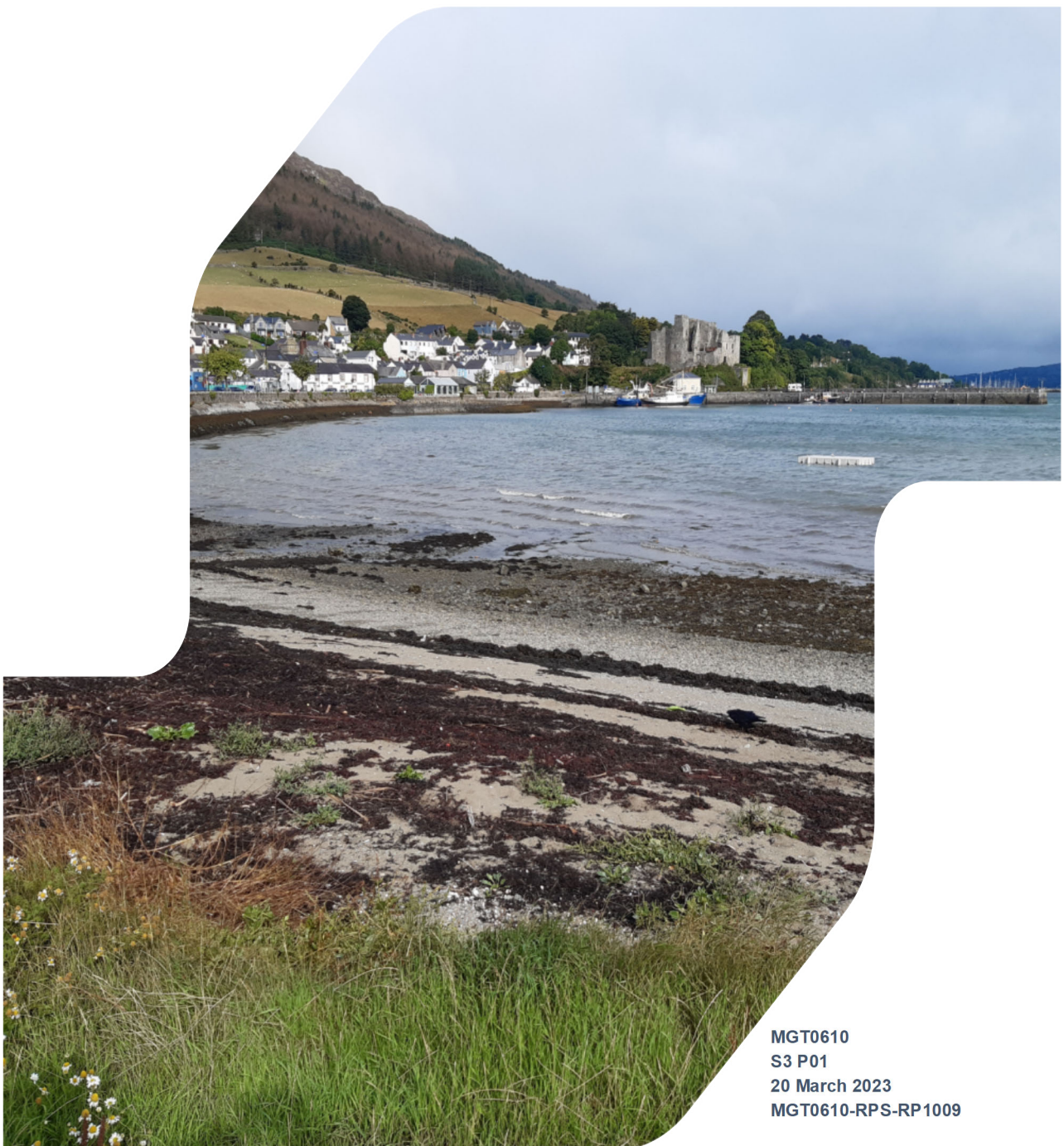


# FLOOD RISK ASSESSMENT

Living in Carlingford – Visiting Carlingford – Car Park & Tennis Courts



MGT0610  
S3 P01  
20 March 2023  
MGT0610-RPS-RP1009

# FLOOD RISK ASSESSMENT REPORT

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# 1 INTRODUCTION

## 1.1 Background

RPS Consulting Engineers were commissioned by Louth County Council (LCC) to carry out a Site-Specific Flood Risk Assessment (FRA) for a proposed sports and recreation development in Carlingford which includes tennis courts and an accompanying car park. The site location is highlighted in **Figure 1-1**.

The objective of this report is to review and appraise information pertinent to flood risk at the location of the proposed works and determine the impact, if any, the proposed works will have on the existing flood risk in the area. The assessment involves a desk study utilising the most up-to-date hydrological information.

The proposed works at Carlingford must undergo a Flood Risk Assessment under the Planning System and Flood Risk Management Guidelines for Planning Authorities (DoEHLG & OPW, 2009) (hereinafter referred to as “the Guidelines”).

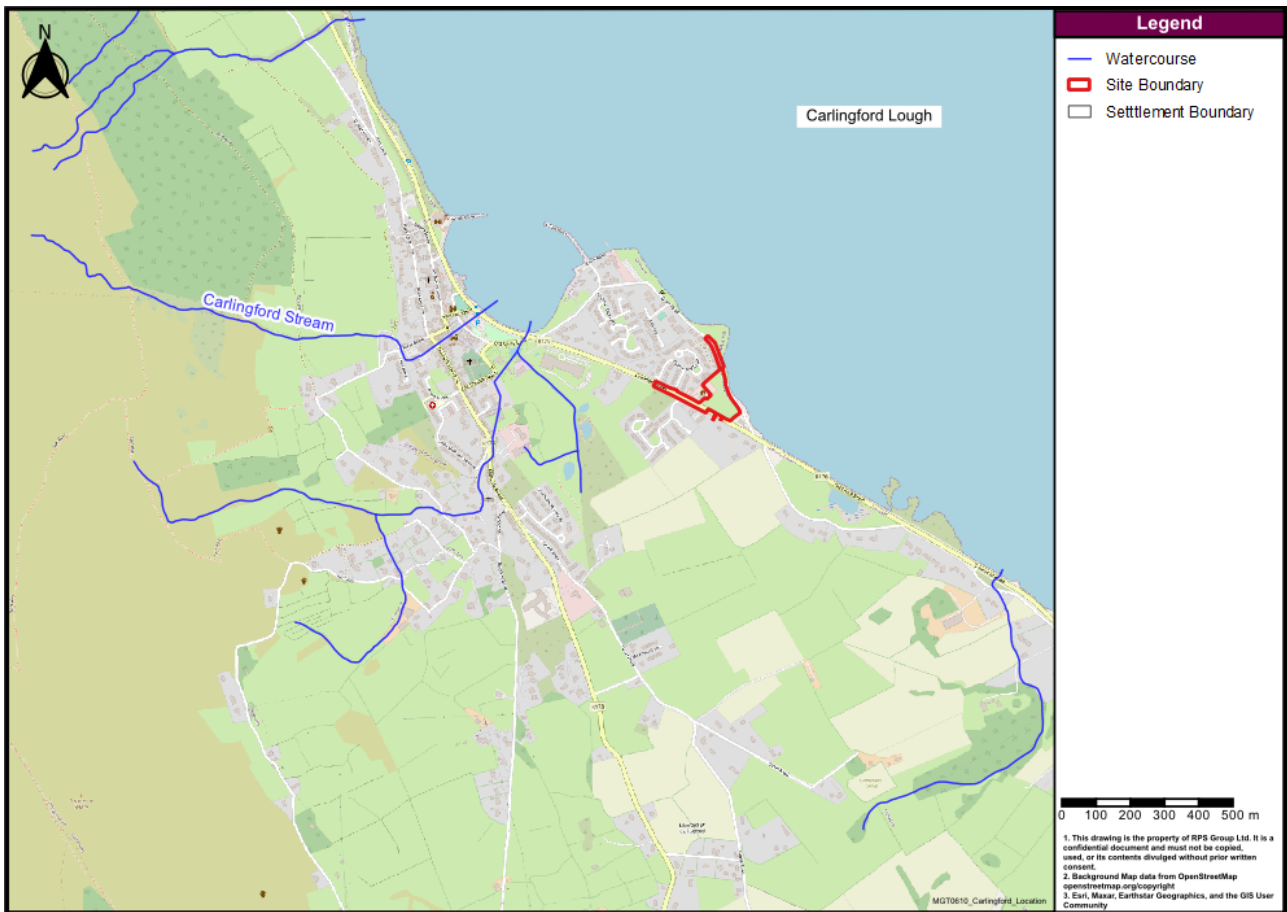


Figure 1-1 – Site Location

## 1.2 Existing Site

The site is located between Greenore Road and Ghan Road on the eastern side of Carlingford Town, on the shores of Carlingford Lough. It is currently a greenfield site previously used as a field for holding horses. Residential properties border the site to the north and south, whilst Carlingford Fire Station borders the

northwest corner of the site. 'Clós An Manach' residential estate and further residential housing is situated on the inland side of Greenore Road as shown in Figure 1-2.



Figure 1-2 – Existing Site

### 1.3 Proposed Development

The proposed tennis courts and associated works are within an area of approx. 1.0ha and will include;

- 2 no. new porous asphalt tennis courts, complete with lighting and fencing (approx. 5m high). Tennis court drainage to consist of filter drain system connecting to closed pipe network;
- New gully and pipe drainage network tying into the existing network on Ghan Road;
- New ESB substation, comprising of an above ground steel cabinet of dimensions approx. 2.6m x 2.2m x 2.0m;
- Ducting for communications and electrical services requirements;
- 148 no. car parking spaces, made up of; 8 no. accessible parking bays, 10 no. potential electric car charging parking bays, 9 no. parent and child parking bays and 121 no. standard parking bays, parking bays to be constructed of permeable paving block setts;
- Public lighting - where necessary, shielding to avoid unnecessary light spill that may have a negative effect on the ecology within the area;

- Pedestrian network including concrete footpaths connecting to the existing footpath network on the Ghan Road. The Ghan Road is considered to be an appropriate connection point due to the presence of existing footpath network along this route connecting to the town centre. This route is also less trafficked by vehicles and more scenic with tourist attractions in the form of viewing points of Carlingford Lough, the Underground Leprechaun and Fairy Cavern and the Folklore Park. A secondary linkage will also be provided from the car park to the town centre along the R176. A new section of footpath will be constructed to the north of the car park entrance that will link into an existing footpath. A controlled pedestrian crossing will be provided to allow pedestrians continue their journey to the town centre by linking into the footpath network along the northbound carriage way of the R176 and R173;
- Internal asphalt road network with road markings;
- Bus parking/set down bays; and
- Landscaping.

The site layout of the proposed development – Car Park and Tennis Court Area is illustrated in Figure 1-3.

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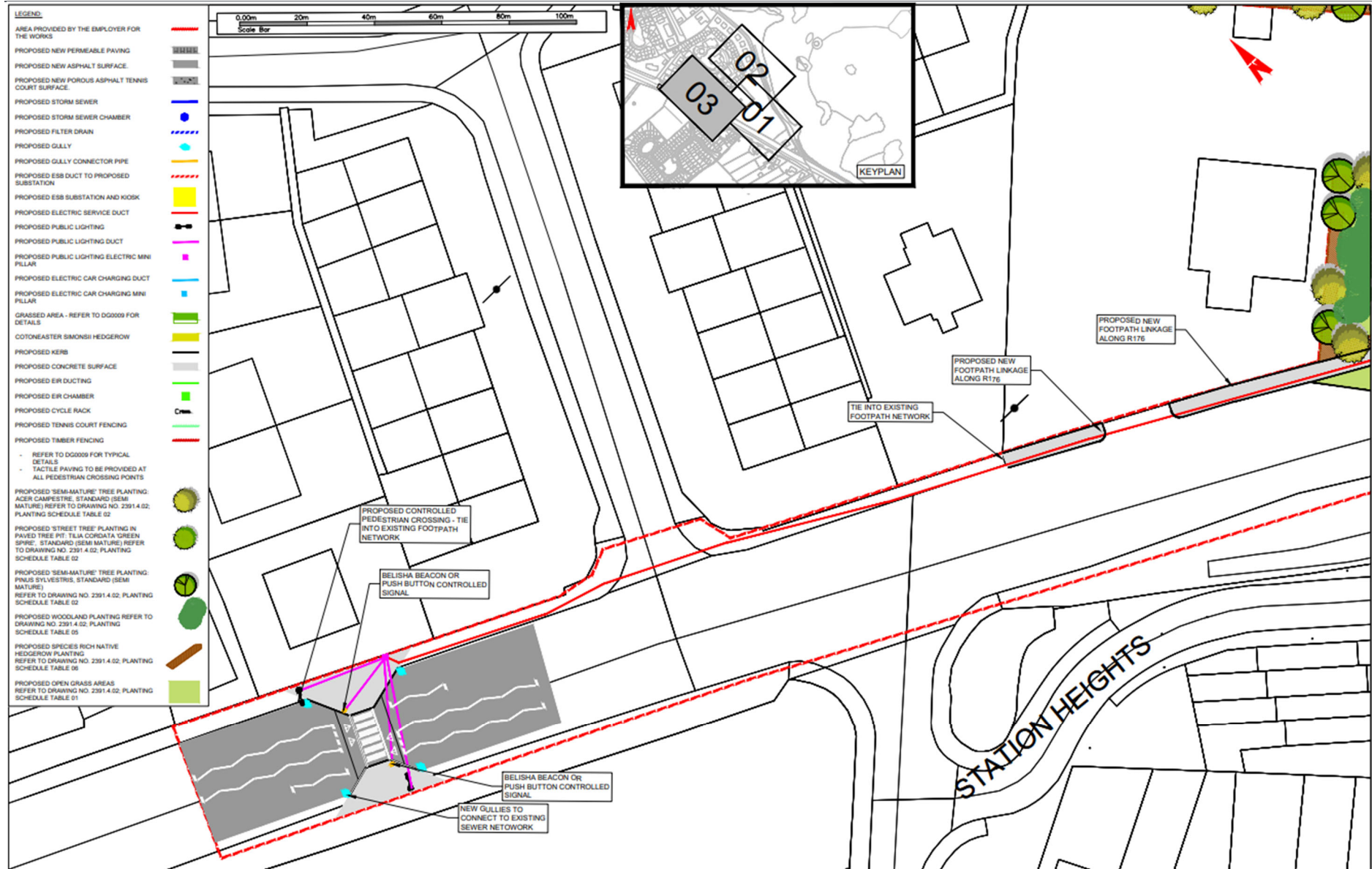


Figure 1-3: Proposed Tennis Courts and associated car park

## 1.4 Louth County Development Plan (2021 – 2027)

### 1.4.1 Volume 2 Self-Sustaining Towns

The Town Statement for Carlingford acknowledges flood risk throughout the settlement and outlines the following settlement overview and Policy Objective (CAR 18) with respect to the Strategic Flood Risk Assessment for the town

**Table 1-1: Settlement Overview and Policy Objective**

Settlement Overview	
<b>Strategic Flood Risk Assessment</b>	<p>Flood Zones A &amp; B at various locations throughout the settlement and along streams flowing into the settlement.</p> <p>Manage flood risk and development in accordance with the Neagh Bann Flood Risk Management Plan and in line with Policy Objectives as set out in Vol. 1 Chapter 10: Utilities</p> <p>LCC has been allocated funding to implement the Carlingford and Greenore Flood Relief scheme and is working with OPW on their delivery which will be in the lifetime of this Plan.</p>
Policy Objective	
<b>CAR 18</b>	<p>To avoid land uses or development identified as 'highly vulnerable development' in Table 3.1 of <i>'The Planning System and Flood Risk Management Guidelines (2009)'</i> on lands at risk of flooding and where development in floodplains cannot be avoided, take a sequential approach to flood risk management based on avoidance, reduction and adaptation to the risk.</p>

### 1.4.2 Volume 1 Chapter 10: Infrastructure and Public Utilities

#### 1.4.2.1 SuDs

In addition to forming part of the County's drainage infrastructure, Sustainable Drainage Systems (SuDs) can also provide amenity benefits to local communities and benefits for biodiversity simultaneously. Volume 1 Chapter 10 of the Louth CDP outlines the following Policy Objectives in relation to SuDS.

Policy Objective	
<b>IU 19</b>	To require the use of Sustainable Drainage Systems to minimise and limit the extent of hard surfacing and paving and require the use of SuDS measures be incorporated in all new development (including extensions to existing developments). All development proposals shall be accompanied by a comprehensive SuDS assessment including run-off quantity, run off quality and impacts on habitat and water quality.

Policy Objective	
<b>IU 20</b>	To require all development proposals meet the design criteria, (adjusted to reflect local conditions), and material designs contained in the Greater Dublin Strategic Drainage Study (GDSDS) and demonstrate how runoff is captured as close to source as possible with subsequent slow release to the drainage system and watercourse.

Policy Objective	
<b>IU 21</b>	To seek to avoid the discharge of additional surface water to combined sewers and promote Sustainable Urban Drainage Systems (SuDS) and solutions to maximise the capacity of towns with combined drainage systems.

Policy Objective	
<b>IU 22</b>	To ensure all new development incorporates appropriate measures to protect existing water bodies, through appropriate treatment of runoff. In particular, discharges from car parks shall be appropriately treated so as to remove pollutant materials.

Policy Objective	
<b>IU 23</b>	To ensure all new developments provide for separated drainage systems.

Policy Objective	
<b>IU 24</b>	To encourage particularly in buildings of increased height the provision of green roofs and green walls as an integrated part of Sustainable Drainage Systems (SuDS) and which provide benefits for biodiversity, wherever possible.

### 1.4.2.2 Flood Risk Management

Section 10.3 of the Louth County Council Development Plan sets out the objectives regarding Flood Risk Assessment and sets out the Specific Development Standards relating to Flood Risk Management as following:

- To reduce the risk of new development being affected by possible future flooding by:
  - Avoiding development in areas at risk of flooding and
  - Where development in floodplains cannot be avoided, taking a sequential approach to flood risk management based on avoidance, reduction and mitigation of risk.

Avoid development other than 'water compatible development' in 'Flood Zone A' and avoid 'highly vulnerable development' in 'Flood Zone B' in accordance with Section 3 of The Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009).

- To ensure all proposals for development falling within Flood Zones A or B are consistent with The Planning System and Flood Risk Management – Guidelines for Planning Authorities 2009. Proposals for development identified as being vulnerable to flooding must be supported by a Site-Specific Flood Risk Assessment and demonstrate, to the satisfaction of the Planning Authority that the development, and its infrastructure, will avoid significant risks of flooding and not exacerbate flooding elsewhere. In Flood Zone C, where the probability of flooding is low (less than 0.1%), Site Specific Flood Risk Assessment may be required and the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed. The County Plan SFRA datasets and the most up to date CFRAM Programme climate scenario mapping should be consulted by prospective applicants for developments in this regard and will be made available to lower-tier Development Management processes in the Council. Applications for development in flood vulnerable zones, including those at risk under the OPW's Mid-Range Future Scenario, shall provide details of structural and non-structural risk management measures, such as those relating to floor levels, internal layout, flood-resilient construction, emergency response planning and access and egress during flood events.
- Where a site-specific Flood Risk Assessment demonstrates that there are significant residual flood risks to a proposed development or its occupiers in conflict with The Planning System and Flood Risk Management – Guidelines for Planning Authorities 2009, planning permission will normally not be granted unless the requirements of Section 5.28 'Assessment of minor proposals in areas of flood risk' can be satisfied.
- To implement the Flood Risk Management Measures as detailed in the Neagh Bann Flood Risk Management Plan, the Eastern Flood Risk Management Plan and the Dunleer Flood Risk Management Plan ensuring that proposals for development support and do not impede the progression of these measures. Louth County Council will, in partnership with the Office of Public Works (OPW) deliver the following Flood Relief Schemes:
  - Dundalk, Blackrock and Ardee;
  - Drogheda and Baltray; and
  - Carlingford and Greenore.
- To work with the Office for Public Works in the development and implementation of catchment-based strategies for the management of flood risk – including those relating to storage and conveyance.
- To contribute towards the improvement and/or restoration of the natural flood risk management functions of flood plains subject to compliance with the environmental legislation and availability of resources.
- To ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan for Flood Risk Management applicable at the time.

- Where a portion of a site is at risk of flooding, the lands at risk will be subject to the sequential approach to ensure first and foremost that new development is directed towards lands at low risk of flooding; and to restrict the type of development to that 'appropriate' to each flood zone in accordance with Tables 3.1 and 3.2 of the Flood Risk Management Guidelines.
- To consult with the Office of Public Works (OPW) in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible.
- To consult with the Office of Public Works (OPW) in relation to proposed developments which include the construction, replacement or alteration of a bridge or culvert and to require that the developers obtain consent from the OPW under Section 50 of the EU (Assessment and Management of Flood Risks) Regulations 2010 and Section 50 of the Arterial Drainage Act 1945, where appropriate.

### **1.5 Louth CDP 2021-2027 SFRA**

The CDP SFRA identified Carlingford Town as requiring the application of the Justification Test for Development Plans.

The subject site of this Site-Specific FRA is referenced as 'Site 2' within the Justification Test for Carlingford. The test was applied and satisfactorily passed for the site. Appendix A includes the Justification as applied within the Strategic FRA.

## 1.6 Potential Sources of Flooding

When carrying out a flood risk assessment one should consider all the potential flood risks and sources of flood water at the site. Generally, the relevant flood sources are:

### 1.6.1 Coastal Flood Risk

Coastal flooding results from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influenced by the following three factors which often work in combination, high tide level, storm surges and wave action.

#### 1.6.1.1 Tides

Astronomical tides vary over time and are predictable. The highest astronomical tides occur in spring tides every two weeks around the time of full and new moons when the gravitational pull of the moon and sun are aligned. This gravitational pull is amplified around the equinox. As these tides occur relatively frequently, they do not result in flooding. However, these predicted tide levels often differ from observed tide levels due to weather conditions.

#### 1.6.1.2 Storm Surge

A storm surge is a rise in sea level caused by winds associated with an area of low atmospheric pressure (depression). This area of elevated water can then be pushed towards the coast by the winds of a depression or storm. Surges occur relatively frequently on the coast of Ireland; however, it is only when the arrival of these surges at the coast coincides with a high tide that storm surges will result in coastland flooding.

#### 1.6.1.3 Wave Action

A combination of storm surges and high tides may result in the flooding of low-lying areas near the coast. While this flood water will result in damage in these areas the wave action of the flood waters may cause significantly more damage to buildings and infrastructure in flooded areas due to the energy of the waves. The energy of waves is dependent on local topography, exposure, direction and the wind speed generating the waves. Wave action may also result in the overtopping of flood defences.

### 1.6.2 Fluvial Flood Risk

Fluvial flooding refers to flooding from rivers and streams. Fluvial flooding is the result of a river/stream exceeding its channel capacity and excess water spilling out onto the adjacent floodplain. The process of flooding on watercourses depends on a number of characteristics associated within the catchment including geographical location, and variation in rainfall, steepness of the channel and surrounding floodplain and infiltration rate of runoff associated with urban and rural catchments.

### 1.6.3 Pluvial Flood Risk

Pluvial flooding relates to flooding as a direct result of extreme rainfall. Pluvial flooding can occur during a rainfall event of extreme intensity. If the rate at which water falls on the ground is faster than the rate at which the water can make its way to the drainage network, then flooding will occur. This type of flood is also referred to as 'ponding' and typically occurs during summer months.

### 1.6.4 Groundwater Flooding

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause periods of flooding.



## 2 THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT

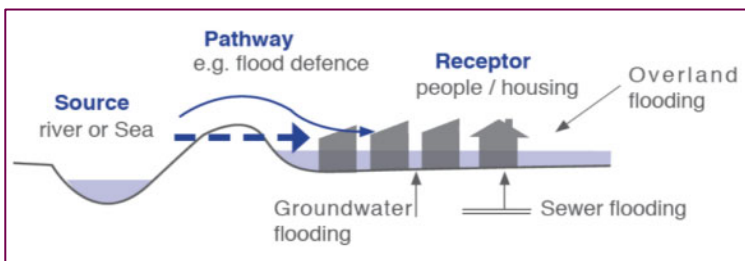
In September 2008 “The Planning System and Flood Risk Management” Guidelines (Guidelines) were published by the Department of the Environment, Heritage and Local Government in Draft format. In November 2009 the adopted version of the document was published.

The Flood Risk Management Guidelines give guidance on flood risk and development. The guidelines recommend a precautionary approach when considering flood risk management in the planning system.

Foremost, flood risk is a combination of the likelihood/probability of flooding and the potential consequences arising.

### Flood Risk = Likelihood of Flooding x Consequences of Flooding

The assessment of flood risk requires the understanding of where the water comes from (i.e. the source), how and where it flows (i.e. the pathways) and the people and assets affected by it (i.e. the receptors). This is highlighted in **Figure 2-1** below which is extracted from the “The Planning System & Flood Risk Management Guidelines”.



**Figure 2-1 – Sources, Pathways and Receptors of Flooding (Extract from PSFRM)**

The core principle of the guidelines is to adopt a risk based sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding.

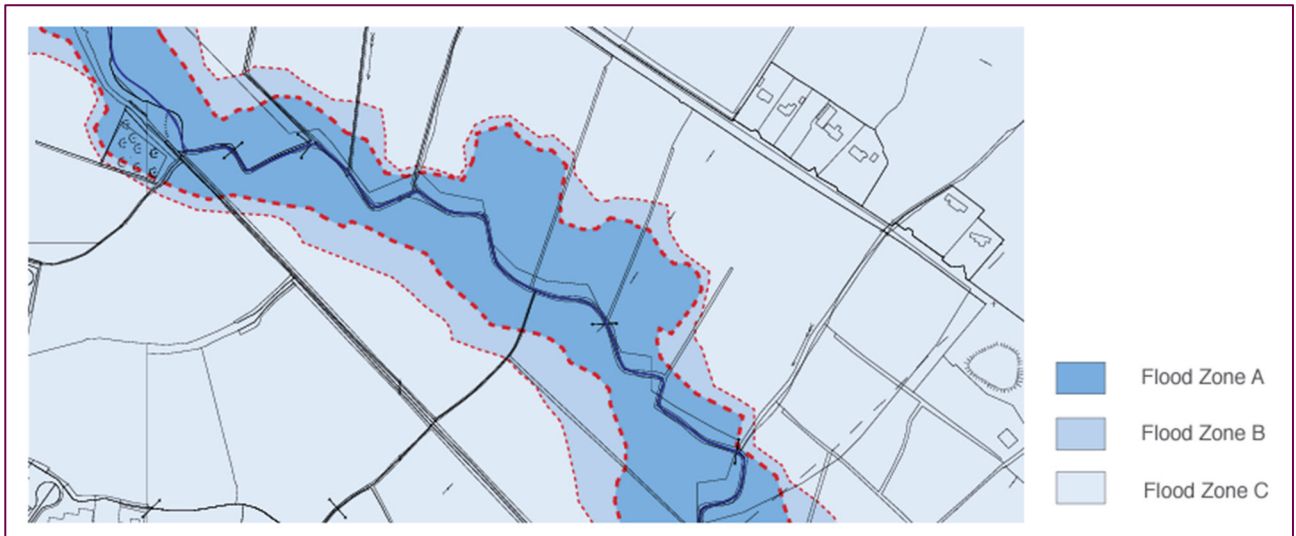
The guidelines include definitions of Flood Zones A, B and C as noted below. It should be noted that these do not take into account the presence of flood defences, as risks remain of overtopping and breach of the defences.

**Zone A** (high probability of flooding) is for lands where the probability of flooding is greatest (greater than 1% or the 1 in 100 for river flooding and 0.5% or 1 in 200 for coastal flooding).

**Zone B** (moderate probability of flooding) refers to lands where the probability of flooding is moderate (between 0.1% or 1 in 1,000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1,000 and 0.5% or 1 in 200 for coastal flooding).

**Zone C** (low probability of flooding) refers to lands where the probability of flooding is low (less than 0.1% or 1 in 1,000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

This is highlighted in **Figure 2-2** below which is extracted from the “The Planning System & Flood Risk Management Guidelines”.



**Figure 2-2 – Indicative Flood Zone Map Extract**

Once a flood zone has been identified, the guidelines set out the different types of development appropriate to each zone. Exceptions to the restriction of development due to potential flood risks are provided for through the use of the **Justification Test**, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated as shown in **Table 2-1**. This recognises that there will be a need for future development in existing towns and urban centres that lie within flood risk zones, and that the avoidance of all future development in these areas would be unsustainable.

**Table 2-1. Matrix of Development Vulnerability vs Flood Zone (Extract from PSFRM)**

	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

A three-staged approach to undertaking an FRA is recommended:

**Flood Risk Identification (Stage 1)** - Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment.

**Initial Flood Risk Assessment (Stage 2)** - Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measures.

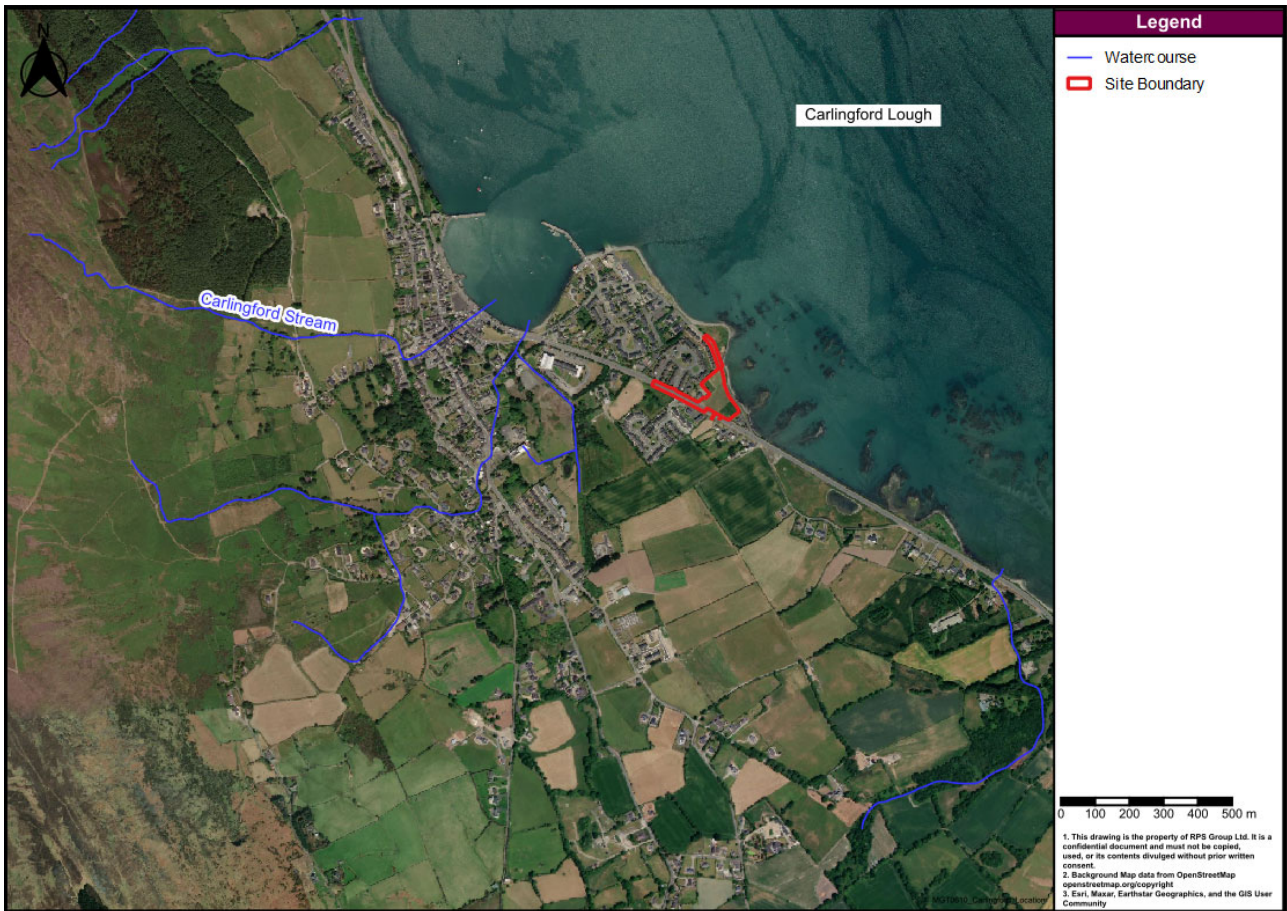
**Detailed Flood Risk Assessment (Stage 3)** - Assess flood risk issues in sufficient detail to provide quantitative appraisal of potential flood risk of the development, impacts of the flooding elsewhere and the effectiveness of any proposed mitigation measures.

This report addresses the requirements for Stages 1 and 2.

### 3 EXISTING SITE CHARACTERISTICS

#### 3.1 Hydrology & Drainage

The subject site is located within Hydrometric Area 06 – Newry, Fane, Glyde and Dee. The Environmental Protection Agency (EPA) mapping shows two small watercourses, including the Carlingford Stream, within a 2km vicinity of the proposed site which flow through Carlingford before draining into the ocean, as shown in **Figure 3-1** below. The proposed site is primarily in green area with natural infiltration to ground.



**Figure 3-1 – Fluvial Watercourses**

### 3.2 Topography / Relief

The site topography is relatively flat at approximately 3.5-4m (ODMalin). Ghan Road on the coastal side of the site is slightly elevated above site levels, with a general slight slope of the land within the vicinity of the site is in a north-westerly direction along Greenore Road towards the fluvial watercourses. There is a shallow depression on-site which would naturally infiltrate rainfall on-site

The topography of the site is shown in **Figure 3-2**.

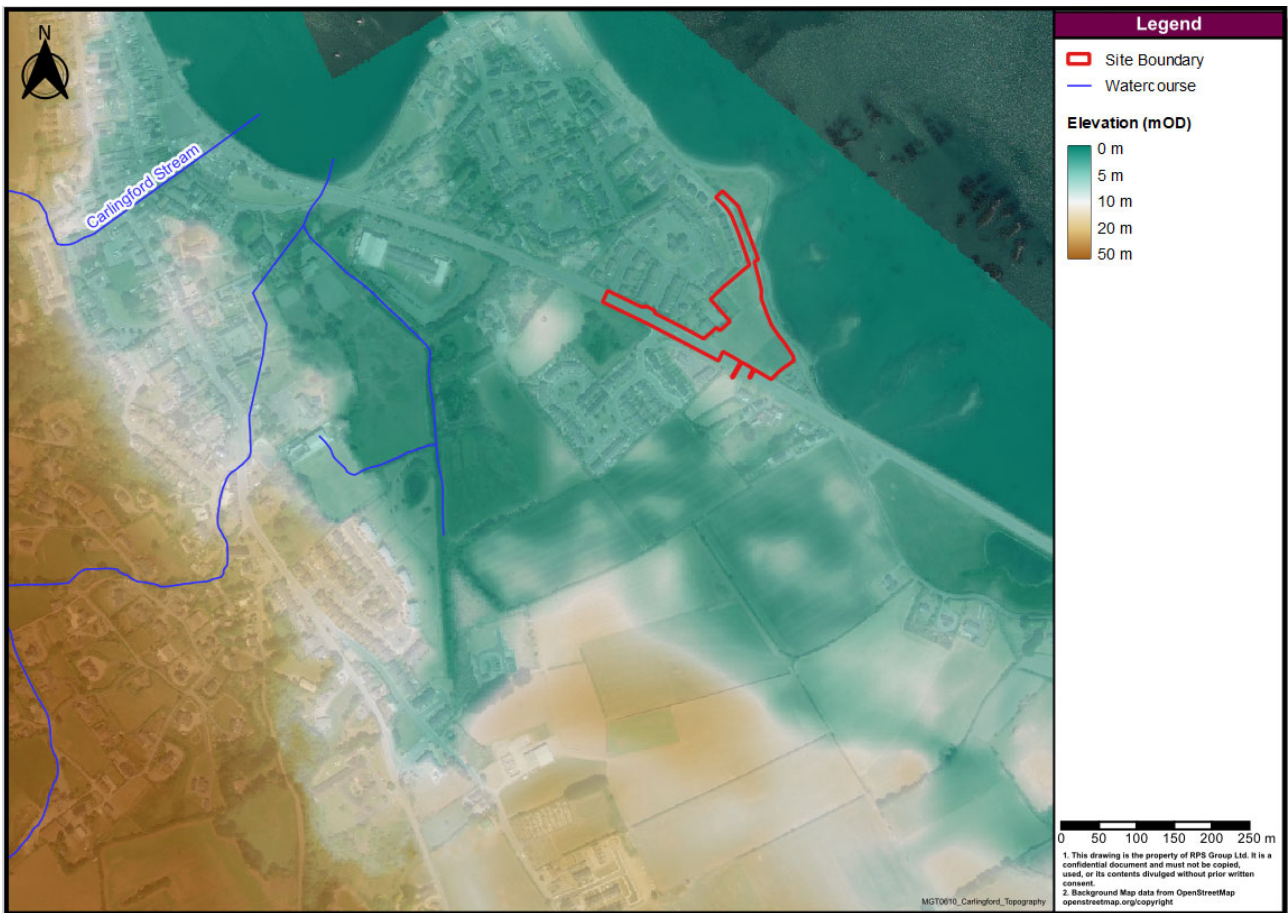


Figure 3-2 – Site Topography

### 3.3 Geology

#### 3.3.1 Desk Study

The geology of the site was examined using EPA and Geological Survey of Ireland (GSI) information to further understand the drainage characteristics of the site.

**Figure 3-3** shows the site’s subsoils predominantly consist of “TLPSsS – Sandstone and shale till’ which can be further described as a deep, well drained, mineral soil.

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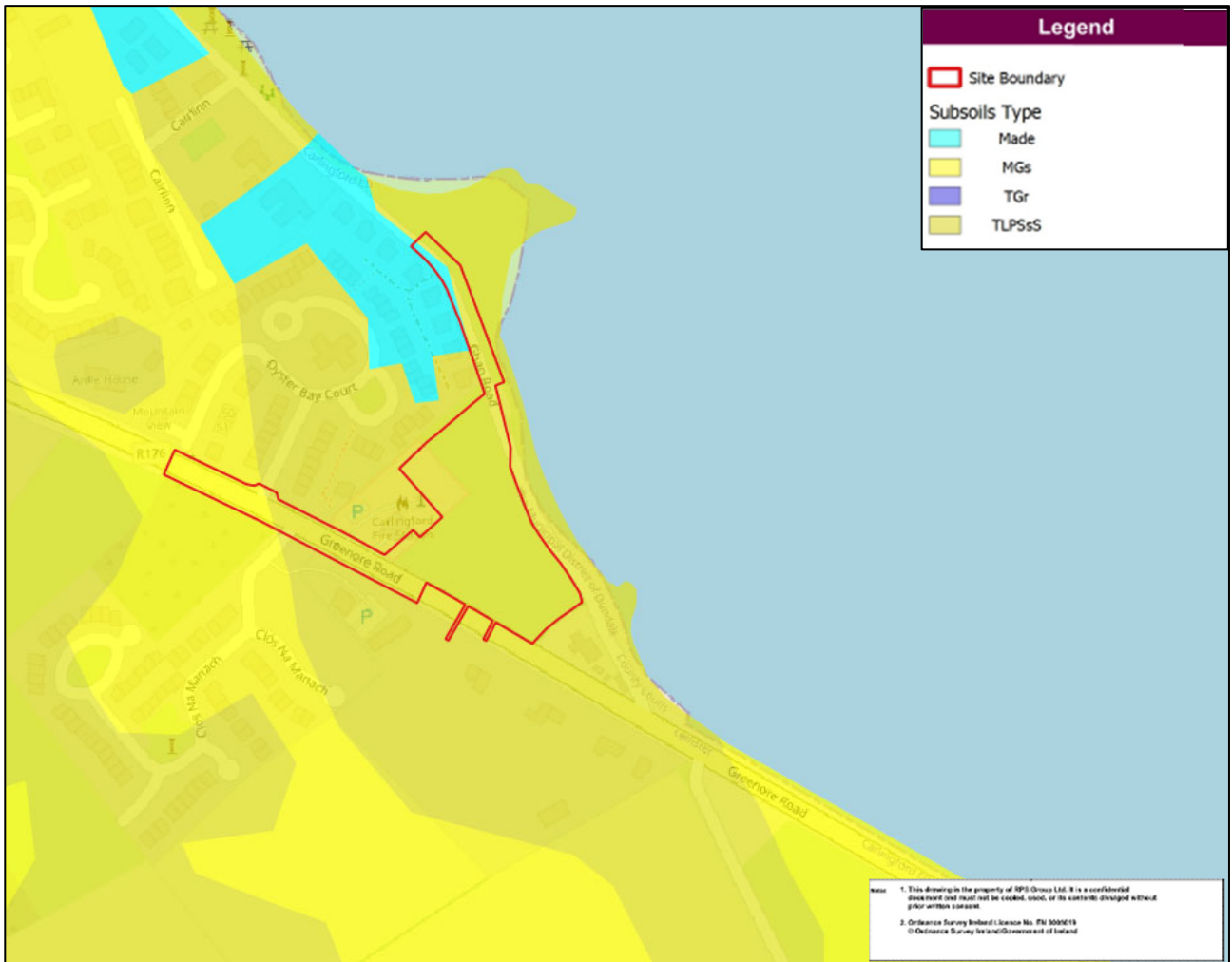


Figure 3-3 – EPA Subsoils

## 4 FLOOD RISK IDENTIFICATION – STAGE 1

This section identifies existing information pertinent to flood risk at the site. The information used to inform this assessment includes historical mapping and indicative sources relating to previous predictive flood studies and risk assessments.

### 4.1 Flooding History

#### 4.1.1 OPW Flood Hazard Mapping

The FloodInfo.ie website was consulted to find any instances of flooding in the proximity of the proposed site. The mapping shows zero instances of single past flood events nor recurring flood events within the proposed development boundary nor within its immediate vicinity as highlighted in **Figure 4-1**. A Past Flood Event Local Area Summary report was generated using floodinfo.ie. This Past Flood Event Summary Report summarises recorded flood events within 2.5 kilometres of the subject site. **Table 4-1** presents a summary of six flood events recorded within proximity of the site.

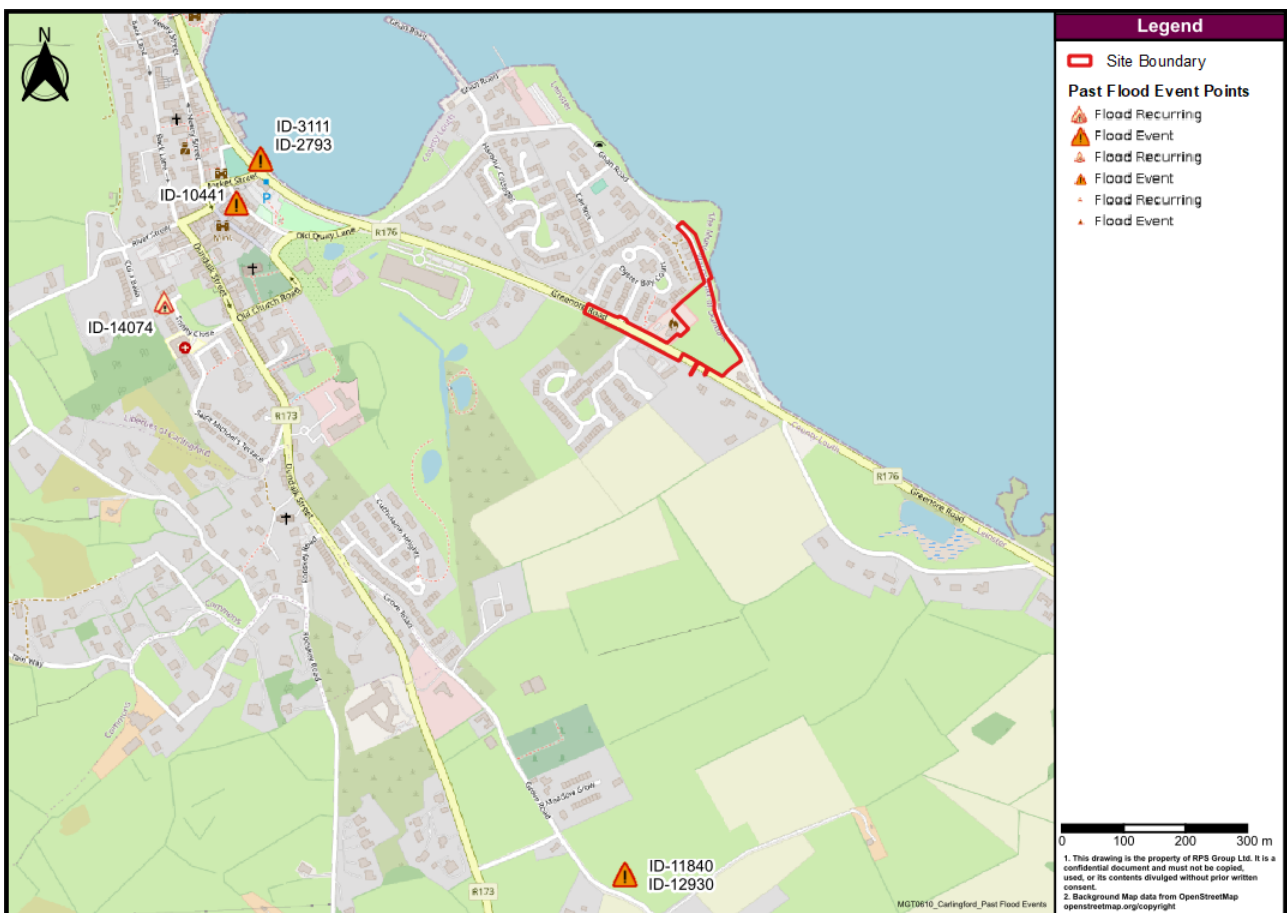


Figure 4-1 – OPW Past Flood Events

**Table 4-1. OPW Past Flood Event Local Area Summary**

Flood ID	Location	Date of Report	Recorded Date of Occurrence	Frequency	Description
3111	Carlingford	10/11/2000	02/11/2000	Single Flood Event	Flooding from Cooley mountains – damage to roads including N1
2793	Public House, Market St., Carlingford	10/10/2005	Approx. 1995	Single Flood Event	Flash Flood
11840	Grove Road, Carlingford	04/04/2013	12/02/2013	Single Flood Event	Surface Water Runoff from adjacent lands. Noted as having previously occurred
10441	Carlingford	1/12/2005	23/10/2005	Single Flood Event	Fluvial Flooding
12930	Grove Road, Carlingford	N/A	12/02/2013	Single Flood Event	N/A
14074	Trinity Close, Carlingford	N/A	28/01/2021	Recurring Flood Event	N/A

## 4.2 Indicative Flood Risk Mapping

### 4.2.1 OPW Catchment Flood Risk and Management (CFRAM) Preliminary Risk Assessment (PFRA)

The CFRAM Programme covered those areas, in each county, where, based on initial analysis, the flood risk was determined to be potentially significant from one or more sources of flooding. These areas, referred to as Areas for Further Assessment (AFAs) were identified through a scoping phase called the Preliminary Flood Risk Assessment (PFRA), which was a requirement of the EU ‘Floods’ Directive.

### 4.2.2 OPW CFRAM Mapping

The risk of fluvial flooding to the proposed site is low as highlighted in Figure 4-2. There is a small encroachment of the 0.1% AEP (1 in 1000 year) flood extent predicted across the western boundary of the site, however this affects only a very limited area of the site. The coastline adjacent to the site is shown as flooding in the 10%AEP event (1 in 10 year), however this is representative of the coastal sea level rather than



# FLOOD RISK ASSESSMENT REPORT

fluvial flooding. The site is shown not to be sensitive to climate change from fluvial flooding, with not distinct change in flood extents affecting the site in the Mid-Range Future Scenario (Figure 4-3).

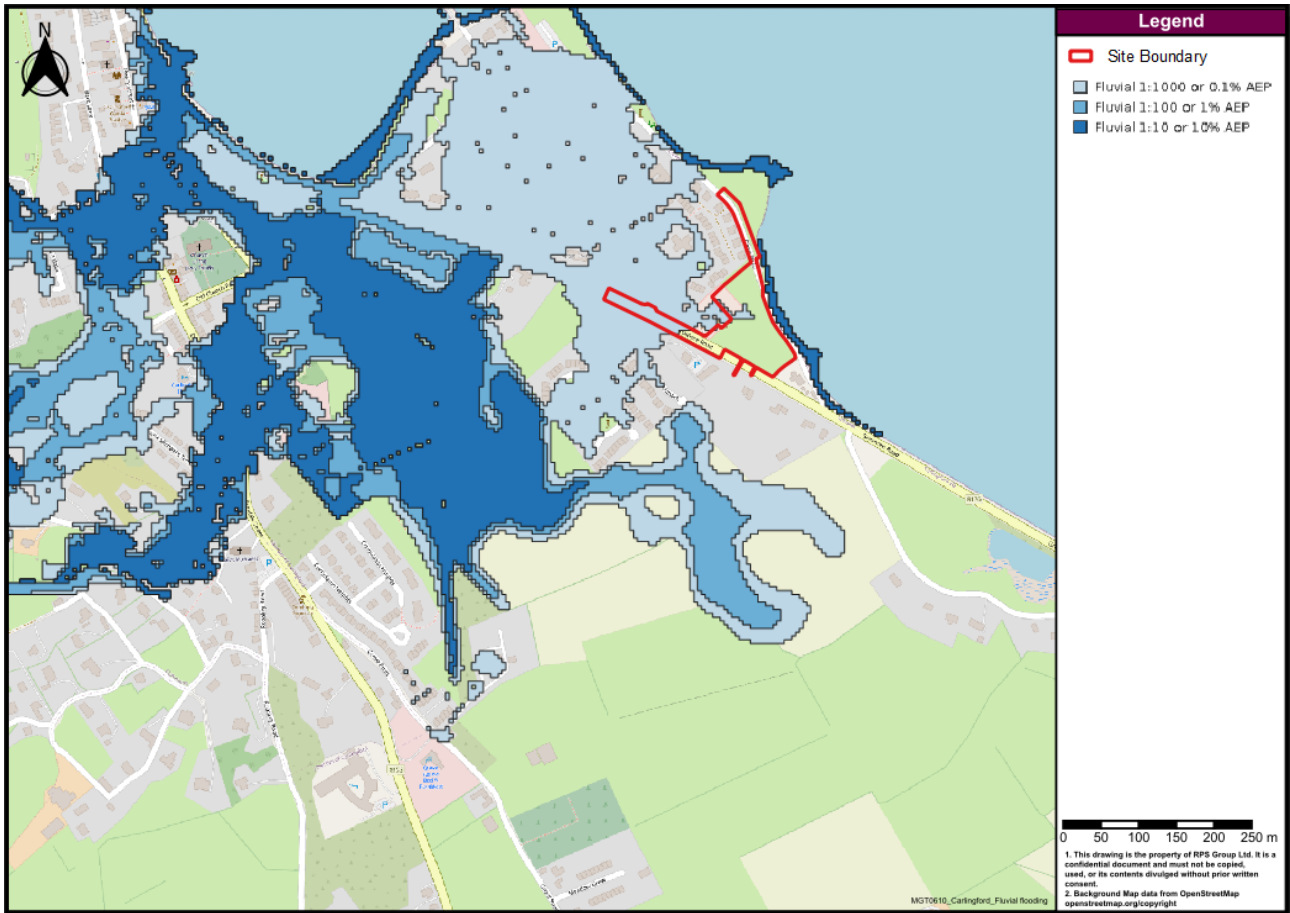


Figure 4-2: CFRAM Fluvial Predictive Flooding – Present Day

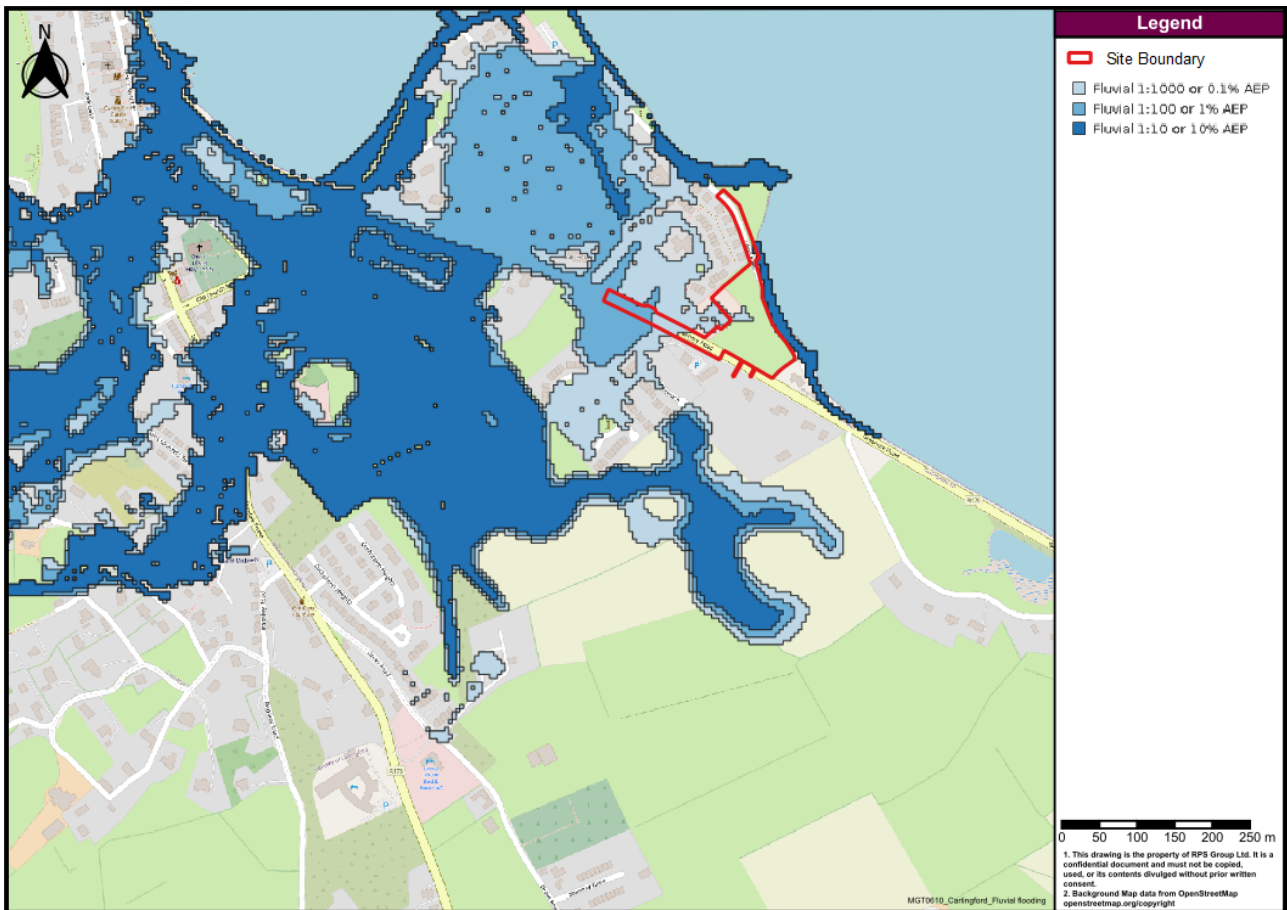


Figure 4-3: CFram Fluvial Predictive Flooding – MRFS

### 4.2.3 GSI GW Flood Predictive Groundwater Flooding

GSI mapping does not indicate any groundwater flooding at the proposed site. GSI Mapping also identified the Teagasc soil of the site is as deep, well drained mineral soil with moderate groundwater subsoil permeability, further supporting a low risk of groundwater flooding on the proposed site.

### 4.2.4 NCFHM Coastal Flooding

There is a high risk of coastal flooding at the site as shown in **Figure 4-4**. The NCFHM mapping indicates extensive coastal flooding of the entire site as a result of both high coastal water levels and water overtopping onto the site from wave action. ICWWS mapping data was able to predict coastal flooding to the site with predicted water levels at the site of 4.15 mOD in the 0.5%AEP event (1 in 200 year). The predicted coastal flood level for the site in the 0.1%AEP event (1 in 1000 year) is 4.42 mOD. As shown in Figure 4-5, this predicts flood depths of up to 1m within the site boundary in the 0.5%AEP event under present day conditions. Water levels are predicted to rise a further by 0.5m in the Mid-Range Future Scenario . Consequently, further assessment of coastal flood risk to the site is required in Stage 2 of the report.

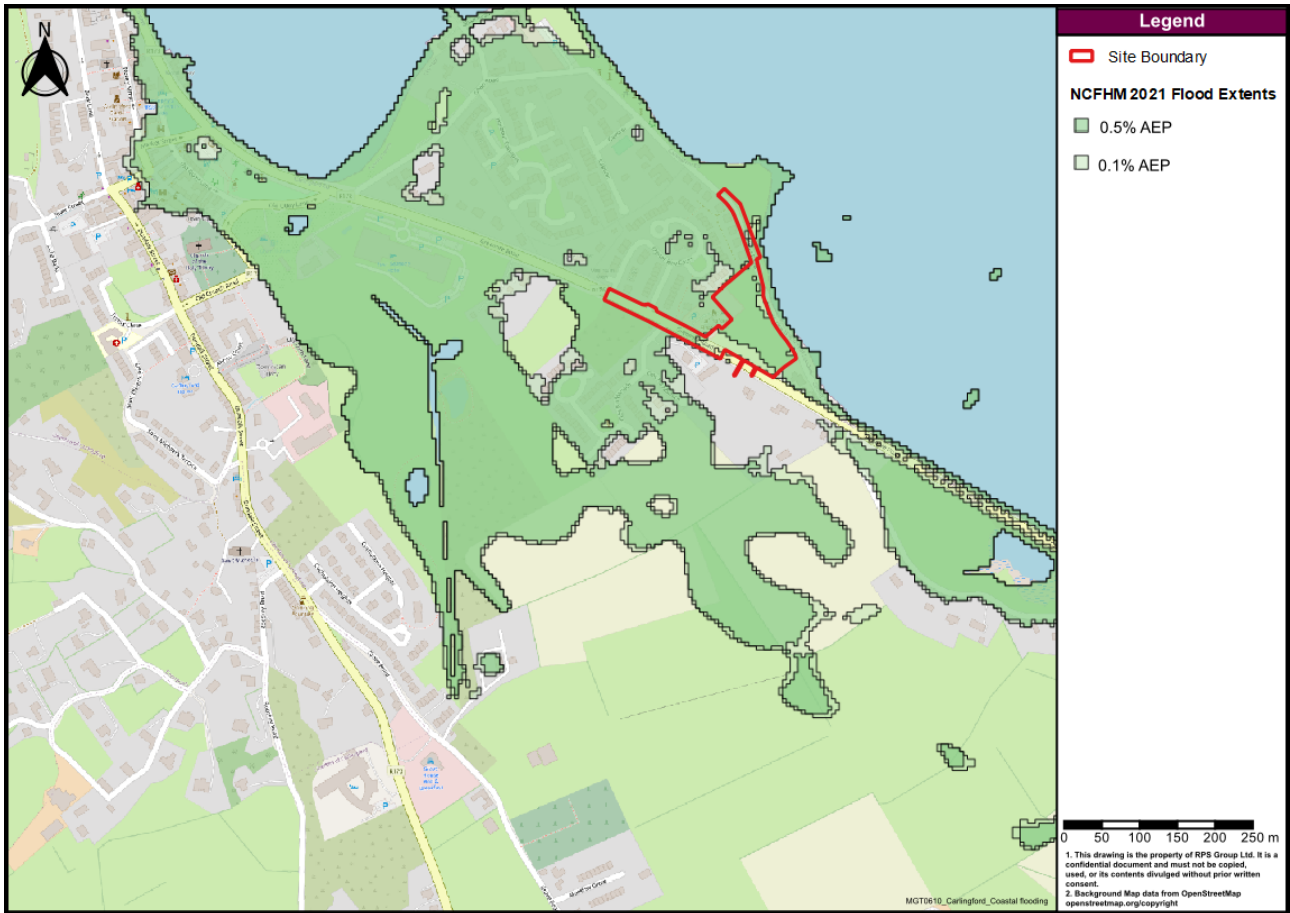


Figure 4-4: NCFHM Coastal Flooding – Present Day

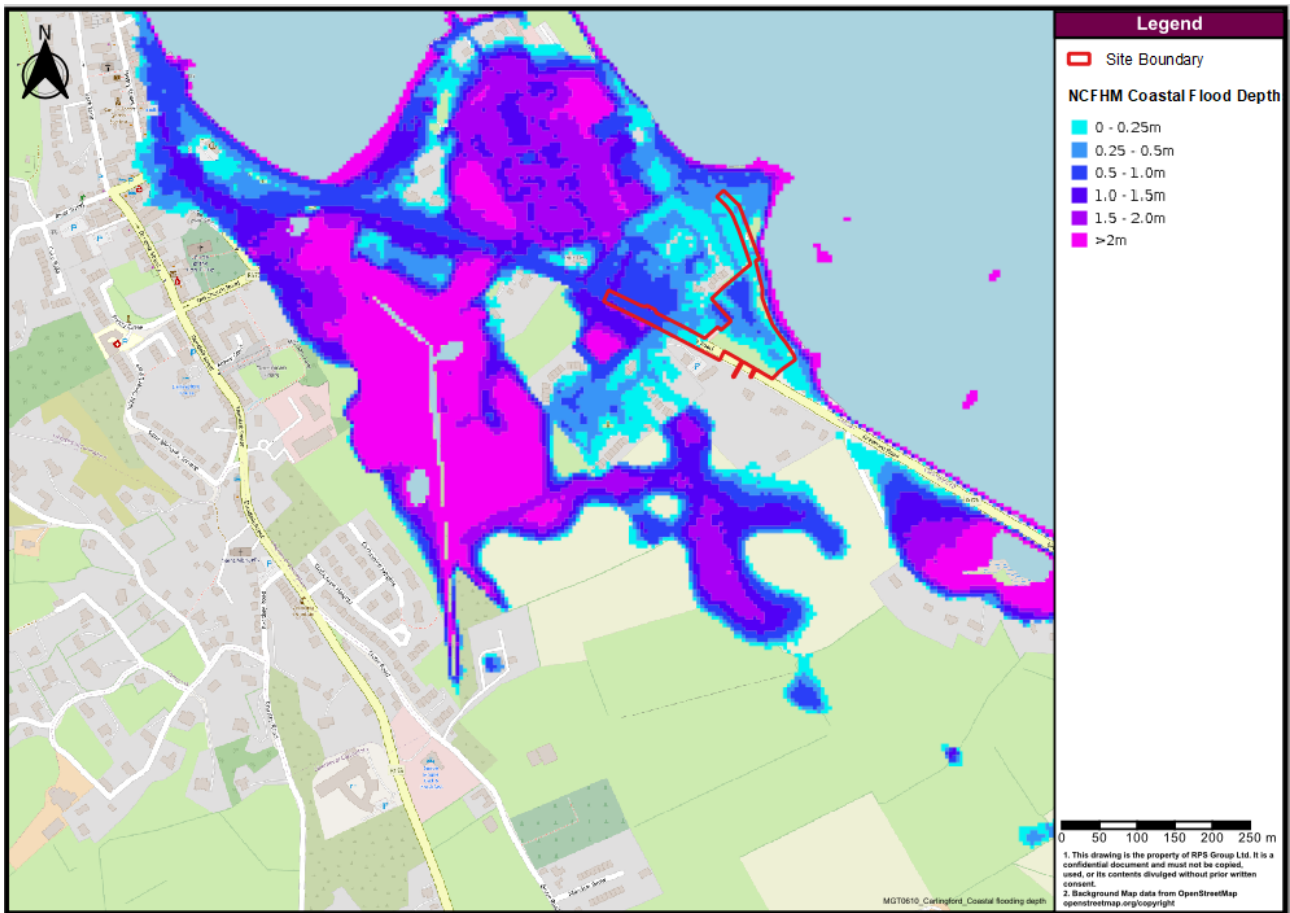


Figure 4-5: NCFHM 0.5% AEP Coastal Flood Depths – Present Day

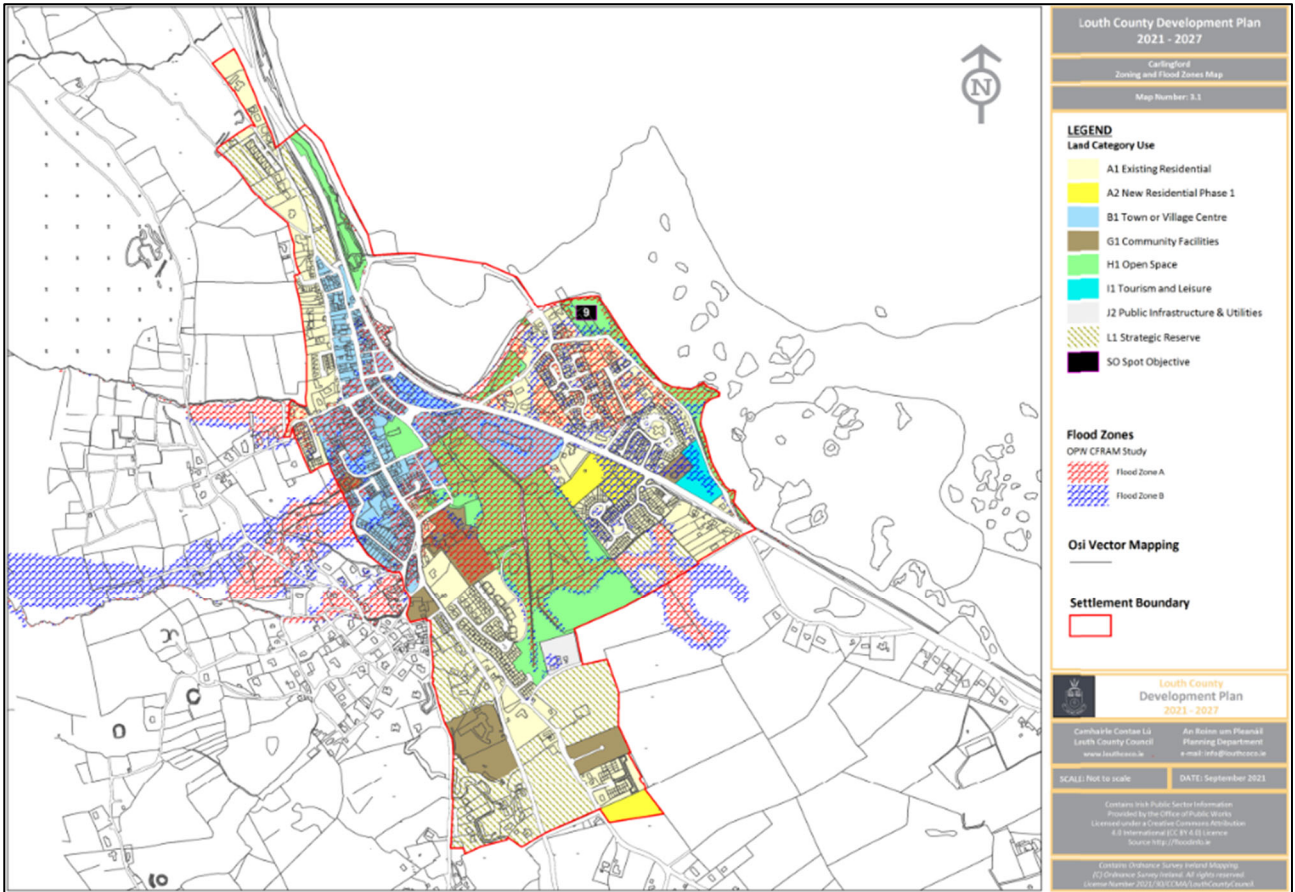
### 4.2.5 Pluvial Flooding

Pluvial flooding of the site is considered to be low risk with no indication of highly vulnerable zonings, existing zonings or well-established areas of the surrounding area that could come under increased flood risk. However, due to the topographical and urban nature of the site and surrounding area, pluvial flooding and associated surface water runoff are important factors to consider. Further assessment of the pluvial flood risk to the site is required in Stage 2 of the report.

### 4.2.6 Louth County Strategic Flood Risk Assessment (SFRA)

A Strategic Flood Risk Assessment was completed as part of the Development Plan 2021 - 2027 that outlines objectives in relation to flood risk management. The SFRA flood maps identify the site to be partially contained within Flood Zone B.

**FLOOD RISK ASSESSMENT REPORT**



**Figure 4-6 – Louth County Flood Zone Mapping<sup>1</sup>**

## 5 FLOOD RISK MANAGEMENT – STAGE 2

The data reviewed in **Section 4** indicates that the site is located within Flood Zone A and so must progress to Stage 2 for further assessment before the proposed development is deemed appropriate.

### 5.1 Coastal Flooding

Coastal flooding of the site is considered a high risk as observed by extensive flooding of the site due to coastal water levels, as observed from NCFHM mapping. Coastal flooding depths of up to 1m are predicted on the site with water levels predicted to rise by a further 0.5m in the Mid-Range Future Scenario. Coastal flood risk is managed through the provision of safe egress from the facilities via Greenore Road on the inland boundary of the site. There are no proposed ground level changes to the site, with surface water continuing to drain towards the natural depression within the centre of the site. Therefore, there will be no increase in flood risk elsewhere as a result of the development of the site.

### 5.2 Pluvial Flooding

There is a low risk of pluvial flooding to the proposed site, however due to the topographical and urban nature of Carlingford, such flooding and associated surface water runoff are important factors to consider when assessing the site. The risk of pluvial flooding is diminished by the nature of the subsoil as deep, well drained mineral soil. As required within the objectives of the Louth CDP, on-site attenuation of surface water flows will be provided using SuDs measures through permeable paving and infiltration should detailed site investigations and testing allow. There are no proposed ground level changes to the site, with surface water continuing to drain towards the natural depression within the centre of the site. Therefore, there will be no increase in flood risk elsewhere as a result of the development of the site.

### 5.3 Fluvial Flooding

There is a low risk of fluvial flooding at the proposed development site and limited sensitivity to climate change. As there are no proposed ground level changes to the site, and surface water continuing to drain towards the natural depression within the centre of the site, there will be no increase in flood risk elsewhere as a result of the development of the site.

### 5.4 Groundwater

There is no predicted groundwater flooding at the proposed site. The subsoil of the site is classified as deep, well drained, mineral soil with a moderate groundwater permeability.

Due to the zoning of the location as a tourism and leisure site and the implementation of best practice engineering methods in sustainable drainage design it is not envisaged that the proposed development will be at risk of groundwater flooring of nor exacerbate flood risk at the site.

## 6 CONCLUSION

Based on the review of existing information referenced throughout this report and the information which has been established as a result of undertaking the flood risk assessment described in this report, the conclusions can be summarised as follows:

- The proposed works at Carlingford must undergo a Flood Risk Assessment under the Planning System and Flood Risk Management Guidelines for Planning Authorities (DoEHLG & OPW, 2009) (hereinafter referred to as “the Guidelines”).
- There are no records of historical flooding within the proposed site development. There are six recorded instances of historical flooding within the vicinity of the proposed site, five of which are single flood events. The majority of the recorded events can be attributed to pluvial or coastal flooding, with one record of fluvial flooding.
- In the Louth County Development Plan 2021 - 2027, the subject site is zoned as ‘Tourism and Leisure’ which is suitable for the proposed works. The SFRA completed as part of the Louth County Development Plan 2021 – 2027, identified that the subject site to be partially within Flood Zone B. A Justification Test for Plan Development was applied and successfully passed within the SFRA. The SFRA recommends that development proposals in this settlement should be cognisant of the appropriate implementation of SUDS in the management of surface water runoff.
- The desktop study undertaken identified coastal flooding as the primary source of flood risk to the site. Coastal flooding caused by high water levels and overtopping from wave action results in extensive flooding of the site as indicated by NCFHM mapping. Pluvial flooding was identified as a possible risk to the site due to the urban location of the development. There is also a small portion of the site predicted to be at risk within the 0.1% AEP fluvial flood event, though depths on site will be minimal.
- The Initial Flood Risk Assessment completed in **Section 5** of this report determined that the chosen location of the development is appropriate due to the designation of the site as a tourism and leisure site, the soil type of the site, and the SuDs attenuation features included within the proposed design.
- The site is identified within the NCFHM to be at flood risk from coastal flooding, placing the majority of the site within Flood Zone A. Flood depths on-site of up to 1m predicted for the 0.5%AEP coastal flood event and the site will remain liable to flooding after development. The site is zoned within the Louth County Development Plan for ‘Tourism and Leisure’, and is the only land zoned for this purpose within the Carlingford Town settlement. The proposed development of the site for tennis courts and associated parking is considered a water compatible land use and is therefore an appropriate development of the site without need of the Justification Test, in accordance with the Planning Guidelines for Flood Risk Management (DoEHLG 2009). As the source of flooding will be coastal sea level, flood risk is managed through the provision of safe egress from the facilities via Greenore Road on the inland boundary of the site. As required within the objectives of the Louth CDP, on-site attenuation of surface water flows will be provided using SuDs measures through permeable paving and infiltration should detailed site investigations and testing allow.

## Appendix A

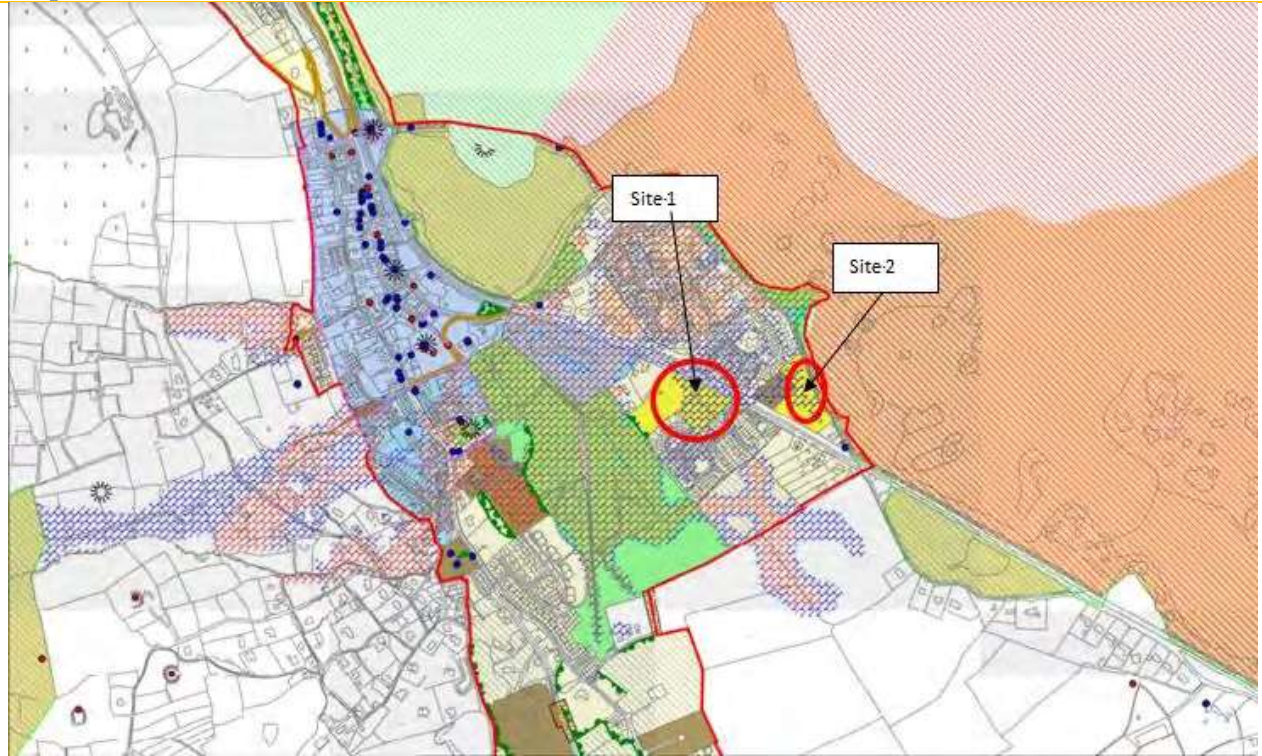
### Louth CDP SFRA Justification Test - Carlingford



## Carlingford

<b>Hierarchy</b>	<b>Self Sustaining Town</b>
<b>Area for Further Assessment under the CFRAM Programme</b>	Yes

### Map



#### Criteria 1

Carlingford in the Settlement Strategy of the LCDP is identified as a ‘Self-Sustaining Town’. The Core and Growth Strategies both focus on driving investment in services, employment growth and infrastructure while balancing housing delivery, including consolidation of the core areas and delivery of compact growth. In support of these strategies, the corresponding Policy Objectives seek to facilitate balanced and proportionate population and economic growth to meet the needs of the residents of the settlements while creating vibrant rural communities through the promotion and targeting of sustainable development. The rejuvenation of vacant and underutilised lands for appropriate uses is also encouraged. Carlingford is a settlement characterised by a very strong employment base.

Carlingford as one of eight identified ‘Areas for Further Assessment’ was subject to the CFRAM programme, with associated Flood Zones A and B identified.

#### Criteria 2

**Site 1:** These lands are zoned ‘New Residential’ (A2) with approximately half of the lands in Flood Zone B, and the more elevated lands in Flood Zone C.

The site is centrally located within the settlement, and in close proximity to the commercial centre, encircled to the north, south and east by Existing Residential (A1) development.

The zoning of these lands for ‘New Residential’ will not seek to expand the centre of the settlement but rather will seek to realise the policy objectives of both the core and growth strategies which seek to consolidate core areas and deliver compact growth, while supporting the creation of vibrant communities. Simultaneously it will promote sequential and sustainable development of lands adjoining the existing built up area, which are under-utilised, and are preferential to peripheral locations. Compact forms of growth such as this can bring more life and footfall, contribute to the viability of services and public transport, increase housing supply in a serviced area and enable people to be closer to employment and recreational opportunities.

	<p>A substantial portion of these zoned lands is not identified for potential flood risk and is located within Flood Zone C. It is anticipated that flood risk mitigation measures could be designed to allow development of the wider site, as necessary. Development of the site will require a site-specific FRA which should consider the sequential approach within the site, allocating vulnerable and less vulnerable development to Flood Zone C and restricting the type of development to that which is 'appropriate' to each flood zone in accordance with Tables 3.1 and 3.2 of the Flood Risk Management Guidelines 2009.</p> <p><b>Site 2:</b> Rezone lands 'New Residential' (A2) in Flood Zone B to 'Tourism and Leisure' (I1) the objective of which is to provide for and enhance tourism and leisure facilities. The rezoning of the lands provides for uses which fall into the category of less vulnerable development and as such are considered appropriate in terms of lands affected by Flood Zone B. The rezoning of these lands will realise policy objectives including supporting the development of Carlingford as a sustainable tourism hub, facilitating sustainable development that will create locally based employment opportunities and supporting the creation of vibrant communities. The rezoning of the lands does not seek to expand the development boundary of the settlement as the subject lands are located between existing community and residential uses. Rather, it comprises under-utilised land within the settlement boundary in close proximity to the commercial core which can consolidate and provide for compact growth of the settlement centre.</p> <p>Compact forms of growth such as this can bring more life and footfall, contribute to the viability of services and public transport, increase housing supply in a serviced area and enable people to be closer to employment and recreational opportunities.</p> <p>A portion of these zoned lands is not identified for potential flood risk and is located within Flood Zone C. It is anticipated that flood risk mitigation measures could be designed to allow development of the wider site, as necessary. Development of the site will require a site-specific FRA which should consider the Approach within the site, allocating vulnerable and less vulnerable development to Flood Zone C and restricting the type of development to that which is 'appropriate' to each flood zone in accordance with Tables 3.1 and 3.2 of the Flood Risk Management Guidelines 2009.</p> <p><b>Infill Lands:</b> Lands within the existing settlement and zoned 'Town or Village Centre' (B1), 'Existing Residential' (R1) and 'Community Facilities' (G1) are characterised by existing buildings and structures with a range of varying uses. A Justification Test was not carried out on these lands as they are already developed. Further development on the lands will be of an infill/brownfield nature.</p> <p>Within areas of existing development, proposals for extensions and minor development shall be assessed with reference to Section 5.28 of the Planning System and Flood Risk Management Guidelines, in accordance with Policies IU 26-IU 35 of the LCDP. Any highly vulnerable or less vulnerable land uses affected by Flood Zone A or B should employ the sequential approach when considering the site layout and an appropriately detailed site-specific FRA must be submitted at development management stage.</p>
<p><b>Criteria 3</b></p>	<p>A detailed site-specific FRA shall be submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <p>A site specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>• A sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>• Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>• Development in Flood Zone A should be either open space or water compatible.</li> <li>• FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>• Compensatory storage for development that results in a loss of floodplain within Flood Zone A must be provided on a level for level basis.</li> </ul>

Volume 5  
Strategic Flood Risk Assessment (SFRA)

<b>Conclusion</b>	<b>Site 1</b> Justification Test satisfied. <b>Site 2</b> Justification Test satisfied.  It is recommended that any proposals for future development on lands vulnerable to flooding and in Flood Zones A and B will be subject to a site-specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.
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