

Drainage Design Report

Project:

157 Old Court Road, Tallaght, Dublin 24

Client:

Robert Bourke Architects

Date of Report:

16th June 2022

Project Ref. No.:

22713



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Document Control

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E.Roche	26/06/2022	B.McGinn	26/06/2022	1st	Issued For Planning
E.Roche	26/06/2022	B.McGinn	26/06/2022	2nd	'RBA' revised to 'The Client'
E.Roche	07/07/2022	B.McGinn	07/07/2022	3rd	Client Name - Typo Amended



1.0 Introduction

1.1 Proposed Development Details

Mable Consulting Engineers have been appointed by the client to prepare a RFI response report to respond to the FI request received from South Dublin County Council on 14 April 2022 for the proposed construction of a new extension to 157 Old Court Road, Tallaght, Dublin 24, Planning reference number: SD22B/0061.

Mable consultants Mr Barry McGinn visited the site to aid in preparing this RFI response report.

This report was created in order to address Item 2, 3, 4 & 5 of the further information request.

The items state:-

- There are no soil percolation test results, design calculations or dimensions submitted for the
 proposed soakaway. The applicant is requested to submit a report showing site specific soil
 percolation test results and design calculations for the proposed soakaway in accordance with BRE
 Digest 365 Soakaway Design.
- 3. The applicant is requested to submit a revised drawing showing plan and cross-sectional views, dimensions, and location of proposed soakaway. Any proposed soakaway shall be located fully within the curtilage of the property and shall be:
 - (i) At least 5m from any building, public sewer, road boundary or structure.
 - (ii) Generally, not within 3m of the boundary of the adjoining property.
 - (iii) Not in such a position that the ground below foundations is likely to be adversely affected.
 - (iv) 10m from any sewage treatment percolation area and from any watercourse / floodplain. Should a soakaway prove not to be feasible, then the applicant shall submit the following:
 - (i) Soil percolation test results demonstrating a soakaway is not feasible
 - (ii) A revised surface water layout drainage drawing for the development showing the inclusion of alternative SuDS (Sustainable Drainage Systems) features.
- 4. The applicant is requested to include Water Butts as part of additional Sustainable Drainage Systems (SuDS) measures for the proposed development.
- 5. It is unclear where the foul water discharges from the proposed development. The applicant is requested to submit a drawing showing existing and proposed foul water drainage layouts up to and including the point of connection to the public foul water sewer. The drawing shall include the location of all Aj's, manholes, pipe size, material type and direction of flow. The drawing shall clearly show that the foul and surface water systems are discharging to separate pipe networks. Maps of the public watermains and Wastewater drainage networks may be obtained, if available, for required locations in by emailing: datarequests@water.ie.



1.2 Site Location

The site is located at rear of 157 Old Court Road, Tallaght, Dublin 24. The site is outlined in red in figure 1 below:



Figure 1 - Site Location - Site outlined in red

2.0 Existing Drainage

Existing Drainage drawings were attained from South Dublin County Council Drainage Division & Irish Water. A topographic survey of the existing drainage was undertaken along with a site visit to inspect the existing drainage lines. See Appendix 'A' & 'B' for the Existing drainage maps and topographic survey respectively.

The existing surface water and foul drainage systems outfall to a combined sewer at the rear of 156 Old Court Road which connects to an existing line in Old Court Road.

The location of existing manholes and existing sewer lines are shown in drawing 22713-100.

3.0 Foul Water Drainage Design

The proposed development foul water will discharge into a new manhole on the North-East side of the site which will be piped below the proposed extension to a second new manhole on the existing line constructed in the neighbouring property. The existing line is connected to the public 225mm Dia. foul sewer already present on Old Court Road. See Appendix 'C' for foul water drainage design calculations.

4.0 Surface Water Drainage Design

During the surface water drainage design process, 2 different solutions were assessed:

4.1 Discharge to Soakpit

Due to the poor soakage rate found by performing a soakage test in the area, this solution was found not to be suitable. See Appendix 'D' for soakage test results.

Date: 26/06/2022



4.2 Discharge to Public Stormwater Sewer

The existing public sewers in the vicinity of the site were reviewed.

There is a separate surface water drainage line located in the footpath to the front of the site. This is suitable for a connection. It is proposed to connect to this drainage line.

The proposed construction of a new separate surface water outfall point will lower the surface water load on the existing combined public sewer.

A small increase in load will be applied to the existing surface water sewer due to the proposed new connection works. SUDS measures will be provided to manage the peak rate of surface water discharge into the surface water sewer.

The design of the attenuation storage capacity is based on Rainfall Data Issued by Met Eireann for the site location and for 30 years and 100 years return period, increased by 20% to consider the future variation caused by climate changes. A discharge rate of 0.41l/s was calculated. See Appendix 'E' for Surface water Qbar calculation sheet, Attenuation Storage Design Spreadsheet and Met Eireann Rainfall Data, Appendix 'F' for flow control device, and Appendix 'G' for Wavin Aquacell technical data sheet.

In addition to this design, Water Butts have been added to the planning drawings.

The final Site layout & Drainage Plan drawing 22713-100 shows the locations of all the mentioned equipment in this report. See Appendix 'H' for Existing Site Layout & Drainage Plan, Proposed Site Layout & Drainage Plan, and Proposed Drainage Details.

End Of Report.

Signed: <u>F. Roche</u> Eoin Roche

Design Engineer



Appendix A – Topographic Survey



Appendix B – Irish Water Web Map / Existing Drainage Map

Irish Water Web Map





Print Date: 10/06/2022

Printed by:Irish Water

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Appendix C - Foul Water Drainage Calculations

Project:	157 OLD COU	RT ROAD;	TALCAGHET,	024
Project No.:	22713	Sheet No.:	1	
Member / Location:	FOUL SOLVER	Design		
Doc. Control:	Calculations By	Reviewed	Ву С	ate
Name:	ER			



Ref.				Calculations		Output
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CHMCAL						
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	< 2.5	100	1:60*	1		
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	* Minimum of 1 we					
	† Minimum of 5 w					
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Appendix D – Soakage Test



SOAKAWAY TESTS

SOAKAWAY DESIGN

DRAINAGE DESIGN

PERCOLATION TESTS

SITE CHARACTERISATION TESTS

Declan Kearns & Associates Ltd. t/a Soakaway Tests Tullywest Kildare Co. Kildare Ireland

Phone: 01 539 4447 Phone: 045 520642 Mob: 086 2111590

Email: info@soakawaytests.ie Visit: www.soakawaytests.ie

Factual Report on Soakaway Test at

Proposed Development at 157 Oldcourt Road, Dublin 24

Date: 21/05/22

1. INTRODUCTION

It is understood that it will be necessary to dispose of the storm water from the proposed Development at 157 Oldcourt Road, Dublin 24 by means of a soakaway system on site.

An investigation has been carried out to assess the suitability of the sub-soils for this purpose and to determine soakaway requirements.

2. FIELDWORK

One trial pit was excavated (see Appendix 1 for testhole photos) in order to ascertain subsoil conditions and the depth to groundwater. ST1 was excavated to a depth of 1.80m. Groundwater was not encountered after 48 hours.

The soakaway trial pit details are located in Appendix 2.

3. TESTING

To determine the soil infiltration rate, water was poured into the pit and records made of the fall in water level against time. Testing was continued until a constant rate of fall was established.

From the rate of fall in water level and measurement of the average internal surface area of the test pit over the test zone, the soil infiltration rate "f" was calculated.

The field data and calculations are located in Appendix 2.

There was no soakage in the test hole during the test after 3 hours. As the site is not suitable for a soakaway system, an attenuation system should be designed by the project engineers.

Signed:

Declan Kearns

Consultant Civil / Geotechnical Engineer

for and on behalf of

Declan Kearns & Associates Ltd. t/a

Park Kang

Soakaway Tests

Appendix 1 Site Photographs



Figure 1. Testhole ST1



Figure 2. View of Arisings



Figure 3. View of Site

Appendix 2 Field Data Records & Calculations

soaka	waytest	s.ie					
Soak	away D	Design	f -valu	ue from	field tes	ts	
		Road, Dublin 2	40 000000000000000000000000000000000000				
Test No.		rroad, Dubiiii 2					
Client	Teres Small						
Date:	21/05/2022						
Summary	of Ground Co	onditions					
From	То	Description					Ground water
0.00	0.30	Topsoil					
0.30	0.80	Brown mottled	grey sandy	gravelly CLAY			
0.80	1.80	Grey mottled b	rown sandy	gravelly CLAY			
Notes:	Groundwater	was not met di	uring test				
Field Data	<u>a</u>			Field Test			
D 41- 4-	F1	1		D		1.00	
Depth to				Depth of Pit (I		1.80	m
Water	Time			Width of Pit (E		0.35 1.50	m
(m)	(min)			Length of Pit (L)	1.50	m
1.220	0	d		Initial depth to	Water (25%) =		m
1.220					water (75%) =		m
1.220	42	1		Elapsed time	The second secon		
1.220	183	No soakage after	er 3 Hours	1			
				Top of permea	able soil		m
]		Base of perme	eable soil		m
		4					
		1					
		1					
		1		Base area=		0.525	m2
		*Av. side area	of permeabl	e stratum over	test period=	6.66	m2
		1		Total Exposed	area =	7.185	m2
		1					
		Infiltration rate	(f) =	Volume of war	ter used/unit ex	posed area / unit time	1
		f=	#DIV/0!	m/min	or	#DIV/0!	m/sec



Appendix E – Surface Water Calculation Sheet & Met Eireann Rainfall Data

	-			,	,		\mathbf{N}	ahla
INPUT		Calculation		ER	-			able
ОИТРИТ]	Checked B	y:	BMG			Consult	ing Engineers
SITE DETAILS								
Location				157 Old Court Re	oad, Old Cour	t, Dublin 24		
Site Area 0.041 Ha					m2	0.00041	km2	
ALLOWABLE D	ISCHARGE	FROM SIT	F					
	JOHNHOL	THOM SIT		0.00	1.17	2.17		
Equation:			Q _{bar} : 0.	00108 x AREA ^{0.89}	x SAAR ^{1.17} x SC	DIL ^{2.17}		
Q _{bar} :	Mean Anni	ual Peak Flo	w From Sit	e	(m ⁻ /s)			
AREA:	Area of Site				km ²	- III - I		555.5
SAAR: SOIL:	Standard A Soil Index	nnual Avera	SOIL TYPE			Dublin Airport SOIL:	SAAR: 0.47	666.6 mm
1	0.1	Very Low	Sandy, We			3012.	0,1,1	
2	0.3	Low		ate Soil (Silty)			Rainfall Intesi	ties
3	0.37	Moderate		ate Soil (Sandy)			Climate Chan	ge % 20%
4	0.47	High		orly Drained				
5	0.53	Very High	Steep, Ro	cky area				
If site is <50H								
	interpolate		ea					
	ar 50 Ha - ST							
Area Q _{bar}	Ha/km²	50	0.5		Qbar Note:	Ab 0 41/- 1: 111	January I	
Q _{bar}	=	0.0456 45.59				than 0.4I/s it will be ow is not practical &		
Q _{bar}	=		I/s/ha			ow is not practical & sues and blockages o		
	_{sar} 50 Ha - R		, -,		pipe.	-13 and Diochages	sucruit	
Area	Ha/km ²	0.041	0.00041					
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Q _{bar}	=	0.41		Qbar Used	=	0.41	l/s	
Q _{bar} (Allowable)	=	2.00	l/s/ha					
Attenu	ation Desig	n Innuts (C	ontribution	Areasl	1			
Location	Area (m²)	Area (Ha)						
Roof & Terrace	160	0.016	100	% Impervious				
Footpath,								
Access, Road &	140	0.014	90	% Impervious				
Carparking								
5.11								
GreenField	110	0.011	15	% Impervious				
Total Area	0	0.041		% Impervious				
30 Year Storm -								
Duration	Met Ereann	Rainfall	Rainfall +	Proposed Total	Proposed Un-Attenuated	Attenuated Outflow	Storage (m3)	
(minutes)	Rainfall (mm)	(mm) + 20%	20% (m3/ha)	Outflow (m3)	Outflow Rate	(m3)		
	()	1	(s/ila/		(I/s)			
5	10.6	12.72	127.20	3.85	12.826	0.123	3.73	
10	14.7	17.64	176.40	5.34	8.894	0.245	5.09	
15	17.3	20.76	207.60	6.28	6.978	0.368	5.91	
30	23.3	27.96	279.60	8.46	4.699	0.735	7.72	
60	31.4	37.68	376.80	11.40	3.166	1.471	9.93	
120	42.4	50.88	508.80	15.39	2.138	2.941	12.45	
180	50.4	60.48	604.80	18.30	1.694	4.412	13.88	
240	57.1	68.52	685.20	20.73	1.439	5.882	14.85	
360 540	68	81.60	816.00	24.68	1.143	8.823	15.86	MAX
720	80.9 91.6	97.08 109.92	970.80 1099.20	29.37 33.25	0.906 0.770	13.235 17.647	16.13 15.60	IVIDA
1080	109	130.80	1308.00	33.25	0.770	26.470	13.10	
1440	123.3	147.96	1479.60	44.76	0.518	35.293	9.46	
100 Year Storm	+ 20%							
Duration	Met Ereann	Rainfall	Rainfall +	Proposed Total	Proposed	Attenuated Outflow	Storage (m3)	
5	14.7	17.64	176.40	5.34	17.787	0.123	5.21	
10	20.5	24.60	246.00	7.44	12.403	0.245	7.20	
15	24.1	28.92	289.20	8.75	9.720	0.368	8.38	
30	32.4	38.88	388.80	11.76	6.534	0.735	11.03	
120	43.7	52.44	524.40	15.86	4.406	1.471	14.39	
120 180	58.8 70.1	70.56 84.12	705.60 841.20	21.34 25.45	2.965 2.356	2.941 4.412	18.40 21.03	
240	70.1	95.16	951.60	28.79	1.999	5.882	22.90	
360	94.4	113.28	1132.80	34.27	1.586	8.823	25.44	
540	112.4	134.88	1348.80	40.80	1.259	13.235	27.57	
720	127.2	152.64	1526.40	46.17	1.069	17.647	28.53	MAX
1080	151.4	181.68	1816.80	54.96	0.848	26.470	28.49	
1440	171.3	205.56	2055.60	62.18	0.720	35.293	26.89	



Appendix F - Flow Control Device

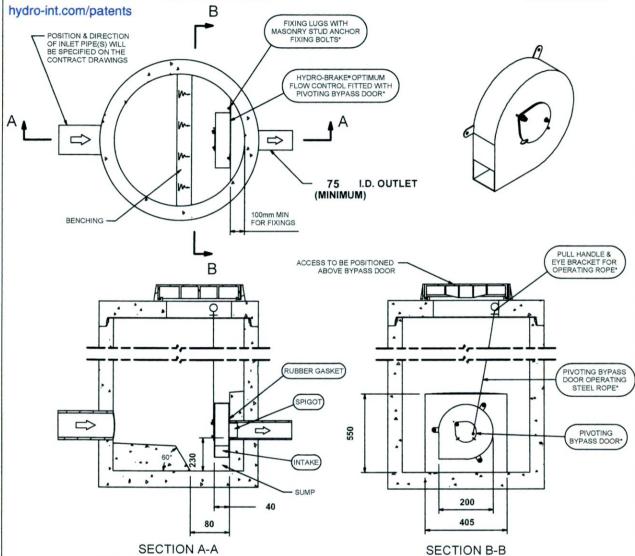
Technical Specification Head (m) Control Point Flow (I/s) Primary Design 0.600 0.400 Flush-Flo™ 0.143 0.343 Kick-Flo® 0.287 0.292 Mean Flow 0.323

Hydro-Brake® Optimum Flow Control including:

- grade 304L stainless steel 3 mm
- 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







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-0032-4000-0600-4000

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.

DATE	5/13/2021 9:09 AM	
SITE	Dublin	
DESIGNER	TB	
REF	Prussia Apartment	



SHE-0032-4000-0600-4000

Hydro-Brake® Optimum

© 2021 Hydro International Ltd, Shearwater House, Clevedon Hall Estate, Victoria Road, Clevedon, BS21 7RD. Tel; 01275 878371 Fax; 01275 874979 Web; www.hydro-int.com Email; enquiries@hydro-int.com

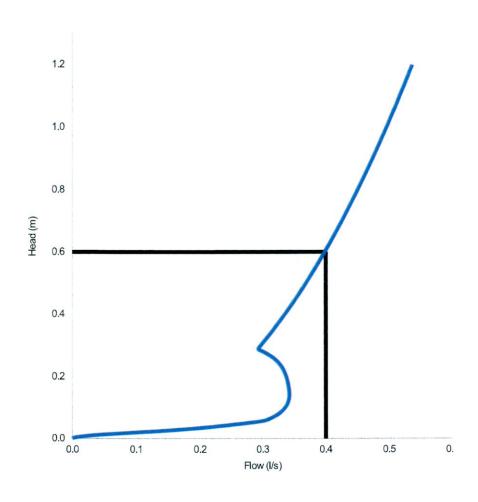
Technical Specification					
Control Point	Head (m)	Flow (l/s)			
Primary Design	0.600	0.400			
Flush-Flo	0.143	0.343			
Kick-Flo®	0.287	0.292			
Mean Flow		0.323			





PT/329/0412

hydro-int.com/patents



Head (m)	Flow (I/s)
0.000	0.000
0.021	0.105
0.041	0.237
0.062	0.309
0.083	0.327
0.103	0.337
0.124	0.342
0.145	0.342
0.166	0.342
0.186	0.339
0.207	0.336
0.228	0.331
0.248	0.324
0.269	0.310
0.290	0.293
0.310	0.302
0.331	0.310
0.352	0.318
0.372	0.325
0.393	0.333
0.414	0.340
0.434	0.347
0.455	0.354
0.476	0.361
0.497	0.368
0.517	0.374
0.538	0.380
0.559	0.386
0.579	0.393
0.600	0.398

DESIGN ADVICE	The head/flow characteristics of this SHE-0032-4000-0600-4000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.	Hydro S			
!	The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.	International 20			
DATE	13/05/2021 09:09	SHE-0032-4000-0600-4000			
Site	Dublin	3112-0032-4000-0000-4000			
DESIGNER	TB	Hydro-Brake Optimum®			
Ref	Prussia Apartment	Trydro-brake Optimum			
© 2018 Hydro International, Shearwater House, Clevedon Hall Estate, Victoria Road, Clevedon, BS21 7RD. Tel 01275 878371 Fax 01275 874979 Web www.hydro-int.com Email designtools@hydro-int.com					



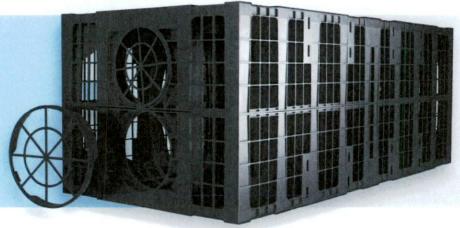
Appendix G - Wavin Aquacell Technical Data Sheet



AquaCell Plus-R

Product description

AquaCell Plus-R has been designed primarily for use in applications where inspectability is required, and is suitable for use in all applications from landscaped areas to heavily trafficked areas.



Technical specification

Product code / SAP code	6LB250 / 4064832	Void ratio	95%
Colour	Black	Material	Recycled PP
Dimensions	1m x 0.5m x 0.4m	Vertical loading	70.2 tonnes/m² (702 kN/m²)
Weight	12.7kg	Lateral loading	15.1 tonnes/m² (151 kN/m²)
Storage volume	190 litres		

Maximum installation depths

Typical soil type	Maximum depth of installation – to base of units (m) ¹					
	Soil weight kN/m³	Angle of internal friction φ (degrees) ^{2, 3}	Landscaped areas	Vehicle mass <9 tonnes ^{4, 5}	Vehicle mass <44 tonnes	
Over consolidated stiff clay	20	24	4.67	4.42	4.17	
Silty sandy clay	19	26	5.03	4.78	4.53	
Loose sand and gravel	18	30	5.86	5.61	5.36	
Medium dense sand and gravel	19	34	6.87	6.62	6.37	
Dense sand and gravel	20	38	7.82	7.57	7.30	

Minimum cover depths

	Landscaped areas	Car parks with vehicle mass <3 tonnes ⁵	Car parks with vehicle mass <9 tonnes	Car parks with vehicle mass <12 tonnes	Low speed roads with vehicle mass <60 tonnes
Minimum cover depth (m)	0.30	0.50	0.69	0.81	1.30

- 1. Without groundwater present below base of units AquaCell Plus-R may be used where groundwater is present, contact Wavin for technical advice.
- 2. Loosening of dense sand or softening of clay by water can occur during installation. The designer should allow for any such likely effects when choosing an appropriate value of φ.
- The design is very sensitive to small changes in the assumed value of φ, therefore, it should be confirmed by a chartered geotechnical engineer. In clay soils, it may be possible to utilise cohesion in some cases.
- 4. Applicable for car parks or other areas trafficked only by cars or occasional refuse collection trucks or similar vehicles (typically one per week).
- 5. This category should be used when considering landscaped areas that may be trafficked by ride on mowers.

Assumptions made:

- · Ground surface is horizontal
- Shear planes or other weaknesses are not present within the structure of the soil



Appendix H – Existing Site Layout & Drainage Plan, Proposed Site Layout & Drainage Plan, and Proposed Drainage Details