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Engineering Services Report

Strategic Housing Development (SHD)

Heuston South Quarter, St. John's Road West, Kilmainham, Dublin 8

Client: HPREF HSQ Investments Ltd.

Job No. H087

September 2021

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ENGINEERING SERVICES REPORT

STRATEGIC HOUSING DEVELOPMENT (SHD)

HEUSTON SOUTH QUARTER, ST. JOHN'S ROAD WEST, KILMAINHAM, DUBLIN 8

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H087	RFM	RFM	DR	30.10.2020	P1

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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned to prepare an Engineering Services Report to accompany a planning application for a proposed residential development at HSQ site, Dublin 8.

This report assesses the proposed development under the following headings:

- Foul Drainage Infrastructure
- Stormwater Drainage Infrastructure
- Potable Water Infrastructure

In preparing this report, CS Consulting has made reference to the following:

- Dublin City Development Plan 2016–2022
- Regional Code of Practice for Drainage Works
- The Greater Dublin Strategic Drainage Study
- Irish Water Code of Practice for Water
- Irish Water Code of Practice for Wastewater
- Local Authority Drainage Records

The Engineering Services Report is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with the various additional information submitted by the other members of the design team, as part of the Planning Submission.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development is located on St. John's Road West at the Heuston South Quarter complex in Dublin 8, within the administrative jurisdiction of Dublin City Council. The site has an area of 1.08ha and is bounded to the west by the gardens of the Royal Hospital Kilmainham, to the north by St. John's Road West, and to the east and south by existing office and residential buildings forming Phase 1 of the larger HSQ development (which extend to Military Road, further to the south-east).

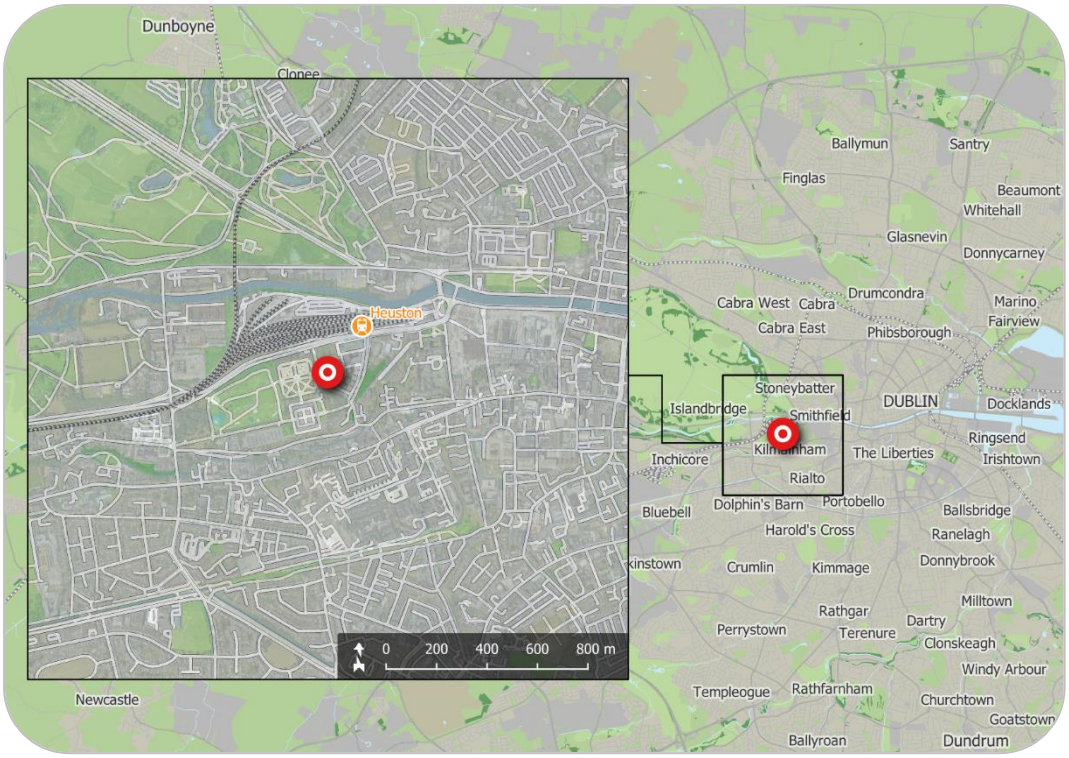

Figure 1 – Location of proposed development site
(*map data & imagery: EPA, OSi, OSM Contributors, Google*)

The location of the proposed development site is shown in Figure 1 above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 2.

Figure 2 – Site extents and environs
(*map data & imagery: NTA, DCC, OSi, OSM Contributors, Google*)

2.2 Existing Land Use

The subject site is brownfield, comprising a partially developed section of the Heuston South Quarter (HSQ) complex. Some surface level internal roads are present on the site, which benefits from the existing established HSQ vehicular accesses on St. John's Road West (R148) and Military Road. The site has been landscaped as an interim measure to improve its aesthetics pending its complete development. There is already an established road, pedestrian and cycle network in the vicinity of the site.

2.3 Description of Proposed Development

The proposed development will consist of a residential development of 399 no. 'Build To Rent' residential units and all ancillary and associated uses,

development and works, and a retail unit of 120 sq m, on a site of 1.08 ha. The proposed development consists of:

- Site clearance and localised demolitions to remove part of the podium and Basement Level -1 reinforced concrete slabs at the interface of the proposed Blocks A and B, together with the incorporation of part of the existing double basement level structure extending to approximately 7,613 sq.m over two levels (excluding an area of 3,318 sq.m that will be backfilled at Basement Level -1) within the proposed development.
- The construction of 5 no. buildings (Blocks A to E) ranging in height between 3- to 18-storeys over double basement level / podium level to provide a residential / mixed use development to provide 399 Specific BTR (Build to Rent) units with a total gross floor area of 29,391 sq.m, comprising 46 no. studios, 250 no. one bedroom units, 90 no. 2 bedroom / 4 person units and 13 no. 2 bedroom / 3 person units; internal communal ancillary residential services / amenities to include a shared co-working area / lounge (178 sq.m) and gym (102 sq.m) at lower ground floor level, and lounges on either side of a residential foyer at ground floor / podium level within Block A (196 sq.m), and a TV Room / lounge (57 sq.m) at ground floor / podium level within Block C.
- An independent retail unit (120 sq.m) is proposed at ground floor / podium level within Block B.
- A double basement is provided that will be integrated within the existing basement levels serving the wider HSQ development and will be accessed from the existing vehicular ramped accesses/egresses onto/off St. John's Road West and Military Road to the north and east, respectively. Basement level -1 provides: a refuse store; 80 no. car parking spaces (including 4 no. disabled spaces and 8 car club spaces); 4 no. motorcycle parking spaces; and, secure bicycle parking

/ storage in the form of 251 no. double stacked cycle parking spaces providing capacity for 502 no. secure bicycle storage spaces for residents. An additional 49 no. Sheffield type bicycle stands are provided at basement level -1 to provide 98 no. visitor cycle spaces (inclusive of 8 no. designated cargo bike spaces, that will also be available for the shared use with residents of the scheme) and a further 55 no. Sheffield type bicycle stands are provided at podium level to provide 110 no. cycle parking spaces (108 no. visitor cycle parking spaces (inclusive of 6 no. designated cargo bike spaces) and 2 no. cycle parking spaces in connection with the retail unit). All bicycle parking at basement level is accessed via a dedicated cycle lift from podium to basement level -1 that is situated to the south of Block B.

- Works proposed along the St John's Road West frontage include the omission of the existing left-turn filter lane to the vehicular ramped access to the HSQ development and re-configuration of the pedestrian crossings at the existing junction together with the re-configuration of the existing pedestrian crossing over the westbound lanes of St. John's Road West leading to an existing pedestrian refuge island. Re-alignment of the existing footpath along the site frontage onto St John's Road West to tie into the reconfigured junction arrangement and provision of a link to a new lift to provide wheelchair access from St John's Road West to the HSQ podium.
- Communal Outdoor Amenity space is provided for residents in the form of rooftop terraces (totalling 1,179sqm), and lower-level communal courtyards between blocks (totalling 960sqm).
- Hard and soft landscaping works are proposed at podium level which includes the extension and completion of the public plaza to the east of Block A; the provision of footpaths; a MUGA (Multi Use Games Area) and informal play areas for children (totalling 1,670sqm).

- A double ESB substation/switch room at ground / podium level within Block A, and a single substation/switch room at ground / podium level within Block B together with associated site development works, which includes the realignment / reprofiling of an existing vehicular access ramp at the southern end of the site between basement levels -1 and -2 and the closure / removal of a second vehicular access ramp between the subject site at basement level -1 and the raised basement level -1 under the Telford building.

3.0 EXISTING DEVELOPMENT INFRASTRUCTURE

The original masterplan for the entire HSQ development was granted planning permission by Dublin City Council in 2003 (DCC Ref 2656/03). As part of this planning grant, the developer was obliged to constructed infrastructure to serve the entire development at the outset. This included new foul and surface water sewers along St John's Road and Military Road. The new 300mm foul sewer connected to a public combined sewer at Dr. Steeven's Hospital. The new 300mm surface water sewer connected to the existing Camac Culvert, also adjacent to Dr. Steeven's Hospital. Finally, a new 450mm watermain was extended down Military Road, from an existing line at Bow Lane, as part of these initial infrastructure works (see Appendix E).

A number of subsequent applications were approved by DCC, based on connecting into the infrastructure noted in the 2003 masterplan. The majority of the east of the site was constructed prior to the financial crash in 2008.

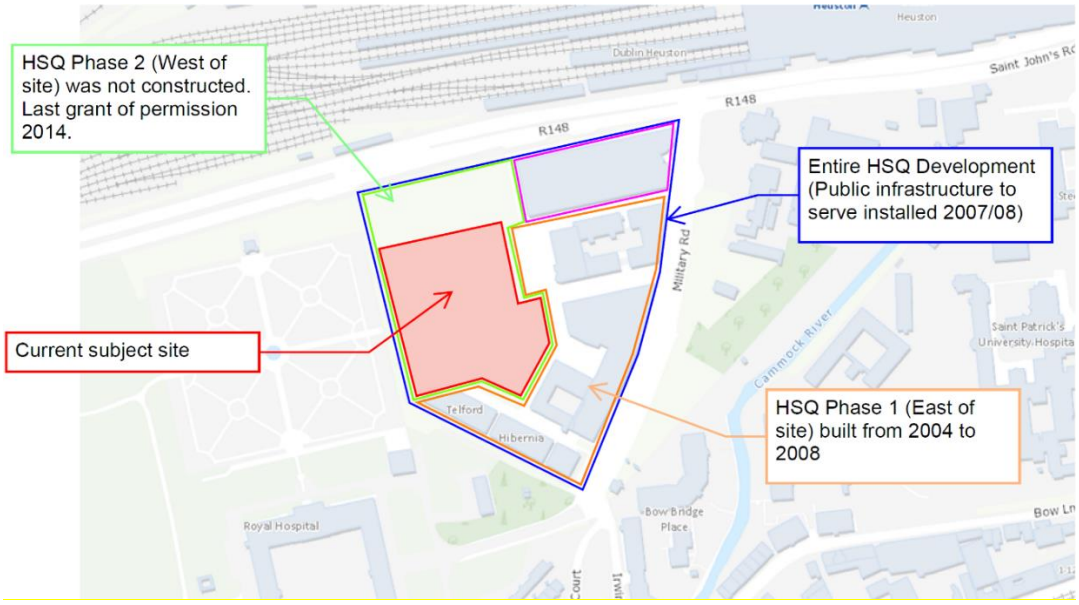

Figure 3 – Indicative location of early works

During the basement construction works for the completed portions of the development, much of the foul, surface and watermain infrastructure was constructed to connect to the newly installed public infrastructure.

3.1 Existing Site Foul Drainage Infrastructure

A perimeter 300mm foul sewer was constructed to the internal face of the southern and eastern retaining wall, discharging via gravity to the last private foul manhole adjacent to the Military Road ramp.

In addition, a sub-basement collection tank and pump arrangement was constructed below the central podium area, to collect all basement gullies (via a petrol interceptor). The effluent from this tank is pumped via rising main to the last private foul manhole adjacent to the Military Road ramp (see Appendix E).

3.2 Existing Site Surface Drainage Infrastructure

In order to facilitate gravity flow of the surface water infrastructure, and as outlined in the original masterplan scheme and subsequent amended applications, attenuation tanks were constructed at both the Military Road ramp and the St John's Road ramp. The attenuation tanks are fitted with flow control devises, and discharge to the final private surface water manholes at both locations, and in turn discharge to the public sewer systems constructed in 2007/2008. A third central attenuation tank to cater from run-off from the central and western buildings was not constructed.

The internal site surface water infrastructure is located below the podium slab, and connect to perimeter 300mm surface sewer, along the retaining wall, before discharging to the attenuation tanks noted (see Appendix E).

3.3 Existing Watermain Infrastructure

There is an existing internal potable watermain network below the current podium slab. The network is connected to the 450mm public watermain on Military Road, to the south of the site (near the entrance to the RHK). There are existing fire hydrants along Military Road which connect to the 450mm public watermain. The fire hydrants within the podium area connect to the internal watermain network (see **Appendix E**).

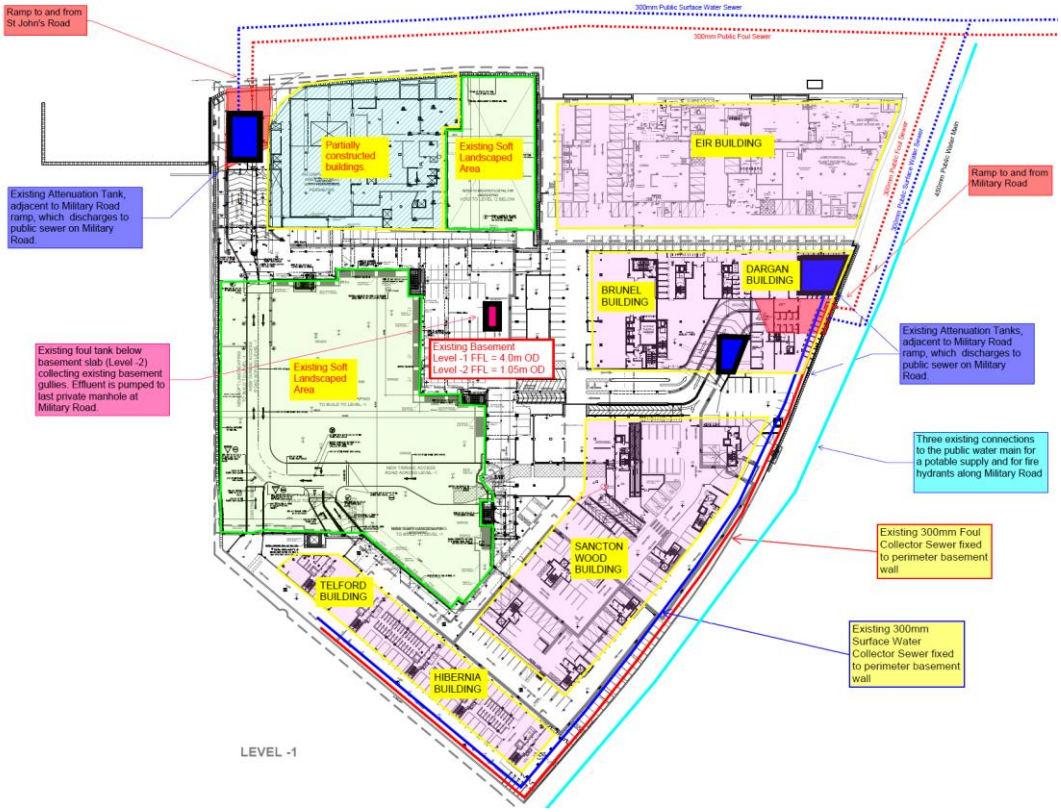

Figure 4 – Indicative existing services Infrastructure (See Appendix E)

4.0 FOUL DRAINAGE

4.1 Existing Foul Drainage Infrastructure

Drainage records received from Dublin City Council indicate that there is a 300mm dedicated foul public sewer along St John's Road. There is an existing connection from the subject lands to this combined sewer.

See **Appendix A** for Dublin City Council's drainage records and Irish Water Records.

4.2 Proposed Foul Drainage Arrangements

The proposed development is to consist of 399no. apartments. Irish Water guidelines stipulate that each residential unit should be considered to discharge an effluent volume of 446 l/day.

Therefore, the proposed new development will generate wastewater in the order of 177.95m^3/day, which equates to:

- 2.06 l/s Dry Weather Flow (DWF)
- 12.36 l/s Peak Flow (6 x DWF)

All foul effluent generated by the proposed development shall be collected in pipes 225mm in diameter and flow under gravity to an existing outfall manhole located at the top of the sites existing ramp adjacent to St. John's Road West. This existing foul sewer drains to the east and ultimately outfalls into the Regional Wastewater Treatment Plant at Ringsend.

The drainage network for the development will be in accordance with Part H of the Building Regulations and to the requirements and specifications of Irish Water.

A Pre-Connection Enquiry has been submitted to Irish Water, based on the foul water flows for 402no. apartments, and we have received a favourable

response. See **Appendix B** for copies of the Irish Water response to the submitted pre-connection enquiry and of the letter of design acceptance received from Irish Water.

The proposed foul water drainage infrastructure and routing plan are shown on CS Consulting drawings **HSQ-CSC-XX-XX-DR-C-0101** and **HSQ-CSC-XX-XX-DR-C-0102** included with this submission.

5.0 STORMWATER DRAINAGE

5.1 Existing Stormwater Drainage Infrastructure

Drainage records received from Dublin City Council indicate that there is a dedicated 375mm storm sewer to the north of the site along St. John's Road West.

A review of the Local Authority hydraulic performance maps prepared by Dublin City Council as part of The Greater Dublin Strategic Drainage Study (GDSDS) for the 2031 hydraulic scenario indicates that the storm sewers on site are currently under hydraulic pressure, and flooding is predicted for storm events with return periods of less than 30years. See **Appendix D** for GDSDS map.

5.2 Proposed Stormwater Drainage Arrangements

The proposed scheme will have a separate, attenuated storm water drainage system designed in accordance with the Greater Dublin Strategic Drainage Study and the Regional Code of Practice for Drainage Works. Both documents are used within the jurisdiction of Dublin City Council.

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 a factor of 20% for the predicted effects of climate change. The total site area of the development site is approximately 1ha which gives an attenuation volume requirement of 760m^3 for a 1-in-100-year storm event. This is due to the fact that the allowable discharge rate from the site is 5.0 l/s, based on the requirements of Regional Code of Practice for Drainage Works.

Stormwater collected within the proposed development shall be collected in pipes ranging in diameter from 225mm – 300mm and flow under gravity into a proposed storm water attenuation tank. It is proposed to pump the storm water from the attenuation tank to a standoff manhole located at the top of the existing basement carpark ramp adjacent to St. John's Road. The proposed discharge rate will be 5.0 l/sec.

The proposed discharging of the storm water into the existing 375mm sewer at a controlled rate for all storm water events will aid in the freeing up of hydraulic capacity during high intensity storms. See **Appendix C** for the Attenuation Calculation.

The second aspect is the policy of the Local Authority to include Sustainable Drainage Systems (SuDS) for all new applications. As such, it is proposed to use a range of SuDS devices for the scheme. These are listed below:

- Water butts for local water rainwater reuse.
- Use of green roof technology to cater for the initial interception storage (refer to architect's plans).
- Low water usage appliances, to restrict potable water demand.
- Attenuation tank with flow control device, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change effects, to limit discharge from the site during extreme rainfall events.

The proposed stormwater management plan requires that various stages of treatment are provided to surface water prior to its ultimate disposal.

5.2.1 Interception

The proposed building will have a sedum roof to capture the first 5mm of rainfall. When greater volumes of rainwater are experienced, an overflow system takes this storm water to lower levels and into the treatment stage. The landscaped areas also act to capture the first 5mm of rainfall with a positive outfall to a perimeter drain.

5.2.2 Treatment

As noted above, rainfall greater than 5mm will pass through the interception stage and into the treatment stage. Treatment will consist of a perimeter drain to allow water to filtrate into the subsoil. Due to the physical constraints of the site and the low porosity of the clays in this part of Dublin, the treatment stage will be limited to a section of the site; the proximity of the site boundary is also a restriction. When a volume of storm water is experienced that is greater than the infiltration capacity of the liner drain, an overflow system will allow this exceedance of storm water to overflow into the positive outfall, which ultimately connects to a dedicated storm water sewer which discharges to the combined sewer.

5.2.3 Attenuation

Rainwater exceedances which cannot be dealt with by the interception treatment stages positively drain by gravity into the development's attenuation tank. As noted above, this has been sized to cater for the predicted 1-in-100-year storm event, increased by 20% for the predicted effects of climate change. The storm water flows from the development are released via a flow control device limited to 5.0 l/sec, as per Dublin City council requirements. The proposed storm water drainage infrastructure and routing plan are shown on CS Consulting drawings **HSQ-CSC-XX-XX-DR-C-0101** and **HSQ-CSC-XX-XX-DR-C-0102** included with this submission.

6.0 POTABLE WATER SUPPLY

6.1 Existing Potable Water System

Records obtained from Dublin City Council indicate a 450mm diameter HPPE public watermain in place along the eastern boundary of the larger HSQ site, adjacent to military Road. This watermain has an existing connection into the subject lands.

6.2 Proposed Potable Water System

It is proposed to utilise the existing water connection into the subject lands to supply this scheme.

The proposed watermain arrangements will be designed in accordance with the Irish Water Specifications and Code of Practice. The predicted volume of water usage is based on 2.7 people per dwelling, at a rate of 150 l/person/day.

This generates a potable water demand of 161.60m^3/day, based on:

- 399 apart. x 2.7 person/unit x 150 l/person/day = 161.60m^3/day

Therefore:

- Average demand = 162.81m^3/day x 1000 l/m^3 / 84600s/day = 1.87 l/s
- Peak demand = 5 x average demand = 9.35 l/s

A Pre-Connection Enquiry has been submitted to Irish Water, based on the predicted water demand for 402no. apartments, and we have received a favourable response. See **Appendix B** for copy of Irish Water response to the submitted pre-connection enquiry.

The proposed watermain infrastructure and routing plan is shown on CS Consulting drawing **HSQ-CSC-XX-XX-DR-C-0103** included with this submission.

Appendix A

Dublin City Council Drainage and Watermain Records

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UISCE ÉIREANN : IRISH WATER

Legend

- Unknown Meter ; Other Meter
- Sluice Valve Open
- Sluice Valve Closed

Water Hydrants

Hydrant Function

- Fire Hydrant
- Cap
- Other Fittings

Water Distribution Mains

Owned By

- Irish Water
- Irish Water

Sewer Manholes

Manhole Type

- Standard

Sewer Inlets

Inlet Type

- Catchpit
- Sewer Chambers
- Gravity - Combined
- Gravity - Overflow

Storm Manholes

Manhole Type

- Standard
- Surface Gravity Mains

Storm Inlets

Inlet Type

- Standard

1:500 at A0

Last edited: 29/04/2020

Metres

0 25 50 100

Ordnance Survey Ireland 2018

Appendix B

Irish Water Correspondence

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Frank Duggan
CS Consulting Engineers
19-22 Dame Street
Dublin 2
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

22 December 2020

Re: CDS20005019 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 400 unit(s) at Heuston South Quarter, Saint John's Road West, Dublin

Dear Sir/Madam,

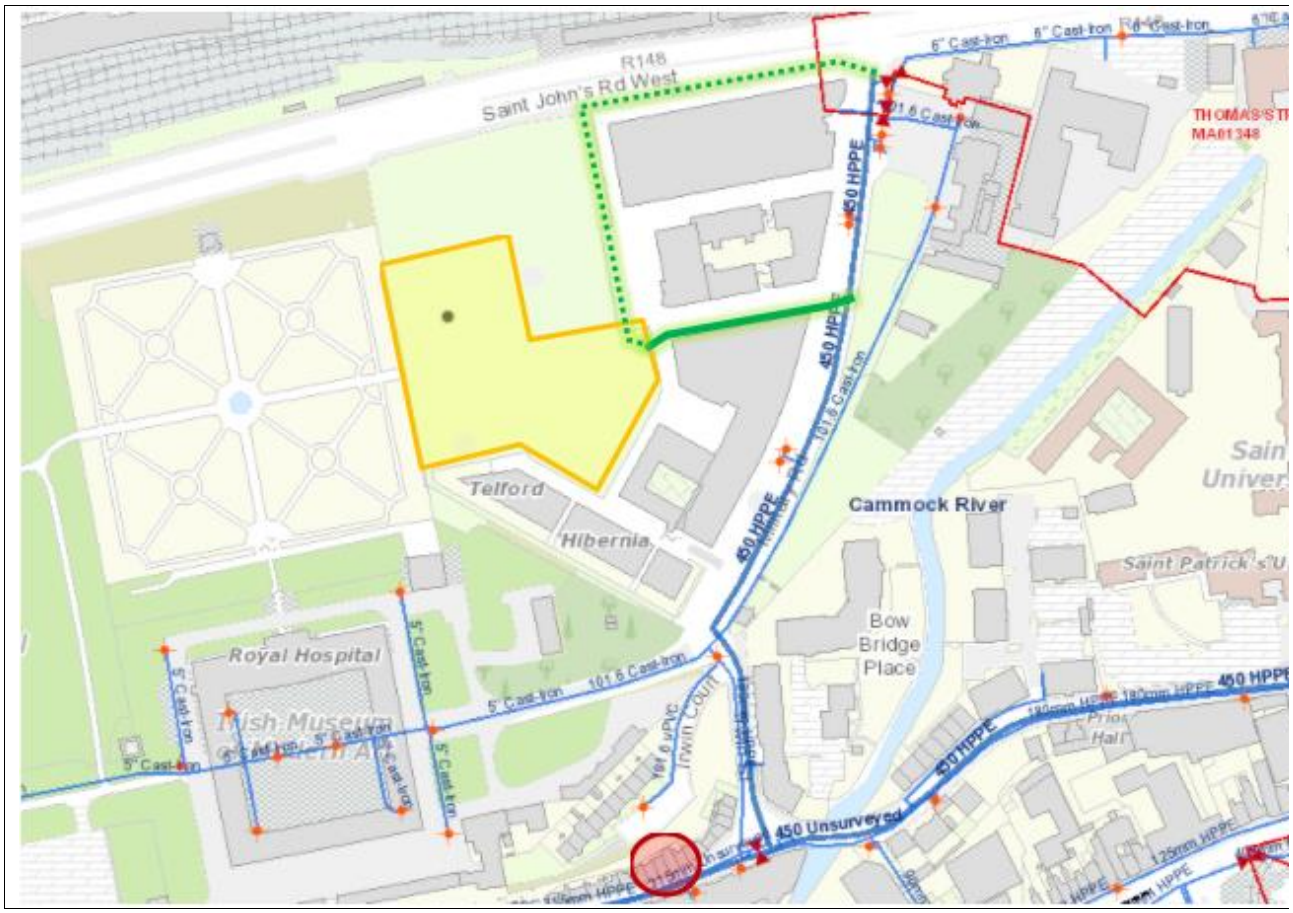
Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Heuston South Quarter, Saint John's Road West, Dublin (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible Subject to upgrades
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	In order to accommodate the proposed connection to Irish Water network at the Premises, approximately 100m of new 200mm ID pipe main is required to connect the site development (see yellow section) to the existing 450mm HDPE main, as shown below (See green line in figure). A bulk meter needs to be installed on this main and linked with telemetry online. Irish Water currently does not have any plans to extend its network in this area. Should you wish to progress with the connection you will be required to fund this network extension.
Wastewater Connection	Surveys and additional information will be required to verify the exact connection point of the 300mm wastewater sewer to the trunk sewer. There are also inconsistencies between the 2008 as built data and Irish Water data that will need to be addressed and resolved. The applicant is required

	to engage with Irish Water to determine the scope of surveys to clarify these issues.

The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.

The map included below outlines the current Irish Water infrastructure adjacent to your site:



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

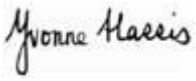
Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Marko Komso from the design team on 022 54611 or email mkomso@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,



Yvonne Harris

Head of Customer Operations

Frank Duggan

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Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

10 August 2021

Re: Design Submission for Heuston South Quarter, Saint John's Road West, Dublin (the "Development")
(the "Design Submission") / Connection Reference No: CDS20005019

Dear Frank Duggan,

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: Dario Alvarez
Email: dalvarez@water.ie

Yours sincerely,

Yvonne Harris

Yvonne Harris

Head of Customer Operations

Appendix A

Document Title & Revision

- [HSQ-CSC-XX-XX-DR-C-0103_Residential_Proposed Watermain Layout]
- [HSQ-CSC-XX-XX-DR-C-0102_Residential_Proposed Podium Drainage Layout]
- [HSQ-CSC-XX-XX-DR-C-0101_Residential_Proposed Basement -1 Drainage Layout]

Standard Details/Code of Practice Exemption:

The water and wastewater infrastructure within the private site will not be taken in charge by Irish Water

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.

PROPOSED WATERMAIN LAYOUT.

SCALE 1:500

H087

DRAFT

PLANNING DRAWING.
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Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By

Architect	Reddy Architecture
Project	HEUSTON SOUTH QUARTER, ST. JOHN'S ROAD WEST, KILMAINHAM
Title	PROPOSED WATERMAIN LAYOUT
Dwg. No.	HSQ-CSC-XX-XX-DR-C-0103

Date	Drn by	Chkd by	Aprvd by	Scale	Revision
JULY 2021	JS	NB	DR	1:500 @ A1	

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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

LEGEND:

- EXISTING FOUL SEWER LINE
- EXISTING SURFACE WATER LINE
- PROPOSED FOUL SEWER LINE
- PROPOSED SURFACE WATER LINE
- PROPOSED ATTENUATION TANK
- TRAPPED FOUL GULLY
- TRAPPED ACO CHANNEL
- SITE BOUNDARY

PROPOSED PODIUM DRAINAGE LAYOUT.

SCALE 1:500

H087

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Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By

Architect	Reddy Architecture
Project	HEUSTON SOUTH QUARTER, ST. JOHN'S ROAD WEST, KILMAINHAM
Title	PROPOSED PODIUM DRAINAGE LAYOUT.
Dwg. No.	HSQ-CSC-XX-XX-DR-C-0102

Date	Drn by	Chkd by	Aprvd by	Scale	Revision
JULY 2021	JS	NB	DR	1:500 @ A1	

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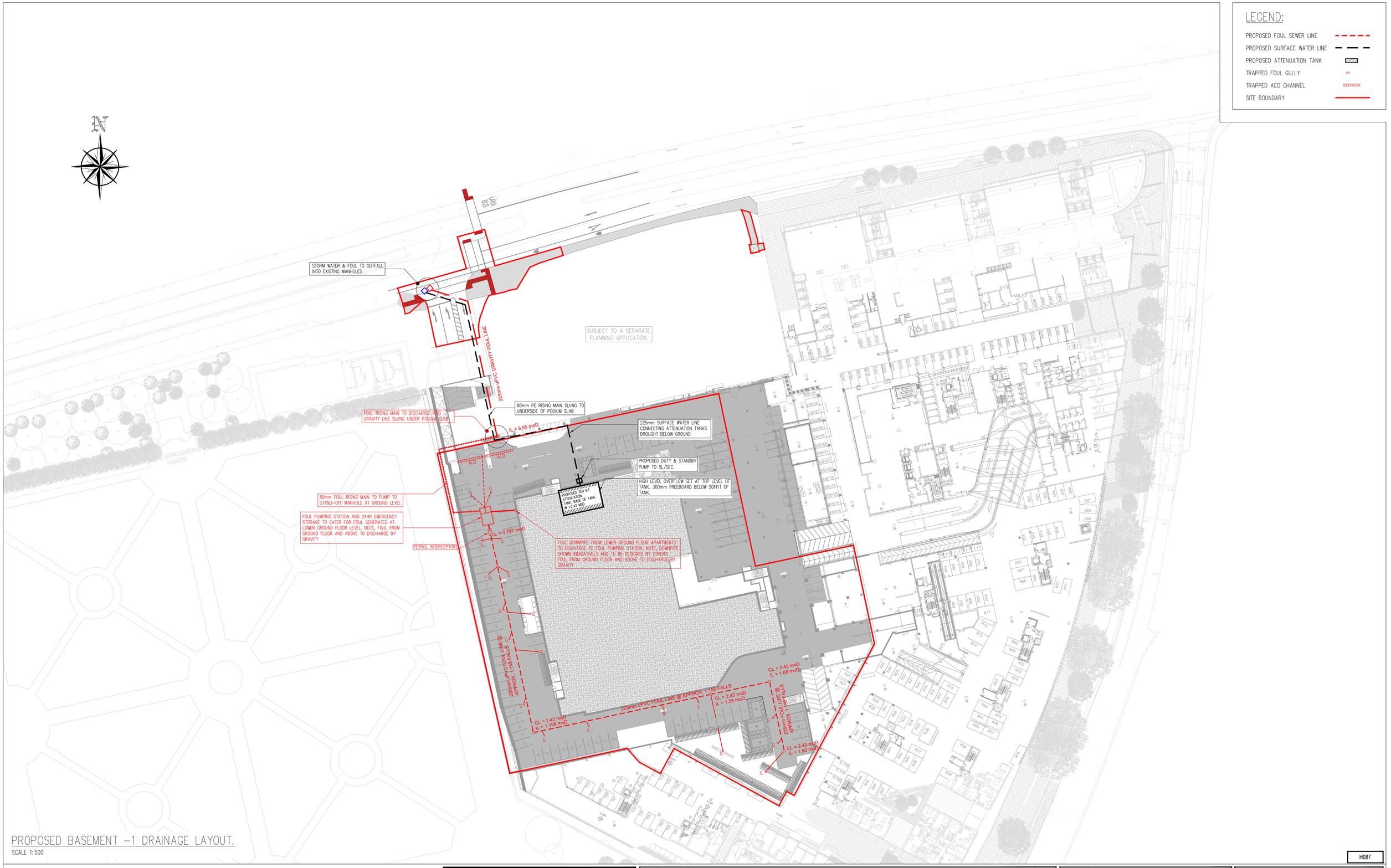

PROPOSED BASEMENT –1 DRAINAGE LAYOUT.

SCALE 1:500

H087

DRAFT

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

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.
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Rev. No.	Date	REVISION NOTE	Drn. By	Chkd. By

Architect	Reddy Architecture
Project	HEUSTON SOUTH QUARTER, ST. JOHN'S ROAD WEST, KILMAINHAM
Title	PROPOSED BASEMENT -1 DRAINAGE LAYOUT.
Dwg. No.	HSQ-CSC-XX-XX-DR-C-0101

Date	Drn by	Chkd by	Aprvd by	Scale	Revision
JULY 2021	JS	NB	DR	1:500 @ A1	

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Appendix C

Attenuation Calculation

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Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Robert Fitzmaurice
Site name:	Job no. H087
Site location:	Proposed Development At HSQ

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.34475° N
Longitude:	6.29871° W
Reference:	1577156374
Date:	Oct 30 2020 14:47

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1.00

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	963	727
Hydrological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Growth curve factor 200 years:	2.86	2.86

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	7.01	5.05
1 in 1 year (l/s):	5.96	4.29
1 in 30 years (l/s):	14.94	10.75
1 in 100 year (l/s):	18.3	13.17
1 in 200 years (l/s):	20.05	14.43

Appendix D

Greater Dublin Strategic Drainage Study 2031 Performance Map and Flood Maps

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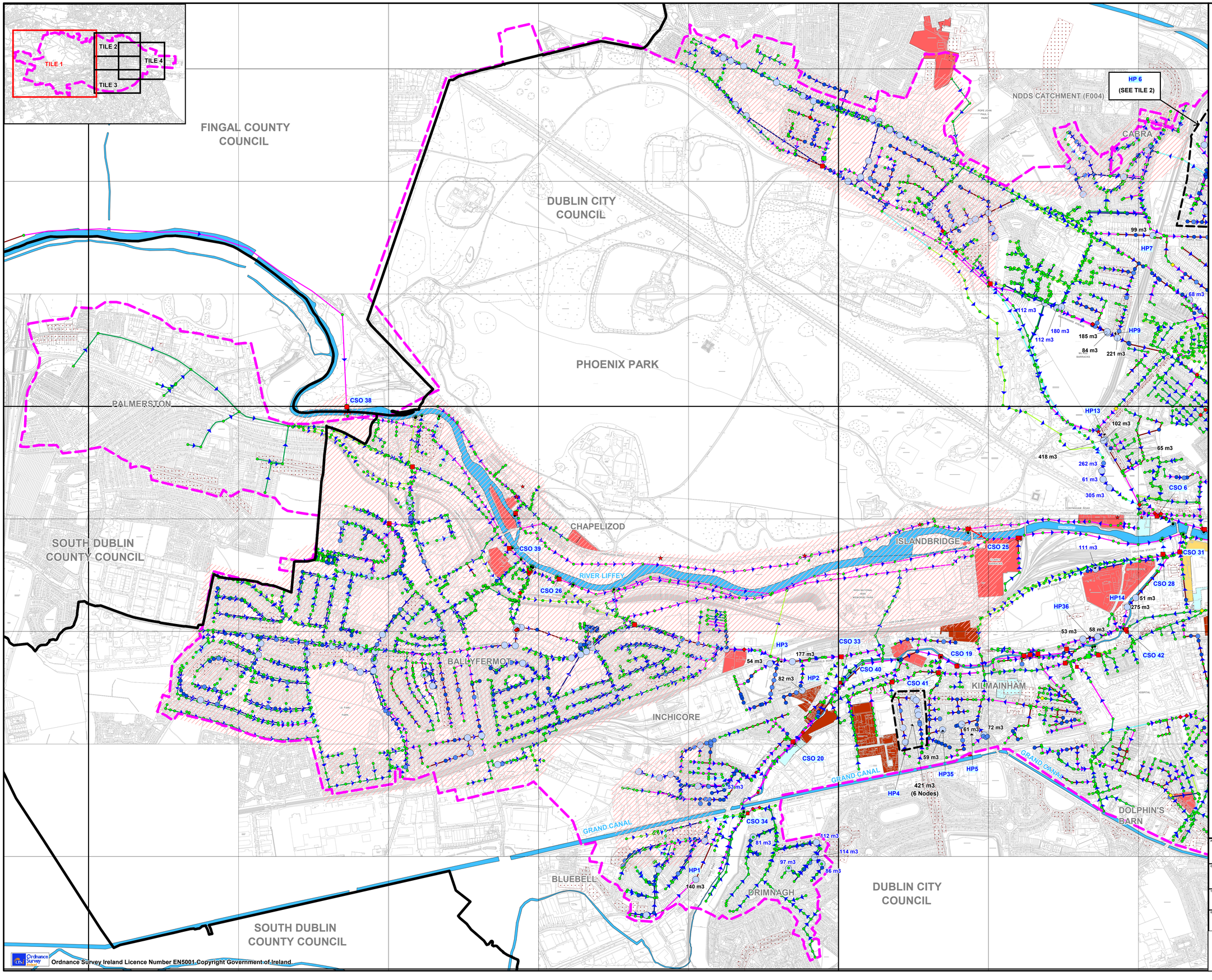

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Legend

- 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

Drg. No.: GDSDS/MAR3079/F001/P3-003_Tile1

Dublin Drainage — A Sewerage Study for Greater Dublin

Drawn	JGA	Chk'd	MCB
Approved	MCB		
Scale	N.T.S.	REVISION	A
Date	7/5/04		

Appendix E

Indicative Existing Infrastructure

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Ramp to and from St John's Road

300mm Public Surface Water Sewer

300mm Public Foul Sewer

Existing Attenuation Tank, adjacent to Military Road ramp, which discharges to public sewer on Military Road.

Partially constructed buildings.

Existing Soft Landscaped Area

EIR BUILDING

300mm Public Foul Sewer

300mm Public Surface Water Sewer

450mm Public Water Main

Ramp to and from Military Road

DARGAN BUILDING

BRUNEL BUILDING

Existing foul tank below basement slab (Level -2) collecting existing basement gullies. Effluent is pumped to last private manhole at Military Road.

Existing Basement
Level -1 FFL = 4.0m OD
Level -2 FFL = 1.05m OD

Existing Soft Landscaped Area

Existing Attenuation Tanks, adjacent to Military Road ramp, which discharges to public sewer on Military Road.

Three existing connections to the public water main for a potable supply and for fire hydrants along Military Road

SANCTON WOOD BUILDING

Existing 300mm Foul Collector Sewer fixed to perimeter basement wall

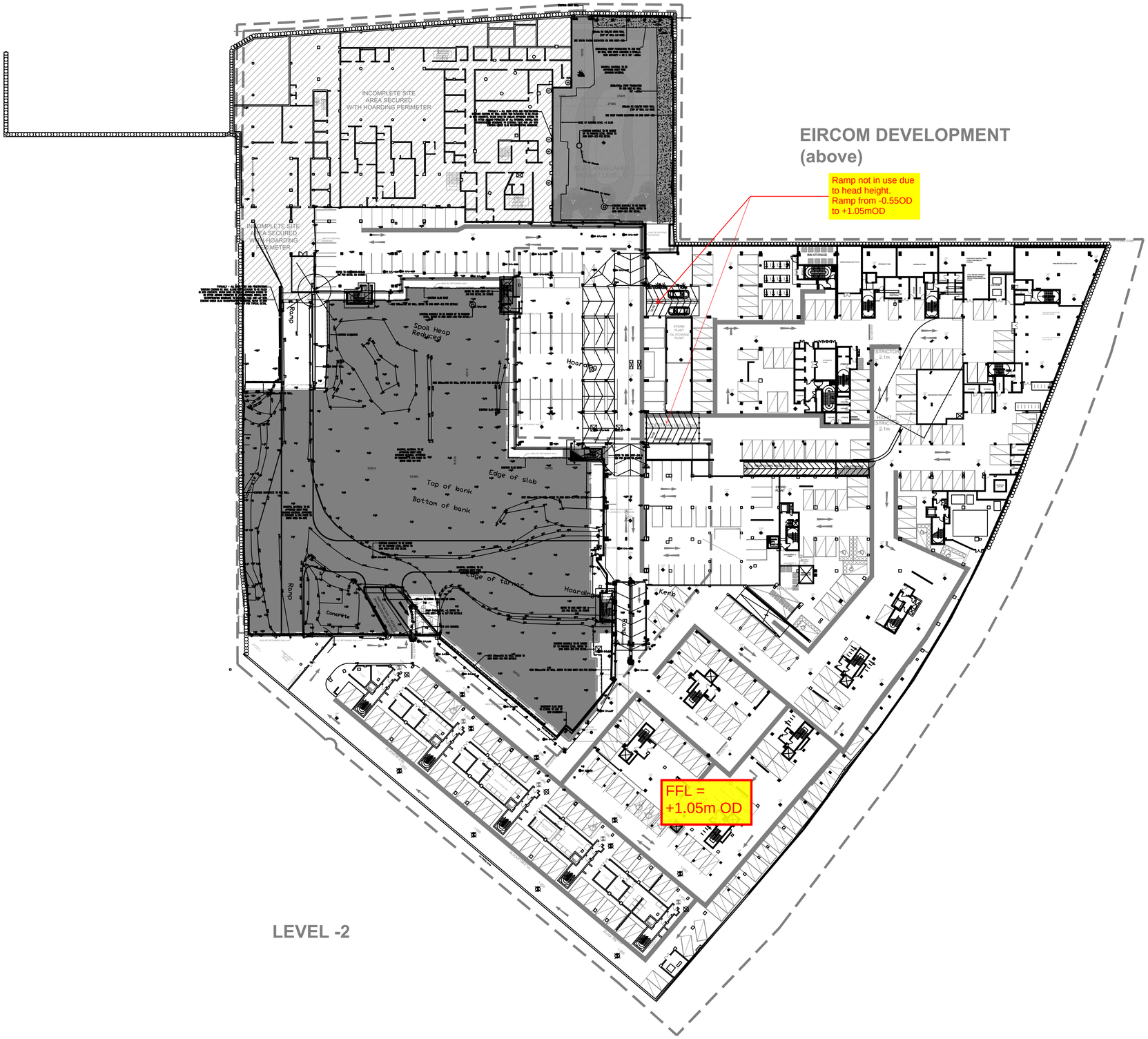
TELFORD BUILDING

HIBERNIA BUILDING

Existing 300mm Surface Water Collector Sewer fixed to perimeter basement wall

LEVEL -1

Indicative Basement Drainage



Indicative Level -2 Existing Layout