CS CONSULTING
GROUP
DUBLIN - LONDON - LIMERICK

CRONIN & SUTTON CONSULTING (part of the CS Consulting Group)
19-22 Dame Street, Dublin 2, D02 E267, Ireland

T | 353 1 5480863 E | info@csconsulting.ie W | www.csconsulting.ie

Engineering Services Report

Spencer Place Residential

Block 2, Spencer Dock, Dublin 1

Client: Spencer Place Development Company Limited

Job No. R043

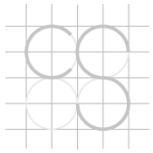
August 2019

Limerick Office:
45 O'Connell Street
Limerick, V94 XE18
Ireland

T: 353 (0)61 594988
E: info@csconsulting.ie
W: www.csconsulting.ie

London Office:
45 Beech Street
London, EC2Y 8AD
UK

T: +44 (0) 207 070 3660
E: info@csconsultinguk.com
W: www.csconsultinguk.com



CS CONSULTING
GROUP
DUBLIN - LONDON - LIMERICK

CS CONSULTING GROUP
DUBLIN - LONDON - LIMERICK

ENGINEERING SERVICES REPORT

SPENCER PLACE RESIDENTIAL, BLOCK 2, SPENCER DOCK, DUBLIN 1

CONTENTS

File Location: J:\R_JOBS\JOB-R043\B_DOCUMENTS\C_CIVIL\A_CS REPORTS\4.0 SHD APPLICATION FOR ADDITIONAL FLOORS\ENGINEERING SERVICES REPORT\R043 - ENGINEERING SERVICES REPORT.DOCX

Job Ref.	Author	Reviewed By	Authorised By	Issue Date	Rev. No.
R043	DB	CT	RFM	08.08.2019	PLANNING

1.0 INTRODUCTION

In conjunction with the multi-disciplinary Design Team, CS Consulting were commissioned by Spencer Place Development Company Limited, to develop an Engineering Services Report (ESR) to accompany a planning application for the site at City Block 2, bound by Sheriff Street to the north, Mayor Street to the south and New Wapping Street to the east, Spencer Dock, Dublin 1.

The purpose of this ESR is to review the potential services available to develop the proposed subject lands. This report addresses drainage (both foul & storm) and potable water for the site. A Flood Risk Assessment is outlined in an accompanying document.

Development comprising of an amendment to permitted development Reg. Ref. DSDZ2896/18 and as amended by Reg. Ref. DSDZ4279/18 at Spencer Place North, City Block 2, Spencer Dock, Dublin 1. The proposed development seeks revisions to the permitted Block 1 and 2 to provide for an increase in the number of residential units from 349 no. to 464 no. apartment units and the change of use of the permitted aparthotel development to provide shared accommodation. The proposed development will increase the height of the permitted development) increasing the maximum height of Block 1 from 7 no. storeys (27.5 m) to a maximum height of 13 no. storeys (46.8m) and increasing the maximum height of Block 2 (27.5m) to 11 no. storeys (40.5m). The proposed development will also include the provision of a link bridge between Block 1 and Block 2 at 6th floor level, revised landscaping, the provision of communal open space, revised under croft level, provision of roof terraces and all other associates site development works to facilitate the development.

A full description of the scheme is outlined in the Planning Report prepared by John Spain and Associates which accompanies this submission.

The site, of C. 1.26Ha, is bound by Sheriff Street to the north, Mayor Street to the south and New Wapping Street to the east.

The site also includes the existing operational North Lotts Pumping Station and its associated infrastructure – the development of the planning application involves building adjacent to, and over, the Pumping Station.

The site has an average topographical level of approximately 2.5mAOD (Malin Head). The site is located within the Strategic Development Zone (SDZ) for the North Lotts and Grand Canal Dock Planning Scheme 2014.

All associated and ancillary site development and landscaping works will be undertaken including provision of internal routes for pedestrians, hard and soft landscaping with integrated lighting and provision of communal open space for amenities as well as all other site excavation and development works above and below ground.

A full description of the scheme is outlined in the Planning Report prepared by John Spain and Associates which accompanies this submission.

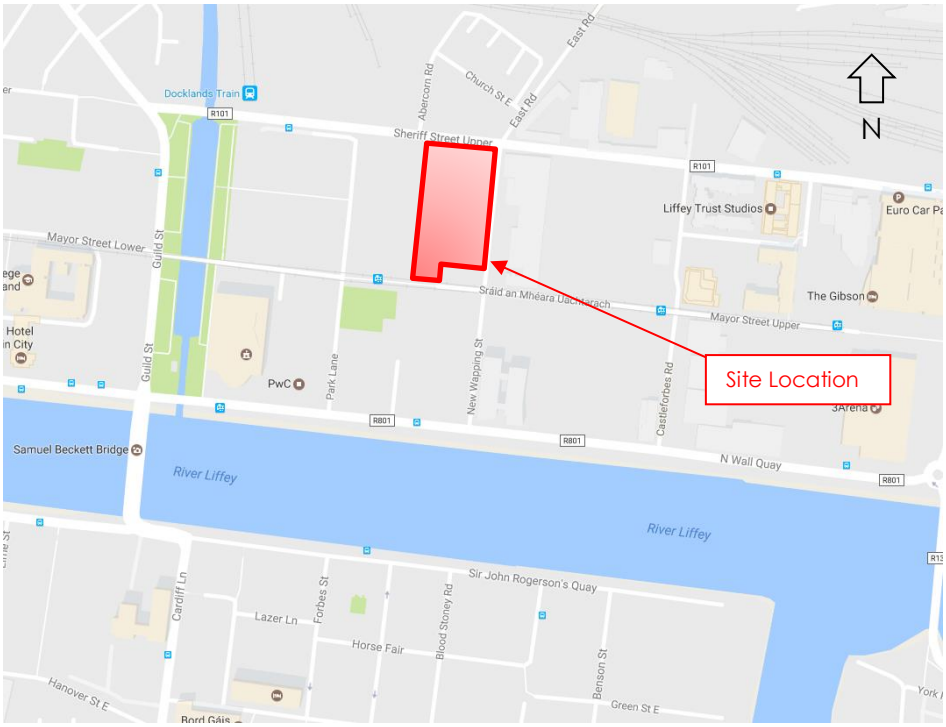


Figure 1 Site Location
(Image source: Google Maps)

2.0 SCOPE OF WORKS

CS Consulting were commissioned by Spencer Place Development Company Limited to prepare the following Engineering Services Report to accompany a planning application for the site at Block 2, Spencer Dock, Dublin 1.

In compiling this report Cronin & Sutton Consulting liaised with a number of third parties, namely:

- Dublin City Council Drainage Division,
- Irish Water,
- Office of Public Works,
- Geological Survey of Ireland,
- CIE,
- Clients representatives & Design Team.

In preparing this report the site was visited and assessed.

No intrusive on-site testing was carried out and all conclusions indicated in this report were based solely on desk top information.

3.0 SITE CONTEXT

The site, of C. 1.26Ha, is bound by Mayor Street Upper, Sheriff Street Upper, Park Lane and New Wapping Street, Dublin 1.

The site has an average topographical level of 2.5mAOD (Malin Head) to the Mayor Street Upper side and 3.40mAOD (Malin Head) to the Sheriff Street Upper side of the site.

The site is currently zoned within the Docklands SDZ and is subject to the provisions of the North Lotts and Grand Canal Dock Planning Scheme 2014.

4.0 FOUL DRAINAGE

4.1 Existing Foul Drainage Infrastructure

Records obtained from Dublin City Council indicate a number of public sewers adjacent to the subject lands, namely: -

- A 1000-brick culvert combined sewer to the West;
- A 940-brick culvert combined sewer to the East, flowing North on New Wapping Street.

These sewers ultimately drain to the Ringsend WWTP at Ringsend.

See **Appendix A for Drainage Records**.

As part of the Greater Dublin Strategic Drainage Study (DCC 2005) a comprehensive review of the public drainage network in the greater Dublin area was carried by Dublin City Council. An aspect of these works was to assess the public drainage infrastructure for its current and future hydraulic performance.

A number of maps were published giving an indication of the predicated hydraulic performance up to 2031.

The report modelling indicated that the combined sewer on New Wapping Street surcharges for a 1- to 2-year return period but does not flood for 1-in 30-year events or less.

See **Appendix B** for the GDSDS 2031 System Performance Assessment.

4.2 Proposed Foul Drainage Infrastructure

It is proposed to construct a new foul drainage network in accordance with BS EN 752, Part 'H' of the Building Regulations and the Irish Water Code of Practise for Wastewater Infrastructure.

The accommodation schedule, namely number of rooms, is summarised below: -

Building	1B2P	2B3P	2B4P	Studio Single	Studio Double	2Bed
Block 1 – Residential	141	0	157	-	-	
Block 2 – Residential	88	18	60	-	-	
Block 2 – Co Living	-	-	-	2	46	36

Given the presence of the existing North Lotts Pumping Station and associated underground infrastructure, the site is essentially divided in two halves i.e. north and south of the pumping station. It is proposed to provide separate foul systems i.e. one for each side of the existing pumping station.

The Irish Water Code of Practise for Wastewater Infrastructure (clause 3.6) indicate that an effluent volume of 450L/day/person and 500ltrs/day/room under hotel use is appropriate.

Block 1 Resi – (141 + 157) Units x 450 ltrs/day/head = **135,900ltrs/day**

Block 2 Resi – (88 + 18 + 60) Units x 450 ltrs/day/head = **74,700 ltrs/day**

Block 2 Co Living – (2 + 46 + 36) = 84 rooms x 500 ltrs/day/room = **42,000 ltrs/day**

Therefore, the proposed new development will generate in the order of 252,600 litres of effluent per day.

This equates to:

Building	Dry Weather Flow (DWF)	6 x DWF
Block 1	1.57 ltrs/sec	9.43 ltrs/sec
Block 2	1.35 ltrs/sec	8.10 ltrs/sec

The drainage network for the development will be in accordance with Part H of the Building Regulations and the last private manhole before connection into the public system will be in accordance with Irish Water requirements.

It is proposed to allow the upper floors to drain via gravity as per the effluent flows above directly to the existing combined sewer on New Wapping Street.

The basement level will drain into an internal pumping chamber and discharge to an outfall manhole at ground level and outfall by gravity into the public system.

Assuming an effluent value of 100 ltrs/person/day (as per Irish Water Code of Practise for Wastewater Infrastructure) at 1 person/7.5m^2 in the basement areas, equates to the following storage requirements for each of the lower ground parking areas under Block 1 and Block 2: -

Building	Area (m^2)	Persons	Effluent	Storage Volume (m^3)
Block 1	3,304	440	44,053 ltrs/day	44 m^3
Block 2	3,067	408	40,900ltrs/day	41 m^3

Two foul tanks and pumping chambers will be installed to cater for the volumes noted above.

The basement area will be fitted with a suitable oil separator before the run-off is collected into the pumping chamber.

The pumping chamber will pump to stand-off manholes where it will fall by gravity to the existing brick culvert combined sewer running south to north along New Wapping Street.

The proposed effluent generated by the subject lands combined with the separation and attenuation of storm flows will have minimal impact on the receiving drainage infrastructure.

5.0 STORMWATER DRAINAGE

5.1 Existing Stormwater Drainage Infrastructure

Existing drainage records indicate a 940-brick culvert combined sewer running from south to north on New Wapping Street.

It is proposed to discharge the attenuated surface water flows into this sewer.

5.2 Proposed Storm Water Infrastructure

In accordance with the requirements of the Councils Drainage Division all new developments are to incorporate the principles of Sustainable Urban Drainage Systems, SuDs. The SuDs principles require a two-fold approach to address storm water management on new developments.

The first aspect is to reduce any post development run-off to pre-development discharge rates. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event increased by 20% for predicted climate change factors.

The study levels are taken from CFRAMS Tidal Map, location 09LIFF00131, See **Appendix C.**

As noted above, the existing North Lotts Pumping Station bisects the site in two, therefore, it is intended proposed to provide 2no attenuation tanks at lower ground level i.e. one tank for North 1 and one tank for North 2.

Attenuation calculations indicate a storage volume of **1,217m³** is required based on a site area of 12,645m² (i.e. 1.26Ha).

Furthermore, in accordance with Dublin City Councils requirements as set out in their document, North Lotts & Grand Canal Dock Planning Scheme, NLGCDPS, DCC 2014, the proposed must provide a minimum storm water storage of 570m³/Ha, (See. 4.5.4.3.2 Surface Management, NLGCDPS) which leads to a requirement for a further **720m³** (i.e. 570m³/Ha x 1.26Ha).

Hence, a total attenuation volume of **1,940m³** (i.e. 1217m³ + 720m³) is required for the development based on a development area of 12,645m² (1.26Ha).

As the site is divided in two, 2no separate attenuation tanks – each taking approximately 50% of the volume of water required are to be provided as below: -

- North 1 – 970m³ attenuation tank
- North 2 – 970m³ attenuation tank

See **Appendix D** for attenuation calculations.

The second aspect of the SuDs systems is to improve the quality of the storm water before it leaves the site. Generally, a number of SuDs techniques are available to aid in the improvement of the storm water. This will include:

i) Low water usage sanitary appliances,
ii) 'Green Roof' technology, (Bauder product),
iii) Permeable paving for car parking bays,
iv) Local draining of footpath or hardstanding areas into planting.
v) Attenuation and restricted storm water discharge.

See CS Consulting drawing R043/018 for details of the proposed SuDs strategy.

Following the proposed developments initial discussions with the planning Board, their option made reference to the query from Dublin City Council pertaining to a requirement in the North Lotts LAP regarding the requirement to ensure that sufficient attenuation had been included in the storage design to cater for a 'tidal locking' scenario, to prevent flooding. CS Consulting can confirm that the additional 570m3/Ha requirement has been included in our storm water design calculations, see **Appendix D** for our attenuation calculations.

6.0 POTABLE WATER SUPPLY

6.1 Existing Potable Water Supply

According to Irish Water records, there is existing watermains located along New Wapping Street.

It is assumed that there is an existing watermain connection to the North Lotts however this will not be utilised as part of the new development. A new connection(s) will be provided to the site for the new development.

Refer to **Appendix E** for Irish Water records.

6.2 Proposed Potable Water Supply

Two new metred connections (one for Block 1 and one for Block 2) taken from the existing public watermain located along New Wapping Street are proposed.

The volumes required per day are based on the following ratios

Residential – 150 ltrs/day/head @ 2.7heads/unit

Co Living – 500 ltrs/day/room

Building	**Resi**	**Co Living**
Block 1	135,900 ltrs/day	0 ltrs/day
Block 2	74,700 ltrs/day	42,000 ltrs/day

The average daily demand is 252m^3 per day.

The average day/peak week is 315m^3 per day.

In order to mitigate actual demand, mitigating methods such as dual-flush toilet units and aerated taps will be applied.

7.0 AGREED STRATEGY WITH IRISH WATER REGARDING NORTH LOTTS PUMPING STATION

Extensive dialogue was held between the Design Team & both Irish Water and Dublin City Council pertaining to the arrangements required for the proposed interaction of the development and this existing Pumping Station.

Agreements, in principle have been reached as part of the schemes recent previously granted application in terms of: -

- Protection of the Irish Water asset during construction works of the proposed development;
- Appointment of an Independent 3rd Party Engineer to review works adjacent to the North Lotts Pumping Station;
- Maintaining access to the Irish Water asset during construction and operation of the proposed development;
- Review of technical aspects;
- Environmental monitoring (noise, vibration, etc) of the proposed development during construction.

Regular meetings have commenced in October 2018 between Irish Water, the Independent 3rd Party Engineer and the Developer in terms of implementing the measures previously agreed in principle with all parties being informed of the planning application which this report accompanies for additional height to the scheme.

In addition CS Consulting received a response to our *Pre-connection Enquiry* submission and a further *Letter of Design Acceptance* from Irish Water for the submitted design, See **Appendix F**.

8.0 BASEMENT IMPACT ASSESSMENT

It is acknowledged by CS Consulting that Dublin City Council are currently drafting guidance documentation on the preparation of Basement Impact Assessments to establish any potential risks to the current groundwater flow regime post new basement construction within the City. Following initial discussion, Dublin City Council indicated that the assessment should cover the points listed below.

- Groundwater levels and flows,
- Surface water flows and infiltration,
- Planting, landscaping and biodiversity,
- Structural and other impacts on adjacent properties, including the public realm,
- Construction Stage Impacts.

8.1 Current Hydrogeological Conditions

In preparation for an earlier planning submission for the subject site a detailed site investigation was commissioned to establish the geotechnical & environmental condition of the subsoil. Boreholes/rotary core drilling and trial pits were all installed. A brief summation of the ground conditions encountered is listed below:

Made Ground:	0 – 3.00 Below Ground level
Dense sandy gravel:	3 – 7.60m
Stiff Brown Clay:	7.6 – 9.5m
Very Stiff Clay:	9.5 – 19.30m (no drilling deeper than this)

Groundwater strikes were recorded in all on site boreholes, water depths ranged from 3.7m to 6.5m below existing ground levels. Groundwater flow direction is to the River Liffey to the south of the subject site. The River Liffey is constrained by the Quay Wall which acts as a barrier to groundwater flow. It is not known if there is a hydraulic link between the groundwater on the subject site and Liffey.

The Quay Wall acts as the main subsurface hydraulic boundary condition for the subject site. A lesser subsurface obstruction is the Irish Water Regional Pumping Station, which extends 15.0m below ground level & is located in the centre of the subject lands. The pumping station has a foot print in the region of 40m x 20m.

A review of the sites Hydrogeological status from available mapping prepared by the Geological survey of Ireland, (www.gsi.ie) sets the local groundwater conditions as:

- Bed Rock Aquafer: Locally Important Aquifer: Moderately Productive in local zones, (Li classification),
- Groundwater Vulnerability: Low,
- Maximum annual recharge: 200mm/year,
- here are no recorded Drinking Water Protection Areas in proximity of the site.

8.2 Current Surface Water Conditions

The present site is a mix of temporary carparking / removed previous buildings and open space. Historically the site drainage unattenuated storm water flows into the local Dublin City council combined drainage system. This transported combined flows for treatment at the Ringsend regional Waste Water Treatment Plant. As there are risks from combined

flows being released into the River during periods of intense rainfall and the uneconomic process of treating combined flows Dublin City Council follow a policy of separating the storm and foul flows from all new developments. As such the proposed development will separate its foul & surface water (which will be an attenuated flow) flows on site before discharge into the local drainage network. The proposed site use will see the subject lands returned to its historical hardstanding make up. As such no infiltration systems will be introduced to the site.

To the south of the subject lands is the River Liffey and to the west the Royal Canal. The subject site does not have a positive outfall into either of these water bodies and none is proposed post-development.

8.3 Ecological Setting of the Development

As noted above the River Liffey and the Royal Canal are in close proximity to the subject site. The Royal Canal is a man-made water body with its more prominent ecological value lies in the diversity of spices it supports. The River Liffey supports a wide range of species and it is a stated aim of local and national policy to enhance its overall quality.

Notwithstanding, as noted the proposed development does not discharge directly into either of these two water bodies and the quay Wall, (containing the Liffey) & the man-made nature of the Royal Canals construction prevents hydrogeological conductivity with the groundwater regime at the subject lands.

8.4 Proposed Development

The proposed development will NOT include the installation of a basement in the traditional sense. The levels across the site vary from 2.50m – 3.00mAOD. The proposed ground floor level is set at 4.60mAOD, with the lower, under croft level set at 1.00mAOD. Based on the groundwater levels

established during the 2015 site investigation the groundwater has a level ranging from 0.00mAOD to -1.00mAOD. Therefore, the proposed lowest level of the development will not be located in the groundwater table. The deepest points of the proposed development, (lift pits) will extend to a level of -0.50mAOD, still outside of the established groundwater level.

8.5 Potential Impacts – Construction Phase

As with any on site works there is a potential for site activities to led to accidental onsite spillages. The onsite construction management plan lodged with this application gives a breakdown of the onsite protocols to be followed to reduce, as far as reasonably practical, the likelihood of accidental spills occurring, along with the procedures in place to address same. As the proposed development will not consist of any excavations going down to the water table, the potential for surface activities to have a negative effect on groundwater quality is negligible.

8.6 Potential Impacts – Post Construction

As noted the completed building will not be located within the water table. Therefore, the potential long-term impacts of the development on the local groundwater regime is negligible. The completed scheme will have no physical impediment to ground water flow as such no impacts are predicted.

8.7 Concluding Remarks to Basement Impact Assessment

Dublin City Council require that all potential new developments review their proposals taking into account any potential risk during construction phase or when the development is completed. The subject lands were the subject of a previous planning application in preparation of same a detailed site investigation was carried out. The onsite works established the sub-strata for

the site and noted the groundwater level. The proposed development does not include any element of the structure which will be located in the water table.

As no part of the completed scheme will interfere with the current groundwater flow regime no adverse effects are predicated for the proposed development.

9.0 TRAFFIC GENERATION AND IMPACT

A Traffic Impact Assessment has been prepared by CS Consulting and submitted in support of the previous planning application (register ref. DSDZ4279/18) pertaining to the subject site. Given that the amendments sought under the current application will result in the addition of only 1no. car parking space to that already permitted, the findings of this Traffic Impact Assessment continue to hold.

The previously-submitted Traffic Impact Assessment found that:

- The proposed development shall not generate excessive traffic flows during peak hour periods and shall not have a detrimental impact on the operation of the surrounding road network.
- The existing signal-controlled Mayor Street Upper / New Wapping Street junction will be able to operate within effective capacity up to and beyond the year 2036 (15 years after development completion). Vehicle queues and delays on all approaches to this junction shall remain at levels similar to those currently existing.
- The existing signal-controlled Sheriff Street Upper / East Road / New Wapping Street junction will be able to operate within ultimate capacity up to and beyond the year 2036 (15 years after development completion). The northern and western approaches to this junction currently operate at effective capacity during the AM peak period; these approaches shall exceed effective capacity from 2021 onwards, under the influence of background traffic growth and other committed development, but shall continue to operate within ultimate capacity beyond 2036. Traffic related to the proposed development shall have a negligible influence on the operation of this junction.

- The 2no. proposed priority-controlled development access junctions on New Wapping Street will be able to operate within their effective capacities and with negligible queues and delays when the development is completed in 2021; in 2026, 5 years after opening; in 2031, 10 years after completion; and in 2036, 15 years after development completion.

- The proposed development access junctions shall not result in any increase in vehicle queueing on New Wapping Street and shall not impact upon the operation of LUAS light rail services along Mayor Street Upper.

10.0 ODOUR DISPERSAL MODELLING

While not specifically related to CS Consulting's scope of work, it is noted that an odour dispersal model has been completed by AWN Consulting for the proposed development and has been submitted with the planning application.

On behalf of CS Consulting

Damien Byrne

Senior Project Engineer

BE (Hons) CEng MIEI MIStructE

Appendix A: Drainage Records

UISCE ÉIREANN : IRISH WATER

Legend

- Unknown Meter ; Other Meter
- Sluice Valve Open
- Sluice Valve Closed
- Double Air Control Valve

Water Hydrants

Hydrant Function

- Fire Hydrant
- Telemetry Kiosk
- Cap
- Other Fittings

Water Distribution Mains

Owned By

- Irish Water
- Water Abandoned Lines

Sewer Manholes

Manhole Type

- Standard
- Pump Station
- Gravity - Combined
- Gravity - Foul
- Gravity - Overflow
- Pumping - Combined
- Pumping - Foul
- Syphon - Overflow

Storm Manholes

Manhole Type

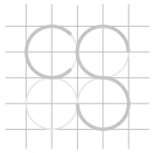
- Standard
- Surface Gravity Mains

1:500 at A0

Last edited: 16/03/2018

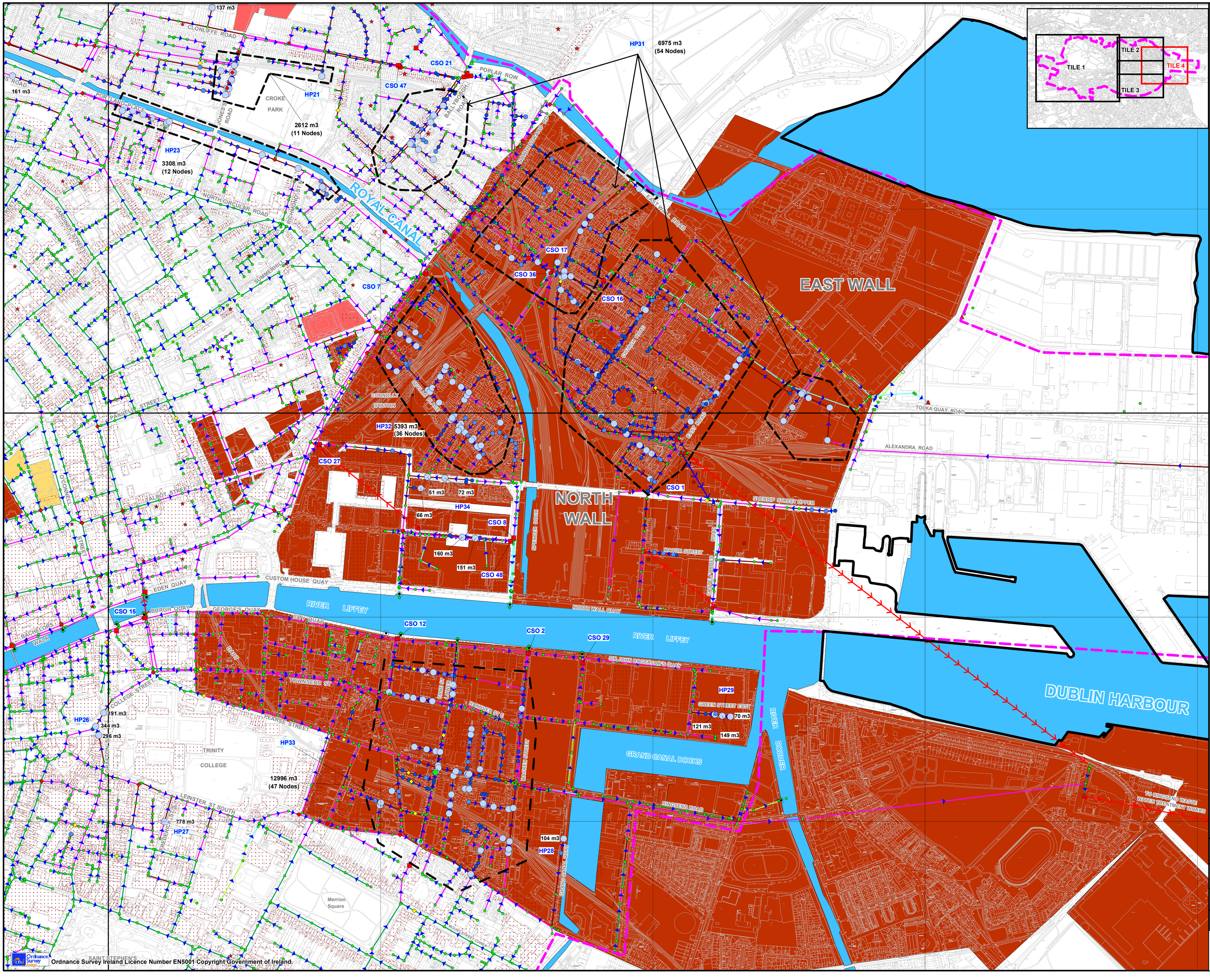
Metres

0 25 50 100



CS CONSULTING
GROUP
DUBLIN - LONDON - LIMERICK

Appendix B: GDSDS 2031 System Performance Assessment



Ordnance Survey Ireland Licence Number EN5001 Copyright Government of Ireland.

Legend

- Wastewater Treatment Works
- County Council Boundaries
- Catchment Boundary
- Rising Main (Coloured as sewer)
- Sewer not included in hydraulic model
- Direction of Flow (on sewer line)
- River/Watercourse
- Culverted River/Watercourse
- 1:1000 OS Grid Line Boundaries
- 1:5000 OS Grid Line Boundaries
- Combined Sewer Overflow
- Foul/Combined Pumping Station
- Foul/Combined Bifurcation
- Foul/Combined Apex Manhole
- Foul/Combined Flow Management Chamber
- Storm Water Overflow to Foul/Combined
- Storm Water Bifurcation
- Storm Water Apex Manhole

Flooding Performance Key

- Flooding greater than 50m3 Volume for 5yr Return Period Event (Volume m3)
- Flooding between 25m3 and 50m3 Volume for 5yr Return Period Event
- Flooding less than 25m3 Volume for 5yr Return Period Event
- Modelled Manhole does not flood for 5 year Return Period Event
- 75m3 — 1:5 year Foul/Combined flood volume
- 75m3 — 1:5 year Storm flood volume
- Historically Reported Flooding Incidents caused by Hydraulic Overloading
- Outfall

Foul/Combined Hydraulic Performance Key

- Foul/Combined Sewer floods for 30 year return period or less.
- Foul/Combined Sewer surcharges for 1 or 2 year return period events
- Foul/Combined Sewer does not surcharge for 1 or 2 year return period events and does not flood for a 30 year return period event or below. (eg 1,2,5,10,20)

Storm Hydraulic Performance Key

- Storm Sewer floods for 30 year return period or less.
- Storm Sewer surcharges for 1 or 2 year return period events
- Storm Sewer does not surcharge for 1 or 2 year return period events and does not flood for a 30 year return period event or below. (eg 1,2,5,10,20)
- Area Covered by EDS/DCC Asset Survey

Important Hydraulic Considerations

- Location of Known Basements
- Zoned Residential Land
- Zoned Science/Technology Parks/Land
- Zoned Industrial Land
- Zoned Commercial Land
- Zoned Land for Mixed Development
- Recently Completed Developments

Catchment Deficiency Reference Key

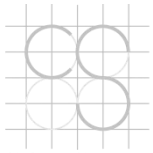
- HP 1 — Hydraulic Deficiency Reference No (Foul/Combined) (Not included for EDS/DCC Asset Survey area).
- CSO 1 — CSO Deficiency Reference No. (Hydraulic or Environmental)
- OP 1 — Operational Deficiency Reference No.

Notes

1. Results are based on assessment of sewer system under 1, 2, 5, 10, 20, 30, 50 and 100 year return period rainfall events.
2. For colour coding, flooding takes priority over surcharging.
3. Levels referenced in meters to Ordnance Survey Datum, which is Mean Sea Level at Malin Head, Co. Donegal (1970 Adjustment).

Project	GREATER DUBLIN STRATEGIC DRAINAGE STUDY
Catchment	CITY CENTRE/DOCKLANDS CATCHMENT
Title	PHASE 3 - 2031 System Performance Assessment
Dr'g. No.	GDSDS/MAR3079/F001/P3-003_Tile4
Drawn: JGA	Chk'd: MCB
Approved: MCB	
Scale: N.T.S.	REVISION: A
Date: 7/5/04	

Dublin Drainage
A Strategic Study for Greater Dublin



CS CONSULTING
GROUP
DUBLIN - LONDON - LIMERICK

Appendix C: CFRAMS Tidal Map, location 09LIFF00131

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09LIFF00180	2.67	N/A	3.12	N/A	3.35	N/A
09LIFF00131	2.67	N/A	3.11	N/A	3.34	N/A
09LIFF00072	2.67	199.56	3.11	205.11	3.34	208.47

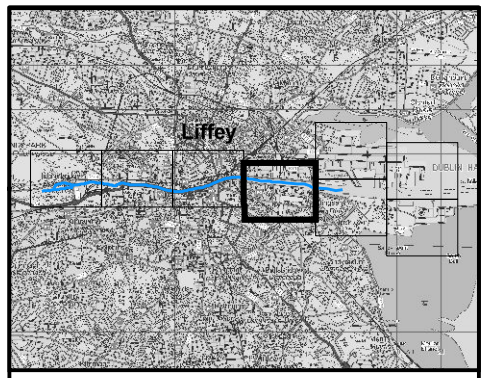
09LIFF00180

09LIFF00131

09LIFF00072

For river Dodder flood extents and depths refer to Dodder maps.

Please note that the South Docklands Campshire Works are currently not included in the mapping shown here.



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Tidal AEP Event
- 0.5% Tidal AEP Event
- 0.1% Tidal AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

OPW Oifig na nOibreacha Poiblí The Office of Public Works

RPS

The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:
Liffey Tidal Flood Extents

Map Type:	EXTENT	
Source:	TIDAL	
Map Area:	COASTAL	
Scenario:	CURRENT	
Drawn By :	C.C.	Date : 28 July 2016
Checked By :	A.S.	Date : 28 July 2016
Approved By :	S.P.	Date : 28 July 2016

Drawing No. :
E09LIF_EXCCD_F0_04

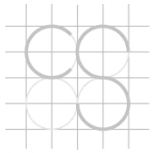
Map Series : Page 4 of 8

Drawing Scale : 1:5,000 @ A3

316600 316800 317000 317200 317400 317600 317800 318000

234800 234600 234400 234200 234000 233800 233600

0 50 100 200 300 400 500 Metres



CS CONSULTING
GROUP
DUBLIN - LONDON - LIMERICK

Appendix D: Attenuation Calculations

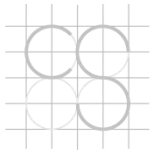
JOB NAME: Spencer North			JOB No: R043			02/08/2018
TITLE:	Planning Attenuation Calculations RevA		CALCS BY: DB			CHECK'D: RFM
RCD.	48		ISSUE.	1	REV.	1

Design Storm Return Period:	100	years		
Nearest Rainfall Gauge:	Dublin City			
Total Site Area:	1.26	ha		
Roof Area:	0.62	ha	.....@	100% Impervious
Hard Surface:	0.63	ha	.....@	100% Impervious
Open Area:	0.00	ha	.....@	0% Impervious
Effective Impermeable Area:	1.26	ha		

Allowable Outflow	**Calculate**		
IH124: QBAR = 0.00108 x AREA$^{0.89}$ x SAAR$^{1.17}$ x SOIL$^{2.17}$			
SAAR:	710	mm	
Soil Type:	3		
SOIL:	0.37		
QBAR/ha	2.92	l/s/ha	
Specified Allowable Outflow	**2**	**l/s/ha**	(County Council Requirments)
Allowable Outflow	**2.50**	**l/s**	

Duration (min)	Rainfall 100 Year (mm)	Intensity (mm/hr)	Discharge Q (= 2.71Ai) (l/s)	Proposed Runoff (m^3)	Contiguous Land Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Req'd (m^3)
2	8.3	247.5	845	101	0	101	0	101
5	14.3	171.6	586	176	0	176	1	175
10	21.5	128.7	439	264	0	264	2	262
15	25.9	103.4	353	318	0	318	2	316
30	34.1	68.2	233	419	0	419	5	415
60	41.3	41.3	141	507	0	507	9	498
120	49.5	24.8	85	608	0	608	18	590
240	59.4	14.9	51	730	0	730	36	694
360	70.4	11.7	40	865	0	865	54	811
720	84.7	7.1	24	1041	0	1041	108	933
1440	98.5	4.1	14	1210	0	1210	216	994
2880	118.8	2.5	8	1460	0	1460	432	1028
4320	126.5	1.8	6	1555	0	1555	648	907

Storage required		1028	**m^3**
Climate Change Factor	20%	1234	**m^3**
DCC Tidal Lock Factor (570/ha)	(570*1.26)	703.95	**m^3**
Total Storage Required		**1938**	**m^3**



CS CONSULTING
GROUP
DUBLIN - LONDON - LIMERICK

Appendix E: Irish Water Watermain Records

UISCE ÉIREANN : IRISH WATER

Flow Control Valves

Valve Type

- PRV

Boundary Valves

Valve Normal Position

- Closed

Non Boundary Valves

Valve Normal Position

- Open
- Closed
- Air Control Valves

Non Boundary Meter

Meter Function

- Meter

Water Hydrants

Hydrant Function

- Fire Hydrant
- Kiosk

Water Fittings

Fitting Type

- Cap
- Other Fitting

Water Mains(Irish Water Owned)

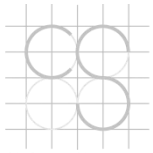
Liquid Type

- Potable Water
- Water Abandoned Lines

1:1,000
at A0
Metres

Last edited:
16/03/2015

0 37.5 75 150



CS CONSULTING
GROUP
DUBLIN - LONDON - LIMERICK

Appendix F: Irish Water PCE & Design Acceptance Letter

Robert Fitzmaurice
CS Consulting
19-22 Dame Street
Dublin 2
Dublin, Ireland D02E267

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

30 July 2019

Re: Design Submission for City Block 2, Spencer Dock, Dublin (the "Development") (the "Design Submission") / Connection Reference No: CDS19000361

Dear Robert Fitzmaurice,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:
Name: Marina Zivanovic Byrne
Phone: 01 89 25991
Email: mzbyrne@water.ie

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

Appendix A

Document Title & Revision

- R043-003-E Ground Level Proposed Drainage Layout
- R043-004-D Proposed Watermain Layout

Standard Details/Code of Practice Exemption: N/A

*For further information, visit **www.water.ie/connections***

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

NOTES

1. For setting out refer to Architect's drawings.
2. This drawing to be read in conjunction with all other Architectural and Engineering drawings and all other relevant drawings and Specifications.
3. DO NOT SCALE THIS DRAWING. Use figured dimensions only.
4. No part of this document may be reproduced or transmitted in any form or stored in any retrieval system of any nature without the written permission as copyright holder except as agreed for use on the project for which the document was originally issued.
5. Ordnance Survey Ireland Licence Number EN 0074018

Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By
A	AUG 2018	DRAINAGE LAYOUT UP-DTED AND SUBMITTED AS PART OF DUBLIN CITY COUNCILS AI REQUEST	RFM	RFM
B	26.10.2018	REGULARISATION PLANNING APPLICATION	DD	DB
C	11.02.2019	REVISED FOR PLANNING FOR ADDITIONAL FLOORS	DD	DB
D	28.03.2019	DRAWING ISSUED FOR SHD APPLICATION	DD	DB
E	23.07.2019	DETAILS UP-DATED FOLLOWING IRISH WATER COMMENTS	RFM	RFM

Architect	Henry J Lyons
Project	Spencer Place Residential Block 2 Spencer Dock Dublin 1
Title	Ground Level Proposed Drainage Layout

Drn by	Chkd by	Aprvd by	Dwg. No.	Revision
AAK	DB	RFM	R043-003	E
Date MAR 2018	Scale 1:250 @ A1			

CS Consulting Group
DUBLIN | LONDON | LIMERICK
Head Office
19-22 Dame Street, Dublin 2.
T: +353 (0)1 5480863 F: +353 (0)1 9011355
e: info@csconsulting.ie
w: www.csconsulting.ie
NSAI Certified
Quality I.S. EN ISO 9001:2008
Environment I.S. EN ISO 14001:2004
Energy I.S. EN ISO 50001:2011
Health & Safety OHSAS 18001:2007

EXISTING 400mmø DI WATERMAIN

PROPOSED 400mmø WATERMAIN TO IRISH WATER REQUIREMENTS

BLOCK 1 RESIDENTIAL

BLOCK 2 RESIDENTIAL

BLOCK 2 CO-LIVING

Existing Irish Water Pump Station

Lobby

Reception 82 m²

Reception 143 m²

Management & Maintenance 35 m²

Post Room

Meter Room

Sub-Station

Cafe LV Room

AV / Multimedia Room 41 m²

Gym / Multi-Purpose Room 71 m²

Staff 33 m²

Bookable Room 56 m²

Cafe 116 m²

Line of Mezzanine Above

PROPOSED BULK FLOW METER

PROPOSED 100mmø WATERMAIN CONNECTION TO SUB BASEMENT LEVEL (BY OTHERS) AS PER IRISH REQUIREMENTS AN ISOLATION DEVICE WILL BE PROVIDED USING AN UNRESTRICTED AIR-GAP DEVICE (AA TYPE DEVISE TO IS EN 1717).

CONNECT TO EXISTING 300mmø DI WATERMAIN

EXISTING 300mmø DI WATERMAIN

CO-ORDS TO IRISH NATIONAL GRID
E:317552.0943
N:234693.6606

PLANNING DRAWING

NOT FOR CONSTRUCTION
THIS DRAWING HAS BEEN ISSUED FOR INFORMATION PURPOSES ONLY AND MUST NOT BE USED FOR CONSTRUCTION UNDER ANY CIRCUMSTANCES

LEGEND:

- SITE BOUNDARY
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- SV PROPOSED SLUICE VALVE
- M PROPOSED WATER METER
- H PROPOSED HYDRANT

PROPOSED 400mmø WATERMAIN DUCTILE IRON TO;
i) IS-EN 545

CS Consulting Group
DUBLIN | LONDON | LIMERICK
Head Office
19-22 Dame Street, Dublin 2.
T: +353 (0)1 5480863 F: +353 (0)1 9011355
e: info@csconsulting.ie
w: www.csconsulting.ie

Quality I.S. EN ISO 9001:2008
Environment I.S. EN ISO 14001:2004
Energy I.S. EN ISO 50001:2011
NSAI Certified Health & Safety OHSAS 18001:2007

Henry J Lyons
Spencer Place Residential Block 2
Spencer Dock Dublin 1

Architect
Project
Title: Proposed Watermain Layout

Dm by	Chkd by	Aprvd by	Dwg. No.	Revision
AAK	DB	RFM	R043-004	D

Date MAR 2018 | Scale 1:250 @ A1

Rev. No.	Date	REVISION NOTE	Dm. By	Chkd. By
A	26.10.2018	REGULARISATION PLANNING APPLICATION	DD	DB
B	11.02.2019	REVSIED FOR PLANNING FOR ADDITIONAL FLOORS	DD	DB
C	28.03.2019	DRAWING ISSUED FOR SHD APPLICATION	DD	DB
D	22.07.2019	Drawing Up-dated Following IW Review	RFM	RFM

NOTES
1. For setting out refer to Architect's drawings.
2. This drawing to be read in conjunction with all other Architectural and Engineering drawings and all other relevant drawings and Specifications.
3. DO NOT SCALE THIS DRAWING. Use figured dimensions only.
4. No part of this document may be reproduced or transmitted in any form or stored in any retrieval system of any nature without the written permission as copyright holder except as agreed for use on the project for which the document was originally issued.
5. Ordnance Survey Ireland Licence Number EN 0074018

Gessica Silva
CS Consulting
19-22 Dame Street
Dublin 2
Dublin, Ireland D02E267

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

8 April 2019

Dear Gessica Silva,

Re: Connection Reference No CDS19000361 pre-connection enquiry - Subject to contract | Contract denied

Connection for Mixed Use Development of 470 units at City Block 2, Spencer Dock, Dublin.

Irish Water has reviewed your pre-connection enquiry in relation to a water connection at City Block 2, Spencer Dock, Dublin.

Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network(s) can be facilitated.

Water:

As part of the North Docklands Ancillary Water Service Infrastructure, Line A runs through the site. Line A is noted as 160m of 400mm diameter water main and links the existing water mains in Sheriff Street Upper and Mayor Street Upper. The applicant will need to install the line A as part of the development.

Wastewater:

New connection to the existing network is feasible without upgrade.
There is an Irish Water infrastructure within and in close proximity of the site boundaries. You are advised that structures or works over or in close proximity to IW infrastructure that will inhibit access for maintenance or endanger structural integrity of the infrastructure are not allowed.
Diversion/buildover of the infrastructure may be required subject to layout proposal of the development and separation distances.The diversion/ buildover will be subject to customer entering diversion/buildover agreement with Irish Water. You are advised that a wayleave in favour of Irish Water, will be required over all Infrastructure that is not located within the Public Space. For further information related to diversion/buildover please visit www.water.ie/connections/developer-services/diversions.

Storm flows from the Development should be separated and discharged to an existing storm water pipeline in Mayor Street.

Irish Water notes that the scale of this development dictates that it is subject to the **Strategic Housing Development** planning process. Therefore in advance of submitting your full application to An Bord Pleanala for assessment, you must have reviewed this development with Irish Water and received a Statement of Design Acceptance in relation to the layout of water and wastewater services.

All infrastructure should be designed and installed in accordance with the Irish Water Codes of Practice and Standard Details.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities.

If you have any further questions, please contact Marina Zivanovic Byrne from the design team on 01 89 25991 or email mzbyrne@water.ie. For further information, visit **www.water.ie/connections.**

Yours sincerely,

Maria O'Dwyer

Connections and Developer Services