

|                                                         |                                                        |                                                                                     |
|---------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                          |                                                        | Page 1                                                                              |
| 66a Church Walk<br>Burgess Hill<br>West Sussex RH15 9AS | COURTWICK LANE<br>SWALE NETWORK<br>(with Cottage Site) |  |
| Date 07.09.17                                           | Designed by DMS                                        |                                                                                     |
| File 4485_SWS Swale Network + Cottage Site.mdx          | Checked by                                             |                                                                                     |
| Micro Drainage                                          |                                                        | Network 2015.1                                                                      |

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

|                                        |        |                                       |       |
|----------------------------------------|--------|---------------------------------------|-------|
| FSR Rainfall Model - England and Wales |        |                                       |       |
| Return Period (years)                  | 1      | Foul Sewage (l/s/ha)                  | 0.000 |
| M5-60 (mm)                             | 19.000 | Volumetric Runoff Coeff.              | 0.750 |
| Ratio R                                | 0.350  | Add Flow / Climate Change (%)         | 0     |
| Maximum Rainfall (mm/hr)               | 100    | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Time of Concentration (mins)   | 30     | Maximum Backdrop Height (m)           | 1.500 |
|                                        |        | Min Design Depth for Optimisation (m) | 1.200 |
|                                        |        | Min Vel for Auto Design only (m/s)    | 1.00  |
|                                        |        | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

Time Area Diagram for Storm

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|
| 0-4            | 0.363        | 4-8            | 1.090        | 8-12           | 0.353        | 12-16          | 0.014        |

Total Area Contributing (ha) = 1.819

Total Pipe Volume (m³) = 112.440

Network Design Table for Storm

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| S4.000 | 34.080        | 0.200       | 170.4          | 0.047          | 5.00           | 0.0                | 0.600     | 0           | 225         |  |
| S4.001 | 20.610        | 0.121       | 170.3          | 0.022          | 0.00           | 0.0                | 0.600     | 0           | 225         |  |
| S4.002 | 24.670        | 0.145       | 170.1          | 0.031          | 0.00           | 0.0                | 0.600     | 0           | 225         |  |
| S4.003 | 15.270        | 0.090       | 169.7          | 0.010          | 0.00           | 0.0                | 0.600     | 0           | 225         |  |
| S4.004 | 11.850        | 0.070       | 169.3          | 0.000          | 0.00           | 0.0                | 0.600     | 0           | 225         |  |
| S4.005 | 24.270        | 0.389       | 62.4           | 0.038          | 0.00           | 0.0                | 0.600     | 0           | 225         |  |
| S4.006 | 23.070        | 0.217       | 106.3          | 0.015          | 0.00           | 0.0                | 0.600     | 0           | 225         |  |
| S5.000 | 14.020        | 0.242       | 57.9           | 0.021          | 5.00           | 0.0                | 0.600     | 0           | 150         |  |
| S4.007 | 46.000        | 0.352       | 130.7          | 0.068          | 0.00           | 0.0                | 0.600     | 0           | 300         |  |
| S4.008 | 17.860        | 0.136       | 131.3          | 0.027          | 0.00           | 0.0                | 0.600     | 0           | 300         |  |
| S4.009 | 35.150        | 0.207       | 169.8          | 0.030          | 0.00           | 0.0                | 0.600     | 0           | 300         |  |
| S4.010 | 9.300         | 0.038       | 244.7          | 0.023          | 0.00           | 0.0                | 0.600     | 0           | 300         |  |
| S4.011 | 64.420        | 0.263       | 244.9          | 0.060          | 0.00           | 0.0                | 0.600     | 0           | 300         |  |
| S4.012 | 34.370        | 0.108       | 318.2          | 0.039          | 0.00           | 0.0                | 0.600     | 0           | 375         |  |
| S4.013 | 15.430        | 0.049       | 314.9          | 0.042          | 0.00           | 0.0                | 0.600     | 0           | 375         |  |
| S6.000 | 25.060        | 1.725       | 14.5           | 0.052          | 5.00           | 0.0                | 0.600     | 0           | 150         |  |
| S4.014 | 76.030        | 0.190       | 400.2          | 0.112          | 0.00           | 0.0                | 0.600     | 0           | 450         |  |
| S4.015 | 51.680        | 0.155       | 333.4          | 0.067          | 0.00           | 0.0                | 0.600     | 0           | 450         |  |
| S7.000 | 26.420        | 0.260       | 101.6          | 0.065          | 5.00           | 0.0                | 0.600     | 0           | 225         |  |

Network Results Table

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | E I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>Flow (l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|------------------|----------------------|--------------------|-------------------|--------------|--------------|---------------|
| S4.000 | 46.47           | 5.57           | 6.645        | 0.047            | 0.0                  | 0.0                | 0.0               | 1.00         | 39.7         | 5.9           |
| S4.001 | 45.26           | 5.91           | 6.445        | 0.069            | 0.0                  | 0.0                | 0.0               | 1.00         | 39.7         | 8.5           |
| S4.002 | 43.90           | 6.32           | 6.324        | 0.100            | 0.0                  | 0.0                | 0.0               | 1.00         | 39.7         | 11.9          |
| S4.003 | 43.11           | 6.58           | 6.179        | 0.110            | 0.0                  | 0.0                | 0.0               | 1.00         | 39.8         | 12.8          |
| S4.004 | 42.52           | 6.78           | 6.089        | 0.110            | 0.0                  | 0.0                | 0.0               | 1.00         | 39.8         | 12.8          |
| S4.005 | 41.82           | 7.02           | 6.019        | 0.148            | 0.0                  | 0.0                | 0.0               | 1.66         | 65.9         | 16.8          |
| S4.006 | 40.98           | 7.32           | 5.630        | 0.163            | 0.0                  | 0.0                | 0.0               | 1.27         | 50.4         | 18.1          |
| S5.000 | 47.95           | 5.18           | 5.730        | 0.021            | 0.0                  | 0.0                | 0.0               | 1.32         | 23.4         | 2.7           |
| S4.007 | 39.53           | 7.88           | 5.338        | 0.252            | 0.0                  | 0.0                | 0.0               | 1.37         | 97.1         | 27.0          |
| S4.008 | 39.00           | 8.10           | 4.986        | 0.279            | 0.0                  | 0.0                | 0.0               | 1.37         | 96.9         | 29.5          |
| S4.009 | 37.87           | 8.58           | 4.850        | 0.309            | 0.0                  | 0.0                | 0.0               | 1.20         | 85.1         | 31.7          |
| S4.010 | 37.52           | 8.74           | 4.643        | 0.332            | 0.0                  | 0.0                | 0.0               | 1.00         | 70.7         | 33.7          |
| S4.011 | 35.32           | 9.81           | 4.605        | 0.392            | 0.0                  | 0.0                | 0.0               | 1.00         | 70.7         | 37.5          |
| S4.012 | 34.28           | 10.38          | 4.267        | 0.431            | 0.0                  | 0.0                | 0.0               | 1.01         | 111.6        | 40.0          |
| S4.013 | 33.83           | 10.63          | 4.159        | 0.473            | 0.0                  | 0.0                | 0.0               | 1.02         | 112.2        | 43.3          |
| S6.000 | 48.03           | 5.16           | 6.060        | 0.052            | 0.0                  | 0.0                | 0.0               | 2.66         | 47.0         | 6.8           |
| S4.014 | 31.89           | 11.89          | 4.035        | 0.637            | 0.0                  | 0.0                | 0.0               | 1.01         | 160.7        | 55.0          |
| S4.015 | 30.83           | 12.67          | 3.845        | 0.704            | 0.0                  | 0.0                | 0.0               | 1.11         | 176.2        | 58.8          |
| S7.000 | 47.32           | 5.34           | 6.900        | 0.065            | 0.0                  | 0.0                | 0.0               | 1.30         | 51.6         | 8.3           |

|                                                         |                                                        |                                                                                     |
|---------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                          |                                                        | Page 2                                                                              |
| 66a Church Walk<br>Burgess Hill<br>West Sussex RH15 9AS | COURTWICK LANE<br>SWALE NETWORK<br>(with Cottage Site) |  |
| Date 07.09.17                                           | Designed by DMS                                        |                                                                                     |
| File 4485_SWS Swale Network + Cottage Site.mdx          | Checked by                                             |                                                                                     |
| Micro Drainage                                          |                                                        | Network 2015.1                                                                      |

Network Design Table for Storm

| PN      | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| S7.001  | 56.510        | 0.385       | 146.8          | 0.035          | 0.00           | 0.0                | 0.600     | o           | 225         |    |
| S7.002  | 27.470        | 0.191       | 143.8          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         |    |
| S7.003  | 21.440        | 0.113       | 189.7          | 0.054          | 0.00           | 0.0                | 0.600     | o           | 300         |    |
| S7.004  | 23.350        | 0.123       | 189.8          | 0.084          | 0.00           | 0.0                | 0.600     | o           | 300         |    |
| S8.000  | 22.670        | 0.327       | 69.3           | 0.024          | 5.00           | 0.0                | 0.600     | o           | 150         |    |
| S7.005  | 53.750        | 1.171       | 45.9           | 0.099          | 0.00           | 0.0                | 0.600     | o           | 300         |    |
| S9.000  | 14.150        | 0.177       | 79.9           | 0.018          | 5.00           | 0.0                | 0.600     | o           | 150         |    |
| S9.001  | 16.250        | 0.204       | 79.7           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         |    |
| S9.002  | 19.740        | 0.247       | 79.9           | 0.048          | 0.00           | 0.0                | 0.600     | o           | 225         |    |
| S9.003  | 24.430        | 0.329       | 74.3           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         |    |
| S10.000 | 35.220        | 0.587       | 60.0           | 0.030          | 5.00           | 0.0                | 0.600     | o           | 150         |    |
| S9.004  | 56.060        | 0.419       | 133.8          | 0.067          | 0.00           | 0.0                | 0.600     | o           | 300         |   |
| S11.000 | 37.430        | 2.246       | 16.7           | 0.069          | 5.00           | 0.0                | 0.600     | o           | 150         |  |
| S12.000 | 20.050        | 0.251       | 79.9           | 0.027          | 5.00           | 0.0                | 0.600     | o           | 150         |  |
| S12.001 | 21.630        | 0.725       | 29.8           | 0.092          | 0.00           | 0.0                | 0.600     | o           | 225         |  |
| S9.005  | 63.190        | 0.258       | 244.9          | 0.058          | 0.00           | 0.0                | 0.600     | o           | 300         |  |
| S9.006  | 26.320        | 0.108       | 243.7          | 0.028          | 0.00           | 0.0                | 0.600     | o           | 300         |  |
| S9.007  | 25.830        | 0.106       | 243.7          | 0.024          | 0.00           | 0.0                | 0.600     | o           | 300         |  |
| S7.006  | 44.850        | 0.231       | 194.2          | 0.041          | 0.00           | 0.0                | 0.600     | o           | 450         |  |
| S7.007  | 39.910        | 0.205       | 194.7          | 0.030          | 0.00           | 0.0                | 0.600     | o           | 450         |  |
| S7.008  | 39.550        | 0.204       | 193.9          | 0.109          | 0.00           | 0.0                | 0.600     | o           | 450         |  |
| S7.009  | 19.040        | 0.102       | 186.7          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         |  |
| S4.016  | 23.850        | 0.127       | 187.8          | 0.020          | 0.00           | 0.0                | 0.600     | o           | 525         |  |
| S4.017  | 25.490        | 0.135       | 188.8          | 0.029          | 0.00           | 0.0                | 0.600     | o           | 525         |  |
| S4.018  | 16.320        | 0.094       | 173.6          | 0.015          | 0.00           | 0.0                | 0.600     | o           | 525         |  |
| S13.000 | 17.240        | 0.416       | 41.4           | 0.049          | 5.00           | 0.0                | 0.600     | o           | 150         |  |

Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|---------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S7.001  | 44.26           | 6.21           | 6.640        | 0.100          | 0.0                  | 0.0           | 0.0               | 1.08         | 42.8         | 12.0          |
| S7.002  | 42.94           | 6.63           | 6.255        | 0.100          | 0.0                  | 0.0           | 0.0               | 1.09         | 43.3         | 12.0          |
| S7.003  | 42.02           | 6.95           | 5.989        | 0.154          | 0.0                  | 0.0           | 0.0               | 1.14         | 80.4         | 17.5          |
| S7.004  | 41.06           | 7.29           | 5.876        | 0.238          | 0.0                  | 0.0           | 0.0               | 1.14         | 80.4         | 26.5          |
| S8.000  | 47.43           | 5.31           | 6.230        | 0.024          | 0.0                  | 0.0           | 0.0               | 1.21         | 21.4         | 3.1           |
| S7.005  | 40.05           | 7.68           | 5.753        | 0.361          | 0.0                  | 0.0           | 0.0               | 2.33         | 164.5        | 39.2          |
| S9.000  | 47.82           | 5.21           | 6.580        | 0.018          | 0.0                  | 0.0           | 0.0               | 1.13         | 19.9         | 2.3           |
| S9.001  | 46.91           | 5.45           | 6.403        | 0.018          | 0.0                  | 0.0           | 0.0               | 1.13         | 19.9         | 2.3           |
| S9.002  | 46.09           | 5.67           | 6.124        | 0.066          | 0.0                  | 0.0           | 0.0               | 1.46         | 58.2         | 8.2           |
| S9.003  | 45.16           | 5.94           | 5.877        | 0.066          | 0.0                  | 0.0           | 0.0               | 1.52         | 60.4         | 8.2           |
| S10.000 | 46.90           | 5.45           | 6.210        | 0.030          | 0.0                  | 0.0           | 0.0               | 1.30         | 23.0         | 3.8           |
| S9.004  | 42.95           | 6.63           | 5.473        | 0.163          | 0.0                  | 0.0           | 0.0               | 1.36         | 96.0         | 19.0          |
| S11.000 | 47.66           | 5.25           | 7.450        | 0.069          | 0.0                  | 0.0           | 0.0               | 2.48         | 43.8         | 8.9           |
| S12.000 | 47.48           | 5.30           | 6.180        | 0.027          | 0.0                  | 0.0           | 0.0               | 1.13         | 19.9         | 3.5           |
| S12.001 | 46.92           | 5.45           | 5.854        | 0.119          | 0.0                  | 0.0           | 0.0               | 2.40         | 95.6         | 15.1          |
| S9.005  | 40.03           | 7.68           | 5.054        | 0.409          | 0.0                  | 0.0           | 0.0               | 1.00         | 70.7         | 44.3          |
| S9.006  | 38.94           | 8.12           | 4.796        | 0.437          | 0.0                  | 0.0           | 0.0               | 1.00         | 70.9         | 46.1          |
| S9.007  | 37.94           | 8.55           | 4.688        | 0.461          | 0.0                  | 0.0           | 0.0               | 1.00         | 70.9         | 47.4          |
| S7.006  | 36.82           | 9.06           | 4.432        | 0.863          | 0.0                  | 0.0           | 0.0               | 1.46         | 231.5        | 86.1          |
| S7.007  | 35.89           | 9.52           | 4.201        | 0.893          | 0.0                  | 0.0           | 0.0               | 1.45         | 231.2        | 86.8          |
| S7.008  | 35.02           | 9.97           | 3.996        | 1.002          | 0.0                  | 0.0           | 0.0               | 1.46         | 231.7        | 95.0          |
| S7.009  | 34.62           | 10.19          | 3.792        | 1.002          | 0.0                  | 0.0           | 0.0               | 1.48         | 236.1        | 95.0          |
| S4.016  | 30.52           | 12.91          | 3.615        | 1.726          | 0.0                  | 0.0           | 0.0               | 1.63         | 353.1        | 142.7         |
| S4.017  | 30.19           | 13.17          | 3.488        | 1.755          | 0.0                  | 0.0           | 0.0               | 1.63         | 352.1        | 143.5         |
| S4.018  | 29.99           | 13.33          | 3.353        | 1.770          | 0.0                  | 0.0           | 0.0               | 1.70         | 367.4        | 143.8         |
| S13.000 | 47.92           | 5.18           | 4.050        | 0.049          | 0.0                  | 0.0           | 0.0               | 1.57         | 27.7         | 6.4           |

|                                                         |                                                        |                                                                                     |
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| GTA Civils Ltd                                          |                                                        | Page 3                                                                              |
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| Date 07.09.17                                           | Designed by DMS                                        |                                                                                     |
| File 4485_SWS Swale Network + Cottage Site.mdx          | Checked by                                             |                                                                                     |
| Micro Drainage                                          |                                                        | Network 2015.1                                                                      |

Network Design Table for Storm

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                      |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|-------------------------------------------------------------------------------------|
| S4.019 | 7.540         | 0.019       | 400.0          | 0.000          | 0.00           | 0.0                | 0.600     | 0           | 525         |  |

Network Results Table

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S4.019 | 29.86           | 13.44          | 3.259        | 1.819            | 0.0                  | 0.0           | 0.0               | 1.11         | 241.1        | 147.1         |

|                                                         |                                                        |                                                                                     |
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| GTA Civils Ltd                                          |                                                        | Page 4                                                                              |
| 66a Church Walk<br>Burgess Hill<br>West Sussex RH15 9AS | COURTWICK LANE<br>SWALE NETWORK<br>(with Cottage Site) |  |
| Date 07.09.17                                           | Designed by DMS                                        |                                                                                     |
| File 4485_SWS Swale Network + Cottage Site.mdx          | Checked by                                             |                                                                                     |
| Micro Drainage                                          |                                                        | Network 2015.1                                                                      |

Manhole Schedules for Storm

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | PN      | Pipe Out Invert Level (m) | Diameter (mm) | PN      | Pipes In Invert Level (m) | Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|---------|---------------------------|---------------|---------|---------------------------|---------------|---------------|
| S17     | 8.070     | 1.425        | Open Manhole  | 1200               | S4.000  | 6.645                     | 225           |         |                           |               |               |
| S18     | 8.450     | 2.005        | Open Manhole  | 1200               | S4.001  | 6.445                     | 225           | S4.000  | 6.445                     | 225           |               |
| S19     | 8.060     | 1.736        | Open Manhole  | 1200               | S4.002  | 6.324                     | 225           | S4.001  | 6.324                     | 225           |               |
| S20     | 7.820     | 1.641        | Open Manhole  | 1200               | S4.003  | 6.179                     | 225           | S4.002  | 6.179                     | 225           |               |
| S21     | 7.850     | 1.761        | Open Manhole  | 1200               | S4.004  | 6.089                     | 225           | S4.003  | 6.089                     | 225           |               |
| S22     | 7.700     | 1.681        | Open Manhole  | 1200               | S4.005  | 6.019                     | 225           | S4.004  | 6.019                     | 225           |               |
| S23     | 7.380     | 1.750        | Open Manhole  | 1200               | S4.006  | 5.630                     | 225           | S4.005  | 5.630                     | 225           |               |
| S24     | 7.380     | 1.650        | Open Manhole  | 1200               | S5.000  | 5.730                     | 150           |         |                           |               |               |
| S25     | 7.220     | 1.882        | Open Manhole  | 1200               | S4.007  | 5.338                     | 300           | S4.006  | 5.413                     | 225           |               |
|         |           |              |               |                    |         |                           |               | S5.000  | 5.488                     | 150           |               |
| S26     | 6.625     | 1.639        | Open Manhole  | 1200               | S4.008  | 4.986                     | 300           | S4.007  | 4.986                     | 300           |               |
| S27     | 6.350     | 1.500        | Open Manhole  | 1200               | S4.009  | 4.850                     | 300           | S4.008  | 4.850                     | 300           |               |
| S28     | 6.435     | 1.792        | Open Manhole  | 1200               | S4.010  | 4.643                     | 300           | S4.009  | 4.643                     | 300           |               |
| S29     | 6.575     | 1.970        | Open Manhole  | 1200               | S4.011  | 4.605                     | 300           | S4.010  | 4.605                     | 300           |               |
| S30     | 7.435     | 3.168        | Open Manhole  | 1350               | S4.012  | 4.267                     | 375           | S4.011  | 4.342                     | 300           |               |
| S31     | 6.935     | 2.776        | Open Manhole  | 1350               | S4.013  | 4.159                     | 375           | S4.012  | 4.159                     | 375           |               |
| S32     | 7.410     | 1.350        | Open Manhole  | 1200               | S6.000  | 6.060                     | 150           |         |                           |               |               |
| S33     | 7.220     | 3.185        | Open Manhole  | 1350               | S4.014  | 4.035                     | 450           | S4.013  | 4.110                     | 375           |               |
|         |           |              |               |                    |         |                           |               | S6.000  | 4.335                     | 150           |               |
| S34     | 6.365     | 2.520        | Open Manhole  | 1350               | S4.015  | 3.845                     | 450           | S4.014  | 3.845                     | 450           |               |
| S35     | 8.310     | 1.410        | Open Manhole  | 1200               | S7.000  | 6.900                     | 225           |         |                           |               |               |
| S36     | 8.050     | 1.410        | Open Manhole  | 1200               | S7.001  | 6.640                     | 225           | S7.000  | 6.640                     | 225           |               |
| S37     | 8.870     | 2.615        | Open Manhole  | 1200               | S7.002  | 6.255                     | 225           | S7.001  | 6.255                     | 225           |               |
| S38     | 8.540     | 2.551        | Open Manhole  | 1200               | S7.003  | 5.989                     | 300           | S7.002  | 6.064                     | 225           |               |
| S39     | 8.260     | 2.384        | Open Manhole  | 1200               | S7.004  | 5.876                     | 300           | S7.003  | 5.876                     | 300           |               |
| S40A    | 7.630     | 1.400        | Open Manhole  | 1200               | S8.000  | 6.230                     | 150           |         |                           |               |               |
| S40     | 8.020     | 2.267        | Open Manhole  | 1200               | S7.005  | 5.753                     | 300           | S7.004  | 5.753                     | 300           |               |
|         |           |              |               |                    |         |                           |               | S8.000  | 5.903                     | 150           |               |
| S41     | 8.280     | 1.700        | Open Manhole  | 1200               | S9.000  | 6.580                     | 150           |         |                           |               |               |
| S42     | 8.200     | 1.797        | Open Manhole  | 1200               | S9.001  | 6.403                     | 150           | S9.000  | 6.403                     | 150           |               |
| S43     | 8.015     | 1.891        | Open Manhole  | 1200               | S9.002  | 6.124                     | 225           | S9.001  | 6.199                     | 150           |               |
| S43A    | 8.130     | 2.253        | Open Manhole  | 1200               | S9.003  | 5.877                     | 225           | S9.002  | 5.877                     | 225           |               |
| S44     | 7.610     | 1.400        | Open Manhole  | 1200               | S10.000 | 6.210                     | 150           |         |                           |               |               |
| S45     | 8.235     | 2.762        | Open Manhole  | 1200               | S9.004  | 5.473                     | 300           | S9.003  | 5.548                     | 225           |               |
|         |           |              |               |                    |         |                           |               | S10.000 | 5.623                     | 150           |               |
| S46C    | 8.775     | 1.325        | Open Manhole  | 1200               | S11.000 | 7.450                     | 150           |         |                           |               |               |
| S46A    | 8.280     | 2.100        | Open Manhole  | 1200               | S12.000 | 6.180                     | 150           |         |                           |               |               |
| S46B    | 8.575     | 2.721        | Open Manhole  | 1200               | S12.001 | 5.854                     | 225           | S12.000 | 5.929                     | 150           |               |
| S46     | 8.345     | 3.291        | Open Manhole  | 1200               | S9.005  | 5.054                     | 300           | S9.004  | 5.054                     | 300           |               |
|         |           |              |               |                    |         |                           |               | S11.000 | 5.204                     | 150           |               |
|         |           |              |               |                    |         |                           |               | S12.001 | 5.129                     | 225           |               |
| S47     | 7.565     | 2.769        | Open Manhole  | 1200               | S9.006  | 4.796                     | 300           | S9.005  | 4.796                     | 300           |               |
| S48     | 7.610     | 2.922        | Open Manhole  | 1200               | S9.007  | 4.688                     | 300           | S9.006  | 4.688                     | 300           |               |
| S49     | 7.335     | 2.903        | Open Manhole  | 1350               | S7.006  | 4.432                     | 450           | S7.005  | 4.582                     | 300           |               |
|         |           |              |               |                    |         |                           |               | S9.007  | 4.582                     | 300           |               |
| S50     | 6.640     | 2.439        | Open Manhole  | 1350               | S7.007  | 4.201                     | 450           | S7.006  | 4.201                     | 450           |               |
| S51     | 6.125     | 2.129        | Open Manhole  | 1350               | S7.008  | 3.996                     | 450           | S7.007  | 3.996                     | 450           |               |
| S52     | 5.845     | 2.053        | Open Manhole  | 1350               | S7.009  | 3.792                     | 450           | S7.008  | 3.792                     | 450           |               |
| S53     | 6.105     | 2.490        | Open Manhole  | 1500               | S4.016  | 3.615                     | 525           | S4.015  | 3.690                     | 450           |               |
|         |           |              |               |                    |         |                           |               | S7.009  | 3.690                     | 450           |               |
| S54     | 5.940     | 2.452        | Open Manhole  | 1500               | S4.017  | 3.488                     | 525           | S4.016  | 3.488                     | 525           |               |
| S55     | 5.490     | 2.137        | Open Manhole  | 1500               | S4.018  | 3.353                     | 525           | S4.017  | 3.353                     | 525           |               |
| S56     | 5.400     | 1.350        | Open Manhole  | 1200               | S13.000 | 4.050                     | 150           |         |                           |               |               |
| S46     | 5.340     | 2.081        | Open Manhole  | 1500               | S4.019  | 3.259                     | 525           | S4.018  | 3.259                     | 525           |               |
|         |           |              |               |                    |         |                           |               | S13.000 | 3.634                     | 150           |               |
| SHWALL  | 5.300     | 2.060        | Open Manhole  | 0                  |         | OUTFALL                   |               | S4.019  | 3.240                     | 525           |               |

Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D, L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|-----------|--------|
| S4.019              | SHWALL       | 5.300        | 3.240        | 0.000            | 0         | 0      |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                        |                                                                                     |                         |                                     |                                 |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------|-------------------------------------|---------------------------------|-------|--------------------|-------|------------------------|-------|-------------------------------|-------|-------------------------------------|-------|------------------|---|-----------------------------------|--------|-----------------|----|----------------------|---|-----------------------|---------------|------------------------|---|----------------|-----|------------|--------|-------------|-------|-----------------------|-----|---------|-------|-------------|-------|--------------------------|--|--------------|--------------|-----------------|----|
| GTA Civils Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                        | Page 5                                                                              |                         |                                     |                                 |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| 66a Church Walk<br>Burgess Hill<br>West Sussex RH15 9AS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | COURTWICK LANE<br>SWALE NETWORK<br>(with Cottage Site) |  |                         |                                     |                                 |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| Date 07.09.17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Designed by DMS                                        |                                                                                     |                         |                                     |                                 |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| File 4485_SWS Swale Network + Cottage Site.mdx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Checked by                                             |                                                                                     |                         |                                     |                                 |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Network 2015.1                                         |                                                                                     |                         |                                     |                                 |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| <p style="text-align: center;"><u>Simulation Criteria for Storm</u></p> <table><tr><td>Volumetric Runoff Coeff</td><td>0.840</td><td>Manhole Headloss Coeff (Global)</td><td>0.500</td><td>Inlet Coeffiecient</td><td>0.800</td></tr><tr><td>Areal Reduction Factor</td><td>1.000</td><td>Foul Sewage per hectare (l/s)</td><td>0.000</td><td>Flow per Person per Day (l/per/day)</td><td>0.000</td></tr><tr><td>Hot Start (mins)</td><td>0</td><td>Additional Flow - % of Total Flow</td><td>30.000</td><td>Run Time (mins)</td><td>60</td></tr><tr><td>Hot Start Level (mm)</td><td>0</td><td>MADD Factor * 10m³/ha</td><td>Storage 2.000</td><td>Output Interval (mins)</td><td>1</td></tr></table> <p>Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0<br/>Number of Online Controls 0    Number of Storage Structures 0    Number of Real Time Controls 0</p> <p style="text-align: center;"><u>Synthetic Rainfall Details</u></p> <table><tr><td>Rainfall Model</td><td>FSR</td><td>M5-60 (mm)</td><td>19.000</td><td>Cv (Summer)</td><td>0.750</td></tr><tr><td>Return Period (years)</td><td>100</td><td>Ratio R</td><td>0.350</td><td>Cv (Winter)</td><td>0.840</td></tr><tr><td colspan="2">Region England and Wales</td><td>Profile Type</td><td>Winter Storm</td><td>Duration (mins)</td><td>30</td></tr></table> |                                                        |                                                                                     | Volumetric Runoff Coeff | 0.840                               | Manhole Headloss Coeff (Global) | 0.500 | Inlet Coeffiecient | 0.800 | Areal Reduction Factor | 1.000 | Foul Sewage per hectare (l/s) | 0.000 | Flow per Person per Day (l/per/day) | 0.000 | Hot Start (mins) | 0 | Additional Flow - % of Total Flow | 30.000 | Run Time (mins) | 60 | Hot Start Level (mm) | 0 | MADD Factor * 10m³/ha | Storage 2.000 | Output Interval (mins) | 1 | Rainfall Model | FSR | M5-60 (mm) | 19.000 | Cv (Summer) | 0.750 | Return Period (years) | 100 | Ratio R | 0.350 | Cv (Winter) | 0.840 | Region England and Wales |  | Profile Type | Winter Storm | Duration (mins) | 30 |
| Volumetric Runoff Coeff                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.840                                                  | Manhole Headloss Coeff (Global)                                                     | 0.500                   | Inlet Coeffiecient                  | 0.800                           |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| Areal Reduction Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.000                                                  | Foul Sewage per hectare (l/s)                                                       | 0.000                   | Flow per Person per Day (l/per/day) | 0.000                           |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| Hot Start (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0                                                      | Additional Flow - % of Total Flow                                                   | 30.000                  | Run Time (mins)                     | 60                              |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| Hot Start Level (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0                                                      | MADD Factor * 10m³/ha                                                               | Storage 2.000           | Output Interval (mins)              | 1                               |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | FSR                                                    | M5-60 (mm)                                                                          | 19.000                  | Cv (Summer)                         | 0.750                           |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100                                                    | Ratio R                                                                             | 0.350                   | Cv (Winter)                         | 0.840                           |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
| Region England and Wales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        | Profile Type                                                                        | Winter Storm            | Duration (mins)                     | 30                              |       |                    |       |                        |       |                               |       |                                     |       |                  |   |                                   |        |                 |    |                      |   |                       |               |                        |   |                |     |            |        |             |       |                       |     |         |       |             |       |                          |  |              |              |                 |    |
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|                                                         |                                                        |                                                                                     |
|---------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|
| GTA Civils Ltd                                          |                                                        | Page 6                                                                              |
| 66a Church Walk<br>Burgess Hill<br>West Sussex RH15 9AS | COURTWICK LANE<br>SWALE NETWORK<br>(with Cottage Site) |  |
| Date 07.09.17                                           | Designed by DMS                                        |                                                                                     |
| File 4485_SWS Swale Network + Cottage Site.mdx          | Checked by                                             |                                                                                     |
| Micro Drainage                                          |                                                        | Network 2015.1                                                                      |

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 150.0 DTS Status ON Inertia Status OFF  
Analysis Timestep Fine DVD Status OFF

| PN      | US/MH<br>Name | Water        | Surcharged   | Flooded        | Flow /<br>Cap. | Overflow<br>(l/s) | Pipe          | Status     |
|---------|---------------|--------------|--------------|----------------|----------------|-------------------|---------------|------------|
|         |               | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) |                |                   | Flow<br>(l/s) |            |
| S4.000  | S17           | 6.960        | 0.090        | 0.000          | 0.52           |                   | 19.5          | SURCHARGED |
| S4.001  | S18           | 6.929        | 0.259        | 0.000          | 0.71           |                   | 25.5          | SURCHARGED |
| S4.002  | S19           | 6.894        | 0.345        | 0.000          | 0.97           |                   | 35.5          | SURCHARGED |
| S4.003  | S20           | 6.834        | 0.430        | 0.000          | 1.03           |                   | 36.1          | SURCHARGED |
| S4.004  | S21           | 6.784        | 0.470        | 0.000          | 1.01           |                   | 34.5          | SURCHARGED |
| S4.005  | S22           | 6.743        | 0.499        | 0.000          | 0.78           |                   | 47.3          | SURCHARGED |
| S4.006  | S23           | 6.618        | 0.763        | 0.000          | 1.01           |                   | 46.7          | SURCHARGED |
| S5.000  | S24           | 6.505        | 0.625        | 0.000          | 0.38           |                   | 8.1           | SURCHARGED |
| S4.007  | S25           | 6.485        | 0.847        | 0.000          | 0.80           |                   | 72.8          | SURCHARGED |
| S4.008  | S26           | 6.344        | 1.058        | 0.000          | 0.89           |                   | 74.3          | SURCHARGED |
| S4.009  | S27           | 6.264        | 1.114        | 0.000          | 1.00           |                   | 78.5          | FLOOD RISK |
| S4.010  | S28           | 6.096        | 1.153        | 0.000          | 1.50           |                   | 82.0          | SURCHARGED |
| S4.011  | S29           | 6.004        | 1.099        | 0.000          | 1.42           |                   | 95.8          | SURCHARGED |
| S4.012  | S30           | 5.534        | 0.892        | 0.000          | 1.00           |                   | 100.5         | SURCHARGED |
| S4.013  | S31           | 5.426        | 0.892        | 0.000          | 1.23           |                   | 109.8         | SURCHARGED |
| S6.000  | S32           | 6.134        | -0.076       | 0.000          | 0.49           |                   | 21.7          | OK         |
| S4.014  | S33           | 5.347        | 0.862        | 0.000          | 1.00           |                   | 150.6         | SURCHARGED |
| S4.015  | S34           | 5.163        | 0.868        | 0.000          | 1.02           |                   | 164.5         | SURCHARGED |
| S7.000  | S35           | 7.022        | -0.103       | 0.000          | 0.57           |                   | 27.1          | OK         |
| S7.001  | S36           | 6.893        | 0.028        | 0.000          | 0.97           |                   | 39.9          | SURCHARGED |
| S7.002  | S37           | 6.705        | 0.225        | 0.000          | 0.91           |                   | 36.4          | SURCHARGED |
| S7.003  | S38           | 6.604        | 0.315        | 0.000          | 0.79           |                   | 55.8          | SURCHARGED |
| S7.004  | S39           | 6.558        | 0.382        | 0.000          | 1.24           |                   | 88.4          | SURCHARGED |
| S8.000  | S40A          | 6.492        | 0.112        | 0.000          | 0.50           |                   | 10.0          | SURCHARGED |
| S7.005  | S40           | 6.460        | 0.407        | 0.000          | 0.83           |                   | 129.2         | SURCHARGED |
| S9.000  | S41           | 7.352        | 0.622        | 0.000          | 0.41           |                   | 7.4           | SURCHARGED |
| S9.001  | S42           | 7.333        | 0.780        | 0.000          | 0.55           |                   | 10.2          | SURCHARGED |
| S9.002  | S43           | 7.320        | 0.971        | 0.000          | 0.46           |                   | 24.1          | SURCHARGED |
| S9.003  | S43A          | 7.292        | 1.190        | 0.000          | 0.44           |                   | 24.7          | SURCHARGED |
| S10.000 | S44           | 7.329        | 0.969        | 0.000          | 0.49           |                   | 10.8          | SURCHARGED |
| S9.004  | S45           | 7.265        | 1.492        | 0.000          | 0.50           |                   | 45.8          | SURCHARGED |
| S11.000 | S46C          | 7.723        | 0.123        | 0.000          | 0.67           |                   | 28.5          | SURCHARGED |
| S12.000 | S46A          | 7.327        | 0.997        | 0.000          | 0.51           |                   | 9.5           | SURCHARGED |
| S12.001 | S46B          | 7.291        | 1.212        | 0.000          | 0.46           |                   | 40.5          | SURCHARGED |
| S9.005  | S46           | 7.202        | 1.848        | 0.000          | 1.65           |                   | 111.1         | SURCHARGED |
| S9.006  | S47           | 6.649        | 1.553        | 0.000          | 1.79           |                   | 113.6         | SURCHARGED |
| S9.007  | S48           | 6.347        | 1.359        | 0.000          | 1.81           |                   | 115.2         | SURCHARGED |
| S7.006  | S49           | 6.012        | 1.130        | 0.000          | 1.09           |                   | 227.0         | SURCHARGED |
| S7.007  | S50           | 5.755        | 1.104        | 0.000          | 1.11           |                   | 228.9         | SURCHARGED |
| S7.008  | S51           | 5.505        | 1.059        | 0.000          | 1.24           |                   | 255.1         | SURCHARGED |
| S7.009  | S52           | 5.201        | 0.959        | 0.000          | 1.41           |                   | 253.7         | SURCHARGED |
| S4.016  | S53           | 5.001        | 0.861        | 0.000          | 1.54           |                   | 421.3         | SURCHARGED |
| S4.017  | S54           | 4.699        | 0.686        | 0.000          | 1.51           |                   | 426.7         | SURCHARGED |
| S4.018  | S55           | 4.388        | 0.510        | 0.000          | 1.73           |                   | 430.0         | SURCHARGED |
| S13.000 | S56           | 4.204        | 0.004        | 0.000          | 0.79           |                   | 20.3          | SURCHARGED |
| S4.019  | S46           | 4.072        | 0.288        | 0.000          | 3.28           |                   | 441.8         | SURCHARGED |