MALONE O'REGAN
CONSULTING ENGINEERS

PROPOSED PART 8 RESIDENTIAL DEVELOPMENT
KISHOGE, LUCAN.

ENGINEERING REPORT

DUBLIN CITY COUNCIL

May 2024

Job: 23006

Contents Amendment Record

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MALONE O'REGAN

Title: **Proposed Part 8 Residential Development – Kishoge, Lucan Engineering Report / South Dublin County Council**

Job Number: **23006**

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1 INTRODUCTION

1.1 Introduction

This report is prepared in support of the planning application for National Development Finance Agency for the proposed development of new social housing on a greenfield site at Clonburris South County Dublin. The new residential development consists of a mix of one-to-two-bedroom apartments in separate blocks, one/three-bedroom duplex housing units and three-to-four-bedroom housing units. New roads, parking bays and amenity spaces are also detailed for planning on a site of 2.31 hectares.

The purpose of this document is to describe the engineering proposals associated with the new development. These proposals are indicated on the drawings prepared by Malone O'Regan which accompany the planning submission. Where reference is made to drawings and drawing numbers within this report these should be taken as meaning those drawings produced by Malone O'Regan unless specifically stated otherwise.

1.2 Site Description

The location of the proposed development is illustrated in Figure 1.1 below. The site is situated in a greenfield site near R136 and Thomas Omer Way, Clondalkin South County Dublin. The site borders a two storey residential development at Lynch's Park to the east, two community colleges to the north, a greenfield site to the west and the Adamstown to Parkwest/Cherry Orchard railway line to the south. The proximity of the site to natural watercourses is outlined in Figure 1.2 below.

Figure 1.1 – Site location

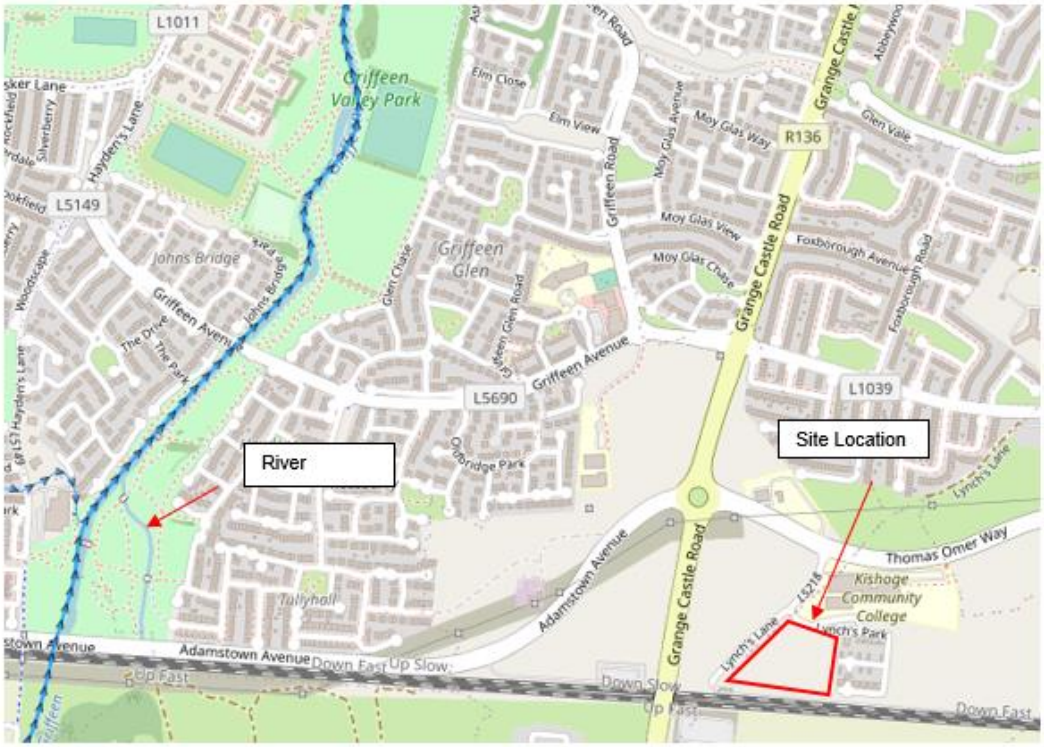


Figure 1.2 – Surrounding Watercourse (Extract from the EPA Maps)

2 SURFACE WATER DRAINAGE DESIGN

2.1 Introduction

This chapter follows the guidelines set out in Greater Dublin Strategic Drainage Study (GDSDS) and the CIRIA 2015 SuDS Manual.

The aim of any SuDS strategy is to ensure that a new development does not negatively affect surrounding watercourse systems, existing surface water networks and groundwater systems. This SuDS strategy will achieve these aims by using a variety of SuDS measures within the site. These measures include water interception, treatment, infiltration and attenuation.

The SuDS strategy will be developed with the following steps:

1. The existing greenfield run-off of the development site will be calculated and used as the minimum benchmark for the SuDS design. This run-off calculation is based on the drained area of the new development. The post development run-off will not exceed the greenfield run-off.
2. A set of SuDS measures will be chosen based on their applicability and usage for the site.
3. A “FLOW” model will be created to analyse the rainfall on the site and the effectiveness of the proposed SuDS measures.
4. If effective, these SuDS measures will be incorporated into the proposed design.

Table 2.1 outlines the parameters adopted in the design of the surface water drainage infrastructure.

Parameter Description	Assigned Value
Surface Water Drainage Pipework Design Return Period	2 years (Ref IS EN 752 Table 2 for 'Residential areas')
Attenuation Design Return Period	100 years
Allowance for climate change	20% (Ref. OPW Flood Risk Management Climate Change Sectoral Adaptation Plan, High-End Future Scenario)
M5-60	16.7mm (Met Eireann data)
M5-2D	60.8mm (Met Eireann data)
Ratio, r	0.27
Time of Entry	4 min
Pipe roughness, Ks	0.6mm (Ref. GDSDS Volume 2, Table 6.4)
Minimum velocity	1.0 m/s (Ref. GDSDS Volume 2, Table 6.4)

Table 2.1 Surface Water Design Parameters

2.2 Existing Services

An existing network of drainage runs along Thomas Omer Way road to the north of the site. These underground sewers carry surface water runoff towards existing catchment areas in the south-west Dublin area. Due to the relative levels of the existing drainage within the road and the proposed site levels, it is not possible to achieve a gravity connection to the surface water drainage pipework as installed. There is a new South Dublin County Council infrastructure project for the area called Clonburris Infrastructure Ltd. This project will design a new link road to the north of the site with associated surface water sewers leading to attenuation area number 5.

2.3 Surface water Management Strategy

The Clonburris Strategic Development Zone (SDZ) Surface Water Management Plan outlines the attenuation strategy for the wider area. This strategy is detailed on DBFL drawing number 190113-DBFL-SW-ST-DR-C-1101 Revision P04, included in Appendix E. The subject site is located within Catchment 2A. Surface water drainage pipework will be provided within the new distributor road to the north of the site, conveying unattenuated surface water runoff to a large attenuation zone on the western side of the R136. The DBFL drawing indicates this attenuation zone as an open pond; however, discussions with DBFL suggest this may now involve a large buried attenuation tank.

The DBFL drawing identifies a portion of the site as an “Urban Centre”. The Clonburris SDZ Surface Water Management Plan requires that Urban Centres and educational sites have on-site attenuation and flow controls. Consequently, on-site attenuation for the apartment building in the southwest corner of the site will be provided via an open detention basin with a Hydrobrake flow control device on the outlet pipework. Additionally, although not expressly required by the SDZ Surface Water Management Plan, further on-site attenuation will be achieved through the installation of blue roofs above all apartment blocks and duplexes.

2.4 Proposed Services

The proposed surface water drainage system is designed to comply with the ‘Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Technical Document – Volume 2, New Developments, 2005’ and the ‘Greater Dublin Regional Code of Practice for Drainage Works, V6.0 2005’. CIRIA Design Manuals C753, C697 and C609 have also been used to design the surface water drainage system within the site.

The proposed surface water drainage layout for the development is indicated on Malone O’Regan drawings SHB4-CSD-DR-MOR-CS-P1-130, 150 and 151. Surface water runoff from new internal road surfaces, footpaths, other areas of hardstanding and the roofs of buildings will be collected within a gravity drainage network and directed towards an attenuation storage system. The attenuation storage is sized to cater for a 1 in 100-year storm event. The catchment area is 2A and is running towards attenuation No.05.

The outfall from each attenuation pond will be restricted to the applicable ‘greenfield’ runoff rate using a Hydrobrake flow control device.

A number of sustainable drainage systems (SuDS) are proposed in order to minimise the volume and rate of runoff from the site. Further details on these SuDS measures are provided in Section 2.5.

All surface water drainage will be designed and installed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.

The runoff coefficients used in the calculations are as outlined in the table 2.2 below.

Type of Areas	CV
Landscaping (Grass / Soft)	0.2
Intensive Green Roof	0.834
Extensive Green Roof	0.917
Blue Roof	0.917
Permeable Paving	0.5
Impermeable Surface (Incl. tree pits)	0.9
Standard Roof (Impermeable)	0.95

Table 2.2: Runoff Coefficients

Calculations for the Surface Water Pipe Network are provided in Appendix C.

For the purposes of surface water attenuation design, the site is dealt with as two catchments as shown in Figure 2.1 and will drain to attenuation area no.5 via new sewers. A breakdown of the impermeable areas contributing to the surface water drainage network in each catchment with applied runoff coefficients is provided in Table 2.3 below. The site drains to two detention basins.

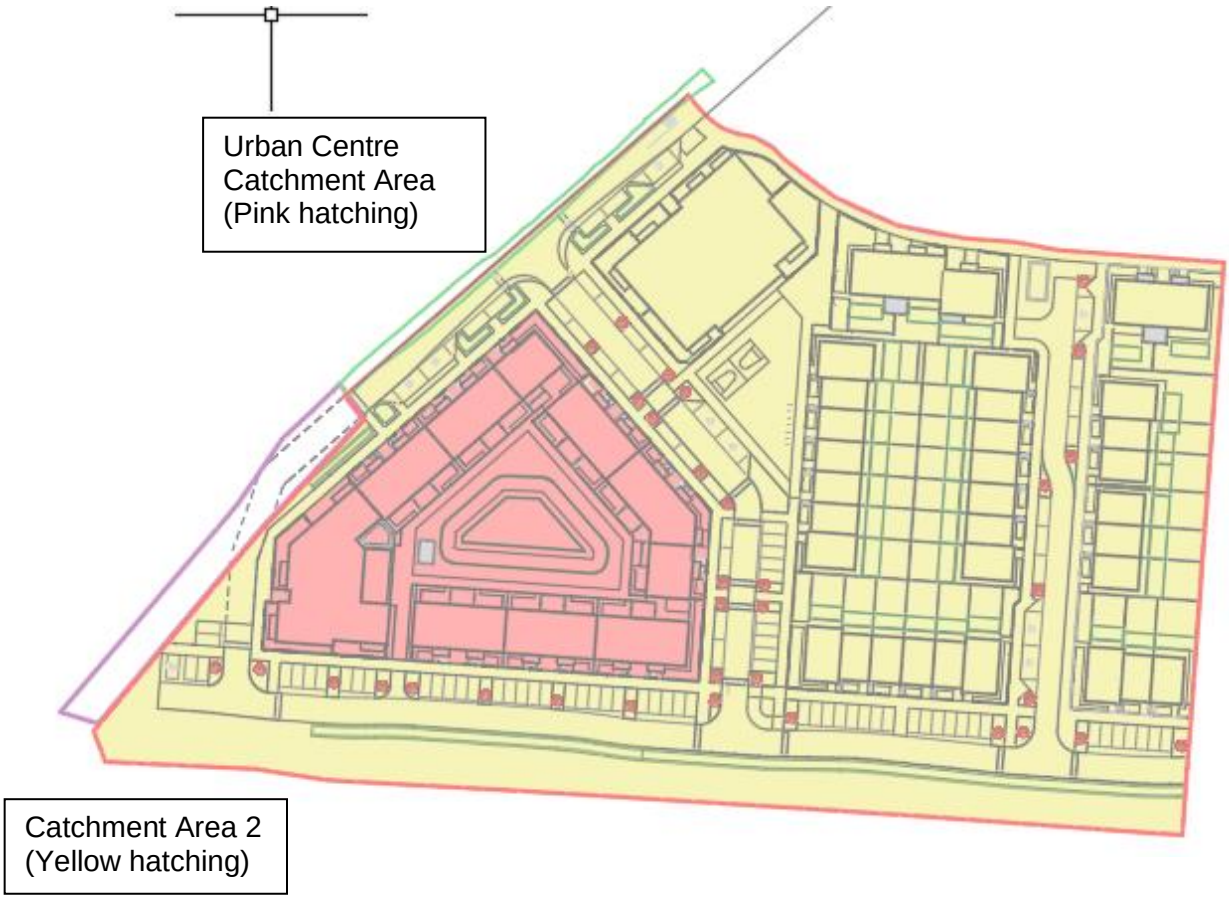


Figure 2.1 – Surface Water Drainage Catchment Area

2.5 Permissible Runoff

The regression equation recommended for use by the Greater Dublin Strategic Drainage Study 2005 calculates a value, $QBAR_{rural}$, which is sourced from the Institute of Hydrology Report 124. This value is the mean annual flood flow from a rural catchment in m^3/s and is given by the equation,

$$QBAR_{rural} = 0.00108[Area^{0.89}] \times [SAAR^{1.17}] \times [Soil^{2.17}]$$

Where:

$QBAR_{rural}$	Mean annual flood flow from a rural catchment in m^3/s
Area	Area of the catchment in km^2

SAAR	Standard Average Annual Rainfall in mm.
Soil	Soil index

For catchments smaller than 50 hectares, $QBAR_{rural}$ is first calculated assuming an area of 50ha and then $QBAR_{rural}$ for the site area is calculated on a pro rata basis.

Standard Average Annual Rainfall for the site in Clonburris was taken from the Flood Studies Report as 978mm.

The Soil Type was taken from the Flood Studies Report as Soil Type 2 which has a corresponding Standard Percentage Runoff (SPR) coefficient of 0.3. Soil Type 2 is typically described as very permeable soil such as sand or gravel with low runoff potential.

In June and July 2022, Ground Investigations Ireland completed a comprehensive programme of site investigations for the site. These investigations showed that ground conditions varied considerably across the site. Generally, cohesive deposits were identified at shallower depths which were described as brown or brown mottled grey sandy gravelly clay with occasional cobbles and boulders. The presence of secondary sand and gravel constituents varied across the site. Peat lenses were also noted at shallow depths in some test locations. 3 no. infiltration tests were conducted across the site. The results of these tests varied significantly which would be expected given the non-uniform nature of the ground conditions. Infiltration rates of f=6.237 x 10-5 m/s and 2.600 x 10-4 m/s were calculated at 2 no. soakaway locations but, at the other test location, the water level dropped too slowly to allow calculation of the soil infiltration rate. The report prepared by Ground Investigations Ireland concludes that the site is not suitable for soakaway design. The ground investigations reveal that the soils would be closer to Soil Type 3 (with corresponding SPR of 0.37) however runoff calculations have been based on a more conservative SPR value of 0.3 (Soil Type 2).

When this equation is applied to the proposed development, the following value for $QBAR_{rural}$ is obtained.

For 50ha area $QBAR_{rural} = 0.00108\,[0.5]^{0.89} \times [978]^{1.17} \times [0.3]^{2.17}$

$= 0.135\ m^3/s$

$= 135.0\ l/s$ (for 50ha)

$QBAR_{rural,Uban\ Centre}$ = 1.235l/s (for 0.46ha)

$QBAR_{rural,Area\ 2}$ = 5.008l/s (for 1.86ha)

Total Area sq.m	Type of Surface		Area sq.m	Run-off Coefficient	Equivalent Impermeable	Urban Creep Allowance	Overall Impermeable Area
4584	Roof - Standard duplex (Note 1)		0.00	0.50	0.0	0.0	1756.54
	Roof - Apartments	Standard - 25%	475.00	0.95	451.3	496.4	
		Green/ Blue Roof - 75%		0.92	0.0		
	Permeable Paving inc. areas from hardstanding		830.00	0.50	415.0	456.5	
ha	Landscaped Areas inc. areas from hardstanding		1340.00	0.20	268.0	294.8	ha
0.46	Hardstanding		514.00	0.90	462.6	508.9	0.18

Table 2.3 Breakdown of Impermeable Areas for Urban Centre

Total Area sq.m	Type of Surface		Area sq.m	Run-off Coefficient	Equivalent Impermeable	Urban Creep Allowance	Overall Impermeable Area
4584	Roof - Standard duplex			0.50	0.0	0.0	1437.40
	Roof - Apartments	Standard - 25%		0.95	0.0	0.0	
		Green/ Blue Roof - 75%	1425.00	0.92	1306.7	1437.4	
	Permeable Paving inc. areas from hardstanding			0.50	0.0	0.0	
ha	Landscaped Areas inc. areas from hardstanding			0.20	0.0	0.0	ha
0.46	Hardstanding			0.90	0.0	0.0	0.14

Table 2.4 Breakdown of Impermeable Areas for Urban Centre– Blue/ Green Roof

Total Area sq.m	Type of Surface		Area sq.m	Run-off Coefficient	Equivalent Impermeable	Urban Creep Allowance	Overall Impermeable Area
18580	Roof - Standard duplex (Note 1)		1936.00	0.50	968.0	1064.8	9543.45
	Roof - Apartments	Standard - 25%	313.75	0.95	298.1	327.9	
		Green/ Blue Roof - 75%		0.92	0.0		
	Permeable Paving inc. areas from hardstanding		2834.00	0.50	1417.0	1558.7	
ha	Landscaped Areas inc. areas from hardstanding		7581.00	0.20	1516.2	1667.8	ha
1.86	Hardstanding		4974.00	0.90	4476.6	4924.3	0.95

Table 2.5 Breakdown of Impermeable Areas for Area 2

Total Area sq.m	Type of Surface		Area sq.m	Run-off Coefficient	Equivalent Impermeable	Urban Creep Allowance	Overall Impermeable Area
18580	Roof - Standard duplex			0.50	0.0	0.0	949.44
	Roof - Apartments	Standard - 25%		0.95	0.0	0.0	
		Green/ Blue Roof - 75%	941.25	0.92	863.1	949.4	
	Permeable Paving inc. areas from hardstanding			0.50	0.0	0.0	
ha	Landscaped Areas inc. areas from hardstanding			0.20	0.0	0.0	ha
1.86							0.09
	Hardstanding			0.90	0.0	0.0	

Table 2.6 Breakdown of Impermeable Areas for Area 2– Blue/ Green Roof

2.6 Sustainable Drainage Systems (SuDS)

The proposed development will be designed in accordance with the principles of Sustainable Drainage Systems (SuDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS) and will significantly reduce run-off rates and improve storm water quality discharging to the public storm water system. The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of drainage criteria which aim to minimize the impact of urbanization by replicating the run-off characteristics of the greenfield site. The criteria provide a consistent approach to addressing the increase in both rate and volume of run-off, as well as ensuring the environment is protected from any pollution from roads and buildings. These drainage design criteria are as follows:

- Criterion 1 – River Water Quality Protection
- Criterion 2 – River Regime Protection
- Criterion 3 – Flood Risk Assessment
- Criterion 4 – River Flood Protection

The requirements of SuDS are typically addressed by provision of the following:

- Interception storage
- Treatment storage (commonly addressed in interception storage)
- Attenuation storage
- Long term storage (not applicable if growth factors are not applied to Qbar when designing attenuation storage)

2.6.1 Compliance with the principles of the CIRIA C753 SuDS Manual

The C753 SuDS Manual explains that the primary function of SuDS measures is to protect watercourses from any impact due to the new development. However, SuDS can also improve the quality of life in a new development and urban spaces by making them more vibrant, visually attractive, sustainable and more resilient to change. This document explains the wider social context of SuDS and how SuDS can deliver high quality drainage while supporting urban areas to cope better with sever rainfall both in present and future.

There are four main categories of benefits that can be achieved by SuDS:
1. Water Quantity (mitigate flood risk & protect natural water cycle)
2. Water Quality (manage the quality of the runoff to prevent pollution)
3. Amenity (create and sustain better places for people)
4. Biodiversity (create and sustain better places for nature)

Table 2.7 includes a list of all current SuDS measures which would typically be considered when designing a new residential development such as that which is now proposed. This table also outlines the rationale behind the selection of SuDS measures and why other measures would not be appropriate. The runoff generated from the catchment will be attenuated in storage systems within and below ground and in the blue/green roof attenuation systems. The proposed attenuation systems are explained in section 2.5. A wide range of SuDS measures are proposed across the site to maximise interception and treatment.

SUDS Measure	Measure Adopted?	Rationale for Selecting / Not Selecting Measure
Bioretention Swales *Shallow landscaped depressions that serve to reduce runoff rates / volumes as well as providing interception storage, treatment of runoff and encouraging biodiversity*	Yes	Bioretention swales are proposed in areas beside roads and green spaces within the site.
Tree pits *Attenuate surface water runoff by utilising voids within the root zone*	Yes	Tree pits have been specified in suitable areas beside the development roads and car parking.
Green Roofs *Vegetated roofs used to reduce the rate and volume of runoff as well as encouraging biodiversity*	Yes	It is proposed to provide green roofs for flat roofs above apartment and duplex buildings.
Blue Roofs *Provide attenuation storage, reducing requirement for storage elsewhere on site*	Yes	It is proposed to provide blue roofs in areas where the building structure is appropriate to support such roofs. Refer to 'Green Roofs' above.
Green Living Walls *Planted walls which improve air quality and encourage biodiversity*	No	Green walls are not considered appropriate given the proposed residential building use.
Rain Gardens *Localised depressions in the ground that collect runoff from hard surfaces and allow infiltration and absorption*	Yes	The proposed residential development aims to provide rain gardens along planting strips.
Rainwater harvesting *Runoff captured from roofs is reused for non-potable purposes, thereby reducing overall runoff volume.*	Yes	In the case of the proposed residential development, it is considered viable to gather the water for grey water use. Refer to M&E details.
Permeable paving *Allows runoff to percolate into the subsoil, reducing overall runoff volume*	Yes	Permeable paving is proposed within the development in homezones, driveways and car parking spaces.

Porous asphalt *Allows runoff to percolate into the subsoil, reducing overall runoff volume*	No	Porous asphalt is not considered suitable for use in roads within the development as it does not comply with the Local Authority roads standards.
Integrated Constructed Wetlands (ICWs) *System of shallow ponds, planted to treat water, removing nutrients and harmful impurities*	No	ICWs are not considered appropriate due to the limited space available.

Table 2.7 Proposed SuDS Features

Further details of the principal SuDS features proposed for this development are provided in the following sections.

2.6.2 Bioretention Swales

It is proposed to provide a number of discrete, shallow landscaped areas, adjacent to the access roads in the site where feasible. Runoff from the roads will be directed towards these bioretention swales and will be able to run directly into them via short cut-out sections within the road kerbs. Refer to the details on drawing SHB5-CSD-DR-MOR-CS-P1-130, 150 and 151. These features will provide a level of storage to attenuate the runoff flows and also permit settlement of coarse silts. As described in Section 2.3 above, the permeability of the underlying soils varies across the site. However, it is anticipated that runoff from minor rainfall events will be able to percolate directly into the soil. An overflow from the swales will be provided. This will take the form of a manhole with an open-grated access cover. During larger storm events, the water in the bioretention areas will be able to overflow through the grated access cover and will then drain towards the attenuation system.

The bioretention swales will be planted in order to promote settlement of silt particles. Runoff will also be treated through the adsorption of particles by vegetation or by soil, and by biological activity. Swales can reduce the runoff rates and volumes of surface water. They are very effective in delivering interception and treatment storage.

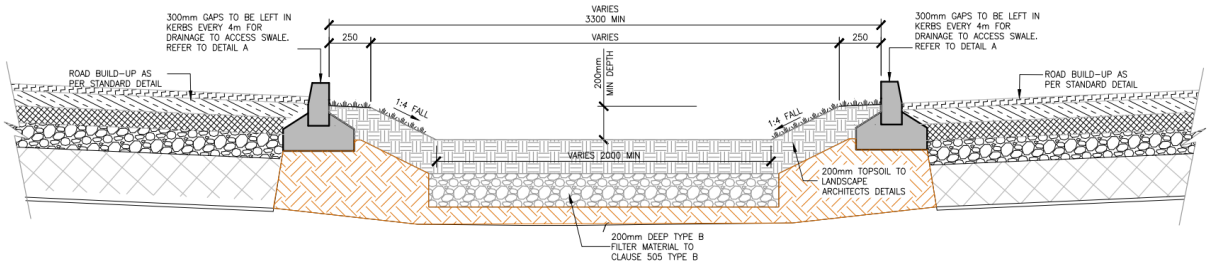


Figure 2.2 – Bio-Retention Area Detail

2.6.3 Tree Pit

It is proposed to provide a number of tree pits adjacent to car parking and footpaths where feasible within the development. Runoff from the roads and footpaths will be directed towards these tree pits. Refer to the details on drawings SHB4-CSD-DR-MOR-CS-P1-150 and 151.

These features will provide a level of storage to attenuate the runoff flows. It is anticipated that runoff from minor rainfall events will be able to percolate directly into the soil. An overflow from the tree pits will be provided. During larger storm events, the water in the bioretention areas will be able to overflow and drain towards the attenuation system.

The bioretention areas will be planted in order to promote biodiversity. Runoff will also be treated through the adsorption of particles by vegetation or by soil, and by biological activity. Tree pits can reduce the runoff rates and volumes of surface water although the area contributing is small. They are effective in delivering interception and treatment storage.

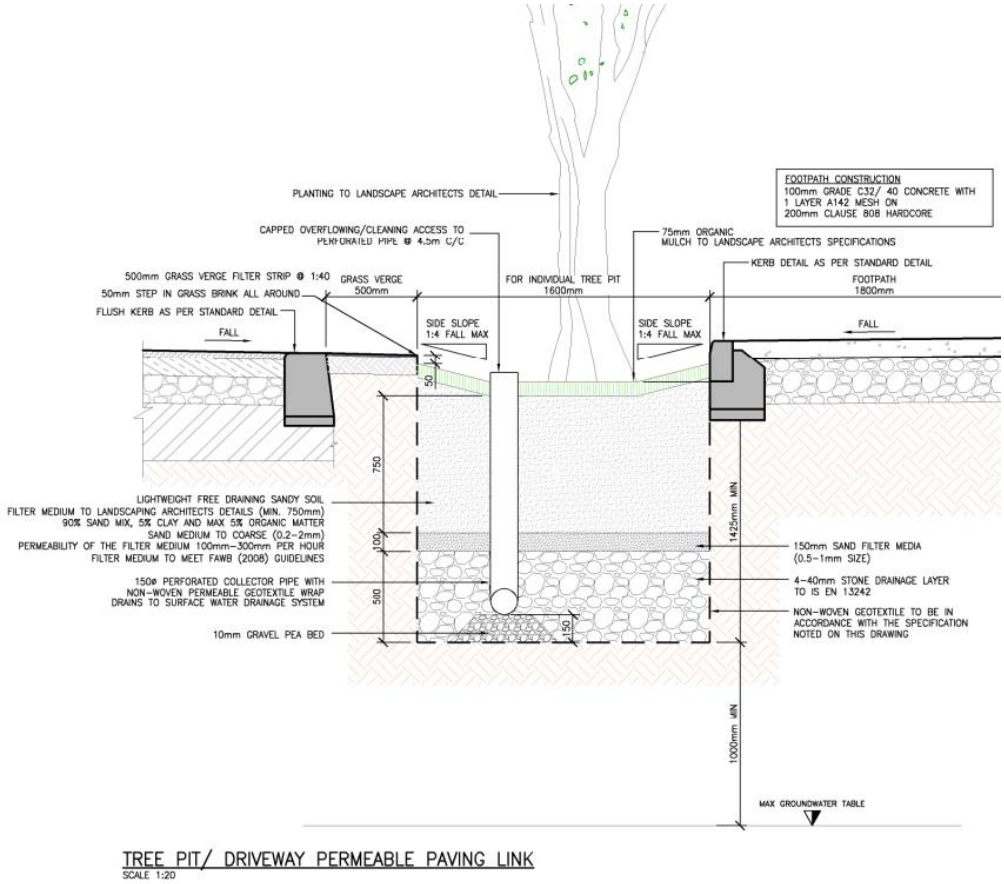


Figure 2.7 – Tree Pit

2.6.4 Green Roofs

2.6.5 Intensive Green/ Blue Roofs

Green roofs provide ecological, aesthetic and amenity benefits and intercept and retain rainfall, at source, reducing the volume of runoff and attenuating peak flows. Details from the suppliers of green roof systems indicate that they will typically provide interception storage of 38 litres per square metre of roof covering.

Green roofs absorb most of the rainfall that they receive during normal rainfall events and treat surface water through removal of atmospherically deposited urban pollutants. They also reduce building heating requirements (by adding mass and thermal resistance value) and cooling requirements (by evaporative cooling). Intensive green roofs typically have a growing medium of 200mm allowing for a wider array of planting possibilities than extensive (sedum) green roof coverings.

The green roofs will be underlaid by a storage medium so that they also perform as blue roofs, capable of attenuating rainwater. The proposed green / blue roofs will provide initial storage of rainwater, while also reducing the rate at which rainwater from heavier rainfall events discharges to the attenuation systems. Flow restrictor outlets will be provided to control the rate of runoff from the roof.

It is proposed to provide green/blue roofs over at least 50% of the total roof area with a further 25% as blue roof only in accordance with the Dublin City Council Green & Blue Roof Guidelines 2021. Roof structures will be designed to cater for the additional loads associated with the blue roof storage layer and the overlying green roof build-up. Details of the proposed green / blue roof build-up are provided on Malone O'Regan drawing no. SHB4-FLD-DR-MOR- CS-P1-150, an extract from which is provided below.

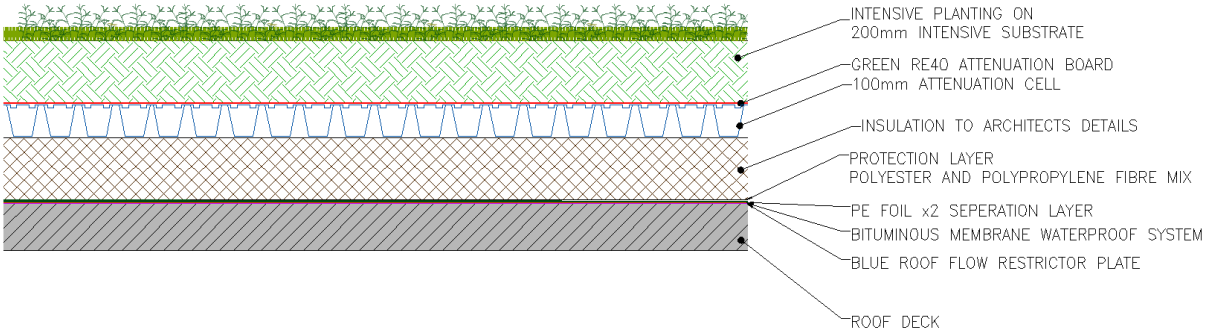


Figure 2.3 – Typical Intensive Green/ Blue Roof Landscaping

2.6.5.1 Blue Roofs

Blue roofs will be installed above the apartment flat roof buildings. These roofs will provide initial storage of rainwater, while also reducing the rate at which rainwater from heavier rainfall events discharges to the attenuation systems. They can also help to filter the run-off, removing pollutants and resulting in a higher quality of water discharging into the drainage system and receiving watercourse.

However, it is important to note that a blue roof allows for water storage on the roof in a void which sits above the waterproofing layer and beneath a surface finish such as vegetated green roof or hard landscaping. Flow restrictor outlets are critical to the good working of the roof system. Maintenance requirements are higher for blue roofs to ensure all outlets remain free from debris, silt, leaves etc.

As noted above it is proposed to install green/blue roofs over at least 50% of the total roof area with a further 25% as blue roof only.

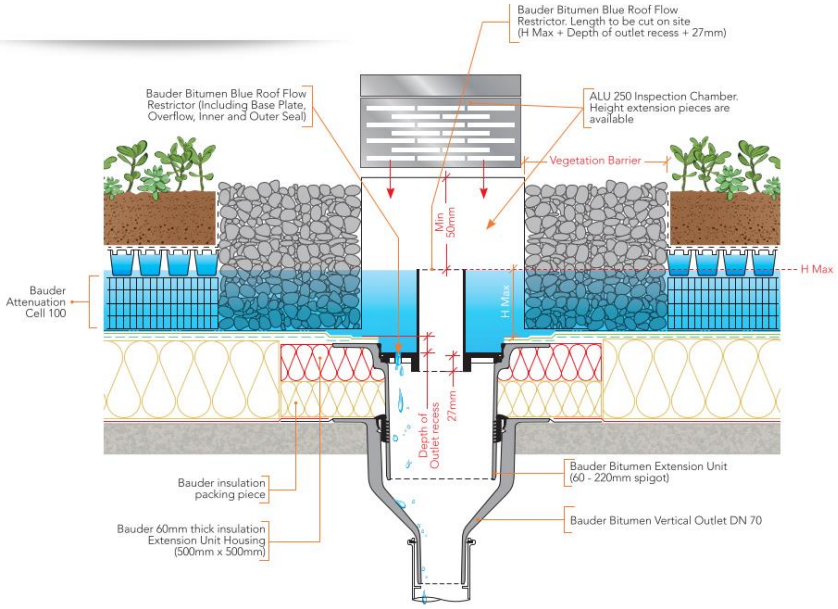
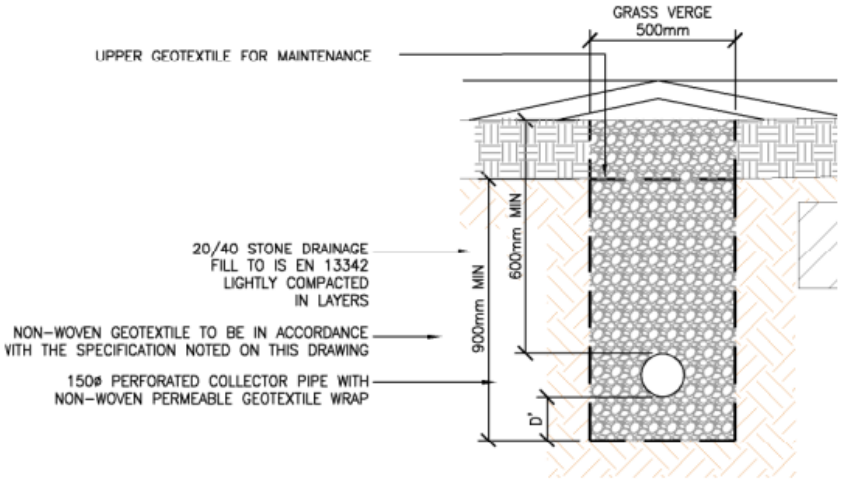


Figure 2.6 – Blue Roof

2.6.6 Rain Garden / Bioretention Area

It is proposed to provide a number of discrete, shallow landscaped areas in rear gardens of the housing units. Runoff from the roofs will be directed towards these bioretention gardens. Refer to the details on drawing SHB5-CSD-DR-MOR-CS-P1-130, 150 and 151. These features will provide a level of storage to attenuate the runoff flows. It is anticipated that runoff from minor rainfall events will be able to percolate directly into the soil. An overflow from the rain gardens will be provided. During larger storm events, the water in the bioretention areas will be able to overflow and drain towards the attenuation system.

The bioretention areas will be planted in order to promote biodiversity. Runoff will also be treated through the adsorption of particles by vegetation or by soil, and by biological activity. Rain gardens can reduce the runoff rates and volumes of surface water. They are very effective in delivering interception and treatment storage.



TYPICAL SECTION THROUGH RAIN GARDEN/BIO-RETENTION AREA
SCALE 1:20

Figure 2.7 – Rain Garden

2.6.7 Permeable Paving

It is proposed to use permeable paving to surface the parking spaces *and driveways* in the development. It is anticipated that most of the rainwater will be able to percolate through the permeable paving and infiltrate into the underlying soils. However, it is proposed to provide a number of overflow outlets within the permeable paving build-up which will ensure the parking area is not flooded during severe rainfall events. The outlet from the permeable paving areas will be raised 100-150mm above formation level to provide interception storage within the stone sub-base; this gives 30mm interception storage @ 30% voids in the gravel.

These permeable surfaces, together with their associated substructures, are an efficient means of managing surface water runoff close to source – intercepting runoff, reducing the volume and frequency of runoff, and providing treatment medium. Refer to the Malone O'Regan SuDS detail drawing no. SHB4-CSD-DR-MOR-CS-P1-151 for typical permeable paving details.

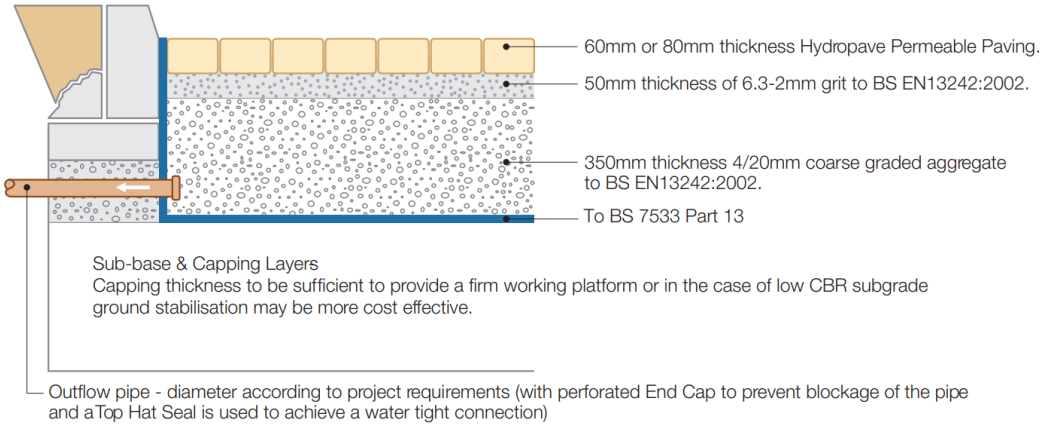


Figure 2.3 – Typical Section Through Permeable Paving in Parking Spaces

2.7 Interception Storage

To prevent pollutants or sediments discharging into watercourses the GDSDS requires "interception storage" to be incorporated into the drainage design for the development. The volume of interception required is based on 5-10mm of rainfall depth from 80% of the runoff from impermeable areas as defined in GDSDS. The interception volume attributable to each SuDS feature consists of the volume of water that can infiltrate to the ground, the quantity that evaporates into the atmosphere and the volume lost through transpiration in plants and vegetation. Additionally, there will be some loses of water due to absorption and wetting of stone and soil media.

Calculations for the interception storage systems are provided in Appendix B.

2.7.1 Urban Centre

The total equivalent impermeable area for Urban Centre Area is 1756.50m^2 including 10% allowance for urban creep (refer to Table 2.3).

Therefore, the total interception storage required =1756.50 x 0.8 x 0.005 x 1.2 **= 8.43m^3**.

Permeable Paving	Area	830.0	m²
	Stone Layer 100mm deep	0.1	m
	Void Ratio	30%	
	Storage Volume	24.90	m³

Swale	Area	0.0	m²
	*75mm	0.075	m
	Storage Volume	0.00	m³

Bio-Retention Area/ Raingarden inc. bio-retentiona areas from private house gardens	Area	1340.0	m²
	Depth of Subgrade	0.1	m
	Storage Volume	134	m³

The total interception volume provided for the Urban Centre Area is **158.90m³** which exceeds the required volume calculated of 8.43m3.

Green/Blue Roofs

The total equivalent impermeable area for Urban Centre Area Blue/Green Roof is 1437.4m² including 10% allowance for urban creep (refer to Table 2.4).

Therefore, the total interception storage required =1437.4 x 0.8 x 0.005 x 1.2 **= 6.90m³**.

A "Bauder Sedum Blanket" or equivalent designed to retain 30 litres/m2 of rainwater will be used on roof level of both blocks where only maintenance access is provided.

Green Roof A 'Bauder Sedume' or equivalent design to retain 30 l/m² of rainwater will be used on roof level	Area	1425.0	m²
	Interception Store 30 l/m²	0.03	l/m²
	Storage Volume	42.75	m³

The total interception volume provided for the Blue/Green Roof is **42.75m³** which exceeds the required volume calculated of 6.90m3.

2.7.2 Area 2

The total equivalent impermeable area for Area 2 is 9543.40m² including 10% allowance for urban creep (refer to Table 2.5).

Therefore, the total interception storage required =9543.40 x 0.8 x 0.005 x 1.2 **= 45.81m³**.

Permeable Paving	Area	2834.0	m²
	Stone Layer 100mm deep	0.1	m
	Void Ratio	30%	
	Storage Volume	85.02	m³

Swale	Area	492.0	m²
	*75mm	0.075	m
	Storage Volume	36.90	m³

Bio-Retention Area/ Raingarden inc. bio-retentiona areas from private house gardens	Area	1645.0	m²
	Depth of Subgrade	0.1	m
	Storage Volume	164.5	m³

The total interception volume provided for the Area 2 is **286.42m³** which exceeds the required volume calculated of 45.81m3.

Green/Blue Roofs

The total equivalent impermeable area for Area 2 Blue/Green Roof is 949.4m^2 including 10% allowance for urban creep (refer to Table 2.6).

Therefore, the total interception storage required =949.4 x 0.8 x 0.005 x 1.2 **= 4.56m^3**.

A “Bauder Sedum Blanket” or equivalent designed to retain 30 litres/m2 of rainwater will be used on roof level of both blocks where only maintenance access is provided.

Green Roof A 'Bauder Sedume' or equivalent design to retain 30 l/m² of rainwater will be used on roof level	Area	941.3	m²
	Interception Store 30 l/m²	0.03	l/m²
	Storage Volume	28.24	m³

The total interception volume provided for the Blue/Green Roof is **28.24m^3** which exceeds the required volume calculated of 4.56m3.

2.8 Attenuation Design

Attenuation storage is provided on the site using an attenuation storage system. For the purposes of surface water attenuation design, the site is divided into two sections as shown in Figure 2.1 draining to the storage system. The volume of surface water storage required has been calculated in accordance with the SuDS Manual Ciria C697, taking account of design invert levels, ground levels and allowable discharge rate. Calculations for the attenuation storage system is provided in Appendix B.

Surface water runoff from the site area will drain by gravity to the detention basins located in the southwestern end of the site and along the southern boundary of the site. During a 1 in 100-year storm event, the size of attenuation for the Urban Centre is calculated to be 80.640 m^3. This volume accommodates a 20% increase in future rainfall intensities due to climate change.

The detention basin for the Urban Centre Area has a capacity to store a maximum of 107.536 m^3 of surface water runoff. The outflow from the detention basin is limited by a Hydrobrake flow control device, which restricts the flow to 2 l/s.

On-site attenuation for Area 2 will be provided by installing blue roofs above the apartment blocks and duplexes within the site.

2.9 GDSDS Criterion Compliance

2.9.1 Criterion 1 River Water Quality Protection

Run-off from natural greenfield areas contributes very little pollution and sediment to rivers and for most rainfall events direct run-off from greenfield sites to rivers does not take place as rainfall percolates into the ground. By contrast, urban run-off, when drained by pipe systems, results in run-off from virtually every rainfall event with high levels of pollution, particularly in the first phase of run-off, with little rainfall percolating to the ground. To prevent this happening, Criterion 1 requires that interception storage and/or treatment storage is provided, thereby replicating the run-off characteristics of the pre-development greenfield site.

2.9.2 Criterion 3 Site Flooding

The GDSDS requires that no flooding should occur on site for storms up to and including the 1 in 30-year event. The pipe network and the attenuation storage volumes should, therefore, be checked for such storms to ensure that no site flooding occurs although partial surcharging of the system is allowed if it does not threaten to flood.

For the 1 in 100-year event, the pipe network can fully surcharge and cause site flooding, but the top water level due to any such flooding must be at least 500mm below any vulnerable internal floor levels, and the flood waters should be contained within the site. In addition, the top water level in any attenuation device during the 100-year storm must be at least 500mm below any vulnerable internal floor levels.
Surface water drains have been sized to ensure the following:
The system does not surcharge for the 1-year event.

The system surcharges but does not flood for the 30-year event. The system surcharges but does not flood for the 100-year event.

Detailed modelling of the surface water sewer network has been carried out using Causeway Flow software to confirm the above criteria is adequately met. The outputs are appended to this report.

2.9.3 Criterion 2 & 4 River Regime & Flood Protection

Regardless of the rainfall event, unchecked run-off from the developed site through traditional pipe networks will discharge into receiving waters at rates that are an order of magnitude greater than that prior to development. This can cause flash flow in the outfall river / stream that can cause scour, erosion & downstream flooding. Attenuation storage is provided to prevent this occurring by limiting the rate of run-off to that which took place from the pre-development greenfield site. In practice, the rate of run-off needs to be appropriately low for most rainfall events, and attenuation storage volumes should be provided for the 1 and 100-year storm event + 20% for climate change. The rate of outflow from such storage should be controlled so that it does not exceed the greenfield run-off rate of QBAR, which can be factored upwards by factors appropriate to the various return periods (given in the Flood Studies Report) if long term storage is provided. Notwithstanding that significant long-term storage will be provided in the form of interception storage, this does not equate to full long-term storage volume provision and so growth factors will not be applied to QBAR when calculating the attenuation storage volume required.

Qbar for the site has been calculated in accordance with the IH124 method as 6.23 l/s, based on the drained areas of the site. As the surface runoff flow rate discharged from the site does not exceed Qbar, there is a requirement for long-term storage to limit the impact on the receiving watercourse. Please refer to section 2.3.2 of this report for the Qbar calculation.

Criterion 4 is intended to prevent flooding of the receiving system / watercourse by either.

- Limiting the volume of run-off to the pre-development greenfield volume using ‘long-term storage’ (Option 1) or by
- Limiting the rate of run-off for the 1 in 100-year storm to QBAR without applying growth factors using ‘extended attenuation storage’ (Option 2).

Significant long-term storage will be provided in the form of interception storage. This does not, however, equate to full long term storage volumes and it is not feasible to provide additional storage areas elsewhere on site to achieve the required volume.

Option (2) has therefore been used to comply with Criterion 4 and an attenuation volume will be provided in the proposed detention basin in the northwest area and an attenuation storage system in the southeast of the site to limit the rate of discharge in the 1 in 100-year storm +20% event to QBAR without growth factors applied.
Refer to Appendix B for surface water network design calculations.

2.10 Enhanced Biodiversity

Bioretention areas will be included as part of the proposed development. Biodiversity has been carefully considered when determining both the location and the detailed design of these

elements. The proposed bioretention area offers the opportunity to create a planted vegetation zone for plants and animals which will encourage biodiversity on the site.

2.11 SuDS CIRIA Pillars of Design

2.11.1 Water Quantity

The "Water Quantity" design objective is to ensure that the surface water runoff from a developed site does not have a detrimental impact on people, property, or the environment, it is important to control:

- How fast the runoff is discharged from the site (i.e., the peak runoff rate) and
- How much runoff is discharged from the site (i.e., the runoff volume)

2.11.2 Water Quality

The "Water Quality" design objective seeks to ensure the surface water runoff from the site does not compromise the groundwater or surrounding water courses relating to the site.

2.11.3 Amenity

The "Amenity" design objective aims to deliver attractive, pleasant, useful and above all liveable urban environments. SuDS measures should be designed to replicate the existing natural environment and blend in with the urban development.

MOR have worked closely with the landscaping architect throughout the SuDS strategy design process to ensure that the measures which have been suggested and incorporated have a high sense of public use. Throughout the site, there are green roofs, bio-retention areas and tree pits.

2.11.4 Biodiversity

The encouragement of biodiverse environments within urban environments is incredibly important. The SuDS measures must not only replicate the pre-development surface water runoff systems and treatment for rainfall, but they should also aim to replicate the existing habitats from the pre- development stage.

By incorporating large landscaped areas, green/blue roofs throughout the site and the bio-retention areas, biodiversity on site is promoted.

2.11.5 SuDS Conclusion

This section of the report has comprehensively discussed the various SuDS measures which can be applied to the site and then selected the applicable systems, based on the site layout. A wide range of measures have been employed.
Finally, the chosen SuDS measures have been analysed for various rainfall scenarios to ensure that all the SuDS design criteria are met an extensive range of SuDS measures are proposed with extensive coverage of the developed area of the site. These measures will be effective in treating rainfall on the site to meet GDSDS and CIRIA.

2.12 Assessment for Flood Risk due to Potential Blockage of the Surface Water Drainage System on Site

A secondary check has been carried out to assess for flood risk arising from potential blockages in the proposed surface water network. This analysis was carried out using Causeway Flow by modelling the Hydrobrake at half of the Qbar for 50% blockage of the system. The results are appended in Appendix C of the report and indicate the flood volumes. Refer to the Desktop Flood Risk Assessment Report for further information.

2.13 Maintenance and Management Plan

Refer to appendix D for details of maintenance requirements for individual SuDS drainage measures on the site.

2.14 Potential Future Expansion

No future expansion has been considered for the proposed drainage networks for the development.

3 FOUL WATER DRAINAGE DESIGN

3.1 General

The foul water drainage infrastructure has been designed in accordance with Uisce Eireann Technical Standard for Wastewater Gravity Sewers (Document Number: IW-TEC-800-01) and the Uisce Eireann Code of Practice for Wastewater Infrastructure (Document Number: IW-CDS-5030-03).

On 12th December 2023, a Pre-Connection Enquiry Form was submitted to Uisce Eireann in respect of this development. Uisce Eireann provided a Confirmation of Feasibility letter on 5th March 2024, which confirms that subject to a valid connection agreement being put in place, and subject to upgrades the proposed connection to the public sewer network can be facilitated. The letter further notes that the Development is a part of the Clonburris SDZ. All relevant infrastructure has to be constructed as per the Master Plan and connected to Uisce Eireann network prior the connection.

A Copy of the Uisce Eireann Confirmation of Feasibility Letter is provided in Appendix A.

Table 3.1 outlines the parameters adopted in the design of the foul and process water drainage infrastructure.

Parameter Description	Assigned Value
Hydraulic Loading (Foul associated with domestic)	150 litres / person / day
Estimated Pipe Friction Losses	1.5 mm
Minimum Velocity	0.7 m/s
Maximum Velocity	3.0 m/s
Peaking Factor (for domestic foul flows only)	6.0

Table 3.1 Foul Water Design Parameters

Hydraulic loading for the foul drainage i.e. domestic foul flows from toilets, sinks etc. have been calculated in accordance with the Uisce Eireann Code of Practice for Wastewater Infrastructure which gives a flow rate of 150 litres per person per day for domestic dwellings.

Calculations for the foul and process water pipe networks are provided in Appendix C.

3.2 Existing Services

An existing network of drainage runs along Thomas Omer Way road to the north of the site. These underground sewers carry foul water runoff towards existing pumping stations in the south-west Dublin area. Due to the relative levels of the existing drainage within the road and the proposed site levels, it is not possible to achieve a gravity connection to the foul water drainage pipework as installed. There is a new South Dublin County Council infrastructure project for the area called Clonburris Infrastructure Ltd. This project will design a new link road to the north of the site with associated foul water sewers leading to a pumping station area number 5.

3.3 Proposed Services

The proposed foul water drainage system is designed to comply with the 'Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Technical Document – Volume

2, New Developments, 2005' and the 'Greater Dublin Regional Code of Practice for Drainage Works, V6.0 2005'.

The proposed foul water drainage layout for the development is indicated on Malone O'Regan drawings SHB4-CSD-DR-MOR-CS-P1-130. Foul water from new housing units will be collected within a gravity drainage network and directed towards the pumping station No.03 for catchment area W.

3.4 Potential Future Expansion

No future expansion has been considered for the proposed drainage networks for the development.

4 WATER SUPPLY

4.1 General

The Proposed Development will use mains water. The proposed water supply infrastructure has been designed in accordance with the Uisce Eireann Code of Practice for Water Infrastructure (Document Number: IW-CDS-5020-03).

On 12th December 2023, a Pre-Connection Enquiry Form was submitted to Uisce Eireann in respect of this development. Uisce Eireann provided a Confirmation of Feasibility (CoF) letter on 5th March 2024, which confirms that, subject to a valid connection agreement being put in place, and subject to upgrades the proposed connection to the public water supply network can be facilitated. The letter further notes that the Development is a part of the Clonburris SDZ. All relevant infrastructure has to be constructed as per the Master Plan and connected to Uisce Eireann network prior the connection.

A Copy of the Uisce Eireann Confirmation of Feasibility Letter is provided in Appendix A.

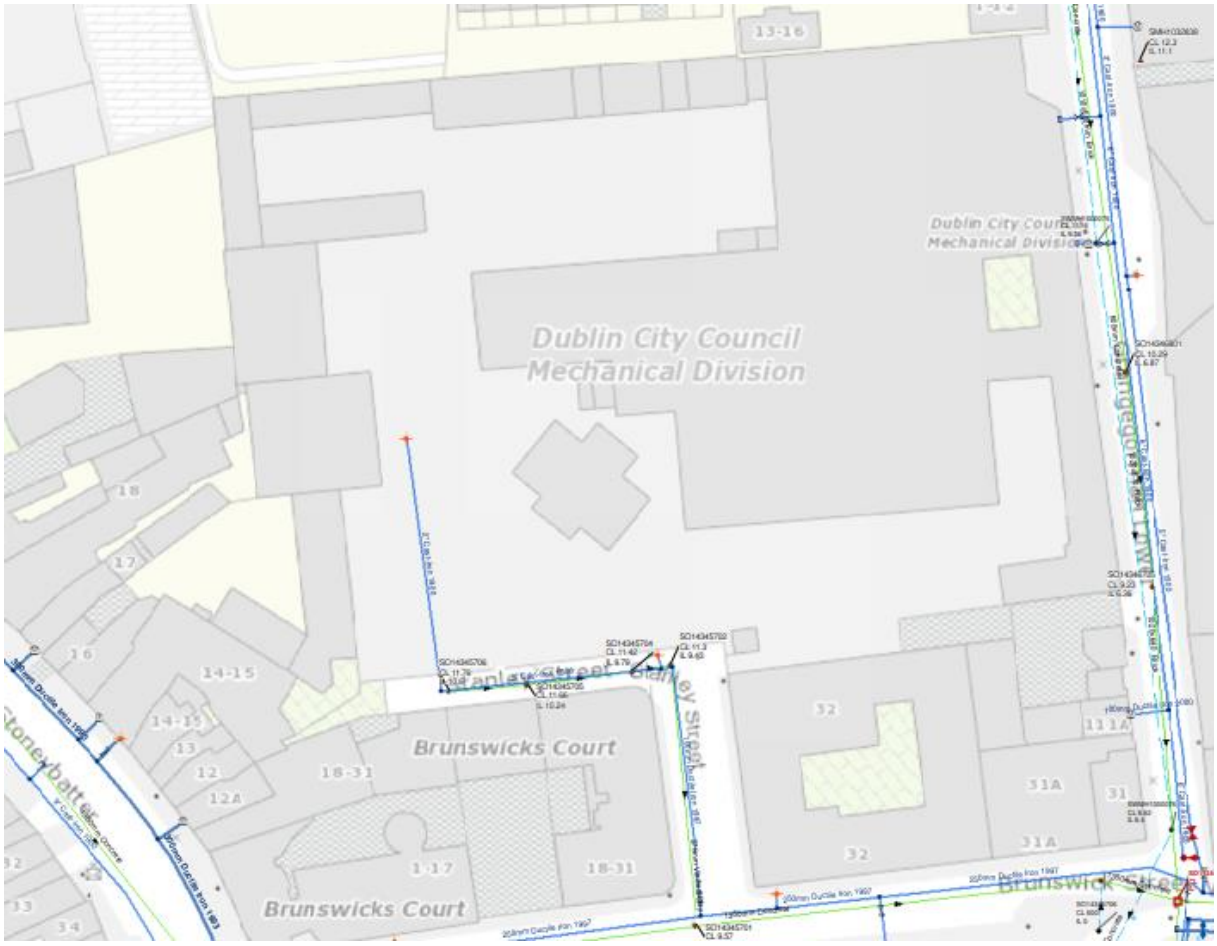


Figure 4.1 – Extract from Uisce Eireann maps

4.2 Existing & Proposed Services

An existing network of watermains runs along Thomas Omer Way road to the north of the site. There is a new South Dublin County Council infrastructure project for the area called Clonburris Infrastructure Ltd. This project will design a new link road to the north of the site with associated services.

The proposed watermain layout is indicated on drawing SHB4-CSD-DR-MOR-CS-P1-140 which accompanies this planning application. It is proposed to connect to the new watermain for the new link road in the long term for the supply for the site.

4.3 Water Demand Calculations

Average and peak water demand rates have been calculated as follows, in accordance with the Uisce Eireann Code of Practice for Water Infrastructure:

Domestic Water Demand

Total no. residents = 474

Uisce Eireann Code of Practice for Water Infrastructure gives flow rate for Domestic Dwellings' as 150 litres per person per day.

Total Daily Water Demand = 474 people x 150 litres per day per person
= 71,100 litres/day

Average Hour Demand = 71,100 litres/day / (24hr x 60min x 60sec)
= 0.822 litres/sec

The average day, peak week demand is taken as 1.25 times the average daily domestic demand.

Average Day / Peak Week Demand = 0.822 litres/sec x 1.25
= 1.03 litres/sec

The above figures were provided to Uisce Eireann within the Pre-Connection Enquiry Form dated 13th December 2023. Uisce Eireann ’s response to the Pre-Connection Enquiry, outlined in their Confirmation of Feasibility Letter, is therefore based on these figures.

APPENDIX A – UISCE EIREANN CONFIRMATION OF FEASIBILITY

CONFIRMATION OF FEASIBILITY

Ray O'Connor

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Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

5 March 2024

Our Ref: CDS24000426 Pre-Connection Enquiry
New houses at Clonburris, Link Street, Lucan, Dublin

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 118 unit(s) at New houses at Clonburris, Link Street, Lucan, Dublin, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible Subject to upgrades

- The Development is a part of Clonburris SDZ. All relevant infrastructure has to be constructed as per the Master Plan and connected to Uisce Éireann network with valve reconfiguration prior the connection.
- As per the Master Plan, a 300mm ID main has been proposed along adjacent road to the North. Connection main, to be a 125mm ID pipe connected to the new 300mm main, with bulk meter installed on the connection line with associated telemetry online system.
- The applicant water main layout indicates 100mm main. If hydrants are proposed within the developer mains, it is recommended to have 125mm ID main spine to cater for fire flow.
- On-site storage if provided, must have a re-fill time of minimum 12 hours.

Stiúrthóirí / Directors: Tony Keohane (Cathaoirleach / Chairman), Niall Gleeson (POF / CEO), Christopher Banks, Fred Barry, Gerard Britchfield, Liz Joyce, Patricia King, Eileen Maher, Cathy Mannion, Michael Walsh.
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin, Ireland D01NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Uisce Éireann is a design activity company, limited by shares. Cláraithe in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

- **Wastewater Connection** - Feasible Subject to upgrades

- The Development is a part of Clonburris SDZ. All relevant infrastructure has to be constructed as per the Master Plan and connected to Uisce Éireann network prior the connection.
- Any interim/temporary connection proposal, in advance of the delivery of the strategic infrastructure, has to be reviewed and agreed separately with Uisce Éireann.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Uisce Éireann's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Uisce Éireann's network(s). This is not a connection offer and capacity in Uisce Éireann's network(s) may only be secured by entering into a connection agreement with Uisce Éireann.

For any further information, visit **www.water.ie/connections**, **email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,

Dermot Phelan
Connections Delivery Manager

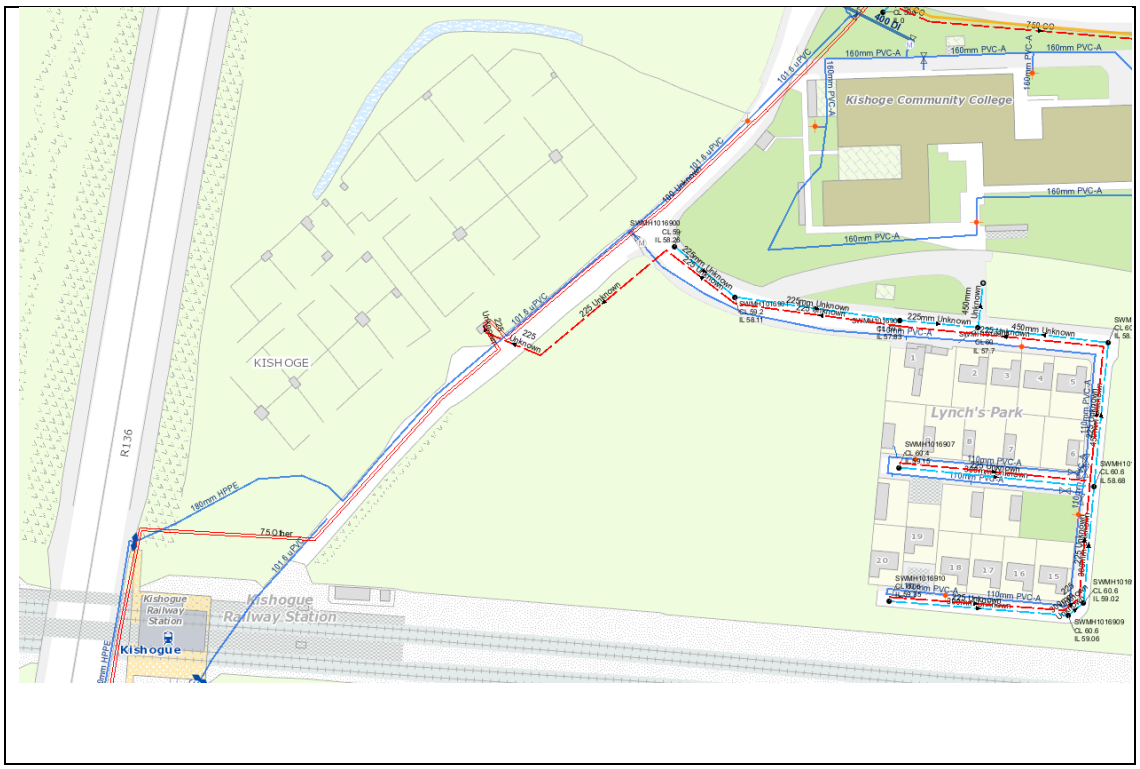
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Uisce Éireann's network(s). • Before the Development can connect to Uisce Éireann's network(s), you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Uisce Éireann connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Uisce Éireann's network(s), including works in the public space, must be carried out by Uisce Éireann*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Uisce Éireann's network(s)?	• Requests for maps showing Uisce Éireann's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Uisce Éireann Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Uisce Éireann's Network(s)

The map included below outlines the current Uisce Éireann infrastructure adjacent the Development: To access Uisce Éireann Maps email datarequests@water.ie



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Note: The information provided on the included maps as to the position of Uisce Éireann's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Uisce Éireann.

Whilst every care has been taken in respect of the information on Uisce Éireann's network(s), Uisce Éireann assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Uisce Éireann's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

APPENDIX B – ATTENUATION VOLUME CALCULATIONS

Job Title	B5 08 Clonburris - Urban Centre Area (Blue Roof- Refer to Figure 2.1)	**Job no.**	23006
By:	Silulami Liwani	**Checked by:**	ND
Date	30/05/2024	**Rev number**	

Part 1 Permissible Runoff

The regression equation recommended for use by the Greater Dublin Strategic Drainage Study 2005 calculates a value, QBARural, which is sourced from the Institute of Hydrology Report 124. This value is the mean annual flood flow from a rural catchment in m³/s and is given by the equation:

QBARrural = 0.00108[Area^0.89] x [SAAR^1.17] x [Soil^2.17]

Rainfall Data	
M5-60 (1 hour - 5 years) mm	16.7
M5-2D (2 days - 5 years) mm	60.8
Ratio "r" (M5-60/ M5-2D)	0.27
SAAR mm	978
Soil/ SPR mm	0.3

For 50 Ha Area ~ QBARrural =	0.135	m³/s
For 0.46 Ha Area ~ QBARrural =	1.235	l/s

Allowable outflow from the site (Council recommendation) 2 l/s/ha 0.9168 l/s

Part 2 Impermeable Area

Breakdown of the impermeable areas contributing to the surface water drainage network in each catchment with applied runoff coeifficients is provided in the table below

Total Area sq.m	Type of Surface		Area sq.m	Run-off Coefficient	Equivalent Impermeable	Urban Creep Allowance	Overall Impermeable Area
4584	Roof - Standard duplex			0.50	0.0	0.0	1437.40
	Roof - Apartments	Standard - 25%		0.95	0.0	0.0	
		Green/ Blue Roof - 75%	1425.00	0.92	1306.7	1437.4	
	Permeable Paving inc. areas from hardstanding			0.50	0.0	0.0	
ha	Landscaped Areas inc. areas from hardstanding			0.20	0.0	0.0	**ha**
0.46	Hardstanding			0.90	0.0	0.0	0.14

Part 3 Attenuation Volume Required

1 in 10 Years								
Time	**%**	**M5**	**Growth Factor (10 Years)**	**Area Factor**	**MT Factor**	**Inflow "I"**	**Outflow "O"**	**Capacity Required "I"-"O" ="S"**
note	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1 min	3.3	2.0	1.15	1	2.307	3.317	0.12	3.197
2min	5.7	3.5	1.16	1	4.020	5.778	0.24	5.538
5 min	10.3	6.3	1.18	1	7.390	10.622	0.6	10.022
10 min	14.8	9.0	1.18	1	10.618	15.262	1.2	14.062
15 min	17.7	10.8	1.18	1	12.699	18.253	1.8	16.453
30 min	23.3	14.2	1.18	1	16.716	24.028	3.6	20.428
60 min	30	18.2	1.17	1	21.341	30.675	7.2	23.475
2 hour	38	23.1	1.16	1	26.801	38.523	14.4	24.123
4 hour	48	29.2	1.15	1	33.562	48.241	28.8	19.441
6 hour	55	33.4	1.14	1	38.122	54.796	43.2	11.596
12 hour	68	41.3	1.14	1	47.132	67.748	86.4	-18.652
24 hour	85	51.7	1.13	1	58.398	83.942	172.8	-88.858
48 hour	106	64.4	1.12	1	72.182	103.754	345.6	-241.846
Size of Attenuation for 1 in 10 year flood event m³								**24.123**

1 in 30 Years								
Time	%	M5	Growth Factor (30 Years)	Area Factor	MT Factor	Inflow "I"	Outflow "O"	Capacity Required "I"-"O" ="S"
note	1	2	3	4	5	6	7	8
1 min	3.3	2.0	1.39	1	2.789	4.009	0.12	3.889
2min	5.7	3.5	1.41	1	4.886	7.024	0.24	6.784
5 min	10.3	6.3	1.44	1	9.018	12.962	0.6	12.362
10 min	14.8	9.0	1.46	1	13.138	18.884	1.2	17.684
15 min	17.7	10.8	1.48	1	15.927	22.894	1.8	21.094
30 min	23.3	14.2	1.49	1	21.108	30.340	3.6	26.740
60 min	30	18.2	1.48	1	26.995	38.803	7.2	31.603
2 hour	38	23.1	1.47	1	33.963	48.818	14.4	34.418
4 hour	48	29.2	1.45	1	42.317	60.826	28.8	32.026
6 hour	55	33.4	1.44	1	48.154	69.216	43.2	26.016
12 hour	68	41.3	1.42	1	58.708	84.387	86.4	-2.013
24 hour	85	51.7	1.38	1	71.318	102.513	172.8	-70.287
48 hour	106	64.4	1.34	1	86.360	124.134	345.6	-221.466
Size of Attenuation for 1 in 30 year flood event m³								34.418

1 in 100 Years								
Time	%	M5	Growth Factor (30 Years)	Area Factor	MT Factor	Inflow "I"	Outflow "O"	Capacity Required "I"-"O" ="S"
note	1	2	3	4	5	6	7	8
1 min	3.3	2.0	1.87	1	3.752	5.393	0.12	5.273
2min	5.7	3.5	1.88	1	6.515	9.365	0.24	9.125
5 min	10.3	6.3	1.97	1	12.337	17.733	0.6	17.133
10 min	14.8	9.0	1.98	1	17.817	25.610	1.2	24.410
15 min	17.7	10.8	1.95	1	20.985	30.164	1.8	28.364
30 min	23.3	14.2	1.91	1	27.058	38.893	3.6	35.293
60 min	30	18.2	1.85	1	33.744	48.504	7.2	41.304
2 hour	38	23.1	1.78	1	41.125	59.113	14.4	44.713
4 hour	48	29.2	1.73	1	50.488	72.572	28.8	43.772
6 hour	55	33.4	1.71	1	57.182	82.194	43.2	38.994
12 hour	68	41.3	1.62	1	66.977	96.273	86.4	9.873
24 hour	85	51.7	1.58	1	81.654	117.370	172.8	-55.430
48 hour	106	64.4	1.53	1	98.605	141.735	345.6	-203.865
Size of Attenuation for 1 in 100 year flood event m³								44.713

Part 4 Interception Storage

To prevent pollitant or sediments discharging into water courses the GDSDS required "interception storage" to be incorporated into the drainage design for the development. The volume of interception required is based on the 5-10mm of rainfall depth from 80% of the runoff from impermeable areas. The interception volume attributable to each of the SuDS features consists of the volyme of water that can infiltrate to the ground, the quanity that evaporates into the atmosphere and the volyme lost through transpiration in plants and vegitation. Additionally, there will be some loses of water due to absorption and westting of stone and soil media.

Required Interception Storage

Overall Impermeable area is 1437.4 m² including 10% for urban creep

Therefore, the total interception storage required is 'overall impermeable area x 80% x 0.005 x 1.2 for climate change' 6.90 m³

Interception Storage Provided *Only fill in SuDS on your site

Green Roof A 'Bauder Sedume' or equivalent design to retain 30 l/m² of rainwater will be used on roof level	Area	1425.0	m²
	Interception Store 30 l/m²	0.03	l/m²
	Storage Volume	42.75	m³

Total interception volume provided for the overall site 42.75 m³

which exceeds the required volume calculated of 6.90 m³

Job Title	B5 08 Clonburris - Urban Centre Area (Attenuation- Refer to Figure 2.1)	**Job no.**	23006
By:	Silulami Liwani	**Checked by:**	ND
Date	30/05/2024	**Rev number**	

Part 1 Permissible Runoff

The regression equation recommended for use by the Greater Dublin Strategic Drainage Study 2005 calculates a value, QBARural, which is sourced from the Institute of Hydrology Report 124. This value is the mean annual flood flow from a rural catchment in m³/s and is given by the equation:

QBARrural = 0.00108[Area^0.89] x [SAAR^1.17] x [Soil^2.17]

Rainfall Data	
M5-60 (1 hour - 5 years) mm	16.7
M5-2D (2 days - 5 years) mm	60.8
Ratio "r" (M5-60/ M5-2D)	0.27
SAAR mm	978
Soil/ SPR mm	0.3

For 50 Ha Area ~ QBARrural =	0.135	m³/s
For 0.46 Ha Area ~ QBARrural =	1.235	l/s

Allowable outflow from the site (Council recommendation) 2 l/s/ha 0.92 l/s

*Note 1: the catchement from the roof of the standard houses are considered half going into the rain garden and half is considered to be going into the drainage system.

Part 2 Impermeable Area

Breakdown of the impermeable areas contributing to the surface water drainage network in each catchment with applied runoff coeifficients is provided in the table below

Total Area sq.m	**Type of Surface**		**Area sq.m**	**Run-off Coefficient**	**Equivalent Impermeable**	**Urban Creep Allowance**	**Overall Impermeable Area**
4584	Roof - Standard duplex (Note 1)		0.00	0.50	0.0	0.0	1756.54
	Roof - Apartments	Standard - 25%	475.00	0.95	451.3	496.4	
		Green/ Blue Roof - 75%		0.92	0.0		
	Permeable Paving inc. areas from hardstanding		830.00	0.50	415.0	456.5	
ha	Landscaped Areas inc. areas from hardstanding		1340.00	0.20	268.0	294.8	**ha**
0.46	Hardstanding		514.00	0.90	462.6	508.9	0.18

Part 3 Attenuation Volume Required

1 in 10 Years								
Time	**%**	**M5**	**Growth Factor (10 Years)**	**Area Factor**	**MT Factor**	**Inflow "I"**	**Outflow "O"**	**Capacity Required "I"-"O" ="S"**
note	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1 min	3.3	2.0	1.15	1	2.307	4.053	0.055008	3.998
2min	5.7	3.5	1.16	1	4.020	7.061	0.110016	6.951
5 min	10.3	6.3	1.18	1	7.390	12.980	0.27504	12.705
10 min	14.8	9.0	1.18	1	10.618	18.651	0.55008	18.101
15 min	17.7	10.8	1.18	1	12.699	22.306	0.82512	21.481
30 min	23.3	14.2	1.18	1	16.716	29.363	1.65024	27.713
60 min	30	18.2	1.17	1	21.341	37.486	3.30048	34.185
2 hour	38	23.1	1.16	1	26.801	47.076	6.60096	40.475
4 hour	48	29.2	1.15	1	33.562	58.952	13.20192	45.750
6 hour	55	33.4	1.14	1	38.122	66.962	19.80288	47.159
12 hour	68	41.3	1.14	1	47.132	82.789	39.60576	43.184
24 hour	85	51.7	1.13	1	58.398	102.579	79.21152	23.367
48 hour	106	64.4	1.12	1	72.182	126.790	158.42304	-31.633
Size of Attenuation for 1 in 10 year flood event m³								**47.159**

1 in 30 Years								
Time	%	M5	Growth Factor (30 Years)	Area Factor	MT Factor	Inflow "I"	Outflow "O"	Capacity Required "I"-"O" ="S"
note	1	2	3	4	5	6	7	8
1 min	3.3	2.0	1.39	1	2.789	4.899	0.055008	4.844
2min	5.7	3.5	1.41	1	4.886	8.583	0.110016	8.473
5 min	10.3	6.3	1.44	1	9.018	15.840	0.27504	15.565
10 min	14.8	9.0	1.46	1	13.138	23.077	0.55008	22.527
15 min	17.7	10.8	1.48	1	15.927	27.977	0.82512	27.152
30 min	23.3	14.2	1.49	1	21.108	37.077	1.65024	35.427
60 min	30	18.2	1.48	1	26.995	47.418	3.30048	44.118
2 hour	38	23.1	1.47	1	33.963	59.657	6.60096	53.056
4 hour	48	29.2	1.45	1	42.317	74.331	13.20192	61.129
6 hour	55	33.4	1.44	1	48.154	84.583	19.80288	64.781
12 hour	68	41.3	1.42	1	58.708	103.123	39.60576	63.518
24 hour	85	51.7	1.38	1	71.318	125.273	79.21152	46.062
48 hour	106	64.4	1.34	1	86.360	151.695	158.42304	-6.728
Size of Attenuation for 1 in 30 year flood event m³								64.781

1 in 100 Years								
Time	%	M5	Growth Factor (30 Years)	Area Factor	MT Factor	Inflow "I"	Outflow "O"	Capacity Required "I"-"O" ="S"
note	1	2	3	4	5	6	7	8
1 min	3.3	2.0	1.87	1	3.752	6.590	0.055008	6.535
2min	5.7	3.5	1.88	1	6.515	11.444	0.110016	11.334
5 min	10.3	6.3	1.97	1	12.337	21.670	0.27504	21.395
10 min	14.8	9.0	1.98	1	17.817	31.296	0.55008	30.746
15 min	17.7	10.8	1.95	1	20.985	36.861	0.82512	36.036
30 min	23.3	14.2	1.91	1	27.058	47.528	1.65024	45.878
60 min	30	18.2	1.85	1	33.744	59.273	3.30048	55.972
2 hour	38	23.1	1.78	1	41.125	72.238	6.60096	65.637
4 hour	48	29.2	1.73	1	50.488	88.685	13.20192	75.483
6 hour	55	33.4	1.71	1	57.182	100.443	19.80288	80.640
12 hour	68	41.3	1.62	1	66.977	117.648	39.60576	78.042
24 hour	85	51.7	1.58	1	81.654	143.429	79.21152	64.217
48 hour	106	64.4	1.53	1	98.605	173.204	158.42304	14.781
Size of Attenuation for 1 in 100 year flood event m³								80.640

Part 4 Interception Storage

To prevent pollitant or sediments discharging into water courses the GDSDS required "interception storage" to be incorporated into the drainage design for the development. The volume of interception required is based on the 5-10mm of rainfall depth from 80% of the runoff from impermeable areas. The interception volume attributable to each of the SuDS features consists of the volyme of water that can infiltrate to the ground, the quanity that evaporates into the atmosphere and the volyme lost through transpiration in plants and vegitation. Additionally, there will be some loses of water due to absorption and westting of stone and soil media.

Required Interception Storage

Overall Impermeable area is 1756.5 m² including 10% for urban creep

Therefore, the total interception storage required is 'overall impermeable area x 80% x 0.005 x 1.2 for climate change' 8.43 m³

Interception Storage Provided *Only fill in SuDS on your site

Permeable Paving	Area	830.0	m²
	Stone Layer 100mm deep	0.1	m
	Void Ratio	30%	
	Storage Volume	24.90	m³

*Storage depth will depend on your site

Swale	Area	0.0	m²
	*75mm	0.075	m
	Storage Volume	0.00	m³

Bio-Retention Area/ Raingarden inc. bio-retentiona areas from private house gardens	Area	1340.0	m²
	Depth of Subgrade	0.1	m
	Storage Volume	134	m³

Total interception volume provided for the overall site 158.90 m³

which exceeds the required volume calculated of 8.43 m³

Job Title	B5 08 Clonburris - Area 2 (Refer to Figure 2.1)	Job no.	23006
By:	Silulami Liwani	Checked by:	ND
Date	30/05/2024	Rev number	

Part 1 Permissible Runoff

The regression equation recommended for use by the Greater Dublin Strategic Drainage Study 2005 calculates a value, QBARural, which is sourced from the Institute of Hydrology Report 124. This value is the mean annual flood flow from a rural catchment in m^3/s and is given by the equation:

QBARrural = 0.00108[Area^0.89] x [SAAR^1.17] x [Soil^2.17]

Rainfall Data	
M5-60 (1 hour - 5 years) mm	16.7
M5-2D (2 days - 5 years) mm	60.8
Ratio "r" (M5-60/ M5-2D)	0.27
SAAR mm	978
Soil/ SPR mm	0.3

For 50 Ha Area ~ QBARrural =	0.135	m^3/s
For 1.86 Ha Area ~ QBARrural =	5.008	l/s

Allowable outflow from the site (Council recommendation) 2 l/s/ha 3.72 l/s

*Note 1: the catchement from the roof of the standard houses are considered half going into the rain garden and half is considered to be going into the drainage system.

Part 2 Impermeable Area

Breakdown of the impermeable areas contributing to the surface water drainage network in each catchment with applied runoff coeifficients is provided in the table below

Total Area sq.m	Type of Surface		Area sq.m	Run-off Coefficient	Equivalent Impermeable	Urban Creep Allowance	Overall Impermeable Area
18580	Roof - Standard duplex (Note 1)		1936.00	0.50	968.0	1064.8	9543.45
	Roof - Apartments	Standard - 25%	313.75	0.95	298.1	327.9	
		Green/ Blue Roof - 75%		0.92	0.0		
	Permeable Paving inc. areas from hardstanding		2834.00	0.50	1417.0	1558.7	
ha	Landscaped Areas inc. areas from hardstanding		7581.00	0.20	1516.2	1667.8	ha
1.86	Hardstanding		4974.00	0.90	4476.6	4924.3	0.95

Part 3 Interception Storage

To prevent pollitant or sediments discharging into water courses the GDSDS required "interception storage" to be incorporated into the drainage design for the development. The volume of interception required is based on the 5-10mm of rainfall depth from 80% of the runoff from impermeable areas. The interception volume attributable to each of the SuDS features consists of the volyme of water that can infiltrate to the ground, the quanity that evaporates into the atmosphere and the volyme lost through transpiration in plants and vegitation. Additionally, there will be some loses of water due to absorption and westting of stone and soil media.

Required Interception Storage

Overall Impermeable area is 9543.4 m² including 10% for urban creep

Therefore, the total interception storage required is 'overall impermeable area x 80% x 0.005 x 1.2 for climate change' 45.81 m³

Interception Storage Provided *Only fill in SuDS on your site

Permeable Paving	Area	2834.0	m²
	Stone Layer 100mm deep	0.1	m
	Void Ratio	30%	
	Storage Volume	85.02	m³

*Storage depth will depend on your site

Swale	Area	492.0	m²
	*75mm	0.075	m
	Storage Volume	36.90	m³

Bio-Retention Area/ Raingarden inc. bio-retentiona areas from private house gardens	Area	1645.0	m²
	Depth of Subgrade	0.1	m
	Storage Volume	164.5	m³

Total interception volume provided for the overall site 286.42 m³

which exceeds the required volume calculated of 45.81 m³

Job Title	B5 08 Clonburris - Area 2 (Blue Roof-Refer to Figure 2.1)	**Job no.**	23006
By:	Silulami Liwani	**Checked by:**	ND
Date	30/05/2024	**Rev number**	

Part 1 Permissible Runoff

The regression equation recommended for use by the Greater Dublin Strategic Drainage Study 2005 calculates a value, QBARural, which is sourced from the Institute of Hydrology Report 124. This value is the mean annual flood flow from a rural catchment in m³/s and is given by the equation:

QBARrural = 0.00108[Area^0.89] x [SAAR^1.17] x [Soil^2.17]

Rainfall Data		
M5-60 (1 hour - 5 years) mm		16.7
M5-2D (2 days - 5 years) mm		60.8
Ratio "r" (M5-60/ M5-2D)		0.27
SAAR mm		978
Soil/ SPR mm		0.3

For 50 Ha Area ~ QBARrural =	0.135	m³/s
For 1.86 Ha Area ~ QBARrural =	5.008	l/s

Allowable outflow from the site (Council recommendation) 2 l/s/ha 3.716 l/s

Part 2 Impermeable Area

Breakdown of the impermeable areas contributing to the surface water drainage network in each catchment with applied runoff coeifficients is provided in the table below

Total Area sq.m	Type of Surface		Area sq.m	Run-off Coefficient	Equivalent Impermeable	Urban Creep Allowance	Overall Impermeable Area
18580	Roof - Standard duplex			0.50	0.0	0.0	949.44
	Roof - Apartments	Standard - 25%		0.95	0.0	0.0	
		Green/ Blue Roof - 75%	941.25	0.92	863.1	949.4	
	Permeable Paving inc. areas from hardstanding			0.50	0.0	0.0	
ha	Landscaped Areas inc. areas from hardstanding			0.20	0.0	0.0	**ha**
1.86	Hardstanding			0.90	0.0	0.0	0.09

Part 3 Attenuation Volume Required

1 in 10 Years								
Time	**%**	**M5**	**Growth Factor (10 Years)**	**Area Factor**	**MT Factor**	**Inflow "I"**	**Outflow "O"**	**Capacity Required "I"-"O" ="S"**
note	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1 min	3.3	2.0	1.15	1	2.307	2.191	0.12	2.071
2min	5.7	3.5	1.16	1	4.020	3.817	0.24	3.577
5 min	10.3	6.3	1.18	1	7.390	7.016	0.6	6.416
10 min	14.8	9.0	1.18	1	10.618	10.081	1.2	8.881
15 min	17.7	10.8	1.18	1	12.699	12.057	1.8	10.257
30 min	23.3	14.2	1.18	1	16.716	15.871	3.6	12.271
60 min	30	18.2	1.17	1	21.341	20.262	7.2	13.062
2 hour	38	23.1	1.16	1	26.801	25.446	14.4	11.046
4 hour	48	29.2	1.15	1	33.562	31.865	28.8	3.065
6 hour	55	33.4	1.14	1	38.122	36.194	43.2	-7.006
12 hour	68	41.3	1.14	1	47.132	44.749	86.4	-41.651
24 hour	85	51.7	1.13	1	58.398	55.446	172.8	-117.354
48 hour	106	64.4	1.12	1	72.182	68.532	345.6	-277.068
Size of Attenuation for 1 in 10 year flood event m³								**13.062**

1 in 30 Years								
Time	%	M5	Growth Factor (30 Years)	Area Factor	MT Factor	Inflow "I"	Outflow "O"	Capacity Required "I"-"O" ="S"
note	1	2	3	4	5	6	7	8
1 min	3.3	2.0	1.39	1	2.789	2.648	0.12	2.528
2min	5.7	3.5	1.41	1	4.886	4.639	0.24	4.399
5 min	10.3	6.3	1.44	1	9.018	8.562	0.6	7.962
10 min	14.8	9.0	1.46	1	13.138	12.473	1.2	11.273
15 min	17.7	10.8	1.48	1	15.927	15.122	1.8	13.322
30 min	23.3	14.2	1.49	1	21.108	20.041	3.6	16.441
60 min	30	18.2	1.48	1	26.995	25.630	7.2	18.430
2 hour	38	23.1	1.47	1	33.963	32.246	14.4	17.846
4 hour	48	29.2	1.45	1	42.317	40.177	28.8	11.377
6 hour	55	33.4	1.44	1	48.154	45.719	43.2	2.519
12 hour	68	41.3	1.42	1	58.708	55.740	86.4	-30.660
24 hour	85	51.7	1.38	1	71.318	67.712	172.8	-105.088
48 hour	106	64.4	1.34	1	86.360	81.994	345.6	-263.606
Size of Attenuation for 1 in 30 year flood event m³								18.430

1 in 100 Years								
Time	%	M5	Growth Factor (30 Years)	Area Factor	MT Factor	Inflow "I"	Outflow "O"	Capacity Required "I"-"O" ="S"
note	1	2	3	4	5	6	7	8
1 min	3.3	2.0	1.87	1	3.752	3.562	0.12	3.442
2min	5.7	3.5	1.88	1	6.515	6.186	0.24	5.946
5 min	10.3	6.3	1.97	1	12.337	11.713	0.6	11.113
10 min	14.8	9.0	1.98	1	17.817	16.916	1.2	15.716
15 min	17.7	10.8	1.95	1	20.985	19.924	1.8	18.124
30 min	23.3	14.2	1.91	1	27.058	25.690	3.6	22.090
60 min	30	18.2	1.85	1	33.744	32.038	7.2	24.838
2 hour	38	23.1	1.78	1	41.125	39.046	14.4	24.646
4 hour	48	29.2	1.73	1	50.488	47.936	28.8	19.136
6 hour	55	33.4	1.71	1	57.182	54.291	43.2	11.091
12 hour	68	41.3	1.62	1	66.977	63.591	86.4	-22.809
24 hour	85	51.7	1.58	1	81.654	77.526	172.8	-95.274
48 hour	106	64.4	1.53	1	98.605	93.620	345.6	-251.980
Size of Attenuation for 1 in 100 year flood event m³								24.838

Part 4 Interception Storage

To prevent pollitant or sediments discharging into water courses the GDSDS required "interception storage" to be incorporated into the drainage design for the development. The volume of interception required is based on the 5-10mm of rainfall depth from 80% of the runoff from impermeable areas. The interception volume attributable to each of the SuDS features consists of the volyme of water that can infiltrate to the ground, the quanity that evaporates into the atmosphere and the volyme lost through transpiration in plants and vegitation. Additionally, there will be some loses of water due to absorption and westting of stone and soil media.

Required Interception Storage

Overall Impermeable area is 949.4 m² including 10% for urban creep

Therefore, the total interception storage required is 'overall impermeable area x 80% x 0.005 x 1.2 for climate change' 4.56 m³

Interception Storage Provided *Only fill in SuDS on your site

Green Roof A 'Bauder Sedume' or equivalent design to retain 30 l/m² of rainwater will be used on roof level	Area	941.3	m²
	Interception Store 30 l/m²	0.03	l/m²
	Storage Volume	28.24	m³

Total interception volume provided for the overall site 28.24 m³

which exceeds the required volume calculated of 4.56 m³

APPENDIX C – SURFACE WATER PIPE NETWORK CALCULATIONS

Drainage Design Report

Flow+

v10.1

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Network	Storm Network
Filename	Flow 2024-05-30.pfd
Username	Liwani Liwani (sliwani@morce.ie)
Last analysed	30/05/2024 15:48:20
Report produced on	30/05/2024 15:48:50

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Rainfall Methodology	FSR
Return Period (years)	2
Additional Flow (%)	0
FSR Region	Scotland and Ireland
M5-60 (mm)	16.700
Ratio-R	0.270
CV	0.750
Time of Entry (mins)	4.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	50.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Inverts
Minimum Backdrop Height (m)	0.500
Preferred Cover Depth (m)	1.200
Include Intermediate Ground	Yes
Enforce best practice design rules	Yes

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Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Width (mm)	Sump (m)	Easting (m)	Northing (m)	Depth (m)	Notes
SW01	0.090	4.00		59.225	Manhole	Adoptable	1500			704693.773	732853.675	2.262	
SW02	0.040	4.00		59.624	Manhole	Adoptable	1200			704660.785	732824.843	1.514	
SW03	0.020	4.00		59.718	Manhole	Adoptable	1200			704721.222	732822.270	2.639	
SW04	0.010	4.00		59.893	Manhole	Adoptable	1200			704739.071	732801.848	2.613	
SW05	0.010	4.00		59.851	Manhole	Adoptable	1200			704738.583	732795.164	2.521	
SW06	0.020	4.00		59.992	Manhole	Adoptable	1200			704737.494	732780.273	2.551	
SW07	0.010	4.00		60.178	Manhole	Adoptable	1200			704735.438	732752.156	2.528	
SW08	0.060	4.00		60.207	Manhole	Adoptable	1200			704684.079	732755.890	2.036	
SW09	0.070	4.00		60.553	Manhole	Adoptable	1200			704632.723	732759.666	2.096	
SW10	0.040	4.00		60.210	Manhole	Adoptable	1200			704634.836	732788.589	1.560	
SW11	0.190	4.00		60.548	Manhole	Adoptable	1350			704825.199	732745.593	1.575	
SW12	0.010	4.00		60.012	Manhole	Adoptable	1200			704748.780	732794.418	1.654	
SW13	0.070	4.00		59.794	Manhole	Adoptable	1200			704751.315	732829.096	1.204	
SW14	0.040	4.00		59.451	Manhole	Adoptable	1200			704757.002	732853.543	1.365	
SW15	0.040	4.00		59.406	Manhole	Adoptable	1200			704757.217	732856.490	1.300	
SW16	0.110	4.00		60.007	Manhole	Adoptable	1200			704802.759	732808.413	1.592	
SW17	0.040	4.00		60.045	Manhole	Adoptable	1200			704804.120	732803.918	1.583	
SW18	0.080	4.00		60.177	Manhole	Adoptable	1200			704802.735	732784.969	1.525	
SW19-HB		4.00	2.0	60.410	Manhole	Adoptable	1200			704701.187	732782.884	2.240	
EXSW1-35-11	0.068	4.00		59.195	Manhole	Adoptable	1200			704724.495	732880.351	2.345	
EXSW1-39-1	0.068	4.00		58.883	Manhole	Adoptable	1200			704805.875	732850.468	0.890	

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	Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)	Con Offset (m)	Min DS IL (m)	Lateral Area (ha)	Lateral Ins Point (%)	Lateral T of E (mins)
	6.000	SW02	SW01	43.812	0.600	Colebrook-White	58.110	57.672	0.438	100.0	225	Circular	4.56	50.0					
	1.008	SW01	EXSW1-35-11	40.687	0.600	Colebrook-White	56.963	56.850	0.113	360.0	525	Circular	7.63	42.0					
	1.000	SW10	SW09	29.000	0.600	Colebrook-White	58.650	58.457	0.193	150.0	225	Circular	4.45	50.0					
	1.001	SW09	SW08	51.495	0.600	Colebrook-White	58.457	58.171	0.286	180.0	375	Circular	5.09	49.4					
	1.002	SW08	SW07	51.495	0.600	Colebrook-White	58.171	57.885	0.286	180.0	375	Circular	5.73	47.3					
	1.003	SW07	SW06	28.192	0.600	Colebrook-White	57.650	57.441	0.209	135.0	450	Circular	6.00	46.4					
	1.004	SW06	SW05	14.931	0.600	Colebrook-White	57.441	57.330	0.111	135.0	450	Circular	6.14	46.0					
	1.005	SW05	SW04	6.702	0.600	Colebrook-White	57.330	57.280	0.050	135.0	450	Circular	6.20	45.8					
	1.006	SW04	SW03	27.123	0.600	Colebrook-White	57.280	57.079	0.201	135.0	450	Circular	6.46	45.0					
	1.007	SW03	SW01	41.710	0.600	Colebrook-White	57.079	56.963	0.116	360.0	525	Circular	7.05	43.4					
	2.000	SW11	SW07	90.001	0.600	Colebrook-White	58.973	58.223	0.750	120.0	375	Circular	4.91	50.0					
	3.000	SW19-HB	SW06	36.401	0.600	Colebrook-White	58.170	57.927	0.243	150.0	225	Circular	4.57	50.0					
?	4.000	SW13	SW12	34.771	0.600	Colebrook-White	58.590	58.358	0.232	150.0	225	Circular	4.54	50.0					
	4.001	SW12	SW05	10.224	0.600	Colebrook-White	58.358	58.290	0.068	150.0	300	Circular	4.68	50.0					
?	5.000	SW15	SW14	2.955	0.600	Colebrook-White	58.106	58.086	0.020	150.0	225	Circular	4.05	50.0					
?	5.001	SW14	SW03	47.521	0.600	Colebrook-White	58.086	57.769	0.317	149.9	225	Circular	4.79	50.0					
	7.000	SW18	SW17	19.000	0.600	Colebrook-White	58.652	58.462	0.190	100.0	300	Circular	4.20	50.0					
	7.001	SW17	SW16	4.697	0.600	Colebrook-White	58.462	58.415	0.047	100.0	300	Circular	4.25	50.0					
?	7.002	SW16	EXSW1-39-1	42.170	0.600	Colebrook-White	58.415	57.993	0.422	100.0	300	Circular	4.70	50.0					

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	Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)	Notes
	6.000	SW02	SW01	1.307	52.0	5.4	1.289	1.328	1.289	1.328	0.040	0.0	49	0.851	
	1.008	SW01	EXSW1-35-11	1.174	254.2	84.0	1.737	1.820	1.737	1.820	0.720	2.0	207	1.058	
	1.000	SW10	SW09	1.065	42.3	5.4	1.335	1.871	1.335	1.871	0.040	0.0	54	0.735	
	1.001	SW09	SW08	1.347	148.8	14.7	1.721	1.661	1.661	1.721	0.110	0.0	79	0.867	
	1.002	SW08	SW07	1.347	148.8	21.8	1.661	1.918	1.661	1.918	0.170	0.0	96	0.971	
	1.003	SW07	SW06	1.748	278.0	46.5	2.078	2.101	2.078	2.101	0.370	0.0	123	1.310	
	1.004	SW06	SW05	1.748	278.0	50.6	2.101	2.071	2.071	2.101	0.390	2.0	129	1.339	
	1.005	SW05	SW04	1.748	278.0	61.6	2.071	2.163	2.071	2.163	0.480	2.0	143	1.414	
	1.006	SW04	SW03	1.748	278.0	61.8	2.163	2.189	2.163	2.189	0.490	2.0	144	1.419	
	1.007	SW03	SW01	1.174	254.2	71.5	2.114	1.737	1.737	2.114	0.590	2.0	189	1.014	
	2.000	SW11	SW07	1.653	182.5	25.7	1.200	1.580	1.200	1.580	0.190	0.0	94	1.177	
	3.000	SW19-HB	SW06	1.065	42.3	2.0	2.015	1.840	1.840	2.015	0.000	2.0	33	0.546	
?	4.000	SW13	SW12	1.065	42.3	9.5	0.979	1.429	0.979	1.429	0.070	0.0	73	0.864	Upstream Depth is less than the specified minimum
	4.001	SW12	SW05	1.281	90.6	10.8	1.354	1.261	1.261	1.354	0.080	0.0	69	0.869	
?	5.000	SW15	SW14	1.065	42.3	5.4	1.075	1.140	1.075	1.140	0.040	0.0	54	0.735	Upstream Depth is less than the specified minimum | Downstream Depth is less than the specified minimum
?	5.001	SW14	SW03	1.065	42.4	10.8	1.140	1.724	1.140	1.724	0.080	0.0	78	0.896	Upstream Depth is less than the specified minimum
	7.000	SW18	SW17	1.572	111.1	10.8	1.225	1.283	1.225	1.283	0.080	0.0	63	1.009	
	7.001	SW17	SW16	1.572	111.1	16.3	1.283	1.292	1.283	1.292	0.120	0.0	77	1.132	
?	7.002	SW16	EXSW1-39-1	1.572	111.1	31.2	1.292	0.590	0.590	1.292	0.230	0.0	108	1.354	Downstream Depth is less than the specified minimum

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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)	US Node	Dia (mm)	Width (mm)	Sump (m)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Sump (m)	Node Type	MH Type
6.000	43.812	100.0	225	Circular	59.624	58.110	1.289	59.225	57.672	1.328	SW02	1200			Manhole	Adoptable	SW01	1500			Manhole	Adoptable
1.008	40.687	360.0	525	Circular	59.225	56.963	1.737	59.195	56.850	1.820	SW01	1500			Manhole	Adoptable	EXSW1-35-11	1200			Manhole	Adoptable
1.000	29.000	150.0	225	Circular	60.210	58.650	1.335	60.553	58.457	1.871	SW10	1200			Manhole	Adoptable	SW09	1200			Manhole	Adoptable
1.001	51.495	180.0	375	Circular	60.553	58.457	1.721	60.207	58.171	1.661	SW09	1200			Manhole	Adoptable	SW08	1200			Manhole	Adoptable
1.002	51.495	180.0	375	Circular	60.207	58.171	1.661	60.178	57.885	1.918	SW08	1200			Manhole	Adoptable	SW07	1200			Manhole	Adoptable
1.003	28.192	135.0	450	Circular	60.178	57.650	2.078	59.992	57.441	2.101	SW07	1200			Manhole	Adoptable	SW06	1200			Manhole	Adoptable
1.004	14.931	135.0	450	Circular	59.992	57.441	2.101	59.851	57.330	2.071	SW06	1200			Manhole	Adoptable	SW05	1200			Manhole	Adoptable
1.005	6.702	135.0	450	Circular	59.851	57.330	2.071	59.893	57.280	2.163	SW05	1200			Manhole	Adoptable	SW04	1200			Manhole	Adoptable
1.006	27.123	135.0	450	Circular	59.893	57.280	2.163	59.718	57.079	2.189	SW04	1200			Manhole	Adoptable	SW03	1200			Manhole	Adoptable
1.007	41.710	360.0	525	Circular	59.718	57.079	2.114	59.225	56.963	1.737	SW03	1200			Manhole	Adoptable	SW01	1500			Manhole	Adoptable
2.000	90.001	120.0	375	Circular	60.548	58.973	1.200	60.178	58.223	1.580	SW11	1350			Manhole	Adoptable	SW07	1200			Manhole	Adoptable
3.000	36.401	150.0	225	Circular	60.410	58.170	2.015	59.992	57.927	1.840	SW19-HB	1200			Manhole	Adoptable	SW06	1200			Manhole	Adoptable
4.000	34.771	150.0	225	Circular	59.794	58.590	0.979	60.012	58.358	1.429	SW13	1200			Manhole	Adoptable	SW12	1200			Manhole	Adoptable
4.001	10.224	150.0	300	Circular	60.012	58.358	1.354	59.851	58.290	1.261	SW12	1200			Manhole	Adoptable	SW05	1200			Manhole	Adoptable
5.000	2.955	150.0	225	Circular	59.406	58.106	1.075	59.451	58.086	1.140	SW15	1200			Manhole	Adoptable	SW14	1200			Manhole	Adoptable
5.001	47.521	149.9	225	Circular	59.451	58.086	1.140	59.718	57.769	1.724	SW14	1200			Manhole	Adoptable	SW03	1200			Manhole	Adoptable
7.000	19.000	100.0	300	Circular	60.177	58.652	1.225	60.045	58.462	1.283	SW18	1200			Manhole	Adoptable	SW17	1200			Manhole	Adoptable
7.001	4.697	100.0	300	Circular	60.045	58.462	1.283	60.007	58.415	1.292	SW17	1200			Manhole	Adoptable	SW16	1200			Manhole	Adoptable
7.002	42.170	100.0	300	Circular	60.007	58.415	1.292	58.883	57.993	0.590	SW16	1200			Manhole	Adoptable	EXSW1-39-1	1200			Manhole	Adoptable

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Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Sump (m)	Node Type	MH Type		Link	IL (m)	Dia (mm)	Link Type
SW01	704693.773	732853.675	59.225	2.262	1500			Manhole	Adoptable	1	6.000	57.672	225	Circular
										2	1.007	56.963	525	Circular
										0	1.008	56.963	525	Circular
SW02	704660.785	732824.843	59.624	1.514	1200			Manhole	Adoptable					
										0	6.000	58.110	225	Circular
SW03	704721.222	732822.270	59.718	2.639	1200			Manhole	Adoptable	1	5.001	57.769	225	Circular
										2	1.006	57.079	450	Circular
										0	1.007	57.079	525	Circular
SW04	704739.071	732801.848	59.893	2.613	1200			Manhole	Adoptable	1	1.005	57.280	450	Circular
										0	1.006	57.280	450	Circular
SW05	704738.583	732795.164	59.851	2.521	1200			Manhole	Adoptable	1	4.001	58.290	300	Circular
										2	1.004	57.330	450	Circular
										0	1.005	57.330	450	Circular
SW06	704737.494	732780.273	59.992	2.551	1200			Manhole	Adoptable	1	3.000	57.927	225	Circular
										2	1.003	57.441	450	Circular
										0	1.004	57.441	450	Circular
SW07	704735.438	732752.156	60.178	2.528	1200			Manhole	Adoptable	1	2.000	58.223	375	Circular
										2	1.002	57.885	375	Circular
										0	1.003	57.650	450	Circular
SW08	704684.079	732755.890	60.207	2.036	1200			Manhole	Adoptable	1	1.001	58.171	375	Circular
										0	1.002	58.171	375	Circular
SW09	704632.723	732759.666	60.553	2.096	1200			Manhole	Adoptable	1	1.000	58.457	225	Circular

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										0	1.001	58.457	375	Circular
SW10	704634.836	732788.589	60.210	1.560	1200			Manhole	Adoptable					
										0	1.000	58.650	225	Circular
SW11	704825.199	732745.593	60.548	1.575	1350			Manhole	Adoptable					
										0	2.000	58.973	375	Circular
SW12	704748.780	732794.418	60.012	1.654	1200			Manhole	Adoptable	1	4.000	58.358	225	Circular
										0	4.001	58.358	300	Circular
SW13	704751.315	732829.096	59.794	1.204	1200			Manhole	Adoptable					
										0	4.000	58.590	225	Circular
SW14	704757.002	732853.543	59.451	1.365	1200			Manhole	Adoptable	1	5.000	58.086	225	Circular
										0	5.001	58.086	225	Circular
SW15	704757.217	732856.490	59.406	1.300	1200			Manhole	Adoptable					
										0	5.000	58.106	225	Circular
SW16	704802.759	732808.413	60.007	1.592	1200			Manhole	Adoptable	1	7.001	58.415	300	Circular
										0	7.002	58.415	300	Circular
SW17	704804.120	732803.918	60.045	1.583	1200			Manhole	Adoptable	1	7.000	58.462	300	Circular
										0	7.001	58.462	300	Circular
SW18	704802.735	732784.969	60.177	1.525	1200			Manhole	Adoptable					

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										0	7.000	58.652	300	Circular
SW19-HB	704701.187	732782.884	60.410	2.240	1200			Manhole	Adoptable					
										0	3.000	58.170	225	Circular
EXSW1-35-11	704724.495	732880.351	59.195	2.345	1200			Manhole	Adoptable	1	1.008	56.850	525	Circular
EXSW1-39-1	704805.875	732850.468	58.883	0.890	1200			Manhole	Adoptable	1	7.002	57.993	300	Circular

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Rainfall Methodology	FSR		Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
FSR Region	England and Wales		2	20	0	0
M5-60 (mm)	16.700		30	20	0	0
Ratio-R	0.270		100	20	0	0
Summer CV	0.750					
Winter CV	0.840					
Analysis Speed	Normal					
Skip Steady State	No					
Drain Down Time (mins)	240					
Additional Storage (m³/ha)	20.0					
Storm Durations (mins)	15					
	30					
	60					
	120					
	180					
	240					
	360					
Check Discharge Rate(s)	No					
Check Discharge Volume	No					
100 year 360 minute (m³)						

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Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year +20% CC 15 minute summer	124.322	35.179
2 year +20% CC 15 minute winter	87.243	35.179
2 year +20% CC 30 minute summer	85.370	24.157
2 year +20% CC 30 minute winter	59.909	24.157
2 year +20% CC 60 minute summer	60.923	16.100
2 year +20% CC 60 minute winter	40.476	16.100
2 year +20% CC 120 minute summer	39.923	10.550
2 year +20% CC 120 minute winter	26.524	10.550
2 year +20% CC 180 minute summer	31.894	8.207
2 year +20% CC 180 minute winter	20.732	8.207
2 year +20% CC 240 minute summer	25.966	6.862
2 year +20% CC 240 minute winter	17.251	6.862
2 year +20% CC 360 minute summer	20.662	5.317
2 year +20% CC 360 minute winter	13.431	5.317
30 year +20% CC 15 minute summer	232.676	65.839
30 year +20% CC 15 minute winter	163.282	65.839
30 year +20% CC 30 minute summer	162.061	45.858
30 year +20% CC 30 minute winter	113.727	45.858
30 year +20% CC 60 minute summer	116.163	30.698
30 year +20% CC 60 minute winter	77.176	30.698
30 year +20% CC 120 minute summer	75.684	20.001
30 year +20% CC 120 minute winter	50.282	20.001
30 year +20% CC 180 minute summer	59.793	15.387
30 year +20% CC 180 minute winter	38.867	15.387
30 year +20% CC 240 minute summer	48.055	12.700
30 year +20% CC 240 minute winter	31.927	12.700
30 year +20% CC 360 minute summer	37.435	9.633
30 year +20% CC 360 minute winter	24.333	9.633
100 year +20% CC 15 minute summer	298.058	84.340

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100 year +20% CC 15 minute winter	209.164	84.340
100 year +20% CC 30 minute summer	210.368	59.527
100 year +20% CC 30 minute winter	147.626	59.527
100 year +20% CC 60 minute summer	152.181	40.217
100 year +20% CC 60 minute winter	101.106	40.217
100 year +20% CC 120 minute summer	99.554	26.309
100 year +20% CC 120 minute winter	66.141	26.309
100 year +20% CC 180 minute summer	78.512	20.204
100 year +20% CC 180 minute winter	51.035	20.204
100 year +20% CC 240 minute summer	62.844	16.608
100 year +20% CC 240 minute winter	41.752	16.608
100 year +20% CC 360 minute summer	48.542	12.492
100 year +20% CC 360 minute winter	31.554	12.492

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Results for 2 year +20% CC Critical Storm Duration. Lowest mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event (Upstream Depth)	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	12	57.214	0.251	113.2	0.6435	0.0000	OK	15 minute winter	1.008	EXSW1-35-11	112.6	1.190	0.443	3.8503	82.8
15 minute winter	SW02	10	58.165	0.055	6.8	0.0910	0.0000	OK	15 minute winter	6.000	SW01	6.6	0.898	0.127	0.3234	
15 minute winter	SW03	11	57.314	0.235	95.9	0.3016	0.0000	OK	15 minute winter	1.007	SW01	93.8	0.969	0.369	4.0744	
15 minute winter	SW04	11	57.457	0.177	80.3	0.2139	0.0000	OK	15 minute winter	1.006	SW03	80.2	1.134	0.289	1.9207	
15 minute winter	SW05	11	57.524	0.194	78.8	0.2342	0.0000	OK	15 minute winter	1.005	SW04	78.9	1.282	0.284	0.4124	
15 minute winter	SW06	11	57.609	0.168	64.2	0.2167	0.0000	OK	15 minute winter	1.004	SW05	64.4	1.082	0.232	0.8899	
15 minute winter	SW07	11	57.798	0.148	58.8	0.1787	0.0000	OK	15 minute winter	1.003	SW06	59.3	1.196	0.213	1.3988	
15 minute winter	SW08	11	58.281	0.110	28.8	0.1889	0.0000	OK	15 minute winter	1.002	SW07	27.2	1.032	0.183	1.3574	
15 minute winter	SW09	10	58.546	0.089	18.7	0.1593	0.0000	OK	15 minute winter	1.001	SW08	18.6	0.814	0.125	1.1828	
15 minute winter	SW10	10	58.710	0.060	6.8	0.0994	0.0000	OK	15 minute winter	1.000	SW09	6.8	0.592	0.160	0.3344	
15 minute winter	SW11	10	59.077	0.104	32.2	0.4002	0.0000	OK	15 minute winter	2.000	SW07	30.2	1.242	0.166	2.2079	
15 minute winter	SW12	10	58.441	0.083	13.6	0.1041	0.0000	OK	15 minute winter	4.001	SW05	13.5	0.889	0.149	0.1547	
15 minute winter	SW13	10	58.673	0.083	11.9	0.1904	0.0000	OK	15 minute winter	4.000	SW12	11.9	0.897	0.282	0.4625	
15 minute winter	SW14	10	58.173	0.087	13.6	0.1500	0.0000	OK	15 minute winter	5.001	SW03	13.1	0.938	0.309	0.6643	
15 minute winter	SW15	10	58.183	0.077	6.8	0.1352	0.0000	OK	15 minute winter	5.000	SW14	6.8	0.533	0.159	0.0389	
15 minute summer	SW16	10	58.541	0.126	38.9	0.3168	0.0000	OK	15 minute summer	7.002	EXSW1-39-1	38.9	1.422	0.350	1.1542	15.1
15 minute summer	SW17	10	58.571	0.109	20.3	0.1782	0.0000	OK	15 minute summer	7.001	SW16	20.3	0.794	0.183	0.1201	
15 minute summer	SW18	10	58.722	0.070	13.5	0.1526	0.0000	OK	15 minute summer	7.000	SW17	13.5	0.770	0.122	0.3377	
15 minute summer	SW19-HB	55	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute summer	Hydro-Brake®	SW06	2.0				
15 minute winter	EXSW1-35-11	12	57.073	0.223	119.8	0.0000	0.0000	OK								
15 minute summer	EXSW1-39-1	10	58.114	0.121	50.4	0.0000	0.0000	OK								

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Results for 30 year +20% CC Critical Storm Duration. Lowest mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event (Upstream Depth)	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	11	57.338	0.375	214.2	0.9617	0.0000	OK	15 minute winter	1.008	EXSW1-35-11	210.3	1.427	0.827	6.0511	129.1
15 minute winter	SW02	10	58.186	0.076	12.7	0.1268	0.0000	OK	15 minute winter	6.000	SW01	12.5	1.072	0.241	0.5123	
15 minute winter	SW03	11	57.441	0.362	180.4	0.4646	0.0000	OK	15 minute winter	1.007	SW01	178.1	1.103	0.701	6.7566	
15 minute winter	SW04	11	57.549	0.269	150.9	0.3255	0.0000	OK	15 minute winter	1.006	SW03	151.1	1.272	0.544	3.1971	
15 minute winter	SW05	11	57.625	0.295	147.8	0.3575	0.0000	OK	15 minute winter	1.005	SW04	148.2	1.415	0.533	0.7016	
15 minute winter	SW06	11	57.697	0.256	120.0	0.3292	0.0000	OK	15 minute winter	1.004	SW05	121.1	1.190	0.436	1.5174	
15 minute winter	SW07	11	57.868	0.218	111.3	0.2641	0.0000	OK	15 minute winter	1.003	SW06	112.6	1.331	0.405	2.3840	
15 minute winter	SW08	11	58.326	0.155	54.1	0.2672	0.0000	OK	15 minute winter	1.002	SW07	51.8	1.229	0.348	2.1703	
15 minute summer	SW09	10	58.580	0.123	34.9	0.2221	0.0000	OK	15 minute summer	1.001	SW08	35.2	0.954	0.237	1.9060	
15 minute winter	SW10	10	58.734	0.084	12.7	0.1377	0.0000	OK	15 minute winter	1.000	SW09	12.7	0.714	0.300	0.5163	
15 minute winter	SW11	10	59.120	0.147	60.1	0.5666	0.0000	OK	15 minute winter	2.000	SW07	58.0	1.480	0.318	3.5453	
15 minute winter	SW12	10	58.476	0.118	25.4	0.1473	0.0000	OK	15 minute winter	4.001	SW05	25.3	1.050	0.280	0.2466	
15 minute summer	SW13	10	58.709	0.119	22.2	0.2733	0.0000	OK	15 minute summer	4.000	SW12	22.2	1.051	0.525	0.7358	
15 minute winter	SW14	10	58.213	0.127	25.3	0.2178	0.0000	OK	15 minute winter	5.001	SW03	24.7	1.099	0.584	1.0710	
15 minute winter	SW15	10	58.224	0.118	12.7	0.2058	0.0000	OK	15 minute winter	5.000	SW14	12.6	0.596	0.298	0.0652	
15 minute winter	SW16	10	58.600	0.185	72.8	0.4661	0.0000	OK	15 minute winter	7.002	EXSW1-39-1	72.9	1.650	0.656	1.8630	31.7
15 minute winter	SW17	10	58.629	0.167	38.0	0.2728	0.0000	OK	15 minute winter	7.001	SW16	38.0	0.884	0.342	0.2018	
15 minute summer	SW18	10	58.748	0.096	25.3	0.2102	0.0000	OK	15 minute summer	7.000	SW17	25.3	0.865	0.228	0.5674	
15 minute summer	SW19-HB	55	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute summer	Hydro-Brake®	SW06	2.0				
15 minute winter	EXSW1-35-11	11	57.159	0.309	228.7	0.0000	0.0000	OK								
15 minute winter	EXSW1-39-1	10	58.168	0.175	94.4	0.0000	0.0000	OK								

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Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event (Upstream Depth)	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	11	57.413	0.450	272.2	1.1523	0.0000	OK	15 minute winter	1.008	EXSW1-35-11	268.9	1.529	1.058	7.1325	157.0
15 minute winter	SW02	10	58.197	0.087	16.2	0.1450	0.0000	OK	15 minute winter	6.000	SW01	16.1	1.146	0.309	0.6135	
15 minute winter	SW03	11	57.525	0.446	228.2	0.5719	0.0000	OK	15 minute winter	1.007	SW01	226.0	1.155	0.889	8.1828	
15 minute winter	SW04	11	57.623	0.343	191.8	0.4140	0.0000	OK	15 minute winter	1.006	SW03	190.7	1.306	0.686	3.9026	
15 minute winter	SW05	11	57.702	0.372	188.4	0.4495	0.0000	OK	15 minute winter	1.005	SW04	188.3	1.436	0.677	0.9031	
15 minute winter	SW06	11	57.759	0.318	153.6	0.4098	0.0000	OK	15 minute winter	1.004	SW05	154.2	1.197	0.555	1.9396	
15 minute winter	SW07	10	57.908	0.258	144.0	0.3120	0.0000	OK	15 minute winter	1.003	SW06	144.7	1.373	0.521	3.0072	
15 minute winter	SW08	10	58.351	0.180	69.4	0.3104	0.0000	OK	15 minute winter	1.002	SW07	66.6	1.310	0.448	2.6171	
15 minute summer	SW09	10	58.598	0.141	44.6	0.2535	0.0000	OK	15 minute summer	1.001	SW08	45.2	1.008	0.304	2.3088	
15 minute winter	SW10	10	58.746	0.096	16.2	0.1573	0.0000	OK	15 minute winter	1.000	SW09	16.2	0.769	0.382	0.6101	
15 minute winter	SW11	10	59.143	0.170	77.1	0.6542	0.0000	OK	15 minute winter	2.000	SW07	74.8	1.580	0.410	4.2805	
15 minute winter	SW12	10	58.494	0.136	32.5	0.1698	0.0000	OK	15 minute winter	4.001	SW05	32.4	1.118	0.358	0.2966	
15 minute summer	SW13	10	58.730	0.140	28.4	0.3207	0.0000	OK	15 minute summer	4.000	SW12	28.4	1.117	0.672	0.8853	
15 minute winter	SW14	10	58.236	0.150	32.3	0.2568	0.0000	OK	15 minute winter	5.001	SW03	31.6	1.159	0.746	1.2987	
15 minute winter	SW15	10	58.247	0.141	16.2	0.2466	0.0000	OK	15 minute winter	5.000	SW14	16.1	0.622	0.380	0.0802	
15 minute winter	SW16	10	58.638	0.223	93.2	0.5600	0.0000	OK	15 minute winter	7.002	EXSW1-39-1	93.2	1.725	0.838	2.2763	40.6
15 minute winter	SW17	10	58.666	0.204	48.7	0.3331	0.0000	OK	15 minute winter	7.001	SW16	48.6	0.908	0.438	0.2514	
15 minute winter	SW18	10	58.762	0.110	32.5	0.2398	0.0000	OK	15 minute winter	7.000	SW17	32.5	0.889	0.292	0.7058	
15 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute summer	Hydro-Brake®	SW06	2.0				
15 minute winter	EXSW1-35-11	11	57.202	0.352	292.5	0.0000	0.0000	OK								
15 minute winter	EXSW1-39-1	10	58.200	0.207	120.8	0.0000	0.0000	OK								

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Results for 2 year +20% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW01	12	57.210	0.247	110.2	0.6319	0.0000	OK	15 minute summer	1.008	EXSW1-35-11	109.3	1.181	0.430	3.7667	77.0
15 minute summer	SW02	10	58.165	0.055	6.8	0.0907	0.0000	OK	15 minute summer	6.000	SW01	6.6	0.896	0.127	0.3217	
15 minute summer	SW03	11	57.311	0.232	94.2	0.2972	0.0000	OK	15 minute summer	1.007	SW01	91.7	0.968	0.361	3.9839	
15 minute summer	SW04	11	57.455	0.175	78.9	0.2119	0.0000	OK	15 minute summer	1.006	SW03	78.7	1.131	0.283	1.8904	
15 minute summer	SW05	11	57.522	0.192	77.5	0.2320	0.0000	OK	15 minute summer	1.005	SW04	77.5	1.276	0.279	0.4072	
15 minute summer	SW06	11	57.608	0.167	63.2	0.2146	0.0000	OK	15 minute summer	1.004	SW05	63.3	1.078	0.228	0.8785	
15 minute summer	SW07	11	57.796	0.146	57.8	0.1771	0.0000	OK	15 minute summer	1.003	SW06	58.4	1.193	0.210	1.3812	
15 minute summer	SW08	11	58.280	0.109	28.7	0.1871	0.0000	OK	15 minute summer	1.002	SW07	26.7	1.027	0.179	1.3395	
15 minute summer	SW09	10	58.546	0.089	18.6	0.1592	0.0000	OK	15 minute summer	1.001	SW08	18.5	0.818	0.124	1.1651	
15 minute summer	SW10	10	58.710	0.060	6.8	0.0994	0.0000	OK	15 minute summer	1.000	SW09	6.8	0.592	0.160	0.3343	
15 minute summer	SW11	10	59.076	0.103	32.2	0.3970	0.0000	OK	15 minute summer	2.000	SW07	29.7	1.238	0.163	2.1804	
15 minute summer	SW12	10	58.441	0.083	13.5	0.1037	0.0000	OK	15 minute summer	4.001	SW05	13.3	0.887	0.147	0.1538	
15 minute summer	SW13	10	58.673	0.083	11.8	0.1896	0.0000	OK	15 minute summer	4.000	SW12	11.8	0.895	0.279	0.4597	
15 minute summer	SW14	10	58.173	0.087	13.5	0.1492	0.0000	OK	15 minute summer	5.001	SW03	12.9	0.936	0.305	0.6593	
15 minute summer	SW15	10	58.183	0.077	6.8	0.1348	0.0000	OK	15 minute summer	5.000	SW14	6.7	0.549	0.159	0.0387	
15 minute summer	SW16	10	58.541	0.126	38.9	0.3168	0.0000	OK	15 minute summer	7.002	EXSW1-39-1	38.9	1.422	0.350	1.1542	15.1
15 minute summer	SW17	10	58.571	0.109	20.3	0.1782	0.0000	OK	15 minute summer	7.001	SW16	20.3	0.794	0.183	0.1201	
15 minute summer	SW18	10	58.722	0.070	13.5	0.1526	0.0000	OK	15 minute summer	7.000	SW17	13.5	0.770	0.122	0.3377	
15 minute summer	SW19-HB	55	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute summer	Hydro-Brake®	SW06	2.0				
15 minute summer	EXSW1-35-11	12	57.070	0.220	115.0	0.0000	0.0000	OK								
15 minute summer	EXSW1-39-1	10	58.114	0.121	50.4	0.0000	0.0000	OK								

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Results for 2 year +20% CC 15 minute winter. 255 minute analysis at 1 minute timestep. Mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	12	57.214	0.251	113.2	0.6435	0.0000	OK	15 minute winter	1.008	EXSW1-35-11	112.6	1.190	0.443	3.8503	82.8
15 minute winter	SW02	10	58.165	0.055	6.8	0.0910	0.0000	OK	15 minute winter	6.000	SW01	6.6	0.898	0.127	0.3234	
15 minute winter	SW03	11	57.314	0.235	95.9	0.3016	0.0000	OK	15 minute winter	1.007	SW01	93.8	0.969	0.369	4.0744	
15 minute winter	SW04	11	57.457	0.177	80.3	0.2139	0.0000	OK	15 minute winter	1.006	SW03	80.2	1.134	0.289	1.9207	
15 minute winter	SW05	11	57.524	0.194	78.8	0.2342	0.0000	OK	15 minute winter	1.005	SW04	78.9	1.282	0.284	0.4124	
15 minute winter	SW06	11	57.609	0.168	64.2	0.2167	0.0000	OK	15 minute winter	1.004	SW05	64.4	1.082	0.232	0.8899	
15 minute winter	SW07	11	57.798	0.148	58.8	0.1787	0.0000	OK	15 minute winter	1.003	SW06	59.3	1.196	0.213	1.3988	
15 minute winter	SW08	11	58.281	0.110	28.8	0.1889	0.0000	OK	15 minute winter	1.002	SW07	27.2	1.032	0.183	1.3574	
15 minute winter	SW09	10	58.546	0.089	18.7	0.1593	0.0000	OK	15 minute winter	1.001	SW08	18.6	0.814	0.125	1.1828	
15 minute winter	SW10	10	58.710	0.060	6.8	0.0994	0.0000	OK	15 minute winter	1.000	SW09	6.8	0.592	0.160	0.3344	
15 minute winter	SW11	10	59.077	0.104	32.2	0.4002	0.0000	OK	15 minute winter	2.000	SW07	30.2	1.242	0.166	2.2079	
15 minute winter	SW12	10	58.441	0.083	13.6	0.1041	0.0000	OK	15 minute winter	4.001	SW05	13.5	0.889	0.149	0.1547	
15 minute winter	SW13	10	58.673	0.083	11.9	0.1904	0.0000	OK	15 minute winter	4.000	SW12	11.9	0.897	0.282	0.4625	
15 minute winter	SW14	10	58.173	0.087	13.6	0.1500	0.0000	OK	15 minute winter	5.001	SW03	13.1	0.938	0.309	0.6643	
15 minute winter	SW15	10	58.183	0.077	6.8	0.1352	0.0000	OK	15 minute winter	5.000	SW14	6.8	0.533	0.159	0.0389	
15 minute winter	SW16	10	58.541	0.126	38.9	0.3167	0.0000	OK	15 minute winter	7.002	EXSW1-39-1	38.9	1.422	0.350	1.1538	16.9
15 minute winter	SW17	10	58.571	0.109	20.3	0.1781	0.0000	OK	15 minute winter	7.001	SW16	20.3	0.794	0.183	0.1201	
15 minute winter	SW18	10	58.722	0.070	13.5	0.1526	0.0000	OK	15 minute winter	7.000	SW17	13.5	0.770	0.122	0.3376	
15 minute winter	SW19-HB	55	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute winter	Hydro-Brake®	SW06	2.0				
15 minute winter	EXSW1-35-11	12	57.073	0.223	119.8	0.0000	0.0000	OK								
15 minute winter	EXSW1-39-1	10	58.114	0.121	50.4	0.0000	0.0000	OK								

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Results for 2 year +20% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW01	19	57.204	0.241	103.2	0.6169	0.0000	OK	30 minute summer	1.008	EXSW1-35-11	102.9	1.157	0.405	3.6334	96.6
30 minute summer	SW02	18	58.162	0.052	6.2	0.0858	0.0000	OK	30 minute summer	6.000	SW01	5.9	0.873	0.114	0.2984	
30 minute summer	SW03	19	57.302	0.223	86.4	0.2861	0.0000	OK	30 minute summer	1.007	SW01	87.1	0.948	0.343	3.8325	
30 minute summer	SW04	19	57.446	0.166	72.2	0.2011	0.0000	OK	30 minute summer	1.006	SW03	73.0	1.112	0.263	1.7843	
30 minute summer	SW05	18	57.511	0.181	71.1	0.2196	0.0000	OK	30 minute summer	1.005	SW04	71.0	1.258	0.256	0.3787	
30 minute summer	SW06	18	57.599	0.158	58.4	0.2031	0.0000	OK	30 minute summer	1.004	SW05	58.0	1.065	0.209	0.8159	
30 minute summer	SW07	18	57.790	0.140	53.8	0.1696	0.0000	OK	30 minute summer	1.003	SW06	53.5	1.170	0.192	1.2903	
30 minute summer	SW08	18	58.275	0.104	25.5	0.1793	0.0000	OK	30 minute summer	1.002	SW07	24.3	1.002	0.164	1.2584	
30 minute summer	SW09	18	58.540	0.083	16.9	0.1496	0.0000	OK	30 minute summer	1.001	SW08	16.5	0.788	0.111	1.1091	
30 minute summer	SW10	17	58.707	0.057	6.2	0.0938	0.0000	OK	30 minute summer	1.000	SW09	6.0	0.574	0.143	0.3073	
30 minute summer	SW11	18	59.072	0.099	29.5	0.3821	0.0000	OK	30 minute summer	2.000	SW07	27.9	1.210	0.153	2.0775	
30 minute summer	SW12	18	58.437	0.079	12.2	0.0985	0.0000	OK	30 minute summer	4.001	SW05	12.2	0.868	0.135	0.1437	
30 minute summer	SW13	17	58.668	0.078	10.9	0.1799	0.0000	OK	30 minute summer	4.000	SW12	10.6	0.872	0.251	0.4244	
30 minute summer	SW14	18	58.168	0.082	12.3	0.1414	0.0000	OK	30 minute summer	5.001	SW03	11.9	0.915	0.280	0.6167	
30 minute summer	SW15	17	58.178	0.072	6.2	0.1255	0.0000	OK	30 minute summer	5.000	SW14	6.1	0.521	0.143	0.0354	
30 minute summer	SW16	17	58.534	0.118	35.3	0.2978	0.0000	OK	30 minute summer	7.002	EXSW1-39-1	34.6	1.384	0.312	1.0608	20.8
30 minute summer	SW17	17	58.564	0.102	18.5	0.1665	0.0000	OK	30 minute summer	7.001	SW16	18.2	0.776	0.164	0.1101	
30 minute summer	SW18	17	58.719	0.067	12.4	0.1459	0.0000	OK	30 minute summer	7.000	SW17	12.3	0.758	0.111	0.3109	
30 minute summer	SW19-HB	55	58.272	0.102	2.0	0.1158	0.0000	OK	30 minute summer	Hydro-Brake®	SW06	2.0				
30 minute summer	EXSW1-35-11	19	57.063	0.213	111.0	0.0000	0.0000	OK								
30 minute summer	EXSW1-39-1	18	58.107	0.114	45.1	0.0000	0.0000	OK								

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Results for 2 year +20% CC 30 minute winter. 270 minute analysis at 1 minute timestep. Mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	SW01	19	57.190	0.227	93.8	0.5827	0.0000	OK	30 minute winter	1.008	EXSW1-35-11	93.5	1.127	0.368	3.3837	104.5
30 minute winter	SW02	18	58.159	0.049	5.4	0.0808	0.0000	OK	30 minute winter	6.000	SW01	5.3	0.843	0.101	0.2739	
30 minute winter	SW03	19	57.288	0.209	77.9	0.2678	0.0000	OK	30 minute winter	1.007	SW01	78.1	0.921	0.307	3.5349	
30 minute winter	SW04	19	57.436	0.156	65.1	0.1889	0.0000	OK	30 minute winter	1.006	SW03	65.4	1.084	0.235	1.6389	
30 minute winter	SW05	19	57.500	0.170	63.7	0.2063	0.0000	OK	30 minute winter	1.005	SW04	63.9	1.230	0.230	0.3482	
30 minute winter	SW06	19	57.589	0.148	52.3	0.1908	0.0000	OK	30 minute winter	1.004	SW05	52.2	1.041	0.188	0.7496	
30 minute winter	SW07	18	57.781	0.131	47.8	0.1587	0.0000	OK	30 minute winter	1.003	SW06	47.7	1.141	0.172	1.1799	
30 minute winter	SW08	18	58.269	0.098	22.3	0.1689	0.0000	OK	30 minute winter	1.002	SW07	21.8	0.971	0.146	1.1597	
30 minute winter	SW09	18	58.535	0.078	14.7	0.1403	0.0000	OK	30 minute winter	1.001	SW08	14.5	0.745	0.097	1.0165	
30 minute winter	SW10	17	58.704	0.054	5.4	0.0880	0.0000	OK	30 minute winter	1.000	SW09	5.3	0.554	0.126	0.2807	
30 minute winter	SW11	18	59.066	0.093	25.5	0.3590	0.0000	OK	30 minute winter	2.000	SW07	24.7	1.169	0.136	1.9045	
30 minute winter	SW12	18	58.431	0.073	10.6	0.0915	0.0000	OK	30 minute winter	4.001	SW05	10.6	0.835	0.117	0.1297	
30 minute winter	SW13	17	58.663	0.073	9.4	0.1667	0.0000	OK	30 minute winter	4.000	SW12	9.3	0.840	0.219	0.3843	
30 minute winter	SW14	18	58.163	0.077	10.7	0.1327	0.0000	OK	30 minute winter	5.001	SW03	10.5	0.885	0.249	0.5655	
30 minute winter	SW15	17	58.173	0.067	5.4	0.1165	0.0000	OK	30 minute winter	5.000	SW14	5.3	0.494	0.126	0.0323	
30 minute winter	SW16	17	58.525	0.110	30.7	0.2762	0.0000	OK	30 minute winter	7.002	EXSW1-39-1	30.4	1.336	0.273	0.9618	23.3
30 minute winter	SW17	17	58.556	0.094	16.0	0.1531	0.0000	OK	30 minute winter	7.001	SW16	15.9	0.756	0.143	0.0989	
30 minute winter	SW18	17	58.714	0.062	10.7	0.1356	0.0000	OK	30 minute winter	7.000	SW17	10.6	0.734	0.096	0.2781	
30 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	30 minute winter	Hydro-Brake®	SW06	2.0				
30 minute winter	EXSW1-35-11	19	57.053	0.203	101.6	0.0000	0.0000	OK								
30 minute winter	EXSW1-39-1	18	58.099	0.106	39.4	0.0000	0.0000	OK								

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Results for 2 year +20% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW01	34	57.175	0.212	82.4	0.5423	0.0000	OK	60 minute summer	1.008	EXSW1-35-11	82.1	1.088	0.323	3.0823	121.8
60 minute summer	SW02	33	58.156	0.046	4.7	0.0757	0.0000	OK	60 minute summer	6.000	SW01	4.6	0.811	0.089	0.2496	
60 minute summer	SW03	34	57.273	0.194	68.5	0.2483	0.0000	OK	60 minute summer	1.007	SW01	68.7	0.895	0.270	3.2031	
60 minute summer	SW04	34	57.425	0.145	57.3	0.1755	0.0000	OK	60 minute summer	1.006	SW03	57.5	1.055	0.207	1.4834	
60 minute summer	SW05	34	57.488	0.158	56.2	0.1915	0.0000	OK	60 minute summer	1.005	SW04	56.3	1.198	0.202	0.3149	
60 minute summer	SW06	34	57.579	0.138	46.1	0.1774	0.0000	OK	60 minute summer	1.004	SW05	46.1	1.017	0.166	0.6779	
60 minute summer	SW07	33	57.772	0.122	42.0	0.1476	0.0000	OK	60 minute summer	1.003	SW06	41.8	1.107	0.151	1.0664	
60 minute summer	SW08	33	58.263	0.092	19.7	0.1579	0.0000	OK	60 minute summer	1.002	SW07	19.1	0.936	0.129	1.0552	
60 minute summer	SW09	33	58.530	0.073	12.9	0.1316	0.0000	OK	60 minute summer	1.001	SW08	12.7	0.719	0.086	0.9256	
60 minute summer	SW10	32	58.700	0.050	4.7	0.0823	0.0000	OK	60 minute summer	1.000	SW09	4.6	0.531	0.110	0.2569	
60 minute summer	SW11	33	59.061	0.088	22.5	0.3364	0.0000	OK	60 minute summer	2.000	SW07	21.8	1.128	0.119	1.7378	
60 minute summer	SW12	33	58.426	0.068	9.4	0.0855	0.0000	OK	60 minute summer	4.001	SW05	9.3	0.808	0.103	0.1182	
60 minute summer	SW13	32	58.658	0.068	8.3	0.1560	0.0000	OK	60 minute summer	4.000	SW12	8.2	0.812	0.193	0.3501	
60 minute summer	SW14	33	58.158	0.072	9.4	0.1237	0.0000	OK	60 minute summer	5.001	SW03	9.2	0.853	0.218	0.5138	
60 minute summer	SW15	33	58.167	0.061	4.7	0.1071	0.0000	OK	60 minute summer	5.000	SW14	4.7	0.483	0.110	0.0291	
60 minute summer	SW16	32	58.517	0.102	27.0	0.2575	0.0000	OK	60 minute summer	7.002	EXSW1-39-1	26.8	1.291	0.241	0.8759	27.7
60 minute summer	SW17	32	58.549	0.087	14.1	0.1417	0.0000	OK	60 minute summer	7.001	SW16	14.0	0.738	0.126	0.0894	
60 minute summer	SW18	32	58.711	0.059	9.5	0.1278	0.0000	OK	60 minute summer	7.000	SW17	9.4	0.719	0.085	0.2517	
60 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	60 minute summer	Hydro-Brake®	SW06	2.0				
60 minute summer	EXSW1-35-11	34	57.039	0.189	89.1	0.0000	0.0000	OK								
60 minute summer	EXSW1-39-1	33	58.092	0.099	34.8	0.0000	0.0000	OK								

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Results for 2 year +20% CC 60 minute winter. 300 minute analysis at 1 minute timestep. Mass balance: 99.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	SW01	34	57.153	0.190	67.6	0.4858	0.0000	OK	60 minute winter	1.008	EXSW1-35-11	67.5	1.031	0.266	2.6676	132.6
60 minute winter	SW02	33	58.151	0.041	3.7	0.0677	0.0000	OK	60 minute winter	6.000	SW01	3.7	0.759	0.071	0.2131	
60 minute winter	SW03	34	57.251	0.172	56.1	0.2206	0.0000	OK	60 minute winter	1.007	SW01	56.0	0.852	0.220	2.7445	
60 minute winter	SW04	34	57.410	0.130	46.9	0.1569	0.0000	OK	60 minute winter	1.006	SW03	46.9	1.008	0.169	1.2678	
60 minute winter	SW05	34	57.471	0.141	46.0	0.1709	0.0000	OK	60 minute winter	1.005	SW04	46.0	1.146	0.166	0.2692	
60 minute winter	SW06	34	57.564	0.123	37.7	0.1580	0.0000	OK	60 minute winter	1.004	SW05	37.8	0.976	0.136	0.5782	
60 minute winter	SW07	33	57.759	0.109	33.9	0.1315	0.0000	OK	60 minute winter	1.003	SW06	33.9	1.055	0.122	0.9068	
60 minute winter	SW08	34	58.253	0.082	15.7	0.1418	0.0000	OK	60 minute winter	1.002	SW07	15.6	0.883	0.105	0.9094	
60 minute winter	SW09	33	58.523	0.066	10.2	0.1182	0.0000	OK	60 minute winter	1.001	SW08	10.2	0.666	0.068	0.7930	
60 minute winter	SW10	33	58.695	0.045	3.7	0.0735	0.0000	OK	60 minute winter	1.000	SW09	3.7	0.492	0.087	0.2203	
60 minute winter	SW11	33	59.051	0.078	17.7	0.3009	0.0000	OK	60 minute winter	2.000	SW07	17.5	1.059	0.096	1.4851	
60 minute winter	SW12	33	58.419	0.061	7.4	0.0759	0.0000	OK	60 minute winter	4.001	SW05	7.4	0.757	0.082	0.1000	
60 minute winter	SW13	32	58.650	0.060	6.5	0.1379	0.0000	OK	60 minute winter	4.000	SW12	6.5	0.761	0.154	0.2972	
60 minute winter	SW14	33	58.150	0.064	7.4	0.1100	0.0000	OK	60 minute winter	5.001	SW03	7.4	0.802	0.174	0.4369	
60 minute winter	SW15	33	58.159	0.053	3.7	0.0934	0.0000	OK	60 minute winter	5.000	SW14	3.7	0.453	0.087	0.0244	
60 minute winter	SW16	32	58.506	0.091	21.3	0.2275	0.0000	OK	60 minute winter	7.002	EXSW1-39-1	21.3	1.213	0.192	0.7409	31.1
60 minute winter	SW17	33	58.538	0.075	11.2	0.1235	0.0000	OK	60 minute winter	7.001	SW16	11.2	0.703	0.100	0.0746	
60 minute winter	SW18	32	58.704	0.052	7.5	0.1141	0.0000	OK	60 minute winter	7.000	SW17	7.5	0.682	0.067	0.2098	
60 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	60 minute winter	Hydro-Brake®	SW06	2.0				
60 minute winter	EXSW1-35-11	35	57.021	0.171	73.6	0.0000	0.0000	OK								
60 minute winter	EXSW1-39-1	33	58.081	0.088	27.6	0.0000	0.0000	OK								

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Results for 2 year +20% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 99.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	SW01	64	57.140	0.177	59.5	0.4530	0.0000	OK	120 minute summer	1.008	EXSW1-35-11	59.1	0.991	0.233	2.4286	156.0
120 minute summer	SW02	62	58.148	0.038	3.3	0.0632	0.0000	OK	120 minute summer	6.000	SW01	3.2	0.728	0.062	0.1928	
120 minute summer	SW03	64	57.239	0.160	49.5	0.2056	0.0000	OK	120 minute summer	1.007	SW01	49.4	0.827	0.194	2.4923	
120 minute summer	SW04	64	57.401	0.121	41.4	0.1466	0.0000	OK	120 minute summer	1.006	SW03	41.5	0.980	0.149	1.1526	
120 minute summer	SW05	64	57.462	0.132	40.6	0.1592	0.0000	OK	120 minute summer	1.005	SW04	40.6	1.115	0.146	0.2444	
120 minute summer	SW06	64	57.555	0.114	33.3	0.1471	0.0000	OK	120 minute summer	1.004	SW05	33.4	0.953	0.120	0.5235	
120 minute summer	SW07	64	57.751	0.101	29.6	0.1223	0.0000	OK	120 minute summer	1.003	SW06	29.7	1.023	0.107	0.8197	
120 minute summer	SW08	64	58.248	0.077	13.8	0.1323	0.0000	OK	120 minute summer	1.002	SW07	13.6	0.849	0.091	0.8254	
120 minute summer	SW09	62	58.518	0.061	9.1	0.1102	0.0000	OK	120 minute summer	1.001	SW08	8.8	0.643	0.059	0.7156	
120 minute summer	SW10	62	58.692	0.042	3.3	0.0690	0.0000	OK	120 minute summer	1.000	SW09	3.3	0.475	0.077	0.2006	
120 minute summer	SW11	62	59.046	0.073	15.8	0.2803	0.0000	OK	120 minute summer	2.000	SW07	15.2	1.018	0.083	1.3436	
120 minute summer	SW12	62	58.414	0.056	6.5	0.0705	0.0000	OK	120 minute summer	4.001	SW05	6.4	0.727	0.071	0.0901	
120 minute summer	SW13	62	58.646	0.056	5.8	0.1293	0.0000	OK	120 minute summer	4.000	SW12	5.7	0.735	0.135	0.2698	
120 minute summer	SW14	62	58.145	0.059	6.6	0.1021	0.0000	OK	120 minute summer	5.001	SW03	6.4	0.771	0.150	0.3935	
120 minute summer	SW15	62	58.155	0.049	3.3	0.0864	0.0000	OK	120 minute summer	5.000	SW14	3.3	0.442	0.077	0.0219	
120 minute summer	SW16	62	58.500	0.085	18.9	0.2129	0.0000	OK	120 minute summer	7.002	EXSW1-39-1	18.7	1.168	0.168	0.6752	36.3
120 minute summer	SW17	62	58.532	0.070	9.9	0.1148	0.0000	OK	120 minute summer	7.001	SW16	9.8	0.683	0.088	0.0677	
120 minute summer	SW18	62	58.701	0.049	6.7	0.1076	0.0000	OK	120 minute summer	7.000	SW17	6.6	0.667	0.060	0.1906	
120 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	120 minute summer	Hydro-Brake®	SW06	2.0				
120 minute summer	EXSW1-35-11	64	57.010	0.160	64.4	0.0000	0.0000	OK								
120 minute summer	EXSW1-39-1	62	58.075	0.082	24.4	0.0000	0.0000	OK								

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Results for 2 year +20% CC 120 minute winter. 360 minute analysis at 2 minute timestep. Mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	SW01	64	57.117	0.154	46.0	0.3956	0.0000	OK	120 minute winter	1.008	EXSW1-35-11	45.9	0.927	0.181	2.0184	169.8
120 minute winter	SW02	62	58.143	0.033	2.5	0.0555	0.0000	OK	120 minute winter	6.000	SW01	2.5	0.674	0.047	0.1597	
120 minute winter	SW03	64	57.218	0.139	38.1	0.1779	0.0000	OK	120 minute winter	1.007	SW01	38.1	0.775	0.150	2.0512	
120 minute winter	SW04	64	57.385	0.105	32.0	0.1274	0.0000	OK	120 minute winter	1.006	SW03	32.0	0.923	0.115	0.9444	
120 minute winter	SW05	64	57.444	0.114	31.4	0.1380	0.0000	OK	120 minute winter	1.005	SW04	31.4	1.053	0.113	0.2002	
120 minute winter	SW06	64	57.540	0.099	25.9	0.1274	0.0000	OK	120 minute winter	1.004	SW05	25.9	0.906	0.093	0.4276	
120 minute winter	SW07	64	57.738	0.088	22.7	0.1064	0.0000	OK	120 minute winter	1.003	SW06	22.7	0.957	0.082	0.6698	
120 minute winter	SW08	64	58.238	0.067	10.4	0.1161	0.0000	OK	120 minute winter	1.002	SW07	10.4	0.786	0.070	0.6843	
120 minute winter	SW09	64	58.511	0.054	6.8	0.0967	0.0000	OK	120 minute winter	1.001	SW08	6.7	0.588	0.045	0.5949	
120 minute winter	SW10	62	58.687	0.037	2.5	0.0604	0.0000	OK	120 minute winter	1.000	SW09	2.5	0.436	0.058	0.1661	
120 minute winter	SW11	64	59.037	0.064	11.8	0.2464	0.0000	OK	120 minute winter	2.000	SW07	11.7	0.942	0.064	1.1162	
120 minute winter	SW12	64	58.407	0.049	4.9	0.0615	0.0000	OK	120 minute winter	4.001	SW05	4.9	0.674	0.054	0.0743	
120 minute winter	SW13	62	58.639	0.049	4.3	0.1117	0.0000	OK	120 minute winter	4.000	SW12	4.3	0.679	0.102	0.2204	
120 minute winter	SW14	62	58.138	0.052	5.0	0.0892	0.0000	OK	120 minute winter	5.001	SW03	4.9	0.715	0.116	0.3258	
120 minute winter	SW15	62	58.148	0.042	2.5	0.0733	0.0000	OK	120 minute winter	5.000	SW14	2.5	0.415	0.059	0.0178	
120 minute winter	SW16	62	58.488	0.073	14.3	0.1843	0.0000	OK	120 minute winter	7.002	EXSW1-39-1	14.2	1.083	0.128	0.5531	40.7
120 minute winter	SW17	62	58.522	0.060	7.5	0.0978	0.0000	OK	120 minute winter	7.001	SW16	7.5	0.643	0.067	0.0546	
120 minute winter	SW18	62	58.695	0.043	5.0	0.0937	0.0000	OK	120 minute winter	7.000	SW17	5.0	0.623	0.045	0.1532	
120 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	120 minute winter	Hydro-Brake®	SW06	2.0				
120 minute winter	EXSW1-35-11	64	56.990	0.140	50.1	0.0000	0.0000	OK								
120 minute winter	EXSW1-39-1	62	58.065	0.072	18.4	0.0000	0.0000	OK								

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Results for 2 year +20% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	SW01	96	57.119	0.156	46.5	0.4004	0.0000	OK	180 minute summer	1.008	EXSW1-35-11	47.3	0.937	0.186	2.0559	182.4
180 minute summer	SW02	92	58.144	0.034	2.7	0.0571	0.0000	OK	180 minute summer	6.000	SW01	2.6	0.686	0.050	0.1664	
180 minute summer	SW03	96	57.219	0.140	38.7	0.1794	0.0000	OK	180 minute summer	1.007	SW01	38.9	0.780	0.153	2.0817	
180 minute summer	SW04	92	57.386	0.106	32.5	0.1283	0.0000	OK	180 minute summer	1.006	SW03	32.4	0.925	0.116	0.9529	
180 minute summer	SW05	92	57.445	0.115	32.0	0.1392	0.0000	OK	180 minute summer	1.005	SW04	31.8	1.054	0.114	0.2024	
180 minute summer	SW06	92	57.541	0.100	26.4	0.1284	0.0000	OK	180 minute summer	1.004	SW05	26.1	0.908	0.094	0.4326	
180 minute summer	SW07	92	57.739	0.089	23.3	0.1077	0.0000	OK	180 minute summer	1.003	SW06	23.1	0.961	0.083	0.6793	
180 minute summer	SW08	92	58.239	0.068	11.2	0.1173	0.0000	OK	180 minute summer	1.002	SW07	10.6	0.788	0.071	0.6935	
180 minute summer	SW09	92	58.512	0.055	7.4	0.0995	0.0000	OK	180 minute summer	1.001	SW08	7.2	0.605	0.048	0.6107	
180 minute summer	SW10	92	58.688	0.038	2.7	0.0625	0.0000	OK	180 minute summer	1.000	SW09	2.7	0.447	0.063	0.1736	
180 minute summer	SW11	92	59.038	0.065	12.6	0.2508	0.0000	OK	180 minute summer	2.000	SW07	12.0	0.948	0.066	1.1419	
180 minute summer	SW12	92	58.409	0.051	5.3	0.0634	0.0000	OK	180 minute summer	4.001	SW05	5.2	0.685	0.057	0.0776	
180 minute summer	SW13	92	58.641	0.051	4.7	0.1160	0.0000	OK	180 minute summer	4.000	SW12	4.6	0.692	0.109	0.2317	
180 minute summer	SW14	92	58.140	0.054	5.4	0.0919	0.0000	OK	180 minute summer	5.001	SW03	5.2	0.725	0.122	0.3392	
180 minute summer	SW15	92	58.150	0.044	2.7	0.0764	0.0000	OK	180 minute summer	5.000	SW14	2.7	0.424	0.063	0.0187	
180 minute summer	SW16	92	58.490	0.075	15.2	0.1896	0.0000	OK	180 minute summer	7.002	EXSW1-39-1	15.0	1.097	0.135	0.5751	42.1
180 minute summer	SW17	92	58.524	0.062	7.9	0.1009	0.0000	OK	180 minute summer	7.001	SW16	7.9	0.649	0.071	0.0570	
180 minute summer	SW18	92	58.696	0.044	5.3	0.0961	0.0000	OK	180 minute summer	7.000	SW17	5.3	0.630	0.047	0.1597	
180 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	180 minute summer	Hydro-Brake®	SW06	2.0				
180 minute summer	EXSW1-35-11	96	56.992	0.142	51.2	0.0000	0.0000	OK								
180 minute summer	EXSW1-39-1	92	58.067	0.074	19.5	0.0000	0.0000	OK								

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Results for 2 year +20% CC 180 minute winter. 420 minute analysis at 4 minute timestep. Mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	SW01	96	57.100	0.137	36.4	0.3503	0.0000	OK	180 minute winter	1.008	EXSW1-35-11	36.4	0.872	0.143	1.7007	197.8
180 minute winter	SW02	96	58.140	0.030	1.9	0.0490	0.0000	OK	180 minute winter	6.000	SW01	1.9	0.625	0.037	0.1332	
180 minute winter	SW03	96	57.201	0.122	30.2	0.1570	0.0000	OK	180 minute winter	1.007	SW01	30.2	0.732	0.119	1.7248	
180 minute winter	SW04	92	57.373	0.093	25.4	0.1123	0.0000	OK	180 minute winter	1.006	SW03	25.4	0.876	0.092	0.7915	
180 minute winter	SW05	92	57.430	0.100	25.0	0.1215	0.0000	OK	180 minute winter	1.005	SW04	24.9	1.000	0.090	0.1672	
180 minute winter	SW06	92	57.528	0.087	20.7	0.1123	0.0000	OK	180 minute winter	1.004	SW05	20.6	0.863	0.074	0.3570	
180 minute winter	SW07	92	57.727	0.077	17.7	0.0935	0.0000	OK	180 minute winter	1.003	SW06	17.7	0.894	0.064	0.5580	
180 minute winter	SW08	92	58.231	0.060	8.2	0.1024	0.0000	OK	180 minute winter	1.002	SW07	8.1	0.730	0.054	0.5714	
180 minute winter	SW09	92	58.505	0.048	5.3	0.0860	0.0000	OK	180 minute winter	1.001	SW08	5.3	0.547	0.035	0.4983	
180 minute winter	SW10	96	58.682	0.032	1.9	0.0531	0.0000	OK	180 minute winter	1.000	SW09	1.9	0.402	0.045	0.1397	
180 minute winter	SW11	92	59.030	0.057	9.2	0.2181	0.0000	OK	180 minute winter	2.000	SW07	9.1	0.875	0.050	0.9347	
180 minute winter	SW12	92	58.402	0.044	3.9	0.0546	0.0000	OK	180 minute winter	4.001	SW05	3.9	0.631	0.043	0.0627	
180 minute winter	SW13	92	58.633	0.043	3.4	0.0991	0.0000	OK	180 minute winter	4.000	SW12	3.4	0.633	0.080	0.1860	
180 minute winter	SW14	96	58.132	0.046	3.8	0.0785	0.0000	OK	180 minute winter	5.001	SW03	3.8	0.664	0.090	0.2718	
180 minute winter	SW15	96	58.142	0.036	1.9	0.0625	0.0000	OK	180 minute winter	5.000	SW14	1.9	0.390	0.045	0.0145	
180 minute winter	SW16	92	58.480	0.065	11.1	0.1622	0.0000	OK	180 minute winter	7.002	EXSW1-39-1	11.1	1.009	0.100	0.4623	47.6
180 minute winter	SW17	92	58.514	0.052	5.8	0.0847	0.0000	OK	180 minute winter	7.001	SW16	5.8	0.605	0.052	0.0451	
180 minute winter	SW18	92	58.690	0.038	3.9	0.0833	0.0000	OK	180 minute winter	7.000	SW17	3.9	0.590	0.035	0.1262	
180 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	180 minute winter	Hydro-Brake®	SW06	2.0				
180 minute winter	EXSW1-35-11	96	56.974	0.124	39.6	0.0000	0.0000	OK								
180 minute winter	EXSW1-39-1	92	58.056	0.063	14.4	0.0000	0.0000	OK								

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Results for 2 year +20% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	SW01	124	57.108	0.145	40.8	0.3712	0.0000	OK	240 minute summer	1.008	EXSW1-35-11	40.7	0.898	0.160	1.8445	205.0
240 minute summer	SW02	124	58.142	0.032	2.2	0.0525	0.0000	OK	240 minute summer	6.000	SW01	2.2	0.652	0.042	0.1477	
240 minute summer	SW03	124	57.209	0.130	33.8	0.1665	0.0000	OK	240 minute summer	1.007	SW01	33.7	0.751	0.133	1.8735	
240 minute summer	SW04	124	57.379	0.099	28.3	0.1190	0.0000	OK	240 minute summer	1.006	SW03	28.3	0.896	0.102	0.8599	
240 minute summer	SW05	124	57.437	0.107	27.8	0.1289	0.0000	OK	240 minute summer	1.005	SW04	27.8	1.025	0.100	0.1817	
240 minute summer	SW06	124	57.534	0.093	23.0	0.1193	0.0000	OK	240 minute summer	1.004	SW05	23.0	0.885	0.083	0.3889	
240 minute summer	SW07	124	57.732	0.082	19.9	0.0995	0.0000	OK	240 minute summer	1.003	SW06	19.9	0.924	0.072	0.6092	
240 minute summer	SW08	124	58.234	0.063	9.2	0.1088	0.0000	OK	240 minute summer	1.002	SW07	9.2	0.757	0.062	0.6239	
240 minute summer	SW09	124	58.508	0.051	6.0	0.0914	0.0000	OK	240 minute summer	1.001	SW08	6.0	0.570	0.040	0.5444	
240 minute summer	SW10	124	58.685	0.035	2.2	0.0570	0.0000	OK	240 minute summer	1.000	SW09	2.2	0.420	0.052	0.1532	
240 minute summer	SW11	124	59.033	0.060	10.3	0.2315	0.0000	OK	240 minute summer	2.000	SW07	10.3	0.907	0.056	1.0198	
240 minute summer	SW12	124	58.404	0.046	4.3	0.0575	0.0000	OK	240 minute summer	4.001	SW05	4.3	0.650	0.047	0.0676	
240 minute summer	SW13	124	58.636	0.046	3.8	0.1050	0.0000	OK	240 minute summer	4.000	SW12	3.8	0.656	0.090	0.2013	
240 minute summer	SW14	124	58.135	0.049	4.4	0.0845	0.0000	OK	240 minute summer	5.001	SW03	4.4	0.693	0.104	0.3015	
240 minute summer	SW15	124	58.145	0.039	2.2	0.0682	0.0000	OK	240 minute summer	5.000	SW14	2.2	0.405	0.052	0.0162	
240 minute summer	SW16	124	58.484	0.069	12.5	0.1726	0.0000	OK	240 minute summer	7.002	EXSW1-39-1	12.5	1.045	0.112	0.5045	47.4
240 minute summer	SW17	124	58.517	0.055	6.5	0.0904	0.0000	OK	240 minute summer	7.001	SW16	6.5	0.621	0.058	0.0494	
240 minute summer	SW18	124	58.692	0.040	4.3	0.0873	0.0000	OK	240 minute summer	7.000	SW17	4.3	0.600	0.039	0.1373	
240 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	240 minute summer	Hydro-Brake®	SW06	2.0				
240 minute summer	EXSW1-35-11	124	56.982	0.132	44.4	0.0000	0.0000	OK								
240 minute summer	EXSW1-39-1	124	58.060	0.067	16.2	0.0000	0.0000	OK								

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Results for 2 year +20% CC 240 minute winter. 480 minute analysis at 4 minute timestep. Mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	SW01	124	57.088	0.125	30.8	0.3213	0.0000	OK	240 minute winter	1.008	EXSW1-35-11	30.7	0.831	0.121	1.5064	222.4
240 minute winter	SW02	128	58.137	0.027	1.6	0.0451	0.0000	OK	240 minute winter	6.000	SW01	1.6	0.593	0.031	0.1183	
240 minute winter	SW03	124	57.191	0.112	25.6	0.1436	0.0000	OK	240 minute winter	1.007	SW01	25.6	0.701	0.101	1.5232	
240 minute winter	SW04	124	57.365	0.085	21.6	0.1028	0.0000	OK	240 minute winter	1.006	SW03	21.6	0.843	0.078	0.6982	
240 minute winter	SW05	124	57.422	0.092	21.2	0.1112	0.0000	OK	240 minute winter	1.005	SW04	21.2	0.964	0.076	0.1474	
240 minute winter	SW06	124	57.521	0.080	17.6	0.1031	0.0000	OK	240 minute winter	1.004	SW05	17.6	0.835	0.063	0.3149	
240 minute winter	SW07	124	57.721	0.071	14.8	0.0853	0.0000	OK	240 minute winter	1.003	SW06	14.8	0.850	0.053	0.4908	
240 minute winter	SW08	124	58.226	0.055	6.8	0.0939	0.0000	OK	240 minute winter	1.002	SW07	6.8	0.694	0.046	0.5045	
240 minute winter	SW09	124	58.501	0.044	4.4	0.0789	0.0000	OK	240 minute winter	1.001	SW08	4.4	0.519	0.030	0.4392	
240 minute winter	SW10	124	58.680	0.030	1.6	0.0490	0.0000	OK	240 minute winter	1.000	SW09	1.6	0.382	0.038	0.1236	
240 minute winter	SW11	124	59.025	0.052	7.6	0.1998	0.0000	OK	240 minute winter	2.000	SW07	7.6	0.830	0.042	0.8239	
240 minute winter	SW12	124	58.398	0.040	3.2	0.0497	0.0000	OK	240 minute winter	4.001	SW05	3.2	0.598	0.035	0.0548	
240 minute winter	SW13	124	58.629	0.039	2.8	0.0902	0.0000	OK	240 minute winter	4.000	SW12	2.8	0.600	0.066	0.1623	
240 minute winter	SW14	128	58.128	0.042	3.2	0.0721	0.0000	OK	240 minute winter	5.001	SW03	3.2	0.632	0.076	0.2408	
240 minute winter	SW15	124	58.138	0.032	1.6	0.0565	0.0000	OK	240 minute winter	5.000	SW14	1.6	0.375	0.038	0.0127	
240 minute winter	SW16	124	58.474	0.059	9.2	0.1478	0.0000	OK	240 minute winter	7.002	EXSW1-39-1	9.2	0.957	0.083	0.4053	53.0
240 minute winter	SW17	124	58.509	0.047	4.8	0.0763	0.0000	OK	240 minute winter	7.001	SW16	4.8	0.578	0.043	0.0392	
240 minute winter	SW18	124	58.687	0.035	3.2	0.0759	0.0000	OK	240 minute winter	7.000	SW17	3.2	0.561	0.029	0.1091	
240 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	240 minute winter	Hydro-Brake®	SW06	2.0				
240 minute winter	EXSW1-35-11	124	56.964	0.114	33.4	0.0000	0.0000	OK								
240 minute winter	EXSW1-39-1	124	58.051	0.058	11.9	0.0000	0.0000	OK								

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Results for 2 year +20% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	SW01	184	57.090	0.127	31.7	0.3251	0.0000	OK	360 minute summer	1.008	EXSW1-35-11	31.4	0.833	0.123	1.5308	241.5
360 minute summer	SW02	184	58.138	0.028	1.7	0.0461	0.0000	OK	360 minute summer	6.000	SW01	1.7	0.601	0.032	0.1220	
360 minute summer	SW03	184	57.192	0.113	26.4	0.1455	0.0000	OK	360 minute summer	1.007	SW01	26.2	0.704	0.103	1.5505	
360 minute summer	SW04	184	57.366	0.086	22.3	0.1044	0.0000	OK	360 minute summer	1.006	SW03	22.2	0.848	0.080	0.7126	
360 minute summer	SW05	184	57.423	0.093	21.9	0.1131	0.0000	OK	360 minute summer	1.005	SW04	21.9	0.972	0.079	0.1509	
360 minute summer	SW06	184	57.523	0.082	18.3	0.1050	0.0000	OK	360 minute summer	1.004	SW05	18.2	0.841	0.065	0.3232	
360 minute summer	SW07	184	57.722	0.072	15.4	0.0872	0.0000	OK	360 minute summer	1.003	SW06	15.4	0.859	0.055	0.5054	
360 minute summer	SW08	184	58.227	0.056	7.2	0.0957	0.0000	OK	360 minute summer	1.002	SW07	7.0	0.701	0.047	0.5179	
360 minute summer	SW09	184	58.502	0.045	4.7	0.0808	0.0000	OK	360 minute summer	1.001	SW08	4.6	0.528	0.031	0.4528	
360 minute summer	SW10	184	58.681	0.031	1.7	0.0502	0.0000	OK	360 minute summer	1.000	SW09	1.7	0.386	0.040	0.1280	
360 minute summer	SW11	184	59.026	0.053	8.2	0.2050	0.0000	OK	360 minute summer	2.000	SW07	8.0	0.842	0.044	0.8550	
360 minute summer	SW12	184	58.399	0.041	3.4	0.0508	0.0000	OK	360 minute summer	4.001	SW05	3.3	0.605	0.037	0.0565	
360 minute summer	SW13	184	58.631	0.041	3.0	0.0931	0.0000	OK	360 minute summer	4.000	SW12	3.0	0.612	0.070	0.1686	
360 minute summer	SW14	184	58.129	0.043	3.4	0.0736	0.0000	OK	360 minute summer	5.001	SW03	3.3	0.639	0.079	0.2481	
360 minute summer	SW15	184	58.139	0.033	1.7	0.0584	0.0000	OK	360 minute summer	5.000	SW14	1.7	0.381	0.040	0.0132	
360 minute summer	SW16	184	58.475	0.060	9.8	0.1518	0.0000	OK	360 minute summer	7.002	EXSW1-39-1	9.7	0.972	0.087	0.4208	54.7
360 minute summer	SW17	184	58.510	0.048	5.1	0.0786	0.0000	OK	360 minute summer	7.001	SW16	5.1	0.585	0.046	0.0408	
360 minute summer	SW18	184	58.688	0.036	3.4	0.0779	0.0000	OK	360 minute summer	7.000	SW17	3.4	0.569	0.030	0.1137	
360 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	360 minute summer	Hydro-Brake®	SW06	2.0				
360 minute summer	EXSW1-35-11	184	56.966	0.116	34.2	0.0000	0.0000	OK								
360 minute summer	EXSW1-39-1	184	58.052	0.059	12.6	0.0000	0.0000	OK								

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Results for 2 year +20% CC 360 minute winter. 600 minute analysis at 8 minute timestep. Mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	SW01	184	57.074	0.111	24.4	0.2850	0.0000	OK	360 minute winter	1.008	EXSW1-35-11	24.3	0.781	0.095	1.2664	264.6
360 minute winter	SW02	184	58.135	0.025	1.3	0.0407	0.0000	OK	360 minute winter	6.000	SW01	1.3	0.555	0.025	0.1014	
360 minute winter	SW03	184	57.178	0.099	20.3	0.1273	0.0000	OK	360 minute winter	1.007	SW01	20.3	0.660	0.080	1.2836	
360 minute winter	SW04	184	57.356	0.076	17.2	0.0912	0.0000	OK	360 minute winter	1.006	SW03	17.2	0.797	0.062	0.5878	
360 minute winter	SW05	184	57.411	0.081	16.9	0.0986	0.0000	OK	360 minute winter	1.005	SW04	16.9	0.915	0.061	0.1240	
360 minute winter	SW06	184	57.512	0.071	14.2	0.0917	0.0000	OK	360 minute winter	1.004	SW05	14.1	0.796	0.051	0.2655	
360 minute winter	SW07	184	57.712	0.062	11.6	0.0753	0.0000	OK	360 minute winter	1.003	SW06	11.6	0.791	0.042	0.4125	
360 minute winter	SW08	184	58.219	0.048	5.4	0.0834	0.0000	OK	360 minute winter	1.002	SW07	5.3	0.645	0.036	0.4243	
360 minute winter	SW09	184	58.496	0.039	3.5	0.0705	0.0000	OK	360 minute winter	1.001	SW08	3.5	0.484	0.023	0.3703	
360 minute winter	SW10	184	58.677	0.027	1.3	0.0442	0.0000	OK	360 minute winter	1.000	SW09	1.3	0.358	0.031	0.1057	
360 minute winter	SW11	184	59.019	0.046	6.0	0.1778	0.0000	OK	360 minute winter	2.000	SW07	6.0	0.771	0.033	0.6956	
360 minute winter	SW12	184	58.393	0.035	2.5	0.0439	0.0000	OK	360 minute winter	4.001	SW05	2.5	0.554	0.027	0.0458	
360 minute winter	SW13	184	58.625	0.035	2.2	0.0800	0.0000	OK	360 minute winter	4.000	SW12	2.2	0.561	0.052	0.1359	
360 minute winter	SW14	184	58.124	0.038	2.6	0.0647	0.0000	OK	360 minute winter	5.001	SW03	2.6	0.592	0.061	0.2060	
360 minute winter	SW15	184	58.135	0.029	1.3	0.0500	0.0000	OK	360 minute winter	5.000	SW14	1.3	0.358	0.031	0.0108	
360 minute winter	SW16	184	58.467	0.052	7.2	0.1307	0.0000	OK	360 minute winter	7.002	EXSW1-39-1	7.2	0.890	0.065	0.3398	61.5
360 minute winter	SW17	184	58.503	0.041	3.8	0.0670	0.0000	OK	360 minute winter	7.001	SW16	3.8	0.548	0.034	0.0326	
360 minute winter	SW18	184	58.683	0.031	2.5	0.0675	0.0000	OK	360 minute winter	7.000	SW17	2.5	0.525	0.022	0.0909	
360 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	360 minute winter	Hydro-Brake®	SW06	2.0				
360 minute winter	EXSW1-35-11	184	56.951	0.101	26.4	0.0000	0.0000	OK								
360 minute winter	EXSW1-39-1	184	58.044	0.051	9.3	0.0000	0.0000	OK								

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Results for 30 year +20% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW01	11	57.333	0.370	210.3	0.9487	0.0000	OK	15 minute summer	1.008	EXSW1-35-11	205.0	1.419	0.806	5.9602	118.4
15 minute summer	SW02	10	58.186	0.076	12.7	0.1266	0.0000	OK	15 minute summer	6.000	SW01	12.5	1.071	0.240	0.5113	
15 minute summer	SW03	11	57.437	0.358	178.3	0.4588	0.0000	OK	15 minute summer	1.007	SW01	175.1	1.104	0.689	6.6610	
15 minute summer	SW04	11	57.547	0.267	149.3	0.3228	0.0000	OK	15 minute summer	1.006	SW03	149.5	1.273	0.538	3.1620	
15 minute summer	SW05	11	57.623	0.293	146.3	0.3546	0.0000	OK	15 minute summer	1.005	SW04	146.7	1.415	0.528	0.6948	
15 minute summer	SW06	11	57.695	0.254	118.8	0.3269	0.0000	OK	15 minute summer	1.004	SW05	119.9	1.190	0.431	1.5034	
15 minute summer	SW07	11	57.867	0.217	110.0	0.2624	0.0000	OK	15 minute summer	1.003	SW06	111.6	1.331	0.401	2.3635	
15 minute summer	SW08	11	58.326	0.155	54.2	0.2658	0.0000	OK	15 minute summer	1.002	SW07	51.4	1.227	0.345	2.1562	
15 minute summer	SW09	10	58.580	0.123	34.9	0.2221	0.0000	OK	15 minute summer	1.001	SW08	35.2	0.954	0.237	1.9060	
15 minute summer	SW10	10	58.734	0.084	12.7	0.1377	0.0000	OK	15 minute summer	1.000	SW09	12.7	0.711	0.300	0.5183	
15 minute summer	SW11	10	59.120	0.147	60.1	0.5641	0.0000	OK	15 minute summer	2.000	SW07	57.4	1.477	0.314	3.5206	
15 minute summer	SW12	10	58.476	0.118	25.4	0.1473	0.0000	OK	15 minute summer	4.001	SW05	25.3	1.050	0.279	0.2465	
15 minute summer	SW13	10	58.709	0.119	22.2	0.2733	0.0000	OK	15 minute summer	4.000	SW12	22.2	1.051	0.525	0.7358	
15 minute summer	SW14	10	58.212	0.126	25.3	0.2172	0.0000	OK	15 minute summer	5.001	SW03	24.6	1.097	0.580	1.0664	
15 minute summer	SW15	10	58.224	0.118	12.7	0.2053	0.0000	OK	15 minute summer	5.000	SW14	12.6	0.615	0.298	0.0649	
15 minute summer	SW16	10	58.600	0.185	72.8	0.4657	0.0000	OK	15 minute summer	7.002	EXSW1-39-1	72.8	1.649	0.655	1.8611	28.3
15 minute summer	SW17	10	58.629	0.167	38.0	0.2727	0.0000	OK	15 minute summer	7.001	SW16	38.0	0.884	0.342	0.2017	
15 minute summer	SW18	10	58.748	0.096	25.3	0.2102	0.0000	OK	15 minute summer	7.000	SW17	25.3	0.865	0.228	0.5674	
15 minute summer	SW19-HB	55	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute summer	Hydro-Brake®	SW06	2.0				
15 minute summer	EXSW1-35-11	11	57.155	0.305	222.8	0.0000	0.0000	OK								
15 minute summer	EXSW1-39-1	10	58.168	0.175	94.3	0.0000	0.0000	OK								

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Results for 30 year +20% CC 15 minute winter. 255 minute analysis at 1 minute timestep. Mass balance: 99.88%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	11	57.338	0.375	214.2	0.9617	0.0000	OK	15 minute winter	1.008	EXSW1-35-11	210.3	1.427	0.827	6.0511	129.1
15 minute winter	SW02	10	58.186	0.076	12.7	0.1268	0.0000	OK	15 minute winter	6.000	SW01	12.5	1.072	0.241	0.5123	
15 minute winter	SW03	11	57.441	0.362	180.4	0.4646	0.0000	OK	15 minute winter	1.007	SW01	178.1	1.103	0.701	6.7566	
15 minute winter	SW04	11	57.549	0.269	150.9	0.3255	0.0000	OK	15 minute winter	1.006	SW03	151.1	1.272	0.544	3.1971	
15 minute winter	SW05	11	57.625	0.295	147.8	0.3575	0.0000	OK	15 minute winter	1.005	SW04	148.2	1.415	0.533	0.7016	
15 minute winter	SW06	11	57.697	0.256	120.0	0.3292	0.0000	OK	15 minute winter	1.004	SW05	121.1	1.190	0.436	1.5174	
15 minute winter	SW07	11	57.868	0.218	111.3	0.2641	0.0000	OK	15 minute winter	1.003	SW06	112.6	1.331	0.405	2.3840	
15 minute winter	SW08	11	58.326	0.155	54.1	0.2672	0.0000	OK	15 minute winter	1.002	SW07	51.8	1.229	0.348	2.1703	
15 minute winter	SW09	10	58.580	0.123	34.9	0.2210	0.0000	OK	15 minute winter	1.001	SW08	35.2	0.947	0.236	1.9149	
15 minute winter	SW10	10	58.734	0.084	12.7	0.1377	0.0000	OK	15 minute winter	1.000	SW09	12.7	0.714	0.300	0.5163	
15 minute winter	SW11	10	59.120	0.147	60.1	0.5666	0.0000	OK	15 minute winter	2.000	SW07	58.0	1.480	0.318	3.5453	
15 minute winter	SW12	10	58.476	0.118	25.4	0.1473	0.0000	OK	15 minute winter	4.001	SW05	25.3	1.050	0.280	0.2466	
15 minute winter	SW13	10	58.709	0.119	22.2	0.2733	0.0000	OK	15 minute winter	4.000	SW12	22.2	1.051	0.525	0.7358	
15 minute winter	SW14	10	58.213	0.127	25.3	0.2178	0.0000	OK	15 minute winter	5.001	SW03	24.7	1.099	0.584	1.0710	
15 minute winter	SW15	10	58.224	0.118	12.7	0.2058	0.0000	OK	15 minute winter	5.000	SW14	12.6	0.596	0.298	0.0652	
15 minute winter	SW16	10	58.600	0.185	72.8	0.4661	0.0000	OK	15 minute winter	7.002	EXSW1-39-1	72.9	1.650	0.656	1.8630	31.7
15 minute winter	SW17	10	58.629	0.167	38.0	0.2728	0.0000	OK	15 minute winter	7.001	SW16	38.0	0.884	0.342	0.2018	
15 minute winter	SW18	10	58.748	0.096	25.3	0.2102	0.0000	OK	15 minute winter	7.000	SW17	25.3	0.861	0.228	0.5675	
15 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute winter	Hydro-Brake®	SW06	2.0				
15 minute winter	EXSW1-35-11	11	57.159	0.309	228.7	0.0000	0.0000	OK								
15 minute winter	EXSW1-39-1	10	58.168	0.175	94.4	0.0000	0.0000	OK								

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Results for 30 year +20% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 99.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW01	19	57.320	0.357	196.2	0.9157	0.0000	OK	30 minute summer	1.008	EXSW1-35-11	198.1	1.393	0.779	5.7788	155.1
30 minute summer	SW02	18	58.182	0.072	11.8	0.1201	0.0000	OK	30 minute summer	6.000	SW01	11.4	1.048	0.219	0.4767	
30 minute summer	SW03	19	57.420	0.341	165.0	0.4376	0.0000	OK	30 minute summer	1.007	SW01	165.7	1.087	0.652	6.3598	
30 minute summer	SW04	18	57.531	0.251	138.2	0.3032	0.0000	OK	30 minute summer	1.006	SW03	138.0	1.252	0.497	2.9761	
30 minute summer	SW05	18	57.606	0.276	136.4	0.3336	0.0000	OK	30 minute summer	1.005	SW04	135.4	1.405	0.487	0.6456	
30 minute summer	SW06	18	57.681	0.240	111.8	0.3091	0.0000	OK	30 minute summer	1.004	SW05	110.5	1.183	0.398	1.4016	
30 minute summer	SW07	18	57.860	0.210	104.4	0.2535	0.0000	OK	30 minute summer	1.003	SW06	104.2	1.317	0.375	2.2307	
30 minute summer	SW08	18	58.321	0.150	49.1	0.2577	0.0000	OK	30 minute summer	1.002	SW07	47.8	1.197	0.321	2.0582	
30 minute summer	SW09	17	58.574	0.117	32.2	0.2101	0.0000	OK	30 minute summer	1.001	SW08	31.5	0.925	0.211	1.7964	
30 minute summer	SW10	17	58.730	0.080	11.8	0.1312	0.0000	OK	30 minute summer	1.000	SW09	11.6	0.696	0.274	0.4843	
30 minute summer	SW11	18	59.113	0.140	55.9	0.5395	0.0000	OK	30 minute summer	2.000	SW07	53.8	1.451	0.295	3.3367	
30 minute summer	SW12	18	58.469	0.111	23.1	0.1391	0.0000	OK	30 minute summer	4.001	SW05	23.0	1.027	0.254	0.2293	
30 minute summer	SW13	17	58.703	0.113	20.6	0.2592	0.0000	OK	30 minute summer	4.000	SW12	20.2	1.028	0.477	0.6836	
30 minute summer	SW14	18	58.206	0.120	23.4	0.2056	0.0000	OK	30 minute summer	5.001	SW03	22.8	1.081	0.538	1.0019	
30 minute summer	SW15	17	58.216	0.110	11.8	0.1920	0.0000	OK	30 minute summer	5.000	SW14	11.6	0.586	0.274	0.0601	
30 minute summer	SW16	17	58.589	0.174	66.9	0.4381	0.0000	OK	30 minute summer	7.002	EXSW1-39-1	65.9	1.619	0.593	1.7272	39.5
30 minute summer	SW17	17	58.618	0.156	35.1	0.2549	0.0000	OK	30 minute summer	7.001	SW16	34.5	0.873	0.311	0.1865	
30 minute summer	SW18	17	58.744	0.092	23.5	0.2014	0.0000	OK	30 minute summer	7.000	SW17	23.3	0.847	0.210	0.5259	
30 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	30 minute summer	Hydro-Brake®	SW06	2.0				
30 minute summer	EXSW1-35-11	19	57.150	0.300	213.4	0.0000	0.0000	OK								
30 minute summer	EXSW1-39-1	17	58.157	0.164	85.9	0.0000	0.0000	OK								

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Results for 30 year +20% CC 30 minute winter. 270 minute analysis at 1 minute timestep. Mass balance: 99.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	SW01	19	57.296	0.333	177.5	0.8544	0.0000	OK	30 minute winter	1.008	EXSW1-35-11	178.3	1.352	0.701	5.3637	169.9
30 minute winter	SW02	18	58.178	0.068	10.2	0.1123	0.0000	OK	30 minute winter	6.000	SW01	10.0	1.011	0.193	0.4346	
30 minute winter	SW03	19	57.393	0.314	147.4	0.4034	0.0000	OK	30 minute winter	1.007	SW01	147.8	1.057	0.581	5.8294	
30 minute winter	SW04	18	57.512	0.232	123.1	0.2798	0.0000	OK	30 minute winter	1.006	SW03	122.9	1.226	0.442	2.7132	
30 minute winter	SW05	18	57.583	0.253	121.0	0.3066	0.0000	OK	30 minute winter	1.005	SW04	120.6	1.386	0.434	0.5835	
30 minute winter	SW06	18	57.662	0.221	98.9	0.2844	0.0000	OK	30 minute winter	1.004	SW05	98.4	1.166	0.354	1.2637	
30 minute winter	SW07	18	57.843	0.193	92.1	0.2336	0.0000	OK	30 minute winter	1.003	SW06	92.0	1.294	0.331	2.0055	
30 minute winter	SW08	18	58.310	0.139	42.8	0.2397	0.0000	OK	30 minute winter	1.002	SW07	42.2	1.159	0.283	1.8730	
30 minute winter	SW09	17	58.565	0.108	27.9	0.1938	0.0000	OK	30 minute winter	1.001	SW08	27.5	0.884	0.185	1.6315	
30 minute winter	SW10	17	58.724	0.074	10.2	0.1221	0.0000	OK	30 minute winter	1.000	SW09	10.1	0.672	0.239	0.4376	
30 minute winter	SW11	18	59.104	0.131	48.4	0.5039	0.0000	OK	30 minute winter	2.000	SW07	47.4	1.401	0.260	3.0435	
30 minute winter	SW12	18	58.461	0.103	20.1	0.1293	0.0000	OK	30 minute winter	4.001	SW05	20.1	0.991	0.222	0.2078	
30 minute winter	SW13	17	58.694	0.104	17.8	0.2382	0.0000	OK	30 minute winter	4.000	SW12	17.6	0.992	0.416	0.6183	
30 minute winter	SW14	18	58.197	0.111	20.3	0.1904	0.0000	OK	30 minute winter	5.001	SW03	20.0	1.047	0.473	0.9096	
30 minute winter	SW15	17	58.207	0.101	10.2	0.1763	0.0000	OK	30 minute winter	5.000	SW14	10.1	0.558	0.239	0.0542	
30 minute winter	SW16	17	58.575	0.160	58.2	0.4016	0.0000	OK	30 minute winter	7.002	EXSW1-39-1	57.8	1.569	0.520	1.5572	44.3
30 minute winter	SW17	17	58.604	0.142	30.5	0.2319	0.0000	OK	30 minute winter	7.001	SW16	30.2	0.855	0.272	0.1665	
30 minute winter	SW18	17	58.738	0.086	20.4	0.1876	0.0000	OK	30 minute winter	7.000	SW17	20.3	0.828	0.183	0.4694	
30 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	30 minute winter	Hydro-Brake®	SW06	2.0				
30 minute winter	EXSW1-35-11	19	57.134	0.284	193.6	0.0000	0.0000	OK								
30 minute winter	EXSW1-39-1	17	58.145	0.152	75.1	0.0000	0.0000	OK								

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Results for 30 year +20% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW01	34	57.272	0.309	157.2	0.7918	0.0000	OK	60 minute summer	1.008	EXSW1-35-11	157.9	1.305	0.621	4.9232	200.8
60 minute summer	SW02	33	58.174	0.064	9.0	0.1054	0.0000	OK	60 minute summer	6.000	SW01	8.9	0.977	0.171	0.3981	
60 minute summer	SW03	34	57.368	0.289	130.7	0.3712	0.0000	OK	60 minute summer	1.007	SW01	131.0	1.032	0.515	5.2982	
60 minute summer	SW04	33	57.494	0.214	109.1	0.2581	0.0000	OK	60 minute summer	1.006	SW03	109.1	1.200	0.393	2.4623	
60 minute summer	SW05	33	57.564	0.234	107.3	0.2832	0.0000	OK	60 minute summer	1.005	SW04	106.9	1.359	0.385	0.5277	
60 minute summer	SW06	33	57.645	0.204	87.7	0.2625	0.0000	OK	60 minute summer	1.004	SW05	87.2	1.144	0.314	1.1427	
60 minute summer	SW07	33	57.829	0.179	81.4	0.2163	0.0000	OK	60 minute summer	1.003	SW06	81.3	1.267	0.292	1.8093	
60 minute summer	SW08	33	58.301	0.130	37.9	0.2241	0.0000	OK	60 minute summer	1.002	SW07	37.2	1.121	0.250	1.7105	
60 minute summer	SW09	33	58.558	0.101	24.7	0.1821	0.0000	OK	60 minute summer	1.001	SW08	24.4	0.857	0.164	1.4913	
60 minute summer	SW10	32	58.720	0.070	9.0	0.1145	0.0000	OK	60 minute summer	1.000	SW09	8.9	0.647	0.211	0.4020	
60 minute summer	SW11	33	59.096	0.123	42.9	0.4723	0.0000	OK	60 minute summer	2.000	SW07	41.9	1.355	0.230	2.7856	
60 minute summer	SW12	33	58.455	0.097	17.9	0.1211	0.0000	OK	60 minute summer	4.001	SW05	17.9	0.961	0.197	0.1902	
60 minute summer	SW13	32	58.687	0.097	15.8	0.2222	0.0000	OK	60 minute summer	4.000	SW12	15.6	0.961	0.369	0.5658	
60 minute summer	SW14	33	58.189	0.103	17.9	0.1773	0.0000	OK	60 minute summer	5.001	SW03	17.7	1.016	0.419	0.8300	
60 minute summer	SW15	33	58.199	0.093	9.0	0.1624	0.0000	OK	60 minute summer	5.000	SW14	8.9	0.547	0.211	0.0491	
60 minute summer	SW16	32	58.563	0.148	51.7	0.3730	0.0000	OK	60 minute summer	7.002	EXSW1-39-1	51.2	1.525	0.461	1.4207	53.0
60 minute summer	SW17	32	58.593	0.131	27.0	0.2135	0.0000	OK	60 minute summer	7.001	SW16	26.8	0.837	0.241	0.1506	
60 minute summer	SW18	32	58.733	0.081	18.1	0.1764	0.0000	OK	60 minute summer	7.000	SW17	18.0	0.812	0.162	0.4246	
60 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	60 minute summer	Hydro-Brake®	SW06	2.0				
60 minute summer	EXSW1-35-11	34	57.116	0.266	171.3	0.0000	0.0000	OK								
60 minute summer	EXSW1-39-1	32	58.134	0.141	66.6	0.0000	0.0000	OK								

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Results for 30 year +20% CC 60 minute winter. 300 minute analysis at 1 minute timestep. Mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	SW01	34	57.235	0.272	127.9	0.6971	0.0000	OK	60 minute winter	1.008	EXSW1-35-11	128.0	1.230	0.504	4.2374	220.6
60 minute winter	SW02	33	58.166	0.056	7.1	0.0936	0.0000	OK	60 minute winter	6.000	SW01	7.0	0.915	0.135	0.3372	
60 minute winter	SW03	34	57.330	0.251	105.5	0.3226	0.0000	OK	60 minute winter	1.007	SW01	105.7	0.983	0.416	4.4836	
60 minute winter	SW04	33	57.467	0.187	88.1	0.2256	0.0000	OK	60 minute winter	1.006	SW03	88.1	1.152	0.317	2.0768	
60 minute winter	SW05	33	57.534	0.204	86.4	0.2474	0.0000	OK	60 minute winter	1.005	SW04	86.3	1.307	0.310	0.4430	
60 minute winter	SW06	33	57.619	0.178	70.6	0.2290	0.0000	OK	60 minute winter	1.004	SW05	70.5	1.101	0.253	0.9572	
60 minute winter	SW07	33	57.806	0.156	65.1	0.1892	0.0000	OK	60 minute winter	1.003	SW06	65.1	1.216	0.234	1.5095	
60 minute winter	SW08	33	58.287	0.116	30.0	0.1988	0.0000	OK	60 minute winter	1.002	SW07	29.8	1.057	0.201	1.4538	
60 minute winter	SW09	33	58.547	0.090	19.5	0.1622	0.0000	OK	60 minute winter	1.001	SW08	19.4	0.794	0.130	1.2652	
60 minute winter	SW10	32	58.712	0.062	7.1	0.1015	0.0000	OK	60 minute winter	1.000	SW09	7.1	0.601	0.167	0.3429	
60 minute winter	SW11	33	59.082	0.109	33.8	0.4195	0.0000	OK	60 minute winter	2.000	SW07	33.5	1.274	0.184	2.3661	
60 minute winter	SW12	33	58.443	0.085	14.2	0.1068	0.0000	OK	60 minute winter	4.001	SW05	14.2	0.903	0.156	0.1604	
60 minute winter	SW13	32	58.675	0.085	12.4	0.1943	0.0000	OK	60 minute winter	4.000	SW12	12.4	0.903	0.292	0.4763	
60 minute winter	SW14	33	58.177	0.091	14.2	0.1555	0.0000	OK	60 minute winter	5.001	SW03	14.1	0.957	0.332	0.6994	
60 minute winter	SW15	32	58.186	0.080	7.1	0.1400	0.0000	OK	60 minute winter	5.000	SW14	7.1	0.514	0.167	0.0408	
60 minute winter	SW16	32	58.544	0.129	40.7	0.3246	0.0000	OK	60 minute winter	7.002	EXSW1-39-1	40.6	1.439	0.365	1.1914	59.3
60 minute winter	SW17	32	58.574	0.112	21.3	0.1833	0.0000	OK	60 minute winter	7.001	SW16	21.2	0.802	0.191	0.1244	
60 minute winter	SW18	32	58.724	0.072	14.2	0.1565	0.0000	OK	60 minute winter	7.000	SW17	14.2	0.777	0.128	0.3504	
60 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	60 minute winter	Hydro-Brake®	SW06	2.0				
60 minute winter	EXSW1-35-11	34	57.089	0.239	139.6	0.0000	0.0000	OK								
60 minute winter	EXSW1-39-1	32	58.117	0.124	52.7	0.0000	0.0000	OK								

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Results for 30 year +20% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	SW01	64	57.215	0.252	112.0	0.6449	0.0000	OK	120 minute summer	1.008	EXSW1-35-11	111.9	1.184	0.440	3.8488	258.1
120 minute summer	SW02	62	58.163	0.053	6.3	0.0875	0.0000	OK	120 minute summer	6.000	SW01	6.1	0.879	0.118	0.3064	
120 minute summer	SW03	64	57.310	0.231	92.3	0.2969	0.0000	OK	120 minute summer	1.007	SW01	92.6	0.956	0.364	4.0428	
120 minute summer	SW04	64	57.452	0.172	77.0	0.2081	0.0000	OK	120 minute summer	1.006	SW03	77.2	1.122	0.278	1.8698	
120 minute summer	SW05	64	57.518	0.188	75.3	0.2278	0.0000	OK	120 minute summer	1.005	SW04	75.5	1.273	0.272	0.3974	
120 minute summer	SW06	64	57.605	0.164	61.3	0.2106	0.0000	OK	120 minute summer	1.004	SW05	61.7	1.075	0.222	0.8571	
120 minute summer	SW07	64	57.794	0.144	56.2	0.1738	0.0000	OK	120 minute summer	1.003	SW06	56.4	1.183	0.203	1.3464	
120 minute summer	SW08	64	58.278	0.107	26.4	0.1840	0.0000	OK	120 minute summer	1.002	SW07	25.9	1.018	0.174	1.3097	
120 minute summer	SW09	62	58.541	0.084	17.2	0.1516	0.0000	OK	120 minute summer	1.001	SW08	16.9	0.769	0.114	1.1359	
120 minute summer	SW10	62	58.708	0.058	6.3	0.0953	0.0000	OK	120 minute summer	1.000	SW09	6.2	0.580	0.147	0.3136	
120 minute summer	SW11	62	59.074	0.101	30.0	0.3897	0.0000	OK	120 minute summer	2.000	SW07	28.9	1.223	0.158	2.1320	
120 minute summer	SW12	62	58.437	0.079	12.5	0.0992	0.0000	OK	120 minute summer	4.001	SW05	12.3	0.868	0.136	0.1448	
120 minute summer	SW13	62	58.669	0.079	11.0	0.1813	0.0000	OK	120 minute summer	4.000	SW12	10.9	0.873	0.257	0.4327	
120 minute summer	SW14	62	58.170	0.084	12.5	0.1442	0.0000	OK	120 minute summer	5.001	SW03	12.2	0.921	0.288	0.6313	
120 minute summer	SW15	62	58.180	0.074	6.3	0.1291	0.0000	OK	120 minute summer	5.000	SW14	6.2	0.503	0.148	0.0367	
120 minute summer	SW16	62	58.535	0.120	35.9	0.3017	0.0000	OK	120 minute summer	7.002	EXSW1-39-1	35.6	1.388	0.320	1.0817	68.9
120 minute summer	SW17	62	58.565	0.103	18.8	0.1690	0.0000	OK	120 minute summer	7.001	SW16	18.6	0.781	0.168	0.1122	
120 minute summer	SW18	62	58.719	0.067	12.6	0.1470	0.0000	OK	120 minute summer	7.000	SW17	12.5	0.759	0.113	0.3163	
120 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	120 minute summer	Hydro-Brake®	SW06	2.0				
120 minute summer	EXSW1-35-11	64	57.072	0.222	121.9	0.0000	0.0000	OK								
120 minute summer	EXSW1-39-1	62	58.109	0.115	46.3	0.0000	0.0000	OK								

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Results for 30 year +20% CC 120 minute winter. 360 minute analysis at 2 minute timestep. Mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	SW01	64	57.179	0.216	85.8	0.5541	0.0000	OK	120 minute winter	1.008	EXSW1-35-11	85.8	1.100	0.337	3.1742	284.2
120 minute winter	SW02	62	58.156	0.046	4.7	0.0760	0.0000	OK	120 minute winter	6.000	SW01	4.7	0.813	0.090	0.2512	
120 minute winter	SW03	64	57.276	0.197	70.8	0.2525	0.0000	OK	120 minute winter	1.007	SW01	70.8	0.899	0.278	3.2875	
120 minute winter	SW04	64	57.428	0.148	59.2	0.1786	0.0000	OK	120 minute winter	1.006	SW03	59.2	1.061	0.213	1.5179	
120 minute winter	SW05	64	57.491	0.161	58.0	0.1951	0.0000	OK	120 minute winter	1.005	SW04	58.0	1.205	0.209	0.3227	
120 minute winter	SW06	64	57.581	0.140	47.4	0.1805	0.0000	OK	120 minute winter	1.004	SW05	47.4	1.020	0.171	0.6948	
120 minute winter	SW07	64	57.774	0.124	43.1	0.1496	0.0000	OK	120 minute winter	1.003	SW06	43.1	1.115	0.155	1.0911	
120 minute winter	SW08	64	58.264	0.093	19.8	0.1601	0.0000	OK	120 minute winter	1.002	SW07	19.7	0.943	0.133	1.0784	
120 minute winter	SW09	62	58.530	0.073	12.9	0.1321	0.0000	OK	120 minute winter	1.001	SW08	12.8	0.708	0.086	0.9373	
120 minute winter	SW10	62	58.700	0.050	4.7	0.0825	0.0000	OK	120 minute winter	1.000	SW09	4.7	0.529	0.111	0.2584	
120 minute winter	SW11	62	59.061	0.088	22.3	0.3390	0.0000	OK	120 minute winter	2.000	SW07	22.1	1.134	0.121	1.7569	
120 minute winter	SW12	62	58.426	0.068	9.4	0.0857	0.0000	OK	120 minute winter	4.001	SW05	9.4	0.808	0.103	0.1185	
120 minute winter	SW13	62	58.658	0.068	8.2	0.1554	0.0000	OK	120 minute winter	4.000	SW12	8.2	0.808	0.193	0.3520	
120 minute winter	SW14	62	58.158	0.072	9.4	0.1243	0.0000	OK	120 minute winter	5.001	SW03	9.3	0.855	0.220	0.5171	
120 minute winter	SW15	62	58.168	0.062	4.7	0.1080	0.0000	OK	120 minute winter	5.000	SW14	4.7	0.472	0.111	0.0294	
120 minute winter	SW16	62	58.518	0.103	27.0	0.2580	0.0000	OK	120 minute winter	7.002	EXSW1-39-1	26.9	1.290	0.242	0.8790	77.2
120 minute winter	SW17	62	58.549	0.087	14.1	0.1420	0.0000	OK	120 minute winter	7.001	SW16	14.1	0.738	0.127	0.0896	
120 minute winter	SW18	62	58.710	0.058	9.4	0.1275	0.0000	OK	120 minute winter	7.000	SW17	9.4	0.715	0.084	0.2518	
120 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	120 minute winter	Hydro-Brake®	SW06	2.0				
120 minute winter	EXSW1-35-11	64	57.044	0.194	93.7	0.0000	0.0000	OK								
120 minute winter	EXSW1-39-1	62	58.093	0.100	34.9	0.0000	0.0000	OK								

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Results for 30 year +20% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	SW01	96	57.179	0.216	86.1	0.5535	0.0000	OK	180 minute summer	1.008	EXSW1-35-11	86.2	1.105	0.339	3.1771	297.5
180 minute summer	SW02	92	58.157	0.047	5.0	0.0777	0.0000	OK	180 minute summer	6.000	SW01	4.9	0.822	0.094	0.2592	
180 minute summer	SW03	92	57.275	0.196	71.3	0.2518	0.0000	OK	180 minute summer	1.007	SW01	70.7	0.900	0.278	3.2760	
180 minute summer	SW04	92	57.428	0.148	59.5	0.1790	0.0000	OK	180 minute summer	1.006	SW03	59.1	1.060	0.213	1.5165	
180 minute summer	SW05	92	57.492	0.162	58.6	0.1960	0.0000	OK	180 minute summer	1.005	SW04	58.3	1.206	0.210	0.3242	
180 minute summer	SW06	92	57.582	0.141	48.3	0.1818	0.0000	OK	180 minute summer	1.004	SW05	47.8	1.021	0.172	0.7002	
180 minute summer	SW07	92	57.775	0.125	44.1	0.1515	0.0000	OK	180 minute summer	1.003	SW06	43.8	1.118	0.158	1.1055	
180 minute summer	SW08	92	58.265	0.094	20.9	0.1619	0.0000	OK	180 minute summer	1.002	SW07	20.1	0.945	0.135	1.0935	
180 minute summer	SW09	92	58.532	0.075	13.6	0.1348	0.0000	OK	180 minute summer	1.001	SW08	13.4	0.720	0.090	0.9590	
180 minute summer	SW10	92	58.702	0.052	5.0	0.0847	0.0000	OK	180 minute summer	1.000	SW09	4.9	0.540	0.116	0.2667	
180 minute summer	SW11	92	59.063	0.090	23.7	0.3453	0.0000	OK	180 minute summer	2.000	SW07	22.8	1.141	0.125	1.7998	
180 minute summer	SW12	92	58.428	0.070	9.8	0.0871	0.0000	OK	180 minute summer	4.001	SW05	9.6	0.813	0.106	0.1211	
180 minute summer	SW13	92	58.660	0.070	8.7	0.1598	0.0000	OK	180 minute summer	4.000	SW12	8.6	0.822	0.202	0.3628	
180 minute summer	SW14	92	58.160	0.074	10.0	0.1271	0.0000	OK	180 minute summer	5.001	SW03	9.7	0.863	0.228	0.5322	
180 minute summer	SW15	92	58.170	0.064	5.0	0.1115	0.0000	OK	180 minute summer	5.000	SW14	5.0	0.481	0.117	0.0305	
180 minute summer	SW16	92	58.520	0.105	28.5	0.2649	0.0000	OK	180 minute summer	7.002	EXSW1-39-1	28.2	1.305	0.253	0.9100	79.2
180 minute summer	SW17	92	58.551	0.089	14.9	0.1464	0.0000	OK	180 minute summer	7.001	SW16	14.8	0.745	0.133	0.0932	
180 minute summer	SW18	92	58.712	0.060	10.0	0.1310	0.0000	OK	180 minute summer	7.000	SW17	9.9	0.725	0.089	0.2625	
180 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	180 minute summer	Hydro-Brake®	SW06	2.0				
180 minute summer	EXSW1-35-11	96	57.044	0.194	93.5	0.0000	0.0000	OK								
180 minute summer	EXSW1-39-1	92	58.095	0.102	36.7	0.0000	0.0000	OK								

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Results for 30 year +20% CC 180 minute winter. 420 minute analysis at 4 minute timestep. Mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	SW01	96	57.151	0.188	66.3	0.4806	0.0000	OK	180 minute winter	1.008	EXSW1-35-11	66.3	1.026	0.261	2.6326	328.0
180 minute winter	SW02	92	58.150	0.040	3.6	0.0667	0.0000	OK	180 minute winter	6.000	SW01	3.6	0.752	0.069	0.2084	
180 minute winter	SW03	96	57.249	0.170	54.7	0.2176	0.0000	OK	180 minute winter	1.007	SW01	54.8	0.846	0.215	2.6996	
180 minute winter	SW04	92	57.408	0.128	45.8	0.1548	0.0000	OK	180 minute winter	1.006	SW03	45.8	1.002	0.165	1.2442	
180 minute winter	SW05	92	57.469	0.139	44.9	0.1685	0.0000	OK	180 minute winter	1.005	SW04	44.9	1.140	0.161	0.2640	
180 minute winter	SW06	92	57.562	0.121	36.9	0.1559	0.0000	OK	180 minute winter	1.004	SW05	36.8	0.972	0.133	0.5670	
180 minute winter	SW07	92	57.757	0.107	33.1	0.1298	0.0000	OK	180 minute winter	1.003	SW06	33.1	1.049	0.119	0.8906	
180 minute winter	SW08	92	58.252	0.081	15.3	0.1399	0.0000	OK	180 minute winter	1.002	SW07	15.2	0.875	0.102	0.8921	
180 minute winter	SW09	92	58.522	0.065	9.9	0.1163	0.0000	OK	180 minute winter	1.001	SW08	9.9	0.655	0.066	0.7772	
180 minute winter	SW10	92	58.694	0.044	3.6	0.0724	0.0000	OK	180 minute winter	1.000	SW09	3.6	0.487	0.085	0.2155	
180 minute winter	SW11	92	59.050	0.077	17.2	0.2975	0.0000	OK	180 minute winter	2.000	SW07	17.1	1.052	0.094	1.4611	
180 minute winter	SW12	92	58.418	0.060	7.2	0.0747	0.0000	OK	180 minute winter	4.001	SW05	7.2	0.750	0.079	0.0978	
180 minute winter	SW13	92	58.649	0.059	6.3	0.1356	0.0000	OK	180 minute winter	4.000	SW12	6.3	0.753	0.148	0.2904	
180 minute winter	SW14	92	58.149	0.063	7.2	0.1082	0.0000	OK	180 minute winter	5.001	SW03	7.1	0.795	0.169	0.4272	
180 minute winter	SW15	92	58.159	0.053	3.6	0.0917	0.0000	OK	180 minute winter	5.000	SW14	3.6	0.447	0.085	0.0238	
180 minute winter	SW16	92	58.504	0.089	20.9	0.2249	0.0000	OK	180 minute winter	7.002	EXSW1-39-1	20.8	1.204	0.187	0.7289	89.0
180 minute winter	SW17	92	58.536	0.074	10.9	0.1217	0.0000	OK	180 minute winter	7.001	SW16	10.9	0.698	0.098	0.0733	
180 minute winter	SW18	92	58.704	0.052	7.3	0.1127	0.0000	OK	180 minute winter	7.000	SW17	7.3	0.679	0.066	0.2057	
180 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	180 minute winter	Hydro-Brake®	SW06	2.0				
180 minute winter	EXSW1-35-11	96	57.020	0.170	72.3	0.0000	0.0000	OK								
180 minute winter	EXSW1-39-1	92	58.080	0.087	27.0	0.0000	0.0000	OK								

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Results for 30 year +20% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	SW01	124	57.162	0.199	73.9	0.5097	0.0000	OK	240 minute summer	1.008	EXSW1-35-11	73.7	1.055	0.290	2.8452	330.7
240 minute summer	SW02	124	58.152	0.042	4.0	0.0704	0.0000	OK	240 minute summer	6.000	SW01	4.0	0.777	0.077	0.2254	
240 minute summer	SW03	124	57.259	0.180	60.9	0.2312	0.0000	OK	240 minute summer	1.007	SW01	60.9	0.867	0.239	2.9286	
240 minute summer	SW04	124	57.416	0.136	50.9	0.1641	0.0000	OK	240 minute summer	1.006	SW03	50.9	1.026	0.183	1.3501	
240 minute summer	SW05	124	57.478	0.148	49.9	0.1790	0.0000	OK	240 minute summer	1.005	SW04	49.9	1.167	0.180	0.2868	
240 minute summer	SW06	124	57.570	0.129	41.0	0.1658	0.0000	OK	240 minute summer	1.004	SW05	40.9	0.992	0.147	0.6172	
240 minute summer	SW07	124	57.764	0.114	37.0	0.1377	0.0000	OK	240 minute summer	1.003	SW06	37.0	1.076	0.133	0.9695	
240 minute summer	SW08	124	58.257	0.086	17.0	0.1482	0.0000	OK	240 minute summer	1.002	SW07	17.0	0.904	0.114	0.9674	
240 minute summer	SW09	124	58.525	0.068	11.0	0.1226	0.0000	OK	240 minute summer	1.001	SW08	11.0	0.677	0.074	0.8419	
240 minute summer	SW10	124	58.696	0.046	4.0	0.0763	0.0000	OK	240 minute summer	1.000	SW09	4.0	0.504	0.094	0.2323	
240 minute summer	SW11	124	59.055	0.082	19.0	0.3137	0.0000	OK	240 minute summer	2.000	SW07	19.0	1.085	0.104	1.5748	
240 minute summer	SW12	124	58.421	0.063	8.0	0.0790	0.0000	OK	240 minute summer	4.001	SW05	8.0	0.773	0.088	0.1058	
240 minute summer	SW13	124	58.652	0.062	7.0	0.1432	0.0000	OK	240 minute summer	4.000	SW12	7.0	0.775	0.165	0.3140	
240 minute summer	SW14	124	58.153	0.067	8.0	0.1147	0.0000	OK	240 minute summer	5.001	SW03	8.0	0.821	0.189	0.4632	
240 minute summer	SW15	124	58.162	0.056	4.0	0.0980	0.0000	OK	240 minute summer	5.000	SW14	4.0	0.459	0.094	0.0260	
240 minute summer	SW16	124	58.509	0.094	23.0	0.2371	0.0000	OK	240 minute summer	7.002	EXSW1-39-1	23.0	1.238	0.207	0.7837	87.6
240 minute summer	SW17	124	58.541	0.079	12.0	0.1291	0.0000	OK	240 minute summer	7.001	SW16	12.0	0.713	0.108	0.0792	
240 minute summer	SW18	124	58.706	0.054	8.0	0.1179	0.0000	OK	240 minute summer	7.000	SW17	8.0	0.692	0.072	0.2221	
240 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	240 minute summer	Hydro-Brake®	SW06	2.0				
240 minute summer	EXSW1-35-11	124	57.029	0.179	80.5	0.0000	0.0000	OK								
240 minute summer	EXSW1-39-1	124	58.085	0.092	29.8	0.0000	0.0000	OK								

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Results for 30 year +20% CC 240 minute winter. 480 minute analysis at 4 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	SW01	124	57.134	0.171	55.6	0.4372	0.0000	OK	240 minute winter	1.008	EXSW1-35-11	55.5	0.977	0.218	2.3145	363.1
240 minute winter	SW02	124	58.147	0.037	3.0	0.0611	0.0000	OK	240 minute winter	6.000	SW01	3.0	0.715	0.058	0.1839	
240 minute winter	SW03	124	57.233	0.154	45.9	0.1970	0.0000	OK	240 minute winter	1.007	SW01	45.9	0.811	0.180	2.3620	
240 minute winter	SW04	124	57.396	0.116	38.4	0.1404	0.0000	OK	240 minute winter	1.006	SW03	38.4	0.962	0.138	1.0865	
240 minute winter	SW05	124	57.456	0.126	37.7	0.1526	0.0000	OK	240 minute winter	1.005	SW04	37.7	1.098	0.136	0.2302	
240 minute winter	SW06	124	57.551	0.110	31.1	0.1412	0.0000	OK	240 minute winter	1.004	SW05	31.1	0.941	0.112	0.4936	
240 minute winter	SW07	124	57.747	0.097	27.6	0.1177	0.0000	OK	240 minute winter	1.003	SW06	27.6	1.005	0.099	0.7748	
240 minute winter	SW08	124	58.245	0.074	12.7	0.1279	0.0000	OK	240 minute winter	1.002	SW07	12.7	0.832	0.085	0.7856	
240 minute winter	SW09	124	58.516	0.059	8.2	0.1063	0.0000	OK	240 minute winter	1.001	SW08	8.2	0.621	0.055	0.6828	
240 minute winter	SW10	124	58.690	0.040	3.0	0.0663	0.0000	OK	240 minute winter	1.000	SW09	3.0	0.462	0.071	0.1900	
240 minute winter	SW11	124	59.044	0.071	14.2	0.2714	0.0000	OK	240 minute winter	2.000	SW07	14.2	0.997	0.078	1.2818	
240 minute winter	SW12	124	58.412	0.054	5.9	0.0676	0.0000	OK	240 minute winter	4.001	SW05	5.9	0.711	0.065	0.0850	
240 minute winter	SW13	124	58.644	0.054	5.2	0.1230	0.0000	OK	240 minute winter	4.000	SW12	5.2	0.716	0.123	0.2526	
240 minute winter	SW14	124	58.144	0.058	6.0	0.0989	0.0000	OK	240 minute winter	5.001	SW03	6.0	0.757	0.142	0.3767	
240 minute winter	SW15	124	58.153	0.047	3.0	0.0822	0.0000	OK	240 minute winter	5.000	SW14	3.0	0.430	0.071	0.0207	
240 minute winter	SW16	124	58.496	0.081	17.2	0.2034	0.0000	OK	240 minute winter	7.002	EXSW1-39-1	17.2	1.143	0.155	0.6348	98.1
240 minute winter	SW17	124	58.529	0.067	9.0	0.1090	0.0000	OK	240 minute winter	7.001	SW16	9.0	0.670	0.081	0.0632	
240 minute winter	SW18	124	58.699	0.047	6.0	0.1025	0.0000	OK	240 minute winter	7.000	SW17	6.0	0.649	0.054	0.1771	
240 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	240 minute winter	Hydro-Brake®	SW06	2.0				
240 minute winter	EXSW1-35-11	124	57.005	0.155	60.6	0.0000	0.0000	OK								
240 minute winter	EXSW1-39-1	124	58.072	0.079	22.3	0.0000	0.0000	OK								

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Results for 30 year +20% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	SW01	184	57.134	0.171	56.4	0.4389	0.0000	OK	360 minute summer	1.008	EXSW1-35-11	55.7	0.977	0.219	2.3241	383.9
360 minute summer	SW02	184	58.147	0.037	3.1	0.0617	0.0000	OK	360 minute summer	6.000	SW01	3.1	0.718	0.059	0.1864	
360 minute summer	SW03	184	57.234	0.155	46.7	0.1984	0.0000	OK	360 minute summer	1.007	SW01	46.3	0.812	0.182	2.3798	
360 minute summer	SW04	184	57.398	0.118	39.2	0.1420	0.0000	OK	360 minute summer	1.006	SW03	39.0	0.967	0.140	1.0997	
360 minute summer	SW05	184	57.458	0.128	38.5	0.1543	0.0000	OK	360 minute summer	1.005	SW04	38.4	1.100	0.138	0.2338	
360 minute summer	SW06	184	57.552	0.111	31.7	0.1425	0.0000	OK	360 minute summer	1.004	SW05	31.5	0.940	0.113	0.5009	
360 minute summer	SW07	184	57.748	0.098	28.2	0.1190	0.0000	OK	360 minute summer	1.003	SW06	28.1	1.008	0.101	0.7859	
360 minute summer	SW08	184	58.246	0.075	13.2	0.1291	0.0000	OK	360 minute summer	1.002	SW07	12.9	0.835	0.087	0.7950	
360 minute summer	SW09	184	58.517	0.060	8.6	0.1080	0.0000	OK	360 minute summer	1.001	SW08	8.5	0.630	0.057	0.6950	
360 minute summer	SW10	184	58.691	0.041	3.1	0.0672	0.0000	OK	360 minute summer	1.000	SW09	3.1	0.464	0.073	0.1941	
360 minute summer	SW11	184	59.044	0.071	14.8	0.2744	0.0000	OK	360 minute summer	2.000	SW07	14.5	1.002	0.079	1.3016	
360 minute summer	SW12	184	58.413	0.055	6.3	0.0693	0.0000	OK	360 minute summer	4.001	SW05	6.2	0.719	0.068	0.0880	
360 minute summer	SW13	184	58.645	0.055	5.5	0.1261	0.0000	OK	360 minute summer	4.000	SW12	5.5	0.724	0.129	0.2618	
360 minute summer	SW14	184	58.144	0.058	6.2	0.0998	0.0000	OK	360 minute summer	5.001	SW03	6.1	0.760	0.144	0.3811	
360 minute summer	SW15	184	58.154	0.048	3.1	0.0835	0.0000	OK	360 minute summer	5.000	SW14	3.1	0.434	0.073	0.0211	
360 minute summer	SW16	184	58.497	0.082	17.8	0.2068	0.0000	OK	360 minute summer	7.002	EXSW1-39-1	17.7	1.151	0.159	0.6490	99.1
360 minute summer	SW17	184	58.530	0.068	9.3	0.1106	0.0000	OK	360 minute summer	7.001	SW16	9.2	0.672	0.083	0.0646	
360 minute summer	SW18	184	58.700	0.048	6.2	0.1039	0.0000	OK	360 minute summer	7.000	SW17	6.2	0.654	0.056	0.1809	
360 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	360 minute summer	Hydro-Brake®	SW06	2.0				
360 minute summer	EXSW1-35-11	184	57.005	0.155	61.0	0.0000	0.0000	OK								
360 minute summer	EXSW1-39-1	184	58.073	0.080	23.0	0.0000	0.0000	OK								

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Results for 30 year +20% CC 360 minute winter. 600 minute analysis at 8 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	SW01	184	57.111	0.148	42.8	0.3806	0.0000	OK	360 minute winter	1.008	EXSW1-35-11	42.7	0.909	0.168	1.9119	419.9
360 minute winter	SW02	184	58.142	0.032	2.3	0.0535	0.0000	OK	360 minute winter	6.000	SW01	2.3	0.660	0.044	0.1519	
360 minute winter	SW03	184	57.212	0.133	35.5	0.1710	0.0000	OK	360 minute winter	1.007	SW01	35.4	0.761	0.139	1.9420	
360 minute winter	SW04	184	57.381	0.101	29.8	0.1224	0.0000	OK	360 minute winter	1.006	SW03	29.8	0.908	0.107	0.8935	
360 minute winter	SW05	184	57.440	0.110	29.2	0.1325	0.0000	OK	360 minute winter	1.005	SW04	29.2	1.035	0.105	0.1891	
360 minute winter	SW06	184	57.536	0.095	24.1	0.1222	0.0000	OK	360 minute winter	1.004	SW05	24.0	0.891	0.086	0.4035	
360 minute winter	SW07	184	57.734	0.084	21.0	0.1021	0.0000	OK	360 minute winter	1.003	SW06	21.0	0.937	0.075	0.6314	
360 minute winter	SW08	184	58.236	0.065	9.7	0.1115	0.0000	OK	360 minute winter	1.002	SW07	9.6	0.767	0.065	0.6460	
360 minute winter	SW09	184	58.509	0.052	6.3	0.0934	0.0000	OK	360 minute winter	1.001	SW08	6.3	0.577	0.042	0.5630	
360 minute winter	SW10	184	58.685	0.035	2.3	0.0582	0.0000	OK	360 minute winter	1.000	SW09	2.3	0.425	0.054	0.1579	
360 minute winter	SW11	184	59.035	0.062	10.8	0.2367	0.0000	OK	360 minute winter	2.000	SW07	10.7	0.919	0.059	1.0528	
360 minute winter	SW12	184	58.405	0.047	4.6	0.0595	0.0000	OK	360 minute winter	4.001	SW05	4.6	0.662	0.051	0.0708	
360 minute winter	SW13	184	58.637	0.047	4.0	0.1075	0.0000	OK	360 minute winter	4.000	SW12	4.0	0.662	0.094	0.2096	
360 minute winter	SW14	184	58.136	0.050	4.6	0.0861	0.0000	OK	360 minute winter	5.001	SW03	4.6	0.701	0.108	0.3100	
360 minute winter	SW15	184	58.146	0.040	2.3	0.0699	0.0000	OK	360 minute winter	5.000	SW14	2.3	0.406	0.054	0.0168	
360 minute winter	SW16	184	58.485	0.070	13.0	0.1759	0.0000	OK	360 minute winter	7.002	EXSW1-39-1	13.0	1.056	0.117	0.5182	111.4
360 minute winter	SW17	184	58.519	0.057	6.8	0.0927	0.0000	OK	360 minute winter	7.001	SW16	6.8	0.628	0.061	0.0509	
360 minute winter	SW18	184	58.693	0.041	4.5	0.0892	0.0000	OK	360 minute winter	7.000	SW17	4.5	0.606	0.040	0.1421	
360 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	360 minute winter	Hydro-Brake®	SW06	2.0				
360 minute winter	EXSW1-35-11	184	56.985	0.135	46.6	0.0000	0.0000	OK								
360 minute winter	EXSW1-39-1	184	58.062	0.069	16.9	0.0000	0.0000	OK								

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Results for 100 year +20% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW01	11	57.406	0.443	267.8	1.1356	0.0000	OK	15 minute summer	1.008	EXSW1-35-11	263.3	1.521	1.036	7.0459	143.3
15 minute summer	SW02	10	58.197	0.087	16.2	0.1449	0.0000	OK	15 minute summer	6.000	SW01	16.0	1.145	0.308	0.6125	
15 minute summer	SW03	11	57.518	0.439	225.9	0.5633	0.0000	OK	15 minute summer	1.007	SW01	222.9	1.157	0.877	8.0788	
15 minute summer	SW04	11	57.616	0.336	190.1	0.4064	0.0000	OK	15 minute summer	1.006	SW03	189.0	1.309	0.680	3.8588	
15 minute summer	SW05	11	57.696	0.366	186.8	0.4430	0.0000	OK	15 minute summer	1.005	SW04	186.7	1.441	0.672	0.8889	
15 minute summer	SW06	11	57.755	0.314	152.2	0.4050	0.0000	OK	15 minute summer	1.004	SW05	153.0	1.197	0.551	1.9143	
15 minute summer	SW07	10	57.905	0.255	142.0	0.3091	0.0000	OK	15 minute summer	1.003	SW06	143.5	1.374	0.516	2.9745	
15 minute summer	SW08	10	58.350	0.179	69.4	0.3077	0.0000	OK	15 minute summer	1.002	SW07	66.0	1.308	0.444	2.5988	
15 minute summer	SW09	10	58.598	0.141	44.6	0.2535	0.0000	OK	15 minute summer	1.001	SW08	45.2	1.008	0.304	2.3088	
15 minute summer	SW10	10	58.746	0.096	16.2	0.1573	0.0000	OK	15 minute summer	1.000	SW09	16.2	0.766	0.382	0.6123	
15 minute summer	SW11	10	59.143	0.170	77.0	0.6521	0.0000	OK	15 minute summer	2.000	SW07	74.2	1.577	0.407	4.2579	
15 minute summer	SW12	10	58.494	0.136	32.5	0.1698	0.0000	OK	15 minute summer	4.001	SW05	32.4	1.118	0.358	0.2966	
15 minute summer	SW13	10	58.730	0.140	28.4	0.3207	0.0000	OK	15 minute summer	4.000	SW12	28.4	1.117	0.672	0.8853	
15 minute summer	SW14	10	58.235	0.149	32.3	0.2560	0.0000	OK	15 minute summer	5.001	SW03	31.4	1.158	0.741	1.2929	
15 minute summer	SW15	10	58.247	0.141	16.2	0.2458	0.0000	OK	15 minute summer	5.000	SW14	16.1	0.641	0.380	0.0799	
15 minute summer	SW16	10	58.638	0.223	93.2	0.5600	0.0000	OK	15 minute summer	7.002	EXSW1-39-1	93.1	1.725	0.838	2.2761	36.3
15 minute summer	SW17	10	58.666	0.204	48.7	0.3331	0.0000	OK	15 minute summer	7.001	SW16	48.6	0.908	0.438	0.2514	
15 minute summer	SW18	10	58.762	0.110	32.5	0.2398	0.0000	OK	15 minute summer	7.000	SW17	32.5	0.891	0.292	0.7058	
15 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute summer	Hydro-Brake®	SW06	2.0				
15 minute summer	EXSW1-35-11	11	57.198	0.348	286.1	0.0000	0.0000	OK								
15 minute summer	EXSW1-39-1	10	58.200	0.207	120.7	0.0000	0.0000	OK								

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Results for 100 year +20% CC 15 minute winter. 255 minute analysis at 1 minute timestep. Mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	11	57.413	0.450	272.2	1.1523	0.0000	OK	15 minute winter	1.008	EXSW1-35-11	268.9	1.529	1.058	7.1325	157.0
15 minute winter	SW02	10	58.197	0.087	16.2	0.1450	0.0000	OK	15 minute winter	6.000	SW01	16.1	1.146	0.309	0.6135	
15 minute winter	SW03	11	57.525	0.446	228.2	0.5719	0.0000	OK	15 minute winter	1.007	SW01	226.0	1.155	0.889	8.1828	
15 minute winter	SW04	11	57.623	0.343	191.8	0.4140	0.0000	OK	15 minute winter	1.006	SW03	190.7	1.306	0.686	3.9026	
15 minute winter	SW05	11	57.702	0.372	188.4	0.4495	0.0000	OK	15 minute winter	1.005	SW04	188.3	1.436	0.677	0.9031	
15 minute winter	SW06	11	57.759	0.318	153.6	0.4098	0.0000	OK	15 minute winter	1.004	SW05	154.2	1.197	0.555	1.9396	
15 minute winter	SW07	10	57.908	0.258	144.0	0.3120	0.0000	OK	15 minute winter	1.003	SW06	144.7	1.373	0.521	3.0072	
15 minute winter	SW08	10	58.351	0.180	69.4	0.3104	0.0000	OK	15 minute winter	1.002	SW07	66.6	1.310	0.448	2.6171	
15 minute winter	SW09	10	58.597	0.140	44.6	0.2522	0.0000	OK	15 minute winter	1.001	SW08	45.0	1.002	0.303	2.3170	
15 minute winter	SW10	10	58.746	0.096	16.2	0.1573	0.0000	OK	15 minute winter	1.000	SW09	16.2	0.769	0.382	0.6101	
15 minute winter	SW11	10	59.143	0.170	77.1	0.6542	0.0000	OK	15 minute winter	2.000	SW07	74.8	1.580	0.410	4.2805	
15 minute winter	SW12	10	58.494	0.136	32.5	0.1698	0.0000	OK	15 minute winter	4.001	SW05	32.4	1.118	0.358	0.2966	
15 minute winter	SW13	10	58.730	0.140	28.4	0.3206	0.0000	OK	15 minute winter	4.000	SW12	28.4	1.117	0.672	0.8852	
15 minute winter	SW14	10	58.236	0.150	32.3	0.2568	0.0000	OK	15 minute winter	5.001	SW03	31.6	1.159	0.746	1.2987	
15 minute winter	SW15	10	58.247	0.141	16.2	0.2466	0.0000	OK	15 minute winter	5.000	SW14	16.1	0.622	0.380	0.0802	
15 minute winter	SW16	10	58.638	0.223	93.2	0.5600	0.0000	OK	15 minute winter	7.002	EXSW1-39-1	93.2	1.725	0.838	2.2763	40.6
15 minute winter	SW17	10	58.666	0.204	48.7	0.3331	0.0000	OK	15 minute winter	7.001	SW16	48.6	0.908	0.438	0.2514	
15 minute winter	SW18	10	58.762	0.110	32.5	0.2398	0.0000	OK	15 minute winter	7.000	SW17	32.5	0.889	0.292	0.7058	
15 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	15 minute winter	Hydro-Brake®	SW06	2.0				
15 minute winter	EXSW1-35-11	11	57.202	0.352	292.5	0.0000	0.0000	OK								
15 minute winter	EXSW1-39-1	10	58.200	0.207	120.8	0.0000	0.0000	OK								

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Results for 100 year +20% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW01	19	57.391	0.428	253.6	1.0974	0.0000	OK	30 minute summer	1.008	EXSW1-35-11	255.7	1.505	1.006	6.8740	191.9
30 minute summer	SW02	17	58.193	0.083	15.3	0.1384	0.0000	OK	30 minute summer	6.000	SW01	14.8	1.125	0.285	0.5762	
30 minute summer	SW03	19	57.499	0.420	213.3	0.5386	0.0000	OK	30 minute summer	1.007	SW01	213.4	1.142	0.839	7.7944	
30 minute summer	SW04	19	57.593	0.313	179.0	0.3786	0.0000	OK	30 minute summer	1.006	SW03	177.9	1.296	0.640	3.6857	
30 minute summer	SW05	18	57.672	0.342	177.0	0.4137	0.0000	OK	30 minute summer	1.005	SW04	175.4	1.429	0.631	0.8263	
30 minute summer	SW06	18	57.736	0.295	145.5	0.3803	0.0000	OK	30 minute summer	1.004	SW05	143.5	1.196	0.516	1.7877	
30 minute summer	SW07	18	57.899	0.249	136.3	0.3008	0.0000	OK	30 minute summer	1.003	SW06	136.3	1.361	0.490	2.8196	
30 minute summer	SW08	18	58.346	0.175	63.9	0.3002	0.0000	OK	30 minute summer	1.002	SW07	62.5	1.282	0.420	2.5115	
30 minute summer	SW09	17	58.592	0.135	41.7	0.2420	0.0000	OK	30 minute summer	1.001	SW08	41.0	0.985	0.275	2.1858	
30 minute summer	SW10	17	58.742	0.092	15.3	0.1511	0.0000	OK	30 minute summer	1.000	SW09	15.0	0.752	0.355	0.5799	
30 minute summer	SW11	18	59.136	0.163	72.6	0.6256	0.0000	OK	30 minute summer	2.000	SW07	70.1	1.555	0.384	4.0587	
30 minute summer	SW12	18	58.487	0.129	30.0	0.1612	0.0000	OK	30 minute summer	4.001	SW05	29.8	1.098	0.329	0.2780	
30 minute summer	SW13	17	58.723	0.133	26.7	0.3053	0.0000	OK	30 minute summer	4.000	SW12	26.2	1.096	0.619	0.8318	
30 minute summer	SW14	18	58.228	0.142	30.3	0.2435	0.0000	OK	30 minute summer	5.001	SW03	29.6	1.145	0.698	1.2266	
30 minute summer	SW15	17	58.238	0.132	15.3	0.2312	0.0000	OK	30 minute summer	5.000	SW14	15.0	0.611	0.355	0.0748	
30 minute summer	SW16	17	58.624	0.209	86.8	0.5257	0.0000	OK	30 minute summer	7.002	EXSW1-39-1	85.4	1.707	0.768	2.1239	51.2
30 minute summer	SW17	17	58.652	0.190	45.6	0.3111	0.0000	OK	30 minute summer	7.001	SW16	44.8	0.903	0.403	0.2338	
30 minute summer	SW18	17	58.758	0.106	30.6	0.2312	0.0000	OK	30 minute summer	7.000	SW17	30.3	0.881	0.273	0.6588	
30 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	30 minute summer	Hydro-Brake®	SW06	2.0				
30 minute summer	EXSW1-35-11	19	57.193	0.343	275.6	0.0000	0.0000	OK								
30 minute summer	EXSW1-39-1	17	58.187	0.194	111.4	0.0000	0.0000	OK								

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Results for 100 year +20% CC 30 minute winter. 270 minute analysis at 1 minute timestep. Mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	SW01	19	57.359	0.396	229.4	1.0159	0.0000	OK	30 minute winter	1.008	EXSW1-35-11	230.6	1.459	0.907	6.4112	211.3
30 minute winter	SW02	17	58.188	0.078	13.2	0.1289	0.0000	OK	30 minute winter	6.000	SW01	13.0	1.085	0.250	0.5241	
30 minute winter	SW03	19	57.461	0.382	190.8	0.4898	0.0000	OK	30 minute winter	1.007	SW01	190.9	1.112	0.751	7.1561	
30 minute winter	SW04	18	57.561	0.281	159.4	0.3395	0.0000	OK	30 minute winter	1.006	SW03	158.9	1.274	0.572	3.3548	
30 minute winter	SW05	18	57.639	0.309	156.8	0.3737	0.0000	OK	30 minute winter	1.005	SW04	156.2	1.419	0.562	0.7375	
30 minute winter	SW06	18	57.708	0.267	128.2	0.3437	0.0000	OK	30 minute winter	1.004	SW05	127.5	1.191	0.459	1.5968	
30 minute winter	SW07	18	57.878	0.228	119.7	0.2762	0.0000	OK	30 minute winter	1.003	SW06	119.8	1.341	0.431	2.5179	
30 minute winter	SW08	18	58.333	0.162	55.6	0.2780	0.0000	OK	30 minute winter	1.002	SW07	54.9	1.242	0.369	2.2771	
30 minute winter	SW09	17	58.581	0.124	36.2	0.2226	0.0000	OK	30 minute winter	1.001	SW08	35.8	0.944	0.241	1.9796	
30 minute winter	SW10	17	58.735	0.085	13.2	0.1400	0.0000	OK	30 minute winter	1.000	SW09	13.1	0.726	0.309	0.5237	
30 minute winter	SW11	18	59.124	0.151	62.8	0.5821	0.0000	OK	30 minute winter	2.000	SW07	61.6	1.504	0.338	3.6899	
30 minute winter	SW12	18	58.477	0.119	26.2	0.1495	0.0000	OK	30 minute winter	4.001	SW05	26.1	1.060	0.288	0.2517	
30 minute winter	SW13	17	58.712	0.122	23.1	0.2790	0.0000	OK	30 minute winter	4.000	SW12	22.9	1.059	0.540	0.7513	
30 minute winter	SW14	18	58.216	0.130	26.3	0.2234	0.0000	OK	30 minute winter	5.001	SW03	25.9	1.113	0.612	1.1077	
30 minute winter	SW15	17	58.227	0.121	13.2	0.2108	0.0000	OK	30 minute winter	5.000	SW14	13.1	0.582	0.309	0.0671	
30 minute winter	SW16	17	58.604	0.189	75.4	0.4760	0.0000	OK	30 minute winter	7.002	EXSW1-39-1	74.8	1.662	0.673	1.9055	57.5
30 minute winter	SW17	17	58.633	0.171	39.5	0.2792	0.0000	OK	30 minute winter	7.001	SW16	39.1	0.888	0.352	0.2072	
30 minute winter	SW18	17	58.750	0.098	26.4	0.2144	0.0000	OK	30 minute winter	7.000	SW17	26.3	0.860	0.236	0.5838	
30 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	30 minute winter	Hydro-Brake®	SW06	2.0				
30 minute winter	EXSW1-35-11	19	57.175	0.325	250.5	0.0000	0.0000	OK								
30 minute winter	EXSW1-39-1	17	58.171	0.178	97.3	0.0000	0.0000	OK								

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Results for 100 year +20% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW01	34	57.330	0.367	205.5	0.9413	0.0000	OK	60 minute summer	1.008	EXSW1-35-11	206.7	1.412	0.813	5.9460	252.2
60 minute summer	SW02	33	58.183	0.073	11.8	0.1215	0.0000	OK	60 minute summer	6.000	SW01	11.6	1.052	0.224	0.4840	
60 minute summer	SW03	34	57.429	0.350	171.1	0.4495	0.0000	OK	60 minute summer	1.007	SW01	171.3	1.090	0.674	6.5572	
60 minute summer	SW04	33	57.538	0.258	142.9	0.3113	0.0000	OK	60 minute summer	1.006	SW03	142.6	1.256	0.513	3.0640	
60 minute summer	SW05	33	57.613	0.283	140.6	0.3423	0.0000	OK	60 minute summer	1.005	SW04	140.0	1.409	0.504	0.6660	
60 minute summer	SW06	33	57.686	0.245	114.8	0.3161	0.0000	OK	60 minute summer	1.004	SW05	114.2	1.184	0.411	1.4429	
60 minute summer	SW07	33	57.863	0.213	107.1	0.2576	0.0000	OK	60 minute summer	1.003	SW06	107.1	1.321	0.385	2.2862	
60 minute summer	SW08	33	58.323	0.152	49.9	0.2610	0.0000	OK	60 minute summer	1.002	SW07	49.1	1.207	0.330	2.0958	
60 minute summer	SW09	32	58.574	0.117	32.4	0.2100	0.0000	OK	60 minute summer	1.001	SW08	32.1	0.919	0.216	1.8239	
60 minute summer	SW10	32	58.730	0.080	11.8	0.1319	0.0000	OK	60 minute summer	1.000	SW09	11.7	0.701	0.276	0.4854	
60 minute summer	SW11	33	59.115	0.142	56.3	0.5472	0.0000	OK	60 minute summer	2.000	SW07	55.1	1.460	0.302	3.3995	
60 minute summer	SW12	33	58.470	0.112	23.5	0.1406	0.0000	OK	60 minute summer	4.001	SW05	23.4	1.031	0.259	0.2324	
60 minute summer	SW13	32	58.704	0.114	20.7	0.2607	0.0000	OK	60 minute summer	4.000	SW12	20.5	1.030	0.484	0.6926	
60 minute summer	SW14	33	58.207	0.121	23.5	0.2084	0.0000	OK	60 minute summer	5.001	SW03	23.2	1.085	0.549	1.0178	
60 minute summer	SW15	33	58.218	0.112	11.8	0.1949	0.0000	OK	60 minute summer	5.000	SW14	11.7	0.574	0.276	0.0613	
60 minute summer	SW16	32	58.591	0.176	67.7	0.4423	0.0000	OK	60 minute summer	7.002	EXSW1-39-1	67.1	1.624	0.604	1.7497	69.4
60 minute summer	SW17	32	58.619	0.157	35.4	0.2576	0.0000	OK	60 minute summer	7.001	SW16	35.1	0.875	0.316	0.1888	
60 minute summer	SW18	32	58.745	0.093	23.7	0.2027	0.0000	OK	60 minute summer	7.000	SW17	23.6	0.848	0.212	0.5321	
60 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	60 minute summer	Hydro-Brake®	SW06	2.0				
60 minute summer	EXSW1-35-11	34	57.157	0.307	224.3	0.0000	0.0000	OK								
60 minute summer	EXSW1-39-1	32	58.159	0.166	87.2	0.0000	0.0000	OK								

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Results for 100 year +20% CC 60 minute winter. 300 minute analysis at 1 minute timestep. Mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	SW01	34	57.283	0.320	167.0	0.8201	0.0000	OK	60 minute winter	1.008	EXSW1-35-11	167.2	1.327	0.658	5.1255	278.2
60 minute winter	SW02	33	58.175	0.065	9.3	0.1077	0.0000	OK	60 minute winter	6.000	SW01	9.2	0.988	0.178	0.4099	
60 minute winter	SW03	34	57.379	0.300	137.6	0.3845	0.0000	OK	60 minute winter	1.007	SW01	137.8	1.039	0.542	5.5288	
60 minute winter	SW04	33	57.501	0.221	114.8	0.2668	0.0000	OK	60 minute winter	1.006	SW03	114.7	1.209	0.413	2.5680	
60 minute winter	SW05	33	57.572	0.242	112.6	0.2924	0.0000	OK	60 minute winter	1.005	SW04	112.5	1.371	0.405	0.5498	
60 minute winter	SW06	33	57.651	0.210	91.9	0.2711	0.0000	OK	60 minute winter	1.004	SW05	91.8	1.153	0.330	1.1903	
60 minute winter	SW07	33	57.834	0.184	85.4	0.2227	0.0000	OK	60 minute winter	1.003	SW06	85.3	1.277	0.307	1.8842	
60 minute winter	SW08	33	58.305	0.134	39.4	0.2300	0.0000	OK	60 minute winter	1.002	SW07	39.2	1.137	0.263	1.7730	
60 minute winter	SW09	33	58.560	0.103	25.6	0.1860	0.0000	OK	60 minute winter	1.001	SW08	25.4	0.855	0.171	1.5419	
60 minute winter	SW10	32	58.721	0.071	9.3	0.1167	0.0000	OK	60 minute winter	1.000	SW09	9.3	0.653	0.219	0.4132	
60 minute winter	SW11	33	59.099	0.126	44.2	0.4840	0.0000	OK	60 minute winter	2.000	SW07	43.9	1.372	0.241	2.8804	
60 minute winter	SW12	33	58.457	0.099	18.5	0.1236	0.0000	OK	60 minute winter	4.001	SW05	18.5	0.969	0.205	0.1955	
60 minute winter	SW13	32	58.689	0.099	16.3	0.2266	0.0000	OK	60 minute winter	4.000	SW12	16.2	0.970	0.383	0.5819	
60 minute winter	SW14	33	58.192	0.106	18.6	0.1816	0.0000	OK	60 minute winter	5.001	SW03	18.5	1.026	0.436	0.8559	
60 minute winter	SW15	32	58.202	0.096	9.3	0.1671	0.0000	OK	60 minute winter	5.000	SW14	9.3	0.541	0.219	0.0508	
60 minute winter	SW16	32	58.567	0.152	53.4	0.3810	0.0000	OK	60 minute winter	7.002	EXSW1-39-1	53.2	1.538	0.479	1.4608	77.7
60 minute winter	SW17	32	58.596	0.134	27.9	0.2187	0.0000	OK	60 minute winter	7.001	SW16	27.8	0.842	0.250	0.1551	
60 minute winter	SW18	32	58.734	0.082	18.6	0.1792	0.0000	OK	60 minute winter	7.000	SW17	18.6	0.814	0.167	0.4368	
60 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	60 minute winter	Hydro-Brake®	SW06	2.0				
60 minute winter	EXSW1-35-11	34	57.124	0.274	182.4	0.0000	0.0000	OK								
60 minute winter	EXSW1-39-1	32	58.138	0.145	69.0	0.0000	0.0000	OK								

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Results for 100 year +20% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	SW01	64	57.258	0.295	146.5	0.7568	0.0000	OK	120 minute summer	1.008	EXSW1-35-11	146.7	1.277	0.577	4.6737	326.3
120 minute summer	SW02	62	58.171	0.061	8.3	0.1008	0.0000	OK	120 minute summer	6.000	SW01	8.1	0.950	0.156	0.3732	
120 minute summer	SW03	64	57.354	0.275	120.6	0.3523	0.0000	OK	120 minute summer	1.007	SW01	121.2	1.013	0.477	4.9906	
120 minute summer	SW04	64	57.483	0.203	100.5	0.2448	0.0000	OK	120 minute summer	1.006	SW03	100.8	1.181	0.363	2.3127	
120 minute summer	SW05	64	57.552	0.222	98.3	0.2683	0.0000	OK	120 minute summer	1.005	SW04	98.6	1.341	0.355	0.4925	
120 minute summer	SW06	64	57.634	0.193	80.0	0.2484	0.0000	OK	120 minute summer	1.004	SW05	80.5	1.129	0.290	1.0648	
120 minute summer	SW07	64	57.818	0.168	73.8	0.2038	0.0000	OK	120 minute summer	1.003	SW06	74.1	1.247	0.267	1.6770	
120 minute summer	SW08	64	58.295	0.124	34.7	0.2129	0.0000	OK	120 minute summer	1.002	SW07	34.1	1.097	0.229	1.5994	
120 minute summer	SW09	62	58.554	0.097	22.7	0.1742	0.0000	OK	120 minute summer	1.001	SW08	22.3	0.829	0.150	1.3903	
120 minute summer	SW10	62	58.717	0.067	8.3	0.1096	0.0000	OK	120 minute summer	1.000	SW09	8.2	0.630	0.194	0.3792	
120 minute summer	SW11	62	59.090	0.117	39.4	0.4502	0.0000	OK	120 minute summer	2.000	SW07	38.1	1.320	0.209	2.6021	
120 minute summer	SW12	62	58.450	0.092	16.4	0.1151	0.0000	OK	120 minute summer	4.001	SW05	16.2	0.935	0.179	0.1774	
120 minute summer	SW13	62	58.682	0.092	14.5	0.2114	0.0000	OK	120 minute summer	4.000	SW12	14.3	0.939	0.339	0.5309	
120 minute summer	SW14	62	58.184	0.098	16.5	0.1681	0.0000	OK	120 minute summer	5.001	SW03	16.1	0.989	0.379	0.7731	
120 minute summer	SW15	62	58.194	0.088	8.3	0.1540	0.0000	OK	120 minute summer	5.000	SW14	8.2	0.531	0.194	0.0458	
120 minute summer	SW16	62	58.556	0.141	47.4	0.3539	0.0000	OK	120 minute summer	7.002	EXSW1-39-1	46.9	1.488	0.422	1.3294	90.5
120 minute summer	SW17	62	58.585	0.123	24.8	0.2017	0.0000	OK	120 minute summer	7.001	SW16	24.6	0.823	0.221	0.1403	
120 minute summer	SW18	62	58.729	0.077	16.6	0.1688	0.0000	OK	120 minute summer	7.000	SW17	16.5	0.800	0.148	0.3956	
120 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	120 minute summer	Hydro-Brake®	SW06	2.0				
120 minute summer	EXSW1-35-11	64	57.106	0.256	159.9	0.0000	0.0000	OK								
120 minute summer	EXSW1-39-1	62	58.127	0.134	61.0	0.0000	0.0000	OK								

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Results for 100 year +20% CC 120 minute winter. 360 minute analysis at 2 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	SW01	64	57.215	0.252	112.3	0.6456	0.0000	OK	120 minute winter	1.008	EXSW1-35-11	112.3	1.185	0.442	3.8553	360.3
120 minute winter	SW02	62	58.163	0.053	6.2	0.0875	0.0000	OK	120 minute winter	6.000	SW01	6.2	0.881	0.119	0.3066	
120 minute winter	SW03	64	57.310	0.231	92.4	0.2966	0.0000	OK	120 minute winter	1.007	SW01	92.4	0.954	0.364	4.0433	
120 minute winter	SW04	64	57.452	0.172	77.1	0.2080	0.0000	OK	120 minute winter	1.006	SW03	77.1	1.121	0.277	1.8683	
120 minute winter	SW05	64	57.518	0.188	75.5	0.2280	0.0000	OK	120 minute winter	1.005	SW04	75.6	1.274	0.272	0.3976	
120 minute winter	SW06	64	57.605	0.164	61.7	0.2110	0.0000	OK	120 minute winter	1.004	SW05	61.8	1.075	0.222	0.8586	
120 minute winter	SW07	64	57.794	0.144	56.7	0.1745	0.0000	OK	120 minute winter	1.003	SW06	56.7	1.183	0.204	1.3518	
120 minute winter	SW08	64	58.279	0.108	26.2	0.1849	0.0000	OK	120 minute winter	1.002	SW07	26.1	1.020	0.175	1.3179	
120 minute winter	SW09	62	58.541	0.084	17.0	0.1516	0.0000	OK	120 minute winter	1.001	SW08	16.9	0.764	0.114	1.1451	
120 minute winter	SW10	62	58.708	0.058	6.2	0.0949	0.0000	OK	120 minute winter	1.000	SW09	6.2	0.577	0.146	0.3130	
120 minute winter	SW11	62	59.074	0.101	29.3	0.3900	0.0000	OK	120 minute winter	2.000	SW07	29.1	1.225	0.159	2.1381	
120 minute winter	SW12	62	58.437	0.079	12.3	0.0989	0.0000	OK	120 minute winter	4.001	SW05	12.3	0.868	0.135	0.1444	
120 minute winter	SW13	62	58.669	0.079	10.8	0.1802	0.0000	OK	120 minute winter	4.000	SW12	10.8	0.872	0.255	0.4301	
120 minute winter	SW14	62	58.170	0.084	12.4	0.1445	0.0000	OK	120 minute winter	5.001	SW03	12.3	0.923	0.290	0.6337	
120 minute winter	SW15	62	58.180	0.074	6.2	0.1287	0.0000	OK	120 minute winter	5.000	SW14	6.2	0.499	0.146	0.0367	
120 minute winter	SW16	62	58.534	0.119	35.5	0.3001	0.0000	OK	120 minute winter	7.002	EXSW1-39-1	35.4	1.388	0.318	1.0754	101.7
120 minute winter	SW17	62	58.565	0.103	18.5	0.1678	0.0000	OK	120 minute winter	7.001	SW16	18.5	0.780	0.166	0.1113	
120 minute winter	SW18	62	58.719	0.067	12.3	0.1456	0.0000	OK	120 minute winter	7.000	SW17	12.3	0.754	0.111	0.3128	
120 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	120 minute winter	Hydro-Brake®	SW06	2.0				
120 minute winter	EXSW1-35-11	64	57.073	0.223	122.7	0.0000	0.0000	OK								
120 minute winter	EXSW1-39-1	62	58.108	0.115	45.9	0.0000	0.0000	OK								

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Results for 100 year +20% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	SW01	92	57.214	0.251	112.8	0.6434	0.0000	OK	180 minute summer	1.008	EXSW1-35-11	112.0	1.188	0.441	3.8376	375.6
180 minute summer	SW02	92	58.164	0.054	6.5	0.0890	0.0000	OK	180 minute summer	6.000	SW01	6.4	0.888	0.122	0.3137	
180 minute summer	SW03	92	57.310	0.231	93.3	0.2963	0.0000	OK	180 minute summer	1.007	SW01	91.8	0.954	0.361	4.0316	
180 minute summer	SW04	92	57.453	0.173	77.9	0.2092	0.0000	OK	180 minute summer	1.006	SW03	77.3	1.122	0.278	1.8727	
180 minute summer	SW05	92	57.520	0.190	76.6	0.2296	0.0000	OK	180 minute summer	1.005	SW04	76.3	1.275	0.274	0.4010	
180 minute summer	SW06	92	57.606	0.165	63.0	0.2128	0.0000	OK	180 minute summer	1.004	SW05	62.4	1.074	0.224	0.8676	
180 minute summer	SW07	92	57.796	0.146	58.0	0.1769	0.0000	OK	180 minute summer	1.003	SW06	57.7	1.186	0.208	1.3720	
180 minute summer	SW08	92	58.280	0.109	27.3	0.1868	0.0000	OK	180 minute summer	1.002	SW07	26.4	1.021	0.177	1.3327	
180 minute summer	SW09	92	58.543	0.086	17.8	0.1542	0.0000	OK	180 minute summer	1.001	SW08	17.5	0.775	0.118	1.1677	
180 minute summer	SW10	92	58.709	0.059	6.5	0.0968	0.0000	OK	180 minute summer	1.000	SW09	6.4	0.585	0.152	0.3210	
180 minute summer	SW11	92	59.076	0.103	31.1	0.3975	0.0000	OK	180 minute summer	2.000	SW07	30.0	1.233	0.165	2.1924	
180 minute summer	SW12	92	58.439	0.080	12.9	0.1008	0.0000	OK	180 minute summer	4.001	SW05	12.7	0.875	0.140	0.1480	
180 minute summer	SW13	92	58.671	0.081	11.4	0.1849	0.0000	OK	180 minute summer	4.000	SW12	11.3	0.882	0.266	0.4434	
180 minute summer	SW14	92	58.172	0.086	12.9	0.1469	0.0000	OK	180 minute summer	5.001	SW03	12.6	0.928	0.298	0.6471	
180 minute summer	SW15	92	58.181	0.075	6.5	0.1318	0.0000	OK	180 minute summer	5.000	SW14	6.4	0.506	0.152	0.0377	
180 minute summer	SW16	92	58.538	0.123	37.3	0.3082	0.0000	OK	180 minute summer	7.002	EXSW1-39-1	36.9	1.401	0.333	1.1120	104.1
180 minute summer	SW17	92	58.568	0.106	19.5	0.1729	0.0000	OK	180 minute summer	7.001	SW16	19.3	0.786	0.174	0.1156	
180 minute summer	SW18	92	58.721	0.069	13.1	0.1498	0.0000	OK	180 minute summer	7.000	SW17	13.0	0.766	0.117	0.3258	
180 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	180 minute summer	Hydro-Brake®	SW06	2.0				
180 minute summer	EXSW1-35-11	96	57.072	0.222	121.8	0.0000	0.0000	OK								
180 minute summer	EXSW1-39-1	92	58.111	0.118	48.0	0.0000	0.0000	OK								

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Results for 100 year +20% CC 180 minute winter. 420 minute analysis at 4 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	SW01	96	57.180	0.217	86.7	0.5566	0.0000	OK	180 minute winter	1.008	EXSW1-35-11	86.6	1.104	0.341	3.1946	415.2
180 minute winter	SW02	92	58.156	0.046	4.8	0.0768	0.0000	OK	180 minute winter	6.000	SW01	4.8	0.818	0.092	0.2550	
180 minute winter	SW03	92	57.277	0.198	71.5	0.2535	0.0000	OK	180 minute winter	1.007	SW01	71.3	0.900	0.280	3.3056	
180 minute winter	SW04	92	57.428	0.148	59.6	0.1793	0.0000	OK	180 minute winter	1.006	SW03	59.6	1.062	0.214	1.5259	
180 minute winter	SW05	92	57.492	0.162	58.5	0.1960	0.0000	OK	180 minute winter	1.005	SW04	58.4	1.207	0.210	0.3246	
180 minute winter	SW06	92	57.582	0.141	47.9	0.1815	0.0000	OK	180 minute winter	1.004	SW05	47.8	1.022	0.172	0.6996	
180 minute winter	SW07	92	57.774	0.124	43.6	0.1506	0.0000	OK	180 minute winter	1.003	SW06	43.5	1.117	0.157	1.1002	
180 minute winter	SW08	92	58.265	0.094	20.1	0.1611	0.0000	OK	180 minute winter	1.002	SW07	20.0	0.945	0.134	1.0874	
180 minute winter	SW09	92	58.531	0.074	13.1	0.1331	0.0000	OK	180 minute winter	1.001	SW08	13.0	0.710	0.088	0.9476	
180 minute winter	SW10	92	58.701	0.051	4.8	0.0834	0.0000	OK	180 minute winter	1.000	SW09	4.8	0.534	0.113	0.2616	
180 minute winter	SW11	92	59.062	0.089	22.6	0.3415	0.0000	OK	180 minute winter	2.000	SW07	22.4	1.137	0.123	1.7754	
180 minute winter	SW12	92	58.427	0.069	9.5	0.0862	0.0000	OK	180 minute winter	4.001	SW05	9.5	0.810	0.104	0.1194	
180 minute winter	SW13	92	58.658	0.068	8.3	0.1565	0.0000	OK	180 minute winter	4.000	SW12	8.3	0.811	0.195	0.3549	
180 minute winter	SW14	92	58.159	0.073	9.6	0.1258	0.0000	OK	180 minute winter	5.001	SW03	9.5	0.860	0.224	0.5252	
180 minute winter	SW15	92	58.169	0.063	4.8	0.1095	0.0000	OK	180 minute winter	5.000	SW14	4.8	0.474	0.113	0.0299	
180 minute winter	SW16	92	58.518	0.103	27.4	0.2600	0.0000	OK	180 minute winter	7.002	EXSW1-39-1	27.3	1.296	0.246	0.8885	117.1
180 minute winter	SW17	92	58.550	0.088	14.3	0.1432	0.0000	OK	180 minute winter	7.001	SW16	14.3	0.740	0.128	0.0906	
180 minute winter	SW18	92	58.711	0.059	9.5	0.1281	0.0000	OK	180 minute winter	7.000	SW17	9.5	0.715	0.085	0.2545	
180 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	180 minute winter	Hydro-Brake®	SW06	2.0				
180 minute winter	EXSW1-35-11	96	57.045	0.195	94.5	0.0000	0.0000	OK								
180 minute winter	EXSW1-39-1	92	58.093	0.100	35.4	0.0000	0.0000	OK								

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Results for 100 year +20% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	SW01	124	57.193	0.230	96.1	0.5902	0.0000	OK	240 minute summer	1.008	EXSW1-35-11	96.0	1.134	0.378	3.4447	413.4
240 minute summer	SW02	124	58.158	0.048	5.2	0.0803	0.0000	OK	240 minute summer	6.000	SW01	5.2	0.839	0.100	0.2714	
240 minute summer	SW03	124	57.289	0.210	79.1	0.2697	0.0000	OK	240 minute summer	1.007	SW01	79.1	0.921	0.311	3.5825	
240 minute summer	SW04	124	57.438	0.158	66.1	0.1903	0.0000	OK	240 minute summer	1.006	SW03	66.1	1.086	0.238	1.6550	
240 minute summer	SW05	124	57.502	0.172	64.9	0.2082	0.0000	OK	240 minute summer	1.005	SW04	64.8	1.234	0.233	0.3523	
240 minute summer	SW06	124	57.591	0.150	53.1	0.1928	0.0000	OK	240 minute summer	1.004	SW05	53.1	1.043	0.191	0.7598	
240 minute summer	SW07	124	57.782	0.132	48.5	0.1598	0.0000	OK	240 minute summer	1.003	SW06	48.5	1.144	0.174	1.1950	
240 minute summer	SW08	124	58.270	0.099	22.3	0.1704	0.0000	OK	240 minute summer	1.002	SW07	22.3	0.975	0.150	1.1764	
240 minute summer	SW09	124	58.535	0.078	14.4	0.1399	0.0000	OK	240 minute summer	1.001	SW08	14.4	0.730	0.097	1.0222	
240 minute summer	SW10	124	58.703	0.053	5.2	0.0870	0.0000	OK	240 minute summer	1.000	SW09	5.2	0.545	0.123	0.2791	
240 minute summer	SW11	124	59.067	0.094	24.9	0.3600	0.0000	OK	240 minute summer	2.000	SW07	24.9	1.172	0.136	1.9121	
240 minute summer	SW12	124	58.431	0.073	10.5	0.0911	0.0000	OK	240 minute summer	4.001	SW05	10.5	0.833	0.116	0.1289	
240 minute summer	SW13	124	58.662	0.072	9.2	0.1654	0.0000	OK	240 minute summer	4.000	SW12	9.2	0.835	0.217	0.3833	
240 minute summer	SW14	124	58.163	0.077	10.4	0.1318	0.0000	OK	240 minute summer	5.001	SW03	10.4	0.882	0.245	0.5604	
240 minute summer	SW15	124	58.172	0.066	5.2	0.1155	0.0000	OK	240 minute summer	5.000	SW14	5.2	0.485	0.123	0.0320	
240 minute summer	SW16	124	58.524	0.109	30.1	0.2741	0.0000	OK	240 minute summer	7.002	EXSW1-39-1	30.1	1.331	0.271	0.9540	114.2
240 minute summer	SW17	124	58.555	0.093	15.7	0.1518	0.0000	OK	240 minute summer	7.001	SW16	15.7	0.755	0.141	0.0978	
240 minute summer	SW18	124	58.714	0.062	10.5	0.1347	0.0000	OK	240 minute summer	7.000	SW17	10.5	0.733	0.094	0.2750	
240 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	240 minute summer	Hydro-Brake®	SW06	2.0				
240 minute summer	EXSW1-35-11	124	57.055	0.205	104.9	0.0000	0.0000	OK								
240 minute summer	EXSW1-39-1	124	58.099	0.106	39.0	0.0000	0.0000	OK								

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Results for 100 year +20% CC 240 minute winter. 480 minute analysis at 4 minute timestep. Mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	SW01	124	57.159	0.196	72.1	0.5030	0.0000	OK	240 minute winter	1.008	EXSW1-35-11	72.0	1.049	0.283	2.7960	457.9
240 minute winter	SW02	124	58.152	0.042	3.9	0.0696	0.0000	OK	240 minute winter	6.000	SW01	3.9	0.772	0.075	0.2214	
240 minute winter	SW03	124	57.257	0.178	59.4	0.2279	0.0000	OK	240 minute winter	1.007	SW01	59.4	0.862	0.234	2.8742	
240 minute winter	SW04	124	57.414	0.134	49.7	0.1619	0.0000	OK	240 minute winter	1.006	SW03	49.7	1.021	0.179	1.3245	
240 minute winter	SW05	124	57.476	0.146	48.7	0.1764	0.0000	OK	240 minute winter	1.005	SW04	48.7	1.161	0.175	0.2813	
240 minute winter	SW06	124	57.568	0.127	39.9	0.1632	0.0000	OK	240 minute winter	1.004	SW05	39.9	0.986	0.144	0.6047	
240 minute winter	SW07	124	57.762	0.112	36.0	0.1357	0.0000	OK	240 minute winter	1.003	SW06	36.0	1.070	0.129	0.9495	
240 minute winter	SW08	124	58.256	0.085	16.5	0.1460	0.0000	OK	240 minute winter	1.002	SW07	16.5	0.897	0.111	0.9474	
240 minute winter	SW09	124	58.524	0.067	10.7	0.1210	0.0000	OK	240 minute winter	1.001	SW08	10.7	0.670	0.072	0.8248	
240 minute winter	SW10	124	58.696	0.046	3.9	0.0754	0.0000	OK	240 minute winter	1.000	SW09	3.9	0.500	0.092	0.2282	
240 minute winter	SW11	124	59.054	0.081	18.5	0.3096	0.0000	OK	240 minute winter	2.000	SW07	18.5	1.077	0.101	1.5459	
240 minute winter	SW12	124	58.420	0.062	7.8	0.0779	0.0000	OK	240 minute winter	4.001	SW05	7.8	0.768	0.086	0.1038	
240 minute winter	SW13	124	58.651	0.061	6.8	0.1410	0.0000	OK	240 minute winter	4.000	SW12	6.8	0.768	0.161	0.3078	
240 minute winter	SW14	124	58.152	0.066	7.8	0.1132	0.0000	OK	240 minute winter	5.001	SW03	7.8	0.815	0.184	0.4548	
240 minute winter	SW15	124	58.161	0.055	3.9	0.0965	0.0000	OK	240 minute winter	5.000	SW14	3.9	0.454	0.092	0.0255	
240 minute winter	SW16	124	58.508	0.093	22.4	0.2337	0.0000	OK	240 minute winter	7.002	EXSW1-39-1	22.4	1.229	0.202	0.7687	128.2
240 minute winter	SW17	124	58.540	0.078	11.7	0.1271	0.0000	OK	240 minute winter	7.001	SW16	11.7	0.710	0.105	0.0776	
240 minute winter	SW18	124	58.705	0.053	7.8	0.1165	0.0000	OK	240 minute winter	7.000	SW17	7.8	0.687	0.070	0.2177	
240 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	240 minute winter	Hydro-Brake®	SW06	2.0				
240 minute winter	EXSW1-35-11	124	57.027	0.177	78.6	0.0000	0.0000	OK								
240 minute winter	EXSW1-39-1	124	58.083	0.090	29.0	0.0000	0.0000	OK								

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Results for 100 year +20% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	SW01	184	57.159	0.196	72.3	0.5023	0.0000	OK	360 minute summer	1.008	EXSW1-35-11	71.6	1.046	0.282	2.7870	474.7
360 minute summer	SW02	184	58.152	0.042	4.0	0.0700	0.0000	OK	360 minute summer	6.000	SW01	3.9	0.774	0.076	0.2235	
360 minute summer	SW03	184	57.257	0.178	59.8	0.2281	0.0000	OK	360 minute summer	1.007	SW01	59.3	0.861	0.233	2.8723	
360 minute summer	SW04	184	57.415	0.135	50.1	0.1625	0.0000	OK	360 minute summer	1.006	SW03	49.9	1.022	0.179	1.3280	
360 minute summer	SW05	184	57.477	0.147	49.2	0.1773	0.0000	OK	360 minute summer	1.005	SW04	49.1	1.162	0.176	0.2831	
360 minute summer	SW06	184	57.569	0.128	40.4	0.1642	0.0000	OK	360 minute summer	1.004	SW05	40.2	0.987	0.145	0.6093	
360 minute summer	SW07	184	57.763	0.113	36.5	0.1368	0.0000	OK	360 minute summer	1.003	SW06	36.4	1.072	0.131	0.9588	
360 minute summer	SW08	184	58.257	0.086	17.1	0.1472	0.0000	OK	360 minute summer	1.002	SW07	16.7	0.899	0.112	0.9577	
360 minute summer	SW09	184	58.525	0.068	11.1	0.1224	0.0000	OK	360 minute summer	1.001	SW08	11.0	0.677	0.074	0.8365	
360 minute summer	SW10	184	58.696	0.046	4.0	0.0761	0.0000	OK	360 minute summer	1.000	SW09	4.0	0.502	0.094	0.2316	
360 minute summer	SW11	184	59.054	0.081	19.2	0.3127	0.0000	OK	360 minute summer	2.000	SW07	18.8	1.082	0.103	1.5666	
360 minute summer	SW12	184	58.421	0.063	8.0	0.0789	0.0000	OK	360 minute summer	4.001	SW05	8.0	0.772	0.088	0.1056	
360 minute summer	SW13	184	58.653	0.063	7.1	0.1439	0.0000	OK	360 minute summer	4.000	SW12	7.0	0.778	0.166	0.3149	
360 minute summer	SW14	184	58.152	0.066	8.0	0.1139	0.0000	OK	360 minute summer	5.001	SW03	7.9	0.817	0.186	0.4583	
360 minute summer	SW15	184	58.162	0.056	4.0	0.0976	0.0000	OK	360 minute summer	5.000	SW14	4.0	0.458	0.094	0.0258	
360 minute summer	SW16	184	58.509	0.094	23.1	0.2372	0.0000	OK	360 minute summer	7.002	EXSW1-39-1	23.0	1.237	0.207	0.7838	128.8
360 minute summer	SW17	184	58.541	0.079	12.1	0.1292	0.0000	OK	360 minute summer	7.001	SW16	12.0	0.713	0.108	0.0792	
360 minute summer	SW18	184	58.706	0.054	8.1	0.1184	0.0000	OK	360 minute summer	7.000	SW17	8.1	0.694	0.073	0.2227	
360 minute summer	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	360 minute summer	Hydro-Brake®	SW06	2.0				
360 minute summer	EXSW1-35-11	184	57.026	0.176	78.5	0.0000	0.0000	OK								
360 minute summer	EXSW1-39-1	184	58.085	0.092	29.9	0.0000	0.0000	OK								

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Results for 100 year +20% CC 360 minute winter. 600 minute analysis at 8 minute timestep. Mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link Event	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	SW01	184	57.132	0.169	54.5	0.4324	0.0000	OK	360 minute winter	1.008	EXSW1-35-11	54.4	0.971	0.214	2.2790	523.6
360 minute winter	SW02	192	58.146	0.036	2.9	0.0601	0.0000	OK	360 minute winter	6.000	SW01	2.9	0.708	0.056	0.1795	
360 minute winter	SW03	184	57.231	0.152	45.0	0.1950	0.0000	OK	360 minute winter	1.007	SW01	45.0	0.807	0.177	2.3265	
360 minute winter	SW04	184	57.395	0.115	37.8	0.1392	0.0000	OK	360 minute winter	1.006	SW03	37.7	0.959	0.136	1.0719	
360 minute winter	SW05	184	57.455	0.125	37.1	0.1512	0.0000	OK	360 minute winter	1.005	SW04	37.1	1.093	0.133	0.2274	
360 minute winter	SW06	184	57.550	0.109	30.6	0.1398	0.0000	OK	360 minute winter	1.004	SW05	30.5	0.937	0.110	0.4871	
360 minute winter	SW07	184	57.746	0.096	27.1	0.1166	0.0000	OK	360 minute winter	1.003	SW06	27.1	0.999	0.097	0.7639	
360 minute winter	SW08	184	58.245	0.074	12.5	0.1266	0.0000	OK	360 minute winter	1.002	SW07	12.4	0.827	0.084	0.7746	
360 minute winter	SW09	184	58.516	0.059	8.1	0.1055	0.0000	OK	360 minute winter	1.001	SW08	8.1	0.620	0.054	0.6743	
360 minute winter	SW10	184	58.690	0.040	2.9	0.0653	0.0000	OK	360 minute winter	1.000	SW09	2.9	0.458	0.068	0.1872	
360 minute winter	SW11	184	59.043	0.070	14.0	0.2690	0.0000	OK	360 minute winter	2.000	SW07	13.9	0.991	0.076	1.2655	
360 minute winter	SW12	184	58.412	0.054	5.9	0.0674	0.0000	OK	360 minute winter	4.001	SW05	5.9	0.710	0.065	0.0847	
360 minute winter	SW13	184	58.644	0.054	5.2	0.1229	0.0000	OK	360 minute winter	4.000	SW12	5.2	0.715	0.123	0.2521	
360 minute winter	SW14	192	58.143	0.057	5.8	0.0972	0.0000	OK	360 minute winter	5.001	SW03	5.8	0.750	0.137	0.3677	
360 minute winter	SW15	184	58.152	0.046	2.9	0.0805	0.0000	OK	360 minute winter	5.000	SW14	2.9	0.427	0.068	0.0202	
360 minute winter	SW16	184	58.495	0.080	16.9	0.2014	0.0000	OK	360 minute winter	7.002	EXSW1-39-1	16.9	1.137	0.152	0.6260	144.3
360 minute winter	SW17	184	58.528	0.066	8.8	0.1075	0.0000	OK	360 minute winter	7.001	SW16	8.8	0.665	0.079	0.0622	
360 minute winter	SW18	184	58.699	0.047	5.9	0.1016	0.0000	OK	360 minute winter	7.000	SW17	5.9	0.648	0.053	0.1741	
360 minute winter	SW19-HB	56	58.272	0.102	2.0	0.1158	0.0000	OK	360 minute winter	Hydro-Brake®	SW06	2.0				
360 minute winter	EXSW1-35-11	184	57.003	0.153	59.4	0.0000	0.0000	OK								
360 minute winter	EXSW1-39-1	184	58.071	0.078	21.9	0.0000	0.0000	OK								

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APPENDIX D – MAINTENANCE AND MANAGEMENT PLAN

APPENDIX E – DBFL SW MANAGEMENT PLAN MAP

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ON ORIGINAL

0 5 10 15 20 25 30 40 50mm

NOTES:

CATCHMENT LEGEND

- CATCHMENT 1
- CATCHMENT 2A
- CATCHMENT 2B
- CATCHMENT 3
- CATCHMENT 4AA
- CATCHMENT 4B
- CATCHMENT 4BB
- CATCHMENT 4CC
- CATCHMENT 5
- CATCHMENT 6
- CATCHMENT 7

LEGEND

- PROPOSED ATTENUATION TANK
- PROPOSED ATTENUATION / FLOOD COMPENSATION BASIN / POND
- PROPOSED FLOW CONTROL DEVICE
- EDUCATION FACILITY
- URBAN CENTRES
- ASSUMED DRAINAGE DIRECTION

ORDNANCE SURVEY IRELAND LICENCE
No EN 0017919
© ORDNANCE SURVEY IRELAND
GOVERNMENT OF IRELAND

rev	date	description	by	chkd.
P04	16-12-20	Labels Added	OC	NCG
P03	05-11-20	Updated Attenuation	OC	NCG
P02	14-10-20	Updated Attenuation	OC	NCG
P01	12-12-19	STAGE 2 PRELIMINARY DESIGN	DJG	JPC

client approval
- A - Approved
- B - Approved with comments
- C - Do not use

suitability: S2 - INFORMATION

issue purpose: PRELIMINARY DESIGN

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project ref.

CLONBURRIS JOINT INFRASTRUCTURE WORKS (JIW)

drawing title

PROPOSED SURFACE WATER CATCHMENTS

client

CLONBURRIS INFRASTRUCTURE LIMITED

designed by	author	scale	sheet size
PJC	DJG	1:5000	A1

drawing no.: 190113-DBFL-SW-ST-DR-C-1101

revision: P04