.310 | 108.463 |
| 30 year 120 minute winter | 56.401 | 22.435 | 100 year 15 minute winter | 268.989 | 108.463 |
| 30 year 180 minute summer | 64.570 | 16.616 | 100 year 30 minute summer | 257.235 | 72.789 |
| 30 year 180 minute winter | 41.972 | 16.616 | 100 year 30 minute winter | 180.516 | 72.789 |
| 30 year 240 minute summer | 50.454 | 13.333 | 100 year 60 minute summer | 176.825 | 46.730 |
| 30 year 240 minute winter | 33.520 | 13.333 | 100 year 60 minute winter | 117.478 | 46.730 |
| 30 year 360 minute summer | 37.600 | 9.676 | 100 year 120 minute summer | 106.535 | 28.154 |
| 30 year 360 minute winter | 24.441 | 9.676 | 100 year 120 minute winter | 70.780 | 28.154 |
| 30 year 480 minute summer | 28.969 | 7.656 | 100 year 180 minute summer | 80.486 | 20.712 |
| 30 year 480 minute winter | 19.246 | 7.656 | 100 year 180 minute winter | 52.318 | 20.712 |
| 30 year 600 minute summer | 23.283 | 6.368 | 100 year 240 minute summer | 62.731 | 16.578 |
| 30 year 600 minute winter | 15.908 | 6.368 | 100 year 240 minute winter | 41.677 | 16.578 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|
| 100 year 360 minute summer | 46.729 | 12.025 |
| 100 year 360 minute winter | 30.375 | 12.025 |
| 100 year 480 minute summer | 36.098 | 9.540 |
| 100 year 480 minute winter | 23.983 | 9.540 |
| 100 year 600 minute summer | 29.076 | 7.953 |
| 100 year 600 minute winter | 19.867 | 7.953 |
| 100 year 720 minute summer | 25.538 | 6.844 |
| 100 year 720 minute winter | 17.163 | 6.844 |
| 100 year 960 minute summer | 20.442 | 5.383 |
| 100 year 960 minute winter | 13.541 | 5.383 |
| 100 year 1440 minute summer | 14.307 | 3.834 |
| 100 year 1440 minute winter | 9.615 | 3.834 |
| 100 year +45% CC 15 minute summer | 555.799 | 157.272 |
| 100 year +45% CC 15 minute winter | 390.034 | 157.272 |
| 100 year +45% CC 30 minute summer | 372.990 | 105.543 |
| 100 year +45% CC 30 minute winter | 261.748 | 105.543 |
| 100 year +45% CC 60 minute summer | 256.396 | 67.758 |
| 100 year +45% CC 60 minute winter | 170.343 | 67.758 |
| 100 year +45% CC 120 minute summer | 154.476 | 40.824 |
| 100 year +45% CC 120 minute winter | 102.630 | 40.824 |
| 100 year +45% CC 180 minute summer | 116.705 | 30.032 |
| 100 year +45% CC 180 minute winter | 75.861 | 30.032 |
| 100 year +45% CC 240 minute summer | 90.959 | 24.038 |
| 100 year +45% CC 240 minute winter | 60.431 | 24.038 |
| 100 year +45% CC 360 minute summer | 67.757 | 17.436 |
| 100 year +45% CC 360 minute winter | 44.044 | 17.436 |
| 100 year +45% CC 480 minute summer | 52.343 | 13.833 |
| 100 year +45% CC 480 minute winter | 34.775 | 13.833 |
| 100 year +45% CC 600 minute summer | 42.161 | 11.532 |
| 100 year +45% CC 600 minute winter | 28.807 | 11.532 |
| 100 year +45% CC 720 minute summer | 37.030 | 9.924 |
| 100 year +45% CC 720 minute winter | 24.887 | 9.924 |
| 100 year +45% CC 960 minute summer | 29.641 | 7.805 |
| 100 year +45% CC 960 minute winter | 19.635 | 7.805 |
| 100 year +45% CC 1440 minute summer | 20.745 | 5.560 |
| 100 year +45% CC 1440 minute winter | 13.942 | 5.560 |

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**Results for 10 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 |
|---|---|---|---|---|---|---|---|---|
| 600 minute winter | SAA | 420 | 9.933 | 0.233 | 0.2 | 2.0321 | 0.0000 | OK |
| 15 minute summer | RE | 10 | 10.175 | 0.025 | 1.3 | 0.0004 | 0.0000 | OK |
| 600 minute winter | S2 | 420 | 9.933 | 0.088 | 0.2 | 0.0248 | 0.0000 | OK |
| 15 minute summer | S1 | 10 | 10.047 | 0.049 | 2.6 | 0.0078 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) |
|---|---|---|---|---|---|---|---|
| 600 minute winter | SAA | Infiltration | | 0.0 | | | |
| 15 minute summer | RE | 1.000 | S1 | 1.3 | 0.501 | 0.135 | 0.0163 |
| 600 minute winter | S2 | 1.002 | SAA | 0.2 | 0.703 | 0.015 | 0.0219 |
| 15 minute summer | S1 | 1.001 | S2 | 2.6 | 0.886 | 0.427 | 0.0448 |

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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 |
|---|---|---|---|---|---|---|---|---|
| 180 minute summer | SAA | 168 | 10.005 | 0.305 | 1.0 | 2.6620 | 0.0000 | OK |
| 15 minute summer | RE | 10 | 10.179 | 0.029 | 1.7 | 0.0005 | 0.0000 | OK |
| 180 minute summer | S2 | 168 | 10.005 | 0.160 | 1.0 | 0.0452 | 0.0000 | SURCHARGED |
| 15 minute summer | S1 | 10 | 10.056 | 0.058 | 3.4 | 0.0092 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) |
|---|---|---|---|---|---|---|---|
| 180 minute summer | SAA | Infiltration | | 0.1 | | | |
| 15 minute summer | RE | 1.000 | S1 | 1.7 | 0.533 | 0.177 | 0.0198 |
| 180 minute summer | S2 | 1.002 | SAA | 1.0 | 0.907 | 0.070 | 0.0227 |
| 15 minute summer | S1 | 1.001 | S2 | 3.4 | 0.947 | 0.561 | 0.0548 |

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**Results for 30 year +40% CC 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 |
|---|---|---|---|---|---|---|---|---|
| 240 minute summer | SAA | 244 | 10.178 | 0.478 | 1.0 | 3.5843 | 0.0000 | OK |
| 15 minute summer | RE | 10 | 10.183 | 0.033 | 2.3 | 0.0006 | 0.0000 | OK |
| 240 minute summer | S2 | 244 | 10.178 | 0.333 | 1.2 | 0.0942 | 0.0000 | SURCHARGED |
| 240 minute summer | S1 | 244 | 10.178 | 0.180 | 1.2 | 0.0286 | 0.0000 | SURCHARGED |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) |
|---|---|---|---|---|---|---|---|
| 240 minute summer | SAA | Infiltration | | 0.1 | | | |
| 15 minute summer | RE | 1.000 | S1 | 2.3 | 0.570 | 0.240 | 0.0249 |
| 240 minute summer | S2 | 1.002 | SAA | 1.0 | 0.864 | 0.077 | 0.0227 |
| 240 minute summer | S1 | 1.001 | S2 | 1.2 | 0.598 | 0.199 | 0.1197 |

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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 |
|---|---|---|---|---|---|---|---|---|
| 240 minute winter | SAA | 232 | 10.071 | 0.371 | 0.7 | 3.2382 | 0.0000 | OK |
| 15 minute summer | RE | 10 | 10.182 | 0.032 | 2.1 | 0.0006 | 0.0000 | OK |
| 240 minute winter | S2 | 232 | 10.071 | 0.226 | 0.6 | 0.0639 | 0.0000 | SURCHARGED |
| 240 minute winter | S1 | 232 | 10.071 | 0.073 | 0.6 | 0.0116 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) |
|---|---|---|---|---|---|---|---|
| 240 minute winter | SAA | Infiltration | | 0.1 | | | |
| 15 minute summer | RE | 1.000 | S1 | 2.1 | 0.560 | 0.219 | 0.0232 |
| 240 minute winter | S2 | 1.002 | SAA | 0.7 | 0.907 | 0.049 | 0.0227 |
| 240 minute winter | S1 | 1.001 | S2 | 0.6 | 0.598 | 0.103 | 0.1065 |

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**Results for 100 year +45% CC 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 |
|---|---|---|---|---|---|---|---|---|
| 480 minute winter | SAA | 448 | 10.594 | 0.894 | 0.5 | 4.0548 | 0.0000 | OK |
| 480 minute winter | RE | 448 | 10.594 | 0.444 | 0.3 | 0.0080 | 0.0000 | FLOOD RISK |
| 480 minute winter | S2 | 448 | 10.594 | 0.749 | 0.6 | 0.2119 | 0.0000 | FLOOD RISK |
| 480 minute winter | S1 | 448 | 10.594 | 0.596 | 0.6 | 0.0947 | 0.0000 | FLOOD RISK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) |
|---|---|---|---|---|---|---|---|
| 480 minute winter | SAA | Infiltration | | 0.1 | | | |
| 480 minute winter | RE | 1.000 | S1 | 0.3 | 0.350 | 0.031 | 0.0476 |
| 480 minute winter | S2 | 1.002 | SAA | 0.5 | 0.868 | 0.039 | 0.0227 |
| 480 minute winter | S1 | 1.001 | S2 | 0.6 | 0.432 | 0.099 | 0.1197 |

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