



# **FLOOD RISK ASSESSMENT**

## **17-20 Merchant's Road Lower, Galway City**

**On behalf of Galway City Council**

**November 2021**

## Contents

|       |                                              |    |
|-------|----------------------------------------------|----|
| 1.    | Introduction .....                           | 1  |
| 1.1   | Objectives.....                              | 2  |
| 1.2   | Methodology.....                             | 2  |
| 1.3   | Flood Zones .....                            | 3  |
| 2.    | Flood Risk Identification (Stage 1) .....    | 5  |
| 3.    | Initial Flood Risk Assessment (Stage 2)..... | 6  |
| 3.1   | Flooding Sources.....                        | 6  |
| 3.1.1 | Fluvial flooding .....                       | 6  |
| 3.1.2 | Coastal Flooding .....                       | 6  |
| 3.1.3 | Pluvial flooding .....                       | 8  |
| 3.1.4 | Groundwater flooding.....                    | 8  |
| 3.1.5 | Flood Zoning .....                           | 8  |
| 4.    | Justification Test .....                     | 9  |
| 4.1   | Zoning .....                                 | 10 |
| 4.2   | Mitigation .....                             | 11 |
| 5.    | Conclusions and Recommendations.....         | 12 |

## Tables

|                                                                          |    |
|--------------------------------------------------------------------------|----|
| Table 1-1: Existing Finished Floor Levels at Ground Floor .....          | 1  |
| Table 1-2: Proposed Finished Floor Levels at Ground Floor .....          | 2  |
| Table 1-3: Vulnerability Matrix.....                                     | 3  |
| Table 1-4: Vulnerability Classification .....                            | 4  |
| Table 2-1: Recorded Flood Events on Floodinfo.ie.....                    | 5  |
| Table 3-1 : Estimated Water levels to OD Malin for W6 Phase 4 ICPSS..... | 6  |
| Table 4-1: Land Use Zoning Objectives for City Centre.....               | 10 |

## Figures

|                                                                                             |    |
|---------------------------------------------------------------------------------------------|----|
| Figure 1-1: Site Location Map.....                                                          | 1  |
| Figure 2-1: Recorded Flood Events in the vicinity of the site (Floodinfo.ie) .....          | 5  |
| Figure 3-1: Extract from ICWSS 2018.....                                                    | 7  |
| Figure 3-2: Galway City Coastal Wave and Water Level Modelling Study 2020 Model Nodes ..... | 7  |
| Figure 4-1: Extract of Zoning Map from Galway City Development Plan 2017-2023 .....         | 10 |

## Appendices

Appendix A – Site Layout Plan

| Project No. | Doc. No. | Rev. | Date        | Prepared By | Checked By | Approved By | Status   |
|-------------|----------|------|-------------|-------------|------------|-------------|----------|
| 21665       | 6007     | A    | 02/Nov/2021 | D Cagney    | I Brosnan  | I Brosnan   | Planning |
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1. Introduction

The site is located at 17-20 Merchant's Road Lower, Galway City as shown in Figure 1-1. The site is approximately both 80m west and east of the River Corrib. The site currently consists of four number two-story terraced residential houses. These are currently in a derelict condition. Existing ground levels in the vicinity of the site vary from approximately 3.6mOD in the north to 3.4mOD in the south. The current finished ground floor levels on the existing dwellings are summarized in Table 1-1.

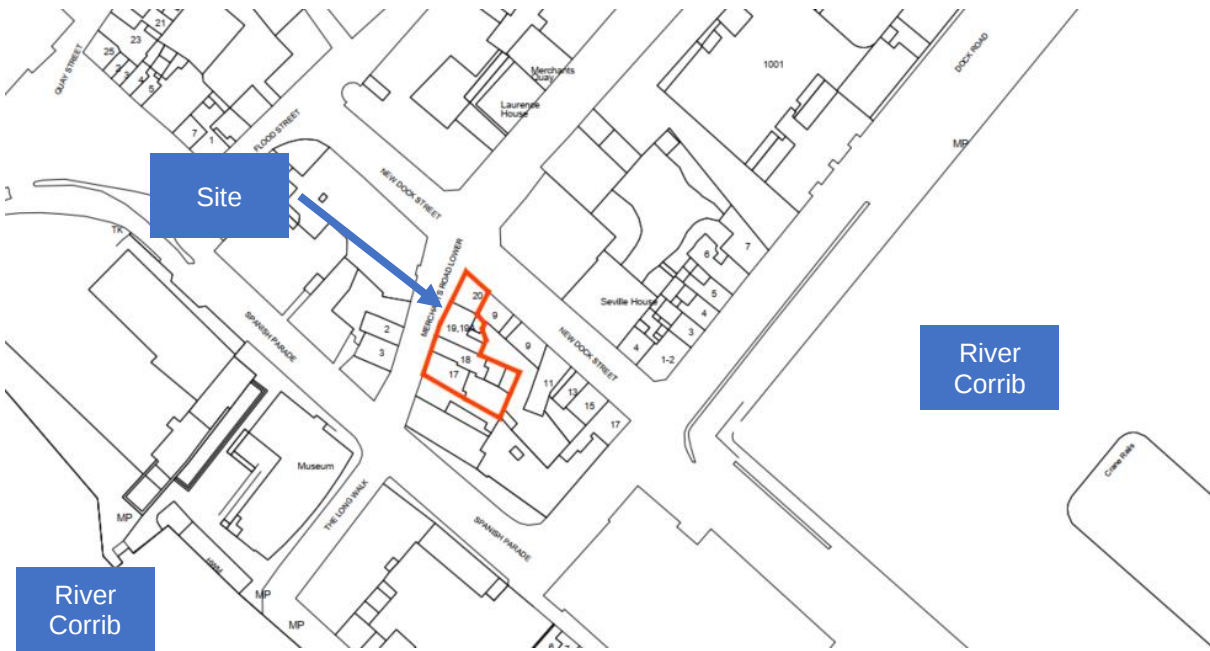


Figure 1-1: Site Location Map

Table 1-1: Existing Finished Floor Levels at Ground Floor

| House No.                                  | 17   | 18   | 19   | 20   |
|--------------------------------------------|------|------|------|------|
| Existing Finished Floor Levels (mOD Malin) | 3.49 | 3.49 | 3.52 | 3.52 |

The existing structures on the site are intended to be demolished to accommodate the new development. It is proposed to construct a multi-purpose structure containing social housing apartments, cafe and a cultural centre on the site. The ground floor will contain the café and cultural centre along with a communal area to serve the residential apartments on the upper floors. The proposed floor levels for the ground floor are summarized in Table 1-2.

**Table 1-2: Proposed Finished Floor Levels at Ground Floor**

| Area                                       | Cafe | Cultural Centre | Communal Area |
|--------------------------------------------|------|-----------------|---------------|
| Proposed Finished Floor Levels (mOD Malin) | 3.65 | 3.75            | 3.45          |

## 1.1 Objectives

The purpose of the report is to establish the flood risk associated with the proposed development and, if appropriate, to recommend mitigation measures to prevent any increase in flood risk within the site or externally in the wider area.

The report has been prepared in the context of The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009, published by the Office of Public Works and the Department of Environment, Heritage and Local Government. Flood Risk Assessments are carried out at different scales by different organisations. The hierarchy of assessment types are Regional (RFRA), Strategic (SFRA) and Site-specific (FRA). This report is site-specific.

## 1.2 Methodology

The Flood Risk Management Guidelines document outlines three stages in the assessment of flood risk as follows:

### Stage 1 Flood risk identification –

To identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation;

### 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 determine what surveys and modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. The extent of the risk of flooding should be assessed which may involve preparing indicative flood zone maps. Where existing river or coastal models exist, these should be used broadly to assess the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures; and

### Stage 3 Detailed risk assessments –

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 impact 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 or a river or coastal cell across a wide enough area to appreciate the catchment wide impacts and hydrological processes involved.

This report has been prepared generally in accordance with these stages.

### 1.3 Flood Zones

The Flood Risk Management Guidelines document defines three flood zone types as follows:

#### Flood Zone A –

where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 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 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 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). Flood Zone C covers all areas of the plan which are not in zones A or B.

The flood zone type is determined based on current water surface levels without allowance for climate change.

The Guidelines divide developments into three vulnerability classes as follows:

- Highly vulnerable developments
- Less vulnerable developments
- Water compatible developments

The Guidelines include a matrix that determines the appropriateness of different types of development based on their vulnerability classification and the Flood Zones in which they are located.

**Table 1-3: Vulnerability Matrix**

|                                                                    | <b>Flood Zone A</b> | <b>Flood Zone B</b> | <b>Flood Zone C</b> |
|--------------------------------------------------------------------|---------------------|---------------------|---------------------|
| 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 1-4: Vulnerability Classification**

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

Where the matrix indicates that a development is not appropriate it may still be justified based on a procedure described as a Justification Test.

The café and cultural centre would be classified as a Less Vulnerable Development. The residential apartments would be classified as a highly vulnerable development.

## 2. Flood Risk Identification (Stage 1)

Possible sources of flood risk were identified by examination of publicly available information on the floodinfo.ie website. It indicated several records of flooding in the vicinity of the site. Refer to Figure 2-1. These events are summarised in Table 2-1. While Merchants Road was not explicitly mentioned, various records advise that flooding has occurred in the area in the vicinity of the site previously.

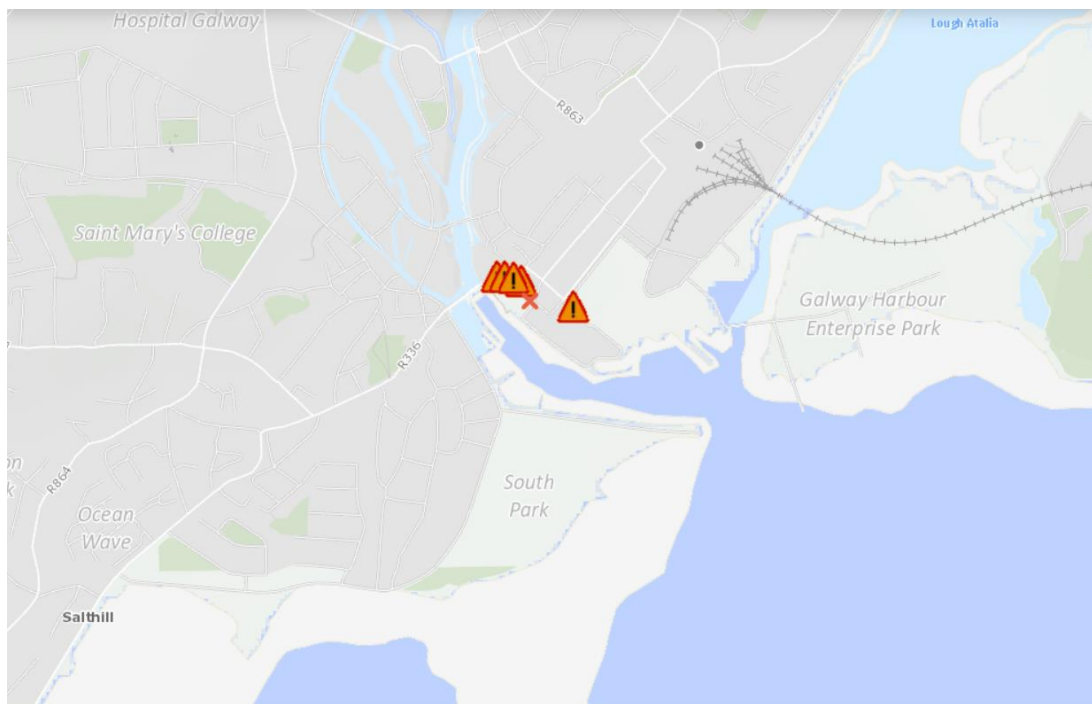


Figure 2-1: Recorded Flood Events in the vicinity of the site (Floodinfo.ie)

Table 2-1: Recorded Flood Events on Floodinfo.ie

| Date              | Source                                  | Area Affected                                                                          | Type              |
|-------------------|-----------------------------------------|----------------------------------------------------------------------------------------|-------------------|
| 17th January 1995 | OPW                                     | Main areas affected where Quay Street, Flood Street, The Docks Area and Lower Salthill | Not Stated        |
| 28th January 2013 | Galway City Council & WFRAM Consultants | Flood street, Spanish Arch/Quay Street area and Lough Atalia road                      | Pluvial           |
| 3rd January 2014  | JBA on behalf of Galway City Council    | Report not available                                                                   | Coastal/Estuarine |
| January 2018      | Irish Times                             | Claddagh Area                                                                          | Not Stated        |

### 3. Initial Flood Risk Assessment (Stage 2)

The purpose of Initial Flood Risk Assessment is to ensure that all of the relevant flood risk sources are identified so that they can be addressed appropriately in the Detailed Risk Assessment.

#### 3.1 Flooding Sources

The potential sources of flooding and their relevance to the flood risk to the site are outlined in the following sub section's.

##### 3.1.1 Fluvial flooding

Fluvial flooding occurs when the capacity of a river channel is exceeded and water flows onto the adjacent land or flood plain.

OPW Map (W30GLW\_EXCCD\_F1) shows the site being within the extent for the 0.1% AEP fluvial flood event. No model node is in close proximity to the site. The OPW CFRAM maps for the 0.1% AEP flood event suggest that flood depth in the area is approximately 0 to 0.25m.

##### 3.1.2 Coastal Flooding

OPW Map (W30GLW\_EXFCD\_F4\_12) shows the site being within the extent for the 0.1% AEP fluvial flood event. No model node is in the vicinity of the site for the CFRAM mapping. The OPW CFRAM maps for this flood event suggest that flood depth in the area is estimated to be approximately 1 to 1.5m. Irish Coastal Wave and Water Level Modelling Study 2018 Phase 1, advises the levels summarized in Table 3-1 for the model node closest to the site. These levels are comparable to the levels in the Galway City Coastal Wave and Water Level Modelling Study 2020 Report for the respective return periods for Galway Port Location A which is adjacent to the site. The height of wave action affecting this location is low due to the node's sheltered nature. Any wave action would be reduced further due to the distance of the site from the River Corrib and the sheltered nature of the site itself.

**Table 3-1 : Estimated Water levels to OD Malin for W6 Phase 4 ICPSS**

| Scenario | 10% AEP | 0.5% AEP | 0.1% AEP |
|----------|---------|----------|----------|
| Current  | 3.55    | 4.01     | 4.26     |
| MRFS     | 4.05    | 4.51     | 4.76     |
| HEFS     | 4.55    | 5.01     | 5.26     |

Floodinfo.ie advises that the Flood Relief Scheme for Galway City is at Stage 1 Scheme Development and Preliminary Design to protect against the 0.5% AEP design event. When completed, these defences would assist in reducing risk to the site.



Figure 3-1: Extract from ICWSS 2018

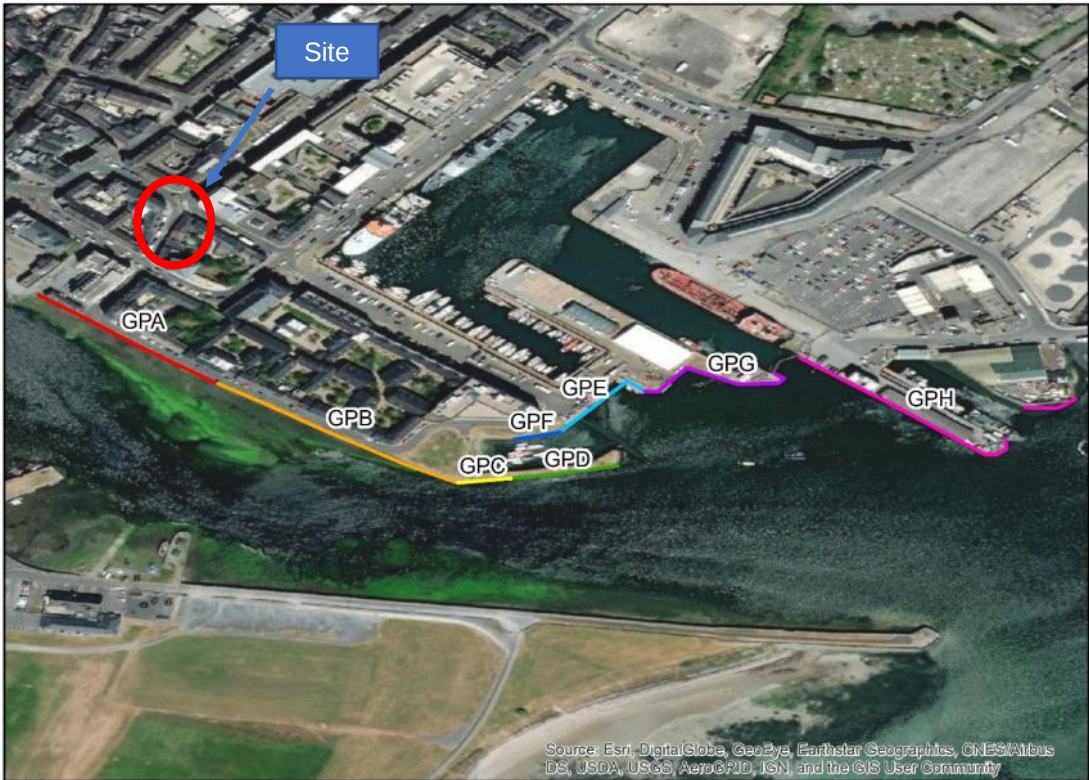


Figure 3-2: Galway City Coastal Wave and Water Level Modelling Study 2020 Model Nodes

### **3.1.3 Pluvial flooding**

Pluvial flooding or overland flow occurs when rainfall intensity exceeds the infiltration capacity of the ground. The excess water flows overland to the nearest watercourse or results in ponding in low areas or upstream of physical obstructions. Overland flow is most likely to occur following periods of sustained rainfall that cause the ground surface to become saturated or by high intensity short duration rainfall events. The proposed site is in an area already developed and no change in runoff is proposed. Pluvial flooding has been recorded in nearby streets.

### **3.1.4 Groundwater flooding**

Groundwater flooding occurs when the water table rises to the level of the ground surface due to rainfall and flows out over the surface. The ground in the vicinity of the site generally has reasonable permeability. The Groundwater Flooding Data Viewer by the GSI closest area affected by groundwater flooding being over 2km from the site. Groundwater levels may vary with the tidal influence due to the site's proximity to Galway Port.

### **3.1.5 Flood Zoning**

The OPW flood zoning maps indicate the site will be within Flood Zone B. The commercial types of development being proposed are appropriate for this and therefore a justification test is not required. The communal area for the residential area requires the Justification Test due to the highly vulnerable proposed use.

## 4. Justification Test

### 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.

4.1 Zoning

The site is located within an area zoned as “City Centre Uses” in the Galway City Development Plan 2017-2023 as shown in Figure 4-1. The proposed uses of residential, café and cultural centre are in the list of compatible uses for this Zoning Objective. The Justification Test for the City Centre Residential was completed as part of the SFRA which accompanied the City Development Plan.

The site currently contains residential buildings so the vulnerability due to the development is not increased due to the proposed development uses. The footprint of the site is generally unchanged and it will not impede on overland flow routes.

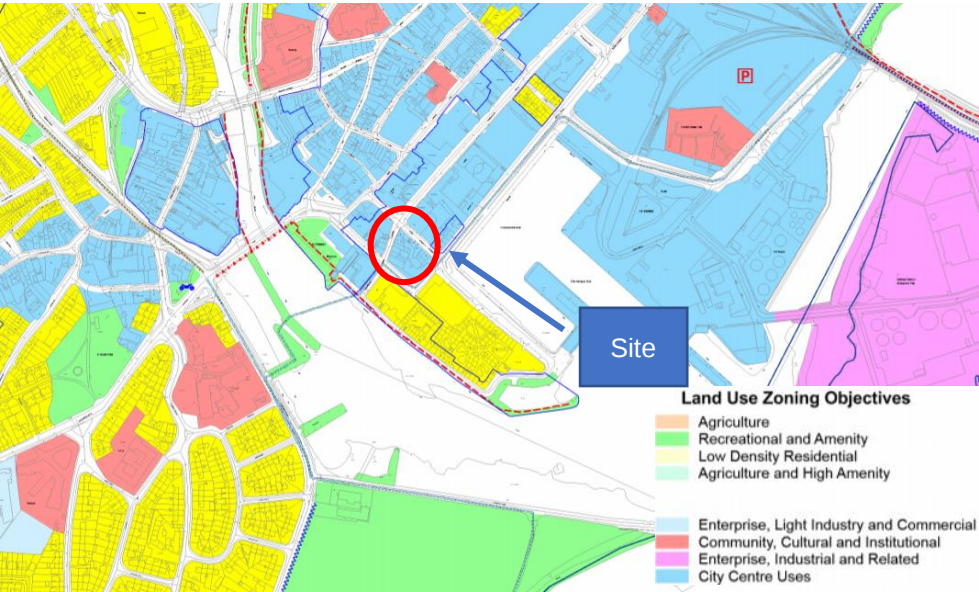


Figure 4-1: Extract of Zoning Map from Galway City Development Plan 2017-2023

Table 4-1: Land Use Zoning Objectives for City Centre

| Zoning Objective CC<br>To provide for city centre activities and particularly those, which preserve the city, centre as the dominant commercial area of the city. |                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Uses which are compatible with and contribute to the zoning objective, for example:                                                                               | <ul style="list-style-type: none"><li>• Retail</li><li>• Residential</li><li>• Offices, banks and professional services</li><li>• Tourist related uses</li><li>• Cultural and community uses</li><li>• Buildings for education</li><li>• Recreation</li><li>• Childcare facilities</li><li>• Places of worship</li></ul> |
| Uses which may contribute to the zoning objectives, dependent on the area and the propose development for example:                                                | <ul style="list-style-type: none"><li>• Light industry</li><li>• Public utilities</li></ul>                                                                                                                                                                                                                              |

## 4.2 Mitigation

Mitigation measures are advised to mitigate against the flood risk to the structure will be primarily a flood defenses to the minimum elevation of 4.76mOD. This equates to the 0.2% AEP event in the Medium Range Future Scenario (MRFS) and a freeboard of 250mm. The MRFS scenario is employed to account for the increase in sea levels due to Climate Change. The 250mm freeboard is applied to mitigate against any localized flooding or wave action in the vicinity of the site during this event and to reduce risk of the flood defenses being overtopped.

The provision of flood defences to protect the site from flooding will result in a residual risk to the site. An emergency and evacuation plan will be required to ensure that everyone on the site can be kept safe and evacuated in a safe manner. The design should incorporate resilient measures to help with the repair of the structure in the event of it becoming inundated and to mitigate any potential impacts due to flooding within and around the site. Non-return valves should be fitted on all drains leaving the premise at the property where flood water could potentially access the structure by. These will also prevent backflows if there is a failure in the public system or due to flooding in the area.

In the event of flooding the area surrounding the proposed development could be inundated during the tidal cycle/ surge which could result in the interruption to road access to residents and emergency services. Local services, gas, electricity, and phones could be disrupted. The developer and residents should consider this possibility and plan for periods of tide locking/ surge or periods of fluvial inundation.

## **5. Conclusions and Recommendations**

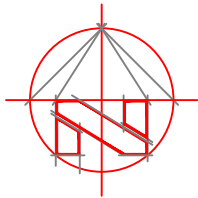
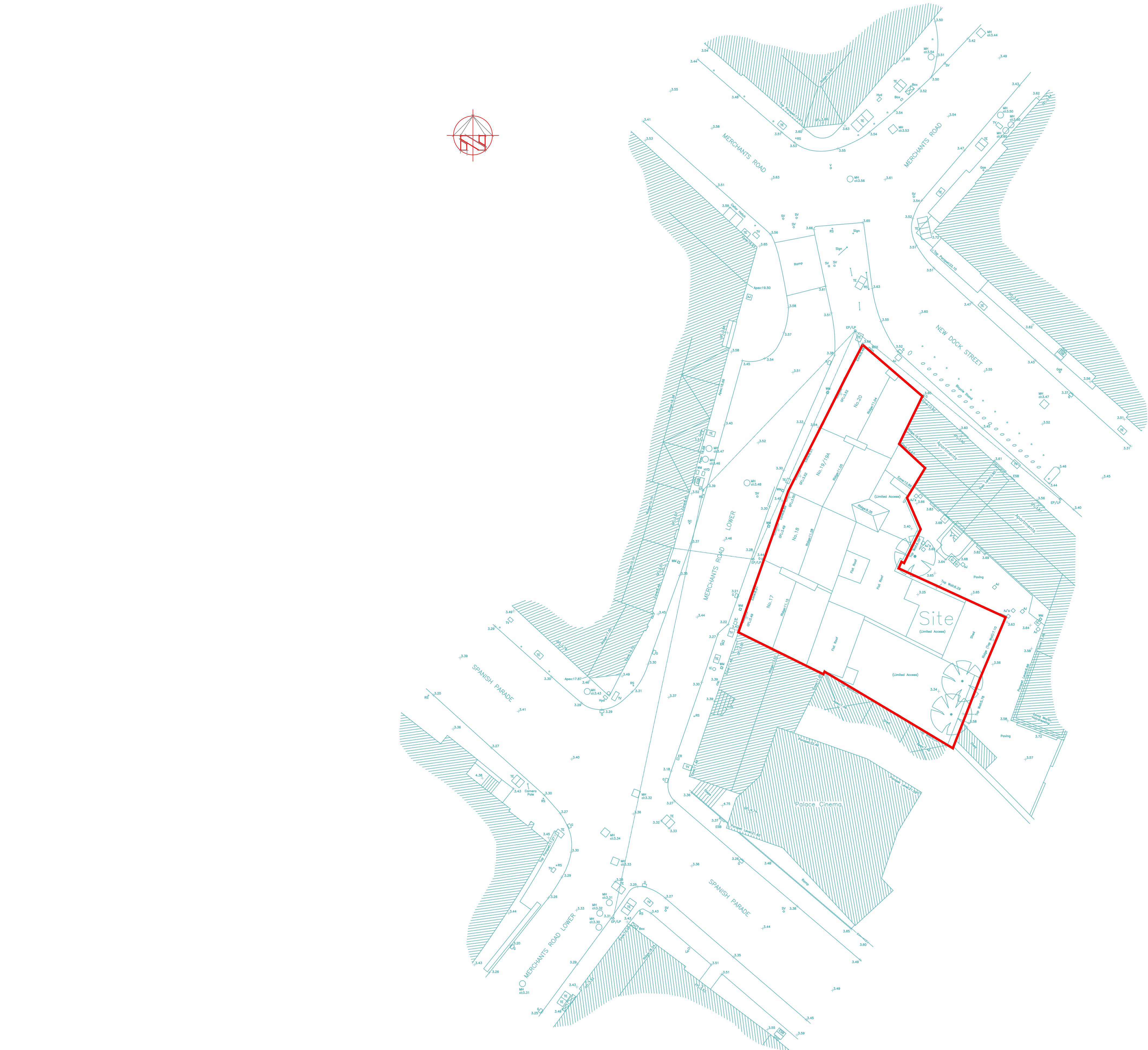
The flood risk assessment has identified that the site is within Flood Zone B as defined in the Flood Risk Management Guidelines. The proposed uses are justified based on existing zoning, existing use and the SFRA conducted for the City Development Plan. The primary flood source to the site will be from estuarial sources due to its proximity to the Atlantic Ocean.

The following recommendations are advised to be incorporated into the design:

- Flood Barriers to the minimum elevation of 4.76mOD Malin be incorporated into the detailed design of the proposed structure.
- An emergency and evacuation plan be in place for the businesses and the residents in event of a prolonged inundation of the area around the building and in the event that the flood defenses are breached. This should include how residents will be evacuated in event of inundation preventing access via the communal area.
- Use of non-return valves on opes where flood water could gain access into the structure such as stormwater and foul water pipes to protect the structure in event of the area around the site being flooded.
- Location of critical infrastructure for the building above the elevation of 4.76mOD Malin and use of elements resilient to flooding such as masonry walls instead of timber stud and plywood.

## **Appendix A**

### **Site Layout Plan**



DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS IN ALL CASES. VERIFY DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES TO THE DESIGNERS IMMEDIATELY.  
THIS DRAWING TO BE READ IN CONJUNCTION WITH THE DESIGNERS SPECIFICATION.  
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- NOTES:
1. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS: BILLS OF QUANTITIES, ARCHITECTURAL, SERVICES AND ENGINEERING DRAWINGS.
  2. ALL LEVELS ARE IN **METRES** RELATED TO ORDNANCE DATUM MALIN HEAD, OSGRHS.
  3. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
  4. DRAWINGS ARE NOT TO BE SCALED.
  5. ALL DIMENSIONS ARE IN **MILLIMETRES**, UNLESS NOTED OTHERWISE.

LEGEND:

- SITE BOUNDARY
- FOUL SEWER
- STORM SEWER
- COMBINED SEWER

|     |          |                        |    |     |
|-----|----------|------------------------|----|-----|
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PROJECT: 17/20 MERCHANTS ROAD,  
GALWAY CITY,  
GALWAY

TITLE: SITE LAYOUT PLAN

CLIENT: Comhairle Cathrach na Gaillimhe  
Galway City Council

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