

**Site Evolution Ltd**  
**Proposed Housing Development,**  
**Rheda Park North,**  
**Frizington.**  
**Drainage Strategy and Calculations**



**Civil Engineers**  
**Structural Engineers**  
**Project Managers**

Document No: AA7281/9/1/2

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|                  | Name                 | Signature                                                                            | Date     |
|------------------|----------------------|--------------------------------------------------------------------------------------|----------|
| Prepared by      | William Milne        |  | 22.08.24 |
| Purpose of Issue | Planning Application |                                                                                      |          |

22 August 2024

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## **Introduction**

This proposed 22-unit development is located on a greenfield site to the West Frizington. The site is a continuation of the 'Beckstones' development completed by Genesis Homes. The proposed site was granted outline planning permission in 2018 (ref: 4/18/2426/001). Asher Associates Ltd have been commissioned to prepare designs to discharge reserved matter conditions 4, 7, 9, 10, 15, 16, 17 and 18 of the outline approval.

## **Site Description**

The topography of this site falls from a central crest to the boundaries in north, east and west. The ground surface continues to fall to the north beyond the site boundary and is within the Dub Beck catchment.

The underlying soils are clay to variable depths over gravel and weathered bedrock which is suitable for surface water disposal by infiltration. Infiltration testing was carried out by Geo Environmental Engineering in July 2022. Three of the four tests undertaken were successful. Test 3 was abandoned as it was carried out in the clay layer above the permeable substrate. There will be a SUDS infiltration feature at this location. The bottom of the feature shall be excavated down to the gravel layer allowing infiltration from the base only.

## **Foul Water Design**

The design of the foul drainage network installed in the first phase of the development does not cater for a gravity system in this phase. A private foul network will be installed for phase two and will discharge to an adoptable pumping station in the public open space to the east of the development.

## **Surface Water Design**

The development will be drained via a private network with infiltration SUDS and a flow control before discharging at greenfield rate to a ditch in the Dub Beck catchment. The western part of the development has filter drains along the site boundary to intercept overland flows from the site and prevent them entering adjacent properties.

Surface water run-off from adopted surfaces will be conveyed to infiltration SUDS via highway drains. Due to the site topography, there will be two separate drain runs to the east and west of the central crest. The drain runs will have an infiltration blanket to provide storage and afford disposal. Each drain run will have a high-level overflow connected to the private drainage network for exceedance purposes. Catchpits will be installed upstream of the infiltration features to prevent silting.

### **Greenfield runoff rates for the development site:**

Greenfield runoff rates were calculated using HR Wallingford's Greenfield runoff rate estimation for sites and the following value was obtained for the positively drained site and a 30% run-off from landscape and gardens giving a total contributing area of 1.2ha. Peak surface water discharge from the site is to be discharged at  $Q_{Bar} = 12.18\text{l/s}$ .

**Calculations:** All calculations are as prescribed by the Wallingford Procedure – ‘Modified Rational Method’ and use the parameters set out in Design and construction Guidance for foul and surface water sewers version 2.1 as the design criteria. The Causeway Flow application was used to generate various rainfall events with return periods of 1, 30 & 100 years.

The design criteria for the network is as follows:

|                                   |          |
|-----------------------------------|----------|
| Design Storm, pipes full          | 2 year   |
| Design Storm, no flooding         | 30 year  |
| Flood Risk Assessment             | 100 year |
| Minimum velocity, pipe full       | 1m/sec   |
| Ks roughness value                | 0.6mm    |
| Time of Entry                     | 5 mins   |
| Contributing Area classification: |          |
| Impervious areas                  | 100%     |

For all storm simulations the model was set to record a flood risk when manhole surcharge reached a level of 300mm below the cover level. A 40% uplift for climate change was added to the design storms. A further 10% was added to the impervious areas contributing to the proposed networks to allow for urban creep. The model was also run for a 50% climate change uplift in accordance with the South Lakes Management Catchment Peak Rainfall Allowances. Run-off from landscape and garden areas has been factored into the design calculations at 40% impermeability.

Where possible, a minimum cover of 1200mm has been applied to pipework under roads and 900mm in open ground. Where cover is less than 1200mm below the road, concrete protection will be applied to pipework.

### **Critical Storms:**

The network was modelled in Causeway Flow to ensure that no flooding is experienced for storms with a return period of up to 30 years and also to establish the critical storms with return periods of 1, 30 and 100 years for use in the network simulation. The critical storms for the network were established during this process and are presented in the Flow calculations.

### **Network Simulation:**

The network including all manholes, pipes, storage features and flow control was simulated for the critical storm events shown in the Causeway Flow calculations.

During the 2-year return period critical storms all flows are contained within the system. Some minor surcharging was experienced at the lowest points in each system during the 2-year return period critical storms.

During the 30-year return period critical storms all flows are contained within the system, some surcharging is evident in the manholes. No flooding is experienced at any point in the system during the 30-year return period critical storms.

No flooding is experienced in the system during the 100-year +40% climate change return period critical storms.

A further simulation using the upper end allowance 1% peak annual rainfall event 100yr +50% Climate Change event for the South Lakes Management Catchment upper limit. No flooding was recorded.

## Greenfield Runoff Calculation



Calculated by: Ryan Johnston

Site name: Rheda Park Phase 2

Site location:

Site Details

Latitude: 54.53846° N

Longitude: 3.49979° W

Reference: 687027822

Date: Aug 23 2024 10:38

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1.20

Methodology

Q<sub>BAR</sub> estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Notes

(1) Is Q<sub>BAR</sub> < 2.0 l/s/ha?

When Q<sub>BAR</sub> is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

|              | Default | Edited |
|--------------|---------|--------|
| SOIL type:   | 4       | 4      |
| HOST class:  | N/A     | N/A    |
| SPR/SPRHOST: | 0.47    | 0.47   |

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

|                                | Default | Edited |
|--------------------------------|---------|--------|
| SAAR (mm):                     | 1377    | 1377   |
| Hydrological region:           | 10      | 10     |
| Growth curve factor 1 year:    | 0.87    | 0.87   |
| Growth curve factor 30 years:  | 1.7     | 1.7    |
| Growth curve factor 100 years: | 2.08    | 2.08   |
| Growth curve factor 200 years: | 2.37    | 2.37   |

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

| Greenfield runoff rates | Default | Edited |
|-------------------------|---------|--------|
|-------------------------|---------|--------|

|                               |       |       |
|-------------------------------|-------|-------|
| <b>Q<sub>BAR</sub> (l/s):</b> | 12.79 | 12.79 |
| <b>1 in 1 year (l/s):</b>     | 11.12 | 11.12 |
| <b>1 in 30 years (l/s):</b>   | 21.74 | 21.74 |
| <b>1 in 100 year (l/s):</b>   | 26.59 | 26.59 |
| <b>1 in 200 years (l/s):</b>  | 30.3  | 30.3  |

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at [www.uksuds.com](http://www.uksuds.com). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at [www.uksuds.com/terms-and-conditions.htm](http://www.uksuds.com/terms-and-conditions.htm). The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

## Percolation Testing Report

Mr Ian Storey  
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Site Evolution Limited  
14 Pinecroft, Carlisle,  
United Kingdom, CA3 0DB

**Date:** 08.07.2022

**Project No:** GEO2022-5394

**Project Title:** Land at Rheda Phase 2 – Soil Infiltration Test Report

### Introduction:

Geo Environmental Engineering Ltd (GEO) were commissioned by Mr Ian Storey to carry out soil infiltration tests for the proposed residential development at a site at Rheda, near Frizington, Cumbria.

The site works were completed on the 7<sup>th</sup> July 2022 and comprised 4 No. trial pits (PT1 to PT4) with in-situ soil infiltration testing (soakaway tests to BRE365 methodology). A copy of the exploratory hole location plan and the trial pit logs are enclosed.

### Ground Conditions:

The trial pits typically encountered topsoil overlying sandy tabular/angular gravel of sandstone with cobbles and boulders. PT3 differed in that this location noted topsoil over clay soils. All the trial pits remained dry, with no water ingress noted. All the trial pits were noted as stable.

### In-situ Testing:

Soil Infiltration tests were completed in all four trial pits to the BRE365 methodology. This involved partially filling the pits with water and monitoring the water levels until the water had drained sufficiently to calculate a soil infiltration rate. A summary of the results is below:

- PT1: Three tests were completed within PT1 from starting depths of c.0.90m to c.1.00m below ground level, to the base of the trial pit.

Test 1 took 12 minutes to complete, and this equates to a soil infiltration rate of  $1.4 \times 10^{-04}$  m/s.

Test 2 took 16 minutes to complete, and this equates to a soil infiltration rate of  $1.1 \times 10^{-04}$  m/s.

Test 3 took 20 minutes to complete, and this equates to a soil infiltration rate of  $8.6 \times 10^{-05}$  m/s.

All the above results at PT1 would equate to soil with good drainage characteristics and a medium permeability classification.

- PT2: Three tests were completed within PT2 from starting depths of c.0.35m to c.0.40m below ground level, to the base of the trial pit.

Test 1 took 60 minutes to complete, and this equates to a soil infiltration rate of  $2.9 \times 10^{-05}$  m/s.

Test 2 took 97 minutes to complete, and this equates to a soil infiltration rate of  $1.8 \times 10^{-05}$  m/s.

Test 3 took 94 minutes to complete, and this equates to a soil infiltration rate of  $1.9 \times 10^{-05}$  m/s.

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*Site Investigation Steering Group (SISG), 1993*

All the above results at PT2 would equate to soil with good drainage characteristics and a medium permeability classification.

- PT3: One test was completed at PT3. The test commenced at c.0.60m below ground level. Following a 300-minute monitoring period the water had only drained c.0.96m in total. This test was considered as a failure as it had not fallen enough during the time allocated for the fieldworks to determine a soil infiltration rate.
- PT4: Three tests were completed within PT4 from starting depths of c.0.45m to c.0.50m below ground level, to the base of the trial pit.

Test 1 took 30 minutes to complete, and this equates to a soil infiltration rate of  $5.8 \times 10^{-5}$  m/s.  
Test 2 took 48 minutes to complete, and this equates to a soil infiltration rate of  $3.6 \times 10^{-5}$  m/s.  
Test 3 took 56 minutes to complete, and this equates to a soil infiltration rate of  $3.1 \times 10^{-5}$  m/s.

All the above results would equate to soil with good drainage characteristics and a medium permeability classification.

The results of the tests should therefore be passed to a Civil Engineer to determine an appropriate drainage design.

#### Exploratory Hole Locations:

A surveyor was present on site to record the trial pit locations, with the details below:

| Exploratory Hole | Easting    | Northing   | Ground Level |
|------------------|------------|------------|--------------|
| PT1              | 302615.825 | 516814.448 | 144.500      |
| PT2              | 302691.974 | 516843.717 | 146.900      |
| PT3              | 302772.183 | 516867.664 | 141.704      |
| PT4              | 302637.381 | 516896.808 | 142.500      |

#### General Comments:

Consideration must be made for variations to occur in the ground conditions between the exploratory hole locations for which GEO holds no responsibility. It is therefore recommended that a “watching brief” be applied to ensure that if ground conditions appear to vary from those identified within this investigation, then advice should be sought from a suitably qualified and experienced Geo-Environmental Engineer.

The recommendations and opinions expressed in this report are based on the ground conditions observed. Consequently, GEO takes no responsibility for conditions that have not been revealed or which occur between them.

The conclusions and recommendations presented within this report are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory authorities and/ or other key stakeholders, including warranty providers in order to seek their approval of the findings prior to undertaking any development works on site.

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*Site Investigation Steering Group (SISG), 1993*

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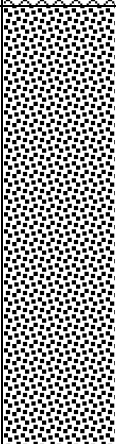
If there are any queries, please do not hesitate to contact Geo-Environmental Engineering Ltd.

Yours Faithfully

.....  
Curtis R Evans *BSc (Hons), FGS*  
Director - Geo Environmental Engineering Limited  
Tel: 01900 826 027, Mob: 07883 440 186

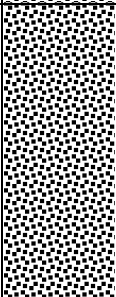


**GEO2022-5394: Rheda Phase 2 – PT1**

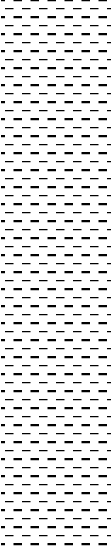
| Depth From (m)                                                                                                                                            | Depth To (m) | Strata Description                                                                                                                                            | Legend                                                                                                                                                    | Testing / Samples       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 0.00                                                                                                                                                      | 0.20         | TOPSOIL: Grass over brown slightly sandy slightly gravelly LOAM(TOPSOIL).                                                                                     |                                                                        | No samples retained     |
| 0.20                                                                                                                                                      | 1.70         | Brown slightly clayey angular/tabular GRAVEL of SANDSTONE with occasional cobbles and boulders.<br><br>1.70 Difficult to excavate, unable to continue deeper. |                                                                        | Soakaway Test Completed |
| <b>Log Notes:</b><br>End of trial hole at 1.70m.<br>Trial hole remained open and dry on completion.<br>Trial hole backfilled with arisings on completion. |              |                                                                                                                                                               |                                                                                                                                                           |                         |
| <b>Site:</b> Rheda Phase 2<br><b>Engineer:</b> CR Evans<br><b>Site Works Date:</b> 08/07/2022<br><b>Plant:</b> Tracked 360 Excavator supplied by Client   |              |                                                                                                                                                               | <b>Log Key:</b><br>HSV = Hand Shear Vane (kN/m <sup>2</sup> )<br>CBR = California Bearing Ratio (%)<br>B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub |                         |
|                                                                        |              |                                                                                                                                                               |                                                                       |                         |



**GEO2022-5394: Rheda Phase 2 – PT2**

| Depth From (m)                                                                                                                                            | Depth To (m) | Strata Description                                                                                                                            | Legend                                                                                                                                                    | Testing / Samples       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 0.00                                                                                                                                                      | 0.25         | TOPSOIL: Grass over brown slightly sandy slightly gravelly LOAM(TOPSOIL).                                                                     |                                                                        | No samples retained     |
| 0.25                                                                                                                                                      | 1.15         | Brown angular/tabular GRAVEL of SANDSTONE with occasional cobbles and boulders.<br><br>1.15 Difficult to excavate, unable to continue deeper. |                                                                        | Soakaway Test Completed |
| <b>Log Notes:</b><br>End of trial hole at 1.70m.<br>Trial hole remained open and dry on completion.<br>Trial hole backfilled with arisings on completion. |              |                                                                                                                                               |                                                                                                                                                           |                         |
| <b>Site:</b> Rheda Phase 2<br><b>Engineer:</b> CR Evans<br><b>Site Works Date:</b> 08/07/2022<br><b>Plant:</b> Tracked 360 Excavator supplied by Client   |              |                                                                                                                                               | <b>Log Key:</b><br>HSV = Hand Shear Vane (kN/m <sup>2</sup> )<br>CBR = California Bearing Ratio (%)<br>B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub |                         |
|                                                                         |              |                                                                                                                                               |                                                                        |                         |

**GEO2022-5394: Rheda Phase 2 – PT3**

| Depth From (m) | Depth To (m) | Strata Description                                                        | Legend                                                                               | Testing / Samples       |
|----------------|--------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------|
| 0.00           | 0.30         | TOPSOIL: Grass over brown slightly sandy slightly gravelly LOAM(TOPSOIL). |   | No samples retained     |
| 0.30           | 2.30         | Red brown slightly sandy slightly gravelly CLAY.                          |  | Soakaway Test Completed |

**Log Notes:**

End of trial hole at 2.30m.  
Trial hole remained open and dry on completion.  
Trial hole backfilled with arisings on completion.

**Site:** Rheda Phase 2

**Engineer:** CR Evans

**Site Works Date:** 08/07/2022

**Plant:** Tracked 360 Excavator supplied by Client

**Log Key:**

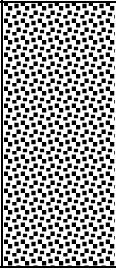
HSV = Hand Shear Vane (kN/m<sup>2</sup>)

CBR = California Bearing Ratio (%)

B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub



**GEO2022-5394: Rheda Phase 2 – PT4**

| Depth From (m)                                                                                                                                            | Depth To (m) | Strata Description                                                                                                                                            | Legend                                                                                                                                                    | Testing / Samples       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 0.00                                                                                                                                                      | 0.30         | TOPSOIL: Grass over brown slightly sandy slightly gravelly LOAM(TOPSOIL).                                                                                     |                                                                        | No samples retained     |
| 0.30                                                                                                                                                      | 1.30         | Brown slightly clayey angular/tabular GRAVEL of SANDSTONE with occasional cobbles and boulders.<br><br>1.30 Difficult to excavate, unable to continue deeper. |                                                                        | Soakaway Test Completed |
| <b>Log Notes:</b><br>End of trial hole at 1.30m.<br>Trial hole remained open and dry on completion.<br>Trial hole backfilled with arisings on completion. |              |                                                                                                                                                               |                                                                                                                                                           |                         |
| <b>Site:</b> Rheda Phase 2<br><b>Engineer:</b> CR Evans<br><b>Site Works Date:</b> 08/07/2022<br><b>Plant:</b> Tracked 360 Excavator supplied by Client   |              |                                                                                                                                                               | <b>Log Key:</b><br>HSV = Hand Shear Vane (kN/m <sup>2</sup> )<br>CBR = California Bearing Ratio (%)<br>B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub |                         |
|                                                                         |              |                                                                                                                                                               |                                                                        |                         |



**GEO2022-5394: Rheda Phase 2 – Site Works Photographs**



**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT1  
**TEST NO.:** 1

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1400 mm  
 Depth of hole 1700 mm  
 Change Water Level 700 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 12      | 0       | 720                  | 1700                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 1

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.1715 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 1.715 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 720 \text{ secs}$

**Soil Infiltration rate:**

$f = 1.4\text{E-}04 \text{ m/s}$

**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT1  
**TEST NO.:** 2

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1400 mm  
 Depth of hole 1700 mm  
 Change Water Level 800 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 16      | 0       | 960                  | 1700                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 2

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.196 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 1.89 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 960 \text{ secs}$

**Soil Infiltration rate:**

$f = 1.1\text{E-}04 \text{ m/s}$

**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT1  
**TEST NO.:** 3

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1400 mm  
 Depth of hole 1700 mm  
 Change Water Level 800 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 20      | 0       | 1200                 | 1700                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 3

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.196 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 1.89 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 1200 \text{ secs}$

**Soil Infiltration rate:**

$f = 8.6E-05 \text{ m/s}$

**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT2  
**TEST NO.:** 1

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1500 mm  
 Depth of hole 1150 mm  
 Change Water Level 750 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 60      | 0       | 3600                 | 1150                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 1

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.196875 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 1.9125 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 3600 \text{ secs}$

**Soil Infiltration rate:**

$f = 2.9\text{E-}05 \text{ m/s}$



**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT2  
**TEST NO.:** 2

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1500 mm  
 Depth of hole 1150 mm  
 Change Water Level 750 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 97      | 0       | 5820                 | 1150                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 2

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.196875 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 1.9125 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 5820 \text{ secs}$

**Soil Infiltration rate:**

$f = 1.8\text{E-}05 \text{ m/s}$

**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT2  
**TEST NO.:** 3

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1500 mm  
 Depth of hole 1150 mm  
 Change Water Level 800 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 94      | 0       | 5640                 | 1150                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 3

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.21 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 2.005 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 5640 \text{ secs}$

**Soil Infiltration rate:**

$f = 1.9\text{E-}05 \text{ m/s}$

**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT4  
**TEST NO.:** 1

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1400 mm  
 Depth of hole 1300 mm  
 Change Water Level 800 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 30      | 0       | 1800                 | 1300                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 1

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.196 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 1.89 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 1800 \text{ secs}$

**Soil Infiltration rate:**

$f = 5.8E-05 \text{ m/s}$

**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT4  
**TEST NO.:** 2

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1400 mm  
 Depth of hole 1300 mm  
 Change Water Level 800 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 48      | 0       | 2880                 | 1300                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 2

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.196 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 1.89 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 2880 \text{ secs}$

**Soil Infiltration rate:**

$f = 3.6\text{E-}05 \text{ m/s}$

**SOIL INFILTRATION TEST CALCULATION SHEET**

**SITE:** Land at Rheda (Phase 2)  
**JOB NO:** 2022-5394  
**TRIAL PIT:** PT4  
**TEST NO.:** 3

**GROUND CONDITIONS:** See Trial Pit Logs for Details

**TEST HOLE SIZE:**

Width 350 mm  
 Length 1400 mm  
 Depth of hole 1300 mm  
 Change Water Level 850 mm

**MONITORING RESULTS:**

| Recorded Time |         |         | Total Time<br>(secs) | Depth of water<br>(mm) |
|---------------|---------|---------|----------------------|------------------------|
| Hours         | Minutes | Seconds |                      |                        |
| 0             | 0       | 0       | 0                    | 0                      |
| 0             | 56      | 0       | 3360                 | 1300                   |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |
| 0             |         | 0       | 0                    |                        |

**PERCOLATION TEST RESULTS AND SOIL INFILTRATION ASSESSMENT**

**TEST NO.:** 3

**SOIL INFILTRATION RATE ASSESSMENT:**

**Vol. Outflowing between 75% and 25% effective depth:**

$V_{p75-25} = 0.20825 \text{ m}^3$

**Mean surface area (pit sides to 50% effective depth + base of pit):**

$A_{p50} = 1.9775 \text{ m}^2$

**Time for the outflow between 75% and 25% effective depth:**

$t_{p75-25} = 3360 \text{ secs}$

**Soil Infiltration rate:**

$f = 3.1\text{E-}05 \text{ m/s}$



End of Report

***“Without Site Investigation Ground is a Hazard”***

*Site Investigation Steering Group (SISG), 1993*

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## Causeway Flow Calculations

### Design Settings

|                                      |        |                                    |               |
|--------------------------------------|--------|------------------------------------|---------------|
| Rainfall Methodology                 | FEH-22 | Minimum Velocity (m/s)             | 0.75          |
| Return Period (years)                | 30     | Connection Type                    | Level Soffits |
| Additional Flow (%)                  | 40     | Minimum Backdrop Height (m)        | 5.000         |
| CV                                   | 0.750  | Preferred Cover Depth (m)          | 0.500         |
| Time of Entry (mins)                 | 5.00   | Include Intermediate Ground        | ✓             |
| Maximum Time of Concentration (mins) | 30.00  | Enforce best practice design rules | ✓             |
| Maximum Rainfall (mm/hr)             | 50.0   |                                    |               |

### Nodes

| Name | Area<br>(ha) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Easting<br>(m) | Northing<br>(m) | Depth<br>(m) |
|------|--------------|------------------|-----------------------|------------------|----------------|-----------------|--------------|
| 1    | 0.028        | 5.00             | 147.000               | 450              | 302711.122     | 516816.690      | 1.000        |
| 2    | 0.027        | 5.00             | 146.135               | 450              | 302718.986     | 516833.113      | 0.863        |
| 3    |              |                  | 144.537               | 450              | 302742.391     | 516840.716      | 0.682        |
| 4    | 0.036        | 5.00             | 144.350               | 450              | 302744.422     | 516835.044      | 0.696        |
| 5    | 0.014        | 5.00             | 143.050               | 450              | 302765.162     | 516840.455      | 0.657        |
| 6    |              |                  | 142.874               | 450              | 302776.415     | 516844.531      | 0.681        |
| 15   | 0.035        | 5.00             | 147.065               | 1200             | 302702.002     | 516816.821      | 1.400        |
| 16   | 0.023        | 5.00             | 146.823               | 1200             | 302697.839     | 516829.347      | 1.450        |
| 17   | 0.014        | 5.00             | 146.038               | 1200             | 302715.422     | 516841.746      | 1.350        |
| 18   |              |                  | 142.580               | 1200             | 302764.113     | 516858.208      | 1.350        |
| 19   |              |                  | 141.888               | 1200             | 302780.221     | 516870.920      | 1.350        |
| 20   |              |                  | 141.538               | 1200             | 302778.107     | 516878.375      | 1.350        |
| 7    | 0.022        | 5.00             | 141.577               | 450              | 302765.920     | 516875.517      | 0.877        |
| 21   | 0.089        | 5.00             | 143.560               | 450              | 302668.202     | 516897.353      | 0.725        |
| 22   | 0.068        | 5.00             | 143.287               | 450              | 302714.229     | 516887.001      | 0.725        |
| 23   |              |                  | 141.610               | 450              | 302758.067     | 516879.677      | 0.725        |
| 8    |              |                  | 141.390               | 1200             | 302762.807     | 516881.421      | 1.116        |
| 24   | 0.026        | 5.00             | 146.512               | 450              | 302682.051     | 516835.565      | 1.400        |
| 25   | 0.044        | 5.00             | 146.118               | 450              | 302662.422     | 516830.810      | 1.450        |
| 26   |              |                  | 144.672               | 450              | 302629.113     | 516803.173      | 1.450        |
| 27   |              |                  | 145.047               | 1200             | 302624.191     | 516809.147      | 1.864        |
| 28   |              |                  | 144.647               | 450              | 302614.257     | 516804.163      | 1.001        |
| 38   | 0.041        | 5.00             | 147.000               | 450              | 302694.276     | 516816.455      | 0.700        |
| 39   | 0.032        | 5.00             | 146.391               | 450              | 302670.174     | 516827.838      | 0.700        |
| 40   | 0.026        | 5.00             | 145.761               | 450              | 302643.839     | 516805.190      | 0.700        |
| 41   | 0.031        | 5.00             | 145.030               | 450              | 302619.998     | 516794.102      | 0.700        |
| 29   | 0.037        | 5.00             | 143.925               | 450              | 302598.614     | 516795.797      | 1.050        |
| 30   |              |                  | 142.525               | 450              | 302573.732     | 516786.689      | 1.125        |
| 31   | 0.018        | 5.00             | 142.127               | 450              | 302570.406     | 516797.993      | 1.133        |
| 32   | 0.057        | 5.00             | 142.068               | 1200             | 302573.737     | 516814.798      | 1.784        |
| 33   | 0.034        | 5.00             | 142.100               | 1200             | 302580.173     | 516831.846      | 1.907        |
| 34   | 0.016        | 5.00             | 142.538               | 1200             | 302596.868     | 516848.309      | 2.462        |
| 42   | 0.037        | 5.00             | 145.820               | 450              | 302664.012     | 516853.709      | 0.600        |
| 43   | 0.068        | 5.00             | 145.787               | 450              | 302655.938     | 516836.851      | 0.749        |
| 44   | 0.081        | 5.00             | 143.807               | 450              | 302626.462     | 516850.883      | 0.650        |
| 45   |              |                  | 143.045               | 450              | 302623.109     | 516866.433      | 0.650        |
| 35   |              |                  | 142.618               | 1200             | 302611.538     | 516864.692      | 2.652        |
| 36   | 0.004        | 5.00             | 141.344               | 1200             | 302605.982     | 516884.602      | 1.809        |
| 37   |              |                  | 141.345               | 1200             | 302675.011     | 516918.194      | 2.193        |
| 9    |              |                  | 139.094               | 1200             | 302744.417     | 516932.463      | 1.807        |
| 10   |              |                  | 138.342               | 1200             | 302740.393     | 516966.535      | 1.801        |
| 11   |              |                  | 135.319               | 1200             | 302669.446     | 517000.030      | 0.997        |



### Nodes

| Name | Area<br>(ha) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Easting<br>(m) | Northing<br>(m) | Depth<br>(m) |
|------|--------------|------------------|-----------------------|------------------|----------------|-----------------|--------------|
| 12   |              |                  | 132.585               | 450              | 302605.418     | 517011.858      | 0.997        |
| 13   |              |                  | 130.610               | 450              | 302545.156     | 517057.825      | 1.001        |
| 14   |              |                  | 130.384               |                  | 302552.508     | 517071.039      | 0.851        |
| 46   | 0.023        | 5.00             | 145.856               | 1200             | 302705.910     | 516854.165      | 1.064        |
| 47   | 0.043        | 5.00             | 146.850               | 1200             | 302685.409     | 516795.643      | 1.225        |
| 48   | 0.018        | 5.00             | 145.000               | 1200             | 302639.418     | 516780.033      | 1.225        |
| 49   | 0.000        |                  | 143.750               | 1200             | 302596.079     | 516765.323      | 1.225        |
| 50   | 0.017        | 5.00             | 143.147               | 1200             | 302580.902     | 516772.793      | 1.225        |
| 51   | 0.027        | 5.00             | 146.200               |                  | 302737.768     | 516809.930      | 1.225        |
| 52   | 0.008        | 5.00             | 143.450               |                  | 302774.877     | 516821.962      | 1.144        |

### Links (Input)

| Name  | US<br>Node | DS<br>Node | Length<br>(m) | ks (mm) /<br>n | US IL<br>(m) | DS IL<br>(m) | Fall<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | T of C<br>(mins) | Rain<br>(mm/hr) |
|-------|------------|------------|---------------|----------------|--------------|--------------|-------------|----------------|-------------|------------------|-----------------|
| 1.000 | 1          | 2          | 18.208        | 0.600          | 146.000      | 145.272      | 0.728       | 25.0           | 100         | 5.20             | 50.0            |
| 1.001 | 2          | 3          | 24.609        | 0.600          | 145.272      | 143.905      | 1.367       | 18.0           | 150         | 5.37             | 50.0            |
| 1.002 | 3          | 4          | 6.024         | 0.600          | 143.855      | 143.654      | 0.201       | 30.0           | 150         | 5.42             | 50.0            |
| 1.003 | 4          | 5          | 21.434        | 0.600          | 143.654      | 142.393      | 1.261       | 17.0           | 150         | 5.57             | 50.0            |
| 1.004 | 5          | 6          | 11.969        | 0.600          | 142.393      | 142.193      | 0.200       | 59.8           | 225         | 5.69             | 50.0            |
| 1.005 | 6          | 7          | 32.715        | 0.600          | 142.193      | 140.766      | 1.427       | 22.9           | 225         | 5.98             | 50.0            |
| 2.000 | 15         | 16         | 13.199        | 0.600          | 145.665      | 145.423      | 0.242       | 54.5           | 100         | 5.21             | 50.0            |
| 2.001 | 16         | 17         | 21.515        | 0.600          | 145.373      | 144.688      | 0.685       | 31.4           | 150         | 5.41             | 50.0            |
| 2.002 | 17         | 18         | 51.398        | 0.600          | 144.688      | 141.230      | 3.458       | 14.9           | 150         | 5.74             | 50.0            |
| 2.003 | 18         | 19         | 20.520        | 0.600          | 141.230      | 140.538      | 0.692       | 29.7           | 150         | 5.92             | 50.0            |
| 2.004 | 19         | 20         | 7.749         | 0.600          | 140.538      | 140.188      | 0.350       | 22.1           | 150         | 5.98             | 50.0            |
| 2.005 | 20         | 7          | 12.517        | 0.600          | 140.813      | 140.750      | 0.063       | 198.7          | 100         | 6.37             | 50.0            |
| 1.006 | 7          | 8          | 6.675         | 0.600          | 140.700      | 140.349      | 0.351       | 19.0           | 225         | 6.40             | 50.0            |
| 3.000 | 21         | 22         | 47.177        | 0.600          | 142.835      | 142.562      | 0.273       | 172.8          | 225         | 5.79             | 50.0            |
| 3.001 | 22         | 23         | 44.446        | 0.600          | 142.562      | 140.885      | 1.677       | 26.5           | 225         | 6.08             | 50.0            |
| 3.002 | 23         | 8          | 5.051         | 0.600          | 140.885      | 140.683      | 0.202       | 25.0           | 225         | 6.12             | 50.0            |
| 1.007 | 8          | 9          | 54.254        | 0.600          | 140.274      | 137.363      | 2.911       | 18.6           | 225         | 6.70             | 50.0            |
| 4.000 | 24         | 25         | 20.197        | 0.600          | 145.112      | 144.718      | 0.394       | 51.3           | 100         | 5.31             | 50.0            |
| 4.001 | 25         | 26         | 43.282        | 0.600          | 144.668      | 143.222      | 1.446       | 29.9           | 150         | 5.70             | 50.0            |
| 4.002 | 26         | 27         | 7.741         | 0.600          | 143.222      | 143.183      | 0.039       | 198.5          | 150         | 5.88             | 50.0            |
| 4.003 | 27         | 28         | 11.114        | 0.600          | 143.878      | 143.646      | 0.232       | 47.9           | 100         | 6.05             | 50.0            |
| 4.004 | 28         | 29         | 17.740        | 0.600          | 143.646      | 142.925      | 0.721       | 24.6           | 100         | 6.24             | 50.0            |
| 5.000 | 38         | 39         | 26.655        | 0.600          | 146.300      | 145.691      | 0.609       | 43.8           | 150         | 5.29             | 50.0            |
| 5.001 | 39         | 40         | 34.734        | 0.600          | 145.691      | 145.061      | 0.630       | 55.1           | 150         | 5.72             | 50.0            |
| 5.002 | 40         | 41         | 26.293        | 0.600          | 145.061      | 144.330      | 0.731       | 36.0           | 225         | 5.92             | 50.0            |
| 5.003 | 41         | 29         | 21.452        | 0.600          | 144.330      | 142.875      | 1.455       | 14.7           | 225         | 6.02             | 50.0            |
| 4.005 | 29         | 30         | 26.497        | 0.600          | 142.875      | 141.475      | 1.400       | 18.9           | 225         | 6.39             | 50.0            |
| 4.006 | 30         | 31         | 11.783        | 0.600          | 141.400      | 140.994      | 0.406       | 29.0           | 225         | 6.47             | 50.0            |
| 4.007 | 31         | 32         | 17.133        | 0.600          | 140.994      | 140.359      | 0.635       | 27.0           | 225         | 6.58             | 50.0            |
| 4.008 | 32         | 33         | 18.222        | 0.600          | 140.284      | 140.193      | 0.091       | 200.2          | 300         | 6.85             | 50.0            |
| 4.009 | 33         | 34         | 23.447        | 0.600          | 140.193      | 140.076      | 0.117       | 200.4          | 300         | 7.21             | 50.0            |
| 4.010 | 34         | 35         | 21.992        | 0.600          | 140.076      | 139.966      | 0.110       | 199.9          | 300         | 7.54             | 50.0            |
| 6.000 | 42         | 43         | 18.691        | 0.600          | 145.220      | 145.038      | 0.182       | 102.7          | 150         | 5.31             | 50.0            |
| 6.001 | 43         | 44         | 32.646        | 0.600          | 145.039      | 143.207      | 1.832       | 17.8           | 150         | 5.54             | 50.0            |
| 6.002 | 44         | 45         | 15.907        | 0.600          | 143.157      | 142.395      | 0.762       | 20.9           | 225         | 5.63             | 50.0            |
| 6.003 | 45         | 35         | 11.700        | 0.600          | 142.395      | 141.664      | 0.731       | 16.0           | 225         | 5.69             | 50.0            |
| 4.011 | 35         | 36         | 20.670        | 0.600          | 139.966      | 139.535      | 0.431       | 48.0           | 300         | 7.69             | 50.0            |

### Links (Input)

| Name  | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|-------|---------|---------|------------|-------------|-----------|-----------|----------|-------------|----------|---------------|--------------|
| 4.012 | 36      | 37      | 76.769     | 0.600       | 139.536   | 139.152   | 0.384    | 199.9       | 300      | 8.84          | 50.0         |
| 4.013 | 37      | 9       | 70.858     | 0.600       | 139.152   | 137.287   | 1.865    | 38.0        | 300      | 9.31          | 50.0         |
| 1.008 | 9       | 10      | 34.309     | 0.600       | 137.287   | 136.541   | 0.746    | 46.0        | 300      | 9.55          | 50.0         |
| 1.009 | 10      | 11      | 78.456     | 0.600       | 137.144   | 134.322   | 2.822    | 27.8        | 150      | 10.23         | 50.0         |
| 1.010 | 11      | 12      | 65.111     | 0.600       | 134.322   | 131.588   | 2.734    | 23.8        | 150      | 10.76         | 50.0         |
| 1.011 | 12      | 13      | 75.792     | 0.600       | 131.588   | 129.609   | 1.979    | 38.3        | 150      | 11.53         | 50.0         |
| 1.012 | 13      | 14      | 15.121     | 0.600       | 129.609   | 129.533   | 0.076    | 199.0       | 150      | 11.89         | 50.0         |
| 7.000 | 46      | 17      | 15.643     | 0.600       | 144.792   | 144.688   | 0.104    | 150.0       | 150      | 5.32          | 50.0         |
| 8.000 | 47      | 48      | 48.568     | 0.600       | 145.625   | 143.775   | 1.850    | 26.3        | 150      | 5.41          | 50.0         |
| 8.001 | 48      | 49      | 45.767     | 0.600       | 143.775   | 142.525   | 1.250    | 36.6        | 150      | 5.87          | 50.0         |
| 8.002 | 49      | 50      | 16.916     | 0.600       | 142.525   | 141.922   | 0.603    | 28.1        | 150      | 6.02          | 50.0         |
| 8.003 | 50      | 30      | 15.637     | 0.600       | 141.992   | 141.475   | 0.517    | 30.2        | 150      | 6.16          | 50.0         |
| 9.000 | 51      | 52      | 39.011     | 0.600       | 144.975   | 142.306   | 2.669    | 14.6        | 150      | 5.25          | 50.0         |
| 9.001 | 52      | 6       | 22.621     | 0.600       | 142.306   | 142.193   | 0.113    | 200.0       | 150      | 5.78          | 50.0         |

### 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 | 18.208     | 25.0        | 100      | 1 SW COMBINED02 | 147.000   | 146.000   | 0.900        | 146.135   | 145.272   | 0.763        |
| 1.001 | 24.609     | 18.0        | 150      | 1 SW COMBINED02 | 146.135   | 145.272   | 0.713        | 144.537   | 143.905   | 0.482        |
| 1.002 | 6.024      | 30.0        | 150      | 1 SW COMBINED02 | 144.537   | 143.855   | 0.532        | 144.350   | 143.654   | 0.546        |
| 1.003 | 21.434     | 17.0        | 150      | 1 SW COMBINED02 | 144.350   | 143.654   | 0.546        | 143.050   | 142.393   | 0.507        |
| 1.004 | 11.969     | 59.8        | 225      | 1 SW COMBINED02 | 143.050   | 142.393   | 0.432        | 142.874   | 142.193   | 0.456        |
| 1.005 | 32.715     | 22.9        | 225      | 1 SW COMBINED02 | 142.874   | 142.193   | 0.456        | 141.577   | 140.766   | 0.586        |
| 2.000 | 13.199     | 54.5        | 100      | 1 SW COMBINED02 | 147.065   | 145.665   | 1.300        | 146.823   | 145.423   | 1.300        |
| 2.001 | 21.515     | 31.4        | 150      | 1 SW COMBINED02 | 146.823   | 145.373   | 1.300        | 146.038   | 144.688   | 1.200        |
| 2.002 | 51.398     | 14.9        | 150      | 1 SW COMBINED02 | 146.038   | 144.688   | 1.200        | 142.580   | 141.230   | 1.200        |
| 2.003 | 20.520     | 29.7        | 150      | 1 SW COMBINED02 | 142.580   | 141.230   | 1.200        | 141.888   | 140.538   | 1.200        |
| 2.004 | 7.749      | 22.1        | 150      | 1 SW COMBINED02 | 141.888   | 140.538   | 1.200        | 141.538   | 140.188   | 1.200        |
| 2.005 | 12.517     | 198.7       | 100      | 1 SW COMBINED02 | 141.538   | 140.813   | 0.625        | 141.577   | 140.750   | 0.727        |
| 1.006 | 6.675      | 19.0        | 225      | 1 SW COMBINED02 | 141.577   | 140.700   | 0.652        | 141.390   | 140.349   | 0.816        |
| 3.000 | 47.177     | 172.8       | 225      | 1 SW COMBINED02 | 143.560   | 142.835   | 0.500        | 143.287   | 142.562   | 0.500        |
| 3.001 | 44.446     | 26.5        | 225      | 1 SW COMBINED02 | 143.287   | 142.562   | 0.500        | 141.610   | 140.885   | 0.500        |

| Link  | US Node | Dia (mm) | Node Type | MH Type         | DS Node | Dia (mm) | Node Type | MH Type         |
|-------|---------|----------|-----------|-----------------|---------|----------|-----------|-----------------|
| 1.000 | 1       | 450      | Manhole   | 1 SW COMBINED02 | 2       | 450      | Manhole   | 1 SW COMBINED02 |
| 1.001 | 2       | 450      | Manhole   | 1 SW COMBINED02 | 3       | 450      | Manhole   | 1 SW COMBINED02 |
| 1.002 | 3       | 450      | Manhole   | 1 SW COMBINED02 | 4       | 450      | Manhole   | 1 SW COMBINED02 |
| 1.003 | 4       | 450      | Manhole   | 1 SW COMBINED02 | 5       | 450      | Manhole   | 1 SW COMBINED02 |
| 1.004 | 5       | 450      | Manhole   | 1 SW COMBINED02 | 6       | 450      | Manhole   | 1 SW COMBINED02 |
| 1.005 | 6       | 450      | Manhole   | 1 SW COMBINED02 | 7       | 450      | Manhole   | 1 SW COMBINED02 |
| 2.000 | 15      | 1200     | Manhole   | 1 SW COMBINED02 | 16      | 1200     | Manhole   | 1 SW COMBINED02 |
| 2.001 | 16      | 1200     | Manhole   | 1 SW COMBINED02 | 17      | 1200     | Manhole   | 1 SW COMBINED02 |
| 2.002 | 17      | 1200     | Manhole   | 1 SW COMBINED02 | 18      | 1200     | Manhole   | 1 SW COMBINED02 |
| 2.003 | 18      | 1200     | Manhole   | 1 SW COMBINED02 | 19      | 1200     | Manhole   | 1 SW COMBINED02 |
| 2.004 | 19      | 1200     | Manhole   | 1 SW COMBINED02 | 20      | 1200     | Manhole   | 1 SW COMBINED02 |
| 2.005 | 20      | 1200     | Manhole   | 1 SW COMBINED02 | 7       | 450      | Manhole   | 1 SW COMBINED02 |
| 1.006 | 7       | 450      | Manhole   | 1 SW COMBINED02 | 8       | 1200     | Manhole   | 1 SW COMBINED02 |
| 3.000 | 21      | 450      | Manhole   | 1 SW COMBINED02 | 22      | 450      | Manhole   | 1 SW COMBINED02 |
| 3.001 | 22      | 450      | Manhole   | 1 SW COMBINED02 | 23      | 450      | Manhole   | 1 SW COMBINED02 |

### Pipeline Schedule

| Link  | Length<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | Link<br>Type    | US CL<br>(m) | US IL<br>(m) | US Depth<br>(m) | DS CL<br>(m) | DS IL<br>(m) | DS Depth<br>(m) |
|-------|---------------|----------------|-------------|-----------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
| 3.002 | 5.051         | 25.0           | 225         | 1 SW COMBINED02 | 141.610      | 140.885      | 0.500           | 141.390      | 140.683      | 0.482           |
| 1.007 | 54.254        | 18.6           | 225         | 1 SW COMBINED02 | 141.390      | 140.274      | 0.891           | 139.094      | 137.363      | 1.506           |
| 4.000 | 20.197        | 51.3           | 100         | 1 SW COMBINED02 | 146.512      | 145.112      | 1.300           | 146.118      | 144.718      | 1.300           |
| 4.001 | 43.282        | 29.9           | 150         | 1 SW COMBINED02 | 146.118      | 144.668      | 1.300           | 144.672      | 143.222      | 1.300           |
| 4.002 | 7.741         | 198.5          | 150         | 1 SW COMBINED02 | 144.672      | 143.222      | 1.300           | 145.047      | 143.183      | 1.714           |
| 4.003 | 11.114        | 47.9           | 100         | 1 SW COMBINED02 | 145.047      | 143.878      | 1.069           | 144.647      | 143.646      | 0.901           |
| 4.004 | 17.740        | 24.6           | 100         | 1 SW COMBINED02 | 144.647      | 143.646      | 0.901           | 143.925      | 142.925      | 0.900           |
| 5.000 | 26.655        | 43.8           | 150         | 1 SW COMBINED02 | 147.000      | 146.300      | 0.550           | 146.391      | 145.691      | 0.550           |
| 5.001 | 34.734        | 55.1           | 150         | 1 SW COMBINED02 | 146.391      | 145.691      | 0.550           | 145.761      | 145.061      | 0.550           |
| 5.002 | 26.293        | 36.0           | 225         | 1 SW COMBINED02 | 145.761      | 145.061      | 0.475           | 145.030      | 144.330      | 0.475           |
| 5.003 | 21.452        | 14.7           | 225         | 1 SW COMBINED02 | 145.030      | 144.330      | 0.475           | 143.925      | 142.875      | 0.825           |
| 4.005 | 26.497        | 18.9           | 225         | 1 SW COMBINED02 | 143.925      | 142.875      | 0.825           | 142.525      | 141.475      | 0.825           |
| 4.006 | 11.783        | 29.0           | 225         | 1 SW COMBINED02 | 142.525      | 141.400      | 0.900           | 142.127      | 140.994      | 0.908           |
| 4.007 | 17.133        | 27.0           | 225         | 1 SW COMBINED02 | 142.127      | 140.994      | 0.908           | 142.068      | 140.359      | 1.484           |
| 4.008 | 18.222        | 200.2          | 300         | 1 SW COMBINED02 | 142.068      | 140.284      | 1.484           | 142.100      | 140.193      | 1.607           |
| 4.009 | 23.447        | 200.4          | 300         | 1 SW COMBINED02 | 142.100      | 140.193      | 1.607           | 142.538      | 140.076      | 2.162           |
| 4.010 | 21.992        | 199.9          | 300         | 1 SW COMBINED02 | 142.538      | 140.076      | 2.162           | 142.618      | 139.966      | 2.352           |
| 6.000 | 18.691        | 102.7          | 150         | 1 SW COMBINED02 | 145.820      | 145.220      | 0.450           | 145.787      | 145.038      | 0.599           |
| 6.001 | 32.646        | 17.8           | 150         | 1 SW COMBINED02 | 145.787      | 145.039      | 0.598           | 143.807      | 143.207      | 0.450           |
| 6.002 | 15.907        | 20.9           | 225         | 1 SW COMBINED02 | 143.807      | 143.157      | 0.425           | 143.045      | 142.395      | 0.425           |
| 6.003 | 11.700        | 16.0           | 225         | 1 SW COMBINED02 | 143.045      | 142.395      | 0.425           | 142.618      | 141.664      | 0.729           |
| 4.011 | 20.670        | 48.0           | 300         | 1 SW COMBINED02 | 142.618      | 139.966      | 2.352           | 141.344      | 139.535      | 1.509           |
| 4.012 | 76.769        | 199.9          | 300         | 1 SW COMBINED02 | 141.344      | 139.536      | 1.508           | 141.345      | 139.152      | 1.893           |
| 4.013 | 70.858        | 38.0           | 300         | 1 SW COMBINED02 | 141.345      | 139.152      | 1.893           | 139.094      | 137.287      | 1.507           |
| 1.008 | 34.309        | 46.0           | 300         | 1 SW COMBINED02 | 139.094      | 137.287      | 1.507           | 138.342      | 136.541      | 1.501           |

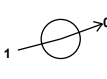
| Link  | US<br>Node | Dia<br>(mm) | Node<br>Type | MH<br>Type      | DS<br>Node | Dia<br>(mm) | Node<br>Type | MH<br>Type      |
|-------|------------|-------------|--------------|-----------------|------------|-------------|--------------|-----------------|
| 3.002 | 23         | 450         | Manhole      | 1 SW COMBINED02 | 8          | 1200        | Manhole      | 1 SW COMBINED02 |
| 1.007 | 8          | 1200        | Manhole      | 1 SW COMBINED02 | 9          | 1200        | Manhole      | 1 SW COMBINED02 |
| 4.000 | 24         | 450         | Manhole      | 1 SW COMBINED02 | 25         | 450         | Manhole      | 1 SW COMBINED02 |
| 4.001 | 25         | 450         | Manhole      | 1 SW COMBINED02 | 26         | 450         | Manhole      | 1 SW COMBINED02 |
| 4.002 | 26         | 450         | Manhole      | 1 SW COMBINED02 | 27         | 1200        | Manhole      | 1 SW COMBINED02 |
| 4.003 | 27         | 1200        | Manhole      | 1 SW COMBINED02 | 28         | 450         | Manhole      | 1 SW COMBINED02 |
| 4.004 | 28         | 450         | Manhole      | 1 SW COMBINED02 | 29         | 450         | Manhole      | 1 SW COMBINED02 |
| 5.000 | 38         | 450         | Manhole      | 1 SW COMBINED02 | 39         | 450         | Manhole      | 1 SW COMBINED02 |
| 5.001 | 39         | 450         | Manhole      | 1 SW COMBINED02 | 40         | 450         | Manhole      | 1 SW COMBINED02 |
| 5.002 | 40         | 450         | Manhole      | 1 SW COMBINED02 | 41         | 450         | Manhole      | 1 SW COMBINED02 |
| 5.003 | 41         | 450         | Manhole      | 1 SW COMBINED02 | 29         | 450         | Manhole      | 1 SW COMBINED02 |
| 4.005 | 29         | 450         | Manhole      | 1 SW COMBINED02 | 30         | 450         | Manhole      | 1 SW COMBINED02 |
| 4.006 | 30         | 450         | Manhole      | 1 SW COMBINED02 | 31         | 450         | Manhole      | 1 SW COMBINED02 |
| 4.007 | 31         | 450         | Manhole      | 1 SW COMBINED02 | 32         | 1200        | Manhole      | 1 SW COMBINED02 |
| 4.008 | 32         | 1200        | Manhole      | 1 SW COMBINED02 | 33         | 1200        | Manhole      | 1 SW COMBINED02 |
| 4.009 | 33         | 1200        | Manhole      | 1 SW COMBINED02 | 34         | 1200        | Manhole      | 1 SW COMBINED02 |
| 4.010 | 34         | 1200        | Manhole      | 1 SW COMBINED02 | 35         | 1200        | Manhole      | 1 SW COMBINED02 |
| 6.000 | 42         | 450         | Manhole      | 1 SW COMBINED02 | 43         | 450         | Manhole      | 1 SW COMBINED02 |
| 6.001 | 43         | 450         | Manhole      | 1 SW COMBINED02 | 44         | 450         | Manhole      | 1 SW COMBINED02 |
| 6.002 | 44         | 450         | Manhole      | 1 SW COMBINED02 | 45         | 450         | Manhole      | 1 SW COMBINED02 |
| 6.003 | 45         | 450         | Manhole      | 1 SW COMBINED02 | 35         | 1200        | Manhole      | 1 SW COMBINED02 |
| 4.011 | 35         | 1200        | Manhole      | 1 SW COMBINED02 | 36         | 1200        | Manhole      | 1 SW COMBINED02 |
| 4.012 | 36         | 1200        | Manhole      | 1 SW COMBINED02 | 37         | 1200        | Manhole      | 1 SW COMBINED02 |
| 4.013 | 37         | 1200        | Manhole      | 1 SW COMBINED02 | 9          | 1200        | Manhole      | 1 SW COMBINED02 |
| 1.008 | 9          | 1200        | Manhole      | 1 SW COMBINED02 | 10         | 1200        | Manhole      | 1 SW COMBINED02 |

### Pipeline Schedule

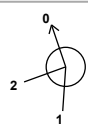
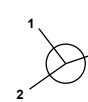
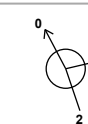
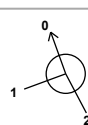
| Link  | Length<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | Link<br>Type    | US CL<br>(m) | US IL<br>(m) | US Depth<br>(m) | DS CL<br>(m) | DS IL<br>(m) | DS Depth<br>(m) |
|-------|---------------|----------------|-------------|-----------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
| 1.009 | 78.456        | 27.8           | 150         | 1 SW COMBINED02 | 138.342      | 137.144      | 1.048           | 135.319      | 134.322      | 0.847           |
| 1.010 | 65.111        | 23.8           | 150         | 1 SW COMBINED02 | 135.319      | 134.322      | 0.847           | 132.585      | 131.588      | 0.847           |
| 1.011 | 75.792        | 38.3           | 150         | 1 SW COMBINED02 | 132.585      | 131.588      | 0.847           | 130.610      | 129.609      | 0.851           |
| 1.012 | 15.121        | 199.0          | 150         | 1 SW COMBINED02 | 130.610      | 129.609      | 0.851           | 130.384      | 129.533      | 0.701           |
| 7.000 | 15.643        | 150.0          | 150         | 1 SW COMBINED02 | 145.856      | 144.792      | 0.914           | 146.038      | 144.688      | 1.200           |
| 8.000 | 48.568        | 26.3           | 150         | 1 SW COMBINED02 | 146.850      | 145.625      | 1.075           | 145.000      | 143.775      | 1.075           |
| 8.001 | 45.767        | 36.6           | 150         | 1 SW COMBINED02 | 145.000      | 143.775      | 1.075           | 143.750      | 142.525      | 1.075           |
| 8.002 | 16.916        | 28.1           | 150         | 1 SW COMBINED02 | 143.750      | 142.525      | 1.075           | 143.147      | 141.922      | 1.075           |
| 8.003 | 15.637        | 30.2           | 150         | 1 SW COMBINED02 | 143.147      | 141.992      | 1.005           | 142.525      | 141.475      | 0.900           |
| 9.000 | 39.011        | 14.6           | 150         | 1 SW COMBINED02 | 146.200      | 144.975      | 1.075           | 143.450      | 142.306      | 0.994           |
| 9.001 | 22.621        | 200.0          | 150         | 1 SW COMBINED02 | 143.450      | 142.306      | 0.994           | 142.874      | 142.193      | 0.531           |

| Link  | US<br>Node | Dia<br>(mm) | Node<br>Type | MH<br>Type      | DS<br>Node | Dia<br>(mm) | Node<br>Type | MH<br>Type      |
|-------|------------|-------------|--------------|-----------------|------------|-------------|--------------|-----------------|
| 1.009 | 10         | 1200        | Manhole      | 1 SW COMBINED02 | 11         | 1200        | Manhole      | 1 SW COMBINED02 |
| 1.010 | 11         | 1200        | Manhole      | 1 SW COMBINED02 | 12         | 450         | Manhole      | 1 SW COMBINED02 |
| 1.011 | 12         | 450         | Manhole      | 1 SW COMBINED02 | 13         | 450         | Manhole      | 1 SW COMBINED02 |
| 1.012 | 13         | 450         | Manhole      | 1 SW COMBINED02 | 14         |             | Manhole      | 1 SW COMBINED02 |
| 7.000 | 46         | 1200        | Manhole      | 1 SW COMBINED02 | 17         | 1200        | Manhole      | 1 SW COMBINED02 |
| 8.000 | 47         | 1200        | Junction     |                 | 48         | 1200        | Junction     |                 |
| 8.001 | 48         | 1200        | Junction     |                 | 49         | 1200        | Junction     |                 |
| 8.002 | 49         | 1200        | Junction     |                 | 50         | 1200        | Junction     |                 |
| 8.003 | 50         | 1200        | Junction     |                 | 30         | 450         | Manhole      | 1 SW COMBINED02 |
| 9.000 | 51         |             | Junction     |                 | 52         |             | Junction     |                 |
| 9.001 | 52         |             | Junction     |                 | 6          | 450         | Manhole      | 1 SW COMBINED02 |

### Manhole Schedule

| Node | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                          | Link | IL<br>(m) | Dia<br>(mm) |     |
|------|----------------|-----------------|-----------|--------------|-------------|--------------------------------------------------------------------------------------|------|-----------|-------------|-----|
| 1    | 302711.122     | 516816.690      | 147.000   | 1.000        | 450         |  | 0    | 1.000     | 146.000     | 100 |
| 2    | 302718.986     | 516833.113      | 146.135   | 0.863        | 450         |  | 1    | 1.000     | 145.272     | 100 |
| 3    | 302742.391     | 516840.716      | 144.537   | 0.682        | 450         |   | 0    | 1.001     | 145.272     | 150 |
| 4    | 302744.422     | 516835.044      | 144.350   | 0.696        | 450         |  | 1    | 1.001     | 143.905     | 150 |
| 5    | 302765.162     | 516840.455      | 143.050   | 0.657        | 450         |  | 0    | 1.002     | 143.855     | 150 |
|      |                |                 |           |              |             |                                                                                      | 1    | 1.002     | 143.654     | 150 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.003     | 143.654     | 150 |
|      |                |                 |           |              |             |                                                                                      | 1    | 1.003     | 142.393     | 150 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.004     | 142.393     | 225 |

### Manhole Schedule

| Node | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                          | Link | IL<br>(m) | Dia<br>(mm) |     |
|------|----------------|-----------------|-----------|--------------|-------------|--------------------------------------------------------------------------------------|------|-----------|-------------|-----|
| 6    | 302776.415     | 516844.531      | 142.874   | 0.681        | 450         |    | 1    | 9.001     | 142.193     | 150 |
|      |                |                 |           |              |             |                                                                                      | 2    | 1.004     | 142.193     | 225 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.005     | 142.193     | 225 |
| 15   | 302702.002     | 516816.821      | 147.065   | 1.400        | 1200        |    |      |           |             |     |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.000     | 145.665     | 100 |
| 16   | 302697.839     | 516829.347      | 146.823   | 1.450        | 1200        |    | 1    | 2.000     | 145.423     | 100 |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.001     | 145.373     | 150 |
| 17   | 302715.422     | 516841.746      | 146.038   | 1.350        | 1200        |    | 1    | 7.000     | 144.688     | 150 |
|      |                |                 |           |              |             |                                                                                      | 2    | 2.001     | 144.688     | 150 |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.002     | 144.688     | 150 |
| 18   | 302764.113     | 516858.208      | 142.580   | 1.350        | 1200        |    | 1    | 2.002     | 141.230     | 150 |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.003     | 141.230     | 150 |
| 19   | 302780.221     | 516870.920      | 141.888   | 1.350        | 1200        |  | 1    | 2.003     | 140.538     | 150 |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.004     | 140.538     | 150 |
| 20   | 302778.107     | 516878.375      | 141.538   | 1.350        | 1200        |  | 1    | 2.004     | 140.188     | 150 |
|      |                |                 |           |              |             |                                                                                      | 0    | 2.005     | 140.813     | 100 |
| 7    | 302765.920     | 516875.517      | 141.577   | 0.877        | 450         |  | 1    | 2.005     | 140.750     | 100 |
|      |                |                 |           |              |             |                                                                                      | 2    | 1.005     | 140.766     | 225 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.006     | 140.700     | 225 |
| 21   | 302668.202     | 516897.353      | 143.560   | 0.725        | 450         |  |      |           |             |     |
|      |                |                 |           |              |             |                                                                                      | 0    | 3.000     | 142.835     | 225 |
| 22   | 302714.229     | 516887.001      | 143.287   | 0.725        | 450         |  | 1    | 3.000     | 142.562     | 225 |
|      |                |                 |           |              |             |                                                                                      | 0    | 3.001     | 142.562     | 225 |
| 23   | 302758.067     | 516879.677      | 141.610   | 0.725        | 450         |  | 1    | 3.001     | 140.885     | 225 |
|      |                |                 |           |              |             |                                                                                      | 0    | 3.002     | 140.885     | 225 |
| 8    | 302762.807     | 516881.421      | 141.390   | 1.116        | 1200        |  | 1    | 3.002     | 140.683     | 225 |
|      |                |                 |           |              |             |                                                                                      | 2    | 1.006     | 140.349     | 225 |
|      |                |                 |           |              |             |                                                                                      | 0    | 1.007     | 140.274     | 225 |
| 24   | 302682.051     | 516835.565      | 146.512   | 1.400        | 450         |  |      |           |             |     |
|      |                |                 |           |              |             |                                                                                      | 0    | 4.000     | 145.112     | 100 |

### Manhole Schedule

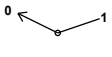
| Node | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                               | Link  | IL<br>(m) | Dia<br>(mm) |
|------|----------------|-----------------|-----------|--------------|-------------|-------------------------------------------------------------------------------------------|-------|-----------|-------------|
| 25   | 302662.422     | 516830.810      | 146.118   | 1.450        | 450         |  1      | 4.000 | 144.718   | 100         |
|      |                |                 |           |              |             | 0                                                                                         | 4.001 | 144.668   | 150         |
| 26   | 302629.113     | 516803.173      | 144.672   | 1.450        | 450         |  1      | 4.001 | 143.222   | 150         |
|      |                |                 |           |              |             | 0                                                                                         | 4.002 | 143.222   | 150         |
| 27   | 302624.191     | 516809.147      | 145.047   | 1.864        | 1200        |  1      | 4.002 | 143.183   | 150         |
|      |                |                 |           |              |             | 0                                                                                         | 4.003 | 143.878   | 100         |
| 28   | 302614.257     | 516804.163      | 144.647   | 1.001        | 450         |  1      | 4.003 | 143.646   | 100         |
|      |                |                 |           |              |             | 0                                                                                         | 4.004 | 143.646   | 100         |
| 38   | 302694.276     | 516816.455      | 147.000   | 0.700        | 450         |  1      |       |           |             |
|      |                |                 |           |              |             | 0                                                                                         | 5.000 | 146.300   | 150         |
| 39   | 302670.174     | 516827.838      | 146.391   | 0.700        | 450         |  1    | 5.000 | 145.691   | 150         |
|      |                |                 |           |              |             | 0                                                                                         | 5.001 | 145.691   | 150         |
| 40   | 302643.839     | 516805.190      | 145.761   | 0.700        | 450         |  1    | 5.001 | 145.061   | 150         |
|      |                |                 |           |              |             | 0                                                                                         | 5.002 | 145.061   | 225         |
| 41   | 302619.998     | 516794.102      | 145.030   | 0.700        | 450         |  1    | 5.002 | 144.330   | 225         |
|      |                |                 |           |              |             | 0                                                                                         | 5.003 | 144.330   | 225         |
| 29   | 302598.614     | 516795.797      | 143.925   | 1.050        | 450         |  1, 2 | 5.003 | 142.875   | 225         |
|      |                |                 |           |              |             | 2                                                                                         | 4.004 | 142.925   | 100         |
|      |                |                 |           |              |             | 0                                                                                         | 4.005 | 142.875   | 225         |
| 30   | 302573.732     | 516786.689      | 142.525   | 1.125        | 450         |  1, 2 | 8.003 | 141.475   | 150         |
|      |                |                 |           |              |             | 2                                                                                         | 4.005 | 141.475   | 225         |
|      |                |                 |           |              |             | 0                                                                                         | 4.006 | 141.400   | 225         |
| 31   | 302570.406     | 516797.993      | 142.127   | 1.133        | 450         |  1    | 4.006 | 140.994   | 225         |
|      |                |                 |           |              |             | 0                                                                                         | 4.007 | 140.994   | 225         |
| 32   | 302573.737     | 516814.798      | 142.068   | 1.784        | 1200        |  1    | 4.007 | 140.359   | 225         |
|      |                |                 |           |              |             | 0                                                                                         | 4.008 | 140.284   | 300         |
| 33   | 302580.173     | 516831.846      | 142.100   | 1.907        | 1200        |  1    | 4.008 | 140.193   | 300         |
|      |                |                 |           |              |             | 0                                                                                         | 4.009 | 140.193   | 300         |



### Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m)  | Depth (m) | Dia (mm) | Connections                                                                          | Link    | IL (m)  | Dia (mm) |
|------|-------------|--------------|---------|-----------|----------|--------------------------------------------------------------------------------------|---------|---------|----------|
| 34   | 302596.868  | 516848.309   | 142.538 | 2.462     | 1200     |    | 1 4.009 | 140.076 | 300      |
| 42   | 302664.012  | 516853.709   | 145.820 | 0.600     | 450      |    | 0 4.010 | 140.076 | 300      |
| 43   | 302655.938  | 516836.851   | 145.787 | 0.749     | 450      |    | 0 6.000 | 145.220 | 150      |
| 44   | 302626.462  | 516850.883   | 143.807 | 0.650     | 450      |    | 1 6.000 | 145.038 | 150      |
| 45   | 302623.109  | 516866.433   | 143.045 | 0.650     | 450      |  | 0 6.001 | 145.039 | 150      |
| 35   | 302611.538  | 516864.692   | 142.618 | 2.652     | 1200     |  | 1 6.001 | 143.207 | 150      |
| 36   | 302605.982  | 516884.602   | 141.344 | 1.809     | 1200     |  | 0 6.002 | 143.157 | 225      |
| 37   | 302675.011  | 516918.194   | 141.345 | 2.193     | 1200     |  | 1 6.002 | 142.395 | 225      |
| 9    | 302744.417  | 516932.463   | 139.094 | 1.807     | 1200     |  | 0 6.003 | 142.395 | 225      |
| 10   | 302740.393  | 516966.535   | 138.342 | 1.801     | 1200     |  | 1 6.003 | 141.664 | 225      |
| 11   | 302669.446  | 517000.030   | 135.319 | 0.997     | 1200     |  | 2 4.010 | 139.966 | 300      |
| 12   | 302605.418  | 517011.858   | 132.585 | 0.997     | 450      |  | 0 4.011 | 139.966 | 300      |
| 13   | 302545.156  | 517057.825   | 130.610 | 1.001     | 450      |  | 1 4.011 | 139.535 | 300      |
| 9    | 302744.417  | 516932.463   | 139.094 | 1.807     | 1200     |  | 0 4.012 | 139.536 | 300      |
| 10   | 302740.393  | 516966.535   | 138.342 | 1.801     | 1200     |  | 1 4.012 | 139.152 | 300      |
| 11   | 302669.446  | 517000.030   | 135.319 | 0.997     | 1200     |  | 0 4.013 | 139.152 | 300      |
| 12   | 302605.418  | 517011.858   | 132.585 | 0.997     | 450      |  | 1 4.013 | 137.287 | 300      |
| 13   | 302545.156  | 517057.825   | 130.610 | 1.001     | 450      |  | 2 1.007 | 137.363 | 225      |
| 9    | 302744.417  | 516932.463   | 139.094 | 1.807     | 1200     |  | 0 1.008 | 137.287 | 300      |
| 10   | 302740.393  | 516966.535   | 138.342 | 1.801     | 1200     |  | 1 1.008 | 136.541 | 300      |
| 11   | 302669.446  | 517000.030   | 135.319 | 0.997     | 1200     |  | 0 1.009 | 137.144 | 150      |
| 12   | 302605.418  | 517011.858   | 132.585 | 0.997     | 450      |  | 1 1.009 | 134.322 | 150      |
| 13   | 302545.156  | 517057.825   | 130.610 | 1.001     | 450      |  | 0 1.010 | 134.322 | 150      |
| 9    | 302744.417  | 516932.463   | 139.094 | 1.807     | 1200     |  | 1 1.010 | 131.588 | 150      |
| 10   | 302740.393  | 516966.535   | 138.342 | 1.801     | 1200     |  | 0 1.011 | 131.588 | 150      |
| 11   | 302669.446  | 517000.030   | 135.319 | 0.997     | 1200     |  | 1 1.011 | 129.609 | 150      |
| 12   | 302605.418  | 517011.858   | 132.585 | 0.997     | 450      |  | 0 1.012 | 129.609 | 150      |

### Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m)  | Depth (m) | Dia (mm) | Connections                                                                            | Link  | IL (m)  | Dia (mm) |
|------|-------------|--------------|---------|-----------|----------|----------------------------------------------------------------------------------------|-------|---------|----------|
| 14   | 302552.508  | 517071.039   | 130.384 | 0.851     |          |  1   | 1.012 | 129.533 | 150      |
| 46   | 302705.910  | 516854.165   | 145.856 | 1.064     | 1200     |  0   | 7.000 | 144.792 | 150      |
| 47   | 302685.409  | 516795.643   | 146.850 | 1.225     | 1200     |  0    | 8.000 | 145.625 | 150      |
| 48   | 302639.418  | 516780.033   | 145.000 | 1.225     | 1200     |  1   | 8.000 | 143.775 | 150      |
| 49   | 302596.079  | 516765.323   | 143.750 | 1.225     | 1200     |  1   | 8.001 | 142.525 | 150      |
| 50   | 302580.902  | 516772.793   | 143.147 | 1.225     | 1200     |  1 | 8.002 | 141.922 | 150      |
| 51   | 302737.768  | 516809.930   | 146.200 | 1.225     |          |  0 | 9.000 | 144.975 | 150      |
| 52   | 302774.877  | 516821.962   | 143.450 | 1.144     |          |  1 | 9.000 | 142.306 | 150      |
|      |             |              |         |           |          |  0 | 9.001 | 142.306 | 150      |

### Simulation Settings

|                      |        |                            |      |                         |   |
|----------------------|--------|----------------------------|------|-------------------------|---|
| Rainfall Methodology | FEH-22 | Skip Steady State          | x    | Check Discharge Rate(s) | x |
| Summer CV            | 0.750  | Drain Down Time (mins)     | 240  | Check Discharge Volume  | x |
| Analysis Speed       | Normal | Additional Storage (m³/ha) | 20.0 |                         |   |

### 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 %) |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 2                     | 0                     | 0                     | 0                     |
| 30                    | 40                    | 0                     | 0                     |
| 100                   | 40                    | 0                     | 0                     |
| 100                   | 50                    | 0                     | 0                     |



#### Node 10 Online Orifice Control

|                          |         |                   |       |                       |       |
|--------------------------|---------|-------------------|-------|-----------------------|-------|
| Flap Valve               | x       | Design Depth (m)  | 1.200 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓       | Design Flow (l/s) | 12.2  |                       |       |
| Invert Level (m)         | 137.144 | Diameter (m)      | 0.073 |                       |       |

#### Node 37 Online Orifice Control

|                          |   |                  |         |                       |       |
|--------------------------|---|------------------|---------|-----------------------|-------|
| Flap Valve               | x | Invert Level (m) | 139.152 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓ | Diameter (m)     | 0.100   |                       |       |

#### Node 19 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.37580 | Safety Factor | 2.0  | Invert Level (m)          | 139.480 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.30 | Time to half empty (mins) | 80      |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 66.0                   | 66.0                       | 1.800     | 66.0                   | 72.8                       | 1.801     | 0.0                    | 72.8                       |

#### Node 10 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.25760 | Safety Factor | 2.0  | Invert Level (m)          | 136.541 |
| Side Inf Coefficient (m/hr) | 0.25760 | Porosity      | 0.30 | Time to half empty (mins) | 104     |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 325.0                  | 325.0                      | 1.400     | 325.0                  | 431.4                      | 1.401     | 0.0                    | 431.4                      |

#### Node 27 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.72120 | Safety Factor | 2.0  | Invert Level (m)          | 143.183 |
| Side Inf Coefficient (m/hr) | 0.72120 | Porosity      | 0.30 | Time to half empty (mins) | 25      |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 45.0                   | 45.0                       | 1.000     | 45.0                   | 73.0                       | 1.001     | 0.0                    | 73.0                       |

#### Node 31 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 140.994 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 4       |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 20.6                   | 20.6                       | 1.000     | 20.6                   | 57.2                       | 1.001     | 0.0                    | 57.2                       |

#### Node 32 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 140.284 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 16      |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 21.9                   | 21.9                       | 1.000     | 21.9                   | 60.7                       | 1.001     | 0.0                    | 60.7                       |

### Node 33 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 140.193 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 19      |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 28.1                   | 28.1                       | 1.000     | 28.1                   | 77.4                       | 1.001     | 0.0                    | 77.4                       |

### Node 34 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.25760 | Safety Factor | 2.0  | Invert Level (m)          | 140.076 |
| Side Inf Coefficient (m/hr) | 0.25760 | Porosity      | 0.30 | Time to half empty (mins) | 22      |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 26.4                   | 26.4                       | 1.000     | 26.4                   | 72.8                       | 1.001     | 0.0                    | 72.8                       |

### Node 35 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.25760 | Safety Factor | 2.0  | Invert Level (m)          | 139.966 |
| Side Inf Coefficient (m/hr) | 0.25760 | Porosity      | 0.30 | Time to half empty (mins) | 26      |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 24.8                   | 24.8                       | 1.000     | 24.8                   | 68.5                       | 1.001     | 0.0                    | 68.5                       |

### Node 36 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.25760 | Safety Factor | 2.0  | Invert Level (m)          | 139.535 |
| Side Inf Coefficient (m/hr) | 0.25760 | Porosity      | 0.30 | Time to half empty (mins) | 42      |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 135.0                  | 135.0                      | 1.000     | 135.0                  | 288.6                      | 1.001     | 0.0                    | 288.6                      |

### Node 37 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.25760 | Safety Factor | 2.0  | Invert Level (m)          | 139.152 |
| Side Inf Coefficient (m/hr) | 0.25760 | Porosity      | 0.30 | Time to half empty (mins) | 61      |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 85.0                   | 85.0                       | 1.000     | 85.0                   | 229.1                      | 1.001     | 0.0                    | 229.1                      |

### Node 47 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 145.625 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 0       |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 58.0                   | 58.0                       | 1.000     | 58.0                   | 158.4                      | 1.001     | 0.0                    | 158.4                      |

#### Node 48 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 143.775 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 0       |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 55.0                      | 55.0                          | 1.000        | 55.0                      | 149.2                         | 1.001        | 0.0                       | 149.2                         |

#### Node 49 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 142.525 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 0       |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 20.0                      | 20.0                          | 1.000        | 20.0                      | 56.5                          | 1.001        | 0.0                       | 56.5                          |

#### Node 50 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 141.922 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 0       |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 18.7                      | 18.7                          | 1.000        | 18.7                      | 58.5                          | 1.001        | 0.0                       | 58.5                          |

#### Node 51 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 144.975 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 0       |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 46.8                      | 46.8                          | 1.000        | 46.8                      | 127.2                         | 1.001        | 0.0                       | 127.2                         |

#### Node 52 Depth/Area Storage Structure

|                             |         |               |      |                           |         |
|-----------------------------|---------|---------------|------|---------------------------|---------|
| Base Inf Coefficient (m/hr) | 0.14870 | Safety Factor | 2.0  | Invert Level (m)          | 142.306 |
| Side Inf Coefficient (m/hr) | 0.14870 | Porosity      | 0.30 | Time to half empty (mins) | 0       |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 27.1                      | 27.1                          | 1.000        | 27.1                      | 74.7                          | 1.001        | 0.0                       | 74.7                          |

**Results for 2 year Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event                     | US Node | Peak (mins)  | Level (m) | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|--------------------------------|---------|--------------|-----------|---------------|----------------|---------------|---------------|--------------------|
| 15 minute summer               | 1       | 10           | 146.037   | 0.037         | 3.6            | 0.0267        | 0.0000        | OK                 |
| 15 minute summer               | 2       | 10           | 145.314   | 0.042         | 7.1            | 0.0330        | 0.0000        | OK                 |
| 15 minute summer               | 3       | 10           | 143.905   | 0.050         | 6.9            | 0.0079        | 0.0000        | OK                 |
| 15 minute summer               | 4       | 10           | 143.707   | 0.053         | 11.5           | 0.0628        | 0.0000        | OK                 |
| 15 minute summer               | 5       | 10           | 142.466   | 0.073         | 13.2           | 0.0426        | 0.0000        | OK                 |
| 15 minute summer               | 6       | 11           | 142.250   | 0.057         | 15.2           | 0.0091        | 0.0000        | OK                 |
| 15 minute summer               | 15      | 10           | 145.720   | 0.055         | 4.5            | 0.0889        | 0.0000        | OK                 |
| 15 minute summer               | 16      | 10           | 145.423   | 0.049         | 7.3            | 0.0717        | 0.0000        | OK                 |
| 15 minute summer               | 17      | 11           | 144.740   | 0.052         | 11.9           | 0.0692        | 0.0000        | OK                 |
| 15 minute summer               | 18      | 11           | 141.295   | 0.065         | 11.9           | 0.0730        | 0.0000        | OK                 |
| 60 minute summer               | 19      | 41           | 139.653   | -0.885        | 8.9            | 3.4246        | 0.0000        | OK                 |
| 15 minute summer               | 20      | 1            | 140.188   | 0.000         | 0.0            | 0.0000        | 0.0000        | OK                 |
| 15 minute summer               | 7       | 11           | 140.764   | 0.064         | 17.7           | 0.0423        | 0.0000        | OK                 |
| 15 minute summer               | 21      | 10           | 142.920   | 0.085         | 11.4           | 0.2217        | 0.0000        | OK                 |
| 15 minute summer               | 22      | 11           | 142.629   | 0.067         | 19.8           | 0.1358        | 0.0000        | OK                 |
| 15 minute summer               | 23      | 11           | 140.960   | 0.075         | 19.6           | 0.0120        | 0.0000        | OK                 |
| 15 minute summer               | 8       | 11           | 140.361   | 0.087         | 37.3           | 0.0982        | 0.0000        | OK                 |
| 15 minute summer               | 24      | 10           | 145.156   | 0.044         | 3.3            | 0.0233        | 0.0000        | OK                 |
| 15 minute summer               | 25      | 10           | 144.721   | 0.053         | 8.9            | 0.0407        | 0.0000        | OK                 |
| 15 minute summer               | 26      | 11           | 143.313   | 0.091         | 8.8            | 0.0145        | 0.0000        | OK                 |
| 30 minute summer               | 27      | 22           | 143.281   | 0.098         | 8.2            | 1.4379        | 0.0000        | OK                 |
| 15 minute summer               | 28      | 1            | 143.646   | 0.000         | 0.0            | 0.0000        | 0.0000        | OK                 |
| 15 minute summer               | 38      | 10           | 146.345   | 0.044         | 5.2            | 0.0591        | 0.0000        | OK                 |
| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node   | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 15 minute summer               | 1       | 1.000        | 2         | 3.6           | 1.236          | 0.293         | 0.0526        |                    |
| 15 minute summer               | 2       | 1.001        | 3         | 6.9           | 1.744          | 0.165         | 0.0981        |                    |
| 15 minute summer               | 3       | 1.002        | 4         | 6.9           | 1.303          | 0.212         | 0.0320        |                    |
| 15 minute summer               | 4       | 1.003        | 5         | 11.4          | 1.637          | 0.263         | 0.1499        |                    |
| 15 minute summer               | 5       | 1.004        | 6         | 13.2          | 1.413          | 0.196         | 0.1137        |                    |
| 15 minute summer               | 6       | 1.005        | 7         | 15.0          | 1.913          | 0.138         | 0.2566        |                    |
| 15 minute summer               | 15      | 2.000        | 16        | 4.4           | 1.039          | 0.538         | 0.0561        |                    |
| 15 minute summer               | 16      | 2.001        | 17        | 7.3           | 1.397          | 0.228         | 0.1118        |                    |
| 15 minute summer               | 17      | 2.002        | 18        | 11.9          | 1.908          | 0.255         | 0.3246        |                    |
| 15 minute summer               | 18      | 2.003        | 19        | 11.8          | 1.672          | 0.361         | 0.1454        |                    |
| 60 minute summer               | 19      | 2.004        | 20        | 0.0           | 0.000          | 0.000         | 0.0000        |                    |
| 60 minute summer               | 19      | Infiltration |           | 3.4           |                |               |               |                    |
| 15 minute summer               | 20      | 2.005        | 7         | 0.0           | 0.000          | 0.000         | 0.0042        |                    |
| 15 minute summer               | 7       | 1.006        | 8         | 17.7          | 2.031          | 0.147         | 0.0581        |                    |
| 15 minute summer               | 21      | 3.000        | 22        | 11.1          | 0.952          | 0.282         | 0.5528        |                    |
| 15 minute summer               | 22      | 3.001        | 23        | 19.6          | 1.837          | 0.193         | 0.4775        |                    |
| 15 minute summer               | 23      | 3.002        | 8         | 19.7          | 1.847          | 0.188         | 0.0538        |                    |
| 15 minute summer               | 8       | 1.007        | 9         | 37.0          | 2.660          | 0.306         | 0.7546        |                    |
| 15 minute summer               | 24      | 4.000        | 25        | 3.3           | 0.995          | 0.384         | 0.0660        |                    |
| 15 minute summer               | 25      | 4.001        | 26        | 8.8           | 1.063          | 0.269         | 0.3631        |                    |
| 15 minute summer               | 26      | 4.002        | 27        | 8.6           | 1.122          | 0.688         | 0.0818        |                    |
| 30 minute summer               | 27      | 4.003        | 28        | 0.0           | 0.000          | 0.000         | 0.0000        |                    |
| 30 minute summer               | 27      | Infiltration |           | 4.7           |                |               |               |                    |
| 15 minute summer               | 28      | 4.004        | 29        | 0.0           | 0.000          | 0.000         | 0.0065        |                    |
| 15 minute summer               | 38      | 5.000        | 39        | 5.2           | 0.873          | 0.191         | 0.1581        |                    |

**Results for 2 year Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer  | 39      | 10          | 145.757   | 0.066     | 9.3          | 0.0711        | 0.0000     | OK         |
| 15 minute summer  | 40      | 11          | 145.121   | 0.059     | 12.4         | 0.0536        | 0.0000     | OK         |
| 15 minute summer  | 41      | 11          | 144.382   | 0.052     | 16.2         | 0.0546        | 0.0000     | OK         |
| 15 minute summer  | 29      | 11          | 142.940   | 0.065     | 20.7         | 0.0561        | 0.0000     | OK         |
| 30 minute summer  | 30      | 19          | 141.480   | 0.079     | 23.2         | 0.0126        | 0.0000     | OK         |
| 30 minute summer  | 31      | 19          | 141.073   | 0.079     | 25.1         | 0.5286        | 0.0000     | OK         |
| 30 minute summer  | 32      | 19          | 140.421   | 0.137     | 30.6         | 1.1427        | 0.0000     | OK         |
| 30 minute summer  | 33      | 20          | 140.334   | 0.141     | 33.1         | 1.3954        | 0.0000     | OK         |
| 30 minute summer  | 34      | 20          | 140.214   | 0.138     | 33.4         | 1.2699        | 0.0000     | OK         |
| 15 minute summer  | 42      | 10          | 145.274   | 0.053     | 4.7          | 0.0744        | 0.0000     | OK         |
| 15 minute summer  | 43      | 10          | 145.098   | 0.060     | 13.3         | 0.1177        | 0.0000     | OK         |
| 15 minute summer  | 44      | 10          | 143.230   | 0.073     | 23.5         | 0.1925        | 0.0000     | OK         |
| 15 minute summer  | 45      | 10          | 142.463   | 0.068     | 23.4         | 0.0109        | 0.0000     | OK         |
| 15 minute summer  | 35      | 12          | 140.088   | 0.122     | 50.8         | 1.0437        | 0.0000     | OK         |
| 30 minute summer  | 36      | 21          | 139.688   | 0.153     | 49.9         | 6.3820        | 0.0000     | OK         |
| 60 minute summer  | 37      | 44          | 139.494   | 0.342     | 34.6         | 9.1154        | 0.0000     | SURCHARGED |
| 15 minute summer  | 9       | 11          | 137.400   | 0.112     | 37.3         | 0.1272        | 0.0000     | OK         |
| 120 minute summer | 10      | 90          | 136.755   | 0.214     | 28.8         | 21.1329       | 0.0000     | OK         |

| Link Event (Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|-----------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer            | 39      | 5.001        | 40      | 9.1           | 1.301          | 0.379    | 0.2425        |                    |
| 15 minute summer            | 40      | 5.002        | 41      | 12.4          | 1.613          | 0.142    | 0.2018        |                    |
| 15 minute summer            | 41      | 5.003        | 29      | 16.2          | 1.977          | 0.119    | 0.1765        |                    |
| 15 minute summer            | 29      | 4.005        | 30      | 20.8          | 2.240          | 0.173    | 0.2462        |                    |
| 30 minute summer            | 30      | 4.006        | 31      | 23.1          | 1.850          | 0.239    | 0.1474        |                    |
| 30 minute summer            | 31      | 4.007        | 32      | 24.4          | 2.026          | 0.243    | 0.2066        |                    |
| 30 minute summer            | 31      | Infiltration |         | 0.4           |                |          |               |                    |
| 30 minute summer            | 32      | 4.008        | 33      | 29.4          | 0.935          | 0.375    | 0.5787        |                    |
| 30 minute summer            | 32      | Infiltration |         | 0.5           |                |          |               |                    |
| 30 minute summer            | 33      | 4.009        | 34      | 32.0          | 0.997          | 0.409    | 0.7521        |                    |
| 30 minute summer            | 33      | Infiltration |         | 0.7           |                |          |               |                    |
| 30 minute summer            | 34      | 4.010        | 35      | 31.7          | 1.148          | 0.404    | 0.6314        |                    |
| 30 minute summer            | 34      | Infiltration |         | 1.1           |                |          |               |                    |
| 15 minute summer            | 42      | 6.000        | 43      | 4.6           | 0.765          | 0.265    | 0.1135        |                    |
| 15 minute summer            | 43      | 6.001        | 44      | 13.1          | 2.089          | 0.309    | 0.2049        |                    |
| 15 minute summer            | 44      | 6.002        | 45      | 23.4          | 2.203          | 0.204    | 0.1687        |                    |
| 15 minute summer            | 45      | 6.003        | 35      | 23.2          | 2.393          | 0.177    | 0.1135        |                    |
| 15 minute summer            | 35      | 4.011        | 36      | 50.2          | 2.153          | 0.312    | 0.5986        |                    |
| 15 minute summer            | 35      | Infiltration |         | 1.0           |                |          |               |                    |
| 30 minute summer            | 36      | 4.012        | 37      | 40.8          | 1.274          | 0.521    | 3.7096        |                    |
| 30 minute summer            | 36      | Infiltration |         | 5.4           |                |          |               |                    |
| 60 minute summer            | 37      | Orifice      | 9       | 11.3          |                |          |               |                    |
| 60 minute summer            | 37      | Infiltration |         | 4.6           |                |          |               |                    |
| 15 minute summer            | 9       | 1.008        | 10      | 37.9          | 2.572          | 0.231    | 0.5946        |                    |
| 120 minute summer           | 10      | Orifice      | 11      | 0.0           |                |          |               |                    |

**Results for 2 year Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event       | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|--------|
| 15 minute summer | 11      | 1           | 134.322   | 0.000     | 0.0          | 0.0000        | 0.0000     | OK     |
| 15 minute summer | 12      | 1           | 131.588   | 0.000     | 0.0          | 0.0000        | 0.0000     | OK     |
| 15 minute summer | 13      | 1           | 129.609   | 0.000     | 0.0          | 0.0000        | 0.0000     | OK     |
| 15 minute summer | 14      | 1           | 129.533   | 0.000     | 0.0          | 0.0000        | 0.0000     | OK     |
| 15 minute summer | 46      | 10          | 144.838   | 0.046     | 2.9          | 0.0719        | 0.0000     | OK     |
| 15 minute summer | 47      | 11          | 145.660   | 0.035     | 5.5          | 0.6269        | 0.0000     | OK     |
| 30 minute summer | 48      | 20          | 143.816   | 0.041     | 6.0          | 0.6867        | 0.0000     | OK     |
| 30 minute summer | 49      | 21          | 142.560   | 0.035     | 4.5          | 0.2124        | 0.0000     | OK     |
| 30 minute summer | 50      | 21          | 142.032   | 0.110     | 5.5          | 0.6474        | 0.0000     | OK     |
| 15 minute summer | 51      | 11          | 145.000   | 0.025     | 3.5          | 0.3550        | 0.0000     | OK     |
| 30 minute summer | 52      | 20          | 142.352   | 0.046     | 3.5          | 0.3785        | 0.0000     | OK     |

| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 120 minute summer              | 10      | Infiltration |         | 12.1          |                |          |               |                    |
| 15 minute summer               | 11      | 1.010        | 12      | 0.0           | 0.000          | 0.000    | 0.0000        |                    |
| 15 minute summer               | 12      | 1.011        | 13      | 0.0           | 0.000          | 0.000    | 0.0000        |                    |
| 15 minute summer               | 13      | 1.012        | 14      | 0.0           | 0.000          | 0.000    | 0.0000        | 0.0                |
| 15 minute summer               | 46      | 7.000        | 17      | 2.9           | 0.579          | 0.198    | 0.0775        |                    |
| 15 minute summer               | 47      | 8.000        | 48      | 4.1           | 1.298          | 0.116    | 0.1667        |                    |
| 15 minute summer               | 47      | Infiltration |         | 0.8           |                |          |               |                    |
| 30 minute summer               | 48      | 8.001        | 49      | 4.5           | 1.314          | 0.154    | 0.1601        |                    |
| 30 minute summer               | 48      | Infiltration |         | 0.9           |                |          |               |                    |
| 30 minute summer               | 49      | 8.002        | 50      | 4.1           | 0.486          | 0.122    | 0.1438        |                    |
| 30 minute summer               | 49      | Infiltration |         | 0.3           |                |          |               |                    |
| 30 minute summer               | 50      | 8.003        | 30      | 4.9           | 1.318          | 0.151    | 0.0583        |                    |
| 30 minute summer               | 50      | Infiltration |         | 0.4           |                |          |               |                    |
| 15 minute summer               | 51      | 9.000        | 52      | 2.7           | 1.142          | 0.058    | 0.1206        |                    |
| 15 minute summer               | 51      | Infiltration |         | 0.5           |                |          |               |                    |
| 30 minute summer               | 52      | 9.001        | 6       | 2.5           | 0.512          | 0.204    | 0.1181        |                    |
| 30 minute summer               | 52      | Infiltration |         | 0.5           |                |          |               |                    |

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer  | 1       | 10          | 146.071   | 0.071     | 10.0         | 0.0512        | 0.0000     | OK         |
| 15 minute summer  | 2       | 10          | 145.346   | 0.074     | 19.6         | 0.0583        | 0.0000     | OK         |
| 15 minute summer  | 3       | 10          | 143.950   | 0.095     | 19.4         | 0.0152        | 0.0000     | OK         |
| 15 minute summer  | 4       | 10          | 143.750   | 0.096     | 32.3         | 0.1147        | 0.0000     | OK         |
| 15 minute summer  | 5       | 10          | 142.526   | 0.133     | 37.1         | 0.0776        | 0.0000     | OK         |
| 15 minute summer  | 6       | 11          | 142.298   | 0.105     | 45.4         | 0.0167        | 0.0000     | OK         |
| 15 minute summer  | 15      | 11          | 146.002   | 0.337     | 12.5         | 0.5503        | 0.0000     | SURCHARGED |
| 15 minute summer  | 16      | 11          | 145.458   | 0.085     | 18.6         | 0.1228        | 0.0000     | OK         |
| 15 minute summer  | 17      | 11          | 144.779   | 0.090     | 31.3         | 0.1210        | 0.0000     | OK         |
| 15 minute summer  | 18      | 11          | 141.359   | 0.128     | 31.4         | 0.1453        | 0.0000     | OK         |
| 120 minute summer | 19      | 88          | 140.358   | -0.180    | 17.8         | 17.3844       | 0.0000     | OK         |
| 15 minute summer  | 20      | 13          | 140.198   | 0.010     | 0.1          | 0.0112        | 0.0000     | OK         |
| 15 minute summer  | 7       | 11          | 140.824   | 0.124     | 52.9         | 0.0822        | 0.0000     | OK         |
| 15 minute summer  | 21      | 10          | 142.992   | 0.157     | 31.8         | 0.4112        | 0.0000     | OK         |
| 15 minute summer  | 22      | 11          | 142.679   | 0.117     | 55.4         | 0.2380        | 0.0000     | OK         |
| 15 minute summer  | 23      | 11          | 141.031   | 0.145     | 54.7         | 0.0231        | 0.0000     | OK         |
| 15 minute summer  | 8       | 11          | 140.447   | 0.173     | 107.8        | 0.1956        | 0.0000     | OK         |
| 15 minute summer  | 24      | 11          | 145.244   | 0.132     | 9.3          | 0.0701        | 0.0000     | SURCHARGED |
| 15 minute summer  | 25      | 10          | 144.764   | 0.096     | 24.3         | 0.0737        | 0.0000     | OK         |
| 60 minute summer  | 26      | 41          | 143.702   | 0.480     | 19.4         | 0.0764        | 0.0000     | SURCHARGED |
| 60 minute summer  | 27      | 42          | 143.689   | 0.506     | 17.4         | 7.4060        | 0.0000     | OK         |
| 15 minute summer  | 28      | 1           | 143.646   | 0.000     | 0.0          | 0.0000        | 0.0000     | OK         |
| 15 minute summer  | 38      | 10          | 146.379   | 0.079     | 14.7         | 0.1045        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | 1       | 1.000        | 2       | 9.9           | 1.628          | 0.816    | 0.1110        |                    |
| 15 minute summer               | 2       | 1.001        | 3       | 19.4          | 2.289          | 0.461    | 0.2091        |                    |
| 15 minute summer               | 3       | 1.002        | 4       | 19.4          | 1.635          | 0.594    | 0.0715        |                    |
| 15 minute summer               | 4       | 1.003        | 5       | 32.1          | 2.227          | 0.740    | 0.3043        |                    |
| 15 minute summer               | 5       | 1.004        | 6       | 36.9          | 1.764          | 0.548    | 0.2523        |                    |
| 15 minute summer               | 6       | 1.005        | 7       | 45.4          | 2.572          | 0.416    | 0.5776        |                    |
| 15 minute summer               | 15      | 2.000        | 16      | 10.8          | 1.385          | 1.320    | 0.1022        |                    |
| 15 minute summer               | 16      | 2.001        | 17      | 18.6          | 1.741          | 0.584    | 0.2299        |                    |
| 15 minute summer               | 17      | 2.002        | 18      | 31.4          | 2.343          | 0.677    | 0.6980        |                    |
| 15 minute summer               | 18      | 2.003        | 19      | 31.0          | 2.026          | 0.946    | 0.3151        |                    |
| 120 minute summer              | 19      | 2.004        | 20      | 0.0           | 0.000          | 0.000    | 0.0000        |                    |
| 120 minute summer              | 19      | Infiltration |         | 3.4           |                |          |               |                    |
| 15 minute summer               | 20      | 2.005        | 7       | -0.1          | -0.038         | -0.028   | 0.0418        |                    |
| 15 minute summer               | 7       | 1.006        | 8       | 52.8          | 2.612          | 0.440    | 0.1349        |                    |
| 15 minute summer               | 21      | 3.000        | 22      | 31.1          | 1.236          | 0.790    | 1.1904        |                    |
| 15 minute summer               | 22      | 3.001        | 23      | 54.7          | 2.295          | 0.539    | 1.0664        |                    |
| 15 minute summer               | 23      | 3.002        | 8       | 55.0          | 2.307          | 0.527    | 0.1203        |                    |
| 15 minute summer               | 8       | 1.007        | 9       | 107.6         | 3.377          | 0.889    | 1.7277        |                    |
| 15 minute summer               | 24      | 4.000        | 25      | 8.6           | 1.159          | 1.012    | 0.1546        |                    |
| 15 minute summer               | 25      | 4.001        | 26      | 24.2          | 1.489          | 0.743    | 0.6393        |                    |
| 60 minute summer               | 26      | 4.002        | 27      | 17.4          | 0.991          | 1.391    | 0.1363        |                    |
| 60 minute summer               | 27      | 4.003        | 28      | 0.0           | 0.000          | 0.000    | 0.0000        |                    |
| 60 minute summer               | 27      | Infiltration |         | 5.9           |                |          |               |                    |
| 15 minute summer               | 28      | 4.004        | 29      | 0.0           | 0.000          | 0.000    | 0.0475        |                    |
| 15 minute summer               | 38      | 5.000        | 39      | 14.6          | 1.077          | 0.541    | 0.3591        |                    |



**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer  | 39      | 11          | 145.904   | 0.213     | 26.0         | 0.2287        | 0.0000     | SURCHARGED |
| 15 minute summer  | 40      | 10          | 145.163   | 0.102     | 32.3         | 0.0916        | 0.0000     | OK         |
| 15 minute summer  | 41      | 10          | 144.418   | 0.088     | 44.2         | 0.0916        | 0.0000     | OK         |
| 15 minute summer  | 29      | 10          | 142.990   | 0.115     | 57.3         | 0.0991        | 0.0000     | OK         |
| 30 minute summer  | 30      | 18          | 141.570   | 0.170     | 74.0         | 0.0271        | 0.0000     | OK         |
| 30 minute summer  | 31      | 20          | 141.176   | 0.182     | 79.9         | 1.2131        | 0.0000     | OK         |
| 30 minute summer  | 32      | 21          | 140.787   | 0.503     | 95.5         | 4.1952        | 0.0000     | SURCHARGED |
| 30 minute summer  | 33      | 21          | 140.664   | 0.471     | 96.2         | 4.6759        | 0.0000     | SURCHARGED |
| 30 minute summer  | 34      | 22          | 140.511   | 0.435     | 91.4         | 3.9967        | 0.0000     | SURCHARGED |
| 15 minute summer  | 42      | 10          | 145.322   | 0.102     | 13.2         | 0.1417        | 0.0000     | OK         |
| 15 minute summer  | 43      | 10          | 145.153   | 0.115     | 37.3         | 0.2269        | 0.0000     | OK         |
| 15 minute summer  | 44      | 10          | 143.291   | 0.134     | 65.7         | 0.3540        | 0.0000     | OK         |
| 15 minute summer  | 45      | 10          | 142.521   | 0.126     | 65.4         | 0.0201        | 0.0000     | OK         |
| 60 minute summer  | 35      | 43          | 140.405   | 0.439     | 128.9        | 3.7658        | 0.0000     | SURCHARGED |
| 60 minute summer  | 36      | 44          | 140.365   | 0.830     | 123.8        | 34.5950       | 0.0000     | SURCHARGED |
| 60 minute summer  | 37      | 41          | 140.312   | 1.160     | 63.8         | 26.8251       | 0.0000     | SURCHARGED |
| 240 minute summer | 9       | 176         | 137.530   | 0.243     | 54.3         | 0.2749        | 0.0000     | OK         |
| 240 minute summer | 10      | 180         | 137.519   | 0.978     | 54.3         | 96.4468       | 0.0000     | SURCHARGED |

| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | 39      | 5.001        | 40      | 23.3          | 1.660          | 0.971    | 0.5261        |                    |
| 15 minute summer               | 40      | 5.002        | 41      | 33.1          | 2.089          | 0.380    | 0.4164        |                    |
| 15 minute summer               | 41      | 5.003        | 29      | 44.1          | 2.551          | 0.324    | 0.3714        |                    |
| 15 minute summer               | 29      | 4.005        | 30      | 56.8          | 2.896          | 0.472    | 0.5194        |                    |
| 30 minute summer               | 30      | 4.006        | 31      | 73.7          | 2.333          | 0.760    | 0.3896        |                    |
| 30 minute summer               | 31      | 4.007        | 32      | 76.9          | 2.185          | 0.765    | 0.6359        |                    |
| 30 minute summer               | 31      | Infiltration |         | 0.5           |                |          |               |                    |
| 30 minute summer               | 32      | 4.008        | 33      | 85.6          | 1.216          | 1.094    | 1.2832        |                    |
| 30 minute summer               | 32      | Infiltration |         | 0.8           |                |          |               |                    |
| 30 minute summer               | 33      | 4.009        | 34      | 86.4          | 1.227          | 1.104    | 1.6511        |                    |
| 30 minute summer               | 33      | Infiltration |         | 1.0           |                |          |               |                    |
| 30 minute summer               | 34      | 4.010        | 35      | 81.6          | 1.201          | 1.042    | 1.5487        |                    |
| 30 minute summer               | 34      | Infiltration |         | 1.6           |                |          |               |                    |
| 15 minute summer               | 42      | 6.000        | 43      | 13.1          | 0.959          | 0.746    | 0.2542        |                    |
| 15 minute summer               | 43      | 6.001        | 44      | 36.7          | 2.634          | 0.867    | 0.4557        |                    |
| 15 minute summer               | 44      | 6.002        | 45      | 65.4          | 2.753          | 0.572    | 0.3778        |                    |
| 15 minute summer               | 45      | 6.003        | 35      | 65.0          | 3.056          | 0.497    | 0.2491        |                    |
| 60 minute summer               | 35      | 4.011        | 36      | 122.7         | 1.968          | 0.763    | 1.4556        |                    |
| 60 minute summer               | 35      | Infiltration |         | 1.5           |                |          |               |                    |
| 60 minute summer               | 36      | 4.012        | 37      | 63.8          | 0.945          | 0.814    | 5.4060        |                    |
| 60 minute summer               | 36      | Infiltration |         | 9.3           |                |          |               |                    |
| 60 minute summer               | 37      | Orifice      | 9       | 22.0          |                |          |               |                    |
| 60 minute summer               | 37      | Infiltration |         | 8.2           |                |          |               |                    |
| 240 minute summer              | 9       | 1.008        | 10      | 54.3          | 1.664          | 0.331    | 2.2570        |                    |
| 240 minute summer              | 10      | Orifice      | 11      | 6.5           |                |          |               |                    |



**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|--------|
| 240 minute summer | 11      | 180         | 134.365   | 0.043     | 6.5          | 0.0483        | 0.0000     | OK     |
| 240 minute summer | 12      | 180         | 131.636   | 0.048     | 6.5          | 0.0077        | 0.0000     | OK     |
| 240 minute summer | 13      | 180         | 129.689   | 0.080     | 6.5          | 0.0127        | 0.0000     | OK     |
| 240 minute summer | 14      | 180         | 129.607   | 0.074     | 6.5          | 0.0000        | 0.0000     | OK     |
| 15 minute summer  | 46      | 10          | 144.876   | 0.084     | 8.2          | 0.1317        | 0.0000     | OK     |
| 15 minute summer  | 47      | 11          | 145.689   | 0.064     | 15.4         | 1.1639        | 0.0000     | OK     |
| 15 minute summer  | 48      | 12          | 143.858   | 0.083     | 19.4         | 1.4007        | 0.0000     | OK     |
| 30 minute summer  | 49      | 20          | 142.598   | 0.073     | 16.8         | 0.4404        | 0.0000     | OK     |
| 30 minute summer  | 50      | 20          | 142.081   | 0.159     | 21.1         | 0.9336        | 0.0000     | OK     |
| 15 minute summer  | 51      | 11          | 145.018   | 0.043     | 9.7          | 0.6263        | 0.0000     | OK     |
| 15 minute summer  | 52      | 12          | 142.404   | 0.098     | 11.2         | 0.8069        | 0.0000     | OK     |

| Link Event (Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|-----------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 240 minute summer           | 10      | Infiltration |         | 14.2          |                |          |               |                    |
| 240 minute summer           | 11      | 1.010        | 12      | 6.5           | 1.435          | 0.177    | 0.2939        |                    |
| 240 minute summer           | 12      | 1.011        | 13      | 6.5           | 0.969          | 0.225    | 0.5460        |                    |
| 240 minute summer           | 13      | 1.012        | 14      | 6.5           | 0.715          | 0.517    | 0.1369        | 33.1               |
| 15 minute summer            | 46      | 7.000        | 17      | 8.1           | 0.767          | 0.559    | 0.1648        |                    |
| 15 minute summer            | 47      | 8.000        | 48      | 13.3          | 1.643          | 0.382    | 0.4138        |                    |
| 15 minute summer            | 47      | Infiltration |         | 1.2           |                |          |               |                    |
| 15 minute summer            | 48      | 8.001        | 49      | 17.0          | 1.835          | 0.577    | 0.4257        |                    |
| 15 minute summer            | 48      | Infiltration |         | 1.2           |                |          |               |                    |
| 30 minute summer            | 49      | 8.002        | 50      | 16.2          | 1.112          | 0.482    | 0.2213        |                    |
| 30 minute summer            | 49      | Infiltration |         | 0.4           |                |          |               |                    |
| 30 minute summer            | 50      | 8.003        | 30      | 20.2          | 1.903          | 0.621    | 0.1720        |                    |
| 30 minute summer            | 50      | Infiltration |         | 0.5           |                |          |               |                    |
| 15 minute summer            | 51      | 9.000        | 52      | 8.5           | 1.295          | 0.181    | 0.3131        |                    |
| 15 minute summer            | 51      | Infiltration |         | 0.8           |                |          |               |                    |
| 15 minute summer            | 52      | 9.001        | 6       | 9.3           | 0.786          | 0.742    | 0.2800        |                    |
| 15 minute summer            | 52      | Infiltration |         | 0.6           |                |          |               |                    |

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer  | 1       | 10          | 146.090   | 0.090     | 12.4         | 0.0649        | 0.0000     | OK         |
| 15 minute summer  | 2       | 10          | 145.357   | 0.085     | 24.2         | 0.0664        | 0.0000     | OK         |
| 15 minute summer  | 3       | 10          | 143.968   | 0.113     | 24.0         | 0.0179        | 0.0000     | OK         |
| 15 minute summer  | 4       | 10          | 143.769   | 0.115     | 39.8         | 0.1376        | 0.0000     | OK         |
| 15 minute summer  | 5       | 10          | 142.546   | 0.153     | 45.7         | 0.0895        | 0.0000     | OK         |
| 15 minute summer  | 6       | 11          | 142.313   | 0.120     | 56.4         | 0.0190        | 0.0000     | OK         |
| 30 minute summer  | 15      | 19          | 146.228   | 0.563     | 15.1         | 0.9184        | 0.0000     | SURCHARGED |
| 15 minute summer  | 16      | 11          | 145.470   | 0.096     | 22.6         | 0.1397        | 0.0000     | OK         |
| 15 minute summer  | 17      | 11          | 144.792   | 0.104     | 38.3         | 0.1392        | 0.0000     | OK         |
| 15 minute summer  | 18      | 12          | 141.619   | 0.389     | 38.4         | 0.4404        | 0.0000     | SURCHARGED |
| 120 minute summer | 19      | 94          | 140.658   | 0.120     | 22.3         | 23.4625       | 0.0000     | OK         |
| 120 minute summer | 20      | 92          | 140.660   | 0.472     | 4.6          | 0.5337        | 0.0000     | OK         |
| 15 minute summer  | 7       | 12          | 140.895   | 0.195     | 65.7         | 0.1287        | 0.0000     | OK         |
| 15 minute summer  | 21      | 10          | 143.022   | 0.187     | 39.5         | 0.4887        | 0.0000     | OK         |
| 15 minute summer  | 22      | 11          | 142.696   | 0.134     | 68.6         | 0.2721        | 0.0000     | OK         |
| 15 minute summer  | 23      | 11          | 141.057   | 0.172     | 67.9         | 0.0273        | 0.0000     | OK         |
| 15 minute summer  | 8       | 12          | 140.782   | 0.508     | 130.8        | 0.5740        | 0.0000     | SURCHARGED |
| 15 minute summer  | 24      | 11          | 145.457   | 0.345     | 11.5         | 0.1826        | 0.0000     | SURCHARGED |
| 30 minute summer  | 25      | 19          | 144.797   | 0.129     | 29.0         | 0.0988        | 0.0000     | OK         |
| 60 minute summer  | 26      | 41          | 143.917   | 0.695     | 23.7         | 0.1105        | 0.0000     | SURCHARGED |
| 60 minute summer  | 27      | 42          | 143.897   | 0.714     | 21.5         | 10.4518       | 0.0000     | OK         |
| 60 minute summer  | 28      | 43          | 143.661   | 0.015     | 0.6          | 0.0024        | 0.0000     | OK         |
| 15 minute summer  | 38      | 11          | 146.406   | 0.106     | 18.2         | 0.1404        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | 1       | 1.000        | 2       | 12.2          | 1.688          | 1.000    | 0.1320        |                    |
| 15 minute summer               | 2       | 1.001        | 3       | 24.0          | 2.402          | 0.568    | 0.2454        |                    |
| 15 minute summer               | 3       | 1.002        | 4       | 23.8          | 1.671          | 0.731    | 0.0866        |                    |
| 15 minute summer               | 4       | 1.003        | 5       | 39.5          | 2.379          | 0.911    | 0.3443        |                    |
| 15 minute summer               | 5       | 1.004        | 6       | 45.5          | 1.834          | 0.675    | 0.2988        |                    |
| 15 minute summer               | 6       | 1.005        | 7       | 56.4          | 2.708          | 0.517    | 0.7079        |                    |
| 30 minute summer               | 15      | 2.000        | 16      | 13.1          | 1.676          | 1.598    | 0.1022        |                    |
| 15 minute summer               | 16      | 2.001        | 17      | 22.5          | 1.801          | 0.707    | 0.2691        |                    |
| 15 minute summer               | 17      | 2.002        | 18      | 38.4          | 2.412          | 0.827    | 0.7875        |                    |
| 15 minute summer               | 18      | 2.003        | 19      | 35.5          | 2.015          | 1.082    | 0.3611        |                    |
| 120 minute summer              | 19      | 2.004        | 20      | 4.6           | 0.372          | 0.122    | 0.1268        |                    |
| 120 minute summer              | 19      | Infiltration |         | 3.4           |                |          |               |                    |
| 120 minute summer              | 20      | 2.005        | 7       | 0.0           | 0.000          | 0.000    | 0.0233        |                    |
| 15 minute summer               | 7       | 1.006        | 8       | 62.6          | 2.591          | 0.522    | 0.2547        |                    |
| 15 minute summer               | 21      | 3.000        | 22      | 38.6          | 1.282          | 0.978    | 1.4108        |                    |
| 15 minute summer               | 22      | 3.001        | 23      | 67.9          | 2.385          | 0.669    | 1.2695        |                    |
| 15 minute summer               | 23      | 3.002        | 8       | 68.2          | 2.395          | 0.653    | 0.1431        |                    |
| 15 minute summer               | 8       | 1.007        | 9       | 125.4         | 3.320          | 1.036    | 2.1577        |                    |
| 15 minute summer               | 24      | 4.000        | 25      | 10.3          | 1.314          | 1.214    | 0.1564        |                    |
| 30 minute summer               | 25      | 4.001        | 26      | 28.4          | 1.633          | 0.871    | 0.7298        |                    |
| 60 minute summer               | 26      | 4.002        | 27      | 21.5          | 1.219          | 1.712    | 0.1363        |                    |
| 60 minute summer               | 27      | 4.003        | 28      | 0.6           | 0.764          | 0.071    | 0.0096        |                    |
| 60 minute summer               | 27      | Infiltration |         | 6.5           |                |          |               |                    |
| 60 minute summer               | 28      | 4.004        | 29      | 0.6           | 0.805          | 0.049    | 0.0468        |                    |
| 15 minute summer               | 38      | 5.000        | 39      | 17.4          | 1.111          | 0.646    | 0.4112        |                    |

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer  | 39      | 12          | 146.184   | 0.493     | 31.6         | 0.5285        | 0.0000     | FLOOD RISK |
| 15 minute summer  | 40      | 11          | 145.172   | 0.111     | 38.3         | 0.1000        | 0.0000     | OK         |
| 15 minute summer  | 41      | 11          | 144.426   | 0.096     | 51.3         | 0.1004        | 0.0000     | OK         |
| 15 minute summer  | 29      | 10          | 143.001   | 0.126     | 66.8         | 0.1086        | 0.0000     | OK         |
| 30 minute summer  | 30      | 20          | 141.886   | 0.486     | 90.9         | 0.0772        | 0.0000     | SURCHARGED |
| 30 minute summer  | 31      | 21          | 141.517   | 0.523     | 91.5         | 3.4806        | 0.0000     | SURCHARGED |
| 30 minute summer  | 32      | 22          | 141.044   | 0.760     | 106.3        | 6.3352        | 0.0000     | SURCHARGED |
| 60 minute summer  | 33      | 43          | 140.982   | 0.789     | 95.8         | 7.8293        | 0.0000     | SURCHARGED |
| 60 minute summer  | 34      | 43          | 140.957   | 0.881     | 86.8         | 8.0854        | 0.0000     | SURCHARGED |
| 15 minute summer  | 42      | 12          | 145.424   | 0.204     | 16.4         | 0.2836        | 0.0000     | SURCHARGED |
| 15 minute summer  | 43      | 12          | 145.282   | 0.244     | 46.5         | 0.4823        | 0.0000     | SURCHARGED |
| 30 minute summer  | 44      | 17          | 143.308   | 0.151     | 78.3         | 0.4010        | 0.0000     | OK         |
| 15 minute summer  | 45      | 10          | 142.540   | 0.145     | 78.3         | 0.0230        | 0.0000     | OK         |
| 60 minute summer  | 35      | 43          | 140.934   | 0.968     | 141.5        | 8.2962        | 0.0000     | SURCHARGED |
| 60 minute summer  | 36      | 43          | 140.889   | 1.354     | 128.5        | 42.1108       | 0.0000     | SURCHARGED |
| 60 minute summer  | 37      | 43          | 140.805   | 1.653     | 60.6         | 27.3818       | 0.0000     | SURCHARGED |
| 240 minute summer | 9       | 180         | 137.839   | 0.552     | 66.0         | 0.6240        | 0.0000     | SURCHARGED |
| 240 minute summer | 10      | 184         | 137.819   | 1.278     | 65.5         | 126.0187      | 0.0000     | SURCHARGED |

| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | 39      | 5.001        | 40      | 27.6          | 1.640          | 1.152    | 0.5480        |                    |
| 15 minute summer               | 40      | 5.002        | 41      | 38.2          | 2.151          | 0.439    | 0.4682        |                    |
| 15 minute summer               | 41      | 5.003        | 29      | 51.1          | 2.721          | 0.375    | 0.4129        |                    |
| 15 minute summer               | 29      | 4.005        | 30      | 67.1          | 2.982          | 0.558    | 0.8104        |                    |
| 30 minute summer               | 30      | 4.006        | 31      | 84.4          | 2.345          | 0.871    | 0.4686        |                    |
| 30 minute summer               | 31      | 4.007        | 32      | 81.7          | 2.184          | 0.813    | 0.6814        |                    |
| 30 minute summer               | 31      | Infiltration |         | 0.8           |                |          |               |                    |
| 30 minute summer               | 32      | 4.008        | 33      | 87.4          | 1.241          | 1.116    | 1.2832        |                    |
| 30 minute summer               | 32      | Infiltration |         | 1.1           |                |          |               |                    |
| 60 minute summer               | 33      | 4.009        | 34      | 81.2          | 1.165          | 1.037    | 1.6511        |                    |
| 60 minute summer               | 33      | Infiltration |         | 1.4           |                |          |               |                    |
| 60 minute summer               | 34      | 4.010        | 35      | 77.9          | 1.200          | 0.994    | 1.5487        |                    |
| 60 minute summer               | 34      | Infiltration |         | 2.4           |                |          |               |                    |
| 15 minute summer               | 42      | 6.000        | 43      | 16.3          | 0.979          | 0.929    | 0.3291        |                    |
| 15 minute summer               | 43      | 6.001        | 44      | 42.9          | 2.540          | 1.014    | 0.5548        |                    |
| 30 minute summer               | 44      | 6.002        | 45      | 77.9          | 2.832          | 0.681    | 0.4373        |                    |
| 15 minute summer               | 45      | 6.003        | 35      | 79.0          | 3.177          | 0.604    | 0.2906        |                    |
| 60 minute summer               | 35      | 4.011        | 36      | 127.2         | 1.957          | 0.791    | 1.4556        |                    |
| 60 minute summer               | 35      | Infiltration |         | 2.4           |                |          |               |                    |
| 60 minute summer               | 36      | 4.012        | 37      | 60.6          | 0.988          | 0.773    | 5.4060        |                    |
| 60 minute summer               | 36      | Infiltration |         | 10.3          |                |          |               |                    |
| 60 minute summer               | 37      | Orifice      | 9       | 26.4          |                |          |               |                    |
| 60 minute summer               | 37      | Infiltration |         | 8.2           |                |          |               |                    |
| 240 minute summer              | 9       | 1.008        | 10      | 65.5          | 1.627          | 0.399    | 2.4160        |                    |
| 240 minute summer              | 10      | Orifice      | 11      | 8.9           |                |          |               |                    |

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event                     | US Node | Peak (mins)  | Level (m) | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|--------------------------------|---------|--------------|-----------|---------------|----------------|---------------|---------------|--------------------|
| 240 minute summer              | 11      | 184          | 134.372   | 0.050         | 8.9            | 0.0570        | 0.0000        | OK                 |
| 240 minute summer              | 12      | 184          | 131.645   | 0.057         | 8.9            | 0.0091        | 0.0000        | OK                 |
| 240 minute summer              | 13      | 184          | 129.707   | 0.098         | 8.9            | 0.0156        | 0.0000        | OK                 |
| 240 minute summer              | 14      | 184          | 129.620   | 0.087         | 8.9            | 0.0000        | 0.0000        | OK                 |
| 15 minute summer               | 46      | 10           | 144.890   | 0.098         | 10.2           | 0.1529        | 0.0000        | OK                 |
| 15 minute summer               | 47      | 11           | 145.699   | 0.074         | 19.1           | 1.3318        | 0.0000        | OK                 |
| 30 minute summer               | 48      | 19           | 143.874   | 0.099         | 24.4           | 1.6589        | 0.0000        | OK                 |
| 30 minute summer               | 49      | 20           | 142.611   | 0.086         | 21.9           | 0.5183        | 0.0000        | OK                 |
| 30 minute summer               | 50      | 21           | 142.169   | 0.247         | 27.5           | 1.4548        | 0.0000        | SURCHARGED         |
| 15 minute summer               | 51      | 11           | 145.024   | 0.049         | 12.0           | 0.7042        | 0.0000        | OK                 |
| 30 minute summer               | 52      | 19           | 142.426   | 0.120         | 14.0           | 0.9899        | 0.0000        | OK                 |
| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node   | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 240 minute summer              | 10      | Infiltration |           | 15.1          |                |               |               |                    |
| 240 minute summer              | 11      | 1.010        | 12        | 8.9           | 1.568          | 0.243         | 0.3694        |                    |
| 240 minute summer              | 12      | 1.011        | 13        | 8.9           | 0.967          | 0.308         | 0.6956        |                    |
| 240 minute summer              | 13      | 1.012        | 14        | 8.9           | 0.780          | 0.710         | 0.1722        | 62.6               |
| 15 minute summer               | 46      | 7.000        | 17        | 10.0          | 0.807          | 0.695         | 0.1949        |                    |
| 15 minute summer               | 47      | 8.000        | 48        | 16.9          | 1.707          | 0.484         | 0.4997        |                    |
| 15 minute summer               | 47      | Infiltration |           | 1.2           |                |               |               |                    |
| 30 minute summer               | 48      | 8.001        | 49        | 21.9          | 1.934          | 0.743         | 0.5180        |                    |
| 30 minute summer               | 48      | Infiltration |           | 1.2           |                |               |               |                    |
| 30 minute summer               | 49      | 8.002        | 50        | 21.3          | 1.349          | 0.631         | 0.2377        |                    |
| 30 minute summer               | 49      | Infiltration |           | 0.4           |                |               |               |                    |
| 30 minute summer               | 50      | 8.003        | 30        | 24.9          | 1.709          | 0.767         | 0.2753        |                    |
| 30 minute summer               | 50      | Infiltration |           | 0.6           |                |               |               |                    |
| 15 minute summer               | 51      | 9.000        | 52        | 10.6          | 1.321          | 0.227         | 0.3808        |                    |
| 15 minute summer               | 51      | Infiltration |           | 0.9           |                |               |               |                    |
| 30 minute summer               | 52      | 9.001        | 6         | 11.8          | 0.834          | 0.946         | 0.3394        |                    |
| 30 minute summer               | 52      | Infiltration |           | 0.6           |                |               |               |                    |

**Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer  | 1       | 11          | 146.202   | 0.202     | 13.3         | 0.1449        | 0.0000     | SURCHARGED |
| 30 minute summer  | 2       | 17          | 145.358   | 0.086     | 24.6         | 0.0674        | 0.0000     | OK         |
| 30 minute summer  | 3       | 17          | 143.970   | 0.115     | 24.5         | 0.0183        | 0.0000     | OK         |
| 15 minute summer  | 4       | 10          | 143.775   | 0.121     | 41.3         | 0.1443        | 0.0000     | OK         |
| 15 minute summer  | 5       | 10          | 142.551   | 0.158     | 47.9         | 0.0926        | 0.0000     | OK         |
| 30 minute summer  | 6       | 18          | 142.316   | 0.123     | 59.0         | 0.0195        | 0.0000     | OK         |
| 30 minute summer  | 15      | 19          | 146.313   | 0.647     | 16.2         | 1.0560        | 0.0000     | SURCHARGED |
| 15 minute summer  | 16      | 11          | 145.474   | 0.101     | 24.0         | 0.1459        | 0.0000     | OK         |
| 15 minute summer  | 17      | 11          | 144.797   | 0.109     | 40.8         | 0.1462        | 0.0000     | OK         |
| 30 minute summer  | 18      | 20          | 141.738   | 0.507     | 40.7         | 0.5740        | 0.0000     | SURCHARGED |
| 180 minute summer | 19      | 132         | 140.770   | 0.232     | 18.5         | 25.8086       | 0.0000     | SURCHARGED |
| 180 minute summer | 20      | 132         | 140.770   | 0.582     | 2.9          | 0.6580        | 0.0000     | OK         |
| 15 minute summer  | 7       | 12          | 141.080   | 0.380     | 70.6         | 0.2514        | 0.0000     | SURCHARGED |
| 15 minute summer  | 21      | 11          | 143.036   | 0.200     | 42.3         | 0.5241        | 0.0000     | OK         |
| 15 minute summer  | 22      | 11          | 142.702   | 0.140     | 73.2         | 0.2843        | 0.0000     | OK         |
| 15 minute summer  | 23      | 12          | 141.074   | 0.189     | 72.6         | 0.0300        | 0.0000     | OK         |
| 15 minute summer  | 8       | 12          | 140.942   | 0.668     | 137.0        | 0.7553        | 0.0000     | SURCHARGED |
| 30 minute summer  | 24      | 20          | 145.633   | 0.521     | 12.0         | 0.2763        | 0.0000     | SURCHARGED |
| 30 minute summer  | 25      | 19          | 145.027   | 0.359     | 30.1         | 0.2747        | 0.0000     | SURCHARGED |
| 30 minute summer  | 26      | 22          | 144.000   | 0.778     | 28.9         | 0.1237        | 0.0000     | SURCHARGED |
| 60 minute summer  | 27      | 40          | 143.932   | 0.749     | 22.9         | 10.9530       | 0.0000     | OK         |
| 60 minute summer  | 28      | 40          | 143.688   | 0.042     | 4.4          | 0.0066        | 0.0000     | OK         |
| 15 minute summer  | 38      | 12          | 146.521   | 0.221     | 19.5         | 0.2937        | 0.0000     | SURCHARGED |

| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer               | 1       | 1.000        | 2       | 12.1          | 1.676          | 0.994    | 0.1361        |                    |
| 30 minute summer               | 2       | 1.001        | 3       | 24.5          | 2.415          | 0.581    | 0.2498        |                    |
| 30 minute summer               | 3       | 1.002        | 4       | 24.3          | 1.691          | 0.746    | 0.0888        |                    |
| 15 minute summer               | 4       | 1.003        | 5       | 41.2          | 2.412          | 0.949    | 0.3516        |                    |
| 15 minute summer               | 5       | 1.004        | 6       | 47.9          | 1.857          | 0.711    | 0.3088        |                    |
| 30 minute summer               | 6       | 1.005        | 7       | 58.7          | 2.732          | 0.538    | 0.9898        |                    |
| 30 minute summer               | 15      | 2.000        | 16      | 13.9          | 1.773          | 1.690    | 0.1022        |                    |
| 15 minute summer               | 16      | 2.001        | 17      | 23.9          | 1.817          | 0.751    | 0.2833        |                    |
| 15 minute summer               | 17      | 2.002        | 18      | 40.9          | 2.425          | 0.880    | 0.8058        |                    |
| 30 minute summer               | 18      | 2.003        | 19      | 37.7          | 2.140          | 1.149    | 0.3612        |                    |
| 180 minute summer              | 19      | 2.004        | 20      | 2.9           | 0.241          | 0.076    | 0.1364        |                    |
| 180 minute summer              | 19      | Infiltration |         | 3.4           |                |          |               |                    |
| 180 minute summer              | 20      | 2.005        | 7       | 0.0           | 0.000          | 0.000    | 0.0165        |                    |
| 15 minute summer               | 7       | 1.006        | 8       | 65.8          | 2.629          | 0.549    | 0.2655        |                    |
| 15 minute summer               | 21      | 3.000        | 22      | 41.4          | 1.292          | 1.049    | 1.4926        |                    |
| 15 minute summer               | 22      | 3.001        | 23      | 72.6          | 2.409          | 0.715    | 1.3400        |                    |
| 15 minute summer               | 23      | 3.002        | 8       | 72.7          | 2.405          | 0.696    | 0.1904        |                    |
| 15 minute summer               | 8       | 1.007        | 9       | 123.8         | 3.522          | 1.023    | 2.1577        |                    |
| 30 minute summer               | 24      | 4.000        | 25      | 9.9           | 1.269          | 1.172    | 0.1580        |                    |
| 30 minute summer               | 25      | 4.001        | 26      | 28.9          | 1.661          | 0.884    | 0.7620        |                    |
| 30 minute summer               | 26      | 4.002        | 27      | 25.9          | 1.472          | 2.066    | 0.1363        |                    |
| 60 minute summer               | 27      | 4.003        | 28      | 4.4           | 1.185          | 0.497    | 0.0408        |                    |
| 60 minute summer               | 27      | Infiltration |         | 6.6           |                |          |               |                    |
| 60 minute summer               | 28      | 4.004        | 29      | 4.2           | 1.398          | 0.344    | 0.0536        |                    |
| 15 minute summer               | 38      | 5.000        | 39      | 18.1          | 1.132          | 0.671    | 0.4693        |                    |

**Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute summer  | 39      | 12          | 146.262   | 0.571     | 33.3         | 0.6127        | 0.0000     | FLOOD RISK |
| 15 minute summer  | 40      | 11          | 145.175   | 0.114     | 40.3         | 0.1030        | 0.0000     | OK         |
| 15 minute summer  | 41      | 11          | 144.430   | 0.100     | 54.4         | 0.1041        | 0.0000     | OK         |
| 15 minute summer  | 29      | 10          | 143.005   | 0.130     | 71.2         | 0.1121        | 0.0000     | OK         |
| 30 minute summer  | 30      | 20          | 141.986   | 0.586     | 93.8         | 0.0932        | 0.0000     | SURCHARGED |
| 30 minute summer  | 31      | 21          | 141.608   | 0.614     | 94.4         | 4.0884        | 0.0000     | SURCHARGED |
| 60 minute summer  | 32      | 43          | 141.367   | 1.082     | 101.2        | 8.4892        | 0.0000     | SURCHARGED |
| 60 minute summer  | 33      | 43          | 141.345   | 1.152     | 97.8         | 10.1479       | 0.0000     | SURCHARGED |
| 60 minute summer  | 34      | 43          | 141.317   | 1.241     | 86.8         | 9.4887        | 0.0000     | SURCHARGED |
| 15 minute summer  | 42      | 12          | 145.576   | 0.356     | 17.6         | 0.4955        | 0.0000     | FLOOD RISK |
| 15 minute summer  | 43      | 12          | 145.414   | 0.376     | 46.7         | 0.7426        | 0.0000     | SURCHARGED |
| 15 minute summer  | 44      | 9           | 143.311   | 0.154     | 80.2         | 0.4090        | 0.0000     | OK         |
| 15 minute summer  | 45      | 11          | 142.540   | 0.145     | 79.3         | 0.0230        | 0.0000     | OK         |
| 60 minute summer  | 35      | 43          | 141.292   | 1.326     | 141.6        | 8.9435        | 0.0000     | SURCHARGED |
| 60 minute summer  | 36      | 43          | 141.241   | 1.706     | 130.0        | 42.5246       | 0.0000     | FLOOD RISK |
| 60 minute summer  | 37      | 43          | 141.143   | 1.991     | 59.1         | 27.7651       | 0.0000     | FLOOD RISK |
| 240 minute summer | 9       | 184         | 137.954   | 0.666     | 70.0         | 0.7538        | 0.0000     | SURCHARGED |
| 360 minute summer | 10      | 248         | 137.931   | 1.390     | 58.3         | 137.1316      | 0.0000     | SURCHARGED |

| Link Event (Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|-----------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute summer            | 39      | 5.001        | 40      | 28.7          | 1.693          | 1.198    | 0.5556        |                    |
| 15 minute summer            | 40      | 5.002        | 41      | 40.3          | 2.173          | 0.463    | 0.4885        |                    |
| 15 minute summer            | 41      | 5.003        | 29      | 54.4          | 2.764          | 0.399    | 0.4295        |                    |
| 15 minute summer            | 29      | 4.005        | 30      | 71.2          | 2.965          | 0.593    | 0.8236        |                    |
| 30 minute summer            | 30      | 4.006        | 31      | 86.3          | 2.358          | 0.891    | 0.4686        |                    |
| 30 minute summer            | 31      | 4.007        | 32      | 80.4          | 2.173          | 0.800    | 0.6814        |                    |
| 30 minute summer            | 31      | Infiltration |         | 0.9           |                |          |               |                    |
| 60 minute summer            | 32      | 4.008        | 33      | 85.0          | 1.207          | 1.086    | 1.2832        |                    |
| 60 minute summer            | 32      | Infiltration |         | 1.3           |                |          |               |                    |
| 60 minute summer            | 33      | 4.009        | 34      | 81.1          | 1.164          | 1.037    | 1.6511        |                    |
| 60 minute summer            | 33      | Infiltration |         | 1.6           |                |          |               |                    |
| 60 minute summer            | 34      | 4.010        | 35      | 78.5          | 1.199          | 1.002    | 1.5487        |                    |
| 60 minute summer            | 34      | Infiltration |         | 2.6           |                |          |               |                    |
| 15 minute summer            | 42      | 6.000        | 43      | 16.0          | 0.986          | 0.911    | 0.3291        |                    |
| 15 minute summer            | 43      | 6.001        | 44      | 43.5          | 2.570          | 1.027    | 0.5747        |                    |
| 15 minute summer            | 44      | 6.002        | 45      | 79.3          | 2.842          | 0.694    | 0.4439        |                    |
| 15 minute summer            | 45      | 6.003        | 35      | 78.8          | 3.172          | 0.603    | 0.2904        |                    |
| 60 minute summer            | 35      | 4.011        | 36      | 128.6         | 1.946          | 0.799    | 1.4556        |                    |
| 60 minute summer            | 35      | Infiltration |         | 2.5           |                |          |               |                    |
| 60 minute summer            | 36      | 4.012        | 37      | 59.1          | 1.010          | 0.755    | 5.4060        |                    |
| 60 minute summer            | 36      | Infiltration |         | 10.3          |                |          |               |                    |
| 60 minute summer            | 37      | Orifice      | 9       | 29.1          |                |          |               |                    |
| 60 minute summer            | 37      | Infiltration |         | 8.2           |                |          |               |                    |
| 240 minute summer           | 9       | 1.008        | 10      | 69.7          | 1.626          | 0.424    | 2.4160        |                    |
| 360 minute summer           | 10      | Orifice      | 11      | 9.6           |                |          |               |                    |

**Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 98.75%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 240 minute summer | 11      | 188         | 134.375   | 0.053     | 9.6          | 0.0595        | 0.0000     | OK         |
| 240 minute summer | 12      | 188         | 131.648   | 0.060     | 9.6          | 0.0095        | 0.0000     | OK         |
| 240 minute summer | 13      | 188         | 129.713   | 0.104     | 9.6          | 0.0165        | 0.0000     | OK         |
| 240 minute summer | 14      | 188         | 129.624   | 0.091     | 9.6          | 0.0000        | 0.0000     | OK         |
| 15 minute summer  | 46      | 10          | 144.895   | 0.103     | 10.9         | 0.1606        | 0.0000     | OK         |
| 15 minute summer  | 47      | 11          | 145.702   | 0.077     | 20.4         | 1.3909        | 0.0000     | OK         |
| 30 minute summer  | 48      | 19          | 143.879   | 0.104     | 26.2         | 1.7491        | 0.0000     | OK         |
| 30 minute summer  | 49      | 20          | 142.617   | 0.092     | 23.6         | 0.5517        | 0.0000     | OK         |
| 30 minute summer  | 50      | 21          | 142.276   | 0.354     | 29.6         | 2.0866        | 0.0000     | SURCHARGED |
| 15 minute summer  | 51      | 11          | 145.026   | 0.050     | 12.8         | 0.7307        | 0.0000     | OK         |
| 30 minute summer  | 52      | 20          | 142.435   | 0.129     | 15.0         | 1.0640        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link         | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|--------------|---------|---------------|----------------|----------|---------------|--------------------|
| 360 minute summer              | 10      | Infiltration |         | 15.4          |                |          |               |                    |
| 240 minute summer              | 11      | 1.010        | 12      | 9.6           | 1.603          | 0.263    | 0.3918        |                    |
| 240 minute summer              | 12      | 1.011        | 13      | 9.6           | 1.047          | 0.335    | 0.7412        |                    |
| 240 minute summer              | 13      | 1.012        | 14      | 9.6           | 0.797          | 0.770    | 0.1827        | 73.5               |
| 15 minute summer               | 46      | 7.000        | 17      | 10.7          | 0.817          | 0.743    | 0.2059        |                    |
| 15 minute summer               | 47      | 8.000        | 48      | 18.2          | 1.735          | 0.521    | 0.5305        |                    |
| 15 minute summer               | 47      | Infiltration |         | 1.3           |                |          |               |                    |
| 30 minute summer               | 48      | 8.001        | 49      | 23.6          | 1.960          | 0.799    | 0.5494        |                    |
| 30 minute summer               | 48      | Infiltration |         | 1.2           |                |          |               |                    |
| 30 minute summer               | 49      | 8.002        | 50      | 22.4          | 1.409          | 0.666    | 0.2446        |                    |
| 30 minute summer               | 49      | Infiltration |         | 0.4           |                |          |               |                    |
| 30 minute summer               | 50      | 8.003        | 30      | 26.1          | 1.653          | 0.805    | 0.2753        |                    |
| 30 minute summer               | 50      | Infiltration |         | 0.6           |                |          |               |                    |
| 15 minute summer               | 51      | 9.000        | 52      | 11.4          | 1.342          | 0.243    | 0.4048        |                    |
| 15 minute summer               | 51      | Infiltration |         | 1.0           |                |          |               |                    |
| 30 minute summer               | 52      | 9.001        | 6       | 12.7          | 0.860          | 1.017    | 0.3478        |                    |
| 30 minute summer               | 52      | Infiltration |         | 0.6           |                |          |               |                    |