PUNCH
consulting engineers

Proposed Development of New Mechanical Services Depot & Additional Salt-Barn, Old Lucan Road, Fonthill, Dublin 20

Site Specific Flood Risk Assessment

222153-PUNCH-XX-XX-RP-C-0001

Document Control

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1.0 Introduction

This report was prepared to accompany South Dublin County Council's Part 8 Planning Application for the proposed development of an additional Salt Barn, New Mechanical Services Depot, and 2 no. new diesel pumps with associated underground fuel storage tanks adjoining the Deadman's Inn at existing South Dublin County Council (SDCC) Palmerstown Depot, Old Lucan Road, Dublin 20. This report deals specifically with the flood risk associated with this site.

The proposed works are outlined in a series of architectural drawings prepared by SDCC.

1.1 Site Location

The subject site is located on existing SDCC depot lands adjacent to Dead Man's Inn at the Old Lucan Road, Fonthill, Dublin 20. The site is approximately 0.75 hectares and is located within SDCC's remit. The lands are bounded by Old Lucan Road to the north and east, by a slip-road to the N4 to the south and by Dead Man's Inn car park to the west. The site is a brownfield site with green areas located to the north and south. The site is gently sloping from South to North. The site is accessed from an existing vehicle access on the Old Lucan Road. Figure 1-1 indicates the location of the subject lands.

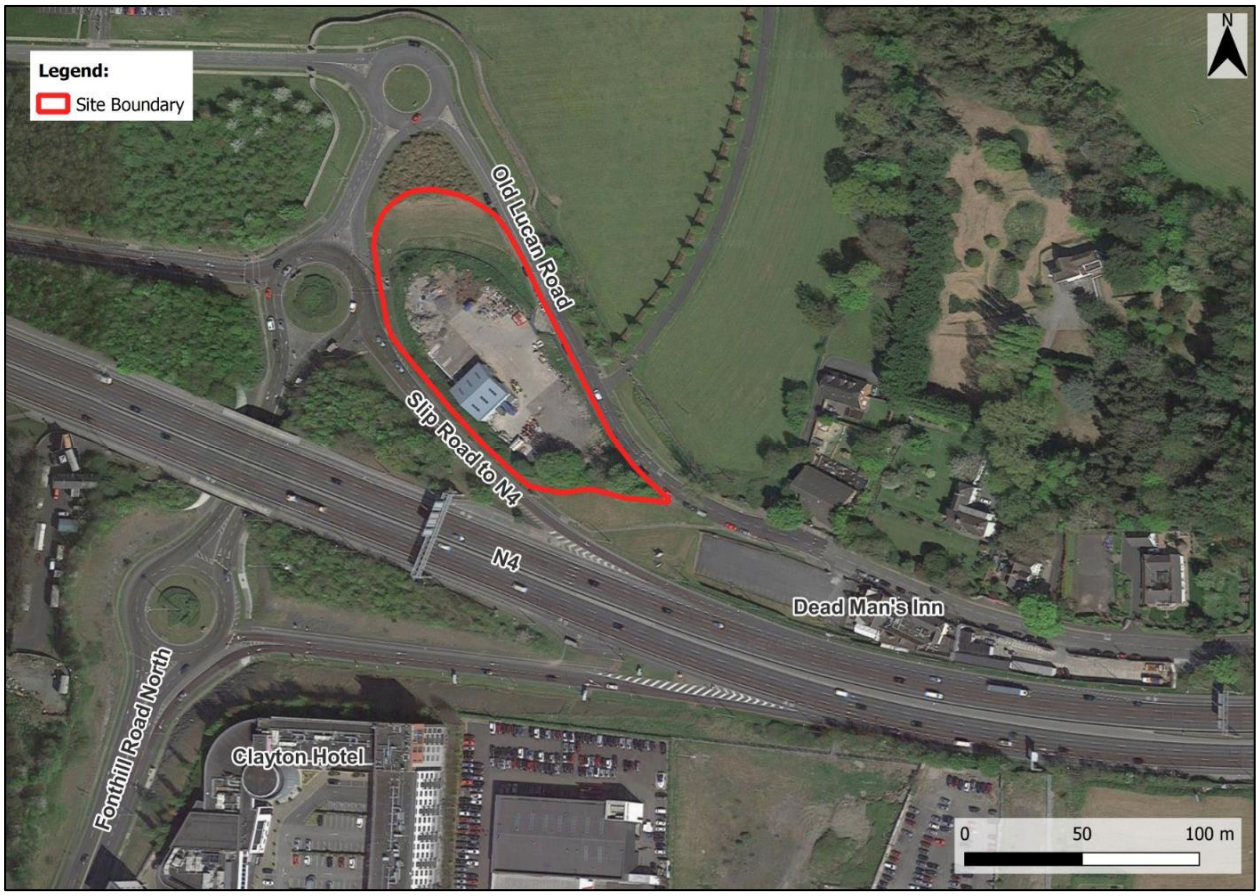


Figure 1-1: Site Location of the Proposed Development (Ref. Google Earth)

1.2 Nature of the Proposed Development

The works to include the construction of Additional Salt Barn, New Mechanical Services Depot and 2no. New Diesel Pumps with Associated Underground Fuel Storage Tanks. The Mechanical Services Depot (two-storey building with single-storey annex) is for servicing of SDCC vehicles and plant, to consist of new 5-bay vehicle maintenance workshop and ancillary support services including offices, canteen, storage and sanitary facilities. The site currently houses a salt barn, wash station and concrete hardstanding area used by SDCC for materials storage.

The proposed works are outlined in a series of architectural drawings prepared by the Architectural Services Department, SDCC, and engineering drawings prepared by PUNCH Consulting Engineers and supplied as part of the planning documentation.

The proposed site layout is shown in Figure 1-2 below.

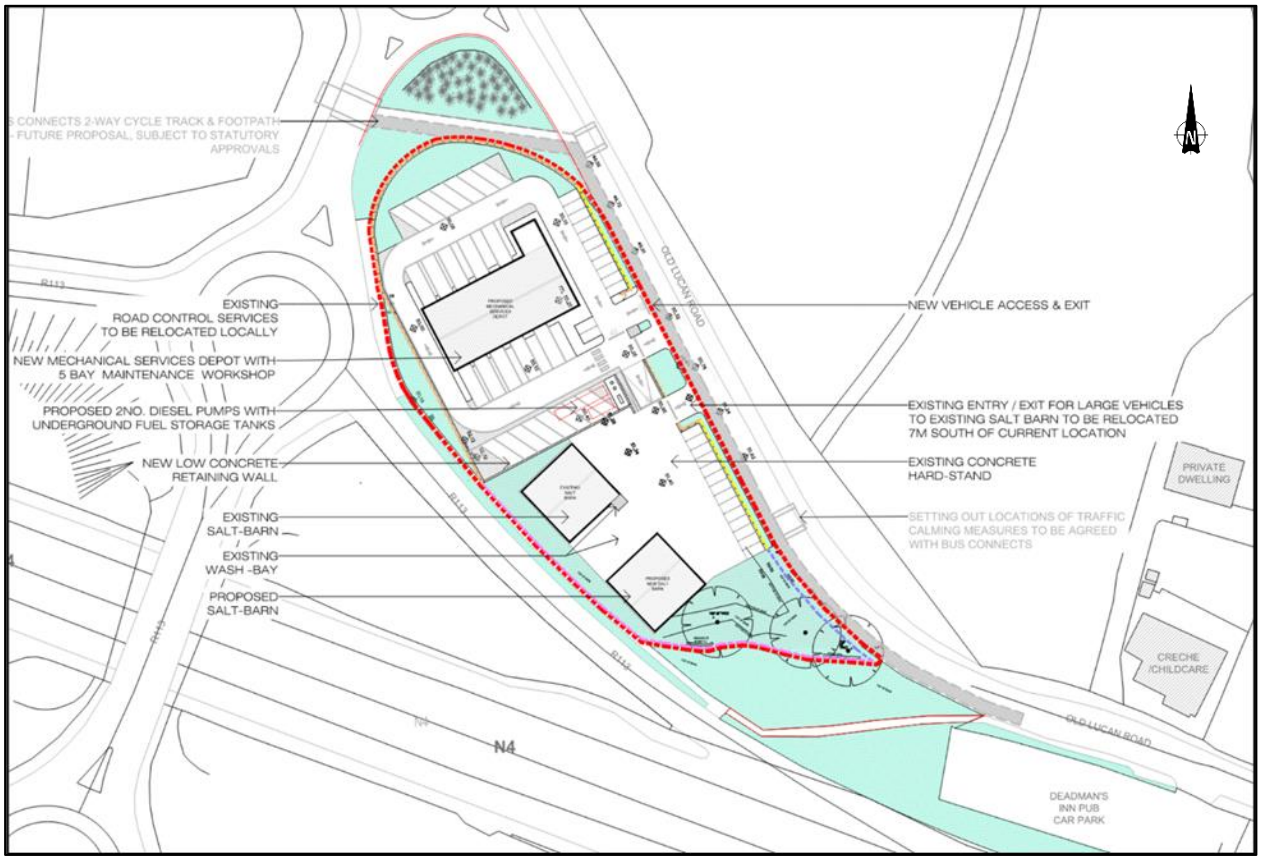


Figure 1-2: Proposed Site Layout

2.0 Relevant Guidance

2.1 The Planning System and Flood Risk Management Guidelines

In September 2008, "The Planning System and Flood Risk Management" Guidelines were published by the Department of the Environment, Heritage and Local Government in Draft Format. In November 2009, the adopted version of the document was published.

The Flood Risk Management Guidelines give guidance on flood risk and development. The guidelines recommend a precautionary approach when considering flood risk management in the planning system. The core principle of the guidelines is to adopt a flood risk sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding. The guidelines include definitions of Flood Zones A, B and C, as noted below. It should be noted that these do not take into account the presence of flood defences, as there remain risks of overtopping and breach of the defences.

Table 1: Flood Zone Designation

Flood Zone	Type of Flooding	Annual Exceedance Probability (AEP)
Flood Zone A	Coastal	Less than a 1:200 (0.5% AEP) year event
	Fluvial	Less than a 1:100 (1% AEP) year event
Flood Zone B	Coastal	Greater than a 1:200 (0.5% AEP) and less than a 1:1000 (0.1% AEP) year event
	Fluvial	Greater than a 1:100 (1% AEP) and less than a 1:1000 (0.1% AEP) year event
Flood Zone C	Coastal	Greater than a 1:1000 (0.1% AEP) year event
	Fluvial	Greater than a 1:1000 (0.1% AEP) year event

Once a flood zone has been identified, the guidelines set out the different types of development appropriate to each zone. Exceptions to the restriction of development due to potential flood risks are provided for through the use of the **Justification Test**, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated. This recognises that there will be a need for future development in existing towns and urban centres that lie within flood risk zones, and that the avoidance of all future development in these areas would be unsustainable.

A three staged approach to undertaking an FRA is recommended:

Stage 1: Flood Risk Identification – Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment;

Stage 2: Initial Flood Risk Assessment – Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measure;

Stage 3: Detailed Flood Risk Assessment – Assess flood risk issues in sufficient detail to provide quantitative appraisal of potential flood risk of the development, impacts of the flooding elsewhere and the effectiveness of any proposed mitigation measures.

This report addresses the requirements for Stage 1.

2.2 SDCC Draft Development Plan 2022 – 2028

Section 13.9.1 (Water Management) of the SDCC Draft Development Plan 2022 – 2028 states the following with regards flood risk:

> *Flood Risk Assessment Flood risk management will be carried out in accordance with the Flood Risk Management Guidelines for Planning Authorities, DOECLG (2009) and Circular PL2/2014. The Dodder CFRAMS, Eastern CFRAMS (Catchment and Flood Risk Assessment and Management) and the South Dublin Strategic Flood Risk Assessment (2021) provide information in relation to known flood risk in South Dublin County (see Development Plan Green Infrastructure (GI) Map).*
>
> - *Development proposals on lands that may be at risk of flooding should be subject to a flood risk assessment, prepared by an appropriately qualified Chartered Engineer, in accordance with the Flood Risk Management Guidelines. Detailed flood risk assessments should be cognisant of possible pluvial flood risk and appropriate drainage proposals should be implemented to reduce the risk of pluvial flooding; and*
> - *Proposals for minor development to existing buildings (e.g. extensions or change of use) in areas of flood risk should include a flood risk assessment of appropriate detail.*

A Draft Strategic Flood Risk Assessment (SFRA) was completed for SDCC in May 2021 to supplement the SDCC Draft Development Plan 2022-2028. The objectives of the SFRA are listed as follows:

- *To undertake site specific flood risk assessments for all new developments in accordance with The Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009).*
- *Ensure that future developments are designed and constructed in accordance with the "Precautionary Principle" detailed in The OPW Guidelines.*
- *To ensure that hydromorphological assessments are undertaken where proposed development is within lands which are partially or wholly within the Riparian Corridors identified as part of this Development Plan.*
- *To require development proposals that are within riparian corridors to demonstrate how the integrity of the Riparian Corridor can be maintained and enhanced having regard to flood risk management, biodiversity, ecosystem service provision, water quality and hydromorphology.*
- *To promote and protect native riparian vegetation along all watercourses and ensure that a minimum 10m vegetated riparian buffer from the top of the riverbank is maintained/reinstated along all watercourses within any development site.*

2.3 Land Zoning

The land on which the development is proposed is currently zoned as "HA - *To protect and enhance the outstanding natural character and amenity of the Liffey Valley, Dodder Valley and Dublin Mountains areas"* in the South Dublin County Council Development Plan 2016 - 2022.

2.4 Flood Risk Management Plan

The Office of Public Works (OPW) publish Flood Risk Management Plans detailing the feasible range of flood risk management measures proposed for their respective river basins. The Flood Risk Management Plan for the Liffey-Dublin Bay (UOM09) River Basin was published by the OPW in 2018. The plan lists current flood management measures in place and potentially viable Flood Relief Works. There are a number of measures proposed in the plan which are applicable for all areas. However, no additional measures (outside of maintenance of existing drainage systems) specific to the area surrounding the site are proposed.

3.0 Flood Risk Identification

3.1 Existing Hydrological Environment

The proposed site is located in Fonthill, Dublin 20. The River Liffey is situated approximately 400m to the north of the site and a small tributary of the River Liffey, the Quarryvale River, is located 200m to the north-east. The hydrological environment around the site is shown in Figure 3-1.

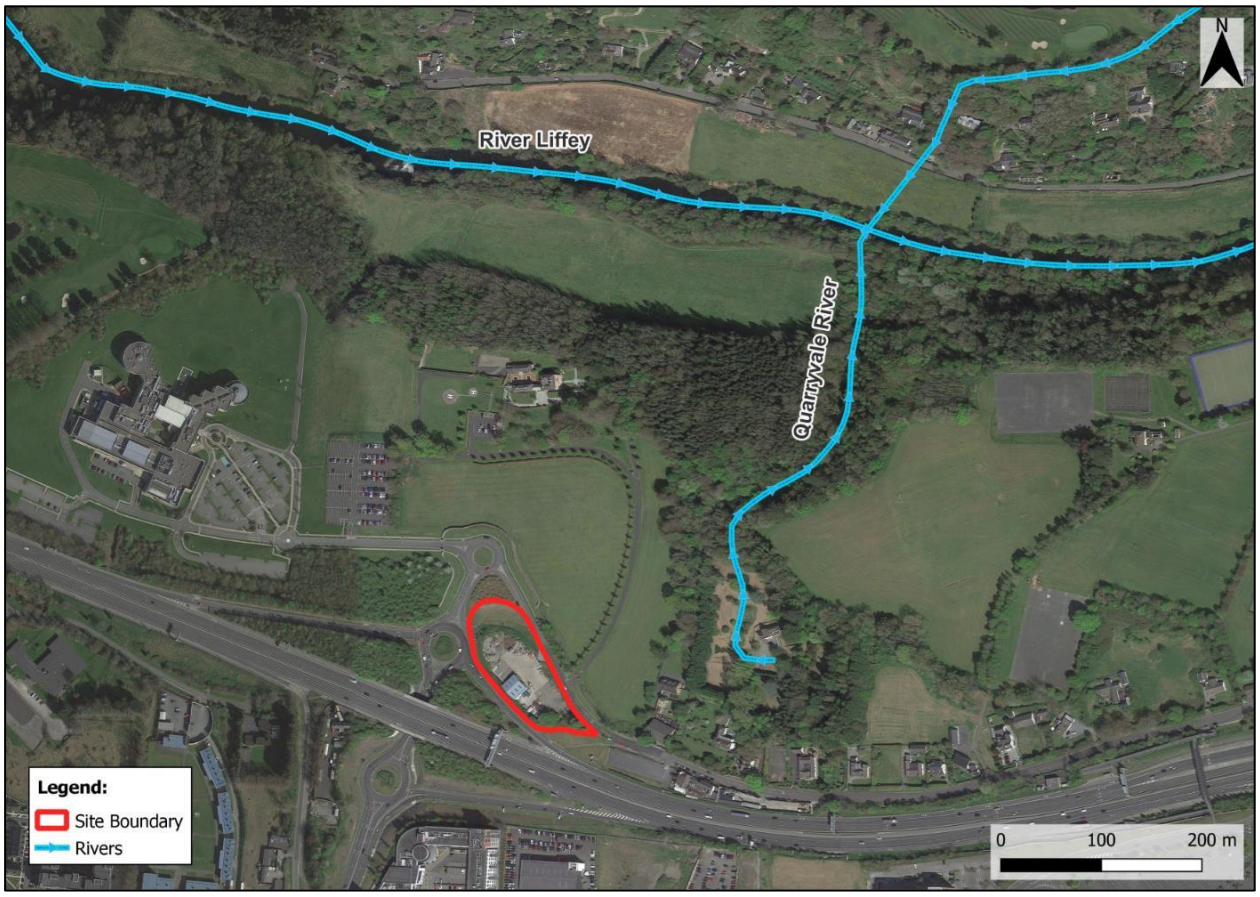


Figure 3-1: Existing Hydrological Environment

3.2 Topographical Survey

A topographical survey of the site and its environs was completed by Precision Surveys in January 2018.

The survey shows that the ground fall from south-east to north-west, with a high point of 56mOD at the south-eastern boundary falling to 49mOD at the north-western extent. The site currently houses a salt barn and concrete hard-standing area. The topographical survey extent is shown in Figure 3-2.

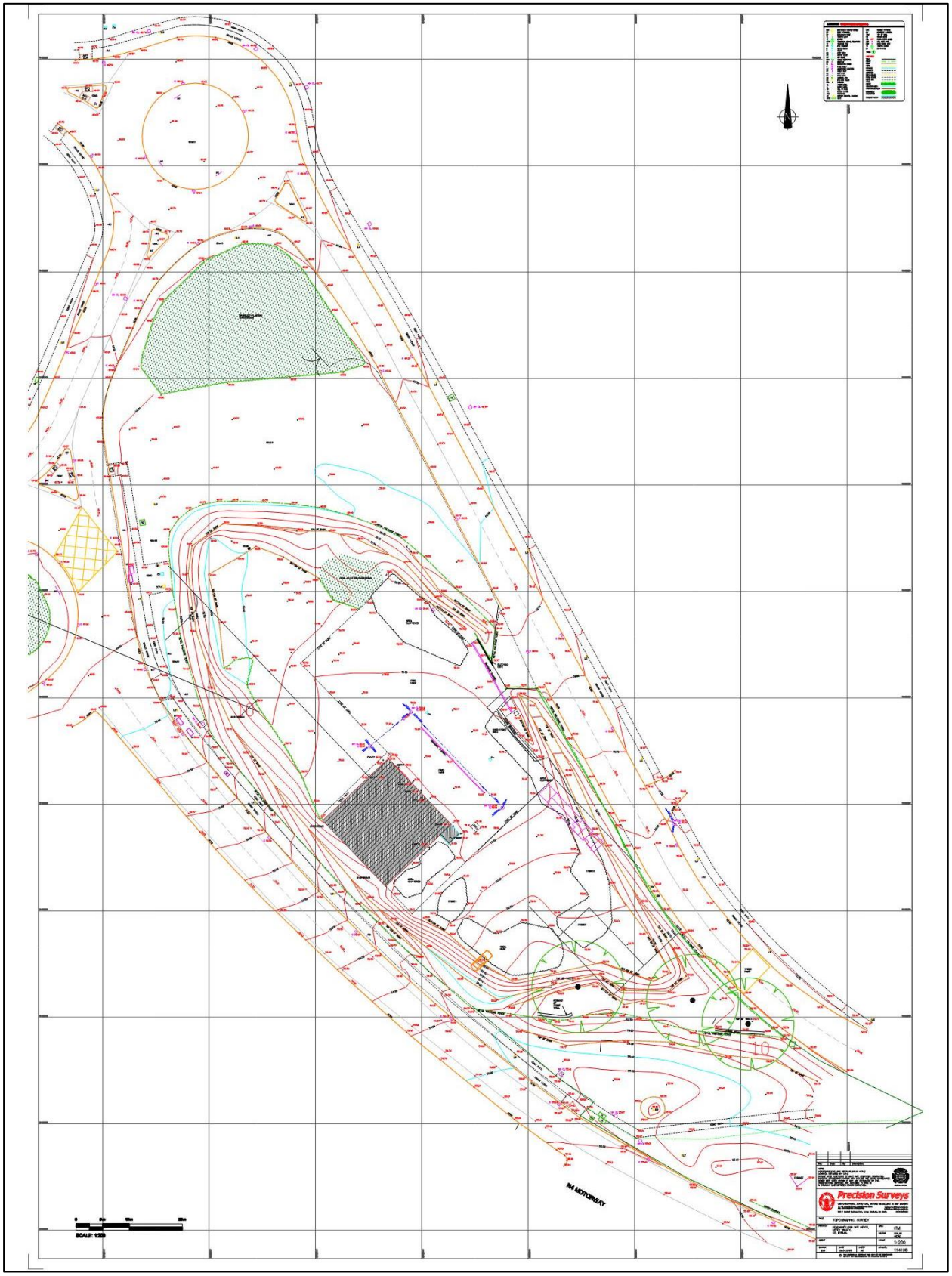


Figure 3-2: Topographical Survey Extent

3.3 Site Geology

The GSI quaternary map was reviewed and an extract from this map is shown in Figure 3-3. This indicates the area to be 'Till derived from limestones.'

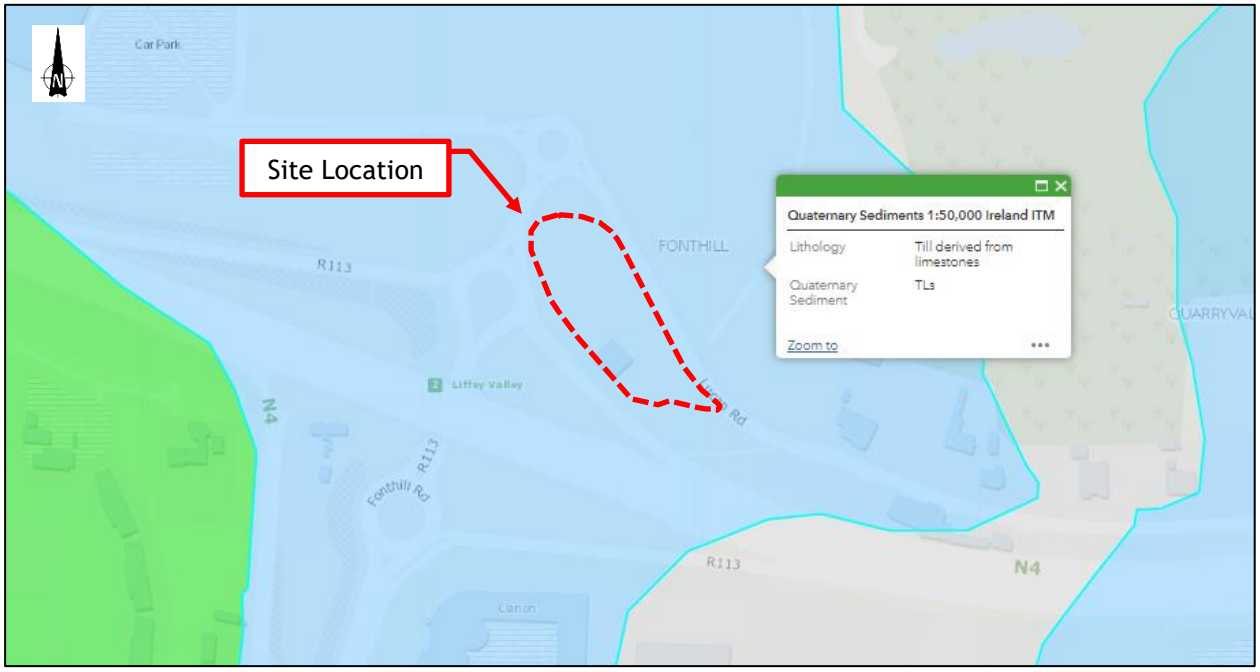


Figure 3-3: Geology of the surrounding area

3.4 Groundwater Flooding

A review of the GSI Groundwater Flooding Probability Maps has not identified groundwater flooding risk in the area.

3.5 Review of Existing Surface Water Infrastructure

An online review of the existing surface water infrastructure in the vicinity of the site was carried out and the results are shown in Figure 3-4. An existing storm water sewer of unknow diameter was identified within the site along the south-western boundary and a second storm water sewer, 225mm in diameter, was found at the eastern end of the site.

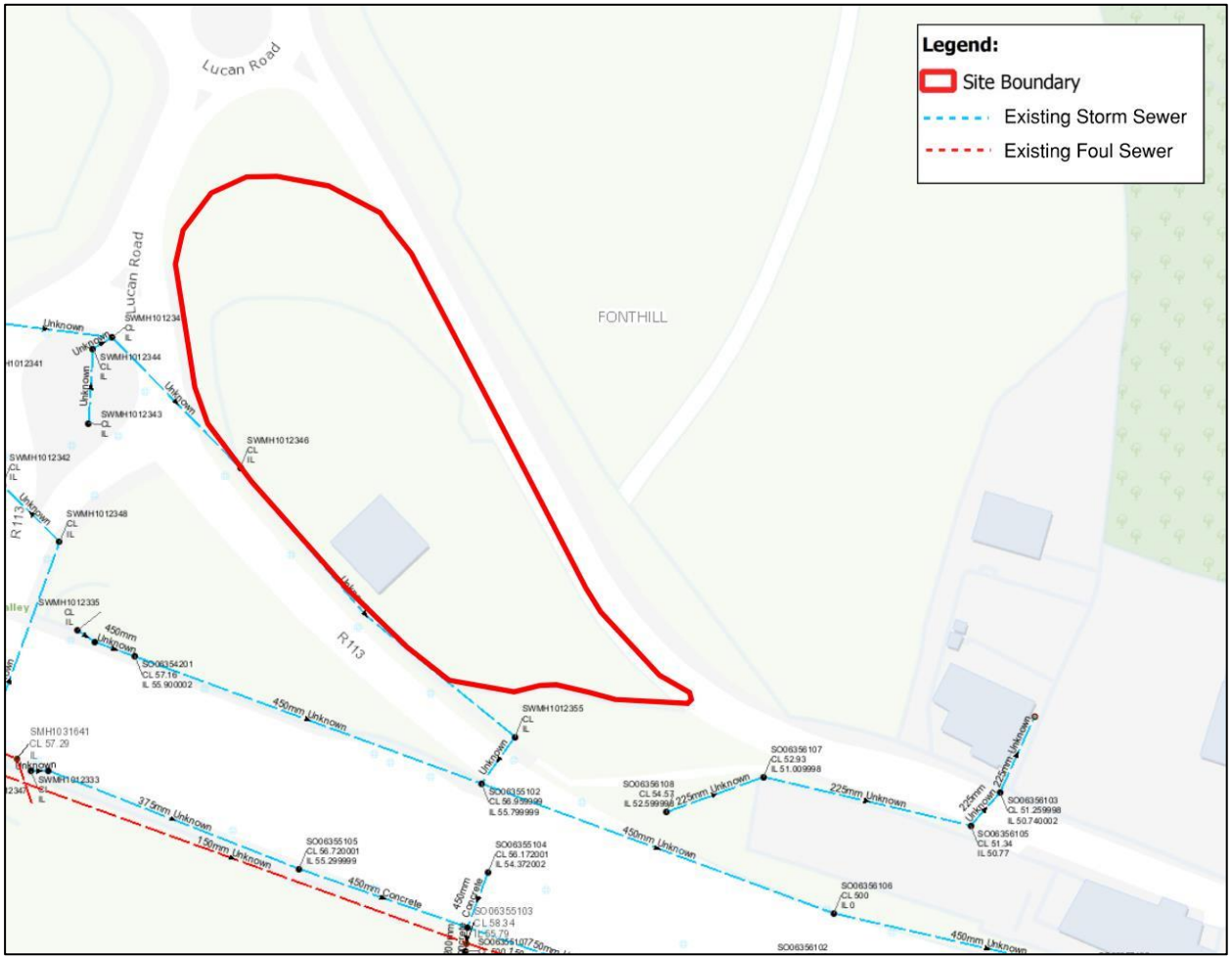


Figure 3-4: Existing Surface Water Infrastructure

3.6 Review of Historic Mapping

A review of the OSI Historical maps[1] was carried out. Figure 3-5 shows an extract from the 25-inch historic map for the site. The site is not indicated as "liable to flood" in the available historic OSI maps.

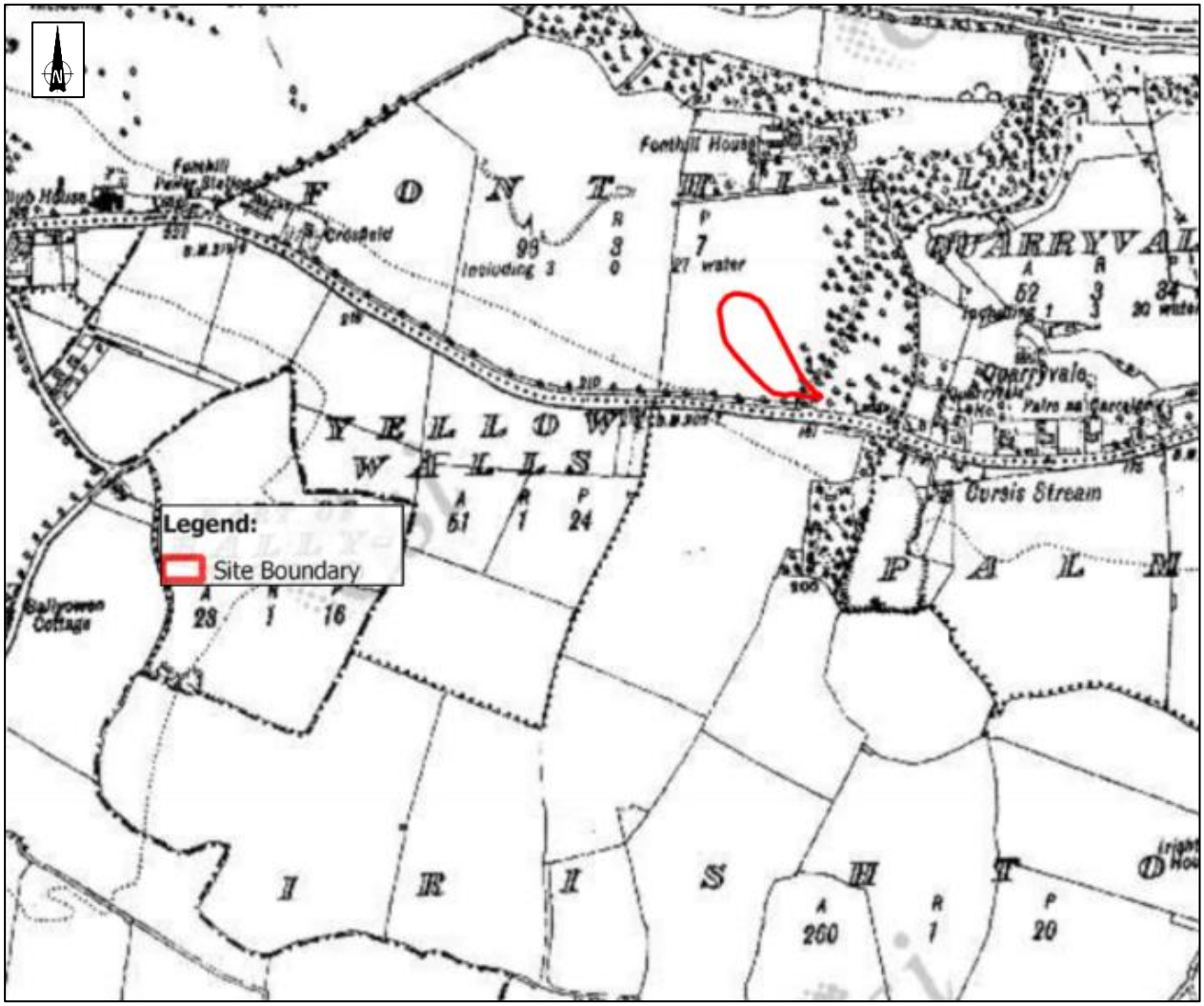


Figure 3-5: Extract from OSI historical 25-inch map

3.7 History of Flooding

The Office of Public Works (OPW) Flood Hazard Mapping website holds a record of historic flood events. A review of the database indicates no records of flooding on the proposed site as shown in Figure 3-6 below. See Appendix A for full report.

[1] Maps available: http://map.geohive.ie/mapviewer.html

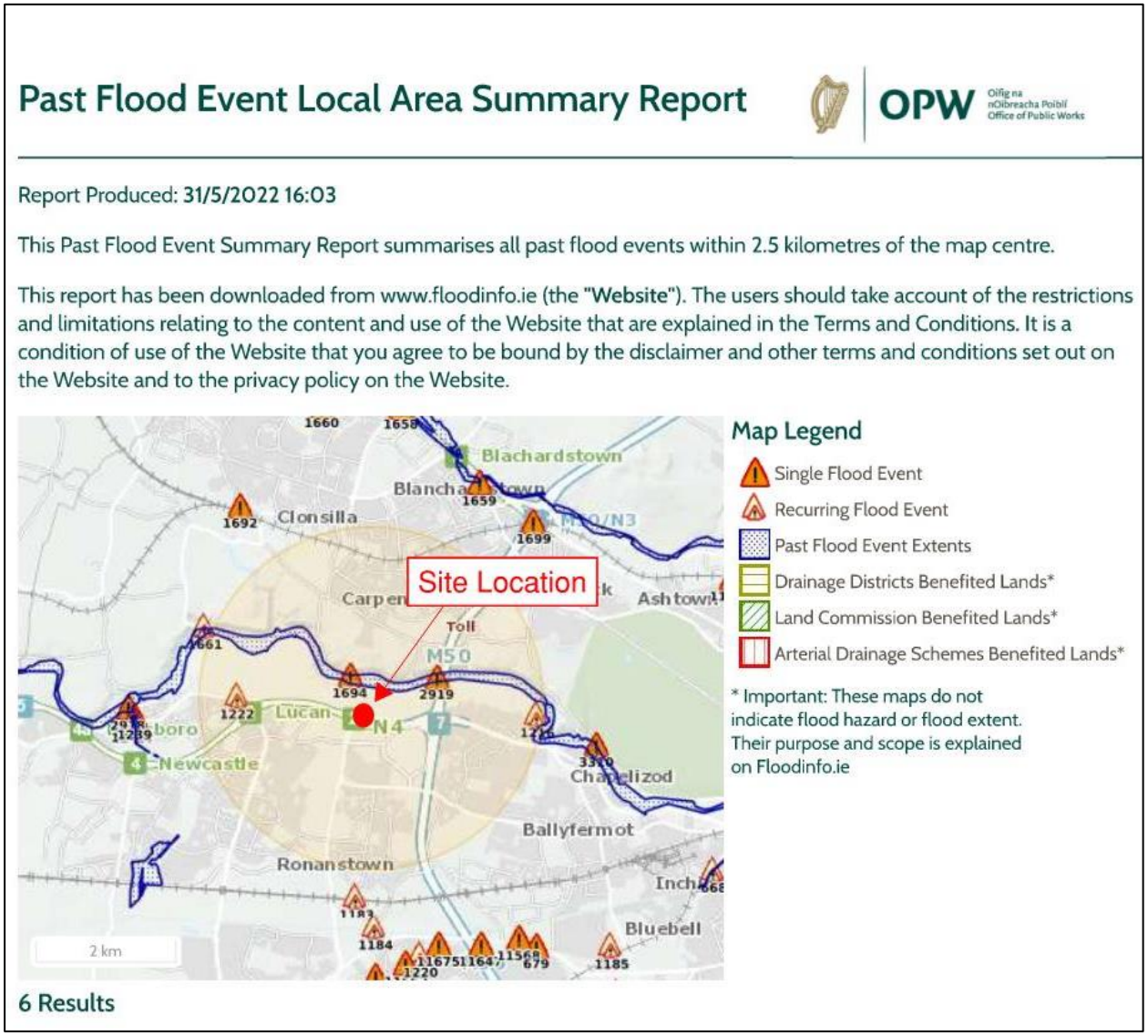


Figure 3-6: Extract from OPW Floodmaps Database Report (see Appendix B for full report)
http://www.floodmaps.ie/index.aspx?ReturnUrl=%2fView%2fDefault.aspx

Please note that this is not a guaranteed record of all flood events.

3.8 Preliminary Flood Risk Assessment Mapping

The Catchment Flood Risk Assessment and Management Study (CFRAMS) is an OPW led national programme which seeks to identify and map potential existing and future flood hazard in areas at significant risk from flooding. It also aims to identify flood relief measures and prepare Flood Risk Management Plans for these areas.

Prior to the publication of the detailed CFRAMS flood mapping, a series of Preliminary Flood Risk Assessment (PFRA) maps were published. These maps indicated preliminary pluvial, fluvial and coastal flood zones for 1% AEP (Flood Zone A) and 0.1% AEP (Flood Zone B) return period events. The PFRA flood extents in the vicinity of the proposed site are shown in Figure 3-7 below.

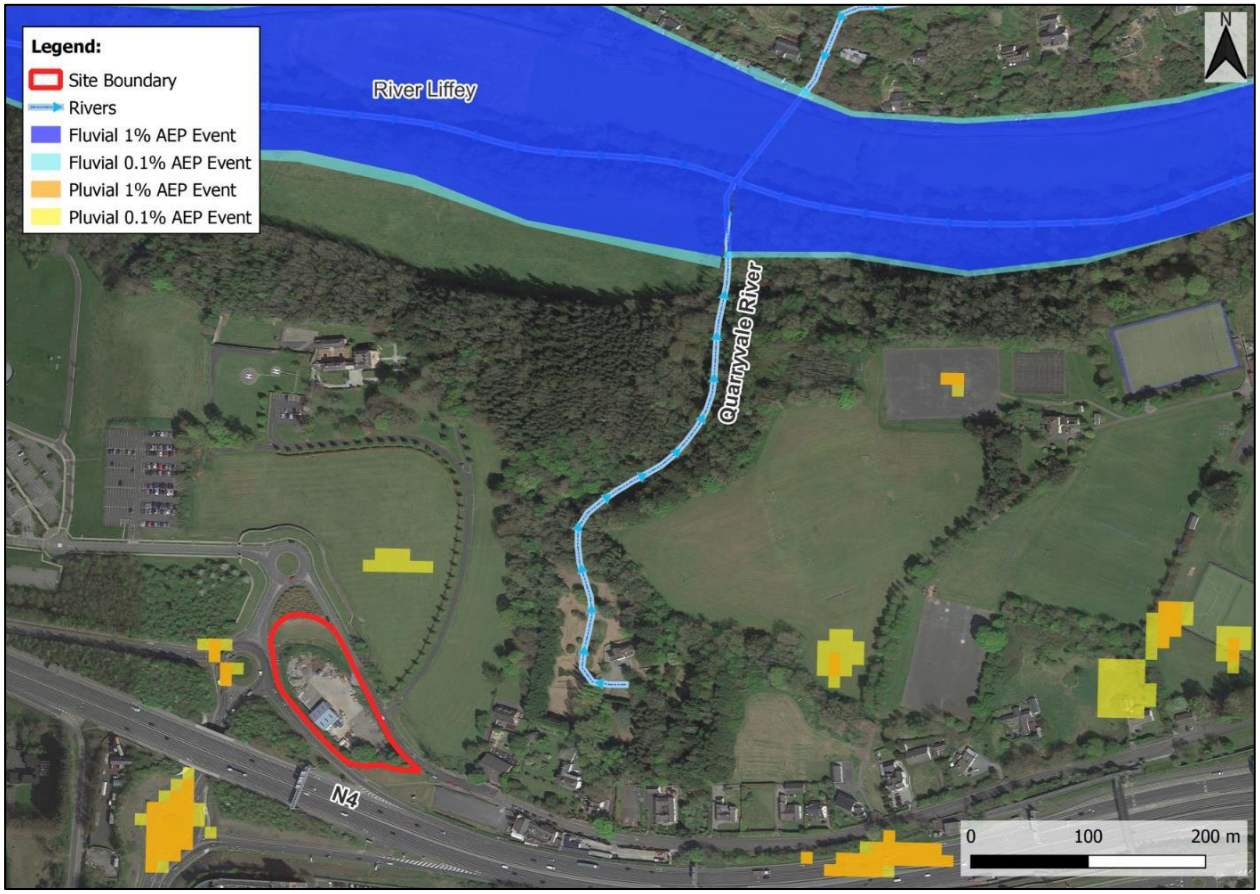


Figure 3-7: PFRA Flood Extents

The PFRA mapping in Figure 3-7 suggests that the site is not at risk of fluvial or pluvial flooding for the 1% or 0.1% AEP events and is therefore within Flood Zone C.

It is noted that the PFRA modelling is a high-level study which uses a coarse ground model to represent the topography of the country and does not take existing flood defences into account. As such PFRA fluvial, pluvial and coastal flood extents are to be utilised as an initial assessment only. CFRAMS mapping discussed in Section 3.10 is deemed more accurate, where available.

3.9 National Indicative Fluvial Mapping

In October 2021 a set of second generation national PFRA maps were produced under the guidance of the OPW as part of the National Indicative Flood Mapping (NIFM) Project. These maps are of higher quality and accuracy than the original PFRA maps and serve to enable improved flood risk assessment for those areas not covered by CFRAMS detailed flood risk assessment mapping. NIFM has not been prepared for the area relevant to this SSFRA as flood risk for these lands has been assessed as part of the Eastern CFRAMS.

3.10 CFRAMS Mapping

As part of the CFRAMS programme, mapping is available online for public viewing, and the local area has been assessed as part of the Eastern CFRAM UoM09 (Liffey and Dublin Bay River Basin). The OPW has published detailed flood hazard mapping for the area based on results from the CFRAMS. This includes flood extent and flood depth mapping for a number of return periods for fluvial and coastal flood events. The CFRAMS assessment in this area is based on hydraulic modelling of the River Liffey and its tributaries.

Figure 3-8 below is an extract from the relevant Eastern CFRAMS Fluvial Flood Map. Full CFRAMS maps for the area are included in Appendix B of this report.

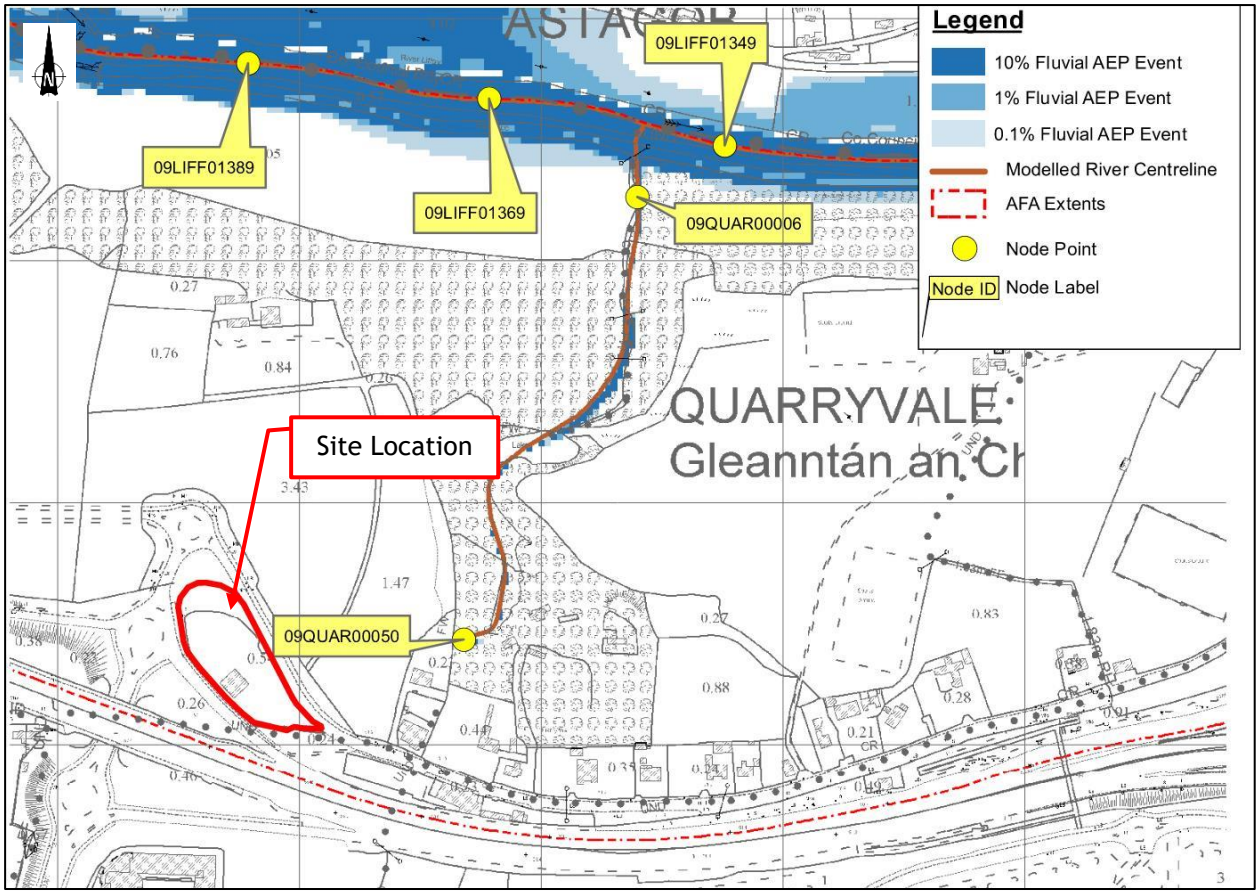


Figure 3-8: Extract from the CFRAMS fluvial map for the area (site indicated in red)
Maps available: http:// http://www.floodinfo.ie/map/floodmaps/

Examination of Figure 3-8 reveals that the subject site is located in Flood Zone C for fluvial flooding.

3.11 Strategic Flood Risk Assessment

A Draft Strategic Flood Risk Assessment report was prepared in May 2021 to supplement SDCC's Draft Development Plan 2022 - 2028. An extract from SDCC *SFRA Flood Zone Mapping (Sheet 2 of 26)* is presented here as Figure 3-9 and shows that the site is located in Flood Zone C. Refer to Appendix A for full SDCC SFRA Zone Mapping relevant to the site.

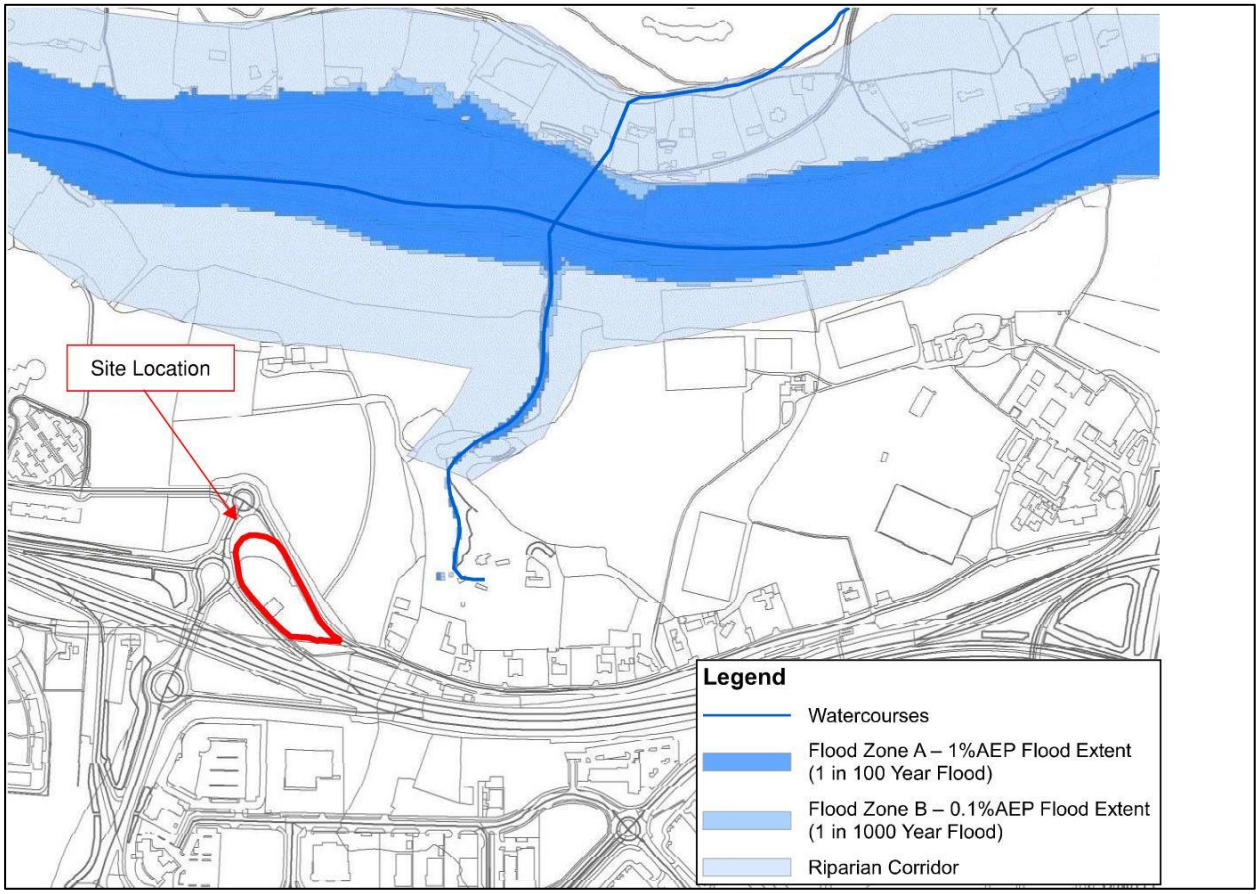


Figure 3-9: Extract from SDCC SFRA Flood Zone Mapping

3.12 Summary of Flooding Sources

3.12.1 Coastal Flood Risk

Coastal flooding results from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influenced by the following three factors which often work in combination: high tide level, storm surges and wave action.

No coastal flood risk has been identified for this site as it is located approximately 12km from the sea and general ground levels here are higher than expected extreme coastal flood levels.

3.12.2 Fluvial Flood Risk

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain.

CFRAMS flood mapping indicates that the proposed development is located in Flood Zone C, and as such there is no fluvial flood risk to the site of the proposed development for the 1% AEP and 0.1% AEP events.

3.12.3 Pluvial Flood Risk

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall and typically occurs in the summer months. The Preliminary Flood Risk Assessment (PFRA) mapping has not identified any pluvial flood risk to this site for the 1% and 0.1% AEP events.

Any runoff generated within the site will be addressed by the provision of Stormwater Infrastructure associated with the proposed development.

3.12.4 Groundwater Flooding

Groundwater flooding occurs when the level of the water stored in the ground rises as a result of prolonged rainfall. From a review of the available information, the site is not considered to be at risk of groundwater flooding.

3.13 Estimate of Flood Zone

PUNCH Consulting Engineers have reviewed the available information as outlined in the above sections. We have concluded that the site is located in Flood Zone C for fluvial flooding and is therefore at low risk of flooding.

4.0 Conclusions

PUNCH Consulting Engineers were appointed by SDCC to carry out a Site-Specific Flood Risk Assessment for a proposed additional Salt Barn and New Mechanical Services Depot at Old Lucan Road, Fonthill, Dublin 20.

This Site-Specific Flood Risk Assessment has been carried out in accordance with *"The Planning System & Flood Risk Management Guidelines"* published by the Department of the Environment, Heritage and Local Government in November 2009 and the SDCC Draft Development Plan 2022 - 2028.

A review of the flood risk in the area was carried out as the site is located approximately 200m from Quarryvale River and approximately 400m from the River Liffey.

Flood Maps produced as part of the CFRAMS were consulted to establish the Flood Zone. It was determined that the proposed development site is currently located in Flood Zone C for fluvial and coastal flooding.

The proposed development is at a low risk of flooding and is deemed appropriate within the proposed site location.

Appendix A OPW Past Flood Event Summary Report

Past Flood Event Local Area Summary Report

Report Produced: **31/5/2022 16:03**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "**Website**"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.

Map Legend

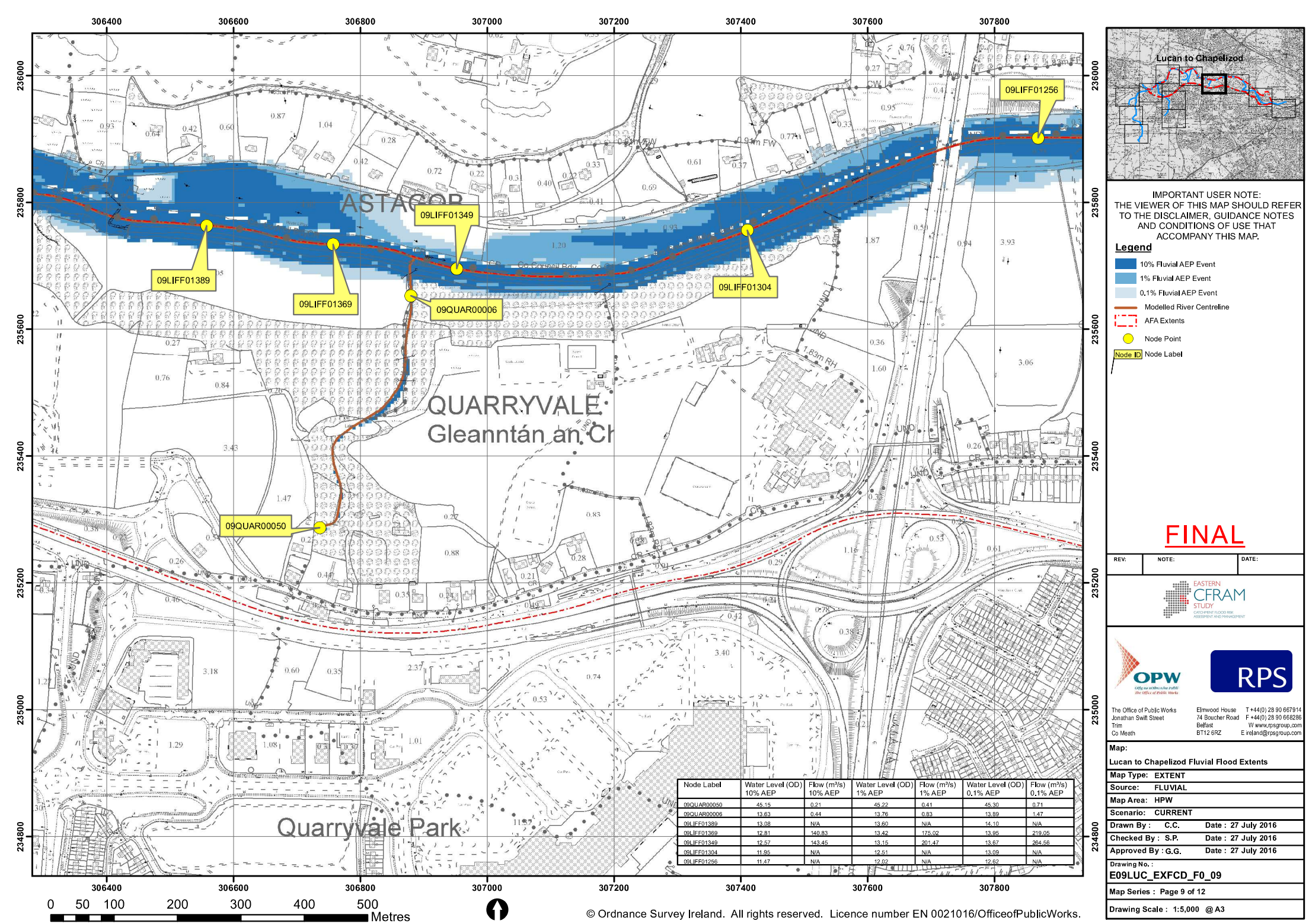
- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

6 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Palmerston Mill Lane Recurring (ID-1216)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
2.	Lucan St Edmonsbury Road Recurring (ID-1222)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
3.	Liffey R109 at the Strawberry Beds Nov 2002 (ID-1694)	13/11/2002	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
4.	Liffey Sommerton Rd Luttrellstown Golf C Oct 2004 (ID-2190)	26/10/2004	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
5.	Liffey Lower - Dec 1954 (ID-241)	08/12/1954	Area
	Additional Information: Reports (5) Press Archive (2)		
6.	Liffey Strawberry Beds June 1993 (ID-2919)	10/06/1993	Approximate Point
	Additional Information: Reports (2) Press Archive (1)		

Appendix B OPW CFRAMS Mapping



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09QUAR00050	45.15	0.21	45.22	0.41	45.30	0.71
09QUAR00006	13.63	0.44	13.76	0.83	13.89	1.47
09LIFF01389	13.08	N/A	13.60	N/A	14.10	N/A
09LIFF01369	12.81	140.83	13.42	175.02	13.95	219.05
09LIFF01349	12.57	143.45	13.15	201.47	13.67	264.56
09LIFF01304	11.95	N/A	12.51	N/A	13.09	N/A
09LIFF01256	11.47	N/A	12.02	N/A	12.62	N/A

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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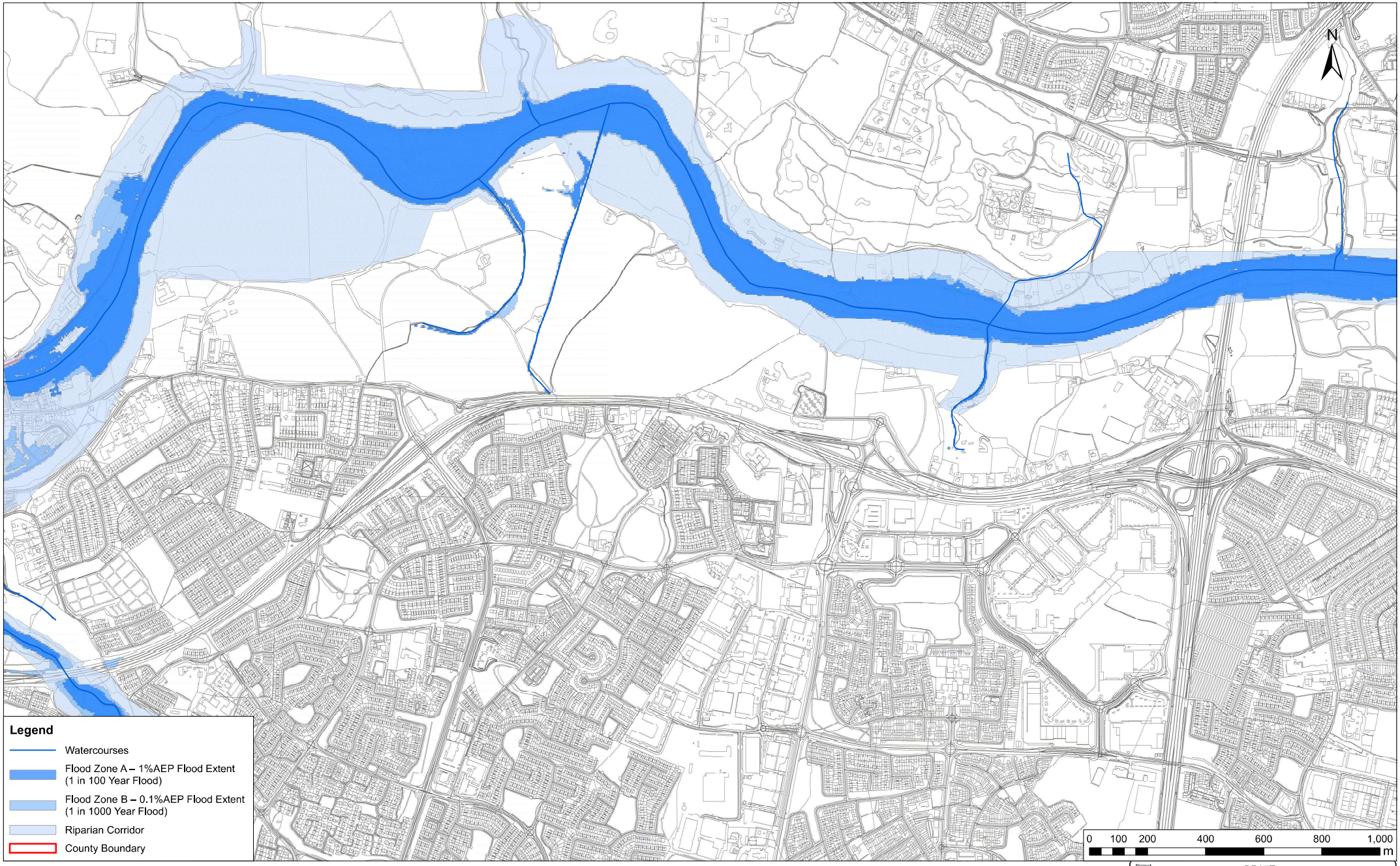
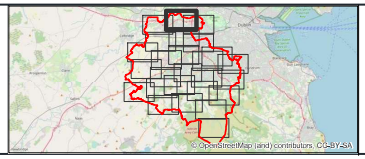
Map: Lucan to Chapelizod Fluvial Flood Extents

Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By : C.C.	Date : 27 July 2016
Checked By : S.P.	Date : 27 July 2016
Approved By : G.G.	Date : 27 July 2016
Drawing No. :	E09LUC_EXFCD_F0_09
Map Series :	Page 9 of 12
Drawing Scale :	1:5,000 @ A3

Appendix C SDCC SFRA Flood Zone Mapping



Comhairle Contae Átha Cliath Theas
South Dublin County Council



No.	Revision	Date	By	Chk'd	App'd

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Drawn	Designed	Checked	Approved	Suitability Code - Description
LA	WV	WV	JPR	S2 - Information

Project Stage	DRAFT
Project Title	SDCC County Development Plan Stategic Flood Risk Assessment
Drawing Title	SFRA Flood Zone Mapping Sheet 2 of 26
Drawing Number	Project | Originator | Volume | Location | Type | Role | Number SDSFRA - ROD - EWE - SW_AE - DR - ENV - 40002
Scale (A1)	1:6,000
Date:	April 2021
Job No:	20.126
Rev:	

DO NOT SCALE USE FIGURED DIMENSIONS ONLY