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Alan Traynor Consulting Engineers Ltd.

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CAVAN COUNTY COUNCIL

PROPOSED RESIDENTIAL DEVELOPMENT AT BARRACK LANE, KILNALECK, CO. CAVAN

Foul, Surface Water, Water Supply
Attenuation Calculations & Details

-

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Alan Traynor
Consulting Engineers Ltd.

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1.0 Introduction

Alan Traynor Consulting Engineers Ltd have been engaged by Cavan County Council to carry out engineering services design for the proposed residential development located at Barrack Road, Kilnaleck, Co. Cavan consisting of 4 new units and the redevelopment of an existing unit. This report addresses the foul drainage, surface water drainage and water supply for this application.

1.1 Site Description

The site has an approximate area of 0.26 hectares and is located along Barrack Road, Kilnaleck Co. Cavan. The site is made up of an existing semidetached bungalow and agricultural field. There are existing one and two storey dwellings to the north, south and east and farmland to the west. The site can be accessed from Barrack Road.

2.0 Surface Water Drainage

2.1 Surface Water Drainage - Existing

The existing dwelling is connected to a storm water sewer running in its front garden which discharges to an open drain that forms the boundary of the field along Barrack Road. It is unknown if a hydrobrake is fitted to the outlet of this sewer.

2.2 Surface Water Drainage – Proposed

It is proposed to collect all surface water runoff from the site in a suitably sized sewer network and discharge it to the existing public surface water sewer running along the boundary of the site. It is also proposed to slightly alter the layout of the existing public surface water sewer within the site to provide additional space for services onsite and to extend it so that the discharge location to the open drain is at the northern end of the boundary along Barrack Road.

An attenuation tank within the site, with a capacity of 26.6 m^3, will retain surface water from the site when the flow exceeds the limit of the hydro-brake fitted to the discharge pipe, which is 5 l/s. The attenuation tank is sized to cater for a 1 in 100-year storm event with an additional 20% allowance for climate change. The Qbar value for the site was calculated using the UKsuds website. As recommended when the Qbar value is calculated at less than 5l/s the restricted value shall be set at 5l/s to prevent buildup of vegetation in the pipework. The surface water runoff will pass through a bypass interceptor prior to being discharged to the public surface water sewer. Please refer to drawing 23-104-100 for the surface water sewer layout and Appendix A for calculations.

3.0 Foul Drainage

3.1 Foul Drainage – Existing

There is a 225mm public foul water sewer running along Barrack Road from southeast to northwest. The existing dwelling on the site is connected to the public foul water sewer.

3.2 Foul Drainage – Proposed

It is proposed to collect the foul discharge from the 4 new proposed dwellings, using a suitably sized network and discharge it to the public foul water sewer. The existing dwelling will utilize its existing connection. Please refer to drawing 23-104-100 for the foul sewer layout, Appendix C for the foul water calculations and Appendix D for the Irish Water Confirmation of Feasibility.

4.0 Water Supply

4.1 Water Supply – Existing

There is a public 125mm watermain running past the site along Barrack Road. The existing dwelling is connected to it.

4.2 Water Supply - Proposed

It is proposed to make a 100mm connection to the public watermain and run a new watermain in the access road to the development terminated in a loop as per Irish Water Guidelines. The 4 new units will be served by the new watermain. Sluice valves, scour valves, air valves and hydrants will be constructed on the proposed watermain as required by Irish Water Code of Practice and Standard Details. Please refer to drawing 23-104-100 for the watermain layout and to Appendix D for the Irish Water Confirmation of Feasibility.

Appendix A - Surface Water Calculations

Storm sewer loadings for Development at Barrack Road, Kilnaleck, Co. Cavan

DATA		STORM WATER FLOW Modified Rational Method			Cr = 1.3 Cv = 1			SEWER DESIGN Ks = 0.60									
SEWER REFERENCE					Cumulative	Rainfall : I	Storm Water Flow	Size of drain	Gradient	Length (m)	Capacity	Pipe full Velocity	Actual Velocity	Half full velocity	Max Velocity	Depth of	Reserve capacity
From Manhole	To Manhole	Roads Area A1	Roofs/yards Area A2	Impervious Area	Impervious Area	(mm/hr)	Q=Ap*I*Cr*Cv*2.78 lt/sec	(mm)	(1 in x)		(l/sec)	(m/sec)	(m/sec)	(m/sec)	(m/sec)	flow (mm)	(l/sec)
1	2	3	4	5	6	7	8	9	10	11	12	13	14		15	16	17
S1	S2	0.007	0.009	0.017	0.017	50.00	3.01	225	22	11.653	111.35	2.80	1.22	2.80	3.18	25.49	108.34
S2	S3	0.073	0.027	0.100	0.117	50.00	21.10	225	22	24.252	111.35	2.80	2.17	2.80	3.18	66.14	90.25
S3	S4	0.015	0.000	0.015	0.131	50.00	23.72	225	200	6.456	36.57	0.92	0.98	0.92	1.04	131.84	12.84
S4	S6	0.000	0.000	0.000	0.131	50.00	5.00	225	200	2.874	36.57	0.92	0.65	0.92	1.04	56.25	31.56

5.00 litres/sec achieved by means of a Hydrobrake

Alan Traynor Consulting Ltd Belturbet Business Park Belturbet Co. Cavan	Job Title	Barrack Road Kilnaleck	
		Revision	A
	Job No: 23.104	Page:	C/01
Section: **Attenuation tank**	Prepared By: JOR	Date:	18/10/2023

GENERAL DATA	
site location:	Ireland
60 min rainfall depth of 5 year return period 'R' *[mm]* =	16
M5-60 to M5-2d rainfall ratio 'r' =	0.30
proposed discharge rate 'v_1' *[litre/s]* =	5.00
proposed discharge rate 'v_2' *[litre/s]* =	5.00
allowance for climate change:	20%

SUMMARY OF CALCULATIONS		
required storage volume for discharge rate 'v_1' =	16.72	m^3
required storage volume for discharge rate 'v_2' =	27.37	m^3

AREA DATA		impermeability *[%]*	effective area *[m^2]*
impermeable area 'A_1' *[m^2]* =	1013	100.00	1013
landscaping and/or green roof area 'A_2' *[m^2]* =	0	25.00	0
other partially permeable area 'A_3' *[m^2]* =		50.00	0
AREA DRAINED TO ATTENUATION TANK =			**1013 m^2**

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_1

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D			M20-D			M30-D			outflow from attenuation tank *[m^3]*	required storage *[m^3]*
			Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*		
5	0.34	6.30	1.18	7.90	8.00	1.36	9.80	9.93	1.45	11.10	11.24	1.50	9.74
10	0.49	8.70	1.18	11.00	11.14	1.38	13.70	13.88	1.48	15.50	15.70	3.00	12.70
15	0.59	10.30	1.19	13.00	13.17	1.39	16.10	16.31	1.49	18.20	18.44	4.50	**13.94**
30	0.77	12.90	1.20	16.20	16.41	1.39	19.90	20.16	1.49	22.40	22.69	9.00	13.69
60	1.00	16.30	1.20	20.20	20.46	1.39	24.60	24.92	1.49	27.50	27.86	18.00	9.86
120	1.25	20.50	1.19	25.10	25.43	1.38	30.40	30.80	1.47	33.80	34.24	36.00	0.00
240	1.57	25.80	1.18	31.40	31.81	1.37	37.50	37.99	1.46	41.60	42.14	72.00	0.00
360	1.79	29.60	1.18	35.70	36.16	1.36	42.50	43.05	1.44	46.90	47.51	108.00	0.00
600	2.13	35.00	1.18	42.00	42.55	1.35	49.60	50.24	1.43	54.50	55.21	180.00	0.00
1440	2.86	47.00	1.16	55.60	56.32	1.31	65.00	65.85	1.39	71.00	71.92	432.00	0.00

** Z2 is a growth factor from M5 rainfalls*

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_2

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D			M30-D			M100-D			outflow from attenuation tank *[m^3]*	required storage *[m^3]*
			Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*		
5	0.34	6.30	1.18	7.90	8.00	1.45	11.10	11.24	1.89	15.80	16.01	1.50	14.51
10	0.49	8.70	1.18	11.00	11.14	1.48	15.50	15.70	1.94	22.10	22.39	3.00	19.39
15	0.59	10.30	1.19	13.00	13.17	1.49	18.20	18.44	1.97	26.00	26.34	4.50	21.84
30	0.77	12.90	1.20	16.20	16.41	1.49	22.40	22.69	1.98	31.40	31.81	9.00	**22.81**
60	1.00	16.30	1.20	20.20	20.46	1.49	27.50	27.86	1.97	38.10	38.60	18.00	20.60
120	1.25	20.50	1.19	25.10	25.43	1.47	33.80	34.24	1.93	46.10	46.70	36.00	10.70
240	1.57	25.80	1.18	31.40	31.81	1.46	41.60	42.14	1.88	55.80	56.53	72.00	0.00
360	1.79	29.60	1.18	35.70	36.16	1.44	46.90	47.51	1.85	62.40	63.21	108.00	0.00
600	2.13	35.00	1.18	42.00	42.55	1.43	54.50	55.21	1.81	71.80	72.73	180.00	0.00
1440	2.86	47.00	1.16	55.60	56.32	1.39	71.00	71.92	1.74	91.70	92.89	432.00	0.00

** Z2 is a growth factor from M5 rainfalls*

hrwallingford

Greenfield runoff ra estimation for site

www.uksuds.com | Greenfield runoff t

Calculated by:	Aodhagan O'Reilly
Site name:	Barrack Road Kilnaleck
Site location:	Cavan

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:	53.85783° N
Longitude:	7.318° W
Reference:	3050693747
Date:	Jun 07 2023 12:54

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	0.2597

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics

	Default	Edited
SAAR (mm):	1008	1008
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):	0.73	0.73
1 in 1 year (l/s):	0.62	0.62
1 in 30 years (l/s):	1.2	1.2
1 in 100 year (l/s):	1.41	1.41
1 in 200 years (l/s):	1.56	1.56

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 244924, Northing: 290018,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.5,	3.6,	4.2,	5.1,	5.8,	6.3,	7.9,	9.8,	11.1,	12.9,	14.6,	15.8,	17.8,	19.4,	20.7,	N/A ,
10 mins	3.4,	5.0,	5.8,	7.1,	8.0,	8.7,	11.0,	13.7,	15.5,	18.0,	20.3,	22.1,	24.9,	27.0,	28.8,	N/A ,
15 mins	4.0,	5.9,	6.9,	8.4,	9.4,	10.3,	13.0,	16.1,	18.2,	21.2,	23.9,	26.0,	29.2,	31.8,	33.9,	N/A ,
30 mins	5.3,	7.6,	8.8,	10.7,	11.9,	12.9,	16.2,	19.9,	22.4,	25.9,	29.0,	31.4,	35.2,	38.2,	40.6,	N/A ,
1 hours	6.9,	9.7,	11.3,	13.5,	15.1,	16.3,	20.2,	24.6,	27.5,	31.6,	35.2,	38.1,	42.4,	45.8,	48.6,	N/A ,
2 hours	9.1,	12.6,	14.4,	17.2,	19.1,	20.5,	25.1,	30.4,	33.8,	38.6,	42.8,	46.1,	51.1,	55.0,	58.2,	N/A ,
3 hours	10.6,	14.6,	16.7,	19.8,	21.9,	23.5,	28.6,	34.4,	38.1,	43.4,	48.0,	51.6,	57.0,	61.2,	64.6,	N/A ,
4 hours	11.9,	16.2,	18.5,	21.9,	24.1,	25.8,	31.4,	37.5,	41.6,	47.1,	52.0,	55.8,	61.6,	66.0,	69.7,	N/A ,
6 hours	14.0,	18.8,	21.4,	25.2,	27.6,	29.6,	35.7,	42.5,	46.9,	53.0,	58.3,	62.4,	68.7,	73.5,	77.4,	N/A ,
9 hours	16.4,	21.9,	24.8,	28.9,	31.7,	33.8,	40.7,	48.1,	52.9,	59.6,	65.4,	69.9,	76.6,	81.8,	86.0,	N/A ,
12 hours	18.3,	24.3,	27.4,	32.0,	35.0,	37.3,	44.6,	52.6,	57.7,	64.8,	70.9,	75.7,	82.8,	88.3,	92.7,	N/A ,
18 hours	21.5,	28.3,	31.7,	36.8,	40.1,	42.7,	50.7,	59.5,	65.1,	72.9,	79.6,	84.7,	92.4,	98.3,	103.1,	N/A ,
24 hours	24.0,	31.4,	35.2,	40.7,	44.3,	47.0,	55.6,	65.0,	71.0,	79.2,	86.3,	91.7,	99.8,	106.0,	111.1,	128.4,
2 days	29.7,	37.9,	42.0,	48.0,	51.8,	54.7,	63.8,	73.5,	79.7,	88.0,	95.2,	100.6,	108.7,	114.9,	119.9,	136.8,
3 days	34.6,	43.6,	48.0,	54.4,	58.5,	61.6,	71.2,	81.4,	87.8,	96.5,	103.9,	109.4,	117.7,	124.0,	129.1,	146.2,
4 days	39.1,	48.7,	53.5,	60.3,	64.6,	67.9,	78.0,	88.7,	95.3,	104.3,	111.9,	117.7,	126.2,	132.6,	137.8,	155.3,
6 days	47.3,	58.1,	63.5,	70.9,	75.7,	79.3,	90.4,	101.9,	109.0,	118.6,	126.8,	132.8,	141.9,	148.6,	154.1,	172.3,
8 days	54.8,	66.8,	72.6,	80.7,	85.9,	89.8,	101.6,	113.9,	121.6,	131.7,	140.3,	146.7,	156.2,	163.2,	168.9,	187.9,
10 days	62.0,	74.9,	81.2,	89.9,	95.4,	99.5,	112.2,	125.2,	133.2,	143.9,	152.9,	159.6,	169.5,	176.9,	182.8,	202.5,
12 days	68.9,	82.7,	89.4,	98.6,	104.5,	108.9,	122.2,	135.9,	144.3,	155.5,	164.9,	171.9,	182.2,	189.8,	196.0,	216.4,
16 days	82.0,	97.5,	105.0,	115.2,	121.7,	126.5,	141.1,	156.1,	165.2,	177.3,	187.4,	194.9,	205.9,	214.1,	220.7,	242.3,
20 days	94.6,	111.7,	119.8,	131.0,	138.0,	143.2,	159.0,	175.0,	184.8,	197.8,	208.5,	216.5,	228.2,	236.9,	243.8,	266.6,
25 days	109.9,	128.8,	137.7,	149.9,	157.6,	163.2,	180.3,	197.7,	208.2,	222.0,	233.6,	242.1,	254.5,	263.7,	271.1,	295.3,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

Appendix B – Hydrobrake & Attenuation Tank details

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.600	5.000
Flush-Flo™	0.193	4.994
Kick-Flo®	0.428	4.280
Mean Flow		4.210

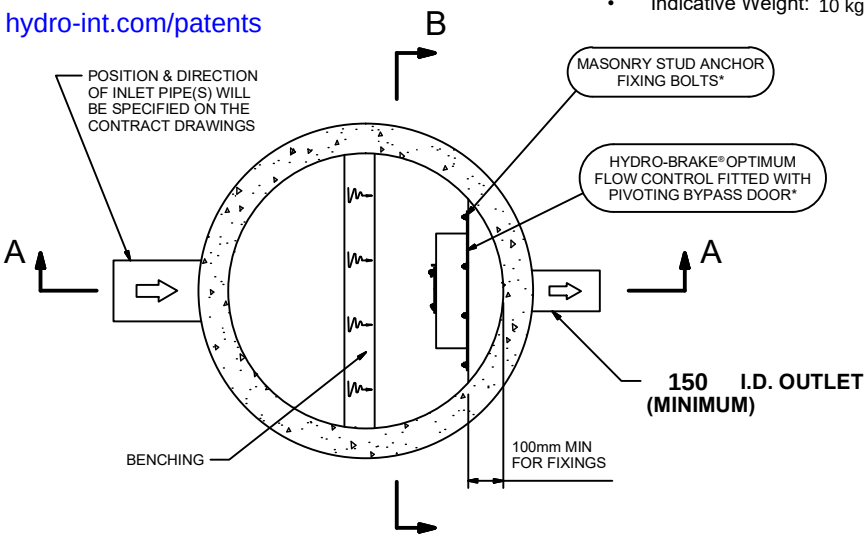
Hydro-Brake® Optimum Flow Control including:

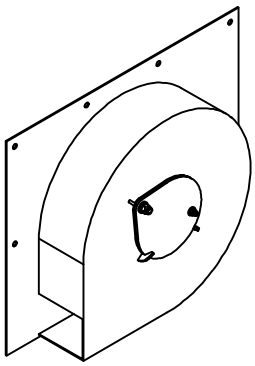
- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 10 kg

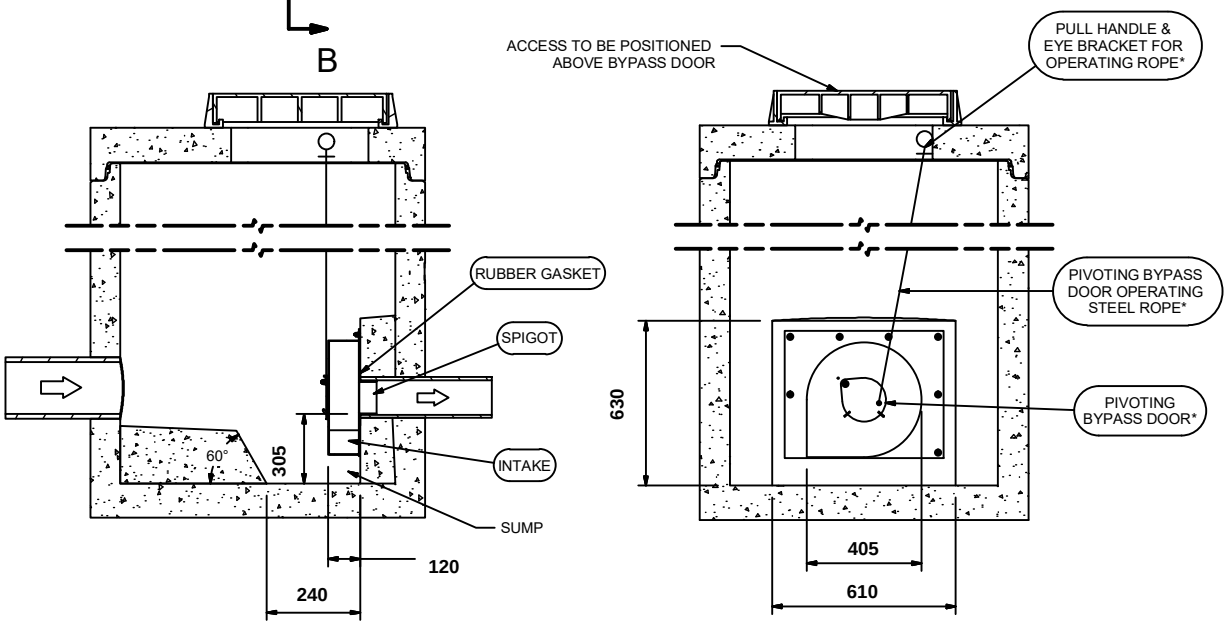
BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

wrc approved PT/503/0422 Valid: 01/04/2022 - 31/03/2027

hydro-int.com/patents







SECTION A-A

SECTION B-B

IMPORTANT:
LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

The head/flow characteristics of this SHE-0111-5000-0600-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International®

DATE	05/07/2023 10:32
SITE	Barrack St Kilnaleck
DESIGNER	Liam McElgunn
REF	23.104

SHE-0111-5000-0600-5000
Hydro-Brake® Optimum

Hydro International Ltd • Unit 2, Rivermead Court • Kenn Business Park • Windmill Road • Kenn • Clevedon • BS21 6FT • Tel: 01275 878371 • www.hydro-int.com • Email: Enquiries@hydro-int.com

liam@alantraynor.com

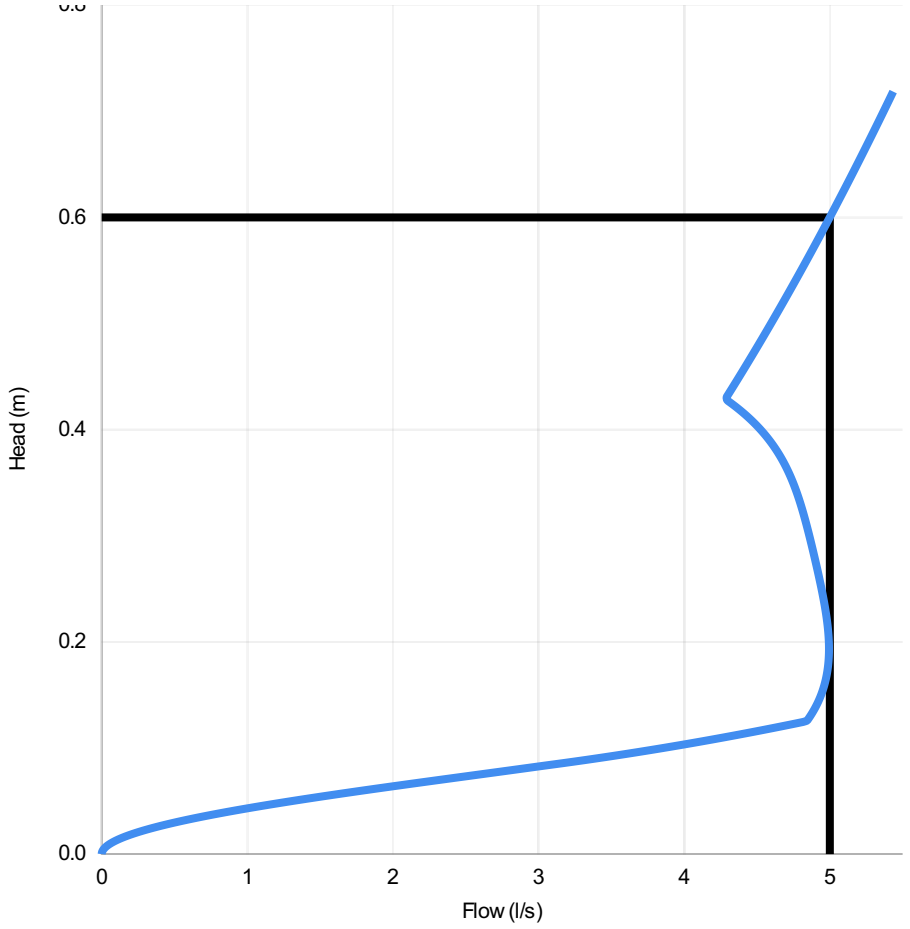
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.600	5.000
Flush-Flo	0.193	4.994
Kick-Flo®	0.428	4.280
Mean Flow		4.210

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

wrc approved™
PT/503/0422
Valid: 01/04/2022 - 31/03/2027

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.021	0.249
0.041	0.927
0.062	1.903
0.083	3.007
0.103	4.004
0.124	4.811
0.145	4.924
0.166	4.974
0.186	4.993
0.207	4.990
0.228	4.973
0.248	4.945
0.269	4.913
0.290	4.878
0.310	4.840
0.331	4.796
0.352	4.742
0.372	4.670
0.393	4.567
0.414	4.422
0.434	4.308
0.455	4.401
0.476	4.492
0.497	4.581
0.517	4.668
0.538	4.753
0.559	4.837
0.579	4.919
0.600	4.999

DESIGN ADVICE

The head/flow characteristics of this SHE-0111-5000-0600-5000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

! **The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

Hydro International®

DATE	05/07/2023 10:32
Site	Barrack St Kilnaleck
DESIGNER	Liam McElgunn
Ref	23.104

SHE-0111-5000-0600-5000

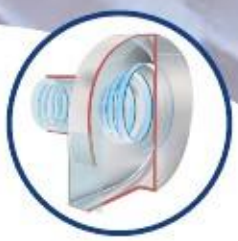
Hydro-Brake Optimum®

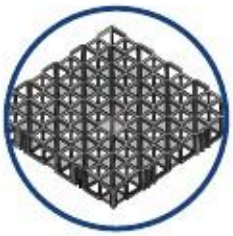
Modular Geo-Void Systems

Total Water Management

ESS EcoCell

Ecological Tank Systems





ENVIRONMENTAL SUSTAINABLE SOLUTIONS LTD

Environmental Sustainable Solutions

Welcome to Environmental Sustainable Solutions; specialist suppliers and designers of geocomposites and water re-use systems. Environmental Sustainable Solutions can help you achieve innovative results for all your requirements:-

- Stormwater Management
- Gas Barrier Protection
- Stormwater Attenuation
- Contaminated Land Development
- Stormwater Drainage
- Ground Stabilisation
- Rainwater Recycling Management
- Structural Waterproofing
- Gas Venting Systems
- Damp-proofing projects

Over the last 12 years Environmental Sustainable Solutions, and associated companies, have designed and installed thousands of water recycling, drainage and attenuation tank systems for schools, car parks, retail parks, offices and sports arenas throughout Ireland, UK, Europe and the Middle East.

Our wide range of environmental protection products, surface water drainage modules and modular water storage tank systems provides maximum design flexibility for engineers and architects working on even the most demanding of storm water storage and recycling projects.

Stormwater Management And Design

Stormwater is the phrase used to describe the excess rainwater that flows from rooftops, roads, car parks and other buildings. This water can contain many pollutants picked up from roofs and highways. In extreme weather conditions sudden heavy downpours of rain can cause major environmental disasters. Using our Rainmanager products; stormwater can not only safely be removed, but it can be stored and recycled for commercial and domestic use.

How it works - ESS Attenuation Tank

Stormwater enters the attenuation tank via the inlet manhole, which incorporates a silt collection sump and a galvanised leaf collection basket. Water passes through the tank and exits through the outlet manhole, which contains an AquaBrake flow control device.
This flow control device regulates the release rate of water from the tank, and in so doing, enables the tank to fill. As a result of water entering the tank at a greater rate than it can exit, the void space then fills with water. While the tank fills, air is vented from the tank.
The Inlet/Outlet pipe will act as a flushing channel. This perforated pipe is wrapped completely in High Flow Filtering Geotextile, which prevents silt entering the block area. As the tank continues to empty at a pre-determined rate, air re-enters the tank via the same air vent system. The roof of the completed tank must be lower than the lowest gully trap on site.

Benefits

- 100% sealed tank
- Full installation service provided
- 12 years experience as market leader
- Quick installation – reduce site access delays
- Increased land usage – tanks are sub surface
- Economical – generally more cost efficient than any other equivalent sealed tank
- Cost effective – reduced costs for excavation and disposal of material
- Modular – easy to create any shape
- Strong – designed to support shear loading
- Lightweight – no cranes required
- Determinate volume – one cubic metre of matrix tank modules contain 950 litres of water, whereas stone fill will only provide 300 litres of storage per cubic metre.

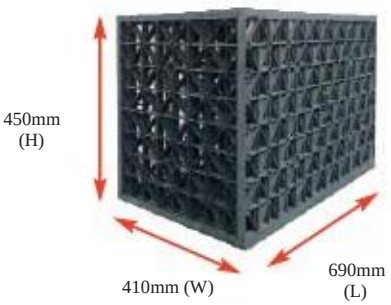
Soakaway

The soakaway is normally best built as a long narrow structure.
The inlet pipe comes in at roof level and faces downwards so that the water can percolate into the tank.
The blocks are wrapped in Geotextile, to protect them and also to keep clay from filling up the void.
An air vent pipe is installed on the highest point with a cowl on top or vented back to an inlet manhole.
There is no outlet from a soakaway, therefore no flow control unit is required.

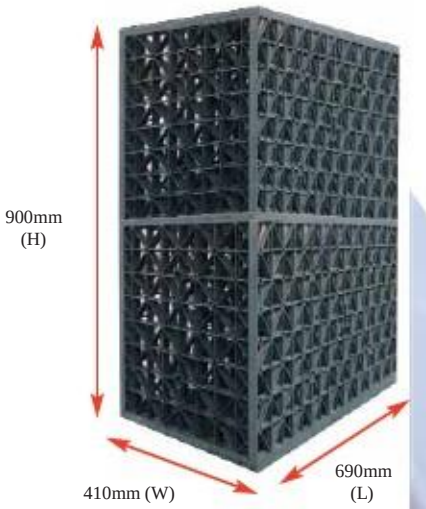
Protecting the Environment

Stormwater Storage Tank

SUITABLE FOR USE UNDER:
- Roadways
- Car parks
- Green areas



Single
8 Modules/m3
Flowrate - 2300 I/min



Double
4 Modules/m3
Flowrate - 4600 I/min

Triple
2.6 Modules/m3
Flowrate - 6900 I/min

Notes:
Blocks must be positioned in the correct orientation.
See opposite above

SPECIFICATION (SINGLE)

Weight (maximum)	9.17kg
Crush Strength (up to)	400kN/m2
Lateral Strength	80kN/m2
Minimum Cover (green areas)	500mm
(trafficked areas)	650mm
Maximum Cover	3m
Material	Polypropylene
Void Ratio (Internal)	>95%

Design Requirements:

Tank storage capacity (m3)
Depth restrictions
Location (Road, Car Park, Green Area)
Design constraints on site

A set of loading calculations specific to the site requirement will be done by ESS and submitted on all tanks

DESIGN CRITERIA

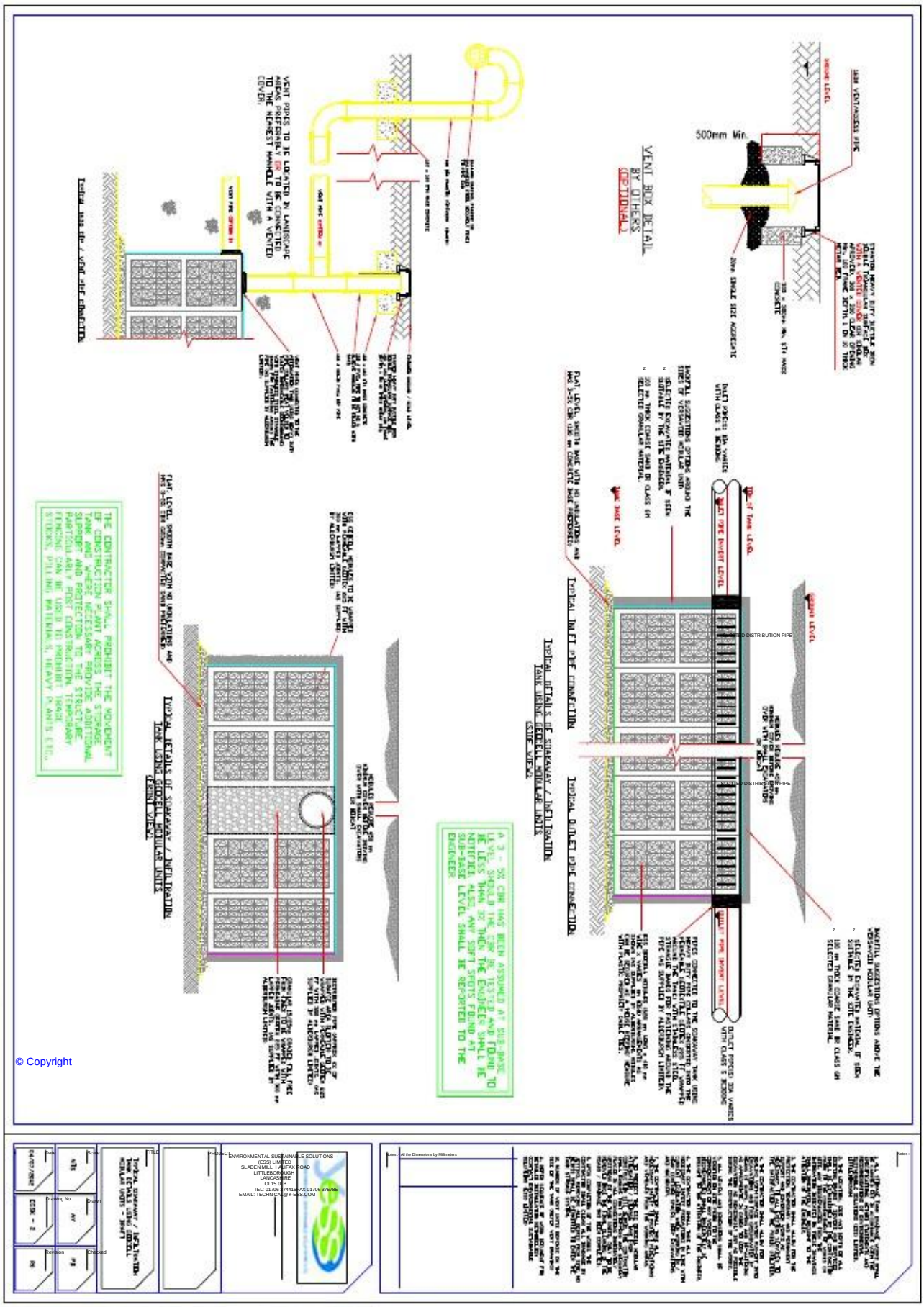
The attenuation tank is constructed using matrix module blocks. These blocks can take passing loads of up to 40 tonnes/m2. The void ratio of each block is 95%. The blocks are made from polypropylene.

The tank is sealed with a layer of Tuflex membrane, which is fully welded together to form a 100% seal. All pipe penetrations are fully sealed to the membrane. The Tuflex membrane is protected by a layer of heavy duty protection geotextile, to prevent damage from construction or backfilling. A number of air extraction vents/flushing points are placed in the roof of the tank.

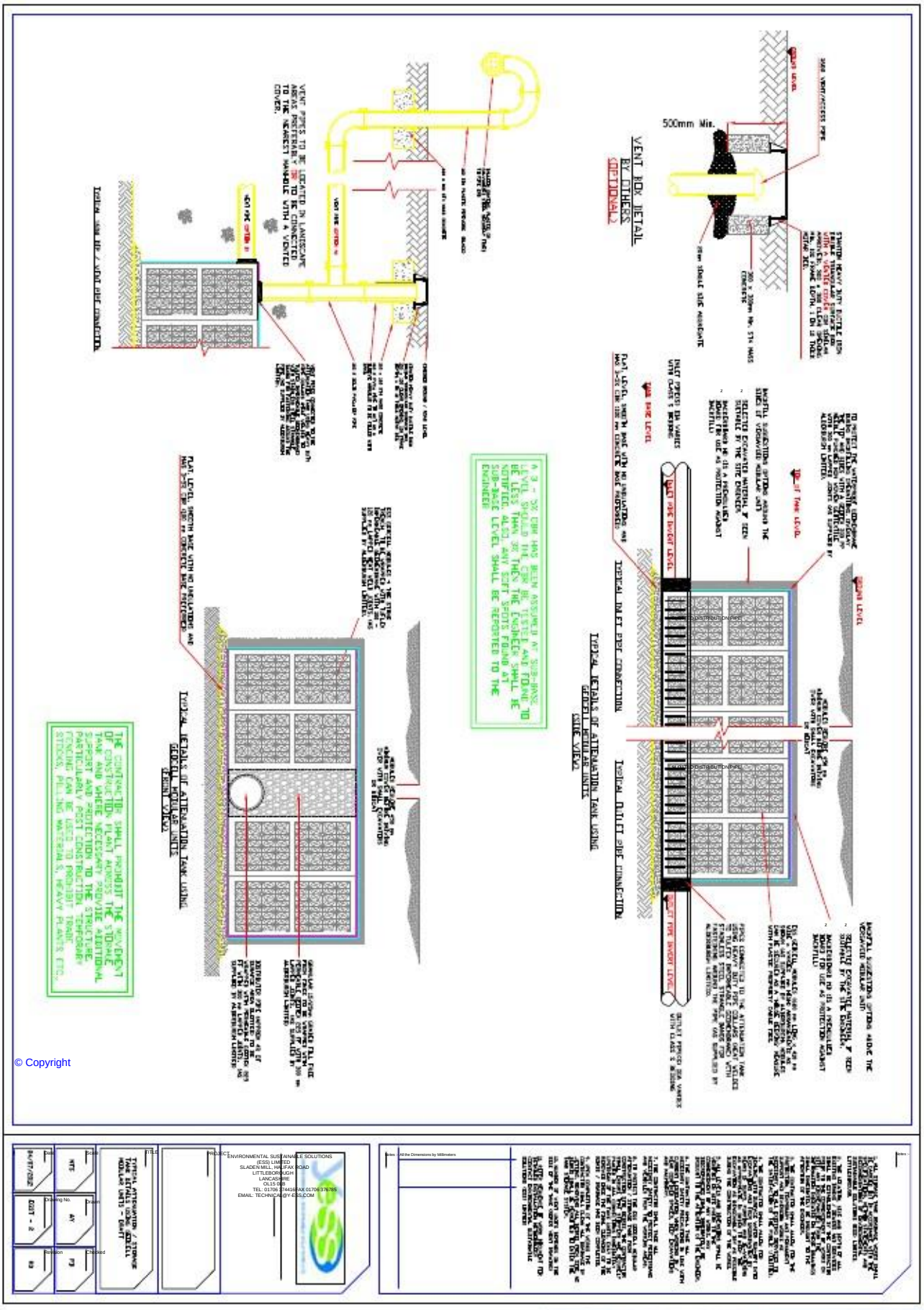
Note:
It is vital that the underground tanks are fully sealed, otherwise ground water and silt particles may enter the void space and use up capacity. Preferably, the base of the tank should be 500mm above the ground water level. Otherwise ground water relief measures should be implemented.

Infiltration System

Typical arrangement using ESS Ecological Tank System for water quality



Typical on site collection and recycling arrangement using ESS Ecological Tank System



Infiltration Swales & Underground Channels

Please refer to separate data sheets for the following products

Modular VersaVoid System

Benefits

Quick
Reduce site access delays

Lightweight
No cranes required

Strong
Designed for maximum anticipated loads

Maintenance Free Tank
All debris and sediment is pre-filtered

Determinate Volume
One cubic metre of Tank modules contain 950 litres of water

Cost Effective
Reduces excavation and disposal by up to 5 x compared with conventional soak wells

High Infiltration
98% void surface area

Totally Modular
For greatest flexibility designed to cope. Units start at 300mm deep for shallow inverts to 3050mm+ deep in 250mm increments.

Designed by Engineers for Engineers – to specify with confidence.

Designing out Problems
with such systems (access, maintenance, loading etc.)

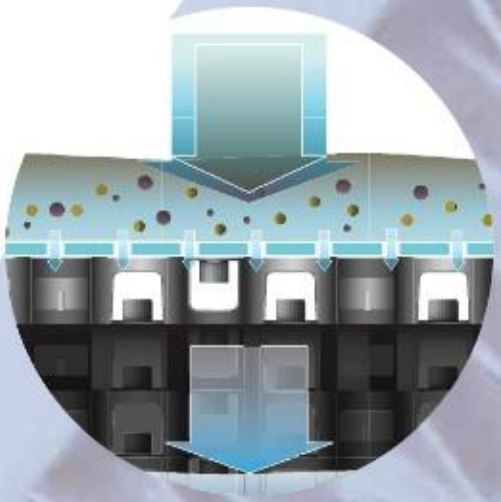
Designing in Answers
to design requirements.

Total 3D Access
For total maintenance with total confidence.

Structurally Designed
with built in safety factor to carry all loads with complete confidence.
16 clear vertical access chambers per m2.

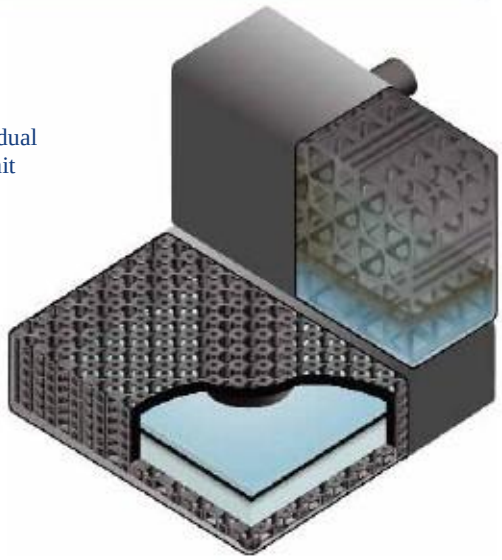
Total Void Creation
With the greatest strength from any modular systems.

Oil Filtration

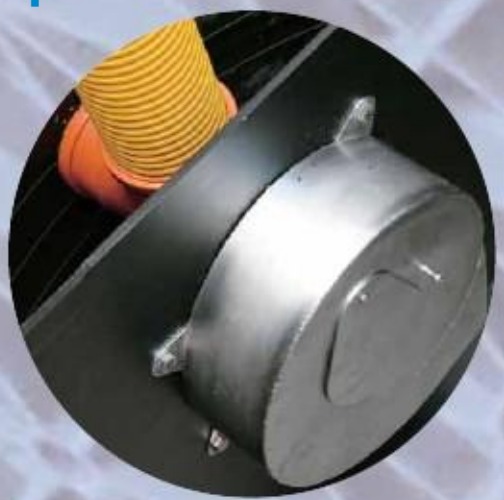


Benefits

- Source control designed to handle catastrophic spillages
- Capture, filter and break down residual hydrocarbons - all in one compact unit
- Self-maintaining ecosystems decompose hydrocarbon compounds and clean filters
- Load bearing, modular components provide up to 200t/m² loading capacity

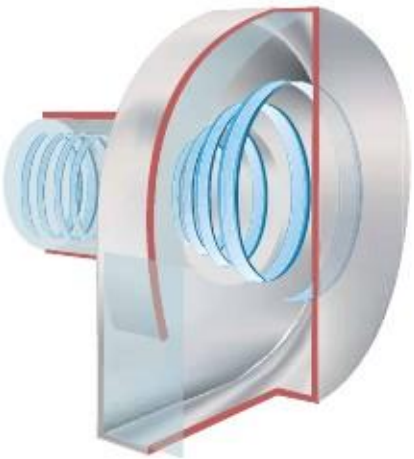


Aquabrake



Benefits

- Cost Savings
  Can reduce upstream storage requirements by up to 30%.
- Durability
  Corrosion resistant stainless steel.
- No energy requirements
  Self-activating solution with no moving parts.
- Clog Resistant
  AquaBrake design prevents blockages likely to occur in traditional orifices.
- Flexible Design
  Several options for attachment available.



The ESS CombiSwale

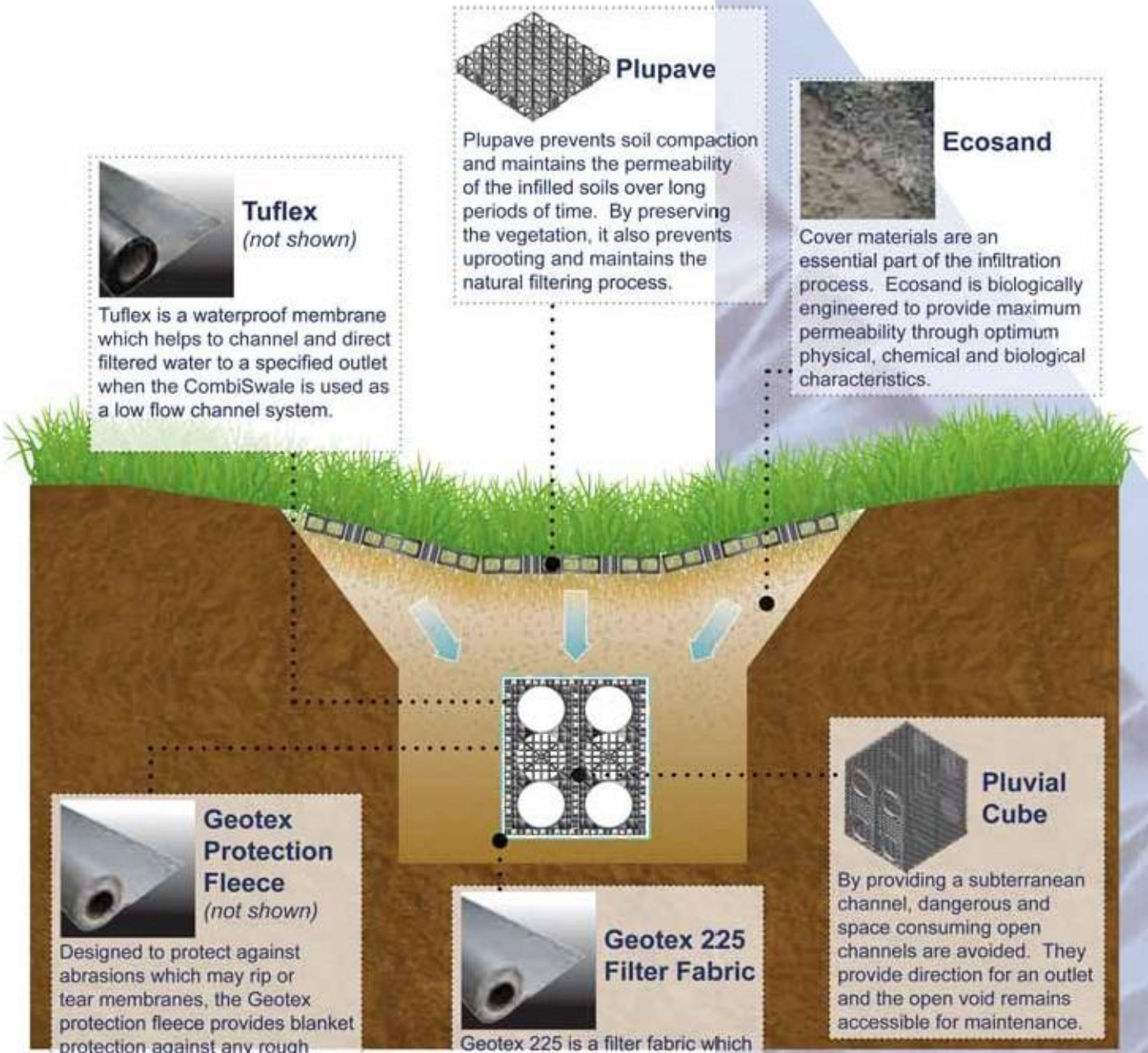
Please refer to separate data sheets for the following products

Water Sensitive Urban Channels

Surface and Sub-Surface Water Treatment

By combining surface and sub-surface channeling and treatment solutions, ESS has created the ideal in bioswale water management.

The CombiSwale system includes the addition of permeable sub-surface waterways that further restore water quality and recharge the natural environment. The sub-surface ESS channel system provides a unique way of working with nature to solve the enormous problems currently associated with open concrete channels and swales.



All products are manufactured to the highest quality, being subject to rigid quality control. However, the company cannot control conditions of application and use of its products, thus any warranty, written or implied, is given in good faith for materials only. ESS Ltd will not accept any responsibility for damage or injury arising from storage handling, misapplication or misuse of its products All transactions are subject to our standard condition of sale, copies of which are available on request.

-

Appendix C – Foul Water Calculations

Foul sewer loadings for Development at Barrack Road, Kilnaleck, Co. Cavan

DATA							SEWER DESIGN Ks = 1.50										
SEWER REFERENCE From Manhole	To Manhole	HOUSES No.	UNITS/ HOUSE No.	UNITS No.	TOTAL UNITS l/s	TOTAL FLOW l/s	Size of drain (mm)	Gradient (1 in x)	Length (m)	Capacity (l/sec)	Pipe full Velocity (m/sec)	Actual Velocity (m/sec)	Half full velocity (m/sec)	Self cleansing at half full	Max Velocity (m/sec)	Depth of flow (mm)	Reserve capacity (l/sec)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
F1	F2	1	14	14	14	2.586	150	20.0	24.057	34.715	1.964	1.141	1.964	OK	2.240	28.125	32.129
F2	F3	3	14	42	56	3.487	150	20.0	17.407	34.715	1.964	1.249	1.964	OK	2.240	32.227	31.228

Unit 6
Belturbet Business Park
Creeny
Belturbet
Co. Cavan
H14AY93

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E: info@alantraynor.com
W: www.alantraynor.com

Bond House
9-10
Lower Bridge St
Dublin 8
D08TH76

T: +353 1 9697881
E: dublin@alantraynor.com
W: www.alantraynor.com

Alan Traynor
Consulting Engineers Ltd.

Foul Discharge Design Calculations

The following calculations are in accordance with Appendix C 'Wastewater Flow Rates for Design' of Irish Water Code of Practice for Wastewater Infrastructure. (IW-CDS_5030-03)

Domestic Dwelling - Flow Rate = 150 litres/occupant/day

Peak Design Flow Rate = 6 x Domestic Flow Rate

Project Name:	Barrack St Kilnaleck
Project Number:	23.104

1 Bed Unit = Max	2	persons
2 Bed Unit = Max	3	persons
3 Bed Unit = Max	5	persons
4 Bed Unit = Max	6	persons

1 Bed Units =	0	
Flow Rate =	0.0000	l/s per unit
Peak Design Flow Rate =	0.0000	l/s per unit
Total Flow from 0 Units =	0.000	l/s

2 Bed Units =	4	
Flow Rate =	0.0052	l/s per unit
Peak Design Flow Rate =	0.0313	l/s per unit
Total Flow from 4 Units =	0.125	l/s

3 Bed Units =	0	
Flow Rate =	0.0000	l/s per unit
Peak Design Flow Rate =	0.0000	l/s per unit
Total Flow from 0 Units =	0.000	l/s

4 Bed Units =	0	
Flow Rate =	0.0000	l/s per unit
Peak Design Flow Rate =	0.0000	l/s per unit
Total Flow from 0 Units =	0.000	l/s

Total Flow From Development (4 Units)(12 Persons) = 1800 litres or 1.8 m^3/day

Peak Design Flow Rate = 0.125 l/s

Average Discharge = 0.0208 l/s

-

Appendix D – Irish Water Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

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

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

Marc McBride

Belturbet Business Park
Creeny
Belturbet
Cavan

27 April 2023

Our Ref: CDS23002483 Pre-Connection Enquiry
Barrack Road, Kilnaleck, Cavan, Co. Cavan

Dear Applicant/Agent,

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

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 6 unit(s) at Barrack Road, Kilnaleck, Cavan, Co. Cavan, (the **Development)**.

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

- **Water Connection**
  - Feasible without infrastructure upgrade by Irish Water
  - Please note, while flows in excess of your required demand may be achieved in the Irish Water network and could be utilised in the event of a fire, Irish Water cannot guarantee a flow rate to meet your fire flow requirement. To guarantee a flow to meet the Fire Authority requirements you should provide adequate fire storage capacity within your development.

- **Wastewater Connection**
  - Feasible without infrastructure upgrade by Irish Water

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water 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 Irish Water.

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/

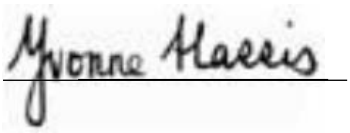
Where can you find more information?

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

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

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

Yours sincerely,



Yvonne Harris
Head of Customer Operations

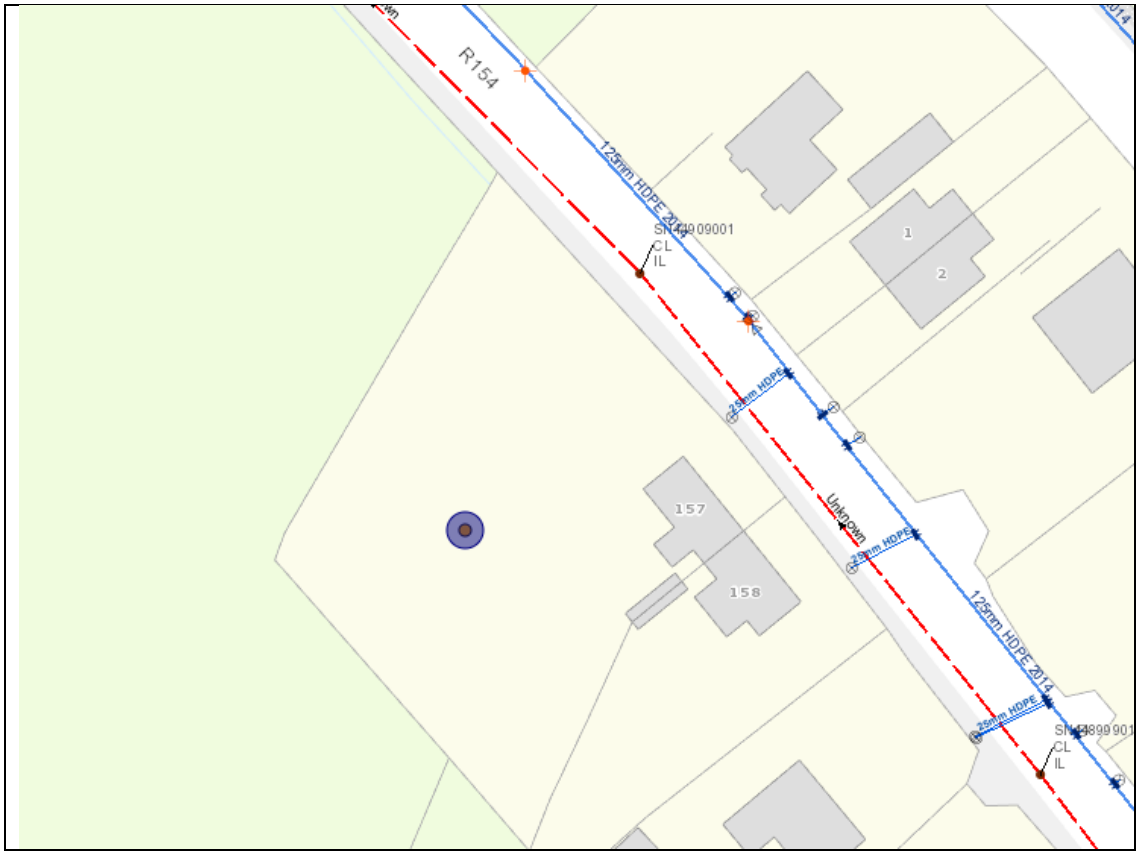
Section A - What is important to know?

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 Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application and be granted and sign a connection agreement with Irish Water.
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?	• Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. *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 Irish Water's network(s)?	• Requests for maps showing Irish Water'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 ***the Irish Water Connections and Developer Services Standard Details and Codes of Practice,*** 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)

Section B – Details of Irish Water's Network(s)

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



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

Note: The information provided on the included maps as to the position of Irish Water's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water's network(s), Irish Water 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 Irish Water's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water'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.