Strategic Flood Risk Assessment

For

DRAFT O'CONNELL STREET AND ENVIRONS SCHEME OF SPECIAL PLANNING CONTROL 2022

Contents

1.0 Introduction and Context

This report has been prepared in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (2009), published by the Department of Environment, Heritage and Local Government (DoHLG).

1.1 Amendments to the O'Connell Street Scheme of Special Planning Control

Pursuant to Sections 85 and 86 of the Planning and Development Act 2000 (as amended) Dublin City Council (DCC) has reviewed the existing Scheme of Special Planning Control (SSPC) for O'Connell Street and Environs, which was approved in 2016. A number of changes to the original scheme are recommended and these have been incorporated into a Draft SSPC for O'Connell Street and Environs 2022 (the Draft SSPC).

DCC proposes amending the existing SSPC to include a number of text changes, to ensure consistency with the Dublin City Development Plan 2016-2022 (the Development Plan) and taking into account wider planning policy and economic changes that have occurred since the SSPC was adopted.

The changes proposed include:

- Updates to general land use controls.
- Updates to street specific land uses considered permitted, open for consideration and non-permissible.
- Text changes, to include updated objectives.

The changes proposed **are consistent** with the Development Plan, which was subject to SEA and AA.

For clarity, no change to the boundary of the Area of Special Planning Control is proposed.

1.2 Purpose of amendments to the SSPC

1.2.1 Background

On 9th July 2001, DCC designated O'Connell Street and environs as an ACA in recognition of its major architectural, historical, cultural, artistic and social importance to the city. DCC subsequently approved a SSPC for the entire O'Connell Street ACA on 8th June 2003 in order to provide more appropriate guidance on how to achieve a strong and dynamic relationship between the quality of architecture and the uses to which it is put. The 2003 SSPC was reviewed and subsequently updated in 2009 and 2016.

1.2.2 Policy Context Update

Since the adoption of the SSPC in 2016, the context for the Area of Special Planning Control has changed, including the adoption of the **Dublin City Development Plan 2016-2022**, and in particular revised policies relating to conservation, retail, urban design and public realm. Broader international and national economic trends relating to retailing will impact on the long term mix and range of land uses anticipated within the O'Connell Street area.

Furthermore, national and regional policy has reinforced the importance of city and town centres in achieving compact growth and facilitating vibrant and sustainable economic development. The **National Planning Framework (NPF)** (Project Ireland 2040) identifies 10 National Strategic Outcomes (NSOs) for the future growth and sustainable development of Ireland, including Compact Growth. It states that at least 50% of all new homes for Dublin City and suburbs are required to be delivered within and adjoining its existing built-up footprint. To achieve this, the NPF identifies the reusing of large and small 'brownfield' land, infill sites, and underutilised lands at locations well served by existing and planned public transport. The NPF particularly highlights the need to focus on underutilised lands within the canals and the M50 ring.

The **Regional Spatial and Economic Strategy (RSES)** for the Eastern and Midlands Region is underpinned by three key principles: healthy placemaking; climate action; and economic opportunity. It seeks the consolidation and re-intensification of infill, brownfield, and underutilised lands within Dublin City and its suburbs. 50% of all new homes within Dublin City and its suburbs are to be located in the existing built-up area. To facilitate this growth the RSES also includes a **Metropolitan Area Strategic Plan (MASP)** for Dublin. The MASP directs future growth to identified Strategic Development Areas located on existing and planned strategic transport corridors and anticipates future growth will also be accommodated on infill development lands in the city.

The **National Transport Authority's Transport Strategy for the Greater Dublin Area 2016-2035**[1] provides a framework for developing a sustainable transport network. Key public transportation projects for Dublin City include:

- **Luas** - expansion of the existing network. Luas Cross City has provided two stops on O'Connell Street by connected the exiting Luas Red and Green Lines. It has made the historic O'Connell St district more accessible to visitors, and the main attractions in the O'Connell Street area (i.e. GPO's Witness History, The Gate Theatre, The Abbey Theatre, and the Dublin City Hugh Lane Gallery).
- **Bus Connects** – enhancement of Dublin's bus network along with several identified Core Bus Corridors. O'Connell Street will be a focal point for significant interchange on the network.
- **Metrolink** – proposed rail link from the City Centre to Dublin Airport / Swords. Both the Luas and Bus Connects are being designed to integrate and interchange with Metrolink as part of a wider strategic transport network for Dublin. A MetroLink stop is proposed on O'Connell Street.

The Draft SSPC acknowledges the link between significant State investment in the public transport infrastructure of the area and the anticipated changes to and intensification of land uses that will occur in the area. Significant re-development proposals and opportunities exist on O'Connell Street and its environs.

It is within this context that it is proposed to update the SSPC.

[1] Draft Transport Strategy for the Greater Dublin Area 2022-2042 published.

2.0 Study Area

2.1 Area of Special Planning Control Context

The physical area covered by the Draft Scheme is identical to the O'Connell Street Architectural Conservation Area (ACA). The designation of the O'Connell Street ACA as an Area of Special Planning Control allows DCC to specify development objectives for the preservation or enhancement of the area that would further strengthen its designation as an ACA.

Section 84 of the Planning & Development Act 2000 (as amended) states:

'A planning authority may, if it considers that all or part of an architectural conservation area is of special importance to, or as respects, the civic life or the architectural, historical, cultural or social character of a city or town in which it is situated, prepare a scheme setting out development objectives for the preservation and enhancement of that area, or part of that area", including the promotion of an appropriate mix of uses and the remediation of derelict or vacant sites.'

The SSPC shall remain in operation for six years. DCC will monitor and review the impact of the Scheme over this six year period and may by resolution, amend or revoke the Scheme as necessary. The SSPC should be read in conjunction with the O'Connell Street Architectural Conservation Area Plan, in particular with regard to the general controls over works to the exterior of all buildings, both protected and non-protected.

Figure 1: O'Connell Street Area of Special Planning Control

2.2 Watercourses

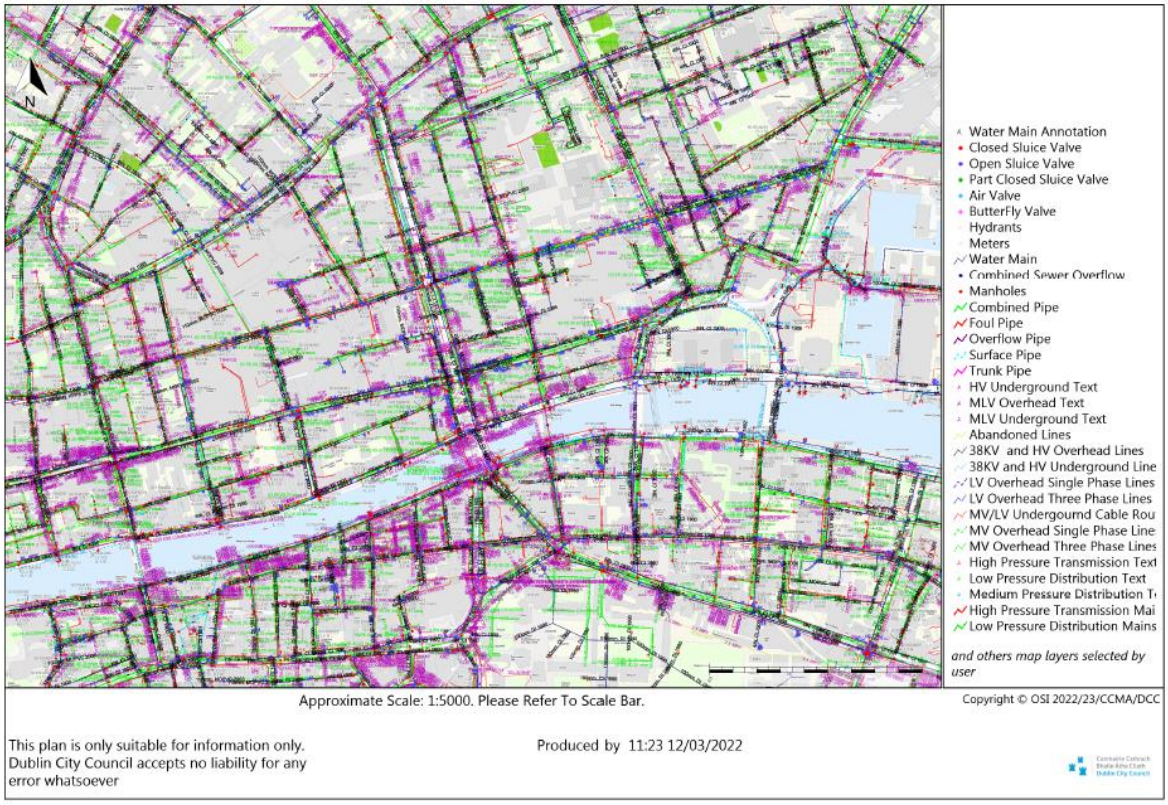
2.2.1 River Liffey

The River Liffey rises in the Wicklow Mountains, flowing through counties Wicklow, Kildare and Dublin, through Dublin City, before it enters the Irish Sea at Dublin Bay. The area covered by the SSPC extends to the south of the Liffey and includes parts of Bachelors Walk, Eden Quay, Aston Quay and Burgh Quay.

2.3 Existing Surface Water Infrastructure

The existing primary surface water infrastructure within the area is indicated below.

Figure 1: Surface Water Infrastructure Network



A network of surface water sewers feeds into the main strategic infrastructure surrounding the subject lands. This network is well developed.

2.4 Topography

The topography of the lands are generally similar to the City Centre, with the lands falling gradually towards the Liffey and Dublin Bay. The lands are approximately 42ft above sea level, dropping to approximately 13ft at North Wall Quay to the east. See figure 3 below.

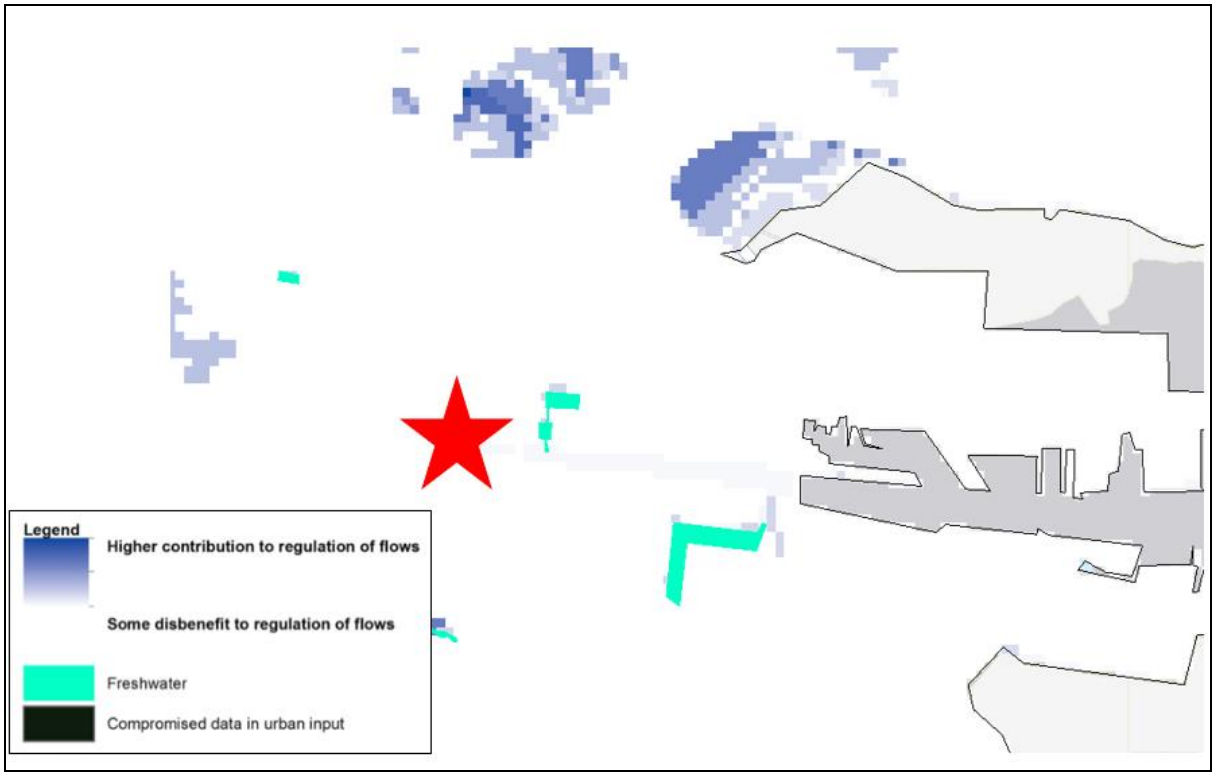
Figure 2: Topography

Source: https://en-ie.topographic-map.com/maps/qb/Dublin/

2.5 Water Attenuation

Linked to topography and also ground conditions is the rate at which water is retained within an area. As can be seen in figure 4 below, the SSPC lands generally have a low water retention value, with limited opportunities for water to be held locally. Retaining water locally can greatly help to reduce flood and water pollution issues downstream. The darker colours shown on the map represent areas that temporarily store water, slowing down the overland flow and therefore contribute to flood control. The lighter colours indicate areas where water is moving quickly through the environment contributing to flooding risk at the downstream parts of the catchment. All new developments within the City are required to demonstrate how they can reduce the water run-off from each site, preferably through the use of natural water retention measures.

Figure 3: Water Retention



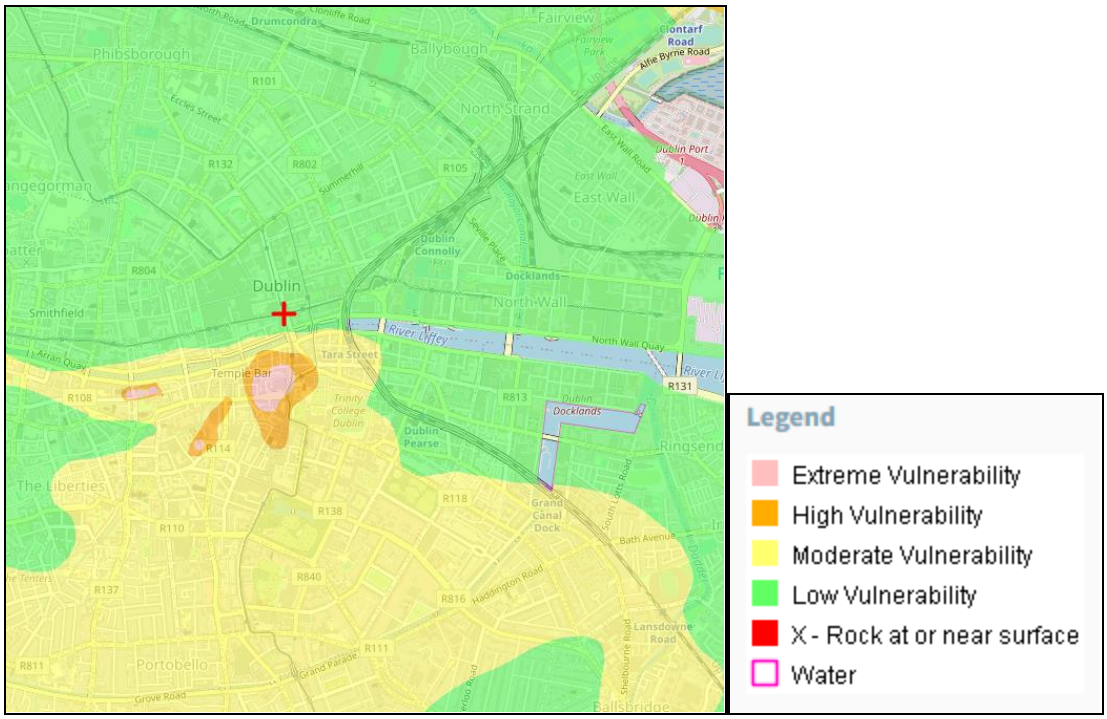
Source: National Parks and Wildlife Service (National Ecosystem and Ecosystem Services Mapping Pilot)

2.6 Groundwater Vulnerability

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities. It is based on the concept of whether water and contaminants can move within the subsurface materials (soil and subsoil) and get down to groundwater easily. The vulnerability category assigned to an area is thus based on the relative ease with which infiltrating water and potential contaminants may reach groundwater in a vertical or sub-vertical direction. As all groundwater is hydrologically connected to the land surface, it is the effectiveness of this connection that determines the relative vulnerability to contamination. Groundwater that readily and quickly receives water (and contaminants) from the land surface is considered to be more vulnerable than groundwater that receives water (and contaminants) more slowly, and consequently in lower quantities. Also, the slower the movement and the longer the pathway, the greater is the potential for attenuation of many contaminants.

In areas where water moves quickly or at times of flooding, then higher quantities of contaminants will have access to groundwater. The groundwater vulnerability map published by the Geological Survey of Ireland (GSI) and as shown below in figure 5, shows that most of the SSPC has a low groundwater vulnerability, with an area of moderate to high vulnerability located to the south of the SSPC.

Figure 4: Ground Water Vulnerability



Source: Geological Survey Ireland https://gis.epa.ie/EPAMaps/

The Planning System and Flood Risk Management: Guidelines for Planning Authorities (the Guidelines), published in 2009, provides a framework for assessing flood risk in the planning process. This Section will outline the definition of risk in terms of its likelihood and consequences and will define the Flood Zones. It will then set out the justification test that is used as a planning tool when considering sites for development.

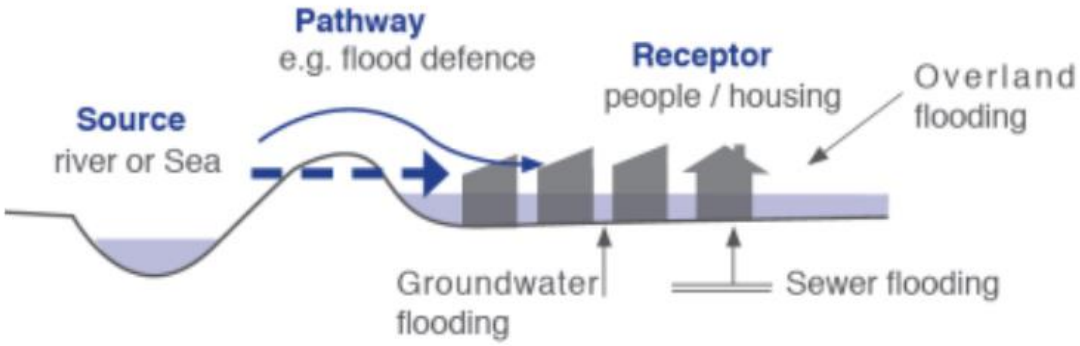
3.1 Identification of Flood Risk

Flood risk is a combination of the likelihood of a flood event occurring and the potential consequences arising from that flood event. Flood risk can be expressed by the following relationship:

Flood Risk = Probability of Flooding x Consequences of Flooding

To fully assess flood risk an understanding of where the water comes from (i.e. the source), how and where it flows (i.e. the pathways), and the people and assets affected by it (i.e. the receptors) is required. The *source-pathway-receptor model* below illustrates this.

Figure 6: Source-Pathway-Receptor Model



Source: The Planning System and Flood Risk Management: Guidelines for Planning Authorities (2009)

The principal sources of flooding generally are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow, and river and coastal floodplains. The receptors can include people, their property, and the environment. All three elements as well as the vulnerability and exposure of receptors must be examined to determine the potential consequences.

The Guidelines set out a staged approach to the assessment of flood risk with each stage carried out only as needed. The stages are listed below:

Stage I Flood Risk Identification – to identify whether there may be any flooding or surface water management issues.

Stage II Initial Flood Risk Assessment – to confirm sources of flooding that may affect an area or proposed development, to appraise the adequacy of existing information, and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps.

Stage III Detailed Flood Risk Assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and the effectiveness of any proposed mitigation measures.

3.2 Likelihood of Flooding

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is generally expressed as a return period or annual exceedance probability (AEP). A 1% AEP flood indicates a flood event that will be equalled or exceeded on average once every hundred years and has a return period of 1 in 100 years. Annual Exceedance probability is the inverse of the return period as shown below.

Table 1: Probability of Flooding

Return Period (Years)	Annual Exceedance Probability (%)
2	50
100	1
200	0.5
1000	0.1

3.3 Consequences of Flooding

The consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, water quality) and the vulnerability of receptors (the type of development, nature, presence, and reliability of mitigation measures, etc.).

The Guidelines provide three vulnerability categories, based on the type of development, which are detailed in Table 3.1 of the Guidelines, and are summarised as follows:

- **Highly vulnerable**: including residential properties, essential infrastructure, and emergency service facilities.
- **Less vulnerable**: such as retail and commercial and local transport infrastructure.
- **Water compatible**: including open space, outdoor recreation, and associated essential infrastructure, such as changing rooms.

3.4 Definition of Flood Zones

The Guidelines use flood zones to indicate the likelihood of a flood event occurring. The zones indicate a high, moderate, or low risk of flooding occurring.

It is important to note that the definition of flood zones is based on an undefended scenario and does not consider flood protection measures.

Flood zones only indicate flooding from fluvial and tidal sources and **do not consider** other sources such as groundwater or pluvial sources.

Table 2: Flood Zones

Zone	Description
Zone A High Probability of Flooding	This zone defines areas with the highest risk of flooding from rivers (i.e. more than 1% probability or more than 1 in 100) and the coast (i.e. more than 0.5% probability or more than 1 in 200).
Zone B Moderate Probability of Flooding	This zone defines areas with a moderate risk of flooding from rivers (i.e. 0.1% to 1% probability or between 1 in 100 and 1 in 1000) and the coast (i.e. 0.1% to 0.5% probability or between 1 in 200 and 1 in 1000).
Zone C Low Probability of Flooding	This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1000).

3.5 Sequential Approach & Justification Test

The Guidelines outline a sequential approach to managing flood risk in the planning process. The principles of the sequential approach are illustrated by the following diagram.

Figure 7: Sequential Approach Principles in Flood Risk Management

Source: The Planning System and Flood Risk Management: Guidelines for Planning Authorities (2009)

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of developments that are being considered in areas of moderate or high flood risk. The test comprises the following two processes.

- The first is the Plan-making Justification Test and is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding.

- The second is the Development Management Justification Test and is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

The following table illustrates the matrix of vulnerability as per the Guidelines. The SFRA aims to guide development zonings to those which are 'appropriate' and thereby avoid the need to apply the Justification Test.

Table 3: Flood Zone Matrix of Vulnerability

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

Source: The Planning System and Flood Risk Management: Guidelines for Planning Authorities (2009)

The lands subject to the Draft SSPC are mostly situated within flood zone C. An area of flood zone A defended is situated on Bachelors Walk, Eden Quay and to the South of O'Connell Street. These lands were subject to a justification test as part of the SFRA of the current Development Plan. The Draft SSPC aligns with the land use zonings and objectives of the current Development Plan. Having regard to the SFRA that was prepared for the Dublin City Development Plan 2016-2022, the SSPC is considered appropriate and therefore a further justification test is not required.

4.0 Data Collection

4.1 Overview

There are several sources of flood data available for the study area.

4.2 National PFRA Study

The Preliminary Flood Risk Assessment (PFRA) is a national screening exercise that was undertaken by the OPW to identify areas at potential flood risk. The PFRA was a requirement of the EU Floods Directive and this work informed the more detailed Catchment Flood Risk Assessment and Management (CFRAM) studies. As part of the PFRA study, maps of the country were produced showing the indicative fluvial, coastal, and pluvial, and groundwater flood extents.

The PFRA fluvial maps have been superseded by the detailed Eastern CFRAM (Catchment Flood Risk Assessment and Management).

4.3 Eastern CFRAM Study

The National CFRAM study is a more detailed FRA for the key flood risk areas (AFA's) identified in the PFRA. The subject site is covered by the Eastern CFRAM study area. The CFRAM Studies generated several outputs including:

- Flood maps indicating modelled flood extents and flood zones for a range of flood events of annual exceedance probability (AEP).
- Flood Risk Management Plans (FRMPs) to manage flood risk within the relevant river catchment.

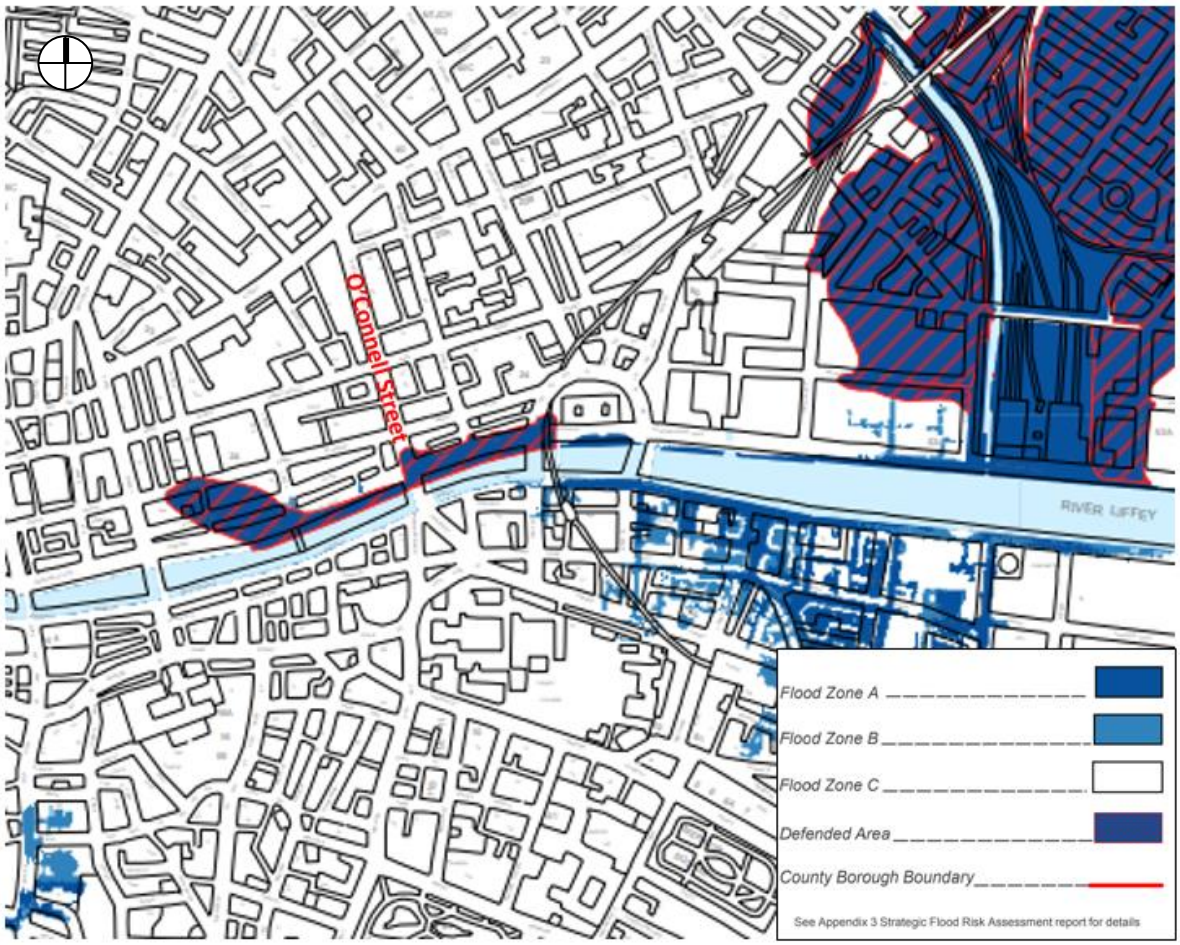
4.4 Dublin City Development Plan 2016 – 2022: Strategic Flood Risk Assessment Volume 7

A Strategic Flood Risk Assessment (SFRA) was prepared as part of the Development Plan. The SFRA informed the strategic land use planning decisions by providing an assessment of all flood risks within Dublin City. The SFRA contains inter-alia, a Composite Flood Map, flood management policies and objectives, and justification Tests. The SFRA was based on historical information such as floodmaps.ie (as updated by www.floodinfo.ie) and predictive flood maps sourced from the CFRAM and FloodReslienCity pluvial programmes.

According to the Composite Flood Map for Dublin City, the subject lands are largely within Flood Zone C. Areas of Flood Zone A Defended are situated along Bachelors Walk, Eden Quay and O'Connell Street South. The area associated with the SSPC has existing Quay Walls, although the SFRA of the current Development Plan notes that their capacity for flood defence is unknown. Dutch Dam defences have been incorporated into openings in the Quay Walls along the boardwalk. These are raised out of the ground to combat high tides and generally afford 750mm of flood protection.[2]

[2] Appendix 3, Strategic Flood Risk Assessment (SFRA), (Appendix 5, Volume 7, Dublin City Development Plan 2016-2022), pp. 113

Figure 8: Extract from Composite Flood Zone Map Dublin City



Source: Strategic Flood Risk Assessment (SFRA), Appendix 5, Volume 7, Dublin City Development Plan 2016-2022

The SFRA of the current Development Plan undertook a justification test for the lands associated with the River Liffey (Appendix 3: Justification Test Tables, Site 4 of SFRA of the current Development Plan), which included the lands associated with the Draft SSPC. The strategic flood risk assessment for flood zones A and B for Site 4 of the SFRA of the Development Plan state the following:

- *To a large extent the areas indicated as being within Flood Risk Areas are generally built out or are existing brownfield sites and the opportunities for future development are limited.*
- *Climate change risks should be assessed and appropriately mitigated in all development.*
- *It is an objective of DCC in conjunction with the OPW to look at identified flood cells as above, and to look at overall flood alleviation scheme for the catchment. However, the extents of the Flood Zones are not significant enough to prevent infill development and well planned larger scale regeneration from occurring.*
- *FRAs should be carried out for all basements and underground structures with respect to any human access.*

4.5 Sources of Flooding

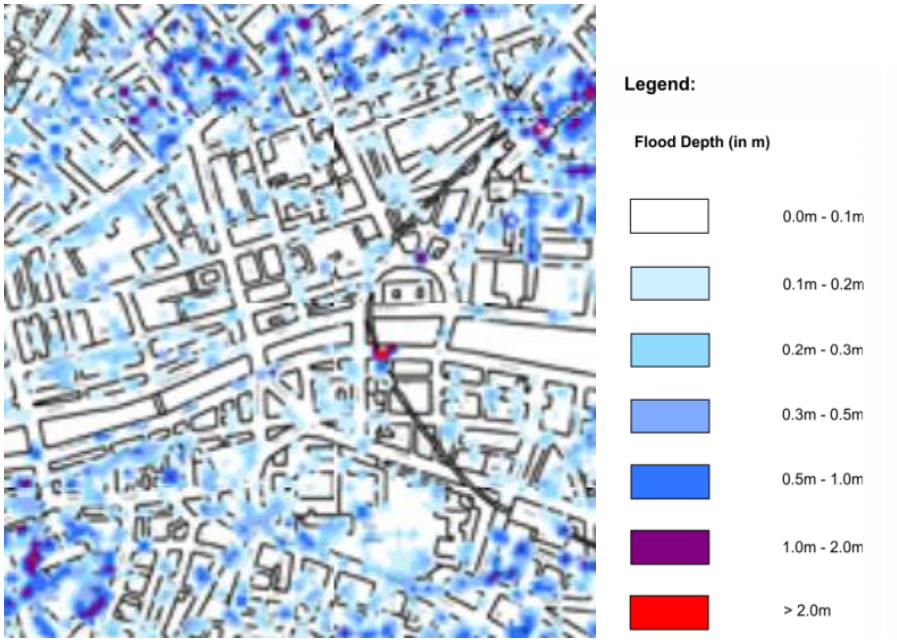
A review of the historical event data and predictive flood information has highlighted several sources of potential flood risk to the area.

4.5.1 Surface Water / Pluvial Flood Risk

Pluvial Flooding results when heavy, often sudden rainfall, causes flooding before it can infiltrate the ground, or enter a natural or man-made drainage system or a watercourse or a conveyance system (e.g. canal) because the system is already full to capacity. Pluvial flooding is associated with storm (surface) water flooding, which is a combination of true pluvial flooding, sewer flooding (due to heavy rainfall), groundwater flooding, and flooding from urban watercourses.

Extracts from the Development Plan Strategic Flood Risk Assessment for pluvial flooding in the study area are illustrated below. The majority of the lands subject to the Draft SSPC indicate a low pluvial flood hazard, with smaller areas showing a moderate risk.

Figure 9: Pluvial Flood Depth Map



Source: Extract from Type 1 Pluvial Flood Depth Map (1% AEP Event – 3 Hr Duration Model, Dublin City Development Plan 2016-2022

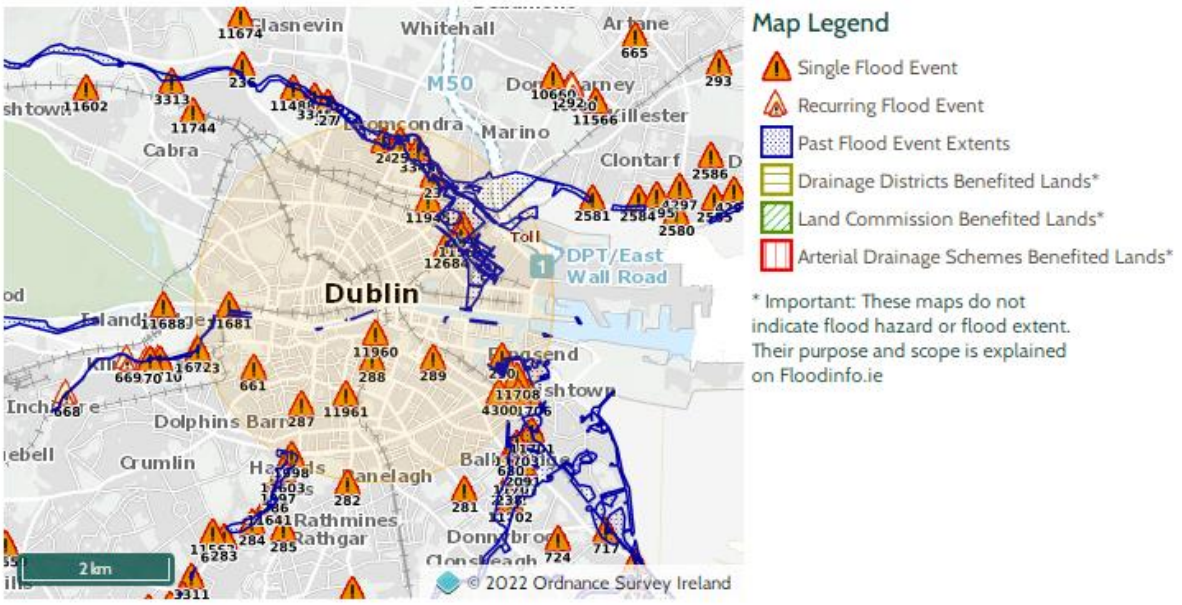
Figure 10: Pluvial Flood Hazard Map

Source: Extract from Type 1 Pluvial Flood Hazard Map (1% AEP Event – 3 Hr Duration Model, Dublin City Development Plan 2016 - 2022

4.5.2 Fluvial or river flooding

Due to the topography and the fast nature at which water flows through the area, the majority of flood events in this area happen within the immediate vicinity of the River Liffey, River Tolka, River Dodder and River Poddle. The map below shows flood events within a c. 2.5 km radius of the SSPC lands. A past flood event extent is indicated on Bachelors Walk, associated with a Dublin City Tidal event February 2002.

Figure 11: Past Flood Events



Source: www.floodinfo.ie

4.6 Climate Change

The Planning System and Flood Risk Management guidelines recommend that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. Specific advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW guidance. This guidance considers two climate change scenarios. These include the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. While the HEFS represents a more "extreme" future scenario at the upper boundaries of future projections.

The OPW recommends the following allowances for climate change, as illustrated below.

Table 4: Allowances for Future Scenarios

Parameter	MRFS	HEFS
Extreme Rainfall Depths	+ 20%	+ 30%
Peak Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Land Movement	- 0.5 mm / year[1]	- 0.5 mm / year[1]
Urbanisation	*No General Allowance – Review on Case-by-Case Basis*	*No General Allowance – Review on Case-by-Case Basis*
Forestation	- 1/6 Tp[2]	- 1/3 Tp[2] + 10% SPR[3]

Note 1: Applicable to the southern part of the country only (Dublin – Galway and south of this)

Note 2: Reduction in the time to peak (Tp) to allow for potential accelerated runoff that may arise as a result of drainage of afforested land

Note 3: Add 10% to the Standard Percentage Runoff (SPR) rate: This allows for temporary increased runoff rates that may arise following felling of forestry.

Source: OPW (September 2019) *Flood Risk Management Climate Change Sectoral Adaptation Plan*

5.0 Flood Risk Management

5.1 Overview

Based on a high-level assessment of the information outlined in the preceding sections, several constraints have been highlighted and can be summarised as follows:

1. The existing surface water drainage infrastructure at the subject lands could be susceptible to increased pluvial flooding unless the management of new development is carefully managed sustainably through the use of SuDS.
2. Any future development must take cognisance of the impact on downstream receiving watercourses and groundwater, requiring the implementation of appropriate SuDS treatment measures.
3. Climate change which is estimated to add between 20% and 30% to design rainfall flood events has to be taken into account in the surface water management of all future proposed developments.

5.2 Recommendations for Managing Flood Risk

The Guidelines recommend a sequential approach to spatial planning, promoting avoidance rather than justification and subsequent mitigation of risk. As identified, the lands subject to the Draft SSPC are mostly situated within **flood zone C**, and thus have a low risk associated with fluvial flooding. Areas of **flood zone A defended** have been subject to the **justification test** carried out as part of the SFRA for the current Development Plan.

5.2.1 Recommended Objectives

No.	Objectives
1	Ensure that the future development of the lands is in accordance with the key principles of the *Planning System and Flood Risk Management Guidelines.*
2	A site-specific Flood Risk Assessment (SSFRA) should be carried out for all basements and underground structures with respect to any human access at the planning application stage.

5.3 Recommendations for Managing Surface Water

The management of surface water within the subject lands should be such that there is no increased risk of flooding downstream, due to increased surface water generated by any proposed development. Additionally, the management of surface water would have to adhere to the requirements of the Greater Dublin Strategic Drainage Study (GDSDS).

5.3.1 Recommended Objective

No.	Objectives
1	All surface water on the subject lands shall adhere to the requirements of the Greater Dublin Strategic Drainage Study (GDSDS).
2	Ensure that the requirements of addressing climate change are incorporated into the surface water management of future proposed developments.

6.0 Conclusion

The lands subject to the Draft SSPC are mostly situated within flood zone C. An area of flood zone A defended was subject to a justification test as part of the SFRA of the current Development Plan. The Draft SSPC aligns with the land use zonings and objectives of the current Development Plan and therefore a further justification test is not required. The O'Connell Street SSPC will not generate a new building but may intensify existing uses. It is not considered that the SSPC, in itself constitutes a flood risk.