MALONE O'REGAN
CONSULTING ENGINEERS

PROPOSED PART 8 RESIDENTIAL DEVELOPMENT

FORBES LANE, DUBLIN.

DESKTOP FLOOD RISK ASSESSMENT

DUBLIN CITY COUNCIL

September 2024

Job: 23006

Contents Amendment Record

2B Richview Office Park, Clonskeagh, Dublin 14
Tel: +353-1-260 2655 Fax: +353-1-260 2660 E-mail: info@MORce.ie

MALONE O'REGAN

Title: **Proposed Part 8 Residential Development – Forbes Lane, Dublin Desktop Flood Risk Assessment / Dublin City Council**

Job Number: **23006**

Prepared By: **Michelle Gaughan** **Signed:** Mgaughan

Checked By: **Douglas Weir** **Signed:** DWeir

Approved By: **Douglas Weir** **Signed:** DWeir

Revision Record

Issue No.	Date	Description	Remark	Prepared	Checked	Approved
0	14.07.2023	Initial Issue	P1	KA	PB	PB
1	13.05.2024	Information	P1	KA	FM	FM
2	23.05.2024	Information	P1	KA	FM	FM
0	25.09.2024	Planning	P3	MG	DW	DW

CONTENTS

		Page No.

1 INTRODUCTION 1

2 PROPOSED SITE DESCRIPTION 1

2.1 Site Description 1

2.2 Surrounding Watercourse 1

2.3 Land Use Zone 2

2.4 Existing Topography Levels at Site 4

3 FLUVIAL FLOOD RISK ASSESSMENT 5

3.1 The National Preliminary Flood Risk Assessment 5

3.2 Climate Change 8

3.3 OPW Flood Records 9

3.4 Ordnance Survey Historic Mapping 10

3.5 Strategic Flood Risk Assessment, Dublin City Development Plan 2022 – 2028 11

3.5.1 Composite Flood Zone Map 11

3.5.2 Justification Test 12

3.6 Rivers of Dublin Book 13

4 OTHER FLOOD SOURCES 15

4.1 Tidal Flooding 15

4.2 Pluvial Flooding 15

5 SEQUENTIAL APPROACH TO PLANNING 17

5.1 Flood Zones 17

5.2 Vulnerability Class of Proposed Development 17

6 SUMMARY AND CONCLUSIONS 20

APPENDIX A – LAND USE ZONING MAP 21

APPENDIX B – CFRAM FLUVIAL FLOOD EXTENTS MAP 22

APPENDIX C – PAST FLOOD SUMMARY REPORT 23

APPENDIX D – DCC COMPOSITE FLOOD MAP 24

APPENDIX E – DCC JUSTIFCATION TEST 25

1 INTRODUCTION

The construction of 108 apartments units at a site c. 0.58 ha at the Road Maintenance Depot, Marrowbone Lane and Forbes Lane, Dublin 8. Development at the site will consist of the following:

- The demolition of the existing sheds and garages and site clearance works
- Partial retention and modification of the existing rubble stone wall fronting Forbes Lane.
- Retention and modification of the former Gate House structure's east elevation along Marrowbone Lane. The removal of the remaining existing boundary wall fronting Marrowbone Lane and subsequent widening to facilitate an active travel route which will be subject to separate consent.
- Construction of 108 no. apartment units in two blocks (Block A and Block B) with frontage onto Marrowbone Land and Forbes Lane comprising 108 residential units (64 no. 1-bed, 31 no. 2-bed, 13 no. 3-bed)
    - Block A ranges from 6-7 storeys and consists of 81 residential units (50 no. 1-bed, 19 no. 2-bed, 12 no. 3-bed)
    - Block B is 5-storeys and consists of 27 residential units (14 no. 1-bed, 12 no. 2 bed, 1 no. 3-bed)
- 165 long-stay and 54 short-stay bicycle parking spaces and 2 car parking spaces.
- 190 sq.m of community, cultural and arts space.
- 800 sq.m of public realm space and 700 sq.m of communal open space.
- One vehicular access is proposed from Marrowbone Lane. A pedestrian and cycle access route is proposed at Forbes Lane which also provides emergency vehicle access.
- Traffic calming measure in the form of raised tables are proposed on the public road at the intersection of Pim Street and Forbes Lane and between the proposed vehicular access and Marrowbone Lane. A new signalised crossing point is also proposed on Marrowbone Lane.
- Boundary treatments, landscaping and public realm works, public lighting, site drainage works, internal road surfacing and footpath, ESB substation and meter rooms, stores, bin and cycle storage, plant rooms; and
- All ancillary site services and development works above and below ground.

The purpose of this DFRA is to assess the potential flood risk to the proposed development site and to assess the impact that the development as proposed may or may not have on the hydrological regime of the area. Quoted ground levels or estimated floor levels relate to Ordnance Datum (Malin) unless stated otherwise.

The flood risk assessment has been carried out in accordance with the Government's 2009 Planning System and Flood Risk Management Guidelines (hereafter referred to as the 2009 Planning Guidelines). These guidelines adopt a staged approach to the assessment of flood risk. This report describes a Stage 2 Initial Flood Risk Assessment which is defined within the 2009 Planning Guidelines as follows:

"A qualitative or semi-quantitative study to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information,

to provide a qualitative appraisal of the risk of flooding to development, including the scope of possible mitigation measures, and the potential impact of development on flooding elsewhere, and to determine the need for further detailed assessment."

The study was principally focused on examining flooding risks to the proposed site from the River Poddle and River Liffey.

2 PROPOSED SITE DESCRIPTION

2.1 Site Description

The location of the proposed development is illustrated in Figure 2-1. The proposed site is currently used as a Road Maintenance Depot by Dublin City Council located at The Liberties, Dublin 8. The site is situated in the south of Dublin City Centre between Forbes Lane to the north, Marrowbone Lane to the east. The total area of the proposed development site is approximately 0.56 hectares.

There are existing warehouse buildings beside a five-storey apartment block across the road on the northern boundary of the development on Forbes Lane with a row of four cottages further along towards James's Walk. There is an historic wall on the northern boundary of the site. The eastern boundary is bordered by a community sports centre at the northeast and adjacent to a four-storey apartment development in the southeastern side of the site. There is a commercial unit off James's Walk bordering the western side of the site. There are two to three storey apartment developments to the south of the site.

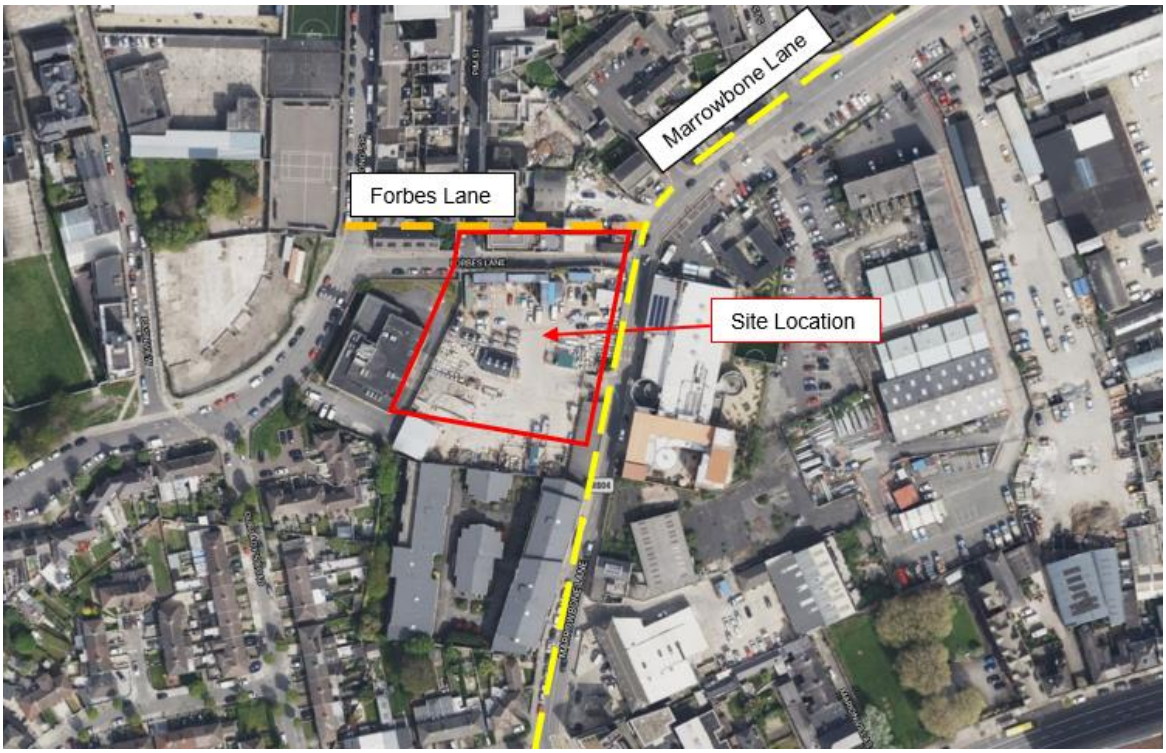


Figure 2-1 - Site Location showing the indicative Site Boundary and Adjacent Developments

2.2 Surrounding Watercourse

One of the most significant hydrological features in the vicinity of the site is the River Camac which is located approximately 700m beyond the north-west of the site and the River Liffey. At the location the River Camac generally flows in an east to north direction where it then enters the River Liffey alongside Heuston Station.

The River Liffey is located approximately 850m north of the site. At this location the River Liffey generally flows to the east entering the Irish Sea at its mouth at the midpoint of Dublin Bay.

An artificial channel almost entirely culverted of the River Poddle is located approximately 800m to the west of the site. At this location the channel flows towards the north and into the River Liffey.

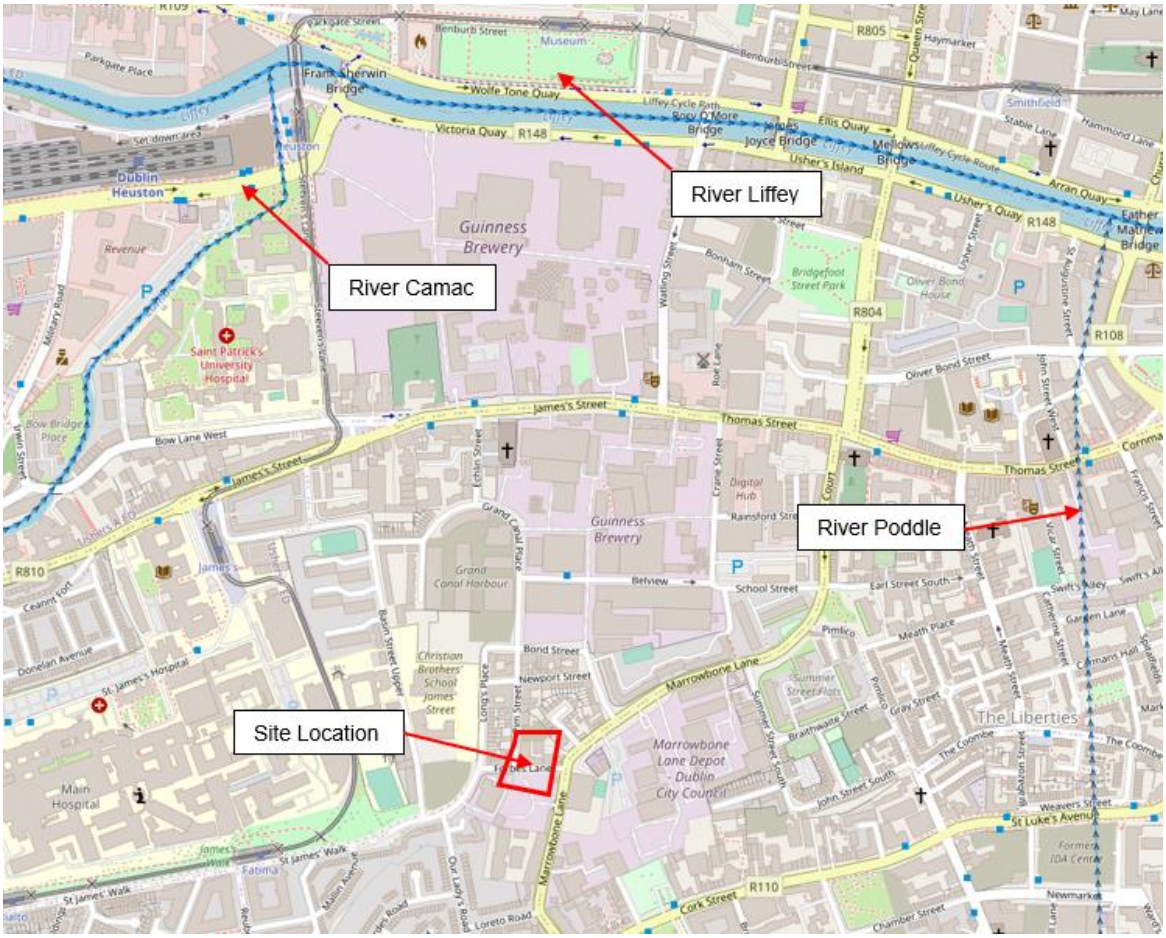


Figure 2-2 – Surrounding Watercourse (Extract from the EPA Maps)

2.3 Land Use Zone

Land use zoning map is used in order to assess which types of developments, based on vulnerability to flood risk, are appropriate for each Flood Zones.

Where developments/land uses are proposed that are considered inappropriate to the Flood Zone that may be identified in the future at project level following adoption of the Plan, then a Development Management Justification Test and site-specific Flood Risk Assessment will be required in accordance with The Planning System and Flood Risk Management Guidelines 2009 (and as updated).

Table 2-1 - Matrix of Vulnerability vs. Flood Zone (Extract from the Strategic Flood Risk Assessment of the Dublin City Development Plan 2022-2028)

Vulnerability Class	Land Use 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;
Water compatible development Contd.	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).

Refer to Flood Risk Management Guidelines 2009 and 'Strategic Flood Risk Assessment for the Dublin CDP 2022-2028' for additional detail:

- Highly vulnerable developments include houses, schools, hospitals, residential institutions, emergency services, essential infrastructure, etc.
- Less vulnerable developments include economic uses (retail, leisure, warehousing, commercial, industrial, non-residential institutions, etc.), land and buildings used for agriculture or forestry, local transport infrastructure, etc.

Land use zone map is provided in the SFRA of the Dublin CDP 2022-2028. The different land zone is illustrated in Figure 2-3 and the full map is provided in Appendix A.

The proposed development is located within land zoned as *"Z1: Sustainable Residential Neighbourhoods – To protect, provide and improve residential amenities"*.

The lands to north, south, east and west are also within land zones as "*Z1: Sustainable Residential Neighbourhoods".*

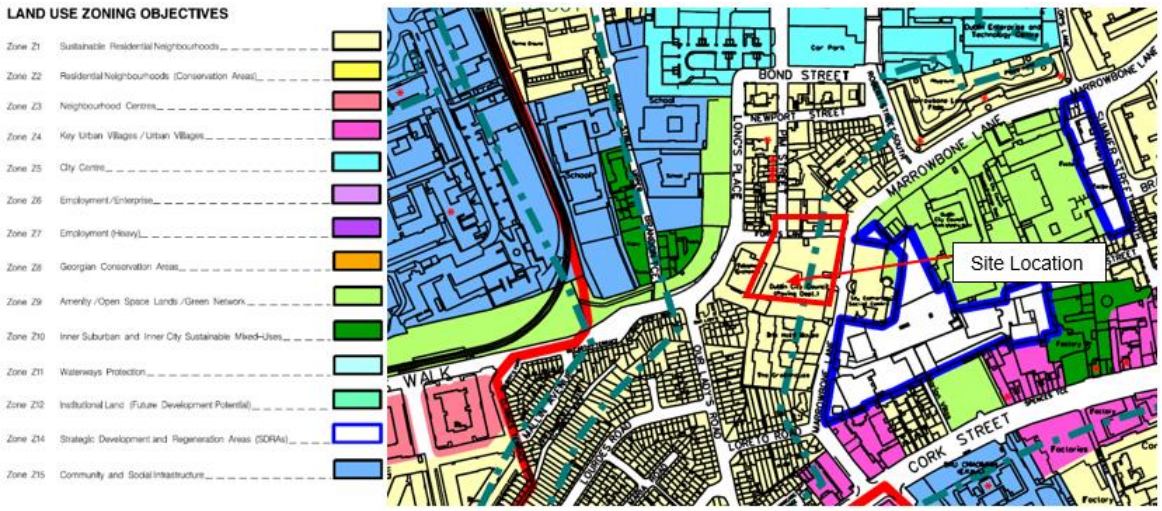


Figure 2-3 - Land Use Zoning Map (Extract from SFRA of the Dublin CDP 2022 – 2028)

2.4 Existing Topography Levels at Site

A topographical survey of the site has been carried out which shows that there is a gentle slope across the site. The topography falls along the southern boundary at 17.80m and rises towards the north at 19.50m. The existing building on the site are to be demolished and had finished floor levels 17.74m OD to the south and rising to 18.29m to the north.

3 FLUVIAL FLOOD RISK ASSESSMENT

The following sources of information were reviewed in order to identify any flood risk to the proposed development site as a result of fluvial flooding:

- The National Preliminary Flood Risk Assessment (PFRA) – Overview Report & Indicative Flood Maps
- Climate Change
- OPW Flood Records from www.floodmaps.ie
- Ordnance Survey Historic Mapping
- Strategic Flood Risk Assessment, Dublin City Development Plan 2022 – 2028

3.1 The National Preliminary Flood Risk Assessment

The National Preliminary Flood Risk Assessment (PFRA), which was carried out by the OPW in March 2012, identified Areas of Further Assessment (AFA) where further, more detailed assessment was required to determine the degree of flood risk. Flood Risk Assessment Maps were prepared by the Catchment Flood Risk Assessment and Management (CFRAM) Study which indicate the extent of flooding caused by fluvial flood events with an annual exceedance probability (AEP) of 10% (10yr event), 1% (100yr event) and 0.1% (1000yr event) in these areas. The final versions of the maps were published in May 2017.

The CFRAM maps indicating the extent of flooding caused by a fluvial flood event with an annual exceedance probability (AEP) of 10% (10yr event), 1% (100yr event) and 0.1% (1000yr event) are included in Appendix B.

Figure 3-1 - CFRAM Fluvial Flood Extent Map (Extract from OPW)

The PFRA flood mapping indicates that the proposed development site does not fall within the predicted extreme 0.1% (1 in 1000 year) current scenario fluvial flood zone. The site is not located near any major open watercourse; however, a branch of the culverted River Poddle flows beneath Mill Street.

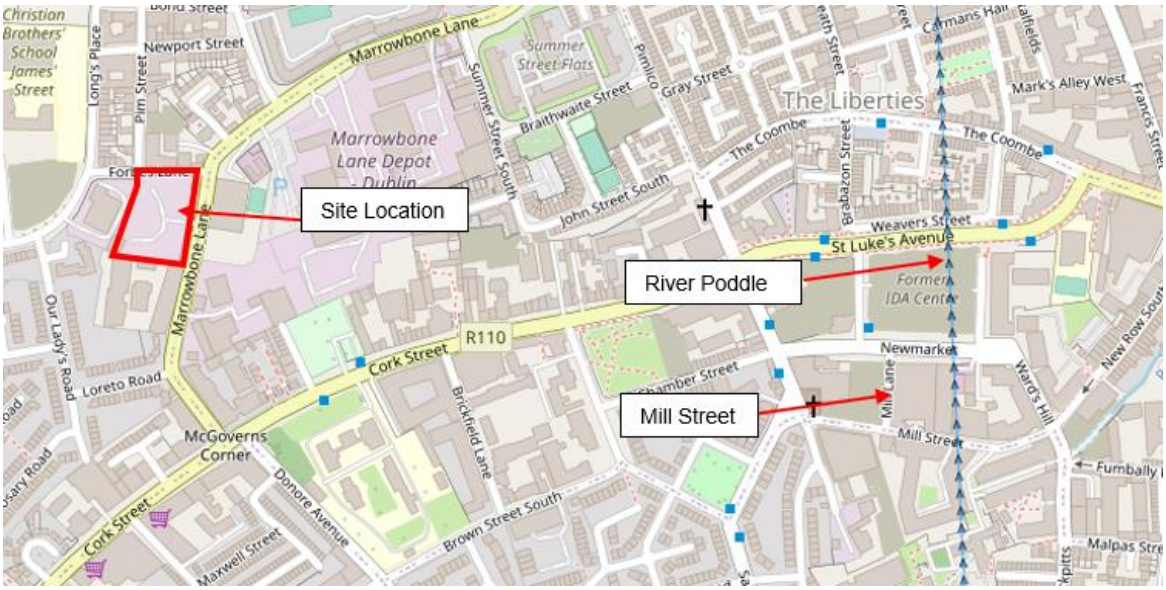


Figure 3-2 - Surrounding Watercourse (Extract from the EPA Maps)

The CFRAMS flood map also provides information on predicted water levels for the 10% AEP (1 in 10 year), 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood events at various node points along the River Poddle, approximately 800m to the west of the site. The CFRAM flood map does not extend to the proposed site. The node points are listed in Table 3-1. The location of the node points is indicated in Figure 3-3 and on the drawings in Appendix B. Predictive extreme flood levels at this node point are applicable to utilise in the assessment of potential fluvial flood risk to the proposed development site.

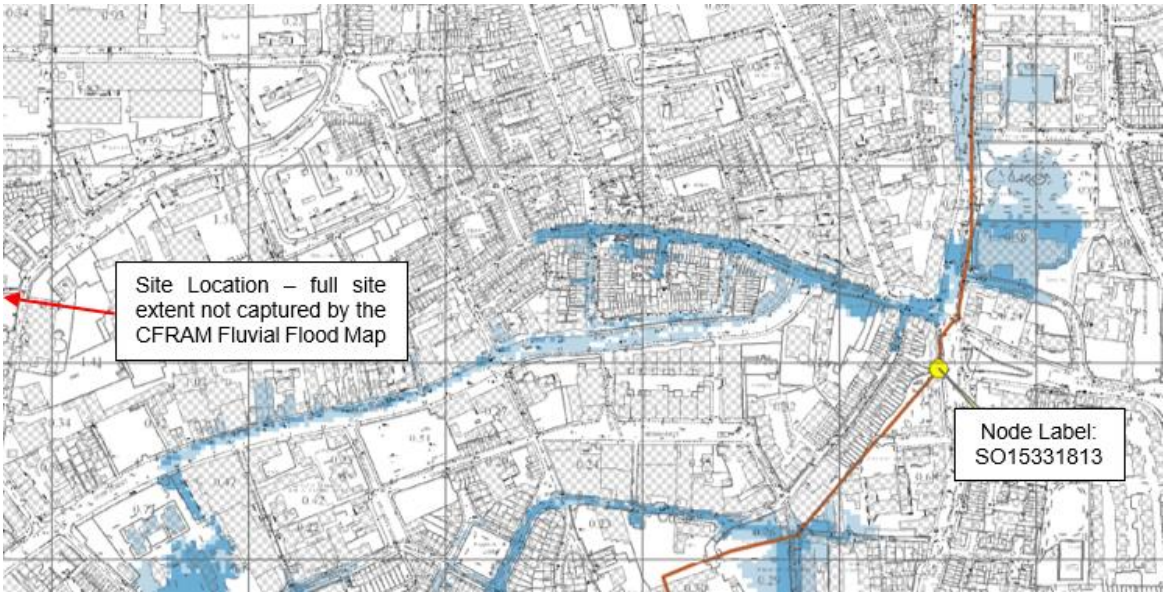


Figure 3-3 - Extract from PFRA Maps (Extract from OPW)

Table 3-1 - CFRAMS Predicted Water Levels

Node Label	Water Level 10% AEP	Water Level 1% AEP	Water Level 0.1% AEP
SO15331313	8.40	8.43	8.46
SO15331813	**5.52**	**5.94**	**6.63**
SO15345201	2.53	2.59	2.69

According to the SFRA of the Dublin City Development Plan 2022 – 2028 the recommended minimum finished floor level is to be:

Table 3-2 - Recommended Minimum Finished Floor Levels (Extract from the Strategic Flood Risk Assessment of the Dublin City Development Plan 2022-2028)

Scenario	Finished floor level to be based on
Fluvial, undefended	1% AEP flood + climate change (20% allowance for highly vulnerable development) + 300mm freeboard

An artificial channel almost entirely culverted of the River Poddle 800m to the west of the site would require a finished floor levels on the maps of 6.24m. The topography falls along the southern boundary at 17.80m and rises towards the north at 19.50m. The existing building on the site are to be demolished and had finished floor levels 17.74m OD to the south and rising to 18.29m to the north with no records of flooding on the site noted.

Thus, it is proposed to place the finished floor levels for the Block B at the southwest end to 18.50m. Block A at the southeast end (facing Marrowbone Lane) will have a finished floor level from 18.00m OD to 18.50m OD and the north of Block A will have a finished floor level of 17.30m OD to 18.50m OD. This allows for more than the minimum 300mm freeboard from the River Poddle.

Figure 3-4 - Proposed Site Layout showing proposed Finished Floor Levels

3.2 Climate Change

'The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' recommends that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects.

Advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (2009).

Two climate change scenarios are considered. These are the mid-range future scenario (increase in rainfall of 20% and sea level rise of 500mm) and the high-end future scenario (increase in rainfall of 30% and sea level rise of 1000mm. The mid-range future scenario is intended to represent a "likely" future scenario based on the wide range of future predictions available. The high-end future scenario represents a more "extreme" future scenario at the upper boundaries of future projections

Figure 3-5, illustrates that the site does not fall within a mid-range and high-end future scenario.

To further mitigate against flood risk, when designing for extreme rainfall events the system will be designed for storms up to and including 1 in 100-year storm and 20% extra for climate change. Hence the development can be considered to climate change resilient.

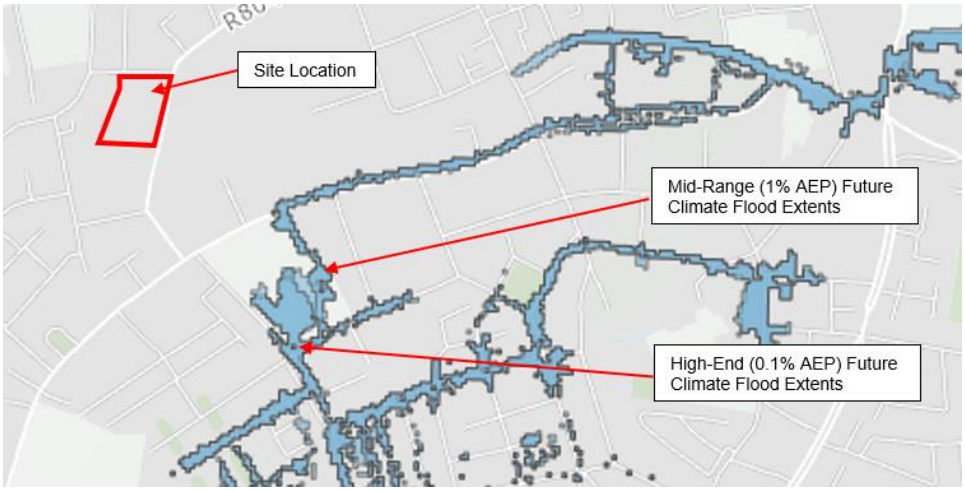


Figure 3-5 - Future Climate Change Scenario Flood Mapping (Extract from OPW)

3.3 OPW Flood Records

The OPW Flood Maps Website (www.floodinfo.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the proposed development site. These records, which are summarised in Appendix C of this report, indicate 37 recorded flood events within a 2.5km radius of the proposed site.

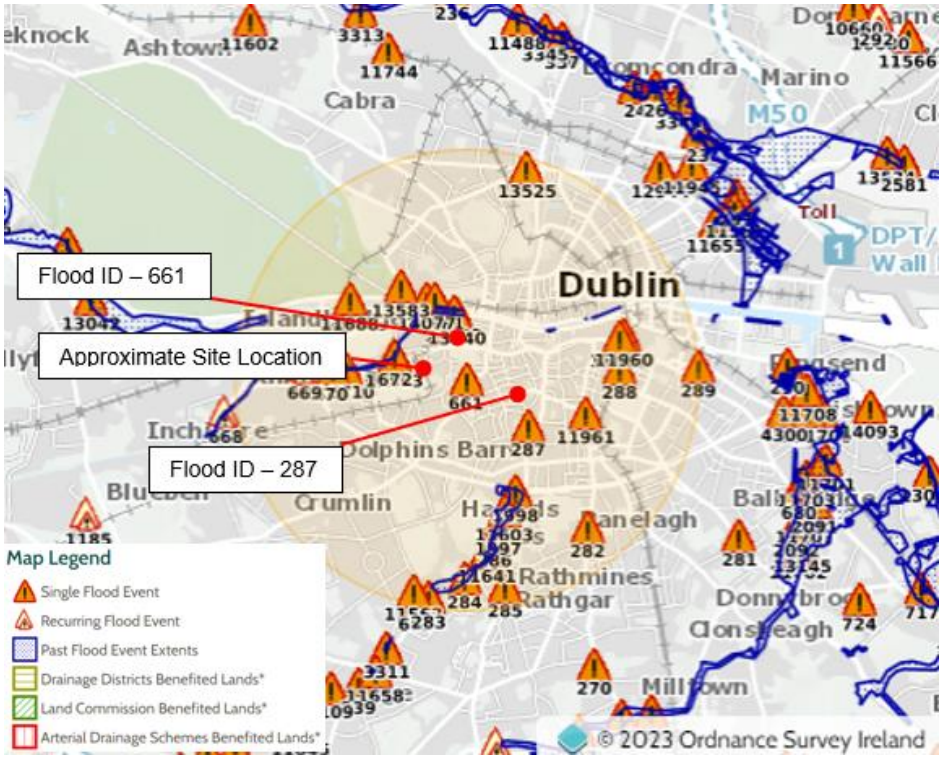


Figure 3-6 - OPW Flood Event Summary

Figure 3-6 indicates various historical flooding events within Dublin City Area, however there are no recorded recurring instances of flood events mapped within the immediate vicinity of the site. A past flood event (Flood ID – 661) is mapped approximately 250m north-east of the site boundary. OPW report is flood locations in Harolds Cross area, Dublin for a number of floods in 1940s from the River Poddle. A past flood event (Flood ID – 287) is mapped approximately 1000m east of the site boundary. OPW report is provided of multiples locations affected by flooding in June 1963 in the Dublin Area. The results of flooding were due to intense rainfall.

The local authority notes that a number of defence assets were put in place after these events. Embankments and walls are provided as significant flood defences as well as storage in the South Dublin County Council to provide estimated flood protection to the 1% AEP fluvial level.

Based on available and recorded information as outlined above, the development site is considered not to have been subject to flooding in recent history.

3.4 Ordnance Survey Historic Mapping

Historic Groundwater Flood Maps were produced by Geological Survey Ireland. The historic groundwater flood map is a national-scale flood map presenting the maximum historic observed extent of karst groundwater flooding. The map is primarily based on the winter 2015/2016 flood event, which in most areas represented the largest groundwater flood event on record. The map was produced based on the SAR imagery of the 2015/2016 event as well as any available supplementary evidence. The floods were classified by flood type differentiating between floods dominated by groundwater (GW) and floods with significant contribution of groundwater and surface water (GWSW).

The map that was viewed was the historical 6-inch map (pre-1900). Figures below illustrate the historic mapping for the area of the proposed development site.

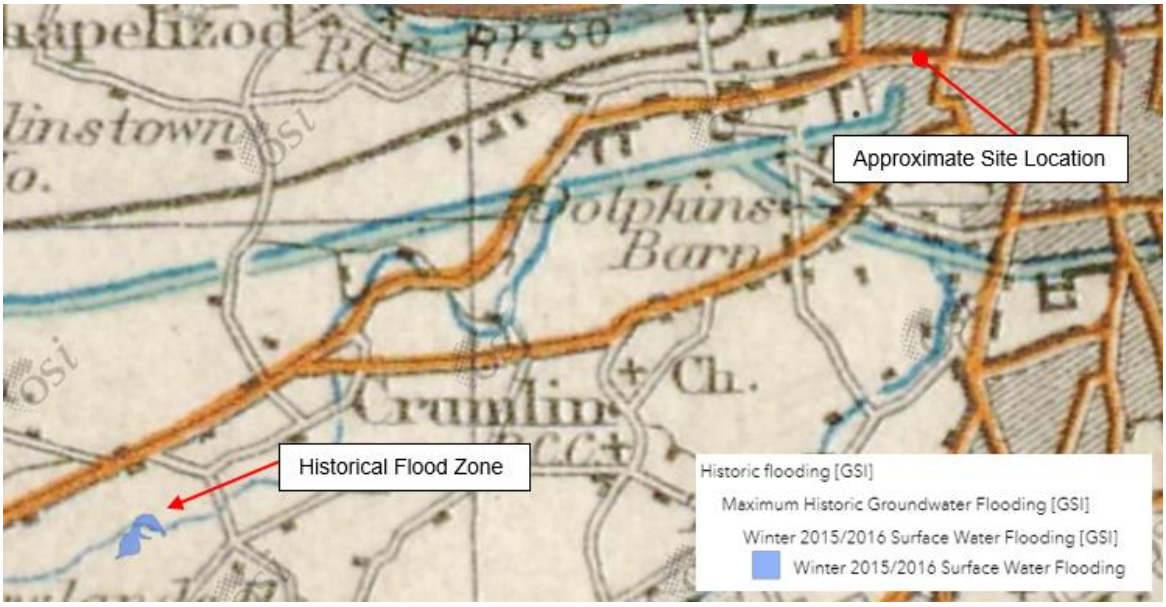


Figure 3-7 - Historic 6 Inch Mapping

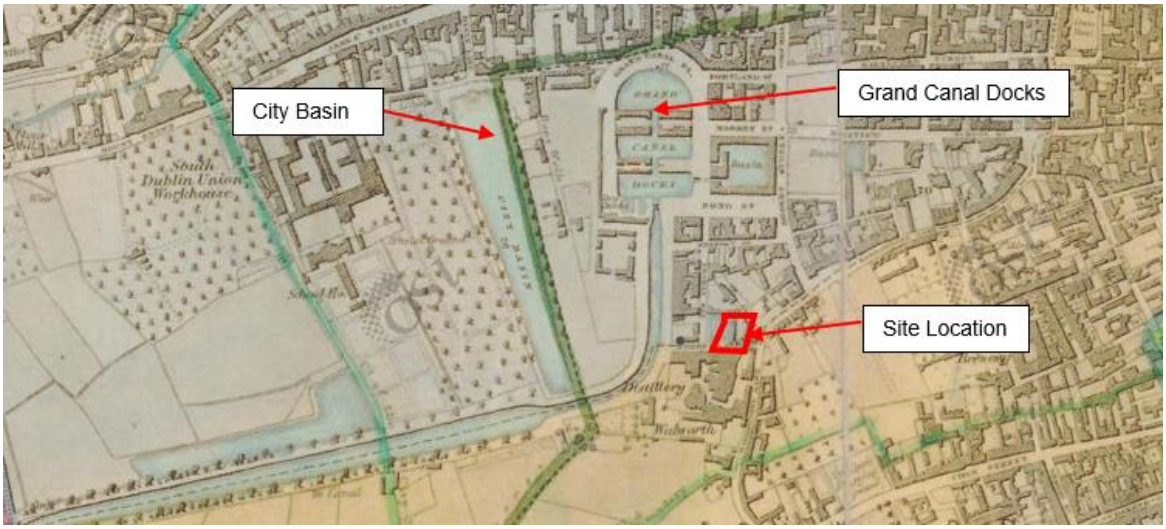


Figure 3-8 - Historic 6 Inch Mapping Zoomed In

According to the history of the Grand Canal, before the completion of the Grand Canal Docks at Ringsend, Figure 3-8 shows that this was considered the main line of the canal. The canal skirted the City Basin off James Street before reaching the Grand Canal Harbour. Most of the route of this line now runs along side the Luas Red Line. The former City Basin has also been filled in with little or no trace remaining.Figure 3-7 illustrates that the historic 6-inch mapping does not indicate any historical or anecdotal instances of flooding within or adjacent to the boundary of the proposed development site.

3.5 Strategic Flood Risk Assessment, Dublin City Development Plan 2022 – 2028

A Strategic Flood Risk Assessment (SFRA), as required by 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DEHLG and OPW, 2009), has been undertaken as part of the preparation of the Dublin City Development Plan 2022 2028.

3.5.1 Composite Flood Zone Map

The SFRA contains a Composite Flood Zone Map, the map is included in Appendix D and an extract is shown in Figure 3-9.

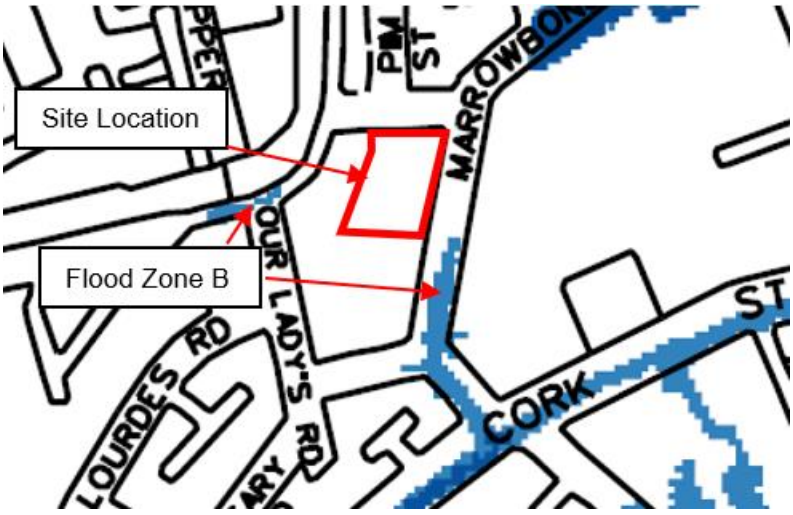


Figure 3-9 - Composite Flood Map – Zoomed In

Figure 3-10 indicates that the proposed development site falls within a predictive Flood Zone C scenario, however a Flood Zone B is mapped as slightly encroaching part of the south-eastern boundary.

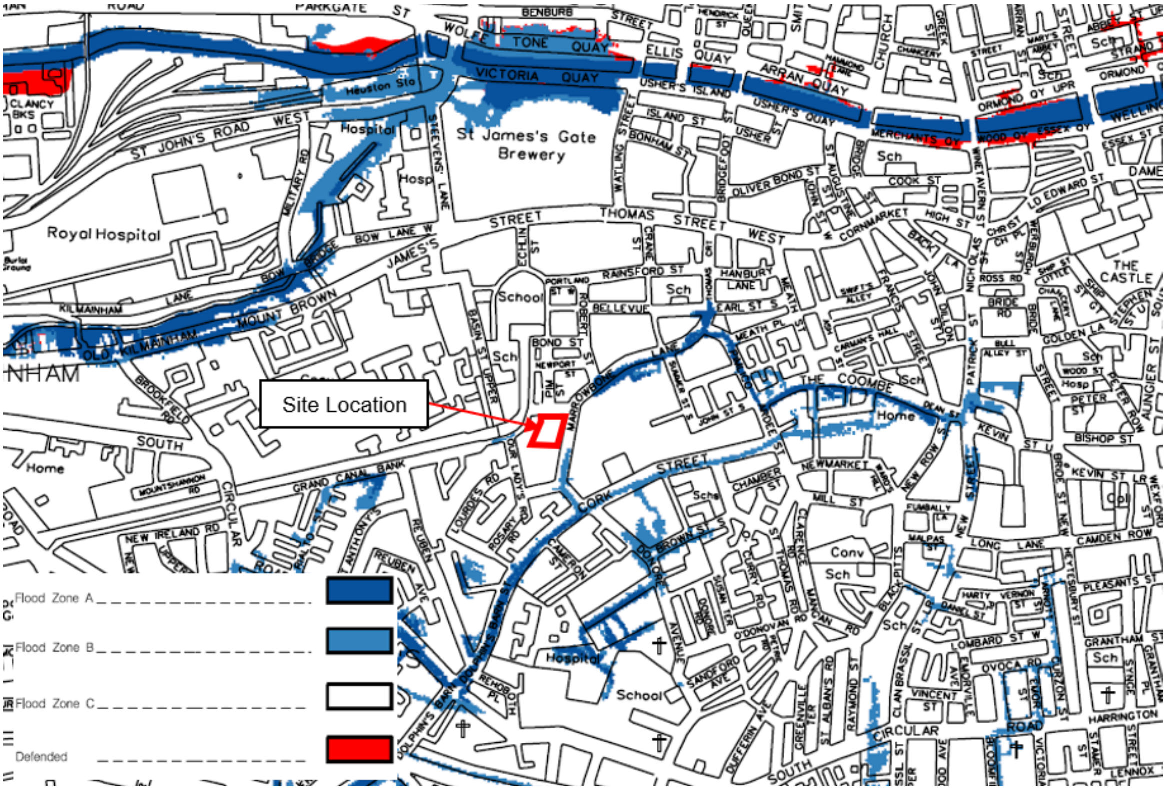


Figure 3-10 - Composite Flood Map (Extract from the SFRA of the Dublin City Development Plan 2022 – 2028)

3.5.2 Justification Test

The Guidelines direct new development primarily towards areas at low risk of flooding. The Guidelines recognise that flood risks should not be the only deciding factor in zoning for development; the Guidelines recognise that circumstances will exist where development of a site in a floodplain is desirable in order to achieve compact and sustainable development of the core of urban settlements.

In order to allow consideration of such development, the Guidelines provide a Justification Test, which establishes the criteria under which desirable development of a site in a floodplain may be warranted.

The full Justification test for the development site is provided in Appendix E. An extract from the Justification Test for is presented in Table 3-3. The development site is located within an area identified as ‘Area 13. Poddle: Inside Canal’.

Table 3-3 – Justification Test for Development (Extract from the SFRA of the Dublin City Development Plan 2022 – 2028)

Justification Test for Development Plans
1. Urban Settlement is targeted for growth. Yes: The subject site is within Dublin City, which is targeted for growth in the National Spatial Strategy 2002-2020, Regional Planning Guidelines for the Greater Dublin Area 2010-2022 and in the Dublin City Development Plan 2022-2028.

2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:

i. Essential to facilitate regeneration and/ or expansion of the centre of the urban settlement.

Yes: This area is an established built-up part of the Inner City which is served by high quality public transport – Luas and Bus Connects.
Three major regeneration areas have been designated in this area:

- SDRA 11 St. Teresa's Gardens and Environs – this is identified for primarily residential development.
- SDRA 12 Dolphin House – this is identified for primarily residential development.
- SDRA 15 Liberties and Newmarket Square - this is identified for residential and employment/ mixed uses.

The regeneration of these older social housing projects (former PPP's) and the Diageo lands are identified in the RSES / MASP as crucial for the creation of sustainable compact communities with improved housing choice, access to social and economic opportunities, enhanced services and amenities. Outside of these areas, development in this area is a mixture of low to high density residential and commercial with infill development of both. This area would be essential for the future expansion of the urban settlement.

ii. Comprises significant previously developed and/ or under-utilised lands.

Yes: Sites would predominantly be brownfield sites. Development in this area will be a mixture of residential, commercial/ retail, community uses.

iii. Is within or adjoining the core of an established or designated urban settlement.

Yes: The lands are located within the canals and form part of the Inner City.

iv. Will be essential in achieving compact and sustainable urban growth.

Yes: Sites would predominantly be brownfield sites. Development in this area will be a mixture of residential, commercial/ retail, community uses.

v. There are no suitable alternative lands for the particular uses or development type in areas at lower risk of flooding, within or adjoining the urban settlement.

Yes: There are no suitable alternative lands for the particular uses or development type in areas at lower risk of flooding, within or adjoining the urban settlement.

3. A flood risk assessment to an appropriate level of detail has been carried out.

Yes: The current report comprises a detailed site-specific flood risk assessment for the subject site that identifies and recommends mitigation measures.

4. Conclusion:

The subject area passes the Justification Test for Development Plans.

3.6 Rivers of Dublin Book

Consultations with the Local Authority informed us of a possible historical culvert near the vicinity of the site. The Rivers of Dublin book was reviewed to give more information about the culvert. Figure 3-11 shows an excerpt of the map for the site location.

It appears that the historic culvert is a culvert of the Abbey Stream which originates from circa the 12th century. The monks of St. Thomas Abbey constructed a high-level artificial take-off channel from the river near Mount Jerome cemetery and this stream passes the site on its 2.5mile long route.

Recent records and current survey information to date does not indicate that the culvert extends as indicated on the site northwestern area. Further survey investigations took place to identify and verify the culvert location. However, after site investigation slit trenches along the culvert path and CCTV surveys it has become apparent that this culvert is now the main 600/750mm diameter concrete surface water sewer line running parallel to the northern boundary of the site along Forbes Lane.

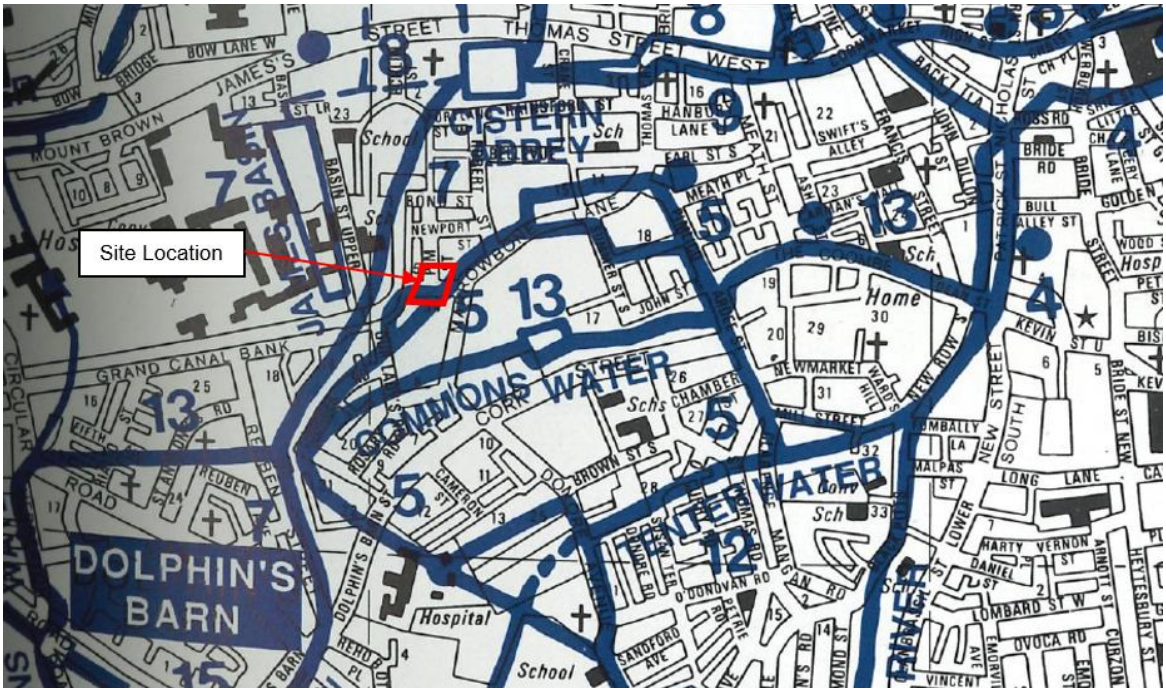


Figure 3-11 – Abbey Stream Location (Extract from Rivers of Dublin Book)

4 OTHER FLOOD SOURCES

4.1 Tidal Flooding

The proposed development site is located approximately 850m north of the nearest potential source of tidal flooding in the River Liffey Estuary. A review of the OPW Tidal Flood Extents Mapping was carried out and indicates that the proposed development site does not fall within a the predicted extreme 0.1% (1 in 1000-year current scenario) tidal flood event.

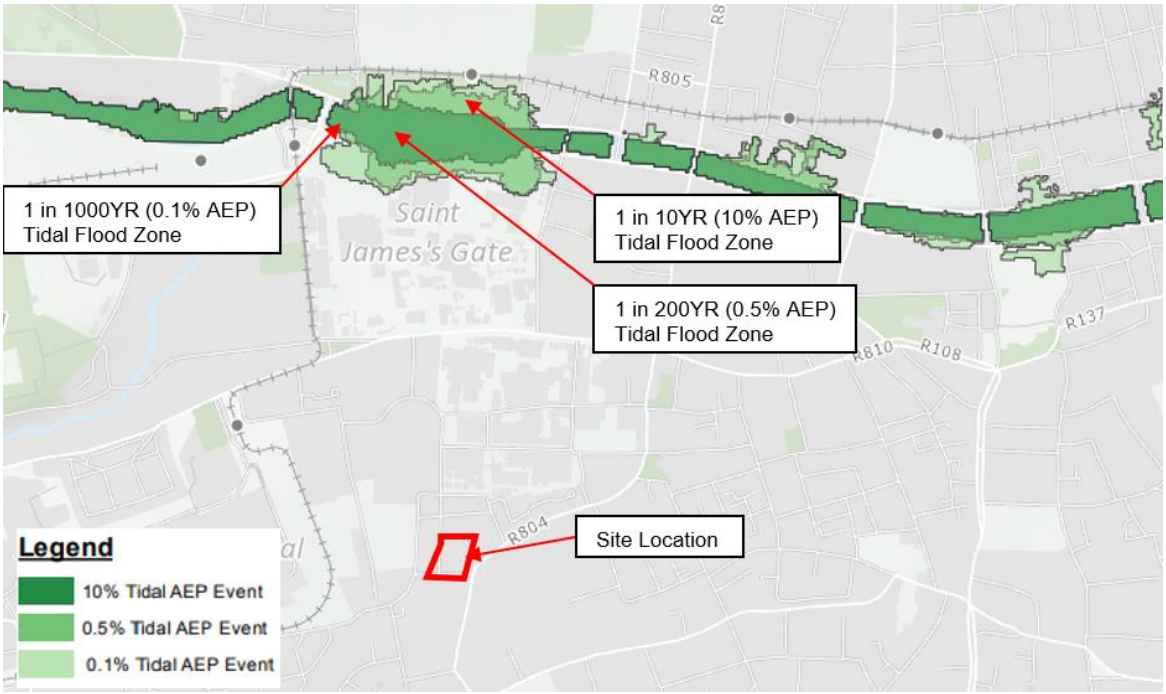


Figure 4-1 – CFRAM Tidal Flood Extent Map (Extract from OPW)

4.2 Pluvial Flooding

Pluvial flooding occurs when the amount of rainfall exceeds the capacity of urban surface water drainage systems or the ground to absorb it. A review of the available literature including the DCC FloodResilienCity (FRC) project was carried out and indicates some pluvial flooding surrounding the site. Note, these maps are 'predictive' flood maps showing areas predicted to be inundated during a theoretical or 'design' flood event with an estimated probability of occurrence, rather than information for actual floods that have occurred in the past, which is presented on 'historical' flood maps.

The flood mapping shows small pockets of moderate pluvial flood risk present on the development site; this corresponds to minor undulations in the ground level within the undeveloped site. In developing the site, the ground levels will be re-profiled, removing these undulations.

The proposed site is currently used as a Road Maintenance Depot by Dublin City Council, occupied by surface car-parking and storage buildings; the site is largely hardstanding and is provided with no attenuation facility or flow control mechanism. The proposed drainage system will collect surface water runoff from the site and attenuate to equivalent greenfield

run-off rates; this will mitigate the potential pluvial flood risk arising from the development site.

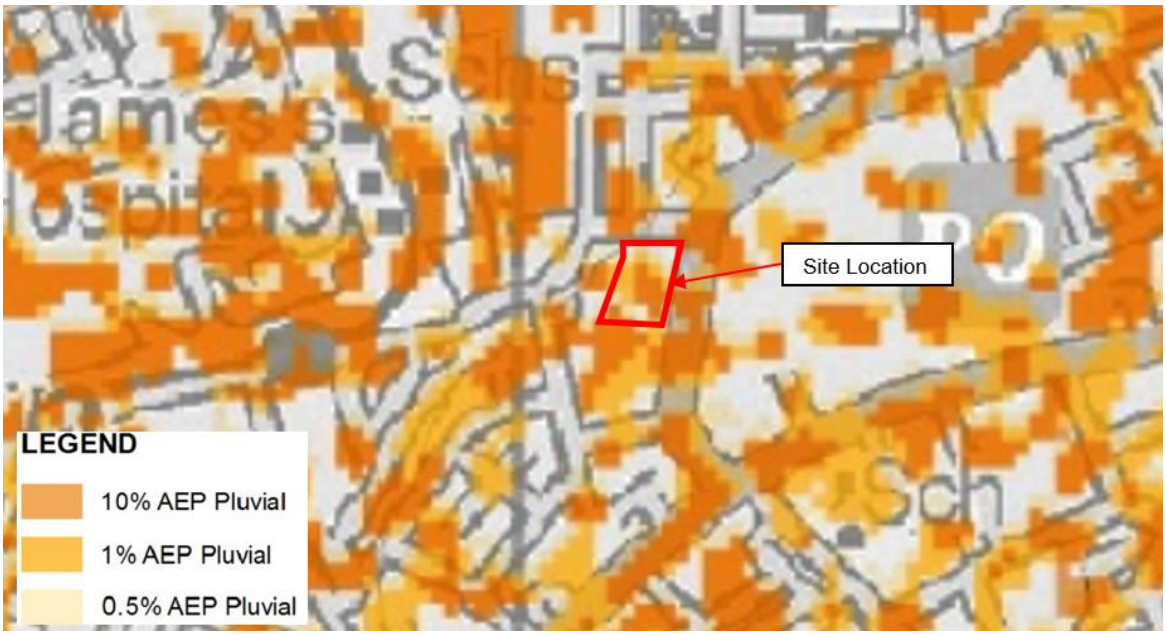


Figure 4-2 - Pluvial Flood Extent Map (Extract from OPW)

5 SEQUENTIAL APPROACH TO PLANNING

The document "Planning Systems and Flood Risk Management: Guidelines for Planning Authorities November 2009" requires the adoption of a sequential approach to flood risk management when assessing the location for new developments. This approach is a risk-based method to guide development away from areas that have been identified through flood risk assessment as being at risk from flooding. The philosophy used in this approach is outlined in Figure 5-1.

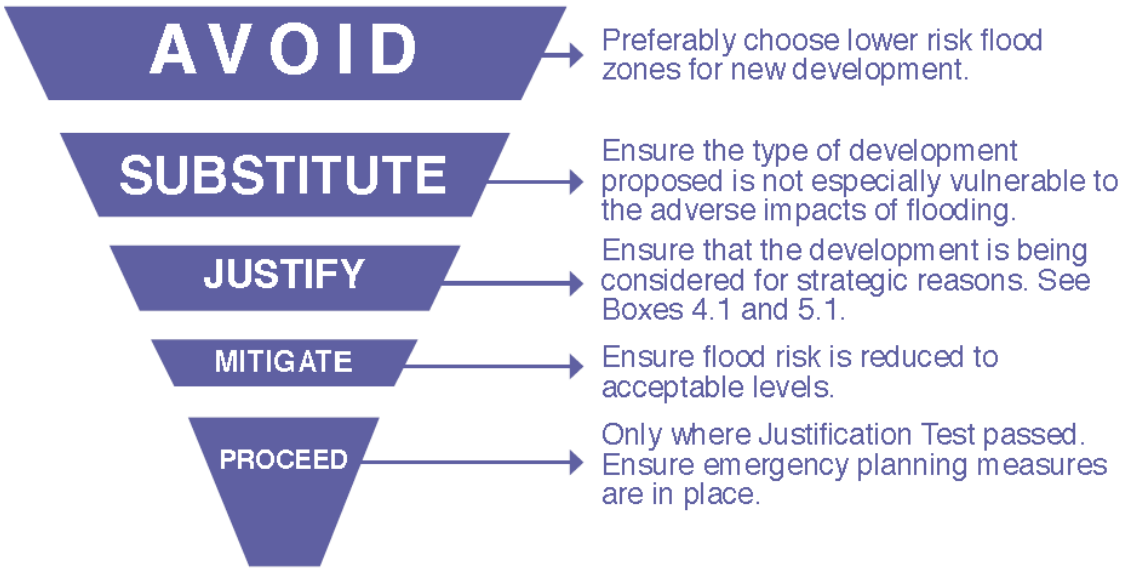


Figure 5-1 - Source: The Planning Systems and Flood Risk Management: Guidelines for Planning Authorities November 2009

The sequential approach uses mapped flood zones alongside considerations of the vulnerability of different types of development to give priority to development in zones of low flood probability.

5.1 Flood Zones

The flood zones are defined on the basis of flooding from rivers and the sea. The different flood zones recommended in the 2009 Planning Guidelines are:

Flood Zone A – Highest risk area where there is a 1% chance of flooding in any one year from rivers and a 0.5% chance of coastal flooding.

Flood Zone B – Moderate risk area where the chance of flooding in any one year is 0.1-1% for rivers and 0.1-0.5% for coastal flooding.

Flood Zone C – Low risk area with less than 0.1% chance of flooding from rivers or the sea in any given year.

As described in Section 3 and Section 4, the proposed development is outside of the area predicted to flood during a 0.1% AEP (1 in 1000year) fluvial flood event. The development is therefore located within Flood Zone C in accordance with the 2009 Planning Guidelines.

5.2 Vulnerability Class of Proposed Development

The vulnerability class of the development is dependent on the land use and type of development proposed. See Table 5-1 for the vulnerability classes.

Table 5-1 - Classification of Vulnerability to Flooding for Various Development Types (Source – Table 3.1 Planning System and Flood Risk Management – Guidelines for Planning Authorities DEHLG, OPW, November 2009)

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).
*Uses not listed here should be considered on their own merits	

The 2009 Planning Guidelines presents a matrix of vulnerability versus flood zone to illustrate appropriate development and the requirement of justification tests. That matrix can be seen in Table 5-2. Based on the land uses listed in Table 5-1, the proposed

residential development is classified as a highly vulnerable development. However, the development will be located in Flood Zone C and is therefore considered to be appropriate, and a Justification Test is not therefore required.

Table 5-2 - Matrix of Vulnerability vs. Flood Zone (Source – Table 3.1 Planning System and Flood Risk Management – Guidelines for Planning Authorities DEHLG, OPW, November 2009)

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

6 SUMMARY AND CONCLUSIONS

The analysis and flood zone delineation undertaken as part of this DFRA indicates that the proposed site is not expected to be impacted during the occurrence of a 0.1% AEP (1 in 1000 year) fluvial flood event.

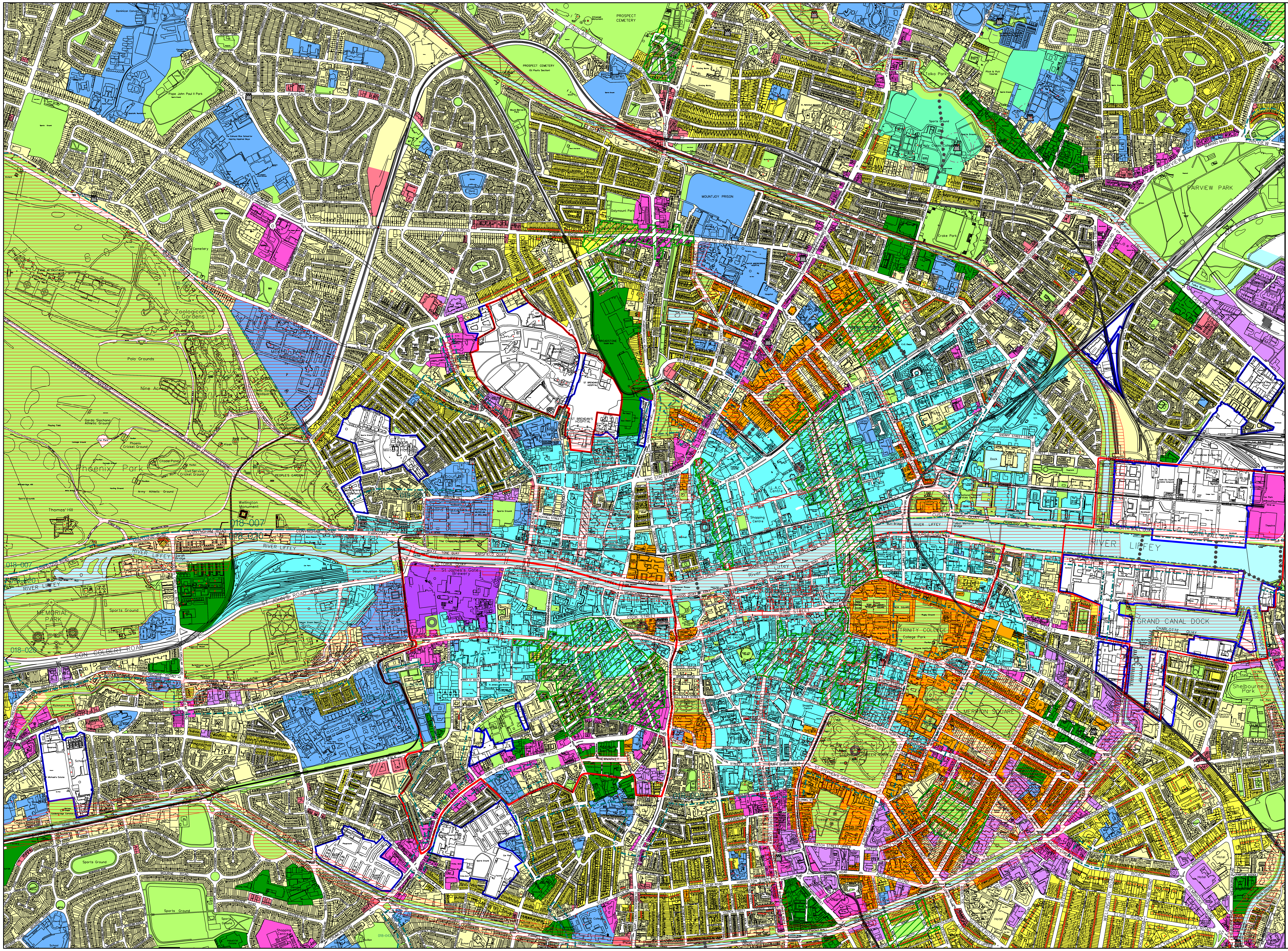
The PFRA flood mapping indicates that the proposed development site does not fall within the predicted extreme 0.1% (1 in 1000 year) current scenario fluvial flood zone. The site is not located near any major open watercourse.

Consideration was given to the predicted flood levels from the artificial channel from the River Poddle. The node point closest to the eastern boundary of the site is referenced as node point SO15331813. The 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood levels at this point are predicted as 5.94m and 6.63m respectively.

The topography falls along the southern boundary at 17.80m and rises towards the north at 19.50m. The existing building on the site are to be demolished and had finished floor levels 17.74m OD to the south and rising to 18.29m to the north with no records of flooding on the site noted. Thus, it is proposed to place the finished floor levels for the Block B at the southwest end to 18.50m. Block A at the southeast end (facing Marrowbone Lane) will have a finished floor level from 18.00m OD to 18.50m OD and the north of Block A will have a finished floor level of 17.30m OD to 18.50m OD. This allows for more than the minimum 300mm freeboard from the River Poddle.

In consideration of the above assessment, analysis and recommendations, overall development of the site is not expected to result in an adverse impact to the existing hydrological regime of the area or to result in an increased flood risk elsewhere.

APPENDIX A – LAND USE ZONING MAP



Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Dublin City Development Plan 2022-2028

DRAFT

Map E

MAP A	MAP B	MAP C
MAP D	MAP E	MAP F
MAP G	MAP H	

LAND USE ZONING OBJECTIVES[4]

- Zone Z1 Sustainable Residential Neighbourhoods
- Zone Z2 Residential Neighbourhoods (Conservation Areas)
- Zone Z3 Neighbourhood Centres
- Zone Z4 Key Urban Villages / Urban Villages
- Zone Z5 City Centre
- Zone Z6 Employment / Enterprise
- Zone Z7 Employment (Heavy)
- Zone Z8 Georgian Conservation Areas
- Zone Z9 Amenity / Open Space Lands / Green Network
- Zone Z10 Inner Suburban and Inner City Sustainable Mixed-Uses
- Zone Z11 Waterways Protection
- Zone Z12 Institutional Land (Future Development Potential)
- Zone Z14 Strategic Development and Regeneration Areas (SDRAs)
- Zone Z15 Community and Social Infrastructure

SPECIFIC OBJECTIVES

- Conservation Areas
- Architectural Conservation Areas
- Protected Structures. [RPS takes precedence]
- Sites of Archaeological Interest*
- Zones of Archaeological Interest*
- National Monuments*
- COMAH establishments (SEVESO establishments)
- LAP (Local Area Plan) & SDZ (Special Development Zone)
- Dublin Airport Outer Public Safety Zone

ROADS
Roads, Street and Bridge Schemes

1. Map to be read in conjunction with the written statement
2. Roads objectives are shown diagrammatically
3. *Based on the Record of Monuments and Places (RMP). For additional information see www.archaeology.ie
4. See written statement (Chapter 14) for full zoning text

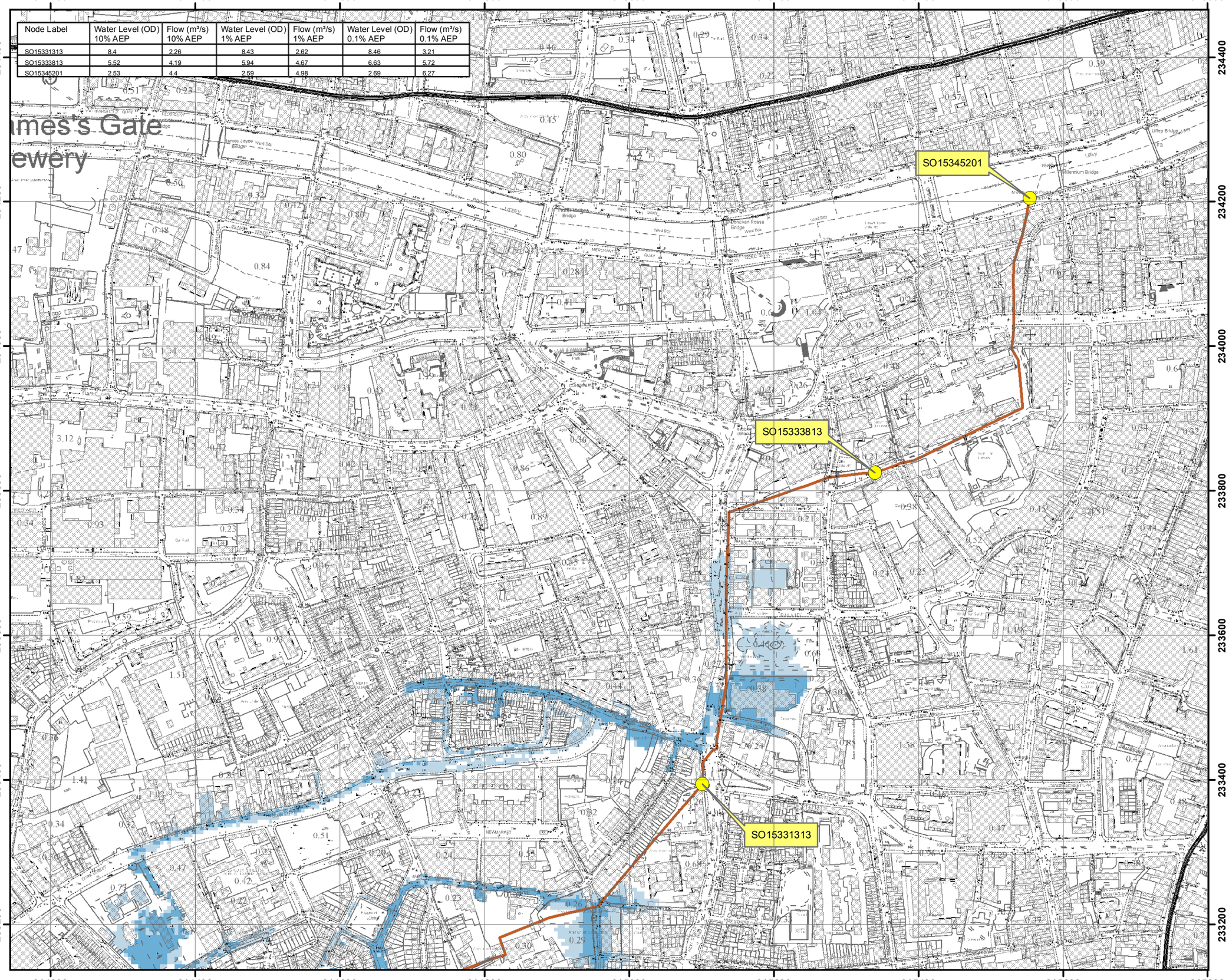
City Boundary

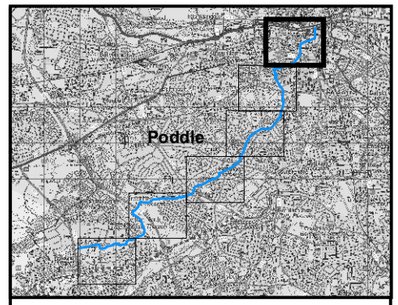
Scale: 0 100 200 300 400 500 metres

John O'Hara
Dublin City Planner

APPENDIX B – CFRAM FLUVIAL FLOOD EXTENTS MAP

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
SO15331313	8.4	2.26	8.43	2.62	8.46	3.21
SO15333813	5.52	4.19	5.94	4.67	6.63	5.72
SO15345201	2.53	4.4	2.59	4.98	2.69	6.27





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
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

OPW Oifig na nOibreacha Poiblí The Office of Public Works
RPS

The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

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

Map:
Poddle River Fluvial Flood Extents

Map Type:	EXTENT		
Source:	FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn By :	F.M.C.	Date :	11 August 2016
Checked By :	A.S.	Date :	11 August 2016
Approved By :	S.P.	Date :	11 August 2016

Drawing No. :
E09POD_EXFCD_F0_06

Map Series : Page 6 of 6

Drawing Scale : 1:5,000 @A3

APPENDIX C – PAST FLOOD SUMMARY REPORT

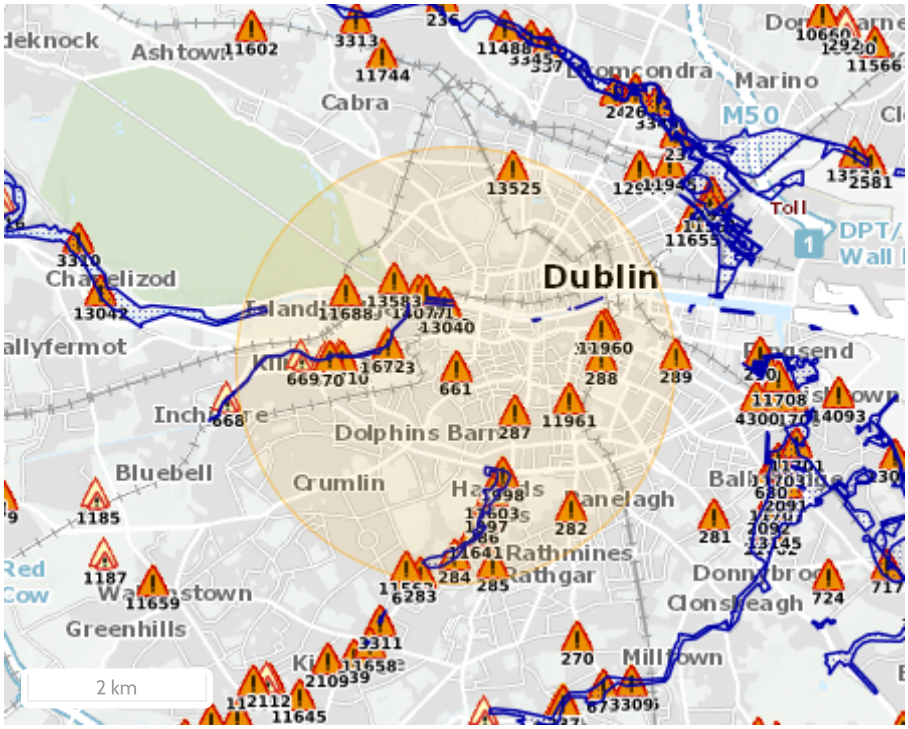
Past Flood Event Local Area Summary Report

OPW Oifig na nOibreacha Poiblí Office of Public Works

Report Produced: **17/5/2023 16:51**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "**Website**"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

37 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Flooding at Trinity College, Dublin 2, 26th July 2013 (ID-11960)	25/07/2013	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
2.	Flooding on Wexford St, Dublin 2 on 26th July 2013 (ID-11961)	25/07/2013	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
3.	Flooding at Dublin City on 30/07/2019 (ID-13659)	30/07/2019	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		
4.	Poddle August 1986 (ID-32)	24/08/1986	Area
	Additional Information: Reports (9) Press Archive (1)		
5.	Poddle St Claires Ave Sept 1931 (ID-1997)	02/09/1931	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
6.	Poddle Limekiln Lane Aug 1905 (ID-1998)	24/08/1905	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		

	Name (Flood_ID)	Start Date	Event Location
7.	Flooding at Dublin City on 22/11/2017 (ID-13583) **Additional Information:** Reports (0) Press Archive (0)	22/11/2017	Approximate Point
8.	Poddle Limekiln Lane Sept 1931 (ID-3267) **Additional Information:** Reports (1) Press Archive (0)	02/09/1931	Approximate Point
9.	Camac August 1986 (ID-125) **Additional Information:** Reports (3) Press Archive (0)	24/08/1986	Area
10.	Liffey Lower - Dec 1954 (ID-241) **Additional Information:** Reports (5) Press Archive (2)	08/12/1954	Area
11.	Flooding at Dublin City on 06/01/2014 (ID-13040) **Additional Information:** Reports (0) Press Archive (0)	06/01/2014	Approximate Point
12.	Rathmines Lower June 1963 (ID-282) **Additional Information:** Reports (4) Press Archive (2)	10/06/1963	Exact Point
13.	Kimmage June 1963 (ID-283) **Additional Information:** Reports (4) Press Archive (2)	10/06/1963	Exact Point
14.	Kimmage Mount Argus June 1963 (ID-284) **Additional Information:** Reports (4) Press Archive (2)	10/06/1963	Exact Point
15.	Harold's Cross June 1963 (ID-285) **Additional Information:** Reports (4) Press Archive (2)	10/06/1963	Exact Point
16.	Mount Jerome Harold's Cross June 1963 (ID-286) **Additional Information:** Reports (4) Press Archive (2)	10/06/1963	Exact Point
17.	Clanbrassil Street June 1963 (ID-287) **Additional Information:** Reports (4) Press Archive (2)	10/06/1963	Exact Point
18.	Grafton Street June 1963 (ID-288) **Additional Information:** Reports (4) Press Archive (2)	10/06/1963	Exact Point
19.	Poddle Tributary Marrowbone Lane Jan 1941 (ID-661) **Additional Information:** Reports (1) Press Archive (0)	20/01/1941	Approximate Point
20.	Camac Turvey Ave Recurring (ID-669) **Additional Information:** Reports (1) Press Archive (0)	n/a	Exact Point
21.	Poddle Harold's Cross undated 1940's (ID-662) **Additional Information:** Reports (1) Press Archive (0)	n/a	Exact Point
22.	Poddle Larkfield Mills Undated 1940s (ID-663) **Additional Information:** Reports (1) Press Archive (0)	n/a	Approximate Point
23.	Camac Carrickfoyle Terrace Recurring (ID-670) **Additional Information:** Reports (1) Press Archive (0)	n/a	Exact Point
24.	Camac Kearns Place Recurring (ID-671) **Additional Information:** Reports (1) Press Archive (0)	n/a	Exact Point
25.	Camac Bow Bridge Recurring (ID-672)	n/a	Approximate Point

	Name (Flood_ID)	Start Date	Event Location
	Additional Information: Reports (1) Press Archive (0)		
26.	Flooding at Dublin City on 14/06/2016 (ID-14077)	14/06/2016	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		
27.	Flooding at Dublin City on 15/06/2016 (ID-13525)	15/06/2016	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		
28.	Dublin City Tidal Feb 2002 (ID-456)	01/02/2002	Area
	Additional Information: Reports (45) Press Archive (27)		
29.	Flooding at Blarney Park, Crumlin, Dublin 12 on 24th Oct 2011 (ID-11562)	23/10/2011	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
30.	Flooding at Bow Lane, Kilmainham, Dublin 8 on 24th Oct 2011 (ID-11563)	23/10/2011	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
31.	Flooding at Harold's Cross, Dublin City on 24th Oct 2011 (ID-11603)	23/10/2011	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
32.	Flooding at Kearns Place, Kilmainham, Dublin 8 on 24th Oct 2011 (ID-11620)	23/10/2011	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
33.	Flooding at Lady's Lane, Kilmainham, Co. Dublin on 24th Oct 2011 (ID-11622)	23/10/2011	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
34.	Flooding at Mount Argus Road and Kimmage Road Lower on 24th Oct 2011 (ID-11641)	23/10/2011	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
35.	Flooding at Ashling Hotel, Parkgate Street, Dublin 8 on 24th Oct 2011 (ID-11681)	23/10/2011	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
36.	Flooding at Bridgewater Quay Apartments, Islandbridge, Dublin 8. on 24th Oct 2011 (ID-11688)	23/10/2011	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
37.	Flooding at Dublin City on 03/02/2014 (ID-13093)	03/02/2014	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		

APPENDIX D – DCC COMPOSITE FLOOD MAP

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Dublin City Development Plan 2022-2028

Composite Flood Map for Dublin City Council

Note: The Composite Flood Map, and all other map extracts, illustrate Flood Zone A, B and Defended Areas (in red), where defended areas indicates lands defended to the 1% AEP fluvial and /or the 0.5% AEP tidal flood events and should therefore be considered also to be Flood Zone A.

Flood Zone A

Flood Zone B

Flood Zone C

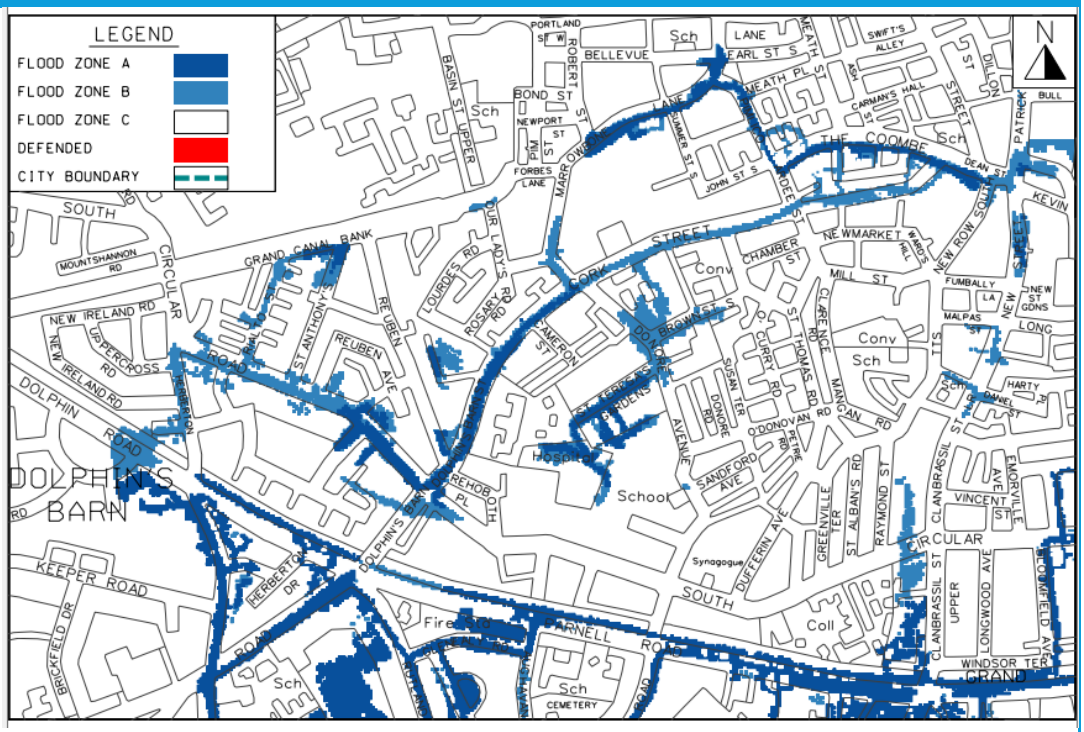
Defended

City Boundary

Refer To OPW Website – Floodinfo.ie

John O'Hara
Dublin City Planner

APPENDIX E – DCC JUSTIFCATION TEST

Area: 13. Poddle: Inside Canal	
	
For Land Use Zoning Maps Overlaid with Flood Zones see [Dublin City Council Development Plan 2022 - 2028](), Flood Map E.	
Area Description	The area on the Poddle River culvert goes from the Grand Canal, to the South Circular Road to Donore Avenue, the Coombe, Cork Street and Marrowbone Lane and over to the Patrick Street/ Clanbrassil Street area. It is mainly fluvial with some tidal influence at its lower end. Development in this area is a mixture of low to high density residential and commercial with infill development of both.
SDRAs within this Area	SDRA 11 St. Teresa's Gardens and Environs SDRA 12 Dolphin House SDRA 15 Liberties and Newmarket Square
Benefitting from Defences (flood relief scheme works)	An overflow into the Grand Canal Sewer (surface water section) reduces flow in the Poddle River into the City Centre inside the Grand Canal. Construction of a new flood scheme on the Poddle River in both the areas of DCC and South Dublin County Council is due to start in 2023 (pending ABP final decision), which will change flood protection on this site and local flood risks.
Sensitivity to Climate Change	An increase of 20% for estimated climate change on top of the estimated 100 year river flow will

Area: 13. Poddle: Inside Canal	
	cause extra flooding in this area. A 30% increase in river flow on top of the estimated 100-year river will cause significant extra flooding.
Residual Risk	Any proposed developments in the protected areas require residual risk for blockage of Grand Canal overflow or other cause to be mitigated against, which may be an assessment of flowpaths and setting of appropriate finished floor levels. A structural inspection of this overflow will be carried out each year.
Historical Flooding	The SFRA flood maps are consistent with previous flooding of this section of the River Poddle.
Surface Water	All surface water in this area needs to be carefully managed and provision made for significant rainfall events during high river flows. Should development be permitted, best practice with regard to surface water management should be implemented across the development area, to limit surface water run-off to current values. Separation of surface water and foul sewage flows should be carried out where possible. All developments shall have regard to the Pluvial Flood Maps in their Site Specific Flood Risk Assessment, see FloodResilienCity Project**,** Volume 2 City Wide Pluvial Flood Risk Assessment at http://www.dublincity.ie/main-menu-services-water-waste-and-environment-drains-sewers-and-waste-water/flood-prevention-plans.
Commentary on Flood Risk: The flood extents indicate flow paths generally coming directly out of the river culvert through manholes and gully grids. These can be compounded with local pluvial flooding if heavy rainfall coincides with high river culvert flows. The flood maps were produced based on the OPW CFRAM Plan and they have been checked against historic flooding in the area.	
Development Options: The main flood cells in this area are located on roadways and in small residential, commercial and industrial developments. No new development should be allowed in these areas unless they are defended except for extensions and small infill provided the number of people at flood risk is not increased. There are three designated Strategic Development and Regeneration Areas within this area - SDRA 11 St. Teresa's Gardens and Environs, SDRA 12 Dolphin House and SDRA 15 Liberties and Newmarket Square.	

Area: 13. Poddle: Inside Canal

The first two are major residential development sites and the latter is a major residential and employment area.

Outside of the SDRA's residential development (mainly infill) with a small amount of commercial would be a natural extension of existing development in this area.

In all cases, any development could reasonably be accommodated within the extents of Flood Zone C and should not need to extend into Flood Zone A or B unless defended. Some development may be required to await future flood defence works on the Poddle River.

Justification Test for Development Plans

1. **Part 1 of the Justification Test is covered under Section 3.2.1 in the main body of the SFRA report.**

2. **The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:**

(i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement.

Answer: Yes: This area is an established built up part of the Inner City which is served by high quality public transport – Luas and Bus Connects. Three major regeneration areas have been designated in this area:

SDRA 11 St. Teresa's Gardens and Environs – this is identified for primarily residential development.

SDRA 12 Dolphin House – this is identified for primarily residential development

SDRA 15 Liberties and Newmarket Square - this is identified for residential and employment/ mixed uses.

The regeneration of these older social housing projects (former PPP's) and the Diageo lands are identified in the RSES / MASP as crucial for the creation of sustainable compact communities with improved housing choice, access to social and economic opportunities, enhanced services and amenities. Outside of these areas, development in this area is a mixture of low to high density residential and commercial with infill development of both. This area would be essential for the future expansion of the urban settlement.

(ii) Comprises significant previously developed and/or under-utilised lands.

Answer: Yes. Sites would predominately be brownfield sites. Development in this area will be a mixture of residential, commercial/ retail, community uses.

Area: 13. Poddle: Inside Canal

(iii) Is within or adjoining the core of an established or designated urban settlement.

Answer: Yes: The lands are located within the canals and form part of the Inner City.

(iv) Will be essential in achieving compact and sustainable urban growth.

Answer: Yes: (see response to (iii) above).

(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.

Answer: There are no suitable alternative lands for the particular uses or development type in areas at lower risk of flooding, within or adjoining the urban settlement.

3. Specific Flood Risk Assessment

- See Justification Test for Strategic Development and Regeneration Areas No's. 11 (St. Teresa's Gardens and Environs) and 15 (Liberties and Newmarket Square) in Appendix C2.
- Modelling shows that risks are primarily linked to the development of overland flow paths which progress along roads. FRAs for developments should specifically address this risk, both to ensure flow paths do not become obstructed and to ensure an appropriate standard of flood resilient construction, which should include (where possible) raising finished floor levels to a minimum of 300mm above road / pavement height.
- Particular attention to the design of any proposed basements should be carried out with full recognition of DCC policies and objectives and the detail in the SFRA, in this regard.

Conclusion: The subject area passes the Justification Test for Development Plans.