Glounthaune SHD

Infrastructure Report

Bluescape Limited

Project number: 60592432

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Quality information

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	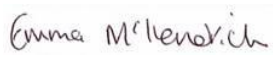		
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
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1. Introduction

1.1 Background

AECOM were appointed by Bluescape Limited to undertake the infrastructure design in support of a Strategic Housing Development (SHD) planning application to An Bord Pleanála for a proposed residential development at Glounthaune, Co. Cork. This infrastructure report has been prepared to accompany the planning application for the proposed development. The proposed layout of the development is detailed in the planning drawings prepared by Deady Gahan Architects.

1.2 Site Location

The proposed development is located in Glounthaune Co. Cork, approximately 4km east of Cork City. The site covers an area of approximately 13.87 ha and is bounded to the south, west and north by residential properties and by greenfield to the east. The current site comprises of a greenfield site. The majority of the site is located to the north of L-2970, known locally as 'the Terrace with a small part of the site located to the south of The Terrace Road. There is a considerable variation in ground levels across the site which has been considered in developing the proposed layout. The site slopes from north to south from approximate +110 m OD Malin to +34.5 m OD Malin on The Terrace to approximately +3.30 m OD Malin.

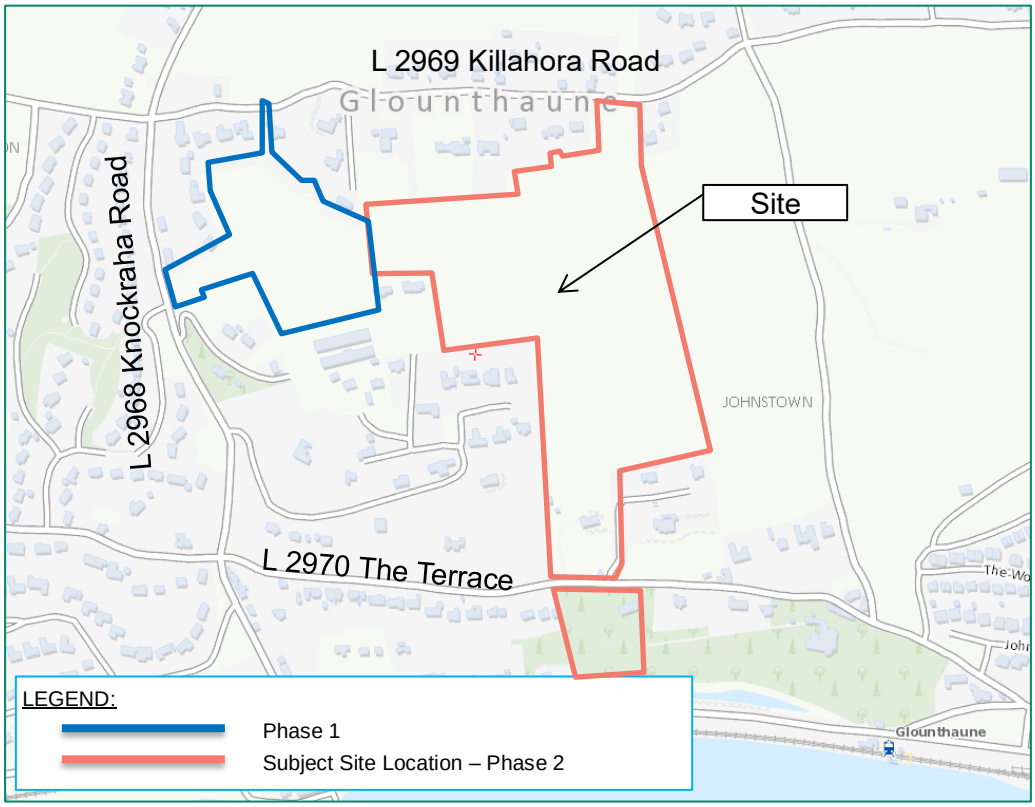

Figure 1-1 - Site Location - Glounthaune, Co. Cork

1.3 Proposed Development

The proposed development consists of the construction of a mixed-use residential development of 289 no. residential units consisting of 201 no. dwelling houses and 88 no. apartment/duplex units, a two storey creche, 4 no. ESB substations and all ancillary site development works at Lackenroe and Johnstown (townlands), Glounthaune, Co. Cork. The proposed development will be constructed on lands to the north and south of the public road, L-2970, known locally as 'the Terrace'. A portion of the site to the south of 'the Terrace' was formerly within Ashbourne Garden and is considered to be within the curtilage and attendant grounds of Ashbourne House, which is a Protected Structure (Ref 00498).

The proposed development to the north of 'the Terrace' provides for 260 no. residential units comprising of 196 no. dwelling houses, 64 no. apartment/duplex units and a two storey creche. The 196 no. dwelling houses includes 5 no. 4 bedroom detached dwellings, 44 no. 4 bedroom semi-detached dwellings, 12 no. 4 bedroom townhouses, 2 no. 3 bedroom detached dwellings, 22 no. 3 bedroom semi-detached dwellings, 47 no. 3 bedroom townhouses and 64 no. 2 bedroom townhouses. The 64 no. apartment/duplex units contains 5 no. 3 bedroom units, 32 no. 2 bedroom units and 27 no. 1 bedroom units contained in 6 no. three storey apartment buildings, with ancillary bicycle parking and bins stores.

The proposed development to the south of 'the Terrace' provides for 29 no. residential units comprising of 5 no. dwelling houses and 24 no. apartments. The 5 no. dwellings include 1 no. 3 bedroom detached dwelling, 2 no. 3 bedroom townhouses and 2 no. 2 bedroom townhouses. The proposed apartments are provided in a four-storey mixed-use building containing a ground floor community unit and a commercial unit with apartments at ground and upper floor levels comprising 3 no. 3 bedroom units, 7 no. 2 bedroom units and 14 no. 1 bedroom units with ancillary rooftop terrace, car parking, bicycle parking and bin stores.

Vehicular access to 2 no. dwellings in the lands to the north of 'the Terrace' will be provided via an upgraded entrance from 'the Terrace' with vehicular access to the remainder of dwellings in the lands to the north of 'the Terrace' via the signalised junction from the L-2968 and internal road network permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17. A separate secondary emergency access is also proposed from the L-2969 to the north.

Vehicular access to the 5 no. dwellings to the south of the 'the Terrace' will be via a new entrance from 'the Terrace' and the proposed apartment building will be accessed from Johnstown Close. The proposed development also makes provision for a pedestrian link from the proposed development north of 'the Terrace' to Johnstown Close via 'the Terrace' which will include a signalised pedestrian crossing and associated traffic calming measures on 'the Terrace'.

Ancillary site works include the demolition of 1 no. existing derelict dwelling house and associated outbuildings, landscaping and servicing proposals including the realignment of the existing pedestrian/cycle route on Johnstown Close, the undergrounding of existing overhead lines, upgrade of the storm and foul sewer network to the south and east of the subject lands along 'the Terrace' and Johnstown Close (L-3004).

Please refer to Constraints Study 1 and 2 for additional information outlining the existing site constraints and the development of the proposed development layout.

Figure 1-2 illustrates the extent and layout of the proposed development.

Figure 1-2 – Site Location and Layout

2. Surface Water Drainage

2.1 Existing Surface Water Drainage

Record drawings provided by Cork County Council indicate that there is no surface water sewers present in the immediate proximity of the site. A 400mm diameter surface water sewer is located approximately 420m east of the site and runs in a south easterly direction along the Terrace towards Johnstown Cl. This surface water sewer was constructed circa 2017 as part of the adjoining "The Woods" Development. Figure 2-1 illustrates the route of this sewer. There is also an existing surface water drainage channel running parallel to the Terrace road. This channel discharges to an existing drainage network at the location noted on Figure 2-2.

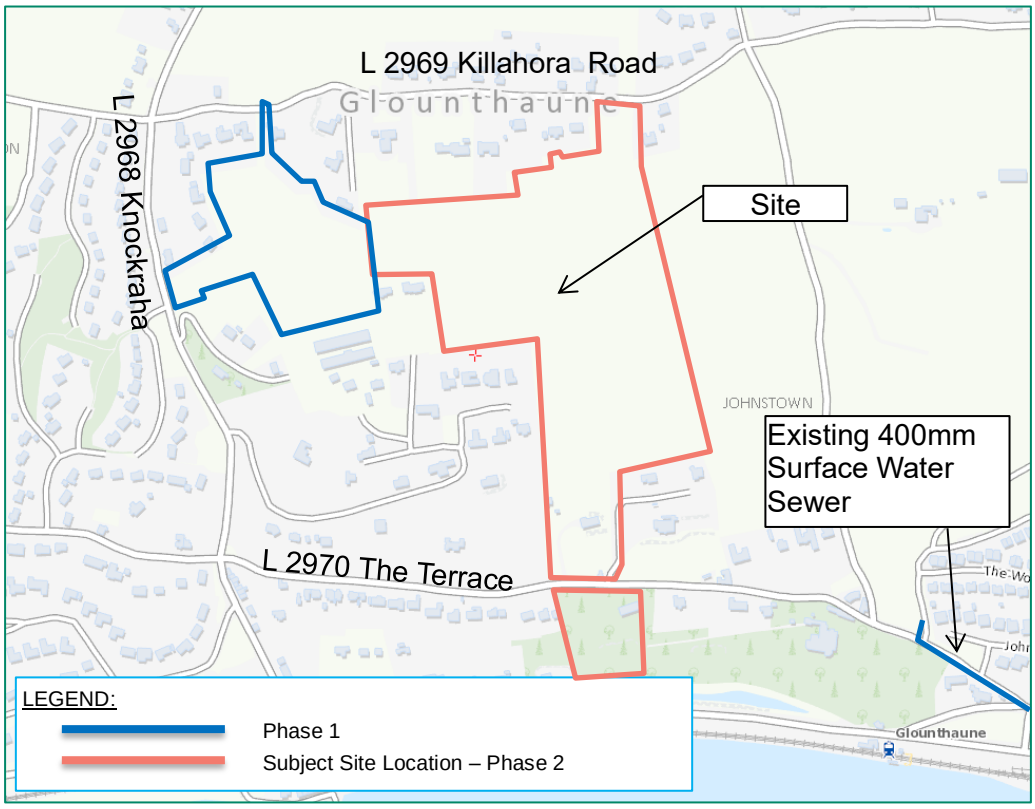

Figure 2-1 – Existing Surface Water Drainage Network

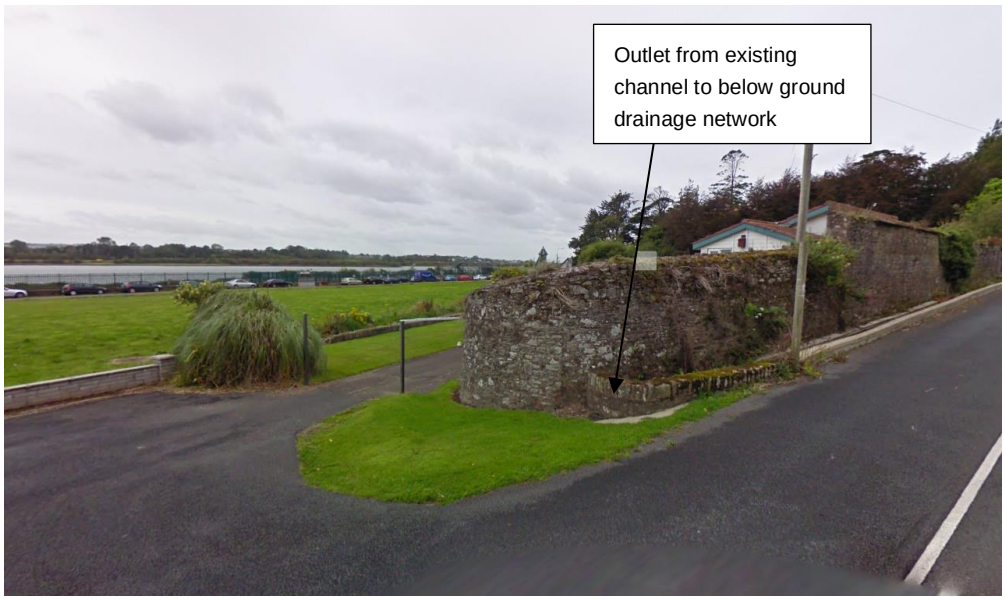

Figure 2-2 – Existing Channel on the Terrace/ Johnstown Close

These existing networks discharge to Lough Mahon through an existing 225 mm diameter pipe running perpendicular to the public roadway and train line. This sewer discharges through a flap valve, as illustrated in Figure 2-3.

Following discussions with Cork County Council (CCC), CCC have noted ongoing issues with this existing outfall (under Glounthaune Train Station) due to the limited capacity of the existing 225 mm diameter pipe. Figure 2-3 is an image of the existing outfall at Glounthaune Train Station (provided by Irish Rail).

Figure 2-3 – Existing Outfall at Glounthaune Train Station

During discussions with CCC, CCC noted that there is an additional surface water outfall to the east of Glounthaune Station, south of Johnstown Park. Cork County Council noted in April 2021 that investigation works were undertaken (2020) and dye testing has been undertaken (2021) to verify the route of the existing network from the public road way to the existing headwall. Figure 2-4 is an image of the existing outfall. This outfall discharges to Lough Mahon between the Cork – Middleton and Cork – Cobh railway lines as shown in Figure 2-5.

Figure 2-4 – Existing Outfall east of Glounthaune Train Station at Johnstown Park

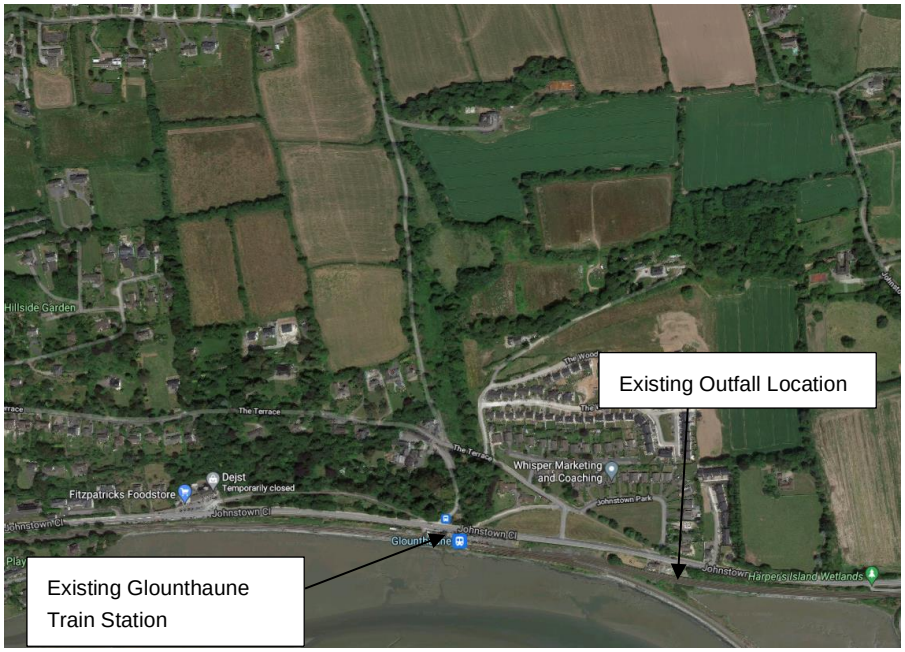

Figure 2-5 – Location of Existing Outfall east of Glounthaune Train Station

2.2 Proposed Surface Water Drainage

It is proposed to provide a separate surface water drainage network within the development. To facilitate maintenance, the proposed surface water drainage network (sewers and attenuation tanks) have been located within roadways and other public areas within the proposed development. It is proposed to discharge surface water from the proposed site to the existing outfall located to the south of Johnstown Park In order to achieve this, it is proposed to lay a new 300mm surface water sewer from the southern boundary of the proposed development along 'the Terrace' and Johnstown Close and connect to the existing manhole located adjacent to the public road.

Please refer to the AECOM Drawing 60592432-ACM-00-00-DR-CE-10-0501, 0502 & 0503, 0504, 0505, 0506 and 0507 for more information on the surface water drainage network layouts.

Run-off generated by roof areas, access roads, and car parking areas will be collected by the proposed surface water drainage network. The proposed network has been split in to the following catchments:

Catchment 1: The proposed units at the northern end of the development will form Catchment 1. Run-off from this catchment will discharge at an attenuated rate of 31.7 l/s to the downstream network (MH S1-13).

Catchment 2: The proposed units to the east and west of the proposed creche Catchment 2. Run-off from this catchment will discharge at an attenuated rate of 55.2 l/s to the downstream network (MH 1-30).

Catchment 3: The proposed units to the south of the Central Parkland will form catchment 3. Run-off from this catchment will discharge at an attenuated rate of 75.3 l/s to the downstream network (MH S1-46).

Catchment 4: The proposed units at the southern end of the development will form catchment 4. Run-off from this catchment will discharge at an attenuated rate of 83 l/s to the downstream network (MH S1-62).

Catchment 5: The 5No. Units to the south of 'the Terrace' and the proposed apartment block will form catchment 5. It is proposed to provide a green roof on the proposed apartment block and permeable paving within the parking area to reduce the rate of discharge from this area.

The proposed surface water drainage network has been designed using the hydraulic modelling software MicroDrainage. The network has been designed to convey flows associated with a 1 in 5 year return period rainfall event and have been checked for flooding during a 1 in 100 year return period rainfall event. The hydraulic model indicates that flooding will not occur during a 1 in 100 year return period rainfall event.

2.2.1 Surface Water Attenuation

While it is proposed to discharge run-off from the proposed development to an area that is tidal in nature rather than a stream/ river, in order to reduce the rate of run-off from the proposed development it is proposed to limit discharge from the site to the greenfield rate (Qbar). The greenfield runoff rate was calculated for the site using soil type 4 (Clayey), a soil value of 0.45 and the Standard Annual Average Rainfall (SAAR) of 1077 mm as per the www.uksuds.com website. The Qbar Rate value for the proposed site area (12.7ha) is 101.5 l/s. Please refer to Appendix C for Q_{Bar} calculations.

It is proposed to attenuate run-off from the proposed development through attenuation tanks, permeable pavement and a green roof is proposed as part of the proposed apartment block.

2.2.1.1 Permeable Paving

Permeable pavement is proposed in the parking area and footpaths around the apartment block. Porous surfacing (paving block or open graded material) which can treat rainwater, at source, and allow infiltration through to an underlying porous subbase where water can be stored within the voids of the subbase before being slowly released to the drainage collection system through natural flow via the porous medium. Refer to Figure 2-6 for typical permeable paving at ground floor level.

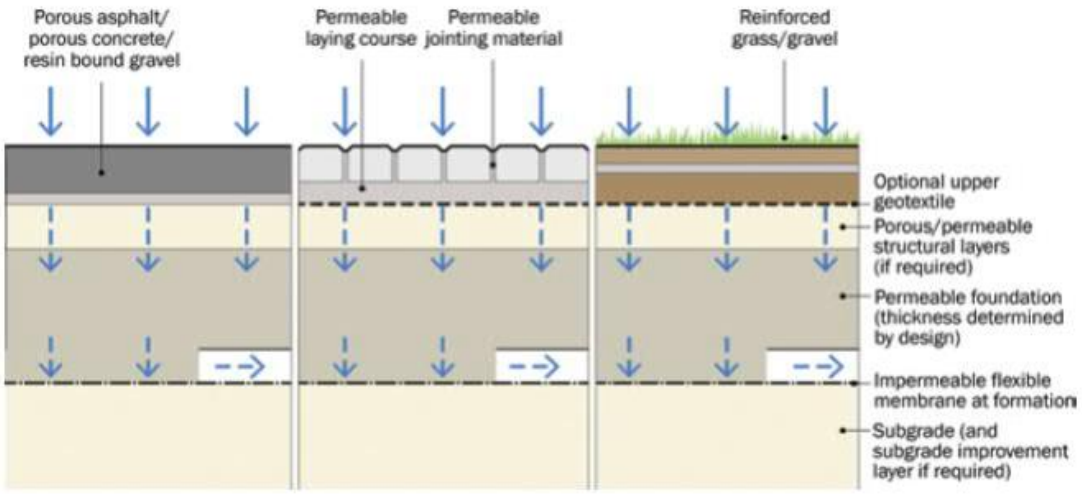

Figure 2-6 – Permeable Paving System (Extract from Ciria C753)

These systems will allow some form of storage for small rainfall events and can result in water evaporation and adsorption in small quantities, therefore there will be less run-off from these areas in small rainfall events thus mimicking the natural response for this catchment. As well as reducing the amount of run-off from the surface, permeable paving will slow down the rate of runoff from the pavement in extreme rainfall events contributing to attenuation of flows.

In addition, permeable paving will increase the quality of water which is intercepted by the system through filtration, biodegradation, pollutant adsorption and settlement and retention of solids, also the reduction in peak flows to the outfall will enhance settlement and biodegradation of pollutants.

2.2.1.2 Green Roof

Green roofs provide ecological, aesthetic and amenity benefits and intercept and retain rainfall, at source, reducing the volume of runoff and attenuating peak flows. Green roofs absorb most of the rainfall that they receive during normal rainfall events, although they will only contribute to attenuation of flows for larger events.

Additionally, green roofs treat surface water through removal of atmospherically deposited urban pollutants. Finally, green roofs may reduce heating (by adding mass and thermal resistance value) and cooling (by evaporative cooling) loads on a building.

The performance of green roofs in the summer is significant in preventing runoff from normal rainfall events due to high levels of evapotranspiration. Green roofs do not provide the same storage in winter as they tend to be saturated for a greater portion of time.

Extensive green roofs allow low growing, low maintenance plants consisting of self-sustaining mosses, sedums, succulents, herbs or grasses over a drainage layer and waterproofing membrane. Extensive roofs are usually only accessed for maintenance. Extensive green roofs typically have a 20-150 mm growing medium.

Intensive green roofs typically have a growing medium greater than 150 mm, allowing for a wider array of planting possibilities, including; grasses, shrubs and trees, as ground cover or within planters. Intensive green roofs are typically accessible as they require a higher level of maintenance. It is proposed that approximately 70% of roof areas are covered with brown or wildflower meadow. Refer to Figure 2-7 for typical detail of green roof.

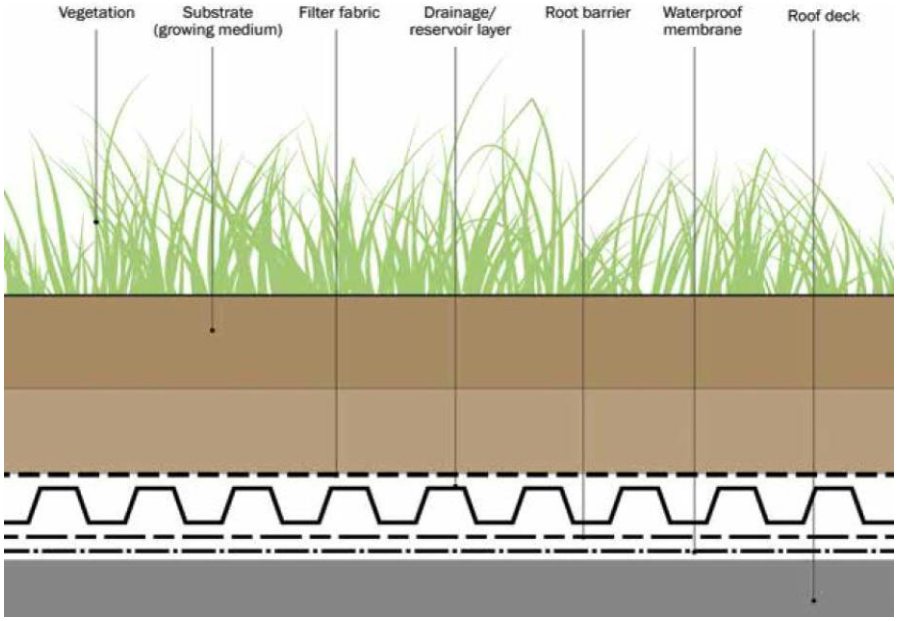

Figure 2-7 – Green Roof Layers (Extract from Ciria C753)

2.2.1.3 Attenuation Tanks

It is proposed to provide a Stormtech attenuation tank with SC-740 cells at the under-croft car park, totalling 18m3 of storage capacity. An impermeable bituminous liner Coletanche or similar surrounding the tank is proposed in order to protect the building's foundations. The Stormtech storage systems include a stone medium (the Stormtech chambers are surrounded by stone to manufacturer specification). Sediments are captured in the stone medium providing treatment by removing silts and some hydrocarbons from the runoff. Figure 2-8 shows a typical section of the tank.

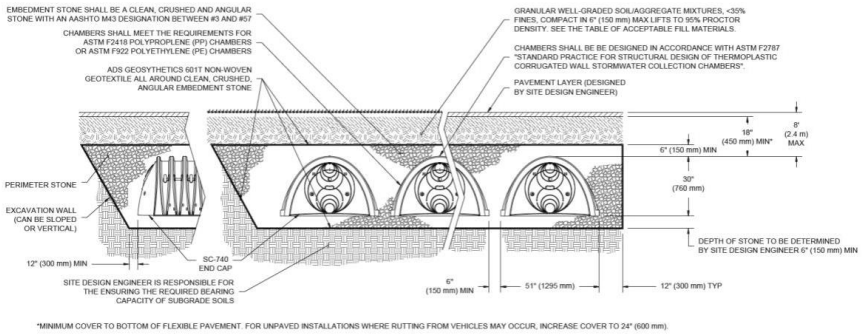

Figure 2-8 – Attenuation Tank Typical Section

2.2.1.4 Petrol & Oil Interceptor

Petrol interceptors are widely used to avoid and prevent hazardous chemical and petroleum by-products from entering watercourses and public sewers. As standard, petrol interceptors shall be positioned close to the potential pollution source (to minimise emulsification of oils and their coating of sediments) and upstream of the connection point to the public network, within the private boundary.

There are two classes of systems:

- Class 1 device means that the resultant effluent should contain 5mg/l hydrocarbon content or less under standard test conditions;
- Class 2 can contain up to 100mg/l in their discharge and are appropriate where drainage is to a foul sewer.

It is proposed to provide a Class I Bypass Petrol & Oil interceptor to treat run-off for possible hydrocarbon contamination within the under-croft car park prior to discharge to the existing foul sewer.

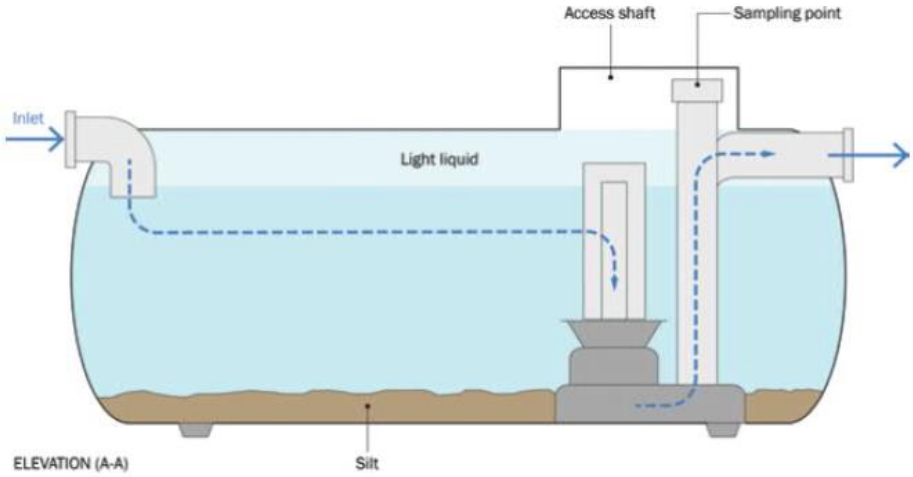

Figure 2-9 – Typical Petrol Interceptor detail (Extract from Ciria C753)

2.2.2 Design Criteria

The design of residential developments is be based on Section 3.5 of the Department of Environment, Heritage and Local Government Recommendations for Site Development Works for Housing Areas and the requirements of Cork County Council.

The following design standards and guidelines have been folloed in the design of the proposed surface water drainage network:

- BS EN 752 – Drains and sewer system outside buildings,
- Greater Dublin Strategic Drainage Study (GDSDS) Volume 2 – New Developments,
- BS EN 858-2- - Separator System for Light Liquids (e.g. oil and petrol),
- Pipe network has been designed to ensure no surcharging during a 1 in 5 year return period rainfall event,
- No pipe flooding during a 1 in 100-year return period rainfall event,
- Surface water storage sized based on a 1 in 100-year return period rainfall event,
- An additional 20% has been allowed for climate change in relation to rainfall intensities,
- The following design criteria have been used in the design of the proposed surface water drainage network:
  - Carrier pipe network – 1.0m/s to 3.0m/s,
  - Colebrook White roughness value of 0.6mm for all pipework,
  - Time of entry: 4 minutes,
  - Return Period: 5 years,
  - Met Eireann rainfall data for site,
  - M5/60 = 18.8 mm,
  - Ratio r = 0.264.

2.3 Drainage Maintenance Inspection Checklist

Maintenance is suggested to be carried out every 6 months to ensure the system is operating correctly. The maintenance for this site consists of inspection and assessment, however if issues arise during inspection remedial measures must be taken. The client is not required to carry out the maintenance themselves but they must ensure that a competent contractor is employed. An example maintenance record and checklist can be seen in Appendix D

Accidental spillages or pollution into the system must be dealt with by a competent contractor. Pollutants will need to be pumped from the system and correctly disposed of.

3. Foul Water Drainage

3.1 Existing Foul Water Drainage

There are no existing wastewater drainage networks within or to the north of the subject site. There are a number of existing combined drainage networks in the area to the west and south of the subject site:

- Existing combined drainage network running in the Knockraha road to the west of the subject site,
- Existing combined network running east along 'the Terrace' at the entrance to The Woods residential development and onto Johnstown Park,
- Existing combined network running along the Old Youghal Road at Johnstown Close.

A 225mm diameter surface water sewer is located approximately 420m from the southern boundary of the site and is running in an easterly direction along the Terrace towards Johnstown Close. This foul water sewer was constructed circa 2017 as part of the adjoining "The Woods" Development. Although this sewer is not on current Irish Water record maps AECOM has received confirmation from Irish Water that they deem this sewer network to be in their ownership, due to the fact it is connected to an Irish Water asset downstream.

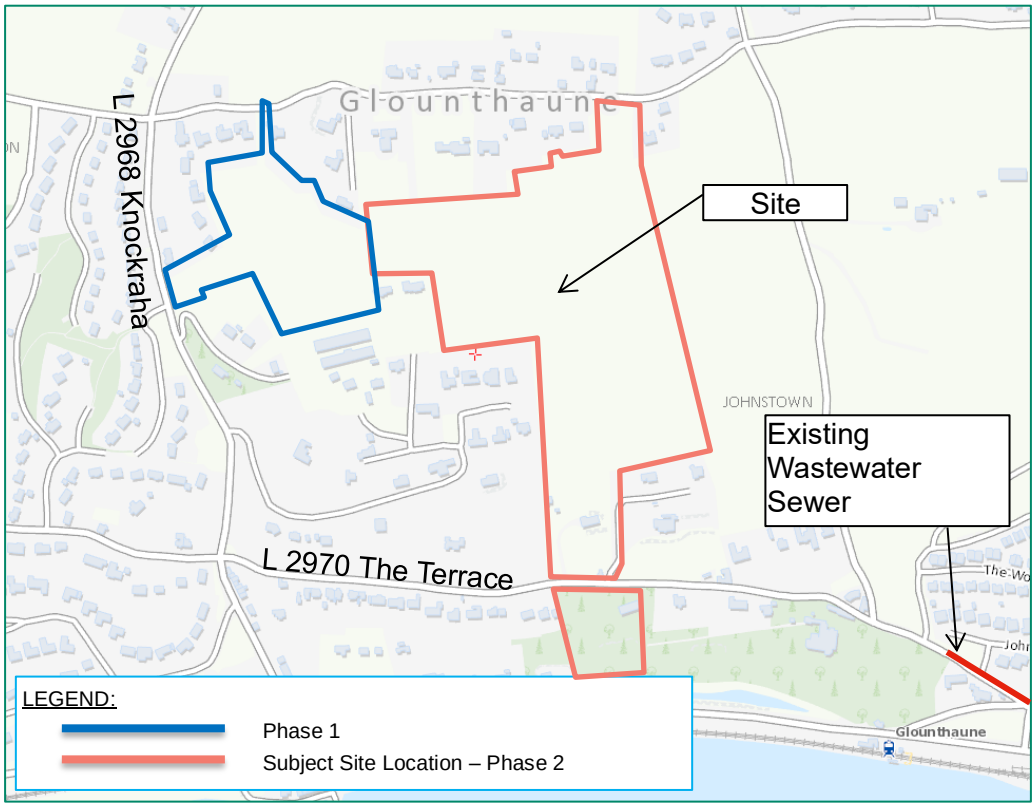

Figure 3-1 – Existing Wastewater Drainage Network Relative to Subject Site

The existing networks running on the Terrace/ Johnstown Park and Johnstown Close discharge to an existing pumping station on Johnstown Close (Johnstown Pumping Station). The existing pumping station is located in the walkway to the east of Fitzpatrick's Shop/ existing apartments. Figure 3-2 illustrates the extent of the existing wastewater drainage networks in the vicinity of the subject site.

Figure 3-2 – Existing Wastewater Drainage Network

3.2 Proposed Foul Water Drainage

A Pre-Connection Enquiry Form has been issued to Irish Water in relation to the feasibility of servicing the proposed development with a foul water connection. Irish Water confirmed that the proposed wastewater connection to the Irish Water network can be facilitated subject to a valid connection agreement being put in place. Please refer to Appendix A for the Irish Water Confirmation of Feasibility.

It is proposed to discharge the wastewater generated by the proposed development north of 'the Terrace' by gravity into the 225mm diameter public foul sewer running along 'the Terrace'. In order to achieve this, it is proposed to lay a new 225mm foul water sewer from the southern boundary of the proposed development along the terrace and connect to the existing 225mm foul water system. It is proposed to discharge the wastewater generated by the proposed development south of 'the Terrace' by gravity to the existing network to the west of the proposed apartment block. Please refer to the AECOM Drawing No. Drawing 60592432-ACM-00-00-DR-CE-10-0501, 0502, 0503 & 0504 for the foul water drainage layout.

Foul water drainage has been designed in accordance with the Irish Water Wastewater Code of Practice Appendix using Innovyze MicroDrainage software (refer to Appendix E for detailed design calculations). The design guidelines of the Environmental Protection Agency (EPA) Wastewater Treatment Manual, "Treatment Systems for Small Communities, Business, Leisure Centres and Hotels" were used to estimate the proposed hydraulic foul water loading rates. The estimated flows are presented in Table 1.

Table 1. Proposed Foul Water Hydraulic Loadings

Source	Unit	Quantity	Flow	Daily Flow	DWF	DWF	Peak Flow	
			(litres/day/unit or litres/sec/ha)	(litres/ day)	m^3/day	litres/ sec	litres/ sec	
Residential Units @ 450 l/day/unit	unit	289	450	130,050.00	130.05	1.51	9.03	6DWF
Creche	Area (ha)	0.0280	0.16	387.07	0.3871	0.004	0.02	4.5DWF

Source	Unit	Quantity	Flow	Daily Flow	DWF	DWF	Peak Flow	
Commercial and Amenity Units (ground floor adjacent to Fitzpatrick's Shop)	Area (ha)	0.0735	0.16	1,016.06	1.0161	0.012	0.05	4.5DWF
Total				131,453.14	131.45	1.52	9.10	

4. Water Supply

4.1 Existing Water Supply

Record drawings provided by Irish Water (refer to Figure 4-1) indicate that there is an existing 150mm watermain running along the north of the site. It also indicates a 100mm watermain running along the terrace at the southern boundary of the proposed development (see Appendix F for full records).

Figure 4-1 – Existing Watermain

4.2 Proposed Water Supply

A Pre-Connection Enquiry Form has been issued to Irish Water in relation to the feasibility of servicing the proposed development with a water supply connection. Irish Water confirmed that the proposed water supply connection to the Irish Water network can be facilitated subject to a valid connection agreement being put in place. Please refer to Appendix A for the Irish Water Confirmation of Feasibility.

It is proposed to service the proposed development via a new 150mm diameter watermain connection off the 150mm diameter watermain running along the northern boundary and to also connect to the 100mm diameter watermain running along the southern boundary indicated on the AECOM Drawing 60592432-ACM-00-00-DR-CE-10-2701, 2702, 2703 & 2704.

The internal water supply network is based on the Department of the Environment 'Recommendation for Site Development Works', the requirements of Irish Water and the Technical Guidance Document – Part B of the Building Regulations 2006:

- The development shall have a bulk water meter (exact location to be agreed with Irish Water) in accordance with Irish Water Code of Practice for Water Infrastructure Section 3.15.4.
- All apartments and similar properties shall have meters installed internally within the premises in accordance with the Building Control Authority's requirements and subject

to review by Irish Water as per Irish Water Code of Practice for Water Infrastructure Section 3.15.2.

- Hydrants are positioned within 46m from all the proposed buildings
- Sluice valves are positioned to isolate the watermain
- An air valve is proposed at the high point within the internal water supply network
- A scour valve is proposed the low point within the internal water supply network

Table 2 presents the estimated water demand submitted to Irish Water as part of the Pre-Connection Enquiry Form.

Table 2. Proposed Water Demand

Source	Unit	Quantity	Flow	Daily	Daily	Daily Demand	Average day/ peak week demand (DD*1.25)	Peak week demand (Average day/ peak week demand*5)
			(litres/day/unit or litres/sec/ha)	(litres/ day)	m³/day	litres/ sec	litres/ sec	litres/ sec
Residential Units @ 450 l/day/unit	unit	289	450	130,050.00	130.05	1.51	1.882	9.408
Creche	Area (ha)	0.0280	0.16	387.07	0.3871	0.004	0.006	0.028
Commercial and Amenity Units (ground floor adjacent to Fitzpatrick's Shop)	Area (ha)	0.0735	0.16	1,016.06	1.0161	0.012	0.015	0.074
Total				131,453.14	131.45	1.52	1.90	9.51

To further reduce the water demand on Local Authority water supplies and to reduce the foul discharge from the development, water conservation measures will be incorporated in the sanitary facilities throughout the development, e.g. dual flush toilets.

Appendix A - Irish Water COF

Aileen Prendergast

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Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

28 September 2021

Re: CDS21006136 pre-connection enquiry - Subject to contract | Contract denied

Connection for Multi/Mixed Use Development of 292 unit(s) at Lackenroe, Glouthaune, Cork

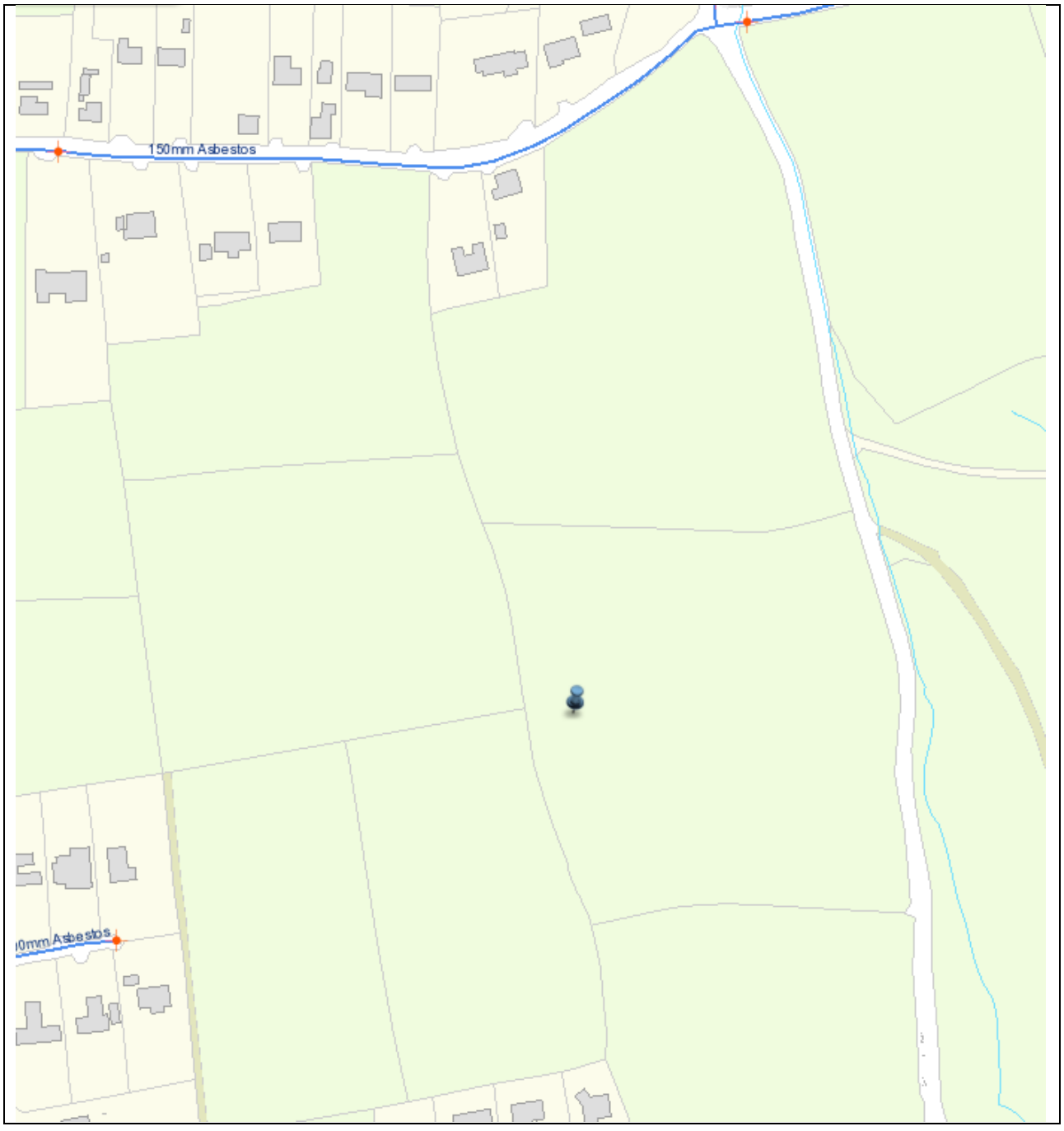
Dear Sir/Madam,

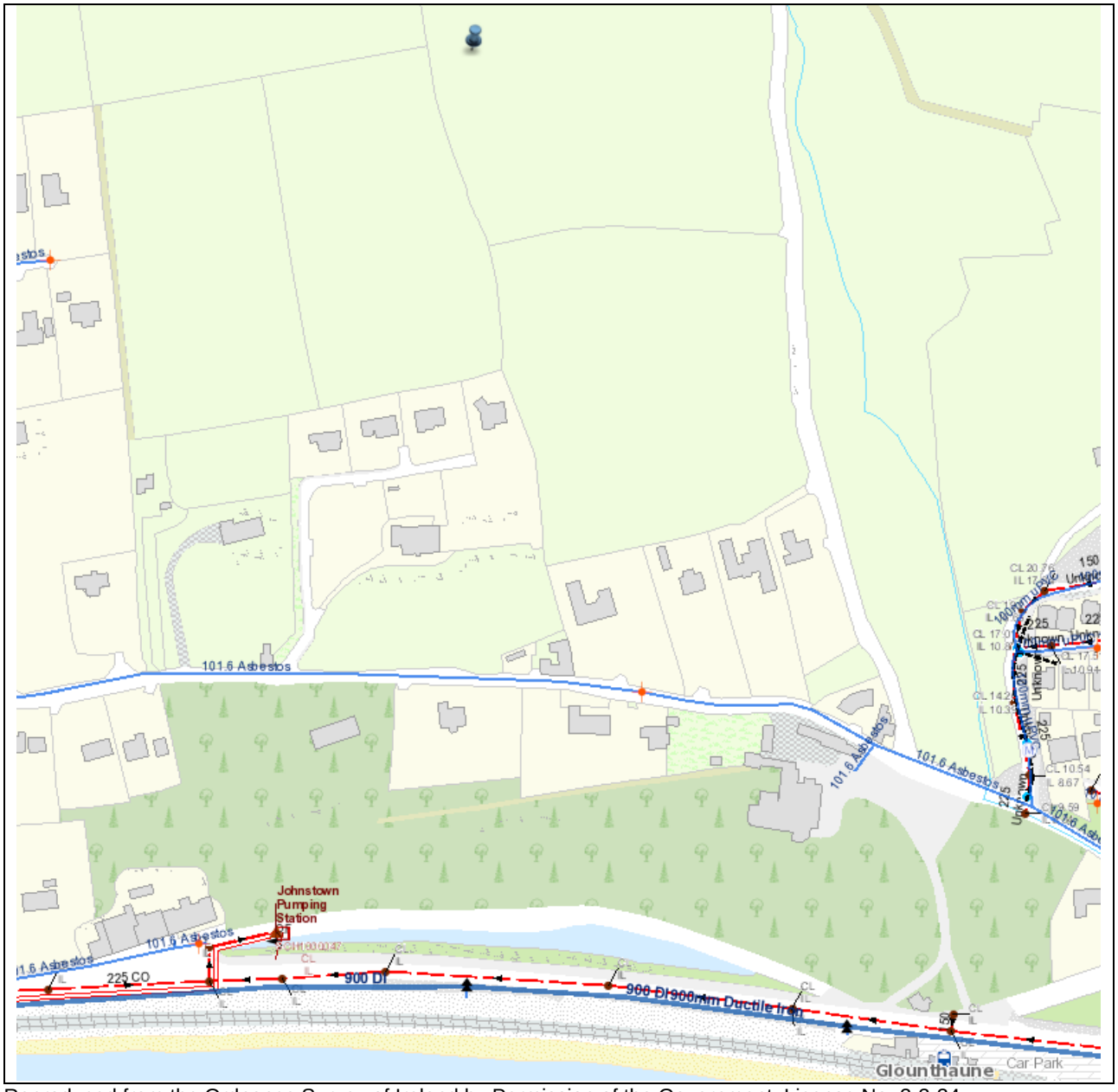
Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Lackenroe, Glouthaune, Cork (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible Subject to upgrades
SITE SPECIFIC COMMENTS	
Water Connection	N/A
Wastewater Connection	In order to accommodate the proposed connection to Irish Water wastewater network at the Premises, upgrade works are required to extend the length of the network by approximately 400m on The Terrace from your site to the existing Irish Water network. Irish Water currently does not have any plans to extend its network in this area. Should you wish to progress with the connection you will be required to fund this network extension. Please note that no upgrades to the Johnstown Pumping Station are required to accommodate the proposed 30 units at the South of the development.
Strategic Housing Development	Irish Water notes that the scale of this development dictates that it is subject to the Strategic Housing Development planning process. Therefore: in

	advance of submitting your full application to An Bord Pleanala for assessment, you must have reviewed this development with Irish Water and received a Statement of Design Acceptance in relation to the layout of water and wastewater services.
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

The map included below outlines the current Irish Water infrastructure adjacent to your site:





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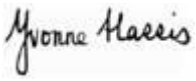
Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network 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.

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Dario Alvarez from the design team on + 353 2254621 or email dalvarez@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,



Yvonne Harris

Head of Customer Operations

Appendix B – Irish Water Statement of Design Acceptance (SODA)

Aileen Prendergast
1st Floor Montrose House
Carrigaline Road, Douglas
Cork

21 October 2021

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

Re: Design Submission for Glounthaune, Cork, Co.Cork (the "Development") (the "Design Submission") / Connection Reference No: 0850513420

Dear Aileen Prendergast,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:
Name: Dario Alvarez
Email: dalvarez@water.ie

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

Appendix A

Document Title & Revision

- 60592432-ACM-00-00-DR-CE-10-2701
- 60592432-ACM-00-00-DR-CE-10-2702
- 60592432-ACM-00-00-DR-CE-10-2703
- 60592432-ACM-00-00-DR-CE-10-2704 - Rev. B
- 60592432-ACM-00-00-DR-CE-10-0501
- 60592432-ACM-00-00-DR-CE-10-0501
- 60592432-ACM-00-00-DR-CE-10-0502
- 60592432-ACM-00-00-DR-CE-10-0503
- 60592432-ACM-00-00-DR-CE-10-0504
- 60592432-ACM-00-00-DR-CE-10-0505 - Rev. B
- 60592432-ACM-00-00-DR-CE-10-0506
- 60592432-ACM-00-00-DR-CE-10-0507
- 20210820 - Foul Long Sections

*For further information, visit **www.water.ie/connections***

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

Appendix C - Glounthaune QBar calcs

Mean Annual Flood Flow Rate Equation for Greenfield Catchments IH124

(Based on Institute of Hydrology report No. 124)

Project title: **Glounthaune SHD - Catchment 1**

Project no.:

Designed: Date:

$Q\ Bar = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$

Where			**Units**
Q Bar	=	Mean Annual Peak Flow	m^3/s
Area	=	Catchment area	km^2
SARR	=	Standard Annual Average Rainfall	mm
Soil	=	Soil Index	-

Table 1

Soil	WRAP	Runoff	Soil value	Soil Characteristics
1	Very high	Very low	0.15	Sandy, well drained
2	High	Low	0.3	Intermediate soils (sandy)
3	Moderate	Moderate	0.4	Intermediate soils (silty)
4	Low	High	0.45	Clayey, poorly drained
5	Very low	Very high	0.5	Steel, rocky areas

Area description: residential

Soil characteristics: Soil type (See Table 1) **4** (Clayey, poorly drained)

=> Soil index = 0.45 **See SI report**

Area = 0.5 km^2 (**43717** m^2)

Where developments are smaller than 50 ha, the analysis for determining the peak greenfield discharge rate should use 50 ha in the formula and linearly interpolate the flow rate value based on the ratio of the development to 50 ha.(Ref: Interim Code of Practice for Sustainable Drainage

SAAR = 1077 mm

Refer to Annual Average Rainfall Diagram on following spreadsheet

Q Bar = 0.3636 m^3/s (Based on 50 ha)

= 363.64 l/s

or

= 7.27 l/s/ha

Linear Interpolation of Q Bar based on ratio of development to 50 ha

Peak greenfield discharge rate, Q_{Bar} = 31.79 l/s

Growth Curve

Return Period Q_{t1}:	1	year
Growth Factor for Q_{t1}:	0.85	
Allowable Discharge for 1 year return period:	**27.03**	**l/s**
Return Period Q_{t2}:	10	year
Growth Factor for Q_{t2}:	1.33	
Allowable Discharge for 10 year return period:	**42.29**	**l/s**
Return Period Q_{t2}:	30	year
Growth Factor for Q_{t2}:	1.58	
Allowable Discharge for 30 year return period:	**50.24**	**l/s**
Return Period Q_{t3}:	100	year
Growth Factor for Q_{t3}:	1.84	
Allowable Discharge for 100 year return period:	**58.50**	**l/s**

Mean Annual Flood Flow Rate Equation for Greenfield Catchments IH124

(Based on Institute of Hydrology report No. 124)

Project title: **Glounthaune SHD - Catchment 2**

Project no.:

Designed: Date:

$Q\ Bar = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$

Where			**Units**
Q Bar	=	Mean Annual Peak Flow	m^3/s
Area	=	Catchment area	km^2
SARR	=	Standard Annual Average Rainfall	mm
Soil	=	Soil Index	-

Table 1

Soil	WRAP	Runoff	Soil value	Soil Characteristics
1	Very high	Very low	0.15	Sandy, well drained
2	High	Low	0.3	Intermediate soils (sandy)
3	Moderate	Moderate	0.4	Intermediate soils (silty)
4	Low	High	0.45	Clayey, poorly drained
5	Very low	Very high	0.5	Steel, rocky areas

Area description: residential

Soil characteristics: Soil type (See Table 1) **4** (Clayey, poorly drained)

=> Soil index = 0.45 **See SI report**

Area = 0.5 km^2 (**75917** m^2)

Where developments are smaller than 50 ha, the analysis for determining the peak greenfield discharge rate should use 50 ha in the formula and linearly interpolate the flow rate value based on the ratio of the development to 50 ha.(Ref: Interim Code of Practice for Sustainable Drainage

SAAR = 1077 mm

Refer to Annual Average Rainfall Diagram on following spreadsheet

Q Bar = 0.3636 m^3/s (Based on 50 ha)

= 363.64 l/s

or

= 7.27 l/s/ha

Linear Interpolation of Q Bar based on ratio of development to 50 ha

Peak greenfield discharge rate, Q_{Bar} = 55.21 l/s

Growth Curve

Return Period Q_{t1}:	1	year
Growth Factor for Q_{t1}:	0.85	
Allowable Discharge for 1 year return period:	**46.93**	**l/s**
Return Period Q_{t2}:	10	year
Growth Factor for Q_{t2}:	1.33	
Allowable Discharge for 10 year return period:	**73.43**	**l/s**
Return Period Q_{t2}:	30	year
Growth Factor for Q_{t2}:	1.58	
Allowable Discharge for 30 year return period:	**87.24**	**l/s**
Return Period Q_{t3}:	100	year
Growth Factor for Q_{t3}:	1.84	
Allowable Discharge for 100 year return period:	**101.59**	**l/s**

Mean Annual Flood Flow Rate Equation for Greenfield Catchments IH124

(Based on Institute of Hydrology report No. 124)

Project title: **Glounthaune SHD - Catchment 3**

Project no.:

Designed: Date:

$Q\ Bar = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$

Where			**Units**
Q Bar	=	Mean Annual Peak Flow	m^3/s
Area	=	Catchment area	km^2
SARR	=	Standard Annual Average Rainfall	mm
Soil	=	Soil Index	-

Table 1

Soil	WRAP	Runoff	Soil value	Soil Characteristics
1	Very high	Very low	0.15	Sandy, well drained
2	High	Low	0.3	Intermediate soils (sandy)
3	Moderate	Moderate	0.4	Intermediate soils (silty)
4	Low	High	0.45	Clayey, poorly drained
5	Very low	Very high	0.5	Steel, rocky areas

Area description: residential

Soil characteristics: Soil type (See Table 1) **4** (Clayey, poorly drained)

=> Soil index = 0.45 **See SI report**

Area = 0.5 km^2 (**103517** m^2)

Where developments are smaller than 50 ha, the analysis for determining the peak greenfield discharge rate should use 50 ha in the formula and linearly interpolate the flow rate value based on the ratio of the development to 50 ha.(Ref: Interim Code of Practice for Sustainable Drainage

SAAR = 1077 mm

Refer to Annual Average Rainfall Diagram on following spreadsheet

Q Bar = 0.3636 m^3/s (Based on 50 ha)

= 363.64 l/s

or

= 7.27 l/s/ha

Linear Interpolation of Q Bar based on ratio of development to 50 ha

Peak greenfield discharge rate, Q_{Bar} = 75.29 l/s

Growth Curve

Return Period Q_{t1}:	1	year
Growth Factor for Q_{t1}:	0.85	
Allowable Discharge for 1 year return period:	**63.99**	**l/s**
Return Period Q_{t2}:	10	year
Growth Factor for Q_{t2}:	1.33	
Allowable Discharge for 10 year return period:	**100.13**	**l/s**
Return Period Q_{t2}:	30	year
Growth Factor for Q_{t2}:	1.58	
Allowable Discharge for 30 year return period:	**118.95**	**l/s**
Return Period Q_{t3}:	100	year
Growth Factor for Q_{t3}:	1.84	
Allowable Discharge for 100 year return period:	**138.53**	**l/s**

Mean Annual Flood Flow Rate Equation for Greenfield Catchments IH124

(Based on Institute of Hydrology report No. 124)

Project title: **Glounthaune SHD - Catchment 4**

Project no.:

Designed: Date:

(Complete figures in **blue** only)

$Q\ Bar = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$

Where			**Units**
Q Bar	=	Mean Annual Peak Flow	m^3/s
Area	=	Catchment area	km^2
SARR	=	Standard Annual Average Rainfall	mm
Soil	=	Soil Index	-

Table 1

Soil	WRAP	Runoff	Soil value	Soil Characteristics
1	Very high	Very low	0.15	Sandy, well drained
2	High	Low	0.3	Intermediate soils (sandy)
3	Moderate	Moderate	0.4	Intermediate soils (silty)
4	Low	High	0.45	Clayey, poorly drained
5	Very low	Very high	0.5	Steel, rocky areas

Area description: commercial

Soil characteristics: Soil type (See Table 1) **4** (Clayey, poorly drained)
=> Soil index = 0.45 **See SI report**

Area = 0.5 km^2 (**114427** m^2)

SAAR = 1077 mm

Where developments are smaller than 50 ha, the analysis for determining the peak greenfield discharge rate should use 50 ha in the formula and linearly interpolate the flow rate value based on the ratio of the development to 50 ha.(Ref: Interim Code of Practice for Sustainable Drainage

Refer to Annual Average Rainfall Diagram on following spreadsheet

Q Bar = 0.3636 m^3/s (Based on 50 ha)

= 363.64 l/s

or

= 7.27 l/s/ha

Linear Interpolation of Q Bar based on ratio of development to 50 ha

Peak greenfield discharge rate, Q_{Bar} = 83.22 l/s

Growth Curve

Return Period Q_{t1}:	1	year
Growth Factor for Q_{t1}:	0.85	
Allowable Discharge for 1 year return period:	**70.74**	**l/s**
Return Period Q_{t2}:	10	year
Growth Factor for Q_{t2}:	1.33	
Allowable Discharge for 10 year return period:	**110.68**	**l/s**
Return Period Q_{t2}:	30	year
Growth Factor for Q_{t2}:	1.58	
Allowable Discharge for 30 year return period:	**131.49**	**l/s**
Return Period Q_{t3}:	100	year
Growth Factor for Q_{t3}:	1.84	
Allowable Discharge for 100 year return period:	**153.13**	**l/s**

Appendix D – Glounthaune Drainage Surface Water Network Details

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	18.800	Add Flow / Climate Change (%)	20
Ratio R	0.264	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	75	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.000
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.000	8-12	0.658	12-16	1.623	16-20	1.885	20-24	0.680	24-28	0.004

Total Area Contributing (ha) = 4.851

Total Pipe Volume (m³) = 423.477

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	31.308	1.044	30.0	0.052	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	57.547	1.918	30.0	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	38.663	1.289	30.0	0.103	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.001	6.184	0.206	30.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.002	39.985	1.333	30.0	0.149	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	67.94	5.22	107.300	0.052	0.0	0.0	1.9	2.40	95.3	11.4
S1.001	66.09	5.62	106.256	0.087	0.0	0.0	3.1	2.40	95.3	18.8
S2.000	67.69	5.27	106.325	0.103	0.0	0.0	3.8	2.40	95.3	22.6
S2.001	67.49	5.31	105.036	0.103	0.0	0.0	3.8	2.40	95.3	22.6
S2.002	66.22	5.59	104.830	0.252	0.0	0.0	9.0	2.40	95.3	54.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.003	6.479	0.216	30.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	65.418	2.181	30.0	0.062	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	51.128	1.704	30.0	0.125	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.001	5.937	0.030	200.0	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	34.165	0.450	75.9	0.051	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	18.464	0.440	42.0	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	39.615	0.943	42.0	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	39.616	1.200	33.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	6.220	0.188	33.0	0.007	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	50.591	1.533	33.0	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	26.273	0.796	33.0	0.065	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.009	29.699	0.900	33.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.010	8.427	0.255	33.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	29.223	1.282	22.8	0.024	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	37.642	1.075	35.0	0.088	5.00	0.0	0.600	o	225	Pipe/Conduit	
S4.001	29.087	1.276	22.8	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.003	66.02	5.63	103.497	0.252	0.0	0.0	9.0	2.40	95.3	54.2
S1.002	64.07	6.09	102.755	0.401	0.0	0.0	13.9	2.40	95.3	83.5
S3.000	67.29	5.36	101.700	0.125	0.0	0.0	4.6	2.40	95.3	27.3
S3.001	66.79	5.46	99.996	0.146	0.0	0.0	5.3	0.92	36.6	31.7
S3.002	65.11	5.84	99.966	0.197	0.0	0.0	6.9	1.50	59.7	41.6
S1.003	63.56	6.22	99.441	0.607	0.0	0.0	20.9	2.43	172.0	125.3
S1.004	62.48	6.49	99.001	0.656	0.0	0.0	22.2	2.43	172.0	133.2
S1.005	61.57	6.73	96.788	0.656	0.0	0.0	22.2	2.75	194.1	133.2
S1.006	61.43	6.77	95.588	0.662	0.0	0.0	22.2	2.75	194.1	133.2
S1.007	60.32	7.07	93.863	0.683	0.0	0.0	22.3	2.75	194.1	133.9
S1.008	59.77	7.23	91.185	0.748	0.0	0.0	24.2	2.75	194.1	145.3
S1.009	59.15	7.41	89.090	0.748	0.0	0.0	24.2	2.75	194.1	145.3
S1.010	58.98	7.46	88.190	0.748	0.0	0.0	24.2	2.74	194.0	145.3
S4.000	68.13	5.18	105.355	0.024	0.0	0.0	0.9	2.75	109.4	5.3
S5.000	67.63	5.28	105.150	0.088	0.0	0.0	3.2	2.22	88.2	19.4
S4.001	66.81	5.46	103.200	0.136	0.0	0.0	4.9	2.75	109.4	29.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.002	45.698	1.632	28.0	0.039	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.003	7.239	0.242	29.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.004	50.509	0.746	67.7	0.103	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.005	10.849	0.136	80.0	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.006	32.024	0.400	80.0	0.062	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.007	29.244	0.334	87.5	0.067	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.008	6.762	0.097	70.0	0.003	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.009	10.707	0.134	80.0	0.005	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.010	54.448	1.959	27.8	0.125	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.011	7.395	0.266	27.8	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.012	5.619	0.202	27.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.013	6.197	0.223	27.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.014	15.612	0.473	33.0	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.015	47.209	0.944	50.0	0.032	0.00	0.0	0.600	o	450	Pipe/Conduit	
S4.016	80.567	0.403	200.0	0.146	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.011	24.157	0.121	200.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S6.000	63.011	1.800	35.0	0.083	5.00	0.0	0.600	o	225	Pipe/Conduit	
S6.001	17.526	0.531	33.0	0.054	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.002	24.238	0.242	100.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4.002	65.67	5.71	101.300	0.175	0.0	0.0	6.2	2.98	210.8	37.4
S4.003	65.48	5.76	99.668	0.175	0.0	0.0	6.2	2.89	204.0	37.4
S4.004	63.64	6.20	99.426	0.278	0.0	0.0	9.6	1.91	135.3	57.6
S4.005	63.22	6.30	98.680	0.308	0.0	0.0	10.5	1.76	124.4	63.2
S4.006	62.04	6.60	98.544	0.370	0.0	0.0	12.4	1.76	124.4	74.6
S4.007	60.97	6.89	98.144	0.437	0.0	0.0	14.4	1.68	118.9	86.7
S4.008	60.75	6.95	97.810	0.441	0.0	0.0	14.5	1.88	133.0	87.0
S4.009	60.39	7.05	97.713	0.446	0.0	0.0	14.6	1.76	124.4	87.6
S4.010	59.34	7.36	96.775	0.571	0.0	0.0	18.4	2.99	211.6	110.1
S4.011	59.20	7.40	92.720	0.602	0.0	0.0	19.3	2.99	211.6	115.9
S4.012	59.10	7.43	90.670	0.602	0.0	0.0	19.3	2.99	211.6	115.9
S4.013	58.98	7.46	89.110	0.602	0.0	0.0	19.3	2.99	211.6	115.9
S4.014	58.67	7.56	88.000	0.620	0.0	0.0	19.7	2.75	194.1	118.2
S4.015	57.78	7.83	87.377	0.651	0.0	0.0	20.4	2.88	458.1	122.3
S4.016	55.24	8.68	86.358	0.798	0.0	0.0	23.9	1.58	342.1	143.2
S1.011	54.53	8.94	85.955	1.546	0.0	0.0	45.7	1.58	342.1	273.9
S6.000	66.74	5.47	90.850	0.083	0.0	0.0	3.0	2.22	88.2	18.0
S6.001	66.17	5.60	89.050	0.137	0.0	0.0	4.9	2.29	90.9	29.5
S6.002	64.82	5.91	88.519	0.150	0.0	0.0	5.3	1.31	52.0	31.6

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.012	20.739	0.104	199.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.013	9.132	0.046	198.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S7.000	48.697	0.243	200.0	0.098	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.014	21.513	0.108	199.2	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.015	33.486	0.419	79.9	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.016	25.693	0.321	80.0	0.023	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.017	28.625	0.159	180.0	0.060	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.018	22.552	0.113	199.6	0.114	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.019	12.965	0.065	199.5	0.016	0.00	0.0	0.600	o	375	Pipe/Conduit	
S8.000	38.260	0.478	80.0	0.086	5.00	0.0	0.600	o	225	Pipe/Conduit	
S8.001	18.620	0.233	80.0	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.002	18.523	0.412	45.0	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.003	9.580	0.274	35.0	0.006	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.004	36.029	1.441	25.0	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.005	52.204	0.653	79.9	0.038	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.006	28.565	0.238	120.0	0.092	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.007	4.016	0.122	33.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.020	28.647	0.143	200.3	0.066	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.012	53.94	9.15	85.834	1.695	0.0	0.0	49.5	1.58	342.6	297.2
S1.013	68.19	5.16	85.730	0.000	31.8	0.0	5.3	0.92	36.8	31.8
S7.000	64.94	5.88	86.700	0.098	0.0	0.0	3.5	0.92	36.6	20.7
S1.014	63.60	6.20	85.250	0.113	31.8	0.0	10.3	1.11	78.5	61.5
S1.015	62.35	6.52	84.750	0.163	31.8	0.0	11.9	1.76	124.4	71.2
S1.016	61.44	6.76	84.331	0.186	31.8	0.0	12.6	1.76	124.3	75.3
S1.017	60.16	7.12	83.935	0.246	31.8	0.0	14.4	1.35	148.8	86.3
S1.018	59.15	7.41	83.776	0.360	31.8	0.0	17.9	1.28	141.3	107.4
S1.019	58.59	7.58	83.663	0.376	31.8	0.0	18.3	1.28	141.3	109.8
S8.000	66.91	5.44	91.295	0.086	0.0	0.0	3.1	1.46	58.2	18.7
S8.001	65.96	5.65	90.817	0.147	0.0	0.0	5.3	1.46	58.2	31.5
S8.002	65.27	5.81	90.000	0.163	0.0	0.0	5.8	1.96	77.7	34.6
S8.003	64.96	5.88	89.000	0.169	0.0	0.0	5.9	2.22	88.2	35.7
S8.004	64.00	6.11	88.000	0.210	0.0	0.0	7.3	2.63	104.5	43.7
S8.005	62.05	6.60	86.484	0.248	0.0	0.0	8.3	1.76	124.4	50.0
S8.006	60.82	6.93	85.831	0.340	0.0	0.0	11.2	1.43	101.4	67.2
S8.007	60.73	6.96	85.593	0.340	0.0	0.0	11.2	2.75	194.1	67.2
S1.020	57.52	7.91	83.523	0.782	31.8	0.0	30.7	1.43	227.9	184.3

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.021	5.980	0.030	199.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.022	15.700	0.262	60.0	0.022	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.023	21.135	0.352	60.0	0.034	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.024	22.570	0.376	60.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S9.000	35.012	0.175	200.0	0.098	5.00	0.0	0.600	o	300	Pipe/Conduit	
S10.000	35.450	0.443	80.0	0.078	5.00	0.0	0.600	o	225	Pipe/Conduit	
S10.001	21.177	0.265	80.0	0.070	0.00	0.0	0.600	o	225	Pipe/Conduit	
S9.001	28.181	0.141	200.0	0.066	0.00	0.0	0.600	o	300	Pipe/Conduit	
S9.002	47.606	0.238	200.0	0.095	0.00	0.0	0.600	o	375	Pipe/Conduit	
S9.003	12.032	0.060	200.0	0.069	0.00	0.0	0.600	o	375	Pipe/Conduit	
S9.004	8.097	0.040	200.0	0.031	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.025	19.942	0.100	199.4	0.013	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.026	51.540	0.764	67.5	0.052	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.027	21.478	0.318	67.5	0.095	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.028	20.549	0.304	67.5	0.002	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.029	24.871	0.368	67.6	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.030	54.296	0.271	200.4	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S1.031	12.329	0.062	198.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.021	57.32	7.98	83.305	0.782	31.8	0.0	30.7	1.58	342.7	184.3
S1.022	57.04	8.07	83.275	0.804	31.8	0.0	31.2	2.90	626.8	187.1
S1.023	56.67	8.19	81.835	0.838	31.8	0.0	32.1	2.90	626.8	192.4
S1.024	56.29	8.32	80.390	0.838	31.8	0.0	32.1	2.89	626.7	192.4
S9.000	66.50	5.53	78.265	0.098	0.0	0.0	3.5	1.11	78.3	21.2
S10.000	67.06	5.40	80.600	0.078	0.0	0.0	2.8	1.46	58.2	17.0
S10.001	65.97	5.65	80.157	0.148	0.0	0.0	5.3	1.46	58.2	31.7
S9.001	64.16	6.07	78.090	0.312	0.0	0.0	10.8	1.11	78.3	65.1
S9.002	61.71	6.69	77.874	0.407	0.0	0.0	13.6	1.28	141.1	81.6
S9.003	61.13	6.85	77.636	0.476	0.0	0.0	15.8	1.28	141.1	94.6
S9.004	60.75	6.95	77.576	0.507	0.0	0.0	16.7	1.28	141.1	100.1
S1.025	55.67	8.53	77.385	1.358	31.8	0.0	47.3	1.58	342.6	283.8
S1.026	54.78	8.84	77.285	1.410	31.8	0.0	48.2	2.73	591.0	289.1
S1.027	54.42	8.98	75.700	1.505	31.8	0.0	50.7	2.73	590.6	304.3
S1.028	54.11	9.09	75.307	1.507	31.8	0.0	50.7	2.97	838.9	304.3
S1.029	53.74	9.23	74.180	1.507	31.8	0.0	50.7	2.97	838.4	304.3
S1.030	52.49	9.72	73.737	1.507	31.8	0.0	50.7	1.85	661.3	304.3
S1.031	68.09	5.18	73.000	0.000	55.2	0.0	9.2	1.11	78.6	55.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.032	37.487	0.187	200.0	0.125	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.033	37.487	0.750	50.0	0.024	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.034	12.395	0.155	80.0	0.185	0.00	0.0	0.600	o	375	Pipe/Conduit	
S11.000	34.492	1.725	20.0	0.036	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.035	16.820	0.449	37.5	0.054	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.036	16.820	0.449	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.037	5.698	0.152	37.5	0.035	0.00	0.0	0.600	o	375	Pipe/Conduit	
S12.000	27.986	0.700	40.0	0.059	5.00	0.0	0.600	o	225	Pipe/Conduit	
S12.001	27.959	1.398	20.0	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.002	44.285	0.805	55.0	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.003	40.226	1.609	25.0	0.080	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.004	14.337	0.717	20.0	0.064	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.005	22.179	0.111	200.0	0.034	0.00	0.0	0.600	o	300	Pipe/Conduit	
S12.006	6.988	0.035	199.6	0.005	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.038	31.274	0.625	50.0	0.019	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.039	33.875	0.847	40.0	0.124	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.040	29.561	0.788	37.5	0.016	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.041	33.090	0.882	37.5	0.024	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.032	65.84	5.67	72.863	0.125	55.2	0.0	15.5	1.28	141.1	93.0
S1.033	64.79	5.92	72.676	0.149	55.2	0.0	16.3	2.57	283.6	97.6
S1.034	64.36	6.02	71.250	0.334	55.2	0.0	22.7	2.03	223.9	136.1
S11.000	68.04	5.20	74.475	0.036	0.0	0.0	1.3	2.94	116.9	8.0
S1.035	63.97	6.11	71.095	0.424	55.2	0.0	25.7	2.97	327.9	154.5
S1.036	63.59	6.21	69.695	0.424	55.2	0.0	25.7	2.97	327.9	154.5
S1.037	63.46	6.24	69.246	0.459	55.2	0.0	26.8	2.97	327.7	161.0
S12.000	67.90	5.22	73.450	0.059	0.0	0.0	2.2	2.08	82.5	13.0
S12.001	67.16	5.38	72.750	0.075	0.0	0.0	2.7	2.94	116.9	16.4
S12.002	65.29	5.80	71.352	0.115	0.0	0.0	4.1	1.77	70.3	24.4
S12.003	64.21	6.06	70.547	0.195	0.0	0.0	6.8	2.63	104.5	40.7
S12.004	63.88	6.14	68.938	0.259	0.0	0.0	9.0	2.94	116.9	53.8
S12.005	62.55	6.47	68.146	0.293	0.0	0.0	9.9	1.11	78.3	59.5
S12.006	62.20	6.56	67.960	0.297	0.0	0.0	10.0	1.28	141.2	60.1
S1.038	61.43	6.77	67.925	0.776	55.2	0.0	36.9	2.57	283.5	221.1
S1.039	60.72	6.96	67.300	0.900	55.2	0.0	40.6	2.87	317.3	243.8
S1.040	60.13	7.13	66.453	0.916	55.2	0.0	40.9	2.97	327.6	245.2
S1.041	59.49	7.31	64.400	0.940	55.2	0.0	41.3	2.97	327.6	247.9

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.042	10.698	0.285	37.5	0.008	0.00	0.0	0.600	o	375	Pipe/Conduit	
S13.000	57.517	0.765	75.2	0.139	5.00	0.0	0.600	o	225	Pipe/Conduit	
S13.001	43.659	0.218	200.0	0.100	0.00	0.0	0.600	o	300	Pipe/Conduit	
S13.002	12.661	0.063	200.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S13.003	30.940	0.155	200.0	0.087	0.00	0.0	0.600	o	300	Pipe/Conduit	
S13.004	23.772	0.119	200.0	0.062	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.043	5.101	0.085	60.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.044	3.750	0.063	59.5	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.045	10.149	0.169	60.1	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.046	5.835	0.156	37.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.047	10.127	0.270	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.048	10.126	0.270	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.049	7.863	0.210	37.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.050	9.381	0.250	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.051	6.042	0.161	37.5	0.019	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.052	6.042	0.161	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.053	9.062	0.242	37.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.054	17.313	0.462	37.5	0.039	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.055	10.000	0.267	37.5	0.012	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.056	10.000	0.267	37.5	0.005	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.042	59.28	7.37	63.518	0.948	55.2	0.0	41.5	2.97	327.5	248.8
S13.000	66.02	5.63	63.300	0.139	0.0	0.0	5.0	1.51	60.0	29.8
S13.001	63.25	6.29	62.460	0.238	0.0	0.0	8.2	1.11	78.3	49.0
S13.002	62.51	6.48	62.242	0.238	0.0	0.0	8.2	1.11	78.3	49.0
S13.003	60.77	6.95	62.178	0.325	0.0	0.0	10.7	1.11	78.3	64.2
S13.004	59.51	7.30	62.024	0.387	0.0	0.0	12.5	1.11	78.3	74.9
S1.043	59.18	7.40	61.680	1.335	55.2	0.0	53.8	2.90	626.8	323.0
S1.044	59.11	7.42	59.850	1.335	55.2	0.0	53.8	2.91	629.3	323.0
S1.045	58.91	7.48	57.985	1.335	55.2	0.0	53.8	2.89	626.5	323.0
S1.046	68.84	5.03	56.500	0.000	75.3	0.0	12.6	2.97	328.1	75.3
S1.047	68.56	5.09	54.644	0.000	75.3	0.0	15.1	2.97	327.7	90.4
S1.048	68.28	5.15	52.400	0.000	75.3	0.0	15.1	2.97	327.7	90.4
S1.049	68.07	5.19	50.430	0.000	75.3	0.0	15.1	2.97	327.9	90.4
S1.050	67.82	5.24	49.220	0.000	75.3	0.0	15.1	2.97	327.6	90.4
S1.051	67.65	5.28	47.470	0.019	75.3	0.0	15.8	2.97	327.6	94.5
S1.052	67.49	5.31	45.700	0.019	75.3	0.0	15.8	2.97	327.6	94.5
S1.053	67.26	5.36	44.540	0.019	75.3	0.0	15.8	2.97	327.9	94.5
S1.054	66.81	5.46	43.795	0.058	75.3	0.0	17.2	2.97	327.8	103.0
S1.055	66.55	5.52	41.750	0.070	75.3	0.0	17.6	2.97	327.9	105.5
S1.056	66.30	5.57	39.980	0.075	75.3	0.0	17.7	2.97	327.9	106.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.057	10.000	0.267	37.5	0.004	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.058	9.796	0.261	37.5	0.004	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.059	9.689	0.258	37.6	0.004	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.060	14.747	0.393	37.5	0.004	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.061	14.121	0.121	116.7	0.035	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.062	15.055	0.401	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.063	4.756	0.024	198.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S14.000	17.431	0.218	80.0	0.000	5.00	0.0	0.600	o	100	Pipe/Conduit	
S14.001	11.232	0.140	80.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.064	21.787	0.581	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.065	81.953	2.185	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.066	45.614	1.216	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.067	29.502	0.787	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.068	20.758	0.554	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.069	20.757	0.554	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.070	20.758	0.554	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.071	20.757	0.554	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.072	36.558	0.975	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.073	23.489	0.626	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.074	25.896	0.691	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.057	66.05	5.63	37.950	0.079	75.3	0.0	17.9	2.97	327.9	107.3
S1.058	65.80	5.68	36.380	0.083	75.3	0.0	18.0	2.97	327.6	108.2
S1.059	65.56	5.74	35.250	0.087	75.3	0.0	18.2	2.96	327.4	109.0
S1.060	65.21	5.82	33.990	0.091	75.3	0.0	18.3	2.97	327.6	109.7
S1.061	64.61	5.96	33.597	0.126	75.3	0.0	19.5	1.68	185.1	116.9
S1.062	64.25	6.05	33.476	0.126	75.3	0.0	19.5	2.97	327.5	116.9
S1.063	68.69	5.06	31.750	0.000	83.2	0.0	13.9	1.28	141.8	83.2
S14.000	67.37	5.34	33.200	0.000	0.0	0.0	0.0	0.86	6.8	0.0
S14.001	66.37	5.55	32.982	0.000	0.0	0.0	0.0	0.86	6.8	0.0
S1.064	65.83	5.68	31.726	0.000	83.2	0.0	16.6	2.97	327.7	99.8
S1.065	63.87	6.14	31.145	0.000	83.2	0.0	16.6	2.97	327.7	99.8
S1.066	62.85	6.39	28.960	0.000	83.2	0.0	16.6	2.97	327.6	99.8
S1.067	62.21	6.56	27.744	0.000	83.2	0.0	16.6	2.97	327.8	99.8
S1.068	61.77	6.68	26.957	0.000	83.2	0.0	16.6	2.97	327.8	99.8
S1.069	61.33	6.79	26.403	0.000	83.2	0.0	16.6	2.97	327.8	99.8
S1.070	60.91	6.91	25.849	0.000	83.2	0.0	16.6	2.97	327.8	99.8
S1.071	60.49	7.03	25.295	0.000	83.2	0.0	16.6	2.97	327.8	99.8
S1.072	59.77	7.23	24.741	0.000	83.2	0.0	16.6	2.97	327.7	99.8
S1.073	59.32	7.36	23.766	0.000	83.2	0.0	16.6	2.97	327.6	99.8
S1.074	58.83	7.51	23.140	0.000	83.2	0.0	16.6	2.97	327.8	99.8

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.075	86.931	2.318	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.076	69.412	1.851	37.5	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.077	45.038	0.901	50.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.078	45.039	0.751	60.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.079	51.463	0.172	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S15.000	18.804	0.470	40.0	0.037	5.00	0.0	0.600	o	225	Pipe/Conduit	
S15.001	9.098	0.364	25.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.002	6.980	0.279	25.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.003	8.735	0.349	25.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.004	6.537	0.327	20.0	0.098	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.005	11.237	0.562	20.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.006	4.169	0.417	10.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.007	5.981	0.299	20.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.008	5.594	0.280	20.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.009	4.032	0.160	25.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.010	5.992	0.266	22.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.011	18.620	0.466	40.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.012	4.192	0.140	30.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.013	17.772	0.355	50.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.014	7.672	0.128	60.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.015	17.517	1.460	12.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.075	57.26	8.00	22.449	0.000	83.2	0.0	16.6	2.97	327.7	99.8
S1.076	56.09	8.39	20.131	0.000	83.2	0.0	16.6	2.97	327.7	99.8
S1.077	55.25	8.68	18.280	0.000	83.2	0.0	16.6	2.57	283.6	99.8
S1.078	54.36	9.00	17.379	0.000	83.2	0.0	16.6	2.34	258.8	99.8
S1.079	52.23	9.82	16.629	0.000	83.2	0.0	16.6	1.04	115.0	99.8
S15.000	68.26	5.15	27.000	0.037	0.0	0.0	1.4	2.07	82.5	8.3
S15.001	67.98	5.21	26.400	0.037	0.0	0.0	1.4	2.63	104.5	8.3
S15.002	67.77	5.25	25.700	0.037	0.0	0.0	1.4	2.63	104.4	8.3
S15.003	67.51	5.31	25.000	0.037	0.0	0.0	1.4	2.63	104.4	8.3
S15.004	67.33	5.35	24.600	0.136	0.0	0.0	4.9	2.94	116.9	29.7
S15.005	67.04	5.41	24.200	0.136	0.0	0.0	4.9	2.94	116.9	29.7
S15.006	66.96	5.43	22.200	0.136	0.0	0.0	4.9	4.16	165.5	29.7
S15.007	66.80	5.46	21.000	0.136	0.0	0.0	4.9	2.94	116.9	29.7
S15.008	66.66	5.49	19.500	0.136	0.0	0.0	4.9	2.94	116.9	29.7
S15.009	66.54	5.52	18.500	0.136	0.0	0.0	4.9	2.62	104.1	29.7
S15.010	66.38	5.55	17.300	0.136	0.0	0.0	4.9	2.77	110.1	29.7
S15.011	65.72	5.70	15.800	0.136	0.0	0.0	4.9	2.07	82.5	29.7
S15.012	65.59	5.73	15.000	0.136	0.0	0.0	4.9	2.40	95.3	29.7
S15.013	64.90	5.89	14.300	0.136	0.0	0.0	4.9	1.85	73.7	29.7
S15.014	64.58	5.97	13.800	0.136	0.0	0.0	4.9	1.69	67.3	29.7
S15.015	64.26	6.04	13.300	0.136	0.0	0.0	4.9	3.80	151.0	29.7

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S15.016	3.410	0.227	15.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.017	4.800	0.190	25.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.018	33.051	1.653	20.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.019	10.982	0.572	19.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.020	18.001	0.980	18.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.021	8.685	0.347	25.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.022	11.718	0.234	50.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.023	16.645	0.555	30.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.024	14.019	0.234	60.0	0.052	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.025	53.073	0.152	350.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.026	52.973	0.151	350.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.027	37.373	0.107	350.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.028	49.399	0.123	401.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.029	76.851	0.192	400.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.030	32.833	0.082	400.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.031	71.778	0.179	401.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.032	71.777	0.179	401.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.033	72.143	0.180	400.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.080	86.427	0.144	600.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.081	87.004	0.145	600.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S15.016	64.19	6.06	11.300	0.136	0.0	0.0	4.9	3.39	134.9	29.7
S15.017	64.06	6.09	10.800	0.136	0.0	0.0	4.9	2.61	103.9	29.7
S15.018	63.30	6.28	10.000	0.136	0.0	0.0	4.9	2.94	116.9	29.7
S15.019	63.06	6.34	8.200	0.136	0.0	0.0	4.9	3.00	119.3	29.7
S15.020	62.68	6.44	7.300	0.136	0.0	0.0	4.9	3.07	122.0	29.7
S15.021	62.46	6.49	5.500	0.136	0.0	0.0	4.9	2.63	104.5	29.7
S15.022	62.06	6.60	5.153	0.136	0.0	0.0	4.9	1.85	73.7	29.7
S15.023	61.62	6.71	4.000	0.136	0.0	0.0	4.9	2.40	95.3	29.7
S15.024	61.11	6.85	3.300	0.188	0.0	0.0	6.2	1.69	67.3	37.3
S15.025	57.53	7.91	2.800	0.188	0.0	0.0	6.2	0.83	59.0	37.3
S15.026	54.44	8.97	2.648	0.188	0.0	0.0	6.2	0.83	59.0	37.3
S15.027	52.50	9.72	2.497	0.188	0.0	0.0	6.2	0.83	59.0	37.3
S15.028	50.02	10.77	2.390	0.188	0.0	0.0	6.2	0.78	55.0	37.3
S15.029	46.71	12.42	2.267	0.188	0.0	0.0	6.2	0.78	55.1	37.3
S15.030	45.46	13.12	2.075	0.188	0.0	0.0	6.2	0.78	55.1	37.3
S15.031	42.99	14.65	1.993	0.188	0.0	0.0	6.2	0.78	55.1	37.3
S15.032	40.84	16.19	1.814	0.188	0.0	0.0	6.2	0.78	55.1	37.3
S15.033	38.93	17.73	1.635	0.188	0.0	0.0	6.2	0.78	55.1	37.3
S1.080	61.49	6.75	1.305	0.000	90.0	0.0	15.0	0.82	130.8	90.0
S1.081	61.44	6.76	1.161	0.000	90.0	0.0	15.0	0.82	130.8	90.0

Appendix E - Drainage Maintenance Inspection Checklist

Appendix B: Maintenance inspection checklist

Table B.25 SuDS maintenance inspection checklist			
General information			
Site ID			
Site location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved drawing reference(s)	
Inspection frequency		Approved specification reference	
Type of development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection date								
	Details	**Y/N**	**Action required**	**Date completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								

Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required								
Infrastructure								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (eg wheel ruts?)								

Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next inspection								
Proposed date for next inspection								

Appendix F - Glounthaune Drainage Foul Water Network Details

FOUL SEWERAGE DESIGN

Design Criteria for Foul

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.000
Flow Per Person (l/per/day)	150.00	Maximum Backdrop Height (m)	0.000
Persons per House	2.70	Min Design Depth for Optimisation (m)	0.000
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	25.594	0.450	56.9	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.001	49.643	1.867	26.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F2.000	38.513	0.642	60.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F2.001	6.339	0.106	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F2.002	42.560	0.946	45.0	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
F1.002	70.519	3.983	17.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F3.000	41.652	0.694	60.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
F3.001	24.370	1.311	18.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F3.002	56.933	0.712	80.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F3.003	8.300	0.098	84.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	107.000	0.000	0.0	2	0.0	6	0.23	1.16	20.6	0.1
F1.001	106.550	0.000	0.0	2	0.0	5	0.30	1.70	30.1	0.1
F2.000	106.370	0.000	0.0	6	0.0	10	0.33	1.13	20.0	0.2
F2.001	105.728	0.000	0.0	6	0.0	10	0.33	1.13	20.0	0.2
F2.002	105.622	0.000	0.0	15	0.0	14	0.49	1.31	23.1	0.4
F1.002	104.275	0.000	0.0	17	0.0	12	0.70	2.09	36.9	0.5
F3.000	104.376	0.000	0.0	5	0.0	9	0.31	1.13	20.0	0.1
F3.001	103.682	0.000	0.0	5	0.0	7	0.46	2.04	36.0	0.1
F3.002	102.371	0.000	0.0	12	0.0	15	0.37	0.98	17.3	0.3
F3.003	101.659	0.000	0.0	12	0.0	15	0.37	0.95	16.8	0.3

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F3.004	31.110	0.891	34.9	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F1.003	17.730	0.610	29.1	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.004	28.460	1.294	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.005	46.536	2.115	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.006	6.640	0.302	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.007	14.483	0.658	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.008	36.766	1.671	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.009	31.436	1.429	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.010	28.508	1.296	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.011	12.176	0.553	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F4.000	40.658	0.678	60.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F4.001	10.781	0.180	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.002	58.388	0.973	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.003	4.897	0.082	60.0	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
F4.004	3.426	0.057	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.005	10.431	0.174	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.006	52.919	2.405	22.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
F4.007	10.288	0.468	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F4.008	5.491	0.250	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F4.009	7.945	0.361	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F3.004	101.561	0.000	0.0	16	0.0	14	0.55	1.49	26.3	0.5
F1.003	100.200	0.000	0.0	33	0.0	17	0.69	2.13	84.8	0.9
F1.004	99.590	0.000	0.0	33	0.0	16	0.76	2.45	97.6	0.9
F1.005	98.000	0.000	0.0	33	0.0	16	0.76	2.45	97.5	0.9
F1.006	95.885	0.000	0.0	33	0.0	16	0.76	2.45	97.5	0.9
F1.007	95.405	0.000	0.0	33	0.0	16	0.76	2.45	97.5	0.9
F1.008	94.193	0.000	0.0	33	0.0	16	0.76	2.45	97.5	0.9
F1.009	91.645	0.000	0.0	33	0.0	16	0.76	2.45	97.5	0.9
F1.010	89.558	0.000	0.0	33	0.0	16	0.76	2.45	97.6	0.9
F1.011	87.400	0.000	0.0	33	0.0	16	0.76	2.45	97.5	0.9
F4.000	98.900	0.000	0.0	6	0.0	10	0.33	1.13	20.0	0.2
F4.001	98.222	0.000	0.0	6	0.0	10	0.33	1.13	20.0	0.2
F4.002	98.042	0.000	0.0	6	0.0	10	0.33	1.13	20.0	0.2
F4.003	97.069	0.000	0.0	14	0.0	15	0.43	1.13	20.0	0.4
F4.004	96.988	0.000	0.0	14	0.0	15	0.43	1.13	20.0	0.4
F4.005	96.930	0.000	0.0	14	0.0	15	0.43	1.13	20.0	0.4
F4.006	96.682	0.000	0.0	22	0.0	13	0.66	2.45	97.5	0.6
F4.007	93.038	0.000	0.0	22	0.0	13	0.66	2.45	97.5	0.6
F4.008	90.825	0.000	0.0	22	0.0	13	0.67	2.46	97.6	0.6
F4.009	88.800	0.000	0.0	22	0.0	13	0.66	2.45	97.5	0.6

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F4.010	11.088	0.055	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F4.011	8.859	0.044	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F4.012	36.224	1.228	29.5	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F4.013	13.802	0.230	60.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F4.014	68.504	0.343	200.0	0.000	11	0.0	1.500	o	225	Pipe/Conduit	
F1.012	13.867	0.069	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.013	48.770	0.244	200.0	0.000	6	0.0	1.500	o	225	Pipe/Conduit	
F5.000	75.458	1.258	60.0	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
F5.001	12.890	0.215	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.014	14.953	0.075	200.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F1.015	36.096	1.141	31.6	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F1.016	44.321	0.222	200.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F6.000	36.716	0.612	60.0	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
F6.001	16.755	0.279	60.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F6.002	18.342	0.864	21.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F6.003	9.033	0.695	13.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F6.004	24.025	1.848	13.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F6.005	8.731	0.275	31.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F4.010	88.439	0.000	0.0	22	0.0	22	0.31	0.81	32.2	0.6
F4.011	88.383	0.000	0.0	22	0.0	22	0.31	0.81	32.2	0.6
F4.012	88.339	0.000	0.0	22	0.0	14	0.60	2.12	84.2	0.6
F4.013	87.111	0.000	0.0	22	0.0	17	0.47	1.48	59.0	0.6
F4.014	86.881	0.000	0.0	33	0.0	27	0.35	0.81	32.2	0.9
F1.012	86.539	0.000	0.0	66	0.0	37	0.44	0.81	32.2	1.9
F1.013	86.469	0.000	0.0	72	0.0	38	0.45	0.81	32.2	2.0
F5.000	89.647	0.000	0.0	9	0.0	12	0.38	1.13	20.0	0.3
F5.001	88.389	0.000	0.0	9	0.0	12	0.38	1.13	20.0	0.3
F1.014	86.225	0.000	0.0	83	0.0	41	0.47	0.81	32.2	2.3
F1.015	86.151	0.000	0.0	85	0.0	27	0.90	2.04	81.3	2.4
F1.016	85.010	0.000	0.0	87	0.0	42	0.48	0.81	32.2	2.4
F6.000	91.332	0.000	0.0	8	0.0	12	0.36	1.13	20.0	0.2
F6.001	90.720	0.000	0.0	8	0.0	12	0.36	1.13	20.0	0.2
F6.002	90.441	0.000	0.0	8	0.0	9	0.51	1.91	33.7	0.2
F6.003	89.500	0.000	0.0	8	0.0	8	0.61	2.44	43.1	0.2
F6.004	88.805	0.000	0.0	10	0.0	9	0.65	2.44	43.1	0.3
F6.005	86.957	0.000	0.0	10	0.0	11	0.48	1.56	27.5	0.3

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F6.006	76.268	0.953	80.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F6.007	16.621	0.208	79.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F6.008	36.726	0.288	127.5	0.000	7	0.0	1.500	o	225	Pipe/Conduit	
F1.017	31.207	1.419	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.018	19.868	0.903	22.0	0.000	0	0.5	1.500	o	225	Pipe/Conduit	
F1.019	19.868	0.903	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.000	41.539	0.692	60.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F8.000	35.918	0.599	60.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F9.000	18.080	0.301	60.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F8.001	10.775	0.180	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F8.002	10.775	0.180	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F7.001	22.991	0.115	200.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F7.002	50.143	0.251	200.0	0.000	12	0.0	1.500	o	225	Pipe/Conduit	
F7.003	5.668	0.028	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.004	15.552	0.078	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F6.006	86.682	0.000	0.0	17	0.0	17	0.42	0.98	17.3	0.5
F6.007	85.729	0.000	0.0	17	0.0	17	0.42	0.98	17.3	0.5
F6.008	85.446	0.000	0.0	24	0.0	21	0.37	1.02	40.4	0.7
F1.017	84.621	0.000	0.0	111	0.0	28	1.11	2.45	97.6	3.1
F1.018	82.194	0.000	0.5	111	0.0	30	1.16	2.45	97.5	3.6
F1.019	79.791	0.000	0.5	111	0.0	30	1.16	2.45	97.5	3.6
F7.000	78.050	0.000	0.0	7	0.0	11	0.35	1.13	20.0	0.2
F8.000	81.075	0.000	0.0	7	0.0	11	0.35	1.13	20.0	0.2
F9.000	81.345	0.000	0.0	4	0.0	8	0.29	1.13	20.0	0.1
F8.001	80.476	0.000	0.0	11	0.0	13	0.40	1.13	20.0	0.3
F8.002	78.900	0.000	0.0	11	0.0	13	0.40	1.13	20.0	0.3
F7.001	77.283	0.000	0.0	21	0.0	21	0.31	0.81	32.2	0.6
F7.002	77.168	0.000	0.0	33	0.0	27	0.35	0.81	32.2	0.9
F7.003	76.917	0.000	0.0	33	0.0	27	0.35	0.81	32.2	0.9
F7.004	76.889	0.000	0.0	33	0.0	27	0.35	0.81	32.2	0.9

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.020	20.177	0.101	199.8	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.021	52.965	0.265	199.9	0.000	9	0.0	1.500	o	225	Pipe/Conduit	
F1.022	19.986	0.908	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.023	37.453	1.702	22.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F10.000	87.705	1.462	60.0	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
F1.024	21.461	0.976	22.0	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F1.025	17.602	0.800	22.0	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F11.000	52.194	3.017	17.3	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F11.001	45.689	1.015	45.0	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
F11.002	49.617	2.255	22.0	0.000	12	0.0	1.500	o	225	Pipe/Conduit	
F11.003	22.348	0.112	200.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F11.004	5.967	0.030	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.026	18.385	0.836	22.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F1.027	47.699	0.318	150.0	0.000	23	0.0	1.500	o	225	Pipe/Conduit	
F1.028	15.503	0.705	22.0	0.020	0	0.0	1.500	o	225	Pipe/Conduit	
F1.029	15.309	0.696	22.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F1.030	27.542	1.252	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.031	9.927	0.451	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.020	76.811	0.000	0.5	144	0.0	57	0.57	0.81	32.2	4.6
F1.021	76.710	0.000	0.5	153	0.0	59	0.58	0.81	32.2	4.8
F1.022	76.445	0.000	0.5	153	0.0	34	1.27	2.45	97.5	4.8
F1.023	74.455	0.000	0.5	155	0.0	34	1.27	2.45	97.5	4.9
F10.000	74.290	0.000	0.0	8	0.0	12	0.36	1.13	20.0	0.2
F1.024	71.964	0.000	0.5	164	0.0	35	1.29	2.45	97.6	5.1
F1.025	70.345	0.000	0.5	165	0.0	35	1.29	2.45	97.5	5.1
F11.000	74.500	0.000	0.0	2	0.0	5	0.34	2.11	37.3	0.1
F11.001	71.483	0.000	0.0	14	0.0	14	0.48	1.31	23.1	0.4
F11.002	70.393	0.000	0.0	26	0.0	14	0.70	2.45	97.5	0.7
F11.003	68.137	0.000	0.0	28	0.0	25	0.34	0.81	32.2	0.8
F11.004	68.026	0.000	0.0	28	0.0	25	0.34	0.81	32.2	0.8
F1.026	67.545	0.000	0.5	197	0.0	38	1.36	2.45	97.6	6.0
F1.027	66.709	0.000	0.5	220	0.0	65	0.71	0.94	37.2	6.7
F1.028	66.391	0.020	0.5	220	0.0	40	1.40	2.45	97.6	6.7
F1.029	65.686	0.020	0.5	222	0.0	40	1.40	2.45	97.6	6.7
F1.030	64.990	0.020	0.5	222	0.0	40	1.40	2.45	97.5	6.7
F1.031	62.950	0.020	0.5	222	0.0	40	1.40	2.45	97.5	6.7

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.032	39.727	0.265	149.9	0.000	12	0.0	1.500	o	225	Pipe/Conduit	
F1.033	20.571	0.137	150.2	0.000	6	0.0	1.500	o	225	Pipe/Conduit	
F12.000	29.901	0.498	60.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F12.001	54.696	0.405	135.0	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
F12.002	15.499	0.115	135.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F12.003	10.732	0.079	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.034	7.826	0.356	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.035	12.580	0.572	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.036	17.000	0.773	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.037	40.979	1.863	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.038	14.180	0.645	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.039	10.617	0.483	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.040	7.980	0.363	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.041	7.980	0.363	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.042	10.884	0.495	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.043	11.637	0.529	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.044	19.448	0.884	22.0	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F1.045	9.925	0.451	22.0	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F1.046	9.925	0.451	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.047	17.626	0.801	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.032	62.499	0.020	0.5	234	0.0	66	0.72	0.94	37.2	7.1
F1.033	62.234	0.020	0.5	240	0.0	67	0.72	0.94	37.2	7.3
F12.000	63.381	0.000	0.0	6	0.0	10	0.33	1.13	20.0	0.2
F12.001	62.883	0.000	0.0	15	0.0	19	0.33	0.75	13.3	0.4
F12.002	62.478	0.000	0.0	18	0.0	20	0.35	0.75	13.3	0.5
F12.003	62.363	0.000	0.0	18	0.0	20	0.35	0.75	13.3	0.5
F1.034	62.097	0.020	0.5	258	0.0	43	1.46	2.45	97.6	7.8
F1.035	59.891	0.020	0.5	258	0.0	43	1.46	2.45	97.6	7.8
F1.036	59.319	0.020	0.5	258	0.0	43	1.46	2.45	97.6	7.8
F1.037	58.546	0.020	0.5	258	0.0	43	1.46	2.45	97.6	7.8
F1.038	54.970	0.020	0.5	258	0.0	43	1.46	2.45	97.6	7.8
F1.039	52.058	0.020	0.5	258	0.0	43	1.46	2.45	97.6	7.8
F1.040	49.800	0.020	0.5	258	0.0	43	1.46	2.45	97.5	7.8
F1.041	48.133	0.020	0.5	258	0.0	43	1.46	2.45	97.6	7.8
F1.042	46.270	0.020	0.5	258	0.0	43	1.46	2.45	97.6	7.8
F1.043	44.000	0.020	0.5	258	0.0	43	1.46	2.45	97.5	7.8
F1.044	42.750	0.020	0.5	259	0.0	43	1.47	2.45	97.5	7.8
F1.045	41.127	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.046	39.676	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.047	37.776	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.048	12.056	0.548	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.049	5.111	0.232	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.050	16.414	0.746	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.051	5.587	0.254	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.052	48.992	2.227	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.053	81.507	3.705	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.054	45.850	2.084	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.055	29.537	1.343	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.056	42.404	1.927	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.057	40.655	1.848	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.058	36.305	1.650	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.059	22.839	1.038	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.060	25.324	1.151	22.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.061	88.717	2.779	31.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F13.000	12.201	0.203	60.1	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F13.001	12.063	0.201	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.002	8.847	0.147	60.0	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F13.003	6.553	0.164	40.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.004	7.779	0.389	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.005	20.776	1.039	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.006	12.564	0.628	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.048	35.575	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.049	35.027	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.050	34.495	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.051	33.520	0.020	0.5	260	0.0	43	1.47	2.45	97.6	7.8
F1.052	33.266	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.053	31.039	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.054	27.334	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.055	25.250	0.020	0.5	260	0.0	43	1.47	2.45	97.6	7.8
F1.056	23.000	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.057	19.678	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.058	16.254	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.059	13.674	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.060	12.350	0.020	0.5	260	0.0	43	1.47	2.45	97.5	7.8
F1.061	11.199	0.020	0.5	260	0.0	47	1.29	2.04	80.9	7.8
F13.000	27.300	0.000	0.0	4	0.0	8	0.29	1.13	20.0	0.1
F13.001	26.400	0.000	0.0	4	0.0	8	0.29	1.13	20.0	0.1
F13.002	26.199	0.000	0.0	5	0.0	9	0.31	1.13	20.0	0.1
F13.003	25.600	0.000	0.0	5	0.0	9	0.36	1.39	24.5	0.1
F13.004	25.200	0.000	0.0	5	0.0	7	0.45	1.97	34.7	0.1
F13.005	24.500	0.000	0.0	5	0.0	7	0.45	1.97	34.7	0.1
F13.006	23.200	0.000	0.0	5	0.0	7	0.45	1.96	34.7	0.1

Network Design Table for Foul

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F13.007	3.502	0.175	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.008	7.465	0.149	50.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.009	8.549	0.570	15.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.010	9.972	0.399	25.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.011	5.377	0.414	13.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.012	22.976	1.149	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.013	5.168	0.258	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.014	17.706	0.354	50.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.015	5.965	0.398	15.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.016	18.054	0.602	30.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.017	4.311	0.216	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.018	15.739	1.211	13.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.019	30.184	1.442	20.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.020	10.751	0.215	50.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.021	8.966	0.448	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.022	10.539	0.527	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.023	37.749	1.887	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F13.024	59.935	0.266	225.3	0.000	24	0.0	1.500	o	225	Pipe/Conduit	
F13.025	3.181	0.014	227.2	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F13.007	22.500	0.000	0.0	5	0.0	7	0.45	1.96	34.7	0.1
F13.008	22.000	0.000	0.0	5	0.0	9	0.33	1.24	21.9	0.1
F13.009	20.800	0.000	0.0	5	0.0	7	0.49	2.27	40.1	0.1
F13.010	19.000	0.000	0.0	5	0.0	8	0.42	1.76	31.0	0.1
F13.011	17.100	0.000	0.0	5	0.0	7	0.52	2.44	43.1	0.1
F13.012	15.500	0.000	0.0	5	0.0	7	0.45	1.97	34.7	0.1
F13.013	14.200	0.000	0.0	5	0.0	7	0.45	1.96	34.7	0.1
F13.014	13.900	0.000	0.0	5	0.0	9	0.33	1.24	21.9	0.1
F13.015	13.000	0.000	0.0	5	0.0	7	0.49	2.27	40.1	0.1
F13.016	12.000	0.000	0.0	5	0.0	8	0.39	1.60	28.3	0.1
F13.017	11.000	0.000	0.0	5	0.0	7	0.45	1.97	34.8	0.1
F13.018	10.100	0.000	0.0	5	0.0	7	0.52	2.44	43.1	0.1
F13.019	8.800	0.000	0.0	5	0.0	7	0.44	1.92	33.9	0.1
F13.020	7.300	0.000	0.0	5	0.0	9	0.33	1.24	21.9	0.1
F13.021	7.000	0.000	0.0	5	0.0	7	0.45	1.96	34.7	0.1
F13.022	5.300	0.000	0.0	5	0.0	7	0.45	1.97	34.7	0.1
F13.023	4.000	0.000	0.0	5	0.0	7	0.45	1.96	34.7	0.1
F13.024	2.038	0.000	0.0	29	0.0	26	0.33	0.76	30.3	0.8
F13.025	1.772	0.000	0.0	29	0.0	26	0.32	0.76	30.2	0.8

Appendix G - StormTech MC3500 & MC4500

STORMTECH MC-3500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-3500 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
90" x 77" x 45"
2,286 mm x 1,956 mm x 1,143 mm

Chamber Storage
109.9 ft³ (3.11 m³)

Min. Installed Storage*
178.9 ft³ (5.06 m³)

Weight
134 lbs (60.8 kg)

Shipping
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 9" (230 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-3500 END CAP
(not to scale)

Nominal End Cap Specifications

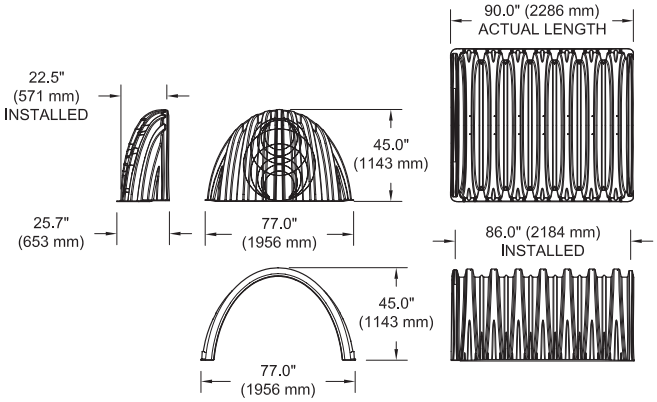
Size (L x W x H)
26.5" x 71" x 45.1"
673 mm x 1,803 mm x 1,145 mm

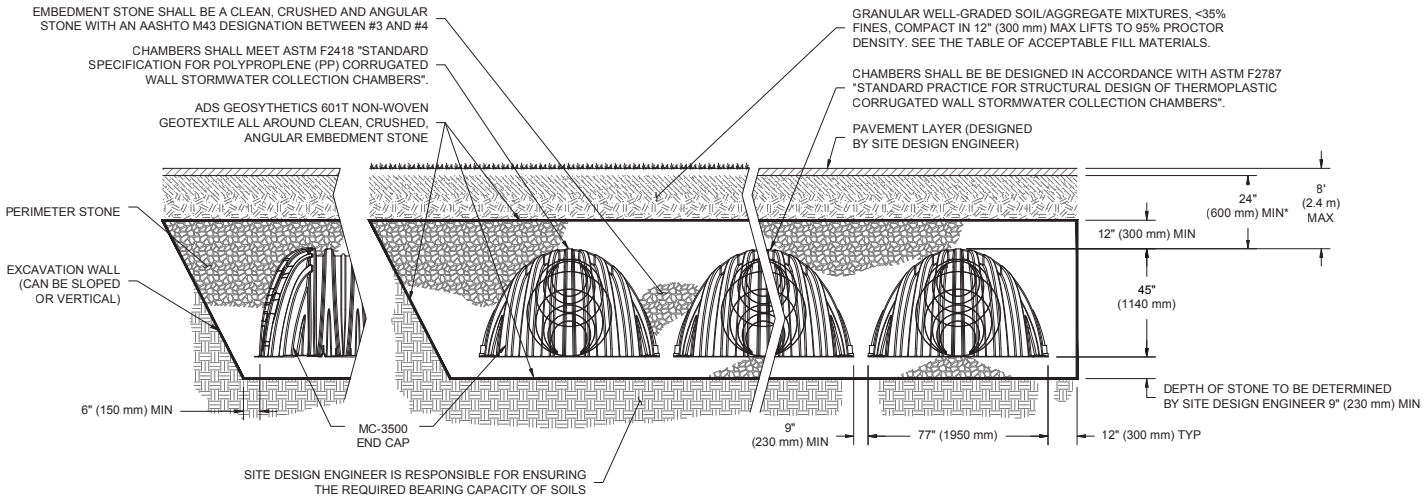
End Cap Storage
14.9 ft³ (1.30 m³)

Min. Installed Storage*
46.0 ft³ (1.30 m³)

Weight
49 lbs (22.2 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 9" (230 mm) of stone between chambers/end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

MC-3500 CHAMBER SPECIFICATION

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-3500 Chamber	109.9 (3.11)	178.9 (5.06)	184.0 (5.21)	189.2 (5.36)	194.3 (5.5)
MC-3500 End Cap	14.9 (.42)	46.0 (1.33)	47.7 (1.35)	49.4 (1.40)	51.1 (1.45)

Note: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

AMOUNT OF STONE PER CHAMBER

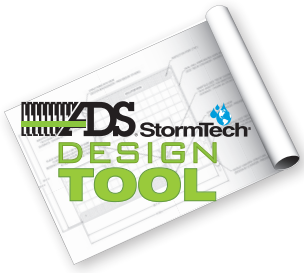
ENGLISH TONS (yds³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500 Chamber	9.1 (6.4)	9.7 (6.9)	10.4 (7.3)	11.1 (7.8)
MC-3500 End Cap	4.1 (2.9)	4.3 (3.0)	4.5 (3.2)	4.5 (3.2)
METRIC KILOGRAMS (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
MC-3500 Chamber	8,220 (4.9)	8,831 (5.3)	9,443 (5.6)	10,054 (6.0)
MC-3500 End Cap	3,699 (2.2)	3,900 (2.3)	4,100 (2.5)	4,301 (2.6)

Note: Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-3500 Chamber	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)	13.8 (10.5)
MC-3500 End Cap	4.1 (3.1)	4.2 (3.2)	4.4. (3.3)	4.5 (3.5)

Note: Assumes 9" (230 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.



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MC-4500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-4500 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
52” x 100” x 60”
1,321 mm x 2,540 mm x 1,524 mm

Chamber Storage
106.5 ft^3 (3.01 m^3)

Min. Installed Storage*
162.6 ft^3 (4.60 m^3)

Weight
120 lbs (54.4 kg)

Shipping
7 chambers/pallet
11 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-4500 END CAP
(not to scale)

Nominal End Cap Specifications

Size (L x W x H)
35.1” x 90.2” x 59.4”
891 mm x 2,291 mm x 1,509 mm

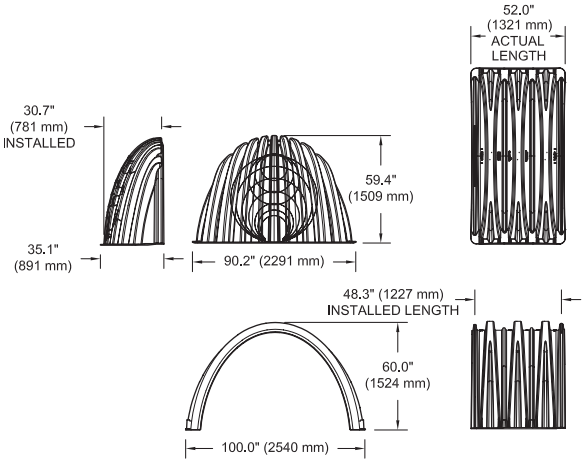
End Cap Storage
35.7 ft^3 (1.01 m^3)

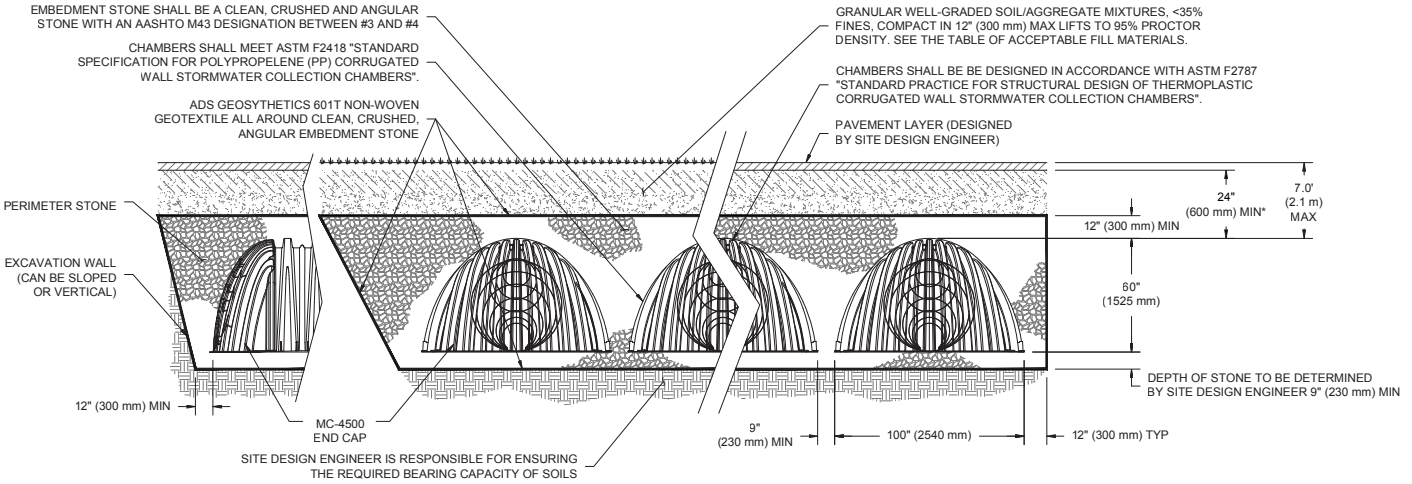
Min. Installed Storage*
108.7 ft^3 (3.08 m^3)

Weight
120 lbs (54.4 kg)

Shipping
7 end caps/pallet
11 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

MC-4500 CHAMBER SPECIFICATIONS

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-4500 Chamber	106.5 (3.02)	162.6 (4.60)	166.3 (4.71)	169.6 (4.81)	173.6 (4.91)
MC-4500 End Cap	35.7 (1.0)	108.7 (3.08)	111.9 (3.17)	115.2 (3.26)	118.4 (3.35)

Note: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter.

AMOUNT OF STONE PER CHAMBER

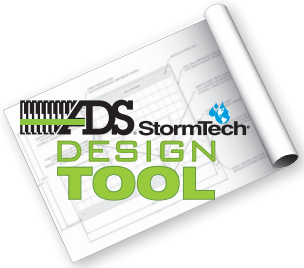
ENGLISH TONS (yds³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-4500 Chamber	7.4 (5.2)	7.8 (5.5)	8.3 (5.9)	8.8 (6.2)
MC-4500 End Cap	9.6 (6.8)	10.0 (7.1)	10.4 (7.4)	10.9 (7.7)
METRIC KILOGRAMS (m³)	230 mm	300 mm	375 mm	450 mm
MC-4500 Chamber	6,681 (4.0)	7,117 (4.2)	7,552 (4.5)	7,987 (4.7)
MC-4500 End Cap	8,691 (5.2)	9,075 (5.4)	9,460 (5.6)	9,845 (5.9)

Note: Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-4500 Chamber	10.5 (8.0)	10.8 (8.3)	11.2 (8.5)	11.5 (8.8)
MC-4500 End Cap	9.3 (7.1)	9.6 (7.3)	9.9 (7.6)	10.2 (7.8)

Note: Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will varyas depth of cover increases.



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