Student Residence at 139-149 North King Street, Dublin 7

Stormwater Management Plan Report – LRD Stage 3

September 2024

2424

Issue No. 3

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1 Introduction

1.1 General

This report addresses the storm water management for the proposed Student Residence at 139-149 North King St, Dublin 7.

Ringline Investments Limited intend to apply for permission for development at 139-149 North King Street, Dublin 7. The development will consist of the demolition of existing structures on site, with the exception of the façade on North King Street (N) and Bow Street (E), which is a protected structure (RPS Ref. No. 8790 – north and east elevation only), which will be retained, improved and restored as part of the proposed development.

The proposal will provide a purpose-built student accommodation development in a 7-storey building over a partial existing basement with a setback at 5th floor and a further significant setback at the 6th floor level.

The proposal includes 361 no. student bedspaces, a ground level retail unit with frontage to both North King Street and Bow Street, communal facilities including a courtyard, external terrace at roof level at 5th and 6th floor and internal amenity spaces.

1.2 Proposed Stormwater Management Plan Summary

In order to comply with modern standards, stormwater shall be treated using nature-based solutions as far as possible in line with the Dublin City Council Development Plan.

For the purposes of stormwater management the site is defined in 2 No. Sub-Catchments as identified in the image below.



The table below summarises the description of the sub-catchments and the proposed stormwater management for each. Each sub-catchment shall be described in greater details in section 2.

Sub-catchment No.	Description	Gross Plan Area (m ²)	Stormwater management systems			
1	Roofs and Terraces of the Student Residence Building	2361	Extensive blue green roof systems with a storage volume of 150mm over the areas shown.			
2	Ground Level communal open space	789	Permeable paving systems and soft landscaping with a minimum storage layer of 350mm of clean crushed limestone subbase. An above ground			

1.3 Blue & Green Roofs

Extensive Blue and green roof systems are used for all levels of the building where possible and a variety of planting finishes is used on the terraces. Details are shown in the Landscape Architects drawings and design statement.

A storage layer of 1500mm depth is provided at all levels typically.

The footprint of the roof is circa 2361m² on plan with an extensive blue/ green roof coverage of circa 1975m². Therefore over 80% of the roof and terraces have an extensive roof system.

1.4 DCC Opinion On Stage 2

The stormwater management plan submitted as part of the Stage 2 LRD Application was reviewed by DCC and the following Opinion was returned. These items have been addressed in this report and the supporting drawings and a summary is indicated below each item.

5. Drainage

Insufficient information has been provided on the surface water management proposals. Appendix 13 of the Dublin City Development Plan 2022-2028 sets out the criteria that should be provided. In particular, the following items must be addressed:

a) Clarification of proposed green-blue roof area is required, including full extent of the green roof element. Policy SI23 of the Dublin City Development Plan 2022-2028 and the DCC Green- Blue Roof documents sets out the specific requirements.

Over 80% of the Roof coverage employs Extensive Blue/ Green roof systems.

b) Further details, including calculations, are required for the attenuation and interception storage provisions for each sub-catchment within the site.

Calculations are contained in Appendix A of this report along with a description of the Sub-Catchment areas in section 2 below. c) A clear explanation of the various SuDS devices is required, including any control structures proposed. The SuDS proposals should be integrated fully with the landscaping proposals.

Refer to CORA drawings along with BLSArch Landscape Architecture details and drawings for details.

d) A taking-in-charge layout should be provided, which clearly indicates those areas intended to remain private, and those intended to be taken in charge by DCC. The taking in charge proposals will have a direct impact on the drainage proposals.

There is footpath on Browne Street North that shall be taken in charge by DCC. Run-off from the footpath shall be directed the local public storm water gullies on Brown Street North

e) The applicant is advised to consult with the DPPDC section to ensure the above concerns are adequately addressed.

Consultation has been undertaken with DPPDC and the general stormwater management plan strategy is agreed in principle subject to the further information and detailed calculations outlined in this report and supporting drawings.

2 Stormwater Management Plan

2.1 Existing Site

The proposed application site is approximately 3,307m² and is fully occupied by buildings and impermeable surfaces. All stormwater run-off is directed to the combined Uisce Eireann sewers in the local streets.

The site is generally level with a slight fall from North King Street to the South at Bow Lane.

Using Met Eireann Rainfall Data the greenfield run-off for the site (Qbar) is taken as 2.00 l/s. Details of the input data and calculations are in Appendix A.

2.2 Ground Conditions and Site Investigations

The site is fully occupied by existing buildings and there are a number of businesses operating within the property boundary. Due to health and safety concerns access was not permitted (by lease holders)to carry out site investigations.

From published data on <u>www.gsi.ie</u>, the ground conditions are known to be made ground of circa 2m to 3m overlying a sandy gravelly clay layer with bedrock at circa 5m below ground level. Ground conditions are not considered suitable for soakaways, particularly given the substantial coverage of the site with the proposed new building.

2.3 Sub-Catchment #1 – Roofs and Terraces of the Student Residence Buildings

The building footprint is circa 2361m² and the form of the building includes setbacks and terraces at a number of levels.

There ais a planted terrace at level 2 in the North eastern Corner. This terrace in not accessible, however it shall include soft landscaping over a storage layer of 150mm deep for the management stormwater.

Levels 5 and 6 have accessible terraces and employ a similar system.

Roof systems shall also incorporate a similar storage depth of for the management of stormwater. Rainwater outlets at roof and terraces shall have flow restrictions to limit the run-off. The restrictions at the outlets and the roof systems shall be designed by a specialist sub-contractor/ supplier to meet the required flow limits. Details are shown on CORA drawings with supporting calculations in Appendix A.

2.4 Sub-Catchment #2 – Communal Open Space at Ground Level

The communal open space at ground level covers an area of 789m². This area is finished with soft landscaping and permeable paving. A layer of 350mm of clean crushed stone shall be provided below the landscaping finishes to manage stormwater falling on this Sub-Catchment. Tis provides ample storage for the area.

A feature SUDs zone shall also be provided within the communal open space and is detailed on the Landscape Architects Masterplan. The SUDS feature combines gravel beds/ larger boulders and rain-garden appropriate planting to provide a high value feature element in terns of green infrastructure and biodiversity within the site.

2.5 Works to Brown Street North

Following consultations with DCC, the application red-line has been extended to include a large portion of Brown Street North and therefore the development includes upgrades to the street within this area. Furthermore the footpath on the development side of Brown Street North will be ceded to Dublin City Council from the front elevation of the new building and will make a significant improvement to the street.

The works include a large area of green infrastructure on Brown Street North which will improve water quality.

In summary the total plan area of the development site on Brown Street North is circa 820m². Of this area over 110m² shall be soft landscaping and tree pits.

Kerb lines and the street layout has been agree with DCC Transportation Dept and is shown on the relevant Landscape Architects (AIT) and Traffic Engineering (NRB) drawings.

Drainage to the hard scaped street finishes that will be within the public (DCC) realm shall remain unchanged with existing gullies, locally modified and directing run-off to the existing public sewer network.

3.0 Conclusion of Stormwater Management Plan

The above stormwater management plan proposes *nature-based solutions* to manage stormwater on the site. The integrated Landscaping and Stormwater strategy ensures a significant improvement in the management of stormwater form the site in the private realm with all run off limited to 2.0I/s

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	Drainage Input Data									
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	Standard Average Annual Rainfall, SA	AR =	754 mm		(From Met Éireann Historical Data)					
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Primary Catchments		•			Date:	19.12	2.2024
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Catchment Area 1:	Overall Footprint	A _{O/A} =	2361.0 m ²				
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SUMMARY OF AREAS (sqm)	220	-				
		330	17				
EXTENSIVE BLUE GREE	N ROOF AREAS	197	5				
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IMPERMEABLE FOOTP	ATH TO PUBLIC REALM	16	1				
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CON	CONSULTING ENGINEERS t: +353 1 66111 e: info@cora					J	РС	Checked:	KO'M
tle:	SW Drainage	: Attenuation S	Storage Vo	olume: Roof Volu	me			Date:	19.12.2024
	Calculation of	of Attenuation	Volume					-	
	Length, I =				132 m	1	Area	$\cdot 1980.0 m^2$	
	Width, w =				15 m		Alea	. 1980.0 11	
	Depth, d =				0.15 m				
	Free Volume	, V _{free} =			95%				
	M5-60min fr	om Met Éirear	in Data 😑		15.9 mm				
	M5-60m/M5	-2d from Met	Éireann Da	ata, r =	0.278				
	Return Perio	d, years =			100 year		+ 30%		
	Impermeable	e Area, A =			2600 m ²				
	Outflow Fact	or, AF =			1.5 l/s		(0.0015 m ³ /s	s)	
	Max. Inflow =	=			0.0 l/s	=	0 m³/s		
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	Duration	M5 Rainfalls	Rainfal	Rainfall	Inflow	Inflow	Outflow	Required	
				+ 30%	(m³)	(m³)	(m³)	(m³)	
	5 mins	5.9 mm	14.7 mr	n 19.1 mm	49.7	0	0.5	49.2	7

5 mins	5.9 mm	14.7 mm	19.1 mm	49.7	0	0.5	49.2
10 mins	8.3 mm	20.5 mm	26.7 mm	69.3	0	0.9	68.4
15 mins	9.7 mm	24.1 mm	31.3 mm	81.5	0	1.4	80.1
30 mins	12.4 mm	29.8 mm	38.7 mm	100.7	0	2.7	98.0
1 hour	15.9 mm	36.9 mm	48.0 mm	124.7	0	5.4	119.3
2 hours	20.3 mm	45.6 mm	59.3 mm	154.1	0	10.8	143.3
3 hours	23.4 mm	51.6 mm	67.1 mm	174.4	0	16.2	158.2
4 hours	25.9 mm	56.3 mm	73.2 mm	190.3	0	21.6	168.7
6 hours	29.9 mm	63.8 mm	82.9 mm	215.6	0	32.4	183.2
9 hours	34.6 mm	72.2 mm	93.9 mm	244.0	0	48.6	195.4
12 hours	38.3 mm	78.9 mm	102.6 mm	266.7	0	64.8	201.9
18 hours	44.2 mm	89.3 mm	116.1 mm	301.8	0	97.2	204.6
24 hours	48.9 mm	97.5 mm	126.8 mm	329.6	0	129.6	200.0

Rainfall Values are taken from Met Éirean Data for the site (see separate data sheet)

Required Storage, S_{reqd} = Actual Storage, S_{act} = 204.6 m³

282.15 m³ (0.73)

Storage Volume is OK

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tle:	SW Drainage	: Attenuation S	Storage Volur	me: Ground Le	vel Open Spa	се		Date:	19.12.2024
	Calculation c	of Attenuation	<u>Volume</u>						
	Length, I =				35.5 m]	Aroa:	$791.0 m^2$	
	Width, w =				22 m		Alea.	781.0 m²	
	Depth, d =				0.35 m				
	Free Volume	, V _{free} =			35%				
	M5-60min fr	om Met Éirean	n Data 😑		15.9 mm				
	M5-60m/M5	-2d from Met	Éireann Data,	, r =	0.278				
	Return Perio	d, years =			100 year		+ 30%		
	Impermeable	e Area, A =			573 m²				
	Outflow Fact	or, AF =			2.0 l/s		(0.002 m³/s)		
	Max. Inflow	(from Roof Ove	errun) =		1.5 l/s	=	0.0015 m³/s		
									_
	Duration	M5 Rainfalls	100 year Rainfall	100 year Rainfall	Inflow	Additional Inflow	Outflow	Storage Required	
				+ 30%	(m³)	(m³)	(m³)	(m³)	
	5 mins	5.9 mm	14.7 mm	19.1 mm	11.0	0.45	0.6	10.8	1
	10 mins	8.3 mm	20.5 mm	26.7 mm	15.3	0.9	1.2	15.0	1
	15 mins	9.7 mm	24.1 mm	31.3 mm	18.0	1.35	1.8	17.5	1
	30 mins	12.4 mm	29.8 mm	38.7 mm	22.2	2.7	3.6	21.3	1
	1 hour	15.9 mm	36.9 mm	48.0 mm	27.5	5.4	7.2	25.7	1
	2 hours	20.3 mm	45.6 mm	59.3 mm	34.0	10.8	14.4	30.4	1
	3 hours	23.4 mm	51.6 mm	67.1 mm	38.4	16.2	21.6	33.0	

5 11001 5	23.4 1111	51.0 mm	07.1 11111	50.4	10.2	21.0	55.0
4 hours	25.9 mm	56.3 mm	73.2 mm	41.9	21.6	28.8	34.7
6 hours	29.9 mm	63.8 mm	82.9 mm	47.5	32.4	43.2	36.7
9 hours	34.6 mm	72.2 mm	93.9 mm	53.8	48.6	64.8	37.6
12 hours	38.3 mm	78.9 mm	102.6 mm	58.8	64.8	86.4	37.2
18 hours	44.2 mm	89.3 mm	116.1 mm	66.5	97.2	129.6	34.1
24 hours	48.9 mm	97.5 mm	126.8 mm	72.6	129.6	172.8	29.4

Rainfall Values are taken from Met Éirean Data for the site (see separate data sheet)

Required Storage, S_{reqd} = Actual Storage, S_{act} = 37.6 m³

95.67 m³ (0.39)

Storage Volume is OK

Appendix A – StormWater Management Calculations