

Water Services Report

Clanwilliam Quarter
Dublin 2

DCC PLAN NO 4126/22
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1 Introduction

1.1 General

This report addresses the Foul and Surface Water Drainage and Water supply for the proposed development of a new office building at the corner of Mount St Lower and Clanwilliam Place.

The subject site covers an area of approximately 5160m²; and is currently occupied with a 4 to 6 storey office building originally completed in the 1970s.

It is proposed to carry out a complete redevelopment of the site where the existing buildings shall be demolished and a new office development of six to eight stories over a lower ground floor and basement will be constructed.

1.2 Proposed Drainage Scheme

In order to comply with the Greater Dublin Drainage strategy requirements, it is proposed to drain the foul and surface water generated from the property using a completely separate system.

The rainwater falling on the main roofs and high level terraces will be largely contained within the site and used to irrigate the soft landscaped sedum section of the roofs and terrace planters. Overflows from stepped terrace and courtyard systems will be directed to an attenuation tank at basement / lower ground level.

The foul sewage generated will be discharged via a modified integral foul drainage network and discharge to the public sewer via a new 225mm diameter connection to the 300 mm diameter combined sewer on Love Lane in a similar manner to the existing connection.

1.3 Reference Publications used in the production of this Report

- Greater Dublin Strategic Drainage Study – Volumes 1 to 6
- Greater Dublin Regional Code of Practice for Drainage Works – Version 6.0
- Technical Guidance Documents – Part C and H
- OPW National Flood Hazard Mapping
- Irish Water Codes of Practice for Wastewater
- Irish Water Codes of Practice for Water services.

2 Foul Waste Discharge

The proposed development provides space for 2200 office desks within the overall campus. Therefor the population equivalent for the building shall be 2200 persons.

Based on Irish Water codes of practice the wastewater loading shall be taken as 100litres per person per day (office with canteen)

The wastewater discharge from the site shall be as follows;;

$$2200 \times 100 = 220,000 \text{ litres}$$

Average discharge = 2.55 l/s (1 DWF)

Peak Discharge = 15.3 l/s (6 DWF)

Modern sanitary fittings shall be provided which shall limit the overall water demand for the development.

3 Surface Water Discharge

3.1 Existing Site

Surface water from the existing site is connected directly to the public combined sewer on Love Lane.

There is limited soft landscaping on the site and there are no other attenuation features or systems to control the surface water run-off from the site and all roof level rainwater is discharged directly to the Irish Water combined sewer in a number of locations.

We have calculated that the existing maximum surface runoff from the site in the event of a storm can be up to 71.6l/s.

3.2 Proposed Surface Water Drainage Strategy

The proposed new development provides the opportunity to introduce a number of features that shall make a significant improvement to the water quality and use of surface water on the site.

The strategy shall ensure that surface water run-off is retained using a number of features.

The vertical profile of the new building includes set backs at high levels containing sedum finishes, planters and terraces. The roofs are finished with sedum around the perimeter with impermeable surfacing under the areas designated for PV Cells and other Plant.

With 2 large central courtyards, the rainwater is directed to the subbase under the combined soft and permeable finishes on the courtyards and provide substantial volumes of surface water storage (21.5m³ in each courtyard).

The combined treatment train with run-off directed to the stepped terraces and water quality being improved at each stage shall over most rainfall events.

Where extreme events occur, an attenuation feature in the basement / lower ground level shall provide adequate storage for a 1 in 100 year storm event plus 20% climate change.

A discharge flow rate by rising main which is limited to 2.0l/s by the size of the pumps incorporated into the tank. In addition to the high level treatment train of rainwater passing through sedum, planting and landscaped areas, an overall storage volume of 300m³ is also provided throughout the development in four distinct areas. This is made up of 2 No. storage volumes of 18m³ and 21.5m³ in the form of Permavoid cells under the paving in each courtyard and 1 No. concrete tank at basement / lower ground floor level along the boundary with Clanwilliam Place.

The attenuation calculations are shown below and the overall water services treatment train and attenuation is shown on CORA drawings C001, C002 & C003.

This proposed development and design will reduce the surface water runoff from the site from a current maximum of 71.6 l/s to 2.0 l/s as well as providing two stage treatment to the surface water.

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Sedum & Plantings 2690 m ²		Roof Area: 2500 m ²	Other: 0 m ²	Equivalent Impermeable Area: 3172.5 m ²		Checked by: JFC	
I. Factor: 0.25		I. Factor: 1.00	I. Factor: 1			Attenuated Flow Rate: 2 l/s	
Factors:		Climate Change: 1.2	Simplification of Head/Discharge Relationship: 1.25		Hydro-Brake		

Storm Duration (Hours)	Rainfall (mm)	Total Surface Water (m ³)	Allowable Discharge (m ³)	Attenuate (m ³)
0.03 (2mins)	7.80	24.75	0.216	30.66
0.08 (5mins)	13.80	43.78	0.576	54.01
0.166 (10mins)	22.20	70.43	1.1952	86.54
0.25 (15mins)	26.40	83.75	1.8	102.44
0.5 (30mins)	34.20	108.50	3.6	131.12
1.00	48.84	154.94	7.2	184.68
2.00	60.36	191.49	14.4	221.37
4.00	74.52	236.41	28.8	259.52
6.00	84.48	268.01	43.2	281.02
12.00	104.40	331.21	86.4	306.01
24.00	129.00	409.25	172.8	295.57
48.00	145.80	462.55	345.6	146.19
72.00	159.72	506.71	518.4	0.00

Attenuate versus Storm Duration

Attenuate (m³)

Storm Duration (Hours)

Note: This spreadsheet calculates the Volume of Attenuate based on a Return Period of: 100 years.

4 Water Supply

The existing incoming water supply of 100mm Diameter to the building shall be reused.

A diversified flow rate of 4.0l/s is calculated for the water demand. Additional storage of 45,318 litres shall be provided to allow for 24 hour storage of Potable Water.

The Services Engineer - Ramboll - has undertaken details calculations (see below) relating to water storage volumes and consumption of water and adequate storage is being provided in addition to the use low water use fittings and appliances throughout the building.

Building Services Calculation 11/08/2021 - Rev A

Potable Cold Water Storage and Usage

RAMBOLL

Clanwilliam Quarter Water Storage and Usage

Areas	
Retail 01	336 m ²
Retail 02	138 m ²
Retail 03	75 m ²
Retail 04	684 m ²
Social Hub	1677 m ²
Office Space	21935 m ²
Total Office Areas	24845 m²
Occupancy (based on 10m ² /p)	2485 people
BCO Guide Cold Water Storage	
BCO Guide	15 l/p/day
BCO kitchen (60% occupants)	5 l/p/day
Total Cold Water Storage	44721 Litres
Tank Size Based on BCO Calculation	
Sectional Tank	
Length	6.5 m
Width	3.5 m
Height	2.5 m
Usable Water	45318 L
Estimated Water flow Rate	
Total number of loading units (EN806)	986
Equivalent Diversified flow rate	4.0 l/s

BCO Water Storage Requirements

Water storage of 15 l per person per day should be allowed, based on effective density - for example, one person per 10 m² for a workplace density of one person per 8m².

Where restaurants and kitchens are anticipated, the base building storage should be increased by 5 l per person per day - this is based on an allowance for up to 60% of the building population using the facility. Alternatively, a space allowance for occupiers to install their own additional water storage facilities can be provided.

Loading Unit (LU) Estimation (EN 806)

Sanitaryware Estimations

	WC's	WHB's Sinks	Showers	Other LU	
Basement	0	0	4		
Lower Ground	19	19	4	37	30 Other is for kitchen
Ground	14	14	6		24 Retail - 4 sinks each equivalent
First	15	15	8		
Second	20	20	10		
Third	20	20	10		
Fourth	20	20	10		
Fifth	18	18	10		
Sixth	14	14	8		
Seventh	10	10	4		
Totals	150	150	70	37	54
LU per item	1	1	2	2	1
Total Cold LU	150	150	140	74	54
Total Hot LU		150	140	74	54
					986

5 Conclusion

As outlined above, the proposed drainage strategy shall contribute to significant improvements in both surface water and foul run-off from the site from the existing condition.

The surface water strategy proposed shall dramatically reduce surface water leaving the site and entering the Irish Water network from the current level. Surface water runoff from the site will be reduced from a maximum of 71.6 l/s to 2.0 l/s.

As the proposed surface water design shall ensure that surface water is retained on the site and only released at 2.0 l/s, the risks of pluvial flooding in nearby streets is reduced with the overall effect of the proposed development is to have a positive impact on the local area.

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