

Existing Network Details for Existing

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|
| E1.000 | 5.965 | 0.050 | 119.3 | 0.036 | 5.00 | 0.0 | 0.600 | o | 225 |
| E1.001 | 14.954 | 0.190 | 78.7 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 |
| E1.002 | 35.573 | 0.130 | 273.6 | 0.126 | 0.00 | 0.0 | 0.600 | o | 300 |
| E1.003 | 25.582 | 0.030 | 852.7 | 0.137 | 0.00 | 0.0 | 0.600 | o | 300 |
| E1.004 | 27.484 | 0.024 | 1145.2 | 0.124 | 0.00 | 0.0 | 0.600 | o | 375 |
| E1.005 | 44.814 | 0.046 | 974.2 | 0.157 | 0.00 | 0.0 | 0.600 | o | 375 |
| E1.006 | 22.657 | 0.140 | 161.8 | 0.095 | 0.00 | 0.0 | 0.600 | o | 450 |
| E1.007 | 13.394 | 0.070 | 191.3 | 0.031 | 0.00 | 0.0 | 0.600 | o | 450 |
| E1.008 | 40.307 | 0.110 | 366.4 | 0.058 | 0.00 | 0.0 | 0.600 | o | 450 |
| E1.009 | 58.164 | 0.090 | 646.3 | 0.082 | 0.00 | 0.0 | 0.600 | o | 450 |
| E1.010 | 5.590 | 0.110 | 50.8 | 0.019 | 0.00 | 0.0 | 0.600 | o | 525 |
| | | | | | | | | | |
| E2.000 | 29.453 | 0.030 | 981.8 | 0.081 | 5.00 | 0.0 | 0.600 | o | 225 |
| E2.001 | 20.584 | 0.390 | 52.8 | 0.083 | 0.00 | 0.0 | 0.600 | o | 300 |
| | | | | | | | | | |
| E3.000 | 19.866 | 0.200 | 99.3 | 0.110 | 5.00 | 0.0 | 0.600 | o | 225 |
| E3.001 | 22.831 | 0.100 | 228.3 | 0.058 | 0.00 | 0.0 | 0.600 | o | 300 |
| E3.002 | 22.210 | 0.130 | 170.8 | 0.062 | 0.00 | 0.0 | 0.600 | o | 300 |
| E3.003 | 27.782 | 0.120 | 231.5 | 0.106 | 0.00 | 0.0 | 0.600 | o | 400 |
| E3.004 | 7.201 | 0.130 | 55.4 | 0.080 | 0.00 | 0.0 | 0.600 | o | 400 |
| | | | | | | | | | |
| E2.002 | 10.644 | 0.180 | 59.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 400 |

Network Results Table

| PN | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Vel (m/s) | Cap (l/s) |
|--------|--------------|------------------|----------------------|--------------|--------------|
| E1.000 | 8.490 | 0.036 | 0.0 | 1.20 | 47.6 |
| E1.001 | 8.440 | 0.036 | 0.0 | 1.77 | 125.4 |
| E1.002 | 8.250 | 0.161 | 0.0 | 0.95 | 66.8 |
| E1.003 | 8.120 | 0.298 | 0.0 | 0.53 | 37.5 |
| E1.004 | 8.090 | 0.422 | 0.0 | 0.53 | 58.2 |
| E1.005 | 8.066 | 0.579 | 0.0 | 0.57 | 63.2 |
| E1.006 | 8.020 | 0.674 | 0.0 | 1.60 | 253.7 |
| E1.007 | 7.880 | 0.705 | 0.0 | 1.47 | 233.2 |
| E1.008 | 7.810 | 0.764 | 0.0 | 1.06 | 168.0 |
| E1.009 | 7.700 | 0.845 | 0.0 | 0.79 | 126.0 |
| E1.010 | 7.610 | 0.864 | 0.0 | 3.15 | 681.4 |
| | | | | | |
| E2.000 | 8.150 | 0.081 | 0.0 | 0.41 | 16.3 |
| E2.001 | 8.120 | 0.164 | 0.0 | 2.17 | 153.3 |
| | | | | | |
| E3.000 | 8.360 | 0.110 | 0.0 | 1.31 | 52.2 |
| E3.001 | 8.160 | 0.168 | 0.0 | 1.04 | 73.3 |
| E3.002 | 8.060 | 0.230 | 0.0 | 1.20 | 84.8 |
| E3.003 | 7.930 | 0.336 | 0.0 | 1.24 | 155.3 |
| E3.004 | 7.810 | 0.415 | 0.0 | 2.54 | 319.2 |
| | | | | | |
| E2.002 | 7.680 | 0.580 | 0.0 | 2.46 | 308.9 |

Existing Network Details for Existing

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|
| E1.011 | 6.314 | 0.100 | 63.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 |
| E1.012 | 4.433 | 0.044 | 100.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 |

Network Results Table


| PN | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Vel (m/s) | Cap (l/s) |
|--------|--------------|------------------|----------------------|--------------|--------------|
| E1.011 | 5.530 | 1.444 | 0.0 | 1.27 | 22.4 |
| E1.012 | 7.983 | 1.444 | 0.0 | 1.00 | 17.7 |

Simulation Criteria for Existing

| | | | |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff | 0.750 | Additional Flow - % of Total Flow | 0.000 |
| Areal Reduction Factor | 1.000 | MADD Factor * 10m ³ /ha Storage | 2.000 |
| Hot Start (mins) | 0 | Inlet Coefficient | 0.800 |
| Hot Start Level (mm) | 0 | Flow per Person per Day (l/per/day) | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins) | 60 |
| Foul Sewage per hectare (l/s) | 0.000 | Output Interval (mins) | 1 |
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls | 1 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 0 | Number of Real Time Controls | 0 |

Synthetic Rainfall Details

| | | | |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 30 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.400 | Storm Duration (mins) | 30 |
| Ratio R | 0.428 | | |


| | | |
|--------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------|
| Mott MacDonald | | Page 3 |
| 1st Floor Spring Bank House 33 Stamford Street Altrincham WA14 1ES | |  |
| Date 03/08/2016 14:40 File TWICKENHAM EXISITNG SW ... | Designed by sim64626 Checked by | |
| Micro Drainage | | Network 2015.1 |

Online Controls for Existing

Pump Manhole: E15, DS/PN: E1.011, Volume (m³): 6.3

Invert Level (m) 5.730

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100 | 24.0000 | 1.200 | 24.0000 | 3.000 | 24.0000 | 7.000 | 24.0000 |
| 0.200 | 24.0000 | 1.400 | 24.0000 | 3.500 | 24.0000 | 7.500 | 24.0000 |
| 0.300 | 24.0000 | 1.600 | 24.0000 | 4.000 | 24.0000 | 8.000 | 24.0000 |
| 0.400 | 24.0000 | 1.800 | 24.0000 | 4.500 | 24.0000 | 8.500 | 24.0000 |
| 0.500 | 24.0000 | 2.000 | 24.0000 | 5.000 | 24.0000 | 9.000 | 24.0000 |
| 0.600 | 24.0000 | 2.200 | 24.0000 | 5.500 | 24.0000 | 9.500 | 24.0000 |
| 0.800 | 24.0000 | 2.400 | 24.0000 | 6.000 | 24.0000 | | |
| 1.000 | 24.0000 | 2.600 | 24.0000 | 6.500 | 24.0000 | | |

| | | |
|--------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------|
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| Date 03/08/2016 14:40 File TWICKENHAM EXISITNG SW ... | Designed by sim64626 Checked by | |
| Micro Drainage | | Network 2015.1 |

Storage Structures for Existing

Tank or Pond Manhole: E15, DS/PN: E1.011

Invert Level (m) 5.530

| Depth (m) | Area (m ²) | Depth (m) | Area (m ²) | Depth (m) | Area (m ²) |
|-----------|------------------------|-----------|------------------------|-----------|------------------------|
| 0.000 | 84.0 | 2.000 | 84.0 | 2.601 | 0.0 |
| 1.000 | 84.0 | 2.600 | 84.0 | | |

100 year Return Period Summary of Critical Results by Maximum Flood Volume
(Rank 1) for Existing

Simulation Criteria

| | | | |
|---------------------------------|-------|--------------------------------------------|-------|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m ³ /ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

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

Synthetic Rainfall Details

| | | | |
|--------------------------|-------------|-------------|-------|
| Rainfall Model | FSR | Ratio R | 0.431 |
| Region England and Wales | Cv (Summer) | | 0.750 |
| M5-60 (mm) | 20.700 | Cv (Winter) | 0.840 |

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

| | |
|--------------------------|-----------------------------------------------------------------------------------------------------------|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080 |
| Return Period(s) (years) | 100 |
| Climate Change (%) | 0 |

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|--------|------------|------------|---------------|----------------|-----------------|-----------------|--------------------|---------------|
| E1.000 | E1 | 15 Winter | 100 | +0% | 100/15 Summer | 100/15 Summer | | |
| E1.001 | E2 | 15 Winter | 100 | +0% | 100/15 Summer | 100/15 Summer | | |
| E1.002 | E3 | 15 Winter | 100 | +0% | 100/15 Summer | 100/15 Summer | | |
| E1.003 | E4 | 180 Winter | 100 | +0% | 100/15 Summer | 100/15 Summer | | |
| E1.004 | E5 | 120 Winter | 100 | +0% | 100/15 Summer | 100/15 Summer | | |
| E1.005 | E6 | 120 Winter | 100 | +0% | 100/15 Summer | 100/30 Winter | | |
| E1.006 | E7 | 120 Winter | 100 | +0% | 100/15 Summer | 100/30 Winter | | |
| E1.007 | E8 | 360 Winter | 100 | +0% | 100/15 Summer | | | |
| E1.008 | E9 | 360 Winter | 100 | +0% | 100/15 Summer | | | |
| E1.009 | E10 | 60 Winter | 100 | +0% | 100/15 Summer | 100/60 Winter | | |
| E1.010 | E11 | 60 Winter | 100 | +0% | 100/15 Winter | 100/60 Winter | | |
| E2.000 | E15 | 120 Winter | 100 | +0% | 100/15 Summer | 100/60 Winter | | |
| E2.001 | E16 | 60 Winter | 100 | +0% | 100/30 Summer | 100/60 Winter | | |
| E3.000 | E15 | 120 Winter | 100 | +0% | 100/15 Summer | 100/30 Winter | | |
| E3.001 | E16 | 60 Winter | 100 | +0% | 100/15 Summer | 100/60 Winter | | |
| E3.002 | E17 | 360 Winter | 100 | +0% | 100/15 Summer | | | |
| E3.003 | E18 | 360 Winter | 100 | +0% | 100/15 Summer | | | |

100 year Return Period Summary of Critical Results by Maximum Flood Volume
(Rank 1) for Existing

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m ³) | Flow / Overflow Cap. (l/s) | Pipe Flow (l/s) | Status | Level Exceeded |
|--------|------------|-----------------|----------------------|----------------------------------|----------------------------|-----------------|------------|----------------|
| E1.000 | E1 | 9.184 | 0.469 | 4.279 | 1.37 | 43.3 | FLOOD | 8 |
| E1.001 | E2 | 9.184 | 0.444 | 4.115 | 0.42 | 44.6 | FLOOD | 7 |
| E1.002 | E3 | 9.202 | 0.652 | 1.853 | 0.89 | 54.8 | FLOOD | 4 |
| E1.003 | E4 | 9.184 | 0.764 | 33.938 | 1.21 | 31.4 | FLOOD | 13 |
| E1.004 | E5 | 9.185 | 0.720 | 35.063 | 1.47 | 59.4 | FLOOD | 12 |
| E1.005 | E6 | 9.190 | 0.749 | 40.156 | 1.47 | 81.8 | FLOOD | 10 |
| E1.006 | E7 | 9.202 | 0.732 | 11.894 | 0.45 | 94.9 | FLOOD | 7 |
| E1.007 | E8 | 9.175 | 0.845 | 0.000 | 0.25 | 43.0 | FLOOD RISK | |
| E1.008 | E9 | 9.178 | 0.918 | 0.000 | 0.31 | 46.5 | FLOOD RISK | |
| E1.009 | E10 | 9.291 | 1.141 | 1.527 | 1.46 | 169.1 | FLOOD | 2 |
| E1.010 | E11 | 9.327 | 1.192 | 0.040 | 0.65 | 164.3 | FLOOD | |
| E2.000 | E15 | 9.285 | 0.910 | 5.454 | 0.99 | 11.8 | FLOOD | 5 |
| E2.001 | E16 | 9.302 | 0.882 | 1.671 | 0.29 | 39.4 | FLOOD | 3 |
| E3.000 | E15 | 9.299 | 0.714 | 8.932 | 0.34 | 16.0 | FLOOD | 6 |
| E3.001 | E16 | 9.330 | 0.870 | 0.243 | 0.62 | 40.3 | FLOOD | 2 |
| E3.002 | E17 | 9.202 | 0.842 | 0.000 | 0.19 | 14.1 | FLOOD RISK | |
| E3.003 | E18 | 9.194 | 0.864 | 0.000 | 0.15 | 20.6 | FLOOD RISK | |

100 year Return Period Summary of Critical Results by Maximum Flood Volume
(Rank 1) for Existing

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surchage | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|--------|------------|------------|---------------|----------------|--------------------|-----------------|--------------------|---------------|
| E3.004 | E19 | 60 Winter | 100 | +0% | 100/15 Summer | 100/60 Winter | | |
| E2.002 | E15 | 360 Winter | 100 | +0% | 100/15 Summer | | | |
| E1.011 | E15 | 360 Winter | 100 | +0% | 100/15 Summer | | | |
| E1.012 | E16 | 360 Winter | 100 | +0% | 100/15 Summer | | | |

| PN | US/MH Name | Water Surcharged | | | Flooded | | Pipe Flow (l/s) | Status | Level Exceeded |
|--------|------------|------------------|-----------|-------------|-------------|----------------|-----------------|--------|----------------|
| | | Level (m) | Depth (m) | Volume (m³) | Flow / Cap. | Overflow (l/s) | | | |
| E3.004 | E19 | 9.330 | 1.120 | 0.061 | 0.62 | 98.9 | FLOOD | 2 | |
| E2.002 | E15 | 9.184 | 1.104 | 0.000 | 0.19 | 35.6 | FLOOD RISK | | |
| E1.011 | E15 | 9.178 | 3.498 | 0.000 | 1.27 | 24.0 | FLOOD RISK | | |
| E1.012 | E16 | 8.228 | 0.095 | 0.000 | 1.83 | 24.0 | SURCHARGED | | |