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STRUCTURAL ENGINEERING
DESIGN

CIVIL ENGINEERING DESIGN

CONSERVATION ENGINEERING
DESIGN

SITE DEVELOPMENT DESIGN

CONTRACT ADMINISTRATION

PART 8 PLANNING REPORT

LEVEL 1/2 SITE SPECIFIC FLOOD RISK ASSESSMENT

FOR
LAKELANDS FOOD HUB DEVELOPMENT
LANESBOROUGH
CO. LONGFORD

OCTOBER 2023

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FLOODING AND FLOOD RISK ASSESSMENT

1.0 INTRODUCTION

Flood risk is a combination of the likelihood of flooding and the potential consequences arising. The Planning System and Flood Risk Management Guidelines for Planning Authorities recommend a staged approach to flood risk assessment covers both the likelihood of flooding and the potential consequences.

There are two components of flood risk that must be considered in applying this guidance in a consistent manner:

- Likelihood of flooding is normally defined as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year.
- Consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality), and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development, presence and reliability of mitigation measures etc).

Flood risk is then normally expressed in terms of the following relationship: Flood risk = Likelihood of flooding x Consequences of flooding.

Flood zones are geographical areas within which the likelihood of flooding is in a particular range and 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 types or levels of flood zones defined in the Planning System and Flood Risk Management Guidelines for Planning Authorities:

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.

For sites within Flood Zone A or B, a site specific "Stage 2 - Initial FRA" will be required and may need to be developed into a "Stage 3 - Detailed FRA". The extents of Flood Zone A and B are delineated through a SFRA.

A Site-Specific Flood Risk Assessment (Site FRA) is undertaken to assess all types of flood risk for a new development. This requires identification of the sources of

flood risk, the effects of climate change on the flood risk, the impact of the proposed development, the effectiveness of flood mitigation and management measures and the residual risks that then remain.

A Site Specific Flood Risk Assessments is categorised into three levels.

FRA Level 1 - Flood Risk Identification

Investigation and report to assess any flooding or surface water issues which may require further investigation or confirm that the site is at low risk of flooding from all sources. This assessment will provide an early stage recommendation for the rest of the assessment. This allows developers to make an informed decision by balancing flood risk and impacts on the development.

FRA Level 2 - Initial Flood Risk Assessment

This assessment builds on Level 1, and includes:

- Appraisal of the availability and adequacy of existing flood risk information.
- Qualitative appraisal of flood risk posed to the site and the potential impacts the development will have on flood risk elsewhere.
- Production of an FRA including possible flood risk mitigation measures to reduce flood risk to acceptable levels.

FRA Level 3 - Detailed Flood Risk Assessment

This assessment is only undertaken if the previous stages determine the need for quantitative analysis to assess flood risk issues relating to the development site. This assessment may include;

- Topographic survey of the channel and surrounding ground levels,
- Hydrological assessment of the catchment by specialists,
- Hydraulic calculations and modelling to quantify the flood risk to the site, assessment any offsite flood risk impacts,
- Considerations of existing and proposed surface water drainage arrangements and
- Determination of appropriate flood risk mitigation measures.

2.0 DESCRIPTION OF THE SITE AND THE PROPOSED DEVELOPMENT

The site generally comprises agricultural lands with an area of 1.8ha. It is bounded to the north by the N63, to the west by Lanesborough Fire Station, and to the south and east by a local stream. Refer to Appendix A for a Site Location Map. The topography of the site falls from north to south, towards the stream, with an overall level difference of approximately 2.1m.

The proposed development comprises

- The construction of single-storey industrial/commercial building of c. 1,250m² to accommodate up to 8 individual or linked food production units.
- Ancillary single-storey 'common room' building of c. 82m² with a canopy structure over outdoor seating area of c. 200m²
- Site works include signage, delivery & loading area for commercial vehicles, footpaths & cycleways, car parking, cycle racks, EV charge points, drainage, surface water attenuation, hard & soft landscaping including community garden with water feature.

The potential food type operators may vary widely - from craft bakery to a specific honey product packaging and distribution company, specialist foods, etc.. Another growing area is in pre-prepared meals.

Under the Planning System and Flood Risk Management Guidelines, the proposed development is classed as 'Less Vulnerable Development'

3.0 FLOOD RISK ASSESSMENT

3.1 Level 1: Flood Risk Identification

Flood Risk Identification is the process for deciding whether a plan or project requires a Level 2 FRA. It is essentially a desk study based on sources of existing information. At the preliminary stage a study was carried out to develop an understanding of the flood conditions on the site, to identify available information about the flood risk and to assess the likely probability and suitability of the site in flood risk terms. This was achieved by.

- a. Identification of possible flooding sources and mechanisms.
- b. Identification and review of existing information relating to previous flood events.

a) Identification of possible flooding sources and mechanisms

The principal sources for flooding are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains. Fluvial Flooding occurs due the rise in water levels from a river or other watercourses, Tidal Flooding occurs when the areas around the sea are inundated with seawater during a storm surge and Pluvial Flooding occurs as a result of rainfall-generated overland flow and includes overflowing drainage systems.

The main possible sources of fluvial flooding identified for this site is a local stream located on the southeastern/eastern boundary of the site. The stream flows in a northeastern direction along the southeastern boundary before turning northwards towards to N63. The stream then flows under the N63 via a concrete culvert, approximately 4.1m wide. The stream continues in a northerly direction and contributes to the River Shannon.

The site is located in the midlands of Ireland and Tidal Flooding therefore not an issue or contributing factor.

The main possible sources of pluvial flooding are the existing foul drains located on the N63, to the north of the site. There are no records of surface water drains located on N63. Refer to Table 3.1 for a summary of identified sources with commentary.

b) Identification and review of existing information relating to previous flood events

A range of sources were consulted for this study. These include;

- i. OPW Flood Hazard Maps on www.floodmaps.ie
 - ii. Local Authority records / Past Flood Events
 - iii. Longford CDP 2021-2027
 - iv. Geological Survey Ireland (GSI) winter 2015/2016 Surface Water Flooding Maps
 - v. GSI Maps – Maximum Historic Groundwater Flooding
-
- i. The OPW Flood Hazard Maps do not record any flooding events in the vicinity of the site.

- ii. Photographs showing flooding to the southern portion of the site during the November 2009 storm were provided by the Local Authority. These are shown in Appendix B1.
- iii. The Longford CDP 2021-2027 Historical Indicators Maps do not show any flooding on the site. Areas of fluvial flooding are shown outside the southern boundary of the site, namely the stream. Refer to Appendix B2.
- iv. The Geological Survey of Ireland (GSI) maps were developed as part of the 2016-2019 GW Flood project in collaboration with Trinity College Dublin and the Institute of Technology Carlow.
The Winter 2015/2016 Surface Water Flooding map shows fluvial (rivers) and pluvial (rain) floods, excluding urban areas, during the winter 2015/2016 flood event, and was developed as a by-product of the historic groundwater flood map. These maps do not show any flooding on the site. They do however show flooding to the southern side of the stream running along the southern boundary of the site. Refer to Appendix B3.
- v. The GSI Maps Maximum Historic Groundwater Flooding maps do not show any flooding in the vicinity of the site.

3.2 Level 2: Initial Flood Risk Assessment

As the Level 1 FRA identified evidence of flooding to the southern boundary of the site, a Level 2 FRA was carried out. This included,

- a) Identification and review of any previous modelling studies;
- b) Qualitative assessment of the risk of flooding to the site;
- c) Qualitative assessment of the potential impact of a development on flood risk on the site and elsewhere;

a) Identification and review of previous modelling studies.

A range of sources were consulted for this study. These include

- i. OPW National Preliminary Flood Risk Assessment and CFRAM Study
 - ii. The National Indicative Fluvial Maps
 - iii. Longford CDP 2021-2027
 - iv. Longford Strategic Flood Risk Assessment for the Longford 2015-2021 Draft CDP
- i. The OPW Catchment Flood Risk Assessment Management Study (CFRAMS) do not extend to the proposed site. The study limits are to the north of the N63 as shown on CFRAMS Flood Maps in Appendix C1.
 - ii. The National Indicative Fluvial Maps (NIFM) have been produced for catchments greater than 5km² in areas for which flood maps were not produced under the National CFRAM Programme and should be read in this context. River reaches that have been modelled are indicated by the NIFM Modelled River Centrelines dataset. Floodinfo.ie include indicative maps for Present Day Scenario, the Mid-Range Future Scenario and High End Future Scenario. All these scenarios include medium probability (100 year return period) and low probability 1000 year return period). The Present-Day Scenario data was generated using methodologies based on historic flood data, without taking account of potential changes due to climate change. The potential effects of climate change have been separately modelled and

reported on. The Mid-Range Future Scenario extents were generated taking in the potential effects of climate change using an increase in rainfall of 20% while the High-End Future Scenario extents were generated taking an increase in rainfall of 30%.

Extracts from these maps are presented in Appendix C2. These maps show portions of the site to be within Flood Zone A and Flood Zone B.

It must be noted that the National Indicative Fluvial Maps should not be used to assess the flood risk associated with individual properties or point locations, or to replace a detailed site-specific flood risk assessment.

- iii. The Longford CDP 2021-2027 includes predictive flood maps for the county. Appendix C3 shows an extract of the maps for the Lanesborough area. The Predictive Indicators map show a small portion of the southern part of the site within Flood Zone A. This map is based on a Preliminary Flood Risk Assessment data supplied by Longford County Council.
- iv. The Longford SFRA Assessment for 2015-2021 LCP includes indicative flood maps for Lanesborough. This map shows a portion of the southern end of the site in Flood Zone A. Refer to Appendix C4.

b) Qualitative assessment of the risk of flooding to the site;

From historical the data observed in a) above, it is deemed that the southern portion of the site is susceptible to flooding. From examination of the historic flooding information, and from examination of the topography of the lands and environs, it is expected that flooding will be predominantly to the south/southeast of the watercourse, with flooding on the site predominantly to the southern portion of the site, along the watercourse. This is demonstrated in the November 2009 flood photographs presented in Appendix B1.

Table 3.1 below summarises the risk of flooding with commentary on measures to reduce risk, and outlines the residual risks. To protect the proposed buildings from flooding, floor levels are to be raised to a minimum of 500mm above flood level. A berm should also be constructed alongside the stream to further prevent floodwaters rising to the upper levels of the site. Recommendations are also to be developed for the regular maintenance of the watercourse, to prevent accidental blockages, and to maintain flows. This will prevent floodwaters rising to the building locations, and to finished floor levels.

Table 3.1 below summarises the risk of flooding with commentary.

Flood risk	Applicable to subject site	Measures to reduce risk /	Residual risk
Fluvial	Yes	Locate buildings towards the northern side of the site. Raise FFL's to min 500mm above the predicted flood level. Re-profile ground along southern boundary to increase compensation storage. Create a Berm along the watercourse.	Culvert under N63 blocks. Watercourse not maintained.
Pluvial	Not known or expected	Storm network designed to accommodate on-site surface water run-off. Development will be designed with sufficient surface gradients falling away from properties, with engineered flow paths towards the river. On site attenuation will be provided to intercept rainfall on the site	Drainage system is not maintained.
Coastal	No	N/A	N/A
Groundwater	Not expected	Monitor groundwater levels. Avoid basements.	Rising Ground Water Levels.
Dam/Embankment /Canal bank breach	Not known or expected	N/A	N/A
Network drainage	No.	No existing network on site. Drainage network to be designed to accommodate expected flows plus 20% for climate change. Silt traps to be designed into the system. Adjoining drainage could fail but the topography falls away from the site.	
Snow melt	Yes	Ground levels & gradients designed to fall away from properties.	Overload drainage system – low risk
Watermain burst	Yes	Watermains to be designed and constructed in accordance with Irish Water Code of Practice. Watermains to be placed in footpaths with falls away from dwellings.	Burst mains not reported. Accidental damage.

c) **Qualitative assessment of the potential impact of a development on flood risk.**

The mid to southern end of the site is shown to be within Flood Zone B, with the most southern portion within Flood Zone A. The northern side of the site is not identified as been on the path of floodwater flows. A riparian corridor will be maintained along the stream, with only landscaping in this area. Ground profiles will be altered along the watercourse to compensate for any loss of compensation storage due to the development.

It is proposed to attenuate and discharge the surface water from the site directly to the watercourse at a rate of 2.0l/s/ha. The proposed development will include interception storage by using water butts, permeable pavement, permeable swales and detention basins where possible.

The new development should therefore not adversely impact on surface water runoff impact on flood risk. It will potentially have a positive effect as surface water run-off will be reduced from the current greenfield runoff.

4.0 JUSTIFICATION TEST

In accordance with Planning System and Flood Risk Management Guidelines, the proposed development is classed as 'Less Vulnerable Development'. As a portion of the site is within Flood Zone A, the 'Justification Test' needs to be applied in accordance with the guidelines. The test is comprised of two processes.

1. The first is the Plan-making Justification Test and used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding. This test was carried out as part of the Longford CDP 2015- 2021 and 2021-2027. The land use zoning for this site is for Industrial/Commercial/Warehousing, with the southeastern section been zoned as Area of Constrained Land Use.
2. The second is the Development Management Justification Test. This is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

It is considered that, along with proposed flood impact mitigation measures, including raised floor levels, berms, detention basins for the development, it is sufficient to pass the Justification Test.

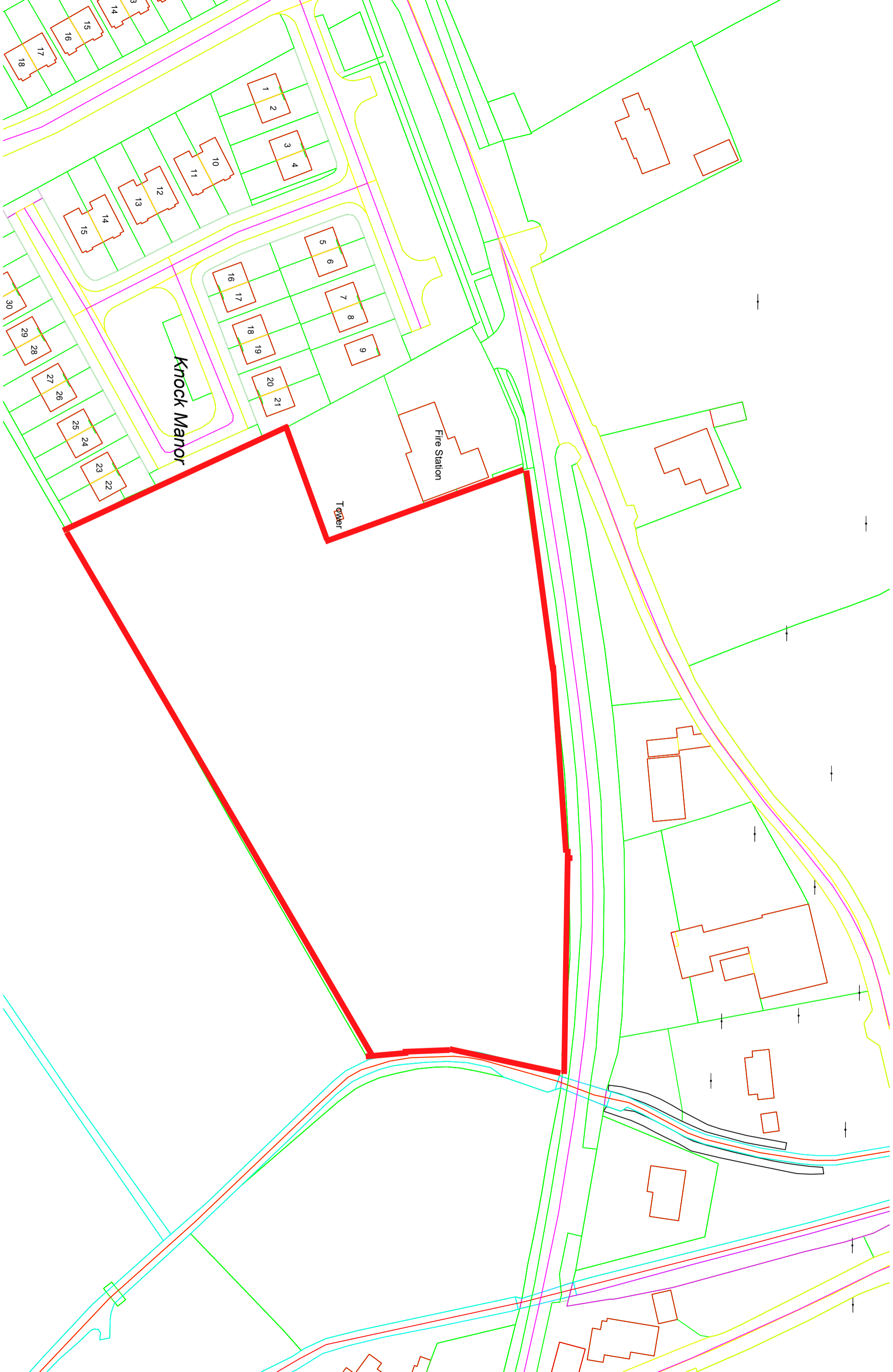
5.0 CONCLUSION

This Site-Specific FRA has determined that a portion of the site is within Flood Zone A and Flood Zone B. This is generally expected towards the southern boundary.

The flood study has demonstrated that mitigation measures have been considered to protect any proposed buildings from flooding. These measures include, inter alia, raised floor levels, berms, watercourse maintenance schedules etc. On-site surface water management will form part of the design to restrict discharge to the watercourse, further reducing the risk of flooding. It also considers that the development is not expected to have an adverse effect on flooding downstream.

The project is currently at Capital Works Management Framework (CWMF) Stage 1 'Inception'. The next stage would be CWMF Stage 2 'Detailed Design', which would lead to complete drawings and specifications for CWMF Stage 3, 'Tender Action'. The process of establishing the appropriate floor level in accordance with the principles set out above would occur as part of the CWMF Stage 2 'Detailed Design' process. This will include a rigid maintenance schedule for regular cleaning/maintenance to the watercourse along the southern and eastern boundaries of the site.

APPENDIX A1
SITE LOCATION MAP



Knock Manor

Fire Station

Tower

APPENDIX B1
HISTORIC PHOTOGRAPHS OF SITE
IN NOVEMBER 2009 FLOODS

Provided by Longford County Council



Photo 1: Flood Event November 2009
























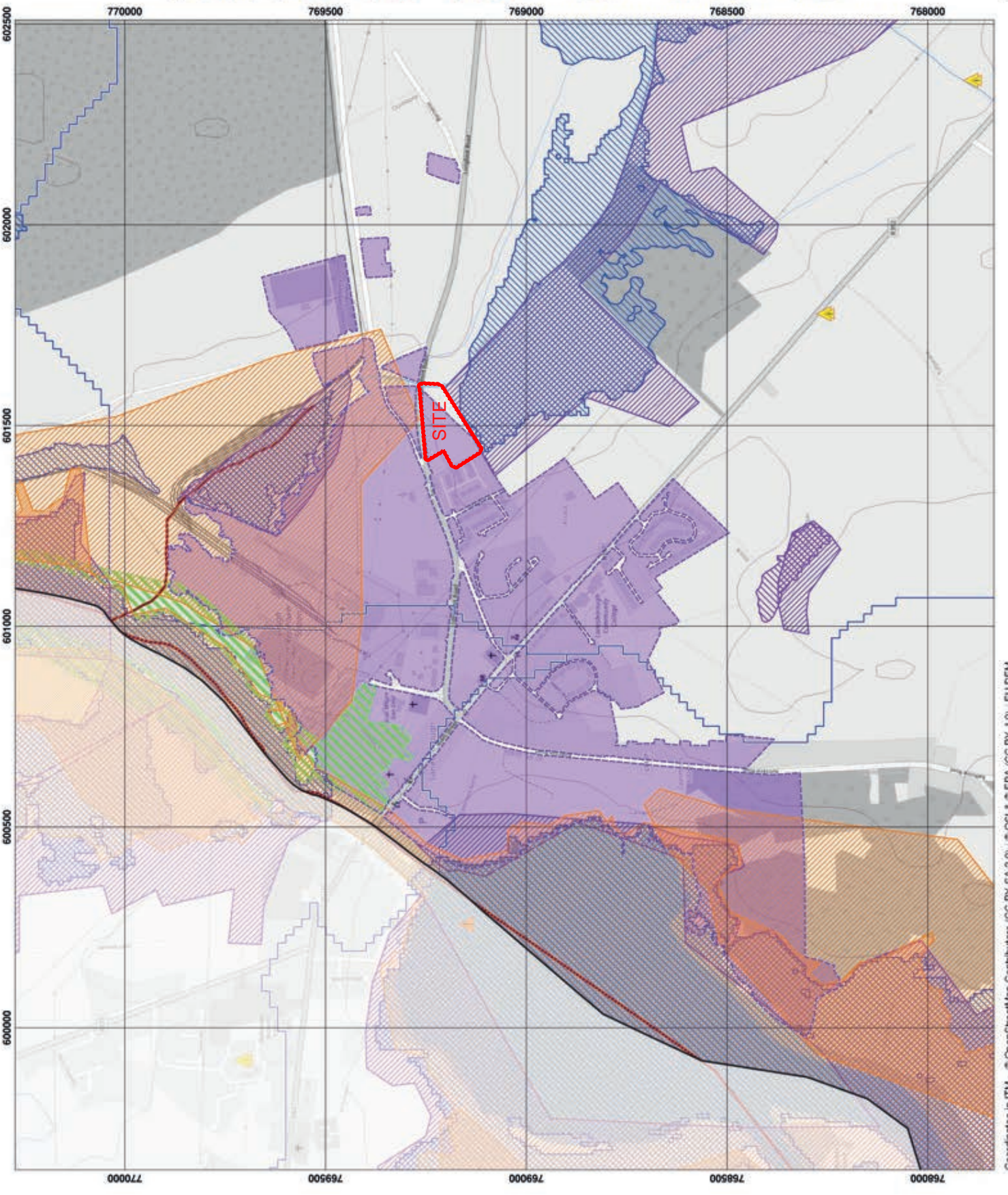
Photo 2: Flood Event November 2009

APPENDIX B2
EXTRACT FROM LONGFORD CDP 2021-2027
HISTORICAL INDICATORS MAP

Longford CDP 2021-2027

Lanesborough Historical Indicators

-  Zoned Lands
-  Rivers & Streams
-  Lakes
-  WFD River Sub Basins
- Arterial Drainage Schemes (ADS)**
-  ADS Channel
-  ADS Embankment
-  ADS Benefitted Land
- Drainage Districts (DD)**
-  DD Channel
-  DD Embankment
-  DD Benefitted Land
- Land Commission (LC)**
-  LC Watercourse
-  LC Embankment
-  LC Benefitted Land
- OPW Past Flood Data**
-  Single Flood Event
-  Recurring Flood Event
-  OPW Past Flood Extent
-  Flooding Region - Provided by Longford County Council with PFRA Data
- Soils**
-  Alluvial Soils
- GSI Groundwater Flood Mapping**
-  Winter 2015-2016 Surface Water Flooding
- Maximum Historic Groundwater Flooding**
-  Groundwater
-  Groundwater/Surface water



APPENDIX B3
GEOLOGICAL SURVEY IRELAND (GSI) MAPS
EXTRACT FROM
2015/2016 SURFACE WATER FLOOD MAPS



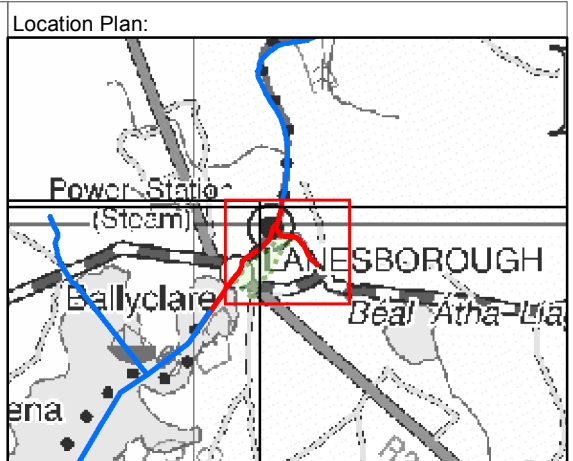
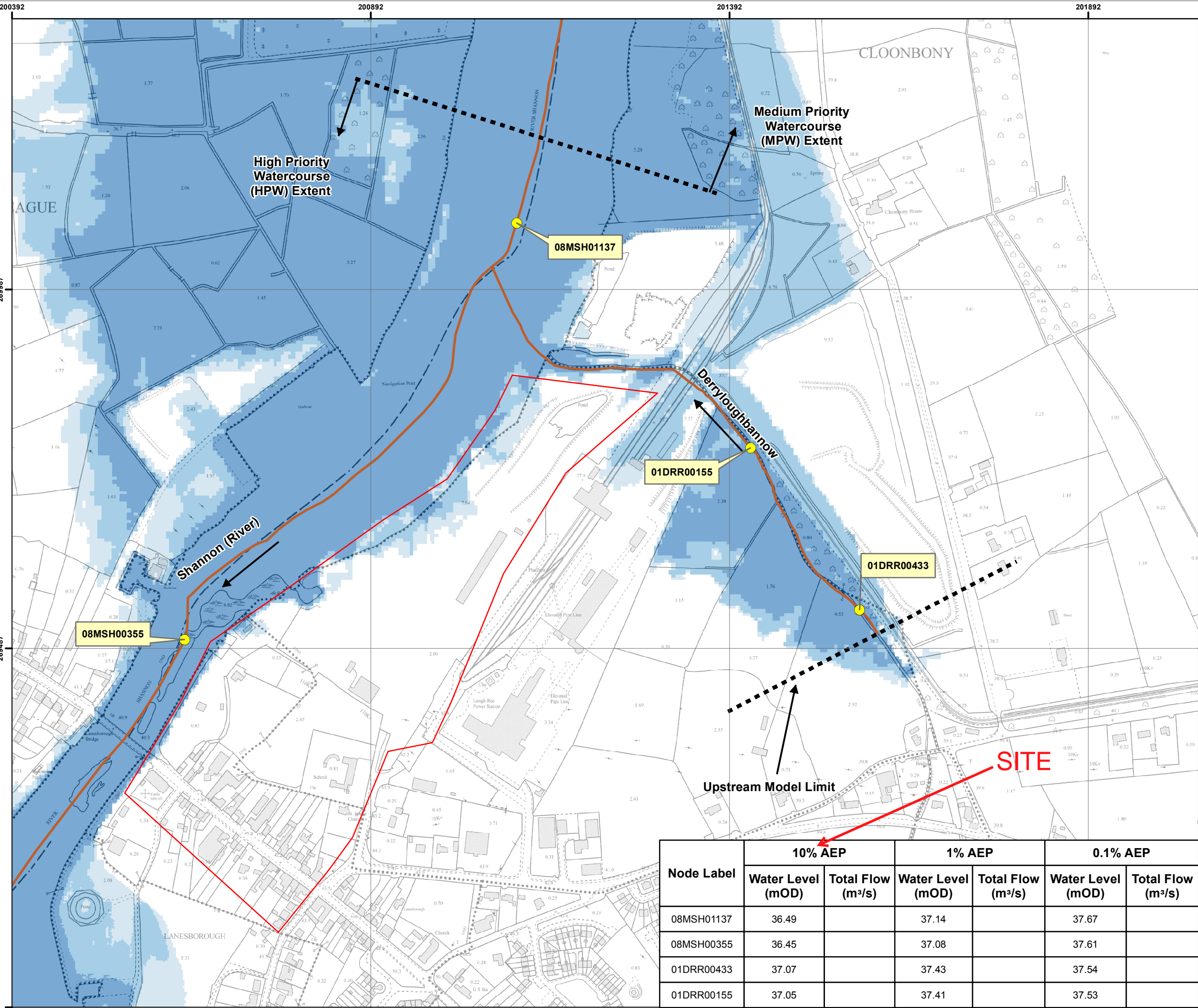
SITE



APPENDIX C1

Catchment Flood Risk Assessment Management Study (CFRAMS)

FLOOD MAPS



Legend:

- Nodes
- Model Reach
- AFA Boundary
- Flood Defence: Wall
- Flood Defence: Embankment
- Defended Area
- 10% AEP Fluvial Flood Extent**
 (1 in 10 chance in any given year)
- 1% AEP Fluvial Flood Extent**
 (1 in 100 chance in any given year)
- 0.1% AEP Fluvial Flood Extent**
 (1 in 1000 chance in any given year)

IMPORTANT USER NOTE:
 THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.



The Office of Public Works
 Jonathan Swift Street
 Trim
 Co. Meath
 C15 NX36

Merrion House
 Merrion Road
 Dublin 4
 D04 R2C5

Project:	SHANNON CFRAM STUDY
Map Type:	EXTENT
Source:	FLUVIAL
Area:	LANESBOROUGH
Scenario:	EXISTING
Drawn by:	EF Date: JUNE 2016
Checked by:	AC Date: JUNE 2016
Reviewed by:	MC Date: JUNE 2016
Approved by:	PS Date: JUNE 2016

Node Label	10% AEP		1% AEP		0.1% AEP	
	Water Level (mOD)	Total Flow (m³/s)	Water Level (mOD)	Total Flow (m³/s)	Water Level (mOD)	Total Flow (m³/s)
08MSH01137	36.49		37.14		37.67	
08MSH00355	36.45		37.08		37.61	
01DRR00433	37.07		37.43		37.54	
01DRR00155	37.05		37.41		37.53	



APPENDIX C2
EXTRACT FROM
NATIONAL INDICATIVE FLUVIAL MAPS (NIFM)



Figure C2-1 National indicative Fluvial Maps – Present – Medium Probability



Figure C2-2 National indicative Fluvial Maps – Present – Low Probability



Figure C2-3 National indicative Fluvial Maps – Mid Range – Medium Probability



Figure C2-4 National indicative Fluvial Maps – Mid Range – Low Probability



Figure C2-5 National indicative Fluvial Maps – High End – Medium Probability
















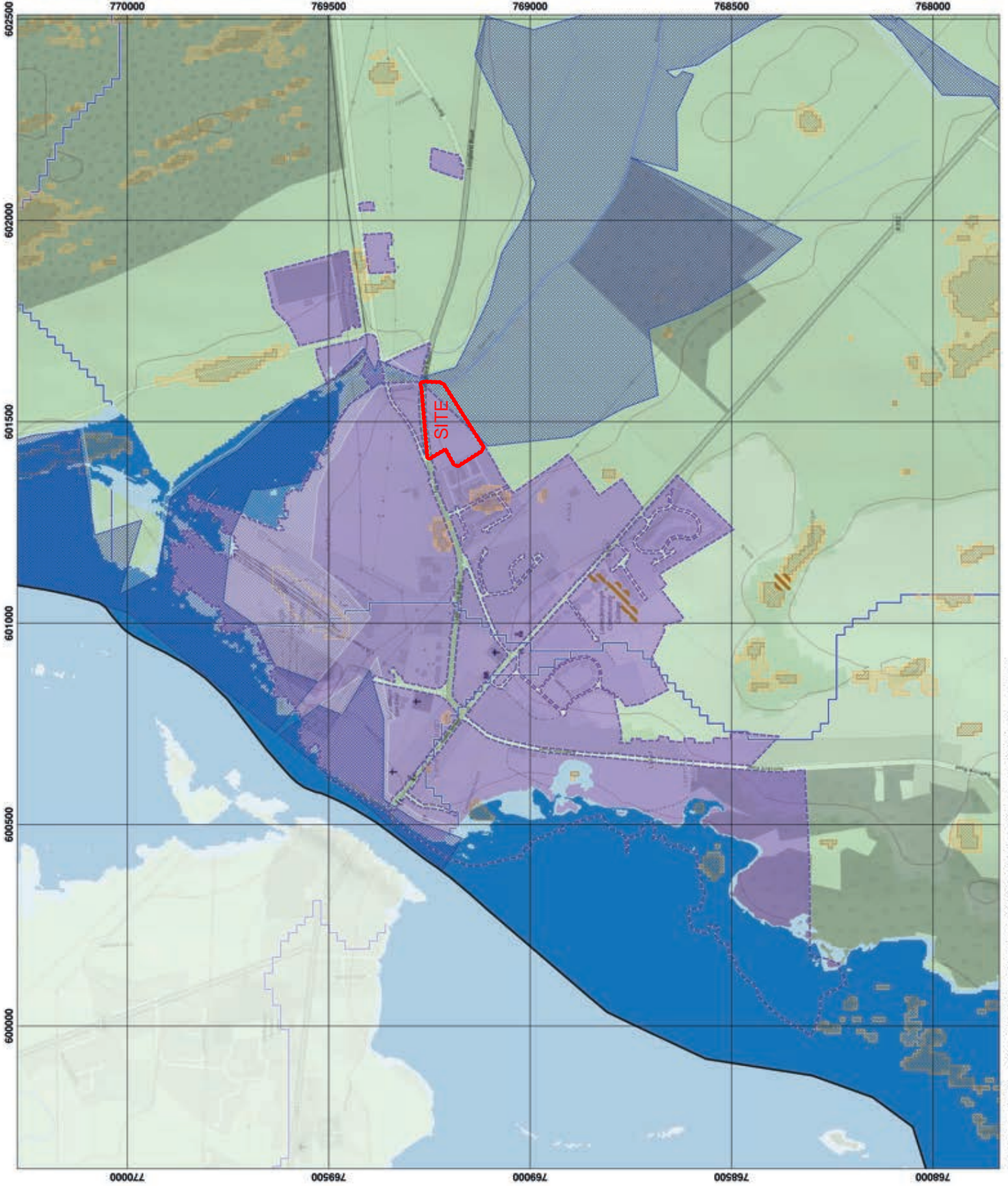
Figure C2-6 National indicative Fluvial Maps – High End – Low Probability

APPENDIX C3
EXTRACT FROM LONGFORD CDP 2021-2027
PREDICTIVE FLOOD MAPS

Longford CDP 2021-2027











Lanesborough Predictive Indicators

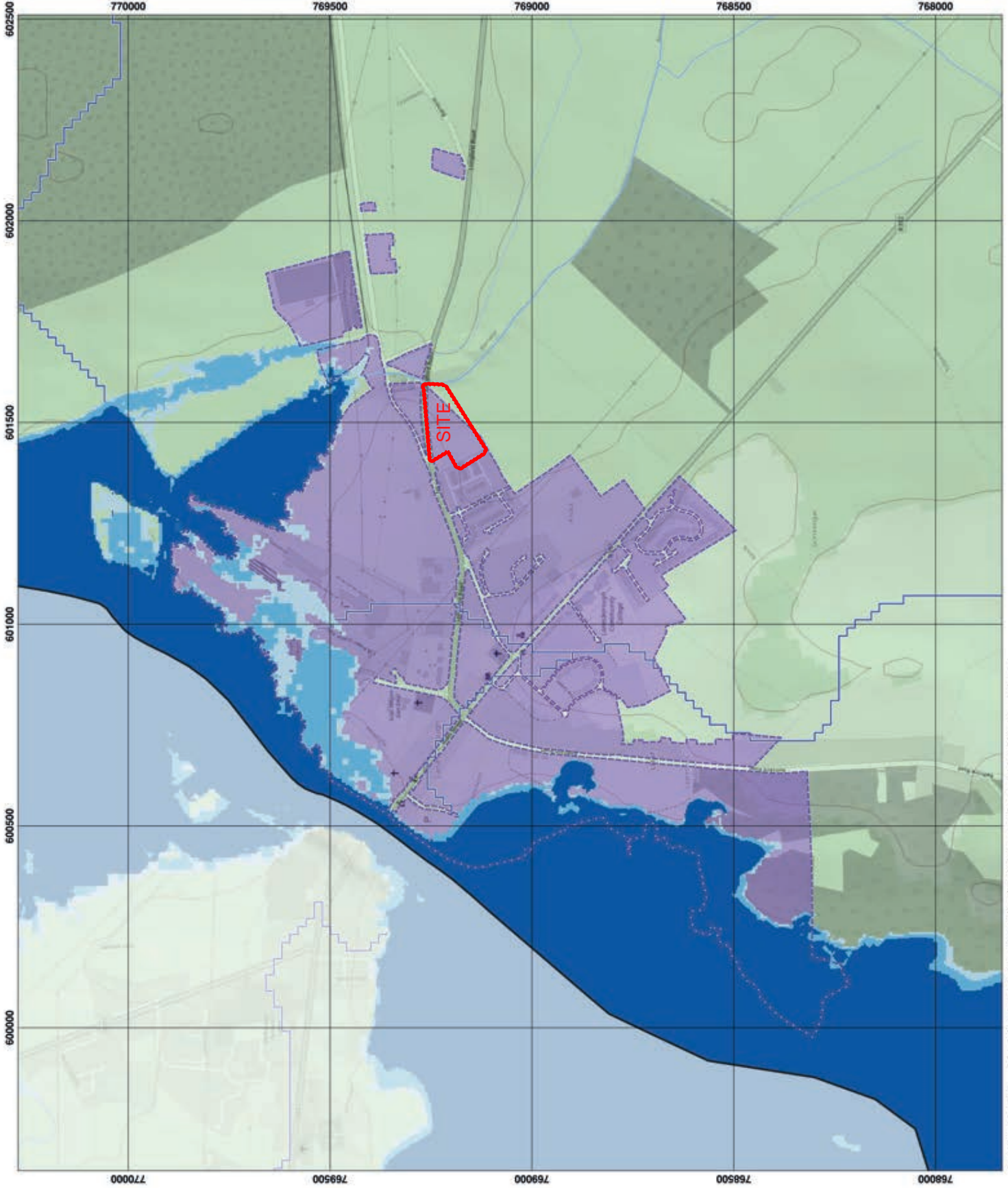
-  Zoned Lands
-  Rivers & Streams
-  Lakes
-  WFD River Sub Basins
- CFRAM Flood Extents**
 -  1% AEP Fluvial Extent
 -  0.1% AEP Fluvial Extent
- GSI Groundwater Flooding**
 -  1% AEP Groundwater Extent
 -  0.1% AEP Groundwater Extent
- PFRA Data supplied by Longford County Council**
 -  1% AEP Fluvial Extent
 -  0.1% AEP Fluvial Extent
 -  1% AEP Pluvial Extent
 -  0.1% AEP Pluvial Extent
 -  Groundwater Flooding



**Longford CDP
2021-2027**

**Lanesborough
CFRAM All Scenarios**

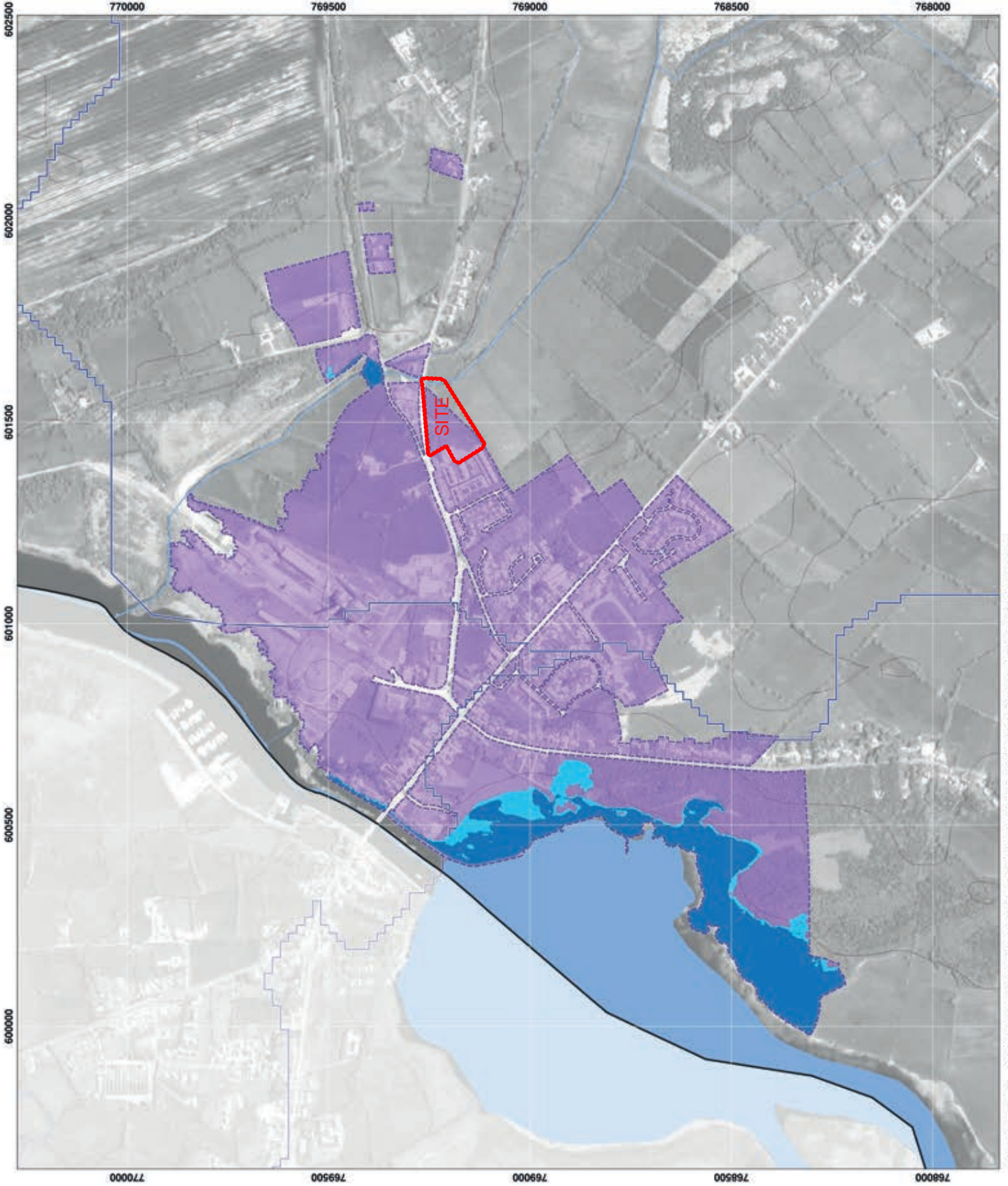
-  Zoned Lands
 -  Rivers & Streams
 -  Lakes
 -  WFD River Sub Basins
- CFRAM All Scenarios**
-  Present Day Scenario
 -  0.1% AEP
 -  Mid-Range Future Scenario
 -  0.1% AEP
 -  High-End Future Scenario
 -  0.1% AEP



Longford CDP 2021-2027

Lanesborough Flood Zones

- Zoned Lands
 - Rivers & Streams
 - Lakes
 - WFD River Sub Basins
- Indicative Flood Zones
- Flood Zone A
 - Flood Zone B



APPENDIX C4
EXTRACT FROM LONGFORD CDP 2015-2021
INDICATIVE FLOOD MAPS

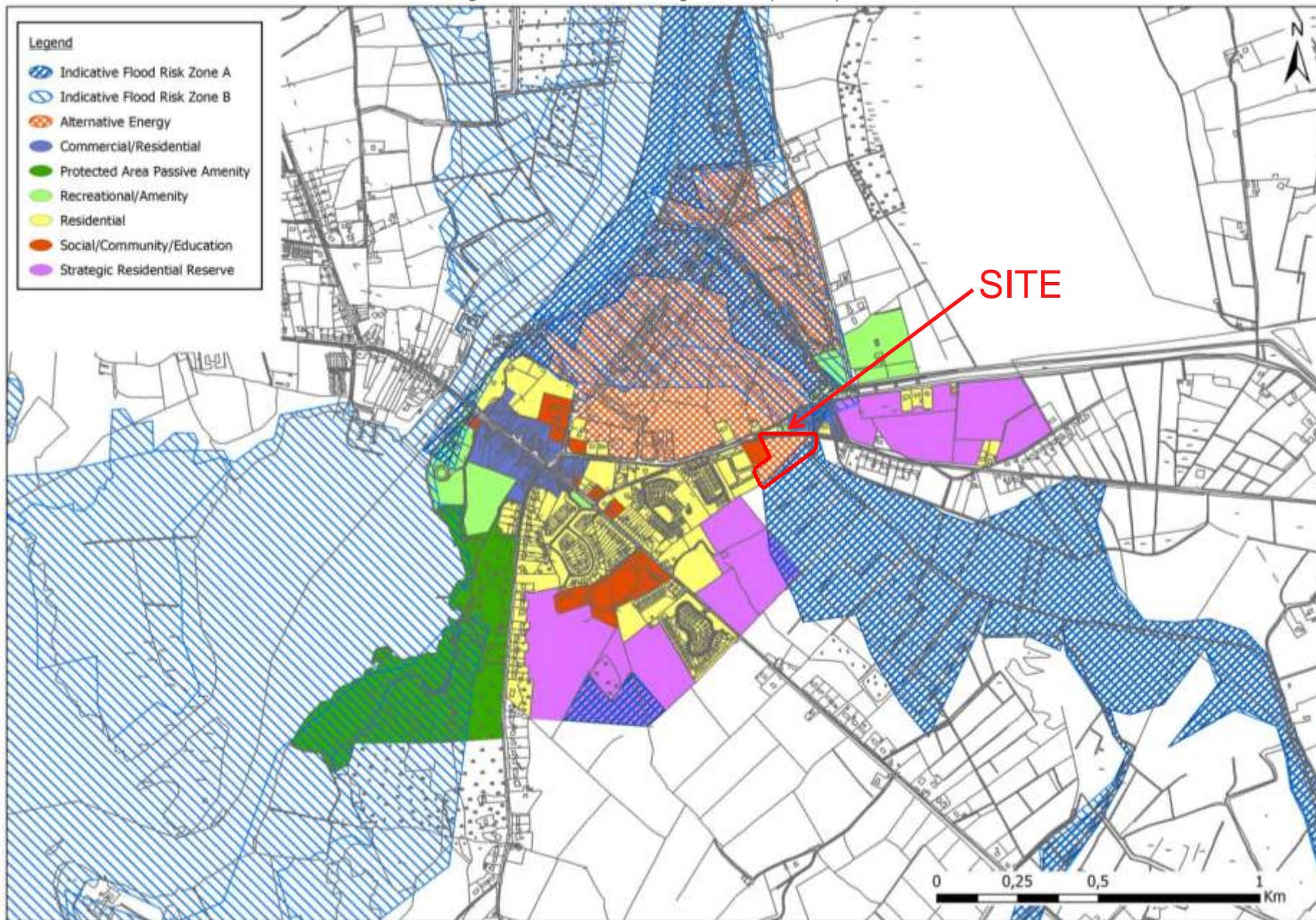


Figure 3.25 Lanesborough Indicative Flood Risk Zones (overlain on older version of the Draft Land Use Zoning)