KAVANAGH BURKE
CONSULTING ENGINEERS

Drainage Design Report

for

Residential Development

at

Neilstown Road,
Dublin 22

Job No:	**D1691**
Architect:	**John O'Neill & Associates Architects & Interior Designers Ltd.**
Date:	**March 2020**
Local Authority:	**South Dublin County Council**
Revision:	**PL1**




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Site Overview:

The site is located on the corner of Neilstown Road and Collinstown Road in Dublin 22. It is proposed to redevelop the existing site of Finches pub and off licence into a mixed use development containing new ground floor commercial unit, total number of 29 apartments and undercroft car parking.

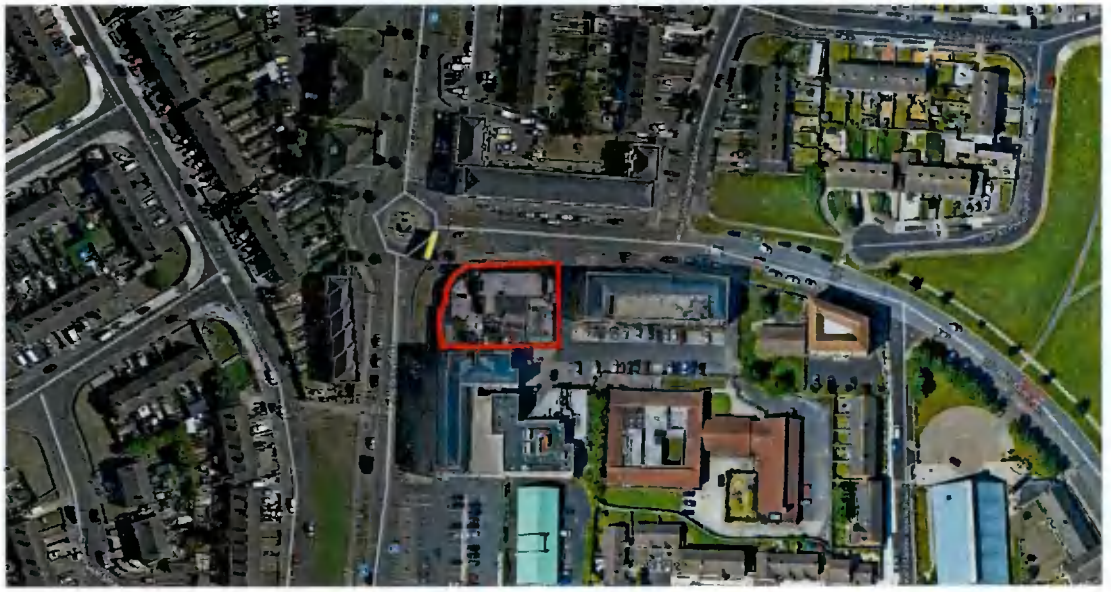


Fig 1: Site Location

Vehicular Access:

Vehicular access to the site is from Collinstown Road.

Existing & Proposed Drainage & Watermain:

Watermain:

The current Local Authority records show an existing 110mm diameter watermain spur off the 12" WM in Neilstown Road serving the site. A pre-connection enquiry was submitted to Irish Water and in the response we have received a "Confirmation of Feasibility" letter (see Appendix D) stating that the proposed development can be facilitated without any additional works to the local WM and Foul sewer networks. The watermain layout drawing provided as part of the planning submission indicates the proposed location of connection to the existing watermain spur and relocation of two sections of 100dia watermain to maintain 3m separation distance between the proposed structure and IW assets.

Foul Drainage:

Irish Water in their "Confirmation of Feasibility" letter advised that a new foul sewer connection will have to be made to an existing 225mm diameter foul sewer located on the north side of Collinstown Road. The drainage layout drawing D1691-D1-Rev PL1 shows the proposed gravity discharge pipe serving the proposed development connecting to this foul sewer.

It is not envisaged that the internal network in the undercroft car parking will be taken in charge by the Local Authority however the foul sewer design will demonstrate design compliance with the relevant design codes including the minimum self-cleansing velocities of 0.75m/sec.

The "Confirmation of Feasibility" letter can be found in Appendix C.

Surface Water Drainage:

There is an existing 225mm diameter surface water drain located in the footpath of Collinstown Road. The drainage layout drawing D1691-D1-PL1 shows the restricted surface water connection from the proposed development to a new manhole on the aforementioned storm water line.

The surface water drainage design for the site will comply with the GDSDS with an allowable discharge to the public system restricted to Greenfield Runoff Rate QBAR for the site as calculated in this report. The flow restriction will be achieved by providing a flow control device (Hydrobrake or similar) on the outfall from the attenuation tank.

Due to the nature of this brown field site and the proposed high density development with car park underneath, attenuation ponds and storm water disposal through soakage in swales or wetlands are not applicable. Notwithstanding this we are proposing the alternative SUDS items forming a complete storm water runoff management train.

The treatment train approach was applied to both the storm water network and the attenuation design to ascertain that both runoff quality and quantity are appropriately addressed. An array of techniques was used to fulfil requirements of each element of the treatment train:

- Pollution prevention – to prevent chemicals and other pollutants from contaminating the rainfall runoff, maintenance regime for the estate will be established and it will include regular sweeping of the car park and collection of rubbish. Provided waste bins will be sheltered to prevent the rainfall flushing the contaminants out of them.

- Source control and site control – to detain and infiltrate the runoff as close as possible to the point of origin and to deal with as much of the runoff as possible on site an "extensive" sedum type green roof is proposed to the roof of the apartment block. This will be made up of fabric mats sown with sedum planting. This roof type allows for storm water interception and disposal through transpiration and evaporation. In addition to quantity reduction, the green roofs will improve the quality of the runoff and will become a wildlife habitat, improve biodiversity and boost the environmental credentials of the development. According to CIRIA 697 SUDS Manual, typical green roofs should attenuate storms up to a two-year return period event.

- Regional control – to mimic the behaviour of the green field site and protect the receiving watercourse, the attenuation tank is designed to cater for all durations of rainfall up to 100 years return period. The design up to 100 years return will minimise the flooding potential of the receiving watercourse and other watercourses within this catchment. The storm water network and the proposed attenuation storage was checked in the drainage modelling and analysis computer software and no flooding on site was indicated for all storms up to 100 years return period of all durations with 20% CCF. The results of both 30 and 100 years storm analysis can be found in Appendices of this report.

Flood Risk Assessment:

A desktop study carried out by Kavanagh Burke engineers did not show any pluvial or fluvial flood risks. The closest watercourse (Grand Canal) is located 1.7km to the south and the closest river (Liffey) is located in the valley 1.8km to the north from the subject site. No past single or recurring flood events were indicated within 1km of the site. Flood maps are available at floodinfo.ie website.

- **Catchment Green Field Runoff Calculations**

Surface Water Attenuation Calculations:

1) Underground Attenuation Catchment

The design areas or the catchment are as follows:

Catchment Area:	1267m^2 (0.127 ha)
Total Impermeable Areas:	1132m^2
Landscaping Areas:	135m^2

2) Interception Storage

Interception storage accommodating the first 5mm of every rainfall from the proposed development will be provided within the Extensive Green Roof substrate installed on the roof of the proposed apartment block. The maximum water capacity of vegetation substrates in their installed state is approx. 35% (according to the green roof manufacturer's specification) providing interception of smaller rainfall events. According to CIRIA 697 SUDS Manual, typical green roofs should attenuate storms up to a two-year return period event.

The soft landscaping albeit being a small percentage of the site will also be a source of rainfall infiltration.

3) Greenfield Runoff Rate – QBAR, (mean annual flood flow):

Catchment Area: 0.127ha

$QBAR_{rural}$ (m^3/sec) = $0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$

SAAR (307000E, 234000N): 769 mm (as per Met Eireann data)

Soil Index:
S1 (very low runoff)
S2
S3 (moderate runoff)
S4
S5 (very high runoff)

$Soil = 0.1(Soil_1) + 0.3(Soil_2) + 0.37(Soil_3) + 0.47(Soil_4) + 0.53(Soil_5)$

As the site is relatively small in catchment terms the soil class will be 100% $Soil_2$
(as per uksuds.com greenfield runoff estimation tool)

Soil Class:	$Soil_2$
Runoff Potential:	Moderate to high
SPR Value:	0.3

QBAR:

As the site area is less than 50 hectares;

QBAR for 50 hectares is firstly calculated,

QBAR (m^3/sec) = $0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$
$0.00108 \times (0.5)^{0.89} \times (769)^{1.17} \times (0.3)^{2.17}$
101.72 l/sec
2.034 l/sec/Ha

QBAR for the smaller area (i.e. the subject site area):

2.034 l/sec/Ha x 0.127 Ha
0.26 l/sec

Due to the size of the orifice and potential blockage issues the minimum achievable hydrobrake flow is 2.0l/s therefore the QBAR will be set as 2.0 l/s

QBAR = 2.0 l/s

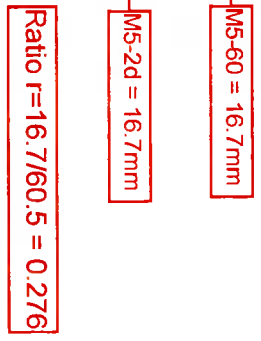
4) Attenuation storage volume

Refer to Appendix A for detailed storm water network modelling and attenuation storage volume check with a specific Hydrobrake flow control device included in the analysis.

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 306750, Northing: 233880,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.3,	3.5,	4.1,	5.0,	5.7,	6.2,	8.0,	10.1,	11.5,	13.5,	15.3,	16.8,	19.0,	20.8,	22.3,	N/A ,
10 mins	3.2,	4.8,	5.7,	7.0,	8.0,	8.7,	11.2,	14.1,	16.0,	18.8,	21.4,	23.3,	26.5,	28.9,	31.0,	N/A ,
15 mins	3.8,	5.7,	6.7,	8.3,	9.4,	10.2,	13.1,	16.5,	18.8,	22.1,	25.1,	27.5,	31.1,	34.0,	36.5,	N/A ,
30 mins	5.0,	7.4,	8.7,	10.7,	12.0,	13.1,	16.7,	20.8,	23.6,	27.6,	31.2,	34.0,	38.3,	41.8,	44.7,	N/A ,
1 hours	6.7,	9.6,	11.2,	13.7,	15.4,	16.7,	21.1,	26.2,	29.5,	34.3,	38.6,	42.0,	47.2,	51.3,	54.7,	N/A ,
2 hours	8.8,	12.6,	14.6,	17.7,	19.8,	21.4,	26.8,	32.9,	37.0,	42.7,	47.9,	51.9,	58.1,	63.0,	67.0,	N/A ,
3 hours	10.4,	14.7,	17.0,	20.5,	22.9,	24.7,	30.8,	37.6,	42.2,	48.6,	54.3,	58.8,	65.6,	71.0,	75.4,	N/A ,
4 hours	11.6,	16.4,	18.9,	22.7,	25.3,	27.4,	33.9,	41.4,	46.3,	53.2,	59.4,	64.2,	71.6,	77.3,	82.0,	N/A ,
6 hours	13.7,	19.1,	22.0,	26.4,	29.3,	31.6,	39.0,	47.3,	52.8,	60.5,	67.4,	72.7,	80.8,	87.1,	92.3,	N/A ,
9 hours	16.1,	22.3,	25.6,	30.6,	33.9,	36.5,	44.8,	54.1,	60.2,	68.8,	76.4,	82.3,	91.3,	98.2,	103.9,	N/A ,
12 hours	18.1,	24.9,	28.6,	34.0,	37.6,	40.4,	49.4,	59.5,	66.1,	75.4,	83.5,	89.8,	99.5,	106.9,	113.1,	N/A ,
18 hours	21.3,	29.1,	33.3,	39.4,	43.4,	46.6,	56.8,	68.1,	75.4,	85.7,	94.8,	101.7,	112.3,	120.5,	127.3,	N/A ,
24 hours	23.9,	32.5,	37.0,	43.7,	48.2,	51.6,	62.6,	74.9,	82.8,	93.9,	103.6,	111.1,	122.5,	131.2,	138.5,	163.5,
2 days	29.8,	39.6,	44.6,	51.9,	56.8,	60.5,	72.3,	85.2,	93.5,	104.9,	114.8,	122.4,	133.9,	142.7,	149.9,	174.7,
3 days	34.6,	45.2,	50.7,	58.6,	63.7,	67.7,	80.1,	93.6,	102.3,	114.1,	124.4,	132.1,	143.9,	152.9,	160.2,	185.2,
4 days	38.8,	50.2,	56.0,	64.3,	69.8,	73.9,	87.0,	101.1,	110.0,	122.2,	132.7,	140.7,	152.8,	161.9,	169.3,	194.7,
6 days	46.1,	58.8,	65.2,	74.3,	80.3,	84.8,	98.9,	113.9,	123.4,	136.3,	147.3,	155.7,	168.2,	177.7,	185.4,	211.5,
8 days	52.6,	66.4,	73.3,	83.1,	89.5,	94.3,	109.2,	125.1,	135.0,	148.5,	160.1,	168.7,	181.7,	191.5,	199.5,	226.3,
10 days	58.5,	73.3,	80.7,	91.1,	97.8,	102.8,	118.6,	135.2,	145.6,	159.6,	171.5,	180.5,	193.9,	204.0,	212.2,	239.7,
12 days	64.0,	79.8,	87.5,	98.5,	105.5,	110.8,	127.2,	144.5,	155.3,	169.8,	182.1,	191.4,	205.1,	215.5,	223.9,	252.0,
16 days	74.3,	91.6,	100.1,	112.0,	119.6,	125.4,	143.0,	161.4,	172.9,	188.3,	201.3,	211.0,	225.5,	236.4,	245.1,	274.4,
20 days	83.9,	102.6,	111.7,	124.4,	132.6,	138.6,	157.4,	176.8,	188.9,	205.0,	218.7,	228.8,	243.9,	255.2,	264.3,	294.6,
25 days	95.0,	115.3,	125.1,	138.8,	147.5,	154.0,	173.9,	194.6,	207.3,	224.3,	238.6,	249.2,	265.0,	276.7,	286.2,	317.7,

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



- **Specification/Product Information for;**

  a) Petrol Interceptor

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Separators

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Surface water drains normally discharge to a watercourse or indirectly into underground waters (groundwater) via a soakaway. Contamination of surface water by oil, chemicals or suspended solids can cause these discharges to have a serious impact on the receiving water.

The Environment Regulators, Environment Agency, England and Wales, SEPA, Scottish Environmental Protection Agency in Scotland and Department of Environment & Heritage in Northern Ireland, have published guidance on surface water disposal, which offers a range of means of dealing with pollution both at source and at the point of discharge from site (so called 'end of pipe' treatment). These techniques are known as 'Sustainable Drainage Systems' (SuDS).

Where run-off is draining from relatively low risk areas such as car-parks and non-operational areas, a source control approach, such as permeable surfaces or infiltration trenches, may offer a suitable means of treatment, removing the need for a separator.

Oil separators are installed on surface water drainage systems to protect receiving waters from pollution by oil, which may be present due to minor leaks from vehicles and plant, from accidental spillage.

Effluent from industrial processes and vehicle washing should normally be discharged to the foul sewer (subject to the approval of the sewerage undertaker) for further treatment at a municipal treatment works.

SEPARATOR STANDARDS AND TYPES

A British (and European) standard (EN 858-1 and 858-2) for the design and use of prefabricated oil separators has been adopted. New prefabricated separators should comply with the standard.

SEPARATOR CLASSES

The standard refers to two 'classes' of separator, based on performance under standard test conditions.

CLASS I

Designed to achieve a concentration of less than 5mg/l of oil under standard test conditions, should be used when the separator is required to remove very small oil droplets.

CLASS II

Designed to achieve a concentration of less than 100mg/l oil under standard test conditions and are suitable for dealing with discharges where a lower quality requirement applies (for example where the effluent passes to foul sewer).

Both classes can be produced as full retention or bypass separators. The oil concentration limits of 5 mg/l and 100 mg/l are only applicable under standard test conditions. It should not be expected that separators will comply with these limits when operating under field conditions.

FULL RETENTION SEPARATORS

Full retention separators treat the full flow that can be delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hr.

On large sites, some short term flooding may be an acceptable means of limiting the flow rate and hence the size of full retention systems.

BYPASS SEPARATORS

Bypass separators fully treat all flows generated by rainfall rates of up to 6.5mm/hr. This covers over 99% of all rainfall events. Flows above this rate are allowed to bypass the separator. These separators are used when it is considered an acceptable risk not to provide full treatment for high flows, for example where the risk of a large spillage and heavy rainfall occurring at the same time is small.

FORECOURT SEPARATORS

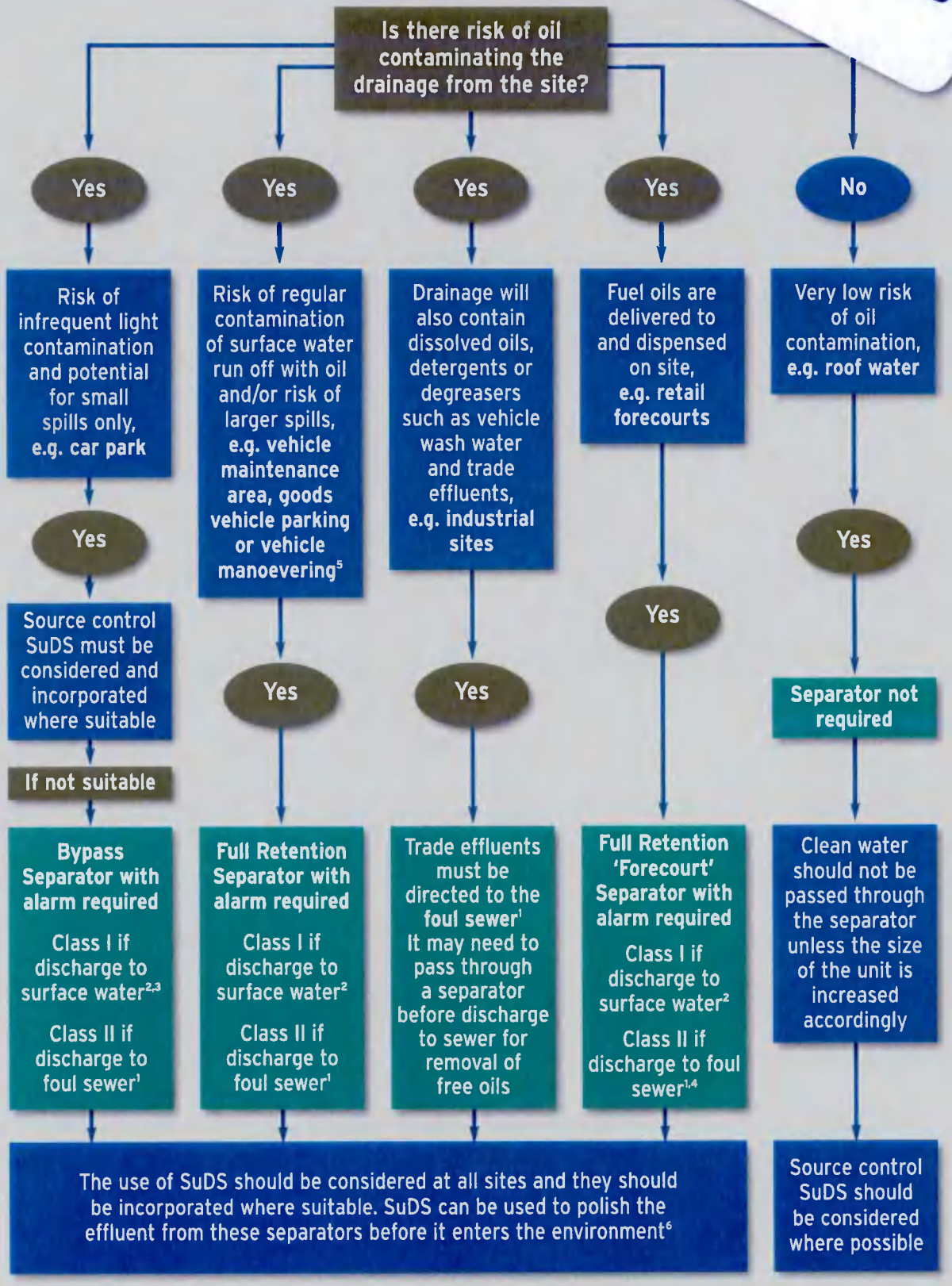
Forecourt separators are full retention separators specified to retain on site the maximum spillage likely to occur on a petrol filling station. They are required for both safety and environmental reasons and will treat spillages occurring during vehicle refuelling and road tanker delivery. The size of the separator is increased in order to retain the possible loss of the contents of one compartment of a road tanker, which may be up to 7,600 litres.

SELECTING THE RIGHT SEPARATOR

The chart on the following page gives guidance to aid selection of the appropriate type of fuel/oil separator for use in surface water drainage systems which discharge into rivers and soakaways.

For further detailed information, please consult the Environment Agency Pollution Prevention Guideline 03 (PPG 3) 'Use and design of oil separators in surface water drainage systems' available from their website.

Klargester has a specialist team who provide technical assistance in selecting the appropriate separator for your application.



1 You must seek prior permission from your local sewer provider before you decide which separator to install and before you make any discharge.
2 You must seek prior permission from the relevant environmental body before you decide which separator to install.
3 In this case, if it is considered that there is a low risk of pollution a source control SuDS scheme may be appropriate.
4 In certain circumstances, the sewer provider may require a Class 1 separator for discharges to sewer to prevent explosive atmospheres from being generated.
5 Drainage from higher risk areas such as vehicle maintenance yards and goods vehicle parking areas should be connected to foul sewer in preference to surface water.
6 In certain circumstances, a separator may be one of the devices used in the SuDS scheme. Ask us for advice.

Full Retention NSF RANGE

APPLICATION

Full retention separators are used in high risk spillage areas such as:

- Fuel distribution depots.
- Vehicle workshops.
- Scrap Yards

PERFORMANCE

Klargester were the first UK manufacturer to have the required range (3-30 l/sec) certified to EN 858-1 in the UK. The NSF number denotes the flow at which the separator operates.

The British Standards Institute (BSI) have witnessed the performance tests of the required range of separators and have certified their performance, in relation to their flow and process performance to ensure that they met the effluent quality requirements of EN 858-1. Larger separator designs have been determined using the formulas extrapolated from the test range.

Each full retention separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Silt storage capacity.
- Automatic closure device.
- Oil storage volume.
- Coalescer (Class I units only).

Klargester full retention separators treat the whole of the specified flow.

FEATURES

- Light and easy to install.
- Class I and Class II designs.
- 3-30 l/sec range independently tested and performance sampled, certified by the BSI.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.

- Oil alarm system available.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size full retention separator, the following information is needed:-

- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the influent is not pumped.
- The required discharge standard. This will decide whether a Class I or Class II unit is required.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	DRAINAGE AREA (m^2) PPG-3 (0.018)	STORAGE CAPACITY (litres) SILT	OIL	UNIT LENGTH (mm)	UNIT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	MIN. INLET INLET (mm)	STANDARD PIPEWORK DIA. (mm)
NSFP003	3	170	300	30	1700	1350	1420	1345	500	160
NSFP006	6	335	600	60	1700	1350	1420	1345	500	160
NSFA010	10	555	1000	100	2610	1225	1050	1000	500	200
NSFA015	15	835	1500	150	3910	1225	1050	1000	500	200
NSFA020	20	1115	2000	200	3200	2010	1810	1760	1000	315
NSFA030	30	1670	3000	300	3915	2010	1810	1760	1000	315
NSFA040	40	2225	4000	400	4640	2010	1810	1760	1000	315
NSFA050	50	2780	5000	500	5425	2010	1810	1760	1000	315
NSFA065	65	3610	6500	650	6850	2010	1810	1760	1000	315
NSFA080	80	4445	8000	800	5744	2820	2500	2450	1000	300
NSFA100	100	5560	10000	1000	6200	2820	2500	2450	1000	400
NSFA125	125	6945	12500	1250	7365	2820	2500	2450	1000	450
NSFA150	150	8335	15000	1500	8675	2820	2550	2450	1000	525
NSFA175	175	9725	17500	1750	9975	2820	2550	2450	1000	525
NSFA200	200	11110	20000	2000	11280	2820	2550	2450	1000	600

Rotomoulded chamber construction *GRP chamber construction*

PROFESSIONAL INSTALLERS

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Experience shows that correct installation is a prerequisite for the long-lasting and successful operation of any wastewater treatment product. This is why using an installer with the experience and expertise to install your product is highly recommended.

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- Tank and drainage system installation
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- Waste emptying and disposal

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BRITISH WATER

UK GREEN BUILDING COUNCIL

Issue No. 20: August 2014

Appendix A – Storm Water Drainage and Attenuation Design

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	100.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	16.700	Minimum Backdrop Height (m)	0.200
Ratio-R	0.276	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

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)
1.000	SW1	SW2	13.532	0.600	63.550	63.450	0.100	135.3	225	5.20	49.6
1.001	SW2	SW3	23.649	0.600	63.450	63.340	0.110	215.0	225	5.65	48.0
1.002	SW3	EX SW	84.716	0.600	63.340	61.830	1.510	56.1	225	6.45	45.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.122	44.6	15.8	1.475	1.485	1.485	0.117	0.0
1.001	0.888	35.3	15.3	1.485	1.595	1.595	0.117	0.0
1.002	1.749	69.6	14.5	1.595	1.375	1.595	0.117	0.0

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW1	706689.716	733902.434	65.250	1.700	1200				
						0	1.000	63.550	225
SW2	706703.201	733903.565	65.160	1.710	1200		1.000	63.450	225
						0	1.001	63.450	225
SW3	706703.104	733927.214	65.160	1.820	1200	1	1.001	63.340	225
									
						0	1.002	63.340	225
EX SW	706787.451	733919.311	63.430	1.600	1200	1	1.002	61.830	225
									

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	Scotland and Ireland	Skip Steady State	x
M5-60 (mm)	16.700	Drain Down Time (mins)	240
Ratio-R	0.276	Additional Storage (m^3/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.950	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
30	20	0	0
100	20	0	0

20% CCF

Storm Durations used for analysis up to 5760min = 4 days

Node SW1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	63.550	Product Number	CTL-SHE-0067-2000-1000-2000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node SW1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	63.550
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	236

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	45.0	0.0	1.000	45.0	0.0	1.010	0.1	0.0

Proposed attenuation volume = Area x Depth = 45 x 1 = 45m3

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +20% CC 15 minute summer	238.965	67.619	30 year +20% CC 2880 minute summer	8.159	2.187
30 year +20% CC 15 minute winter	167.695	67.619	30 year +20% CC 2880 minute winter	5.483	2.187
30 year +20% CC 30 minute summer	164.133	46.444	30 year +20% CC 4320 minute summer	6.307	1.649
30 year +20% CC 30 minute winter	115.181	46.444	30 year +20% CC 4320 minute winter	4.153	1.649
30 year +20% CC 60 minute summer	114.603	30.286	30 year +20% CC 5760 minute summer	5.270	1.349
30 year +20% CC 60 minute winter	76.140	30.286	30 year +20% CC 5760 minute winter	3.411	1.349
30 year +20% CC 120 minute summer	72.942	19.276	100 year +20% CC 15 minute summer	309.949	87.705
30 year +20% CC 120 minute winter	48.461	19.276	100 year +20% CC 15 minute winter	217.508	87.705
30 year +20% CC 180 minute summer	57.087	14.690	100 year +20% CC 30 minute summer	214.282	60.634
30 year +20% CC 180 minute winter	37.108	14.690	100 year +20% CC 30 minute winter	150.373	60.634
30 year +20% CC 240 minute summer	45.778	12.098	100 year +20% CC 60 minute summer	148.859	39.339
30 year +20% CC 240 minute winter	30.414	12.098	100 year +20% CC 60 minute winter	98.898	39.339
30 year +20% CC 360 minute summer	35.665	9.178	100 year +20% CC 120 minute summer	93.958	24.830
30 year +20% CC 360 minute winter	23.183	9.178	100 year +20% CC 120 minute winter	62.423	24.830
30 year +20% CC 480 minute summer	28.516	7.536	100 year +20% CC 180 minute summer	73.073	18.804
30 year +20% CC 480 minute winter	18.945	7.536	100 year +20% CC 180 minute winter	47.499	18.804
30 year +20% CC 600 minute summer	23.634	6.465	100 year +20% CC 240 minute summer	58.338	15.417
30 year +20% CC 600 minute winter	16.148	6.465	100 year +20% CC 240 minute winter	38.758	15.417
30 year +20% CC 720 minute summer	21.275	5.702	100 year +20% CC 360 minute summer	45.136	11.615
30 year +20% CC 720 minute winter	14.298	5.702	100 year +20% CC 360 minute winter	29.340	11.615
30 year +20% CC 960 minute summer	17.757	4.676	100 year +20% CC 480 minute summer	35.904	9.488
30 year +20% CC 960 minute winter	11.762	4.676	100 year +20% CC 480 minute winter	23.854	9.488
30 year +20% CC 1440 minute summer	13.187	3.534	100 year +20% CC 600 minute summer	29.636	8.106
30 year +20% CC 1440 minute winter	8.863	3.534	100 year +20% CC 600 minute winter	20.249	8.106
30 year +20% CC 2160 minute summer	9.661	2.670	100 year +20% CC 720 minute summer	26.587	7.126
30 year +20% CC 2160 minute winter	6.657	2.670	100 year +20% CC 720 minute winter	17.868	7.126

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +20% CC 960 minute summer	22.071	5.812	100 year +20% CC 2880 minute summer	9.930	2.661
100 year +20% CC 960 minute winter	14.620	5.812	100 year +20% CC 2880 minute winter	6.673	2.661
100 year +20% CC 1440 minute summer	16.268	4.360	100 year +20% CC 4320 minute summer	7.609	1.989
100 year +20% CC 1440 minute winter	10.933	4.360	100 year +20% CC 4320 minute winter	5.011	1.989
100 year +20% CC 2160 minute summer	11.827	3.268	100 year +20% CC 5760 minute summer	6.317	1.617
100 year +20% CC 2160 minute winter	8.149	3.268	100 year +20% CC 5760 minute winter	4.089	1.617

Results for 30 year +20% CC Critical Storm Duration. Lowest mass balance: 99.73%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	SW1	200	64.283	0.733	9.4	34.8084	0.0000	SURCHARGED
15 minute winter	SW2	13	63.488	0.038	2.0	0.0425	0.0000	OK
15 minute winter	SW3	36	63.366	0.026	2.0	0.0294	0.0000	OK
15 minute winter	EX SW	37	61.856	0.026	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	SW1	1.000	SW2	2.0	0.503	0.044	0.0527	
15 minute winter	SW2	1.001	SW3	2.0	0.610	0.055	0.0813	
15 minute winter	SW3	1.002	EX SW	2.0	0.772	0.028	0.2144	17.5

Max water level in the attenuation and drainage network for storms up to 1:30y return. Critical event duration 200min. Maximum achieved water level during this event does not exceed the high water level in the proposed attenuation tank (64.55m) therefore proposed attenuation has sufficient capacity to accommodate storms up to 1in30 years return. See drawing ref. D1691-D1-PL1 for attenuation base and high water level.

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.73%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	SW1	224	64.546	0.996	12.0	47.3201	0.0000	SURCHARGED
15 minute winter	SW2	12	63.488	0.038	2.0	0.0426	0.0000	OK
240 minute winter	SW3	228	63.366	0.026	2.0	0.0295	0.0000	OK
240 minute winter	EX SW	228	61.856	0.026	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	SW1	1.000	SW2	2.0	0.504	0.044	0.0530	
15 minute winter	SW2	1.001	SW3	2.0	0.620	0.056	0.0813	
240 minute winter	SW3	1.002	EX SW	2.0	0.774	0.028	0.2154	47.0

Max water level in the attenuation and drainage network for storms up to 1:100y return. Critical event duration 224min. Maximum achieved water level during this event does not exceed the high water level in the proposed attenuation tank (64.55m) therefore proposed attenuation has sufficient capacity to accommodate storms up to 1in100 years return. See drawing ref. D1691-D1-PL1 for attenuation base and high water level.

Appendix B – Foul Sewer Network Design

Design Settings

Frequency of use (kDU)	0.50	Minimum Velocity (m/s)	1.00
Flow per dwelling per day (l/day)	2700	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	1.200
Additional Flow (%)	0	Include Intermediate Ground	✓

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.000	F1	F2	24.336	1.500	64.150	63.910	0.240	101.4	225
1.001	F2	F3	16.822	1.500	63.910	63.600	0.310	54.3	225

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Velocity (m/s)
1.000	1.140	45.3	6.6	0.775	1.005	1.005	0.000	174.0	0.0	0.815
1.001	1.560	62.0	6.6	1.005	1.225	1.225	0.000	174.0	0.0	1.015

Appendix C – Correspondence

Declan O'Sullivan

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

22 December 2020

Re: CDS20008071 pre-connection enquiry - Subject to contract | Contract denied

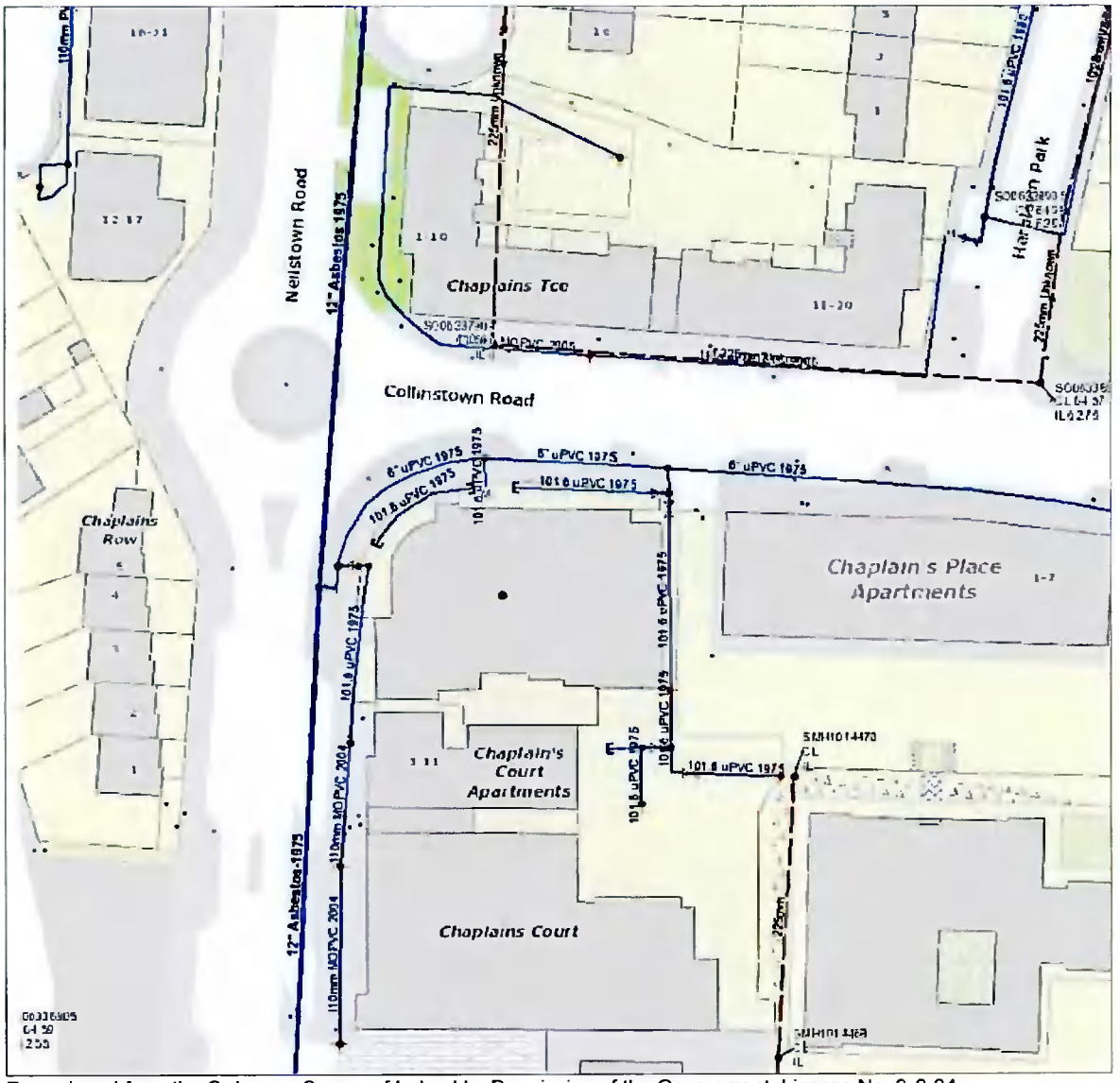
Connection for Housing Development of 30 unit(s) at Finches Public House, Neilstown Neighbourhood Center, Dublin 22, Dublin

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Finches Public House, Neilstown Neighbourhood Center, Dublin 22, Dublin (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	OUTCOME OF PRE-CONNECTION ENQUIRY THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	This Confirmation of Feasibility to connect to the Irish Water infrastructure does not extend to your fire flow requirements. Please note that Irish Water can not guarantee a flow rate to meet fire flow requirements and in order to guarantee a flow to meet the Fire Authority requirements, you should provide adequate fire storage capacity within your development.
Wastewater Connection	Connection to be made to the 225mm sewer across Colinstown Road.
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

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



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

General Notes:

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

If you have any further questions, please contact Marko Komso from the design team on 022 54611 or email mkomso@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Yvonne Harris

Yvonne Harris

Head of Customer Operations