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CONSULTING ENGINEERS

SOCIAL HOUSING BUNDLE 5

DEVELOPMENT AT BASIN VIEW FLATS,

DUBLIN 8

DESKTOP FLOOD RISK ASSESSMENT

DUBLIN CITY COUNCIL

October 2024

Job: 23006

Contents Amendment Record

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Title: **Social Housing Bundle 5, Development at Basin View Flats, Dubin 8 / Desktop Flood Risk Assessment / Dublin City Council**

Job Number: **23006**

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1 INTRODUCTION

This report is prepared in support of the planning application for Dublin City Council for a proposed residential development at Basin Street Flats, Basin View, Dublin 8.

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 Liffey and River Camac.

2 PROPOSED SITE DESCRIPTION

2.1 Site Description

The location of the proposed development is illustrated in Figure 2-1. The site is situated in the south-central area off James Street, Dublin city centre. The site is bounded by Basin Grove and St. James Primary School to the south; Luas light rail line and St. James' Hospital Campus to the west, Basin Street Lower/Ewington Lane and Mary Aikenhead House Flats to the north and Basin View Street / Brandon Terrace to the east.

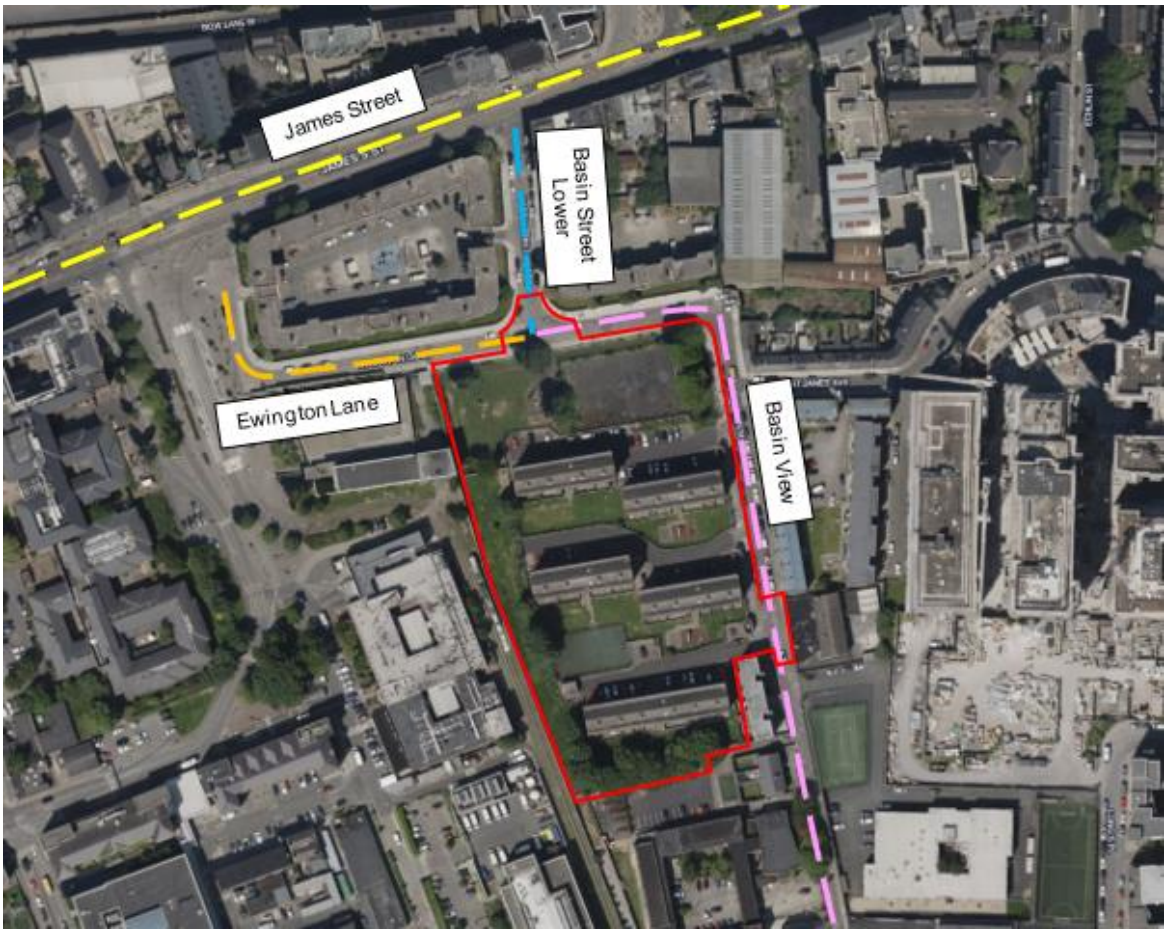


Figure 2-1 - Site Location showing the indicative Site Boundary and Adjacent Developments

2.2 Surrounding Watercourse

There are no hydrological features within the near vicinity of the site, however the River Liffey flows about 650m north of the site and its tributary the River Camac flows 350m north-west of the site. The River Liffey flows west throughout the city to an outflow in the Irish Sea at the centre of the Dublin Bay. The River Camac Flows northeast, joining the River Liffey due north of the site. The two rivers are illustrated in Figure 2-2.

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

2.3 Project Description

The construction of 171 apartments at a site of c. 1.64 ha at Basin Street Flats, Basin View, Dublin 8 will consist of the following:

- The demolition of four existing Basin Street Flats residential blocks; Building 1 (nos. 20-43), Building 2 (nos. 44-67), Building 3 (nos. 68-91) and Building 4 (nos. 92-115), ancillary structures, boundary walls and railings and site clearance works and renovation of one existing Basin Street Flats block (Building 5 nos. 116-151);
- Construction of 171 no. apartment units in three apartment blocks (Block A, Block B and Block C) comprising 171 residential units (83 no. 1-bed, 71 no. 2-bed, 13 no. 3-bed and 4 no. 4 beds);
  - Block A ranges from 4- 8 storeys with 48 units (17 no. 1-bed, 28 no. 2-bed, 3 no. 3-bed)
  - Block B ranges from 4 -8 storeys with 81 units (28 no. 1-bed, 39 no. 2-bed, 10 no. 3-bed, 4 no. 4 bed)
  - Block C is 5 storeys (renovation block) with extension to western gable with 42 units (38 no. 1-bed, 4 no. 2-bed)
- 382 bicycle parking spaces;
- 55 car parking spaces, which includes provision of 51 residential and 4 non-residential car parking spaces (2 creche and 2 community, arts and cultural car parking spaces);
- Provision of a childcare facility of 294 sq.m. at ground floor of Block A;
- Provision of 1114 sq.m. community, cultural and arts space comprising 516 sq.m. internal space at ground floor of Block B and 598 sq.m. external space, which includes a 468 sq.m. amphitheatre and 130 sq.m. space located externally at Block B;
- Relocation of public open space to a new central area of 3767 sq.m. (in place of Oisin Kelly Park) and 2748 sq.m. of communal open space;
- Two vehicular access/ egress points are proposed from Brandon Terrace/ Basin View Street and from Basin Street Lower/ Ewington Lane;
- Existing bollards and line marking fronting Wee Tots Creche Pre-School and Fountain Youth Project at building 2A Basin Lane along Basin View/ Brandon Terrace to be removed and replaced with paving, extension of kerb and flexible bollards;
- Boundary treatments, landscaping and public realm works, public lighting, site drainage works, new internal road layout, traffic calming raised table and pedestrian crossing points, footpaths, ESB substation and meter rooms, stores, bin and cycle storage, plant rooms; and
- All ancillary site services and development works above and below ground.

Figure 2-3 - Proposed Site Layout

2.4 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 2-4 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"* and *"Z9: Amenity/ Open Space Lands/ Green Network."*

To the west and the south, the land is zoned as *"Z15: Community and Social Infrastructure."* To the north and east there are *"Z1: Sustainable Residential*

Neighbourhoods," "Z4: Key Urban Villages / Urban Villages" and *"Z15: Community and Social Infrastructure." The site is also adjacent to "Z5: City Centre."*

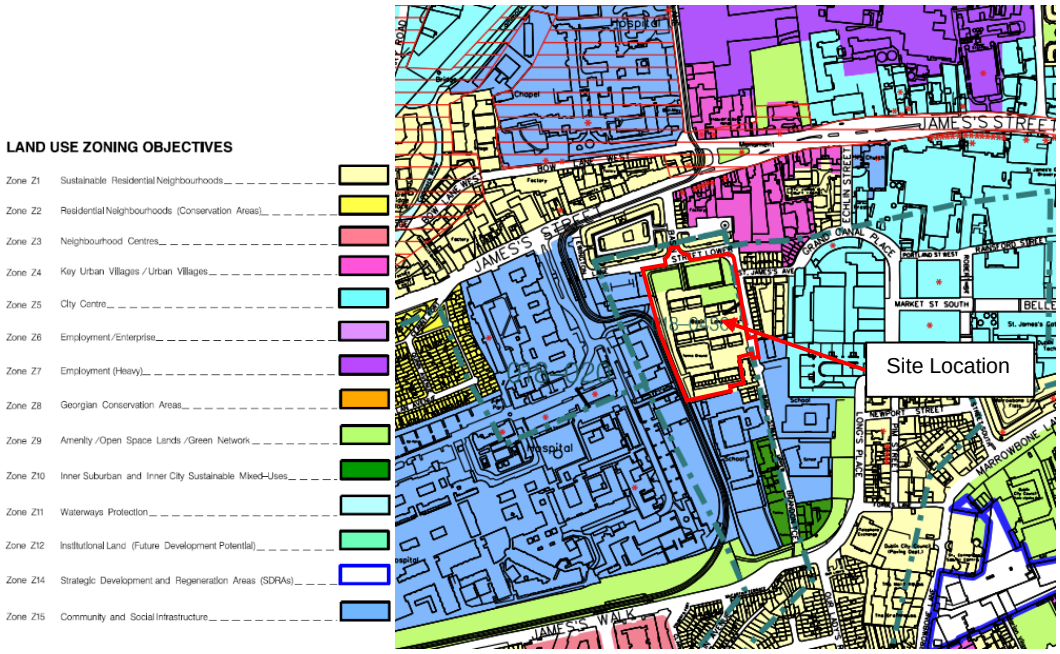


Figure 2-4 - Land Use Zoning Map (Extract from SFRA of the Dublin CDP 2022 – 2028)

2.5 Existing Topography Levels at Site

A topographical survey has been carried out which shows that it is relatively flat across the site at 20.29m towards the northern boundary of the site and a level of 20.15m along the southern boundary.

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.

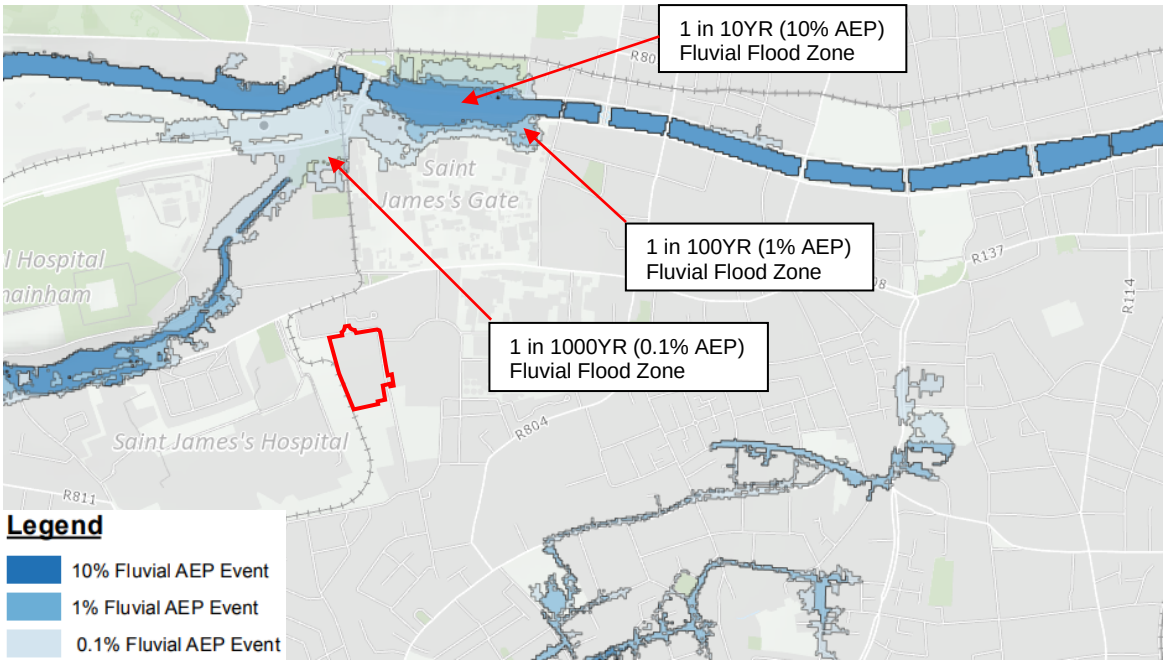


Figure 3-1 - CFRAM Fluvial Flood Extent Map (Extract from OPW)

The PFRA flood mapping indicates that the proposed development site does not fall within any current fluvial flood zones. The site is near a flood zone for the River Camac, however there is a distance of at least 200m between the site and the extent of a 0.1% AEP event.

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 Camac. The node points are listed in Table 3-1The location of the node points is indicated in Figure 6 and on the drawings in Appendix B. Predictive extreme flood levels at the node point closest to the site are applicable to utilise in the assessment of potential fluvial flood risk to the proposed development site.

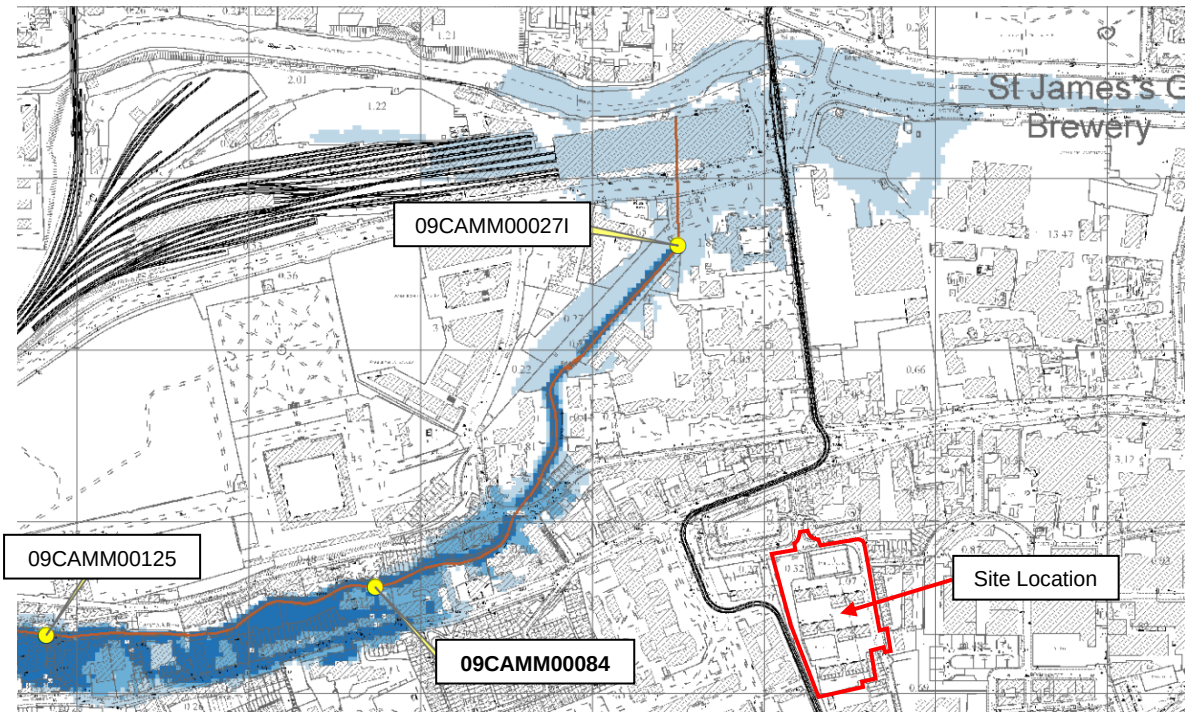


Figure 3-2 – Extract from PFRA Maps (Extract from OPW)

Table 3-1 - CFRAMS Predicted Water Levels

Node Label	Water Level 10% AEP	Water Level 1% AEP	Water Level 0.1% AEP
09CAMM00084	**6.88**	**7.68**	**8.49**
09CAMM00027I	3.29	4.37	6.09
09CAMM00125	9.61	10.18	10.93

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

When reviewing these levels, consideration needs to be given to the potential impact of climate change, resulting in increased quantities of rainfall. The Planning System and Flood Risk Management Guidelines for Planning Authorities DOEHLG 2009 Technical Appendix A, Section 1.6 recommends that, where mathematical models are not available climate change flood extents can be assessed by using the Flood Zone B outline as a surrogate for Flood Zone A with allowance for the possible impacts of climate change.

Therefore, the predicted 0.1% AEP flood level listed above (8.49m) is considered to be representative of the 1% AEP (1 in 100 year) mid-range future climate change scenario.

Using the information obtained from the predicted flood level, in order to permit a sustainable development of this site and to mitigate against potential residual flood risk to the development it is recommended that the finished floor level for all units should be above a minimum level of 8.49m + 500mm freeboard = 8.99m.

Thus, it is proposed that Block A at the northwest of the site will have a finished floor level from 20.50m to 20.65m. Block B at the northeast of the site will have a finished floor level from 19.910 to 20.360m. The existing finished floor level of Block C is 20.370m and the proposed extension to Block C will have a finished floor level of 20.350m. This allows for more than the minimum 500mm freeboard from the River Camac.

3.2 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.

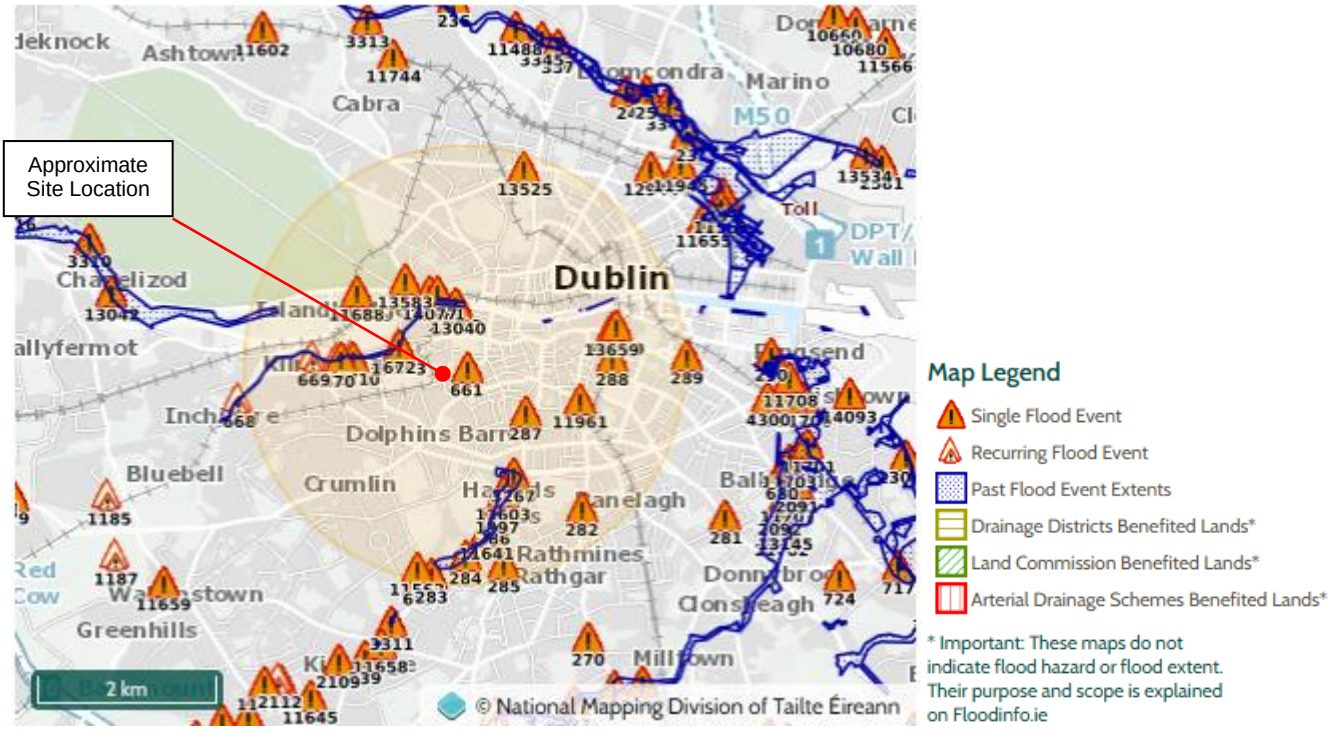


Figure 3-3 - OPW Flood Event Summary

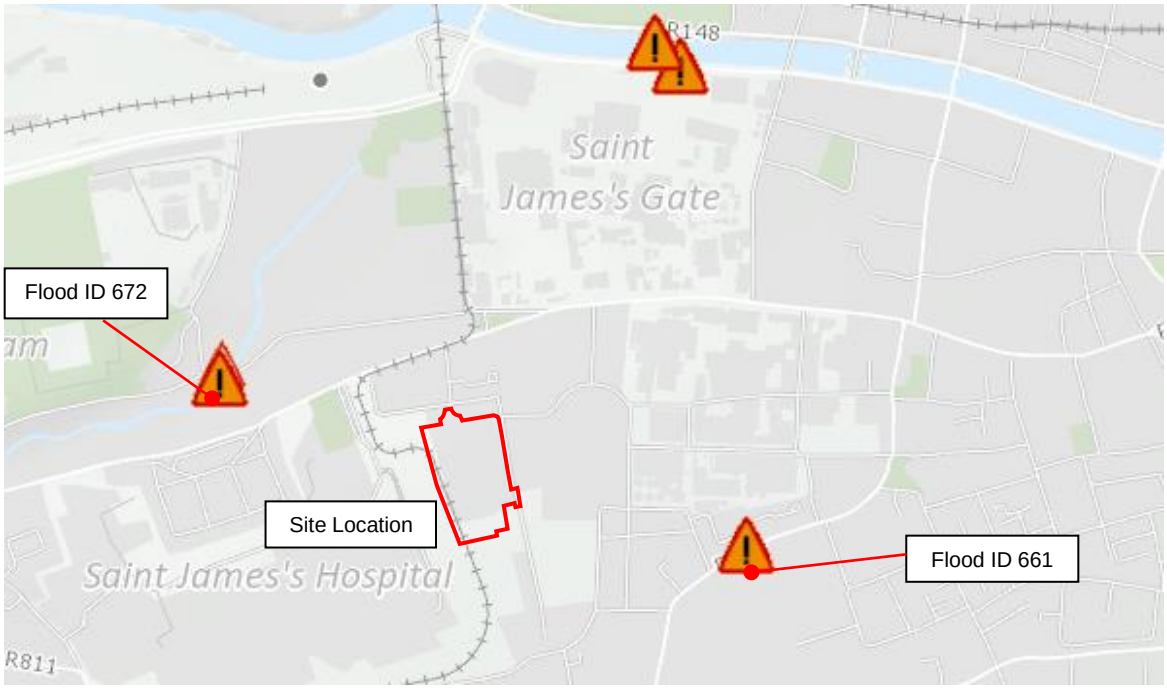


Figure 3-4 - OPW Flood Event Summary (Zoomed In)

Figure 3-3 and Figure 3-4 indicates various historical flooding events within Dublin City Area, however there are no recorded recurring instances of flood events within the immediate vicinity of the site. A past flood event (Flood ID 672) is mapped approximately 400m northwest of the site boundary. OPW report is based on the Camac Surveyors Report and the number of defence assets put in place. A past flood event (Flood ID 661) is mapped approximately 350m to the southeast of the site. OPW report is based on flooding locations in Harolds Cross Area for a number of floods in the 1940s. The report also provides information on the number of flood defence assets put in place. Since then, there has been no further records of flooding in that area.

Based on available and recorded information as outlined above, the development site is considered not to have been subject to flooding in recent history and has numerous defence assets in place in case flooding conditions occur.

3.3 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). Figure 3-5 illustrate the historic mapping for the area of the proposed development site.

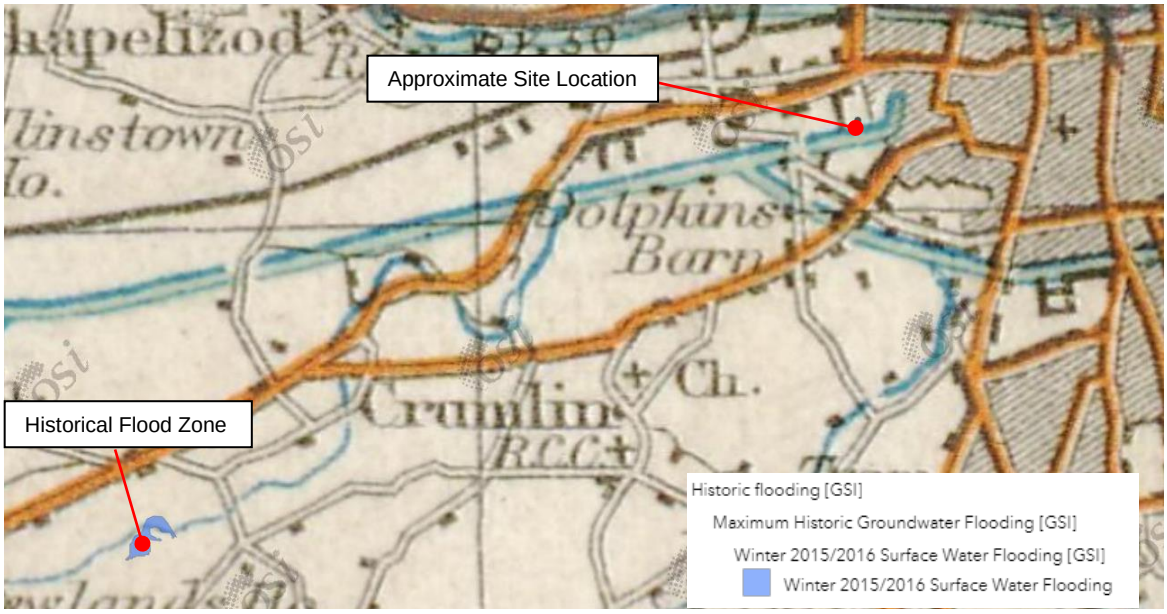


Figure 3-5 - Historic 6 Inch Mapping

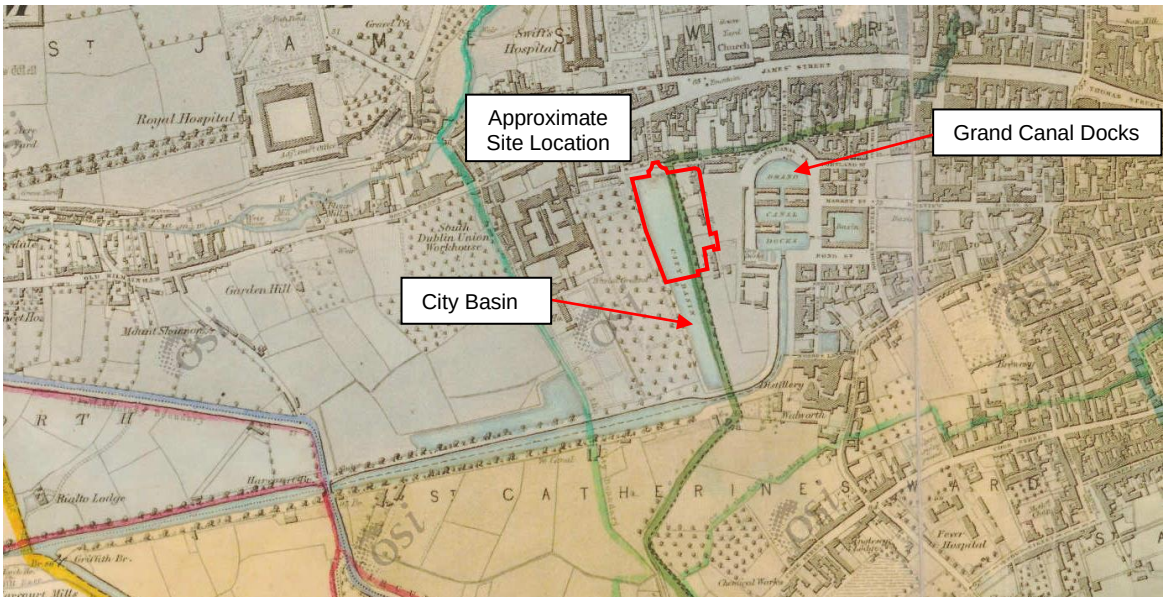


Figure 3-6 - Historic 6 Inch Mapping (Zoomed In)

Figure 3-6 shows the proposed site is located on the Old City Basin, a public reservoir and cistern constructed around 1721 to supply Dublin City with water. It was located just west of the existing Guiness storehouse, between it and St. James Hospital. The City Basin has been filled in and replaced by Basin Street Flats in the 1960s. Figure 3-6 also shows the distinctively shaped hardbour of the Grand Canal to the east of the City Basin. This harbour was the original terminus of the Grand Canal until the main line of the canal was extended further east to the ports and docks. The Grand Canal also fell out of use around 1960 and was filled in sooner after to be finally replaced by apartments in 2023.

Figure 3-5 illustrates that the historic mapping does not indicate any historical flooding within or adjacent the site boundary. The maximum historic groundwater flooding is located approximately 6km away from the site.

3.4 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.

3.4.1 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 3-7.

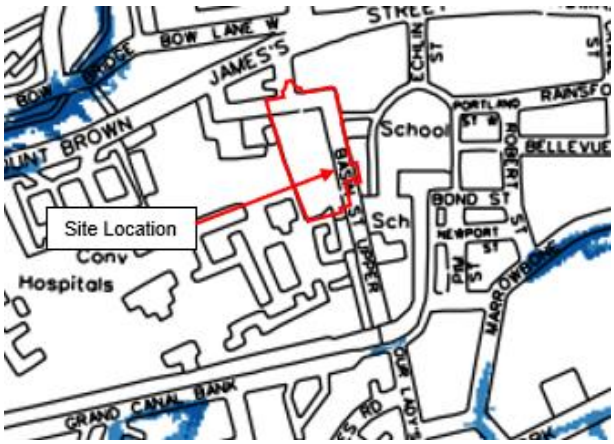


Figure 3-7– Composite Flood Map – Zoomed In

Figure 11 indicates that the proposed development site falls within a predictive Flood Zone C scenario.

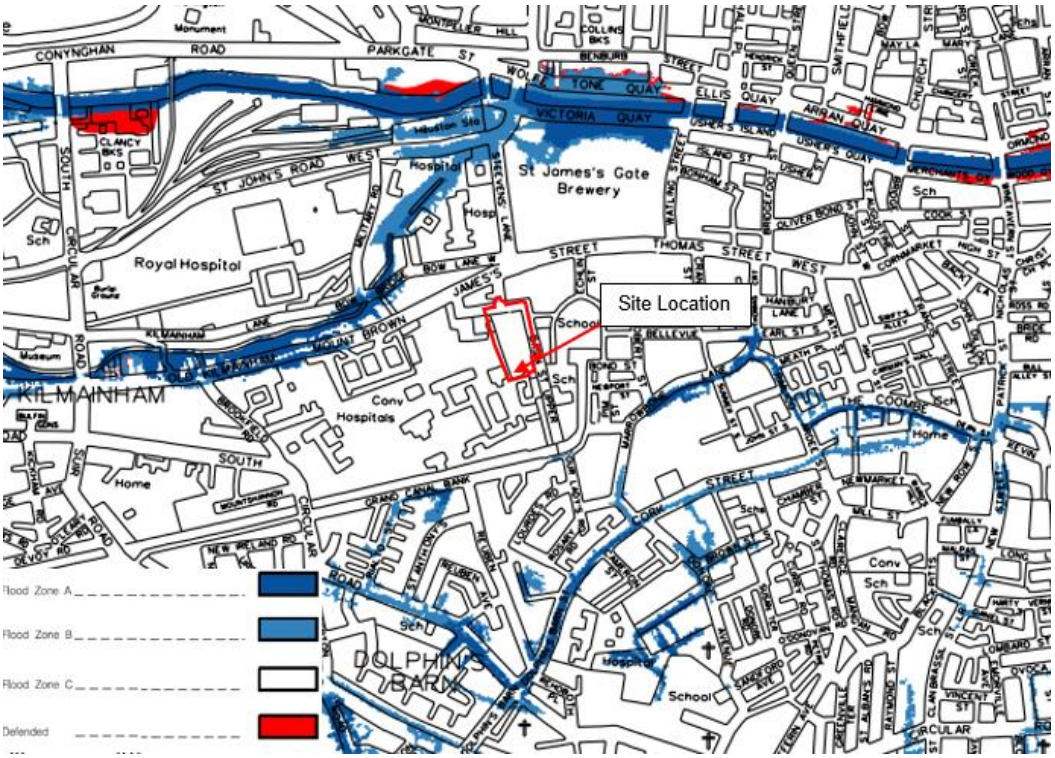


Figure 3-8 - Composite Flood Map (Extract from the SFRA of the Dublin City Development Plan 2022 – 2028)

3.4.2 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 17 Lower Camac: South Circular Road to Liffey Estuary'.

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 – Main Line Rail/ Luas and Bus Connects. Two major regeneration areas have been designated in this area - SDRA 7 Heuston and Environs and SDRA 14 St. James's Healthcare Campus and Environs. The regeneration of lands at Heuston Station and at St. James's Healthcare Campus for mixed use and employment purposes 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. The areas located in Flood Zones A and B are primarily built-up, especially around Kilmainham/ Mount Brown Road/ Bow Lane/ Heuston, where the area comprises established built-up residential areas, industrial / employment lands and commercial properties. Aside from the SDRA lands within this area development could come forward on underutilised infill/brownfield lands or extensions onto existing properties. This area is an established built-up part of the city. ii. **Comprises significant previously developed and/ or under-utilised lands.** iii. Yes: Most of the lands within Flood Zone A and B are already built up or comprise of infill or brownfield sites which could be redeveloped. **iv. Is within or adjoining the core of an established or designated urban settlement.** Yes: The lands form part of an established built-up part of the Inner City close to Strategic Rail Infrastructure. The area around Heuston and St. James's Hospital are identified as Strategic Development and Regeneration Areas (SDRAs) under the Core Strategy, designated parts of the city with substantial development capacity and the

potential to contribute to the delivery of the residential, employment and recreational needs of the city. The Heuston Area has the potential to deliver a significant quantum of mixed-uses. St. James's Healthcare Campus and Environs seeks the development of a leading health and innovation hub.

v. **Will be essential in achieving compact and sustainable urban growth.**
The lands form part of an established built-up part of the city close to Strategic Rail Infrastructure. The intensification and development of lands at Heuston and lands at St. James's Healthcare Campus as well as the intensification of development on infill brownfield lands would represent appropriately high-density use of lands within the city. The lands are served by the Luas Red Line. Multiple bus routes operated by Dublin Bus serve the area. The lands are within walking distance of Heuston Railway Station. High density development on the lands will contribute to sustainable travel patterns. The lands are well Appendix B - 86 Area: 17. Lower Camac: South Circular Road to Liffey Estuary serviced by existing utilities and water services infrastructure, so a minimum of new infrastructure will be required.

vi. **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.**
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. Areas identified as being in Flood Zones A and B are considered essential to achieving a consolidated urban centre and to comply with the NPF, RSES and MASP.

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 Part 1 and 2 of the Justification Test for Development Plans but Part 3 has found that new development should avoid Flood Zone A and only less vulnerable development is appropriate in previously developed parts of Flood Zone B.

4 OTHER FLOOD SOURCES

4.1 Tidal Flooding

The River Liffey Estuary is subject to tidal flooding. However, the flooding zone is located at least 600m away from the site. 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.

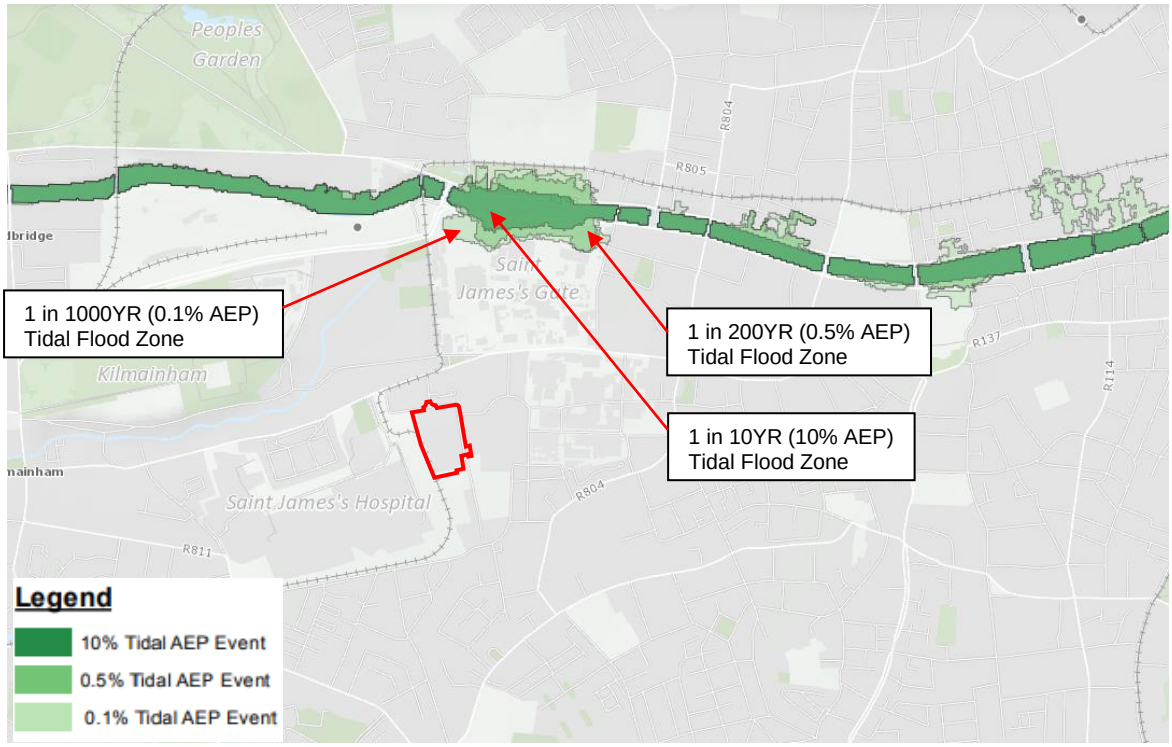


Figure 4-1 - CFRAM Tidal Flood Extent Map (Extract from OPW)

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 Flood Resilient City (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 occupied as flats and car parking; 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.

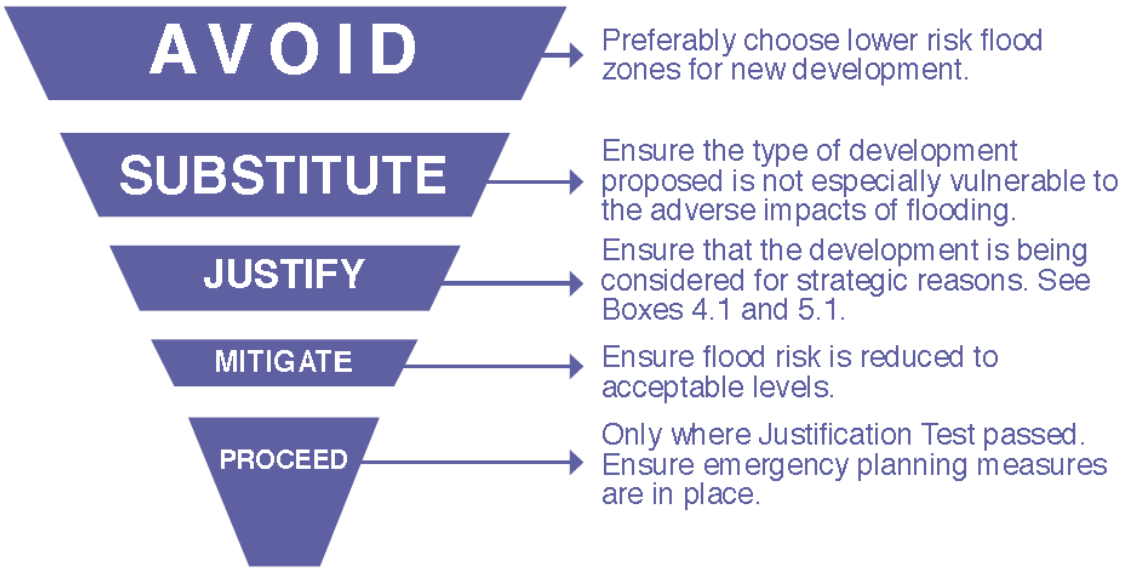


Figure 5-1 - Source: The Planning Systems and Flood Risk Management: Guidelines for Planning Authorities November 2009

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, 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 the River Camac and River Liffey. The site is not in a fluvial or tidal flood zone for either area.

The node point closest to the northern boundary of the site is referenced as node point 09CAMM00084. The 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood levels at this point are predicted as 7.68 and 8.49m respectively. Using the information obtained from the predicted flood level, in order to permit a sustainable development of this site and to mitigate against potential residual flood risk to the development it is recommended that the finished floor level for all units should be above a minimum level of 8.49m + 500mm freeboard = 8.99m.

It is proposed that Block A at the northwest of the site will have a finished floor level from 20.50m to 20.65m. Block B at the northeast of the site will have a finished floor level from 19.910 to 20.360m. The existing finished floor level of Block C is 20.370m and the proposed extension to Block C will have a finished floor level of 20.350m. This allows for more than the minimum 500mm freeboard from the River Camac.

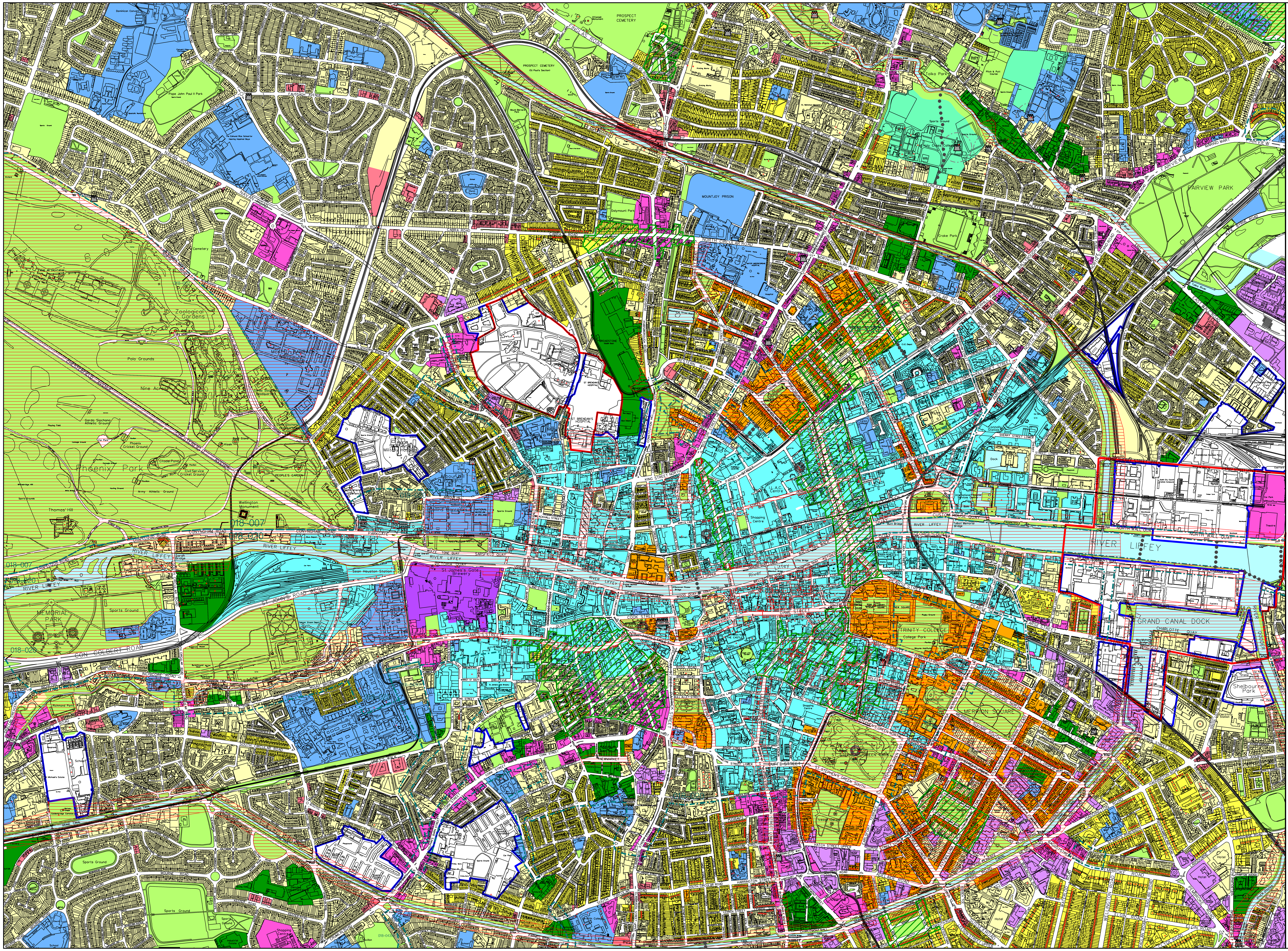
The site passes the Dublin City Justification Test for Development Plans as it is located fully in Flood Zone C.

An analysis of OPW records indicates that the site is not at risk of tidal flooding.

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 occupied as flats and car parking; 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.

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



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Bhaile Átha Cliath
Dublin City Council

Dublin City Development Plan 2022-2028

Map E

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

PRIMARY LAND USE ZONING CATEGORIES[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]
- Record of Monuments and Places (RMP) as Established under Section 12 of the National Monuments (Amendment) Act 1994*
- Record of Monuments and Places (RMP) as Established under Section 12 of the National Monuments (Amendment) Act 1994*
- National Monuments*
- COMAH establishments (SEVESO establishments)
- LAP (Local Area Plan) & SDZ (Special Development Zone)
- Dublin Airport Outer Public Safety Zone
- Dublin Airport Noise Zones

ROADS

Roads, Street and Bridge Schemes

1. Map to be read in conjunction with the written statement
2. Roads objectives are shown diagrammatically
3. *See Record of Monuments and Places (RMP) at https://www.archaeology.ie/publication-forms-lgislation/record-of-monuments-and-places.ie For updated information see the Historic Environment Viewer at https://maps.archaeology.ie/HistoricEnvironment/ The RMP does not include all known archaeological sites and monuments, given that further such sites and monuments are found on an ongoing basis. For that reason, it is very important (in the context of considering proposed development) to take account of all information available on the Historic Environment Viewer (HEV)
4. See written statement (Chapter 14) for full zoning text

City Boundary

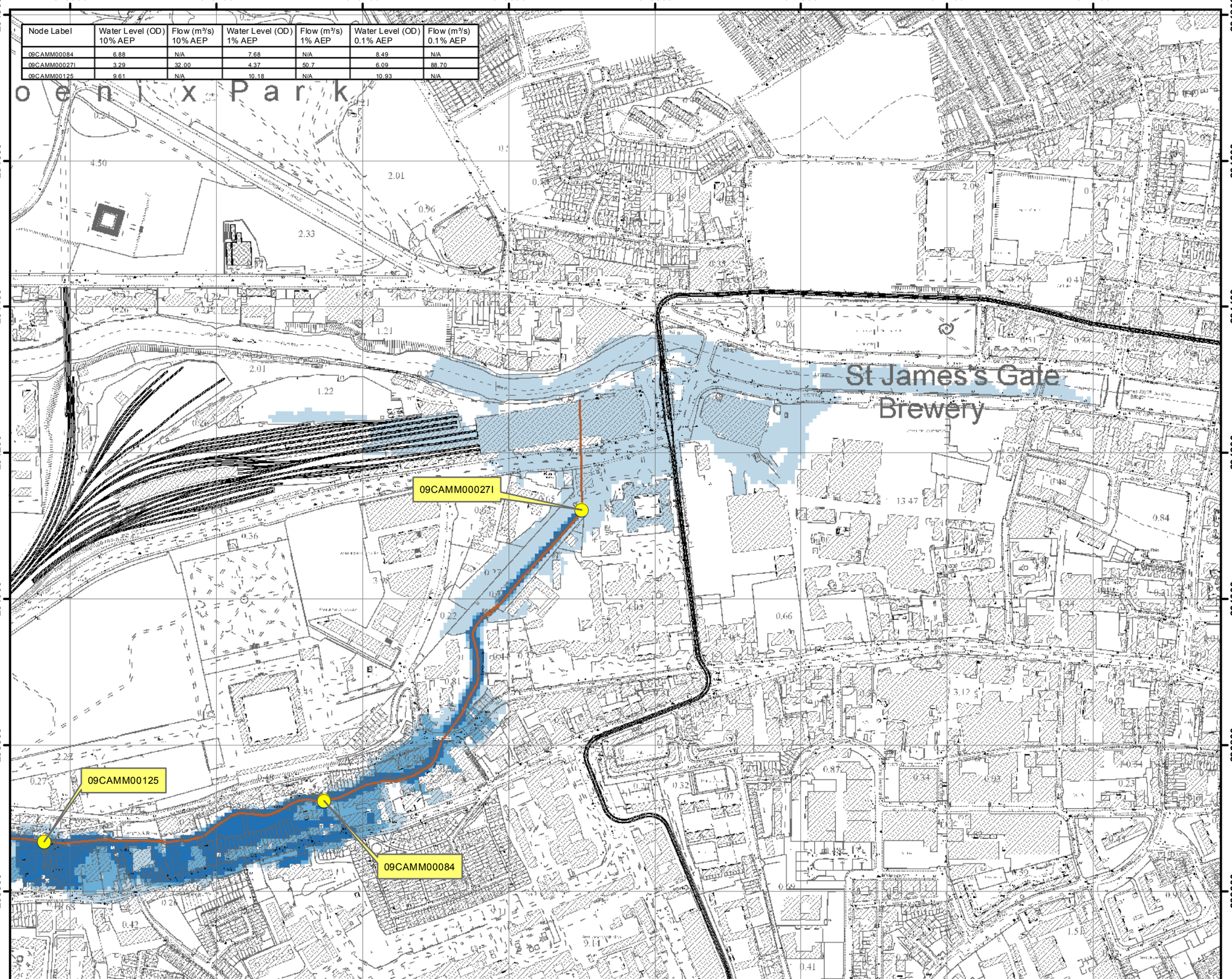
Scale: 0 100 200 300 400 500 metres

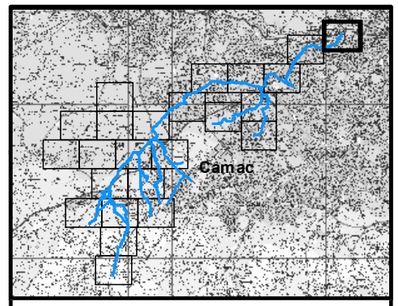
John O'Hara

Dublin City Planner

APPENDIX B – CFRAM FLUVIAL FLOOD EXTENTS MAP

Node Label	Water Level (OD) 10% AEP	Flow (m^3/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m^3/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m^3/s) 0.1% AEP
09CAMM00084	6.88	N/A	7.68	N/A	8.49	N/A
09CAMM00027I	3.29	32.00	4.37	50.7	6.09	88.70
09CAMM00125	9.61	N/A	10.18	N/A	10.93	N/A





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
- 1% AEP Standard of Protection of Flood Defence
- 1% AEP (Walls / Embankments)
- Node Point
- Node ID Node Label

0 50 100 200 300 400 500 Metres

FINAL

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

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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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_24
Map Series :	Page 24 of 24
Drawing Scale :	1:5,000 @A3

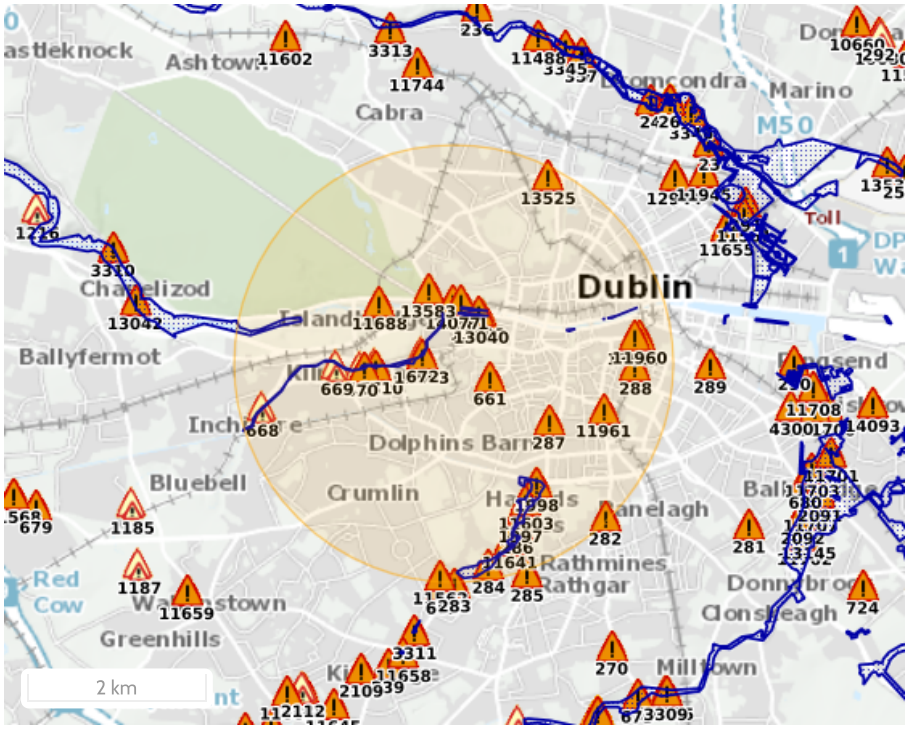
APPENDIX C – PAST FLOOD SUMMARY REPORT

Past Flood Event Local Area Summary Report

Report Produced: **24/5/2023 11:02**

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

34 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 Mount Argus June 1963 (ID-284) Additional Information: Reports (4) Press Archive (2)	10/06/1963	Exact Point
14.	Mount Jerome Harold's Cross June 1963 (ID-286) Additional Information: Reports (4) Press Archive (2)	10/06/1963	Exact Point
15.	Clanbrassil Street June 1963 (ID-287) Additional Information: Reports (4) Press Archive (2)	10/06/1963	Exact Point
16.	Grafton Street June 1963 (ID-288) Additional Information: Reports (4) Press Archive (2)	10/06/1963	Exact Point
17.	Poddle Tributary Marrowbone Lane Jan 1941 (ID-661) Additional Information: Reports (1) Press Archive (0)	20/01/1941	Approximate Point
18.	Camac Turvey Ave Recurring (ID-669) Additional Information: Reports (1) Press Archive (0)	n/a	Exact Point
19.	Camac Goldenbridge Recurring (ID-668) Additional Information: Reports (1) Press Archive (0)	n/a	Approximate Point
20.	Camac Carrickfoyle Terrace Recurring (ID-670) Additional Information: Reports (1) Press Archive (0)	n/a	Exact Point
21.	Camac Kearns Place Recurring (ID-671) Additional Information: Reports (1) Press Archive (0)	n/a	Exact Point
22.	Camac Bow Bridge Recurring (ID-672) Additional Information: Reports (1) Press Archive (0)	n/a	Approximate Point
23.	Flooding at Dublin City on 14/06/2016 (ID-14077) Additional Information: Reports (0) Press Archive (0)	14/06/2016	Approximate Point
24.	Flooding at Dublin City on 15/06/2016 (ID-13525) Additional Information: Reports (0) Press Archive (0)	15/06/2016	Approximate Point
25.	Dublin City Tidal Feb 2002 (ID-456)	01/02/2002	Area

	Name (Flood_ID)	Start Date	Event Location
	Additional Information: Reports (45) Press Archive (27)		
26.	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)		
27.	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)		
28.	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)		
29.	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)		
30.	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)		
31.	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)		
32.	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)		
33.	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)		
34.	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

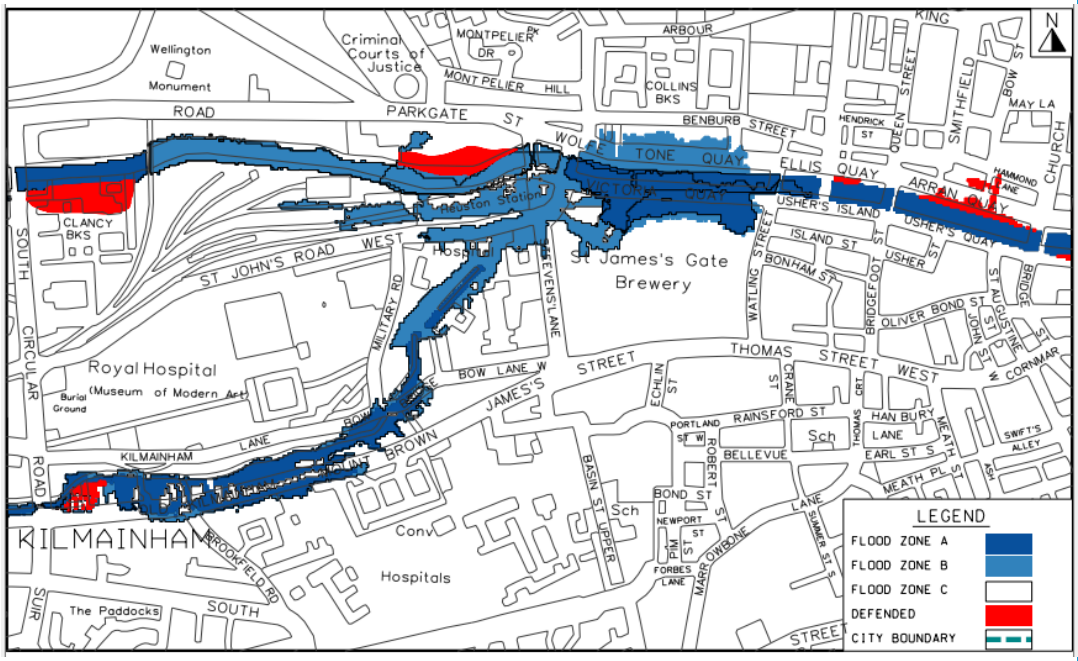
Defended

City Boundary

Refer To OPW Website – Floodinfo.ie

John O'Hara
Dublin City Planner

APPENDIX E – DCC JUSTIFCATION TEST

Area: 17. Lower Camac: South Circular Road to Liffey Estuary	
	
For Land Use Zoning Maps Overlaid with Flood Zones see Dublin City Council Development Plan 2022 - 2028, Flood Map E.	
Area Description	In this section the River Camac flows through residential areas and industrially zoned lands in Kilmainham where it then runs behind the St. Patricks Hospital before entering the Liffey alongside Heuston Station. The area is characterised by residential development, emerging urban quarters such as the Heuston Quarter, the St. James/ St. Patrick's Hospitals and the National Children's Hospital. The areas primarily located in Flood Zone A lie between Kilmainham Lane and Old Kilmainham Road/ Mount Brown Road (north of National Children's Hospital) and Bow Lane which are currently zoned/developed for residential and employment purposes. Some lands owned by the OPW north of the river is one of the few exceptions where Zone B encroaches on part of the site and climate change may affect more of it in the future. Most developments are likely to be infill/ brownfield.
SDRAs within this Area	SDRA 7 Heuston and Environs. SDRA 14 St. James's Medical Campus and Environs.
Benefitting from	Apart from the most westerly section at Lady's

Area: 17. Lower Camac: South Circular Road to Liffey Estuary	
Defences (flood relief scheme works) and residual risk	Lane and Castleforbes Terrace, shown red, the area does not benefit from defences. The protected areas at Lady's Lane and Castleforbes Terrace have residual risk for the 100-year fluvial event, and will flood through overtopping during any event greater than the 1 in 100-year flood. The CFRAM Study for the River Camac did not reveal any overall flood alleviation scheme for the catchment, except for flood awareness and flood warning systems. A new flood study is underway since 2019.
Sensitivity to Climate Change	Slight to moderate - there is little difference between the extents of Flood Zone A and B in most locations. Sea level rise is likely to have more of an impact on water levels at the downstream end. For large scale development within areas shown to be vulnerable to climate change a more detailed hydraulic study may be required to fully understand the risks. The standard of protection given by existing defences will also be reduced as climate change impacts are felt. Climate change flood extents can be seen on www.floodinfo.ie
Residual Risk	The protected areas at Lady's Lane and Castleforbes Terrace have residual risk for the 100-year fluvial event, and will flood through overtopping during any event greater than the 1 in 100-year flood.
Historical Flooding	The flood maps attached are consistent with previous flooding of this section of the River Camac.
Surface Water	This portion of the River Camac catchment is susceptible to pluvial flooding from intense rainfall events, particularly the section along Old Kilmainham Road and Mount Brown from the South Circular road to Cromwell's Quarters. Should development be permitted, best practice with regards to surface water management should be implemented across the development area, to limit surface water run-off to current values. 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

Area: 17. Lower Camac: South Circular Road to Liffey Estuary	
	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 channel. Pluvial flooding may increase flooding risk if it occurs during high river flows.

The flood maps were produced based on the OPW CFRAM Plan and checked against historic flooding in the area.

Development Options:

The main flood cells in this area are located in residential and small 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 two designated Strategic Development and Regeneration Areas within this Area - SDRA 7 Heuston and Environs and SDRA 14 St. James's Healthcare Campus and Environs. SDRA 7 Heuston and Environs seeks the creation of a mixed use quarter centred on a multi-modal public transport hub and SDRA 14 St. James's Healthcare Campus and Environs seeks the development of a leading health and innovation hub.

Residential and employment development (infill) and as per that detailed for the SDRA's as set out in Chapter 13 of the Written Statement of the Development Plan would be a natural extension of existing development in this area. However, any significant 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 require to await future flood defence works on the River Camac.

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 – Main Line Rail/ Luas and Bus Connects. Two major regeneration areas have been designated in this area - SDRA 7

Area: 17. Lower Camac: South Circular Road to Liffey Estuary

Heuston and Environs and SDRA 14 St. James's Healthcare Campus and Environs.

The regeneration of lands at Heuston Station and at St. James's Healthcare Campus for mixed use and employment purposes 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.

The areas located in Flood Zones A and B are primarily built-up, especially around Kilmainham/ Mount Brown Road/ Bow Lane/ Heuston, where the area comprises established built-up residential areas, industrial / employment lands and commercial properties. Aside from the SDRA lands within this area development could come forward on underutilised infill/brownfield lands or extensions onto existing properties. This area is an established built-up part of the city.

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

Answer: Yes. Most of the lands within Flood Zone A and B are already built up or comprise of infill or brownfield sites which could be redeveloped.

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

Answer: Yes: The lands form part of an established built-up part of the Inner City close to Strategic Rail Infrastructure. The area around Heuston and St. James's Hospital are identified as Strategic Development and Regeneration Areas (SDRAs) under the Core Strategy, designated parts of the city with substantial development capacity and the potential to contribute to the delivery of the residential, employment and recreational needs of the city. The Heuston Area has the potential to deliver a significant quantum of mixed-uses. St. James's Healthcare Campus and Environs seeks the development of a leading health and innovation hub.

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

Answer: Yes: The lands form part of an established built-up part of the city close to Strategic Rail Infrastructure. The intensification and development of lands at Heuston and lands at St. James's Healthcare Campus as well as the intensification of development on infill brownfield lands would represent appropriately high-density use of lands within the city. The lands are served by the Luas Red Line. Multiple bus routes operated by Dublin Bus serve the area. The lands are within walking distance of Heuston Railway Station. High density development on the lands will contribute to sustainable travel patterns. The lands are well

serviced by existing utilities and water services infrastructure, so a minimum of new infrastructure will be required.

(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. Areas idenitifed as being in Flood Zones A and B are considered essential to achieving a consolidated urban centre and to comply with the NPF, RSES and MASP.

3. Specific Flood Risk Assessment

- This section should be read in conjunction with the comments on the relevant reaches of the Liffey (see Area Assessment 5 Liffey: Sean Heuston Bridge – Sarah Bridge, South Circular Road).
- See Justification Test for Strategic Development and Regeneration Area No. 7 (Heuston and Environs) in Appendix C2 for specific recommendations in relation to that area.
- Developments within Flood Zone A should be limited to extensions onto existing buildings, or some changes of use. For extensions onto existing residential properties in Flood Zone A or B, it should be noted that bedroom accommodation shall not be permitted at basement or ground floor. There should be no increase in flood risk (through increased numbers of occupiers or increased vulnerability) where changes of use are proposed.
- Commercial development within previously developed parts of Flood Zone B may be justified, provided property resilient construction is carried out, and no increase in flood risk elsewhere can be developed. Evacuation procedures will be required.
- In the absence of a preferred flood management scheme arising from the Eastern CFRAM Study, any larger scale development within Flood Zone A, or highly vulnerable in Flood Zone B, will not be justified.

Conclusion: The subject area passes Part 1 and 2 of the Justification Test for Development Plans but Part 3 has found that new development should avoid Flood Zone A and only less vulnerable development is appropriate in previously developed parts of Flood Zone B.