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OLDCASTLE MAIN SQUARE PUBLIC REALM ENHANCEMENT

FLOOD RISK ASSESSMENT



Document Control Sheet

Document Reference	Stage 2 Flood Risk Assessment
Client:	Meath County Council
Project Reference	11522

Rev	Description	Author	Date	Reviewer	Date	Approval	Date
A	Issued	KD	06/06/2023	ML	08/06/2023	JN	09/06/2023

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1. INTRODUCTION

TOBIN Consulting Engineers were appointed by Meath County Council (MCC) to undertake a Flood Risk Assessment (FRA) as part of the Oldcastle Main Square Public Realm Enhancement Project (see Figure 1-1) at Oldcastle, Co. Meath.

The subject site has an area of approximately 11,063m². Ground levels within the subject site range from 105.6mOD along the southern boundary of the site to approximately 112.4mOD along the western boundary of the site.

The closest hydraulic feature to the subject sites is the Oldcastle Stream. This is located approximately 0.45km north-west of the subject sites. The Oldcastle Stream then flows in a south-westerly direction before out falling into the River Inny approximately 1.3km south-west of the subject sites. The River Inny then flows in a north-westerly direction before it outfalls into Lough Shellin approximately 8.85km north-west of the subject sites.

A topographic survey of the subject sites is provided in Appendix A.

The purpose of this Stage 2 FRA report is to identify, quantify, and communicate the risks of flooding, if any, to the subject sites.



Figure 1-1: Site Location

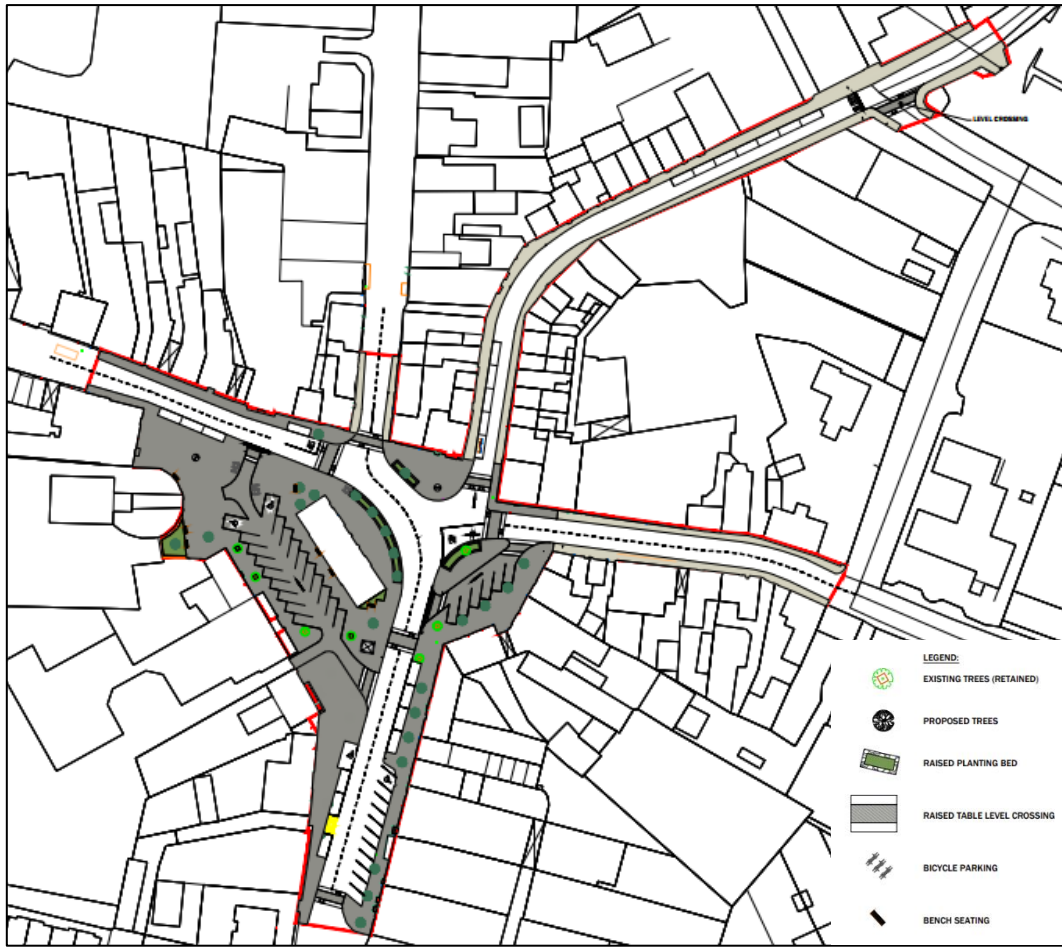


Figure 1-2 Proposed Layout at Oldcastle Main Square

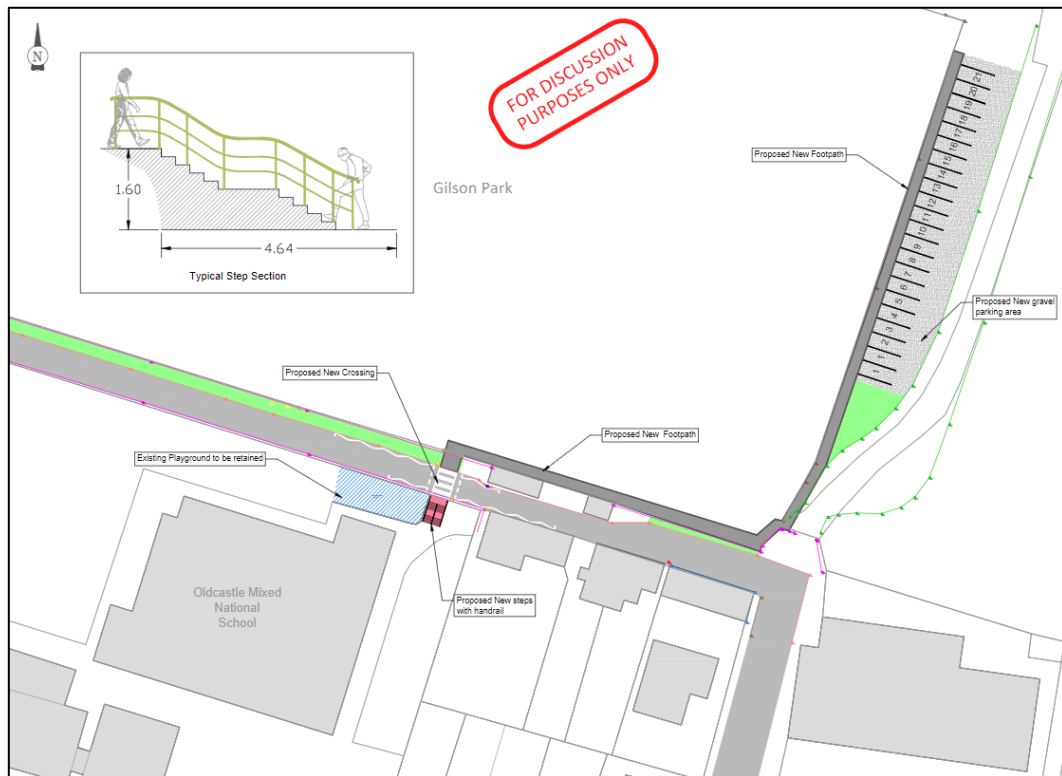


Figure 1-3 Proposed Layout at Gilson National School

2. FLOOD RISK MANAGEMENT GUIDANCE

This Stage 2 Flood Risk Assessment was carried out in accordance with the following flood risk management guidance documents:

- The Planning System and Flood Risk Management Guidelines for Planning Authorities
- Flood Risk Management Climate Change Sectoral Adaptation Plan
- Meath County Development Plan
- Meath Strategic Flood Risk Assessment

2.1 THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT GUIDELINES

The Planning System and Flood Risk Management Guidelines for Planning Authorities (PSFRM Guidelines) were published in 2009 by the Office of Public Works (OPW) and Department of the Environment, Heritage and Local Government (DoEHLG). Their aim is to ensure that flood risk is considered in development proposals and the assessment of planning applications.

2.1.1 Flood Zones and Vulnerability Classes

The PSFRM Guidelines discuss flood risk in terms of flood zones A, B, and C, which correspond to areas of high, medium, or low probability of flooding, respectively. The extents of each flood zone are based on the Annual Exceedance Probability (AEP) of various flood events.

The PSFRM Guidelines also categorise different types of development into three vulnerability classes based on their sensitivity to flooding.

Table 2.1 shows a decision matrix that indicates which types of development are appropriate in each flood zone and when the Justification Test (see Section 2.1.2) must be satisfied. The annual exceedance probabilities used to define each flood zone are also provided.

Table 2.1: Decision Matrix for Determining the Appropriateness of a Development

Flood Zone: (Probability)	Annual Exceedance Probability (AEP)	Highly Vulnerable	Less Vulnerable	Water Compatible
A (High)	<u>Fluvial & Pluvial Flooding</u> More frequent than 1% AEP	Justification Test Required	Justification Test Required	Appropriate
	<u>Coastal Flooding</u> More frequent than 0.5% AEP			
B (Medium)	<u>Fluvial & Pluvial Flooding</u> 0.1% to 1% AEP	Justification Test Required	Appropriate	Appropriate
	<u>Coastal Flooding</u> 0.1% to 0.5% AEP			
C (Low)	<u>Fluvial, Pluvial & Coastal Flooding</u> Less frequent than 0.1% AEP	Appropriate	Appropriate	Appropriate

2.1.2 The Justification Test

Any proposed development being considered in an inappropriate flood zone (as determined by Table 2.1) must satisfy the criteria of the Justification Test outlined in Figure 2-1 (taken from the PSFRM Guidelines).

Box 5.1 Justification Test for development management (to be submitted by the applicant)

When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:

1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:
 - (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;
 - (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;
 - (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and
 - (iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

Note: See section 5.27 in relation to major development on zoned lands where sequential approach has not been applied in the operative development plan.

Refer to section 5.28 in relation to minor and infill developments.

Figure 2-1: Criteria of the Justification Test

2.2 THE FLOOD RISK MANAGEMENT CLIMATE CHANGE ADAPTATION PLAN

The Flood Risk Management Climate Change Sectoral Adaptation Plan was published in 2019 under the National Adaptation Framework and Climate Action Plan. This plan outlines the OPW's approach to climate change adaptation in terms of flood risk management.

This approach is based on a current understanding of the potential impacts of climate change on flooding and flood risk. Research has shown that climate change is likely to worsen flooding through more extreme rainfall patterns, more severe river flows, and rising mean sea levels.

To account for these changes, the Adaptation Plan presents two future flood risk scenarios to consider when assessing flood risk:

- Mid-Range Future Scenario (MRFS)
- High-End Future Scenario (HEFS)

Table 2.1 indicates the allowances that should be added to estimates of extreme rainfall depths, peak flood flows, and mean sea levels for the future scenarios.

Table 2.2: Climate Change Adaptation Allowances for Future Flood Risk Scenarios

Parameter	Mid-Range Future Scenario (MRFS)	High-End Future Scenario (HEFS)
Extreme Rainfall Depths	+ 20%	+ 30%
Peak River Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 0.5 m	+ 1 m

For the purpose of this flood risk assessment, the proposed development has been assessed against the Mid-Range Future Scenario as it represents a likely future scenario.

2.3 MEATH COUNTY DEVELOPMENT PLAN (MCDP) 2021-2027¹

The Meath County Development Plan (MCDP)2021-2027 sets out the policies and objectives and the overall strategy for the development of the County over the plan period 2021-2027.

Chapter 6 of the MCDP outlines the infrastructure strategy for county Meath. The policies relating to flood risk are included in this chapter. The policies are as follows:

INF OBJ 14: To require the use of SuDS within Local Authority Developments and other infrastructural projects in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.

INF OBJ 15: To require the use of SuDS in accordance with the Greater Dublin Regional Code of Practice for Drainage Works for new developments (including extensions).

INF OBJ 16: To ensure that all new developments comply with Section 3.12 of the Greater Dublin Regional Code of Practice for Drainage Works V6 which sets out the requirements for new developments to allow for Climate Change.

INF OBJ 17: To ensure that all new commercial developments provide on-site petrol/oil interceptors and silt traps as per Section 20 of the Greater Dublin Regional Code of Practice for Drainage Works V6.

INF OBJ 18: To ensure that new developments provide for the separation of foul and surface water drainage networks within application site boundaries.

INF OBJ 19: To ensure that developments permitted by the Council which involve discharge of wastewater to surface waters or groundwaters comply with the requirements of the EU Environmental Objectives (Surface Waters) Regulations and EU Environmental Objectives (Groundwater) Regulations.

INF OBJ 20: To implement the Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009) or any updated guidelines. A site-specific Flood Risk Assessment should be submitted where appropriate.

INF OBJ 21: To restrict new development within floodplains other than development which satisfies the Justification Test, as outlined in the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).

INF OBJ 22: To ensure flood relief measures are suitably designed to protect the conservation objectives of Natura 2000 sites, and to avoid direct or indirect impacts upon qualifying interests or Natura 2000 sites.

INF OBJ 23: To protect and enhance the County's floodplains, wetlands and coastal areas subject to flooding as "green infrastructure" which provide space for storage and conveyance of floodwater and ensure that development does not impact on important wetland sites within river/stream catchments.

¹ Meath County Development Plan 2021-2027 [Volume 1 Written Statement.pdf \(meath.ie\)](#)

INF OBJ 24: To identify existing surface water drainage systems vulnerable to flooding and develop proposals to alleviate flooding in the areas served by these systems in conjunction with the Office of Public Works.

INF OBJ 25: To require the use of SuDS to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks.

INF OBJ 26: To discourage the use of hard non-porous surfacing and pavements within the boundaries of rural housing sites.

INF OBJ 27: encourage the use of Green Roof technology particularly on apartment, commercial, leisure and educational buildings.

INF OBJ 28: To ensure that proposals for the development of solar farms are not located within areas identified as being within Flood zones A or B as per the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).

A Strategic Flood Risk Assessment (SFRA) was undertaken as part of the MCDP having regard to the appropriate guidelines. Flood Risk Assessment was integrated into the SEA process. The findings of the SFRA are outlined in section 2.3.1 below.

2.3.1 Strategic Flood Risk Assessment (SFRA) Meath County Development Plan 2021-2027²

The town of Oldcastle is not identified as an Area for Further Assessment under the CFRAM programme. The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately. Flood Zone A – Fluvial: 1 in 100 year or 1% AEP, Tidal: 1 in 200 year or 0.5% AEP. Flood Zone B – 1 in 1,000 year or 0.1% AEP.

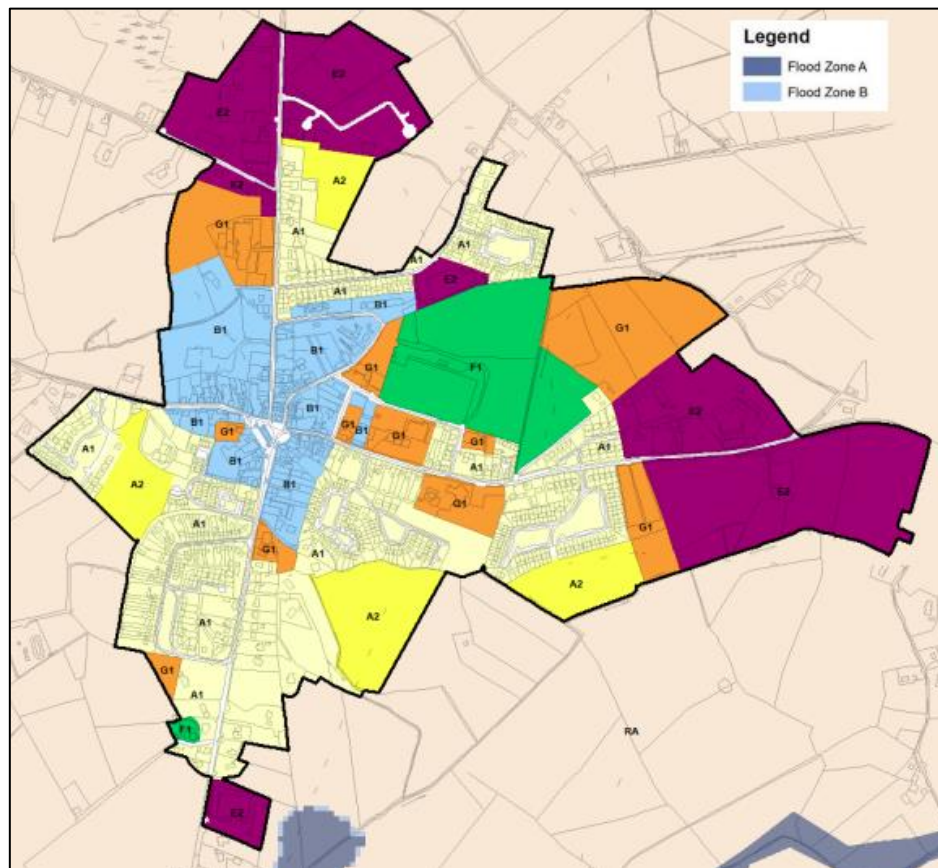


Figure 2-2: Meath County Development Plan SFRA Oldcastle Zoning Map

The town is located outside all the predicted flood extents and flood zoning. There is historical recurring surface water flooding on Store Road. There is no fluvial flood risk identified in the town. OPW benefitting lands mapping indicates some coverage within previously developed general enterprise & employment (E2) zoned land and new residential (A2) in the north west fringe of the settlement. This is not verified by flood history or recent PFRA or JFLOW mapping. The SFRA notes that development within the settlement should be managed in line with the policies (INF POL 14-29) of the MCDP and this will ensure adequate consideration of risk at development management stage. The study found that there are limited or no fluvial impacts, potential increase in runoff could exacerbate existing surface water flooding.

² Flood Risk Assessment & Management Plan for Meath CDP 2021-2027 [JBA Consulting \(meath.ie\)](https://www.meath.ie)

3. INITIAL FLOOD RISK ASSESSMENT

3.1 PAST FLOOD EVENTS

The OPW's National Flood Information Portal³ provides past flood event mapping with records of flooding reports, meeting minutes, photos, and/or hydrometric data. Based on the flood map shown in Figure 3-1, there is one recurring flooding event in the vicinity of the subject site.

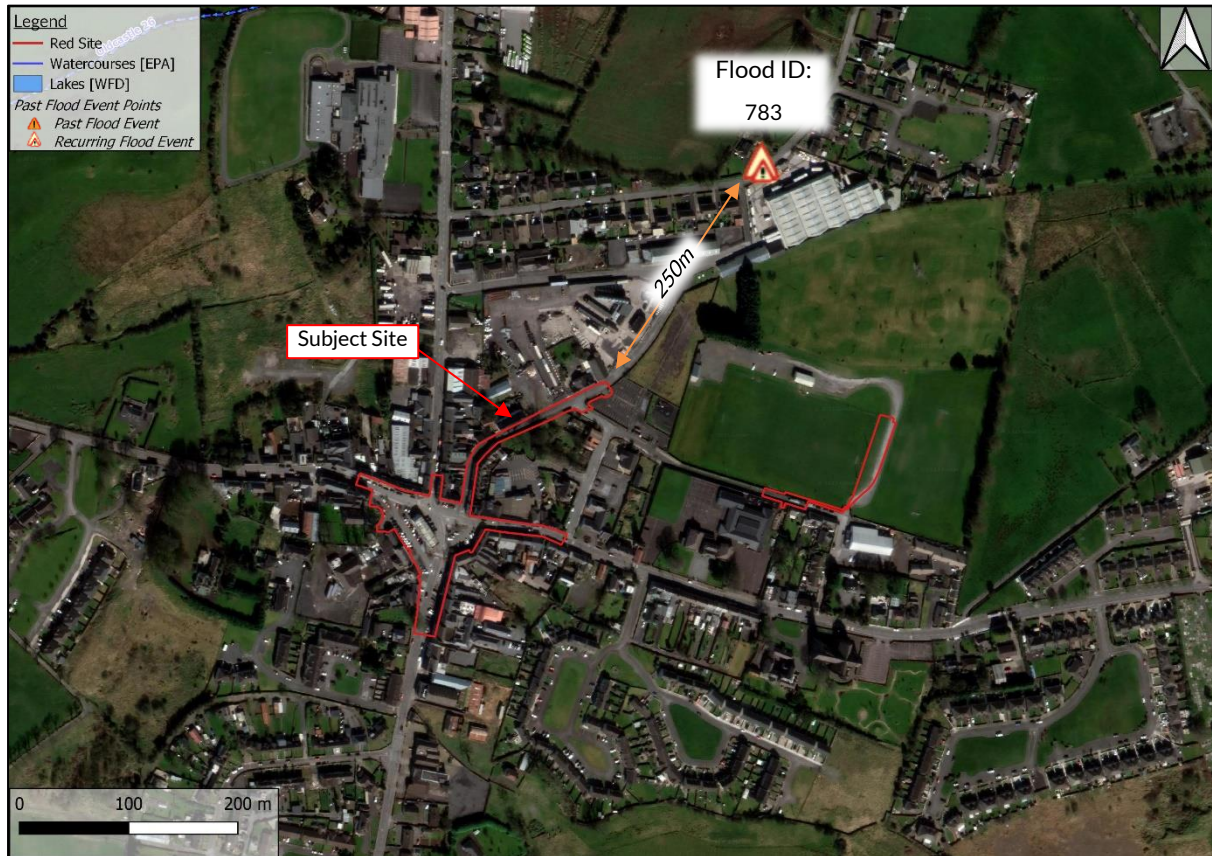


Figure 3-1 OPW Flood Map of Past Flood Events⁴

Flood ID 783 (Store Road, Oldcastle Recurring)

- Located 250m north of subject sites
- Low lying area floods after heavy rain. The flooding occurs every year. Road is liable to flood
- Not hydraulically linked to the subject sites.

³ floodinfo.ie

⁴ <https://www.floodinfo.ie/map/floodmaps/>

3.2 OPW PRELIMINARY FLOOD RISK ASSESSMENT (PFRA) STUDY

In 2009, the OPW produced a series of maps to assist in the development of a broad-scale FRA throughout Ireland. These maps were produced from several sources.

The OPW's National Preliminary Flood Risk Assessment (PFRA) Overview Report from March 2012 noted that *"the flood extents shown on these maps are based on broad-scale simple analysis and may not be accurate for a specific location"*.

Figure 3-2 provides an overview of the fluvial, coastal, pluviial, and groundwater indicative flood extents in the vicinity of the subject site.

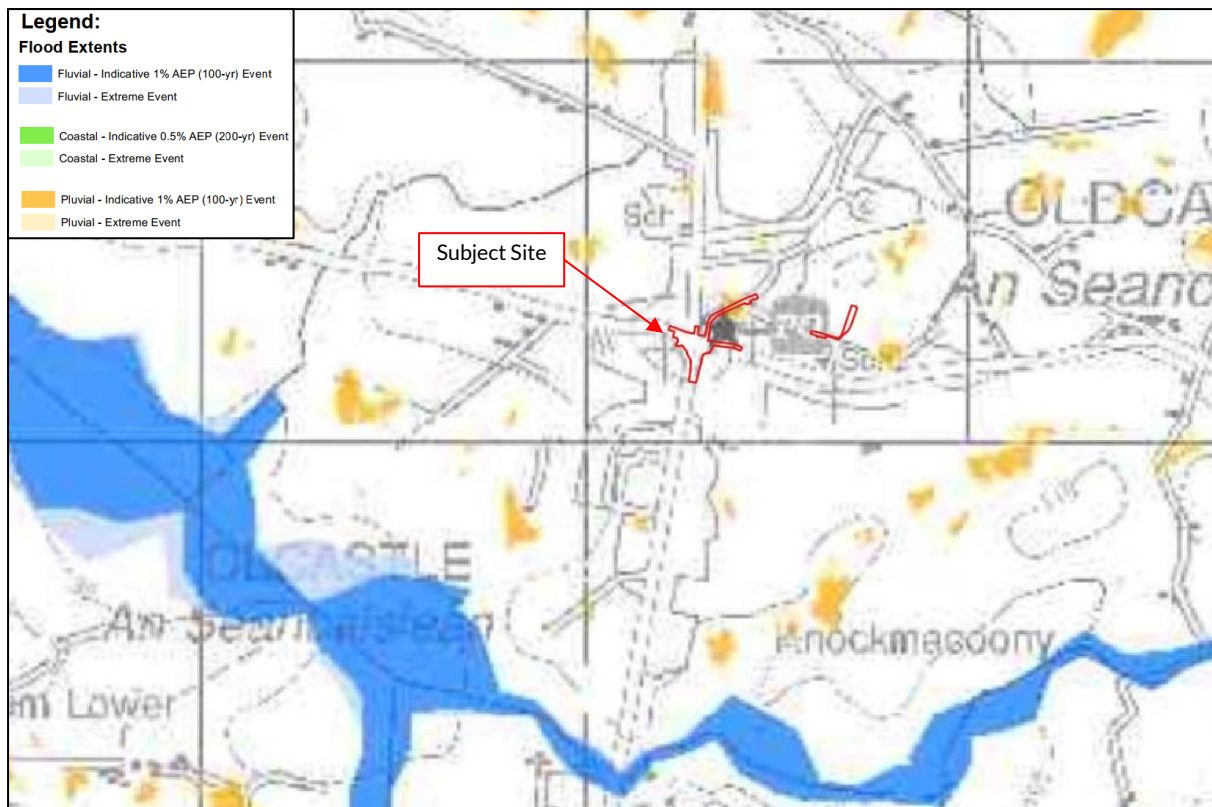


Figure 3-2 Indicative Flood Mapping [extract from PFRA Map 303]

As per Figure 3-2, an area adjacent to the subject site is liable to pluviial flooding. The subject sites are not shown to be at risk of fluvial, coastal or groundwater flooding.

Limitations on potential sources of error associated with the PFRA maps include:

- Assumed channel capacity (due to absence of channel survey information)
- Absence of flood defences and other drainage improvements and channel structures (bridges, weirs, culverts)
- Local errors in the national Digital Terrain Model (DTM)

3.2.1 National Indicative Fluvial Mapping⁵(NIFM)

In 2020, the OPW produced second-generation indicative fluvial flood mapping, improving upon the first generation PFRA and producing higher quality flood maps.

The NIFM Flood Mapping Technical Data notes that “Cross sectional surveys have not been used to define the dimensions of river channels and structures within the 2D model. Channels have been represented in the 2D model by assuming their channel capacity is equivalent to the estimation of [the index flood flow]”. The 2D model uses a Digital Terrain Model with a grid scale of 5m.

Figure 3-3 provides an overview of the 1 in 100-year and 1 in 1,000-year indicative fluvial flood mapping for the subject site. There are no fluvial flood extents in the vicinity of the subject site.

The NIFM update also included an assessment of the likely impact of climate change on flood risk in the area. The flood extents for a Mid-Range Future Scenario (MRFS) are shown in **Error! Reference source not found.**

⁵ National Indicative Fluvial Mapping: Applying and Updating FSU Data to Support Revised Flood Risk Mapping for Ireland, Brown et al., Irish National Hydrology Conference 2019



Figure 3-3 NIFM Current Flood Extents



Figure 3-4 NIFM MRFS Flood Extents

3.3 CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

In 2015, the OPW produced flood maps as part of the Catchment Flood Risk Assessment and Management (CFRAM) Study. The flood extents in these maps are based on detailed modelling of Areas for Further Assessment identified by the National Preliminary Flood Risk Assessment.⁶

The watercourses in the vicinity of the subject site are not modelled as part of the CFRAM study and were not identified as areas for further assessment.

3.4 OPW DRAINAGE DISTRICTS

The OPW Drainage Districts were carried out by the commissioners of Public Works under a number of drainage and navigation acts from 1842 to the 1930s to improve land for agriculture and to mitigate flooding. The local authorities are charged with the responsibility to maintain Drainage Districts.

The River Inny which is located to the south off the subject site is identified as having benefiting from the OPW arterial drainage scheme. However, the subject site is not identified as having benefitted from the scheme.

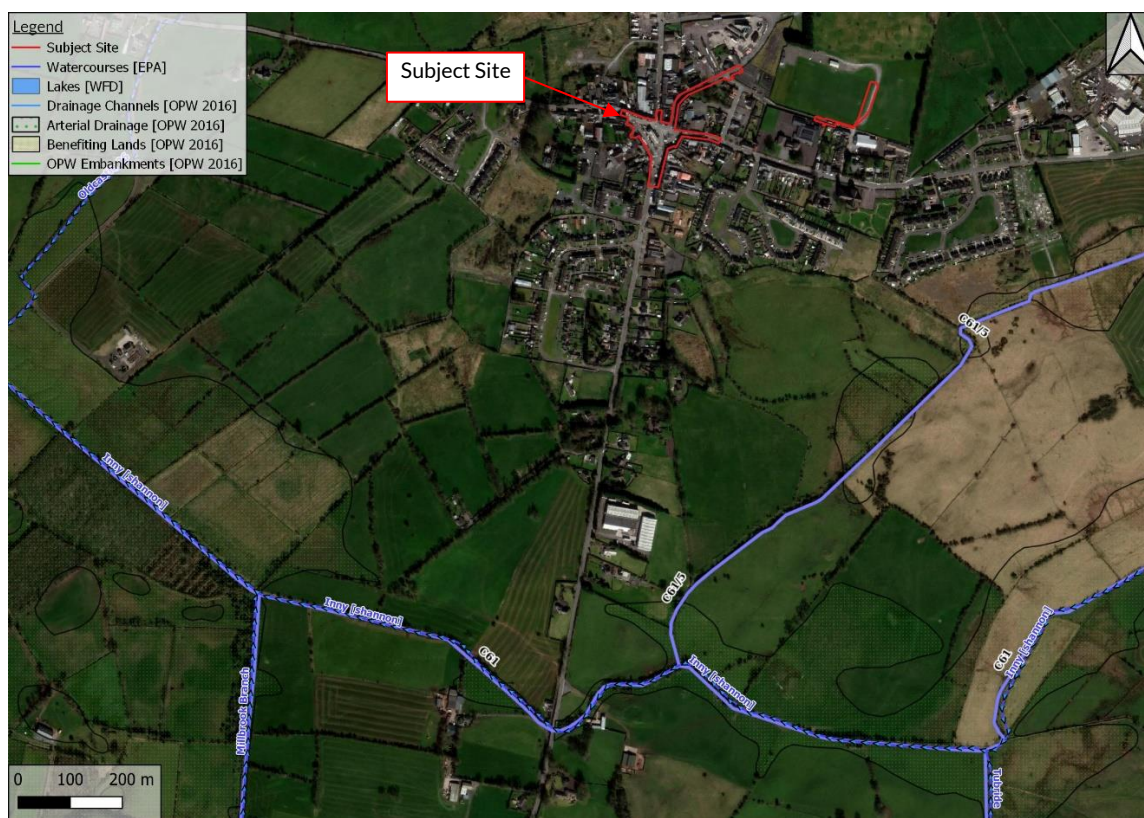


Figure 3-5 OPW Drainage District Scheme

⁶ https://www.floodinfo.ie/about_frm/

3.5 GEOLOGICAL SURVEY IRELAND MAPPING

The Geological Survey Ireland (GSI) provides mapping⁷ with data related to Ireland’s subsurface. Based on the map shown in Figure 3-6, there are no Karst features in the vicinity of the subject site.



Figure 3-6 GSI Mapping of Karst Features

The GSI GW Flood Maps of predicted groundwater flooding and historic ground water and surface water flooding were also reviewed. These maps did not show any predicted or historic groundwater flooding in the vicinity of the subject site.

⁷ <https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx>

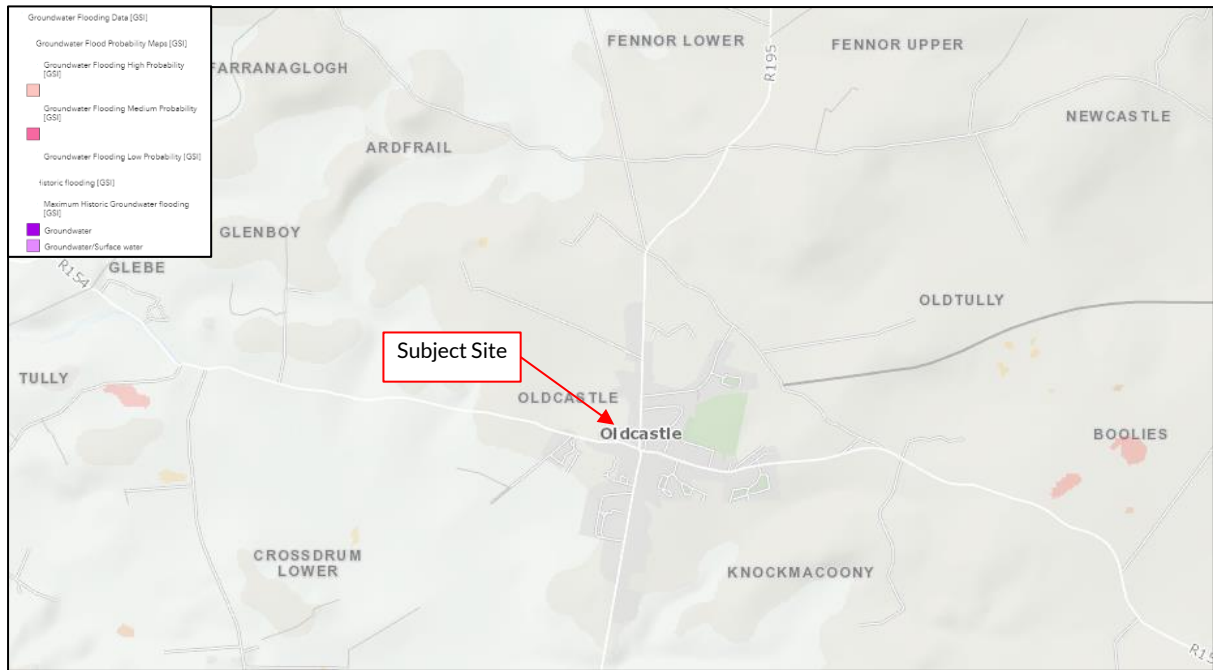


Figure 3-7 GSI Mapping of Groundwater Flooding

4. DETAILED FLOOD RISK ASSESSMENT

4.1 FLUVIAL FLOODING

The closest hydraulic feature to the subject sites is the Oldcastle Stream. This is located approximately 0.45km north-west of the subject sites. There are no fluvial flood extents associated with the Oldcastle Stream in the vicinity of the subject site, with the headwaters of the stream rising within the town bounds.

The town of Oldcastle has not been identified as an AFA by the PFRA or CFRAM studies. The SFRA that was undertaken as part of the MCDP did not identify the town as being at risk from fluvial flooding.

There are no past fluvial flood events noted by the OPW in the vicinity of the subject site. The largest fluvial flood risk comes from the River Inny which is located 1km south of the subject site. The River Inny was not modelled as part of the CFRAM study. Neither the PFRA nor NIFM mapping show that the River Inny's flood extents encroach onto the subject site. The NIFM MRFS flood extents shows that the closest fluvial flood extents are located approximately 0.85km south-west of the subject site.

Therefore, it is estimated that the risk of fluvial flooding associated with the proposed enhancement works is minimal.

4.2 PLUVIAL FLOODING

The PFRA mapping for the subject site show that an area adjacent to the subject site is susceptible to pluvial flooding. A review of the topographic survey for the subject site did not show any depressions within the site. The site gently sloped in a northerly direction. This slope will allow excess surface water to naturally flow away from the site. As mentioned in section 3.1 above, there are limitations in to the PFRA mapping.

There is one past pluvial flood event noted in the vicinity of the subject site. This is located 250m north of the subject site. The flood event is a recurring flood that occurs in low-lying areas during periods of heavy rainfall.

Surface water arising within the subject site will need to be managed by a dedicated stormwater drainage system. The landscaping and topography within the subject site will provide safe exceedance flow paths and prevent surface water ponding to minimise residual risks associated with an extreme flood event or a scenario where the stormwater drainage system becomes blocked.

Therefore, it is estimated that risk of pluvial flooding associated with the proposed enhancement works is minimal.

4.3 GROUNDWATER FLOODING

Based on a review of Geological Survey Ireland (GSI) subsurface mapping of karst features (Figure 3-6), predicted groundwater flooding in the area (Figure 3-7), and the PFRA study (Figure 3-2) there is no evidence to suggest liability to groundwater flooding at the subject site.

4.4 COASTAL FLOODING

The subject site is located more than 62km inland, with minimum site elevations in the region of 105.6mOD. The nearest predicted 0.1% AEP MRFS coastal flood level at Bettystown (61km south-east of the subject site) is estimated by the North East Coast ICPSS Study to be approximately 3.69mOD [Point 9].⁸ Therefore, it is estimated that the proposed development is not at risk of coastal flooding.

⁸ Irish Coastal Protection Strategy Study- Phase III, North East Coast Flood Extent Map, Figure No. NE/RA/EXT/8 Jan 2010

5. CONCLUSIONS

TOBIN Consulting Engineers were appointed by Meath County Council (MCC) to undertake a Flood Risk Assessment (FRA) as part of the Oldcastle Main Square Public Realm Enhancement Project (see Figure 1-1) at Oldcastle, Co. Meath.

Fluvial Flooding:

The closest hydraulic feature to the subject site is the Oldcastle Stream. This is located approximately 0.45km north-west of the subject site. There are no fluvial flood extents associated with the Oldcastle Stream in the vicinity of the subject site, with the headwaters of the stream rising within the town bounds.

The town of Oldcastle has not been identified as an AFA by the PFRA or CFRAM studies. The SFRA that was undertaken as part of the MCDP did not identify the town as being at risk from fluvial flooding.

There are no past fluvial flood events noted by the OPW in the vicinity of the subject site. The largest fluvial flood risk comes from the River Inny which is located 1km south of the subject site. The River Inny is shown to be liable to flooding by both the PFRA and NIFM mapping. The river was not modelled as part of the CFRAM study. Neither the PFRA or NIFM mapping show that the River Inny's flood extents encroach onto the subject site. The NIFM MRFS flood extents shows that the closest fluvial flood extents are located approximately 0.85km south-west of the subject site.

Therefore, it is estimated that the risk of fluvial flooding associated with the proposed development is minimal.

Pluvial Flooding:

The PFRA mapping for the subject site shows that a portion of the orange site is susceptible to pluvial flooding. A review of the topography survey for the subject site did not show any depression within the site. The site gently sloped in a northerly direction. This slope will allow excess surface water to naturally flow away from the site. As mentioned in section 3.1 above, there are limitations in to the PFRA mapping.

There is one past pluvial flood event noted in the vicinity of the subject site. This is located 250m north of the subject site. The flood event is a recurring flood that occurs in low-lying areas during periods of heavy rainfall.

Surface water arising within the subject site will need to be managed by a dedicated stormwater drainage system. The landscaping and topography within the subject site will provide safe exceedance flow paths and prevent surface water ponding to minimise residual risks associated with an extreme flood event or a scenario where the stormwater drainage system becomes blocked.

Therefore, it is estimated that risk of pluvial flooding associated with the proposed development is minimal.

Groundwater Flooding:

There is no evidence to suggest groundwater as a potential source of flood risk to the subject site.

Coastal Flooding:

The subject site is not at risk of coastal flooding due to its elevation and distance inland from the predicted tidal flooding outline.

Based on the results of this Flood Risk Assessment, it is estimated that the risk of flooding to the subject site is minimal. Any proposed development within the subject site will have no affect on flood risk elsewhere.

Appendix A TOPOGRAPHICAL SURVEY



NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES.
5. ALL LEVELS SHOWN RELATE TO ORDANCE SURVEY DATUM AT MALIN HEAD.

Rev	Date	Description	By	Chkd.
A	01-06-23	First Issue	E.M.	J.N.

Client: comhairle chontae na mí meath county council

Project: Oldcastle Public Realm Enhancement Enhancement Scheme

Title: Topo Survey

Scale @ A1: 100
 Prepared by: E.M. Checked by: J.N. Date: June 2023

Drawing Status: Draft

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Drawing No.: **11522-xxxx** Revision: **A**