

Project

Ashbourne SHD

Report Title

Site Specific Flood Risk Assessment

Client

Arnub Ltd. & Aspect Homes (ADC) Ltd

INFRASTRUCTURE



September 2022



DBFL CONSULTING ENGINEERS

Job Title: Ashbourne SHD

Report Title: Site Specific Flood Risk Assessment

Job Number: 200059

Report Ref: 200059-DBFL-CS-SP-RP-C-0002

Author: Jack Butler

Approved by: Brendan Manning

Date: September 2022

Distribution: Planning
Client
Architect
Planning Consultant
File

DBFL Consulting Engineers

Dublin Office

Ormond House
Ormond Quay
Dublin 7

Tel 01 4004000

Email info@dbfl.ie

Web www.dbfl.ie

Waterford Office

Suite 8b, The Atrium,
Maritana Gate, Canada
Street,
Waterford. X91W028

Tel 051 309500

Email info@dbfl.ie

Web www.dbfl.ie

Cork Office

14 South Mall
Cork
T12CT91

Tel 021 202 4538

Email info@dbfl.ie

Web www.dbfl.ie

Revision	Issue Date	Description	Prepared	Reviewed	Approved
*	10/12/2021	Draft	JLB	BCM	DJR
P01	15/12/2021	SHD Stage 2 Final	JLB	BCM	DJR
*	23/08/2022	Stage 3 (draft)	JLB	BCM	DJR
P02	02/09/2022	SHD Stage 3 Final	JLB	BCM	DJR

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 Background	1
1.2 Objectives.....	2
1.3 Flood Risk Assessment Scope	2
1.4 Approach	2
1.5 Existing Site.....	2
2.0 PLANNING SYSTEM & FLOOD RISK MANAGEMENT GUIDELINES .5	
2.1 General.....	5
2.2 Sequential Approach.....	5
2.3 Flood Risk Assessment Stages	6
3.0 STAGE 1 - FLOOD RISK IDENTIFICATION STAGE	7
3.1 General.....	7
3.2 Information Sources Consulted.....	7
3.3 Source-Pathway-Receptor Model	9
4.0 STAGE 2 - INITIAL FLOOD RISK ASSESSMENT STAGE	11
4.1 Initial Fluvial Flood Risk Assessment.....	11
4.2 Initial Pluvial Flood Risk Assessment.....	11
4.3 Flood Zone Category	11
5.0 STAGE 3 - DETAILED FLOOD RISK ASSESSMENT STAGE.....	12
5.1 General.....	12
5.2 Surface Water Management	12
5.3 Flood Exceedance.....	13
5.4 Impact on Adjacent Areas	14
5.5 Climate Change.....	14
5.6 Sustainable Urban Structure	14
5.7 Residual Risks.....	14
5.8 Mitigation Measures	14
6.0 CONCLUSIONS	16

APPENDICES

- Appendix A . OPW FLOOD HAZARD WEBSITE REPORT**
- Appendix B . EXTRACT FROM STRATEGIC FLOOD RISK ASSESSMENT
FOR COUNTY MEATH**
- Appendix C . OVERLAND FLOW PATH**

1.0 INTRODUCTION

1.1 Background

DBFL Consulting Engineers have been instructed by the applicant to undertake a “Site Specific Flood Risk Assessment” (SSFRA) for a proposed residential development at Cherry Lane, Ashbourne, Co. Meath.

The proposed development comprises of 702 residential unit’s street layout, access and associated site services on a greenfield site

The application also includes associated infrastructure comprising a road layout, streets, footpaths and site services including foul and surface water drainage and watermains in accordance with Meath County Council’s Development Plan (2021-2027) and Irish Water’s Code of Practice for Water & Wastewater infrastructure (July 2020).



Figure 1.1: Proposed site location

1.2 Objectives

The objectives of this report are to inform the planning authority in relation to flood risk associated with the development of the lands.

The report will assess the site in accordance with the requirements of “*The Planning System and Flood Risk Management Guidelines for Planning Authorities*” and its Technical Appendices (Office of public Works, November 2009).

The report will provide the following;

- The site’s flood zone category.
- Information to allow an informed decision of the planning application in the context of flood risk.
- Appropriate flood risk mitigation and management measures for any residual flood risk

1.3 Flood Risk Assessment Scope

This SSFRA relates only to the proposed development lands at Cherry Lane, Ashbourne (as described in Section 1.0 of this report) and its immediate surroundings.

This report uses information obtained from various sources, together with an assessment of flood risk for the existing land and proposed development.

The report follows the requirements of ‘*The Planning System & Flood Risk Management – Guidelines for Planning Authorities*’, (referred to as the *Guidelines* for the remainder of this report).

1.4 Approach

Section 2.0 of this report considers ‘*The Planning System & Flood Risk Management – Guidelines for Planning Authorities*’ as they relate to the subject site.

Flood risk identification is presented in Section 3.0 and initial flood risk assessment in Section 4.0. A more detailed assessment of specific flood risk and residual risk relating to the proposed development is presented in Section 5.0.

Conclusions and recommendations are presented in Section 6.0.

1.5 Existing Site

The subject site has an overall area of approximately 20.04 Ha. The site is located to the south-east of Ashbourne town centre in Co. Meath.

The site is bound primarily by existing agricultural land and residential developments to the north. Cherry Lane and Hickeys Lane provide access points to the proposed development off the Dublin Road.

The site, predominantly green-field, falls within the Meath County Development Plan, 2021-2027. As indicated on the Figure 1.2, the majority of the subject site is zoned A2 – New Residential (To provide for new residential communities with ancillary community facilities, neighbourhood facilities and employment uses as considered appropriate for the status of the centre in the Settlement Hierarchy), with the small portion zoned G1 - Community Infrastructure (refer to Figure 1.3).

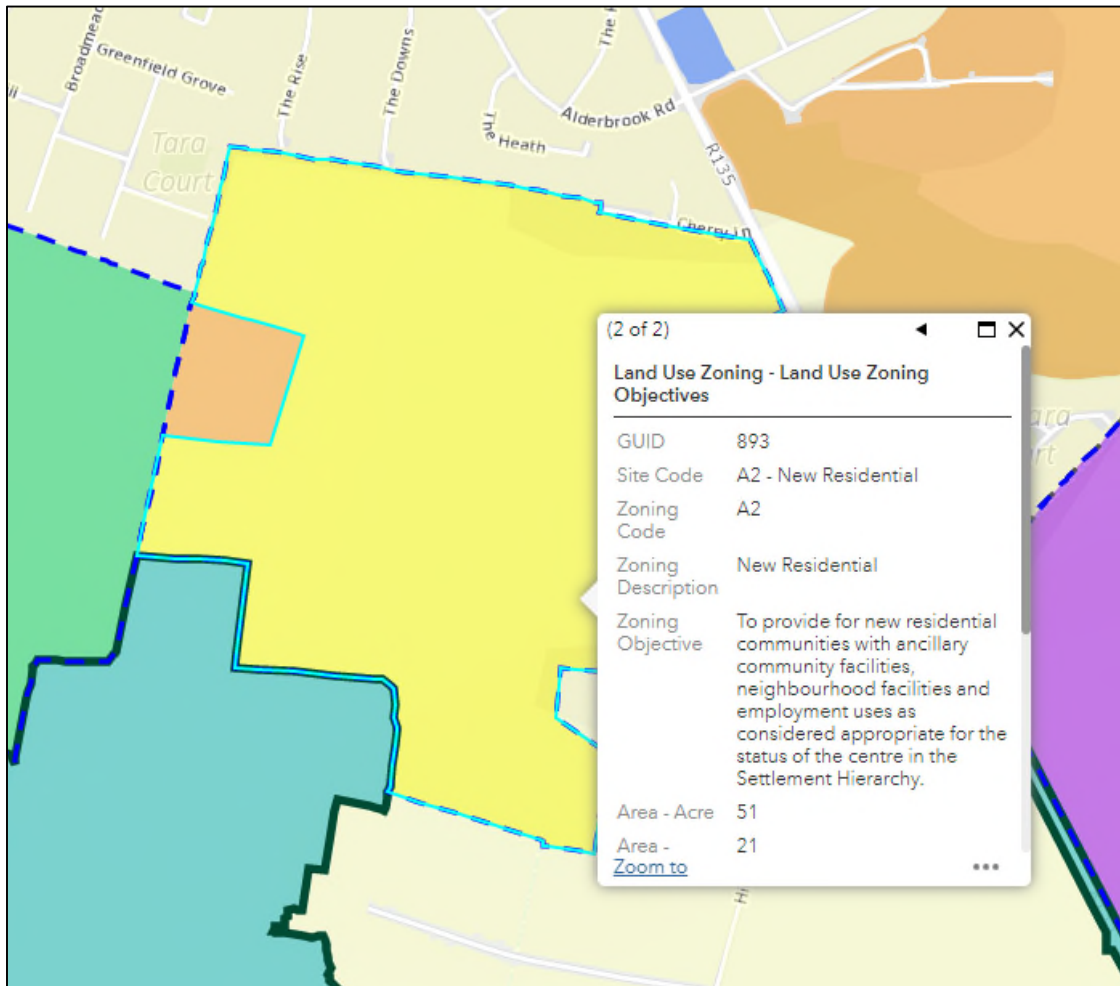


Figure 1.2 – Extract from Ashbourne Land Use Zoning Map (Meath County Development Plan 2021-2027)

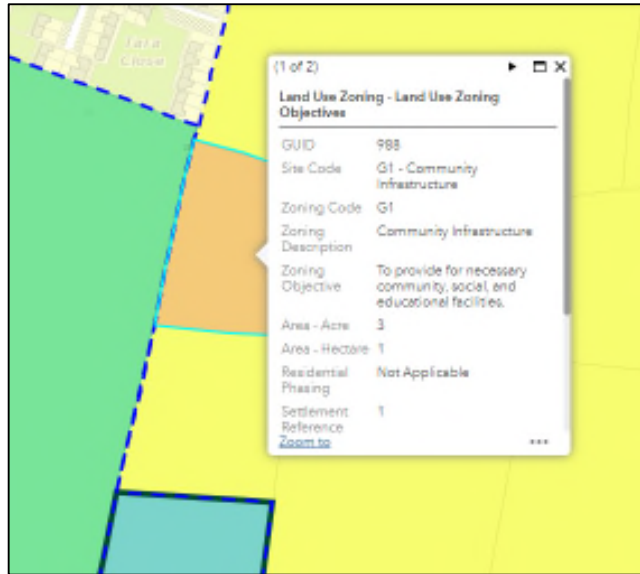


Figure 1.3 – Extract from Ashbourne Land Use Zoning Map (Meath County Development Plan 2021-2027)

There are no watercourses in the immediate vicinity of the site and the site is located approximately 19km west of the Irish Sea (air distance). The nearest EPA designated watercourse is the Broadmeadows located approx. 720m of the site's eastern boundary (air distance), as shown in Figure 1-4.

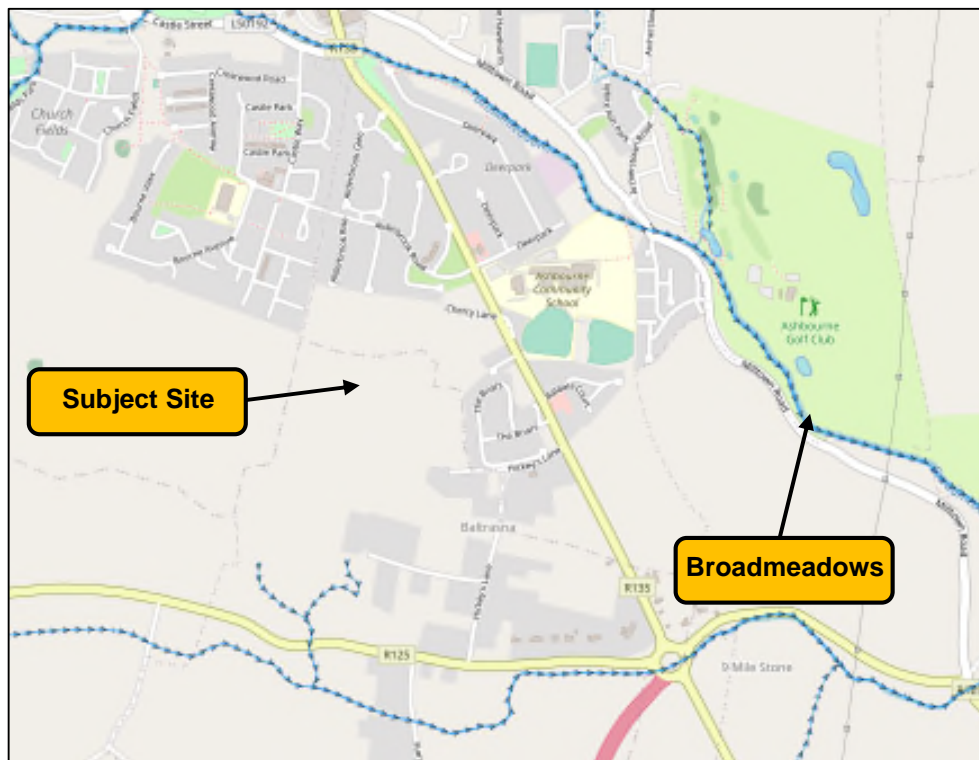


Figure 1.4 – Extract from EPA online mapping

2.0 Planning System & Flood Risk Management Guidelines

2.1 General

“The Planning System and Flood Risk Management Guidelines for Planning Authorities” and its Technical Appendices outline the requirements for a Site-Specific Flood Risk Assessment.

Table 3.1 of the Guidelines classifies dwelling houses as “highly vulnerable development”.

Table 3.2 of the Guidelines indicates that this type of developments is required to be in Flood Zone C i.e. where probability of flooding from rivers is low (less than 0.1% AEP (Annual Exceedance Probability)). A Justification Test is required for the development management to locate a “highly vulnerable development” in Flood Zone A or Flood Zone B.

2.2 Sequential Approach

This site-specific flood risk assessment (SSFRA) will initially use existing flood risk information to determine the flood zone category of the Site i.e. to determine whether the development is considered appropriate or whether a justification test is required, see Figure 2.1 below for details.

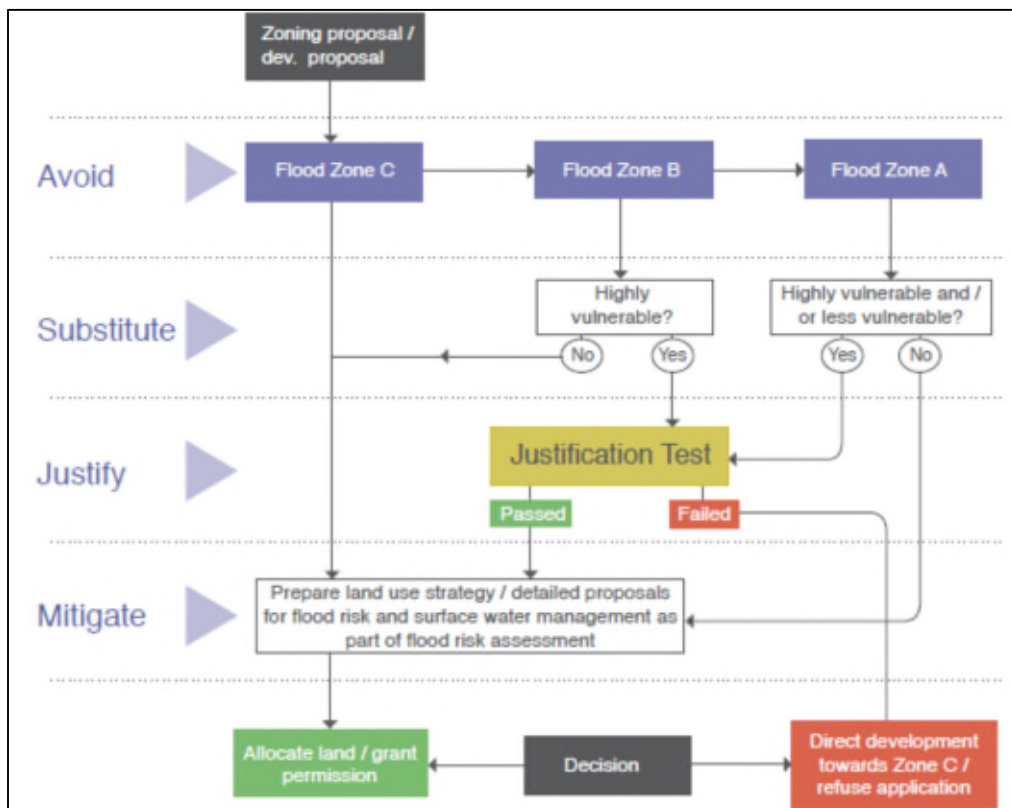


Figure 2.1 – Sequential Approach mechanism in the Planning Process (Figure 3.2 of The Planning System and Flood Risk Management Guidelines)

2.3 Flood Risk Assessment Stages

Flood risk is normally assessed by a flood risk identification (Stage 1) stage followed by an initial flood risk assessment (Stage 2). A more detailed flood risk assessment (Stage 3) then follows which includes an assessment of surface water management, flood risk and mitigation measures to be applied.

The following report sections outline the flood risk assessment stages for the proposed development which follow the requirements of the Guidelines' Technical Appendices.

3.0 Stage 1 - Flood Risk Identification Stage

3.1 General

The initial flood risk identification stage uses existing information to identify and confirm whether there may be flooding or surface water management issues for the lands that may require further investigation.

3.2 Information Sources Consulted

Information sources consulted for the identification exercise are outlined in table 3.1 below.

Information Source	Comments
Predictive and historic flood maps, and Benefiting Lands Maps, such as those at http://www.floodinfo.ie	Information obtained (and reviewed) from http://www.floodinfo.ie (OPW website). See Appendix A for OPW Flood Hazard Website Report
Expert advice from OPW who may be able to provide reports containing the results of detailed modelling and flood-mapping studies, including critical drainage areas, and information on historic flood events, including flooding from all sources;	Information obtained (and reviewed) from http://www.floodinfo.ie (OPW website). see Appendix B OPW flood map
Predictive fluvial flood maps;	CFRA flood extents map consulted.
Previous Strategic Flood Risk Assessments;	Eastern CFRAM Study consulted.
Topographical maps, in particular digital elevation models produced by aerial survey or ground survey techniques;	OSI Maps consulted & Site topographic survey undertaken.
Information on flood defence condition and performance;	No flood defence information available.
Maps of the Geological Survey of Ireland (which would allow the potential for the implementation of source control and infiltration techniques, groundwater and overland flood risk to be assessed). These maps, while not providing full coverage, can indicate areas that have flooded in the past (the source of the alluvium) and may be particularly useful at the early stages of the FRA process where no other information is available;	GSI maps consulted.
Walkover survey to assess potential sources of flooding, likely routes for flood waters and the site's key features, including flood defences;	Walkover survey conducted. No flooding or groundwater observed.
National, regional & local spatial plans, such as the National Spatial Strategy, regional planning guidelines, development plans & local area plans provide key information on existing and potential future receptors.	Meath County Council Development Plan (2021 – 2027) consulted.

Table 3.1 - Information sources consulted

3.2.1 OPW Predictive, Historic & Benefiting Lands Maps & Flood Hazard Information

OPW's Summary Local Area Report is included in Appendix A. This report has been obtained from the OPW website (www.floodinfo.ie) and summarizes all flood events within 2.5km of the subject site.

The report identifies 5 previous flood events within 2.5km of the proposed site the last of which occurred by the Broadmeadow Stream on the 15th of November 2002.

3.2.2 Previous Strategic Flood Risk Assessments & Predictive Flood Maps

As part of the EU Floods Directive, the OPW is undertaking a Catchment Flood Risk Assessment and Management (CFRAM) Study. An initial part of this Study was a national Preliminary Flood Risk Assessment (PFRA) to identify areas at risk of significant flooding.

The PFRA report and maps are available at www.cfram.ie and identify areas deemed to be at risk of flooding (referred to as Areas for Further Assessment, or 'AFAs'), as they require more detailed assessment on the extent and degree of flood risk by the later CFRAM Studies. The Eastern Catchment Flood Risk Assessment and Management (CFRAM) study provides further assessment of areas identified in the PFRA for further investigation.

The final CFRAM Fluvial Flood Extents Map indicate that the subject site is in Flood Zone C and is not affected by fluvial flooding.

3.2.3 Tidal Flood Maps

Tidal flooding is not relevant to the site as Ashbourne is approximately 20km from the coast and more than 60m above sea level.

3.2.4 Other Sources

Other information sources were consulted to determine if there was any additional flood risk to the subject site, these included;

- Topographical surveys of the area – no evidence based on topography.
- Flood defences Information – no flood defence information available.
- Soil data from EPA and GSI – subsoils identified as limestone sands and shale.
- Groundwater information from GSI – no karst features or gravels identified in the site. Groundwater vulnerability of the site is moderate, and the bedrock aquifer is generally moderately productive.

- Site Investigation Report – No evidence of flooding within the development lands.
- Walkover survey – No evidence of flooding within the development lands.
- Development Plan & Local Area plan – lands are zoned for residential development.
- Existing Local Authority Drainage Records – an existing ditch that runs along the southern boundary of the site. Existing Ø375mm storm water sewer along the Dublin Road to the east of the site.
- Local Information & Local Authority Consultation – no evidence of flood risk to lands.
- Historic Maps – no evidence of flooding or marsh areas within the Site.

This Site-Specific Flood Risk Assessment concludes that the proposed residential development is appropriate for the site's flood zone category (Category C) for residential development. From a review of the 'other sources' above there does not appear to be evidence of flood risk to the development lands.

3.3 Source-Pathway-Receptor Model

A Source-Pathway-Receptor model was produced to summarize the possible sources of floodwater, the people and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals) and the pathways by which flood water for a 0.1%AEP (Annual Exceedance Probability) and 1%AEP storms could reach the receptors, see table 3.1. It provides the probability and magnitude of the sources, the performance and response of pathways and the consequences to the receptors in the context of the LAP development proposals. These sources, pathways and receptors will be assessed further by the initial flood risk assessment stage.

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Tidal	Tidal flooding from coast, 32km away	Entire Site	Remote	Low	Low
Fluvial	From Broadmeadow River	Residents, houses	Remote	Medium	Low
Surface Water Drainage (Pluvial)	Flooding from development's surcharging drainage systems	Residents (people), houses, and vehicles. Roads, pathways and open space areas.	Remote	Medium	Moderate
Groundwater flooding	Rising GWL on the site	Residents, houses	Remote	Low	Low
Human or Mechanical Error (Pluvial)	New drainage network blocks	Areas of development draining to the surface water network	Possible	Low	Moderate

Table 3.2 - Source-pathway-receptor analysis

4.0 Stage 2 - Initial Flood Risk Assessment Stage

Flood risks identified during Stage 1 – Flood Risk Identification, are outlined in Table 3.2 (Source Pathway Receptor Analysis) and noted below. These risks are assessed further in this section of the SSFRA.

- A possible risk of fluvial flood risk from the existing ditch.
- Pluvial flood risk following development.

The information sources identified in Section 3.2 are considered adequate for the purpose of an Initial Flood Risk Assessment for the site and no further technical studies are proposed.

4.1 Initial Fluvial Flood Risk Assessment

The final Eastern CFRAM Study indicates that the subject site is located within Flood Zone C i.e. is outside the 0.1%AEP (Annual Exceedance Probability). Therefore, the proposed development is appropriate for the subject site.

4.2 Initial Pluvial Flood Risk Assessment

The Source-Pathway-Receptor model identified that there could be potential for pluvial flood risk within the LAP lands related to future drainage networks to serve the proposed development. These have potential to cause local flooding unless they are designed in accordance with the regulations e.g. GSDSDS and to take account of flood exceedance e.g. for storms return periods over 1%AEP.

The Source-Pathway-Receptor model also identified that the proper operation and maintenance of the drainage system is necessary to reduce the risk of human or mechanical error causing pluvial flood risk from blockages etc.

4.3 Flood Zone Category

Following assessment of the flood risks to the Site and available flood data the entirety of the site is within Flood Zone Category C as defined by the Guidelines. The residential type of development proposed is therefore appropriate for this flood zone category. The Guidelines Sequential Approach is therefore met and the 'Avoid' principal achieved.

5.0 Stage 3 - Detailed Flood Risk Assessment Stage

5.1 General

Since the type of development proposed is appropriate for the Flood zone category C of the site, the detailed flood risk assessment stage will only consider pluvial flood risk in relation to the following;

- Proposed Surface Water Management measures.
- Flood Exceedance.
- Impact of proposals on flood risk to adjacent areas.
- Effects of climate change.
- Sustainable Urban Structure.
- Residual risks.
- Effectiveness of any flood mitigation measures.

5.2 Surface Water Management

The proposed storm-water proposals and drainage design for the development is generally a standard gully and pipe-work collection system with an attenuated outfall and associated attenuation storage.

The proposed new development will increase the impermeable area and run-off volume when compared with the existing green-field site. The new drainage system has the following features.

- Discharged flows are reduced to equivalent green-field run-off rates in accordance with the GDSDS.
- Attenuation storage is provided; in accordance with the GDSDS.

5.2.1 Sustainable Urban Drainage System Proposals

The SUDS proposals for the development include.

- 6 nr Stormtech underground attenuation tanks and 4 nr above ground detention basins to provide approximately 2930m³ storage and promote infiltration.

Catchment	Storage System Type	Calculated Allowable Outflow (l/s)	Storage Volume Required (m3) (30 years)	Storage Volume Required (m3) (100 years)
A	Stormtech MC3500	12.00	-	675
B	Stormtech SC740 & Detention Basin	16.55	435	138
C	Stormtech SC740	7.00	260	
D	Stormtech SC740 & Detention Basin	10.30	365	75
E	Stormtech MC3500 & Detention Basin	21.18	477	120
F	Stormtech SC740 & Detention Basin	10.67	310	75
Total	-	77.70	2930	

Table 3.1 - Surface Water Attenuation Storage and Discharge Limits

5.2.2 Surface Water Attenuation and Storage

Storm-water attenuation for the development has been sized in accordance with the requirements of the GSDSDS. Run-off rates from the proposed development to the public system are also attenuated to existing green-field run-off levels as per the GSDSDS.

The total surface water storage volume available is 2930m³ provided within the attenuation facilities. The total storage volume is based on the site's available outflow of 77.70 l/sec.

5.3 Flood Exceedance

For storms greater than the 1%AEP pluvial event, the development's drainage network design will be exceeded and areas with low ground levels will begin to flood. Proposed road levels all fall towards the south towards the surface water drainage outfalls. This will ensure that the proposed residential units are protected from flooding when the drainage network may be exceeded.

Lowest house floor levels are set a minimum of 0.5m above the top water level in the corresponding attenuation facility in accordance with recommended minimum freeboards.

5.4 Impact on Adjacent Areas

Adjacent areas will not be impacted by the development for up to the 1%AEP flood event, however if larger storms >1%AEP exceed the capacity of the development's drainage system then overland flood routes may be directed towards the surface water drainage outfall to the north of the site.

5.5 Climate Change

The potential impact of climate change has been allowed for as follows;

- Pluvial flood risk - drainage system and attenuation storage design allow for a 20% increase in rainfall intensities, as recommended by the GDSDS.

5.6 Sustainable Urban Structure

The development has been designed in accordance with the GDSDS.

5.6.1 Access & egress during flood events

The proposed development and its essential infrastructure such as road and housing, is in flood zone C. Based on relevant fluvial flood levels from the CFRAM mapping, it is anticipated that for a 0.1% AEP flood event the development can be safely accessed and exited through the proposed vehicular entrances.

5.7 Residual Risks

Remaining residual flood risks, following the detailed assessment include the following;

1. Pluvial flooding from the private drainage system related to a pipe blockage or from flood exceedance.
2. Pluvial flooding from the development's drainage system for storms in excess of the design capacity.

5.8 Mitigation Measures

Proposed mitigation measures to address residual flood risks are summarized below;

M1. Proposed drainage system to be maintained on a regular basis to reduce the risk of a blockage.

M2. In the event of storms exceeding the 100-year design capacity of the drainage system, then possible flood routing for overland flows towards the drainage outfalls to the north should not be blocked.

M3. Floor levels are set a minimum of 500mm above predicted 100-year flood levels.

5.8.1 Effectiveness of Mitigation Measures

It is considered that the flood risk mitigation measures if implemented are sufficient to provide a suitable level of protection to the proposed development. A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur.

Should extreme pluvial flooding occur that is in excess of the development's drainage capacity i.e., probability less than 1% AEP, then overland flood routes to the drainage outfall could protect the development and houses with lower floor levels. See Appendix C for overland flow routes.

6.0 Conclusions

The Site-Specific Flood Risk Assessment for the proposed development at Cherry Lane, Ashbourne was undertaken in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities”, November 2009.

Following the flood risk assessment stages, it was determined that the lands are within Flood Zone C as defined by the Guidelines.

It is concluded that the;

- Residential development proposed is appropriate for the Site’s flood zone category.
- Planning System and Flood Risk Management Guidelines Sequential Approach is met and the ‘Avoid’ principal achieved.

The development was concluded as having a good level of flood protection up to the 100-year return event. For pluvial floods exceeding the 100-year capacity of the drainage system then proposed flood routing mitigation measures are recommended.

Appendix A

OPW FLOOD HAZARD WEBSITE REPORT

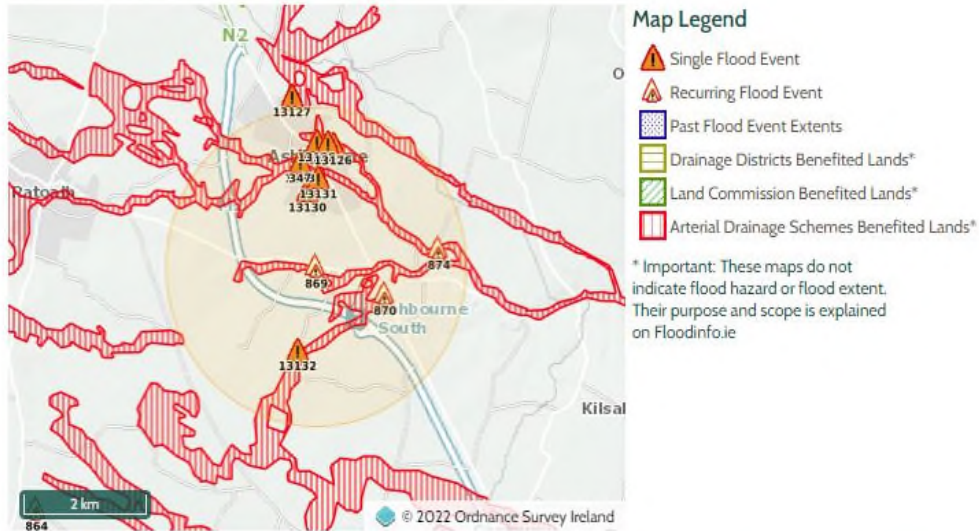
Past Flood Event Local Area Summary Report



Report Produced: 17/8/2022 15:25

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.



11 Results

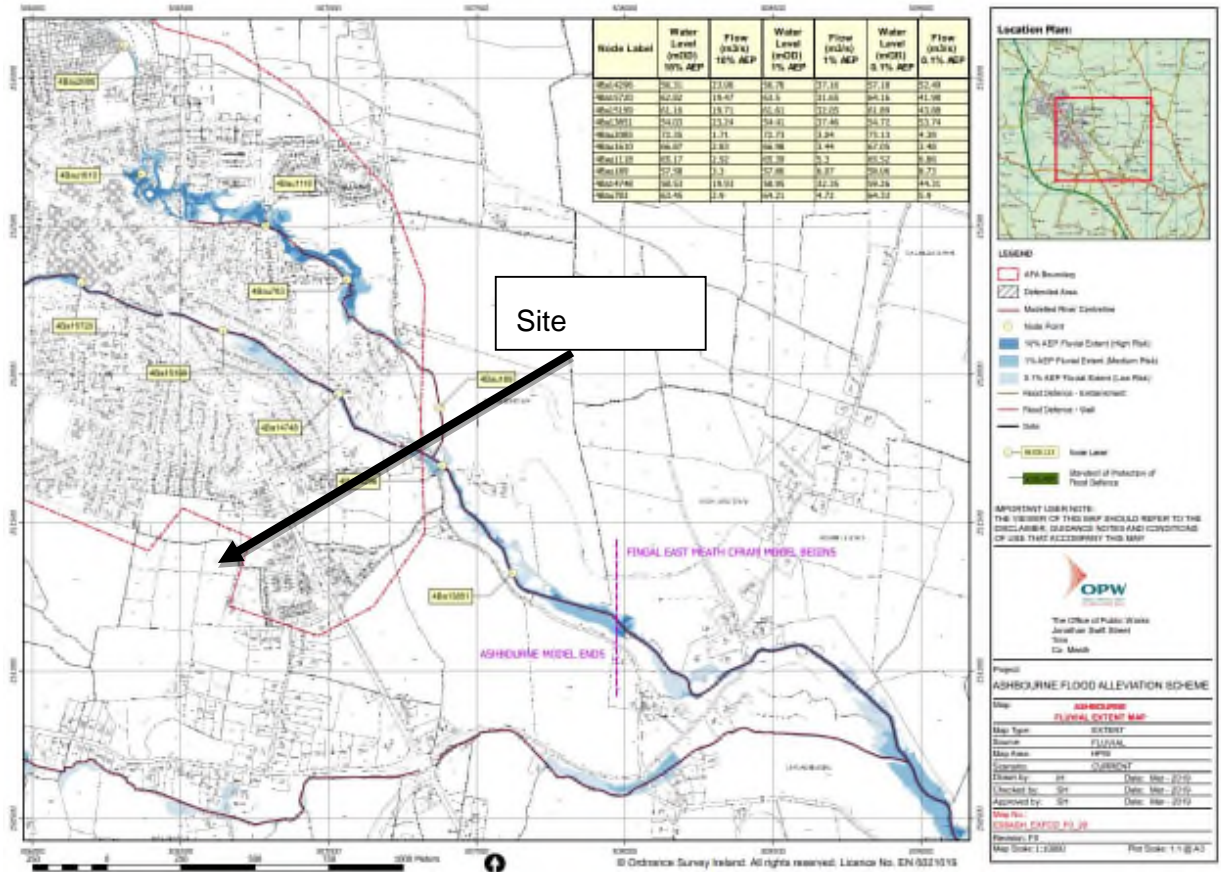
Name (Flood_ID)	Start Date	Event Location
1. Broadmeadow Ashbourne Nov 2002 (ID-347) Additional Information: Reports (1) Press Archive (0)	15/11/2002	Approximate Point
2. Fairyhouse Baltrasna Recurring (ID-869) Additional Information: Reports (2) Press Archive (1)	n/a	Approximate Point
3. Fleenstown Recurring (ID-870)	n/a	Approximate Point

4.	 Broadmeadow Robertstown Recurring (ID-874)	n/a	Approximate Point
Additional Information: Reports (2) Press Archive (0)			
5.	 Broadmeadow Ashbourne Aug 1986 (ID-1693)	24/08/1986	Approximate Point
Additional Information: Reports (1) Press Archive (0)			
6.	 Flooding at Ashbourne, Ashewood Lawn on 13/11/2014 (ID-13126)	13/11/2014	Approximate Point
Additional Information: Reports (0) Press Archive (0)			

	Name (Flood_ID)	Start Date	Event Location
7.	 Flooding at Ashbourne, Huntsgrove on 13/11/2014 (ID-13128)	13/11/2014	Approximate Point
Additional Information: Reports (0) Press Archive (0)			
8.	 Flooding at Ashbourne, Hunters Lane on 13/11/2014 (ID-13129)	13/11/2014	Approximate Point
Additional Information: Reports (0) Press Archive (0)			
9.	 Flooding at Ashbourne, Castle Park on 13/11/2014 (ID-13130)	13/11/2014	Approximate Point
Additional Information: Reports (0) Press Archive (0)			
10.	 Flooding at Ashbourne, Castle Cresnet on 13/11/2014 (ID-13131)	13/11/2014	Approximate Point
Additional Information: Reports (0) Press Archive (0)			
11.	 Flooding at Ashbourne, Blatrasna/Fleenstown on 13/11/2014 (ID-13132)	13/11/2014	Approximate Point
Additional Information: Reports (0) Press Archive (0)			

Appendix B

CFRAM MAPS



Appendix C

Overland Flow Route

