TOBIN
CONSULTING ENGINEERS
BUILT ON KNOWLEDGE

Kegata Ltd.

Residential Development, Rosshill, Galway

Report on Civil Works
Planning Stage

Residential Development, Rosshill, Galway

Report on Civil Works Planning Stage

Document Control Sheet	
Document Reference	10690/TR02
Report Status	PLANNING
Report Date	June 2019
Current Revision	B
Client:	Alber Homes Ltd
Client Address:	1st Floor, Fairgreen House, Fairgreen Rd, Galway, H91 AXK8
Project Number	10690

Galway Office	Dublin Office	Castlebar Office	London Office
Fairgreen House, Fairgreen Road, Galway, H91 AXK8, Ireland. Tel: +353 (0)91 565 211	Block 10-4, Blanchardstown Corporate Park, Dublin 15, D15 X98N, Ireland. Tel: +353 (0)1 803 0406	Market Square, Castlebar, Mayo, F23 Y427, Ireland. Tel: +353 (0)94 902 1401	17 Bowling Green Lane, Clerkenwell, London, EC1R 0QB, United Kingdom. Tel: +44 (0)203 915 6301

Revision	Description	Author:	Date	Reviewed By:	Date	Authorised by:	Date
D01	Draft Planning Issue	RD	02/07/2019	BH	03/07/2019	RD	03/07/2019
D02	Draft Planning Issue	RD	16/07/2019	BH	16/07/2019	BH	16/07/2019
D03	Update after IW CoF Received	RD	01/08/2019	BH	01/08/2019	BH	01/08/2019
A	Planning Issue	RD	05/12/2019	BH	05/12/2019	BH	05/12/2019
B	Planning Issue – Minor Revision	RD	12/12/2019	BH	12/12/2019	BH	13/12/2019

TOBIN Consulting Engineers

Table of Contents

Table of Figures

1 INTRODUCTION

TOBIN Consulting Engineers were appointed in May 2019 to provide engineering consultancy services for the proposed residential development at Rosshill, in Galway City (Figure 1.1 & Figure 1.2).

This report has been prepared to detail the Civil Works Planning submission element of a residential development at Rosshill, Co. Galway. It should be read in conjunction with the foul and storm design drawings as outlined and noted herein.

This report details the foul and storm drainage design and the water main details for the development. The residential development consists of 342no. units comprising 185no. houses and 157no. apartments, including a ground-floor community space, office, cafe and retail unit. A two-storey childcare facility. The provision of public realm landscaping including shared public open space and play areas, public art, public lighting, resident and visitor parking including car rental bays, electric vehicle charging points and bike rental spaces. Pedestrian, cyclist and vehicular links throughout the development. Access road and junction improvements at Rosshill Road/Old Dublin Road.

It is proposed that the wastewater will flow via gravity to a pumping station to the north west of the site and discharge via rising main to an existing IW pumping station located at Merlin Park. The gravity sewers have been sized sufficiently to cater for future possible development to the south of the site. This report outlines the P.E.'s and wastewater flow rate. Details of storm design and water main are also presented within the report.

Figure 1.1 – Site Location

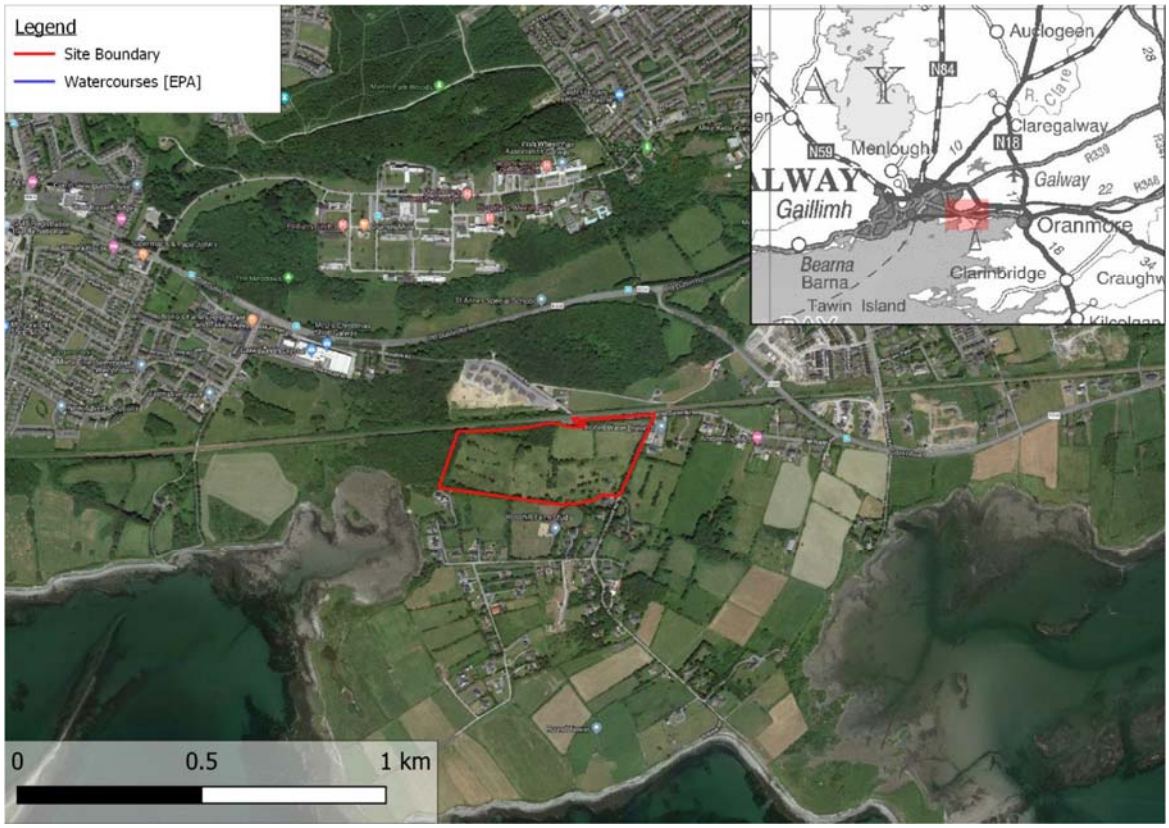


Figure 1.2 - Proposed Site Layout

1.1 Wastewater Drainage System Overview

Details of the Foul Sewer can be found in Appendix B of this document and on Drawing No. 10690-2002 & 10690-2003. It is proposed that all pipes will be thermoplastic structured wall pipes. The maximum pipe diameter is to be 225mm, with a maximum and minimum gradient of 1/20 and 1/200. All velocities at said gradients fall within the limits of 0.75 and 3m/sec as set out in "Recommendations for Site Development Works" as published by the Department of Environment.

1.2 Storm Drainage System Overview

The storm water drainage design has been designed to cater for all surface water runoff from all hard surfaces in the proposed development including roadways, roofs etc. All stormwater generated on site from roadways and roofs will discharge via Oil/Petrol Interceptor to one of 12 no. proposed soakaways which are strategically situated throughout the site. The stormwater will soak away through the underlying fractured rock/boulders. The soakaways shall be constructed of a cellular storage unit providing 95% porosity or stone filled soakaway providing 40% void ratio. These will also attenuate storm water during and post storm events prior to infiltrating through the underlying fractured rock/boulders.

The north west corner of the development is prone to occasional pluvial flooding and therefore there is additional storage provided by means of an open attenuation in the form of a swale. This area, as noted in the FRA, will remain at lower ground level (existing) which is circa 7.0 – 7.5m OD with building and roads in the vicinity being filled and constructed to 9.0m OD – 9.5m OD.

All soakaways are designed to accommodate a 1 in 100 year storm event throughout the site. The networks to the west of the site are designed to accommodate the 1 in 100 year storm event with an overflow being provided which will allow any additional volume of storm water to convey to the naturally forming swale to the north of the site. This will allow for a 1 in 1000 year storm event to be catered for as noted in the FRA.

Details of the soakaways are shown in Appendix C and located on Drawings.

The maximum pipe diameter is to be 450mm, with a maximum and minimum gradient of 1/35 and 1/300. All velocities at said gradients fall within the limits of 0.75 and 3m/sec as set out in "Recommendations for Site Development Works" as published by the Department of Environment.

2 WASTEWATER DRAINAGE DESIGN

2.1 Introduction

The pipework for the drainage system has been designed to provide for six times the dry weather flow in accordance with the Recommendations for Site Development Works as published by the Department of the Environment and Local Government and to Irish Water Code of practice and standard details. The design calculations are displayed in Appendix A. The input reference no., manhole upstream, manhole downstream, length of pipe, population equivalent, size, invert upstream (A), invert downstream (B), resulting gradient, flow rate and capacity of each foul sewer pipe within the network are tabulated in the design calculations.

2.2 Loading rates

An average rate of 2.7 P.E. per dwelling has been taken for the development to account for the varying unit occupancies. The occupancy per dwelling figures have been obtained from the Irish Water Codes of Practice as per Wastewater Code of Practice, Appendix C – Gravity Sewer Design Requirements, section 1.2.1 Housing Density & Occupancy.

150 ltr per head per day has been taken into account for the sewer design as per Irish Water Code of Practice for Wastewater Infrastructure - section 3.6 Hydraulic Design for Gravity Sewers. The foul sewer design has been designed using Microdrainage 2017.1.2 designing software. Results can be found in Appendix B.

A peak flow rate of 6 time the dry weather flow was obtained from as per Wastewater Code of Practice, Appendix C – Gravity Sewer Design Requirements, section 1.2.5. Domestic Wastewater Peaking Factors.

2.3 Wastewater Discharge

It is proposed to discharge via gravity to a pumping station located in the North-West of the site and then discharge via rising main to the existing Merlin Park pumping station. Merlin Park pumping station is currently on Irish Water Capital Infrastructure list of proposed upgrade works – Refer to Section 9.7 *Water Services* of the Galway City Development Plan 2017-2023.

Irish Water have confirmed that the proposed phase 1 and phase 2 of the development can be accommodated under the current arrangement at Merlin Park with the remaining phases being accommodated once the completion of the capital works on the Merlin Park pumping station have been carried out by 2024. Extensive consultations were held with Irish Water, in a collaborative manner, to arrive at a solution that satisfies both the achievable delivery of the houses (in phases) from the developer with that of the realistic delivery of the required infrastructure at Merlin Park.

It is understood that the proposed upgrade works at Merlin Park pumping station are now at design stage and Irish Water have stated that the timeline for completion of these works, 2024, allows for a planning application process. Refer to the Letter of Feasibility from Irish Water in Appendix G for further details.

The rising main will transverse through the site located within the roads and connect to a previously laid rising main on the Rosshill road previously constructed during the construction of the adjacent development. The Contractor has taken a collaborative approach and has agreed with the developer constructing the adjacent development to the north (Pl Ref: 16/228), in consultation with Irish Water, for the developer to lay a rising main and water main within trench to allow for the proposed development. This negates the need for an additional section of trench to be excavated on Rosshill road for this development.

2.4 Pumping Station

A typical detail of the pumping station can be found in Appendix F. The pumping station will be designed in accordance with the requirements set out in the Irish Water specification for wastewater systems IW-CDS-5030-03. The pumping station will be 15m from the boundary of the nearest dwelling as shown on drg. no. 10690-2002

From IW-CDS-5030-03, storage required for pumping station = 24 hr storage for total flow at 600l/dwelling/day

Therefore:

342 x 600 = 205,200 litres/day

An allowance has been made in the calculations for the creche and commercial units equating to the equivalent of 10no. housing units.

Where 10 no. x 600 = 6,000 litres/day

205,200 + 6,000 = 211,200 litres/day

24 hour storage required

Therefore, tank volume required = 211.2 m3 for 24 hour storage

As noted on the Irish Water Confirmation of Feasibility (refer to Appendix G), the pumping station will be required cater for any future development to the south of the proposed lands. This can be achieved by the installation of additional modular storage connected to the existing tank storage and per discussions with Irish Water.

The pumping station layout is illustrated on the site drawing and includes a 4.0m wide pull in area to allow for an occasional tanker or service vehicles to be parked outside the pumping station. It is estimated that tanker movements to the site would be minimal and subject to the operational efficiencies of the pumping station. However, it would be anticipated that no more than 2 - 4 tanker visits would be required per annum.

3 STORMWATER DRAINAGE DESIGN

3.1 Introduction

Storm water drainage design calculations are shown in Appendix B of this report. Detailed design calculations are based on the 100 year return period plus an additional 10% for climate change. As the north west section of the site has shown to be susceptible to occasional pluvial flooding in extreme events, the storm networks on the western section have been designed to a 1 in 1000 year flood event.

This entails that the soakaway being designed to cater for runoff from to 1 in 100 year storm event with excess water generated from a greater storm event conveying, via an overflow arrangement, to the naturally formed and retained swale located along the northern boundary. The swale retains the existing ground level which is approximately 7.2m OD to the formed road level of 9.0m – 9.5m OD.

The soakaways catering for the 1 in 100 year event will retain a combined volume of 343m3 of water (1 in 100 year event) with all additional overflow storm water for up to a 1 in 1000 year event being conveyed to the open swale which will have a capacity of approximately 3,670m3.

The pipe ref. No., manhole No. upstream, manhole No. downstream, length of pipe, ground level at manhole upstream, ground level at manhole downstream, impermeable area for each pipe section, invert level upstream, invert level downstream, gradient, capacity and rate of flow for each pipe section are detailed. Prior to discharge to the soakaways, it is proposed to install oil separators/silt traps at the inlet, thus reducing the amount of debris etc. entering the soakaways. Surface water from hard surfaces in the proposed development including roadways and roofs, as shown on Dwg. No. 10690-2001 & 2003, will flow by gravity to the soakaways. Results of the storm water calculations can be found in Appendix B.

3.2 Soakaway Design

The soakaways are designed to hold water for the largest storage required over a 48 hour storm period with rainfall depths taken for the 100 year return period for sliding durations obtained from Met Eireann. The stormwater discharges to groundwater.

Results of the calculations can be found in Appendix C and details of the soakaways unit are shown on drawings.

4 WATERMAIN

The Watermain has been designed in accordance with Irish Water Code of Practice and standard details.

The water supply required for the proposed development shall be via a 200mm dia watermain as per Irish Water requirements. Similar to the arrangement for the foul rising main, agreements were made with the developer constructing the adjacent residential development and in consultation with Irish Water to install the 200mm watermain within the Rosshill road to the extent of their development (i.e. 200mm watermain was previously constructed during construction of the adjacent development). This will allow the proposed development to be able to connect up to the 200mm watermain on the north side of the railway bridge instead of needing to excavate a new trench up to the R338 (old Dublin Road). Refer to Irish Water Confirmation of Feasibility letter in Appendix G noting the proposed connection location to the 200mm dia watermain just north of the railway bridge.

The watermain arrangement is shown on drawing No. 10690-2004 and 10690-2005. It is proposed to serve to site using a 200mm dia 'spine' watermain down to the main junction in the proposed development. All other branch mains from the 200mm will be 100mm PE. In accordance with Local authority standards, a water meter and Logging Device (Larson Type) are proposed at the connection into the proposed site. A sluice valve, strainer and 200mm Ø by-pass arrangement is also proposed to allow for possible disconnection of water meters by the Local Authority.

5 FIRE FIGHTING FLOWS

In order to meet required fire flow requirements, it is proposed to install a static storage capacity within the site. This is being provided as Irish Water will not guarantee available fire flow within the hydrants located on site. It is proposed to provide an underground storage tank capable of supplying 20 l/s of flow for a 1 hour period. This equates to a minimum volume required for the site of 72,000 litres.

20 l/s is derived from the 'National Guidance Document on the provisions of water for Firefighting – Water UK 3rd Edition'. The tank is located within the grassed area and easily accessible by fire tenders and tankers should they need access. A top up supply for the 150mm dia water main will be provided and a high level overflow will connect back to the main storm drainage for the site.

It is noted that in addition to the static storage tank, a significant volumes of water will still be available from hydrants located throughout the development. Any specific requirements as requested by the local fire authority when applying for the Fire Certification will be incorporated at the detail design stage.

6 CONCLUSION

The Report should be read in conjunction with the associated Drawings, layouts and specifications.

The proposed finish levels of the site generally fall from the south east corner to the north west corner making it ideal for gravity flows without needing to undertake excessive depths. The foul network as detailed herein and as shown on the drainage drawings adequately conveys foul waste to the proposed pumping station located in the north west of the site.

The proposed pumping station located to the north east of the site shall collect the foul waste for the entire development. From this point, the foul waste will be pumped to the existing Merlin Park pumping station. Works underway on the adjacent development to the north included the installation of a foul rising main to the extent of their site. This results in the connection location from the proposed development being required just south of the railway bridge instead of at the Merlin Park pumping station. This will result in an overall reduction in trenches of approximately 1.0km which would otherwise cause disruption.

As noted on the Irish Water Confirmation of Feasibility (refer to Appendix G), the pumping station will be required cater for any future development to the south of the proposed lands. This can be achieved by the installation of additional modular storage connected to the existing tank storage.

However, Irish Water also note in their Code of Practice that for developments in excess of 275 no. properties it may be possible to reduce the requirement for providing 24 hr/storage. Should this go ahead, the reduction in the volume could then be applied requiring little if any additional storage being required to the pumping station at a future stage. The preferred option will be agreed and finalised with Irish Water at detailed design stage.

As per the foul rising main, the 200mm watermain has previously been laid by the adjacent developer which will serve the proposed development with the connection point being located just south of the railway bridge. Irish Water have confirmed feasibility to connect to this 200mm dia water main just south of the railway bridge (refer to Confirmation of Feasibility letter – Appendix G). This will result in the overall reduction in trenching of approximately 540m.

Irish Water have vetted the proposed foul and watermain design for the development and have confirmed acceptance of the design. Refer to the 'Statement of Design Acceptance' in Appendix H

Storm water accumulating within the site is adequately being managed by discharging to the 12 no. soakaway's. this will result in all stormwater being retained and managed ensuring no additional volumes are conveyed to storm or combined sewers or to drains and ditches.

All wastewater and watermain infrastructure has been designed and will be constructed in accordance with Irish Water standard details and relevant codes of practice.

We trust that adequate detail has been provided for Wastewater drainage layout and Storm water drainage layout. Should you require any further detail, we will be happy to meet and supply same, as you may deem appropriate.

APPENDIX A

Stormwater Drainage Design Calculations

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)	1	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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	30.400	0.507	60.0	0.036	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	33.127	0.946	35.0	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	4.100	0.041	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	2.000	0.020	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	2.000	0.007	300.0	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)
S1.000	41.50	5.30	15.500	0.036	0.0	0.0	0.5	1.69	67.3	5.3
S1.001	40.78	5.55	14.500	0.058	0.0	0.0	0.8	2.22	88.2	8.5
S1.002	40.63	5.60	13.554	0.058	0.0	0.0	0.8	1.31	52.0	8.5
S1.003	40.56	5.63	13.513	0.058	0.0	0.0	0.8	1.31	52.0	8.5
S1.004	40.43	5.67	13.493	0.058	0.0	0.0	0.8	0.75	29.8	8.5
S1.005	40.31	5.72	13.486	0.058	0.0	0.0	0.8	0.75	29.8	8.5

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	17.200	1.700	Open Manhole	1200	S1.000	15.500	225				
S2	16.450	1.950	Open Manhole	1200	S1.001	14.500	225	S1.000	14.993	225	493
S3	14.950	1.396	Open Manhole	1200	S1.002	13.554	225	S1.001	13.554	225	
S4	14.950	1.437	Open Manhole	1200	S1.003	13.513	225	S1.002	13.513	225	
S5	14.950	1.457	Open Manhole	1200	S1.004	13.493	225	S1.003	13.493	225	
S6	14.900	1.414	Open Manhole	1200	S1.005	13.486	225	S1.004	13.486	225	
S	14.900	1.421	Open Manhole	0		OUTFALL		S1.005	13.479	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	17.200	15.500	1.475	Open Manhole	1200
S1.001	o	225	S2	16.450	14.500	1.725	Open Manhole	1200
S1.002	o	225	S3	14.950	13.554	1.171	Open Manhole	1200
S1.003	o	225	S4	14.950	13.513	1.212	Open Manhole	1200
S1.004	o	225	S5	14.950	13.493	1.232	Open Manhole	1200
S1.005	o	225	S6	14.900	13.486	1.189	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	30.400	60.0	S2	16.450	14.993	1.232	Open Manhole	1200
S1.001	33.127	35.0	S3	14.950	13.554	1.171	Open Manhole	1200
S1.002	4.100	100.0	S4	14.950	13.513	1.212	Open Manhole	1200
S1.003	2.000	100.0	S5	14.950	13.493	1.232	Open Manhole	1200
S1.004	2.000	300.0	S6	14.900	13.486	1.189	Open Manhole	1200
S1.005	2.000	300.0	S	14.900	13.479	1.196	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.005	S	14.900	13.479	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.300
Return Period (years)		1	Profile Type Summer
Region	Scotland and Ireland	Cv (Summer)	0.900
M5-60 (mm)	16.500	Cv (Winter)	0.840

Synthetic Rainfall Details

Storm Duration (mins) 30

Storage Structures for Storm

Cellular Storage Manhole: S6, DS/PN: S1.005

Invert Level (m) 12.493 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.72000 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	12.0	12.0	1.300	0.0	28.8
1.200	12.0	28.8			

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:46 | Designed by Richard Daly
File STORM DESIGN NETWORK NO. 2_REV B.MDX | Checked by
Micro Drainage | Network 2017.1.2

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)	1	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	16.500	Volumetric Runoff Coeff.	0.900	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.300	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	10	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

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	17.500	0.292	60.0	0.056	5.00	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	41.89	5.17	15.517	0.056	0.0	0.0	0.8	1.69	67.3	8.4

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
S1.001	30.600	0.306	100.0	0.185	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	25.700	0.321	80.0	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	1.880	0.013	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	2.000	0.013	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	2.000	0.007	300.0	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)
S1.001	40.74	5.56	15.225	0.241	0.0	0.0	3.2	1.31	52.0	35.1
S2.000	41.52	5.29	15.175	0.031	0.0	0.0	0.4	1.46	58.2	4.6
S1.002	40.66	5.59	14.854	0.272	0.0	0.0	3.6	1.07	42.4	39.5
S1.003	40.57	5.62	14.841	0.272	0.0	0.0	3.6	1.07	42.4	39.5
S1.004	40.46	5.66	14.753	0.272	0.0	0.0	3.6	0.90	63.8	39.5
S1.005	40.36	5.70	14.746	0.272	0.0	0.0	3.6	0.90	63.8	39.5

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:46 | Designed by Richard Daly
File STORM DESIGN NETWORK NO. 2_REV B.MDX | Checked by
Micro Drainage | Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	17.100	1.583	Open Manhole	1200	S1.000	15.517	225				
S2	16.650	1.425	Open Manhole	1200	S1.001	15.225	225	S1.000	15.225	225	
S3	16.300	1.125	Open Manhole	1200	S2.000	15.175	225				
S4	16.200	1.346	Open Manhole	1200	S1.002	14.854	225	S1.001	14.919	225	66
								S2.000	14.854	225	
S5	16.200	1.359	Open Manhole	1200	S1.003	14.841	225	S1.002	14.841	225	
S6	16.200	1.447	Open Manhole	1200	S1.004	14.753	300	S1.003	14.828	225	
S7	16.150	1.404	Open Manhole	1200	S1.005	14.746	300	S1.004	14.746	300	
S	16.200	1.460	Open Manhole	0		OUTFALL		S1.005	14.740	300	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	17.100	15.517	1.358	Open Manhole	1200
S1.001	o	225	S2	16.650	15.225	1.200	Open Manhole	1200
S2.000	o	225	S3	16.300	15.175	0.900	Open Manhole	1200
S1.002	o	225	S4	16.200	14.854	1.121	Open Manhole	1200
S1.003	o	225	S5	16.200	14.841	1.134	Open Manhole	1200
S1.004	o	300	S6	16.200	14.753	1.147	Open Manhole	1200
S1.005	o	300	S7	16.150	14.746	1.104	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	17.500	60.0	S2	16.650	15.225	1.200	Open Manhole	1200
S1.001	30.600	100.0	S4	16.200	14.919	1.056	Open Manhole	1200
S2.000	25.700	80.0	S4	16.200	14.854	1.121	Open Manhole	1200
S1.002	1.880	150.0	S5	16.200	14.841	1.134	Open Manhole	1200
S1.003	2.000	150.0	S6	16.200	14.828	1.147	Open Manhole	1200
S1.004	2.000	300.0	S7	16.150	14.746	1.104	Open Manhole	1200
S1.005	2.000	300.0	S	16.200	14.740	1.160	Open Manhole	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	10.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	16.500	Cv (Summer)	0.900
Return Period (years)	1	Ratio R	0.300	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:48 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

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)	1	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	16.700	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.300	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	10	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

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	41.500	1.186	35.0	0.134	5.00	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	41.98	5.31	18.900	0.134	0.0	0.0	1.5	2.22	88.2	16.8

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:48
File Storm Design Network no. 3_Rev B.mdx

Designed by Richard Daly
Checked by

Micro Drainage | Network 2017.1.2

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
S1.001	52.200	1.044	50.0	0.256	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	24.000	0.120	200.0	0.041	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	24.400	0.081	300.0	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	20.200	0.067	300.0	0.018	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	25.600	0.640	40.0	0.152	0.00	0.0	0.600	o	350	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)
S1.001	40.84	5.70	17.525	0.390	0.0	0.0	4.3	2.23	157.5	47.5
S2.000	41.61	5.43	16.775	0.041	0.0	0.0	0.5	0.92	36.6	5.1
S1.002	39.62	6.15	16.481	0.452	0.0	0.0	4.9	0.90	63.8	53.4
S3.000	41.57	5.45	16.525	0.018	0.0	0.0	0.2	0.75	29.8	2.2
S1.003	39.23	6.31	16.333	0.622	0.0	0.0	6.6	2.75	264.6	72.7

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:48 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

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
S4.000	33.450	0.112	300.0	0.050	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	5.000	0.017	300.0	0.017	0.00	0.0	0.600	o	350	Pipe/Conduit	
S1.005	6.500	0.033	197.0	0.006	0.00	0.0	0.600	o	350	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)
S4.000	40.73	5.74	15.425	0.050	0.0	0.0	0.6	0.75	29.8	6.1
S1.004	39.01	6.39	15.189	0.689	0.0	0.0	7.3	1.00	95.8	80.1
S1.005	38.80	6.48	15.172	0.695	0.0	0.0	7.3	1.23	118.5	80.3

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:48 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	20.450	1.550	Open Manhole	1200	S1.000	18.900	225				
S3	19.300	1.775	Open Manhole	1200	S1.001	17.525	300	S1.000	17.714	225	114
S4	18.200	1.425	Open Manhole	1200	S2.000	16.775	225				
S5	18.150	1.669	Open Manhole	1200	S1.002	16.481	300	S1.001	16.481	300	
								S2.000	16.655	225	99
S6	17.950	1.425	Open Manhole	1200	S3.000	16.525	225				
S7	18.200	1.867	Open Manhole	1200	S1.003	16.333	350	S1.002	16.400	300	17
								S3.000	16.458	225	
S8	16.850	1.425	Open Manhole	1200	S4.000	15.425	225				
S9	17.100	1.912	Open Manhole	1200	S1.004	15.189	350	S1.003	15.693	350	504
								S4.000	15.314	225	
S10	17.200	2.028	Open Manhole	1200	S1.005	15.172	350	S1.004	15.172	350	
S	17.000	1.861	Open Manhole	0		OUTFALL		S1.005	15.139	350	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	10.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	16.700	Cv (Summer)	0.750
Return Period (years)	1	Ratio R	0.300	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

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)	1	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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	63.500	1.814	35.0	0.296	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	29.900	0.100	300.0	0.054	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	49.100	1.403	35.0	0.174	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.001	30.600	1.020	30.0	0.174	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.002	30.100	0.201	149.8	0.051	0.00	0.0	0.600	o	350	Pipe/Conduit	
S1.002	2.450	0.012	200.0	0.000	0.00	0.0	0.600	o	350	Pipe/Conduit	
S1.003	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	400	Pipe/Conduit	
S1.004	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	400	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	40.98	5.48	16.475	0.296	0.0	0.0	3.9	2.22	88.2	43.4
S1.001	39.46	6.03	14.562	0.350	0.0	0.0	4.5	0.90	63.8	49.4
S2.000	41.30	5.37	17.175	0.174	0.0	0.0	2.3	2.22	88.2	25.7
S2.001	40.79	5.55	15.555	0.348	0.0	0.0	4.6	2.88	203.7	50.7
S2.002	39.80	5.90	14.485	0.399	0.0	0.0	5.2	1.41	136.1	56.8
S1.002	39.38	6.06	14.284	0.749	0.0	0.0	9.6	1.22	117.6	105.4
S1.003	39.30	6.09	14.222	0.749	0.0	0.0	9.6	1.08	136.3	105.4
S1.004	39.22	6.12	14.215	0.749	0.0	0.0	9.6	1.08	136.3	105.4

Fairgreen House
Fairgreen Road
Galway

Date 11/07/2019 09:57 | Designed by Fiontan Gallagher
File STORM DESIGN NETWORK NO... | Checked by
Micro Drainage | Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	17.900	1.425	Open Manhole	1200	S1.000	16.475	225				
S2	16.100	1.538	Open Manhole	1200	S1.001	14.562	300	S1.000	14.661	225	24
S3	18.800	1.625	Open Manhole	1200	S2.000	17.175	225				
S4	17.250	1.695	Open Manhole	1200	S2.001	15.555	300	S2.000	15.772	225	142
S4	16.000	1.515	Open Manhole	1200	S2.002	14.485	350	S2.001	14.535	300	
S5	16.150	1.866	Open Manhole	1200	S1.002	14.284	350	S1.001	14.462	300	128
								S2.002	14.284	350	
S7	16.150	1.928	Open Manhole	1350	S1.003	14.222	400	S1.002	14.272	350	
S8	16.150	1.935	Open Manhole	1350	S1.004	14.215	400	S1.003	14.215	400	
S	16.150	1.942	Open Manhole	0		OUTFALL		S1.004	14.208	400	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	17.900	16.475	1.200	Open Manhole	1200
S1.001	o	300	S2	16.100	14.562	1.238	Open Manhole	1200
S2.000	o	225	S3	18.800	17.175	1.400	Open Manhole	1200
S2.001	o	300	S4	17.250	15.555	1.395	Open Manhole	1200
S2.002	o	350	S4	16.000	14.485	1.165	Open Manhole	1200
S1.002	o	350	S5	16.150	14.284	1.516	Open Manhole	1200
S1.003	o	400	S7	16.150	14.222	1.528	Open Manhole	1350
S1.004	o	400	S8	16.150	14.215	1.535	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	63.500	35.0	S2	16.100	14.661	1.214	Open Manhole	1200
S1.001	29.900	300.0	S5	16.150	14.462	1.388	Open Manhole	1200
S2.000	49.100	35.0	S4	17.250	15.772	1.253	Open Manhole	1200
S2.001	30.600	30.0	S4	16.000	14.535	1.165	Open Manhole	1200
S2.002	30.100	149.8	S5	16.150	14.284	1.516	Open Manhole	1200
S1.002	2.450	200.0	S7	16.150	14.272	1.528	Open Manhole	1350
S1.003	2.000	300.0	S8	16.150	14.215	1.535	Open Manhole	1350
S1.004	2.000	300.0	S	16.150	14.208	1.542	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	16.150	14.208	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0
Number of Online Controls 0 Number of Storage Structures 1

Simulation Criteria for Storm

Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: S8, DS/PN: S1.004

Invert Level (m) 13.075 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 1.02136 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	216.0	216.0	1.300	0.0	316.8
1.200	216.0	316.8			

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)	1	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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	74.000	1.850	40.0	0.268	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	22.800	0.253	90.0	0.076	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	14.000	0.400	35.0	0.010	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	31.500	0.105	300.0	0.090	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	8.100	0.027	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	2.000	0.007	300.0	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)
S1.000	40.65	5.59	19.375	0.268	0.0	0.0	3.5	2.07	82.5	38.9
S2.000	41.58	5.28	18.075	0.076	0.0	0.0	1.0	1.38	54.8	11.3
S1.001	40.35	5.70	17.525	0.354	0.0	0.0	4.6	2.22	88.2	51.1
S3.000	40.35	5.70	16.825	0.090	0.0	0.0	1.2	0.75	29.8	13.0
S1.002	39.94	5.85	16.645	0.444	0.0	0.0	5.8	0.90	63.8	63.4
S1.003	39.84	5.89	16.618	0.444	0.0	0.0	5.8	0.90	63.8	63.4
S1.004	39.74	5.92	16.611	0.444	0.0	0.0	5.8	0.90	63.8	63.4

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	20.800	1.425	Open Manhole	1200	S1.000	19.375	225				
S2	19.500	1.425	Open Manhole	1200	S2.000	18.075	225				
S3	19.250	1.725	Open Manhole	1200	S1.001	17.525	225	S1.000	17.525	225	
								S2.000	17.822	225	297
S4	18.250	1.425	Open Manhole	1200	S3.000	16.825	225				
S5	18.550	1.905	Open Manhole	1200	S1.002	16.645	300	S1.001	17.125	225	405
								S3.000	16.720	225	
S6	18.550	1.932	Open Manhole	1200	S1.003	16.618	300	S1.002	16.618	300	
S7	18.550	1.939	Open Manhole	1200	S1.004	16.611	300	S1.003	16.611	300	
S	18.550	1.945	Open Manhole	0		OUTFALL		S1.004	16.605	300	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	20.800	19.375	1.200	Open Manhole	1200
S2.000	o	225	S2	19.500	18.075	1.200	Open Manhole	1200
S1.001	o	225	S3	19.250	17.525	1.500	Open Manhole	1200
S3.000	o	225	S4	18.250	16.825	1.200	Open Manhole	1200
S1.002	o	300	S5	18.550	16.645	1.605	Open Manhole	1200
S1.003	o	300	S6	18.550	16.618	1.632	Open Manhole	1200
S1.004	o	300	S7	18.550	16.611	1.639	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	74.000	40.0	S3	19.250	17.525	1.500	Open Manhole	1200
S2.000	22.800	90.0	S3	19.250	17.822	1.203	Open Manhole	1200
S1.001	14.000	35.0	S5	18.550	17.125	1.200	Open Manhole	1200
S3.000	31.500	300.0	S5	18.550	16.720	1.605	Open Manhole	1200
S1.002	8.100	300.0	S6	18.550	16.618	1.632	Open Manhole	1200
S1.003	2.000	300.0	S7	18.550	16.611	1.639	Open Manhole	1200
S1.004	2.000	300.0	S	18.550	16.605	1.645	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	18.550	16.605	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: S7, DS/PN: S1.004

Invert Level (m) 15.420 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.42800 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	195.0	195.0	1.300	0.0	262.2
1.200	195.0	262.2			

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)	1	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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	51.950	1.154	45.0	0.220	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	14.700	0.067	219.4	0.046	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.001	9.200	0.133	69.1	0.046	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	27.050	0.773	35.0	0.034	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	33.600	0.840	40.0	0.176	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.001	26.450	0.756	35.0	0.176	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.002	26.450	0.176	150.3	0.030	0.00	0.0	0.600	o	350	Pipe/Conduit	
S1.002	3.300	0.017	194.1	0.000	0.00	0.0	0.600	o	400	Pipe/Conduit	
S1.003	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	400	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	41.30	5.37	19.125	0.220	0.0	0.0	3.0	2.35	166.1	32.5
S2.000	41.71	5.23	18.075	0.046	0.0	0.0	0.6	1.06	74.7	6.9
S2.001	41.47	5.31	18.008	0.092	0.0	0.0	1.2	1.89	133.9	13.6
S1.001	40.81	5.54	17.875	0.346	0.0	0.0	4.6	2.67	188.5	50.5
S3.000	41.59	5.27	18.400	0.176	0.0	0.0	2.4	2.07	82.5	26.2
S3.001	41.10	5.44	17.300	0.352	0.0	0.0	4.7	2.67	188.5	51.7
S3.002	40.22	5.75	16.494	0.382	0.0	0.0	5.0	1.41	135.9	54.9
S1.002	40.11	5.79	16.268	0.728	0.0	0.0	9.5	1.35	169.8	104.4
S1.003	40.03	5.82	16.251	0.728	0.0	0.0	9.5	1.08	136.3	104.4

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
S1.004	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	400	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)
S1.004	39.94	5.85	16.244	0.728	0.0	0.0	9.5	1.08	136.3	104.4

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	20.550	1.425	Open Manhole	1200	S1.000	19.125	300				
S2	19.500	1.425	Open Manhole	1200	S2.000	18.075	300				
S3	19.450	1.442	Open Manhole	1200	S2.001	18.008	300	S2.000	18.008	300	
S3	19.450	1.575	Open Manhole	1200	S1.001	17.875	300	S1.000	17.971	300	96
								S2.001	17.875	300	
S4	20.000	1.600	Open Manhole	1200	S3.000	18.400	225				
S5	19.000	1.700	Open Manhole	1200	S3.001	17.300	300	S3.000	17.560	225	185
S6	18.000	1.506	Open Manhole	1200	S3.002	16.494	350	S3.001	16.544	300	
S8	18.600	2.332	Open Manhole	1350	S1.002	16.268	400	S1.001	17.102	300	734
								S3.002	16.318	350	
S9	18.600	2.349	Open Manhole	1350	S1.003	16.251	400	S1.002	16.251	400	
S10	18.600	2.356	Open Manhole	1350	S1.004	16.244	400	S1.003	16.244	400	
S	18.600	2.362	Open Manhole	0		OUTFALL		S1.004	16.238	400	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	300	S1	20.550	19.125	1.125	Open Manhole	1200
S2.000	o	300	S2	19.500	18.075	1.125	Open Manhole	1200
S2.001	o	300	S3	19.450	18.008	1.142	Open Manhole	1200
S1.001	o	300	S3	19.450	17.875	1.275	Open Manhole	1200
S3.000	o	225	S4	20.000	18.400	1.375	Open Manhole	1200
S3.001	o	300	S5	19.000	17.300	1.400	Open Manhole	1200
S3.002	o	350	S6	18.000	16.494	1.156	Open Manhole	1200
S1.002	o	400	S8	18.600	16.268	1.932	Open Manhole	1350
S1.003	o	400	S9	18.600	16.251	1.949	Open Manhole	1350
S1.004	o	400	S10	18.600	16.244	1.956	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	51.950	45.0	S3	19.450	17.971	1.179	Open Manhole	1200
S2.000	14.700	219.4	S3	19.450	18.008	1.142	Open Manhole	1200
S2.001	9.200	69.1	S3	19.450	17.875	1.275	Open Manhole	1200
S1.001	27.050	35.0	S8	18.600	17.102	1.198	Open Manhole	1350
S3.000	33.600	40.0	S5	19.000	17.560	1.215	Open Manhole	1200
S3.001	26.450	35.0	S6	18.000	16.544	1.156	Open Manhole	1200
S3.002	26.450	150.3	S8	18.600	16.318	1.932	Open Manhole	1350
S1.002	3.300	194.1	S9	18.600	16.251	1.949	Open Manhole	1350
S1.003	2.000	300.0	S10	18.600	16.244	1.956	Open Manhole	1350
S1.004	2.000	300.0	S	18.600	16.238	1.962	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	18.600	16.238	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: S10, DS/PN: S1.004

Invert Level (m) 15.050 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.42800 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	312.0	312.0	1.300	0.0	424.8
1.200	312.0	424.8			

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)	1	PIMP (%)	100
M5-60 (mm)	16.600	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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	50.500	1.443	35.0	0.144	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	37.100	1.060	35.0	0.144	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	4.900	0.016	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	2.000	0.007	300.0	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)
S1.000	41.52	5.38	16.300	0.144	0.0	0.0	1.9	2.22	88.2	21.4
S1.001	40.72	5.66	14.325	0.288	0.0	0.0	3.8	2.22	88.2	41.9
S1.002	40.47	5.75	13.190	0.288	0.0	0.0	3.8	0.90	63.8	41.9
S1.003	40.36	5.79	13.174	0.288	0.0	0.0	3.8	0.90	63.8	41.9
S1.004	40.26	5.82	13.167	0.288	0.0	0.0	3.8	0.90	63.8	41.9

Fairgreen House
Fairgreen Road
Galway

Date 11/07/2019 09:59 | Designed by Fiontan Gallagher
File STORM DESIGN NETWORK NO... | Checked by
Micro Drainage | Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	18.000	1.700	Open Manhole	1200	S1.000	16.300	225				
S2	16.300	1.975	Open Manhole	1200	S1.001	14.325	225	S1.000	14.857	225	532
S3	14.700	1.510	Open Manhole	1200	S1.002	13.190	300	S1.001	13.265	225	
S4	14.700	1.526	Open Manhole	1200	S1.003	13.174	300	S1.002	13.174	300	
S5	14.700	1.533	Open Manhole	1200	S1.004	13.167	300	S1.003	13.167	300	
S	14.700	1.540	Open Manhole	0		OUTFALL		S1.004	13.160	300	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	18.000	16.300	1.475	Open Manhole	1200
S1.001	o	225	S2	16.300	14.325	1.750	Open Manhole	1200
S1.002	o	300	S3	14.700	13.190	1.210	Open Manhole	1200
S1.003	o	300	S4	14.700	13.174	1.226	Open Manhole	1200
S1.004	o	300	S5	14.700	13.167	1.233	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	50.500	35.0	S2	16.300	14.857	1.218	Open Manhole	1200
S1.001	37.100	35.0	S3	14.700	13.265	1.210	Open Manhole	1200
S1.002	4.900	300.0	S4	14.700	13.174	1.226	Open Manhole	1200
S1.003	2.000	300.0	S5	14.700	13.167	1.233	Open Manhole	1200
S1.004	2.000	300.0	S	14.700	13.160	1.240	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	14.700	13.160	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.600	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: S5, DS/PN: S1.004

Invert Level (m) 12.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.33959 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	120.0	120.0	1.300	0.0	182.4
1.200	120.0	182.4			

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)	1	PIMP (%)	100
M5-60 (mm)	17.000	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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	30.200	0.604	50.0	0.068	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	23.200	0.077	300.0	0.081	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	15.600	0.052	300.0	0.170	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.002	3.080	0.010	308.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	2.000	0.007	300.0	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)
S1.000	42.87	5.27	15.375	0.068	0.0	0.0	0.9	1.85	73.7	10.4
S2.000	42.13	5.52	14.125	0.081	0.0	0.0	1.1	0.75	29.8	12.2
S1.001	41.30	5.80	13.973	0.319	0.0	0.0	4.3	0.90	63.8	47.1
S1.002	41.14	5.86	13.921	0.319	0.0	0.0	4.3	0.89	63.0	47.1
S1.003	41.04	5.90	13.911	0.319	0.0	0.0	4.3	0.90	63.8	47.1
S1.004	40.94	5.94	13.904	0.319	0.0	0.0	4.3	0.90	63.8	47.1

Fairgreen House
Fairgreen Road
Galway

Date 11/07/2019 10:00 | Designed by Fiontan Gallagher
File STORM DESIGN NETWORK NO... | Checked by
Micro Drainage | Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	16.850	1.475	Open Manhole	1200	S1.000	15.375	225				
S2	15.550	1.425	Open Manhole	1200	S2.000	14.125	225				
S3	16.200	2.227	Open Manhole	1200	S1.001	13.973	300	S1.000	14.771	225	723
								S2.000	14.048	225	
S4	15.950	2.029	Open Manhole	1200	S1.002	13.921	300	S1.001	13.921	300	
S5	15.950	2.039	Open Manhole	1200	S1.003	13.911	300	S1.002	13.911	300	
S6	15.950	2.046	Open Manhole	1200	S1.004	13.904	300	S1.003	13.904	300	
S	15.950	2.053	Open Manhole	0		OUTFALL		S1.004	13.897	300	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	16.850	15.375	1.250	Open Manhole	1200
S2.000	o	225	S2	15.550	14.125	1.200	Open Manhole	1200
S1.001	o	300	S3	16.200	13.973	1.927	Open Manhole	1200
S1.002	o	300	S4	15.950	13.921	1.729	Open Manhole	1200
S1.003	o	300	S5	15.950	13.911	1.739	Open Manhole	1200
S1.004	o	300	S6	15.950	13.904	1.746	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	30.200	50.0	S3	16.200	14.771	1.204	Open Manhole	1200
S2.000	23.200	300.0	S3	16.200	14.048	1.927	Open Manhole	1200
S1.001	15.600	300.0	S4	15.950	13.921	1.729	Open Manhole	1200
S1.002	3.080	308.0	S5	15.950	13.911	1.739	Open Manhole	1200
S1.003	2.000	300.0	S6	15.950	13.904	1.746	Open Manhole	1200
S1.004	2.000	300.0	S	15.950	13.897	1.753	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	15.950	13.897	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	17.000	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: S6, DS/PN: S1.004

Invert Level (m) 12.704 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.08316 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	261.0	261.0	1.300	0.0	352.2
1.200	261.0	352.2			

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)	1	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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
1.000	8.900	0.148	60.1	0.068	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	8.218	0.235	35.0	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	30.000	0.675	44.4	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	25.300	0.723	35.0	0.119	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	19.100	0.546	35.0	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	7.372	0.025	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	2.000	0.007	300.0	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)
1.000	42.93	5.09	14.925	0.068	0.0	0.0	0.9	1.69	67.2	10.4
1.001	42.73	5.15	14.210	0.093	0.0	0.0	1.3	2.22	88.3	14.2
1.002	41.96	5.40	13.975	0.118	0.0	0.0	1.6	1.97	78.2	17.7
2.000	42.61	5.19	14.175	0.119	0.0	0.0	1.6	2.22	88.2	18.1
1.003	41.54	5.55	13.000	0.258	0.0	0.0	3.5	2.22	88.2	38.3
1.004	41.15	5.68	12.379	0.258	0.0	0.0	3.5	0.90	63.8	38.3
1.005	41.04	5.72	12.354	0.258	0.0	0.0	3.5	0.90	63.8	38.3
1.006	40.94	5.76	12.348	0.258	0.0	0.0	3.5	0.90	63.8	38.3

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	16.350	1.425	Open Manhole	1200	1.000	14.925	225				
2	16.250	2.040	Open Manhole	1200	1.001	14.210	225	1.000	14.777	225	567
3	15.400	1.425	Open Manhole	1200	1.002	13.975	225	1.001	13.975	225	
4	15.600	1.425	Open Manhole	1200	2.000	14.175	225				
5	14.900	1.900	Open Manhole	1200	1.003	13.000	225	1.002	13.300	225	300
								2.000	13.452	225	452
6	13.950	1.571	Open Manhole	1200	1.004	12.379	300	1.003	12.454	225	
7	13.950	1.596	Open Manhole	1200	1.005	12.354	300	1.004	12.354	300	
8	13.950	1.602	Open Manhole	1200	1.006	12.348	300	1.005	12.348	300	
	13.950	1.609	Open Manhole	0		OUTFALL		1.006	12.341	300	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	16.350	14.925	1.200	Open Manhole	1200
1.001	o	225	2	16.250	14.210	1.815	Open Manhole	1200
1.002	o	225	3	15.400	13.975	1.200	Open Manhole	1200
2.000	o	225	4	15.600	14.175	1.200	Open Manhole	1200
1.003	o	225	5	14.900	13.000	1.675	Open Manhole	1200
1.004	o	300	6	13.950	12.379	1.271	Open Manhole	1200
1.005	o	300	7	13.950	12.354	1.296	Open Manhole	1200
1.006	o	300	8	13.950	12.348	1.302	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	8.900	60.1	2	16.250	14.777	1.248	Open Manhole	1200
1.001	8.218	35.0	3	15.400	13.975	1.200	Open Manhole	1200
1.002	30.000	44.4	5	14.900	13.300	1.375	Open Manhole	1200
2.000	25.300	35.0	5	14.900	13.452	1.223	Open Manhole	1200
1.003	19.100	35.0	6	13.950	12.454	1.271	Open Manhole	1200
1.004	7.372	300.0	7	13.950	12.354	1.296	Open Manhole	1200
1.005	2.000	300.0	8	13.950	12.348	1.302	Open Manhole	1200
1.006	2.000	300.0		13.950	12.341	1.309	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006		13.950	12.341	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0
Number of Online Controls 0 Number of Storage Structures 1

Simulation Criteria for Storm

Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: 8, DS/PN: 1.006

Invert Level (m) 11.155 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.08316 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	220.0	220.0	1.300	0.0	294.4
1.200	220.0	294.4			

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)	1	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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
1.000	21.600	0.617	35.0	0.081	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	19.700	0.563	35.0	0.060	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	46.000	0.700	65.7	0.137	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	42.600	0.448	95.0	0.137	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	43.700	0.624	70.0	0.119	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	19.900	0.100	199.0	0.032	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	1.700	0.006	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	2.000	0.007	300.0	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)
1.000	42.69	5.16	10.292	0.081	0.0	0.0	1.1	2.22	88.2	12.4
1.001	42.24	5.31	9.275	0.141	0.0	0.0	1.9	2.22	88.2	21.3
1.002	41.08	5.70	8.637	0.278	0.0	0.0	3.7	1.94	137.3	40.8
1.003	39.89	6.14	7.937	0.415	0.0	0.0	5.4	1.61	114.0	59.2
2.000	41.78	5.47	8.325	0.119	0.0	0.0	1.6	1.56	62.2	17.8
2.001	40.75	5.82	7.675	0.151	0.0	0.0	2.0	0.92	36.7	22.0
1.004	39.81	6.17	7.414	0.566	0.0	0.0	7.3	1.04	115.0	80.6
1.005	39.73	6.20	7.408	0.566	0.0	0.0	7.3	1.04	115.0	80.6
1.006	39.65	6.24	7.401	0.566	0.0	0.0	7.3	1.04	115.0	80.6

Fairgreen House
Fairgreen Road
Galway

Date 11/07/2019 10:02 | Designed by Fiontan Gallagher
File STORM DESIGN NETWORK NO... | Checked by
Micro Drainage | Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	12.350	2.058	Open Manhole	1200	1.000	10.292	225				
2	11.100	1.825	Open Manhole	1200	1.001	9.275	225	1.000	9.675	225	400
3	10.200	1.563	Open Manhole	1200	1.002	8.637	300	1.001	8.712	225	
4	9.500	1.563	Open Manhole	1200	1.003	7.937	300	1.002	7.937	300	
5	9.750	1.425	Open Manhole	1200	2.000	8.325	225				
6	9.100	1.425	Open Manhole	1200	2.001	7.675	225	2.000	7.701	225	26
7	9.050	1.636	Open Manhole	1350	1.004	7.414	375	1.003	7.489	300	
								2.001	7.575	225	11
8	9.000	1.592	Open Manhole	1350	1.005	7.408	375	1.004	7.408	375	
9	9.000	1.599	Open Manhole	1350	1.006	7.401	375	1.005	7.401	375	
	9.000	1.605	Open Manhole	0		OUTFALL		1.006	7.395	375	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	12.350	10.292	1.833	Open Manhole	1200
1.001	o	225	2	11.100	9.275	1.600	Open Manhole	1200
1.002	o	300	3	10.200	8.637	1.263	Open Manhole	1200
1.003	o	300	4	9.500	7.937	1.263	Open Manhole	1200
2.000	o	225	5	9.750	8.325	1.200	Open Manhole	1200
2.001	o	225	6	9.100	7.675	1.200	Open Manhole	1200
1.004	o	375	7	9.050	7.414	1.261	Open Manhole	1350
1.005	o	375	8	9.000	7.408	1.217	Open Manhole	1350
1.006	o	375	9	9.000	7.401	1.224	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	21.600	35.0	2	11.100	9.675	1.200	Open Manhole	1200
1.001	19.700	35.0	3	10.200	8.712	1.263	Open Manhole	1200
1.002	46.000	65.7	4	9.500	7.937	1.263	Open Manhole	1200
1.003	42.600	95.0	7	9.050	7.489	1.261	Open Manhole	1350
2.000	43.700	70.0	6	9.100	7.701	1.174	Open Manhole	1200
2.001	19.900	199.0	7	9.050	7.575	1.250	Open Manhole	1350
1.004	1.700	300.0	8	9.000	7.408	1.217	Open Manhole	1350
1.005	2.000	300.0	9	9.000	7.401	1.224	Open Manhole	1350
1.006	2.000	300.0		9.000	7.395	1.230	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006		9.000	7.395	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: 9, DS/PN: 1.006

Invert Level (m) 6.210 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.33959 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	264.0	264.0	1.300	0.0	362.4
1.200	264.0	362.4			

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)	1	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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
1.000	68.000	2.267	30.0	0.217	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	69.600	0.516	135.0	0.206	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	26.600	0.133	200.0	0.069	0.00	0.0	0.600	o	350	Pipe/Conduit	
1.002	24.800	0.620	40.0	0.074	0.00	0.0	0.600	o	350	Pipe/Conduit	
1.003	8.973	0.030	300.0	0.007	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	35.300	0.122	290.0	0.136	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	42.500	0.425	100.0	0.246	5.00	0.0	0.600	o	300	Pipe/Conduit	
3.001	9.800	0.065	150.0	0.008	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)
1.000	41.75	5.47	11.440	0.217	0.0	0.0	2.9	2.40	95.3	32.4
2.000	40.66	5.86	9.675	0.206	0.0	0.0	2.7	1.35	95.5	29.9
1.001	39.69	6.22	9.048	0.492	0.0	0.0	6.3	1.22	117.6	69.8
1.002	39.30	6.37	8.915	0.566	0.0	0.0	7.2	2.75	264.6	79.5
1.003	38.94	6.51	8.270	0.573	0.0	0.0	7.3	1.04	115.0	79.8
3.000	40.90	5.77	8.575	0.136	0.0	0.0	1.8	0.76	30.3	19.9
4.000	41.82	5.45	8.875	0.246	0.0	0.0	3.3	1.57	111.1	36.8
3.001	40.55	5.90	8.378	0.390	0.0	0.0	5.1	1.28	90.6	56.5

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
1.004	6.000	0.020	300.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.005	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	2.000	0.007	300.0	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)
1.004	38.73	6.60	8.163	0.963	0.0	0.0	12.1	1.17	185.8	133.3
1.005	38.66	6.63	8.143	0.963	0.0	0.0	12.1	1.17	185.8	133.3
1.006	38.59	6.66	8.136	0.963	0.0	0.0	12.1	1.17	185.8	133.3

Fairgreen House
Fairgreen Road
Galway

Date 11/07/2019 10:05 | Designed by Fiontan Gallagher
File STORM DESIGN NETWORK NO... | Checked by
Micro Drainage | Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	13.330	1.890	Open Manhole	1200	1.000	11.440	225				
2	11.100	1.425	Open Manhole	1200	2.000	9.675	300				
3	10.600	1.552	Open Manhole	1200	1.001	9.048	350	1.000	9.173	225	
								2.000	9.159	300	61
4	10.500	1.585	Open Manhole	1200	1.002	8.915	350	1.001	8.915	350	
5	9.900	1.630	Open Manhole	1350	1.003	8.270	375	1.002	8.295	350	
6	10.000	1.425	Open Manhole	1200	3.000	8.575	225				
7	10.300	1.425	Open Manhole	1200	4.000	8.875	300				
8	10.000	1.622	Open Manhole	1200	3.001	8.378	300	3.000	8.453	225	
								4.000	8.450	300	72
9	10.000	1.837	Open Manhole	1350	1.004	8.163	450	1.003	8.240	375	2
								3.001	8.313	300	
10	10.000	1.857	Open Manhole	1350	1.005	8.143	450	1.004	8.143	450	
11	10.000	1.864	Open Manhole	1350	1.006	8.136	450	1.005	8.136	450	
	10.000	1.870	Open Manhole	0		OUTFALL		1.006	8.130	450	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	13.330	11.440	1.665	Open Manhole	1200
2.000	o	300	2	11.100	9.675	1.125	Open Manhole	1200
1.001	o	350	3	10.600	9.048	1.202	Open Manhole	1200
1.002	o	350	4	10.500	8.915	1.235	Open Manhole	1200
1.003	o	375	5	9.900	8.270	1.255	Open Manhole	1350
3.000	o	225	6	10.000	8.575	1.200	Open Manhole	1200
4.000	o	300	7	10.300	8.875	1.125	Open Manhole	1200
3.001	o	300	8	10.000	8.378	1.322	Open Manhole	1200
1.004	o	450	9	10.000	8.163	1.387	Open Manhole	1350
1.005	o	450	10	10.000	8.143	1.407	Open Manhole	1350
1.006	o	450	11	10.000	8.136	1.414	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	68.000	30.0	3	10.600	9.173	1.202	Open Manhole	1200
2.000	69.600	135.0	3	10.600	9.159	1.141	Open Manhole	1200
1.001	26.600	200.0	4	10.500	8.915	1.235	Open Manhole	1200
1.002	24.800	40.0	5	9.900	8.295	1.255	Open Manhole	1350
1.003	8.973	300.0	9	10.000	8.240	1.385	Open Manhole	1350
3.000	35.300	290.0	8	10.000	8.453	1.322	Open Manhole	1200
4.000	42.500	100.0	8	10.000	8.450	1.250	Open Manhole	1200
3.001	9.800	150.0	9	10.000	8.313	1.387	Open Manhole	1350
1.004	6.000	300.0	10	10.000	8.143	1.407	Open Manhole	1350
1.005	2.000	300.0	11	10.000	8.136	1.414	Open Manhole	1350
1.006	2.000	300.0		10.000	8.130	1.420	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006		10.000	8.130	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: 11, DS/PN: 1.006

Invert Level (m) 6.950 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.74074 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	390.0	390.0	1.300	0.0	493.2
1.200	390.0	493.2			

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)	1	PIMP (%)	100
M5-60 (mm)	16.800	Add Flow / Climate Change (%)	10
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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
1.000	15.300	0.068	225.0	0.052	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	27.400	0.122	225.0	0.108	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	2.750	0.079	34.8	0.001	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	2.000	0.018	111.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	2.000	0.007	300.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	2.000	0.007	300.0	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)
1.000	42.29	5.29	7.625	0.052	0.0	0.0	0.7	0.87	34.5	7.9
2.000	41.60	5.53	7.575	0.108	0.0	0.0	1.5	0.87	34.5	16.1
1.001	41.55	5.54	7.150	0.161	0.0	0.0	2.2	2.67	189.0	23.9
1.002	41.48	5.57	7.071	0.161	0.0	0.0	2.2	1.49	105.4	23.9
1.003	41.38	5.60	7.053	0.161	0.0	0.0	2.2	0.90	63.8	23.9
1.004	41.27	5.64	7.046	0.161	0.0	0.0	2.2	0.90	63.8	23.9

Fairgreen House
Fairgreen Road
Galway

Date 11/07/2019 10:06 | Designed by Fiontan Gallagher
File STORM DESIGN NETWORK NO... | Checked by
Micro Drainage | Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	9.000	1.375	Open Manhole	1200	1.000	7.625	225				
2	9.050	1.475	Open Manhole	1200	2.000	7.575	225				
3	9.200	2.050	Open Manhole	1200	1.001	7.150	300	1.000	7.557	225	332
								2.000	7.453	225	228
4	8.500	1.429	Open Manhole	1200	1.002	7.071	300	1.001	7.071	300	
5	8.500	1.447	Open Manhole	1200	1.003	7.053	300	1.002	7.053	300	
6	8.500	1.454	Open Manhole	1200	1.004	7.046	300	1.003	7.046	300	
	8.500	1.460	Open Manhole	0		OUTFALL		1.004	7.040	300	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	9.000	7.625	1.150	Open Manhole	1200
2.000	o	225	2	9.050	7.575	1.250	Open Manhole	1200
1.001	o	300	3	9.200	7.150	1.750	Open Manhole	1200
1.002	o	300	4	8.500	7.071	1.129	Open Manhole	1200
1.003	o	300	5	8.500	7.053	1.147	Open Manhole	1200
1.004	o	300	6	8.500	7.046	1.154	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	15.300	225.0	3	9.200	7.557	1.418	Open Manhole	1200
2.000	27.400	225.0	3	9.200	7.453	1.522	Open Manhole	1200
1.001	2.750	34.8	4	8.500	7.071	1.129	Open Manhole	1200
1.002	2.000	111.1	5	8.500	7.053	1.147	Open Manhole	1200
1.003	2.000	300.0	6	8.500	7.046	1.154	Open Manhole	1200
1.004	2.000	300.0		8.500	7.040	1.160	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004		8.500	7.040	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.800	Storm Duration (mins)	30
Ratio R	0.300		

Storage Structures for Storm

Cellular Storage Manhole: 6, DS/PN: 1.004

Invert Level (m) 5.850 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.33959 Porosity 0.40
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	60.0	60.0	1.100	0.0	98.0
1.000	60.0	98.0			

APPENDIX B

Foul Drainage Design Calculations

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Domestic (l/s/ha)	0.00	Maximum Backdrop Height (m)	1.500
Industrial Peak Flow Factor	0.00	Domestic Peak Flow Factor	6.00	Min Design Depth for Optimisation (m)	1.200
Flow Per Person (l/per/day)	150.00	Add Flow / Climate Change (%)	0	Min Vel for Auto Design only (m/s)	0.75
Persons per House	2.70	Minimum Backdrop Height (m)	0.200	Min Slope for Optimisation (1:X)	300

Designed with Level Soffits

Network Design Table for Foul - Main

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	33.700	0.963	35.0	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
F1.001	52.300	1.308	40.0	0.000	26	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	19.150	0.000	0.0	8	0.0	10	0.43	1.48	26.2	0.2
F1.001	18.187	0.000	0.0	34	0.0	20	0.66	1.39	24.5	1.0

Network Design Table for Foul - Main

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
F1.002	38.120	0.318	120.0	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F2.000	20.510	0.342	60.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F1.003	48.000	1.067	45.0	0.000	11	0.0	1.500	o	150	Pipe/Conduit	
F1.004	30.400	0.304	100.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
F3.000	37.400	0.623	60.0	0.000	18	0.0	1.500	o	150	Pipe/Conduit	
F3.001	30.700	0.614	50.0	0.000	23	0.0	1.500	o	150	Pipe/Conduit	
F3.002	31.600	0.243	130.0	0.000	2	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)
F1.002	16.880	0.000	0.0	35	0.0	27	0.45	0.80	14.1	1.0
F2.000	17.200	0.000	0.0	3	0.0	7	0.26	1.13	20.0	0.1
F1.003	16.562	0.000	0.0	49	0.0	25	0.71	1.31	23.1	1.4
F1.004	15.495	0.000	0.0	54	0.0	32	0.55	0.88	15.5	1.5
F3.000	16.150	0.000	0.0	18	0.0	17	0.47	1.13	20.0	0.5
F3.001	15.527	0.000	0.0	41	0.0	24	0.65	1.24	21.9	1.2
F3.002	14.913	0.000	0.0	43	0.0	30	0.47	0.77	13.6	1.2

Network Design Table for Foul - Main

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
F3.003	30.400	0.234	130.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.005	24.700	0.190	130.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.006	38.600	0.297	130.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F4.000	49.200	1.230	40.0	0.000	13	0.0	1.500	o	150	Pipe/Conduit	
F4.001	33.600	0.960	35.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F1.007	11.000	0.085	130.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.008	12.900	0.099	130.0	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)
F3.003	14.670	0.000	0.0	43	0.0	30	0.47	0.77	13.6	1.2
F1.005	14.436	0.000	0.0	99	0.0	46	0.60	0.77	13.6	2.8
F1.006	14.246	0.000	0.0	101	0.0	47	0.61	0.77	13.6	2.8
F4.000	17.250	0.000	0.0	13	0.0	13	0.48	1.39	24.5	0.4
F4.001	16.020	0.000	0.0	20	0.0	15	0.58	1.48	26.2	0.6
F1.007	13.949	0.000	0.0	121	0.0	51	0.64	0.77	13.6	3.4
F1.008	13.865	0.000	0.0	121	0.0	51	0.64	0.77	13.6	3.4

Network Design Table for Foul - Main

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
F1.009	39.400	0.303	130.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F1.010	32.800	0.164	200.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
F5.000	60.800	2.027	30.0	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
F1.011	37.400	0.187	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.012	31.870	0.159	200.0	0.000	14	0.0	1.500	o	225	Pipe/Conduit	
F6.000	28.770	0.719	40.0	0.000	13	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)
F1.009	13.690	0.000	0.0	123	0.0	45	0.62	1.01	40.0	3.5
F1.010	13.387	0.000	0.0	125	0.0	50	0.53	0.81	32.2	3.5
F5.000	16.650	0.000	0.0	9	0.0	10	0.47	1.60	28.3	0.3
F1.011	13.223	0.000	0.0	134	0.0	52	0.54	0.81	32.2	3.8
F1.012	13.036	0.000	0.0	148	0.0	55	0.56	0.81	32.2	4.2
F6.000	15.300	0.000	0.0	13	0.0	13	0.48	1.39	24.5	0.4

Network Design Table for Foul - Main

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
F1.013	41.300	0.207	200.0	0.000	27	0.0	1.500	o	225	Pipe/Conduit	
F1.014	19.530	0.977	20.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.015	19.710	0.986	20.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.016	5.000	0.097	51.5	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F7.000	23.700	0.948	25.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
F7.001	19.000	0.760	25.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.017	43.900	0.798	55.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F1.018	53.900	0.539	100.0	0.000	29	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)
F1.013	12.877	0.000	0.0	188	0.0	62	0.60	0.81	32.2	5.3
F1.014	12.670	0.000	0.0	188	0.0	35	1.35	2.57	102.3	5.3
F1.015	10.000	0.000	0.0	188	0.0	35	1.35	2.57	102.3	5.3
F1.016	9.014	0.000	0.0	188	0.0	44	0.97	1.60	63.7	5.3
F7.000	10.700	0.000	0.0	5	0.0	8	0.42	1.76	31.0	0.1
F7.001	9.752	0.000	0.0	7	0.0	9	0.47	1.76	31.0	0.2
F1.017	8.917	0.000	0.0	198	0.0	46	0.96	1.55	61.6	5.6
F1.018	8.119	0.000	0.0	227	0.0	57	0.81	1.15	45.6	6.4

Network Design Table for Foul - Main

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
F8.000	37.200	0.744	50.0	0.000	10	0.0	1.500	o	150	Pipe/Conduit	
F8.001	38.600	0.772	50.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F8.002	64.000	0.640	100.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F9.000	60.600	1.212	50.0	0.000	25	0.0	1.500	o	150	Pipe/Conduit	
F8.003	34.400	0.344	100.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F8.004	23.600	0.455	51.9	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)
F8.000	19.450	0.000	0.0	10	0.0	12	0.41	1.24	21.9	0.3
F8.001	18.706	0.000	0.0	13	0.0	14	0.45	1.24	21.9	0.4
F8.002	17.934	0.000	0.0	20	0.0	20	0.41	0.88	15.5	0.6
F9.000	19.250	0.000	0.0	25	0.0	19	0.55	1.24	21.9	0.7
F8.003	17.294	0.000	0.0	45	0.0	29	0.52	0.88	15.5	1.3
F8.004	16.950	0.000	0.0	45	0.0	25	0.66	1.22	21.5	1.3

Network Design Table for Foul - Main

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
F10.000	34.100	0.853	40.0	0.000	5	0.0	1.500	o	225	Pipe/Conduit	
F10.001	44.100	1.103	40.0	0.000	5	0.0	1.500	o	225	Pipe/Conduit	
F8.005	8.500	0.131	65.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F8.006	43.900	1.463	30.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F8.007	8.600	0.287	30.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F8.008	31.400	0.563	55.8	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F11.000	27.700	0.504	55.0	0.000	4	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)
F10.000	18.475	0.000	0.0	5	0.0	8	0.33	1.82	72.3	0.1
F10.001	17.523	0.000	0.0	10	0.0	10	0.42	1.82	72.3	0.3
F8.005	16.421	0.000	0.0	55	0.0	26	0.61	1.43	56.7	1.5
F8.006	16.200	0.000	0.0	59	0.0	22	0.82	2.10	83.5	1.7
F8.007	14.250	0.000	0.0	59	0.0	22	0.82	2.10	83.6	1.7
F8.008	13.963	0.000	0.0	60	0.0	26	0.66	1.54	61.2	1.7
F11.000	13.975	0.000	0.0	4	0.0	8	0.28	1.55	61.6	0.1

Network Design Table for Foul - Main

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
F8.009	21.900	0.876	25.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F8.010	79.800	3.192	25.0	0.000	10	0.0	1.500	o	225	Pipe/Conduit	
F12.000	49.150	0.819	60.0	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
F12.001	22.370	0.224	99.9	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F8.011	30.430	0.203	150.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F8.012	23.900	0.159	150.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F13.000	39.600	0.660	60.0	0.000	33	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)
F8.009	13.400	0.000	0.0	64	0.0	22	0.90	2.30	91.5	1.8
F8.010	12.324	0.000	0.0	74	0.0	24	0.94	2.30	91.5	2.1
F12.000	9.850	0.000	0.0	8	0.0	12	0.36	1.13	20.0	0.2
F12.001	9.031	0.000	0.0	10	0.0	14	0.33	0.88	15.5	0.3
F8.011	8.732	0.000	0.0	87	0.0	39	0.53	0.94	37.2	2.4
F8.012	8.529	0.000	0.0	90	0.0	40	0.53	0.94	37.2	2.5
F13.000	8.900	0.000	0.0	33	0.0	22	0.57	1.13	20.0	0.9

Network Design Table for Foul - Main

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
F13.001	27.900	0.233	120.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F8.013	55.200	0.368	150.0	0.000	7	0.0	1.500	o	225	Pipe/Conduit	
F14.000	56.100	0.935	60.0	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
F14.001	9.200	0.092	100.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F8.014	9.100	0.091	100.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.019	11.500	0.043	267.4	0.000	0	0.0	1.500	o	300	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)
F13.001	8.240	0.000	0.0	36	0.0	27	0.46	0.80	14.1	1.0
F8.013	7.933	0.000	0.0	133	0.0	48	0.60	0.94	37.2	3.7
F14.000	8.250	0.000	0.0	8	0.0	12	0.36	1.13	20.0	0.2
F14.001	7.315	0.000	0.0	8	0.0	13	0.30	0.88	15.5	0.2
F8.014	7.148	0.000	0.0	141	0.0	45	0.70	1.15	45.6	4.0
F1.019	6.982	0.000	0.0	368	0.0	84	0.64	0.85	59.8	10.4

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
FMH21	20.500	1.350	Open Manhole	1200	F1.000	19.150	150				
FMH20	19.450	1.263	Open Manhole	1200	F1.001	18.187	150	F1.000	18.187	150	
FMH19	18.150	1.270	Open Manhole	1200	F1.002	16.880	150	F1.001	16.880	150	
FMH18.1	18.550	1.350	Open Manhole	1200	F2.000	17.200	150				
FMH18	18.250	1.688	Open Manhole	1200	F1.003	16.562	150	F1.002	16.562	150	
								F2.000	16.858	150	296
F17	16.850	1.355	Open Manhole	1200	F1.004	15.495	150	F1.003	15.495	150	
FMH16.4	17.500	1.350	Open Manhole	1200	F3.000	16.150	150				
FMH16.3	17.000	1.473	Open Manhole	1200	F3.001	15.527	150	F3.000	15.527	150	
FMH16.2	16.250	1.337	Open Manhole	1200	F3.002	14.913	150	F3.001	14.913	150	
FMH16.1	16.300	1.630	Open Manhole	1200	F3.003	14.670	150	F3.002	14.670	150	
FMH16	16.200	1.764	Open Manhole	1200	F1.005	14.436	150	F1.004	15.191	150	755
								F3.003	14.436	150	
FMH15	16.100	1.854	Open Manhole	1200	F1.006	14.246	150	F1.005	14.246	150	
FMH14.2	18.800	1.550	Open Manhole	1200	F4.000	17.250	150				
FMH14.1	17.250	1.230	Open Manhole	1200	F4.001	16.020	150	F4.000	16.020	150	
FMH14	16.000	2.051	Open Manhole	1200	F1.007	13.949	150	F1.006	13.949	150	
								F4.001	15.060	150	1111
FMH13	15.750	1.885	Open Manhole	1200	F1.008	13.865	150	F1.007	13.865	150	

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
FMH12	15.550	1.860	Open Manhole	1200	F1.009	13.690	225	F1.008	13.765	150	
FMH11	14.900	1.513	Open Manhole	1200	F1.010	13.387	225	F1.009	13.387	225	
FMH10.1	18.000	1.350	Open Manhole	1200	F5.000	16.650	150				
FMH10	15.900	2.677	Open Manhole	1200	F1.011	13.223	225	F1.010	13.223	225	
								F5.000	14.623	150	1325
FMH9	15.000	1.964	Open Manhole	1200	F1.012	13.036	225	F1.011	13.036	225	
FMH8.1	16.850	1.550	Open Manhole	1200	F6.000	15.300	150				
FMH8	15.800	2.923	Open Manhole	1200	F1.013	12.877	225	F1.012	12.877	225	
								F6.000	14.581	150	1629
FMH 7	14.900	2.230	Open Manhole	1200	F1.014	12.670	225	F1.013	12.670	225	
FMH 6	12.600	2.600	Open Manhole	1200	F1.015	10.000	225	F1.014	11.694	225	1694
FMH 5	10.200	1.186	Open Manhole	1200	F1.016	9.014	225	F1.015	9.014	225	
FMH 4.2	12.400	1.700	Open Manhole	1200	F7.000	10.700	150				
FMH 4.1	11.100	1.348	Open Manhole	1200	F7.001	9.752	150	F7.000	9.752	150	
FMH 4.0	10.200	1.283	Open Manhole	1200	F1.017	8.917	225	F1.016	8.917	225	
								F7.001	8.992	150	
FMH 3	9.500	1.381	Open Manhole	1200	F1.018	8.119	225	F1.017	8.119	225	
FMH 2.15	20.800	1.350	Open Manhole	1200	F8.000	19.450	150				
FMH 2.14	20.100	1.394	Open Manhole	1200	F8.001	18.706	150	F8.000	18.706	150	

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
FMH 2.13	19.200	1.266	Open Manhole	1200	F8.002	17.934	150	F8.001	17.934	150	
FMH 2.12 A	20.600	1.350	Open Manhole	1200	F9.000	19.250	150				
FMH 2.12	19.400	2.106	Open Manhole	1200	F8.003	17.294	150	F8.002	17.294	150	
								F9.000	18.038	150	744
FMH 2.11	18.500	1.550	Open Manhole	1200	F8.004	16.950	150	F8.003	16.950	150	
FMH 2.10 B	19.900	1.425	Open Manhole	1200	F10.000	18.475	225				
FMH 2.10 A	19.000	1.477	Open Manhole	1200	F10.001	17.523	225	F10.000	17.623	225	100
FMH 2.10	17.900	1.480	Open Manhole	1200	F8.005	16.421	225	F8.004	16.496	150	
								F10.001	16.421	225	
FMH 2.9	17.850	1.650	Open Manhole	1200	F8.006	16.200	225	F8.005	16.290	225	90
FMH 2.8	16.250	2.000	Open Manhole	1200	F8.007	14.250	225	F8.006	14.737	225	487
FMH 2.7	15.400	1.437	Open Manhole	1200	F8.008	13.963	225	F8.007	13.963	225	
FMH 2.6 A	15.600	1.625	Open Manhole	1200	F11.000	13.975	225				
FMH 2.6	14.900	1.500	Open Manhole	1200	F8.009	13.400	225	F8.008	13.400	225	
								F11.000	13.471	225	71
FMH 2.5	13.950	1.626	Open Manhole	1200	F8.010	12.324	225	F8.009	12.524	225	200
FMH 2.4 B	11.000	1.150	Open Manhole	1200	F12.000	9.850	150				
FMH 2.4 A	10.550	1.519	Open Manhole	1200	F12.001	9.031	150	F12.000	9.031	150	
FMH 2.4	10.600	1.868	Open Manhole	1200	F8.011	8.732	225	F8.010	9.132	225	400

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								F12.001	8.807	150	
FMH 2.3	10.450	1.921	Open Manhole	1200	F8.012	8.529	225	F8.011	8.529	225	
FMH 2.2 B	10.250	1.350	Open Manhole	1200	F13.000	8.900	150				
FMH 2.2 A	9.850	1.610	Open Manhole	1200	F13.001	8.240	150	F13.000	8.240	150	
FMH 2.2	10.000	2.068	Open Manhole	1200	F8.013	7.933	225	F8.012	8.370	225	437
								F13.001	8.008	150	
FMH 2.1 B	9.400	1.150	Open Manhole	1200	F14.000	8.250	150				
FMH 2.1 A	9.100	1.785	Open Manhole	1200	F14.001	7.315	150	F14.000	7.315	150	
FMH 2.1	9.000	1.852	Open Manhole	1200	F8.014	7.148	225	F8.013	7.565	225	417
								F14.001	7.223	150	
FMH 2.0	9.000	2.018	Open Manhole	1200	F1.019	6.982	300	F1.018	7.580	225	523
								F8.014	7.057	225	
FMH 1	0.000		Open Manhole	0		OUTFALL		F1.019	6.939	300	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	o	150	FMH21	20.500	19.150	1.200	Open Manhole	1200
F1.001	o	150	FMH20	19.450	18.187	1.113	Open Manhole	1200
F1.002	o	150	FMH19	18.150	16.880	1.120	Open Manhole	1200
F2.000	o	150	FMH18.1	18.550	17.200	1.200	Open Manhole	1200
F1.003	o	150	FMH18	18.250	16.562	1.538	Open Manhole	1200
F1.004	o	150	F17	16.850	15.495	1.205	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	33.700	35.0	FMH20	19.450	18.187	1.113	Open Manhole	1200
F1.001	52.300	40.0	FMH19	18.150	16.880	1.120	Open Manhole	1200
F1.002	38.120	120.0	FMH18	18.250	16.562	1.538	Open Manhole	1200
F2.000	20.510	60.0	FMH18	18.250	16.858	1.242	Open Manhole	1200
F1.003	48.000	45.0	F17	16.850	15.495	1.205	Open Manhole	1200
F1.004	30.400	100.0	FMH16	16.200	15.191	0.859	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F3.000	o	150	FMH16.4	17.500	16.150	1.200	Open Manhole	1200
F3.001	o	150	FMH16.3	17.000	15.527	1.323	Open Manhole	1200
F3.002	o	150	FMH16.2	16.250	14.913	1.187	Open Manhole	1200
F3.003	o	150	FMH16.1	16.300	14.670	1.480	Open Manhole	1200
F1.005	o	150	FMH16	16.200	14.436	1.614	Open Manhole	1200
F1.006	o	150	FMH15	16.100	14.246	1.704	Open Manhole	1200
F4.000	o	150	FMH14.2	18.800	17.250	1.400	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F3.000	37.400	60.0	FMH16.3	17.000	15.527	1.323	Open Manhole	1200
F3.001	30.700	50.0	FMH16.2	16.250	14.913	1.187	Open Manhole	1200
F3.002	31.600	130.0	FMH16.1	16.300	14.670	1.480	Open Manhole	1200
F3.003	30.400	130.0	FMH16	16.200	14.436	1.614	Open Manhole	1200
F1.005	24.700	130.0	FMH15	16.100	14.246	1.704	Open Manhole	1200
F1.006	38.600	130.0	FMH14	16.000	13.949	1.901	Open Manhole	1200
F4.000	49.200	40.0	FMH14.1	17.250	16.020	1.080	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F4.001	o	150	FMH14.1	17.250	16.020	1.080	Open Manhole	1200
F1.007	o	150	FMH14	16.000	13.949	1.901	Open Manhole	1200
F1.008	o	150	FMH13	15.750	13.865	1.735	Open Manhole	1200
F1.009	o	225	FMH12	15.550	13.690	1.635	Open Manhole	1200
F1.010	o	225	FMH11	14.900	13.387	1.288	Open Manhole	1200
F5.000	o	150	FMH10.1	18.000	16.650	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F4.001	33.600	35.0	FMH14	16.000	15.060	0.790	Open Manhole	1200
F1.007	11.000	130.0	FMH13	15.750	13.865	1.735	Open Manhole	1200
F1.008	12.900	130.0	FMH12	15.550	13.765	1.635	Open Manhole	1200
F1.009	39.400	130.0	FMH11	14.900	13.387	1.288	Open Manhole	1200
F1.010	32.800	200.0	FMH10	15.900	13.223	2.452	Open Manhole	1200
F5.000	60.800	30.0	FMH10	15.900	14.623	1.127	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.011	o	225	FMH10	15.900	13.223	2.452	Open Manhole	1200
F1.012	o	225	FMH9	15.000	13.036	1.739	Open Manhole	1200
F6.000	o	150	FMH8.1	16.850	15.300	1.400	Open Manhole	1200
F1.013	o	225	FMH8	15.800	12.877	2.698	Open Manhole	1200
F1.014	o	225	FMH 7	14.900	12.670	2.005	Open Manhole	1200
F1.015	o	225	FMH 6	12.600	10.000	2.375	Open Manhole	1200
F1.016	o	225	FMH 5	10.200	9.014	0.961	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.011	37.400	200.0	FMH9	15.000	13.036	1.739	Open Manhole	1200
F1.012	31.870	200.0	FMH8	15.800	12.877	2.698	Open Manhole	1200
F6.000	28.770	40.0	FMH8	15.800	14.581	1.069	Open Manhole	1200
F1.013	41.300	200.0	FMH 7	14.900	12.670	2.005	Open Manhole	1200
F1.014	19.530	20.0	FMH 6	12.600	11.694	0.681	Open Manhole	1200
F1.015	19.710	20.0	FMH 5	10.200	9.014	0.961	Open Manhole	1200
F1.016	5.000	51.5	FMH 4.0	10.200	8.917	1.058	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F7.000	o	150	FMH 4.2	12.400	10.700	1.550	Open Manhole	1200
F7.001	o	150	FMH 4.1	11.100	9.752	1.198	Open Manhole	1200
F1.017	o	225	FMH 4.0	10.200	8.917	1.058	Open Manhole	1200
F1.018	o	225	FMH 3	9.500	8.119	1.156	Open Manhole	1200
F8.000	o	150	FMH 2.15	20.800	19.450	1.200	Open Manhole	1200
F8.001	o	150	FMH 2.14	20.100	18.706	1.244	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F7.000	23.700	25.0	FMH 4.1	11.100	9.752	1.198	Open Manhole	1200
F7.001	19.000	25.0	FMH 4.0	10.200	8.992	1.058	Open Manhole	1200
F1.017	43.900	55.0	FMH 3	9.500	8.119	1.156	Open Manhole	1200
F1.018	53.900	100.0	FMH 2.0	9.000	7.580	1.195	Open Manhole	1200
F8.000	37.200	50.0	FMH 2.14	20.100	18.706	1.244	Open Manhole	1200
F8.001	38.600	50.0	FMH 2.13	19.200	17.934	1.116	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F8.002	o	150	FMH 2.13	19.200	17.934	1.116	Open Manhole	1200
F9.000	o	150	FMH 2.12 A	20.600	19.250	1.200	Open Manhole	1200
F8.003	o	150	FMH 2.12	19.400	17.294	1.956	Open Manhole	1200
F8.004	o	150	FMH 2.11	18.500	16.950	1.400	Open Manhole	1200
F10.000	o	225	FMH 2.10 B	19.900	18.475	1.200	Open Manhole	1200
F10.001	o	225	FMH 2.10 A	19.000	17.523	1.252	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F8.002	64.000	100.0	FMH 2.12	19.400	17.294	1.956	Open Manhole	1200
F9.000	60.600	50.0	FMH 2.12	19.400	18.038	1.212	Open Manhole	1200
F8.003	34.400	100.0	FMH 2.11	18.500	16.950	1.400	Open Manhole	1200
F8.004	23.600	51.9	FMH 2.10	17.900	16.496	1.255	Open Manhole	1200
F10.000	34.100	40.0	FMH 2.10 A	19.000	17.623	1.153	Open Manhole	1200
F10.001	44.100	40.0	FMH 2.10	17.900	16.421	1.255	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F8.005	o	225	FMH 2.10	17.900	16.421	1.254	Open Manhole	1200
F8.006	o	225	FMH 2.9	17.850	16.200	1.425	Open Manhole	1200
F8.007	o	225	FMH 2.8	16.250	14.250	1.775	Open Manhole	1200
F8.008	o	225	FMH 2.7	15.400	13.963	1.212	Open Manhole	1200
F11.000	o	225	FMH 2.6 A	15.600	13.975	1.400	Open Manhole	1200
F8.009	o	225	FMH 2.6	14.900	13.400	1.275	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F8.005	8.500	65.0	FMH 2.9	17.850	16.290	1.335	Open Manhole	1200
F8.006	43.900	30.0	FMH 2.8	16.250	14.737	1.288	Open Manhole	1200
F8.007	8.600	30.0	FMH 2.7	15.400	13.963	1.212	Open Manhole	1200
F8.008	31.400	55.8	FMH 2.6	14.900	13.400	1.275	Open Manhole	1200
F11.000	27.700	55.0	FMH 2.6	14.900	13.471	1.204	Open Manhole	1200
F8.009	21.900	25.0	FMH 2.5	13.950	12.524	1.201	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F8.010	o	225	FMH 2.5	13.950	12.324	1.401	Open Manhole	1200
F12.000	o	150	FMH 2.4 B	11.000	9.850	1.000	Open Manhole	1200
F12.001	o	150	FMH 2.4 A	10.550	9.031	1.369	Open Manhole	1200
F8.011	o	225	FMH 2.4	10.600	8.732	1.643	Open Manhole	1200
F8.012	o	225	FMH 2.3	10.450	8.529	1.696	Open Manhole	1200
F13.000	o	150	FMH 2.2 B	10.250	8.900	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F8.010	79.800	25.0	FMH 2.4	10.600	9.132	1.243	Open Manhole	1200
F12.000	49.150	60.0	FMH 2.4 A	10.550	9.031	1.369	Open Manhole	1200
F12.001	22.370	99.9	FMH 2.4	10.600	8.807	1.643	Open Manhole	1200
F8.011	30.430	150.0	FMH 2.3	10.450	8.529	1.696	Open Manhole	1200
F8.012	23.900	150.0	FMH 2.2	10.000	8.370	1.405	Open Manhole	1200
F13.000	39.600	60.0	FMH 2.2 A	9.850	8.240	1.460	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F13.001	o	150	FMH 2.2 A	9.850	8.240	1.460	Open Manhole	1200
F8.013	o	225	FMH 2.2	10.000	7.933	1.843	Open Manhole	1200
F14.000	o	150	FMH 2.1 B	9.400	8.250	1.000	Open Manhole	1200
F14.001	o	150	FMH 2.1 A	9.100	7.315	1.635	Open Manhole	1200
F8.014	o	225	FMH 2.1	9.000	7.148	1.627	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F13.001	27.900	120.0	FMH 2.2	10.000	8.008	1.843	Open Manhole	1200
F8.013	55.200	150.0	FMH 2.1	9.000	7.565	1.211	Open Manhole	1200
F14.000	56.100	60.0	FMH 2.1 A	9.100	7.315	1.635	Open Manhole	1200
F14.001	9.200	100.0	FMH 2.1	9.000	7.223	1.627	Open Manhole	1200
F8.014	9.100	100.0	FMH 2.0	9.000	7.057	1.718	Open Manhole	1200

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.019	o	300	FMH 2.0	9.000	6.982	1.718	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.019	11.500	267.4	FMH 1	0.000	6.939		Open Manhole	0

APPENDIX C

Soakaway Design Calculations

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 1

Drained Area = **521.514** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
3	4	1.2

a_{s50} 8.4 m^2

Void Ratio 40 %

Infiltration Rate (f) 2.5514E-04 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	5.966	1.286	5	12	OK
15.00	12.2	6.999	1.929	5	13	OK
30.00	15.8	9.064	3.858	5	13	OK
60.00	20.5	11.760	7.715	4	10	OK
120.00	26.6	15.259	15.431	0	0	OK
360.00	40.2	23.061	46.293	-23	-58	OK
720.00	52.1	29.888	92.585	-63	-157	OK
1440.00	67.6	38.780	185.170	-146	-366	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 2

Drained Area = **2439.855** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
13	**6**	**1.2**

a_{s50} 22.8 m^2

Void Ratio 40 %

Infiltration Rate (f) 2.5514E-04 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	27.912	3.490	24	61	OK
15.00	12.2	32.743	5.235	28	69	OK
30.00	15.8	42.405	10.471	32	80	OK
60.00	20.5	55.019	20.942	34	85	OK
120.00	26.6	71.390	41.884	30	74	OK
360.00	40.2	107.890	125.651	-18	-44	OK
720.00	52.1	139.828	251.303	-111	-279	OK
1440.00	67.6	181.428	502.605	-321	-803	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 3

Drained Area = **6521.337** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
29	**8**	**1.2**

a_{s50} 44.4 m^2

Void Ratio 40 %

Infiltration Rate (f) 2.5514E-04 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	74.604	6.797	68	170	OK
15.00	12.2	87.516	10.195	77	193	OK
30.00	15.8	113.341	20.391	93	232	OK
60.00	20.5	147.056	40.782	106	266	OK
120.00	26.6	190.814	81.563	109	273	OK
360.00	40.2	288.374	244.689	44	109	OK
720.00	52.1	373.738	489.379	-116	-289	OK
1440.00	67.6	484.927	978.758	-494	-1235	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 4

Drained Area = **6738.417** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
36	**6**	**1.2**

a_{s50} 50.4 m^2

Void Ratio 40 %

Infiltration Rate (f) 2.8371E-04 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	77.087	8.579	69	171	OK
15.00	12.2	90.430	12.869	78	194	OK
30.00	15.8	117.114	25.738	91	228	OK
60.00	20.5	151.951	51.476	100	251	OK
120.00	26.6	197.166	102.953	94	236	OK
360.00	40.2	297.973	308.858	-11	-27	OK
720.00	52.1	386.179	617.716	-232	-579	OK
1440.00	67.6	501.069	1235.432	-734	-1836	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 5

Drained Area = **4004.532** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
15	**13**	**1.2**

a_{s50} 33.6 m^2

Void Ratio 40 %

Infiltration Rate (f) 1.1889E-04 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	45.812	2.397	43	109	OK
15.00	12.2	53.741	3.595	50	125	OK
30.00	15.8	69.599	7.190	62	156	OK
60.00	20.5	90.302	14.381	76	190	OK
120.00	26.6	117.173	28.762	88	221	OK
360.00	40.2	177.080	86.286	91	227	OK
720.00	52.1	229.500	172.571	57	142	OK
1440.00	67.6	297.777	345.142	-47	-118	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 6

Drained Area = **6535.935** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
39	**8**	**1.2**

a_{s50} 56.4 m^2

Void Ratio 40 %

Infiltration Rate (f) 1.1889E-04 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	74.771	4.023	71	177	OK
15.00	12.2	87.712	6.035	82	204	OK
30.00	15.8	113.595	12.070	102	254	OK
60.00	20.5	147.385	24.139	123	308	OK
120.00	26.6	191.241	48.279	143	357	OK
360.00	40.2	289.019	144.837	144	360	OK
720.00	52.1	374.574	289.673	85	212	OK
1440.00	67.6	486.012	579.346	-93	-233	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 7

Drained Area = **2688.534** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
20	**6**	**1.2**

a_{s50} 31.2 m^2

Void Ratio 40 %

Infiltration Rate (f) 9.4330E-05 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	30.757	1.766	29	72	OK
15.00	12.2	36.080	2.649	33	84	OK
30.00	15.8	46.727	5.298	41	104	OK
60.00	20.5	60.626	10.595	50	125	OK
120.00	26.6	78.667	21.190	57	144	OK
360.00	40.2	118.887	63.571	55	138	OK
720.00	52.1	154.080	127.142	27	67	OK
1440.00	67.6	199.919	254.283	-54	-136	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 8

Drained Area = **2873.799** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
29	**9**	**1.2**

a_{s50} 45.6 m^2

Void Ratio 40 %

Infiltration Rate (f) 2.3100E-05 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	32.876	0.632	32	81	OK
15.00	12.2	38.566	0.948	38	94	OK
30.00	15.8	49.947	1.896	48	120	OK
60.00	20.5	64.804	3.792	61	153	OK
120.00	26.6	84.087	7.584	77	191	OK
360.00	40.2	127.079	22.753	104	261	OK
720.00	52.1	164.697	45.505	119	298	OK
1440.00	67.6	213.696	91.010	123	307	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 9

Drained Area = **2318.364** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
20	**11**	**1.2**

a_{s50} 37.2 m^2

Void Ratio 40 %

Infiltration Rate (f) 2.3100E-05 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	26.522	0.516	26	65	OK
15.00	12.2	31.112	0.773	30	76	OK
30.00	15.8	40.293	1.547	39	97	OK
60.00	20.5	52.279	3.094	49	123	OK
120.00	26.6	67.835	6.187	62	154	OK
360.00	40.2	102.518	18.561	84	210	OK
720.00	52.1	132.865	37.123	96	239	OK
1440.00	67.6	172.394	74.245	98	245	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 10

Drained Area = **5104.08** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
33	**8**	**1.2**

a_{s50} 49.2 m^2

Void Ratio 40 %

Infiltration Rate (f) 9.4330E-05 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	58.391	2.785	56	139	OK
15.00	12.2	68.497	4.177	64	161	OK
30.00	15.8	88.709	8.354	80	201	OK
60.00	20.5	115.097	16.708	98	246	OK
120.00	26.6	149.345	33.415	116	290	OK
360.00	40.2	225.702	100.246	125	314	OK
720.00	52.1	292.515	200.493	92	230	OK
1440.00	67.6	379.539	400.986	-21	-54	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 11

Drained Area = **8758.551** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
30	**13**	**1.2**

a_{s50} 51.6 m^2

Void Ratio 40 %

Infiltration Rate (f) 2.0576E-04 m/s

For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	100.198	6.370	94	235	OK
15.00	12.2	117.540	9.555	108	270	OK
30.00	15.8	152.224	19.111	133	333	OK
60.00	20.5	197.505	38.222	159	398	OK
120.00	26.6	256.275	76.444	180	450	OK
360.00	40.2	387.303	229.332	158	395	OK
720.00	52.1	501.953	458.664	43	108	OK
1440.00	67.6	651.286	917.327	-266	-665	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

Project No.	10690	Client :	Alber Homes	Project:	Rosshill development

Soakaway Design to BRE 365

Design Procedure I - O = S
where;
I = Inflow from impermeable area to be drained
O = Outflow infiltrating into the soil during rainfall
S = Storage required

I = A x R
where;
A = the impermeable area drained to the soakaway;
R = the total rainfall in a 100 yrdesign storm

$O = a_{s50} \times f \times D$
where;

a_{s50} = the internal surface area of the soakaway to 50% effective depth
f = the soil infiltration rate determined in trial pit at the site of the proposed soakaway
D = the storm Duration

Soakaway No. 12

Drained Area = **1451.43** m2

Proposed Soakaway

Length (m)	Width (m)	Depth (m)
15	**4**	**1.2**

a_{s50} 22.8 m^2

Void Ratio 40 %

Infiltration Rate (f) 9.4330E-05 m/s

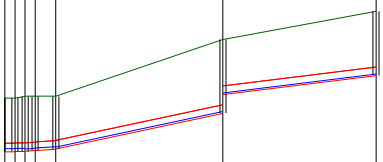
For a 100 Year return period from table below

Duration Minutes	M100 - D (mm)	I (m^3)	O (m^3)	S (m^3)	S required @ 40% voids	Check
10.00	10.4	16.604	1.290	15	38	OK
15.00	12.2	19.478	1.936	18	44	OK
30.00	15.8	25.226	3.871	21	53	OK
60.00	20.5	32.730	7.743	25	62	OK
120.00	26.6	42.469	15.485	27	67	OK
360.00	40.2	64.182	46.456	18	44	OK
720.00	52.1	83.181	92.911	-10	-24	OK
1440.00	67.6	107.928	185.823	-78	-195	OK

Rainfall Data obtained from Met Eireann for Grid co-ords 134241E, 225001N (Irish Grid) with 10% added for climate chang
Highlighted cell is volume required for critcal storm duration

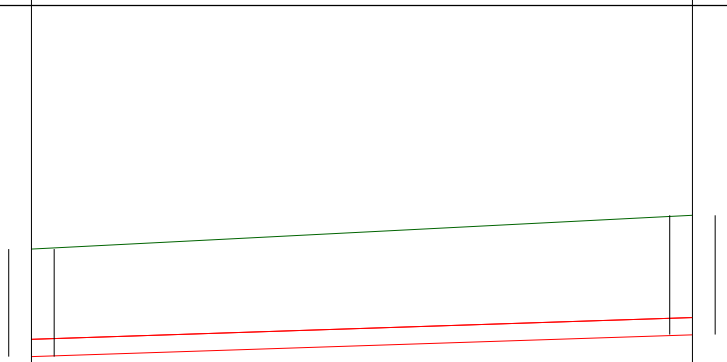
APPENDIX D

Storm Drainage Sections

MH Name	S	S2	S1
			
Hor Scale 1500 Ver Scale 200 Datum (m) 1.000			
PN		S1.001	S1.000
Dia (mm)		225	225
Slope (1:X)		35.0	60.0
Cover Level (m)	14.900	16.450	17.200
Invert Level (m)		13.554 14.500	14.993 15.500
Length (m)		33.127	30.400

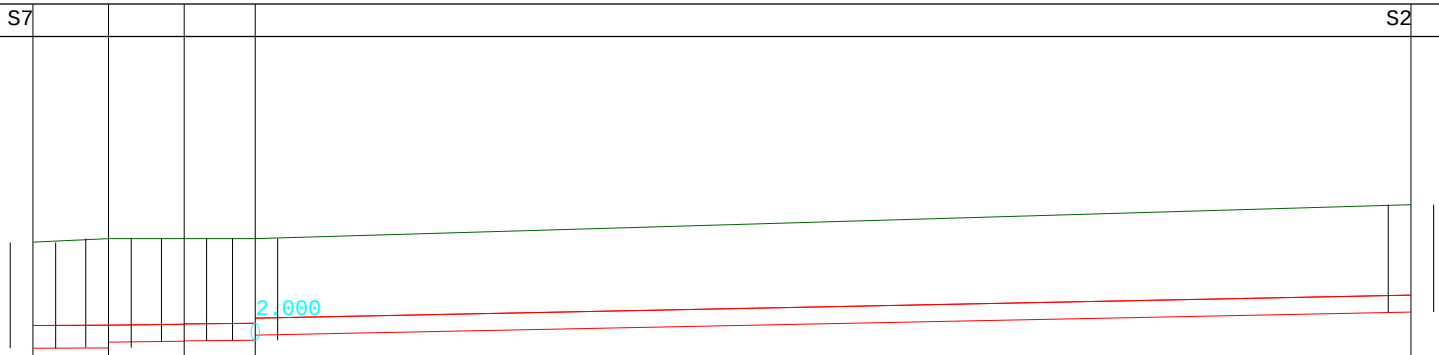
Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:47 | Designed by Richard Daly
File STORM DESIGN NETWORK NO. 2_REV B.MDX | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S2	S1	
Hor Scale 200 Ver Scale 100 Datum (m)13.000			
PN		S1.000	
Dia (mm)		225	
Slope (1:X)		60.0	
Cover Level (m)	16.650	17.100	
Invert Level (m)	15.225	15.517	
Length (m)		17.500	

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:47 | Designed by Richard Daly
File STORM DESIGN NETWORK NO. 2_REV B.MDX | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S7				S2	
						
PN					S1.001	
Dia (mm)					225	
Slope (1:X)					100.0	
Cover Level (m)	16.150	16.200	16.200	16.200	16.650	
Invert Level (m)		14.746	14.753	14.828	14.841	14.841	14.854	14.919	15.225	
Length (m)					30.600	

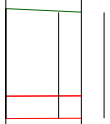
Hor Scale 200

Ver Scale 100

Datum (m)12.000

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:47 | Designed by Richard Daly
File STORM DESIGN NETWORK NO. 2_REV B.MDX | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S		
Hor Scale 200 Ver Scale 100 Datum (m)12.000			
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)	16.200	16.150	
Invert Level (m)	14.740	14.746	
Length (m)			

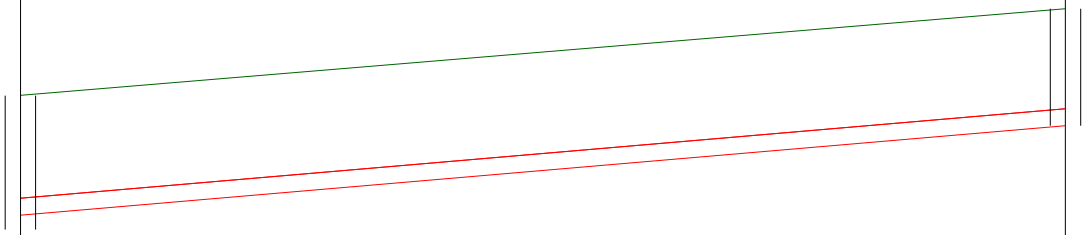
Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:47 | Designed by Richard Daly
File STORM DESIGN NETWORK NO. 2_REV B.MDX | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S4	S3	
Hor Scale 200 Ver Scale 100 Datum (m)12.000			
PN		S2.000	
Dia (mm)		225	
Slope (1:X)		80.0	
Cover Level (m)	16.200	16.300	
Invert Level (m)	14.854	15.175	
Length (m)		25.700	

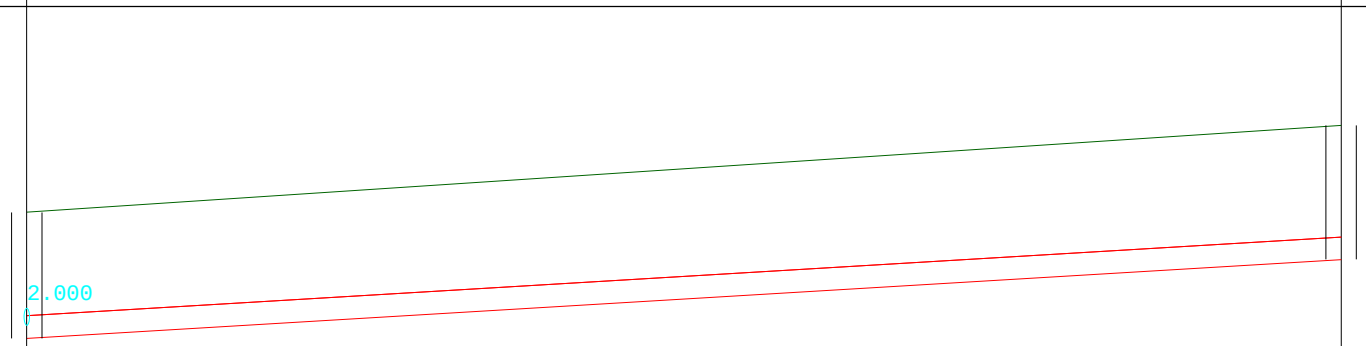
Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:50 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S3	S1	
Hor Scale 300 Ver Scale 100 Datum (m)16.000			
PN		S1.000	
Dia (mm)		225	
Slope (1:X)		35.0	
Cover Level (m)	19.300	20.450	
Invert Level (m)	17.714	18.900	
Length (m)		41.500	

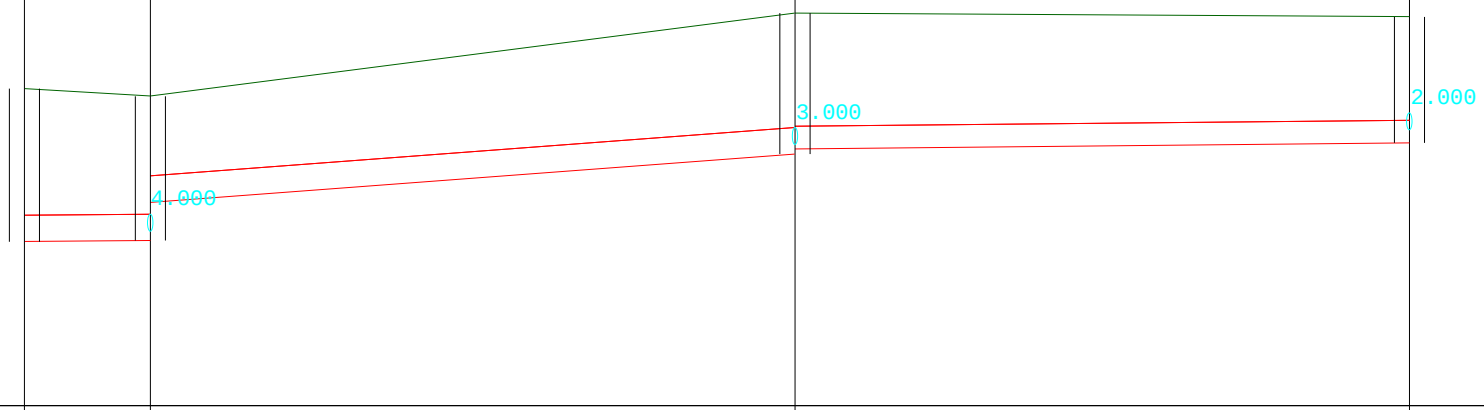
Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:50 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S5		S3
			
Hor Scale 300 Ver Scale 100 Datum (m)14.000			
PN		S1.001	
Dia (mm)		300	
Slope (1:X)		50.0	
Cover Level (m)	18.150		19.300
Invert Level (m)		16.481	17.525
Length (m)		52.200	

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:50 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2



Hor Scale 300

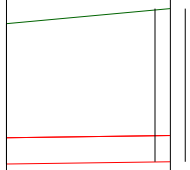
Ver Scale 100

Datum (m)13.000

MH Name	S10	S9	S7	S5	
PN		S1.004	S1.003	S1.002	
Dia (mm)		350	350	300	
Slope (1:X)		300.0	40.0	300.0	
Cover Level (m)	17.200	17.100	18.200	18.150	
Invert Level (m)		15.172 / 15.189	15.693 / 16.333	16.400 / 16.481	
Length (m)		5.000	25.600	24.400	

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:50 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S	S10	
Hor Scale 300 Ver Scale 100 Datum (m)13.000			
PN		S1.005	
Dia (mm)		350	
Slope (1:X)		197.0	
Cover Level (m)	17.000	17.200	
Invert Level (m)	15.139	15.172	
Length (m)		6.500	

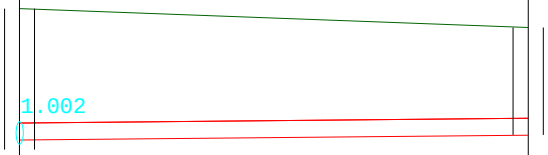
Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:50 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S5	S4	
Hor Scale 300 Ver Scale 100 Datum (m)14.000			
PN		S2.000	
Dia (mm)		225	
Slope (1:X)		200.0	
Cover Level (m)	18.150	18.200	
Invert Level (m)	16.655	16.775	
Length (m)		24.000	

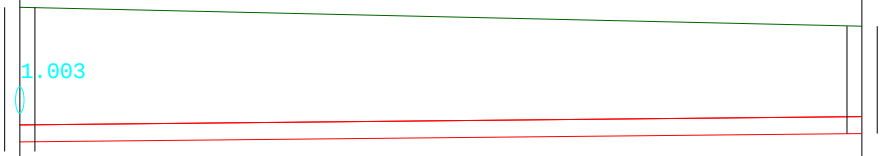
Fairgreen House
Fairgreen Road
Galway

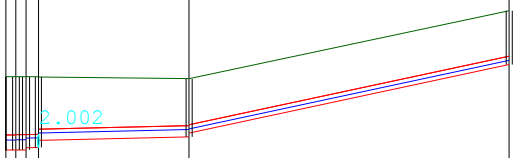
Date 05/12/2019 17:50 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

MH Name	S7	S6	
Hor Scale 300 Ver Scale 100 Datum (m)14.000			
PN		S3.000	
Dia (mm)		225	
Slope (1:X)		300.0	
Cover Level (m)	18.200	17.950	
Invert Level (m)	16.458	16.525	
Length (m)		20.200	

Fairgreen House
Fairgreen Road
Galway

Date 05/12/2019 17:50 | Designed by Richard Daly
File Storm Design Network no. 3_Rev B.mdx | Checked by
Micro Drainage | Network 2017.1.2

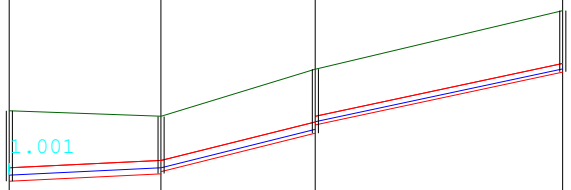
MH Name	S9	S8	
Hor Scale 300 Ver Scale 100 Datum (m)13.000			
PN		S4.000	
Dia (mm)		225	
Slope (1:X)		300.0	
Cover Level (m)	17.100	16.850	
Invert Level (m)	15.314	15.425	
Length (m)		33.450	

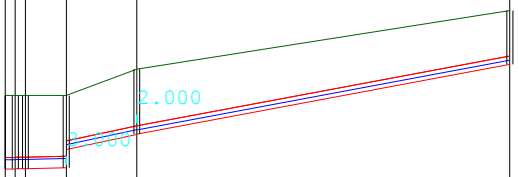
MH Name	S		S2	S1	
					
PN			S1.001	S1.000	
Dia (mm)			300	225	
Slope (1:X)			300.0	35.0	
Cover Level (m)	16.150		16.100	17.900	
Invert Level (m)		14.462	14.562	14.661	16.475
Length (m)			29.900	63.500	

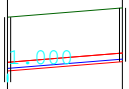
Hor Scale 1500

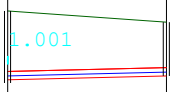
Ver Scale 200

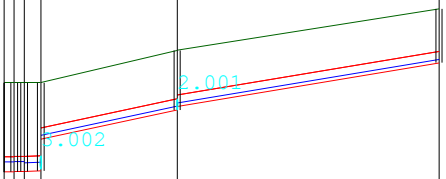
Datum (m)1.000

MH Name	S5	S4	S4	S3	
Hor Scale 1500 Ver Scale 200 Datum (m)2.000					
PN		S2.002	S2.001	S2.000	
Dia (mm)		350	300	225	
Slope (1:X)		149.8	30.0	35.0	
Cover Level (m)	16.150	16.000	17.250	18.800	
Invert Level (m)		14.284 14.485	14.535 15.555	15.772 17.175	
Length (m)		30.100	30.600	49.100	

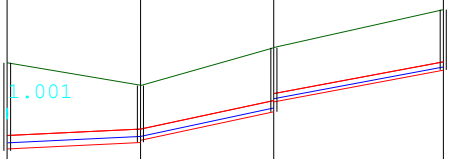
MH Name	S			S1	
					
Hor Scale 1500 Ver Scale 200 Datum (m) 4.000					
PN				S1.000	
Dia (mm)				225	
Slope (1:X)				40.0	
Cover Level (m)	18.550	18.550	19.250	20.800	
Invert Level (m)		16.645 17.125	17.525 17.525	19.375	
Length (m)				74.000	

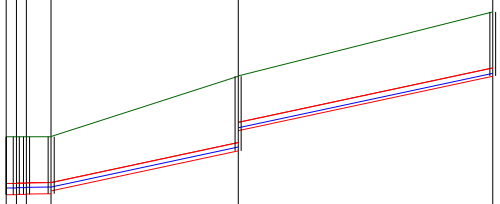
MH Name	S3	S2	
			
Hor Scale 1500 Ver Scale 200 Datum (m) 4.000			
PN		S2.000	
Dia (mm)		225	
Slope (1:X)		90.0	
Cover Level (m)	19.250	19.500	
Invert Level (m)		17.822 18.075	
Length (m)		22.800	

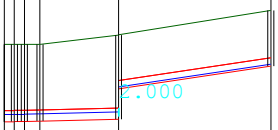
MH Name	S5	S4	
			
Hor Scale 1500 Ver Scale 200 Datum (m) 3.000			
PN		S3.000	
Dia (mm)		225	
Slope (1:X)		300.0	
Cover Level (m)	18.550	18.250	
Invert Level (m)	16.720	16.825	
Length (m)		31.500	

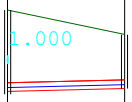
MH Name	S	S3	S1	
				
Hor Scale 1500 Ver Scale 200 Datum (m) 4.000				
PN		S1.001	S1.000	
Dia (mm)		300	300	
Slope (1:X)		35.0	45.0	
Cover Level (m)	18.600	19.450	20.550	
Invert Level (m)		17.102 17.875	17.971 19.125	
Length (m)		27.050	51.950	

MH Name	S3			
			1.000	
Hor Scale 1500 Ver Scale 200 Datum (m) 4.000				
PN				
Dia (mm)				
Slope (1:X)				
Cover Level (m)	19.450	19.450	19.500	
Invert Level (m)		18.008	18.008	18.075
Length (m)				

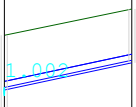
MH Name	S8	S6	S5	S4	
					
Hor Scale 1500 Ver Scale 200 Datum (m) 4.000					
PN		S3.002	S3.001	S3.000	
Dia (mm)		350	300	225	
Slope (1:X)		150.3	35.0	40.0	
Cover Level (m)	18.600	18.000	19.000	20.000	
Invert Level (m)		16.318 / 16.494	16.544 / 17.300	17.560 / 18.400	
Length (m)		26.450	26.450	33.600	

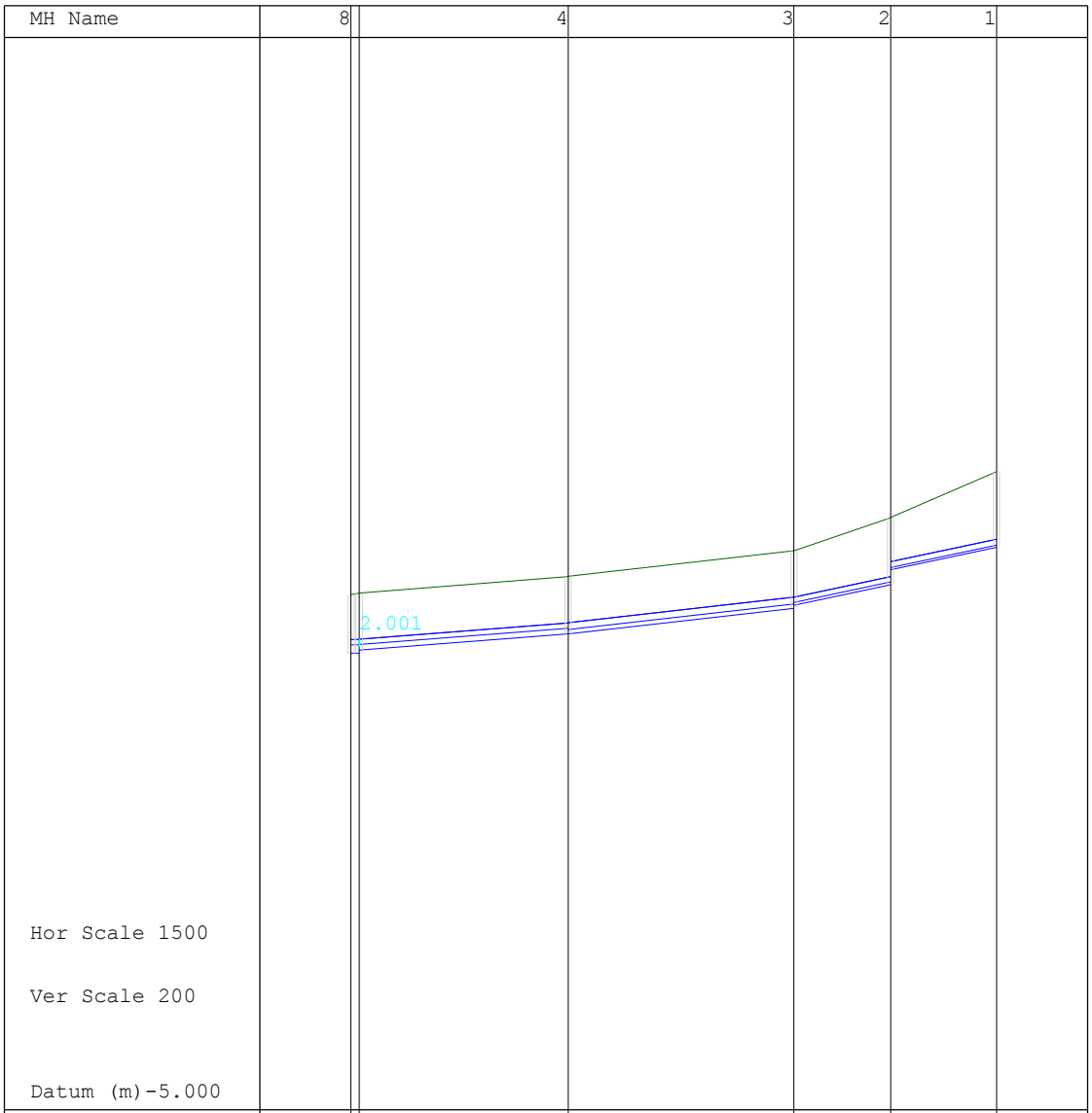
MH Name	S	S2	S1
			
Hor Scale 1500 Ver Scale 200 Datum (m) 1.000			
PN		S1.001	S1.000
Dia (mm)		225	225
Slope (1:X)		35.0	35.0
Cover Level (m)	14.700	16.300	18.000
Invert Level (m)		13.265 14.325	14.857 16.300
Length (m)		37.100	50.500

MH Name	S		S1	
				
Hor Scale 1500 Ver Scale 200 Datum (m) 1.000				
PN			S1.000	
Dia (mm)			225	
Slope (1:X)			50.0	
Cover Level (m)	15.950	16.200	16.850	
Invert Level (m)		13.921 13.973	14.771 15.375	
Length (m)			30.200	

MH Name	S3	S2	
			
Hor Scale 1500 Ver Scale 200 Datum (m) 1.000			
PN		S2.000	
Dia (mm)		225	
Slope (1:X)		300.0	
Cover Level (m)	16.200	15.550	
Invert Level (m)		14.048 14.125	
Length (m)		23.200	

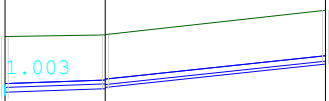
MH Name				5	3			
Hor Scale 1500 Ver Scale 200 Datum (m) 0.000					2.000			
PN				1.003	1.002			
Dia (mm)				225	225			
Slope (1:X)				35.0	44.4			
Cover Level (m)	13.950		13.950	14.900	15.400	16.250	16.350	
Invert Level (m)			12.379	12.454 13.000	13.300 13.975	14.210	14.925	
Length (m)				19.100	30.000			

MH Name	5	4	
			
Hor Scale 1500 Ver Scale 200 Datum (m) 0.000			
PN		2.000	
Dia (mm)		225	
Slope (1:X)		35.0	
Cover Level (m)	14.900	15.600	
Invert Level (m)		13.452 14.175	
Length (m)		25.300	



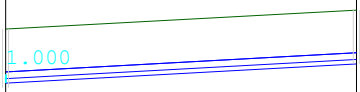
PN		1.003	1.002	1.001	1.000
Dia (mm)		300	300	225	225
Slope (1:X)		95.0	65.7	35.0	35.0
Cover Level (m)	9.000	9.500	10.200	11.100	12.350
Invert Level (m)		7.489	7.937 / 7.937	8.637 / 8.712	9.275 / 9.675	10.292
Length (m)		42.600	46.000	19.700	21.600

MH Name		
Hor Scale 1500 Ver Scale 200 Datum (m)-6.000		
PN		
Dia (mm)		
Slope (1:X)		
Cover Level (m)	9.000	
Invert Level (m)		
Length (m)		

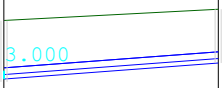
MH Name	7	6	5	
				
Hor Scale 1500 Ver Scale 200 Datum (m)-6.000				
PN		2.001	2.000	
Dia (mm)		225	225	
Slope (1:X)		199.0	70.0	
Cover Level (m)	9.050	9.100	9.750	
Invert Level (m)		7.575 7.675	7.701 8.325	
Length (m)		19.900	43.700	

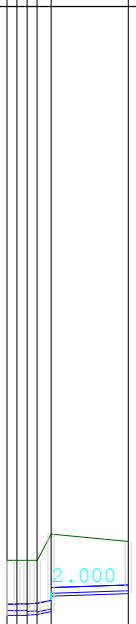
MH Name	9		4	3	1	
		3.001			2.000	
Hor Scale 1500 Ver Scale 200 Datum (m)-4.000						
PN			1.002	1.001	1.000	
Dia (mm)			350	350	225	
Slope (1:X)			40.0	200.0	30.0	
Cover Level (m)	10.000	9.900	10.500	10.600	13.330	
Invert Level (m)		8.270 8.295	8.915	8.915 9.048	9.173 11.440	
Length (m)			24.800	26.600	68.000	

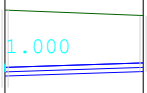
MH Name			
Hor Scale 1500 Ver Scale 200 Datum (m)-6.000		3.001	
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)	10.000	10.000	
Invert Level (m)		8.163	
Length (m)			

MH Name	3	2	
			
Hor Scale 1500 Ver Scale 200 Datum (m)-5.000			
PN		2.000	
Dia (mm)		300	
Slope (1:X)		135.0	
Cover Level (m)	10.600	11.100	
Invert Level (m)	9.159	9.675	
Length (m)		69.600	

MH Name	9		6	
		1.000	3.000	
Hor Scale 1500 Ver Scale 200 Datum (m)-5.000				
PN			3.000	
Dia (mm)			225	
Slope (1:X)			290.0	
Cover Level (m)	10.000	10.000	10.000	
Invert Level (m)		8.378 8.453	8.575	
Length (m)			35.300	

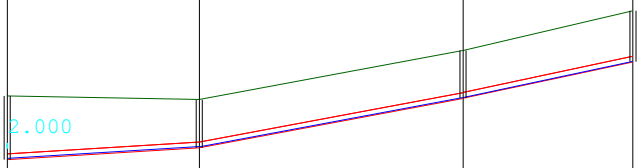
MH Name	8	7	
			
Hor Scale 1500 Ver Scale 200 Datum (m)-5.000			
PN		4.000	
Dia (mm)		300	
Slope (1:X)		100.0	
Cover Level (m)	10.000	10.300	
Invert Level (m)		8.450	8.875
Length (m)		42.500	

MH Name			
Hor Scale 1500 Ver Scale 200 Datum (m)-6.000			
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)	8.500	9.000	
Invert Level (m)		7.557 7.625	
Length (m)			

MH Name	3	2	
			
Hor Scale 1500 Ver Scale 200 Datum (m)-6.000			
PN		2.000	
Dia (mm)		225	
Slope (1:X)		225.0	
Cover Level (m)	9.200	9.050	
Invert Level (m)		7.453 7.575	
Length (m)		27.400	

APPENDIX E

Foul Drainage Sections

MH Name	F5	F3	F2	F1	
					
PN		F1.002	F1.001	F1.000	
Dia (mm)		150	150	150	
Slope (1:X)		120.0	40.0	35.0	
Cover Level (m)	18.250	18.150	19.450	20.500	
Invert Level (m)		16.562 16.880	16.880 18.187	18.187 19.150	
Length (m)		38.120	52.300	33.700	

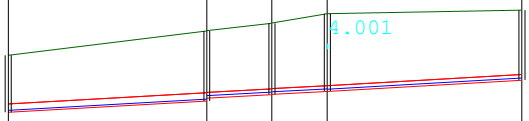
Hor Scale 1500

Ver Scale 200

Datum (m) 4.000

MH Name	F12	F11	F6	F5	
Hor Scale 1500 Ver Scale 200 Datum (m)2.000					
PN		F1.005	F1.004	F1.003	
Dia (mm)		150	150	150	
Slope (1:X)		130.0	100.0	45.0	
Cover Level (m)	16.100	16.200	16.850	18.250	
Invert Level (m)		14.246 14.436	15.191 15.495	15.495 16.562	
Length (m)		24.700	30.400	48.000	

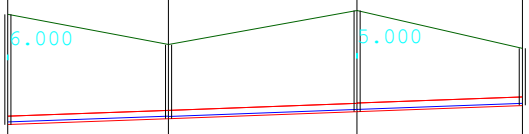
MH Name	F18	F17			F12	
PN		F1.009			F1.006	
Dia (mm)		225			150	
Slope (1:X)		130.0			130.0	
Cover Level (m)	14.900	15.550	15.750	16.000	16.100	
Invert Level (m)	13.387	13.690	13.765	13.865 13.949	13.949 14.246	
Length (m)		39.400			38.600	

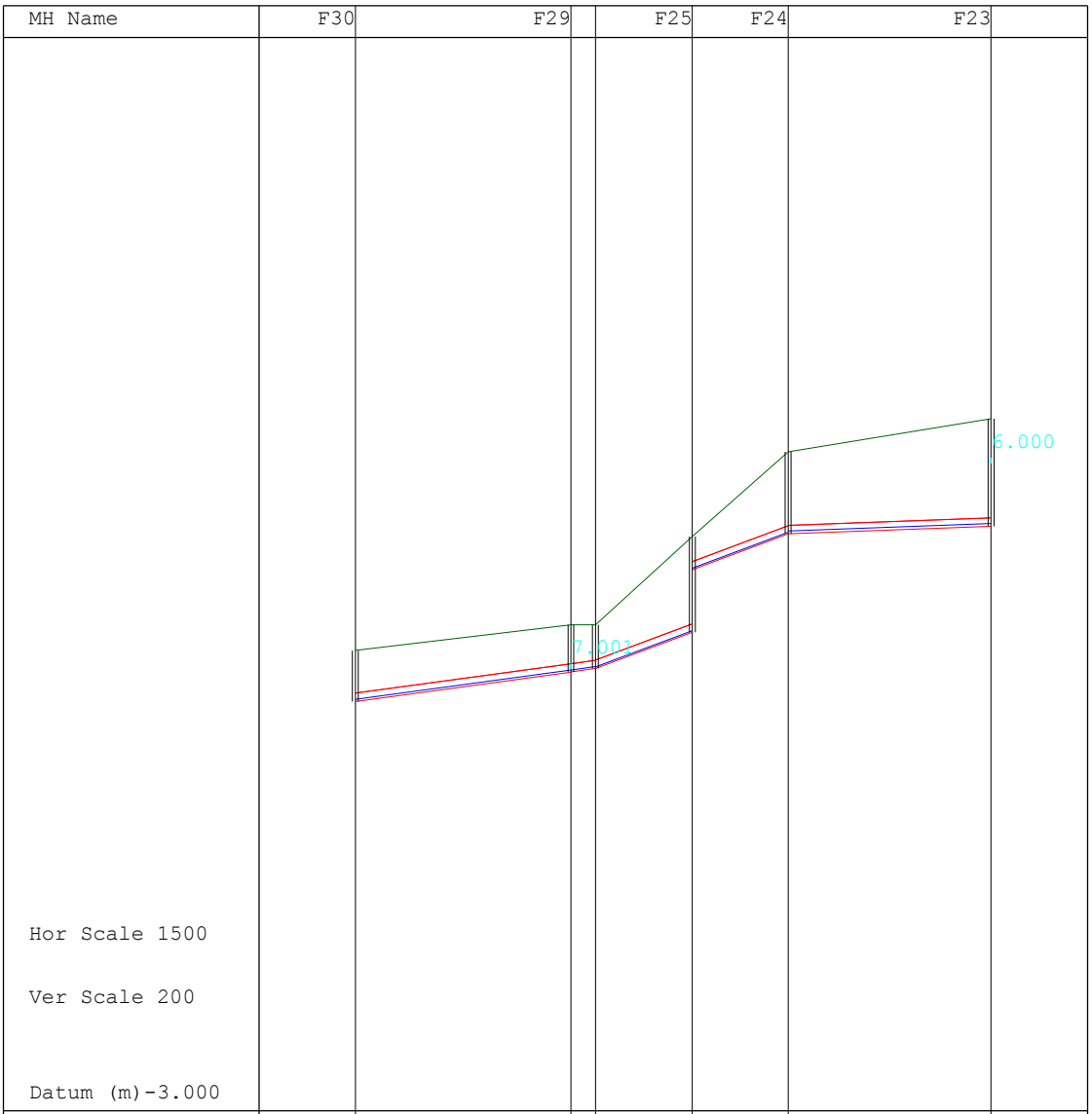


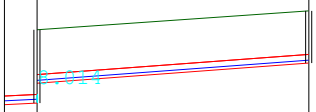
Hor Scale 1500

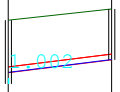
Ver Scale 200

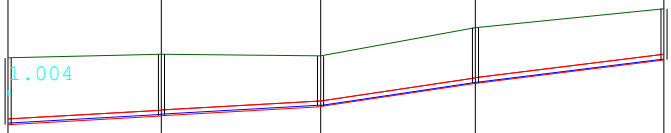
Datum (m) 0.000

MH Name	F23	F21	F20	F18	
					
Hor Scale 1500 Ver Scale 200 Datum (m) 0.000					
PN		F1.012	F1.011	F1.010	
Dia (mm)		225	225	225	
Slope (1:X)		200.0	200.0	200.0	
Cover Level (m)	15.800	15.000	15.900	14.900	
Invert Level (m)		12.877 13.036	13.036 13.223	13.223 13.387	
Length (m)		31.870	37.400	32.800	

MH Name	F30	F29		F25	F24	F23	
							
PN		F1.017		F1.015	F1.014	F1.013	
Dia (mm)		225		225	225	225	
Slope (1:X)		55.0		20.0	20.0	200.0	
Cover Level (m)	9.500	10.200		12.600	14.900	15.800	
Invert Level (m)		8.119	8.917	9.014 10.000	11.694 12.670	12.670 12.877	
Length (m)		43.900		19.710	19.530	41.300	

MH Name	F		F30	
Hor Scale 1500 Ver Scale 200 Datum (m)-6.000				
PN			F1.018	
Dia (mm)			225	
Slope (1:X)			100.0	
Cover Level (m)	0.000	9.000	9.500	
Invert Level (m)		7.057 7.580	8.119	
Length (m)			53.900	

MH Name	F5	F4	
Hor Scale 1500 Ver Scale 200 Datum (m) 3.000			
PN		F2.000	
Dia (mm)		150	
Slope (1:X)		60.0	
Cover Level (m)	18.250	18.550	
Invert Level (m)	16.858	17.200	
Length (m)		20.510	

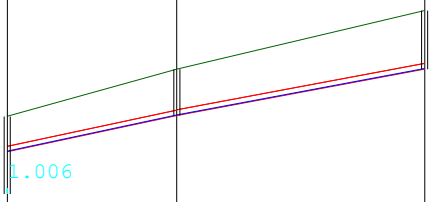


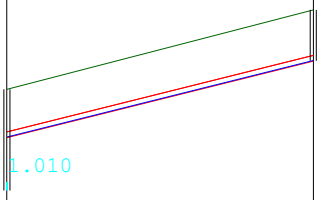
Hor Scale 1500

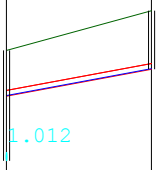
Ver Scale 200

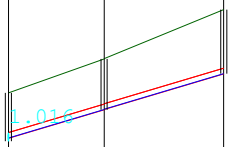
Datum (m) 1.000

MH Name	F11	F10	F9	F8	F7	
PN		F3.003	F3.002	F3.001	F3.000	
Dia (mm)		150	150	150	150	
Slope (1:X)		130.0	130.0	50.0	60.0	
Cover Level (m)	16.200	16.300	16.250	17.000	17.500	
Invert Level (m)		14.436	14.670	14.670	14.913	14.913	15.527	15.527	16.150	
Length (m)		30.400	31.600	30.700	37.400	

MH Name	F15	F14	F13	
Hor Scale 1500 Ver Scale 200 Datum (m) 2.000				
PN		F4.001	F4.000	
Dia (mm)		150	150	
Slope (1:X)		35.0	40.0	
Cover Level (m)	16.000	17.250	18.800	
Invert Level (m)	15.060	16.020	16.020 17.250	
Length (m)		33.600	49.200	

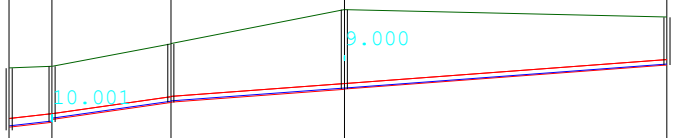
MH Name	F20	F19	
			
Hor Scale 1500 Ver Scale 200 Datum (m) 1.000			
PN		F5.000	
Dia (mm)		150	
Slope (1:X)		30.0	
Cover Level (m)	15.900	18.000	
Invert Level (m)	14.623	16.650	
Length (m)		60.800	

MH Name	F23	F22	
			
Hor Scale 1500 Ver Scale 200 Datum (m) 0.000			
PN		F6.000	
Dia (mm)		150	
Slope (1:X)		40.0	
Cover Level (m)	15.800	16.850	
Invert Level (m)		14.581 15.300	
Length (m)		28.770	

MH Name	F29	F28	F27	
Hor Scale 1500 Ver Scale 200 Datum (m)-4.000				
PN		F7.001	F7.000	
Dia (mm)		150	150	
Slope (1:X)		25.0	25.0	
Cover Level (m)	10.200	11.100	12.400	
Invert Level (m)		8.992 9.752	9.752 10.700	
Length (m)		19.000	23.700	

MH Name	F33	F32	F31	
Hor Scale 1500 Ver Scale 200 Datum (m) 5.000				
PN		F8.001	F8.000	
Dia (mm)		150	150	
Slope (1:X)		50.0	50.0	
Cover Level (m)	19.200	20.100	20.800	
Invert Level (m)		17.934 18.706	18.706 19.450	
Length (m)		38.600	37.200	

MH Name	F40		F36	F35	F33	
PN			F8.004	F8.003	F8.002	
Dia (mm)			150	150	150	
Slope (1:X)			51.9	100.0	100.0	
Cover Level (m)	17.850	17.900	18.500	19.400	19.200	
Invert Level (m)		16.421	16.496 16.950	16.950 17.294	17.294 17.934	
Length (m)			23.600	34.400	64.000	



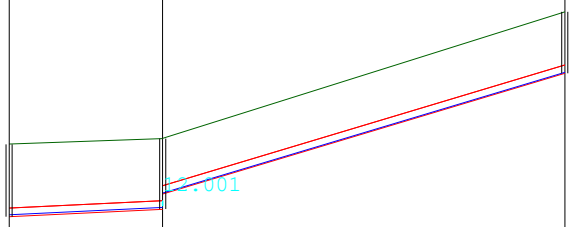
Hor Scale 1500

Ver Scale 200

Datum (m) 3.000

MH Name	F45	F44	F42		F40	
Hor Scale 1500 Ver Scale 200 Datum (m) 1.000						
PN		F8.009	F8.008		F8.006	
Dia (mm)		225	225		225	
Slope (1:X)		25.0	55.8		30.0	
Cover Level (m)	13.950	14.900	15.400	16.250	17.850	
Invert Level (m)		12.524 13.400	13.400 13.963	14.250	14.737 16.200	
Length (m)		21.900	31.400		43.900	

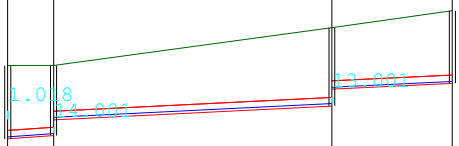
MH Name	F48	F47	F45	
PN		F8.011	F8.010	
Dia (mm)		225	225	
Slope (1:X)		150.0	25.0	
Cover Level (m)	10.450	10.600	13.950	
Invert Level (m)		8.529 8.732	9.132 12.324	
Length (m)		30.430	79.800	

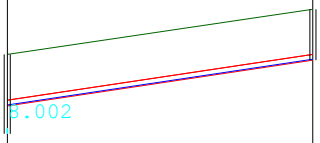


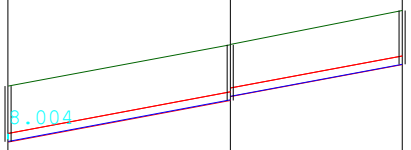
Hor Scale 1500

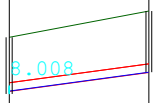
Ver Scale 200

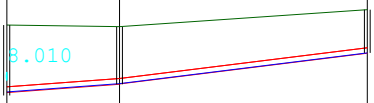
Datum (m)-3.000

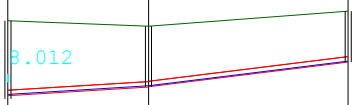
MH Name	F55		F51	F48	
					
Hor Scale 1500 Ver Scale 200 Datum (m)-6.000					
PN			F8.013	F8.012	
Dia (mm)			225	225	
Slope (1:X)			150.0	150.0	
Cover Level (m)	9.000	9.000	10.000	10.450	
Invert Level (m)		7.148 7.565	7.933	8.370 8.529	
Length (m)			55.200	23.900	

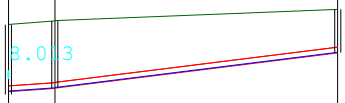
MH Name	F35	F34	
			
Hor Scale 1500 Ver Scale 200 Datum (m) 4.000			
PN		F9.000	
Dia (mm)		150	
Slope (1:X)		50.0	
Cover Level (m)	19.400	20.600	
Invert Level (m)	18.038	19.250	
Length (m)		60.600	

MH Name	F39	F38	F37	
				
Hor Scale 1500 Ver Scale 200 Datum (m) 4.000				
PN		F10.001	F10.000	
Dia (mm)		225	225	
Slope (1:X)		40.0	40.0	
Cover Level (m)	17.900	19.000	19.900	
Invert Level (m)		16.421 17.523	17.623 18.475	
Length (m)		44.100	34.100	

MH Name	F44	F43	
			
Hor Scale 1500 Ver Scale 200 Datum (m) 0.000			
PN		F11.000	
Dia (mm)		225	
Slope (1:X)		55.0	
Cover Level (m)	14.900	15.600	
Invert Level (m)	13.471	13.975	
Length (m)		27.700	

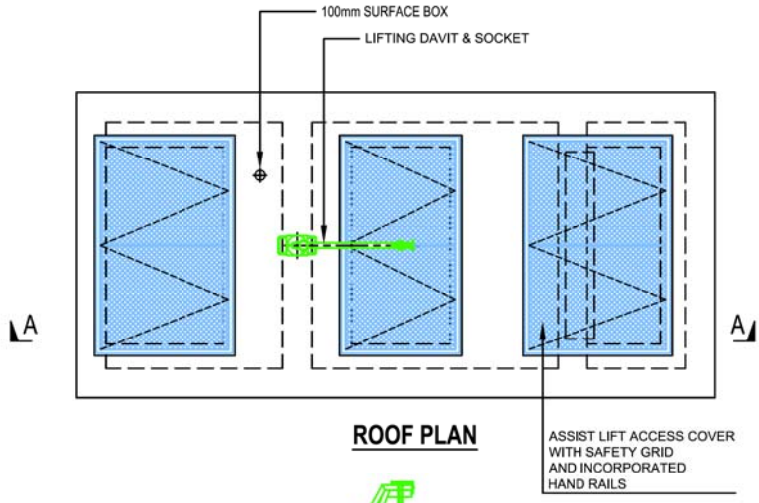
MH Name	F47	F47	F46	
				
Hor Scale 1500 Ver Scale 200 Datum (m)-5.000				
PN		F12.001	F12.000	
Dia (mm)		150	150	
Slope (1:X)		99.9	60.0	
Cover Level (m)	10.600	10.550	11.000	
Invert Level (m)	8.807	9.031 9.031	9.850	
Length (m)		22.370	49.150	

MH Name	F51	F50	F49	
				
Hor Scale 1500 Ver Scale 200 Datum (m)-5.000				
PN		F13.001	F13.000	
Dia (mm)		150	150	
Slope (1:X)		120.0	60.0	
Cover Level (m)	10.000	9.850	10.250	
Invert Level (m)		8.008 / 8.240	8.240 / 8.900	
Length (m)		27.900	39.600	

MH Name	F54		F52	
Hor Scale 1500 Ver Scale 200 Datum (m)-6.000				
PN			F14.000	
Dia (mm)			150	
Slope (1:X)			60.0	
Cover Level (m)	9.000	9.100	9.400	
Invert Level (m)		7.315	8.250	
		7.315		
Length (m)			56.100	

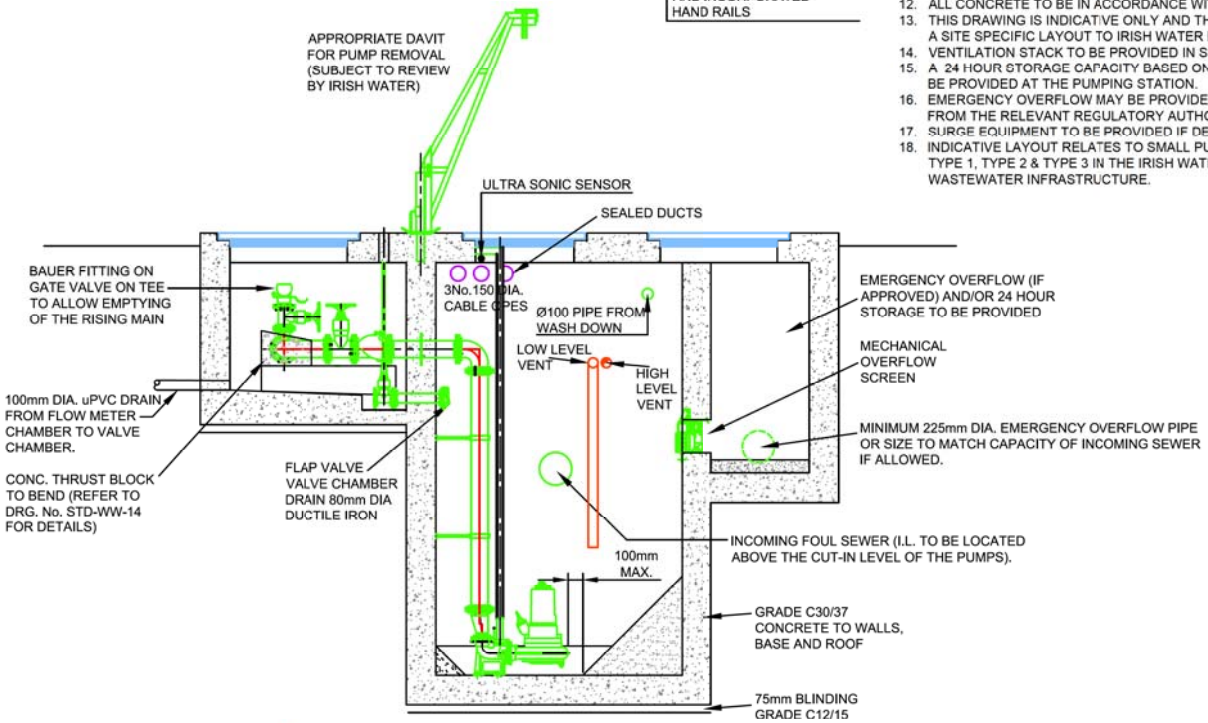
APPENDIX F

Typical Pumping Station Detail Drawing

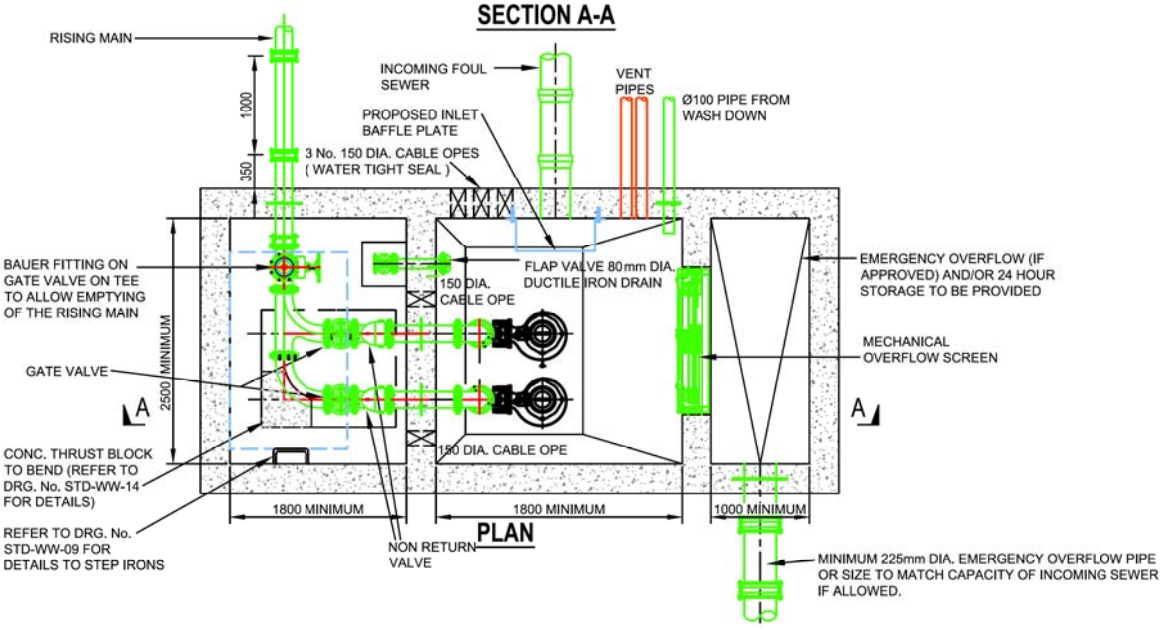


ROOF PLAN

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS NOTED OTHERWISE.
2. PUMPS SHALL BE INSTALLED TO IRISH WATER REQUIREMENTS. REFER TO PART 5 OF THE CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE .
3. ALL DUCTILE IRON PIPE WORK AND FITTINGS TO BE IN ACCORDANCE WITH IS EN 598.
4. PRE-CAST CONCRETE CHAMBERS MAY BE USED SUBJECT TO REVIEW BY IRISH WATER. REFER TO DRG. No. WW-28A FOR DETAILS.
5. ALL GATE VALVES TO BE CLOCKWISE CLOSING.
6. WET WELL TO BE IN ACCORDANCE WITH BS EN 1992-3.
7. COVERS TO BE SIZED TO ALLOW ADEQUATE SPACE FOR PUMP REMOVAL MINIMUM 1400 x 800mm.
8. CHAMBER ACCESS COVERS WITH A CLEAR OPENING EXCEEDING 1m SHALL CONFORM TO BS 9'24.
9. WALL THICKNESS AND REINFORCEMENT SHALL BE SELECTED BASED ON SITE SPECIFIC DESIGN AND SHALL BE SUBJECT TO REVIEW BY IRISH WATER. ROOF SLABS SHALL BE DESIGNED TO CARRY ALL LIVE LOADS & DEAD LOADS, & CONSIST OF A REINFORCED CONCRETE SLAB OF IN-SITU CONCRETE, GRADE C30/37, WITH A MINIMUM THICKNESS OF 225mm. ALTERNATIVELY, PRE-CAST CONCRETE ROOFS MAY BE USED, SUBJECT TO IRISH WATER REVIEW, & COMPLIANCE WITH BS 5911, Part 4
10. THE PUMPING STATION SHOULD NOT BE LOCATED IN AREAS THAT ARE SUSCEPTIBLE TO FLOODING AT MORE THAN A 1:30 YEAR RECURRENCE. THE PUMPING STATION FACILITY SHALL BE DESIGNED FOR INUNDATION. THE FINISHED SLAB LEVEL SHALL BE POSITIONED ABOVE THE 1:100 YEAR FLOOD LEVEL. ALL ELECTRICAL CONTROL EQUIPMENT SHALL BE WATER RESISTANT AND POSITIONED ABOVE 1:200 YEAR FLOOD LEVEL.
11. ALL CHAMBERS TO BE CHECKED FOR UPLIFT BY THE DEVELOPER BASED ON GROUND CONDITIONS WITHIN THE SITE. SHOULD ANTI FLOATATION MEASURES BE REQUIRED THEY SHALL BE SUBJECT TO REVIEW BY IRISH WATER.
12. ALL CONCRETE TO BE IN ACCORDANCE WITH IS EN 206.
13. THIS DRAWING IS INDICATIVE ONLY AND THE DEVELOPER SHALL SUBMIT A SITE SPECIFIC LAYOUT TO IRISH WATER FOR REVIEW.
14. VENTILATION STACK TO BE PROVIDED IN SENSITIVE AREAS.
15. A 24 HOUR STORAGE CAPACITY BASED ON DRY WEATHER FLOW, SHALL BE PROVIDED AT THE PUMPING STATION.
16. EMERGENCY OVERFLOW MAY BE PROVIDED SUBJECT TO APPROVAL FROM THE RELEVANT REGULATORY AUTHORITIES.
17. SURGE EQUIPMENT TO BE PROVIDED IF DEEMED NECESSARY.
18. INDICATIVE LAYOUT RELATES TO SMALL PUMPING STATIONS AS PER TYPE 1, TYPE 2 & TYPE 3 IN THE IRISH WATER CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE.



SECTION A-A



PLAN

REFER TO INDEX SHEET FOR NOTES REGARDING DESIGN RESPONSIBILITY & RISK ASSESSMENT

No.	Date	Drn	Chk	Description	App
2	11/17	JMC	TCC	Revised notes 2,4,9 & 11	MOD
1	08/16	JMC	TCC	Revised note 4, incoming sewer note & added thrust block & step irons to valve chamber	MOD
0	09/15	JMC	TCC	Initial Issue	SL

UISCE ÉIREANN : IRISH WATER

STANDARD DETAILS - WASTEWATER

SCALE: NOT TO SCALE

DATE: SEPT. 2015

TITLE: INDICATIVE SUBMERSIBLE PUMPING STATION

DRAWING No.: STD-WW-28

REV: 2

APPENDIX G

Irish Water Confirmation of Feasibility Correspondence

Barry Duffy

c/o Richard Daly
Tobin Consulting Engineers
1st Floor Fairgreen House
Fairgreen Road
Co. Galway
4 December 2019

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

Dear Barry Duffy,

Re: Connection Reference No CDS19001343 pre-connection enquiry Rev B -
Subject to contract | Contract denied

Connection for Development of 342 unit(s) and Creche at Rosshill, Galway City, Co. Galway.

Irish Water has reviewed your pre-connection enquiry in relation to a water and wastewater connection at Rosshill, Galway City, Co. Galway.

Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, and subject to the conditions outlined below, your proposed connection to the Irish Water network(s) can be facilitated.

Wastewater Connection:

You have presented in your pre connection enquiry submission the phased breakdown of development proposed. Phases 1 & 2 which comprise of a total of 102 housing units and a crèche can be accommodated by the existing network infrastructure subject to you putting in place a night time pumping regime for the discharge to the Irish Water network.

In order to accommodate the proposed connection of Phases 3 & 4 totalling an additional 240 housing units, upgrade works are required to be delivered at Merlin Park No. 1 Pumping Station to provide additional storage. Irish Water is currently delivering a capital project to provide this additional storage. This project is currently underway and is at site investigation and land owner liaison stage. The project is currently scheduled to be complete by 2024 (subject to change).

It is proposed to connect to the Irish Water network via a pumping station and rising main connection. The proposed pumping station layout should be sized to cater for development on adjoining lands to the south which are currently zoned low residential. The sizing will be confirmed at connection application stage. The proposed development is high density; therefore the densities of future development on the adjoining lands will require to be determined

Water Connection:

The nearest point of connection to the watermain network will be to a 200mm diameter watermain which is being extended to a point north of the railway bridge on the Coast Road. This watermain extension is currently being delivered as part of the development works for a housing development north of the railway on the Coast Road. A connection can be facilitated to this watermain.

Please be aware that Irish Water is now responsible for the delivery of the connection related works in the public domain. The costs and conditions associated with the connection would be detailed in a connection offer at connection application stage.

Irish Water notes that the scale of this development dictates that it is subject to the Strategic Housing Development planning process. 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.

All infrastructure should be designed and installed in accordance with the Irish Water Codes of Practice and Standard Details. A design proposal for the water and/or wastewater infrastructure should be submitted to Irish Water for assessment. The design proposal can be submitted to cdsdesignqa@water.ie

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available 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.

If you have any further questions, please contact James O'Malley from the design team at jomalley@water.ie. For further information, visit **www.water.ie/connections.**

Yours sincerely,

Maria O'Dwyer

Connections and Developer Services

APPENDIX H

Irish Water Statement of Design Acceptance

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

Barry Duffy
1st Floor Fairgreen House
Fairgreen Road
Co. Galway

3 December 2019

Re: Design Submission for Rosshill, Galway City, Co. Galway (the "Development") (the "Design Submission") / Connection Reference No: CDS19001343

Dear Barry Duffy,

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: James O'Malley
Phone: 094 90 43310
Email: jomalley@water.ie

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

Appendix A

Document Title & Revision

- 10690-2001_Rev F – Proposed Drainage and Watermain Layout
- 10690-2002_Rev D – Proposed Drainage – Part 1
- 10690-2003_Rev D – Proposed Drainage – Part 2
- 10690-2004_Rev F – Proposed Watermain – Part 2
- 10690-2005_Rev E – Proposed Watermain – Part 2

*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.

www.tobin.ie

TOBIN Consulting Engineers

@tobinengineers

Galway
Fairgreen House,
Fairgreen Road,
Galway,
H91 AXK8,
Ireland.
Tel: +353 (0)91 565 211

Dublin
Block 10-4,
Blanchardstown Corporate Park,
Dublin 15,
D15 X98N,
Ireland.
Tel: +353 (0)1 803 0406

Castlebar
Market Square,
Castlebar,
Mayo,
F23 Y427,
Ireland.
Tel: +353 (0)94 902 1401

London
17 Bowling Green Lane
Clerkenwell
London,
EC1R 0QB,
United Kingdom.
Tel: (+44) (0)203 915 6301