

CONSTITUTION HILL

PART 8 PLANNING REPORT

11 NOVEMBER 2022

FLOOD RISK ASSESSMENT
ARUP

CONHIL-ARUP-ZZ-XX-RP-C-0020



Dublin City Council
Comhairle Cathrach Bhaile Átha Cliath

Dublin City Council

Constitution Hill Renewal

Part 8 Flood Risk Assessment

Reference: CONHIL-ARUP-ZZ-XX-RP-C-0020

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Executive Summary

Arup has been commissioned by Dublin City Council to undertake a Flood Risk Assessment (FRA) as part of the Planning Application for a residential development at Constitution Hill in Dublin 7. The Flood Risk Assessment is being carried out as part of the planning application for the development. It has been undertaken in accordance with ‘The Planning System and Flood Risk Management’ guidelines for planning authorities published in November 2009, jointly by the Office of Public Works (OPW) and the then Department of Environment, Heritage and Local Government (DEHLG).

Flood risk to the site of the proposed development is very low and there is no historic record of flooding at the site. The risk of flooding in a climate change scenario will also remain low.

Surface water discharges from the proposed development will be restricted in line with Dublin County Council (DCC) Water Services requirements and various SuDS features will be incorporated as part of the development. The risk of surface water ingress in a design rainfall exceedance event will be managed through the provision ground regrading external to the buildings which will ensure that any excess surface water falls away from the buildings.

Given the absence of significant flood risk at the site and a sufficient elevation above ground level, access and egress routes are unlikely to be compromised during flood events. The proposed development will not have any impact on floodplain storage or conveyance and will therefore not have any impact off site.

The proposed development is classified as a “Highly Vulnerable Development” as per OPW’s vulnerability classification. As the site is not within the 1000 year fluvial or tidal floodplain, it is within Flood Zone C. Therefore, a justification test for the development is not required and it is necessary only to identify mitigation measures for any residual risk.

1. Introduction and Background

1.1 Project Background

Arup has been commissioned by Dublin City Council to undertake a Flood Risk Assessment as part of the Part 8 planning application for the redevelopment at Constitution Hill in Dublin 7. During the Pre-Part 8 circulation period, the Design Team received detailed comments from the Environment and Transportation Department and the Drainage Planning and Development Control Department. The team responded to each comment by means of a tracker and issued supplementary sketches where necessary. These comments and any updates relating to them have now been incorporated into our final Part 8 design proposal.

The Flood Risk Assessment (FRA) is being carried out as part of the planning application for the redevelopment. It has been undertaken in accordance with ‘The Planning System and Flood Risk Management’ guidelines for planning authorities published in November 2009, jointly by the Office of Public Works (OPW) and the then Department of Environment, Heritage and Local Government (DEHLG).

The purpose of the FRA is to identify and quantify the risk of flooding of the proposed redevelopment and, if necessary, identify a series of measures to mitigate the risk.

1.2 Scope of Study

The scope of study includes the following:

- Review of all relevant information data from:
 - Any historic flooding information for the area and/ or any relevant studies;
 - The CFRAM study;
 - The Office of Public Works (OPW) ‘FloodResilienCity’ (FRC) project; and
 - The available topographical information for the site.
- Review of the risk of fluvial, coastal, pluvial and groundwater flood risk;
- Review of any available site investigation data;
- Review of the proposed building layout and finished floor level; and
- Preparation of a flood risk assessment report.

1.3 Summary of Data used

In preparing this report, the following data was collated and reviewed:

- Topographical data from the site;
- Pre-Part 8 planning circulation drawings of the proposed development;
- Guidelines for Planning Authorities on ‘The Planning System and Flood Risk Management’ published in November 2009, jointly by the Office of Public Works (OPW) and the then Department of Environment, Heritage and Local Government (DEHLG);
- The Dublin City Development Plan 2016 – 2022 and the Draft Dublin City Development Plan 2022 – 2028;
- Flood history of the site from the OPW National Flood Hazard Mapping website (www.floodinfo.ie);
- Flood maps from the CFRAM Study (www.floodinfo.ie);
- Output from the EU Interreg IVB FloodResilienCity (FRC) Project (www.floodinfo.ie);
- Aerial photography and mapping from Bing Maps and Google Maps.

1.4 Site Description

The site for the proposed development is located off Constitution Hill Road, opposite the King's Inn Park in Dublin 7 as indicated in Figure 1. An aerial view of the site and its boundary is shown in Figure 1.

The site is approximately 7,560 m² in size. Existing buildings on the site include three social housing blocks with 89 apartment units in total. It is bordered in all four directions by access roads, with the major access route, Constitution Hill Road situated to the East of the site. The Dublin Bus Garage located is directly to the West of the subject site.

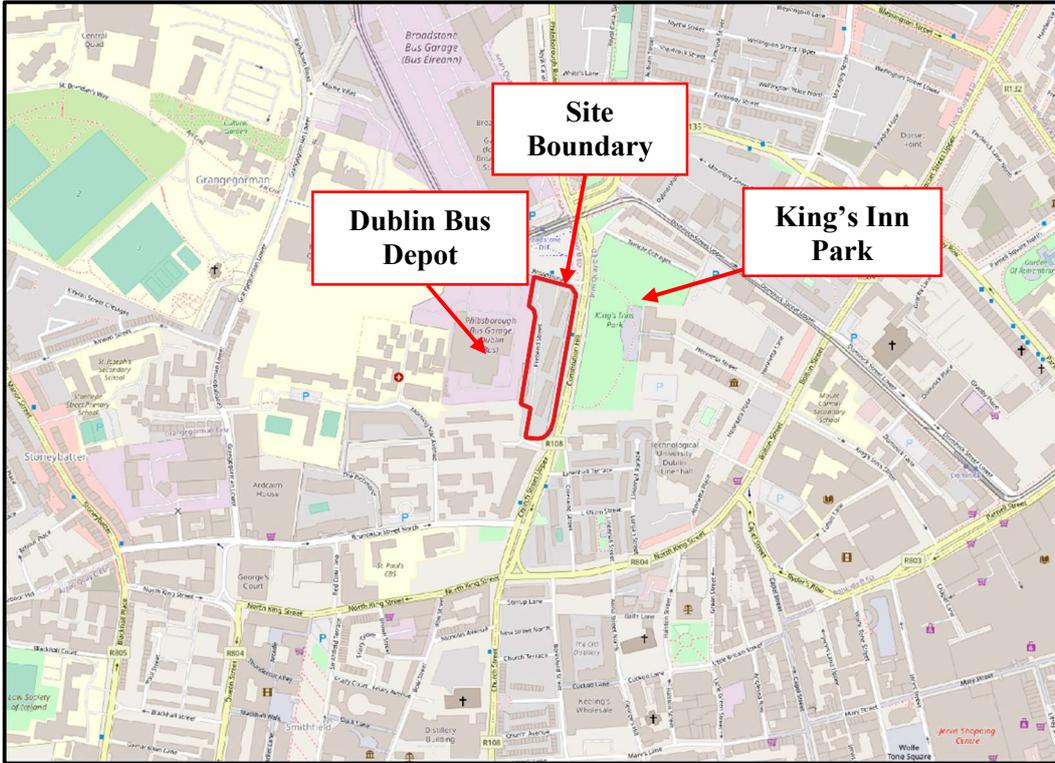


Figure 1 Site location (© Open Street Map and contributors)

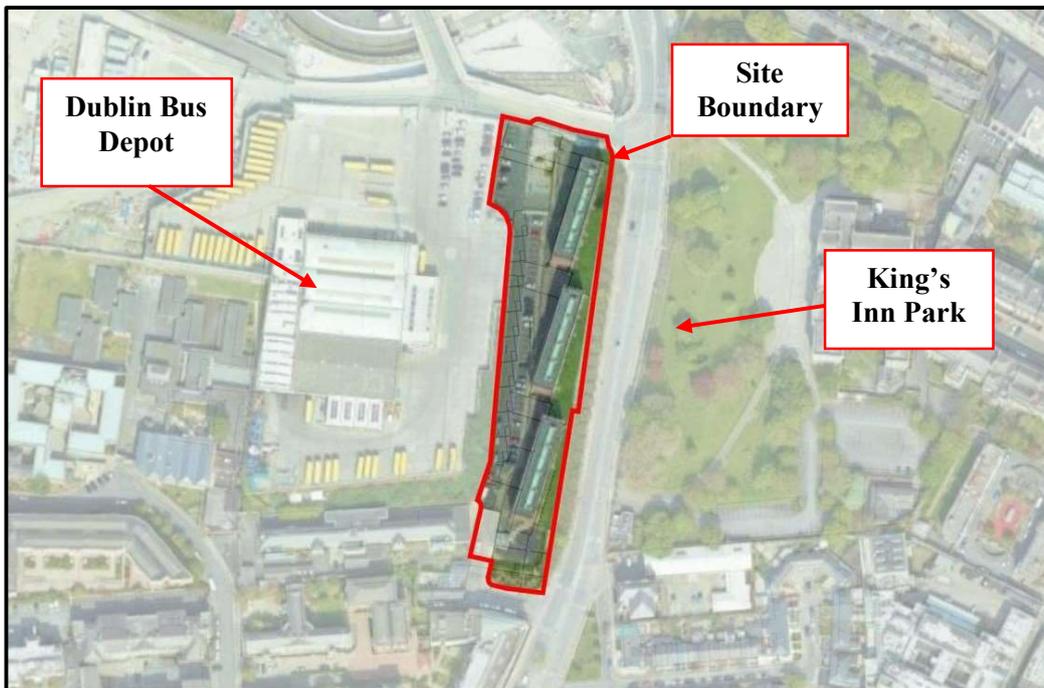


Figure 2 Aerial view of the site (© Google Earth Pro and contributors)

1.5 Proposed Development

The regeneration and redevelopment is proposed for the existing Constitution Hill Estate bounded by Constitution Hill, Broadstone, Catherine's Lane North and Dublin Bus Phibsborough Depot, in Dublin 7. The existing 0.76 hectare site currently comprises of 3 no. five-storey housing blocks providing 89 homes and a crèche which form the Constitution Hill Flats social housing scheme. The proposed redevelopment, which will be managed by Dublin City Council, comprises of:

- Provision of 124 homes (42 no. 1 bed apartments, 54 no. 2 bed apartments, 18 no. 3 bed apartments, 10 no. 2 bed duplex mews dwellings)
- Building heights ranging from 2-7 storeys
- Communal & public open space 0.28ha / 37% of site area
- Deep retrofit and extension to 3 no. existing five-storey existing housing blocks to include an additional floor and side bay with modifications to all elevations
- Construction of a new seven-storey apartment block to the north of the site
- Construction of a new seven-storey apartment block to the south of the site
- Construction of ten no. two-storey duplex dwellings to the west of the site
- The provision of a multi-use childcare facility
- Construction of new ESB substation
- Reconfiguration of pedestrian access to the site with new entrance path to the east of the site including a new stepped access to the footpath on Constitution Hill
- Level access to be provided across the site with secure lines to entrances and communal open space
- Revision to the existing entrance on Broadstone to include a gated pedestrian and vehicular entry
- Revision to the existing entrance on Catherine's Lane to include gated pedestrian and vehicular entry
- Revision to boundary treatments to Constitution Hill, Broadstone and Catherine's Lane North
- Associated car and cycle parking provision
- Demolition of the existing substation and pump house on site
- Provision of public and private open spaces; ancillary structures and associated site infrastructure works / supporting infrastructure, landscaping, public lighting, revision to access roads, pavements, boundary treatments and all other necessary enabling works, roads and services.

Figure 3 shows the proposed site layout.

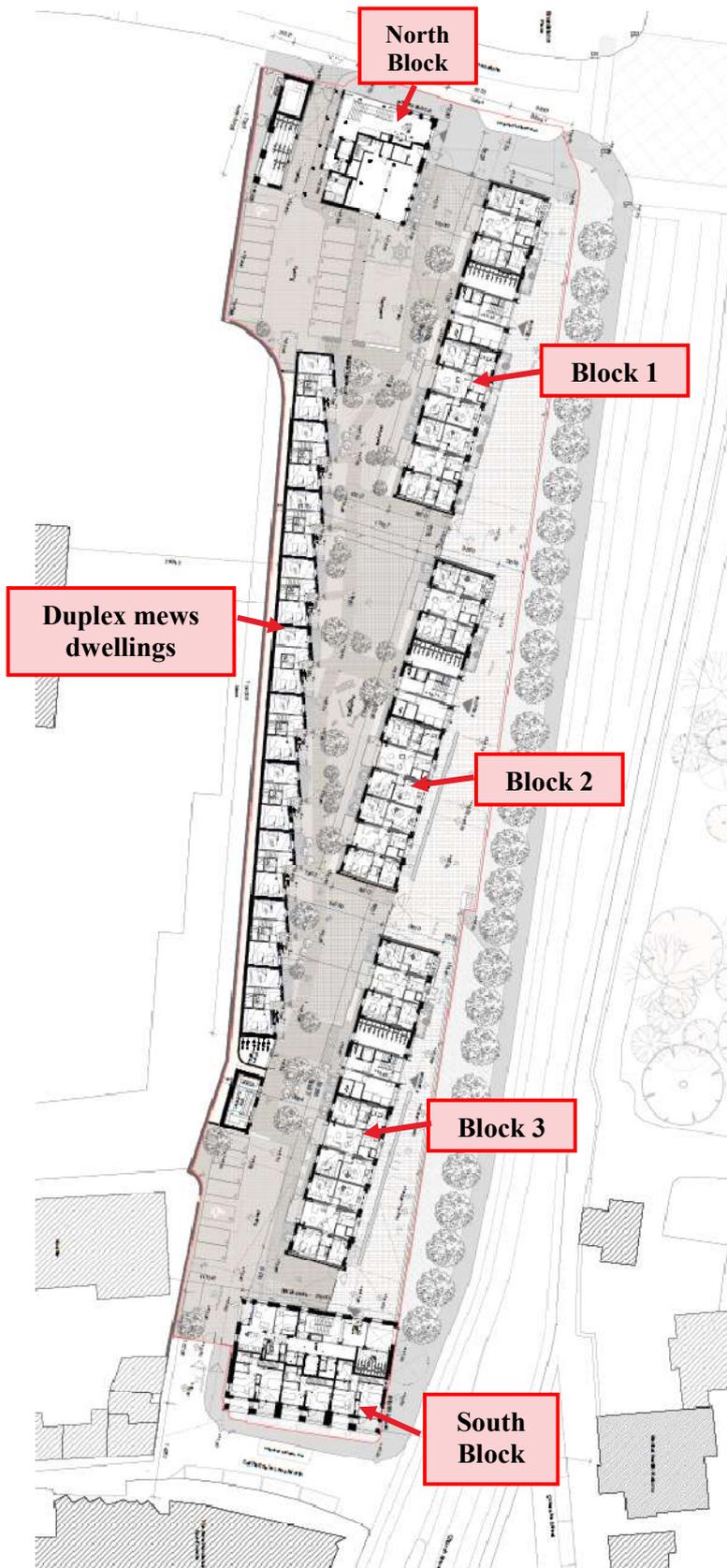


Figure 3 A drawing showing the proposed site layout for the development

The development will provide high quality living accommodation transforming the conditions of the existing occupiers and potential new residents with more enjoyable space. It enhances the existing urban environment with green areas, more planting, attractive areas for recreation and social inclusion. The two new residential

blocks on the south and north and the row of mews dwellings will provide additional residential and common spaces to occupants further meeting high residential demands and enhancing functionality of the development.

1.6 Existing Ground levels

A topographical survey of the existing ground levels across the site was carried out by TST Engineering Ltd and is presented in Figure 4. It can be seen from Figure 4 that the levels vary across the site. Along the northern boundary levels vary from circa 19mOD to circa 16.96mOD while along the Southern boundary levels vary from circa 12.0mOD to 10.2mOD.

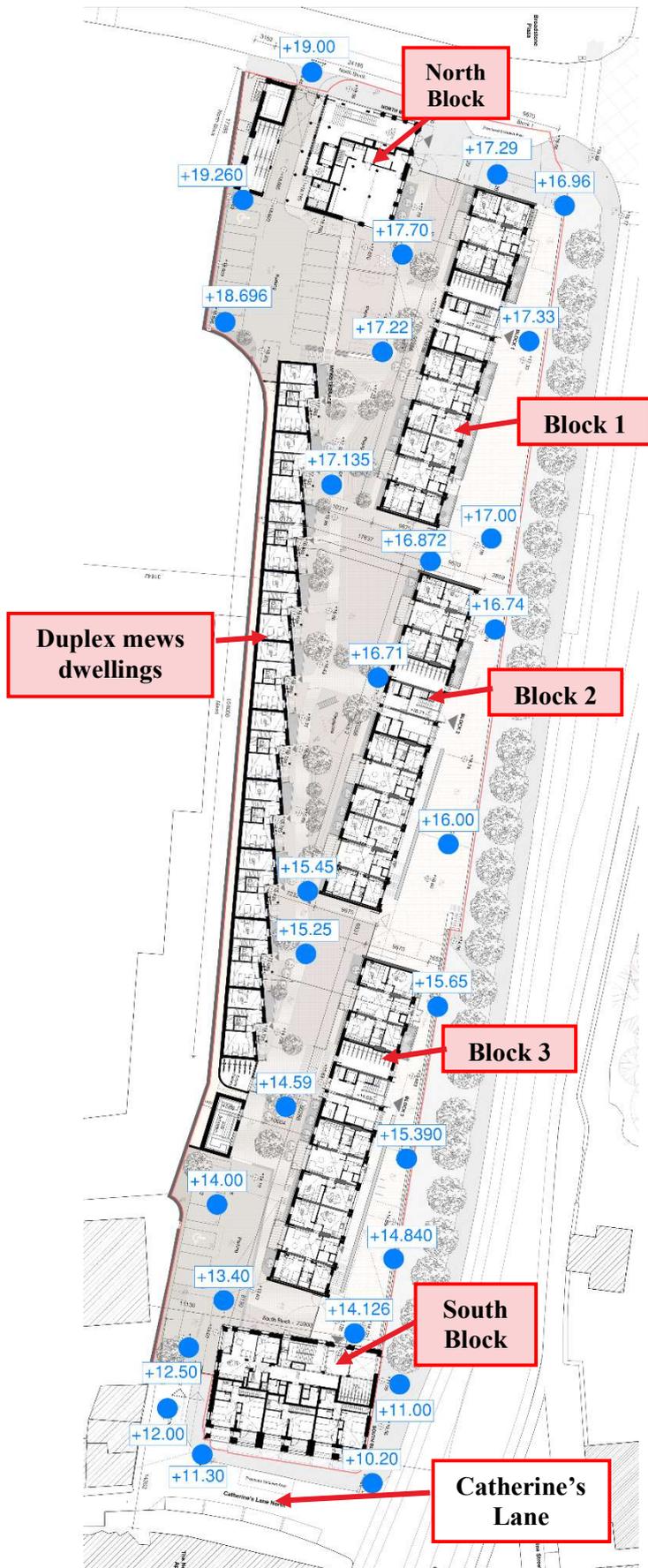


Figure 4 A drawing showing the existing elevation on site and proposed layout

2. Planning Context

The following planning policy documents are relevant to the flood risk assessment of the proposed development;

- The Planning System and Flood Risk Management Guidelines for Planning Authorities.
- Dublin City Development Plan 2016 – 2022 and the Draft Dublin City Development Plan 2022 – 2028

2.1 The Planning System and Flood Risk Management Guidelines

2.1.1 Introduction

In November 2009, the Department of Environment, Heritage and Local Government and the Office of Public works jointly published a Guidance Document for Planning Authorities entitled “the Planning System and Flood Risk Management”.

The Guidelines are issued under Section 28 of the Planning and Development Act 2000 and Planning Authorities and An Bord Pleanála are therefore required to implement these Guidelines in carrying out their functions under the Planning Acts.

The aim of the guidelines is to ensure that flood risk is neither created nor increased by inappropriate development.

The Guidelines require the Planning system to avoid development in areas at risk of flooding unless the development can be justified on wider sustainability grounds and the risk can be reduced or managed to an acceptable level.

The guidelines require the adoption of a Sequential Approach (to Flood Risk Management) of Avoidance, Reduction, Justification and Mitigation and they require the incorporation of Flood Risk Assessment into the process of making decisions on Planning Applications and Planning Appeals.

Fundamental to the guidelines is the introduction of flood risk zoning and the classifications of different types of development having regard to their vulnerability.

The management of flood risk is now a key element of any development proposal in an area of potential flood risk and should therefore be addressed as early as possible in the site master planning stage.

2.1.2 Definition of Flood Zones

Flood Zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types of flood zones defined in the Guidelines as shown in Table 1:

Table 1 Definition of flood zones

Zone	Description
Flood Zone A	Probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding).
Flood Zone B	Probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 year and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and
Flood Zone C	Probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

2.1.3 Definition of Vulnerability Classes

Table 2 summarises the Vulnerability Classes defined in the Guidelines and provides a sample of the most common type of development applicable to each.

Table 2 Definition of vulnerability classes

Type of Vulnerability	Definition
Highly Vulnerable Development	Includes Garda, ambulance and fire stations, Healthcares, schools, residential dwellings, residential institutions, essential infrastructure, such as primary transport and utilities distribution and SEVESO and IPPC sites, etc.
Less Vulnerable Development	Includes retail, leisure, warehousing, commercial, industrial and non-residential institutions, etc.
Water Compatible Development	Includes Flood Control Infrastructure, docks, marinas, wharves, navigation facilities, water based recreation facilities, amenity open spaces and outdoor sport and recreation facilities

2.1.4 Types of Vulnerability Classes Appropriate to Each Zone

Table 3 illustrates the different types of Vulnerability Class appropriate to each Zone and indicates where a Justification Test will be required.

Table 3 Vulnerability class and zones

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable	Justification Test	Justification Test	Appropriate
Less Vulnerable	Justification Test	Appropriate	Appropriate
Water Compatible	Appropriate	Appropriate	Appropriate

2.2 Dublin City Development Plan (2016 - 2022)

2.2.1 Introduction

The Dublin City Development Plan 2016 – 2022 contains the policies and objectives to guide development and land use in Dublin City. The plan has effect from 23 September 2016 and is to be used for the determination of all planning applications from this date. The plan puts forward a vision of the future growth of the County over a six-year period and beyond.

The updated Dublin City Development Plan 2022 – 2028 is currently being finalised and will take effect from October 2022. Both the existing development plan and the draft plan are considered as part of this FRA.

2.2.2 Strategic Flood Risk Assessment for DCC Development Plan

To inform land-use zoning for the Dublin City Development Plan 2016-2022, a Strategic Flood Risk Assessment (SFRA) report has been developed. It aims to support the adoption of policies in relation to the zoning of lands in flood prone areas. The report was prepared in accordance with the requirements of The Planning System and Flood Risk Assessment Guidelines for Planning Authorities (2009) and Circular PL02/2014 (August 2014).

The SFRA provides an assessment of all types of flood risk within the County and assisted DCC to make informed strategic land-use planning decisions and formulate flood risk policies. A Stage 1 Flood Risk Identification was undertaken to identify any flooding or surface water management issues related to the County that may warrant further investigation. The report outlines the primary watercourses in the county and identifies the flood risk zones as per the OPW’s Planning Guidelines.

The report outlines a broad overview of the requirements for a Flood Risk Assessment which should accompany planning applications including:

- All developments, including in Flood Zone C, must consider the impacts of surface water flood risks on drainage design and demonstrate compliance with minimum required finished floor levels in line with the Greater Dublin Strategic Drainage Study, Dublin City Council’s Surface Water Management Guidance and the Council’s forthcoming Sustainable Drainage design and evaluation Guide and Green and Blue Roof Guide – Technical Summaries
- Flood risk from sources other than fluvial and Tidal should be reviewed, as should the impacts of climate change
- Groundwater flood risk reported in a surface water assessment and management report
- Use of the sequential approach and a justification test if necessary, as per The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009)
- As well as assessing the surface water management risk for a site, all development including that in Flood Zone C, should consider residual risk factors which could influence the potential mitigation measures for a site.

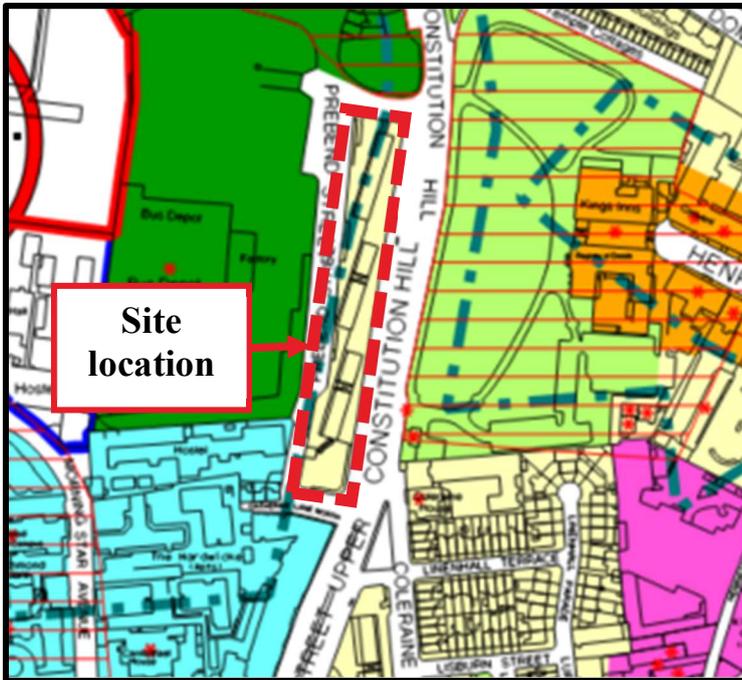
It is recommended that any planning applications in flood risk areas are accompanied by a supporting appropriately detailed flood risk assessment. This is to ensure a conservative approach and that consideration is given to new development within Flood Zones where mitigation measures may still be required to ensure an appropriate level of flood protection and/or resilience. The detailed assessment should include at a minimum Stage 1 - Identification of Flood Risk. Where flood risk is identified a Stage 2 - Initial FRA will be required, and depending on the scale and nature of the risk a Stage 3, detailed FRA may be required.

The SFRA report highlights several sources of relevant flood risk information available for Dublin County including:

- Office of Public Works (OPW) Catchment Flood Risk Assessment and Management Studies (CFRAMS), which include the Dodder and Fingal East Meath Pilot studies, and the Eastern CFRAM study. The studies mapped fluvial and coastal flood risk including benefits provided by flood defences
- The River Tolka flooding study and River Wad drainage study both analysing flood risk based on extreme flood events
- Coastal flooding maps and extreme sea levels from the Irish Coastal Protection Strategy Study (ICPSS) and Dublin Coastal Flood Protection Project (DCFPP)
- Strategies and Actions for Flood Emergency Risk Management (SAFER) providing tide event forecasting and coastal flood maps
- Historical flood events in Dublin from met.ie/

The SFRA identifies several areas of existing development and undeveloped lands which are at risk of flooding. The subject site at Constitution Hill is not included as a flood risk Special Area of Interest in the report.

An extract for the Development Plan Zoning maps in the vicinity of the subject site is shown in Figure 5. It can be seen from the figure that the site falls within Zone Z1 and is marked to protect, provide and improve residential amenities.



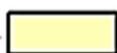
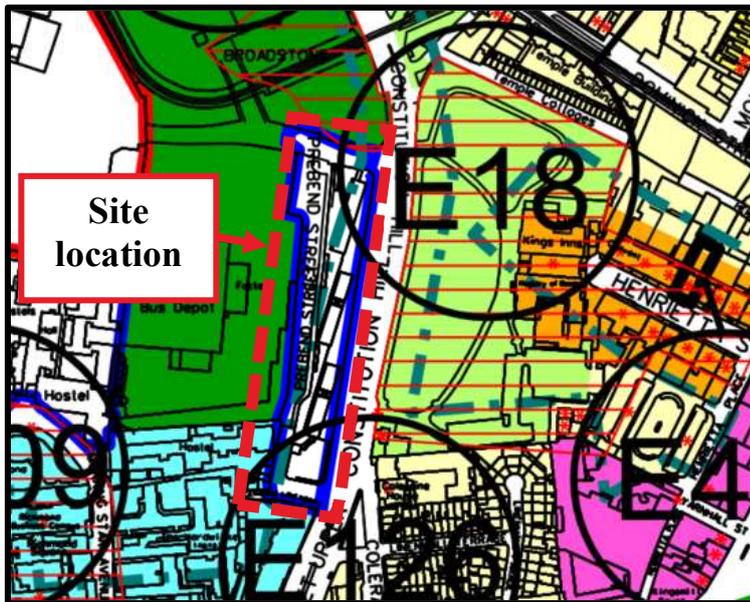
 Zone Z1 – To protect, provide and improve residential amenities

Figure 5 Development plan 2016-2022 zoning map in the vicinity of the subject site

2.3 Draft Dublin City Development Plan 2022 – 2028

The requirements for the Draft Development Plan 2022 – 2028 as regards Flood Risk management are similar to those listed above for the existing development plan. An extract from the zoning for the Draft Development plan 2022 – 2028, shown in Figure 6 shows that the site falls within Zone Z14 and is marked as Strategic Development and Regeneration Areas (SDRAs) - provide homes and employment to the city.



 Zone Z14 – Strategic Development and Regeneration Areas (SDRAs)

Figure 6 Development plan 2022-2028 zoning map in the vicinity of the subject site

3. Overview of Flood Mechanisms and Historical Flooding at the Site

3.1 Flooding Mechanisms

In broad terms, the potential sources of flooding at the site can be categorised as:

- Fluvial (River) Flooding - Fluvial flooding occur when rivers overflow their banks. The closest river to the site is the Bradoge River, which is a tributary of the River Liffey.
- Pluvial Flooding - Pluvial flooding occurs when the capacity of the local urban drainage network is exceeded during periods of intense rainfall. At these times, water can collect at low points in the topography and cause flooding.
- Groundwater Flooding - Groundwater Flooding can occur during lengthy periods of heavy rainfall, typically during late winter/early spring when the groundwater table is already high. If the groundwater level rises above ground level, it can pond at local low points and cause periods of flooding.

Each of the applicable potential sources of flooding are considered in this FRA. It is noted that coastal flooding is not considered given that ground levels at the site are significantly elevated above mean sea level.

3.2 Historic Flooding at the Site

3.2.1 OPW National Flood Hazard Mapping Website

The OPW National Flood Hazard Mapping summarises all recorded flood events within 2.5 km of a chosen location. A map which can be seen in Figure 7 below indicates there are no recorded flood events at or nearby the site location. While there is no record of past flooding on site, it is still possible however that unrecorded flooding has occurred on the site in the past.



Figure 7 Historical flood record in the vicinity of the site (Source: www.floodinfo.ie)

3.3 Fluvial Flood Risk

3.3.1 Bradoge River and its tributaries

The Bradoge river is a small watercourse which rises in Cabra and flows in an easterly direction before discharging into the River Liffey at Ormond Quay. The watercourse is culverted along its entire length. The Bradoge is circa 80m to the north of the site as indicated in Figure 8 which presents the alignment of the watercourse. Additionally, two tributaries of the Bradoge also flow in a southerly direction on either side of the site which is also indicated in Figure 8.

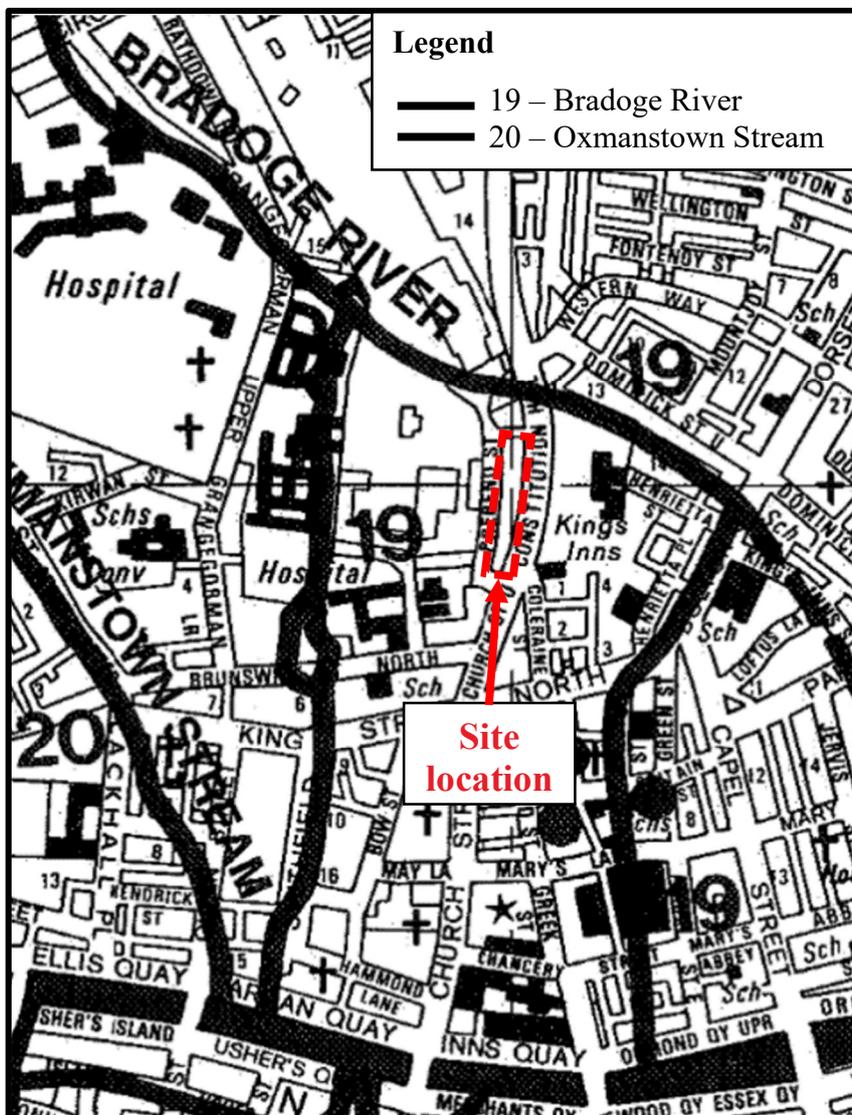


Figure 8 Map showing watercourses in the vicinity of subject site

It was established from our inspection of the site and the surrounding area that there are no open sections or manholes along the Bradoge in the vicinity of the site. The risk of water exiting the culvert near the site during a flood event is therefore deemed to be low. It is noted that even if water were to exit the culvert it is very unlikely to inundate the site given that the existing ground levels along the Broadstone Road (i.e., the road to the immediate north of the site which lies in-between the site and the Bradoge) falls steeply in the direction of Constitution Hill such that any overland flow would be conveyed in this direction and away from the site.

The flood risk to the site from the Bradoge is therefore deemed to be very low.

The flood risk to the site from the two tributaries of the Bradoge which flow due south are also deemed to be low given the very low risk of water escaping from the tributaries and the existing ground level which will convey water away from the site.

3.3.2 River Liffey

The River Liffey is located approximately 750m to the south of the subject site and is the nearest significant watercourse to the site. Flood extent maps for River Liffey were produced as part of the CFRAM study and are presented in Figure 9. It can be seen that there is no risk of flooding to the site from the Liffey.

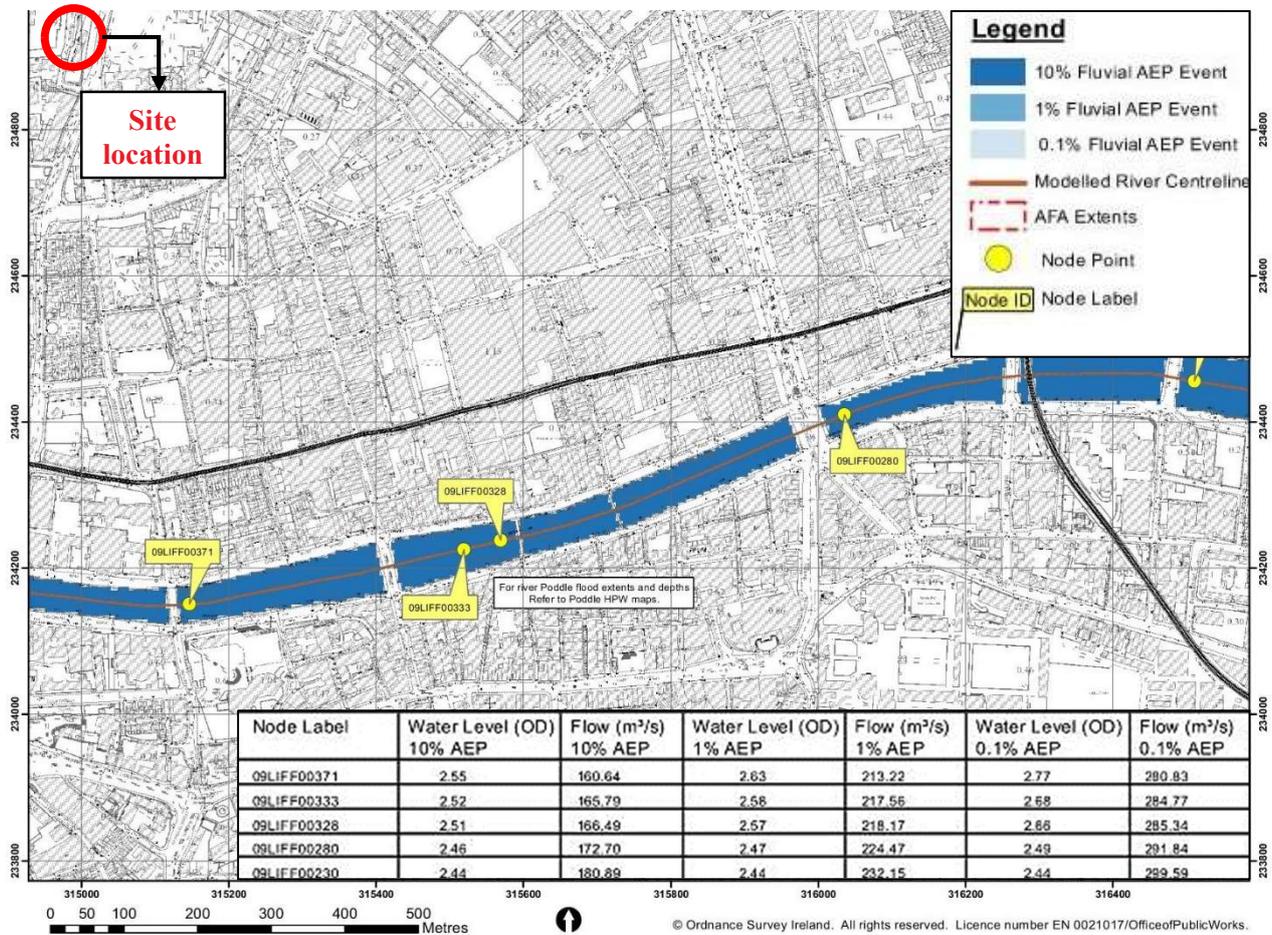


Figure 9 Extract from www.floodinfo.ie showing the CFRAM flood extent mapping for the River Liffey

3.4 Pluvial Flood Risk

Pluvial flooding occurs when extreme rainfall overwhelms drainage systems or soil infiltration capacity, causing excess rainwater to pond above ground at low points in the topography. In order to assess the risk of pluvial flooding to our subject site the findings of the FloodResilientCity (FRC) project have been examined as part of this FRA.

Figure 10 presents the 1 in 100 year (1% AEP) and 1 in 200 year (AEP) pluvial flood extents for the present day scenario from the FRC study. It can be seen from the figure that the site and the roads in the vicinity of the site are shown to be at risk of pluvial flooding.

It is noted however that existing ground levels at the site will prevent surface water from ponding and collecting at the site. The findings of the FRC are therefore deemed to be very conservative for the site.

In a design rainfall exceedance event however the drainage system for the development may be exceeded and may lead to surface water moving across the site. Mitigation measures to address this are considered later in the report.

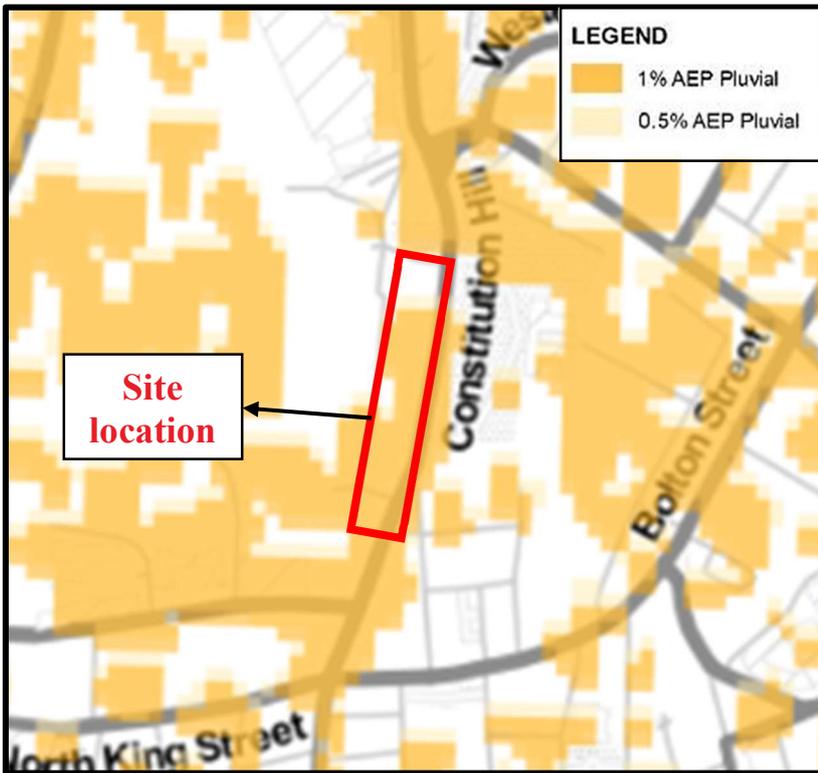


Figure 10 Extract from floodinfo.ie showing CFRAM Rainfall (pluvial) flood extent mapping

3.5 Groundwater Flood Risk

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause flooding.

The risk of ground water flooding to the site is deemed to be low given the existing topography of the site and the surrounding area which would convey any water that comes to surface away from the site.

3.6 Flood risk in a climate change scenario

The impact of climate change is very unlikely to present any significant increase in the flood risk to the site. An increase in the mean sea level is irrelevant given the elevation of the site above the sea. Any increase in rainfall intensity/duration will not increase the risk of fluvial flooding given that the risk in the current scenario is very low.

4. Finished Floor Levels at the Site

4.1 Overview

Given the low flood risk at the subject site, the finished floor level (FFL) of the various buildings in the development need to be considered in the context of the existing ground levels of the site, the FFLs of the existing buildings and the low risk of surface water ingress that may occur during a design rainfall exceedance event.

The FFL for the proposed developments varies across the site as noted below.

- The existing FFL for **Block 1** is set at 17.33 mOD and it is proposed to adopt the same FFL for the extension to this block. This FFL is lower than the maximum ground level external to the building (17.70 mOD).
- The FFL for **Block 2** is set at 16.71 mOD and it is proposed to adopt the same FFL for the extension to this block. This FFL is higher than the maximum ground level external to the building (16.60 mOD).
- The FFL for **Block 3** is set at 15.63 mOD and it is proposed to adopt the same FFL for the extension to this block. This level is equivalent to the maximum ground level external to the building (15.63 mOD).
- Two FFLs are proposed for the **North Block**: 18.795 mOD (around the vehicle entrance and exit) and 17.70 mOD (towards the northeast corner). The 18.795 mOD FFL is higher than the maximum external ground level at the vicinity of the entrance (18.695 mOD). The 17.70 mOD FFL is however lower than the maximum external ground level at the vicinity of the entrance (17.82 mOD).
- The FFL on the northern side of the **South Block** is set at 14.10 mOD which is lower than the maximum ground levels external to the building (14.133 mOD).

The FFL on the southern side of the **South Block** facing Catherine's Lane varies between 11.30 mOD and 10.50 mOD. The levels are sloped in order to match the ground levels/footpath on Catherine's Lane.

- The FFL for the **row of mews dwellings** varies between 17.385 mOD towards the north boundary to 14.735 mOD towards the south boundary. These FFLs are either at the same level, or below the maximum ground level external to the building.

5. Management of Residual Flood Risk

5.1 Drainage System for the development

Surface water from the proposed development will be collected in separate system, connecting to the existing combined sewer to the south of the development.

Surface water will be managed in accordance with Sustainable Drainage Systems (SuDS) and discharges from the proposed development will be restricted in line with the Greater Dublin Strategic Drainage Study (GSDSDS). Surface water discharges will be retained within the various SuDS systems up to and including the 1 in 100-year event plus 20% for climate change.

The drainage systems will be designed in accordance with Part H of the Building Regulations, BS EN 752 Drain and Sewer Systems outside Buildings, the Greater Dublin Regional Code of Practice for Drainage Works and Irish Water requirements.

The reader is referred to a separate Drainage Planning Report accompanying this planning application for further information.

5.2 Access and Egress Routes

Given the absence of significant risk of flooding of the site, access and egress routes will not be compromised during flood events.

5.3 Storage and Conveyance

The proposed development will have no impact on floodplain storage and conveyance as it is outside the 1 in 100-year floodplain of the all the watercourses in the vicinity of the site.

5.4 Surface water runoff in a design exceedance event

As noted in the previous section, there is a risk of surface water ingress to the buildings in a design rainfall exceedance event. This risk is however deemed to be low for two reasons:

- The catchment area for which surface water can be generated is limited to the immediate surroundings of the buildings and is therefore deemed to be minor. Consequently, the volume of surface runoff in a design exceedance event will also be minor.
- The existing ground levels across the site fall towards the Southeast such that and excess surface water will be conveyed in this direction and will not collect or pond on the site.

The low risk of surface water ingress will be managed through the provision ground regrading adjacent to the buildings which will ensure that the finished ground levels fall away from the buildings. Any excess water will therefore not be conveyed in the direction of the buildings.

The reader is referred to the accompanying drainage report or further information.

5.5 Maintenance Programme

The drainage system for the development will need to be maintained. This includes undertaking regular inspections of the drains and various SuDS features by ensuring that any debris which may have accumulated is removed. This will ensure that the risk of blockage of the drains is greatly reduced. The reader is referred to Section 5.1.12 of the accompanying drainage report for further detail.

6. Application of “Flood Risk Management Guidelines”

6.1 Vulnerability Classification

It is considered that the proposed development should be classified as a “Highly Vulnerable Development” as per the vulnerability classification in Table 4. As indicated in Section 3, the proposed development is not indicated as being within the 1000 year fluvial or tidal floodplain. In accordance with the OPW’s planning guidelines, the site therefore lies within Flood Zone C and a justification test for the development is not required.

Table 4 Vulnerability classification as per the planning guidelines

Vulnerability class	Land uses and types of development which include*:
Highly Vulnerable development (include essential infrastructure)	<p>Garda, ambulance and fire stations and command centres require to be operational during flooding;</p> <p>Healthcares;</p> <p>Emergency access and egress points;</p> <p>Schools;</p> <p>Dwelling houses, student half of residence and hostels;</p> <p>Residential institutions such as residential care homes, children’s homes and social service homes;</p> <p>Caravans and mobile home parks;</p> <p>Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and</p> <p>Essential infrastructure, such as primary transport and utilities distribution including electricity generated power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SECESO sites, IPPC sites, etc.) in the event of flooding.</p>
Less vulnerable development	<p>Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions;</p> <p>Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans;</p> <p>Land and buildings used for agriculture and forestry;</p> <p>Water treatment (except landfill and hazardous waste);</p> <p>Mineral working and processing; and</p> <p>Local transport and infrastructure.</p>
Water- compatible development	<p>Flood control infrastructure;</p> <p>Docks, marinas and wharves;</p> <p>Navigation facilities;</p> <p>Ship building, repair and dismantling, dockside fish processing and refrigeration and compatible activities requiring a water side location;</p> <p>Water based recreation and tourism (excluding sleeping accommodation);</p> <p>Lifeguard and coastguard stations;</p> <p>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and</p> <p>Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).</p>

6.2 Sequential Approach

Figure 11 below illustrates the sequential approach to be adopted under the ‘Planning Systems and Flood Risk Management’ guidelines.

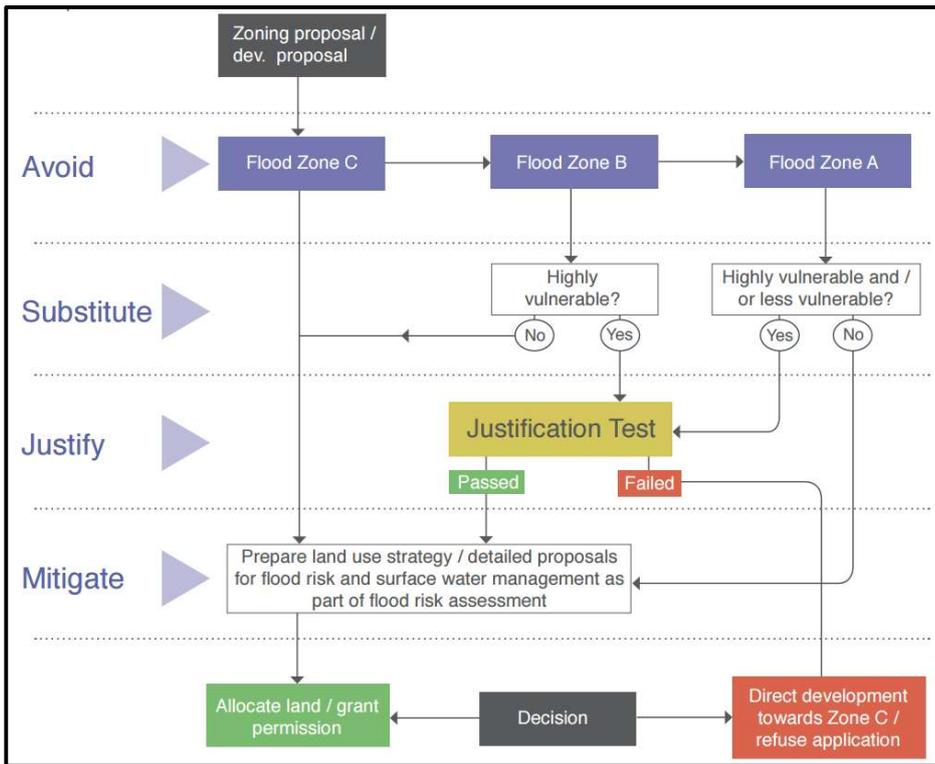


Figure 11 Sequential approach

As the proposed development lies within Flood Zones C, a Justification Test is not required, and it is necessary only to identify mitigation measures for any residual risk. This has been discussed in Section 5 of this report.

7. Discussion

Flood risk to the site of the proposed development at Constitution Hill is very low and there is no historic record of flooding at the site. Flood risk in a climate change scenario will also be very low.

Access and egress routes are unlikely to be compromised during flood events as the proposed development will have no impact on floodplain storage and conveyance. There is no off-site impact associated with the development as it is located outside of the floodplain.

Surface water discharges from the proposed development will be restricted in line with Dublin County Council (DCC) Water Services requirements. The risk of surface water ingress in a design rainfall exceedance event will be managed through the provision ground regrading external to the buildings which will ensure that any excess surface water falls away from the buildings.

It is considered that the proposed development is classified as a “Highly Vulnerable Development” as per OPW’s vulnerability classification. As the site is not within the 1000 year fluvial or tidal floodplain, it is within Flood Zone C. Therefore, a justification test for the development is not required and it is necessary only to identify mitigation measures for any residual risk.