



Drainage Design Report

Athlone Link Road Phase 2 - Coosan Point Road to The Crescent

On behalf of **Westmeath County Council**

Prepared by

CST GROUP / PUNCH Consulting Engineers

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March 2026

Civil
Structural
Traffic

Table of Contents:

DOCUMENT CONTROL.....	3
1. INTRODUCTION	4
2. SURFACE WATER MANAGEMENT.....	5
3. FOUL WATER MANAGEMENT.....	10
4. CONCLUSION	11

Appendices:


APPENDIX A	Storm Drainage Catchment Areas
APPENDIX B1	Greenfield Run-off Rate Estimation – Link Road
APPENDIX B2	Greenfield Run-off Rate Estimation – CIE Lands
APPENDIX C1	Network Analysis – Storm Network – Link Road
APPENDIX C2	Network Analysis – Storm Network – CIE Lands
APPENDIX D	Storm Drainage Network Drawing
APPENDIX E1	Foul Drainage Network Calculations for Current Layout Design to Uisce Eireann Standard
APPENDIX E2	Foul Drainage Network Calculations for original PH McCarthy Design

DOCUMENT CONTROL

Revision History:	R0	R1	R2	R3	R4				
Purpose of Issue: P=Preliminary C=Comment I=Information FC=Fire Cert PL=Planning T=Tender CT=Contract CN=Construction	I	I	PL	PL	PL				
Date:	11 07 23	20 01 25	02 07 25	10 07 25	26 03 26				
Originator:	SS	PB	PB	PB	PB				
Checked By:	FF	FF	FF	FF	SS				
Approved By:	FF	FF	FF	FF	FF				

Report By: 
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Date 26/03/2026

Approved By: 
Francis Fidgeon
Chartered Engineer

Date 26/03/2026

1. INTRODUCTION

PUNCH Consulting Engineers / CST Group were appointed by Westmeath County Council to provide detailed designs for the provision of Phase 2 of a new link road from Coosan Point Road to The Crescent, Athlone. The provision of the new link road will also provide additional parking areas within the CIE bus depot. The works will result in increased hard paved areas and increased surface water run-off to the storm water drainage network. This report outlines the storm and foul water drainage design for the proposals.

2. SURFACE WATER MANAGEMENT

2.1 Existing Surface Water Drainage Regime

The site comprises of the existing CIE bus depot and undeveloped, greenfield land which gently slopes generally from east to west. There are a number of shallow open channels flowing across the lands towards a culvert on the western side of the lands. This culvert crosses under the Southern Station Road and connects with an open drain to the south of the Corrib Oil depot. This open drain is understood to ultimately discharge to the River Shannon nearby. It is likely the surface water run-off from the existing CIE depot and the housing development to the south of the subject land discharges to this drainage network.

Local knowledge suggests the lands are subject to occasional flooding. Reference to the OPW Floodmaps indicates historic flood events are recorded at the Railway Bridge on Coosan Point Road, but no recordings are found for these subject lands.

Following a request for further information by An Coimisiún Pleanála, a Site-Specific Flood Risk Assessment has been carried out by PUNCH Consulting Engineers.

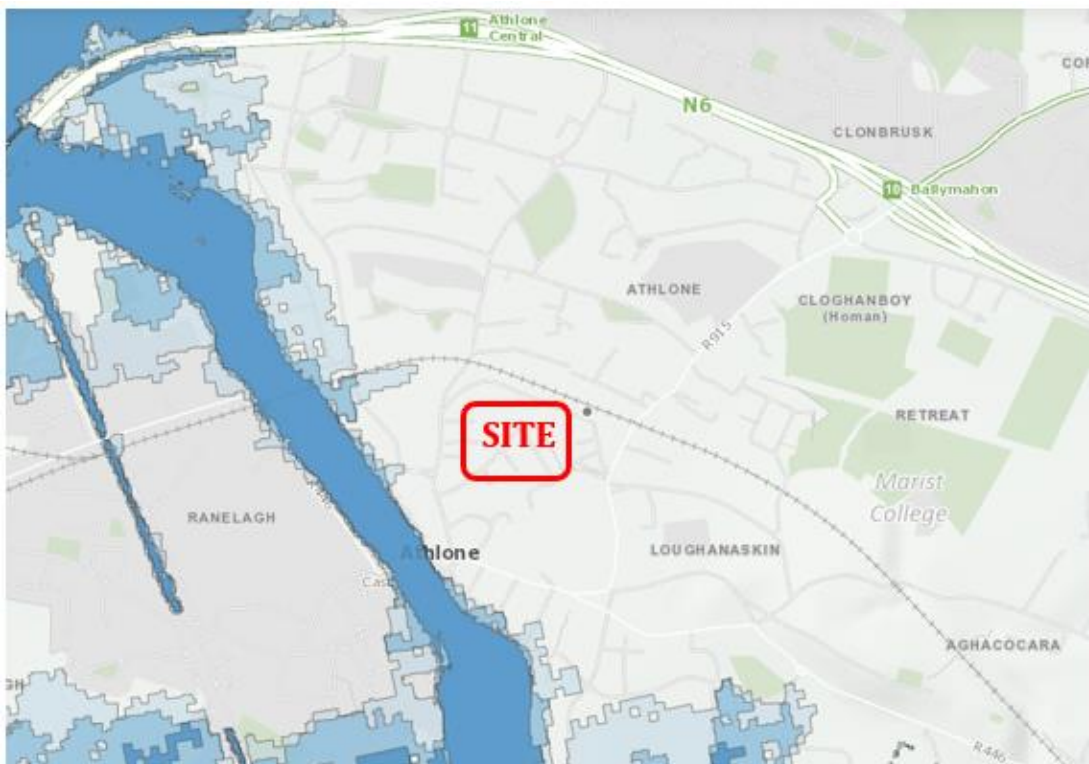


Figure 1: OPW Floodmaps Extract

PH McCarthy Consulting Engineers produced designs for the Athlone Main Drainage Scheme in 2006. Part of the PH McCarthy proposals is to provide upgraded storm drainage networks for the lands to the north of the subject site. These upgraded sewers are routed through the CIE lands and discharge to the same storm water culvert under the Southern Station Road.

2.2 Surface Water Drainage Discharge Options

The following options have been considered for storm water drainage of these lands.

Option 1 – Infiltrate to Groundwater

Infiltration tests have not been undertaken on the site, however from inspection of trial pits and local knowledge suggests the use of soakaways on this site are not viable.

Option 2 – Discharge into the Existing Storm Water drain to the west.

The open drain / culvert to the western side of the lands currently receives the storm water for the subject lands, the housing development to the south and the lands to the north. The development lands generally fall from the east to the west in the direction of this open drain. In order to ensure downstream flooding does not result from the increased run-off rate from the increased hard paved surfacing, any discharge to this ditch should be controlled to pre-development run-off rates.

In view of the assessment of these options it was decided in order to best replicate the existing drainage path and the goals of SuDS best management practises to discharge the storm water run-off to the existing open drain to the west. In order to replicate existing run-off rates on-site attenuation should be provided together with a restrictor on the drainage train prior to the outfall to ensure run-off is controlled to pre-development or local authority dictated run-off rates.

The PH McCarthy proposals should remain unaffected by the current link road and CIE bus depot expansion works.

The drainage attenuation system should be sized sufficient to accommodate all storm durations and intensities up to the 1:100 year storm without surface water leaving the site.

The green field predevelopment run-off from the lands should be no greater that outlined in the Flood Studies Report. The areas of additional hard paved impermeable surface are shown in **Appendix A** and the estimated run-off from these lands are shown in **Appendix B**.

The post development run-off should be no greater than this figure.

2.3 Surface Water Drainage Strategy

A surface water drainage strategy has been prepared in accordance with the general design principles set out below and in general compliance with TII standard DN-DNG-03066 'Design of Earthworks, Drainage, Network Drainage, Attenuation & Pollution Control' and also the Irish Water document 'Code of Practice for Wastewater Infrastructure'. The strategy has been prepared based on the catchment areas/boundaries as defined by existing site topography.

The strategy comprises a conventional, gravity piped drainage system that will collect and convey surface water run-off arising from the catchment. The design levels and drainage layout are such that the designed system will discharge via gravity to the outfall location.

The works consist of two distinctly separate areas. One being the link road, that will remain in Local Authority ownership, and the other being the CIE bus depot as shown in **Appendix A**.

Due to the requirement to control the outflow of water from the site to no greater than pre-development levels, the storm network will discharge via underground attenuation tanks in advance of the discharge point. The discharge will be controlled by a Hydro-brake to limit flows equivalent to green field run-off. As the two separate development areas will have two different owners, the attenuation and flow controls will be separate and located within the ownership boundary of each development.

The attenuation will be sized to accommodate surface water run-off arising from the new hard paved surface areas of the two separate development sections for up to and including the 1-in-100 year rainfall event, plus an allowance for climate change (20%). Exceptional events in excess of the 1:100year storm may overtop the discharge control (Hydrobrake) and result in short term uncontrolled flows towards the culvert. This however will not impact the surrounding residential dwellings.

2.4 Design Parameters

This section sets out the design parameters that have been used in the design of the surface water drainage pipe network and surface water balancing measures serving the proposed development.

2.4.1 Limiting/Allowable Discharge Rate

The greenfield run-off rates from the lands to be developed have been calculated utilising the Institute of Hydrology Report 124 (IoH124) 'Flood Estimation for Small Catchments (1994)' methodology and catchment specific rainfall parameters derived from the Flood Estimation Handbook (FEH) – see **Appendix A** for Greenfield Run-off Rate Estimation. In order to determine run-off rates the permeability of the soil should first be determined. The flood studies report (NERC 1975) divides soil types into 5 categories:

- SOIL Type 1 = SPR 0.1 (sandy highly permeable material);
- SOIL Type 2 = SPR 0.3;
- SOIL Type 3 = SPR 0.37;
- SOIL Type 4 = SPR 0.47 (heavy clay);
- SOIL Type 5 = SPR 0.53 (which is rarely applied) is exposed rock.

The default soil type for the site, as used by the HR Wallingford software, which is derived from the Irish SuDS map, is Type 4. The existing lands for locating the link road are known to be boggy and often submerged and therefore have zero capacity for soakage. Therefore, it is considered more appropriate to use an index of 5 for these lands. SOIL type 4 is considered appropriate for the CIE element of the development.

Calculations are provided in **Appendix B**.

Return Period	Greenfield Run-off Rate i/sec/Ha	Greenfield Run-off Rate – Link Road Catchment Area 0.534Ha (i/sec)
Q _{bar}	10.00	5.34
Q ₃₀	16.50	8.81
Q ₁₀₀	19.51	10.42

Table 1. Greenfield Run-off for Link Road Lands

Return Period	Greenfield Run-off Rate i/sec/Ha	Greenfield Run-off Rate – Link Road Catchment Area 0.534Ha (i/sec)
Q _{bar}	7.71	6.09
Q ₃₀	12.72	10.05
Q ₁₀₀	15.02	11.87

Table 2. Greenfield Run-off for Additional CIE Lands

The surface water drainage strategy for developments generally assume that surface water outflows are limited to the mean annual run-off rate (Q_{bar}) for all storm events up to and including the 1:100-year return period and therefore providing betterment to the downstream receiving network.

Discharge from both development parcels to the open drain / culvert will be controlled by way of a Hydrobake located on the two drainage trains, adjacent to the attenuation tanks. Surplus flow will back-up in the tanks for temporary storage.

2.4.2 Volumetric Run-off Coefficient for Design of the Attenuation Provision

An onerous volumetric runoff coefficient (C_v) of 0.9 has been utilized in the sizing of the surface water pipes and simulated for the 1:100 year storm using a C_v of 1.0.

2.4.3 Impermeable Areas

The proposed impermeable areas associated with the development proposals have been taken from the site layout plan for the development as shown in **Appendix A**. It has been assumed that 100% of the new paved area will be impermeable and the run-off from this area will be routed via an underground pipe network to the outfall. The total areas contributing to the storm drainage network comprise impermeable areas such as roads and hard standing.

2.4.4 Piped Surface Water Drainage System

The proposed surface water drainage system will comprise a network of pipes which will be designed and constructed in accordance with the requirements of Irish Water, the Department of the Environment and Local Government's 'Recommendations for Site Development Works for Housing Areas' and/or the TII 'Specification for Road Works' and also subject to the approval of Westmeath County Council.

2.4.5 Modified Rational Method

The Modified Rational Method has been used for the design of the drainage network by use of the 'MicroDrainage' software. Calculations for the surface water drainage catchment are included in **Appendix B**. These set out catchment and impermeable areas. The calculations also outline the maximum and minimum pipe velocities.

2.4.6 Pipe Flows and Discharge Rates

Calculations for the pipe flows and discharge rates are shown in **Appendix C** for the two systems. Analysis found the critical storm for the Link Road occurs during the 120-minute duration storm and the 480-minute duration storm for the CIE lands. These events have been assessed for the 1:100 year return period storm. Details of the general arrangement/configuration of the surface water drainage infrastructure is shown on drawing number 120278-501 in **Appendix D**.

2.5 Contaminates

2.5.1 Hydrocarbons

Removal of hydrocarbons from the surface water drainage network will be achieved by use of trapped road gullies on the road network and a by-pass interceptor for the CIE lands, where there is greater risk of hydrocarbons from parked vehicles. The proposed interceptor is a Kingspan NSFA125. This has been sized to accommodate surface water flows from all additional hard paved areas within the CIE development.

2.6 Maintenance

2.6.1 Detritus and Silts

The storm water drainage network utilises conventional road gullies. Detritus and silts can gather in the gullies and other inlets to the underground drainage network. The proposed Hydrobrake restrictors incorporates a small-bore orifice that may restrict passage of larger elements of detritus. Without regular maintenance this small bore may become blocked. Storm water would then back-up into the attenuation tanks and eventually overtop the underground network.

It will be the responsibility of the local authority and CIE to undertake regular inspections of the Hydrobrake chamber and clear any gathering detritus.

3. FOUL WATER MANAGEMENT

3.1 Existing Foul Water Drainage Regime

There is an existing foul water sewer running through the CIE lands. These lands are proposed to be used for long term parking of CIE vehicles.

3.2 Foul Water Drainage Proposals

The provision of the link road adjacent and to the south of the CIE lands creates opportunity to divert the existing foul water sewer into local authority owned lands.

PH McCarthy prepared designs for the Athlone Main Drainage Scheme in 2006. These designs included for provision of a new foul sewer along the line of the proposed link road. This would enable the majority of the existing foul sewer within the CIE lands to be decommissioned. The new diversion connects to the existing foul sewer to the west of the land, near Coosan Point Road.

Minor alterations to the PH McCarthy proposals have been incorporated into the current design, to ensure compliance with current Uisce Éireann specifications is achieved.

Calculations are provided in **Appendix E** to prove the capacity of the revised design exceeds the least capacity of the former PH McCarthy design.

4. CONCLUSION

4.1 Existing Undeveloped Lands

The existing lands incorporate the existing CIE bus depot and undeveloped green field lands. There is an existing storm sewer within the CIE depot that discharges to an open drain that runs through the undeveloped lands towards a culvert under Southern Station Road and ultimately discharges to the River Shannon.

Some of the undeveloped lands are known to be boggy and parts are sometimes underwater.

PH McCarthy Consulting Engineers have developed a Main Drainage design for improvements to the storm drainage network to the north of the subject lands.

There is an existing foul sewer crossing the CIE lands to a manhole adjacent to Coosan Point Road.

4.2 Post Development

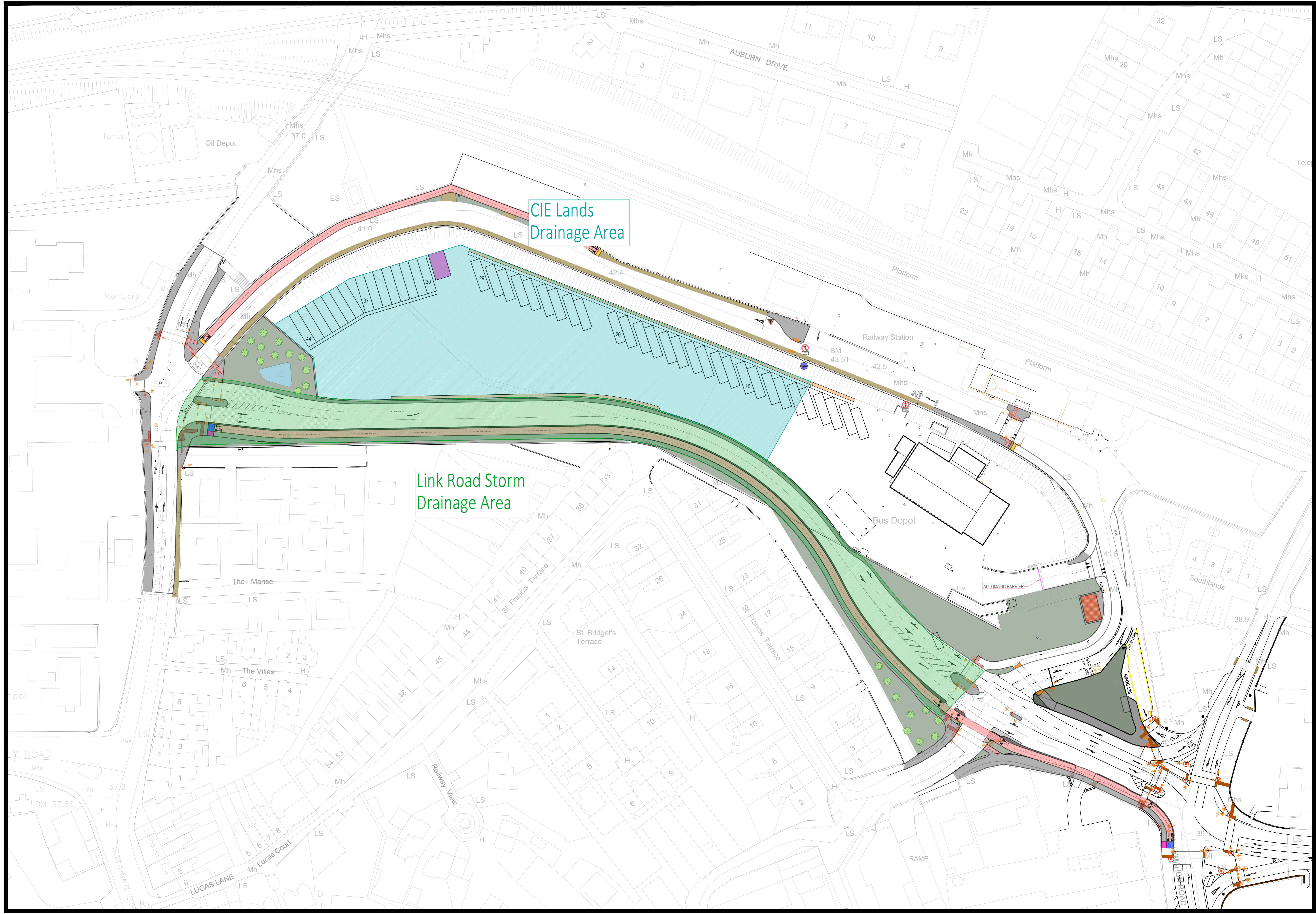
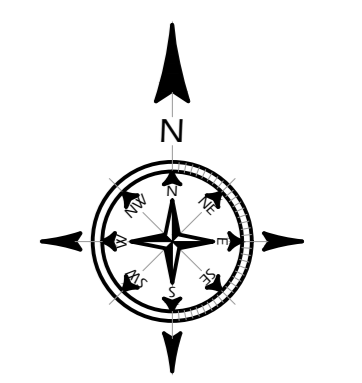
To provide an impact-neutral drainage strategy for the storm water from any additional hard paved surfaces resultant from this development the surface water run-off will be routed to the existing outfall at the culvert under the Southern Station Road. Surface water run-off from the development will be controlled to rates equivalent green-field run-off rates.

All storms up to and including the 1:100 year return period storm will be attenuated and contained within underground attenuation tanks.

The existing foul sewer that is located within the CIE lands will be diverted to be contained within the link road and public ownership, as per the desires of the Athlone main drainage scheme.

APPENDIX A

Storm Drainage Catchment Areas



CIE Lands
 Drainage Area

Link Road Storm
 Drainage Area

REV.	DESCRIPTION	BY	DATE
PL1	CHANGE OF TITLEDLOCK TEMPLATE AMENDMENT	SKM	30.06.25
DATE:	09.06.21	APPROVED:	FF
SCALE @ A3:	1:500	ENG. CHECK:	SS
TECH. CHECK:	KF	STAGE:	PLANNING
JOB TITLE: ATHLONE LINK ROAD			
DRAWING TITLE: STORM DRAINAGE CATCHMENT AREAS			
CLIENT: WESTMEATH COUNTY COUNCIL			
DRAWING No: 120278-SK-500			
		REV: PL1	
		1, O'CONNELL ST. SLIGO P93 W7VY IRELAND +353 71 919 4500 info@cstgroup.ie www.cstgroup.ie	

Appendix B1

Greenfield Run-off Estimation – Link Road

Calculated by:

Site name:

Site location:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:

Longitude:

Reference:

Date:

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	<input type="text" value="4"/>	<input type="text" value="5"/>
HOST class:	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
SPR/SPRHOST:	<input type="text" value="0.47"/>	<input type="text" value="0.53"/>

Hydrological characteristics

	Default	Edited
SAAR (mm):	<input type="text" value="1044"/>	<input type="text" value="1044"/>
Hydrological region:	<input type="text" value="13"/>	<input type="text" value="13"/>
Growth curve factor 1 year:	<input type="text" value="0.85"/>	<input type="text" value="0.85"/>
Growth curve factor 30 years:	<input type="text" value="1.65"/>	<input type="text" value="1.65"/>
Growth curve factor 100 years:	<input type="text" value="1.95"/>	<input type="text" value="1.95"/>
Growth curve factor 200 years:	<input type="text" value="2.15"/>	<input type="text" value="2.15"/>

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	4.12	5.34
1 in 1 year (l/s):	3.5	4.54
1 in 30 years (l/s):	6.79	8.81
1 in 100 year (l/s):	8.02	10.42
1 in 200 years (l/s):	8.85	11.48

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix B2

Greenfield Run-off Estimation – CIE Lands

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	1044	1044
Hydrological region:	13	13
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	1.65	1.65
Growth curve factor 100 years:	1.95	1.95
Growth curve factor 200 years:	2.15	2.15

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?


Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q _{BAR} (l/s):	6.09	6.09
1 in 1 year (l/s):	5.18	5.18
1 in 30 years (l/s):	10.05	10.05
1 in 100 year (l/s):	11.87	11.87
1 in 200 years (l/s):	13.09	13.09

APPENDIX C1

Network Analysis – Storm Network – Link Road

CST Group		Page 1
Nib Building Stephen Street Sligo, ROI	120178 Athlone Link Road Phase 2	
Date 23/03/2026 File 120278 Link Road ...	Designed By SS Checked By	
Elstree Computing Ltd		Network W.12.4

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes 122170 FOUL 2023 05 11 Manhole Sizes 122170 FOUL 2023 05 11

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	Add Flow / Climate Change (%)	20
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.300	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500


Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	62.071	0.276	224.9	0.179	5.00	0.0	0.600	o	300
1.001	28.432	0.126	225.0	0.025	0.00	0.0	0.600	o	300
1.002	27.365	0.175	156.4	0.030	0.00	0.0	0.600	o	300
1.003	43.788	0.628	69.7	0.053	0.00	0.0	0.600	o	300
1.004	58.138	0.258	225.3	0.083	0.00	0.0	0.600	o	300
2.000	79.298	0.628	126.2	0.150	5.00	0.0	0.600	o	225
1.005	10.319	0.020	516.0	0.000	0.00	0.0	0.600	o	450

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.99	37.360	0.179	0.0	0.0	5.8	1.04	73.8	34.9
1.001	50.00	6.44	37.084	0.204	0.0	0.0	6.6	1.04	73.8	39.8
1.002	49.92	6.81	36.958	0.234	0.0	0.0	7.6	1.25	88.7	45.6
1.003	48.73	7.20	36.783	0.287	0.0	0.0	9.1	1.89	133.3	54.5
1.004	46.14	8.12	36.155	0.370	0.0	0.0	11.1	1.04	73.7	66.6
2.000	50.00	6.14	36.600	0.150	0.0	0.0	4.9	1.16	46.2	29.2
1.005	45.65	8.32	35.747	0.520	0.0	0.0	15.4	0.89	141.3	92.6


CST Group		Page 2
Nib Building Stephen Street Sligo, ROI	120178 Athlone Link Road Phase 2	
Date 23/03/2026 File 120278 Link Road ...	Designed By SS Checked By	
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	20.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Run Time (mins)	240
Hot Start Level (mm)	0	Output Interval (mins)	4
Manhole Headloss Coeff (Global)	0.500		
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	120
Ratio R	0.300		

CST Group		Page 3
Nib Building Stephen Street Sligo, ROI	120178 Athlone Link Road Phase 2	
Date 23/03/2026 File 120278 Link Road ...	Designed By SS Checked By	
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Online Controls for Storm

Hydro-Brake® Manhole: 7, DS/PN: 1.005, Volume (m³): 9.2

Design Head (m) 0.620 Diameter (mm) 106
Design Flow (l/s) 5.3 Invert Level (m) 35.747
Hydro-Brake® Type Md5 SW Only

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	1.200	7.4	3.000	11.7	7.000	17.9
0.200	4.6	1.400	8.0	3.500	12.7	7.500	18.5
0.300	4.5	1.600	8.6	4.000	13.5	8.000	19.1
0.400	4.6	1.800	9.1	4.500	14.3	8.500	19.7
0.500	4.9	2.000	9.6	5.000	15.1	9.000	20.3
0.600	5.3	2.200	10.0	5.500	15.9	9.500	20.8
0.800	6.1	2.400	10.5	6.000	16.6		
1.000	6.8	2.600	10.9	6.500	17.2		

Nib Building
Stephen Street
Sligo, ROI

120178
Athlone Link Road
Phase 2



Date 23/03/2026
File 120278 Link Road ...

Designed By SS
Checked By

Elstree Computing Ltd

Network W.12.4

Storage Structures for Storm

Tank or Pond Manhole: 7, DS/PN: 1.005

Invert Level (m) 35.970

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	150.0	0.600	150.0

Nib Building
Stephen Street
Sligo, ROI

120178
Athlone Link Road
Phase 2



Date 23/03/2026

Designed By SS

File 120278 Link Road ...

Checked By

Elstree Computing Ltd

Network W.12.4


Summary of Results for 120 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	37.526	-0.134	0.000	0.58	0.0	40.8	OK
1.001	2	37.271	-0.113	0.000	0.69	0.0	46.1	OK
1.002	3	37.189	-0.069	0.000	0.66	0.0	52.6	OK
1.003	4	37.183	0.100	0.000	0.48	0.0	60.1	SURCHARGED
1.004	5	37.175	0.720	0.000	1.06	0.0	74.2	SURCHARGED
2.000	6	37.175	0.350	0.000	0.70	0.0	31.6	SURCHARGED
1.005	7	37.162	0.965	0.000	0.11	0.0	8.0	FLOOD RISK

APPENDIX C2

Network Analysis – Storm Network – CIE Lands

CST Group		Page 1
Nib Building Stephen Street Sligo, ROI	120278 CIE Lands Athlone	
Date 23/03/2026 File 120278 CIE Bus De...	Designed By SS Checked By	
Elstree Computing Ltd	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	Add Flow / Climate Change (%)	20
M5-60 (mm)	14.500	Minimum Backdrop Height (m)	0.750
Ratio R	0.300	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.900	Min Slope for Optimisation (1:X)	500


Designed with Level Soffits

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	20.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Run Time (mins)	960
Hot Start Level (mm)	0	Output Interval (mins)	8
Manhole Headloss Coeff (Global)	0.500		
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.900
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	14.500	Storm Duration (mins)	480
Ratio R	0.300		


CST Group		Page 2
Nib Building Stephen Street Sligo, ROI	120278 CIE Lands Athlone	
Date 23/03/2026 File 120278 CIE Bus De...	Designed By SS Checked By	
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Online Controls for Storm

Hydro-Brake® Manhole: 5, DS/PN: 1.003, Volume (m³): 4.0

Design Head (m) 0.450 Diameter (mm) 118
Design Flow (l/s) 6.1 Invert Level (m) 36.633
Hydro-Brake® Type Md5 SW Only

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.7	1.200	9.2	3.000	14.5	7.000	22.2
0.200	5.9	1.400	9.9	3.500	15.7	7.500	22.9
0.300	6.0	1.600	10.6	4.000	16.8	8.000	23.7
0.400	5.9	1.800	11.2	4.500	17.8	8.500	24.4
0.500	6.2	2.000	11.9	5.000	18.7	9.000	25.1
0.600	6.6	2.200	12.4	5.500	19.7	9.500	25.8
0.800	7.5	2.400	13.0	6.000	20.5		
1.000	8.4	2.600	13.5	6.500	21.4		


CST Group		Page 3
Nib Building Stephen Street Sligo, ROI	120278 CIE Lands Athlone	
Date 23/03/2026 File 120278 CIE Bus De...	Designed By SS Checked By	
Elstree Computing Ltd	Network W.12.4	

Storage Structures for Storm

Tank or Pond Manhole: 5, DS/PN: 1.003

Invert Level (m) 36.633

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	495.0	0.450	495.0

CST Group		Page 4
Nib Building Stephen Street Sligo, ROI	120278 CIE Lands Athlone	
Date 23/03/2026 File 120278 CIE Bus De...	Designed By SS Checked By	
Elstree Computing Ltd		Network W.12.4

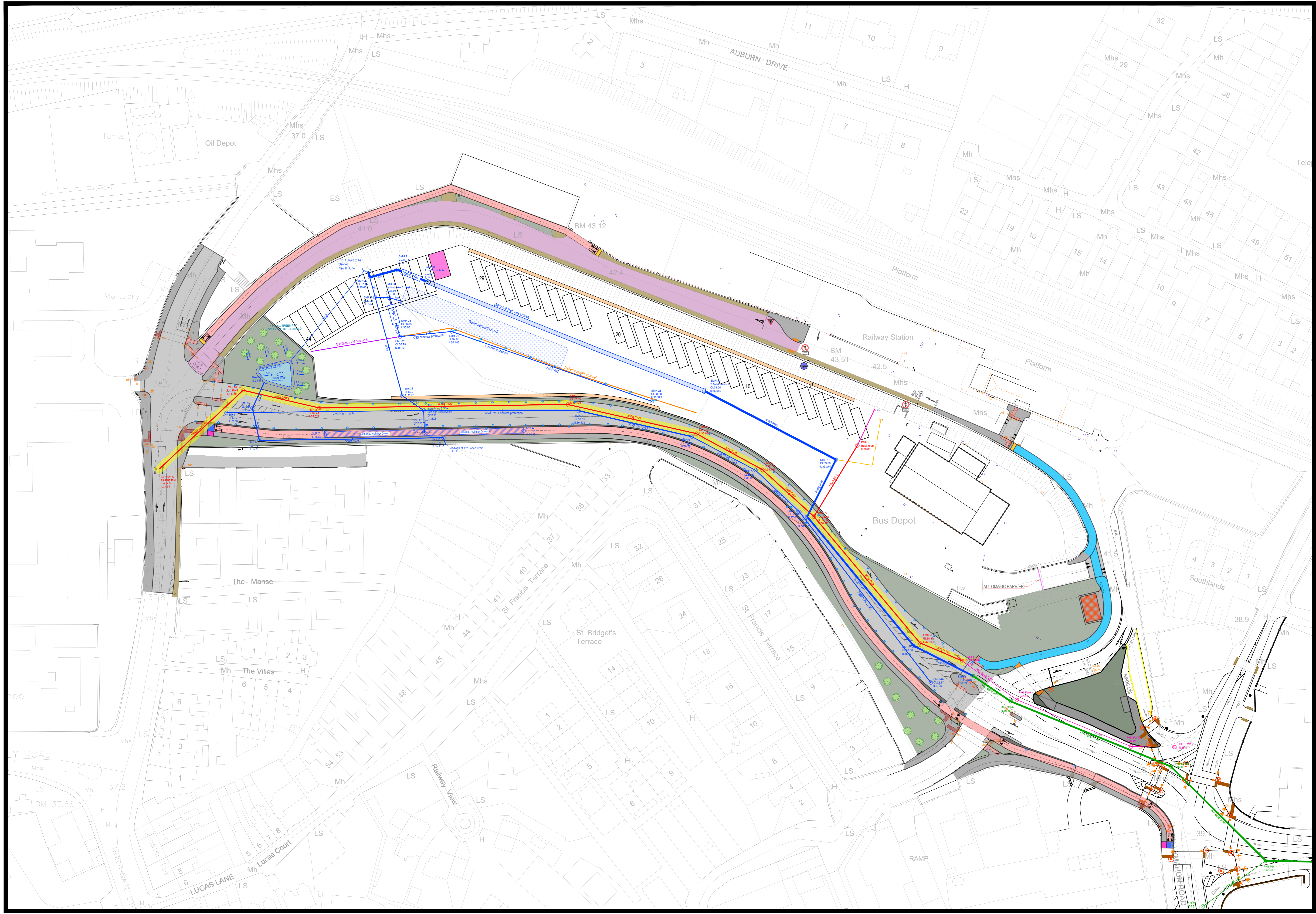
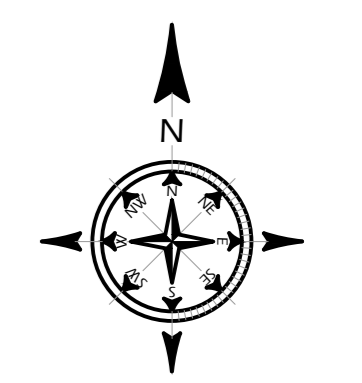
Summary of Results for 480 minute 100 year Summer (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	38.638	-0.162	0.000	0.43	0.0	38.2	FLOOD RISK
1.001	2	37.807	-0.193	0.000	0.28	0.0	45.8	OK
2.000	3	37.864	-0.236	0.000	0.10	0.0	14.5	FLOOD RISK
1.002	4	37.299	0.118	0.000	0.42	0.0	59.7	FLOOD RISK
1.003	5	37.294	0.286	0.000	0.08	0.0	6.8	FLOOD RISK

APPENDIX D

Storm Drainage Network Drawing



KEY:

- PROPOSED STORM SEWER
- PROPOSED FOUL SEWER
- PROPOSED ROAD GULLY
- PROPOSED SLOT CHANNEL
- PROPOSED DISHED CONCRETE CHANNEL
- PROPOSED STORM & FOUL PCC MANHOLE D400 COVER
- UISCÉ EIREANN EASEMENT
- - - EXISTING STORM SEWER
- - - EXISTING PHASE 1 STORM SEWER
- - - EXISTING FOUL SEWER


PL3 LINK ROAD ATTENUATION AMENDED	PL 23/03/20
PL2 ATTENUATION AMENDED	PL 25/09/20
PL1 CHANGE OF TITLEROCK TEMPLATE AMENDMENT	SMK 30/06/20
REV	BY DATE
DRAWN: KL	TECH. CHECK: KF
SCALE @ A0: 1:500	ENG. CHECK: SS
DATE: 09.06.21	APPROVED: FF
STAGE: PLANNING	
JOB TITLE: ATHLONE LINK ROAD	
DRAWING TITLE: DRAINAGE LAYOUT	
CLIENT: WESTMEATH COUNTY COUNCIL	
DRAWING No: 120278-501	

PUNCH
 consulting engineers | REV: PL3

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APPENDIX E1
Foul Drainage Network Calculations for Current Layout Design
to Uisce Eireann Standard

CST Group		Page 0
Nib Building Stephen Street Sligo, ROI	120278 Athlone Link Road Diverted Foul	
Date 26 March 2026 File 120278 LInk Road ...	Designed By SS Checked By	
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FOUL SEWERAGE DESIGN

Design Criteria for NEW LINK ROAD FOUL 2026 03 26.FWS

Pipe Sizes	STANDARD	Manhole Sizes	STANDARD
Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	20
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	225.00	Maximum Backdrop Height (m)	0.000
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

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Network Design Table for NEW LINK ROAD FOUL 2026 03 26.FWS

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	17.220	0.356	48.4	0.000	0	0.0	1.500	o	300
1.001	62.237	1.244	50.0	0.000	0	0.0	1.500	o	300
2.000	15.548	0.200	77.7	0.000	0	0.0	1.500	o	300
2.001	30.905	0.133	232.4	0.000	0	0.0	1.500	o	300
1.002	26.227	0.111	236.3	0.000	0	0.0	1.500	o	300
1.003	28.467	0.120	237.2	0.000	0	0.0	1.500	o	300
1.004	49.691	0.210	236.6	0.000	0	0.0	1.500	o	300
1.005	93.755	0.397	236.2	0.000	0	0.0	1.500	o	300
1.006	29.493	0.125	235.9	0.000	0	0.0	1.500	o	300
1.007	43.449	0.294	147.8	0.000	0	0.0	1.500	o	300

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (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	37.770	0.000	0.0	0	0.0	0	0.00	2.00	141.1	0.0
1.001	37.414	0.000	0.0	0	0.0	0	0.00	1.96	138.8	0.0
2.000	36.200	0.000	0.0	0	0.0	0	0.00	1.57	111.2	0.0
2.001	36.000	0.000	0.0	0	0.0	0	0.00	0.91	64.2	0.0
1.002	35.867	0.000	0.0	0	0.0	0	0.00	0.90	63.6	0.0
1.003	35.756	0.000	0.0	0	0.0	0	0.00	0.90	63.5	0.0
1.004	35.636	0.000	0.0	0	0.0	0	0.00	0.90	63.6	0.0
1.005	35.426	0.000	0.0	0	0.0	0	0.00	0.90	63.7	0.0
1.006	35.029	0.000	0.0	0	0.0	0	0.00	0.90	63.7	0.0
1.007	34.904	0.000	0.0	0	0.0	0	0.00	1.14	80.6	0.0

APPENDIX E2
Foul Drainage Network Calculations for original PH McCarthy Design

CST Group		Page 0
Nib Building Stephen Street Sligo, ROI	120278 Athlone Link Road PH McCarthy Foul	
Date 26 March 2026 File 120278 PH McCarth...	Designed By SS Checked By	
Elstree Computing Ltd		Network W.12.4

FOUL SEWERAGE DESIGN

Design Criteria for NEW LINK ROAD FOUL 2026 03 26.FWS

Pipe Sizes	STANDARD	Manhole Sizes	STANDARD
Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	20
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	225.00	Maximum Backdrop Height (m)	0.000
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 Soffits

Network Design Table for NEW LINK ROAD FOUL 2026 03 26.FWS

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	15.400	0.040	385.0	0.000	0	0.0	1.500	o	300
1.001	48.120	0.130	370.2	0.000	0	0.0	1.500	o	300
1.002	23.346	0.070	333.5	0.000	0	0.0	1.500	o	300
1.003	34.740	0.090	386.0	0.000	0	0.0	1.500	o	300
1.004	45.180	0.120	376.5	0.000	0	0.0	1.500	o	300
1.005	55.625	1.650	33.7	0.000	0	0.0	1.500	o	300
1.006	36.275	0.170	213.4	0.000	0	0.0	1.500	o	300
1.007	61.427	0.280	219.4	0.000	0	0.0	1.500	o	300
1.008	65.404	0.300	218.0	0.000	0	0.0	1.500	o	300
1.009	60.820	0.500	121.6	0.000	0	0.0	1.500	o	300

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (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	38.010	0.000	0.0	0	0.0	0	0.00	0.70	49.8	0.0
1.001	37.970	0.000	0.0	0	0.0	0	0.00	0.72	50.8	0.0
1.002	37.840	0.000	0.0	0	0.0	0	0.00	0.76	53.5	0.0
1.003	37.770	0.000	0.0	0	0.0	0	0.00	0.70	49.7	0.0
1.004	37.680	0.000	0.0	0	0.0	0	0.00	0.71	50.3	0.0
1.005	37.560	0.000	0.0	0	0.0	0	0.00	2.39	169.1	0.0
1.006	35.910	0.000	0.0	0	0.0	0	0.00	0.95	67.0	0.0
1.007	35.740	0.000	0.0	0	0.0	0	0.00	0.93	66.1	0.0
1.008	35.460	0.000	0.0	0	0.0	0	0.00	0.94	66.3	0.0
1.009	35.160	0.000	0.0	0	0.0	0	0.00	1.26	88.9	0.0