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Lock House Developments Ltd.

Strategic Housing Development at Bóthar an Chóiste, Castlegar, Galway

Report on Civil Works
Planning Stage

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TOBIN Consulting Engineers

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1 INTRODUCTION

TOBIN Consulting Engineers were appointed to provide engineering consultancy services for the proposed strategic residential development and road upgrades of Bothar an Choiste Road, in Galway City (See Figure 1 & Figure 2 for Site Extents and Indicative Site Layout). The proposal includes the extension of watermain, foul and storm services from the L5041 local road, north on Bothar an Choiste Road to the proposed development.

This report has been prepared to detail the Civil Works Planning submission element associated with the proposed residential development. It should be read in conjunction with the foul and storm design, watermain and roads drawings as outlined and noted herein.
The development will consist of the following:
1) Demolition of an existing house (124.6 m²), a ruined outbuilding (42.8 m²), and a ruined dwelling (41.7 m²)
2) Construction of 170 no. residential units comprising:

- 84 no. two storey houses (34 no. two-beds, 42 no. three-beds, 8 no. four-beds),
- 1 no. apartment block comprising 17 no. apartments (10 no. one-beds, 7 no. two-beds),
- 1 no. apartment block comprising 21 no. apartments (12 no. one-beds, 9 no. two-beds),
- 48 no. duplex units (11 no. one-beds, 24 no. two-beds, 13 no. three-beds).

3) Development of a two-storey creche facility with 46 no. child spaces (c. 300.36 sqm), associated outdoor play areas and parking.
4) Provision of all associated surface water and foul drainage services and connections including pumping station with all associated site works and ancillary services.
5) The upgrade of the existing Bothar an Chóiste road from the proposed development to the junction at L5041 consisting of road improvements, road widening and junction re-alignment.
6) Pedestrian, cyclist, and vehicular links throughout the development and access with Bóthar Na Chóiste, and pedestrian and cyclist link to the adjacent Greenway route.
7) Provision of shared communal and private open space, site landscaping and public lighting, resident and visitor parking including electric vehicle charging points, bicycle parking spaces, and all associated site development works.
8) The application is accompanied by a Natura Impact Statement (NIS).

Figure 1: Site Extents

Figure 2: Indicative Site Layout

2 WASTEWATER DRAINAGE SYSTEM OVERVIEW

The proposed wastewater drainage system for the development will consist of a combination of gravity sewers and pumped discharge. All gravity sewers shall be laid under roads and open spaces.

Due to site topography a pumping station is required to service the development. The pumping station is to be located at the lowest point of the developable area in the southern section of the site. It is proposed to provide a pumping station capable of facilitating the proposed development while also allowing for future connection for the small parcel of lands adjoining the applicants site boundary to the west. It is therefore proposed that the onsite pumping station will provide 24-hours storage for approximately 300 no. units and will comply with the requirements of the IW Code of Practice for Wastewater Infrastructure.

A rising main will convey foul wastewater to a newly constructed discharge manhole and foul sewer network within the access road, where it will flow via gravity to the existing foul sewer network, *c.*460m to the southwest of the site entrance.

The foul sewer network was designed using Innovyze MicroDrainage modelling software. Outputs from the foul sewer design can be found in **Appendix A** of this document. The proposed foul sewer network is presented graphically on drawing no.s 10750-2103 & 2104 with the foul manhole schedule and foul drainage schedule details on drawing no.s 10750-2107 & 2108 respectively.

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 1/23 and 1/200. All velocities at said gradients fall within the limits as required in accordance with Irish Water Wastewater Infrastructure – Code of Practice and Standard Details.

3 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. The development has been split into 6No. catchment areas.

The stormwater generated by 5 of the catchment areas will flow by gravity and discharge via an Oil/Petrol Interceptor to 5No. soakaway units strategically located throughout the development. The stormwater will soak away through the underlying fractured rock/boulders. The soakaways units shall be of cellular storage providing 95% void ratio. These will also attenuate storm water during and post storm events prior to infiltrating through the underlying fractured rock/boulders. The 6th catchment area associated with the southern section of the access road will connect to an existing storm network on Bothar an Choiste Road.

All soakaways are designed to accommodate a 1 in 100-year storm event + 20% for Climate Change throughout the site.

The maximum pipe diameter is to be 375mm, with a maximum and minimum gradient of 1/60 and 1/250. 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.

4 WATERMAIN SYSTEM OVERVIEW

Details of the watermain arrangement for the proposed development is presented in this report and in drawing no.s 10750-2101 & 2102. It is proposed to connect a 150mm diameter watermain to an existing 200mm diameter watermain located on the L5041 local road. The 150mm diameter watermain will run north along the upgraded Bothar an Choiste road up to the development and brought into the site along the main access road. This will service the site along with 100mm diameter watermain spurs into the smaller cluster of houses in line with Irish Water requirements. All watermain designs will be fully vetted by Irish Water prior to receiving a connection offer.

5 ROADS OVERVIEW

Vehicular access to the proposed development will be via the existing Bothar an Choiste road which is off the existing local road L5041 as indicated on the drawings 10750-2109. The proposals include the upgrade of 525m of the existing Bothar an Choiste road from the development to the junction at L5041. The upgrade works consist of road improvements, road widening and junction re-alignment, as agreed with Galway City Council. The road upgrade works will precede the housing development works and will be completed before any unit is moved into. Refer to Architect phasing drawings for details. The road upgrade works are shown graphically on drawing no.s 10750-2113,2114 & 2115.

Following pre-planning consultation with Galway City Council Roads and transport Department, the proposed upgrade of the existing Bothar an Choiste road will bring the road up to the required standard and in accordance with DMURS 2019.

As part of this application, a Traffic and Transport Assessment and Road Safety Audit have been prepared and submitted. Refer to these separate documents for further details.

6 WASTEWATER

It is proposed that all sewers within the development will discharge via gravity to a pumping station located in the southern area on the residential section of the site. From here it will be pumped via a 110mm HDPE Rising Main to a newly constructed discharge manhole at the head of a proposed gravity sewer along the upgraded Bothar an Choiste. The proposed network will start c.250m southwest of the proposed site entrance and connect to the existing 225mm diameter foul network located within the L5041 local road. This ultimately discharges to the Terryland and River Valley wastewater pumping station.

It is proposed to lay the new rising main and 225mm foul gravity sewer within the Bothar an Choiste extents with these works to be carried out during the road upgrade works. The proposed 225mm diameter gravity foul sewer within the road upgrade is sized sufficiently for any possible future connections.

The proposed and existing foul sewer network is presented graphically on drawing nos. 10750-2103 & 2104, with drawing nos. 10750-2107 & 2108, showing the foul manhole schedule and drainage schedule respectively.

6.1 Loading Rates

An average rate of 2.7 P.E. per dwelling has been considered for the development to account for the varying unit occupancies. The sewer network has been designed to cater for 6 times the dry weather flow rate. The occupancy per dwelling and peak flow rate 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 and the EPA Wastewater Treatment Manuals - Treatment Systems for Small Communities, Business, Leisure Centres and Hotels.

150 litres per head per day plus an additional 10% allowance to account for infiltration within a new development have been considered in the foul sewer design as per Irish Water Code of Practice for Wastewater Infrastructure - Section 3.6 Hydraulic Design for Gravity Sewers.

6.2 Pumping Station

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.

The pumping station will be designed to cater for 24-hr storage for the total number of properties in accordance with Irish Water requirements. The pumping station storage has been designed to cater for the 170 no. properties located within the proposed site and for an additional 100 no. units in the zoned residential area directly to the west of the proposed development should this area be developed in the future.

The pumping station layout is illustrated on the site drawing and includes a 4.0m wide pull in area off Bothar an Choiste Road, (in accordance with Irish Water Standard Detail STD-WW-26), 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.

Therefore:

1. 170 no. Units per current Arch numbers
2. Creche (291m2 or 40 no. children)
3. 100 residential units directly to the west of the proposed site

Design:

1. 170 x 150 x 2.7 = 68,850 litres/day
2. "non-residential with canteen cooking on site" IW CoP Appendix C – 90 x 45(assume 40 children and 5 adults)
   90 x 45 = 4,050 litres/day
3. Assume 100 residential units to the west – 100 x150 x 2.7 = 40,500 litres

Total = 68,850 + 4050 + 40,500 = 113,400 litres or 113.40 m3.

Therefore 24-hour storage required within pumping station of min capacity of 113.40m3

Provide 7.5m long x 8.0m wide x 2.0m deep storage volume (below incoming invert) = 120.00m3

120.00>113.40 - OK

Therefore, tank volume required = 120m^3 for 24-hour storage

6.3 Wastewater Design

The foul sewer drainage services have been designed to take account of the requirements of the Civil Engineering Specification for the Water Industry (CESWI), subject to the requirements applied to it by Irish Water, as outlined in the Irish Water Code of Practice for Wastewater Infrastructure. Other design guidelines adhered to include the Department of Environment "Recommendations for Site Development Works for Housing Areas", 1998, and "Sewers for Adoption" published by WRC, UK.

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 proposed foul sewer networks have been designed using Innovyze MicroDrainage 2018.1.1 modelling software. The results and outputs from the modelling can be found in **Appendix A**.

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 1/23 and 1/200.

All sewers have been designed so that the velocities achieved fall within the limits of 0.75 and 3m/sec as set out in Irish Water Code of Practice for Wastewater Infrastructure and "Recommendations for Site Development Works" as published by the Department of Environment.

A pre-connection enquiry, (CDS21007628), has been submitted to Irish Water based on the envisaged wastewater discharge volumes from the development. Irish Water have reviewed this pre- connection enquiry and have advised that the proposed loading can be facilitated, and a Confirmation of Feasibility was received. A statement of design acceptance was also received

from Irish Water. Please refer to **Appendix D** for details of the Confirmation of Feasibility letter and Statement of Design acceptance.

7 STORMWATER DRAINAGE DESIGN

7.1 Existing Storm Drainage

There is currently no existing storm drainage in the vicinity of the site which will be suitable for serving the proposed development. As a result, all surface water run-off from the site and the northern section of the upgrade road works will need to be discharged to ground water. There is an existing 400mm storm sewer on the L5041 local road. This existing storm sewer will cater for the catchment area of the southern section of the Bothar an Choiste road upgrade works.

7.2 Proposed Storm Drainage

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. The proposed residential development and road upgrade works have been divided into 6No. catchment areas. 5 of the catchment areas will discharge to soakaways and percolate to the ground. Each soakaway has been strategically located to cater best for the associated catchment area. Due to the topography of the site a 6th catchment area, catering for the southern section of the road upgrade works, will discharge via gravity to the existing storm sewer as noted.

The storm water drainage network was designed using Innovyze MicroDrainage Design software and the following parameters formed the basis of the design:

- The surface water run-off is calculated using the Modified Rational Method (Wallingford Procedure),

  $Q = 2.78 \times Cv \times Cr \times I \times A$

  Where, Q = rate of run-off, l/s
  Cv = Volumetric run-off coefficient
  Cr = Routing coefficient
  I = Intensity of rainfall, mm/hr
  A = Impermeable Area, ha
- A design return period of 1 year has been adopted for the sewer network in accordance with good design practice.
- The rainfall intensity is based on rainfall data for County Galway
- Minimum self-cleansing velocity of 0.75m/s
- An allowable discharge of 2l/s/ha for the site
- M5-60 = 15.7
- Ratio R = 0.27

A dedicated storm water drainage system will be provided for the development and will pick up surface water run-off from impermeable surfaces such as roadways, footways, and roofs.

Precast concrete gullies including lockable cast iron grating and frame connected to a piped system will be provided to collect run-off from these areas. The proposed pipe diameter will range between 225mm and 375mm and will be laid at gradients varying between 1/60 and 1/250.

All velocities within said gradients fall within the limits of 0.8 and 3m/sec as set out in 'Recommendations for Site Development Works' as published by the Department for the Environment.

As noted above, the storm drainage for the entire development has been designed using the Innovyze MicroDrainage Design Software in accordance with the Recommendations for Site Development Works for Housing Areas and also the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). The details of the Micro Drainage Outputs and associated long sections for each network are outlined at **Appendix B** of this report.

Refer to drawing nos. 10750-2103 & 10750-2104 for details of the proposed storm drainage network.

The proposed and existing storm sewer network is presented graphically on drawing nos. 10750-2103 & 2104, with drawing nos. 10750-2105 & 2106, showing the storm manhole schedule and drainage schedule respectively.

7.3 Sustainable Urban Drainage Systems

The existing site primarily consist of greenfield with no existing drainage or SuDS measures in place. To maintain surface water runoff from the site to those of the current state, thesurface water drainage for the proposed development will be designed in accordance with theprinciples of Sustainable Urban Drainage Systems (SuDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of drainage criteria which aim to minimise the impact of urbanisation by replicating the runoff characteristics of the greenfield site.

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

Interception storage

Treatment storage (not required if interception storage is provided)

Attenuation storage

Long term storage (if this is not required growth rates should not be applied to QBar)

In the case of the subject site interception and attenuation storage can be achieved by implementing infiltration/attenuation storage tank. Growth factors will be applied to the allowable discharge for the 100-year event. This means that both treatment storage and long-term storage, neither of which would be practical on this site, are not required. All SuDS measures will be designed in accordance with the recommendation set out in the EPA's document entitled "Guidance on Authorisation of Discharges to Groundwater 2011"

7.4 Petrol Interceptor

It is proposed to install a Bypass Petrol Interceptor upstream of the connection into each of the proposed soakaways. Locations of the interceptors can be seen graphically on drawing no.s 10750-2103. Storm water entering each soakaway will include run-off from the roadways and parking areas throughout the site and therefore may have hydrocarbons within their flow. These hydrocarbon pollutants require removal and are not to be discharged back into the environment. The separator has been sized to cater for roads, footways and driveway areas of each catchment area.

From the selection tables in the separator product brochure, attached in **Appendix C**, and using the drainage area per square meter of each catchment, the following would be required, (or similar products approved):

- Network A – NSBE025
- Network B – NSBE015
- Network C – NSPB004
- Network D – NSPB004
- Network E – NSPB004

No Petrol Interceptor is required for catchment area F as the network proposed in connecting into an existing 400mm Stormwater sewer.

7.5 Soakaways (BRE 365)

Storm water from roof run-off and impermeable areas will discharge to 5No. soakaways on the site. The stormwater discharges to groundwater and will be off cellular storage for 95% porosity. 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 + 20% for climate change for sliding durations obtained from Met Eireann. The soakaway locations are shown graphically on drawing no. 10750-2103.

Infiltration tests were carried out in accordance with BRE Digest 365:2016 to establish the achievable infiltration rates on site and these rates were used in drainage calculations to determine suitable soakaway volumes and invert levels. The locations of the soakaways, along with the volumes and invert levels of each is shown on drawing no. 10750-2103. Results of the calculations and long sections can be found in **Appendix B**. A Typical Attenuation/Soakaway Unit & Cross Section Detail is shown on drawing no. 10750-2123.

8 WATERMAIN

The water supply services have been designed to take account of the requirements of the Civil Engineering Specification for the Water Industry (CESWI), subject to the particular requirements applied to it by Irish Water, as outlined in the Irish Water Code of Practice for Water Infrastructure. Other design guidelines adhered to include the Department of Environment "Recommendations for Site Development Works for Housing Areas", 1998.

The water supply required for the proposed development shall be via a 150mm diameter watermain as per Irish Water requirements. It is proposed to connect to the existing 200mm diameter uPVC watermain located in the main junction of the L5041 local road and Bothar an Choiste road, south-west of the residential element of the development, as per drawing no.

10750-2102. The 150mm watermain will be brought north up to the proposed site entrance, within the upgraded Bothar an Choiste, and into the development as a 'spine' watermain within the footpath on the right-hand side of the main access road.

A number of 100mm diameter PE watermains will branch off this 'spine' watermain to service the cluster of houses/apartments within the development. In accordance with Local authority standards, a water meter, and Logging Device (Larson Type) are proposed at the connection into the proposed residential development. A sluice valve, strainer and 150mm Ø by-pass arrangement is also proposed to allow for possible disconnection of water meters by the Local Authority. All watermain designs will be fully vetted by Irish Water prior to receiving a connection offer.

A confirmation of feasibility letter, from the Pre-connection enquiry and a Statement of Design Acceptance issued by Irish Water is attached in **Appendix D**.

Refer to drawings 10750-2101 & 10750-2102 which outline the details of the existing and proposed water supply network.

9 FIRE FIGHTING FLOWS

To meet required fire flow requirements, it is proposed to install a below ground static storage capacity within the site, Figure 3. This is being provided as, in general, 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. An 80mm diameter top up supply for tank will be provided from the main watermain which will include a shut-off valve should the supply need to be switched off for maintenance or in an emergency. The location of the tank is shown graphically on drawing no. 10750-2101.

It is noted that in addition to the static storage tank, a significant volume 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.

The above is subject to Irish Water Confirmation of Feasibility response, and should they note that if 20 l/s can be achieved within the network then the above tank may be omitted allowing the development to be serviced by the hydrants solely. Any such omissions will be agreed with the Fire Officer and Irish water in advance.

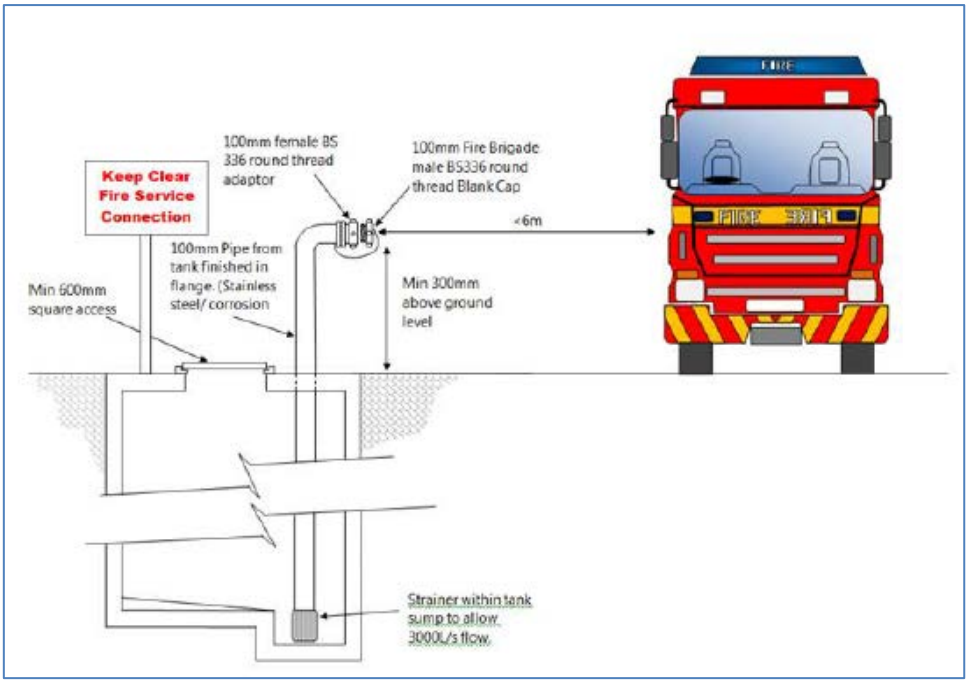


Figure 3: Typical detail of a below ground static storage tank.

10 ROAD DESIGN

All internal roads within the development will consist of macadam surfacing with coloured bitmac areas strategically located representing shared surface areas. Road widths within the development are 5.5m wide with the maximum and minimum road gradients proposed at 1:21 & 1:200 respectively. Drop kerb and tactile paving will be provided at pedestrian desire lines throughout the development.

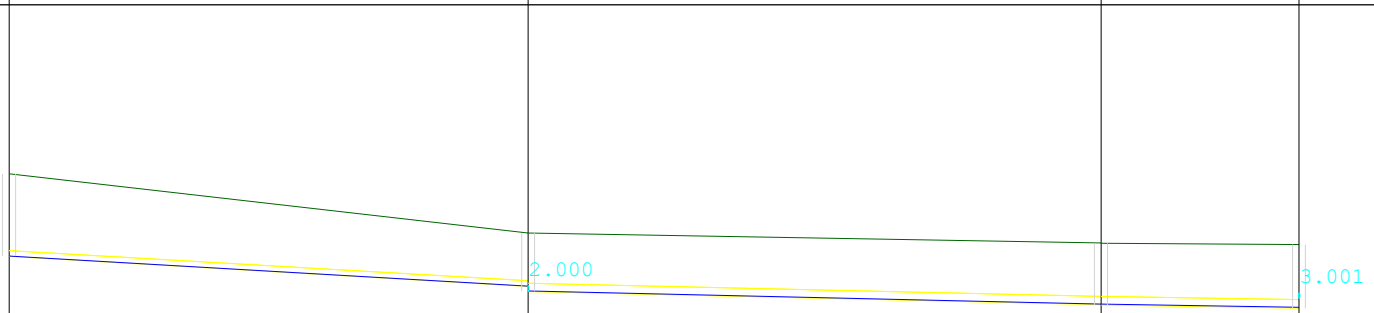
The proposed upgraded works to the Bothar an Choiste road, between the residential development and the junction to the south-west, will provide a 6.5m wide carriageway and 1.8m wide footpath. The footpath will run the full length of the southern side of the road from the development to the junction with the L5041 local road. This will provide pedestrian linkage from the existing footpath network at the junction to the proposed residential development. The upgrade works will tie into the new kerb line outside the recently constructed development at Caireal Mor at the southern end of Bothar an Choiste road. The road upgrade works will precede the housing development works and will be completed before any unit is moved into. Refer to Architect phasing drawings for details.

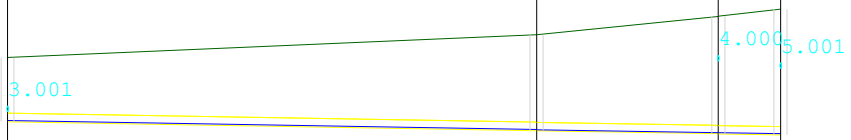
Following pre-planning consultation with Galway County Council Roads and transport Department, the proposed upgrade of the Bothar an Choiste road will bring the road up to the required standard and in accordance with DMURS 2019.

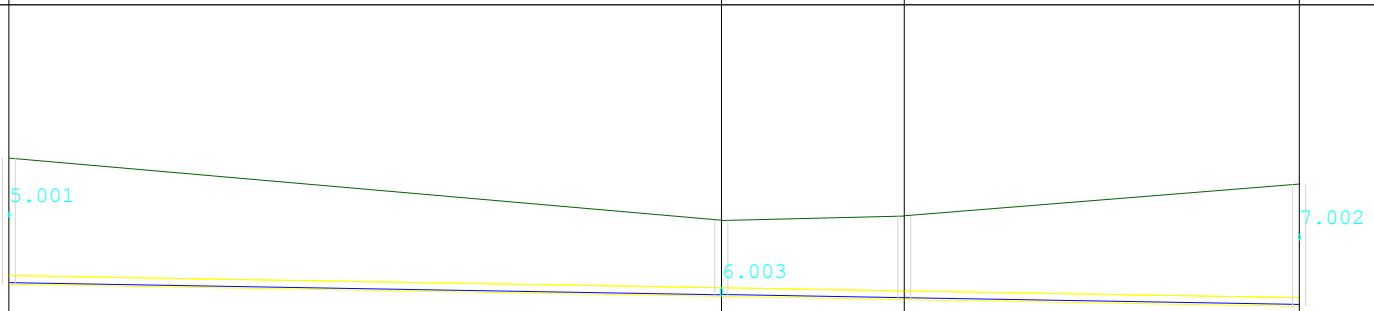
As part of this application, a Traffic and Transport Assessment has been prepared. Refer to these separate documents for further details.

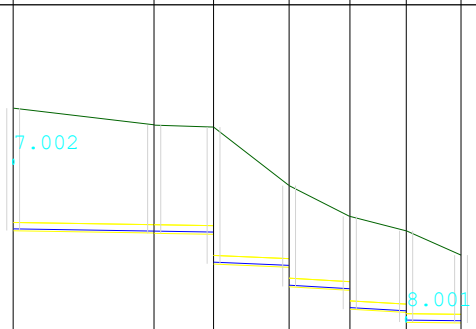
APPENDIX A

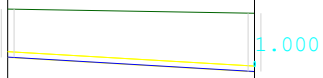
Foul Sewer Design and Calculation

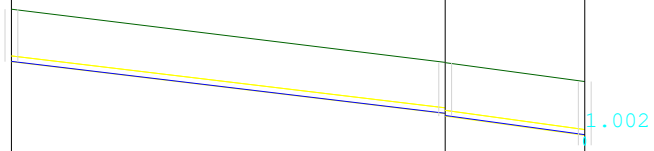
MH Name		F2.1	F2	F3	F4
Hor Scale 700 Ver Scale 200 Datum (m)14.000					
PN		1.000	1.001	1.002	
Dia (mm)		150	225	225	
Slope (1:X)		60.0	149.8	199.2	
Cover Level (m)		21.683	20.116	19.850	19.813
Invert Level (m)		19.501 18.700	18.569 18.215	18.216 18.124	
Length (m)		48.052	53.027	18.330	

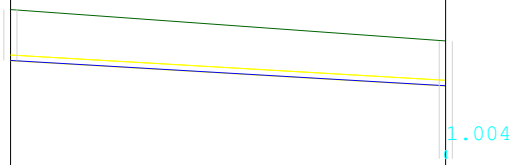
MH Name		F4	F5		F7
Hor Scale 700 Ver Scale 200 Datum (m)13.000					
PN		1.003	1.004		
Dia (mm)		225	225		
Slope (1:X)		199.9	200.4		
Cover Level (m)		19.813	20.419	20.905	21.098
Invert Level (m)		18.124 17.879	17.879 17.795	17.795 17.766	
Length (m)		48.965	16.830		

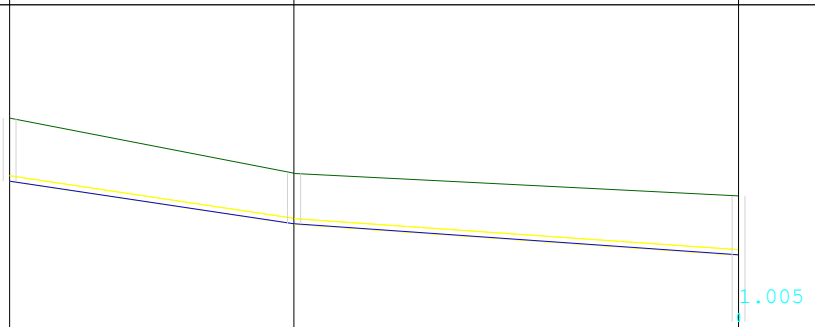
MH Name		F7	F8	F9	F10
Hor Scale 700 Ver Scale 200 Datum (m)13.000					
PN		1.006	1.007	1.008	
Dia (mm)		225	225	225	
Slope (1:X)		204.8	199.2	199.8	
Cover Level (m)		21.098	19.449	19.572	20.417
Invert Level (m)		17.766 17.444	17.445 17.360	17.360 17.177	
Length (m)		65.950	16.934	36.555	

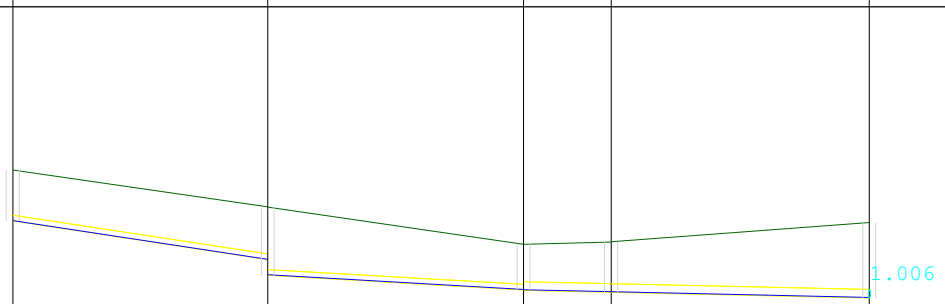
MH Name		F10						F16
Hor Scale 700 Ver Scale 200 Datum (m)11.000								
PN		1.009						
Dia (mm)		225						
Slope (1:X)		200.8						
Cover Level (m)		20.417	19.976	19.922	18.374	17.557	17.175	16.531
Invert Level (m)		17.177 17.112	17.112 17.085	16.300 16.208	15.700 15.606	15.100 15.013	14.758 14.733	
Length (m)		13.049						

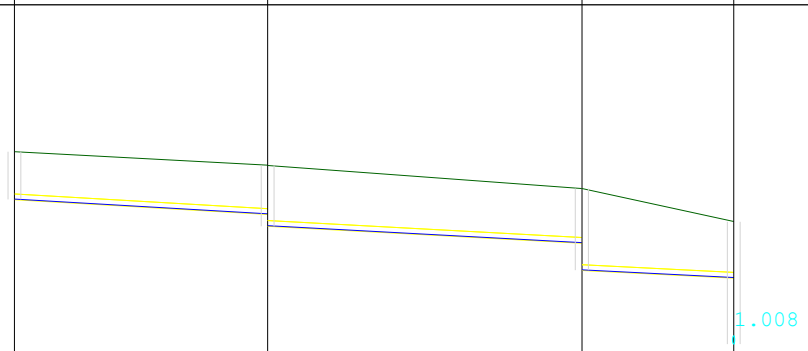
MH Name		F1	F2
Hor Scale 700 Ver Scale 200 Datum (m)13.000			
PN		2.000	
Dia (mm)		150	
Slope (1:X)		60.0	
Cover Level (m)		20.230	20.116
Invert Level (m)		18.950	18.569
Length (m)		22.854	

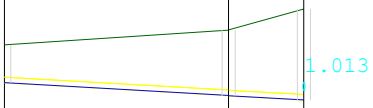
MH Name		F4.2	F4.1	F4
Hor Scale 700 Ver Scale 200 Datum (m)14.000				
PN		3.000	3.001	
Dia (mm)		150	150	
Slope (1:X)		29.3	25.2	
Cover Level (m)		21.728	20.318	19.813
Invert Level (m)		20.338 / 18.966	18.900 / 18.387	
Length (m)		40.146	12.921	

MH Name		F6.1	F6
Hor Scale 700 Ver Scale 200 Datum (m)14.000			
PN		4.000	
Dia (mm)		150	
Slope (1:X)		60.0	
Cover Level (m)		21.743	20.905
Invert Level (m)		20.391	19.719
Length (m)		40.296	

MH Name		F7.2	F7.1	F7
Hor Scale 700 Ver Scale 200 Datum (m)14.000				
PN		5.000	5.001	
Dia (mm)		150	150	
Slope (1:X)		23.3	50.0	
Cover Level (m)		23.156	21.695	21.098
Invert Level (m)		21.482 20.350	20.350 19.527	
Length (m)		26.331	41.148	

MH Name		F8.4	F8.3		F8.1	F8
Hor Scale 700 Ver Scale 200 Datum (m)13.000						
PN		6.000	6.001		6.003	
Dia (mm)		150	150		225	
Slope (1:X)		23.0	59.9		150.3	
Cover Level (m)		20.839	19.858	18.875	18.936	19.449
Invert Level (m)		19.490 18.464	18.052 17.657	17.657 17.603	17.603 17.444	
Length (m)		23.603	23.675		23.897	

MH Name		F10.3	F10.2	F10.1	F10
Hor Scale 700 Ver Scale 200 Datum (m)14.000					
PN		7.000	7.001	7.002	
Dia (mm)		150	150	150	
Slope (1:X)		60.1	63.7	68.6	
Cover Level (m)		22.269	21.907	21.296	20.417
Invert Level (m)		21.000 / 20.610	20.297 / 19.840	19.130 / 18.925	
Length (m)		23.430	29.093	14.054	

MH Name		F15.2		F15
Hor Scale 700 Ver Scale 200 Datum (m)10.000				
PN		8.000		
Dia (mm)		150		
Slope (1:X)		60.0		
Cover Level (m)		16.232	16.622	17.175
Invert Level (m)		15.220 14.874	14.874 14.758	
Length (m)		20.767		

FOUL SEWERAGE DESIGN

Design Criteria for Foul Network 1

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)	500

Designed with Level Soffits

Network Design Table for Foul Network 1

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
1.000	48.052	0.801	60.0	0.000	8	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)
1.000	19.501	0.000	0.0	8	0.0	12	0.36	1.13	20.0	0.2

Network Design Table for Foul Network 1

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
2.000	22.854	0.381	60.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
1.001	53.027	0.354	149.8	0.000	9	0.0	1.500	o	225	Pipe/Conduit	
1.002	18.330	0.092	199.2	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
3.000	40.146	1.372	29.3	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
3.001	12.921	0.513	25.2	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
1.003	48.965	0.245	199.9	0.000	11	0.0	1.500	o	225	Pipe/Conduit	
1.004	16.830	0.084	200.4	0.000	1	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)
2.000	18.950	0.000	0.0	5	0.0	9	0.31	1.13	20.0	0.1
1.001	18.569	0.000	0.0	22	0.0	20	0.34	0.94	37.3	0.6
1.002	18.216	0.000	0.0	24	0.0	23	0.32	0.81	32.3	0.7
3.000	20.338	0.000	0.0	12	0.0	12	0.53	1.62	28.7	0.3
3.001	18.900	0.000	0.0	15	0.0	13	0.60	1.75	30.9	0.4
1.003	18.124	0.000	0.0	50	0.0	32	0.40	0.81	32.2	1.4
1.004	17.879	0.000	0.0	51	0.0	33	0.40	0.81	32.2	1.4

Network Design Table for Foul Network 1

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
4.000	40.296	0.672	60.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
1.005	5.757	0.029	198.5	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
5.000	26.331	1.132	23.3	0.000	10	0.0	1.500	o	150	Pipe/Conduit	
5.001	41.148	0.823	50.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
1.006	65.950	0.322	204.8	0.000	22	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)
4.000	20.391	0.000	0.0	6	0.0	10	0.33	1.13	20.0	0.2
1.005	17.795	0.000	0.0	57	0.0	34	0.42	0.81	32.3	1.6
5.000	21.482	0.000	0.0	10	0.0	10	0.54	1.82	32.2	0.3
5.001	20.350	0.000	0.0	13	0.0	14	0.45	1.24	21.9	0.4
1.006	17.766	0.000	0.0	92	0.0	44	0.48	0.80	31.8	2.6

Network Design Table for Foul Network 1

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
6.000	23.603	1.026	23.0	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
6.001	23.675	0.395	59.9	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
6.002	8.107	0.054	150.1	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
6.003	23.897	0.159	150.3	0.000	7	0.0	1.500	o	225	Pipe/Conduit	
1.007	16.934	0.085	199.2	0.000	5	0.0	1.500	o	225	Pipe/Conduit	
1.008	36.555	0.183	199.8	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
7.000	23.430	0.390	60.1	0.000	10	0.0	1.500	o	150	Pipe/Conduit	
7.001	29.093	0.457	63.7	0.000	6	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)
6.000	19.490	0.000	0.0	9	0.0	10	0.52	1.83	32.4	0.3
6.001	18.052	0.000	0.0	17	0.0	16	0.46	1.13	20.0	0.5
6.002	17.657	0.000	0.0	17	0.0	18	0.32	0.94	37.2	0.5
6.003	17.603	0.000	0.0	24	0.0	21	0.35	0.94	37.2	0.7
1.007	17.445	0.000	0.0	121	0.0	49	0.53	0.81	32.3	3.4
1.008	17.360	0.000	0.0	121	0.0	49	0.53	0.81	32.2	3.4
7.000	21.000	0.000	0.0	10	0.0	13	0.39	1.13	20.0	0.3
7.001	20.297	0.000	0.0	16	0.0	16	0.44	1.10	19.4	0.5

Network Design Table for Foul Network 1

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
7.002	14.054	0.205	68.6	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
1.009	13.049	0.065	200.8	0.000	6	0.0	1.500	o	225	Pipe/Conduit	
1.010	5.499	0.027	203.7	0.000	18	0.0	1.500	o	225	Pipe/Conduit	
1.011	6.985	0.092	75.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.012	5.626	0.094	59.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.013	5.215	0.087	59.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
8.000	20.767	0.346	60.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
8.001	6.958	0.116	60.0	0.000	5	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)
7.002	19.130	0.000	0.0	18	0.0	17	0.45	1.06	18.7	0.5
1.009	17.177	0.000	0.0	145	0.0	54	0.55	0.81	32.2	4.1
1.010	17.112	0.000	0.0	163	0.0	58	0.57	0.80	31.9	4.6
1.011	16.300	0.000	0.0	163	0.0	45	0.81	1.32	52.4	4.6
1.012	15.700	0.000	0.0	163	0.0	43	0.88	1.49	59.1	4.6
1.013	15.100	0.000	0.0	163	0.0	43	0.88	1.48	59.0	4.6
8.000	15.220	0.000	0.0	5	0.0	9	0.31	1.13	20.0	0.1
8.001	14.874	0.000	0.0	10	0.0	13	0.39	1.13	20.0	0.3

Network Design Table for Foul Network 1

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
1.014	5.072	0.025	202.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.014	14.758	0.000	0.0	173	0.0	59	0.58	0.80	32.0	4.9

Manhole Schedules for Foul Network 1

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)
F2.1	21.683	2.182	Open Manhole	1200	1.000	19.501	150				
F1	20.230	1.280	Open Manhole	1200	2.000	18.950	150				
F2	20.116	1.547	Open Manhole	1200	1.001	18.569	225	1.000	18.700	150	56
								2.000	18.569	150	
F3	19.850	1.635	Open Manhole	1200	1.002	18.216	225	1.001	18.215	225	
F4.2	21.728	1.390	Open Manhole	1200	3.000	20.338	150				
F4.1	20.318	1.418	Open Manhole	1200	3.001	18.900	150	3.000	18.966	150	66
F4	19.813	1.689	Open Manhole	1200	1.003	18.124	225	1.002	18.124	225	
								3.001	18.387	150	188
F5	20.419	2.540	Open Manhole	1200	1.004	17.879	225	1.003	17.879	225	
F6.1	21.743	1.352	Open Manhole	1200	4.000	20.391	150				
F6	20.905	3.110	Open Manhole	1200	1.005	17.795	225	1.004	17.795	225	
								4.000	19.719	150	1849
F7.2	23.156	1.674	Open Manhole	1200	5.000	21.482	150				
F7.1	21.695	1.345	Open Manhole	1200	5.001	20.350	150	5.000	20.350	150	
F7	21.098	3.332	Open Manhole	1200	1.006	17.766	225	1.005	17.766	225	
								5.001	19.527	150	1686
F8.4	20.839	1.349	Open Manhole	1200	6.000	19.490	150				
F8.3	19.858	1.806	Open Manhole	1200	6.001	18.052	150	6.000	18.464	150	412

Fairgreen House
Fairgreen Road
Galway

Date 05/07/2022 15:01
File 10750 - NETWORK 1.MDX

Designed by michael.naughton
Checked by

Micro Drainage | Network 2018.1.1

Manhole Schedules for Foul Network 1

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)
F8.2	18.875	1.218	Open Manhole	1200	6.002	17.657	225	6.001	17.657	150	
F8.1	18.936	1.333	Open Manhole	1200	6.003	17.603	225	6.002	17.603	225	
F8	19.449	2.005	Open Manhole	1200	1.007	17.445	225	1.006	17.444	225	
								6.003	17.444	225	
F9	19.572	2.212	Open Manhole	1200	1.008	17.360	225	1.007	17.360	225	
F10.3	22.269	1.269	Open Manhole	1200	7.000	21.000	150				
F10.2	21.907	1.610	Open Manhole	1200	7.001	20.297	150	7.000	20.610	150	313
F10.1	21.296	2.166	Open Manhole	1200	7.002	19.130	150	7.001	19.840	150	710
F10	20.417	3.240	Open Manhole	1200	1.009	17.177	225	1.008	17.177	225	
								7.002	18.925	150	1673
F11	19.976	2.864	Open Manhole	1200	1.010	17.112	225	1.009	17.112	225	
F12	19.922	3.622	Open Manhole	1200	1.011	16.300	225	1.010	17.085	225	785
F13	18.374	2.674	Open Manhole	1200	1.012	15.700	225	1.011	16.208	225	508
F14	17.557	2.457	Open Manhole	1200	1.013	15.100	225	1.012	15.606	225	506
F15.2	16.232	1.012	Open Manhole	1200	8.000	15.220	150				
F15.1	16.622	1.748	Open Manhole	1200	8.001	14.874	150	8.000	14.874	150	
F15	17.175	2.417	Open Manhole	1200	1.014	14.758	225	1.013	15.013	225	255
								8.001	14.758	150	
F16	16.531	1.798	Open Manhole	1200		OUTFALL		1.014	14.733	225	

PIPELINE SCHEDULES for Foul Network 1

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	150	F2.1	21.683	19.501	2.032	Open Manhole	1200
2.000	o	150	F1	20.230	18.950	1.130	Open Manhole	1200
1.001	o	225	F2	20.116	18.569	1.322	Open Manhole	1200
1.002	o	225	F3	19.850	18.216	1.409	Open Manhole	1200
3.000	o	150	F4.2	21.728	20.338	1.240	Open Manhole	1200
3.001	o	150	F4.1	20.318	18.900	1.268	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	48.052	60.0	F2	20.116	18.700	1.266	Open Manhole	1200
2.000	22.854	60.0	F2	20.116	18.569	1.397	Open Manhole	1200
1.001	53.027	149.8	F3	19.850	18.215	1.410	Open Manhole	1200
1.002	18.330	199.2	F4	19.813	18.124	1.464	Open Manhole	1200
3.000	40.146	29.3	F4.1	20.318	18.966	1.202	Open Manhole	1200
3.001	12.921	25.2	F4	19.813	18.387	1.276	Open Manhole	1200

PIPELINE SCHEDULES for Foul Network 1

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)
1.003	o	225	F4	19.813	18.124	1.464	Open Manhole	1200
1.004	o	225	F5	20.419	17.879	2.315	Open Manhole	1200
4.000	o	150	F6.1	21.743	20.391	1.202	Open Manhole	1200
1.005	o	225	F6	20.905	17.795	2.885	Open Manhole	1200
5.000	o	150	F7.2	23.156	21.482	1.524	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)
1.003	48.965	199.9	F5	20.419	17.879	2.315	Open Manhole	1200
1.004	16.830	200.4	F6	20.905	17.795	2.885	Open Manhole	1200
4.000	40.296	60.0	F6	20.905	19.719	1.036	Open Manhole	1200
1.005	5.757	198.5	F7	21.098	17.766	3.107	Open Manhole	1200
5.000	26.331	23.3	F7.1	21.695	20.350	1.195	Open Manhole	1200

PIPELINE SCHEDULES for Foul Network 1

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)
5.001	o	150	F7.1	21.695	20.350	1.195	Open Manhole	1200
1.006	o	225	F7	21.098	17.766	3.107	Open Manhole	1200
6.000	o	150	F8.4	20.839	19.490	1.199	Open Manhole	1200
6.001	o	150	F8.3	19.858	18.052	1.656	Open Manhole	1200
6.002	o	225	F8.2	18.875	17.657	0.993	Open Manhole	1200
6.003	o	225	F8.1	18.936	17.603	1.108	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)
5.001	41.148	50.0	F7	21.098	19.527	1.421	Open Manhole	1200
1.006	65.950	204.8	F8	19.449	17.444	1.780	Open Manhole	1200
6.000	23.603	23.0	F8.3	19.858	18.464	1.244	Open Manhole	1200
6.001	23.675	59.9	F8.2	18.875	17.657	1.068	Open Manhole	1200
6.002	8.107	150.1	F8.1	18.936	17.603	1.108	Open Manhole	1200
6.003	23.897	150.3	F8	19.449	17.444	1.780	Open Manhole	1200

PIPELINE SCHEDULES for Foul Network 1

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)
1.007	o	225	F8	19.449	17.445	1.779	Open Manhole	1200
1.008	o	225	F9	19.572	17.360	1.987	Open Manhole	1200
7.000	o	150	F10.3	22.269	21.000	1.119	Open Manhole	1200
7.001	o	150	F10.2	21.907	20.297	1.460	Open Manhole	1200
7.002	o	150	F10.1	21.296	19.130	2.016	Open Manhole	1200
1.009	o	225	F10	20.417	17.177	3.015	Open Manhole	1200
1.010	o	225	F11	19.976	17.112	2.639	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)
1.007	16.934	199.2	F9	19.572	17.360	1.987	Open Manhole	1200
1.008	36.555	199.8	F10	20.417	17.177	3.015	Open Manhole	1200
7.000	23.430	60.1	F10.2	21.907	20.610	1.147	Open Manhole	1200
7.001	29.093	63.7	F10.1	21.296	19.840	1.306	Open Manhole	1200
7.002	14.054	68.6	F10	20.417	18.925	1.342	Open Manhole	1200
1.009	13.049	200.8	F11	19.976	17.112	2.639	Open Manhole	1200
1.010	5.499	203.7	F12	19.922	17.085	2.612	Open Manhole	1200

PIPELINE SCHEDULES for Foul Network 1

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)
1.011	o	225	F12	19.922	16.300	3.397	Open Manhole	1200
1.012	o	225	F13	18.374	15.700	2.449	Open Manhole	1200
1.013	o	225	F14	17.557	15.100	2.232	Open Manhole	1200
8.000	o	150	F15.2	16.232	15.220	0.862	Open Manhole	1200
8.001	o	150	F15.1	16.622	14.874	1.598	Open Manhole	1200
1.014	o	225	F15	17.175	14.758	2.192	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)
1.011	6.985	75.9	F13	18.374	16.208	1.941	Open Manhole	1200
1.012	5.626	59.9	F14	17.557	15.606	1.726	Open Manhole	1200
1.013	5.215	59.9	F15	17.175	15.013	1.937	Open Manhole	1200
8.000	20.767	60.0	F15.1	16.622	14.874	1.598	Open Manhole	1200
8.001	6.958	60.0	F15	17.175	14.758	2.267	Open Manhole	1200
1.014	5.072	202.9	F16	16.531	14.733	1.573	Open Manhole	1200

Area Summary for Foul Network 1

Pipe Number	Gross Area (ha)	Pipe Total (ha)
1.000	0.000	0.000
2.000	0.000	0.000
1.001	0.000	0.000
1.002	0.000	0.000
3.000	0.000	0.000
3.001	0.000	0.000
1.003	0.000	0.000
1.004	0.000	0.000
4.000	0.000	0.000
1.005	0.000	0.000
5.000	0.000	0.000
5.001	0.000	0.000
1.006	0.000	0.000
6.000	0.000	0.000
6.001	0.000	0.000
6.002	0.000	0.000
6.003	0.000	0.000
1.007	0.000	0.000
1.008	0.000	0.000
7.000	0.000	0.000
7.001	0.000	0.000
7.002	0.000	0.000
1.009	0.000	0.000
1.010	0.000	0.000
1.011	0.000	0.000
1.012	0.000	0.000
1.013	0.000	0.000

Area Summary for Foul Network 1

Pipe Number	Gross Area (ha)	Pipe Total (ha)
8.000	0.000	0.000
8.001	0.000	0.000
1.014	0.000	0.000
	Total	Total
	0.000	0.000

Free Flowing Outfall Details for Foul Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.014	F16	16.531	14.733	0.000	1200	0

Fairgreen House
Fairgreen Road
Galway

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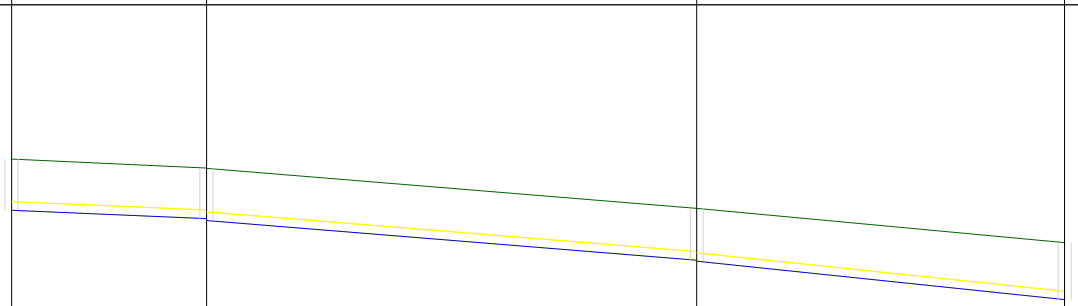
MH Name		F17	F18	F19	F20
Hor Scale 700 Ver Scale 200 Datum (m)11.000					
PN		1.000	1.001	1.002	
Dia (mm)		225	225	225	
Slope (1:X)		79.5	43.2	33.4	
Cover Level (m)		19.071	18.833	17.767	16.857
Invert Level (m)		17.723 / 17.496	17.450 / 16.400	16.370 / 15.350	
Length (m)		18.049	45.373	34.066	

Fairgreen House
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Galway

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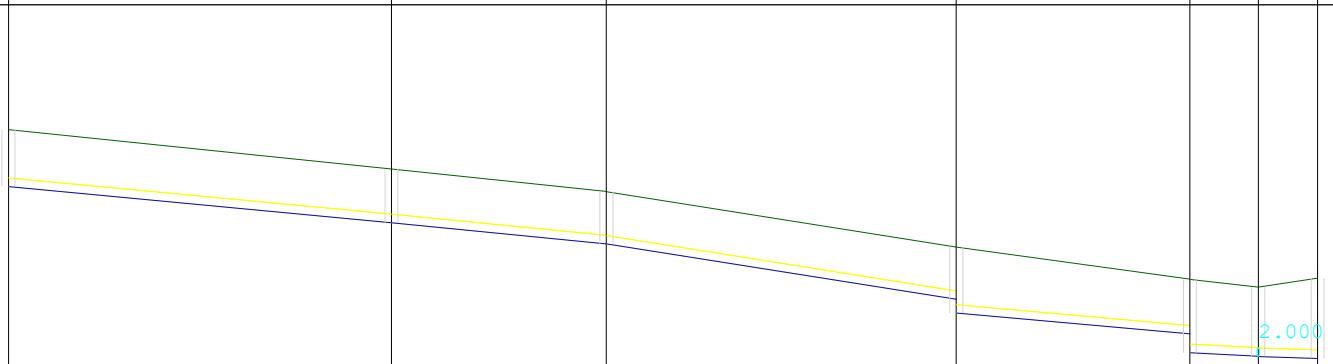
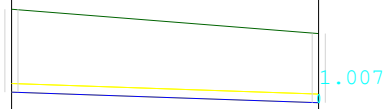
MH Name		F20	F21	F22	F23			Ex. F2
Hor Scale 700 Ver Scale 200 Datum (m) 8.000								
PN		1.003	1.004	1.005	1.006			
Dia (mm)		225	225	225	225			
Slope (1:X)		36.9	35.5	22.0	38.9			
Cover Level (m)		16.857	15.813	15.214	13.749	12.895	12.684	12.922
Invert Level (m)		15.350	14.390	14.390	13.830	13.830	12.357	12.000	11.444	10.954	10.853	10.853	10.798	
Length (m)		35.451		19.893		32.390		21.626				

MH Name		Ex. F1	F25
Hor Scale 700 Ver Scale 200 Datum (m) 6.000			
PN		2.000	
Dia (mm)		225	
Slope (1:X)		100.1	
Cover Level (m)		13.334	12.684
Invert Level (m)		11.137	10.853
Length (m)		28.441	

Manhole Schedules for Foul Network 2

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)
F17	19.071	1.348	Open Manhole	1200	1.000	17.723	225				
F18	18.833	1.383	Open Manhole	1200	1.001	17.450	225	1.000	17.496	225	46
F19	17.767	1.397	Open Manhole	1200	1.002	16.370	225	1.001	16.400	225	30
F20	16.857	1.507	Open Manhole	1200	1.003	15.350	225	1.002	15.350	225	
F21	15.813	1.423	Open Manhole	1200	1.004	14.390	225	1.003	14.390	225	
F22	15.214	1.384	Open Manhole	1200	1.005	13.830	225	1.004	13.830	225	
F23	13.749	1.749	Open Manhole	1200	1.006	12.000	225	1.005	12.357	225	357
F24	12.895	1.941	Open Manhole	1200	1.007	10.954	225	1.006	11.444	225	490
Ex. F1	13.334	2.197	Open Manhole	1200	2.000	11.137	225				
F25	12.684	1.831	Open Manhole	1200	1.008	10.853	225	1.007	10.853	225	
								2.000	10.853	225	
Ex. F2	12.922	2.124	Open Manhole	1200		OUTFALL		1.008	10.798	225	

PIPELINE SCHEDULES for Foul Network 2

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	F17	19.071	17.723	1.123	Open Manhole	1200
1.001	o	225	F18	18.833	17.450	1.158	Open Manhole	1200
1.002	o	225	F19	17.767	16.370	1.172	Open Manhole	1200
1.003	o	225	F20	16.857	15.350	1.282	Open Manhole	1200
1.004	o	225	F21	15.813	14.390	1.198	Open Manhole	1200
1.005	o	225	F22	15.214	13.830	1.159	Open Manhole	1200
1.006	o	225	F23	13.749	12.000	1.524	Open Manhole	1200
1.007	o	225	F24	12.895	10.954	1.716	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	18.049	79.5	F18	18.833	17.496	1.112	Open Manhole	1200
1.001	45.373	43.2	F19	17.767	16.400	1.142	Open Manhole	1200
1.002	34.066	33.4	F20	16.857	15.350	1.282	Open Manhole	1200
1.003	35.451	36.9	F21	15.813	14.390	1.198	Open Manhole	1200
1.004	19.893	35.5	F22	15.214	13.830	1.159	Open Manhole	1200
1.005	32.390	22.0	F23	13.749	12.357	1.167	Open Manhole	1200
1.006	21.626	38.9	F24	12.895	11.444	1.226	Open Manhole	1200
1.007	6.328	62.7	F25	12.684	10.853	1.606	Open Manhole	1200

PIPELINE SCHEDULES for Foul Network 2

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)
2.000	o	225	Ex. F1	13.334	11.137	1.972	Open Manhole	1200
1.008	o	225	F25	12.684	10.853	1.606	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)
2.000	28.441	100.1	F25	12.684	10.853	1.606	Open Manhole	1200
1.008	5.498	100.0	Ex. F2	12.922	10.798	1.899	Open Manhole	1200

Area Summary for Foul Network 2

Pipe Number	Gross Area (ha)	Pipe Total (ha)
1.000	0.000	0.000
1.001	0.000	0.000
1.002	0.000	0.000
1.003	0.000	0.000
1.004	0.000	0.000
1.005	0.000	0.000
1.006	0.000	0.000
1.007	0.000	0.000
2.000	0.000	0.000
1.008	0.000	0.000
	Total	Total
	0.000	0.000

Free Flowing Outfall Details for Foul Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008	Ex. F2	12.922	10.798	0.000	1200	0

APPENDIX B

Storm Sewer Design and Calculations

Fairgreen House
Fairgreen Road
Galway

Date 05/07/2022 17:50
File 10750 - SOAKAWAY A.MDX

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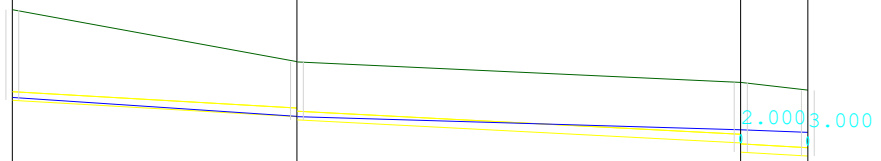
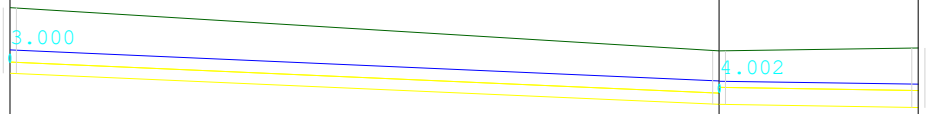
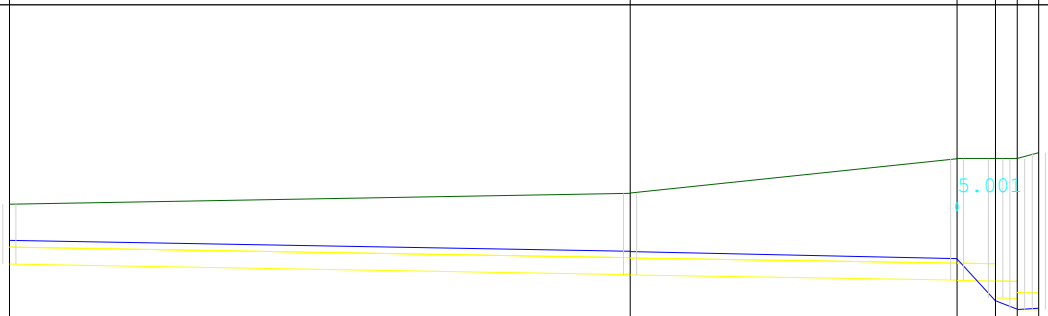
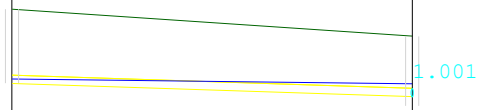
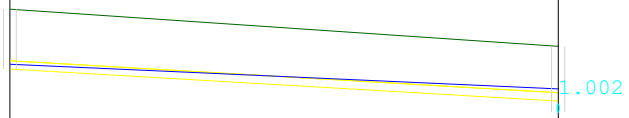
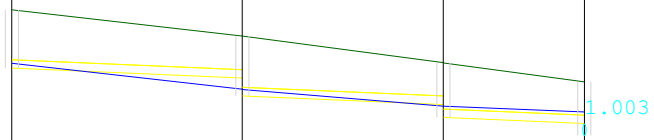
MH Name		SA 1	SA 2		SA 4
Hor Scale 700 Ver Scale 200 Datum (m)15.000					
PN		1.000	1.001		
Dia (mm)		225	225		
Slope (1:X)		60.0	67.2		
Cover Level (m)		23.082	21.706	21.159	20.950
Invert Level (m)		20.689 / 20.250	20.171 / 19.560	19.314	19.210
Length (m)		26.344	41.080		

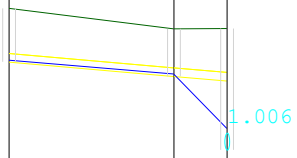
MH Name		SA 4	SA 5	SA 6
Hor Scale 700 Ver Scale 200 Datum (m)14.000				
PN		1.003	1.004	
Dia (mm)		300	450	
Slope (1:X)		79.9	198.2	
Cover Level (m)		20.950	19.805	19.882
Invert Level (m)		19.210 18.388	18.389	18.296
Length (m)		65.658	18.434	

MH Name		SA 6	SA 7			SA 9
Hor Scale 700 Ver Scale 200 Datum (m)13.000						
PN		1.005	1.006			
Dia (mm)		450	450			
Slope (1:X)		200.2	217.7			
Cover Level (m)		19.882	20.173	21.085		21.243
Invert Level (m)		18.295	18.008 / 18.008	17.869 / 17.869		
Length (m)		57.462	30.259			

MH Name		SA 3.1	SA 3
Hor Scale 700 Ver Scale 200 Datum (m)15.000			
PN		2.000	
Dia (mm)		225	
Slope (1:X)		104.7	
Cover Level (m)		21.877	21.159
Invert Level (m)		19.914	19.560
Length (m)		37.047	

MH Name		SA 4.1	SA 4
Hor Scale 700 Ver Scale 200 Datum (m)14.000			
PN		3.000	
Dia (mm)		225	
Slope (1:X)		59.3	
Cover Level (m)		21.940	20.950
Invert Level (m)		20.355	19.500
Length (m)		50.744	

MH Name		SA 5.3	SA 5.2	SA 5.1	SA 5
Hor Scale 700 Ver Scale 200 Datum (m)14.000					
PN		4.000	4.001	4.002	
Dia (mm)		225	225	225	
Slope (1:X)		79.9	79.9	80.0	
Cover Level (m)		21.715	21.016	20.305	19.805
Invert Level (m)		20.167 19.900	19.433 19.200	18.863 18.700	
Length (m)		21.337	18.611	13.041	

MH Name		SA 8.2		SA 8
Hor Scale 700 Ver Scale 200 Datum (m)14.000				
PN		5.000		
Dia (mm)		225		
Slope (1:X)		40.0		
Cover Level (m)		21.621	21.075	21.085
Invert Level (m)		20.199 19.818	19.818	
Length (m)		15.257		

Fairgreen House
Fairgreen Road
Galway

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Manhole Schedules for Surface Network 4

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)
SA 1	23.082	2.393	Open Manhole	1200	1.000	20.689	225				
SA 2	21.706	1.535	Open Manhole	1200	1.001	20.171	225	1.000	20.250	225	79
SA 3.1	21.877	1.963	Open Manhole	1200	2.000	19.914	225				
SA 3	21.159	1.845	Open Manhole	1200	1.002	19.314	225	1.001	19.560	225	246
								2.000	19.560	225	246
SA 4.1	21.940	1.585	Open Manhole	1200	3.000	20.355	225				
SA 4	20.950	1.740	Open Manhole	1200	1.003	19.210	300	1.002	19.210	225	
								3.000	19.500	225	215
SA 5.3	21.715	1.548	Open Manhole	1200	4.000	20.167	225				
SA 5.2	21.016	1.583	Open Manhole	1200	4.001	19.433	225	4.000	19.900	225	467
SA 5.1	20.305	1.442	Open Manhole	1200	4.002	18.863	225	4.001	19.200	225	337
SA 5	19.805	1.417	Open Manhole	1200	1.004	18.389	450	1.003	18.388	300	
								4.002	18.700	225	86
SA 6	19.882	1.587	Open Manhole	1200	1.005	18.295	450	1.004	18.296	450	1
SA 7	20.173	2.165	Open Manhole	1200	1.006	18.008	450	1.005	18.008	450	
SA 8.2	21.621	1.422	Open Manhole	1200	5.000	20.199	225				
SA 8.1	21.075	1.257	Open Manhole	1200	5.001	19.818	225	5.000	19.818	225	
SA 8	21.085	3.216	Open Manhole	1200	1.007	17.869	450	1.006	17.869	450	
								5.001	19.695	225	1601

Manhole Schedules for Surface Network 4

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)
16	21.085	3.685	Open Manhole	1350	1.008	17.400	450	1.007	17.847	450	447
17	21.085	3.988	Open Manhole	1350	1.009	17.097	450	1.008	17.390	450	293
SA 9	21.243	4.156	Open Manhole	1200		OUTFALL		1.009	17.087	450	

PIPELINE SCHEDULES for Surface Network 4

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	SA 1	23.082	20.689	2.168	Open Manhole	1200
1.001	o	225	SA 2	21.706	20.171	1.310	Open Manhole	1200
2.000	o	225	SA 3.1	21.877	19.914	1.738	Open Manhole	1200
1.002	o	225	SA 3	21.159	19.314	1.620	Open Manhole	1200
3.000	o	225	SA 4.1	21.940	20.355	1.360	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	26.344	60.0	SA 2	21.706	20.250	1.231	Open Manhole	1200
1.001	41.080	67.2	SA 3	21.159	19.560	1.374	Open Manhole	1200
2.000	37.047	104.7	SA 3	21.159	19.560	1.374	Open Manhole	1200
1.002	6.207	59.7	SA 4	20.950	19.210	1.515	Open Manhole	1200
3.000	50.744	59.3	SA 4	20.950	19.500	1.225	Open Manhole	1200

PIPELINE SCHEDULES for Surface Network 4

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)
1.003	o	300	SA 4	20.950	19.210	1.440	Open Manhole	1200
4.000	o	225	SA 5.3	21.715	20.167	1.323	Open Manhole	1200
4.001	o	225	SA 5.2	21.016	19.433	1.358	Open Manhole	1200
4.002	o	225	SA 5.1	20.305	18.863	1.217	Open Manhole	1200
1.004	o	450	SA 5	19.805	18.389	0.966	Open Manhole	1200
1.005	o	450	SA 6	19.882	18.295	1.137	Open Manhole	1200
1.006	o	450	SA 7	20.173	18.008	1.715	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)
1.003	65.658	79.9	SA 5	19.805	18.388	1.117	Open Manhole	1200
4.000	21.337	79.9	SA 5.2	21.016	19.900	0.891	Open Manhole	1200
4.001	18.611	79.9	SA 5.1	20.305	19.200	0.880	Open Manhole	1200
4.002	13.041	80.0	SA 5	19.805	18.700	0.880	Open Manhole	1200
1.004	18.434	198.2	SA 6	19.882	18.296	1.136	Open Manhole	1200
1.005	57.462	200.2	SA 7	20.173	18.008	1.715	Open Manhole	1200
1.006	30.259	217.7	SA 8	21.085	17.869	2.766	Open Manhole	1200

PIPELINE SCHEDULES for Surface Network 4

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)
5.000	o	225	SA 8.2	21.621	20.199	1.197	Open Manhole	1200
5.001	o	225	SA 8.1	21.075	19.818	1.032	Open Manhole	1200
1.007	o	450	SA 8	21.085	17.869	2.766	Open Manhole	1200
1.008	o	450	16	21.085	17.400	3.235	Open Manhole	1350
1.009	o	450	17	21.085	17.097	3.538	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)
5.000	15.257	40.0	SA 8.1	21.075	19.818	1.032	Open Manhole	1200
5.001	4.917	40.0	SA 8	21.085	19.695	1.165	Open Manhole	1200
1.007	3.571	162.3	16	21.085	17.847	2.788	Open Manhole	1350
1.008	2.000	200.0	17	21.085	17.390	3.245	Open Manhole	1350
1.009	2.000	200.0	SA 9	21.243	17.087	3.706	Open Manhole	1200

Area Summary for Surface Network 4

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.050	0.050	0.050
1.001	-	-	100	0.012	0.012	0.012
2.000	-	-	100	0.087	0.087	0.087
1.002	-	-	100	0.017	0.017	0.017
3.000	-	-	100	0.132	0.132	0.132
1.003	-	-	100	0.178	0.178	0.178
4.000	-	-	100	0.109	0.109	0.109
4.001	-	-	100	0.048	0.048	0.048
4.002	-	-	100	0.025	0.025	0.025
1.004	-	-	100	0.043	0.043	0.043
1.005	-	-	100	0.194	0.194	0.194
1.006	-	-	100	0.071	0.071	0.071
5.000	-	-	100	0.021	0.021	0.021
5.001	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.987	0.987	0.987

Free Flowing Outfall Details for Surface Network 4

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	SA 9	21.243	17.087	0.000	1200	0

Simulation Criteria for Surface Network 4

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	0.000	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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	15.900	Cv (Summer)	0.900
Return Period (years)	1	Ratio R	0.271	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Surface Network 4

Pump Manhole: 17, DS/PN: 1.009, Volume (m³): 5.8

Invert Level (m) 17.097

Depth (m)	Flow (l/s)
1.000	0.0000

Storage Structures for Surface Network 4

Cellular Storage Manhole: 16, DS/PN: 1.008

Invert Level (m) 17.097 Infiltration Coefficient Side (m/hr) 0.25600 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	600.0	600.0	1.200	600.0	768.0	1.300	0.0	768.0

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.900 Cv (Summer) 0.900
Region Scotland and Ireland Ratio R 0.271 Cv (Winter) 0.900

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30, 100
Climate Change (%) 10, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SA 1 15	Summer	100	+20%					20.780	-0.134	0.000	0.34		21.1	OK

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

PN	US/MH Name	Level Exceeded
1.000	SA 1	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.001	SA 2	15 Summer	100	+20%	100/15 Summer				20.719	0.323	0.000	0.38		23.1
2.000	SA 3.1	15 Summer	100	+20%	100/15 Summer				20.782	0.643	0.000	0.65		31.4
1.002	SA 3	30 Summer	100	+20%	30/15 Summer				20.667	1.128	0.000	1.31		59.3
3.000	SA 4.1	15 Summer	100	+20%	100/15 Summer				20.936	0.356	0.000	0.76		49.3
1.003	SA 4	15 Summer	100	+20%	30/15 Summer				20.574	1.064	0.000	1.15		136.8
4.000	SA 5.3	15 Summer	100	+20%					20.331	-0.061	0.000	0.87		46.2
4.001	SA 5.2	15 Summer	100	+20%	100/15 Summer				20.004	0.346	0.000	1.28		67.0
4.002	SA 5.1	15 Summer	100	+20%	30/15 Summer				19.734	0.646	0.000	1.30		65.5
1.004	SA 5	15 Summer	100	+20%	30/15 Summer				19.478	0.639	0.000	1.24		213.0
1.005	SA 6	15 Summer	100	+20%	30/15 Summer				19.340	0.595	0.000	1.25		262.1
1.006	SA 7	30 Summer	100	+20%	30/15 Summer				18.859	0.401	0.000	1.50		281.7
5.000	SA 8.2	15 Summer	100	+20%					20.251	-0.173	0.000	0.12		8.9
5.001	SA 8.1	15 Summer	100	+20%					19.882	-0.160	0.000	0.18		8.8
1.007	SA 8	30 Summer	100	+20%	30/15 Summer				18.538	0.219	0.000	2.28		288.7
1.008	16	2880 Summer	100	+20%	30/600 Summer				18.283	0.433	0.000	0.15		18.8
1.009	17	2880 Summer	100	+20%	30/120 Summer				18.500	0.953	0.000	0.00		0.0

PN	US/MH Name	Status	Level Exceeded
1.001	SA 2	SURCHARGED	
2.000	SA 3.1	SURCHARGED	
1.002	SA 3	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

PN	US/MH Name	Status	Level Exceeded
3.000	SA 4.1	SURCHARGED	
1.003	SA 4	SURCHARGED	
4.000	SA 5.3	OK	
4.001	SA 5.2	SURCHARGED	
4.002	SA 5.1	SURCHARGED	
1.004	SA 5	SURCHARGED	
1.005	SA 6	SURCHARGED	
1.006	SA 7	SURCHARGED	
5.000	SA 8.2	OK	
5.001	SA 8.1	OK	
1.007	SA 8	SURCHARGED	
1.008	16	SURCHARGED	
1.009	17	SURCHARGED	

Fairgreen House
Fairgreen Road
Galway

Date 11/07/2022 10:19 | Designed by michael.naughton
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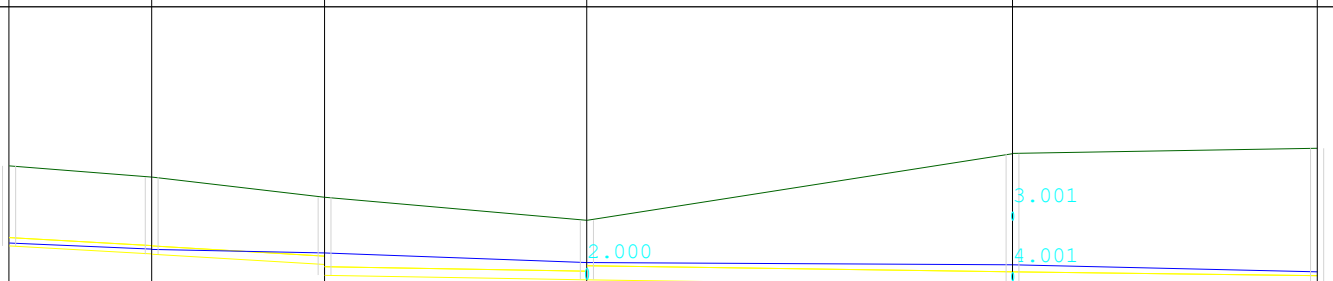
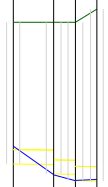
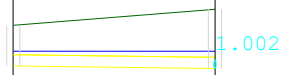
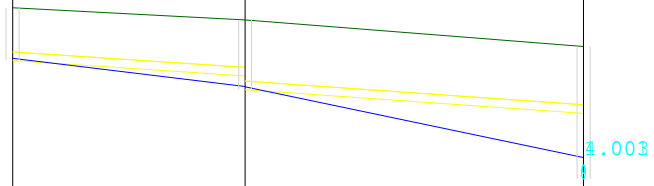
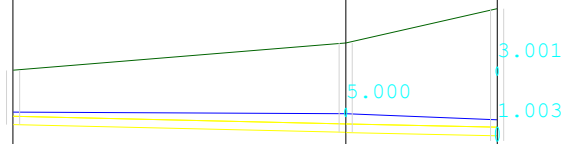
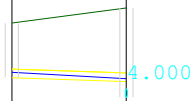
MH Name		SB 1	SB 2	SB 3	SB 4	SB 5	SB 6
Hor Scale 700 Ver Scale 200 Datum (m)13.000							
PN		1.000	1.001	1.002	1.003	1.004	
Dia (mm)		225	225	225	375	375	
Slope (1:X)		60.9	59.0	200.0	233.2	276.4	
Cover Level (m)		20.952	20.652	20.115	19.505	21.270	21.411
Invert Level (m)		18.827 / 18.610	18.610 / 18.339	18.056 / 17.935	17.935 / 17.766	17.767 / 17.665	
Length (m)		13.211	15.999	24.281	39.406	28.196	

MH Name					SB 7
Hor Scale 700 Ver Scale 200 Datum (m)13.000					
PN					
Dia (mm)					
Slope (1:X)					
Cover Level (m)		21.411			21.765
Invert Level (m)		17.665			
Length (m)					

MH Name		SB 4.1	SB 4
Hor Scale 700 Ver Scale 200 Datum (m)13.000			
PN		2.000	
Dia (mm)		300	
Slope (1:X)		249.0	
Cover Level (m)		19.075	19.505
Invert Level (m)		18.010	17.935
Length (m)		18.678	

MH Name		SB 8	SB 9	SB 5
Hor Scale 700 Ver Scale 200 Datum (m)14.000				
PN		3.000	3.001	
Dia (mm)		225	225	
Slope (1:X)		52.5	50.0	
Cover Level (m)		22.296	21.974	21.270
Invert Level (m)		20.900 / 20.490	20.127 / 19.500	
Length (m)		21.524	31.336	

MH Name		SB 11.1	SB 11	SB 5
Hor Scale 700 Ver Scale 200 Datum (m)13.000				
PN		4.000	4.001	
Dia (mm)		225	225	
Slope (1:X)		150.3	150.7	
Cover Level (m)		19.638	20.361	21.270
Invert Level (m)		18.202 17.997	17.996 17.903	
Length (m)		30.802	14.015	

MH Name		SB 10	SB 11
Hor Scale 700 Ver Scale 200 Datum (m)13.000			
PN		5.000	
Dia (mm)		225	
Slope (1:X)		100.0	
Cover Level (m)		19.957	20.361
Invert Level (m)		18.520	18.414
Length (m)		10.597	

Fairgreen House
Fairgreen Road
Galway

Date 11/07/2022 10:20 | Designed by michael.naughton
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Manhole Schedules for Surface Network 6

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)
SB 1	20.952	2.125	Open Manhole	1200	1.000	18.827	225				
SB 2	20.652	2.042	Open Manhole	1200	1.001	18.610	225	1.000	18.610	225	
SB 3	20.115	2.059	Open Manhole	1200	1.002	18.056	225	1.001	18.339	225	283
SB 4.1	19.075	1.065	Open Manhole	1200	2.000	18.010	300				
SB 4	19.505	1.570	Open Manhole	1200	1.003	17.935	375	1.002	17.935	225	
								2.000	17.935	300	
SB 8	22.296	1.396	Open Manhole	1200	3.000	20.900	225				
SB 9	21.974	1.847	Open Manhole	1200	3.001	20.127	225	3.000	20.490	225	363
SB 11.1	19.638	1.436	Open Manhole	1200	4.000	18.202	225				
SB 10	19.957	1.437	Open Manhole	1200	5.000	18.520	225				
SB 11	20.361	2.365	Open Manhole	1200	4.001	17.996	225	4.000	17.997	225	1
								5.000	18.414	225	418
SB 5	21.270	3.504	Open Manhole	1200	1.004	17.767	375	1.003	17.766	375	
								3.001	19.500	225	1583
								4.001	17.903	225	
SB 6	21.411	3.746	Open Manhole	1200	1.005	17.665	375	1.004	17.665	375	
13	21.411	4.011	Open Manhole	1350	1.006	17.400	375	1.005	17.650	375	250
14	21.411	4.186	Open Manhole	1350	1.007	17.225	375	1.006	17.390	375	165
SB 7	21.765	4.550	Open Manhole	1200		OUTFALL		1.007	17.215	375	

PIPELINE SCHEDULES for Surface Network 6

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	SB 1	20.952	18.827	1.900	Open Manhole	1200
1.001	o	225	SB 2	20.652	18.610	1.817	Open Manhole	1200
1.002	o	225	SB 3	20.115	18.056	1.834	Open Manhole	1200
2.000	o	300	SB 4.1	19.075	18.010	0.765	Open Manhole	1200
1.003	o	375	SB 4	19.505	17.935	1.195	Open Manhole	1200
3.000	o	225	SB 8	22.296	20.900	1.171	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	13.211	60.9	SB 2	20.652	18.610	1.817	Open Manhole	1200
1.001	15.999	59.0	SB 3	20.115	18.339	1.551	Open Manhole	1200
1.002	24.281	200.0	SB 4	19.505	17.935	1.345	Open Manhole	1200
2.000	18.678	249.0	SB 4	19.505	17.935	1.270	Open Manhole	1200
1.003	39.406	233.2	SB 5	21.270	17.766	3.129	Open Manhole	1200
3.000	21.524	52.5	SB 9	21.974	20.490	1.259	Open Manhole	1200

PIPELINE SCHEDULES for Surface Network 6

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)
3.001	o	225	SB 9	21.974	20.127	1.622	Open Manhole	1200
4.000	o	225	SB 11.1	19.638	18.202	1.211	Open Manhole	1200
5.000	o	225	SB 10	19.957	18.520	1.212	Open Manhole	1200
4.001	o	225	SB 11	20.361	17.996	2.140	Open Manhole	1200
1.004	o	375	SB 5	21.270	17.767	3.128	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)
3.001	31.336	50.0	SB 5	21.270	19.500	1.545	Open Manhole	1200
4.000	30.802	150.3	SB 11	20.361	17.997	2.139	Open Manhole	1200
5.000	10.597	100.0	SB 11	20.361	18.414	1.722	Open Manhole	1200
4.001	14.015	150.7	SB 5	21.270	17.903	3.142	Open Manhole	1200
1.004	28.196	276.4	SB 6	21.411	17.665	3.371	Open Manhole	1200

PIPELINE SCHEDULES for Surface Network 6

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)
1.005	o	375	SB 6	21.411	17.665	3.371	Open Manhole	1200
1.006	o	375	13	21.411	17.400	3.636	Open Manhole	1350
1.007	o	375	14	21.411	17.225	3.811	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)
1.005	3.751	250.1	13	21.411	17.650	3.386	Open Manhole	1350
1.006	2.000	200.0	14	21.411	17.390	3.646	Open Manhole	1350
1.007	2.000	200.0	SB 7	21.765	17.215	4.175	Open Manhole	1200

Area Summary for Surface Network 6

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.056	0.056	0.056
1.001	-	-	100	0.067	0.067	0.067
1.002	-	-	100	0.063	0.063	0.063
2.000	-	-	100	0.032	0.032	0.032
1.003	-	-	100	0.055	0.055	0.055
3.000	-	-	100	0.031	0.031	0.031
3.001	-	-	100	0.030	0.030	0.030
4.000	-	-	100	0.067	0.067	0.067
5.000	-	-	100	0.106	0.106	0.106
4.001	-	-	100	0.016	0.016	0.016
1.004	-	-	100	0.047	0.047	0.047
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.570	0.570	0.570

Free Flowing Outfall Details for Surface Network 6

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007	SB 7	21.765	17.215	0.000	1200	0

Simulation Criteria for Surface Network 6

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	0.000	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 1	Number of Storage Structures 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	15.900	Cv (Summer)	0.900
Return Period (years)	1	Ratio R	0.271	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Surface Network 6

Pump Manhole: 14, DS/PN: 1.007, Volume (m³): 6.1

Invert Level (m) 17.225

Depth (m)	Flow (l/s)
1.000	0.0000

Storage Structures for Surface Network 6

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 17.225 Infiltration Coefficient Side (m/hr) 0.25654 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	500.0	500.0	0.800	500.0	596.0	0.900	0.0	596.0

Manhole Headloss for Surface Network 6

PN	US/MH Name	US/MH Headloss
1.000	SB 1	0.500
1.001	SB 2	0.500
1.002	SB 3	0.500
2.000	SB 4.1	0.500
1.003	SB 4	0.500
3.000	SB 8	0.500
3.001	SB 9	0.500
4.000	SB 11.1	0.500
5.000	SB 10	0.500
4.001	SB 11	0.500
1.004	SB 5	0.500
1.005	SB 6	0.500
1.006	13	0.500
1.007	14	0.500

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 6

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.900 Cv (Summer) 0.900
Region England and Wales Ratio R 0.271 Cv (Winter) 0.900

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30, 100
Climate Change (%) 10, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SB 1 15	Summer	100	+20%	100/15 Summer				19.266	0.214	0.000	0.38		21.9	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 6

PN	US/MH Name	Level Exceeded
1.000	SB 1	

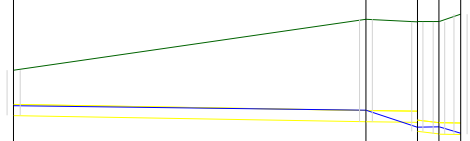
Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 6

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.001	SB 2	15 Summer	100	+20%	100/15 Summer				19.233	0.398	0.000	0.74		44.7
1.002	SB 3	15 Summer	100	+20%	30/15 Summer				19.101	0.820	0.000	1.82		61.4
2.000	SB 4.1	15 Summer	100	+20%	30/15 Summer				18.688	0.378	0.000	0.19		11.8
1.003	SB 4	15 Summer	100	+20%	30/15 Summer				18.677	0.367	0.000	0.75		88.6
3.000	SB 8	15 Summer	100	+20%					20.967	-0.158	0.000	0.19		12.7
3.001	SB 9	15 Summer	100	+20%					20.224	-0.128	0.000	0.38		26.4
4.000	SB 11.1	30 Summer	100	+20%	30/15 Summer				18.935	0.508	0.000	0.58		22.9
5.000	SB 10	30 Summer	100	+20%	100/15 Summer				18.942	0.197	0.000	0.89		38.9
4.001	SB 11	30 Summer	100	+20%	30/15 Summer				18.864	0.643	0.000	1.75		64.4
1.004	SB 5	15 Summer	100	+20%	30/15 Summer				18.577	0.435	0.000	1.78		186.8
1.005	SB 6	30 Summer	100	+20%	30/15 Summer				18.240	0.200	0.000	2.33		187.9
1.006	13	2160 Summer	100	+20%	30/720 Summer				18.144	0.369	0.000	0.05		4.7
1.007	14	2880 Winter	100	+20%	30/120 Summer				18.292	0.692	0.000	0.00		0.0

PN	US/MH Name	Status	Level Exceeded
1.001	SB 2	SURCHARGED	
1.002	SB 3	SURCHARGED	
2.000	SB 4.1	SURCHARGED	
1.003	SB 4	SURCHARGED	
3.000	SB 8	OK	
3.001	SB 9	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 6

PN	US/MH Name	Status	Level Exceeded
4.000	SB 11.1	SURCHARGED	
5.000	SB 10	SURCHARGED	
4.001	SB 11	SURCHARGED	
1.004	SB 5	SURCHARGED	
1.005	SB 6	SURCHARGED	
1.006	13	SURCHARGED	
1.007	14	SURCHARGED	

MH Name		SC 1				SC 3
Hor Scale 700 Ver Scale 200 Datum (m)13.000						
PN		1.000				
Dia (mm)		300				
Slope (1:X)		200.1				
Cover Level (m)		19.218		20.569		20.700
Invert Level (m)		18.018	17.855	17.855		
Length (m)		32.615				

Manhole Schedules for Surface Network 5

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)
SC 1	19.218	1.200	Open Manhole	1200	1.000	18.018	300				
SC 2	20.569	2.714	Open Manhole	1200	1.001	17.855	300	1.000	17.855	300	
3	20.500	2.900	Open Manhole	1050	1.002	17.600	300	1.001	17.831	300	231
4	20.500	2.969	Open Manhole	1050	1.003	17.531	300	1.002	17.531	300	
SC 3	20.700	3.179	Open Manhole	1200		OUTFALL		1.003	17.521	300	

PIPELINE SCHEDULES for Surface Network 5

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	300	SC 1	19.218	18.018	0.900	Open Manhole	1200
1.001	o	300	SC 2	20.569	17.855	2.414	Open Manhole	1200
1.002	o	300	3	20.500	17.600	2.600	Open Manhole	1050
1.003	o	300	4	20.500	17.531	2.669	Open Manhole	1050

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	32.615	200.1	SC 2	20.569	17.855	2.414	Open Manhole	1200
1.001	4.764	198.5	3	20.500	17.831	2.369	Open Manhole	1050
1.002	2.000	29.0	4	20.500	17.531	2.669	Open Manhole	1050
1.003	2.000	200.0	SC 3	20.700	17.521	2.879	Open Manhole	1200

Area Summary for Surface Network 5

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.214	0.214	0.214
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.214	0.214	0.214

Free Flowing Outfall Details for Surface Network 5

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003	SC 3	20.700	17.521	0.000	1200	0

Simulation Criteria for Surface Network 5

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	0.000	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 1	Number of Storage Structures 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	15.900	Cv (Summer)	0.900
Return Period (years)	1	Ratio R	0.271	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Surface Network 5

Pump Manhole: 4, DS/PN: 1.003, Volume (m³): 2.6

Invert Level (m) 17.531

Depth (m)	Flow (l/s)
1.000	0.0000

Storage Structures for Surface Network 5

Cellular Storage Manhole: 3, DS/PN: 1.002

Invert Level (m) 17.531 Infiltration Coefficient Side (m/hr) 0.64195 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	160.0	160.0	0.600	160.0	191.2	0.700	0.0	191.2

Manhole Headloss for Surface Network 5

PN	US/MH Name	US/MH Headloss
1.000	SC 1	0.500
1.001	SC 2	0.500
1.002	3	0.500
1.003	4	0.500

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.900 Cv (Summer) 0.900
Region Scotland and Ireland Ratio R 0.271 Cv (Winter) 0.900

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30, 100
Climate Change (%) 10, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.000	SC 1 960	Summer	100	+20%	100/15 Summer				18.648	0.330	0.000	0.16		11.8

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

PN	US/MH Name	Status	Level Exceeded
1.000	SC 1	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.001	SC 2	960 Summer	100	+20%	30/15 Summer				18.645	0.490	0.000	0.22		11.5
1.002	3	960 Summer	100	+20%	30/120 Summer				18.644	0.744	0.000	0.05		3.6
1.003	4	960 Summer	100	+20%	30/60 Summer				18.644	0.813	0.000	0.00		0.0

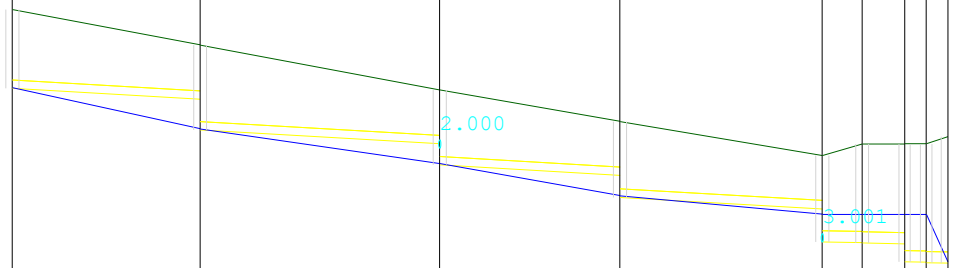
PN	US/MH Name	Status	Level Exceeded
1.001	SC 2	SURCHARGED	
1.002	3	SURCHARGED	
1.003	4	SURCHARGED	

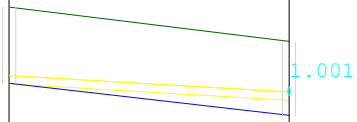
Fairgreen House
Fairgreen Road
Galway

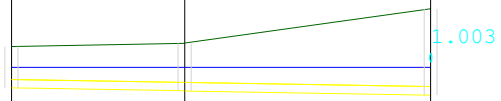
Date 05/07/2022 19:17
File 10750 - SOAKAWAY D.MDX

Designed by michael.naughton
Checked by

Micro Drainage | Network 2018.1.1

MH Name		SD 1	SD 2	SD 3	SD 4				SD 7
Hor Scale 700 Ver Scale 200 Datum (m)10.000									
PN		1.000	1.001	1.002	1.003				
Dia (mm)		225	225	225	225				
Slope (1:X)		59.9	60.0	59.6	61.4				
Cover Level (m)		19.673	18.737	17.551	16.713	15.812	16.121		16.314
Invert Level (m)		17.590 / 17.300	16.490 / 16.120	15.565 / 15.285	14.705 / 14.400	13.525	13.502		
Length (m)		17.381	22.183	16.684	18.731				

MH Name		SD 3.1	SD 3
Hor Scale 700 Ver Scale 200 Datum (m)11.000			
PN		2.000	
Dia (mm)		225	
Slope (1:X)		60.0	
Cover Level (m)		18.462	17.551
Invert Level (m)		16.432	16.000
Length (m)		25.910	

MH Name		SD 5.2	SD 5.1	SD 5
Hor Scale 700 Ver Scale 200 Datum (m) 9.000				
PN		3.000	3.001	
Dia (mm)		225	225	
Slope (1:X)		200.4	199.8	
Cover Level (m)		14.812	14.899	15.812
Invert Level (m)		13.719 13.639	13.639 13.525	
Length (m)		16.028	22.780	

Manhole Schedules for Surface Network 2

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)
SD 1	19.673	2.083	Open Manhole	1200	1.000	17.590	225				
SD 2	18.737	2.247	Open Manhole	1200	1.001	16.490	225	1.000	17.300	225	810
SD 3.1	18.462	2.030	Open Manhole	1200	2.000	16.432	225				
SD 3	17.551	1.986	Open Manhole	1200	1.002	15.565	225	1.001	16.120	225	555
								2.000	16.000	225	435
SD 4	16.713	2.008	Open Manhole	1200	1.003	14.705	225	1.002	15.285	225	580
SD 5.2	14.812	1.093	Open Manhole	1200	3.000	13.719	225				
SD 5.1	14.899	1.260	Open Manhole	1200	3.001	13.639	225	3.000	13.639	225	
SD 5	15.812	2.287	Open Manhole	1200	1.004	13.525	300	1.003	14.400	225	800
								3.001	13.525	225	
SD 6	16.121	2.619	Open Manhole	1200	1.005	13.502	300	1.004	13.502	300	
10	16.121	3.121	Open Manhole	1050	1.006	13.000	300	1.005	13.476	300	476
11	16.121	3.145	Open Manhole	1050	1.007	12.976	300	1.006	12.990	300	14
SD 7	16.314	3.348	Open Manhole	1200		OUTFALL		1.007	12.966	300	

PIPELINE SCHEDULES for Surface Network 2

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	SD 1	19.673	17.590	1.858	Open Manhole	1200
1.001	o	225	SD 2	18.737	16.490	2.022	Open Manhole	1200
2.000	o	225	SD 3.1	18.462	16.432	1.805	Open Manhole	1200
1.002	o	225	SD 3	17.551	15.565	1.761	Open Manhole	1200
1.003	o	225	SD 4	16.713	14.705	1.783	Open Manhole	1200
3.000	o	225	SD 5.2	14.812	13.719	0.868	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	17.381	59.9	SD 2	18.737	17.300	1.212	Open Manhole	1200
1.001	22.183	60.0	SD 3	17.551	16.120	1.206	Open Manhole	1200
2.000	25.910	60.0	SD 3	17.551	16.000	1.326	Open Manhole	1200
1.002	16.684	59.6	SD 4	16.713	15.285	1.203	Open Manhole	1200
1.003	18.731	61.4	SD 5	15.812	14.400	1.187	Open Manhole	1200
3.000	16.028	200.4	SD 5.1	14.899	13.639	1.035	Open Manhole	1200

PIPELINE SCHEDULES for Surface Network 2

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)
3.001	o	225	SD 5.1	14.899	13.639	1.035	Open Manhole	1200
1.004	o	300	SD 5	15.812	13.525	1.987	Open Manhole	1200
1.005	o	300	SD 6	16.121	13.502	2.319	Open Manhole	1200
1.006	o	300	10	16.121	13.000	2.821	Open Manhole	1050
1.007	o	300	11	16.121	12.976	2.845	Open Manhole	1050

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)
3.001	22.780	199.8	SD 5	15.812	13.525	2.062	Open Manhole	1200
1.004	3.695	162.1	SD 6	16.121	13.502	2.319	Open Manhole	1200
1.005	3.927	149.9	10	16.121	13.476	2.345	Open Manhole	1050
1.006	2.000	200.0	11	16.121	12.990	2.831	Open Manhole	1050
1.007	2.000	200.0	SD 7	16.314	12.966	3.048	Open Manhole	1200

Area Summary for Surface Network 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.022	0.022	0.022
1.001	-	-	100	0.020	0.020	0.020
2.000	-	-	100	0.024	0.024	0.024
1.002	-	-	100	0.014	0.014	0.014
1.003	-	-	100	0.038	0.038	0.038
3.000	-	-	100	0.022	0.022	0.022
3.001	-	-	100	0.026	0.026	0.026
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.166	0.166	0.166

Free Flowing Outfall Details for Surface Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007	SD 7	16.314	12.966	0.000	1200	0

Simulation Criteria for Surface Network 2

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	0.000	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 1	Number of Storage Structures 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	15.900	Cv (Summer)	0.900
Return Period (years)	1	Ratio R	0.271	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Surface Network 2

Pump Manhole: 11, DS/PN: 1.007, Volume (m³): 2.8

Invert Level (m) 12.976

Depth (m)	Flow (l/s)
1.000	0.0000

Storage Structures for Surface Network 2

Cellular Storage Manhole: 10, DS/PN: 1.006

Invert Level (m) 12.976 Infiltration Coefficient Side (m/hr) 0.32296 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	110.0	110.0	0.800	110.0	143.6	0.900	0.0	143.6

Manhole Headloss for Surface Network 2

PN	US/MH Name	US/MH Headloss
1.000	SD 1	0.500
1.001	SD 2	0.500
2.000	SD 3.1	0.500
1.002	SD 3	0.500
1.003	SD 4	0.500
3.000	SD 5.2	0.500
3.001	SD 5.1	0.500
1.004	SD 5	0.500
1.005	SD 6	0.500
1.006	10	0.500
1.007	11	0.500

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.900 Cv (Summer) 0.900
Region Scotland and Ireland Ratio R 0.271 Cv (Winter) 0.900

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30, 100
Climate Change (%) 10, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SD 1 15	Summer	100	+20%					17.649	-0.166	0.000	0.16		9.3	OK

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Level Exceeded
1.000	SD 1	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.001	SD 2	15 Summer	100	+20%					16.575	-0.140	0.000	0.31		18.8
2.000	SD 3.1	15 Summer	100	+20%					16.493	-0.164	0.000	0.16		10.1
1.002	SD 3	15 Summer	100	+20%					15.691	-0.099	0.000	0.59		35.5
1.003	SD 4	15 Summer	100	+20%					14.872	-0.058	0.000	0.89		53.4
3.000	SD 5.2	1440 Summer	100	+20%	100/15 Summer				14.264	0.320	0.000	0.03		1.0
3.001	SD 5.1	1440 Summer	100	+20%	100/15 Summer				14.262	0.398	0.000	0.06		2.0
1.004	SD 5	1440 Summer	100	+20%	100/15 Summer				14.259	0.434	0.000	0.13		6.9
1.005	SD 6	1440 Summer	100	+20%	100/15 Summer				14.258	0.456	0.000	0.12		6.9
1.006	10	1440 Summer	100	+20%	30/60 Summer				14.257	0.957	0.000	0.07		3.7
1.007	11	1440 Summer	100	+20%	30/30 Summer				14.257	0.981	0.000	0.00		0.0

PN	US/MH Name	Status	Level Exceeded
1.001	SD 2	OK	
2.000	SD 3.1	OK	
1.002	SD 3	OK	
1.003	SD 4	OK	
3.000	SD 5.2	SURCHARGED	
3.001	SD 5.1	SURCHARGED	
1.004	SD 5	SURCHARGED	
1.005	SD 6	SURCHARGED	
1.006	10	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

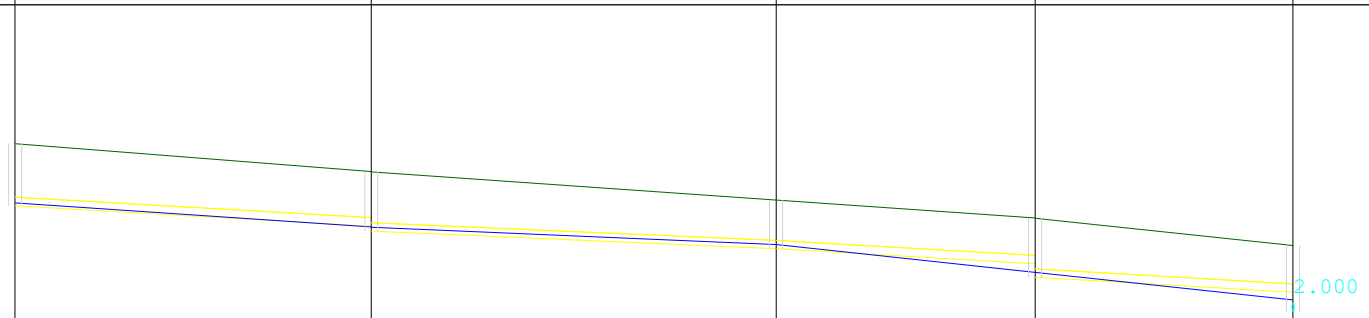
PN	US/MH Name	Status	Level Exceeded
1.007	11	SURCHARGED	

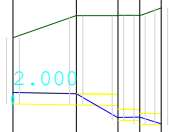
Fairgreen House
Fairgreen Road
Galway

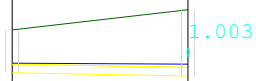
Date 05/07/2022 19:37
File 10750 - SOAKAWAY E.MDX

Designed by michael.naughton
Checked by

Micro Drainage | Network 2018.1.1

MH Name		SE 1	SE 2	SE 3	SE 4	SE 5
Hor Scale 700 Ver Scale 200 Datum (m)10.000						
PN		1.000	1.001	1.002	1.003	
Dia (mm)		225	225	225	225	
Slope (1:X)		59.9	80.1	59.9	60.0	
Cover Level (m)		18.481	17.737	16.989	16.510	15.787
Invert Level (m)		16.840 / 16.290	16.168 / 15.700	15.700 / 15.300	14.948 / 14.550	
Length (m)		32.969	37.472	23.974	23.881	

MH Name						SE 7
Hor Scale 700 Ver Scale 200 Datum (m) 9.000						
PN						
Dia (mm)						
Slope (1:X)						
Cover Level (m)		15.787	16.376			16.579
Invert Level (m)		14.038 14.009	14.009			
Length (m)						

MH Name		SE 5.1	SE 5
Hor Scale 700 Ver Scale 200 Datum (m) 9.000			
PN		2.000	
Dia (mm)		225	
Slope (1:X)		189.2	
Cover Level (m)		15.249	15.787
Invert Level (m)		14.124	14.038
Length (m)		16.271	

Manhole Schedules for Surface Network 1

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)
SE 1	18.481	1.641	Open Manhole	1200	1.000	16.840	225				
SE 2	17.737	1.569	Open Manhole	1200	1.001	16.168	225	1.000	16.290	225	122
SE 3	16.989	1.289	Open Manhole	1200	1.002	15.700	225	1.001	15.700	225	
SE 4	16.510	1.562	Open Manhole	1200	1.003	14.948	225	1.002	15.300	225	352
SE 5.1	15.249	1.125	Open Manhole	1200	2.000	14.124	225				
SE 5	15.787	1.749	Open Manhole	1200	1.004	14.038	300	1.003	14.550	225	437
								2.000	14.038	225	
SE 6	16.376	2.367	Open Manhole	1200	1.005	14.009	300	1.004	14.009	300	
8	16.376	2.776	Open Manhole	1050	1.006	13.600	300	1.005	13.990	300	390
9	16.376	2.886	Open Manhole	1050	1.007	13.490	300	1.006	13.590	300	100
SE 7	16.579	3.099	Open Manhole	1200		OUTFALL		1.007	13.480	300	

PIPELINE SCHEDULES for Surface Network 1

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	SE 1	18.481	16.840	1.416	Open Manhole	1200
1.001	o	225	SE 2	17.737	16.168	1.344	Open Manhole	1200
1.002	o	225	SE 3	16.989	15.700	1.064	Open Manhole	1200
1.003	o	225	SE 4	16.510	14.948	1.337	Open Manhole	1200
2.000	o	225	SE 5.1	15.249	14.124	0.900	Open Manhole	1200
1.004	o	300	SE 5	15.787	14.038	1.449	Open Manhole	1200
1.005	o	300	SE 6	16.376	14.009	2.067	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	32.969	59.9	SE 2	17.737	16.290	1.222	Open Manhole	1200
1.001	37.472	80.1	SE 3	16.989	15.700	1.064	Open Manhole	1200
1.002	23.974	59.9	SE 4	16.510	15.300	0.985	Open Manhole	1200
1.003	23.881	60.0	SE 5	15.787	14.550	1.012	Open Manhole	1200
2.000	16.271	189.2	SE 5	15.787	14.038	1.524	Open Manhole	1200
1.004	5.858	202.0	SE 6	16.376	14.009	2.067	Open Manhole	1200
1.005	3.868	200.4	8	16.376	13.990	2.086	Open Manhole	1050

PIPELINE SCHEDULES for Surface Network 1

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)
1.006	o	300	8	16.376	13.600	2.476	Open Manhole	1050
1.007	o	300	9	16.376	13.490	2.586	Open Manhole	1050

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)
1.006	2.000	200.0	9	16.376	13.590	2.486	Open Manhole	1050
1.007	2.000	200.0	SE 7	16.579	13.480	2.799	Open Manhole	1200

Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.047	0.047	0.047
1.001	-	-	100	0.032	0.032	0.032
1.002	-	-	100	0.020	0.020	0.020
1.003	-	-	100	0.021	0.021	0.021
2.000	-	-	100	0.053	0.053	0.053
1.004	-	-	100	0.016	0.016	0.016
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.189	0.189	0.189

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007	SE 7	16.579	13.480	0.000	1200	0

Simulation Criteria for Surface Network 1

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	0.000	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 1	Number of Storage Structures 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	15.900	Cv (Summer)	0.900
Return Period (years)	1	Ratio R	0.271	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Surface Network 1

Pump Manhole: 9, DS/PN: 1.007, Volume (m³): 2.6

Invert Level (m) 13.490

Depth (m)	Flow (l/s)
1.000	0.0000

Storage Structures for Surface Network 1

Cellular Storage Manhole: 8, DS/PN: 1.006

Invert Level (m) 13.490 Infiltration Coefficient Side (m/hr) 0.25654 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	140.0	140.0	0.800	140.0	178.4	0.900	0.0	178.4

Manhole Headloss for Surface Network 1

PN	US/MH Name	US/MH Headloss
1.000	SE 1	0.500
1.001	SE 2	0.500
1.002	SE 3	0.500
1.003	SE 4	0.500
2.000	SE 5.1	0.500
1.004	SE 5	0.500
1.005	SE 6	0.500
1.006	8	0.500
1.007	9	0.500

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.900 Cv (Summer) 0.900
Region Scotland and Ireland Ratio R 0.271 Cv (Winter) 0.900

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30, 100
Climate Change (%) 10, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SE 1 15	Summer	100	+20%					16.927	-0.138	0.000	0.31		19.8	OK

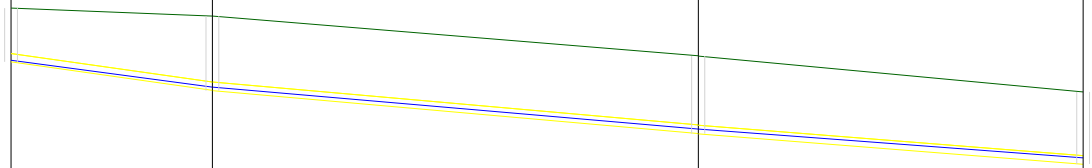
Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

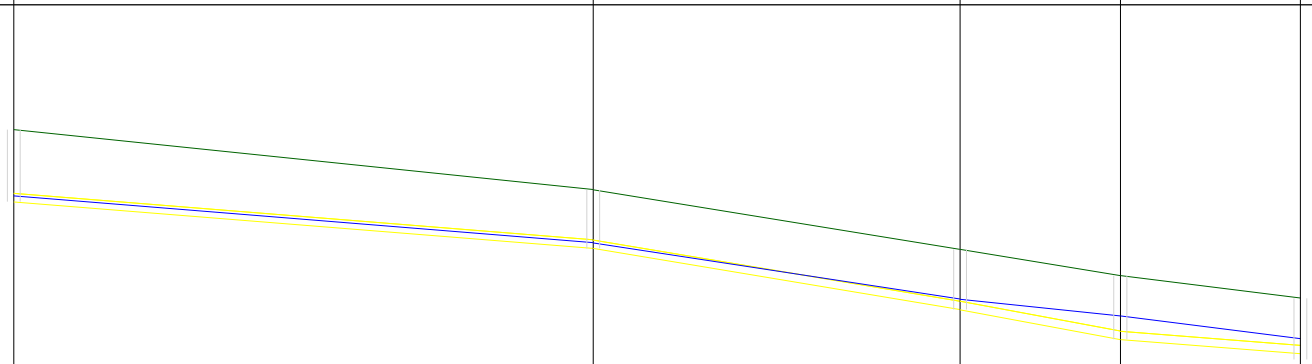
PN	US/MH Name	Level Exceeded
1.000	SE 1	

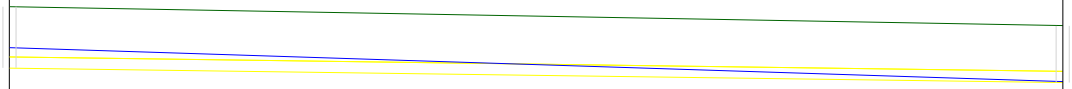
Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.001	SE 2	15 Summer	100	+20%					16.300	-0.093	0.000	0.62		34.2
1.002	SE 3	15 Summer	100	+20%					15.842	-0.083	0.000	0.70		43.0
1.003	SE 4	15 Summer	100	+20%					15.111	-0.062	0.000	0.85		52.3
2.000	SE 5.1	2160 Summer	100	+20%	30/15 Summer				14.904	0.555	0.000	0.05		1.7
1.004	SE 5	2160 Summer	100	+20%	30/15 Summer				14.904	0.566	0.000	0.11		5.9
1.005	SE 6	2160 Summer	100	+20%	100/15 Summer				14.903	0.594	0.000	0.12		5.9
1.006	8	2160 Summer	100	+20%	30/180 Summer				14.903	1.003	0.000	0.07		3.7
1.007	9	2160 Summer	100	+20%	30/60 Summer				14.904	1.114	0.000	0.00		0.0

PN	US/MH Name	Status	Level Exceeded
1.001	SE 2	OK	
1.002	SE 3	OK	
1.003	SE 4	OK	
2.000	SE 5.1	SURCHARGED	
1.004	SE 5	SURCHARGED	
1.005	SE 6	SURCHARGED	
1.006	8	SURCHARGED	
1.007	9	SURCHARGED	

MH Name		SF 1	SF 2	SF 3	SF 4
Hor Scale 700 Ver Scale 200 Datum (m)11.000					
PN		1.000	1.001	1.002	
Dia (mm)		225	225	225	
Slope (1:X)		24.6	39.4	44.2	
Cover Level (m)		19.078	18.864	17.806	16.856
Invert Level (m)		17.650 16.891	16.891 15.750	15.750 14.943	
Length (m)		18.649	44.964	35.632	

MH Name		SF 4	SF 5	SF 6	SF 7	SF 8
Hor Scale 700 Ver Scale 200 Datum (m) 8.000						
PN		1.003	1.004	1.005	1.006	
Dia (mm)		225	225	225	225	
Slope (1:X)		43.5	21.0	18.7	44.1	
Cover Level (m)		16.856	15.265	13.690	12.991	12.395
Invert Level (m)		14.943 13.710	13.710 12.090	12.090 11.298	11.298 10.920	
Length (m)		53.633	33.959	14.840	16.667	

MH Name		SF 8	Ex. S2
Hor Scale 700 Ver Scale 200 Datum (m) 5.000			
PN		1.007	
Dia (mm)		300	
Slope (1:X)		254.8	
Cover Level (m)		12.395	11.887
Invert Level (m)		10.770	10.387
Length (m)		97.505	

Manhole Schedules for Surface Network 3

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)
SF 1	19.078	1.428	Open Manhole	1200	1.000	17.650	225				
SF 2	18.864	1.973	Open Manhole	1200	1.001	16.891	225	1.000	16.891	225	
SF 3	17.806	2.056	Open Manhole	1200	1.002	15.750	225	1.001	15.750	225	
SF 4	16.856	1.913	Open Manhole	1200	1.003	14.943	225	1.002	14.943	225	
SF 5	15.265	1.555	Open Manhole	1200	1.004	13.710	225	1.003	13.710	225	
SF 6	13.690	1.600	Open Manhole	1200	1.005	12.090	225	1.004	12.090	225	
SF 7	12.991	1.693	Open Manhole	1200	1.006	11.298	225	1.005	11.298	225	
SF 8	12.395	1.625	Open Manhole	1200	1.007	10.770	300	1.006	10.920	225	75
Ex. S2	11.887	1.500	Open Manhole	1200		OUTFALL		1.007	10.387	300	

PIPELINE SCHEDULES for Surface Network 3

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	SF 1	19.078	17.650	1.203	Open Manhole	1200
1.001	o	225	SF 2	18.864	16.891	1.748	Open Manhole	1200
1.002	o	225	SF 3	17.806	15.750	1.831	Open Manhole	1200
1.003	o	225	SF 4	16.856	14.943	1.688	Open Manhole	1200
1.004	o	225	SF 5	15.265	13.710	1.330	Open Manhole	1200
1.005	o	225	SF 6	13.690	12.090	1.375	Open Manhole	1200
1.006	o	225	SF 7	12.991	11.298	1.468	Open Manhole	1200
1.007	o	300	SF 8	12.395	10.770	1.325	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	18.649	24.6	SF 2	18.864	16.891	1.748	Open Manhole	1200
1.001	44.964	39.4	SF 3	17.806	15.750	1.831	Open Manhole	1200
1.002	35.632	44.2	SF 4	16.856	14.943	1.688	Open Manhole	1200
1.003	53.633	43.5	SF 5	15.265	13.710	1.330	Open Manhole	1200
1.004	33.959	21.0	SF 6	13.690	12.090	1.375	Open Manhole	1200
1.005	14.840	18.7	SF 7	12.991	11.298	1.468	Open Manhole	1200
1.006	16.667	44.1	SF 8	12.395	10.920	1.250	Open Manhole	1200
1.007	97.505	254.8	Ex. S2	11.887	10.387	1.200	Open Manhole	1200

Area Summary for Surface Network 3

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.021	0.021	0.021
1.001	-	-	100	0.038	0.038	0.038
1.002	-	-	100	0.030	0.030	0.030
1.003	-	-	100	0.046	0.046	0.046
1.004	-	-	100	0.038	0.038	0.038
1.005	-	-	100	0.015	0.015	0.015
1.006	-	-	100	0.024	0.024	0.024
1.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.212	0.212	0.212

Free Flowing Outfall Details for Surface Network 3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007	Ex. S2	11.887	10.387	0.000	1200	0

Simulation Criteria for Surface Network 3

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	0.000	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 0	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	15.900	Cv (Summer)	0.900
Return Period (years)	1	Ratio R	0.271	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Manhole Headloss for Surface Network 3

PN	US/MH Name	US/MH Headloss
1.000	SF 1	0.000
1.001	SF 2	0.000
1.002	SF 3	0.000
1.003	SF 4	0.000
1.004	SF 5	0.000
1.005	SF 6	0.000
1.006	SF 7	0.000
1.007	SF 8	0.000

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

Simulation Criteria

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

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 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.900 Cv (Summer) 0.900
Region Scotland and Ireland Ratio R 0.271 Cv (Winter) 0.900

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30, 100
Climate Change (%) 10, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SF 1 15	Summer	100	+20%					17.696	-0.179	0.000	0.09		8.9	OK

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Level Exceeded
1.000	SF 1	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.001	SF 2	15 Summer	100	+20%					16.982	-0.134	0.000	0.34		26.8	OK
1.002	SF 3	15 Summer	100	+20%					15.870	-0.105	0.000	0.55		40.6	OK
1.003	SF 4	15 Summer	100	+20%					15.100	-0.068	0.000	0.79		60.3	OK
1.004	SF 5	15 Summer	100	+20%					13.856	-0.079	0.000	0.72		77.2	OK
1.005	SF 6	15 Summer	100	+20%	100/15 Summer				12.368	0.053	0.000	0.77		81.1	SURCHARGED
1.006	SF 7	15 Summer	100	+20%	100/15 Summer				11.925	0.402	0.000	1.26		88.0	SURCHARGED
1.007	SF 8	15 Summer	100	+20%	100/15 Summer				11.316	0.246	0.000	1.20		80.4	SURCHARGED

PN	US/MH Name	Level Exceeded
1.001	SF 2	
1.002	SF 3	
1.003	SF 4	
1.004	SF 5	
1.005	SF 6	
1.006	SF 7	
1.007	SF 8	

APPENDIX C

Bypass Petrol Interceptor

Klargester Bypass Separators

NSB RANGE

Concentration Less Than

5 MG/L

Bypass separators are used when it is considered an acceptable risk to not provide full treatment for very high flows, such as where the risk of a large spillage and heavy rainfall occurring at the same time is small. Typical applications include surface carparks, roadways and lightly contaminated commercial areas.

Product Benefits

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Oil alarm system available (required by EN 858-1 and PPG3).
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or polyethylene construction (subject to model).

Performance & Compliance

› Fully compliant and tested to EN 858-1.

› Bypass separators are tested by British standards institute (BSI).

› Certified flow and process performance assessing effluent qualities to the requirements of EN 858-1.

› The unit is designed to treat the 'first flush' - 10% of peak flow. The calculated drainage areas served by each separator are indicated according to the formula given by PPG3 NSB = 0.0018A(m2).

› Class I separators are designed to achieve a concentration of less than 5mg per litre.

Technical Specifications

Model Reference	Flow (l/s)	Peak Flow Rate (l/s)	Drainage Area(m^2) Based on UK rainwater flow	Storage Capacity (Ltrs)		Length (mm)	Diameter (mm)	Access Shaft Diameter (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Standard Fall Across (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)**
				Silt	Oil								
Polyethylene Chamber Construction													
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
GRP Chamber Construction													
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

** Some units have more than one access shaft – diameter of largest shown | ** Larger pipework available on request.*

Klargester Forecourt Separators

Expert Technical Advice

Forecourt separators are used to intercept hydrocarbon pollutants such as petroleum and oil to prevent their entry to the drainage system. Typical applications include petrol filling station forecourts and car breaker yards.

Performance and Compliance

- Operation ensures that the flow cannot exit the unit without first passing through the coalescer assembly.
- In normal operation, the forecourt separator has sufficient capacity to provide storage for separated pollutants within the main chamber, but is also able to contain up to 7,600 litres of pollutant arising from the spillage of a fuel delivery tanker compartment on the petrol forecourt.
- The separator has been designed with an automatic closure device to ensure that oil cannot exit the separator in the event of a major spillage, consequently the separator should be emptied immediately.

Installation

- The unit should be installed on a suitable concrete base slab and surrounded with concrete or pea gravel backfill.
- If the separator is to be installed within a trafficked area, then a suitable cover slab must be designed to ensure that loads are not transmitted to the unit.
- The separator should be installed and vented in accordance with Health and Safety Guidance Note HS(G)41 for filling stations.
- Subject to Local Authority requirements.

Technical Specifications

Separator Class	Backfill Type	Total Capacity (Ltrs)	Drainage Area (m^2)	Peak Flow Rate (L/s)	Length (mm)	Diameter (mm)	Access Shaft Diameter (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Standard Fall Across (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)	Empty Weight (kg)
I/II	Concrete	10000	835	15	3915	2020	600	2180	2130	50	600	160	620
I/II	Concrete	10000	1115	20	3915	2020	600	2180	2130	50	600	200	620

Fuel & Oil Separator Alarms

British European Standard EN 858-1 and Environment Agency Pollution Prevention Guideline PPG3 requires that all separators are to be fitted with an oil level alarm system. It should be installed and calibrated by a suitably qualified technician so that it will respond to an alarm condition when the separator requires emptying.

Product Benefits

- Easily fitted to existing tanks.
- Excellent operational range.
- Visual and audible alarm.
- Additional telemetry option.

APPENDIX D

Irish Water Correspondence

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www.water.ie

07 July 2022

Re: CDS21007628 pre-connection enquiry - Subject to contract | Contract denied

Connection for Multi/Mixed Use Development of 180 unit(s) at Castlegar, Galway, Co Galway

Dear Sir/Madam,

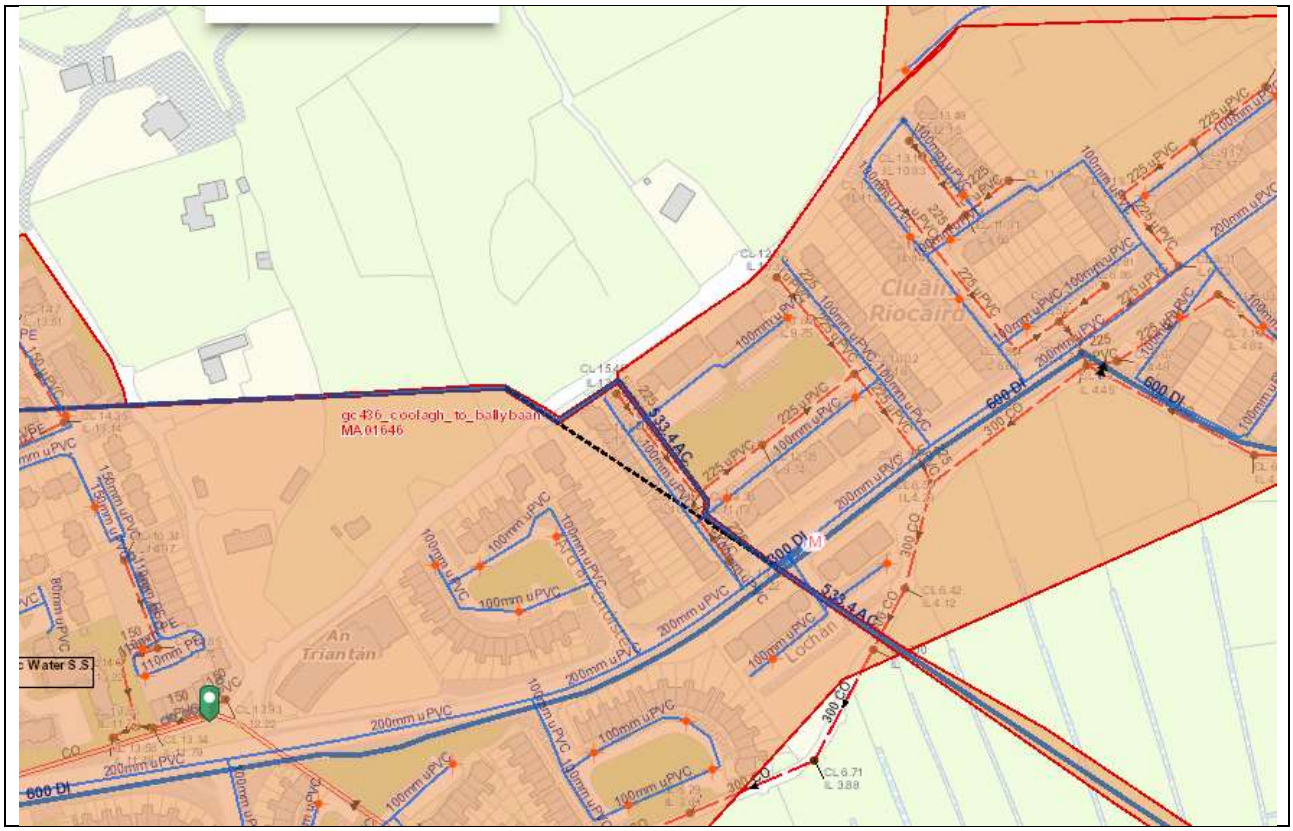
Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Castlegar, Galway, Co Galway (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish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

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible Subject to upgrades
Wastewater Connection	Feasible Subject to upgrades
SITE SPECIFIC COMMENTS	
Water Connection	There is sufficient capacity in the existing Water Treatment Plant to facilitate the proposed development. The Developer has proposed the installation of a 450m (approx.) long water network extension to the south west towards the junction between Bothar an Choiste and the main road. Irish Water have no objection to this proposal. Please note while flows in excess of your required demand may be achieved in the Irish Water network and could be utilised, Irish Water cannot guarantee a flow rate to meet your requirement. To guarantee a flow to meet your requirements, you should provide adequate storage capacity within your development.
Wastewater Connection	There is sufficient capacity in the existing Terryland River Wastewater Treatment Plant to facilitate the proposed development.

	The Developer has proposed the installation of a foul sewer network extension consisting of 230m of a pumped sewer and 215m of Gravity Sewer to the southwest towards the junction between Bothar an Choiste and the main road. Based on current records, this proposal is acceptable.

The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.

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



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

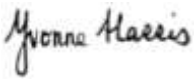
Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish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

General Notes:

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

If you have any further questions, please contact Barry Butler from the design team by email barry.butler@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,



Yvonne Harris

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www.water.ie

25 July 2022

Re: Design Submission for Castlegar, Galway, Co Galway (the "Development") (the "Design Submission") / Connection Reference No: CDS21007628

Dear Brendan,

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: Barry Butler
Phone: 086-7776227
Email: barry.butler@water.ie

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

Appendix A

Document Title & Revision

- [10750-2101 P01 Proposed Watermain Layout]
- [10750-2102 P01 Proposed Watermain Connection]
- [10750-2103 P01 Proposed Drainage Layout]
- [10750-2104 P01 Proposed Drainage Connection]

Standard Details/Code of Practice Exemption:

NOT USED

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.

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