



Comhairle Contae Chorcaí  
Cork County Council

Flood Risk Assessment	
Project	West End, Milford, Co Cork
Date	16/5/2024



## Contents

1. INTRODUCTION.....	3
1.1 Scope .....	3
1.2 Proposed Development.....	3
2. FLOOD RISK ASSESSMENT METHODOLOGY .....	4
2.1 Methodology .....	4
3. EXISTING HYDROLOGICAL ENVIRONMENT.....	7
3.1 Salient Hydrological Features .....	7
3.2 Flood Regime of the Area .....	7
3.3 Existing Flood Studies .....	8
4. FLOOD RISK ASSESSMENT.....	9
4.1 Introduction.....	9
4.2 Flood Risk Identification .....	9
4.3 Initial Flood Risk Assessment.....	10
4.4 Justification Test .....	11
5. CONCLUSION .....	15
5.1 Summary of Results .....	15
5.2 Recommendations.....	15

## 1. INTRODUCTION

Cork County Council owns a disused residential property at West End, Milford Co Cork. The property is a two-storey terraced structure with an incomplete ground floor rear extension. The property is on lands which are bordered by the river Deel to the north, by residential plots to the West and East and by the regional road R515 to the South.

## 2. Scope

The aim of the FRA is to recommend any additional design features to be incorporated into the design to mitigate against the potential Flood risk. The FRA has been carried out in accordance with 'The Planning System and Flood Risk Management Guidelines' (hereafter referred to as the FRM Guidelines) published in November 2009 jointly by the then Department of the Environment, Heritage and Local Government, DEHLG, (now the Department of the Environment, Community and Local Government, DECLG) and the Office of Public Works (OPW).



Figure 2.1: Location of Development

### 2.1 Proposed Development

The proposed development consists of the demolition of the existing rubble stone front and rear elevations and the unfinished rear extension and the construction a three bed residential unit with all ancillary works.

The proposed floor levels shown on the planning drawings prepared by Cork County Council indicate a lowest floor level of +102.098m AOD on the site.

### 3. FLOOD RISK ASSESSMENT METHODOLOGY

#### 3.1 Methodology

The methodology used for the flood risk assessment for the proposed development is based on ‘The Planning System and Flood Risk Management Guidelines for Planning Authorities’ (2009)’. The FRM Guidelines require the planning system at national, regional and local levels to:

- Avoid development in areas at risk of flooding, particularly floodplains, unless there are proven wider substantial grounds that justify appropriate development;
- Adopt a sequential approach to flood risk management when assessing the location for new development based on avoidance, reduction and the mitigation of flood risk; and
- Incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.

The sequential approach (see Figure 3.1 of the FRM Guidelines below) in flood risk management requires the following three steps to identify the necessity for the justification test for a development:

- Step 1: Identification of the Flood Zone at the proposed development site (Section 2.23 of the FRM Guidelines);
- Step 2: Identification of the vulnerability of the type of the proposed development (Table 3.1 of the FRM Guidelines); and
- Step 3: Using the matrix of vulnerability versus Flood Zone (Table 3.2 of the FRM Guidelines), identify the necessity for the justification test for the proposed development.



Fig. 3.1: Sequential approach principles in flood risk management

While Figure 3.1 of the FRM Guidelines sets out the broad philosophy underpinning the sequential approach in the flood risk management, Figure 3.2 of the Guidelines (shown below) describes the mechanism of the sequential approach for use in the planning process.

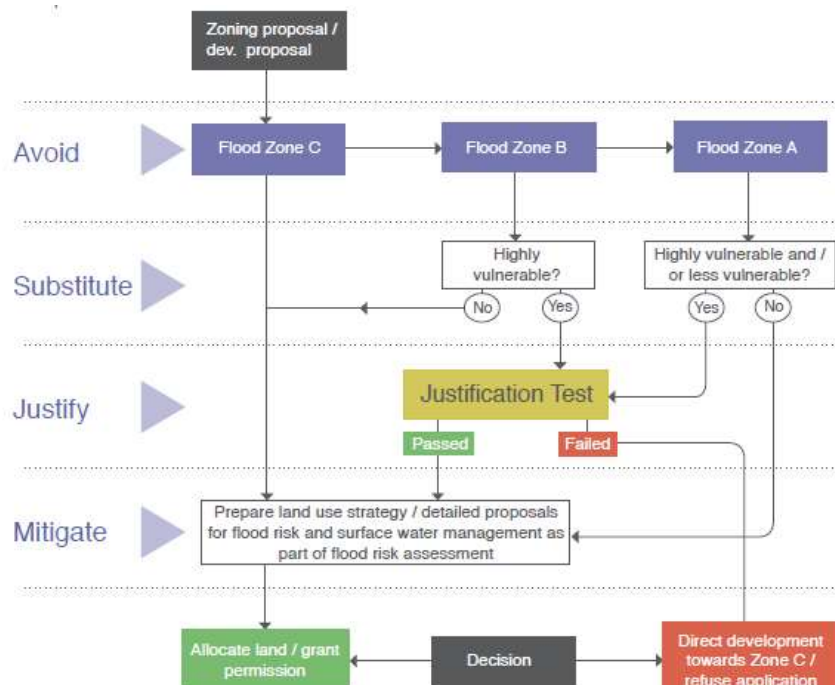


Fig. 3.2: Sequential approach mechanism in the planning process

According to the FRM Guidelines, Flood Zones are graphical areas within which the likelihood of flooding is in a particular range. They are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning. There are three Flood Zones, namely,

**Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% AEP or in 100 years for river flooding or 0.5% or 1 in 200 for coastal flooding);

**Flood Zone B** – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP or 1 in 1000 year and 1% AEP or 1 in 100 year for river folding and between 0.1% AEP or 1 in 1000 year and 0.5% AEP or 1 in 200 year for coastal flooding); and

**Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1000 for both river and coastal flooding).

Flood Zones A, B and C are based on the current assessment of the 1% AEP and the 0.1% AEP fluvial events and the 0.5% AEP and 0.1% AEP tidal events, without the inclusion of climate change factors. Table 3.1 of the FRM Guidelines (see below) shows the classification of the vulnerability to flooding of different types of development. The table classifies dwelling houses as 'highly vulnerable development (including essential infrastructure)'.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	<p>Garda, ambulance and fire stations and command centres required to be operational during flooding;</p> <p>Hospitals;</p> <p>Emergency access and egress points;</p> <p>Schools;</p> <p>Dwelling houses, student halls of residence and hostels;</p> <p>Residential institutions such as residential care homes, children's homes and social services homes;</p> <p>Caravans and mobile home parks;</p> <p>Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and</p> <p>Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.</p>
Less vulnerable development	<p>Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions;</p> <p>Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans;</p> <p>Land and buildings used for agriculture and forestry;</p> <p>Waste treatment (except landfill and hazardous waste);</p> <p>Mineral working and processing; and</p> <p>Local transport infrastructure.</p>
Water-compatible development	<p>Flood control infrastructure;</p> <p>Docks, marinas and wharves;</p> <p>Navigation facilities;</p> <p>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location;</p> <p>Water-based recreation and tourism (excluding sleeping accommodation);</p> <p>Lifeguard and coastguard stations;</p> <p>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and</p> <p>Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).</p>

\*Uses not listed here should be considered on their own merits

Table 3.1 Classification of vulnerability of different types of development

Table 3.2 of the FRM Guidelines (shown below) identifies the types of development that would be appropriate for each Flood Zone and those that would be required to meet the Justification Test. Since dwelling houses are classified as highly vulnerable development that section highlighted in Table 3.2 presents the required actions for each flood zone.

	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

The FRM Guidelines (Chapter 2) outlines the following three stages of flood risk assessment:

**Stage 1: Flood risk identification** - to identify whether there may be any flooding or surface water management issues relating to the proposed development site that may warrant further investigations.

**Stage 2: Initial flood risk assessment** – to confirm sources of flooding that may affect the proposed development site, to appraise the adequacy of existing information and to determine what surveys and

modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. This stage involves the review of existing studies and hydraulic modelling to assess flood risk and to assist with the development of FRM measurements.

**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, of its potential impacts on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve use of an existing or construction of a hydraulic model across a wide enough area to appreciate the catchment wide impacts and hydrological process involved.

## 4. EXISTING HYDROLOGICAL ENVIRONMENT

### 4.1 Salient Hydrological Features

The main hydrological feature of the area is the River Deel. (see figure 3.1 below)

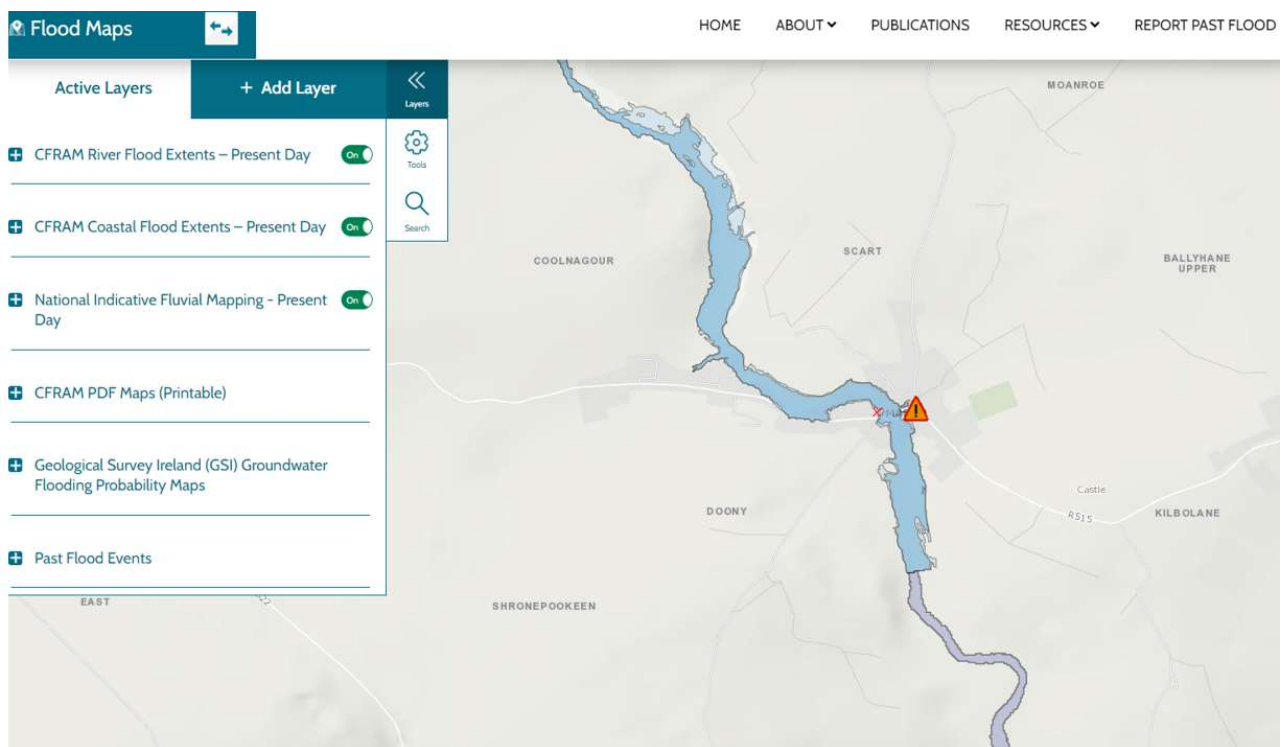


Figure 4.1 Screenshot from Floodinfo.ie showing site marked with a red cross.

### 4.2 Flood Regime of the Area

As can be seen from the floodinfo.ie map reproduced in Fig 3.1 above, the site lies partially within the Flood Zone A with a Medium Probability (1% AEP) of flooding with the remainder of the site in Flood Zone B with a Low Probability (0.1% AEP) of flooding.



There is also evidence of past flood events in the vicinity of the site as shown on Fig 3.1 above.

### 4.3 Existing Flood Studies

The OPW has published Flood Risk Assessment Maps on their website floodinfo.ie. Figure 3.2 below shows that the site lies:

- Partially within the Flood Zone A with a High Probability (10% AEP) of flooding. This area is to remain undeveloped.
- Partially within the Flood Zone B with a Medium Probability (1% AEP) of flooding. This area is to remain undeveloped.
- Partially within the Flood Zone B with a low Probability (0.1% AEP) of flooding. This area is to remain undeveloped.

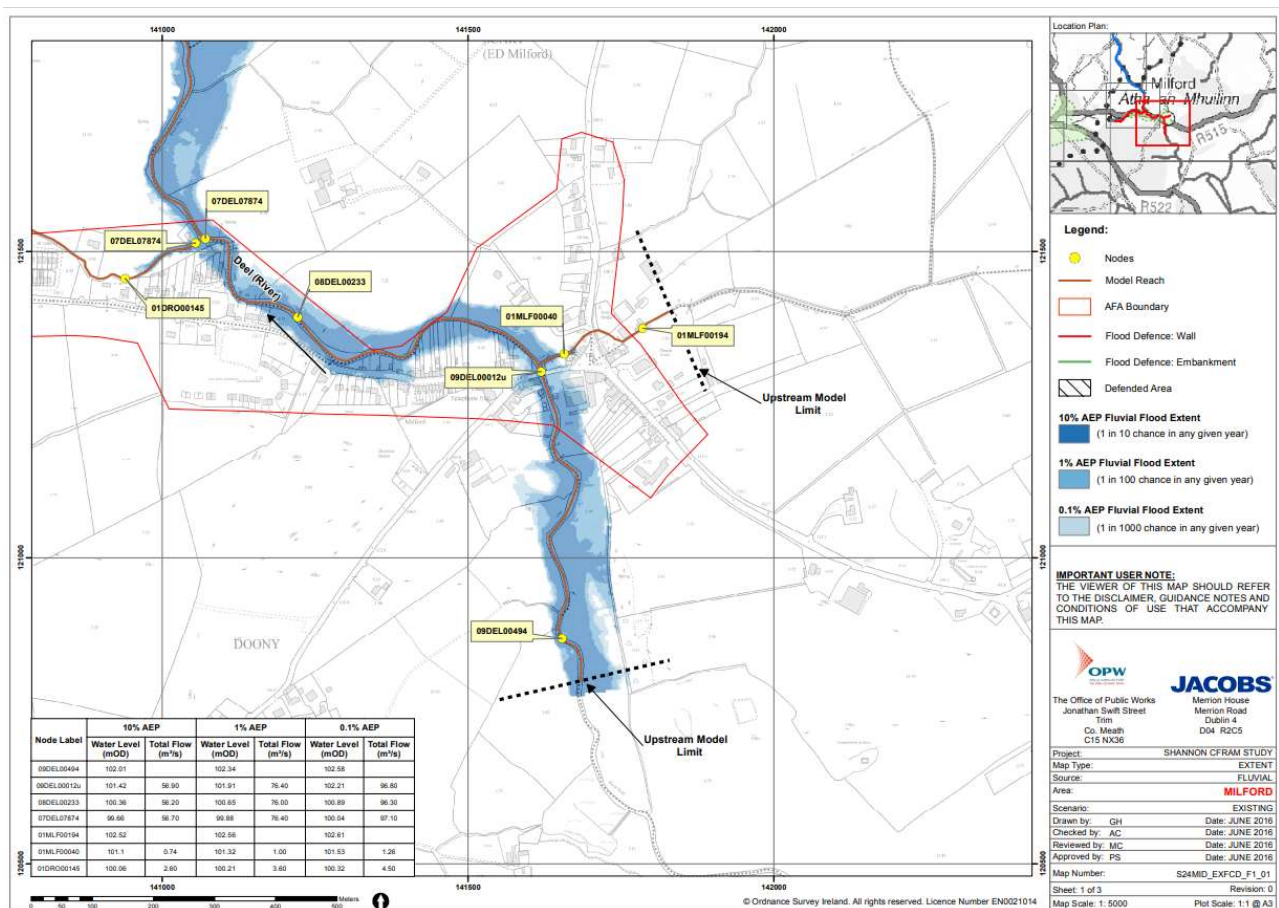


Figure 4.2 River Deel Flood Risk Assessment Extent Map (Drawing reproduced from Floodinfo.ie)



## 5. FLOOD RISK ASSESSMENT

### 5.1 Introduction

As outlined in Section 2 of this report the FRM guidelines identifies three stages of Flood Risk Assessment namely:

- Stage 1: Flood Risk Identification
- Stage 2: Initial Flood Risk Assessment
- Stage 3: Detailed Flood Risk Assessment

### 5.2 Flood Risk Identification

According to the FRM Guidelines, flood risk identification is the process for deciding whether a plan or project requires further investigation. This is a desk-based exercise based on existing information. All the existing information is described in Section 3 and the identification of flood risk from each of the five sources of flooding (coastal, fluvial (river), groundwater, pluvial (rainfall) and from artificial drainage systems) is considered.

#### Coastal Flood Risk

As the site, identified with a red X, is not located away from the coast, the site is not at risk from coastal flooding (see figure 4.1 below).

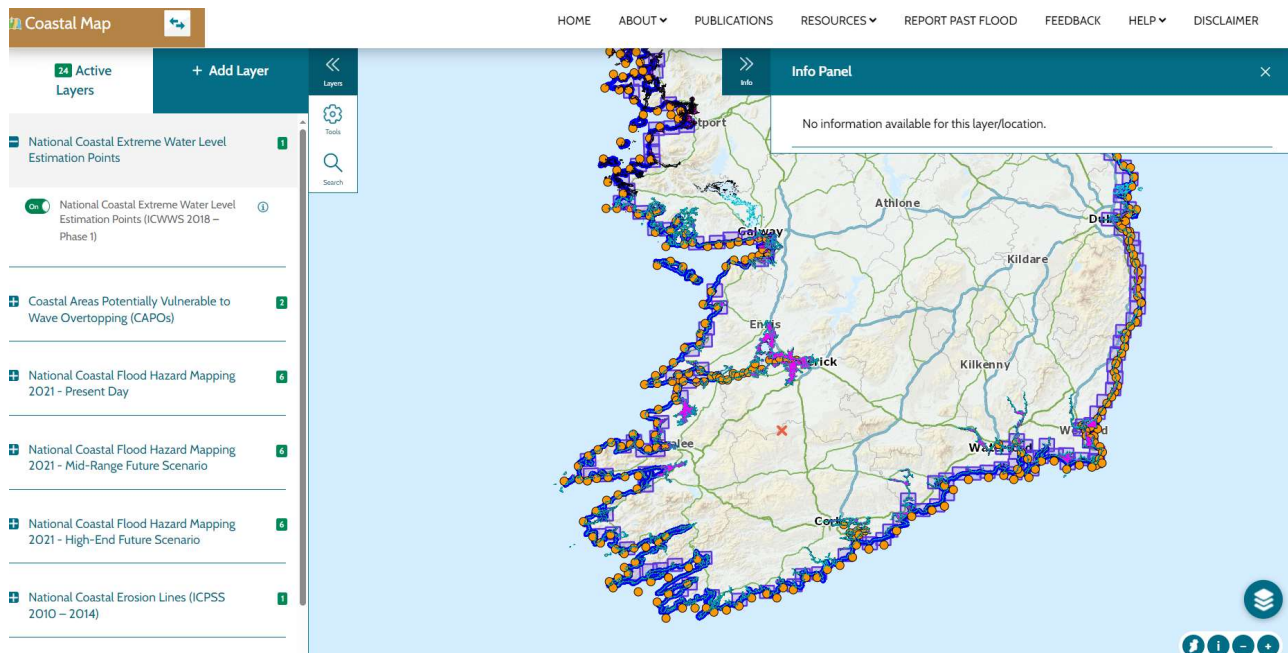


Figure 5.1 Screenshot from Floodinfo.ie showing site marked with a red cross.

#### Fluvial Flood Risk

The site is at risk of fluvial flooding as the site lies partially with the Flood Zone A with a Medium Probability (1% AEP) and partially in Flood Zone B with a Low Probability (0.1% AEP) of flooding (see figure 4.2 below).

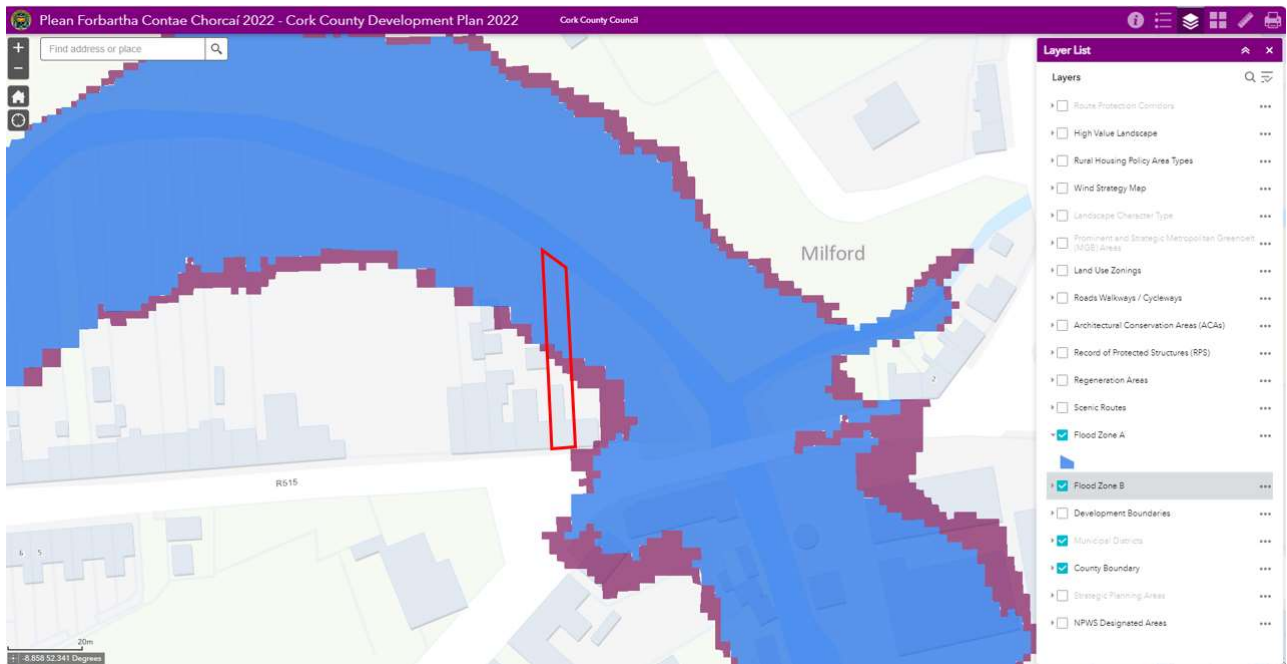


Figure 5.2 Extract from Cork County Council development plan map 2022 showing Flood Zoning

### **Groundwater Flood Risk**

There is no historical evidence of groundwater flooding at the site. There is no indication on the maps of any springs or wells on this site. Groundwater risk is therefore not considered to be significant.

### **Pluvial Flood Risk**

The site is located in an area of good drainage conditions. The existing ground levels fall from the front to the east towards the River Deel, and from the rear of the house to the north, towards the river Deel.

In the event of a surface water drainage blockage, it is considered to be a minor risk of pluvial flooding to the proposed dwelling if constructed to the floor levels of proposed on the Part VIII drawings.

## **5.3 Initial Flood Risk Assessment**

The Flood Risk Assessment has identified that there is a potential flood risk to the site due to fluvial flooding. Under the sequential approach identified in the FRM Guidelines a three step approach is required to confirm the appropriateness of the development in terms of flood risk.

### **Step 1: Identification of the Flood Zone at the proposed development site**

Using the Flood Zone criteria from the FRM Guidelines and as defined in Section 2 previously, the flood zones for the site was determined.

- **Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 year for river flooding or 0.5% or 1 in 200 for coastal flooding);

- **Flood Zone B** – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 100 year and 1% or 1 in 1000 year for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 year for coastal flooding); and
- **Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding).

**Step 2: Identification of the vulnerability of the type of the proposed development (Table 3.1 of the FRM Guidelines)**

The different types of proposed infrastructure are then assigned a vulnerability classification according to the definitions in ‘Table 3.1 – Classification of vulnerability of different types of development’ of the FRM Guidelines. As described in Section 1.2 above, the proposed development consists of residential dwellings. Dwelling houses are classified as ‘highly vulnerable development’.

**Step 3: Using the matrix of vulnerability versus Flood Zone (Table 3.2 of the FRM Guidelines), identify the necessity for the justification test for the proposed development.**

The proposed development site is categorised as ‘highly vulnerable development’. Table 3.2 of the FRM Guidelines and Figure 3.2 – Sequential approach mechanism in the planning process (FRM Guidelines) stipulate that a justification test is required for such a development before it is deemed appropriate development for that flood zone category.

## 5.4 Justification Test

According to the FRM Guidelines, the Justification Test has been designed to rigorously assess the appropriateness, or otherwise of particular developments that are being considered in areas of moderate or high flood risk (Flood Zones B and A, respectively).

The FRM Guidelines outlines, in Box 5.1 below, the five criteria namely Criterion 1, 2(i), 2(ii), 2(iii), and 2(iv), all of which must be satisfied under the Justification Test as it applies to development management. These justification criteria have been dealt in the following paragraphs.

**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.

**Criterion 1: The subject land has been designated for this particular use**

Criterion 1 from the FRM Guidelines requires that 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.

The current County Development plan identifies the site as being within the Development Boundary. Development Boundary objective DB-01 states 'Within the development boundary of Milford encourage development of up to 28 houses during the plan period.'

**Criterion 2: The proposal has been subject to an appropriate flood risk assessment:**

To satisfy the four sub-criteria (namely, 2(i), 2(ii), 2(iii), and 2(iv)) under this criterion, as set out in Box 5.1 of the FRM Guidelines, a detailed flood risk assessment has been undertaken.

A detailed and appropriate flood risk assessment has been undertaken under the 4 sub-criteria of Criterion 2 of the Justification Test, as described below:

- Sub-criterion 2(i) – Detailed flood risk assessment
- Sub-criterion 2(ii) – Flood risk mitigation measures
- Sub-criterion 2(iii) – Residual risks
- Sub-criterion 2(iv) – Wider planning objectives

Each sub-criterion is addressed in the following sections.

**Sub-criterion 2(i) – Potential Flood Risk**

Criterion 2(i) requires that the development proposed will not increase flood risk elsewhere and, if practicable will reduce overall risk.

The Flood Risk Maps indicate the while portions of the site are within Flood zone A,B & C for fluvial flooding, the existing development which is to be demolished and redeveloped lies outside of the flood zones. Therefore, the development will not be at risk from fluvial flooding and the development will not increase flood risk elsewhere.

With this, the proposed development satisfies Sub-criterion 2 (i) of the Justification Test.

**Sub-criterion 2(ii) – Flood risk mitigation measures**

Criterion 2(ii) requires that the development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible.

We recommend that the proposed floor levels of the houses are raised to at least +102.098m AOD to provide adequate freeboard (0.3m) against pluvial flooding. With this, the proposed development includes measures to minimise flood risk to people, property, the economy and the environment and therefore satisfies Sub-criterion 2 (ii) of the Justification Test.

**Sub-criterion 2(iii) – Residual Risks**



Criterion 2 (iii) requires that 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 further flood risk management measures and the provisions for emergency services access.

In this development, raising the floor levels will ensure that the residual risks to the area can be managed to an acceptable level to satisfy sub-criterion 2(iii).

#### **Sub-criterion 2 (iv) – Wider Planning Objectives**

Criterion 2 (iv) requires that 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 site is zoned for residential development and the proposed development has been designed to a high standard and addresses the twelve criteria<sup>1</sup> in the Department of the Environment Community and Local Governments' 'Urban Design Manual'. The development has also been subject to detailed and positive pre-planning consultation with the planning authority where it has been accepted that the development is compatible with the Council's wider objectives for the area and will make a positive contribution to the area and will make a positive contribution to the area.

The proposed residential development is therefore compatible with the wider planning objectives for this area, is of good urban design and will make a positive contribution to the area. Therefore, it is considered that the development also satisfies Sub-criterion 2 (iv) of the Justification Test.

<sup>1</sup> The twelve criteria include: **Context:** How does the development respond to its surroundings? **Connections:** How well connected is the new neighbourhood? **Inclusivity:** How easily can people use and access the development? **Variety:** How does the development promote a good mix of activities? **Efficiency:** How does the development make appropriate use of resources, including land? **Distinctiveness:** How does the proposal create a sense of place? **Layout:** How does the proposal create people friendly streets and spaces? **Public Realm:** How safe, secure and enjoyable are the public areas? **Adaptability:** How will the buildings cope with change? **Privacy and Amenity:** How does the scheme provide a decent standard of amenity? **Parking:** How will the parking be secure and attractive? **Detailed Design:** How well thought through is the building and landscape design?



## 6. CONCLUSION

### 6.1 Summary of Results

A flood risk assessment for the proposed development at West End Milford, Co. Cork has been undertaken following the methodology recommended in the FRM Guidelines. The following is the summary of the flood risk assessment:

- The proposed development site is located off the regional road R515 close to Milford village centre. The development the demolition of an existing two storey terraced structure and rear extension and the redevelopment of same.
- The OPW Flood Risk Assessment Maps shows that the site lies partially with the Flood Zone A with a Medium Probability (1% AEP) of flooding and partially in Flood Zone B with a Low Probability (0.1% AEP) of flooding.
- The type of development is defined as 'Highly Vulnerable Development (including essential infrastructure)'. Using the sequential approach mechanism it is assess that a justification test is required for the proposed development.
- Following the procedures as set out in the FRM Guidelines it was deemed that the site satisfied all Criteria and thus satisfied the Justification Test.

### 6.2 Recommendations

To protect the proposed development against pluvial flooding it is recommended that the development be constructed with a finished floor level (FFL) of at least +102.098m AOD.