Foul Water Drainage Strategy Land at Haine Road Ramsgate CT12 5ET

RMB Consultants (Civil Engineering) Ltd September 2016



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# 1. Background and Introduction

This Foul Water Drainage Strategy accompanies a planning application submitted to Thanet District Council. The planning application is for residential development on land at Haine Road, Ramsgate, CT12 5ET.



## 2. Development Description and Location

# **Development Location**

The site is located west of Haine Road, Ramsgate, Figures 1 and 2. It is a partially developed site that covers 4.25ha.



Figure 1. Site location.



Figure 2. Site location.

## **Development Proposals**

This report accompanies a hybrid planning application for the detailed approval of five dwellings and the outline approval of 95 residential dwellings, Figure 3.



Figure 3. Proposed development.

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## 3. Policy Background

### Thanet District Council Strategic Flood Risk Assessment

Thanet District Council published a Strategic Flood Risk Assessment in 2009. A detailed assessment of drainage was not undertaken as part of the SFRA. However it does states that:

In many areas, drains are designed for both surface water and foul water, and should these reach capacity ahead of heavy rainstorms, the risk of sewage flooding can be high. The introduction of impermeable surfaces such as roofs, roads and parking areas associated with new developments therefore have the potential to increase surface water runoff compared with the natural undeveloped surfaces and also may reduce the natural recharge of groundwater.

LPA's are required to promote the application of SuDS, the preferred option in PPS25 being infiltration techniques as opposed to discharging into watercourses. Where this is not possible, preference should be given to the discharge of surface water into watercourses rather than foul water drains.

## Draft Thanet District Council Local Plan to 2031

The following Draft Local Plan policies are relevant to foul water drainage at the site.

#### Policy H01– Housing Development

Permission for new housing development will be granted on:

- 1) sites allocated for such purposes, subject to consistency with indicative phasing,
- 2) non-allocated sites within the existing built up confines consisting of previously developed land,
- 3) residential gardens where not judged harmful to the local area in terms of the character and amenity considerations set out in Policy QD01, and provided that all the following criteria are met:
- 4) The relevant area specific housing objectives set out in the housing strategy section are addressed.
- It is demonstrated that adequate infrastructure will be in place to serve each unit ready for occupation.
- 6) Satisfactory details are provided showing how any physical conditions including land stability and contamination, affecting the site can be overcome.
- Sufficient mitigation is provided in accordance with Policy SP25 to protect designated nature conservation sites.
- 8) There is no conflict with other policies.

In determining applications for development under this policy the Council will seek to ensure that development does not increase recreational pressure on designated nature conservation sites without sufficient mitigation. Alternative development on sites allocated for residential development will not be permitted.

The site is allocated under the Draft Local Plan:

### Policy H02E - land at Haine Road and Spratling Street, Ramsgate (site reference SR60)

Land is allocated for up to 85 new dwellings at a maximum density of 35 dwellings per hectare net at Haine Road and Spratling Street, Ramsgate.



Phasing of development will be in accordance with Policy H01(1). Proposals will be judged and permitted only in accordance with a development brief and masterplan for the whole site informed by a Transport Assessment and Travel Plan including assessment of impact on the local road network and demonstrating measures to promote multi-modal access.

Development will incorporate and provide for suitable access arrangements together with suitable footway connections.

Masterplanning will be informed by and address:

- 1) Liaison with service providers to investigate the need to upgrade the capacity of any utility services and infrastructure including gas supply.
- A statement of social impacts arising from the development and how any increased demand on community facilities will be addressed.
- 3) The need to clearly demonstrate how the SPA mitigation strategy as set out in Policy SP25 is being met and how it will ensure that development does not increase recreational pressure on designated sites.

A minimum of 30% of all dwellings will be affordable homes in accordance with Policy SP19. The proportion of houses as opposed to flats should exceed that in policy SP18 as much as possible.

Disposition of development and landscaping will be expected to enable a soft edge between the site and open countryside.



## 4. Site Characteristics

**Topographical Survey** - A detailed level survey has been carried out. The site slopes from northeast to southwest from a high point of 56.0mAOD (Above Ordnance Datum), to a low point of 51.0mAOD, Figure 4, at a gradient of approximately 1 in 40.



Figure 4. Local topography.



## 5. Foul Water Management Strategy

## **Existing Infrastructure**

Southern Water is responsible for the adopted drainage infrastructure in the vicinity of the site.

The public sewer record has been obtained from Southern Water, Figure 5.



Figure 5. Public sewer record with site edged blue. (© Southern Water)

The area is served by combined public sewers. A 150mm diameter combined public sewer runs south to north along Haine Road. A 150mm diameter combined public sewer runs along the Spratling Street from southwest to northeast.

A Level 2 Design Capacity Check was submitted to Southern Water in October 2015. The capacity check was for 105 dwellings. Sewers for Adoption 7<sup>th</sup> Edition states that design flow rates for dwellings should be 4,000 litres per dwelling per day. The capacity check was for a flow of 4.9 l/s. This hybrid planning application proposes 100 dwellings, a flow of 4.6 l/s.

Southern Water's response dated 23rd November 2015, Appendix A, states that:

There is currently inadequate capacity within the local sewerage network to accommodate the proposed foul flows at manhole reference TR35668201. The proposed development would increase flows to the local network and as a result existing properties and land may be subject to a greater risk of flooding.



Additional off-site sewers or improvements to existing sewers will be required to provide sufficient capacity to service the proposed development as indicated in Figure 2 and Table 1.

It was not possible to derive a solution to fully resolve detriment caused by the additional flows. The recommended improvements as indicated in this report are indicative only and subject to further detailed investigations of catchment problems.

The nearest point where capacity is currently available is at Weatherlees Hill WTW located approximately 4.4km South West of the proposed development site. Section 98 of the Water Industry Act 1991 provides a legal mechanism through which the appropriate infrastructure can be requested (by the developer) and provided to drain a specific location.

The plan of the proposed connection point and upgrade works required is reproduced in Figure 6.



Figure 6. Foul drainage connection point and upgrades identified by Southern Water.

The table of the upgrade works identified is reproduced in Table 1. The upgrade works are to the east of the site.

II/S Manhole	D/S Manholo	Sewer Diar	meter (mm)	Avg. Depth	Length (m)					
	D/S Marinole	Existing	Proposed	(m)						
Proposed flow control (225mm orifice) at manhole TR36663204										

Table 1. Proposed public sewer improvements schedule.



## Strategy Approach

This strategy provides a solution for the on-site foul drainage in line with Sewers for Adoption 7th Edition.

The topography allows foul water to be drained by gravity to the southern boundary of the site. The public combined sewer running along Haine Road is very deep with an invert level of 44.88mAOD at manhole reference 7101. This allows the whole development to drain via gravity to this manhole.

An illustrative foul drainage layout has been produced, Figure 7.



Figure 7. Illustrative foul drainage layout.

The strategy has been modelled using MicroDrainage WinDes software to ensure that the strategy meets Sewers for Adoption 7th Edition requirements. Model output details can be found in Appendix B. Specific points used for the design include;

- all foul sewers with 10 or less connecting properties are modelled as 100mm diameter with a gradient no flatter than 1:80;
- sewers with more than 10 properties connected are 150mm at a slope no flatter than 1:150;
- any sewer backdrops within the strategy are no less than 1m high.

The modelling demonstrates that development can be served by foul drainage infrastructure.



## 6. Conclusion

This Foul Water Drainage Strategy accompanies a planning application submitted to Thanet District Council. The planning application is for residential development on land at Haine Road, Ramsgate, CT12 5ET.

The area is served by public combined sewers. Combined public sewers run along Haine Road and Spratling Street. These drain to the east.

A capacity check has been submitted to Southern Water. The response indicates that there is currently inadequate capacity within the local foul sewerage network to accommodate the foul flow from the proposed development. The capacity check identifies upgrade works necessary to provide sufficient capacity and the developer proposes to requisition foul sewers under Section 98 of the Water Industry Act 1991 to ascertain the most efficient mechanism for providing foul sewerage infrastructure.

This strategy provides a solution for the on-site foul drainage in line with Sewers for Adoption 7th Edition. The topography allows foul water to be drained by gravity to the southern boundary of the site. The public combined sewer running along Haine Road has a very deep invert level and connection to this sewer via gravity is feasible.

This Strategy shows that that the development can be adequately served by foul sewers and that sufficient capacity is available within the local network for the disposal of wastewater, providing off-site improvement works are carried out. The proposals are considered to be acceptable from a foul drainage perspective.



Appendix A - Southern Water Capacity Check



STUDY INTO THE OPTIONS FOR FOUL DRAINAGE PROVISION AT LAND AT HAINE ROAD HAINE ROAD RAMSGATE, KENT CT12 5ES

23 NOVEMBER 2015

REQUESTED: RMB CONSULTANTS (CIVIL ENGINEERING) LTD Study into the Options for Foul Water Drainage Provision for Land at Haine Road, Haine Road, Ramsgate, Kent

# I. Development Details:

The proposal is to discharge foul flows to the local sewerage systems. The developer did not have a preferred point of connection for the foul flows.

# Figure 1 - Proposed Development- foul water system



## **Results:**

# Foul Water:

There is currently inadequate capacity within the local sewerage network to accommodate the proposed foul flows at manhole reference TR35668201. The proposed development would increase flows to the local network and as a result existing properties and land may be subject to a greater risk of flooding.

Additional off-site sewers or improvements to existing sewers will be required to provide sufficient capacity to service the proposed development as indicated in Figure 2 and Table 1.

It was not possible to derive a solution to fully resolve detriment caused by the additional flows. The recommended improvements as indicated in this report are indicative only and subject to further detailed investigations of catchment problems.

The nearest point where capacity is currently available is at Weatherlees Hill WTW located approximately 4.4km South West of the proposed development site. Section 98 of the Water Industry

Act 1991 provides a legal mechanism through which the appropriate infrastructure can be requested (by the developer) and provided to drain a specific location.





## Table 1 - Proposed Improvements Schedule

U/S Manhole	D/S Manhole	Sewer Diame	Avg. Depth	Length	
		Existing	Proposed	(m)	(m)
Proposed flow co	ntrol (225mm orifice)	at manhole TR36663	3204		

# Surface Water System:

As a surface water capacity check has not been requested it is assumed that Surface Water will be disposed of by alternative means i.e. Soakaway or any local drainage watercourses, subject to all interested parties approval.

Before any connections are made, an application form needs to be completed and approved by Southern Water Services.

Please note: - The information provided above does not grant approval for any designs /drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

# **PUBLIC SEWER RECORD**







Appendix B - Draft Foul Drainage Design

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39 Cossington Road	Haine Road						
Canterbury	Ramsgate, CT12 5ET	4					
Kent CT1 3HU	Draft Foul Drainage Design	Micco					
Date 05/09/16	Designed by RB						
File Foul Network 05-09-16.MDX	Checked by	Drainage					
Micro Drainage	Network 2015.1	1					

## FOUL SEWERAGE DESIGN

# Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	1.000
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Ba Flow	ise (1/s)	k (mm)	HYD SECT	DIA (mm)
=1 000		1 000			<i>.</i>			1 500		100
F.T.000	//.395	1.300	59.5	0.000	6		0.0	1.500	0	100
F1.001	42.422	1.498	28.3	0.000	1		0.0	1.500	0	100
F2.000	15.826	0.198	80.0	0.000	3		0.0	1.500	0	100
F1.002	49.700	0.621	80.0	0.000	8		0.0	1.500	0	150
F1.003	14.764	0.098	150.0	0.000	1		0.0	1.500	0	150
F3.000	49.371	0.617	80.0	0.000	10		0.0	1.500	0	100
F3.001	44.556	0.297	150.0	0.000	10		0.0	1.500	0	150
F1.004	35.372	0.236	150.0	0.000	2		0.0	1.500	0	150
F4.000	15.787	0.197	80.0	0.000	3		0.0	1.500	0	100
F4.001	10.997	0.137	80.0	0.000	2		0.0	1.500	0	100
F4.002	45.333	0.567	80.0	0.000	6		0.0	1.500	0	150
F4.003	22.349	0.248	90.1	0.000	1		0.0	1.500	0	150

### 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 (1/s)	Flow (1/s)
F1.000 F1.001	53.700 52.400	0.000 0.000	0.0	6 7	0.0	14 13	0.41 0.56	0.86 1.25	6.8 9.8	0.3 0.3
F2.000	51.100	0.000	0.0	3	0.0	11	0.30	0.74	5.8	0.1
F1.002	50.902	0.000	0.0	18	0.0	23	0.50	0.98	17.3	0.8
F1.003	50.281	0.000	0.0	19	0.0	27	0.40	0.71	12.6	0.9
F3.000	49.800	0.000	0.0	10	0.0	19	0.44	0.74	5.8	0.5
F3.001	49.183	0.000	0.0	20	0.0	28	0.41	0.71	12.6	0.9
F1.004	48.886	0.000	0.0	41	0.0	39	0.51	0.71	12.6	1.9
F4.000	49.800	0.000	0.0	3	0.0	11	0.30	0.74	5.8	0.1
F4.001	49.603	0.000	0.0	5	0.0	14	0.35	0.74	5.8	0.2
F4.002	49.465	0.000	0.0	11	0.0	18	0.43	0.98	17.3	0.5
F4.003	48.898	0.000	0.0	12	0.0	19	0.42	0.92	16.3	0.6

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Micro Drainage	Network 2015.1					

# Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Ba Flow	se (1/s)	k (mm)	HYD SECT	DIA (mm)
F1.005	18.053	0.120	150.0	0.000	1		0.0	1.500	0	150
F5.000	16.996	0.300	56.7	0.000	3		0.0	1.500	0	100
F6.000	12.365	0.600	20.6	0.000	1		0.0	1.500	0	100
F5.001	16.534	0.300	55.1	0.000	2		0.0	1.500	0	100
F3.002	44.301	3.070	14.4	0.000	2		0.0	1.500	0	100
F1.006	42.631	0.284	150.0	0.000	6		0.0	1.500	0	150
F7.000	51.362	1.200	42.8	0.000	19		0.0	1.500	0	150
F7.001	18.741	0.450	41.6	0.000	0		0.0	1.500	0	150
F7.002	30.041	3.905	7.7	0.000	2		0.0	1.500	0	150
F1.007	45.609	0.304	150.0	0.000	1		0.0	1.500	0	150
F8.000	33.298	2.459	13.5	0.000	7		0.0	1.500	0	100
F1.008	21.899	0.146	150.0	0.000	2		0.0	1.500	0	150
F1.009	14.583	0.097	150.0	0.000	1		0.0	1.500	0	150
F1.010	51.793	0.345	150.0	0.000	2		0.0	1.500	0	150

## Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Bas Flow (1	se Σ ./s)	Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (1/s)	Flow (l/s)
F1.005	48.650	0.000		0.0	54	0.0	45	0.55	0.71	12.6	2.5
F5.000	52.200	0.000		0.0	3	0.0	10	0.33	0.89	7.0	0.1
F6.000	52.500	0.000		0.0	1	0.0	5	0.32	1.47	11.6	0.0
F5.001 F5.002	51.900 51.600	0.000 0.000		0.0	6 8	0.0	14 12	0.42 0.73	0.90 1.76	7.0 13.8	0.3 0.4
F1.006	48.530	0.000		0.0	68	0.0	51	0.59	0.71	12.6	3.1
F7.000 F7.001 F7.002	53.800 52.600 52.150	0.000 0.000 0.000		0.0 0.0 0.0	19 19 21	0.0 0.0 0.0	20 20 14	0.63 0.63 1.17	1.34 1.36 3.17	23.7 24.0 56.0	0.9 0.9 1.0
F1.007	48.245	0.000		0.0	90	0.0	59	0.64	0.71	12.6	4.2
F8.000	50.400	0.000		0.0	7	0.0	11	0.72	1.82	14.3	0.3
F1.008 F1.009 F1.010	47.941 47.795 47.698	0.000 0.000 0.000		0.0 0.0 0.0	99 100 102	0.0 0.0 0.0	63 63 64	0.66 0.66 0.66	0.71 0.71 0.71	12.6 12.6 12.6	4.6 4.6 4.7

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# Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
F1	55.000	1.300	Open Manhole	1200	F1.000	53.700	100				
F2	53.700	1.300	Open Manhole	1200	F1.001	52.400	100	F1.000	52.400	100	
F3	52.400	1.300	Open Manhole	1200	F2.000	51.100	100				
F4	52.800	1.898	Open Manhole	1200	F1.002	50.902	150	F1.001	50.902	100	
								F2.000	50.902	100	
F5	51.800	1.519	Open Manhole	1200	F1.003	50.281	150	F1.002	50.281	150	
F6	51.100	1.300	Open Manhole	1200	F3.000	49.800	100				
F7	51.200	2.017	Open Manhole	1200	F3.001	49.183	150	F3.000	49.183	100	
F8	51.800	2.914	Open Manhole	1200	F1.004	48.886	150	F1.003	50.183	150	1297
								F3.001	48.886	150	
F9	51.100	1.300	Open Manhole	1200	F4.000	49.800	100				
F10	51.000	1.397	Open Manhole	1200	F4.001	49.603	100	F4.000	49.603	100	
F11	51.100	1.635	Open Manhole	1200	F4.002	49.465	150	F4.001	49.465	100	
F12	51.500	2.602	Open Manhole	1200	F4.003	48.898	150	F4.002	48.898	150	
F13	52.000	3.350	Open Manhole	1200	F1.005	48.650	150	F1.004	48.650	150	
								F4.003	48.650	150	
F14	53.500	1.300	Open Manhole	1200	F5.000	52.200	100				
F15	53.800	1.300	Open Manhole	1200	F6.000	52.500	100				
F16	53.200	1.300	Open Manhole	1200	F5.001	51.900	100	F5.000	51.900	100	
								F6.000	51.900	100	
F17	52.900	1.300	Open Manhole	1200	F5.002	51.600	100	F5.001	51.600	100	
F18	52.100	3.570	Open Manhole	1200	F1.006	48.530	150	F1.005	48.530	150	
								F5.002	48.530	100	
F19	55.100	1.300	Open Manhole	1200	F7.000	53.800	150				
F20	53.900	1.300	Open Manhole	1200	F7.001	52.600	150	F7.000	52.600	150	
F21	53.500	1.350	Open Manhole	1200	F7.002	52.150	150	F7.001	52.150	150	
F22	52.600	4.355	Open Manhole	1200	F1.007	48.245	150	F1.006	48.245	150	
								F7.002	48.245	150	
F23	51.700	1.300	Open Manhole	1200	F8.000	50.400	100				
F24	52.100	4.159	Open Manhole	1200	F1.008	47.941	150	F1.007	47.941	150	
								F8.000	47.941	100	
F25	52.400	4.605	Open Manhole	1200	F1.009	47.795	150	F1.008	47.795	150	
F26	52.900	5.202	Open Manhole	1200	F1.010	47.698	150	F1.009	47.698	150	
F	53.580	6.227	Open Manhole	0		OUTFALL		F1.010	47.353	150	

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# PIPELINE SCHEDULES for Foul - Main

## <u>Upstream Manhole</u>

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000 F1.001	0	100 100	F1 F2	55.000 53.700	53.700 52.400	1.200 1.200	Open Manhole Open Manhole	1200 1200
F2.000	0	100	F3	52.400	51.100	1.200	Open Manhole	1200
F1.002	0	150	F4	52.800	50.902	1.748	Open Manhole	1200
F1.003	0	150	F5	51.800	50.281	1.369	Open Manhole	1200
F3.000	0	100	F6	51.100	49.800	1.200	Open Manhole	1200
F3.001	0	150	F7	51.200	49.183	1.867	Open Manhole	1200
F1.004	0	150	F8	51.800	48.886	2.764	Open Manhole	1200
F4.000	0	100	F9	51.100	49.800	1.200	Open Manhole	1200
F4.001	0	100	F10	51.000	49.603	1.297	Open Manhole	1200
F4.002	0	150	F11	51.100	49.465	1.485	Open Manhole	1200
F4.003	0	150	F12	51.500	48.898	2.452	Open Manhole	1200
F1.005	0	150	F13	52.000	48.650	3.200	Open Manhole	1200
F5.000	0	100	F14	53.500	52.200	1.200	Open Manhole	1200
F6.000	0	100	F15	53.800	52.500	1.200	Open Manhole	1200
F5.001	0	100	F16	53.200	51.900	1.200	Open Manhole	1200

# Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000 F1.001	77.395 42.422	59.5 28.3	F2 F4	53.700 52.800	52.400 50.902	1.200 1.798	Open Manhole Open Manhole	1200 1200
F2.000	15.826	80.0	F4	52.800	50.902	1.798	Open Manhole	1200
F1.002 F1.003	49.700 14.764	80.0 150.0	F5 F8	51.800 51.800	50.281 50.183	1.369 1.467	Open Manhole Open Manhole	1200 1200
F3.000 F3.001	49.371 44.556	80.0 150.0	F7 F8	51.200 51.800	49.183 48.886	1.917 2.764	Open Manhole Open Manhole	1200 1200
F1.004	35.372	150.0	F13	52.000	48.650	3.200	Open Manhole	1200
F4.000 F4.001 F4.002 F4.003	15.787 10.997 45.333 22.349	80.0 80.0 80.0 90.1	F10 F11 F12 F13	51.000 51.100 51.500 52.000	49.603 49.465 48.898 48.650	1.297 1.535 2.452 3.200	Open Manhole Open Manhole Open Manhole Open Manhole	1200 1200 1200 1200
F1.005	18.053	150.0	F18	52.100	48.530	3.420	Open Manhole	1200
F5.000	16.996	56.7	F16	53.200	51.900	1.200	Open Manhole	1200
F6.000	12.365	20.6	F16	53.200	51.900	1.200	Open Manhole	1200
F5.001	16.534	55.1	F17	52.900	51.600	1.200	Open Manhole	1200

RMB Consultants Ltd		Page 5
39 Cossington Road	Haine Road	
Canterbury	Ramsgate, CT12 5ET	<u> </u>
Kent CT1 3HU	Draft Foul Drainage Design	Micco
Date 05/09/16	Designed by RB	
File Foul Network 05-09-16.MDX	Checked by	Digiligh
Micro Drainage	Network 2015.1	·

# PIPELINE SCHEDULES for Foul - Main

## <u>Upstream Manhole</u>

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F5.002	0	100	F17	52.900	51.600	1.200	Open Manhole	1200
F1.006	0	150	F18	52.100	48.530	3.420	Open Manhole	1200
F7.000	0	150	F19	55.100	53.800	1.150	Open Manhole	1200
F7.001	0	150	F20	53.900	52.600	1.150	Open Manhole	1200
F7.002	0	150	F21	53.500	52.150	1.200	Open Manhole	1200
F1.007	0	150	F22	52.600	48.245	4.205	Open Manhole	1200
F8.000	0	100	F23	51.700	50.400	1.200	Open Manhole	1200
F1.008	0	150	F24	52.100	47.941	4.009	Open Manhole	1200
F1.009	0	150	F25	52.400	47.795	4.455	Open Manhole	1200
F1.010	0	150	F26	52.900	47.698	5.052	Open Manhole	1200

## Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	M Conne	MH Action	MH DIAM., I (mm)	Ľ*₩
				• •						
F5.002	44.301	14.4	F18	52.100	48.530	3.470	Open M	Manhole	12	200
F1.006	42.631	150.0	F22	52.600	48.245	4.205	Open M	Manhole	12	200
F7.000	51.362	42.8	F20	53.900	52.600	1.150	Open M	Manhole	12	200
F7.001	18.741	41.6	F21	53.500	52.150	1.200	Open N	Manhole	12	200
F7.002	30.041	7.7	F22	52.600	48.245	4.205	Open M	Manhole	12	200
F1.007	45.609	150.0	F24	52.100	47.941	4.009	Open M	Manhole	12	200
F8.000	33.298	13.5	F24	52.100	47.941	4.059	Open M	Manhole	12	200
F1.008	21.899	150.0	F25	52.400	47.795	4.455	Open N	Manhole	12	200
F1.009	14.583	150.0	F26	52.900	47.698	5.052	Open N	Manhole	12	200
F1.010	51.793	150.0	F	53.580	47.353	6.077	Open N	Manhole		0