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D.C. Turley & Associates

Chartered Engineers
Registered Architects
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Rear of The Copper Kettle
Main Street
Rathcoole
Co. Dublin

Engineering Services Report
January 2022

Garocal Ltd.
Woodfarm Cottages
Upper Kennelsfort Road
Palmerstown
Dublin 20

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1.0 Introduction.

1.1 Planning permission is currently being sought for the construction of a detached house at the rear of The Copper Kettle restaurant off the Main Street of Rathcoole in south County Dublin.

1.2 D.C. Turley & Associates have prepared surface water and foul water drainage layouts as part of the design team application submission.

1.3 This report will comment on drainage & watermain requirements, flood risk, traffic and noise management for the proposed design.

1.4 In preparing this report, site testing was carried out for stormwater design, and all proposals or conclusions contained within this report are based on this and a desktop study in conjunction with examination of design drawings.

1.5 Drainage proposals are indicated on drawing no. A01 enclosed with this application.

2.0 Site Description.

2.1 The subject site comprises 0.03Ha and is located just off the Main Street of the town behind the existing restaurant.

2.2 The site is surrounded by existing residential developments and is zoned Objective RES which is to protect and improve residential amenity.

2.3 The site is currently in a brownfield overgrown state and is effectively level.

3.0 Drainage.

3.1 It was decided to deal with roof storm water on site by utilising soakaways designed to BRE Digest 365 specification.

3.2 The front driveway will comprise of permeable paving designed to manufacturer's specifications to satisfy the SuDS requirement for the site.

3.3 A soakaway test was carried out and a soakaway designed in the front driveway area in accordance with BRE Digest 365 specification.

3.4 The results of the soakaway design calculations can be found in Appendix A.

3.5 All stormwater pipes will be 110mmuPVC @ 1:100 gradient.

3.6 Foul drainage is proposed by a direct connection to the sewer in Barrack Court from the proposed house, with the installation of an inspection chamber in the front driveway in accordance with current Irish Water specifications.

3.7 All foul drainage pipes will be 110mm uPVC @ 1:60 gradient.

4.0 **Potable Water.**

4.1 It is proposed to make a single 25mm MDPE connection to the main in Barrack Court, with the inclusion of a boundary box in the public footpath, again in accordance with current Irish Water specifications.

4.2 Potable water demand is calculated as 1 no. dwelling x 3.61 persons x 180 litres per dwelling per day = 650 litres per day.

4.3 24-hour storage will be provided in both houses and both individual connections can be metered with the installation of boundary boxes in the public footpath outside the site.

5.0 **Flood Risk.**

5.1 It is a standard Local Authority and central Government requirement that the predicted effects of climate change are incorporated into any proposed residential design.

5.2 An uplift of 20% in stormwater drainage or pluvial volumes, 20% in fluvial or river flows, and a mean sea level rise of 500mm are generally the anticipated increases.

5.3 An examination of the maps available on the CRAMS website confirms that there is no anticipated risk to this site from pluvial, fluvial, or tidal flooding.

5.4 We also note that there are no recorded flood events in the vicinity of the site.

6.0 **Traffic.**

6.1 This site is located within the 50kph speed limit.

6.2 Taking into consideration the location of the site, and its proximity to public transport and the Main Street, there is considerable scope to ensure that the proposal is in accordance with the principles of sustainability and is in line with the general principles espoused by the DTO.

6.3 It is reasonable to contend, in view of the viable alternatives available, that vehicular movements generated by the development would not have a material impact on the current capacity of the road network in the vicinity of the area, particularly taking into account the location and scale of the development.

6.4 Vehicular access to the site will be by way of an access over the existing roadway in Barrack Court.

6.5 Lines of sight are sufficient in both directions taking into account the speed limit.

7.0 **Noise.**

7.1 The proposed development is a modest two-storey house, located on an existing infill development site and surrounded by similar buildings.

7.2 The house will be separated from the N7 Dual Carriageway by approximately eleven houses at a distance of 120m.

7.3 Taking this distance into account, and the intervening buildings, there will be no significant negative noise impact.

Signed: _____ **for and on behalf of D.C. Turley & Associates**

Robert B. Turley

Appendix A – Soakaway Design

Design of Soakaway for Surface Water Drainage

Designed in accordance with BRE Digest 365.

Details

Area: Roof area (m)		82
Additional Impermeable area (m)		0
Total Impermeable area (m^2):		82
Trench width (m):		1.5
Effective depth (m):		1.5
Void ratio:		0.3
Infiltration Rate: (m/s)		1.5E-05
Rainfall Return Period (1 in _ years)		10
Percentage Increase for Climate Change (%)		20.0

Rainfall rates (mm):	Unfactored	Factored
M100-10	13.4	**16.1**
M10-15	15.7	**18.8**
M10-30	20.1	**24.1**
M10-60	25.7	**30.8**
M10-120	32.8	**39.4**
M10-240	41.9	**50.3**
M10-360	48.3	**58.0**
M10-720	61.7	**74.0**
M10-1440	78.9	**94.7**

Volume Equation: **I - O = S**

I = Inflow from the impermeable area drained to the soakway.
O = The outflow infiltrating into the soil during rainfall.
S = The required storage in the soakway to balance temporarily inflow and outflow.

Inflow to the Soakaway:

I = A * R

I = Inflow from the impermeable area drained to the soakway.
A = The impermeable area drained to the soakway.
R = The total rainfall in a design storm.

Duration D (mins)	(m^2)		Rainfall Rate (mm)	Volume Collected m^3
10	82	*	16.1	1.32
15	82	*	18.8	1.54
30	82	*	24.1	1.98
60	82	*	30.8	2.53
120	82	*	39.4	3.23
240	82	*	50.3	4.12
360	82	*	58.0	4.75
720	82	*	74.0	6.07
1440	82	*	94.7	7.76

Outflow from the Soakaway:

$O = a_{50} * f * D$

O = The outflow infiltrating into the soil during rainfall.
a_{50} = The internal surface area of the soakaway to 50% depth; this excludes the base area which may become clogged.
f = the soil Infiltration rate.
D = The storm duration.

a_{50} = 2 * (1.5 + L)*(1.5 / 2)
= 2.25 + 1.5 L

O = (2.25 + 1.5 L) * (1.49E-05) * (D * 60)

Duration D (mins)					
10	O = (	2.01E-02	+	1.34E-02	L)
15	O = (	3.02E-02	+	2.01E-02	L)
30	O = (	6.03E-02	+	4.02E-02	L)
60	O = (	1.21E-01	+	8.05E-02	L)
120	O = (	2.41E-01	+	1.61E-01	L)
240	O = (	4.83E-01	+	3.22E-01	L)
360	O = (	7.24E-01	+	4.83E-01	L)
720	O = (	1.45E+00	+	9.66E-01	L)
1440	O = (	2.90E+00	+	1.93E+00	L)

Soakaway Storage:

S = L * 1.5 * 1.5 * 0.3 = 0.675 L

	I	-	O		=	S
10 minute storm	1.31856	-	2.01E-02	- 0.01341 L	=	0.675 L
				1.30	=	0.69 L
				L	=	1.88615 m
15 minute storm	1.54488	-	0.030173	- 0.020115 L	=	0.675 L
				1.51	=	0.69512 L
				L	=	2.17907 m
30 minute storm	1.97784	-	0.060345	- 0.04023 L	=	0.675 L
				1.917495	=	0.71523 L
				L	=	2.68095 M
60 minute storm	2.52888	-	0.12069	- 0.08046 L	=	0.675 L
				2.40819	=	0.75546 L
				L	=	3.18771 m
120 minute storm	3.22752	-	2.41E-01	- 0.16092 L	=	0.675 L
				2.98614	=	0.83592 L
				L	=	3.57228 m
240 minute storm	4.12296	-	4.83E-01	- 3.22E-01 L	=	0.675 L
				3.6402	=	0.99684 L
				L	=	3.65174 m
360 minute storm	4.75272	-	7.24E-01	- 4.83E-01 L	=	0.675 L
				4.02858	=	1.15776 L
				L	=	3.47963 m
720 minute storm	6.07128	-	1.45E+00	- 9.66E-01 L	=	0.675 L
				4.623	=	1.64052 L
				L	=	2.81801 m
1440 minute storm	7.76376	-	2.90E+00	- 1.93E+00 L	=	0.675 L
				4.8672	=	2.6060 L
				L	=	1.86766 m

Storm Duration	Required Soakaway Length (m)
10	1.89
15	2.18
30	2.68
60	3.19
120	3.57
240	3.65
360	3.48
720	2.82
1440	1.87

Try a soakaway of length **3.65** m with a storm duration of **240** mins.

Internal surface area at 50% effective depth.

a_{50} = 2 + 1.5 L
= 7.73 m^2

Soakaway storage volume

S = 1.5 * 3.651739 * 1.5 * 0.3
S = 2.5 m^3

Check on time for emptying half storage volume, t_{s50}.

$$ts_{50} = \frac{S * 0.5}{a_{50} * f}$$

$$= \frac{2.5 * 0.5}{7.73 * 1.5E\text{-}05}$$

= 178.40 mins

= 2.97 h (>24h)

Therefore a soakaway of the following dimensions is acceptable:

Length = 3.65 m
Width = 1.50 m
Depth = 1.50 m