Engineering Services Report

Katharine Tynan House

For Hibernia REIT.

PROJECT NO. H657

02 June 2021

OCSC

O'CONNOR | SUTTON | CRONIN

Multidisciplinary
Consulting Engineers

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Kingswood Dublin 24

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NOTICE

DOCUMENT CONTROL & HISTORY

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Engineering Services Report

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APPENDICES

1 INTRODUCTION

1.1 Appointment

O'Connor Sutton Cronin & Associates (OCSC) have been appointed by *Hibernia REIT.* to carry out the design of the Civil Engineering services (surface water, wastewater drainage, watermain and site-specific flood risk assessment) associated with the proposed refurbishment of 'Whitehall' Katharine Tynan House for re-use as a community centre.

1.2 Administrative Jurisdiction

The proposed development is located in the jurisdiction of South Dublin County Council (SDCC), and therefore the engineering services design was carried out with reference to the following:

- South Dublin County Council Development Plan (2016 – 2022);
- Greater Dublin Strategic Drainage Study (GDSDS);
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government and the Office of Public Works).

1.3 Site Location

The subject site is located at Kingswood, Dublin 24, as shown in *Figure 1.1 – Site Location*. The existing structure is set within substantial walled gardens and surrounding by land currently in agricultural use. The proposed development site is immediately bound by:

- Agricultural land to the west with Belgard Road beyond;
- Agricultural land to the north and east;
- Ballymount Road to the south/south east.

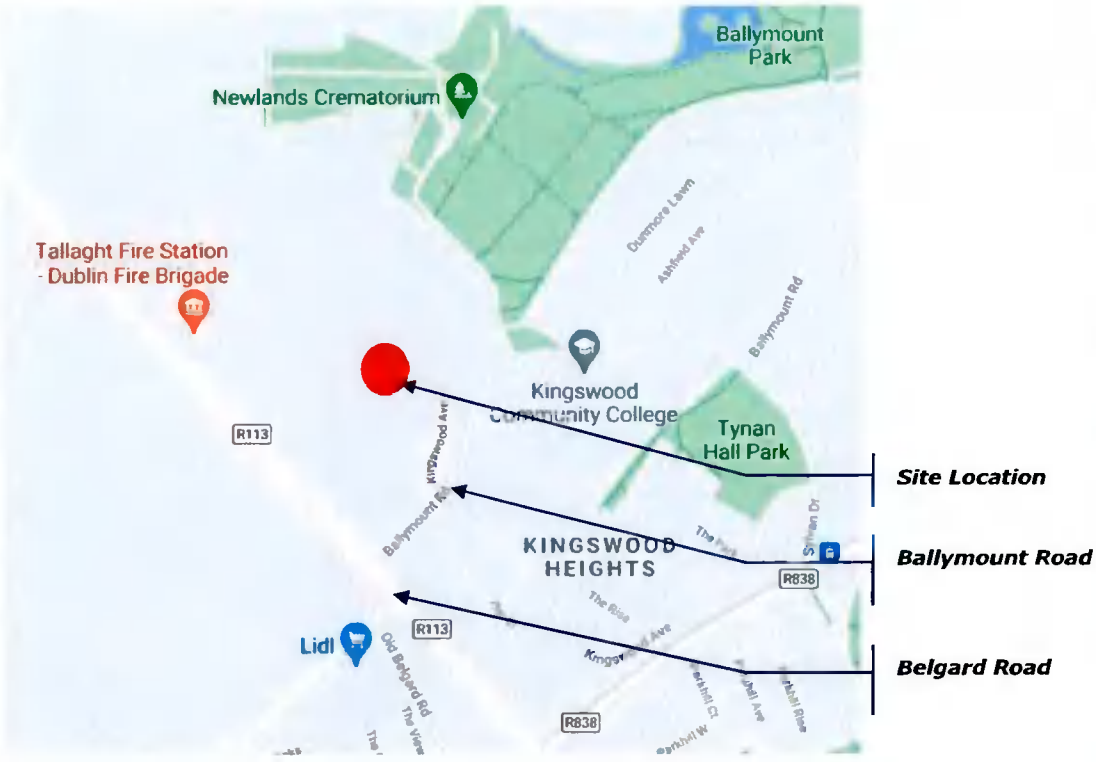

Figure 1.1 - Site Location (www.myplan.ie)

1.4 Existing Site Overview

The existing site consists of the remains of an historic dwelling adjoining a series of walled gardens. Elements of the structure have been removed over time with the remaining structure in a state of disrepair. The site is accessed off Ballymount Road via a track used by agricultural vehicles. The site is set within land currently in agricultural use.

Refer to *Figure 1.2* for the aerial overview of the site location.

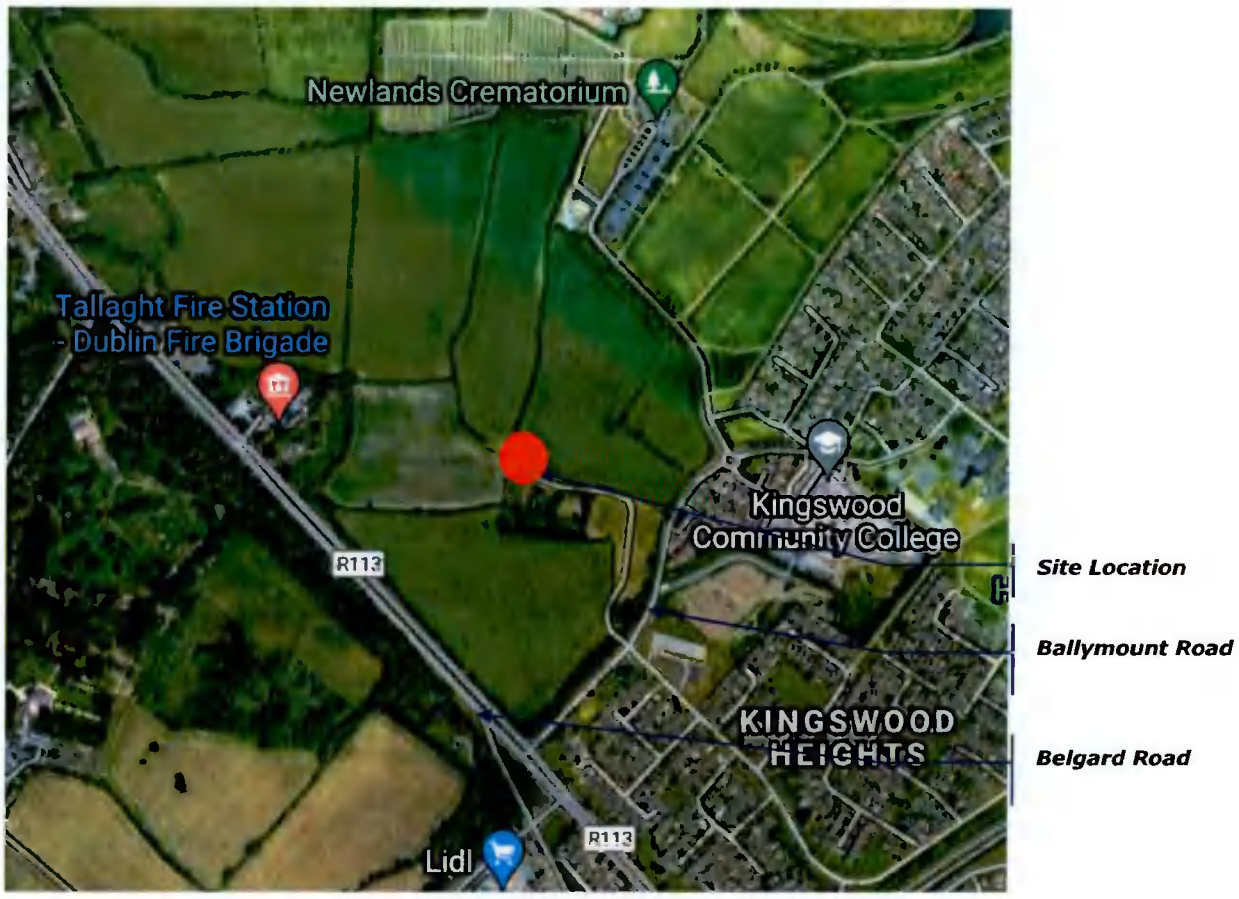

Figure 1.2 – Aerial Overview of the Site

1.5 Proposed Development Context

The proposed development is to refurbish and extend the existing structure for use as a community centre. The main components of the development include:

(i) Refurbishment of the existing structure with remedial works as necessary to ensure the long term condition of the building.

(ii) Internal alternations to the structure to ensure compliance with building regulations.

(iii) Construction of single storey toilet block and outbuildings to the north of the existing structure on the footprint of the no longer extant portions of the building.

(iv) Construction of single-storey open-fronted structures to the west of the house on the footprint of the no longer extant outbuildings that will offer shelter for outdoor community activities.

(v) Refurbishment works to historic boundary walls.

(vi) Provision of 12no. carparking spaces to the east of the site.

(vii) Upgrade of existing entrance off Ballymount Road and upgrade of existing track to the house to provide means of access for vehicles, cyclists and pedestrians.

Please refer to Architectural Heritage Impact Assessment Report for a full description of the proposed development and Figure 1.3 below for the proposed Site Layout.

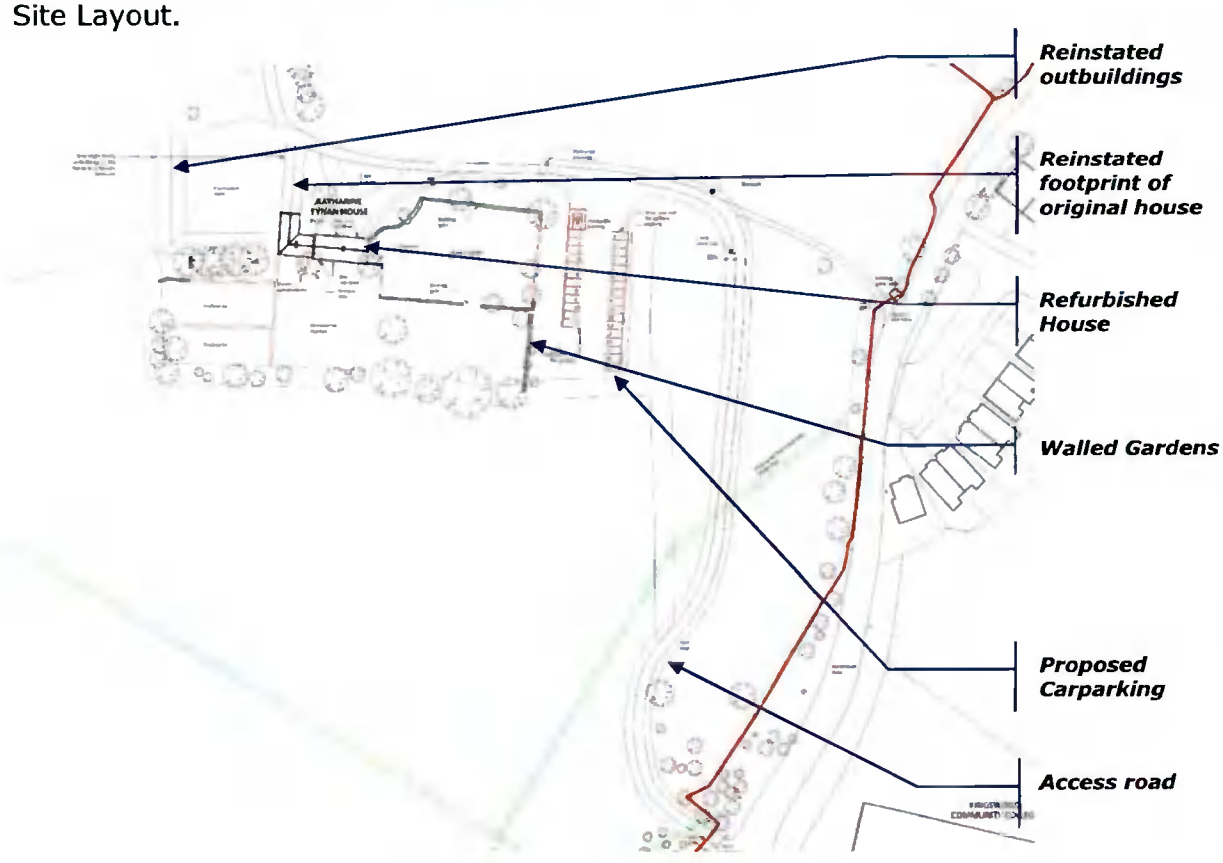

Figure 1.3 – Proposed Site Layout

2 SCOPE OF SERVICES REPORT

This Engineering Services Report was prepared by reviewing the available data from the Local Authority sources and national bodies *i.e.* South Dublin County Council, Irish Water, The OPW, and the wider Design Team.

The following services are addressed within this report, with respect to the proposed development:

- Surface Water Drainage;
- Wastewater Drainage;
- Potable Water Supply;
- Flood Risk Assessment;

The proposed design, for the aforementioned services, have been carried out in accordance with the following technical guidelines and information:

- South Dublin County Council Development Plan (2016 – 2022);
- Greater Dublin Strategic Drainage Study (GDSDS);
- Greater Dublin Regional Code of Practice for Drainage Works (GDRCOP);
- Irish Water Code of Practice for Wastewater, IW-CDS-5030-03 (Revision 2);
- Irish Water Code of Practice for Water Supply, IW-CDS-5020-03 (Revision 2);
- The Building Regulations – Technical Guidance Document Part H;
- BE EN 752 – Drainage Outside Buildings;
- BS 7533-13 – Guide for Design of Permeable Pavements;
- The Office of Public Works, the Planning System and Flood Risk Management;
- OPW website www.floodinfo.ie & www.floodmaps.ie;
- DECLG website www.myplan.ie;
- EPA website http://gis.epa.ie/EPAMaps;
- Geological Survey of Ireland Maps;
- Architectural drawings;
- Topographical survey of the proposed site;

- South Dublin County Council's and Irish Water's Drainage and Watermain Records.

Members of the wider design team cover all other elements of the application pertaining to traffic, sustainability, landscaping, planning, ecological, and architectural detail.

This report should be read in conjunction with the set of OCSC Civil Engineering design drawings that accompany this submission.

3 SURFACE WATER DRAINAGE

3.1 Design Guidelines Overview

Any planning permission sought on the subject lands are required to adhere to the Local Authority requirements *i.e.* the South Dublin County Council Development Plan, and as such, the Greater Dublin Strategic Drainage Study (Dublin City Council, 2005).

New development must ensure that a comprehensive Sustainable Drainage System (SuDS), is incorporated into the development. SuDS requires that post development run-off rates be maintained at equivalent, or lower, levels than pre-development levels. Thus, the development must be able to retain, within its boundaries, surface water volumes from extreme rainfall events up to a 1 in 100-year rainfall event, more commonly expressed as a 1.0% AEP (Annual Exceedance Probability), *while also allowing for an additional climate change factor of **10%** increase in rainfall intensity* in accordance with the South Dublin County Council Development Plan (2016 - 2022).

Any new development must also have the physical capacity to retain surface water volumes as directed under the Greater Dublin Strategic Drainage Strategy (GDSDS) and, if necessary, release these attenuated surface water volumes to an outfall at a controlled flow rate, not greater than the greenfield runoff equivalent.

A further component of the SuDS protocol is to increase the overall water quality of surface water runoff before it enters a natural watercourse or a public sewer, which ultimately discharges to a water body. This is to ensure the highest possible standard of surface water quality.

SuDS are designed in accordance with best practice and the CIRIA C753 (The SuDS Manual) guidance material.

3.2 Surface Water Design Strategy Overview

The proposed development is to be served by a gravity surface water network. The drainage system has been designed to utilise a single surface water catchment which is to drain to a soakaway at the western edge of the development. The provision of a soakaway allows for surface water from the development to infiltrate naturally to ground water. Due to the topography of the site there is no surface water infrastructure in the vicinity of the site which could accommodate the surface water sewer from the proposed development.

Sustainable Drainage Systems are to be provided, wherever practicable, and these are discussed in more detail in *Section 3.5*, with discharge rates from site being restricted to natural infiltration rates, for design rainfall events up to, and including, the 1% AEP, in accordance with the South Dublin County Council Development Plan and the GDSDS.

3.3 Existing Site Drainage

3.3.1 Existing Site Catchment Area

As detailed in *Section 1.4*, the site contains the historic remains of Katherine Tynan House. These remains are derelict and currently overgrown. The structure covers approximately 250m^2. The remaining area of the site is greenfield in nature and is allowed to drain naturally.

3.3.2 Existing Surface Water Drainage Infrastructure

South Dublin County Council records indicate the presence of a 225mm surface water sewer in the Ballymount Road, immediately west of the site. The records indicated that this sewer flows from west to east. Records indicate that the level of this sewer is approximately the same as the existing ground level at the proposed development.

Refer to *Figure 3.1* for an excerpt from the public drainage records, which are also provided in **Appendix A**, for indicative locations of existing infrastructure.

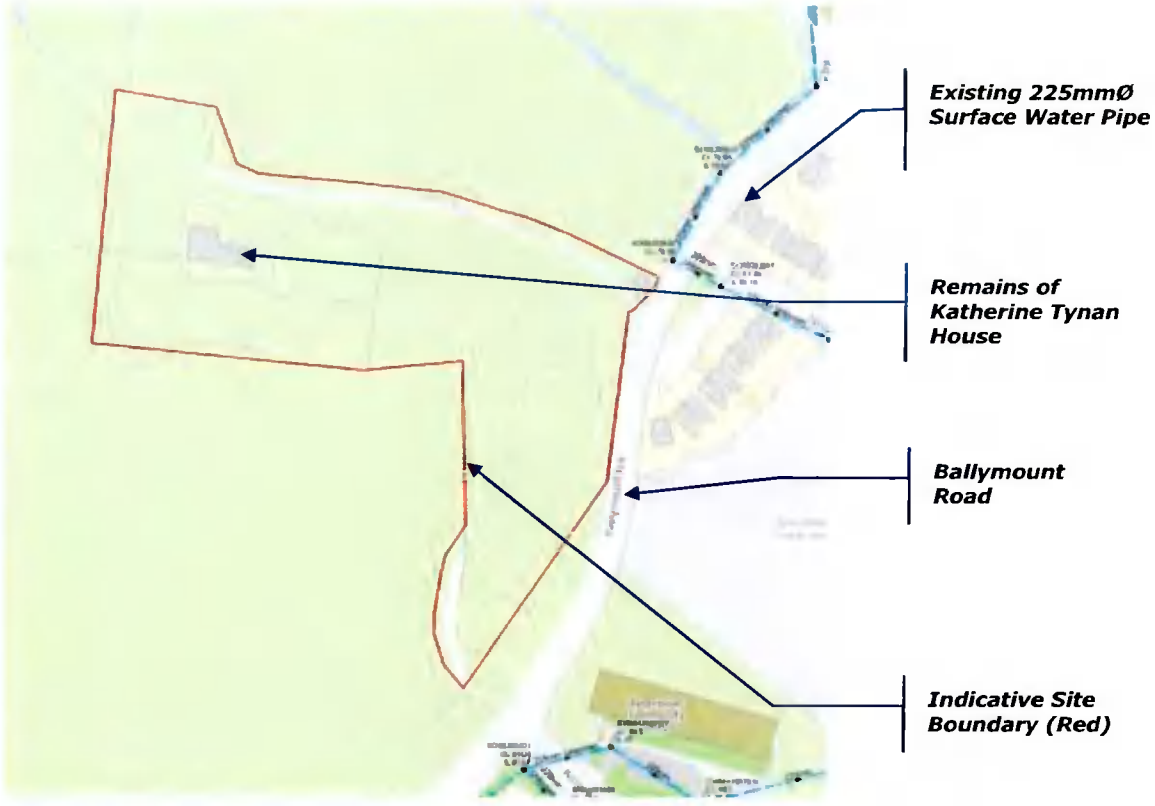

Figure 3.1 – Existing Drainage Infrastructure Records

3.3.3 Existing Site Rainfall Runoff

The soil value can be calculated from *Figure 1.4.18 (institute of Hydrology, 1978)* which shows the various soil types. The soil classifications are also available from the *Wallingford Procedure, Volume 3, Maps, "Winter rain acceptance potential"*. The equation was first published in FSSR 16, 1985. Refer to *Figure 3.2* for the "Soil" value in MicroDrainage that consider the SPR value and it can be obtained at *Greater Dublin Strategic Drainage Study – Regional Drainage Policies Volume 2 – New Development at section 6.7.2*.

SOIL	SPR value (% runoff)
1	0.1
2	0.3
3	0.37
4	0.47
5	0.53

Figure 3.2 – SPR Values for Soil (Excerpt from GDSDS: Table 6.7)

From the aforementioned mapping, a **Soil Type 2** was used in design calculations along with the local Standard Annual Average Rainfall (SAAR) equivalent of **728mm**, as received from Met Éireann, was used to determine the rainfall runoff rate. Refer to the **Appendix B** for the Return Period Rainfall Depths for Sliding Durations from Met Éireann.

Using the ICPSuDS Input, {Flood Studies Report (FSR)} Method, the rainfall runoff discharging from the total brownfield site area that is to be developed (i.e. 0.23 ha), in its existing condition, has been estimated at **$QBAR_{RURAL}$ = 0.4 l/s**. Refer to *Figure 3.3* for an excerpt of the results from the MicroDrainage Runoff Calculator, which also provides the calculated QBAR runoff rate along with the discharge rate for varying Annual Recurrence Intervals (ARI). Refer to the **Appendix C** for the QBAR runoff calculations.

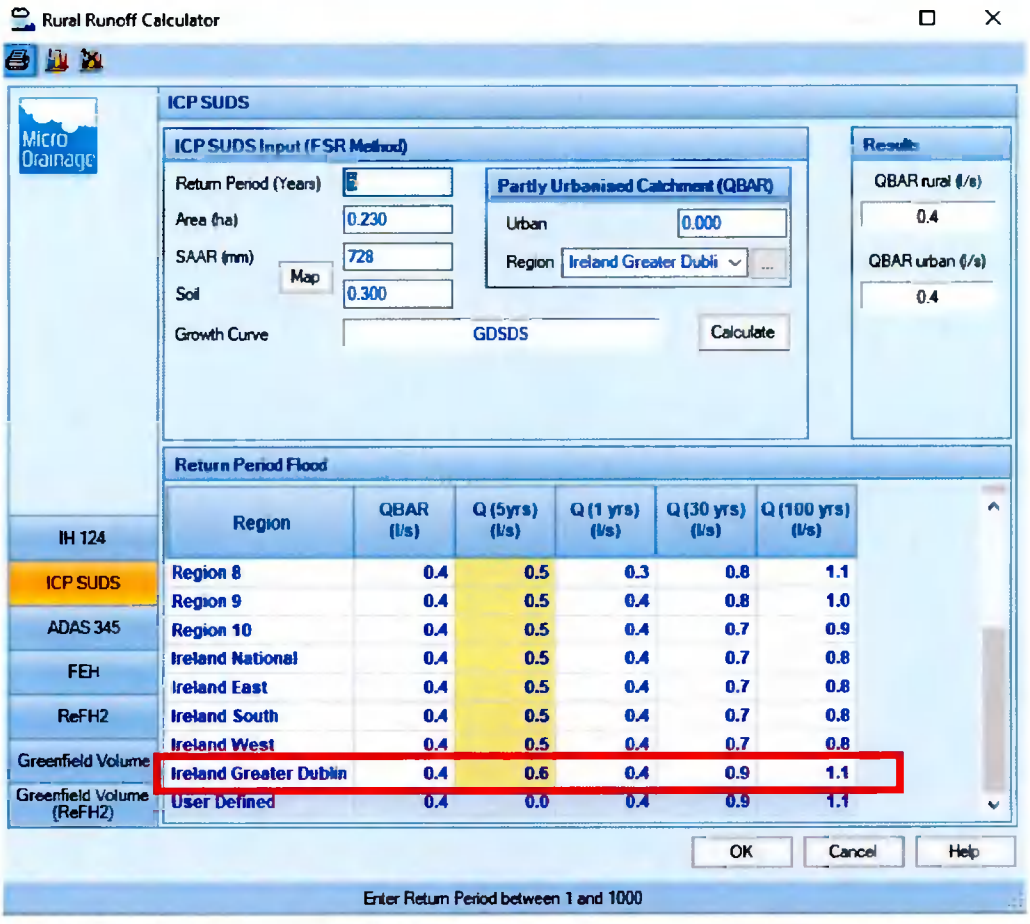

Figure 3.3 - Existing Site Runoff Calculator Results (MicroDrainage Excerpt)

The above outlines the greenfield runoff rate of the area to be developed. The proposed surface water drainage design is to utilise infiltration due the topography of the site and proximity to local surface water infrastructure.

3.4 Infiltration Rates

Infiltration rates were taken based soil value index and the local ground conditions. The infiltration was based on typical infiltration values as outlined in **Table 25.1** of CIRIA C753. An infiltration rate of 5.05×10^{-6} m/s, based on the average value of clayey, sandy gravel.

3.5 Proposed Surface Water Drainage Design Strategy

3.5.1 Proposed Surface Water Strategy Overview

It is proposed to provide separate surface water and wastewater drainage networks to serve the proposed development. These networks will provide infiltration to ground water and connection to the local wastewater sewer network, respectively.

Refer to *Section 4* for details of the proposed wastewater drainage design.

Refer to detailed drawing **H657-OCSC-XX-XX-DR-C-0500** for the proposed drainage network layout, which is to serve the proposed development.

3.5.2 Climate Change Allowance

The proposed surface water network has been designed to allow for an additional 10% increase in rainfall intensity, to allow for Climate Change projections, in accordance with the South Dublin County Council Development Plan and the GDSDS.

All discussion within this report, with regards to surface water network design calculation and results, include for the allowance of an increase of <u>10%</u> in rainfall intensity, as required.

3.5.3 Proposed Surface Water Network Strategy

It is proposed to separate the surface water and wastewater drainage networks, which will serve the proposed development, and allow infiltration to ground water and a connection to the local wastewater sewer network, respectively. Refer to *Section 4* for details of the proposed wastewater drainage design.

The surface water network is to consist of a gravity pipe network, with Sustainable Drainage Systems implemented, where practicable.

The typical traditional and Sustainable Drainage Systems (SuDS) provided, all of which have been designed in accordance with CIRIA C753, the SuDS Manual, and the design guidance material listed in *Section 2* of this report, are listed and detailed the general elements of the surface water network, as follows:

3.5.3.1 Pervious Paving

Pervious pavements provide a pavement finish suitable for both pedestrian and vehicular traffic, while also allowing rainwater to infiltrate the surface layer and into the underlying pervious structural layers. Here, the rainwater is temporarily stored beneath the overlying finished surface before either infiltration to the ground or / and discharge to the main surface water drainage network.

Pervious paving systems are an efficient means of treating the rainwater at source by providing initial interception of the rainwater, reducing the volume and frequency of the runoff and improving the surface water quality by providing at source treatment of the rainfall runoff leaving the site. This is achieved by helping remove and retain pollutants prior to discharge to the drainage system and / or groundwater system.

A pervious paving which has been specified by the landscape architect is a proprietary product which is used with a mixture of sand and gravel. This is to be utilised within the car parking spaces at the proposed development. This will allow runoff from the car parking areas to infiltrate naturally while also providing at source treatment of the runoff.

3.5.3.2 Underground Pipe Network

A traditional gravity pipe and manhole network will be provided, to convey the collected rainfall runoff as far as the development's outfall. Manholes, compliant with the GDSDS and GDRCOP, are provided for maintenance access at branched connections, change in pipe size and gradient, and at intervals no greater than 90m distance.

3.5.3.3 Soakaway

Temporary storage consisting of open graded crushed rock is to be provided with the surface water network. This will act as a filter medium for run off from trafficked areas by providing at source treatment and acting as temporary storage for run off. This crushed rock is to be provided to allow for the runoff from the development to infiltrate to ground water. The soakaway will be size to temporarily store runoff from events up to and including the 1% AEP event, including a 10% allowance for climate change.

3.5.3.4 Silt Traps

A manhole upstream of attenuation system is to contain a 600mm sump, below invert level of outlet pipe, in order to trap sediment and other gross pollutants, and prevent from entering the downstream watercourse; thus improving the water quality discharging from site.

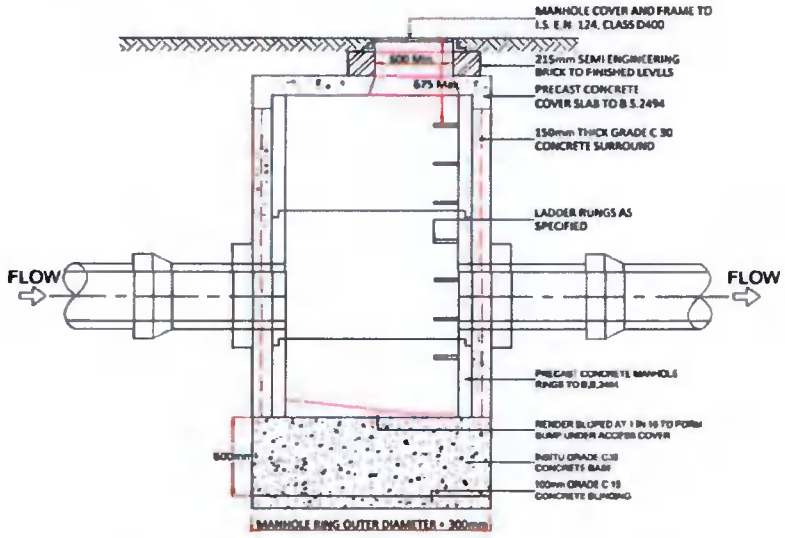

Figure 3.4 - Typical Detail of Silt Trap Manhole

3.6 Proposed Surface Water Network Detailed Design

3.6.1 Software Design Criteria

The proposed surface water network has been designed in accordance with the regulations and guidelines outlined in *Section 2*, using MicroDrainage Network Design package, by Innovyze Inc., which simulates the performance of the integrated drainage network for varying rainfall return periods and storm durations.

The MicroDrainage Network Design software applies the Flood Studies Report (FSR) methodology for analysis of the rainfall profiles. However, the input design parameters that were used, as part of this design, were based on the available Flood Studies Update (FSU) data, *i.e.* the return period rainfall depths for sliding durations, which determine the $\mathbf{M_{5\text{-}60}}$ and **R** values, and the standard annual average rainfall (SAAR); as sourced from Met Éireann.

Figure 3.5 - Surface Water Network Design Criteria (MicroDrainage Excerpt)

3.6.2 Proposed Surface Water Catchment Area

The proposed development consists of a single catchment which covers the structure and associated hardstanding area. Flows from the proposed catchment is to be restricted to natural infiltration rates as no positive outfall to a surface water network is to be provided.

Refer to design layout drawing **H657-OCSC-XX-XX-DR-C-0500** for further information.

3.6.3 Proposed Development Rainfall Runoff

Runoff from the proposed development is to be drained to a soakaway at the western edge of the site. Runoff will be allowed to infiltrate at the ground natural infiltration rate. No discharge from the development to existing local surface water sewer is currently proposed.

For the purpose of the surface water network design simulation, we have considered all external (roads, pavement, and roofs) areas as being 100% impermeable; giving a *winter* global runoff coefficient, C_v, of 0.84, in accordance with the HR Wallingford and Modified Rational Method for runoff.

3.6.4 Proposed Surface Water Pipe Network Design

The overall surface water drainage system, serving the proposed development, is to consist of a gravity sewer network that will convey runoff from the roofs and paved areas to the outfall manhole. The new gravity network will discharge a controlled attenuated flow rate to the existing public network at the north-eastern of the site, as outlined in *Section 3.3.2*.

The proposed piped-network has been designed in accordance with BS EN 752 and all new infrastructure is to be compliant with the requirements of the GDSDS and the GDRCOP for Drainage Works, with minimum full bore velocities of 1.0 m/s achieved throughout.

All main surface water carrier pipes have been sized to ensure no surcharging of the proposed drainage network for rainfall events up to, and including, the 1 in 5-year ARI event.

Refer to drawing **H657-OCSC-XX-XX-DR-C-0500** for the proposed drainage infrastructure layout.

3.7 Proposed Surface Water Attenuation Storage

The proposed development is to attenuate its own rainfall runoff, prior to discharging to the main development network. The primary function of the attenuation systems will be to temporarily store excessive rainfall runoff, during significant rainfall events, due to the restricted discharge rates from the development outfalls.

All attenuation systems have been size to accommodate run off from events up to and including the 1% AEP event including 10% allowance for climate change in accordance with the South Dublin County Council Development Plan 2016-2022.

A soakaway is to be provided at the western boundary of the site. This soakaway is to consist to comprise drainage stone to Cl. 505 of the TII specification for roadworks wrapped in a permeable geotextile to allow for infiltration to ground water. A minimum stone porosity of 30% is to be provided within the soakaway. A volume of **210m³** temporary storage is to be provided within the proposed soakaway as described above.

3.8 Surface Water Outfall Location

The surface water drainage is to discharge to ground water through infiltration. No outfall to the local surface water infrastructure is proposed.

The above is to ensures that there is no increase in flow rates and volumes, from the development site, being discharged to the receiving infrastructure; thus, causing no adverse impact on adjoining and other downstream properties.

3.9 Water Quality

The quality of the surface water discharging from site is to be improved through the following provisions, each of which is discussed in greater detail in *Section 3.4.3*:

- Pervious Paving in all car parking areas;
- Intensive landscaping, where practical;
- Open graded crushed rock storage;
- Silt trap to be provided on manhole immediately upstream of attenuation system, as a further preventative measure to trap silt and other gross pollutants;

3.10 Maintenance

The proposed surface water drainage network has been carefully designed, minimise risk of blockage throughout the network, mainly through the following provisions that limit and restrict the size of pollutants entering the network:

- Pervious paving;
- Silt trap manhole.

All devices, including green roof, road gullies, silt trap, flow control device and attenuation system, should be inspected regularly and maintained, as appropriate and in accordance with manufacturer's recommendations and guidelines.

Items such as the flow controls and fuel separators have been located so as to provide easy vehicular access for inspection and maintenance.

3.11 Taking in Charge

It is proposed that all new surface water infrastructure associated within the redline boundary **is not** to be offered to be taken in charge by South Dublin County Council.

3.12 Surface Water Impact Assessment

The design criteria for the drainage system are established in *GDSDS-RDP Volume 2, Section 6.3.4* and explained further in *GDSDS-RDP Volume 2, Appendix E.* There are four design criteria, each of which has been considered for the subject site:

- River Water Quality Protection;
- River Regime Protection;
- Level of Service (flooding) for the site and;
- River Flood Protection.

3.13 Criterion 1 – River Water Quality Protection

It is proposed that the overall drainage system, serving this development, will contain a range of surface water treatment methods, as outlined previously in *Section 3.4,* which will improve the quality of surface water being discharged from the proposed development.

Gross pollutants, sediments, hydrocarbons, and other impurities, will be removed at source with the following provisions:

a) Open graded crushed rock storage
b) Pervious Paving to all car parking areas;
c) Intensive landscaping, where practicable;
d) Silt-trap prior to attenuation storage area;

3.14 Criterion 2 – River Regime Protection

Surface water discharge from the overall development will be restricted to natural infiltration rate, as per GDSDS and South Dublin County Council requirements. Refer to *Section 3.3.3* for further details of the proposed development rainfall runoff calculations.

No outfall to the local surface water network is to be proposed as the runoff from the proposed development is to infiltrate to ground water.

3.15 Criterion 3 – Level of Service (Flooding) Site

There are four sub-criteria for the required level of service, for a new development; as set out in the *GDSDS Volume 2, Section 6.3.4 (Table 6.3).*

- No flooding on site except where planned (30-year high intensity rainfall event);
- No internal property flooding (100-year high intensity rainfall event);
- No internal property flooding (100-year river event and critical duration for site) and;
- No flood routing off site except where specifically planned. (100-year high intensity rainfall event).

3.15.1 Sub-Criterion 3.1

The surface water drainage systems, serving the proposed development, have been designed to accommodate the 100-year return period rainfall event (including an allowance of 10% increase in rainfall intensity for climate change) without flooding. Therefore, the system has capacity for the 30-year return period rainfall event without flooding.

The performance of the proposed drainage system has been analysed for design rainfall events up to, and including, the 1% AEP event (including 10% climate change allowance) using the *MicroDrainage Network Design Software*, by Innovyze Inc. Refer to **Appendix D** for details of design criteria, calculations and results. The analyses indicate that no flooding will occur for design rainfall events up to, and including, the 1% AEP.

3.15.2 Sub-Criterion 3.2

The surface water drainage systems, serving the proposed development, have been designed to accommodate the 100-year return period rainfall event (including an allowance of 10% increase in rainfall intensity for climate change) without flooding.

The performance of the proposed drainage system in 100-year return period storm events (including 10% climate change allowance) has been

analysed – Refer **Appendix D** for calculations. The analyses show that no flooding will occur in 100-year return period storm events.

3.15.3 Sub-Criterion 3.3

Details of the flood risk assessment associated with the proposed development is outlined in *Section 7* of this report. The assessment indicates that there is no apparent risk of internal property flooding for a design 100-year return period pluvial rainfall event (including 10% climate change allowance).

3.15.4 Sub-Criterion 3.4

The surface water drainage systems, serving the proposed development, have been designed to accommodate the 100-year return period rainfall event (including an allowance of 10% increase in rainfall intensity for climate change) without flooding, so no flood routing off site will be experienced for such a rainfall event.

The performance of the proposed drainage system in 100-year return period storm events (including 10% climate change allowance) has been analysed – Refer **Appendix D** for calculations. The analyses show that no flooding will occur in 100-year return period storm events.

Details of the flood risk assessment associated with the proposed development is outlined in *Section 7* of this report. This assessment, along with the network design simulation results, from the MicroDrainage Network Analysis, indicates that no internal property flooding will occur in a 100-year return period fluvial flood event (including 10% climate change allowance).

3.16 Criterion 4 – River Flood Protection

As outlined in *Section 3.13* (Criterion 2), the surface water runoff from the development's catchment will be limited to the natural infiltration rate.

Refer to *Section 3.3.3* and *Section 3.5* of this report for further details on the limiting discharge rates. The *GDSDS Volume 2, Appendix E* states that this practice ensures *"that sufficient stormwater runoff retention is achieved to protect the river during extreme events".*

Attenuation storage is to be provided for the 100-year return period rainfall event (including an increased 10% rainfall intensity; to allow for climate change).

Refer to **Appendix D** for details of hydraulic modelling calculations of attenuation and flow control facilities, as carried out using MicroDrainage software by Innovyze Inc.

4 WASTEWATER DRAINAGE

4.1 Overview

The proposed gravity sewer and pump station design has been carried out in accordance with Irish Water's Code of Practice for Wastewater Infrastructure.

4.2 Existing Wastewater Drainage

There is no wastewater infrastructure located within the boundary of the site. The closest wastewater sewer to the development is located within Tynan Hall Park, to the east of the proposed development. The sewer within Tynan Hall Park is 225mm Ø sewer with the material not noted on the existing service records.

Refer to **Appendix A** for details of existing service records.

4.3 Consultation

A Pre-Connection Enquiry Form ***(IW Ref Nr. CDS21002593)*** was submitted 15th April 2021 to Irish Water. No Confirmation of feasibility has been returned by Irish Water.

Refer to **Appendix F** for a copy of the Pre-Connection Enquiry Form.

4.4 Proposed Wastewater Drainage Strategy

It is proposed to provide separate wastewater and surface water drainage networks to serve the proposed development, it is proposed to provide an independent connection to the local wastewater sewer.

Refer to *Section 3* for details of the proposed surface water drainage design strategy.

A new wastewater network is to be provided to serve the development. Wastewater from the building is to connect to the new development's gravity wastewater network. Due to the topography of the site, a wastewater pump station is to be provided. This wastewater pump station is to be designed in accordance with the Irish Water Code of Practice for Wastewater Infrastructure. The wastewater pump station is to be designed with 6-hour

emergency storage. This storage will be required in the event of a power outage or in the event that both pumps fail. A HDPE rising main is to be provided from the pump station at the proposed development to Tynan Hall Park. A new standoff manhole is to be constructed in Tynan Hall Park and a gravity connection is to be provided from the new stand-off manhole to the existing wastewater network.

Refer to detailed drawing **H657-OCSC-XX-XX-DR-C-0500** for the proposed drainage network layout, which is to serve the proposed development.

4.5 Wastewater Network Design Calculations

Wastewater (volumetric) calculations have been complied in accordance with *Irish Water's Code of Practice Wastewater Infrastructure, IW-CDS-5030-03* and are included in **Appendix E**. Pipe design calculations have been complied using MicroDrainage software and are included in **Appendix E**. Design flow has been calculated using the Discharge Unit method described in *I.S. EN 752*. The calculations demonstrate that conveyance capacity is provided for all development of zoned lands within the catchment, that self-cleansing velocity will be achieved with the expected design flow rates and that the flow velocities will not exceed the upper limit of 3.0m/s.

4.6 Taking In Charge

It is proposed that all new wastewater drainage infrastructure installed to serve the proposed development within the redline boundary **is not** to be offered to Irish Water for to be taken-in-charge.

5 POTABLE WATER SUPPLY

5.1 Overview

All proposed potable water design has been carried out in accordance with *Irish Water's Code of Practice for Water Infrastructure, IW-CDS-5020-03.*

A new 100mm-diameter HDPE watermain connection is to be provided from the existing 100mm-diameter uPVC watermain at Tynan Hall Park.

5.2 Existing Watermain Infrastructure

The Irish Water public records indicate that there is an existing public 100mm-diameter uPVC watermain within Tynan Hall Park. There is also a 600mm-diameter ductile iron watermain within the Ballymount Road.

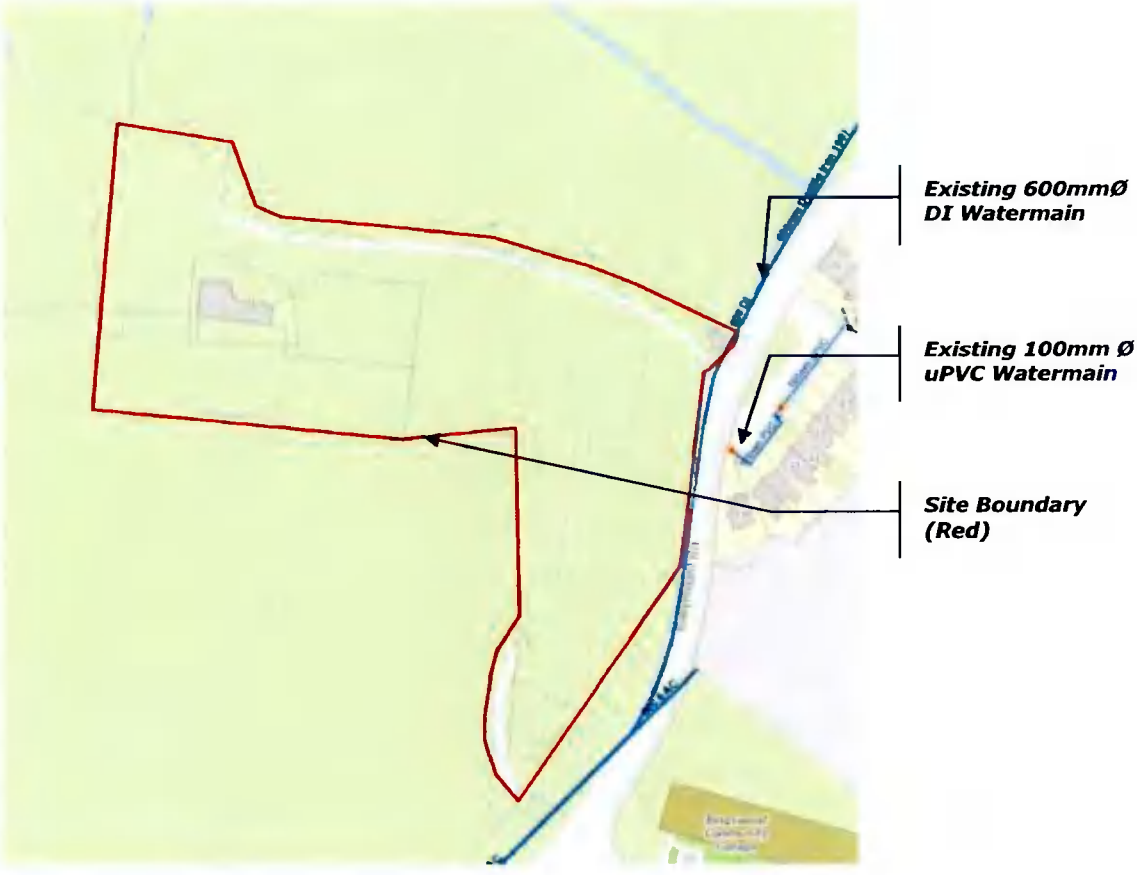

Figure 5.1 - Irish Water Public Records (Excerpt)

Refer to **Appendix A** for details of existing watermain infrastructure records.

5.3 Consultation

A Pre-Connection Enquiry Form ***(IW Ref Nr. CDS21002593)*** was submitted 15th April 2021 to Irish Water. No Confirmation of feasibility has been returned by Irish Water.

Refer to **Appendix F** for a copy of the Pre-Connection Enquiry Form.

5.4 Connection to the Existing Network

It is proposed to serve the proposed development by providing a new 100mm high density polyethylene (HDPE) connection to the existing 100mm uPVC watermain within Tynan Hall Park.

The proposed connection is to be carried out in accordance with *Irish Water's Code of Practice for Water Infrastructure*, following a New Connection agreement with Irish Water, with a bulk water meter to be provided at the development's entrance.

Refer to drawing **H657-OCSC-XX-XX-DR-C-0550** for the proposed watermain layout.

5.5 Water Saving Devices

Water saving devices are to be considered for use within the proposed development units, in order to conserve the use of water, as part of the internal fit-out.

5.6 Water Meters

A bulk water meter is to be provided at the connection to the public watermain, at the development entrance. All metering is to be provided in accordance with Irish Water's requirements.

5.7 Taking In Charge

All new watermain infrastructure, installed to serve the proposed development after the bulk meter **is not** to be offered to Irish Water for to be taken-in-charge.

6 FLOOD RISK ASSESSMENT

6.1 Design Guidelines Overview

Any planning permission sought on the subject lands are required to adhere to the Local Authority requirements *i.e.* the South Dublin County Council Development Plan, and as such, The Planning System and Flood Risk Management (FRM), Guidelines for Planning Authorities, in which, its Technical Appendices outline the requirements for a Site Specific Flood Risk Assessment.

6.2 The Planning System and Flood Management, Guidelines for Planning Authorities

The FRM Guidelines outline methodologies for the "transparent consideration of flood risk at all levels of the planning process, ensuring consistency of approach throughout the country".

"The core objectives of the FRM Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface runoff;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restrictions of national, regional, or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management flood risk management."

In order to achieve the aims and objectives that are set out in the FRM Guidelines, the key principles that should be applied to new development are as follow:

- Avoid the risk, where possible;
- Substitute less vulnerable uses, where avoidance is not possible; and

- Mitigate and manage the risk, where avoidance and substitution are not possible.

Justification for development is required in situations where 'avoid' and 'substitute' principles cannot be applied. This is further summarised in the FRM Guidelines Sequential Approach, as illustrated in *Figure 6.1*.

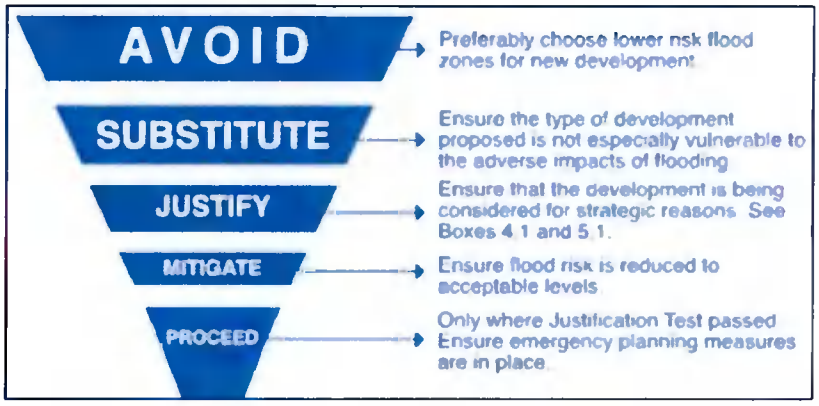

Figure 6.1 – Sequential Approach Principles in Flood Risk Management

6.3 Flood Risk Assessment

The assessment of flood risk requires an understanding of where the water comes from (*i.e.* the source), how and where it flows (*i.e.* the pathways) and the people and assets that if affects (*i.e.* the receptors). This is illustrated further in *Figure 6.2*, as sourced from the FRM Guidelines.

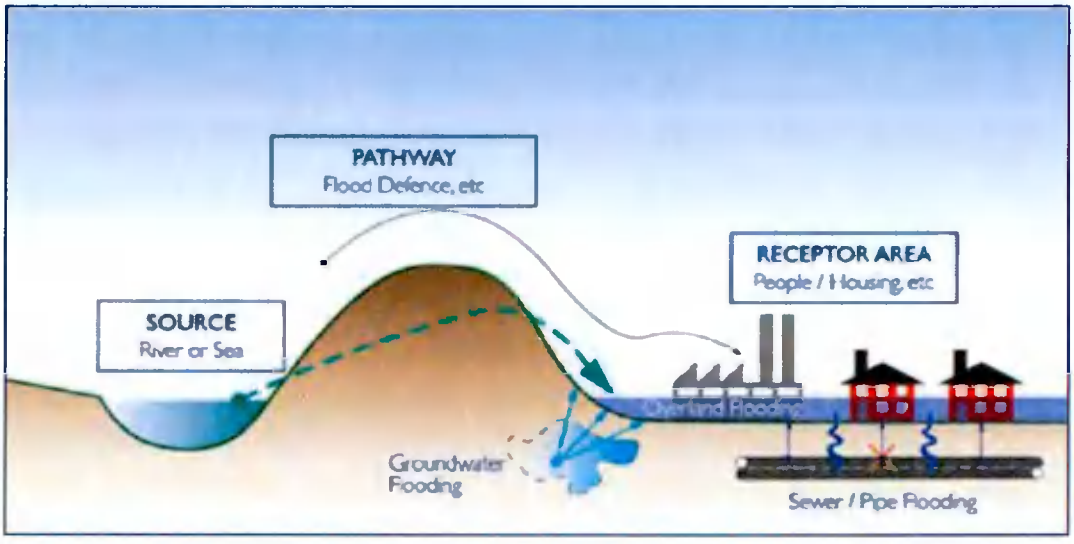

Figure 6.2 – Source – Pathway – Receptor Model

The main sources of flooding are rainfall or higher than normal sea or river levels.

The main pathways include rivers, streams, sewers, drains, overland flow, and river and costal floodplains and their assets.

Receptors typically include people, their property, and their environment.

All three elements of this model must be examined as part of the flood risk assessment, including the vulnerability and exposure of receptors. In order to determine its potential consequence.

Risks to people, property and the environment should be assessed over the full range of probabilities, including extreme events. Flood risk assessment should cover all sources of flooding, including effects of run-off from a development locally and beyond the development site.

6.3.1 Flood Risk Assessment Stages

The FRM Guidelines outline that a staged approach should be adopted when carrying out a flood risk appraisal or assessment of flood risk for individual planning applications. These stages are:

- **Stage 1** – Flood risk identification
- **Stage 2** – Initial flood risk assessment
- **Stage 3** – Detailed flood risk assessment

6.4 Flood Zones

The FRM Guidelines identifies three types, or levels, of flooding zones, which are defined as follows:

1. **Flood Zone A** – where the probability of flooding from rivers and sea is highest (greater than 1% AEP for fluvial, or 0.5% AEP for coastal flooding);
2. **Flood Zone B** – where the probability of flooding from river and sea is moderate (between 0.1% AEP and 1% AEP for fluvial and between 0.1% AEP and 0.5% AEP for coastal flooding);

3. **Flood Zone C** – where the probability of flooding from rivers and sea is low (less than 0.1% AEP for both fluvial and coastal flooding).

6.5 Climate Change

The *FRM Guidelines* require that account be taken of the effects of climate change over the design of a development, typically 100 years. Design parameters to take account of climate change were established in the *GDSDS* and revised following later studies, as directed within the Local Authority's Development Plan. These parameters are set out in the *Figure 6.3 – Climate Change – Impact on Design Parameters*, below.

Design Category	Impact of Climate Change
Drainage	10% increase in rainfall
Fluvial (River)	20% increase in flood flow
Tidal / Coastal	Sea level rise of 500mm

Figure 6.3 – Climate Change – Impact on Design Parameters

6.6 Development Vulnerability

Table 3.1 of the PSFRM Guidelines, reproduced in *Figure 6.4* below, classifies the proposed residential development as being **'Highly Vulnerable Development'** and the proposed commercial development as being **'Less Vulnerable Development'**, based on its proposed land use and type of development.

Vulnerability Class	Land uses and types of development which include:
Highly Vulnerable Development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels;

	Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less Vulnerable Development	Buildings used for: retail, **leisure**, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible Development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

Figure 6.4 – Development Vulnerability Class

Table 3.2 of the PSFRM Guidelines, reproduced in *Figures 6.5* below, illustrates the types of development that are considered appropriate to each flood zone, and those that would be required to meet the criteria of a Justification Test, which establishes the criteria under which desirable development of a site within a floodplain may be warranted.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable Development	Justification Test	Justification Test	Appropriate
Less Vulnerable Development	Justification Test	Appropriate	Appropriate
Water-compatible Development	Appropriate	Appropriate	Appropriate

Figure 6.5 - Matrix of Vulnerability Vs. Flood Zone

Therefore, based on the table above, *Less Vulnerable Development*, such as Leisure (Community Centre) is classified as **'appropriate'** if it is located within Flood Zone C.

6.7 Sequential Approach

A sequential approach, based on the development vulnerability and location with respect to flood zones, is a key tool in ensuring new development is first and foremost directed towards land that is at low risk of flooding. This approach is illustrated further in *Figure 6.6* below.

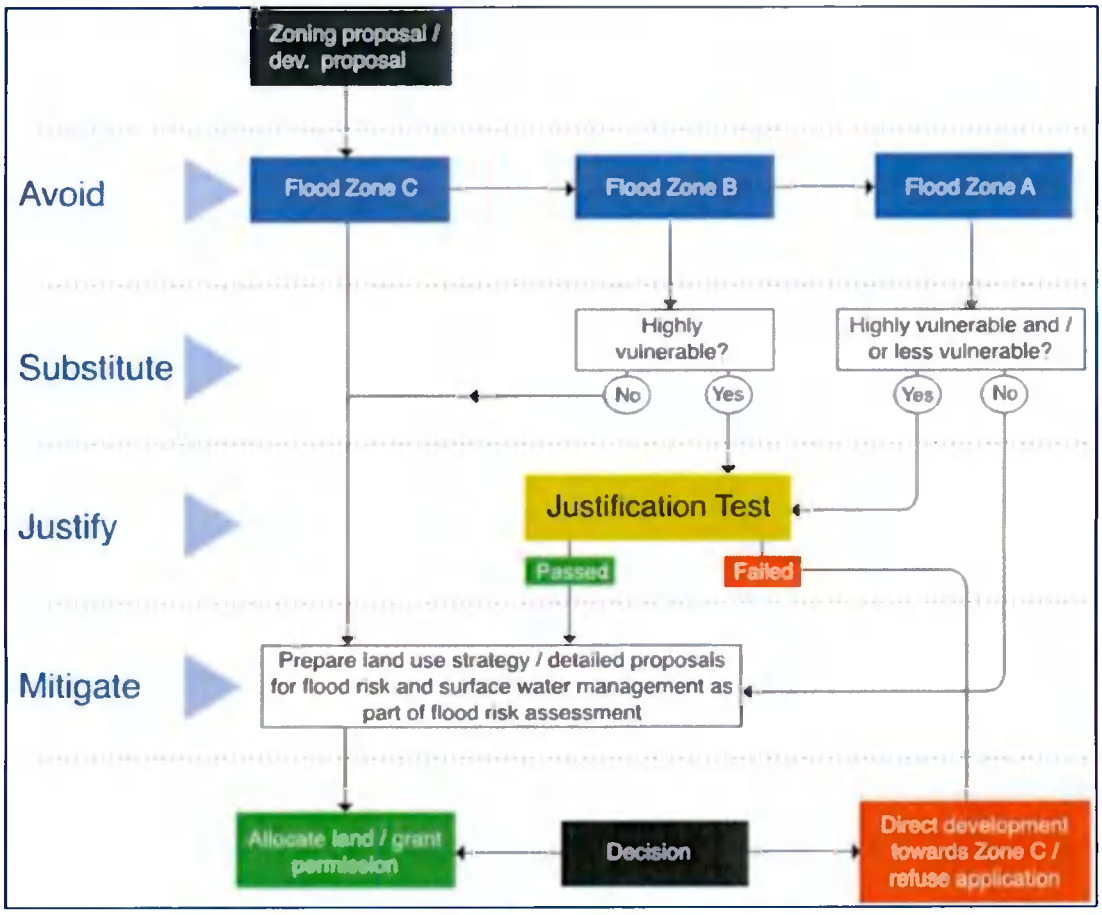

Figure 6.6 – Sequential Approach Mechanism (FRM Guidelines)

7 FLOOD RISK IDENTIFICATION & ASSESSMENT

Details of the information sources that were used as part of the flood risk identification as assessment associated with the subject development site are provided in *Section 2* of this report.

7.1 Historical Flooding

The Office of Public Works (OPW) collates all information available from reports of flooding from all sources on a nationwide basis. This information is available from the OPW's website www.floodmaps.ie, which was consulted in order to obtain any information on previous flooding in the vicinity of the site. The records indicate that there is no past flood events reported in the vicinity of the site.

Refer to *Figure 7.1 – OPW Historical Flooding*, below.

Figure 7.1 – OPW Historical Flooding (www.floodmaps.ie)

7.2 Fluvial Flooding

Fluvial flooding occurs when a river overtops its banks due to a blockage in the channel or the channel capacity is exceeded due to excess rainfall in its catchment area.

The *Environment Protection Agency (EPA)* collates all information available about the waterbodies from all sources on a nationwide basis. This information is available from the EPA's website http://gis.epa.ie/EPAMaps.

The proposed site is located approximately 500m south of a stream which forms a tributary of the River Camac 2km north of the Poddle River.

Refer to *Figure 7.2 – Site Proximity to River Sources*, below.

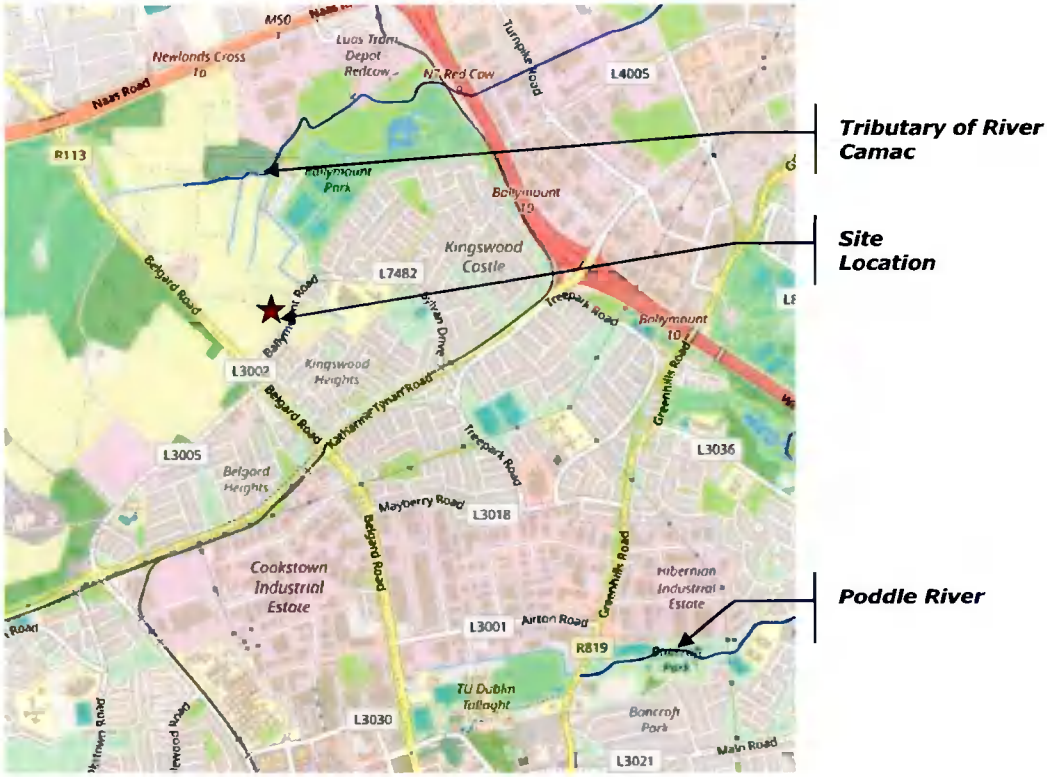

Figure 7.2 – Site Proximity to River Sources

The OPW in conjunction with South Dublin Council Council, and the other affected Local Authorities, have developed flood risk maps as part of the 'Catchment Flood Risk Assessment and Management' programme and as part of the Poddle River and River Camac catchment management. The Poddle River and the River Camac

has been modelled for the 10%, 1% and 0.1% AEP flood events. The modelled information for the Poddle River available in the OPW's website www.floodinfo.ie.

The *Figure 7.3* below is taken from the OPW flood maps available on www.floodinfo.ie

The above mentioned mapping clearly demonstrates that the proposed site is located outside the predicted 10%, 1% and 0.1% AEP flood extent of the Poddle River.

Figure 7.3 – Fluvial Flood Extent

Therefore, the *Figure 7.3* confirms that the development site is located within Flood **Zone C**, *i.e.* is **not** considered at risk from Fluvial Flooding.

7.3 Coastal Flooding

Coastal flooding is caused by high sea levels resulting in the sea overflowing onto the land. The proposed site is located approximately 11.5km west from the east coast. Refer to *Figure 7.4 – Coastal Flooding*, below.

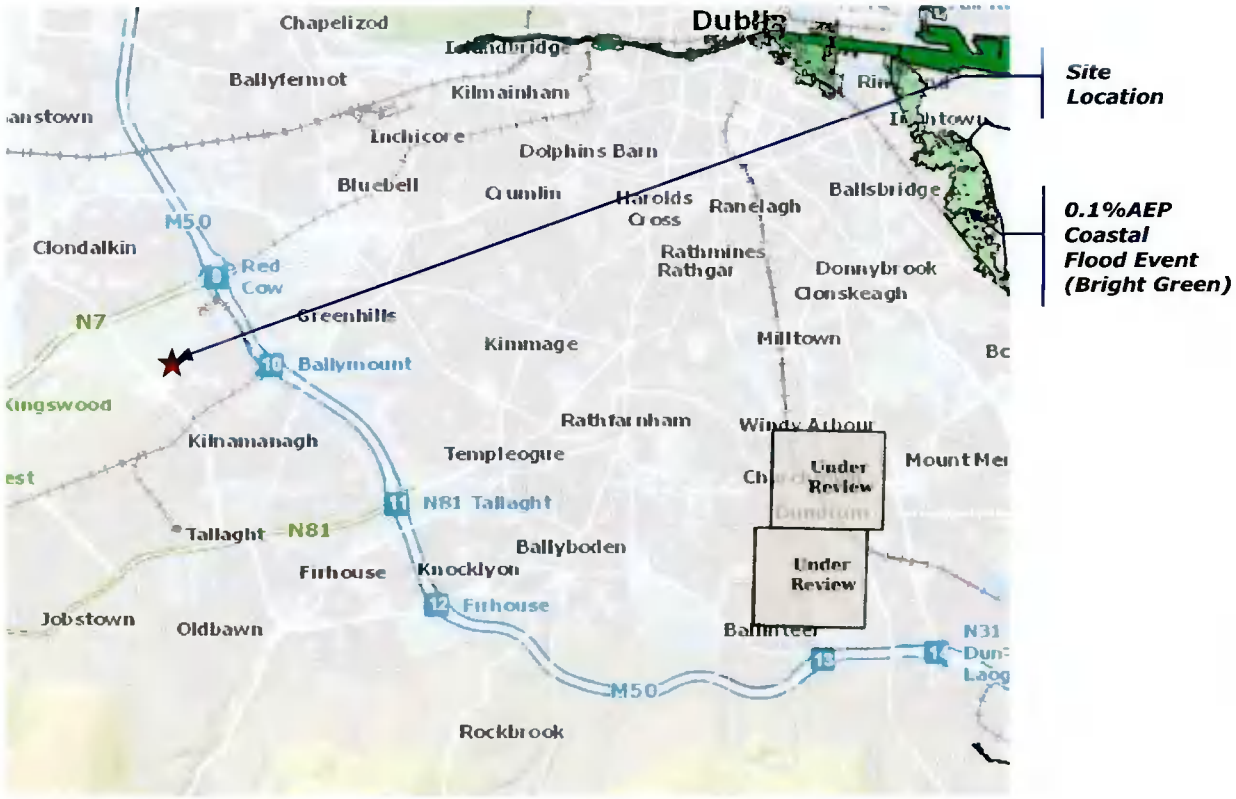

Figure 7.4 – Coastal Flood Extent (www.floodinfo.ie)

Therefore, the site is **not** considered at risk from Coastal Flooding.

7.4 Pluvial Flooding

7.4.1 Preliminary Flood Risk Assessment

Pluvial flooding occurs when overland flow, resulting from rainfall events, cannot infiltrate into the ground, when drainage systems exceed their capacity or are blocked and when the water cannot discharge due to a high water level in the receiving watercourse.

The *Department of Housing, Planning, Community & Local Government (DHPCLG)* have collated the draft Flood mapping from the OPW for predicted pluvial flooding for the 1% AEP flood event. Refer to *Figure 7.5* for details of the predicted pluvial flood extent.

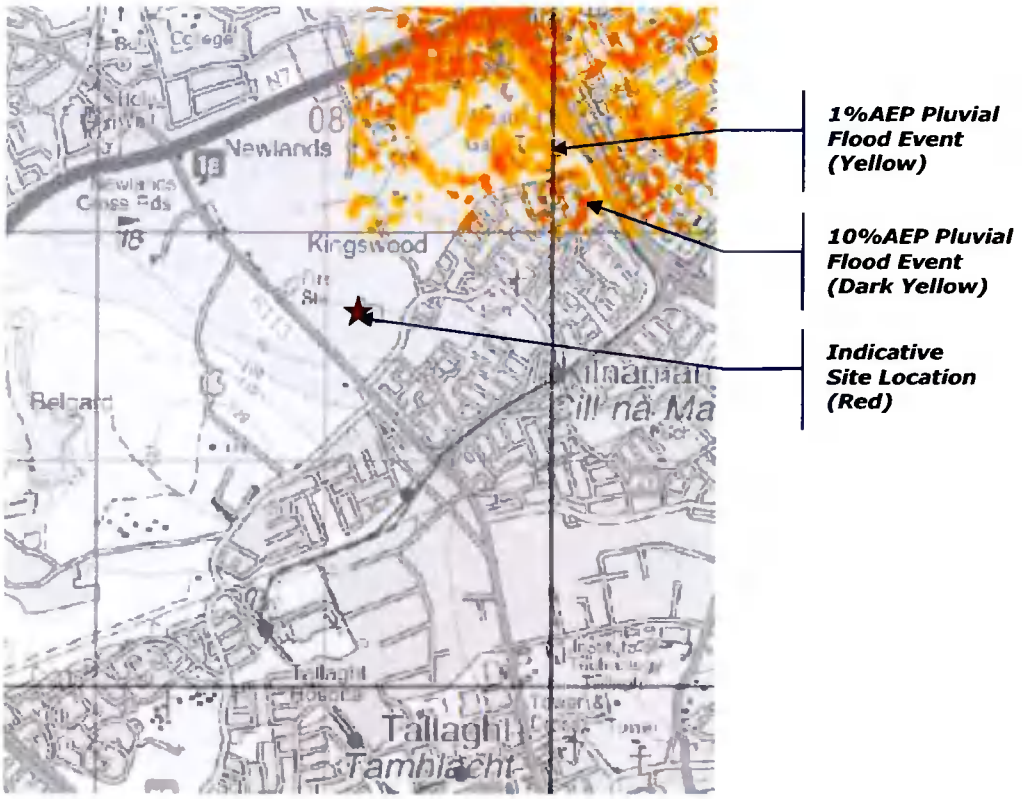

Figure 7.5 – Pluvial Flood Extent (www.floodinfo.ie)

Figure 7.5 illustrates the indicative location of the pluvial flooding, modelling of the pluvial flooding has not been modelled in the vicinity of the proposed development.

In order to mitigate the potential for pluvial flooding the measures outlined in the *Section 7.4.2* below have been proposed.

Refer to **Appendix H** for a copy of the pluvial flood risk map.

7.4.2 Proposed Development Context

The proposed development is to contain a new gravity surface water network that is to discharge to a soakaway which is to be allowed to infiltrate naturally. This soakaway is to be designed to accommodate runoff from rainfall events up to and including the 1% AEP including a 10% allowance for climate change. Details of the proposed surface water drainage strategy associated with the subject development site are provided in *Section 3* of this report.

The surface water network, which is to serve the proposed development, includes two *Sustainable Drainage Systems (SuDS)* which are water management principles that aim to replicate natural drainage processes within a modern drainage system. The two systems proposed on this development are **Pervious Paving** and **Open Grade Crushed Rock Soakaway** with details provided in *Section 3.4.3* of this report.

The proposed surface water network has been designed to accommodate rainfall from events up to and including the 1% AEP event with a 10% allowance for climate change, with flooding experienced.

This ensures that pluvial flooding is **not** considered to be a significant risk to the proposed development.

7.5 Groundwater Flooding

Groundwater flooding occurs when the water table rises above the land surface, this means the natural underground drainage system is incapable of sufficiently draining itself, resulting in the emergence of groundwater at the surface. It generally requires sustained rainfall over relatively longer duration than other forms of flooding, its location is discontinuous, and they can last for weeks or months. The GSI have developed flood risk maps that shows the groundwater flooding and historic groundwater flooding. The groundwater flooding is classified as Low Probability, Medium Probability and High Probability. It can be seen from *Figure 7.6* below that there is no modelled ground water flooding and no historic ground water flooding reported in the vicinity of the site.

Refer to *Figure 7.6 – Groundwater Flooding*, below.

Figure 7.6 – Groundwater Flood Extent (www.gsi.ie)

The site is also not in vicinity of any tidally influenced area of groundwater flood and is therefore **not** considered at Risk from Groundwater flooding.

Daire O'Mahoney

(BEng MEng MIEI)

For OCSC MULTIDISCIPLINARY CONSULTING ENGINEERS

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APPENDIX A. EXISTING DRAINAGE INFRASTRUCTURE RECORDS

Appendix A

Existing Drainage Infrastructure Records

Irish Water Web Map

Water Distribution Network
Water Treatment Plant
Water Pump Station
Storage Cell/Tower
Dosing Point
Meter Station
Abstraction Point
Telemetry Kiosk
Reservoir
Pumped
Raw Water
Water Distribution Mains
Irish Water
Private
Trunk Water Mains
Irish Water
Private
Water Lateral Lines
Irish Water
Non IW
Water Casings
Water Abandoned Lines
Boundary Meter
Bulk/Check Meter
Group Scheme
Source Meter
Water Meter
Unknown Meter - Other Meter
Non Return
PRV
PSV
Sluice Line Valve Open/Closed
Butterfly Line Valve Open/Closed
Sluice Boundary Valve Open/Closed
Butterfly Boundary Valve Open/Closed
Scour Valves
Single Air Control Valve
Double Air Control Valve
Water Side Valves
Water Service Connections
Water Distribution Chambers
Water Network Junctions
Pressure Monitoring Point
Fire Hydrant
Fire Hydrant/Washout
Water Fittings
Cap
Reducer
Tap
Other Fittings
Sewer Foul Combined Network
Waste Water Treatment Plant
Waste Water Pump station
Sewer Mains Irish Water
Gravity - Combsec
Gravity - Foul
Gravity - Unknown
Pumping - Combined
Pumping - Foul
Pumping - Unknown
Syphon - Combsec
Syphon - Foul
Overflow
Sewer Mains Private
Gravity - Combsec
Gravity - Foul
Gravity - Unknown
Pumping - Combined
Pumping - Foul
Pumping - Unknown
Syphon - Combsec
Syphon - Foul
Overflow
Sewer Lateral Lines
Sewer Casings
Bulk/Check
Blanked
Reducing
Cascade
Catchpit
Bifurcation
Hatchbox
Lamphole
Hydrobrake
Other Unknown
Sewer Manholes
Discharge Type
Outfall
Overflow
Soakaway
Other Unknown
Cleanout Type
Rodding Eye
Flushing Structure
Other Unknown
Sewer Inlets
Catchpit
Gully
Standard
Other Unknown
Sewer Fittings
Vent Col
Other Unknown
Storm Water Network
Surface Water Mains
Surface Gravity Mains
Surface Gravity Mains Private
Surface Water Pressurised Mains
Surface Water Pressurised Mains Private
Inlet Type
Gully
Standard
Other Unknown
Storm Manholes
Standard
Cascade
Catchpit
Bifurcation
Hatchbox
Lamphole
Hydrobrake
Other Unknown
Storm Culverts
Storm Casin Data
Stormwater Chambers
Discharge Type
Outfall
Overflow
Soakaway
Other Unknown
Gas Networks Ireland
Transmission High Pressure Gasline
Distribution Medium Pressure Gasline
Distribution Low Pressure Gasline
GNI Networks
≥16B HV Lines
HV Underground
HV Overhead
HV Abandoned
≤8B MV/LV Lines
MV Overhead Three Phase
MV Overhead Single Phase
LV Overhead Three Phase
LV Overhead Single Phase
MV/LV Underground
Abandoned
Gas Service Categories
Proposed
Under Construction
Out of Service
Decommissioned
Water Non Service Assets
Water Point Feature
Water Pipe
Water Structure
Waste Non Service Assets
Waste Point Feature
Sewer
Waste Structure

UISCE ÉIREANN IRISH WATER

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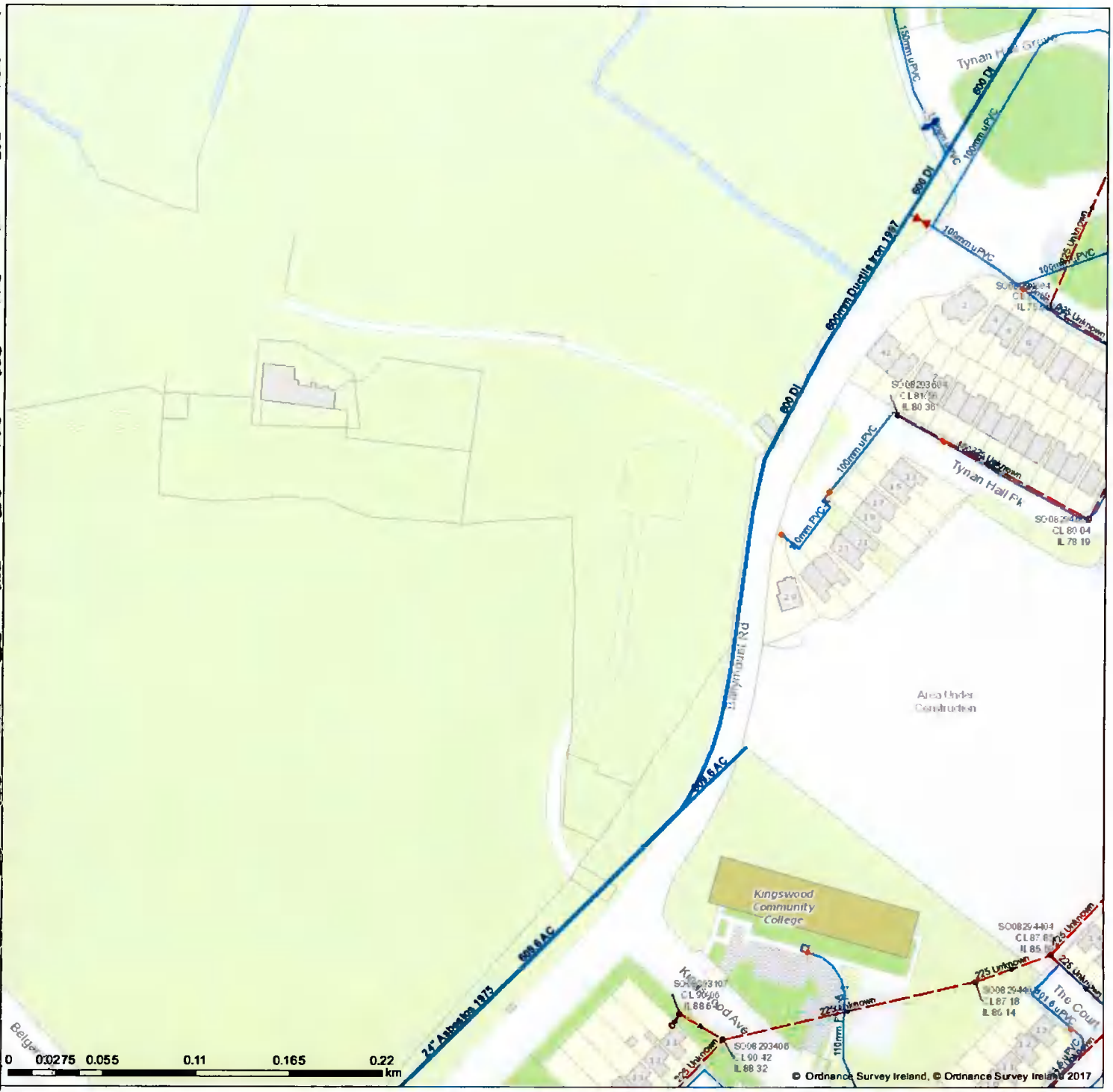
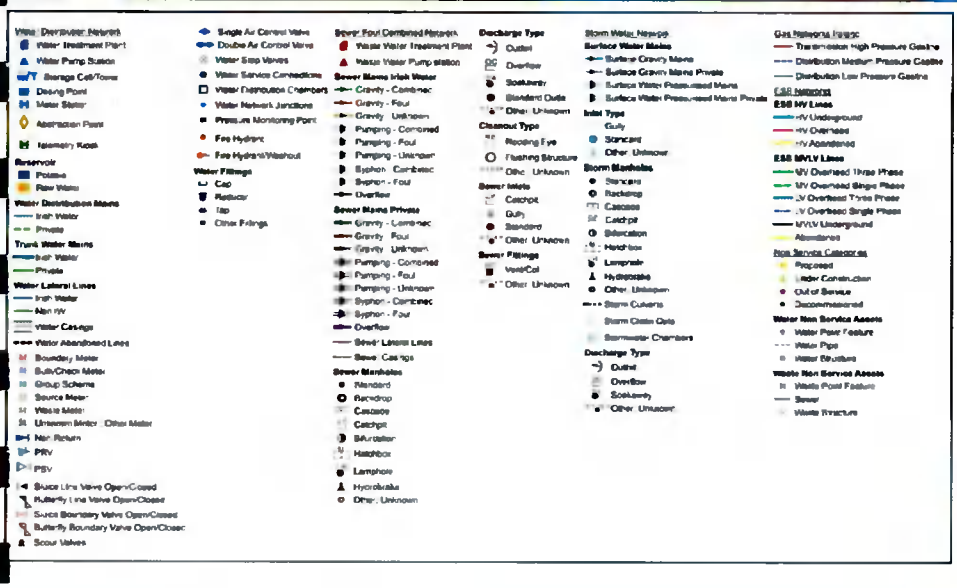
Irish Water Web Map





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APPENDIX B. RETURN PERIOD RAINFALL DEPTHS

Appendix B

Return Period Rainfall Depths

for Sliding Durations from Met Éireann

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 308174, Northing: 229652,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.5,	3.6,	4.2,	5.2,	5.9,	6.4,	8.2,	10.2,	11.5,	13.5,	15.3,	16.6,	18.8,	20.5,	21.9,	N/A ,
10 mins	3.4,	5.0,	5.9,	7.3,	8.2,	8.9,	11.4,	14.2,	16.1,	18.8,	21.3,	23.2,	26.2,	28.5,	30.5,	N/A ,
15 mins	4.0,	5.9,	6.9,	8.5,	9.6,	10.5,	13.4,	16.7,	18.9,	22.1,	25.0,	27.3,	30.8,	33.6,	35.9,	N/A ,
30 mins	5.3,	7.7,	9.0,	11.0,	12.4,	13.5,	17.1,	21.2,	24.0,	27.9,	31.5,	34.2,	38.6,	41.9,	44.8,	N/A ,
1 hours	7.0,	10.0,	11.7,	14.2,	16.0,	17.3,	21.8,	26.9,	30.4,	35.2,	39.6,	43.0,	48.3,	52.4,	55.8,	N/A ,
2 hours	9.1,	13.0,	15.2,	18.4,	20.5,	22.2,	27.8,	34.2,	38.4,	44.4,	49.8,	54.0,	60.4,	65.4,	69.6,	N/A ,
3 hours	10.7,	15.2,	17.6,	21.3,	23.8,	25.7,	32.1,	39.3,	44.1,	50.9,	56.9,	61.6,	68.9,	74.5,	79.2,	N/A ,
4 hours	12.0,	17.0,	19.7,	23.7,	26.4,	28.6,	35.5,	43.4,	48.7,	56.1,	62.6,	67.7,	75.6,	81.8,	86.8,	N/A ,
6 hours	14.1,	19.8,	22.9,	27.5,	30.6,	33.0,	41.0,	50.0,	55.9,	64.2,	71.6,	77.4,	86.2,	93.1,	98.8,	N/A ,
9 hours	16.5,	23.1,	26.6,	31.9,	35.5,	38.3,	47.3,	57.5,	64.2,	73.6,	81.9,	88.4,	98.4,	106.1,	112.5,	N/A ,
12 hours	18.5,	25.8,	29.7,	35.5,	39.4,	42.4,	52.3,	63.5,	70.8,	81.0,	90.1,	97.2,	108.0,	116.3,	123.3,	N/A ,
18 hours	21.7,	30.1,	34.5,	41.2,	45.7,	49.1,	60.4,	73.0,	81.2,	92.8,	103.1,	111.0,	123.1,	132.5,	140.3,	N/A ,
24 hours	24.3,	33.6,	38.5,	45.8,	50.7,	54.5,	66.8,	80.6,	89.6,	102.2,	113.4,	122.0,	135.1,	145.3,	153.7,	183.1,
2 days	30.5,	41.0,	46.5,	54.6,	59.9,	64.1,	77.3,	91.8,	101.2,	114.2,	125.7,	134.4,	147.7,	157.9,	166.3,	195.2,
3 days	35.4,	47.0,	53.0,	61.7,	67.4,	71.8,	85.7,	101.0,	110.8,	124.3,	136.0,	145.0,	158.6,	169.0,	177.5,	206.7,
4 days	39.8,	52.2,	58.6,	67.8,	73.8,	78.5,	93.1,	109.0,	119.1,	133.1,	145.1,	154.3,	168.2,	178.8,	187.4,	217.0,
6 days	47.5,	61.3,	68.3,	78.5,	85.0,	90.1,	105.8,	122.8,	133.6,	148.3,	161.0,	170.6,	185.0,	196.0,	204.9,	235.3,
8 days	54.2,	69.3,	76.9,	87.8,	94.8,	100.2,	116.9,	134.8,	146.1,	161.5,	174.7,	184.7,	199.7,	211.0,	220.2,	251.4,
10 days	60.4,	76.6,	84.7,	96.2,	103.7,	109.3,	126.9,	145.7,	157.5,	173.4,	187.1,	197.4,	212.9,	224.5,	234.0,	265.9,
12 days	66.2,	83.4,	91.9,	104.0,	111.9,	117.8,	136.2,	155.7,	167.9,	184.4,	198.5,	209.1,	225.0,	237.0,	246.6,	279.3,
16 days	77.0,	95.9,	105.2,	118.4,	126.9,	133.3,	153.0,	173.8,	186.8,	204.3,	219.2,	230.4,	247.0,	259.5,	269.6,	303.6,
20 days	86.9,	107.4,	117.4,	131.5,	140.6,	147.4,	168.4,	190.3,	204.0,	222.3,	237.9,	249.5,	266.9,	279.8,	290.3,	325.4,
25 days	98.6,	120.7,	131.6,	146.8,	156.4,	163.7,	186.0,	209.3,	223.7,	243.0,	259.3,	271.5,	289.5,	303.0,	313.9,	350.3,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

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APPENDIX C. QBAR RUNOFF RATE

Appendix C

QBar Run Off Rate

ICP SUDS Mean Annual Flood

Input

Return Period (years)	5	Soil	0.300
Area (ha)	0.230	Urban	0.000
SAAR (mm)	728	Region Number	User Defined

User Defined Growth Curve

Filename GDSDS.gcfx Description GDSDS

Return Period (years)	Growth Curve Factor
1	0.850
2	0.000
5	0.000
10	0.000
20	0.000
25	0.000
30	2.100
50	0.000
100	2.600
200	0.000
500	0.000
1000	0.000

Results	l/s
QBAR Rural	0.4
QBAR Urban	0.4
Q5 years	0.0
Q1 year	0.4
Q30 years	0.9
Q100 years	1.1

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APPENDIX D. SURFACE WATER DESIGN CALCULATIONS

- Design Criteria;
- Area Summary;
- Network Design & Results Table;
- Simulation Criteria;
- Hydrobrake / Controls & Storage Design;
- Summary of Results.

Appendix D

Surface Water Design Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes GDSDS Manhole Sizes GDSDS

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	17.300	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.269	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	10	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.150	4-8	0.059

Total Area Contributing (ha) = 0.209

Total Pipe Volume (m³) = 10.204

Network Design Table for Storm

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	23.101	0.180	128.3	0.009	4.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	38.001	0.224	170.0	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	23.802	0.595	40.0	0.006	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	15.321	0.090	170.2	0.038	4.00	0.0	0.600	o	225	Pipe/Conduit	
S2.001	23.646	0.315	75.0	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.002	12.353	0.236	52.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	27.708	0.792	35.0	0.059	4.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	4.33	79.925	0.009	0.0	0.0	0.1	1.15	45.8	1.3
S1.001	50.00	4.97	79.745	0.018	0.0	0.0	0.2	1.00	39.8	2.7
S1.002	50.00	5.16	79.521	0.025	0.0	0.0	0.3	2.07	82.5	3.7
S2.000	50.00	4.26	79.225	0.038	0.0	0.0	0.5	1.00	39.7	5.6
S2.001	50.00	4.52	79.135	0.045	0.0	0.0	0.6	1.51	60.1	6.8
S2.002	50.00	4.63	78.820	0.045	0.0	0.0	0.6	1.81	72.0	6.8
S3.000	50.00	4.21	79.415	0.059	0.0	0.0	0.8	2.22	88.2	8.7

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.003	24.215	0.142	170.0	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	27.468	1.102	24.9	0.055	4.00	0.0	0.600	o	225	Pipe/Conduit	
S2.004	13.948	0.082	169.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.005	19.493	0.115	169.6	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	2.081	0.012	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	5.496	0.032	170.0	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.003	50.00	5.03	78.584	0.113	0.0	0.0	1.5	1.00	39.8	16.9
S4.000	50.00	4.17	79.505	0.055	0.0	0.0	0.7	2.63	104.6	8.2
S2.004	50.00	5.27	78.403	0.168	0.0	0.0	2.3	1.00	39.8	25.1
S2.005	50.00	5.59	78.320	0.175	0.0	0.0	2.4	1.00	39.8	26.1
S1.003	50.00	5.63	78.206	0.200	0.0	0.0	2.7	1.00	39.8	29.8
S1.004	50.00	5.72	78.193	0.209	0.0	0.0	2.8	1.00	39.8	31.1

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	As Zoned	Building	100	0.009	0.009	0.009
1.001	As Zoned	Building	100	0.009	0.009	0.009
		Permeable Paving	100	0.001	0.001	0.009
1.002	As Zoned	Default	100	0.006	0.006	0.006
2.000	As Zoned	Building	100	0.008	0.008	0.008
		Permeable Paving	100	0.000	0.000	0.008
	As Zoned	Default	100	0.001	0.001	0.008
		Building	100	0.000	0.000	0.009
		Permeable Paving	100	0.029	0.029	0.038
2.001	As Zoned	Building	100	0.008	0.008	0.008
2.002	-	-	100	0.000	0.000	0.000
3.000	As Zoned	Building	100	0.011	0.011	0.011
		Permeable Paving	100	0.047	0.047	0.059
2.003	As Zoned	Permeable Paving	100	0.009	0.009	0.009
4.000	As Zoned	Building	100	0.017	0.017	0.017
		Permeable Paving	100	0.038	0.038	0.055
2.004	-	-	100	0.000	0.000	0.000
2.005	As Zoned	Building	100	0.007	0.007	0.007
1.003	-	-	100	0.000	0.000	0.000
1.004	User	-	30	0.029	0.009	0.009
				Total	Total	Total
				0.229	0.209	0.209

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	80.100	78.161	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	17.300	Cv (Summer)	0.750
Return Period (years)	5	Ratio R	0.269	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Storm

Pump Manhole: S13, DS/PN: S1.004, Volume (m³): 3.6

Invert Level (m) 78.193

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.000	0.0000	2.500	0.0000

Storage Structures for Storm

Infiltration Basin Manhole: S13, DS/PN: S1.004

Invert Level (m) 77.500 Infiltration Coefficient Side (m/hr) 0.01818 Porosity 0.30
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	350.0	2.000	350.0	2.001	0.0

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 17.300 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.269 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30, 100
Climate Change (%) 10, 10

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	S1	15 Winter	100	+10%					79.969	-0.181	0.000	0.08		3.6	OK

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
S1.000	S1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S1.001	S2	15 Winter	100	+10%					79.812	-0.158	0.000	0.19		7.0
S1.002	S3	15 Winter	100	+10%					79.575	-0.172	0.000	0.12		9.4
S2.000	S4	10080 Winter	100	+10%					79.390	-0.060	0.000	0.01		0.2
S2.001	S5	10080 Winter	100	+10%	100/8640 Winter				79.390	0.030	0.000	0.01		0.3
S2.002	S6	10080 Winter	100	+10%	30/5760 Winter				79.390	0.345	0.000	0.00		0.3
S3.000	S7	15 Winter	100	+10%					79.496	-0.144	0.000	0.28		23.3
S2.003	S8	10080 Winter	100	+10%	30/15 Summer				79.390	0.581	0.000	0.02		0.7
S4.000	S9	15 Winter	100	+10%					79.577	-0.153	0.000	0.23		21.9
S2.004	S10	10080 Winter	100	+10%	30/15 Summer				79.390	0.762	0.000	0.03		1.0
S2.005	S11	10080 Winter	100	+10%	30/15 Summer				79.389	0.844	0.000	0.03		1.0
S1.003	S12	10080 Winter	100	+10%	30/15 Summer				79.389	0.958	0.000	0.04		1.1
S1.004	S13	10080 Winter	100	+10%	30/600 Winter				79.389	0.970	0.000	0.00		0.0

PN	US/MH Name	Status	Level Exceeded
S1.001	S2	OK	
S1.002	S3	OK	
S2.000	S4	OK	
S2.001	S5	SURCHARGED	
S2.002	S6	SURCHARGED	
S3.000	S7	OK	
S2.003	S8	FLOOD RISK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Status	Level Exceeded
S4.000	S9	OK	
S2.004	S10	FLOOD RISK	
S2.005	S11	FLOOD RISK	
S1.003	S12	SURCHARGED	
S1.004	S13	SURCHARGED	

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APPENDIX E. WASTEWATER DESIGN CALCULATIONS

- As per Irish Water Code of Practice for Wastewater Infrastructure, IW-CDS-5030-03
- Network Design Tables

Appendix E

Wastewater Design Calculations

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Unit

Pipe Sizes IW Manhole Sizes IW

Industrial Flow (l/s/ha)	0.00	Domestic (l/s/ha)	0.00	Maximum Backdrop Height (m)	1.500
Industrial Peak Flow Factor	0.00	Domestic Peak Flow Factor	6.00	Min Design Depth for Optimisation (m)	1.200
Calculation Method	EN 752	Add Flow / Climate Change (%)	10	Min Vel for Auto Design only (m/s)	0.75
Frequency Factor	0.50	Minimum Backdrop Height (m)	0.200	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Unit

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Units	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	22.076	0.368	60.0	0.000	12.3	0.0	1.500	o	150	Pipe/Conduit	
F1.001	30.391	0.405	75.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	79.120	0.000	0.0	12.3	0.2	32	0.71	1.13	20.0	1.9
F1.001	78.123	0.000	0.0	12.3	0.2	33	0.66	1.01	17.9	1.9

Network Design Table for Foul - Unit

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Units	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.002	5.652	0.042	135.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
F2.000	17.580	0.293	60.0	0.000	12.3	0.0	1.500	o	150	Pipe/Conduit	
F2.001	23.683	0.395	60.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
F1.003	3.189	0.024	135.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	
F1.004	9.990	0.074	135.0	0.000	0.0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Units	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.002	77.718	0.000	0.0	12.3	0.2	39	0.53	0.75	13.3	1.9
F2.000	79.180	0.000	0.0	12.3	0.2	32	0.71	1.13	20.0	1.9
F2.001	78.887	0.000	0.0	12.3	0.2	32	0.71	1.13	20.0	1.9
F1.003	77.676	0.000	0.0	24.6	0.2	46	0.59	0.75	13.3	2.7
F1.004	77.653	0.000	0.0	24.6	0.2	46	0.59	0.75	13.3	2.7

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APPENDIX F. IRISH WATER CORRESPONDENCE

Appendix F

Irish Water Correspondence

Pre-connection enquiry form

Business developments, mixed use developments, housing developments

This form is to be filled out by applicants enquiring about the feasibility of a water and/or wastewater connection to Irish Water infrastructure. If completing this form by hand, please use BLOCK CAPITALS and black ink.

Please refer to the **Guide to completing the pre-connection enquiry form** on page 13 of this document when completing the form.

*** Denotes mandatory/ required field. Please note, if mandatory fields are not completed the application will be returned.**

Section A | Applicant details

1 *Applicant details:

Registered company name (if applicable): Hibernia REIT plc

Trading name (if applicable):

Company registration number (if applicable):

If you are not a registered company/business, please provide the applicant's name:

*Contact name: David Thomson

*Postal address: Hibernia REIT plc

1 WML, Windmill Lane, Dublin 2

*Eircode: D02F206

*Telephone: 01536910 0

Mobile:

*Email: info@hiberniareit.com

2 Agent details (if applicable):

Contact name: Daire O Mahoney

Company name (if applicable): OCSC

Postal address: 9 Prussia Street,

Dublin 7

Eircode: D07KT57

Telephone: 0186820000

Email: daire.omahoney@ocsc.ie

3 ***Please indicate whether it is the applicant or agent who should receive future correspondence in relation to the enquiry:**

Applicant [ ] Agent [X]

Section B | Site details

4 ***Site address:** katherine Tynan House
Ballymount Road, Tallaght,
Dublin 24

5 ***Irish Grid co-ordinates of site:** Eastings (X) 308234 Northings (Y) 229644

Eg. co-ordinates of GPO, O'Connell St., Dublin: E(X) 315,878 N(Y) 234,619

6 ***Local Authority:**

Local Authority that granted planning permission (if applicable):

South Dublin County Council

7 ***Has full planning permission been granted?** Yes [ ] No [X]

If 'Yes', please provide the current or previous planning reference number:

Section C | Development details

8 Please outline the domestic and/or industry/business use proposed:

Property type	Number of units	Property type	Number of units	Property type	Number of units
House		Apartments		Agricultural	
Office		School		Retail unit	
Residential care home		Institution		Industrial unit	
Hotel		Factory		Other	X
Other (please specify type)	Community Centre				

9 *Approximate start date of proposed development: 0 1 / 0 1 / 2 0 2 2

10 *Is the development multi-phased? Yes ☐ No ☒

If 'Yes', application must include a master-plan identifying the development phases and the current phase number.

If 'Yes', please provide details of variations in water demand volumes and wastewater discharge loads due to phasing requirements.

11 *Please indicate the type of connection required by ticking the appropriate box below:

Water ☐ Please go to Section D

Wastewater ☐ Please go to Section E

Both ☒ Please complete both Sections D and E

Section D | Water connection and demand details

12 ***Is there an existing connection to public water mains at the site?** Yes ☐ No ☒

12.1 If yes, is this enquiry for an additional connection to one already installed? Yes ☐ No ☒

12.2 If yes, is this enquiry to increase the size of an existing connection? Yes ☐ No ☒

13 **Approximate date water connection is required:** 01 / 01 / 2022

14 ***What diameter of water connection is required to service the development?** 100 mm

15 ***Is more than one connection required to the public infrastructure to service this development?** Yes ☐ No ☒

If 'Yes', how many? ☐☐

16 **Please indicate the business water demand (shops, offices, schools, hotels, restaurants, etc.):**

Post-development peak hour water demand	2.47	**l/s**
Post-development average hour water demand	.494	**l/s**

Please include calculations on the attached sheet provided. Where there will be a daily/weekly/seasonal variation in the water demand profile, please provide all such details.

17 **Please indicate the industrial water demand (industry-specific water requirements):**

Post-development peak hour water demand	N/a	**l/s**
Post-development average hour water demand	N/a	**l/s**

Please include calculations on the attached sheet provided. Where there will be a daily/weekly/seasonal variation in the water demand profile, please provide all such details.

18 **What is the existing ground level at the property boundary at connection point (if known) above Malin Head Ordnance Datum?** 92.00 m

19 **What is the highest finished floor level of the proposed development above Malin Head Ordnance Datum?** 95.00 m

20 **Is on-site water storage being provided?** Yes ☐ No ☒

Please include calculations on the attached sheet provided.

21 **Are there fire flow requirements?** Yes ☐ No ☒

Additional fire flow requirements over and above those identified in Q16-17		**l/s**

Please include calculations on the attached sheet provided, and include confirmation of requirements from the Fire Authority.

22 **Do you propose to supplement your potable water supply from other sources?** Yes ☐ No ☒

If 'Yes', please indicate how you propose to supplement your potable water supply from other sources (see **Guide to completing the application form** on page 12 of this document for further details):

Section E | Wastewater connection and discharge details

23 ***Is there an existing connection to a public sewer at the site?** Yes ☐ No ☒

23.1 If yes, is this enquiry for an additional connection to the one already installed? Yes ☐ No ☒

23.2 If yes, is this enquiry to increase the size of an existing connection? Yes ☐ No ☒

24 ***Approximate date that wastewater connection is required:** 01 / 01 / 2022

25 ***What diameter of wastewater connection is required to service the development?** 150 mm

26 ***Is more than one connection required to the public infrastructure to service this development?** Yes ☐ No ☒

If 'Yes', how many? ☐☐

27 **Please indicate the commercial wastewater hydraulic load (shops, offices, schools, hotels, restaurants, etc.):**

Post-development peak discharge	2.47	**l/s**
Post-development average discharge	0.548	**l/s**

Please include calculations on the attached sheet provided.

28 **Please indicate the industrial wastewater hydraulic load (industry-specific discharge requirements):**

Post-development peak discharge	N/a	**l/s**
Post-development average discharge	N/a	**l/s**

Please include calculations on the attached sheet provided.

29 **Wastewater organic load:**

Characteristic	Max concentration (mg/l)	Average concentration (mg/l)	Maximum daily load (kg/day)
Biochemical oxygen demand (BOD)			
Chemical oxygen demand (COD)			
Suspended solids (SS)			
Total nitrogen (N)			
Total phosphorus (P)			
Other			

Temperature range	
pH range	

30 ***Storm water run-off will only be accepted from brownfield sites that already have a storm/surface water connection to a combined sewer. In the case of such brownfield sites, please indicate if the development intends discharging surface water to the combined wastewater collection system:**

Yes [ ] No [X]

If 'Yes', please give reason for discharge and comment on adequacy of SUDS/attenuation measures proposed.

31 ***Do you propose to pump the wastewater?** Yes [ ] No [X]

If 'Yes', please include justification for your pumped solution with this application.

32 **What is the existing ground level at the property boundary at connection point (if known) above Malin Head Ordnance Datum?**

92.00 m

33 **What is the lowest finished floor level on site above Malin Head Ordnance Datum?** 92.25 m

34 **What is the proposed invert level of the pipe exiting the property to the public road?**

90.50 m

Section F | Supporting documentation

Please provide the following additional information (all mandatory):

> Site location map: A site location map to a scale of 1:1000, which clearly identifies the land or structure to which the enquiry relates. The map shall include the following details: [X]

i. The scale shall be clearly indicated on the map.

ii. The boundaries shall be delineated in red.

iii. The site co-ordinates shall be marked on the site location map.

> Details of planning and development exemptions (if applicable). [X]

> Calculations (calculation sheets provided below). [X]

> Site layout map to a scale of 1:500 showing layout of proposed development, water network and wastewater network layouts, additional water/wastewater infrastructure if proposed, connection points to Irish Water infrastructure. [X]

> Conceptual design of the connection asset from the proposed development to the existing Irish Water infrastructure, including service conflicts, gradients, pipe sizes and invert levels. [X]

> Any other information that might help Irish Water assess this pre-connection enquiry. [X]

Section G | Declaration

I/We hereby make this application to Irish Water for a water and/or wastewater connection as detailed on this form.

I/We understand that any alterations made to this application must be declared to Irish Water.

The details that I/we have given with this application are accurate.

I/We have enclosed all the necessary supporting documentation.

Any personal data you provide will be stored and processed by Irish Water and may be transferred to third parties for the purposes of the water and/or wastewater connection process. I hereby give consent to Irish Water to store and process my personal data and to transfer my personal data to third parties, if required, for the purposes of the connection process.

If you wish to revoke consent at any time or wish to see Irish Water's full Data Protection Notice, please see **https://www.water.ie/privacy-notice/**

Signature: ______________ Date: __ __ / __ __ / __ __ __ __

Your full name (in BLOCK CAPITALS):

D a i r e O M a h o n e y

Irish Water will carry out a formal assessment based on the information provided on this form.
Any future connection offer made by Irish Water will be based on the information that has been provided here.

Please submit the completed form to **newconnections@water.ie** or alternatively, post to:

Irish Water
PO Box 860
South City Delivery Office
Cork City

Please note that if you are sending us your application form and any associated documentation by email, the maximum file size that we can receive in any one email is 35MB.

Please note, if mandatory fields are not completed the application will be returned.

Irish Water is subject to the provisions of the Freedom of Information Act 2014 ("FOIA") and the codes of practice issued under FOIA as may be amended, updated or replaced from time to time. The FOIA enables members of the public to obtain access to records held by public bodies subject to certain exemptions such as where the requested records may not be released, for example to protect another individual's privacy rights or to protect commercially sensitive information. Please clearly label any document or part thereof which contains commercially sensitive information. Irish Water accepts no responsibility for any loss or damage arising as a result of its processing of freedom of information requests.

Calculations

Water demand

Community centre development unit discharge method has been used to calculate the discharge.
Units discharge in accordance with EN12056-2

12nr. wc - 1.8 DU/ wc
6nr. wash basin - 0.3 Du/ wash basin
2nr kitchen sink - 0.6 DU/ Kitchen sink

12 x 1.8 = 21.6 DU
6 x 0.3 = 1.8 DU
2 x 0.6 = 1.2 DU

Total - 24.6 DU

Peak Discharge
Peak discharge = frequency factor x Square Root (sum of Discharge Units)

0.5 x sq(24.6) = 2.47 l/s

Average discharge

2.47 / 5 = 0.494 l/s

On-site storage

Fire flow requirements

Community centre development unit discharge method has been used to calculate the discharge.
Units discharge in accordance with EN12056-2

12nr. wc - 1.8 DU/ wc
6nr. wash basin - 0.3 Du/ wash basin
2nr kitchen sink - 0.6 DU/ Kitchen sink

12 x 1.8 = 21.6 DU
6 x 0.3 = 1.8 DU
2 x 0.6 = 1.2 DU

Total - 24.6 DU

Peak Discharge
Peak discharge = frequency factor x Square Root (sum of Discharge Units)

0.5 x sq(24.6) = 2.47 l/s

Average discharge

2.47 / 4.5 = 0.548 l/s

Guide to completing the pre-connection enquiry form

This form should be completed by applicants enquiring about the feasibility of a water and/or wastewater connection to Irish Water infrastructure.

The Irish Water Codes of Practice are available at **www.water.ie** for reference.

Section A | Applicant Details

Question 1: This question requires the applicant or company enquiring about the feasibility of a connection to identify themselves, their postal address, and to provide their contact details.

Question 2: If the applicant has employed a consulting engineer or an agent to manage the enquiry on their behalf, the agent's address and contact details should be recorded here.

Question 3: Please indicate whether it is the applicant or the agent who should receive future correspondence in relation to the enquiry.

Section B | Site details

Question 4: This is the address of the site requiring the water/wastewater service connection and for which this enquiry is being made.

Question 5: Please provide the Irish Grid co-ordinates of the proposed site. Irish grid positions on maps are expressed in two dimensions as Eastings (E or X) and Northings (N or Y) relative to an origin. You will find these coordinates on your Ordnance Survey map which is required to be submitted with an application.

Question 6: Please identify the Local Authority that is or will be dealing with your planning application, for example Cork City Council.

Question 7: Please indicate if planning permission has been granted for this application, and if so, please provide the planning permission reference number.

Section C | Development details

Question 8: Please specify the number of different property/premises types by filling in the tables provided.

Question 9: Please indicate the approximate commencement date of works on the development.

Question 10: Please indicate if a phased building approach is to be adopted when developing the site. If so, please provide details of the phase master-plan and the proposed variation in water demand/wastewater discharge as a result of the phasing of the development.

Question 11: Please indicate the type of connection required by ticking the appropriate box and proceed to complete the appropriate section or sections.

Section D | Water connection and demand details

Question 12: Please indicate if a water connection already exists for this site.

Question 12.1: Please indicate if this enquiry concerns an additional connection to one already installed on the site.

Question 12.2: Please indicate if you are proposing to upgrade the water connection to facilitate an increase in water demand. Irish Water will determine what impact this will have on our infrastructure.

Question 13: Please indicate the approximate date that the proposed connection to the water infrastructure will be required.

Question 14: Please indicate what diameter of water connection is required to service this development.

Question 15: Please indicate if more than one connection is required to service this development. Please note that the connection size provided may be used to determine the connection charge.

Question 16: If this connection enquiry concerns a business premises, please provide calculations for the water demand and include your calculations on the calculation sheet provided. Business premises include shops, offices, hotels, schools, etc. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). For design purposes, please refer to the Irish Water Codes of Practice for Water Infrastructure.

Question 17: If this connection enquiry is for an industrial premises, please calculate the water demand and include your calculations on the calculation sheet provided. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak demand for sizing of the pipe network will be as per the specific business production requirements. For design purposes, please refer to the Irish Water Codes of Practice for Water Infrastructure.

Question 18: Please specify the ground level at the location where connection to the public water mains will be made. This is required in order to determine if there is sufficient pressure in the existing water infrastructure to serve your proposed development. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 19: Please specify the highest finished floor level on site. This is required in order to determine if there is sufficient pressure in the existing water infrastructure to serve your proposed development. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 20: If storage is required, water storage capacity of 24-hour water demand must usually be provided at the proposed site. In some cases, 24-hour storage capacity may not be required, for example 24-hour storage for a domestic house would be provided in an attic storage tank. Please calculate the 24-hour water storage requirements and include your calculations on the attached sheet provided. Please also confirm that on-site storage is being provided by ticking the appropriate box.

Question 21: The water supply system shall be designed and constructed to reliably convey the water flows that are required of the development including fire flow requirements by the Fire Authority. The Fire Authority will provide the requirement for fire flow rates that the water supply system will have to carry. Please note that while flows in excess of your required demand may be achieved in the Irish Water network and could be utilised in the event of a fire, Irish Water cannot guarantee a flow rate to meet your fire flow requirement. To guarantee a flow to meet the Fire Authority requirements, you should provide adequate fire storage capacity within your development. Please include your calculations on the attached sheet provided, and further provide confirmation of the Fire Authority requirements.

Question 22: Please identify proposed additional water supply sources, that is, do you intend to connect to the public water mains or the public mains and supplement from other sources? If supplementing public water supply with a supply from another source, please provide details as to how the potable water supply is to be protected from cross contamination at the premises.

Section E | Wastewater connection and discharge details

Question 23: Please indicate if a wastewater connection to a public sewer already exists for this site.

Question 23.1: Please indicate if this enquiry relates to an additional wastewater connection to one already installed.

Question 23.2: Please indicate if you are proposing to upgrade the wastewater connection to facilitate an increased discharge. Irish Water will determine what impact this will have on our infrastructure.

Question 24: Please specify the approximate date that the proposed connection to the wastewater infrastructure will be required.

Question 25: Please indicate what diameter of wastewater connection is required to service this development.

Question 26: Please indicate if more than one connection is required to service this development. Please indicate number required.

Question 27: If this enquiry relates to a business premises, please provide calculations for the wastewater discharge and include your calculations on the attached sheet provided. Business premises include shops, offices, hotels, schools, etc. Discharge rates (peak and average) are site specific. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). For design purposes, please refer to the Irish Water Codes of Practice for Wastewater Infrastructure.

Question 28: If this enquiry relates to an industrial premises, please provide calculations for the wastewater discharge and include your calculations on the calculation sheet provided. Discharge rates (peak and average) are site specific. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak discharge for sizing of the pipe network will be as per the specific business production requirements. For design purposes, please refer to the Irish Water Codes of Practice for Wastewater Infrastructure.

Question 29: Please specify the maximum and average concentrations and the maximum daily load of each of the wastewater characteristics listed in the wastewater organic load table (if not domestic effluent), and also specify if any other significant concentrations are expected in the effluent. Please complete the table and provide additional supporting documentation if relevant. Note that the concentration shall be in mg/l and the load shall be in kg/day. Note that for business premises (shops, offices, schools, hotels, etc.) for which only domestic effluent will be discharged (excluding discharge from canteens/ restaurants which would require a Trade Effluent Discharge licence), there is no need to complete this question.

Question 30: In exceptional circumstances, such as brownfield sites, where the only practical outlet for storm/ surface water is to a combined sewer, Irish Water will consider permitting a restricted attenuated flow to the combined sewer. Storm/surface water will only be accepted from brownfield sites that already have a storm/surface water connection to a combined sewer and the applicant must demonstrate how the storm/surface water flow from the proposed site is minimised using sustainable urban drainage system (SUDS). This type of connection will only be considered on a case by case basis. Please advise if the proposed development intends discharging surface water to the combined wastewater collection system.

Question 31: Please specify if the development needs to pump its wastewater discharge to gain access to Irish Water infrastructure.

Question 32: Please specify the ground level at the location where connection to the public sewer will be made. This is required to determine if the development can be connected to the public sewer via gravity discharge. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 33: Please specify the lowest floor level of the proposed development. This is required in order to determine if the development can be connected to the public sewer via gravity discharge. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 34: Please specify the proposed invert level of the pipe exiting the property to the public road.

Section F | Supporting documentation

Please provide additional information as listed.

Section G | Declaration

Please review the declaration, sign, and return the completed application form to Irish Water by email or by post using the contact details provided in Section G.

Notes

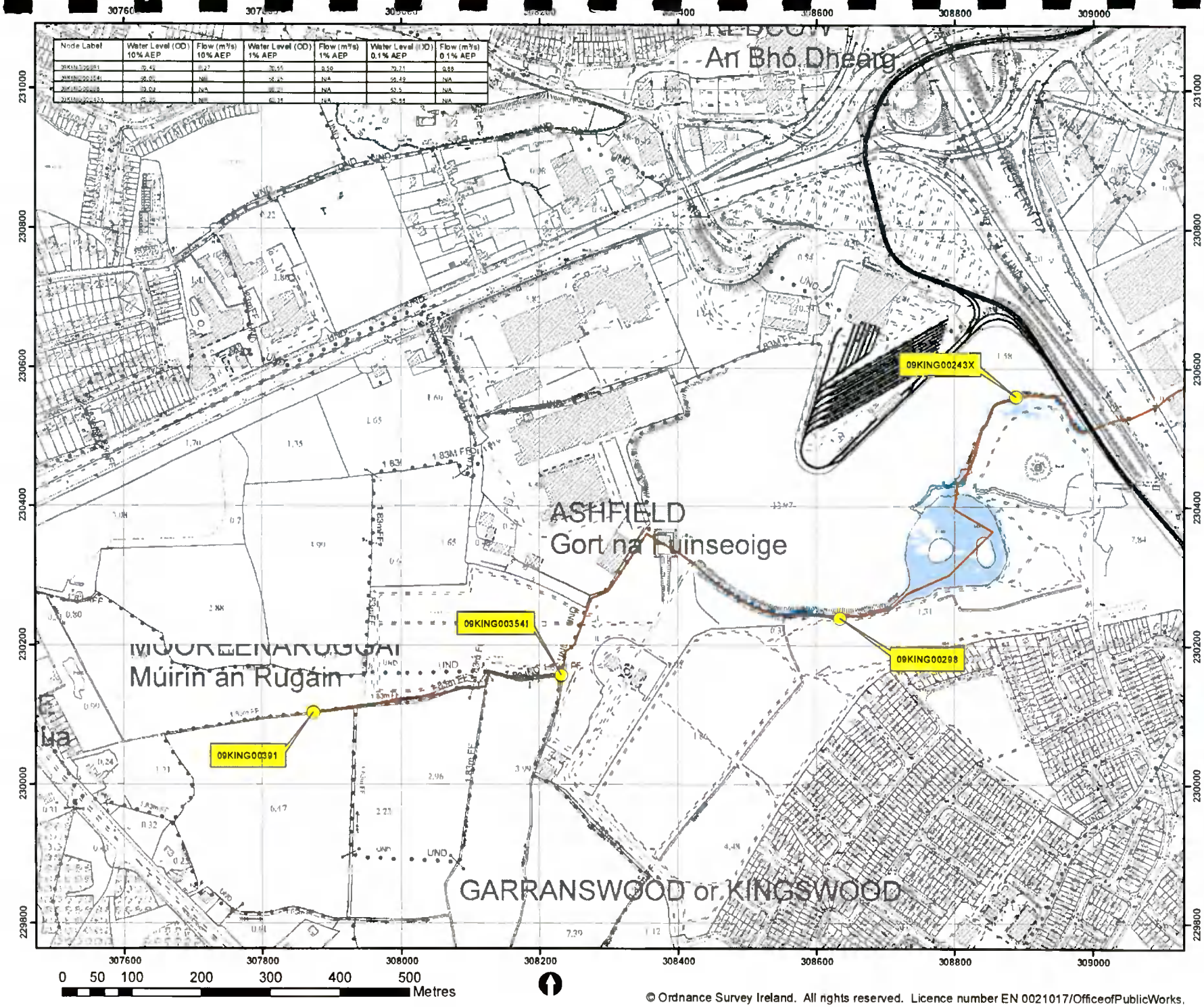
Notes

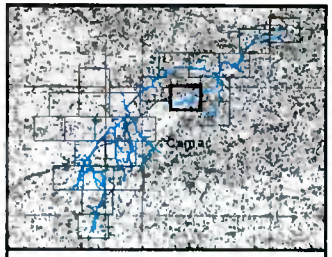
OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

APPENDIX G. FLUVIAL FLOOP MAP

Appendix G

Fluvial Flood Map





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% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Embankment
- Wall
- Defended Area
- Standard of Protection of Flood Defence (Walls / Embankments)
- Node Point
- Node ID Node Label

FINAL

REV	NOTE	DATE
01	SOP label updated (Pg 21) Removal of Def. Area (Pg 21)	13/11/2017

CFRAM

OPW
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 668285
W www.rpsgroup.com
E ireland

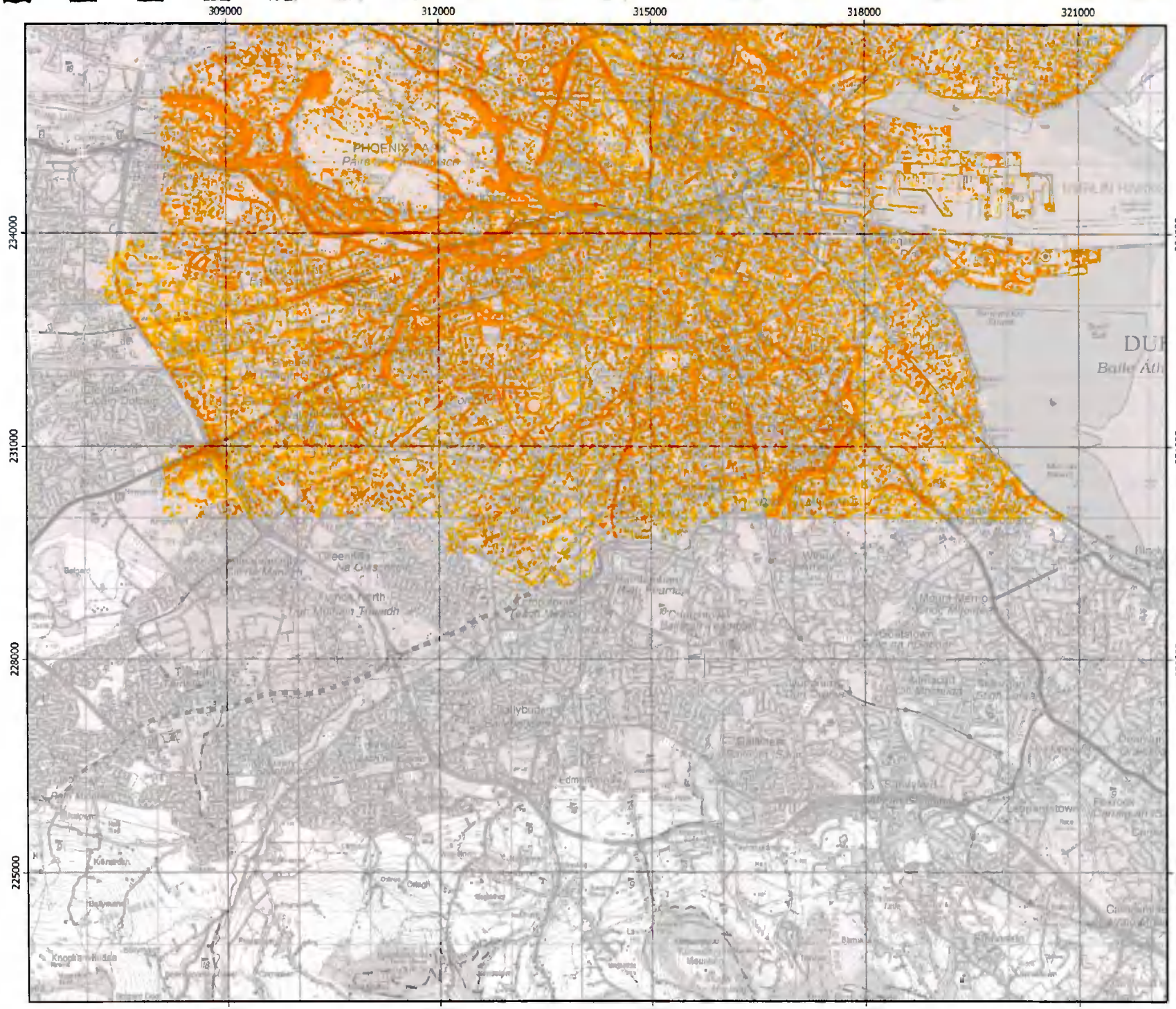
Map:	Camac Fluvial Flood Extents
Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 13 November 2017
Checked By :	A.S. Date : 13 November 2017
Approved By :	S.P. Date : 13 November 2017
Drawing No. :	E09CAM_EXFCD_F1_19
Map Series :	Page 19 of 24
Drawing Scale :	1:5,000 @A3

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

APPENDIX H. PLUVIAL FLOOD RISK MAP

Appendix H

Pluvial Flood Risk Map



Location Plan:

LEGEND

- 10% AEP Pluvial
- 1% AEP Pluvial
- 0.5% AEP Pluvial

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

OPW
The Office Of Public Works
Jonathan Swift Street
Trim
Co. Meath

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council
Dublin City Council
Civic Offices
Wood Quay
Dublin 8

Project:
DUBLIN PLUVIAL STUDY (FloodResilienCity)

Map: DUBLIN CITY - PLUVIAL FLOOD EXTENT MAP

Map Type:	EXTENT - 180min Rainfall	
Source:	PLUVIAL	
Map Area:	URBAN	
Scenario:	CURRENT	
Drawn by:	IH	Date: Aug - 2016
Checked by:	MC	Date: Aug - 2016
Approved by:	JM	Date: Aug - 2016

Map No.: EXPCD_EXPCD_F0_03
Revision: F0
Map Scale: 1:50.000 Plot Scale: 1:1 @ A3