



Comhairle Chontae na Gaillimhe
Galway County Council

56 UNIT RESIDENTIAL DEVELOPMENT AT COSMONA, LOUGHREA, CO. GALWAY

Flood Risk Assessment

October 2024

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1. INTRODUCTION

1.1 General

This Flood Risk Assessment Report has been prepared by Jennings O'Donovan & Partners Limited for Galway County Council to assess the flood risk associated with the site located in Loughrea, Co. Galway. It is proposed to construct residential housing on the site.

The site is located off the R350 in Loughrea as outlined in red in Figure 1 below.



Figure 1.1: Site Location

Details of the site are outlined in Table 1.

Table 1: Proposed Development Works

Component	Proposed Works
Site Area (total)	Approx. 3.30 ha
Site Area (for the development)	Approx. 2.60 ha

This Flood Risk Assessment covers the site off the R350 in Loughrea. It was prepared in accordance with the report 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities' issued by the Department of Environment, Heritage and Local Government in November 2009. Flood risk from fluvial, surface water and ground water sources has been assessed based on existing available information.

The assessment methodology involved researching and collating flood related information from the following data sources:

- Base maps – Ordnance Survey of Ireland;
- Flood Hazard Maps and flooding information for Ireland, (www.floodmaps.ie);
- Office of Public Works (OPW);
- Geological Survey of Ireland (GSI) maps on superficial deposits;
- EPA hydrology maps;
- CFRAMS (Catchment Flood Risk Assessment & Management Study);
- Flood Risk Management and Assessment to the Galway County Development Plan 2015-2021
- Strategic Flood Risk Assessment for the Draft Galway County Development Plan 2022-2028

1.2 Scope

This Flood Risk Assessment is based on the following:

- Department of Environment, Heritage and Local Government guidelines for Planning Authorities covering Flood Risk *Management (The Planning System and Flood Risk Management: Guidelines for Planning Authorities 2009)*
- Risk of flooding to the Proposed Development Site from flood flow from neighbouring watercourses.
- Risk of flooding resulting from direct rainfall.
- Risk of flooding from groundwater.

In addition to the above, the study also examined any possible impact the proposed works may have on the existing drainage regime locally adjacent to the Proposed Development Site. The impacts addressed under this heading comprise:

- The impact of surface water runoff on the flow regimes in neighbouring watercourses.
- Loss of floodplain.
- Review of historical flood records.

2. PLANNING GUIDELINES

In November 2009, the Department of Environment, Heritage and Local Government issued a guidance document to planning authorities in relation to flood risk management, titled '*The Planning System and Flood Risk Management*'. These guidelines set out the policy on development and flood risk in Ireland and provide a framework for the integration of flood risk assessment into the planning process. The objective is to ensure that flood risk is considered at all stages in the planning process and, as a result, to:

- Avoid inappropriate development in areas at risk of flooding,
- Avoid new developments increasing flood risk elsewhere,
- Ensure effective management of residual risks for development permitted in flood plains.

The guidelines set out a staged approach for the consideration of flood risk in relation to developments as follows:

Stage 1: Flood risk identification – to identify whether there may be any flooding or surface water management issues related to either the area of regional planning guidelines, development plans and Local Area Plans (LAP's) or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels;

Stage 2: Initial flood risk assessment – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist, the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped; and

Stage 3: Detailed flood risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

The guidelines classify developments into three vulnerability classes based on the effects of flooding:

- Highly vulnerable development,
- Less vulnerable development,
- Water compatible development.

Residential housing is classed as being highly vulnerable.

The guidelines also classify land areas into three flood zones based on the probability of flooding. Flood zones are defined as follows in the guidelines:

- Zone A is at highest risk. In any one year, Zone A has a 1 in 100 year (1%) chance of flooding from rivers and a 1 in 200 year (0.5%) chance of flooding from the sea.
- Zone B is at moderate risk. The outer limit of Zone B is defined by the 1 in 1,000 year (or 0.1%) flood from rivers and the sea.
- Zone C is at low risk. In any one year, Zone C has less than 1 in 1,000 year (<0.1%) chance of flooding from rivers, estuaries or the sea.

It is stated in the guidelines that during the identification of flood zones, no account should be taken of any flood relief walls or embankments.

Table 2.1: Matrix of Vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test (reproduced from Table 3.2 of Planning Guidelines)

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Table 2.1, which is reproduced from the guideline document to Planning Authorities in relation to Flood Risk Management states that dwelling houses should be located within Flood Zone C. Section 4 of this Flood Risk Assessment document will consider the Flood Zone assignment for the proposed site.

Table 2.1 refers to the use of a Justification Test under certain circumstances. In cases where there are insufficient sites available to locate a development in the appropriate low flood risk zone, the guideline documents allow for consideration of sites within flood risk zones. A Justification Test is then required to assess such proposals in light of proper planning and sustainable development objectives.

This report considers the Flood Risk of the proposed development site in relation to Stages 1 and 2 of the staged approach outlined above.

3. PROPOSED DEVELOPMENT SITE

3.1 Site Description

The proposed development site is located within Loughrea, Co. Galway, just off the R350.

A topographical map of the proposed site and surrounding areas levels are shown in Figure 3.1 below.



Figure 3.1: Topographical map of the proposed development site.

The Proposed Development site is relatively flat with ground levels consistently between approximately 82m and 78.5m OD. The ground level drops from c.82m OD at the western boundary to c.78.5m OD at the eastern boundary of the site, a drop of c.3.5m.

4. FLOOD RISK REVIEW

4.1 Approach

The risk of flooding to the proposed development site shall be assessed in relation to the following criteria:

- Fluvial Risk: Inundation from flow from neighbouring watercourses
- Pluvial Risk: Flooding due to direct rainfall.
- Groundwater Risk: Flooding due to a high-water table.
- History of Flooding
- Available Predictive Flood Risk Mapping
- Impact of presence of the proposed development on the existing flood risk regime at the proposed development site.

4.2 OPW Catchment Flood Risk Assessment and Management (CFRAM)

As identified in Figure 4.1 below, a local River flows through Loughrea, from a South to North. The proposed development site lies approximately 450m West of the local river.

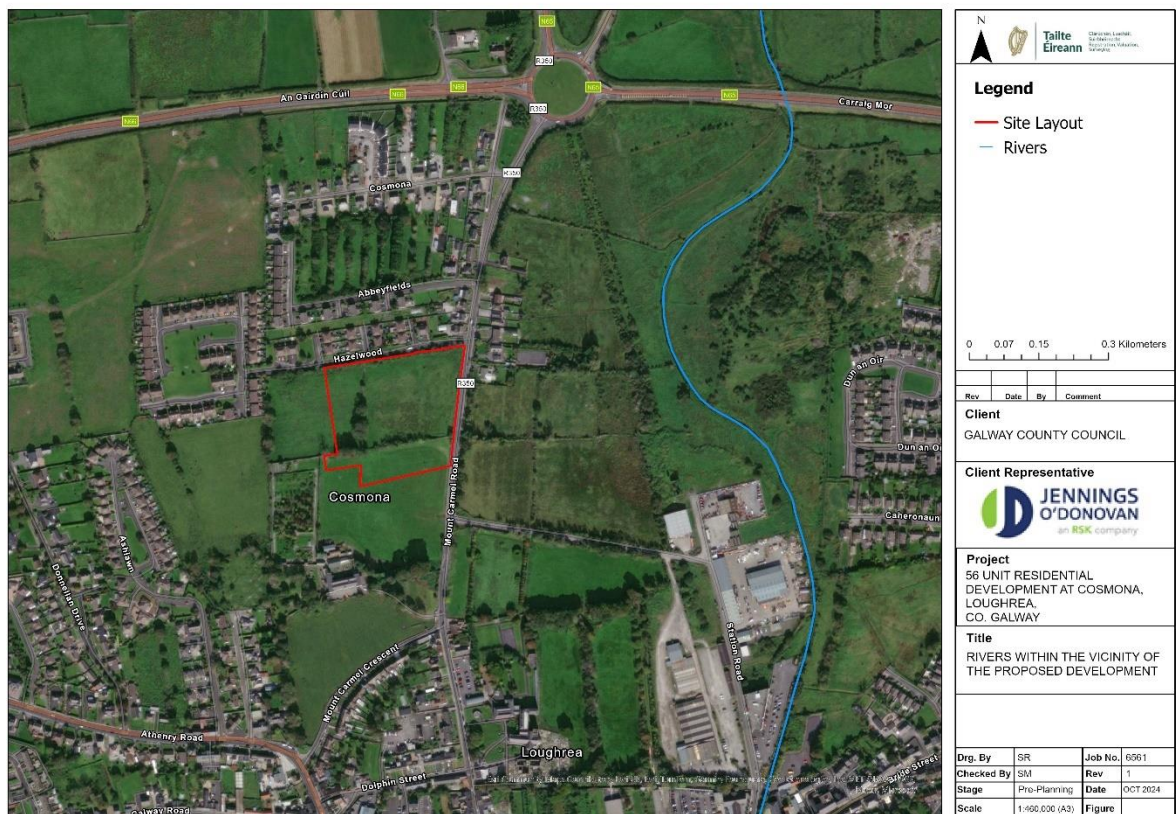


Figure 4.1: Rivers within the vicinity of the site.

The Loughrea Catchment has been identified as a High Priority Watercourse (HPW) during the preparation of the PFRA to be modelled under the Western CFRAM Study. As a result, the accuracy of the modelling increased significantly. In channel and structures cross sections were surveyed and incorporated into a hydraulic river model. The hydrological inputs were produced using a full Flood Studies Update (FSU) methodology. The CFRAM mapping also takes account

possible flood risk scenarios associated with climate change. As such the CFRAM mapping produced from this model is the most appropriate source of flood risk information currently available for the proposed development site.

The Loughrea CFRAM mapping is included in Appendix B.

4.2.1 Fluvial Flood Risk.

At the time of writing the first draft (April 2021) the CFRAM mapping, as shown in Figure 4.2 below, predicted that fluvial flooding would not occur within the development site for all modelled flood AEP probabilities. Therefore, the proposed development site is in Flood Zone C, as referenced in the OPW Planning Systems and Flood Risk Management Guidelines for Planning Authorities, and the proposed development is considered to not be at risk of fluvial and tidal flooding.

The CFRAM outputs also described flow and water levels at a node slightly downstream of the proposed development site. These have been summarised in Table 4.1 below. It can be seen that the 0.1% (1 in 1000 year) flood level is approximately 5.52m below the lowest existing ground level on site.

Table 4.1: CFRAM Water Levels and Flow Data for Cross Section Node_75

Source	Location	10% AEP mOD	1% AEP mOD	0.1% AEP mOD	Lowest G.L
Fluvial	Immediately downstream of the site	76.16	76.31	76.48	82

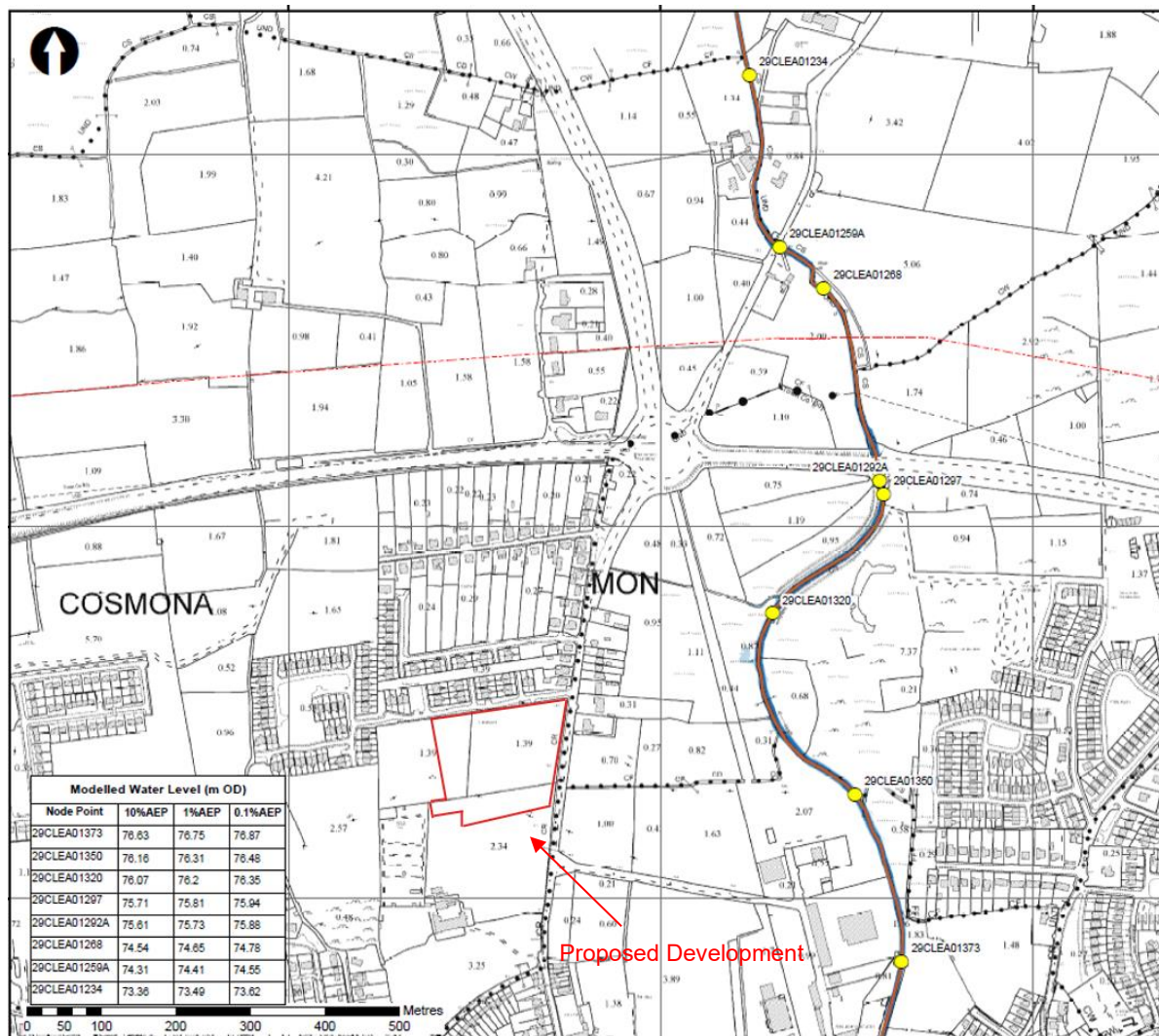


Figure 4.2: Loughrea Fluvial CFRAM Mapping (Source: Floodinfo.ie)

Note that the CFRAM mapping shows the extent of flooding does not come within approximately 250m of the proposed development site.

The OPW National Flood Hazards Map www.floodinfo.ie/maps/floodmaps was accessed (July 2024) and shows that fluvial flooding will not occur within the proposed development site. The Kilcolgan River is approximately 250m to the east of the development boundary and is a high flood risk. High Probability flood events have approximately a 1-in-a-10 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 10%. However, the extent of flooding is contained within the watercourse and will not extend to the development site.

The following Table summarizes OPW Flood Events Probabilities.

Table 4.2: OPW Flood Event Probabilities

Annual Exceedance Probability (%)	Odds of Occurrence in a Given Year	Return Period Years
10 (High Probability)	10:1	10
1 (Medium Probability)	100:1	100
0.5 (Medium Probability – Coastal Flood Map)	200:1	200
0.1 Low Probability	1000:1	1000

**Figure 4.3:** Flood Map for the Proposed Site (Source: FloodInfo.ie)

4.2.2 Historical Flood Risk.

The OPW's online Flood maps portal provides information on reported floods, in the form of reports, photos, and newspaper articles.

The database does not provide any record of flood events occurring at the proposed development site. (Figure 4.3). The closest recorded flood event occurred approximately 2.8 km from the development site.

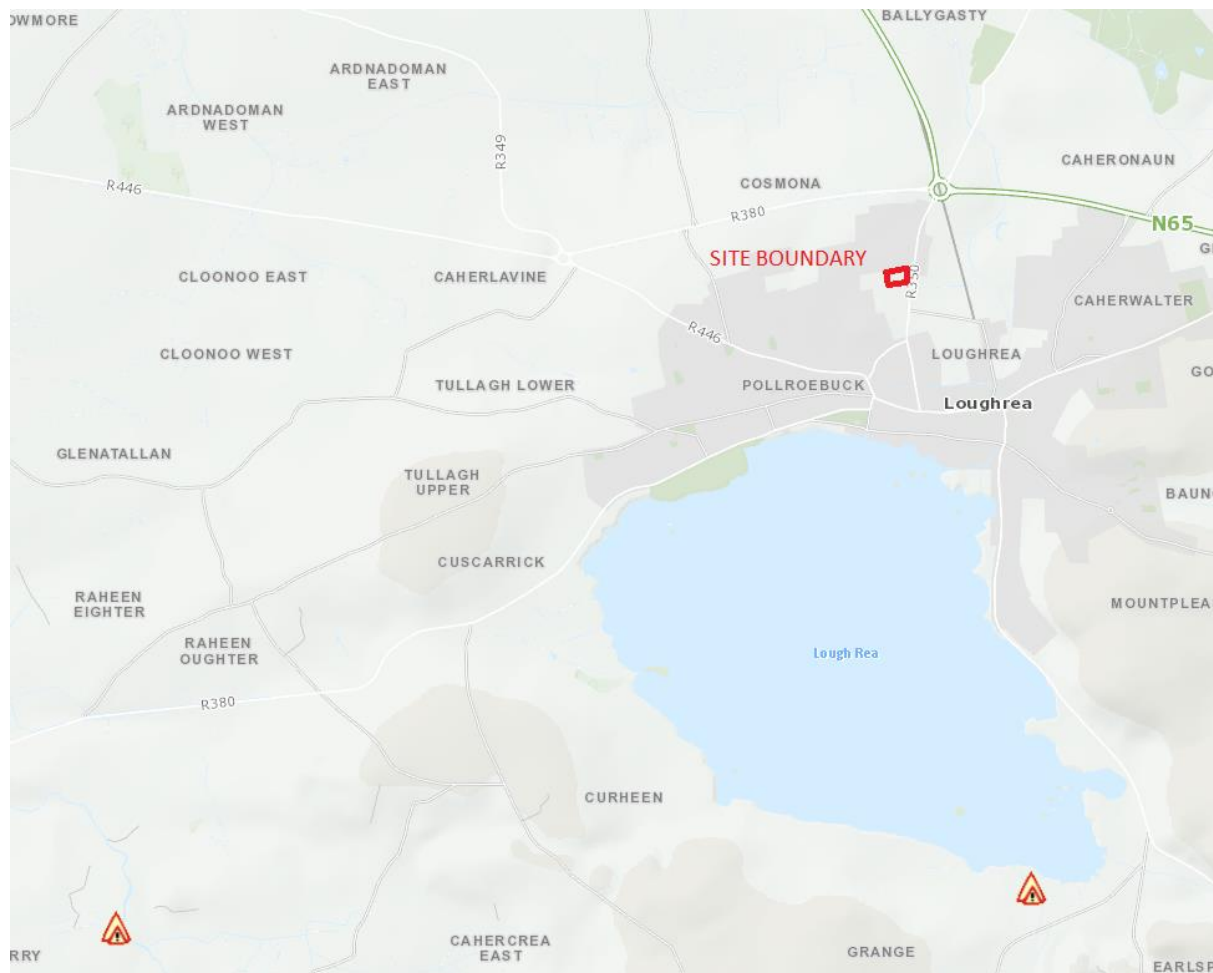


Figure 4.2: Loughrea Historical Flood Events (Source: Floodinfo.ie)

Local Knowledge of the Earlspeak, Loughrea Flood events, states that this is a recurring flood caused by lake level rises every year.

4.3 Pluvial Flood Risk

As mentioned in Section 3 above, the proposed development site is relatively flat. The proposed development and associated works will increase the impermeable area of the existing site and therefore, surface water runoff from the site will be increased. As a result, pluvial flooding on site and downstream can occur if the proposed design and works is not managed correctly.

The average annual rainfall for this region is 1192.9mm, (<https://www.met.ie/climate/available-data/monthly-data>, Athenry, 2018-2021). The mean Potential Evapotranspiration (PE) for Athenry for the past three years is 527.9mm (www.met.ie/climate/available-data/monthly-data). Actual evapotranspiration is estimated at $0.95 \times PE = 501.5\text{mm}$. The effective rainfall represents the water available for run-off and groundwater recharge and equals the annual rainfall less the actual evaporation or $1192.9 - 501.5 = 691.4\text{mm}$.

The use of gravel surfacing and grassed areas in the amenity spaces, where appropriate, will allow rainwater to percolate to ground. The site surface water drainage system from roof and

hard surfaces will be designed to best practice to provide protection from pluvial flooding. The use of SUDs techniques such as underground attenuation tanks and soakaways are considered to offer potential solutions. The drainage design should be such as to cater for short, intense rainstorms.

The use of SuDS techniques will ensure that the natural drainage patterns are replicated, and no negative impacts result from this development in terms of water quality or quantity.

4.4 Groundwater Flood Risk

The Geological Survey of Ireland mapping website indicates that the Proposed Development Site is underlain by Waulsortian Limestone that comprises of massive unbedded lime-mudstone. The bedrock indicated is a locally important aquifer, (LI), with one spring / well drawing from within the vicinity of the site. The groundwater vulnerability was determined to be moderate to high. Appendix B includes the downloaded GSI mapping for the above.

The OPW's groundwater flood mapping was examined to determine if there was an existing risk from groundwater flooding at the site. This typically occurs in karst limestone areas in the vicinity of turloughs. Given that the bedrock is not karst limestone, and there are no known turloughs in the region, therefore, there is little or no risk from groundwater flooding. The groundwater flood mapping confirmed that the site is not at risk from groundwater flooding.

4.5 Impact of Development on current Flood Regime

All surface water runoff from proposed impermeable surfaces within the proposed development site will be collected in a dedicated drainage network. Sustainable Drainage Systems ("SuDS") will be implemented where possible to provide elements of source control of surface water, attenuation of runoff and water quality improvements. The site surface water drainage system will be designed to best practice to provide protection from surface runoff due to direct rainfall. The proposed development site is not located in a floodplain, ensuring that the Development will not result in any loss of floodplain.

4.6 Summary of Flood Risk

Table 4.2 below provides a summary of the flood risk at the Proposed Development Site.

Table 4.2: Flood Risk Summary Table

Source	Pathway	Receptor	Comment
Tidal	-	-	There is no risk of Tidal flooding at the proposed development site.
Fluvial	Overbank	Proposed Development	There is no apparent risk of fluvial flooding at the proposed development site.
Pluvial	Ponding of Rainwater on site	Proposed Development	There is no apparent risk of pluvial flooding at the proposed development site. However, it is recommended that the proposed storm drainage is designed with SuD's principles, where possible, to ensure best practices are upheld and the increase in flows from the development site are catered for.
Groundwater	Rising Groundwater Levels	Proposed Development	Based on the GSI mapping and OPW mapping, there is no apparent risk from groundwater flooding at the proposed development site.

5. CONCLUSION

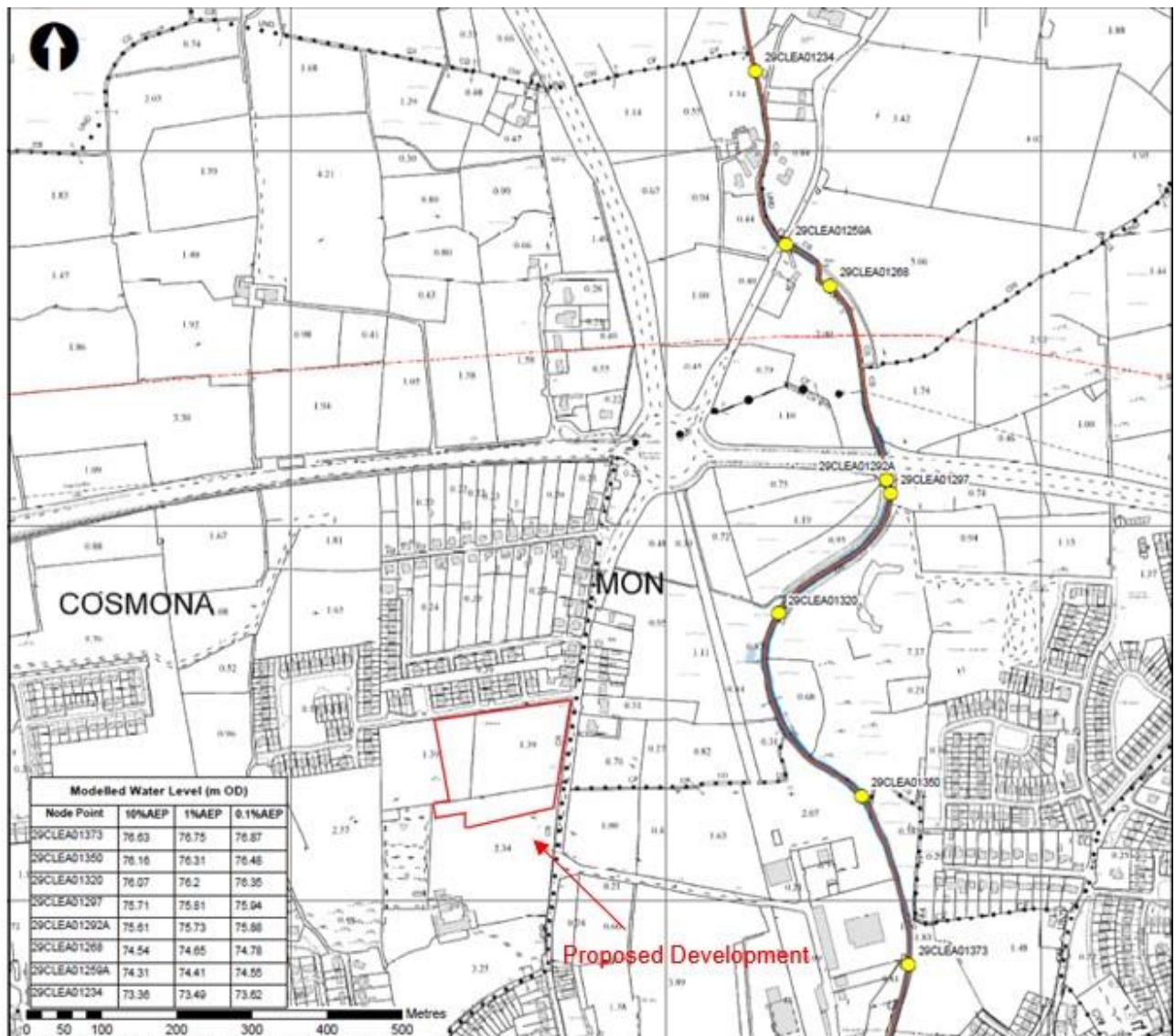
There is no apparent risk of fluvial or tidal flooding at the proposed development site. It is reasonable to conclude that the site lies within Flood Zone C as defined by the guidance document '*The Planning System and Flood Risk Management*'. There is no apparent risk of pluvial flooding at the Proposed Development Site. However, the provision of a stormwater run-off collection system incorporating SUDs features is recommended. There is no apparent risk of groundwater flooding at the proposed development site.

This research has concluded that there is no record of flooding previously occurring on the proposed development site. The proposed development site is not located in a floodplain; therefore, the proposed works will not result in a loss of floodplain. The proposed works are unlikely to increase the current flood risk in this catchment.

The conclusion of this FRA is that the proposed development site is not at risk of flooding (fluvial, tidal, pluvial or groundwater) and the proposed works will not result in any significant change in risk or flooding regime. Additionally, the Development is deemed to be appropriate (as set out in Table 3.2 of the guidelines for Flood Risk Management (DoEHLG/OPW, 2009)). As such, no further stages of flood risk assessment are therefore required.

APPENDIX A

CFRAM Mapping



APPENDIX B

GSI Mapping

