

Flood Risk Assessment & Surface Water Management Plan

Martin Savage Park, Dublin 7

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1 INTRODUCTION

1.1 Terms of Reference

This Flood Risk Assessment & Surface Water Management Plan (FRA & SWMP) was commissioned by Dublin City Council to assess the potential risk of flooding and outline proposed SuDS measures to support proposed development at Martin Savage Park, Dublin 7 (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:

- Andrew Snowling – Environmental Technician experienced in flood risk assessments, environmental Impact assessments and surface water environments.
- 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

Consideration has been given to the sources and extent of fluvial flooding at the site, as well as flooding from pluvial sources, overland flow, and ponding of localised rainfall at the site. A walkover survey of the site was carried out by McCloy Consulting to investigate all sources of potential flooding. A topographical survey of the site was also commissioned and undertaken by a third party.

The method of assessment complies with the Source-Pathway-Receptor model, allowing for a spatial assessment of flood risk to people, properties, and the environment at the site. The assessment investigates the existing runoff characteristics and the potential impact the proposed development will have on pluvial / surface water runoff.

1.4.2 Hydraulic Model Status

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

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 km² in areas for which detailed 'CFRAM' flood maps were not produced or are not available. NIFM flood

mapping was produced for the River Tolka, which flows to the north of the site, and is presented in Section 3.2.1 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 FRAs are generally as set out in the OPW's 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities, Technical Appendix A' 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 13th August 2014, which relates to the use of OPW flood mapping in assessing planning applications and provides 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 Dublin County Development Plan 2022-2028, specifically through the Strategic Flood Risk Assessment (SFRA) published to inform the plan.

The DCC 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 DCC SFRA 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 specify that Flood Zones are to be used to determine the suitability of proposed developments and are to be derived from 'present day' hydrological estimates (i.e., without inclusion of climate change allowances) without taking account of flood defences. The OPW Guidelines also specify that proposed 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 at Martin Savage Park, Dublin 7. The site location and context are shown in Figure 2.1 and Figure 2.2, respectively.

Figure 2.1: Site Location

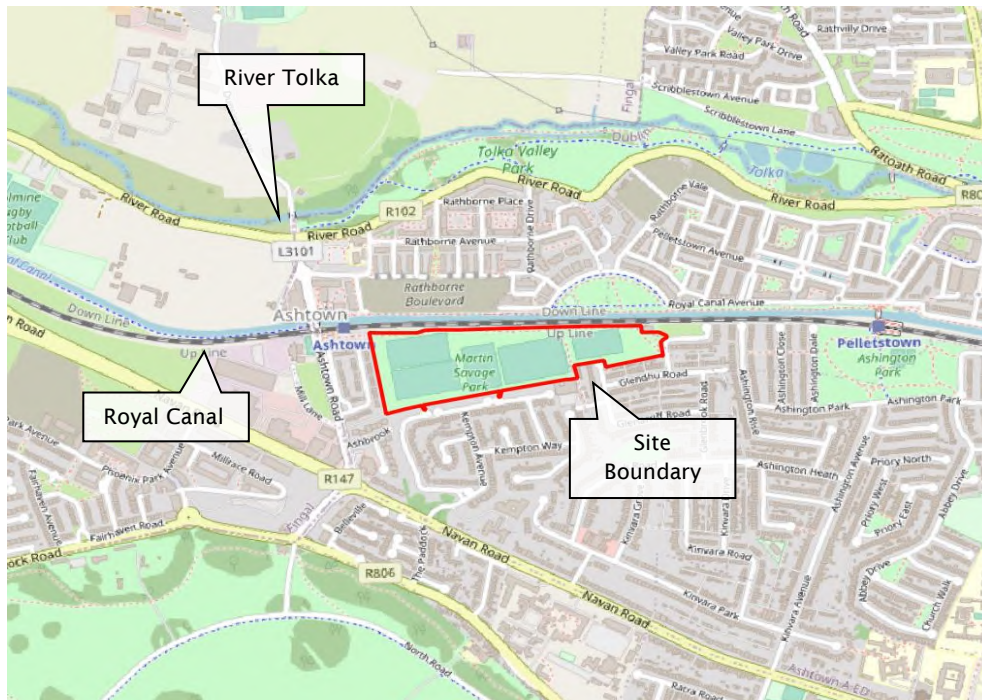


Figure 2.2: Site Context



2.2 Site Description

Relevant information related to the site is as follows:

- The site currently comprises a public park with existing playing pitches and footpaths.
- The River Tolka flows c. 300 m to the north of the site.
- The Royal Canal runs directly north of the site, on the other side of the Dublin-Maynooth railway line.
- The topography of the site falls from south to north with the highest elevation lying at 46.0 mOD and the lowest at 39.4 mOD.

Relevant drawings are included in Appendix A.

2.3 Development Proposals

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

- The development of an 130 m x 70 m all-weather sport pitch with associated fencing and flood lighting.
- The flood lighting of the main GAA pitch in Martin Savage Park.
- The creation of a play zone with swings, slides and climbing equipment within a nature based fenced off location.
- The creation of a community garden with mixed planting, paths, and seating.
- Additional tarmac paths, widening of existing east west path adjacent rail line, additional park opening at Kempton and path lighting.
- 36no. trees removed as part of works with new tree planting and hedgerow installed as part of the works.

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
Recreational Facilities	Open Amenity Space	Water Compatible Development

3 BACKGROUND INFORMATION REVIEW

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 Dublin City Development Plan 2022-2028

The Dublin City Development Plan 2022-2028 sets out the following flood management policies deemed relevant to this FRA:

- SI15 – All development proposals require a Site-Specific Flood Risk Assessment (SSFRA) to demonstrate compliance with the OPW Guidelines, as revised by Circular PL 2/2014 and any future amendments, and the Strategic Flood Risk Assessment (SFRA) prepared to inform the current Development Plan.
- SI20 – There is a general presumption against the development of basements for residential use below the estimated flood levels for Flood Zones A and B.

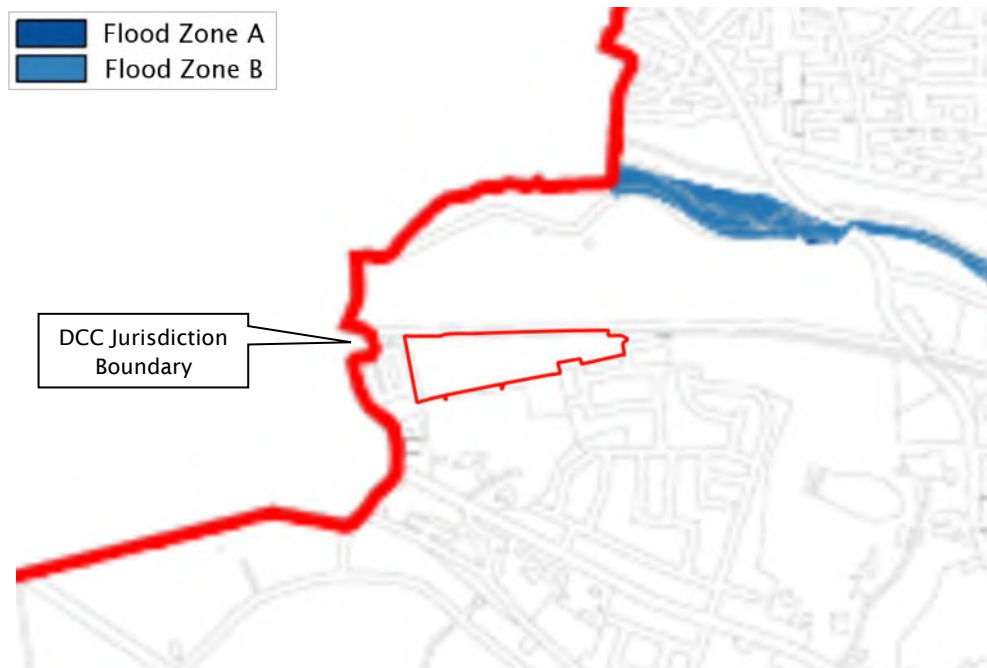
It also sets out the following relevant policies in relation to surface water management:

- SI22 – To require the use of Sustainable Drainage Systems (SuDS) in all new developments.
- SI24 – To require that all surface water runoff from new / extended domestic driveways, repaired / replacement driveways, and vehicular entrances (where such development is not exempt from the requirement to obtain planning permission) is managed through the use of SuDS, ensuring no increase in surface water discharges to the public drainage network.

3.1.1 Strategic Flood Risk Assessment

Flood Zone mapping was produced as part of the SFRA undertaken to inform the Development Plan. The site is shown to be outside both Flood Zone A and Flood Zone B, as shown in Figure 3.1. It is noted that Flood Zone A is based on the PFRA 1% AEP indicative flood extent while Flood Zone B was determined for the purpose of the SFRA Flood Zone mapping.

Figure 3.1: Extract from DCC SFRA 2022-2028



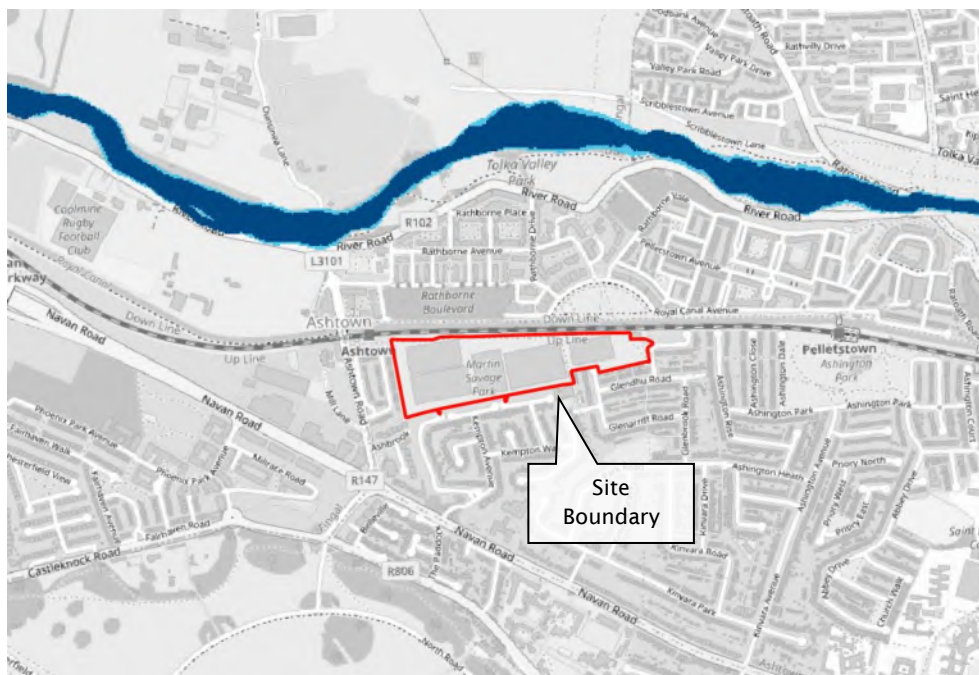
3.2 OPW Data

3.2.1 NIFM

An extract from National Indicative Fluvial Mapping (NIFM) is shown in Figure 3.2. The site is shown to not be affected by fluvial flooding.

The distance and elevation difference between the River Tolka NIFM flood extents and the site provide confidence that even though the CFRAM flood maps for the Tolka are ‘under review’, the flood extents they show would not impact the site. The Royal Canal also act as a significant hydraulic break between the site and predicted floodplain, further reducing the probability of a fluvial flood event from the Tolka River.

Figure 3.2: Extract from OPW NIFM Fluvial Flood Mapping



3.2.2 Past Flood Events

OPW ‘Past Flood Event’ mapping indicates recurring flooding along the River Tolka. There is 1 no. record of historic flooding in the vicinity of the site as seen in Figure 3.3.

- Flooding at Glendhu Park, Cabra, Dublin 7 on 24th Oct 2011 (ID-11602) c. 97 m east from eastern site boundary Source: Runoff from surface water drainage, it was noted the depression in the landscaped area in Glendhu park resulted in runoff ponding in front of properties¹.

¹ https://www.floodinfo.ie/map/pf_addinfo_report/11602/ [Accessed 09/10/2023]

Figure 3.3: Extract from Floodinfo.ie “Past Flood Events”

3.3 Internet Background Search

Based on an initial internet / media background search, there is no evidence of flooding at the site from any source. A web search revealed that nearby residents have in the past reported flooding at local residential areas such as Glendhu Park which is adjacent to the south-eastern site boundary.²

² <https://dublininquirer.com/2022/02/16/with-new-all-weather-pitch-planned-for-ashtown-some-neighbours-fear-increased-flooding/> [Accessed: 09/10/2023]

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
Fluvial Flooding	No	OPW flood mapping indicates that the site is not in an area at risk of fluvial flooding.
Coastal Flooding	No	N/A
Urban Drainage Flooding	Possible	There is no known drainage infrastructure within the site boundary. No indication of urban drainage flooding / sewer incapacity was identified in an initial background search. However, existing development at a higher elevation does exist in the vicinity of the site.
Surface Water Flooding	Yes	Elevated lands exist in the vicinity of the site and a nearby historic flood event references surface water flooding.
Groundwater Flooding	No	Due to the site topography, there are no areas that would cause impoundment of groundwater.
Artificial Sources of Flooding	Yes	The Royal Canal runs adjacent to the northern boundary of the site.

4.3 Surface Water (Pluvial) Flooding

4.3.1 [Pluvial Flooding onto the Site](#)

Lands to north, east and west of the site lie at a similar or lower elevation so surface water runoff from those areas would not be directed towards the site.

Areas at a higher elevation do exist to the south of the site so pluvial runoff from the south, if not intercepted by local drainage, may flow in the direction of the site. However, overland flow would tend to follow preferential flow paths provided by the public roads and spread over a relatively large area in the vicinity of the site.

Therefore, the site is not considered to be at significant risk of pluvial flooding originating from surrounding lands. Mitigation of the residual risk posed by extreme surface water flooding will be addressed by the provision of SuDS surface water drainage as outlined in Section 5.3.

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 5.3.

4.4 Urban Drainage

Similar to pluvial flooding in Section 4.3.1, flooding from urban drainage infrastructure to the north, east and west would not flow towards the site.

Overland flow caused by exceedance and / or blockage of urban drainage to the south may direct flow towards the site. While volumes of floodwater are likely to be low, and any surface water would tend to spread over a large area at the site, residual risk will be mitigated by the provision of SuDS surface water drainage as outlined in Section 5.3.

4.5 Royal Canal

The Royal Canal is located directly north of the site, on the other side of the Maynooth-Dublin railway line. Canal infrastructure is designed to not cause flooding of surrounding areas and is managed / maintained by Waterways Ireland.

An assessment of ground / infrastructure levels in the vicinity of the site, based on best available height data, demonstrates that the railway line (c. 41 mOD) sits approx. 1 m higher than the site (c. 40 mOD) and Canal so in the unlikely event of overtopping, floodwater would spill to lower lying lands (c. 36-38 mOD) to the north rather than flow towards the site.

It is noted that there are no overflows or records of historic infrastructure flooding in the area. Therefore, the site is not considered to be at risk of flooding from infrastructure (canal) failure.

5 SUMMARY OF FINDINGS AND RECOMMENDATIONS

5.1 Summary of Findings

The site has been shown to be unaffected by fluvial flooding from the River Tolka and its tributaries. 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.

Surface water flooding to and from the site will be addressed by provision of a SuDS surface water management system as described in the following sections.

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.

5.2.2 [Design Levels](#)

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

5.2.3 [Site Access](#)

Given that the site 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 details are outlined in Section 5.3.

5.3 Surface Water Management Plan

To ensure no impact to lands / development elsewhere and that the proposals are resilient to / protected from pluvial flooding, the following sections outline the Surface Water Management Plan (SWMP) for the proposed development.

Surface water drainage design should be per the requirements of the Dublin City Development Plan 2022-2028 and to the standards of the Dublin CC Water Services Department. The Dublin Development Plan 2022-2028 states that it is an objective to incorporate and promote the use of SuDS.

The requirements around the application / use of SuDS in Dublin CC are set out in:

- Dublin City Development Plan 2022-2028 Appendix 13: Surface Water Management Guidance
- Dublin City Council Sustainable Drainage Design and Evaluation Guide (2021)

5.3.1 Existing Scenario

The site currently comprises the existing Martin Savage Park which includes grass sports pitches, open amenity space and pedestrian pathways. As such, there is currently limited formal surface water drainage and rainfall in the vicinity of the site is naturally 'discharged' via infiltration, evaporation and transpiration.

The site is shown to lie in an area of Winter Rain Acceptance Potential (WRAP) class 2 meaning soil is relatively free draining with good infiltration capacity. GSI data indicates that the site is overlain with "till derived from limestones".

The site lies at a higher or similar elevation than lands to the north, east and west. Lands at a higher elevation are situated to the south of the site but, due to local topography, there is no identified pluvial flood risk.

5.3.2 Proposed Scenario

The parts of the proposed development that are impermeable and / or drained (i.e. have the potential to contribute additional runoff elsewhere) are:

- All Weather pitch (in the east of the site)
- Widened pedestrian footpaths along the northern and eastern boundaries and between pitches in the east of the site
- New pedestrian footpaths along the western and southern boundaries

The 'Nature Based Play Area' will consist of soft landscaping and porous surfacing and the 'Community Garden (excluding the path described above) will be permeable so these areas will not contribute additional runoff. SuDS components have been considered in relation to the nature and character of the site and proposed development.

The proposed all-weather pitch will include Permeable Pavement (PP) type clean graded stone sub-base beneath the surface. The sub-base would be designed to store the 1% AEP + CC rainfall event and the stone layers would provide more than sufficient treatment to meet Water Quality requirements. The pitch sub-base would provide amenity and the slow flow of clean water from the clean graded stone would contribute to and support biodiversity. A separate 'Drainage Design Statement' (ref.: M02154-03_DG01) has been prepared by McCloy Consulting for the proposed all-weather pitch which further outlines the design approach and details.

The proposed and widened paths, up to 2 m wide additional impermeable surfacing, will drain to adjacent green spaces and discharge via infiltration, as per the existing scenario. Calculations undertaken with an assumed precautionary infiltration rate³ would require 1 m width of green space per metre length of 2 m wide impermeable track at a max. depth of 50 mm to contain and facilitate

³ A conservative infiltration value of 1×10^{-5} m/s for soil type 2 (i.e., good infiltration) was taken from *The SuDS Manual (CIRIA C753, 2015)*

discharge of surface water runoff for the 1% AEP + climate change event. Calculations are included in Appendix B.

The SuDS design will be subject to detailed design at which stage discharge via infiltration and / or attenuation will be confirmed as well as sizing based on site-specific infiltration rates. It is noted that, in keeping with a 'best practice' SuDS approach, no pipes, gullies or deep underground storage tanks are proposed.

5.3.3 Drainage System Maintenance

The owner / occupier(s) shall be responsible for maintenance of drainage networks at the site and will ensure that maintenance of the drainage system is provided for. Detailed drainage layout for the site is to ensure that key SuDS features requiring maintenance are located in accessible public locations.

Maintenance plans for drainage assets should include (where applicable):

- Cyclical (min. annual) check of all surface water drainage features - in particular, clearing of debris.
- Cyclical (min. annual) visual inspection of any surface or underground features - blockages and obstructions to be removed as required.
- Planting in any green component would be maintained in the same manner as the rest of the park.

Appendix A

Site Drawings

NOTES:
This drawing is the copyright of Dublin City Council. It must not be copied or reproduced without written consent. Only stated dimensions are to be taken from this drawing. All contractors must visit the site and be responsible for taking and checking all dimensions related to the works shown on this drawing.

Key
Existing Trees



Part 8 Issue

Rev - Sep 2023 - Pre Part 8 Issue



PROJECT		Martin Savage Park	
SUBJECT		Site Location Plan Site Notice Plan	
DATE	Sep 2023	DRAWN BY	EO/G
SCALE	1:750 @ A0	CHECKED BY	L. Moore
PROJECT NUMBER	LA-MSP-SLP-001	REVISION	A
Project Number	0000	Status	B
A - PRELIMINARY	B - ISSUED FOR PLANNING	C - ISSUED FOR DESIGN	D - ISSUED FOR TENDERS
E - ISSUED FOR APPROVAL	F - ISSUED FOR CONSTRUCTION	G - AS BUILT	

Appendix B

Calculations

CRM Stormflow Stormwater Management Software

Client: Dublin City Council
Project: M02154-03
Location: Martin Savage Park, Dublin 7
Catchment: Site Infiltration

Catchment Details:

Buildings 0 m² x 95 %
 Dense surfacing 2 m² x 90 %
 Effective Area 1.8 m²

Storage Details:

Length 1 m
 Width 1 m
 Depth 0.05 m
 Porosity 100 %
 Area Increase 0 %

Rainfall Details - FSR Method:

Return Period 100 years
 Climate Change Factor 20 %
 r value 0.27
 M5-60 16 mm

	mm	mm/h	storage (m ³)
5 min	9.0	128.9	0.017
10 min	13.9	99.8	0.026
15 min	17.3	83.1	0.031
30 min	24.1	57.8	0.039
45 min	28.4	45.4	0.042
60 min	31.5	37.8	0.042
2 hours	40.0	24.0	0.035
6 hours	56.4	11.3	0.000
24 hours	85.4	4.3	0.000

Outflow Details:

Infiltration rate 0.036 m/hr
 Infiltration by CIRIA 3D method
 Safety Factor against flooding 1.5
 Attenuation Control None
 Control Diameter - mm
 Discharge rate 0 l/s

Results:

Outcome: Pass
 Critical Storm Duration 56 min
 Hmax 0.042 m
 Time to half empty 46.7 min