

Farranamartin, Tuam, Galway

Proposed New Housing Development

Drainage and Watermain Design Report

Gilligan

CONSULTING CIVIL AND STRUCTURAL ENGINEERS

GILLIGAN AND PARTNERS,

23 BEDFORD STREET,

BELFAST.

BT2 7EJ.

PROJECT No. 24561

April 2025

Document Control

Client: Galway County Council

Architect: Collins-Rolston

Project: Farranamartin, Tuam, Galway

Project Number: 24561

Document Title: Drainage and Watermain Design Report

Revision	Date Issued	Prepared	Reviewed	Approved
1 st issue	11/04/2025	CB	CT	CT

1. Introduction

Gilligan NI have been commissioned by Galway County Council, to complete a report on the methodology and design of watermains and sewers for the proposed development off the Galway Road in Tuam.

This report seeks to provide a working drainage design that follows regulations. Methods used will be in accordance with standard practice, with drawings and calculations provided.

2. Site Information

2.1. Predevelopment

Site is located around 675m from St. Jarlath's Park in Tuam. Site is inland, and the local area is predominately residential, with the southern and south western boundaries bounded by fields. The site is greenfield and approximately 1.87ha in area, rising from NW to the SE of the site.



Site Aerial Picture

2.2. Proposed Development

The proposed development can be seen in appendix A, and indicates the construction of 66 units in total, comprised of: 33 houses; 17 apartments; 11 duplex apartments and 5 bungalows along with the normal residential roads and a central open space. Units to range from 2 person to 7 person dwellings.

3. Foul Water Drainage Design

3.1. Existing Drainage Patterns

There are no foul or combined sewers running through the site. There is an existing Uisce Eireann Foul network running along the R939(Galway Road). This has been detailed within the drawing referenced 24561-GNI-XX-ZZ-DR-C-0001. The Foul Sewer runs towards the centre of Tuam (NE of the site) and is a 350mm concrete pipe.

3.2. Foul Sewer Design Method

Foul Sewers are to be designed in accordance with Irish Waters Code of Practice for Wastewater Infrastructure (July 2020, Revision 2).

Usage per person will be taken as 150l/day/person, as per Irish Waters Code of Practice for Wastewater Infrastructure(July 2020, Revision 2.

Pipe roughness (k_s) is to be taken as 1.5mm. Pipe fluid velocity should be no less than 0.75m/s at 1/3 of the design flow(2DWF). Pipe velocity is to be calculated using Colebrook-White equation.

3.3. Development Foul Loading

Foul Loading is to be calculated using the equations specified in the Irish Waters Code of Practice for Wastewater Infrastructure(July 2020, Revision 2), in Appendix B section 2. Site specific foul loading is as follows:

$$DWF = 150l/day(G) \times 285(P) \times 10\% CC = 47025l/day = 0.544l/s$$

$$6DWF = 6[150l/day(G) \times 285(P) \times 10\% CC = 26070l/day] = 282150l/day = 3.266l/s \text{ (Design flow)}$$

3.4. Foul Sewer Design

The Foul Sewer design can be found in **Appendix A**, with the proposed foul sewers shown in red with the relevant manholes referenced as F1, F2, F3 etc.

The Foul sewer is a gravity sewer, falling towards the bottom entrance of the site. Gradients and pipe sizes will be as per the table on P45 of the *Irish Waters Code of Practice for Wastewater Infrastructure*:

Table: Sewer Size/Gradient for Multiple Properties

Number of Dwellings	Pipe Diameter	Minimum Gradient
2 to 9	150mm (or 225mm)	1:60
10 to 20		1:150
21 to 210	225mm	1:200
211 to 250		1:150
251 to 330		1:100
331 – 450	300mm	1:300
451 to 565		1:200
566 to 655		1:150
656 to 830		1:100

Pipe sizes range from 150mm to 300mm, with falls ranging from 1:21 to 1:127. According to the Wastewater Code of Practice, pipes ran at these gradients for the unit numbers served, will reach the ideal self-cleansing velocities, between 0.75m/s and 3.00m/s.

Pipes have been upsized to 300mm along the proposed developments main road(Road 1), to allow for potential future connections.

3.5. Uisce Eireann Feasibility Confirmation

Based on the application submitted by Galway County Council in January 2024, Uisce Eireann have confirmed that the nearby wastewater network can serve the new development.

UE(Uisce Eireann) Confirmation of Feasibility letter can be found in **Appendix B**.

4. Storm Water Drainage Design

4.1. Existing Drainage Patterns

There are no storm water sewers running through the site. There is a dedicated storm sewer running along the R939(Galway Road), heading SW,. The Storm sewer is a 225mm diameter PVC pipe.

4.2. Storm Sewer Design Method

Surface water systems must be designed in accordance with the requirements of the local authority who oversee the surface water drainage systems. Alongside the drainage design, Sustainable Drainage Systems(SuDs), should be implemented within the design.

Sewer systems are to be designed in accordance with Irish Waters Code of Practice for Wastewater Infrastructure(July 2020, Revision 2). Another document that will be taken into account as part of this drainage design would be the Greater Dublin Strategic Drainage Study(GDSDS).

The GDSDS states that for a drainage system must account for four main criteria, seen in section 6.3.4 of the GDSDS document. All will be considered, but criterion 3 would be considered the most pertinent to this scenario.

- 3.1 - No flooding on site except where planned (30-year rainfall event),
- 3.2 - No internal property flooding (100-year rainfall event),
- 3.3 - No internal property flooding (100-year river event and FFL to be 500mm above level of river flooding) and;,,
- 3.4 - No flood routing off site except where specifically planned. (100-year rainfall event).

4.3. Design Parameters

Site specific parameters such as M5-60 and ratio “R” for the designated site, have been set at 17.00mm/hr and 0.300 respectively, which would be standard for the area.

Surface water system is to be designed to store up to a 1-100 year rainfall event + 20% for climate change, whilst discharging at greenfield run-off rate.

Total hardstanding area from the propose development has been predicted to be 0.943ha

A roughness(k_s) value of 0.6mm will be assumed.

4.4. Storm Sewer Design

Storm sewer design can be viewed in **Appendix A**. Storm pipes are coloured in green, with manholes referenced S1, S2, S3 etc.

Storm water run-off will be collected through gullies and downpipes from the roads and houses, which are then connected to PVC pipes and concrete manholes. Pipe sizes range from 150mm to 450mm, with the manholes sizes ranging from 1200mm diameter to 2100mm diameter pre-cast concrete rings. Larger Manholes will have 3 or more connections.

There are two different storm systems designed here: one system will discharge via. ground infiltration; and the other system will discharge directly to the dedicated storm sewer located on the Galway Road. Calculations were completed using the hydraulic modelling software, Causeway Flow. Calculations can be seen in **Appendix C**.

4.4.1. Soakaway System

Two soakaway tests were conducted in accordance with BRE 365 on February of 2025 in the centre of the site. Logs and Locations of the soakaway tests can be found within **Appendix D**.

The soakaway tests found that the site has rapid infiltration through the subgrade, with a soakage rate of $1.74 \times 10^{-4} \text{m/s}$.

As part of this design, a value of 0.6m/hr has been taken and is the infiltration value used within the hydraulic model.

The soakaway system will be in the form of a geocellular crate system, with a permeable membrane installed along the base to allow water to soakaway. The hydraulic model has shown that for a tank of volume 168m^3 , there will be no out of sewer flooding exhibited within the site during a 1:100 year + 20% intensity increase.

Site would have been seen as ideal for a soakaway system, as the subgrade seems to be mainly gravel, which sits on a layer of Burren Formation Limestone. This limestone is categorised as a regionally important karstified aquifer, with a high conduit flow and rapid groundwater recharge rates. Surface water

run-off would be able to rapidly pass through fissures and cracks within the limestone relatively easily. On a further note, no Karst features are exhibited within 100m of the site.

4.4.2. Attenuation System

The attenuation tank system located at the site entrance will be similar to the previously mentioned soakaway and in the form of a geocellular crate system. The attenuation tank will be wrapped in an impermeable membrane with the joints welded together to prevent water from escaping.

According to CIRIA C753, there should not be an infiltration system installed within 5m of a building. Given that there are no soakage rates for the area around the entrance road, and the confined space, it is deemed that a soakaway would provide more risk than a sealed storage system.

To prevent overburdening of the dedicated storm water system, and local watercourses downstream, a vortex flow control has been designed in the final manhole, prior to it discharging into the public system. This will restrict the flow to a greenfield run-off equivalent for the area that it is serving (6.1l/s/ha). The greenfield run-off equivalent is calculated using the formula: 10l/s/ha of greenfield site.

Calculations indicated that there is no out of sewer flooding from this proposed system during a 1:100 year storm event + 20% intensity increase.

4.4.3. Petrol Interceptors

Two Class 1 bypass petrol interceptors are to be installed to guard both geocellular tanks. This is to manage the quality of water that is exiting the site and entering either the ground or the watercourses.

Both storm systems are taking road surface water run-off. The Site would be designated as low risk for oil spills, therefore Class 1 interceptors should be adequate to remove the small amounts of oil generated by this development.

Petrol interceptors will have the capacity to take an excess of 100l/s of flow.

5. Watermain Design

5.1. Local Watermain Network

There are no watermains traversing the site. There is a watermain system located on the R939, directly in front of the site entrance. The Watermain is a 355mm diameter HDPE main at the entrance of the site.

5.2. Watermain Design

In line with Local Authority and Uisce Éireann standards, a water meter and logging device will be installed at the point of connection to the site.

Within the site, boundary boxes, hydrants, and sluice valves will be installed in accordance with the layout drawings, with air valves and scour valves installed at high points and low points respectively. All watermains will be commissioned and pressure tested in compliance with Uisce Éireann standards. Typical construction and meter details are provided as part of the engineering drawings accompanying this planning application.

Fire hydrants will be installed within the site at intervals that comply with Part B of the Building Regulations, ensuring that all buildings are located within 46 metres of a hydrant.

Any additional requirements specified by the local fire authority will be incorporated.

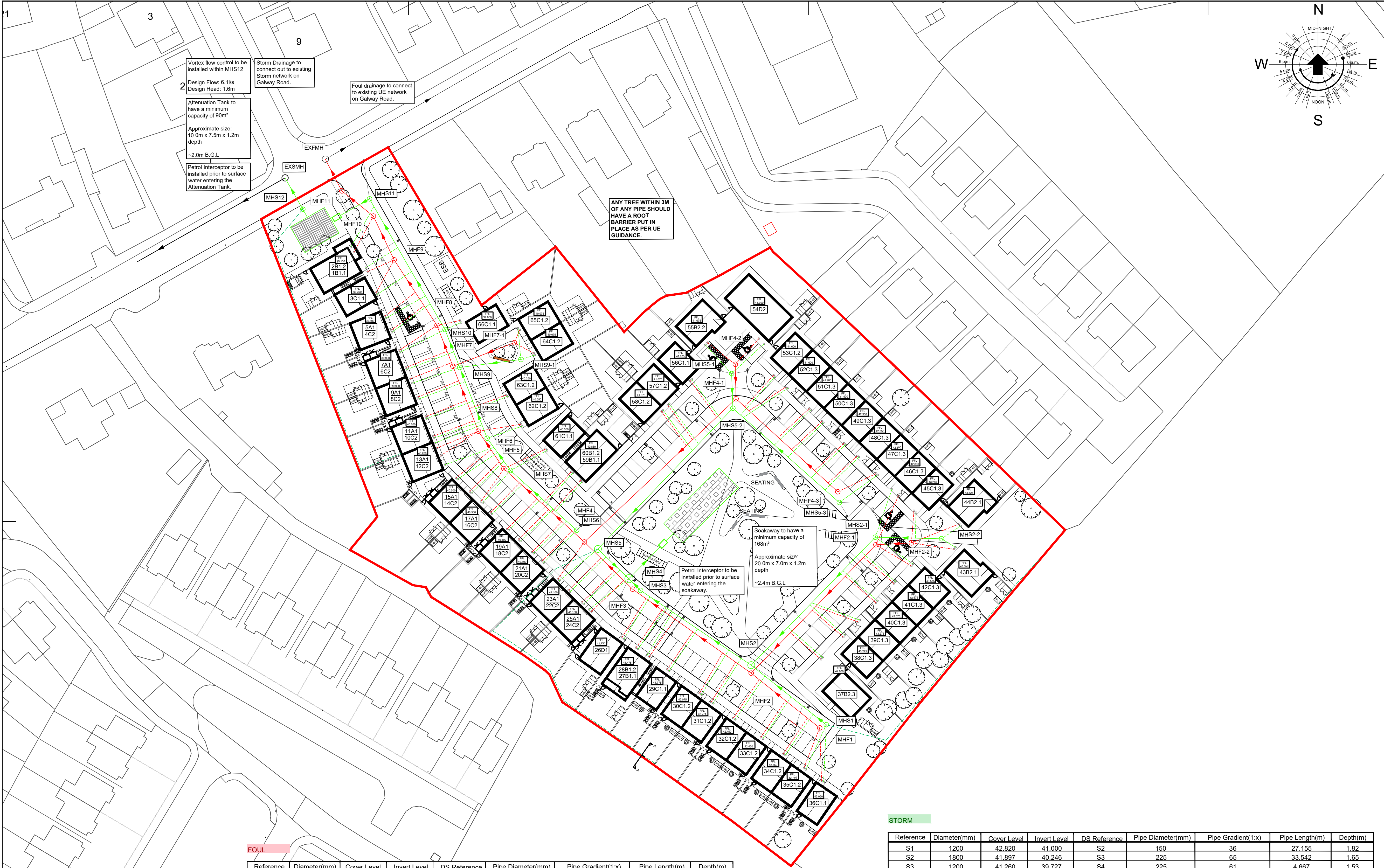
The Watermain design can be found in **Appendix E**.

5.3. Uisce Eireann Feasibility Confirmation

Based off the application submitted by Galway County Council in January 2024, Uisce Eireann have confirmed that the nearby potable water network can serve the new development.

UE(Uisce Eireann) Confirmation of Feasibility letter can be found in **Appendix B**.

Appendix A



KEY

Storm Drainage

Foul Drainage

Existing Foul Drainage

Existing Storm Drainage

Soakaway

Attenuation Tank

Road Gully

Domestic Storm Drainage

Domestic Foul Drainage

Retaining Wall Drainage

Boundary Line

3m Wayleave

- NOTES**
1. All Storm manholes and Foul manholes to be Ø1200mm Concrete rings minimum with D400 lids unless stated otherwise.

2. Irish Water confirmed capacity into the location foul sewer through a PCE REF: CDS2400057

3. All stated units are indicative and the true measurements should be taken on site.

4. Any Levels referenced refer to ORDINANCE SURVEY DATUM, MALIN HEAD.

5. This drawing should be read in conjunction with Architects drawings.

6. All manhole chambers shall be in accordance with Irish Water standard detail STD-WW-10.

7. All pipe materials shall comply with Section 3.13 of the Irish Water Code of Practice for Wastewater Infrastructure Document CDS-5030-03, and should be installed as per the Irish Water detail STD-WW-07.

8. Pipes with less than 1.2m cover from the crown of pipe, should have appropriate road protection, and should be installed as per the Irish Water standard detail STD-WW-08.

9. Sewer service connections and inspection chambers to each dwelling shall be in accordance with Irish Water standard detail STD-WW-02.

10. Separation distances from other services, boundary walls, shrubs etc. shall be in accordance with Irish Water standard details: STD-WW-05, STD-WW-06 and STD-WW-06A

11. Where foul and storm sewers cross, they should be staggered as per the Irish Water Wastewater Code of Practice.

12. Inspection chambers to be installed on all connections from foul and surface water sewers within individual properties in accordance with IW STD-WW-03-1 in compliance with Irish Water code of practice and standard details, set out in IW-CDS-5030-01.

13. Attenuation Tank and Soakaway to be installed as per the manufactures requirements.

14. Soakaway to be wrapped in an impermeable membrane and welded at the joints. Bottom of soakway to have a permeable membrane.

15. Any road openings and reinstatements should comply with the "Guidelines for Managing Openings in Public Roads" April 2017, and should be approved by the local Roads Authority

FOUL

Reference	Diameter(mm)	Cover Level	Invert Level	DS Reference	Pipe Diameter(mm)	Pipe Gradient(1:x)	Pipe Length(m)	Depth(m)
F1	1200	42.710	41.146	F2	300	31	24.052	1.564
F2	1200	41.870	40.370	F3	300	55	37.053	1.50
F3	1200	41.200	39.700	F4	300	57	17.184	1.50
F4	1200	40.900	39.400	F5	300	50	27.781	1.50
F5	1200	40.340	38.840	F6	300	43	11.543	1.50
F6	1200	40.070	38.570	F7	300	52	17.799	1.50
F7	1200	39.730	38.230	F8	300	51	11.182	1.50
F8	1200	39.510	38.010	F9	300	50	20.104	1.50
F9	1200	39.110	37.610	F10	300	40	11.579	1.50
F10	1200	38.820	37.320	F11	300	54	11.892	1.50
F11	1200	38.760	37.100	EXFMH	300	39	7.800	1.66
EXFMH	TBD	38.560	36.900	-	225	-	-	1.66
F2-2	1200	43.200	41.850	F2-1	150	21	9.080	1.35
F2-1	1200	42.870	41.420	F2	225	44	45.685	1.45
F4-3	1200	42.270	40.920	F4-1	225	37	35.166	1.35
F4-2	1200	41.000	39.970	F4-1	150	59	8.784	1.03
F4-1	1200	41.270	39.820	F4	225	127	53.184	1.45
F7-1	1200	39.900	38.550	F4	150	52	16.756	1.35

STORM								
Reference	Diameter(mm)	Cover Level	Invert Level	DS Reference	Pipe Diameter(mm)	Pipe Gradient(1:x)	Pipe Length(m)	Depth(m)
S1	1200	42.820	41.000	S2	150	36	27.155	1.82
S2	1800	41.897	40.246	S3	225	65	33.542	1.65
S3	1200	41.260	39.727	S4	225	61	4.667	1.53
S4	2100	41.140	39.390	SW	450	397	15.868	1.75
SW	-	41.400	39.000	-	-	-	-	2.40
S6	1200	40.760	39.200	S7	150	75	22.740	1.56
S7	1200	40.313	38.898	S8	150	51	10.141	1.42
S8	1200	40.110	37.700	S9	225	74	11.147	2.41
S9	1200	39.820	37.550	S10	225	93	18.574	2.27
S10	1200	39.520	37.350	S11	225	65	32.308	2.17
S11	1200	38.820	36.850	Tank	225	64	6.408	1.97
Tank	1200	38.700	36.750	S12	225	102	6.130	1.95
S12	1200	38.600	36.690	EXSMH	225	92	9.177	1.91
S2-2	1200	43.700	42.100	S2-1	150	40	16.884	1.60
S2-1	1200	43.060	41.678	S2	150	32	45.462	1.38
								0.00
S5-3	1200	42.280	40.600	S5-2	150	50	36.484	1.68
S5-1	1200	41.120	40.000	S5-2	150	65	8.507	1.12
S5-2	1500	41.310	39.870	S5	225	130	50.096	1.44
S5	1800	40.839	39.485	S4	300	134	12.739	1.35
S9-1	1200	40.000	38.650	S9	150	101	49.129	1.35

P.01 | RF | XX/XX/24 | FIRST ISSUE
REV BY | DD/MM/YY | DESCRIPTION

Client:

Comhairle Chontae na Gaillimhe
Galway County Council

Project:

Farranamartin Housing
Development, Tuam, Galway

Stage:

Planning

Drawing title:

Drainage Layout

Scale: 1:500Size: A1

Drawn by: CBChecked: CTArchitect: Collins-RolstonDate: 04/12/24

Gilligan

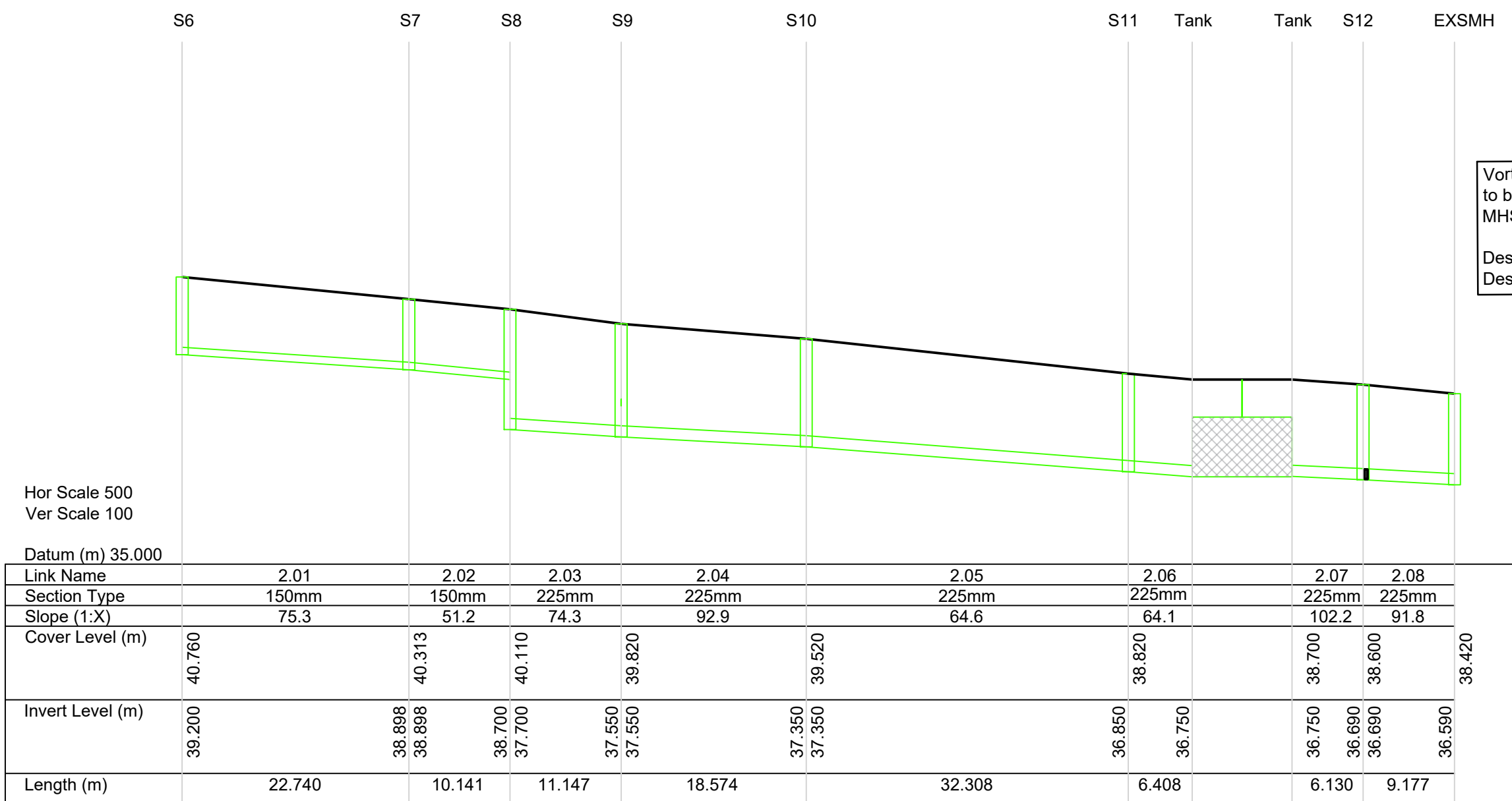
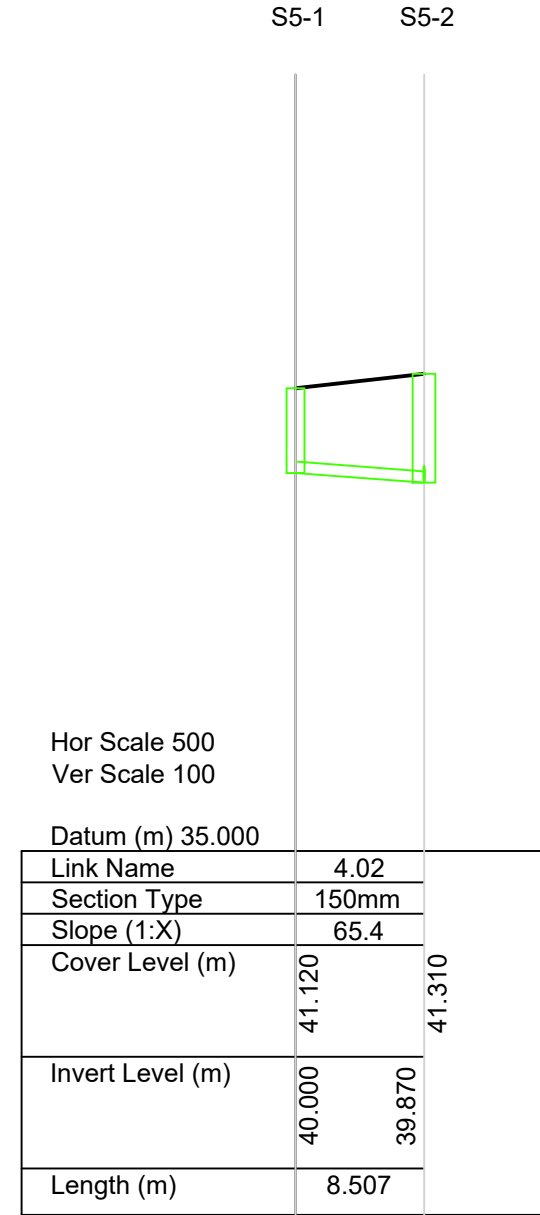
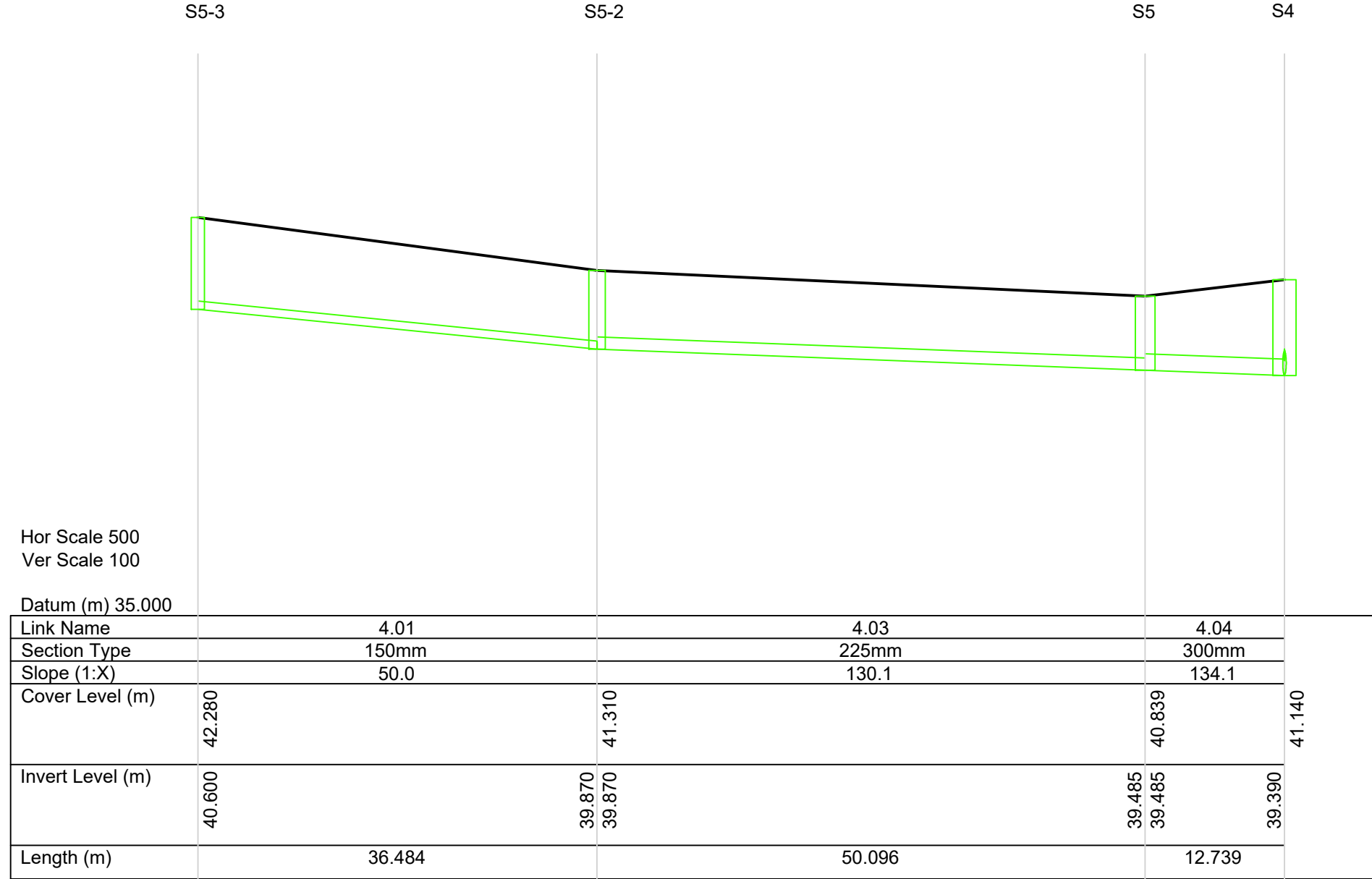
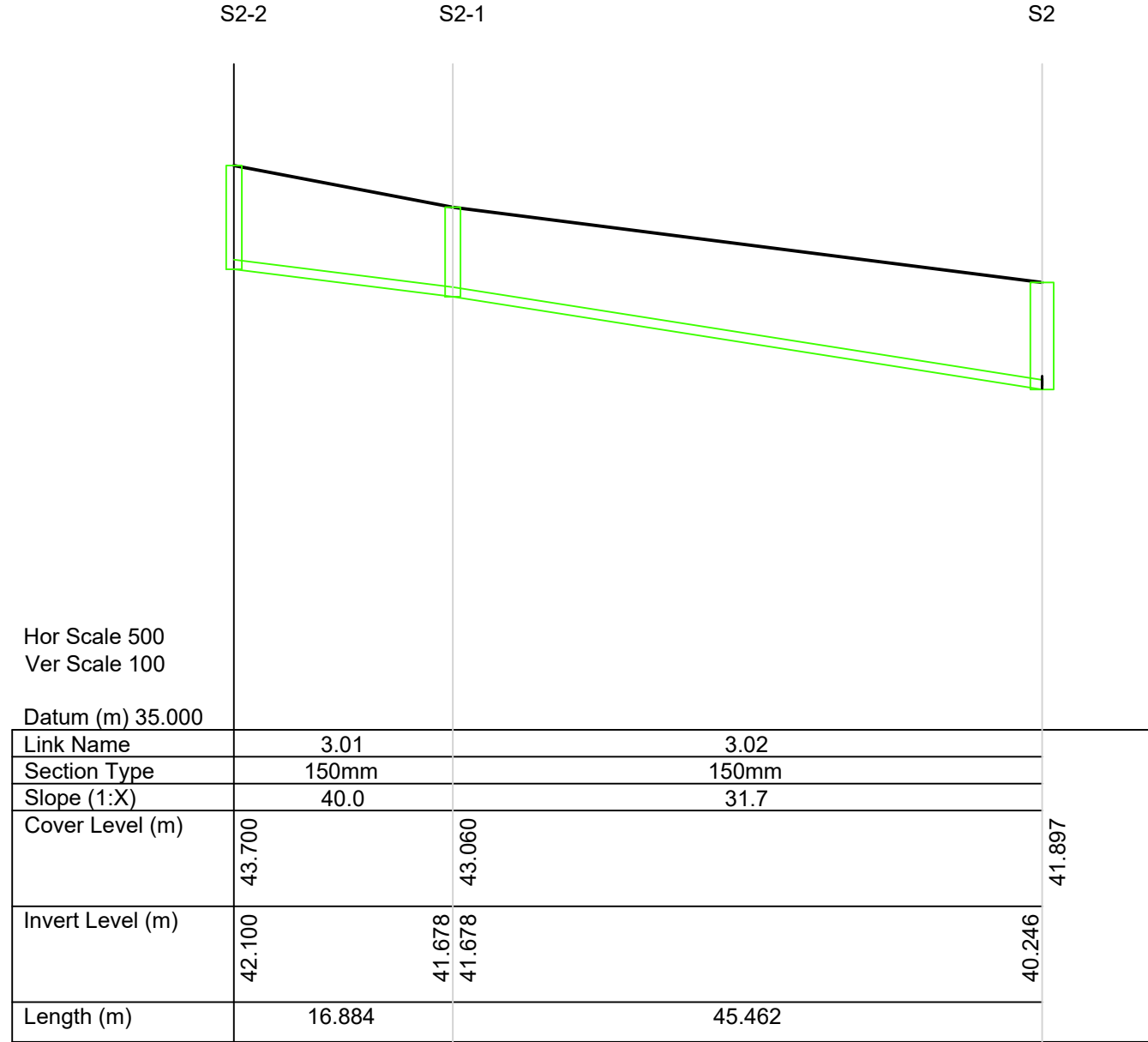
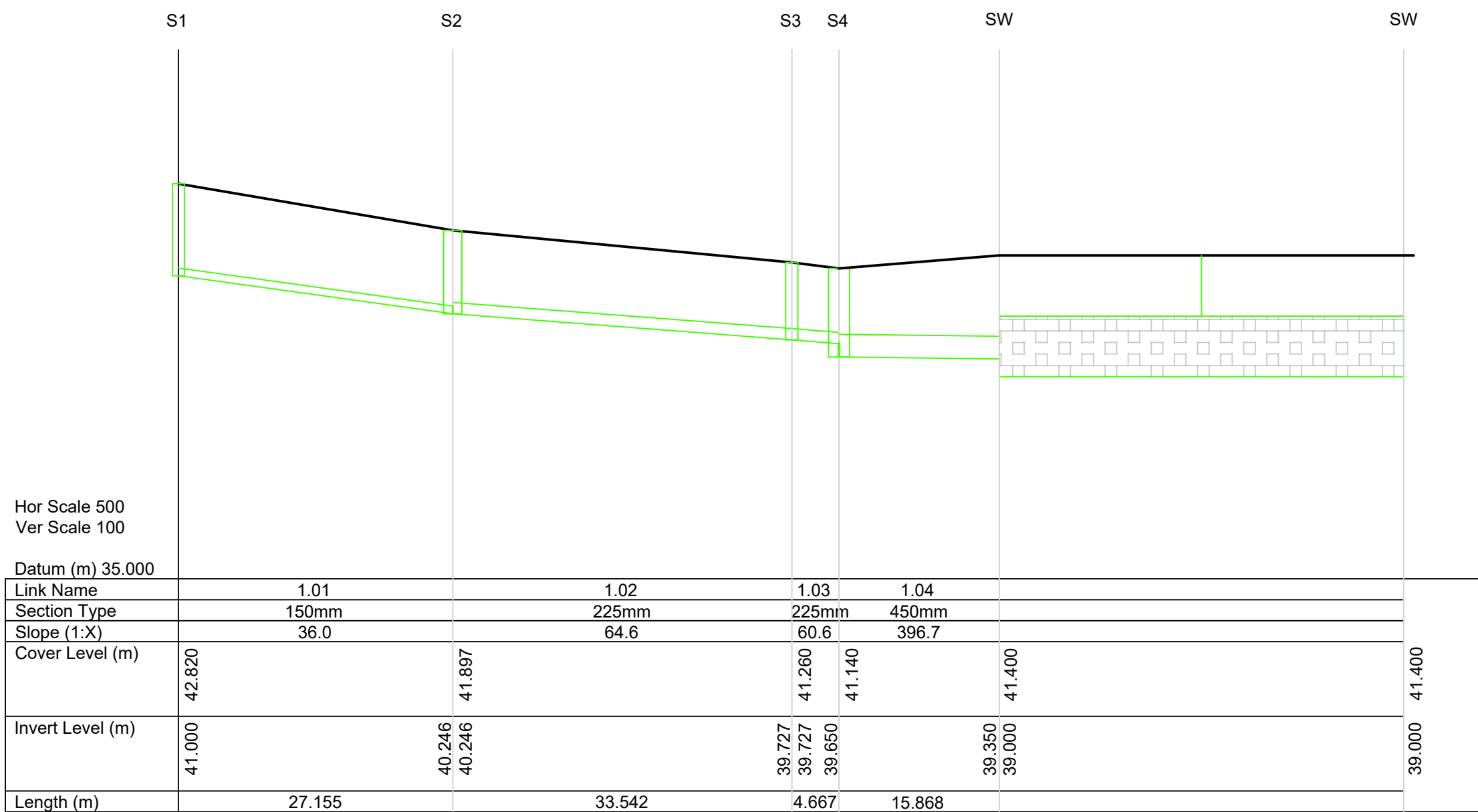
CONSULTING CIVIL & STRUCTURAL ENGINEERS

23 BEDFORD STREET, BELFAST, BT27EJ
TELEPHONE: 028 9023 2841 FACSIMILE: 028 9024 7104

Drawing No: 24561-GNI-XX-ZZ-DR-C-0001Revision: P

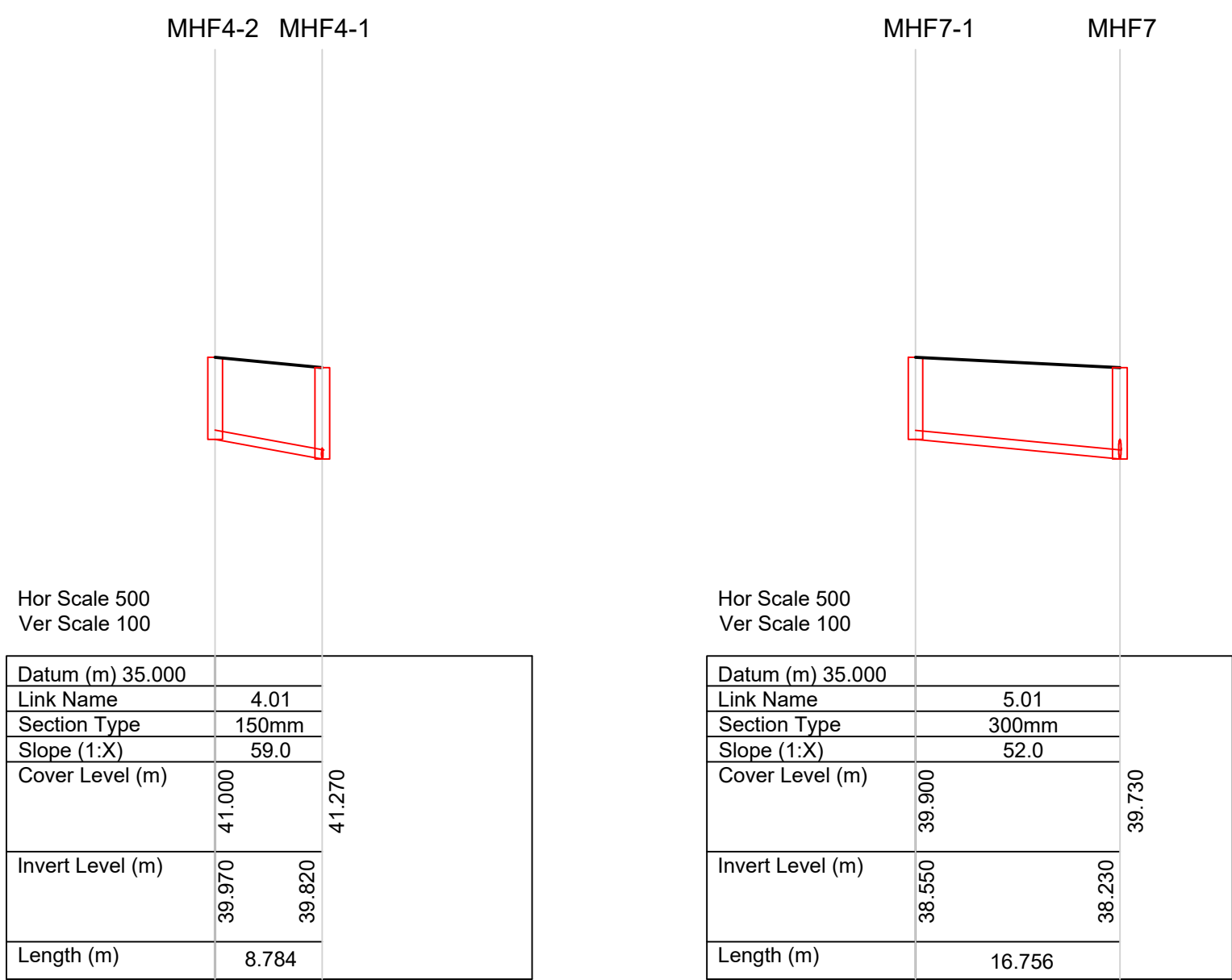
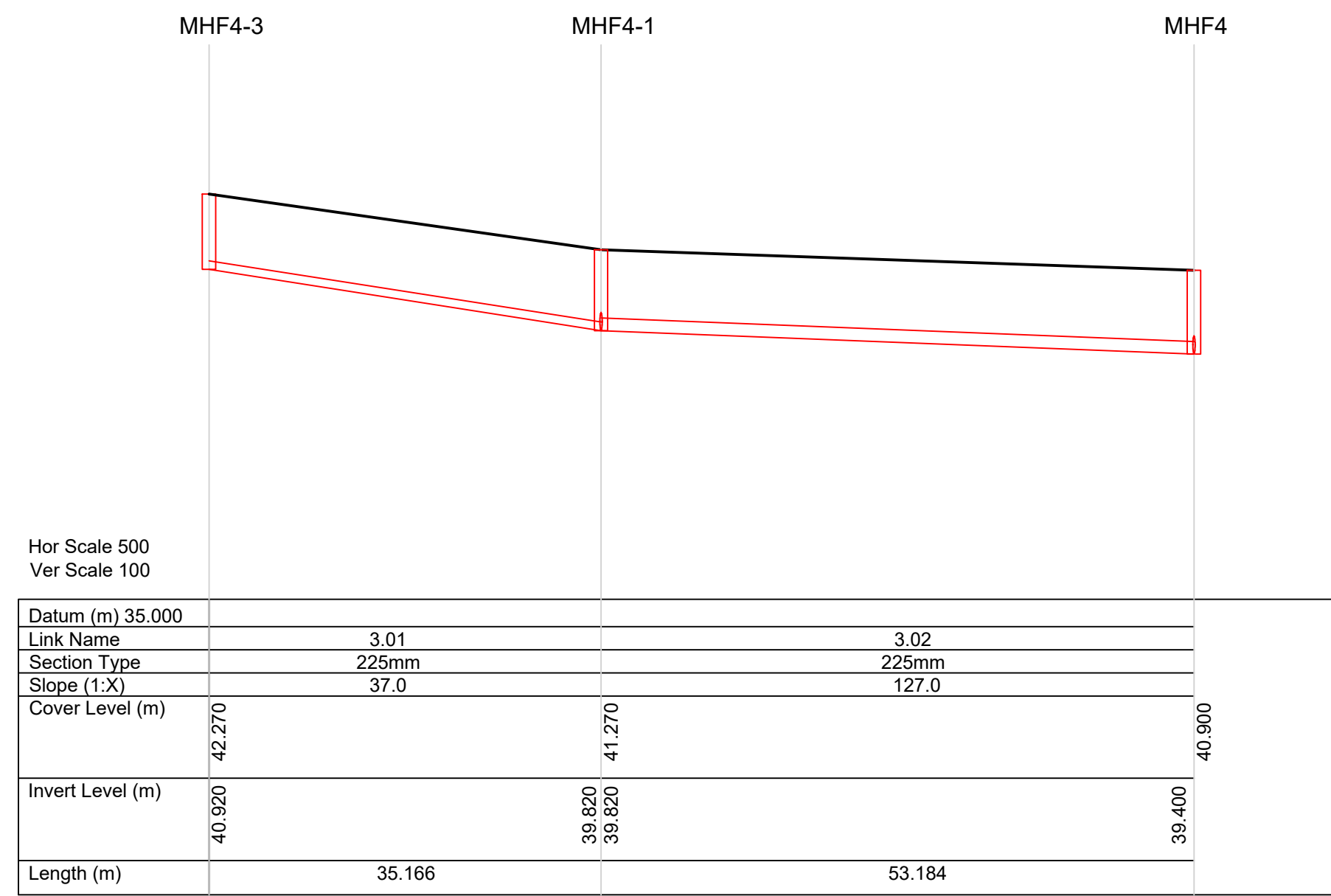
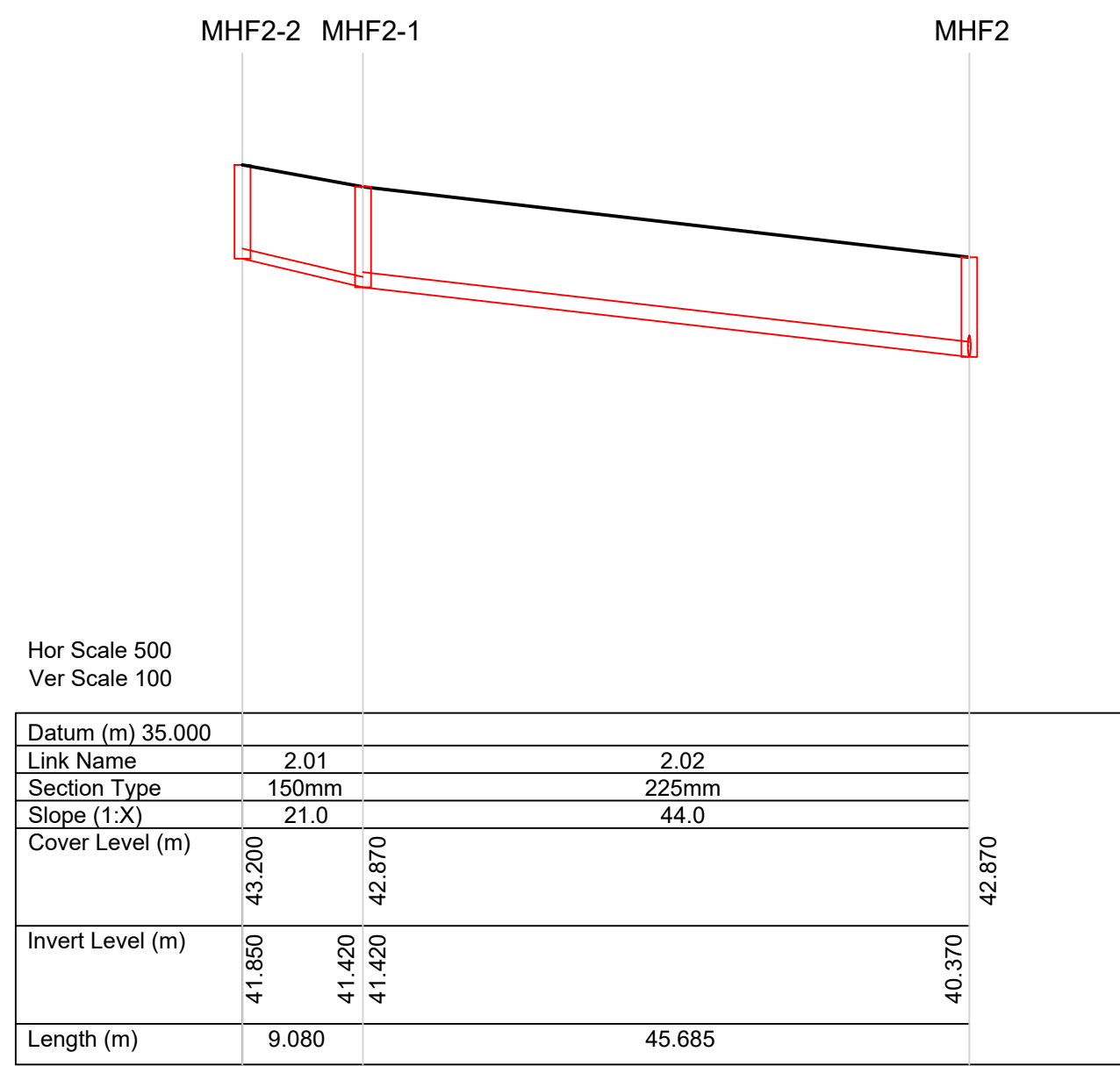
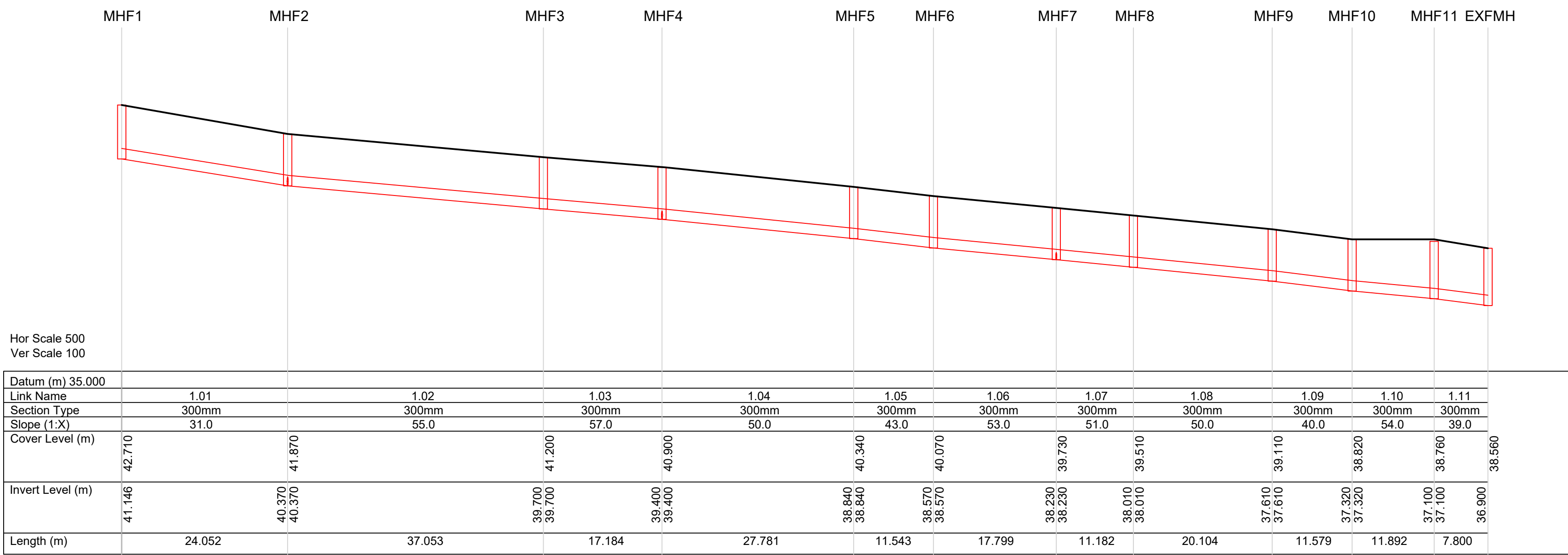
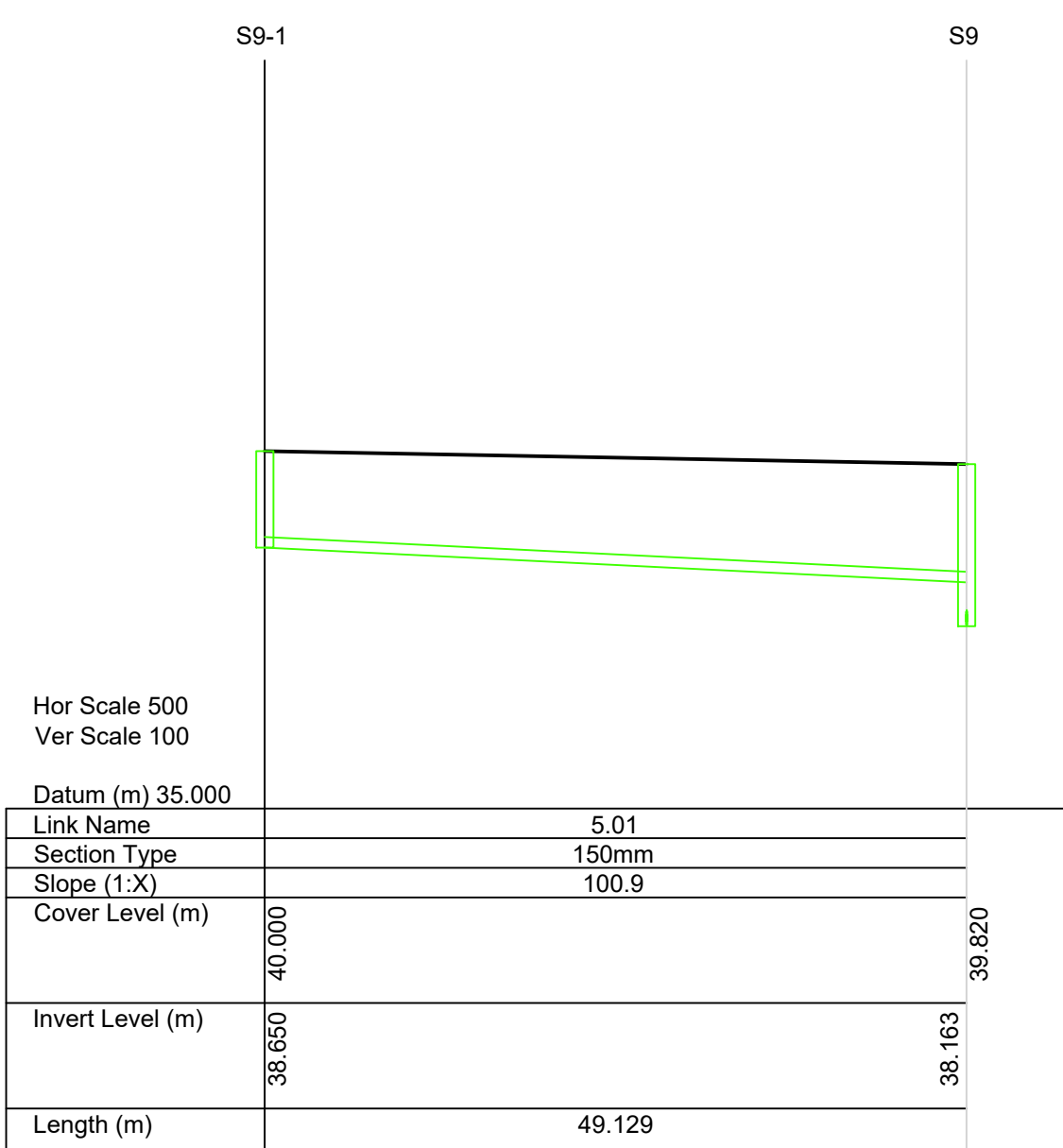
NOTES

1. All Storm manholes and Foul manholes to be Ø1200mm Concrete rings minimum with D400 lids unless stated otherwise.
2. Irish Water confirmed capacity into the location foul sewer through a PDE REF: **CDS24000057**
3. All stated units are indicative and the true measurements should be taken on site.
4. Any Levels referenced refer to **ORDNANCE SURVEY DATUM, MALIN HE2.0**.
5. This drawing should be read in conjunction with Architects drawings.
6. All manhole chambers shall be in accordance with Irish Water standard detail **STD-WW-10**.
7. All pipe materials shall comply with Section 3.13 of the Irish Water Code of Practice for Wastewater Infrastructure Document **CDS-5020-03**, and should be installed as per the Irish Water detail **STD-WW-07**.
8. Pipes with less than 1.2m cover from the crown of pipe, should have appropriate road protection, and should be installed as per the Irish Water standard detail **STD-WW-08**.
9. Sewer service connections and inspection chambers to each dwelling shall be in accordance with Irish Water standard detail **STD-WW-02**.
10. Separation distances from other services, boundary walls, etc. shall be in accordance with Irish Water standard details: **STD-WW-05**, **STD-WW-06** and **STD-WW-06A**.
11. Where foul and storm sewers cross, they should be staggered as per the Irish Water Wastewater Code of Practice.
12. Inspection chambers to be installed on all connections from foul and surface water sewers within individual properties in accordance with **STD-WW-03** in compliance with Irish Water code of practice and standard details, set out in **IW-CDS-5020-07**.
13. **Alternation Tank and Sockaway** to be installed as per the manufactures requirements.
14. **Soakaway** to be wrapped in an impermeable membrane and welded at the joints. Bottom of soakaway to have a permeable membrane.
15. Any road openings and manhole/s should comply with the "Guidelines for Managing Openings in Public Roads" April 2017, and should be approved by the local Roads Authority.



Vortex flow control
to be installed within
MHS12

Design Flow: 6.1l/s
Design Head: 1.6m



REVISION DESCRIPTION

Client:



Project:

Farranamartin Housing
Development, Tuam, Galway

Stage:

Planning

Drawing title:

Storm And Foul Longitudinal
Sections

Scale:

1:500

Size:

A0

Drawn by:

CB

Checked:

CT

Architect:

Collins-Rolston

Date:

05/02/25

Gilligan

CONSULTING CIVIL & STRUCTURAL ENGINEERS

23 BEDFORD STREET, BELFAST, BT7 7JE
TELEPHONE: 028 9023 2841 FACSIMILE: 028 9024 7104

Drawing No:

24561-GNI-XX-ZZ-C-0002

Revision:

P

Appendix B

CONFIRMATION OF FEASIBILITY

Ciara McDonagh

Housing Department
Galway County Council
Prospect Hill
Galway
H91H6KX

13 February 2025

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

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

Our Ref: CDS24000057 Pre-Connection Enquiry
Farranamartin, Galway Road, Tuam, Galway

Dear Applicant/Agent,

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

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 63 unit(s) at Farranamartin, Galway Road, Tuam, Galway, (the **Development**).

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

- **Water Connection** - Feasible without infrastructure upgrade by Uisce Éireann
- **Wastewater Connection** - Feasible without infrastructure upgrade by Uisce Éireann

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

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

Stiúrthóirí / Directors: Niall Gleeson (POF / CEO), Jerry Grant (Cathaoirleach / Chairperson), Gerard Britchfield, Liz Joyce, Michael Nolan, Patricia King, Eileen Maher, Cathy Mannion, Paul Reid, Michael Walsh.

Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin, Ireland D01NP86

Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Uisce Éireann is a designated activity company, limited by shares.

Cláraithe in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

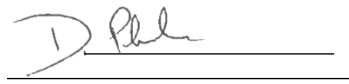
Where can you find more information?

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

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

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

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'D. Phelan', is written over a horizontal line.

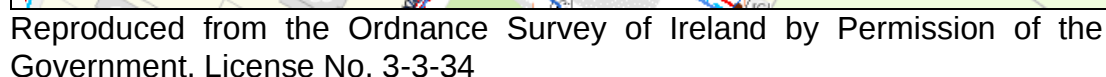
Dermot Phelan
Connections Delivery Manager

Section A - What is important to know?

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

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

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



Whilst every care has been taken in respect of the information on Uisce Éireann's network(s), Uisce Éireann assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works

being carried out in the vicinity of Uisce Éireann's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

Appendix C

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.016	5.00	42.820	1200	264.858	97.133	1.820
S2	0.172	5.00	41.897	1800	243.573	113.995	1.651
S3	0.092	5.00	41.260	1200	215.925	132.986	1.533
S4	0.012	5.00	41.140	2100	212.667	136.328	1.750
S5	0.105	5.00	40.839	1800	204.488	143.621	1.354
S6	0.036	5.00	40.760	1200	199.070	148.415	1.560
S7	0.040	5.00	40.313	1200	182.193	163.655	1.415
S8	0.017	5.00	40.110	1200	176.259	171.878	2.410
S9	0.080	5.00	39.820	1200	172.228	182.271	2.270
S10	0.108	5.00	39.520	1200	165.511	199.588	2.170
S11	0.026	5.00	38.820	1200	146.269	232.913	1.970
S12	0.000	5.00	38.600	1200	129.245	230.280	1.910
EXSMH	0.000		38.420	1200	124.714	238.261	1.830
S2-1	0.031	5.00	43.060	1200	275.222	146.631	1.382
S2-2	0.036	5.00	43.700	1200	292.101	146.228	1.600
S5-3	0.011	5.00	42.280	1200	266.033	155.478	1.680
S5-2	0.109	5.00	41.310	1500	238.895	179.533	1.440
S5-1	0.047	5.00	41.120	1200	238.576	188.350	1.120
S9-1	0.016	5.00	40.000	1200	184.844	193.613	1.350
SW	0.000		41.400		223.801	147.634	2.050
Tank	0.000		38.700		132.272	224.949	1.950

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.01	S1	S2	27.155	0.600	41.000	40.246	0.754	36.0	150	5.27	50.0
1.02	S2	S3	33.542	0.600	40.246	39.727	0.519	64.6	225	5.99	49.8
1.03	S3	S4	4.667	0.600	39.727	39.650	0.077	60.6	225	6.04	49.6
1.04	S4	SW	15.868	0.600	39.390	39.350	0.040	396.7	450	6.37	48.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.01	1.682	29.7	2.2	1.670	1.501	0.016	0.0	27	0.980
1.02	1.629	64.8	34.4	1.426	1.308	0.255	0.0	116	1.652
1.03	1.683	66.9	46.6	1.308	1.265	0.347	0.0	138	1.814
1.04	1.014	161.3	83.0	1.300	1.600	0.631	0.0	229	1.021

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
2.01	S6	S7	22.740	0.600	39.200	38.898	0.302	75.3	150	5.33	50.0
2.02	S7	S8	10.141	0.600	38.898	38.700	0.198	51.2	150	5.47	50.0
2.03	S8	S9	11.147	0.600	37.700	37.550	0.150	74.3	225	5.63	50.0
2.04	S9	S10	18.574	0.600	37.550	37.350	0.200	92.9	225	5.91	50.0
2.05	S10	S11	32.308	0.600	37.350	36.850	0.500	64.6	225	6.38	48.5
2.06	S11	Tank	6.408	0.600	36.850	36.750	0.100	64.1	225	5.09	50.0
2.07	Tank	S12	6.130	0.600	36.750	36.690	0.060	102.2	225	5.18	50.0
2.08	S12	EXSMH	9.177	0.600	36.690	36.590	0.100	91.8	225	5.31	50.0
3.01	S2-2	S2-1	16.884	0.600	42.100	41.678	0.422	40.0	150	5.18	50.0
3.02	S2-1	S2	45.462	0.600	41.678	40.246	1.432	31.7	150	5.65	50.0
4.01	S5-3	S5-2	36.484	0.600	40.600	39.870	0.730	50.0	150	5.35	50.0
4.02	S5-1	S5-2	8.507	0.600	40.000	39.870	0.130	65.4	150	5.12	50.0
4.03	S5-2	S5	50.096	0.600	39.870	39.485	0.385	130.1	225	5.90	50.0
4.04	S5	S4	12.739	1.500	39.485	39.390	0.095	134.1	300	6.11	49.3
5.01	S9-1	S9	49.129	0.600	38.650	38.163	0.487	100.9	150	5.93	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
2.01	1.160	20.5	4.9	1.410	1.265	0.036	0.0	50	0.950
2.02	1.409	24.9	10.3	1.265	1.260	0.076	0.0	67	1.342
2.03	1.518	60.4	12.6	2.185	2.045	0.093	0.0	70	1.209
2.04	1.357	54.0	25.6	2.045	1.945	0.189	0.0	109	1.341
2.05	1.629	64.8	39.0	1.945	1.745	0.297	0.0	126	1.703
2.06	1.636	65.1	43.8	1.745	1.725	0.323	0.0	136	1.753
2.07	1.293	51.4	43.8	1.725	1.685	0.323	0.0	160	1.447
2.08	1.365	54.3	43.8	1.685	1.605	0.323	0.0	153	1.513
3.01	1.596	28.2	4.9	1.450	1.232	0.036	0.0	42	1.195
3.02	1.793	31.7	9.1	1.232	1.501	0.067	0.0	55	1.549
4.01	1.426	25.2	1.5	1.530	1.290	0.011	0.0	25	0.785
4.02	1.245	22.0	6.4	0.970	1.290	0.047	0.0	55	1.081
4.03	1.144	45.5	22.6	1.215	1.129	0.167	0.0	112	1.143
4.04	1.197	84.6	36.3	1.054	1.450	0.272	0.0	137	1.152
5.01	1.000	17.7	2.2	1.200	1.507	0.016	0.0	35	0.680

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.01	27.155	36.0	150	Circular	42.820	41.000	1.670	41.897	40.246	1.501
1.02	33.542	64.6	225	Circular	41.897	40.246	1.426	41.260	39.727	1.308
1.03	4.667	60.6	225	Circular	41.260	39.727	1.308	41.140	39.650	1.265
1.04	15.868	396.7	450	Circular	41.140	39.390	1.300	41.400	39.350	1.600
2.01	22.740	75.3	150	Circular	40.760	39.200	1.410	40.313	38.898	1.265
2.02	10.141	51.2	150	Circular	40.313	38.898	1.265	40.110	38.700	1.260
2.03	11.147	74.3	225	Circular	40.110	37.700	2.185	39.820	37.550	2.045
2.04	18.574	92.9	225	Circular	39.820	37.550	2.045	39.520	37.350	1.945
2.05	32.308	64.6	225	Circular	39.520	37.350	1.945	38.820	36.850	1.745
2.06	6.408	64.1	225	Circular	38.820	36.850	1.745	38.700	36.750	1.725
2.07	6.130	102.2	225	Circular	38.700	36.750	1.725	38.600	36.690	1.685
2.08	9.177	91.8	225	Circular	38.600	36.690	1.685	38.420	36.590	1.605
3.01	16.884	40.0	150	Circular	43.700	42.100	1.450	43.060	41.678	1.232
3.02	45.462	31.7	150	Circular	43.060	41.678	1.232	41.897	40.246	1.501
4.01	36.484	50.0	150	Circular	42.280	40.600	1.530	41.310	39.870	1.290
4.02	8.507	65.4	150	Circular	41.120	40.000	0.970	41.310	39.870	1.290
4.03	50.096	130.1	225	Circular	41.310	39.870	1.215	40.839	39.485	1.129
4.04	12.739	134.1	300	Circular	40.839	39.485	1.054	41.140	39.390	1.450
5.01	49.129	100.9	150	Circular	40.000	38.650	1.200	39.820	38.163	1.507

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.01	S1	1200	Manhole	Adoptable	S2	1800	Manhole	Adoptable
1.02	S2	1800	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.03	S3	1200	Manhole	Adoptable	S4	2100	Manhole	Adoptable
1.04	S4	2100	Manhole	Adoptable	SW		Junction	
2.01	S6	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
2.02	S7	1200	Manhole	Adoptable	S8	1200	Manhole	Adoptable
2.03	S8	1200	Manhole	Adoptable	S9	1200	Manhole	Adoptable
2.04	S9	1200	Manhole	Adoptable	S10	1200	Manhole	Adoptable
2.05	S10	1200	Manhole	Adoptable	S11	1200	Manhole	Adoptable
2.06	S11	1200	Manhole	Adoptable	Tank		Junction	
2.07	Tank		Junction		S12	1200	Manhole	Adoptable
2.08	S12	1200	Manhole	Adoptable	EXSMH	1200	Manhole	Adoptable
3.01	S2-2	1200	Manhole	Adoptable	S2-1	1200	Manhole	Adoptable
3.02	S2-1	1200	Manhole	Adoptable	S2	1800	Manhole	Adoptable
4.01	S5-3	1200	Manhole	Adoptable	S5-2	1500	Manhole	Adoptable
4.02	S5-1	1200	Manhole	Adoptable	S5-2	1500	Manhole	Adoptable
4.03	S5-2	1500	Manhole	Adoptable	S5	1800	Manhole	Adoptable
4.04	S5	1800	Manhole	Adoptable	S4	2100	Manhole	Adoptable
5.01	S9-1	1200	Manhole	Adoptable	S9	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	264.858	97.133	42.820	1.820	1200				
						0	1.01	41.000	150
S2	243.573	113.995	41.897	1.651	1800		1	3.02	40.246
						2	1.01	40.246	150
						0	1.02	40.246	225
S3	215.925	132.986	41.260	1.533	1200		1	1.02	39.727
						0	1.03	39.727	225
S4	212.667	136.328	41.140	1.750	2100		1	4.04	39.390
						2	1.03	39.650	225
						0	1.04	39.390	450
S5	204.488	143.621	40.839	1.354	1800		1	4.03	39.485
						0	4.04	39.485	300
S6	199.070	148.415	40.760	1.560	1200				
						0	2.01	39.200	150
S7	182.193	163.655	40.313	1.415	1200		1	2.01	38.898
						0	2.02	38.898	150
S8	176.259	171.878	40.110	2.410	1200		1	2.02	38.700
						0	2.03	37.700	225
S9	172.228	182.271	39.820	2.270	1200		1	5.01	38.163
						2	2.03	37.550	225
						0	2.04	37.550	225
S10	165.511	199.588	39.520	2.170	1200		1	2.04	37.350
						0	2.05	37.350	225
S11	146.269	232.913	38.820	1.970	1200		1	2.05	36.850
						0	2.06	36.850	225
S12	129.245	230.280	38.600	1.910	1200		1	2.07	36.690
						0	2.08	36.690	225
EXSMH	124.714	238.261	38.420	1.830	1200		1	2.08	36.590
									225



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S2-1	275.222	146.631	43.060	1.382	1200	1	3.01	41.678	150
						0	3.02	41.678	150
S2-2	292.101	146.228	43.700	1.600	1200	0	3.01	42.100	150
S5-3	266.033	155.478	42.280	1.680	1200	0	4.01	40.600	150
						0	4.02	39.870	150
S5-2	238.895	179.533	41.310	1.440	1500	1	4.01	39.870	150
						2	4.03	39.870	150
S5-1	238.576	188.350	41.120	1.120	1200	0	4.02	40.000	150
S9-1	184.844	193.613	40.000	1.350	1200	0	5.01	38.650	150
SW	223.801	147.634	41.400	2.050		1	1.04	39.350	450
Tank	132.272	224.949	38.700	1.950		0	2.06	36.750	225
						1	2.07	36.750	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	Scotland and Ireland	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.300	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	10	10	0
30	10	10	0
100	10	10	0

Node S12 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	36.690	Product Number	CTL-SHE-0107-6100-1600-6100
Design Depth (m)	1.600	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	6.1	Min Node Diameter (mm)	1200

Node SW Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.60000	Invert Level (m)	39.000	Depth (m)	1.200
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	120	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	7.000	Number Required	1
Porosity	1.00	Pit Length (m)	20.000		

Node Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	36.750
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	192

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	75.0	0.0	1.200	75.0	0.0	1.201	0.0	0.0

Results for 2 year +10% CC +10% A Critical Storm Duration. Lowest mass balance: 99.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	41.031	0.031	2.8	0.0410	0.0000	OK
15 minute winter	S2	10	40.382	0.136	44.6	0.6561	0.0000	OK
15 minute winter	S3	11	39.937	0.210	59.3	0.5136	0.0000	OK
15 minute winter	S4	11	39.646	0.256	107.0	0.9265	0.0000	OK
15 minute winter	S5	11	39.681	0.196	46.4	0.8335	0.0000	OK
15 minute winter	S6	10	39.257	0.057	6.3	0.0927	0.0000	OK
15 minute winter	S7	10	38.982	0.084	13.3	0.1465	0.0000	OK
15 minute winter	S8	10	37.782	0.082	16.0	0.1053	0.0000	OK
15 minute winter	S9	10	37.685	0.135	32.5	0.2574	0.0000	OK
15 minute winter	S10	11	37.506	0.156	50.8	0.3474	0.0000	OK
120 minute winter	S11	92	37.140	0.290	20.7	0.4123	0.0000	SURCHARGED
120 minute winter	S12	92	37.138	0.448	12.1	0.5066	0.0000	SURCHARGED
15 minute summer	EXSMH	1	36.590	0.000	5.8	0.0000	0.0000	OK
15 minute winter	S2-1	10	41.741	0.063	11.7	0.1016	0.0000	OK
15 minute winter	S2-2	10	42.148	0.048	6.3	0.0780	0.0000	OK
15 minute winter	S5-3	10	40.628	0.028	1.9	0.0351	0.0000	OK
15 minute winter	S5-2	11	39.997	0.127	29.2	0.4367	0.0000	OK
15 minute winter	S5-1	10	40.063	0.063	8.3	0.1302	0.0000	OK
15 minute winter	S9-1	11	38.690	0.040	2.8	0.0553	0.0000	OK
60 minute winter	SW	55	39.407	0.057	61.6	56.9567	0.0000	OK
120 minute winter	Tank	92	37.139	0.389	20.4	29.1787	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.01	S2	2.8	0.278	0.093	0.2630	
15 minute winter	S2	1.02	S3	43.6	1.343	0.674	1.0650	
15 minute winter	S3	1.03	S4	59.4	1.688	0.887	0.1619	
15 minute winter	S4	1.04	SW	106.9	1.230	0.663	1.3782	
15 minute winter	S5	4.04	S4	45.6	0.800	0.539	0.7191	
15 minute winter	S6	2.01	S7	6.2	0.771	0.303	0.1837	
15 minute winter	S7	2.02	S8	13.0	1.359	0.522	0.0972	
15 minute winter	S8	2.03	S9	15.9	0.841	0.263	0.2113	
15 minute winter	S9	2.04	S10	32.2	1.187	0.597	0.5033	
15 minute winter	S10	2.05	S11	50.8	1.671	0.784	0.9972	
120 minute winter	S11	2.06	Tank	19.8	1.442	0.304	0.2549	
120 minute winter	S12	Hydro-Brake®	EXSMH	6.0				59.2
15 minute winter	S2-1	3.02	S2	11.5	0.932	0.363	0.5388	
15 minute winter	S2-2	3.01	S2-1	6.2	1.061	0.221	0.0996	
15 minute winter	S5-3	4.01	S5-2	1.8	0.203	0.073	0.3307	
15 minute winter	S5-2	4.03	S5	28.3	0.955	0.623	1.4999	
15 minute winter	S5-1	4.02	S5-2	8.2	0.700	0.373	0.0974	
15 minute winter	S9-1	5.01	S9	2.7	0.722	0.151	0.1818	
60 minute winter	SW	Infiltration		11.7				
120 minute winter	Tank	2.07	S12	12.1	0.607	0.236	0.2438	

Results for 30 year +10% CC +10% A Critical Storm Duration. Lowest mass balance: 99.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	41.042	0.042	5.2	0.0559	0.0000	OK
15 minute winter	S2	12	40.878	0.632	82.2	3.0548	0.0000	SURCHARGED
15 minute winter	S3	11	40.175	0.448	95.5	1.0968	0.0000	SURCHARGED
120 minute winter	S4	114	39.889	0.499	71.5	1.8045	0.0000	SURCHARGED
120 minute winter	S5	114	39.890	0.405	30.8	1.7207	0.0000	SURCHARGED
15 minute winter	S6	10	39.280	0.080	11.7	0.1317	0.0000	OK
15 minute winter	S7	11	39.038	0.140	24.5	0.2455	0.0000	OK
15 minute winter	S8	12	38.372	0.672	29.1	0.8646	0.0000	SURCHARGED
15 minute winter	S9	12	38.334	0.784	57.1	1.4941	0.0000	SURCHARGED
15 minute winter	S10	12	38.117	0.767	80.4	1.7081	0.0000	SURCHARGED
120 minute winter	S11	118	37.645	0.795	36.5	1.1301	0.0000	SURCHARGED
120 minute winter	S12	118	37.644	0.954	17.2	1.0790	0.0000	SURCHARGED
15 minute summer	EXSMH	1	36.590	0.000	6.1	0.0000	0.0000	OK
15 minute winter	S2-1	11	41.771	0.093	21.7	0.1509	0.0000	OK
15 minute winter	S2-2	10	42.167	0.067	11.7	0.1089	0.0000	OK
15 minute winter	S5-3	10	40.638	0.038	3.6	0.0483	0.0000	OK
15 minute winter	S5-2	12	40.271	0.401	49.1	1.3763	0.0000	SURCHARGED
15 minute winter	S5-1	12	40.331	0.331	15.3	0.6809	0.0000	SURCHARGED
15 minute winter	S9-1	11	38.705	0.055	5.2	0.0759	0.0000	OK
120 minute winter	SW	114	39.889	0.539	71.4	124.4666	0.0000	OK
120 minute winter	Tank	118	37.645	0.895	35.4	67.1066	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.01	S2	5.1	0.396	0.173	0.2941	
15 minute winter	S2	1.02	S3	69.7	1.752	1.075	1.3340	
15 minute winter	S3	1.03	S4	94.8	2.383	1.416	0.1837	
120 minute winter	S4	1.04	SW	71.4	1.088	0.443	2.5142	
120 minute winter	S5	4.04	S4	30.8	0.733	0.364	0.8971	
15 minute winter	S6	2.01	S7	11.5	0.857	0.563	0.3012	
15 minute winter	S7	2.02	S8	23.9	1.498	0.960	0.1619	
15 minute winter	S8	2.03	S9	27.6	0.867	0.457	0.4433	
15 minute winter	S9	2.04	S10	49.5	1.245	0.917	0.7387	
15 minute winter	S10	2.05	S11	76.5	1.923	1.180	1.2849	
120 minute winter	S11	2.06	Tank	35.4	1.660	0.544	0.2549	
120 minute winter	S12	Hydro-Brake®	EXSMH	6.1				104.7
15 minute winter	S2-1	3.02	S2	21.2	1.329	0.670	0.6606	
15 minute winter	S2-2	3.01	S2-1	11.6	1.241	0.411	0.1588	
15 minute winter	S5-3	4.01	S5-2	3.5	0.278	0.140	0.3848	
15 minute winter	S5-2	4.03	S5	45.5	1.144	1.000	1.9924	
15 minute winter	S5-1	4.02	S5-2	12.7	0.790	0.579	0.1498	
15 minute winter	S9-1	5.01	S9	5.0	0.847	0.284	0.5623	
120 minute winter	SW	Infiltration		11.7				
120 minute winter	Tank	2.07	S12	17.2	0.615	0.334	0.2438	

Results for 100 year +10% CC +10% A Critical Storm Duration. Lowest mass balance: 99.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	12	41.361	0.361	6.8	0.4774	0.0000	SURCHARGED
15 minute winter	S2	12	41.336	1.090	98.8	5.2722	0.0000	SURCHARGED
120 minute winter	S3	118	40.426	0.699	50.6	1.7134	0.0000	SURCHARGED
120 minute winter	S4	118	40.425	1.035	89.6	3.7393	0.0000	SURCHARGED
120 minute winter	S5	118	40.425	0.940	39.7	3.9966	0.0000	SURCHARGED
15 minute winter	S6	12	39.338	0.138	15.2	0.2262	0.0000	OK
15 minute winter	S7	12	39.213	0.315	30.6	0.5525	0.0000	SURCHARGED
15 minute winter	S8	13	38.934	1.234	36.3	1.5868	0.0000	SURCHARGED
15 minute winter	S9	13	38.879	1.329	69.1	2.5323	0.0000	SURCHARGED
15 minute winter	S10	12	38.603	1.253	96.8	2.7898	0.0000	SURCHARGED
120 minute winter	S11	118	38.238	1.388	43.6	1.9722	0.0000	SURCHARGED
120 minute winter	S12	118	38.236	1.546	15.3	1.7481	0.0000	SURCHARGED
15 minute summer	EXSMH	1	36.590	0.000	6.1	0.0000	0.0000	OK
15 minute winter	S2-1	12	42.083	0.405	28.2	0.6580	0.0000	SURCHARGED
15 minute winter	S2-2	12	42.179	0.079	15.2	0.1279	0.0000	OK
15 minute winter	S5-3	10	40.643	0.043	4.6	0.0549	0.0000	OK
15 minute winter	S5-2	12	40.626	0.756	63.2	2.5937	0.0000	SURCHARGED
15 minute winter	S5-1	12	40.719	0.719	19.8	1.4758	0.0000	SURCHARGED
15 minute winter	S9-1	12	38.957	0.307	6.8	0.4276	0.0000	SURCHARGED
120 minute winter	SW	118	40.424	1.074	87.8	168.0700	0.0000	OK
120 minute winter	Tank	118	38.237	1.487	42.7	90.0375	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.01	S2	8.1	0.466	0.274	0.4781	
15 minute winter	S2	1.02	S3	83.4	2.097	1.287	1.3340	
120 minute winter	S3	1.03	S4	50.6	1.645	0.756	0.1856	
120 minute winter	S4	1.04	SW	87.8	1.157	0.544	2.5142	
120 minute winter	S5	4.04	S4	37.9	0.769	0.449	0.8971	
15 minute winter	S6	2.01	S7	13.8	0.873	0.673	0.3929	
15 minute winter	S7	2.02	S8	29.5	1.675	1.185	0.1785	
15 minute winter	S8	2.03	S9	31.5	0.857	0.521	0.4433	
15 minute winter	S9	2.04	S10	58.5	1.472	1.085	0.7387	
15 minute winter	S10	2.05	S11	90.2	2.267	1.392	1.2849	
120 minute winter	S11	2.06	Tank	42.7	1.753	0.657	0.2549	
120 minute winter	S12	Hydro-Brake®	EXSMH	6.1				113.8
15 minute winter	S2-1	3.02	S2	23.6	1.416	0.746	0.8004	
15 minute winter	S2-2	3.01	S2-1	15.1	1.267	0.535	0.2275	
15 minute winter	S5-3	4.01	S5-2	4.5	0.348	0.180	0.3973	
15 minute winter	S5-2	4.03	S5	56.5	1.420	1.241	1.9924	
15 minute winter	S5-1	4.02	S5-2	16.0	0.907	0.726	0.1498	
15 minute winter	S9-1	5.01	S9	6.8	0.870	0.383	0.8649	
120 minute winter	SW	Infiltration		11.7				
120 minute winter	Tank	2.07	S12	15.3	0.620	0.298	0.2438	

Appendix D

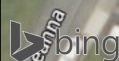
Legend Key

-  Locations By Type - DP
-  Locations By Type - IP
-  Locations By Type - TP

Contract No:	6433
Contract Name:	Farranamartin
Location:	Tuam, Co. Galway
Client:	Galway County Council
Engineer:	Gilligan NI Ltd
Title:	Site Plan
Scale:	1:1000
Drawn By:	SL



Site Investigations Ltd
The Grange
12th Lock Road
Lucan
Co. Dublin
T: 01 6108768
e: info@siteinvestigations.ie



Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation

SOAKAWAY TEST



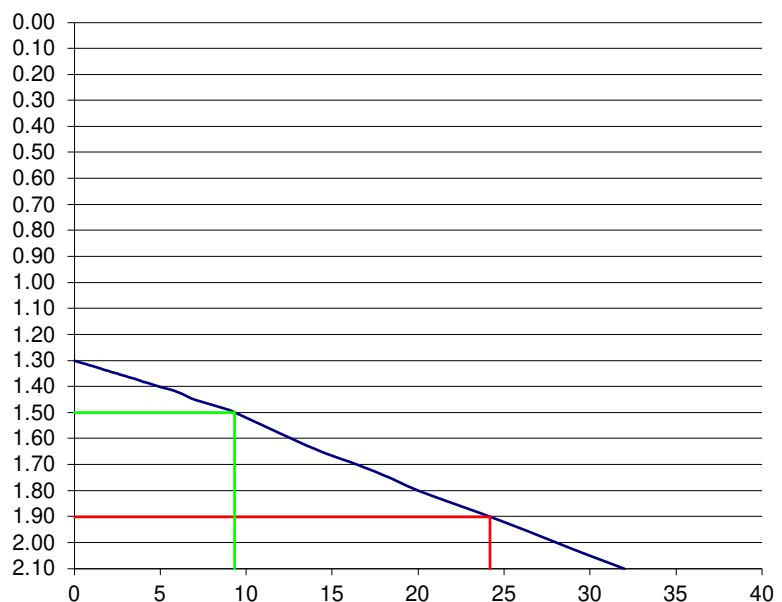
Project Reference:	6433
Contract name:	Farranamartin
Location:	Tuam, Co. Galway
Test No:	SA01
Date:	12/02/2025

Ground Conditions

From	To	
0.00	0.30	TOPSOIL.
0.30	1.00	Firm brown sandy slightly gravelly silty CLAY.
1.00	2.10	Grey silty sandy GRAVEL with high cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.30
0.5	1.31
1	1.32
1.5	1.33
2	1.34
2.5	1.35
3	1.36
3.5	1.37
4	1.38
4.5	1.39
5	1.40
6	1.42
7	1.45
8	1.47
9	1.49
10	1.52
12	1.58
14	1.64
16	1.69
18	1.74
20	1.80
25	1.92
30	2.05
32	2.10

Pit Dimensions (m)		
Length (m)	3.20	m
Width (m)	0.60	m
Depth	2.10	m
Water		
Start Depth of Water	1.30	m
Depth of Water	0.80	m
75% Full	1.50	m
25% Full	1.90	m
75%-25%	0.40	m
Volume of water (75%-25%)	0.77	m ³
Area of Drainage	15.96	m ²
Area of Drainage (75%-25%)	4.96	m ²
Time		
75% Full	9.33	min
25% Full	24.17	min
Time 75% to 25%	14.84	min
Time 75% to 25% (sec)	890.4	sec



$$f = \underline{0.01043} \text{ or } \underline{1.74E-04}$$

m/min

m/s

SOAKAWAY TEST



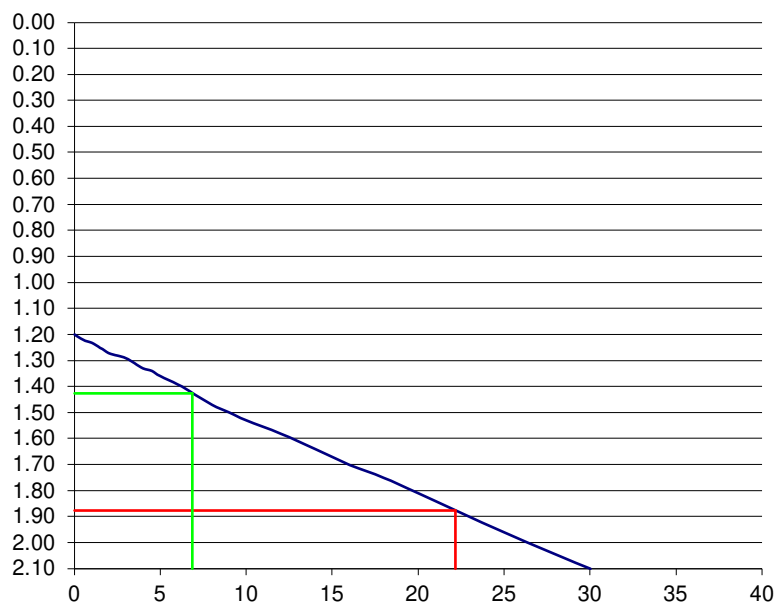
Project Reference:	6433
Contract name:	Farranamartin
Location:	Tuam, Co. Galway
Test No:	SA01
Date:	12/02/2025

Ground Conditions

From	To	
0.00	0.20	TOPSOIL.
0.20	0.70	Firm brown sandy slightly gravelly silty CLAY.
0.70	2.10	Grey silty sandy GRAVEL with high cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.20
0.5	1.22
1	1.23
1.5	1.25
2	1.27
2.5	1.28
3	1.29
3.5	1.31
4	1.33
4.5	1.34
5	1.36
6	1.39
7	1.43
8	1.47
9	1.50
10	1.53
12	1.58
14	1.64
16	1.70
18	1.75
20	1.81
25	1.96
30	2.10

Pit Dimensions (m)		
Length (m)	3.10	m
Width (m)	0.60	m
Depth	2.10	m
Water		
Start Depth of Water	1.20	m
Depth of Water	0.90	m
75% Full	1.43	m
25% Full	1.88	m
75%-25%	0.45	m
Volume of water (75%-25%)	0.84	m ³
Area of Drainage	15.54	m ²
Area of Drainage (75%-25%)	5.19	m ²
Time		
75% Full	6.88	min
25% Full	22.17	min
Time 75% to 25%	15.30	min
Time 75% to 25% (sec)	917.7	sec



$f = \underline{0.01054}$ or
m/min

$\underline{1.76E-04}$
m/s

Appendix E

