

# Flood Risk Assessment

Laurel Lodge, Castleknock, Dublin 15

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<b>Client</b>	Fingal County Council
<b>Project Manager</b>	Paul Singleton
<b>Author(s)</b>	Duncan Hartwick
<b>Branch</b>	DUBLIN Unit 12, The BEaT Centre, Stephenstown Industrial Estate, Balbriggan T: +353 (0)1 5138963   W: www.mccloyconsulting.ie

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## 1 INTRODUCTION

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### 1.1 Terms of Reference

This Flood Risk Assessment (FRA) was commissioned by Fingal County Council to assess the potential risk of flooding at the existing open amenity space Laurel Lodge, Castleknock, Dublin 15 (hereafter referred to as 'the site').

### 1.2 Statement of Authority

This assessment has been completed and reviewed by qualified professionals with appropriate experience in flood risk, drainage, wastewater, and hydraulic modelling studies. The key staff members involved in this project are as follows:

- Duncan Hartwick *BEng (Hons) BSc (Hons) MIEI* – Project Engineer with experience in flood risk assessment, hydrology, and hydraulic modelling.
- Paul Singleton *BEng (Hons) MSc CEng MIEI* – Associate Director and Chartered Engineer specialising in flood risk assessment, hydrology, drainage design and Sustainable Drainage Systems (SuDS); a recognised industry professional providing training courses on these topics to the public and private sectors in Ireland and the UK.

### 1.3 Purpose

This report is intended to produce a detailed site-specific (Stage 3) assessment that identifies potential sources of flooding at the site and determines the suitability of the proposed development in relation to 'Flood Zones' as defined in the relevant flood risk management planning policy. It is also intended to assess the adequacy of existing flood risk data, present any analysis undertaken to supplement the existing data, and recommend design and mitigation measures to be considered as part of the proposed development, including outline SuDS measures.

### 1.4 Approach to the Assessment

#### 1.4.1 Method of Assessment

The method of assessment complies with the Source-Pathway-Receptor model and provides a spatial assessment of flood risk to people, property, and the environment at the site. Consideration has been given to the source and extent of all potential flood mechanisms at the site, including fluvial, coastal, pluvial, and urban drainage flooding.

For the purposes of this assessment, the primary stakeholders are the Office of Public Works (OPW) and Fingal County Council (CC). OPW and Fingal CC data has been used to form the basis of this assessment and is presented in line with the relevant guidance and requirements.

#### 1.4.2 Hydraulic Model Status

As part of the OPW's National Catchment Flood Risk Assessment and Management (CFRAM) Programme, areas identified as being prone to flooding were modelled in detail. The site and surrounding area are covered by one of the detailed flood maps produced for the River Tolka. However, these flood maps are marked as 'Under Review' and not currently available.

The OPW have also produced National Indicative Fluvial Mapping (NIFM) for catchments greater than 5 km<sup>2</sup> in areas for which detailed flood maps were not produced or are not available. NIFM flood mapping was produced for the River Tolka, which flows to the north-east of the site, and is presented in Section 3.3.1 of this report. It is noted that the purpose of the NIFM is not to designate individual properties at risk of flooding or to replace a detailed site-specific assessment.

### 1.4.3 Planning Guidelines

The requirements for flood risk assessments are generally as set out in the 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities', published by the OPW and Department of the Environment, Heritage and Local Government in November 2009 (hereafter referred to as 'the OPW Guidelines'). The OPW Guidelines are supplemented by Departmental Circular PL 2/2014 issued by the Department of Environment, Community and Local Government on 13<sup>th</sup> August 2014, which relates to use of OPW flood mapping in assessing planning applications and clarifications of advice contained within the OPW Guidelines. Further guidance is also provided in the CIRIA Research Project 624 'Development and Flood Risk: Guidance for the Construction Industry'.

Planning guidelines applicable to the site are set out in the Fingal County Development Plan 2017-2023, specifically through the Strategic Flood Risk Assessment (SFRA) published to inform the plan.

The SFRA was prepared in accordance with the requirements of the OPW Guidelines and adopts an identical Flood Zone standard. Flood Zones are the extents of design flood events that determine whether development is appropriate from a flood risk point of view. They are defined in the OPW Guidelines and Development Plan as follows:

- **Flood Zone A** - where the 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** - where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 and 0.5% or 1 in 200 for coastal flooding).
- **Flood Zone C** - where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding).

The OPW Guidelines clarify that Flood Zones are to be used to determine the suitability of proposed developments and are to be derived from 'present day' hydrological estimates. The OPW Guidelines also state that Flood Zones are generated without the inclusion of climate change and that, in addition to flood zoning, developments should be designed to be resilient to the effects of climate change.

## 2 SITE AND PROPOSAL DETAILS

### 2.1 Site Location

The application site is located within the existing Laurel Lodge Green, Castleknock, Dublin 15. The site location and boundary are shown in Figure 2.1.

**Figure 2.1: Site Location**



**Figure 2.2: Site Context**





## 2.2 Site Description

Relevant information related to the site is as follows:

- The site currently comprises undeveloped greenspace within the existing Laurel Lodge Green.
- The Royal Canal flows c. 120 m to the north of the site, as shown in Figure 2.2.
- The River Tolka flows c. 650 m to the north-east of the site.
- The topography of the site is flat with surrounding areas lying at similar elevations.

## 2.3 Development Proposals

The development proposals described in the planning application that this assessment is intended to support are as follows:

*A Local Equipped Area for Play (LEAP) playground totalling approximately 400 m<sup>2</sup>, constructed in line with the principles of universal design. 5 no. play items including multi play & natural play items. Play area finished with permeable safety surfacing. Enclosing the proposed play area, a new 1.2 m high bow topped metal rail fencing & gates finished buff or similar in colour. 1 no. new drinking water fountain. Landscaping including mounding (to a maximum height of 1.5 m) and tree planting to the south-west of the proposed playground. 10 no. bicycle parking spaces using Sheffield type or similar bicycle stands, located adjacent to the proposed playground. All other ancillary site works.*

Relevant proposal drawings are included in Appendix A.

## 2.4 Vulnerability Classification

Based on the classification criteria set out in the OPW Guidelines, the proposal comprises development with the vulnerability classification shown in Table 2.1.

**Table 2.1: Proposed Development Vulnerability Classification**

Part	Use	Classification
Playground	Open Amenity Space	Water Compatible Development
Landscaping	Open Amenity Space	Water Compatible Development

## 3 BACKGROUND INFORMATION REVIEW

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A background information review based on existing flood risk data was carried out to build an understanding of the potential sources of flooding at the site. This section outlines the key findings of a background information review.

### 3.1 Initial Background Search

Based on an initial internet / media background search, there is no evidence of flooding at the site from any source.

### 3.2 Fingal CC Data

#### 3.2.1 [Fingal Development Plan 2017-2023](#)

The Fingal Development Plan 2017-2023 has been reviewed as part of this assessment and the following objectives are considered pertinent to this FRA:

- Objective GI30 – Ensure the provision of new green infrastructure addresses the requirements of functional flood storage, the sustainable management of coastal erosion, and links with provision for biodiversity, Sustainable Drainage Systems (SuDS) and provision for parks and open space wherever possible and appropriate.
- Objective GI31 – Seek the creation of new wetlands and/or enhancement of existing wetlands through provision for Sustainable Drainage Systems (SuDS).
- Objective GI32 – Seek the provision of green roofs and green walls as an integrated part of SuDS and which provide benefits for biodiversity, wherever possible.

#### 3.2.2 [SFRA for the Fingal Development Plan 2017-2023](#)

The Strategic Flood Risk Assessment (SFRA) for the Fingal Development Plan 2017-2023 outlines the following relevant guidance:

- Flood Zones (as outlined in Section 1.4.3) are generated without the inclusion of climate change factors and should ignore flood defences.
- A precautionary approach to climate change includes recommendations to ensure that levels of structures designed to protect against flooding (such as flood defences or raised floor levels) are sufficient to cope with the effects of climate change over the lifetime of the development.
- The minimum design level for highly vulnerable development should be above the Flood Zone B level plus suitable freeboard, whereby the recommended level of freeboard is 500 mm over and above the adjacent Flood Zone B fluvial and / or coastal flood level.
- The minimum design level for less vulnerable development should be above the Flood Zone A level plus suitable freeboard, whereby the recommended level of freeboard is 500 mm over and above the adjacent Flood Zone A fluvial and / or coastal flood level.

### 3.3 OPW Data

#### 3.3.1 [NIFM](#)

An extract from National Indicative Fluvial Mapping (NIFM) is shown in Figure 3.1. The site is shown to not be affected by fluvial flooding.

Figure 3.1: Extract from OPW NIFM Fluvial Flood Mapping



### 3.3.2 [Past Flood Events](#)

OPW 'Past Flood Event' mapping indicates recurring flooding along the River Tolka. There is no record of historic flooding in the vicinity of the site.

## 4 ASSESSMENT OF FLOOD MECHANISMS

### 4.1 Preamble

Development control procedures aim to avoid 'inappropriate' development, as defined in the OPW Guidelines, in areas that are at risk of flooding. They also aim to prevent new development that would increase flood risk elsewhere. This section aims to determine the suitability of the site for the proposed development in accordance with development control procedures by assessing all possible sources of flooding at the site and their associated risk people, property, and the environment.

### 4.2 Initial Assessment

Table 4.1 presents a screening assessment of the site for potential flooding mechanisms requiring further detailed assessment. It is based on the background information review and consultations.

Flooding mechanisms screened as being significant or possibly significant and requiring further assessment have been assessed further in the following sections. Mitigation of flood hazards, where required, is detailed in Section 5.2.

**Table 4.1: Potential Flooding Mechanisms at the Site**

Source / Pathway	Significant?	Reason
<b>Fluvial Flooding</b>	No	OPW indicative flood mapping indicates that the site is not in an area at risk of fluvial flooding.
<b>Coastal Flooding</b>	No	The site is not in a coastal area.
<b>Urban Drainage Flooding</b>	No	There is no known existing drainage infrastructure within the site boundary. No indication of urban drainage flooding / sewer incapacity within the site boundary was identified in an initial background search.
<b>Surface Water Flooding</b>	Possible	Surface water runoff could potentially flow towards the site from adjacent areas.
<b>Groundwater Flooding</b>	No	Due to the site topography, there are no areas that would cause impoundment of groundwater.
<b>Artificial Sources of Flooding</b>	No	The Royal Canal to the north of site sits lower than surrounding ground levels so does not pose a risk of flooding to the site. There are no other impoundments or reservoirs in close proximity to or that drain towards the site.

## 4.3 Surface Water (Pluvial) Flooding

### 4.3.1 [Pluvial Flooding onto the Site](#)

Developed lands surrounding the site are at similar elevations. Surface water runoff from these areas would therefore not be directed towards the site.

If not intercepted by local drainage, overland flow would tend to follow preferential flow paths provided by the public roads and spread over a relatively large area.

Therefore, the site is not considered to be at significant risk of pluvial flooding originating from surrounding lands.

### 4.3.2 [Pluvial Flooding from the Site](#)

Development proposals have the potential to increase the impermeable footprint of the site and increase the rate and volume of surface water runoff accordingly.

The proposed development shall include SuDS to mitigate surface water runoff from the site, as discussed in Section 5.2.4.

## 5 SUMMARY OF FINDINGS AND RECOMMENDATIONS

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### 5.1 Summary of Findings

The site has been shown to be unaffected by fluvial flooding. In relation to Flood Zones as defined by the OPW Guidelines, the assessment demonstrates that the site lies wholly in Flood Zone C. The proposed development will therefore have no impact on flood risk elsewhere.

No other significant flood mechanisms are anticipated at the site.

### 5.2 Design Requirements

The following section outlines measures incorporated into proposals submitted in support of the planning application and to be further considered / developed in any detailed design or variation post-determination of the planning application.

#### 5.2.1 [Land Use](#)

This assessment demonstrates that the site lies wholly in Flood Zone C, meaning there is no policy-based restriction on land use within the site boundary and development will not cause an increase in flood risk elsewhere. Notwithstanding, the proposed water compatible development is appropriate in any Flood Zone and, as such, considered appropriate at the site from a flood risk point of view.

#### 5.2.2 [Design Levels](#)

Given the water compatible nature of the proposed development as well as being sited in Flood Zone C, there is no required minimum design level.

#### 5.2.3 [Site Access](#)

Given that the site and surrounding area lies wholly in Flood Zone C, safe access to and egress from the proposed development will be possible during an extreme flood event.

#### 5.2.4 [Drainage Design](#)

Surface water drainage design should be per the requirements of the Fingal Development Plan 2017-2023 and to the standards of the Fingal County Council Water Services Department. The Fingal Development Plan 2017-2023 states that it is an objective to incorporate and promote the use of SuDS and that these are to be designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.

The requirements around the application / use of SuDS in Fingal is set out in the 'Green / Blue Infrastructure for Development Guidance Note' published in December 2020. The Guidance Note includes template documents / checklists as follows:

- Surface Water Management Design Statement
- Fingal SuDS Selection Hierarchy Sheet

These elements of the initial SuDS strategy have been completed in consultation with the Client and are included in Appendix B.

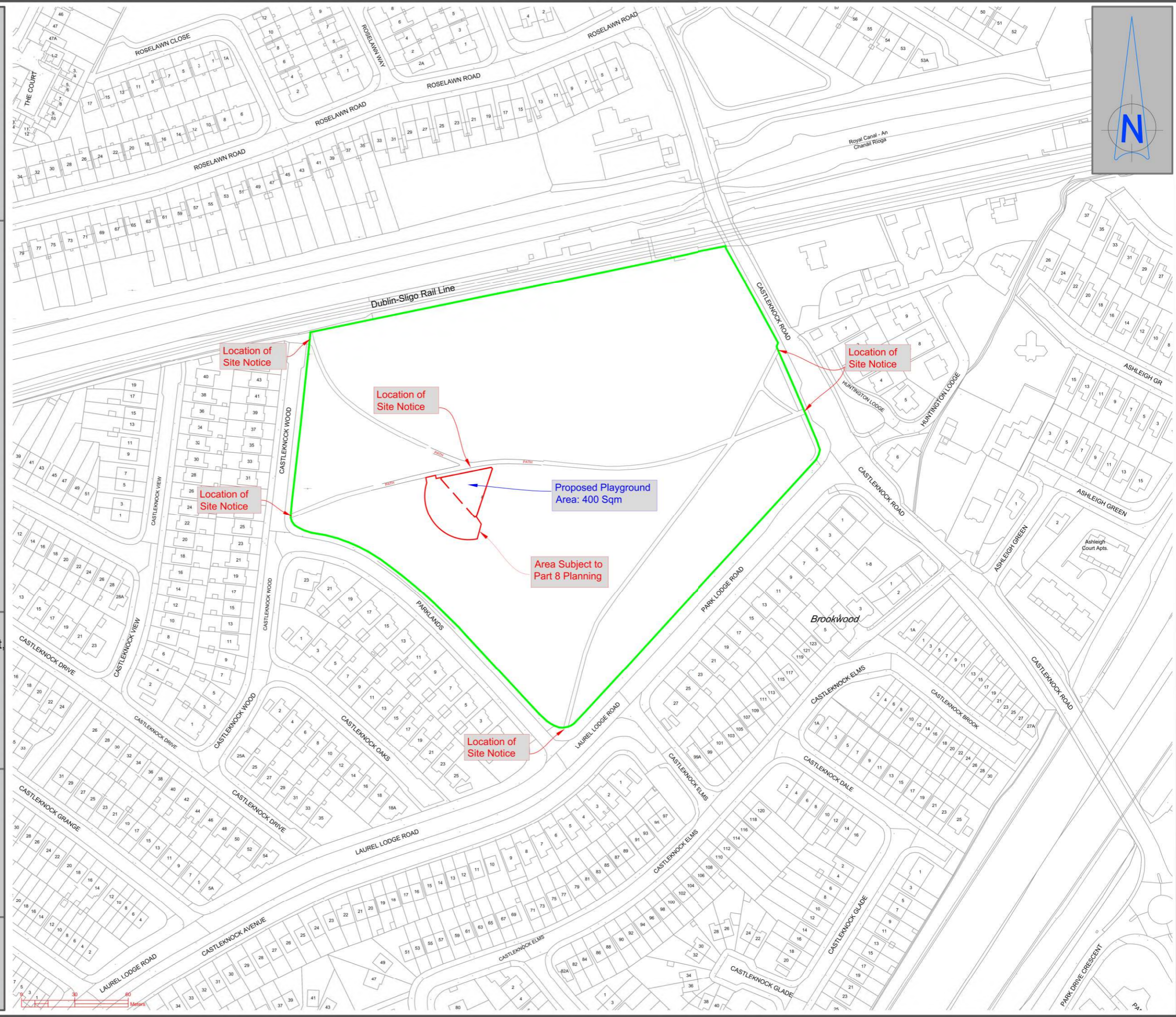
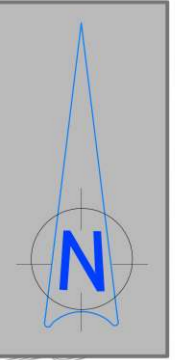
SuDS components have been considered in relation to the nature and character of the site and proposed development. The proposed development will include Permeable Pavement (PP) on the play area and may incorporate a swale bounding the bike storage where PP is not feasible. The SuDS design will be subject to outline and detailed design at which stages discharge via infiltration and / or attenuation will be confirmed.

It is noted that, in keeping with a 'best practice' SuDS approach, no pipes, gullies or storage tanks are proposed.

## Appendix A

### Site Drawings

# Laurel Lodge Park (Location Map)



Area of Land delineated by Green line:  
5.011 Ha. (12.384 Ac.)

Fingal County Council,  
Planning & Strategic Infrastructure Department,  
Parks & Green Infrastructure Division,  
County Hall,  
Swords.

Matthew McAleese  
Director of Services

Kevin J. Halpenny  
Senior Parks Superintendent

Index No.: 6033\_05  
Date: Oct, 2023  
Scale 1:1,000





## Appendix B

# SuDS / Green Infrastructure Checklists

## Surface Water Management Design Statement

Existing Scenario	
<p><i>Description of existing subject site outlining the drainage characteristics - topography, ground conditions, suitability for infiltration, natural directions and paths for water movement, existing surface water flood risk.</i></p>	<p>The site currently comprises open green space with the wider ‘undeveloped’ setting of Laurel Lodge Green – an open amenity space serving surrounding residential development. As such, there is currently no formal surface water drainage and rainfall in the vicinity of the site is naturally ‘discharged’ via infiltration, evaporation and transpiration.</p> <p>The site lies at a similar elevation to lands in all directions and there is no identified pluvial flood risk.</p>
Proposed Scenario	
<p><i>This shall be a clear concise summary of the surface water design proposal.</i></p> <p><i>Applicants shall provide a brief explanation of how they have responded to the principles of Sustainable Drainage Systems (SuDS) Design contained in this policy. This could include implications of SuDS on design of other aspects of the development and price comparisons. We encourage that proposals are mindful of future implications from the beginning and present outline designs based on realistic options including maintenance activities and how they are resourced.</i></p> <p><i>Applicants shall be required to clearly demonstrate how the design makes a significant and positive contribution to the amenity value of the open space provision and shall state how the usability of these areas by the public has been addressed. Reference shall also be made on how the design considered the access and use of maintenance machinery in terms of slopes and any hard structures (e.g. head walls) located within the open space areas.</i></p>	<p>There are two parts to the proposed development:</p> <ul style="list-style-type: none"> <li>• Play area</li> <li>• Bicycle parking</li> </ul> <p>The play area has been designed with ‘permeable safety surfacing’ which would be ideally suited to form the top layer of a Permeable Pavement (PP) structure underlain by a suitable grit layer and open graded stone sub-base. The sub-base would be designed to store the 1% AEP + CC rainfall event and the grit and stone would provide more than sufficient treatment to meet Water Quality requirements. The play space would provide amenity and the slow flow of clean water from the PP would contribute to and support biodiversity.</p> <p>The bicycle parking could also be designed as PP, similar to the play area, or a ‘boundary’ SuDS component such as swale or linear basin. Green boundary components could be planted with amenity grass or wildflower meadow type plating and would store water at very low depths in features with shallow side slopes to facilitate natural losses.</p> <p>It is likely that SuDS components would discharge via infiltration, as per the existing scenario, but this would be confirmed at detailed design stage.</p> <p>Maintenance of PP would consist of an annual visual check and surface sweep when required. Planting in any green component would be maintained in the same manner as the rest of the park.</p>

## SuDS Selection Hierarchy Sheet

SuDS Measures	Measures to be used on this Site	Rationale	Area of Feature (m <sup>2</sup> )	Attenuation Volume of Feature (m <sup>3</sup> )
<b>Source Control</b>				
Swales	Possible	See Design Statement	c. 100	c. 45
Integrated constructed Tree Pits	-			
Rainwater Butts	-			
Downpipe Planters	-			
Soakaways	-			
Infiltration Trenches	-			
Permeable Pavement	Yes	See Design Statement	400 - 600	180 - 270
Green Roofs	-			
Green Wall	-			
Filter Strips	-			
Bio-Retention Systems / Raingardens	-			
Blue Roofs	-			
Filter Drain	-			
<b>Site Control</b>				
Detention Basins	-			
Retention Basins	-			
<b>Regional Control</b>				
Ponds	-			
Wetlands	-			
<b>Other</b>				
Petrol / Oil Interceptor	-			
Attenuation Tank	-			
Oversized Pipes	-			