

# Appendix 8.A

# Project Opera Limerick

Flood Risk Assessment - Stage 2

Limerick 2030 Strategic Developments DAC

Project number: 60568520

8<sup>th</sup> March 2019

### Quality information

**Prepared by**

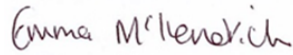
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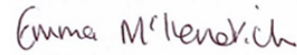
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### Revision History

Revision	Revision date	Details	Authorized	Name	Position
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# 1. Introduction

## 1.1 Background

AECOM were appointed on behalf Limerick 2030 to prepare a planning application and EIAR for the redevelopment of the Opera site in Limerick City Centre.

This Flood Risk Assessment (FRA) has been carried out in support of the planning application proposed development is in compliance with the requirements of “The Planning System & Flood Risk Management Guidelines” published by the Department of the Environment in November 2009.

## 1.2 Existing Site

The existing site is located within Limerick City Centre and consists of areas of brown field site, at-grade public car parking areas, derelict Georgian buildings, occupied offices and the Granary Complex. The site has a vehicular access off Michael Street and Rutland Street. Figure 1 illustrates the location of the development site within Limerick City.

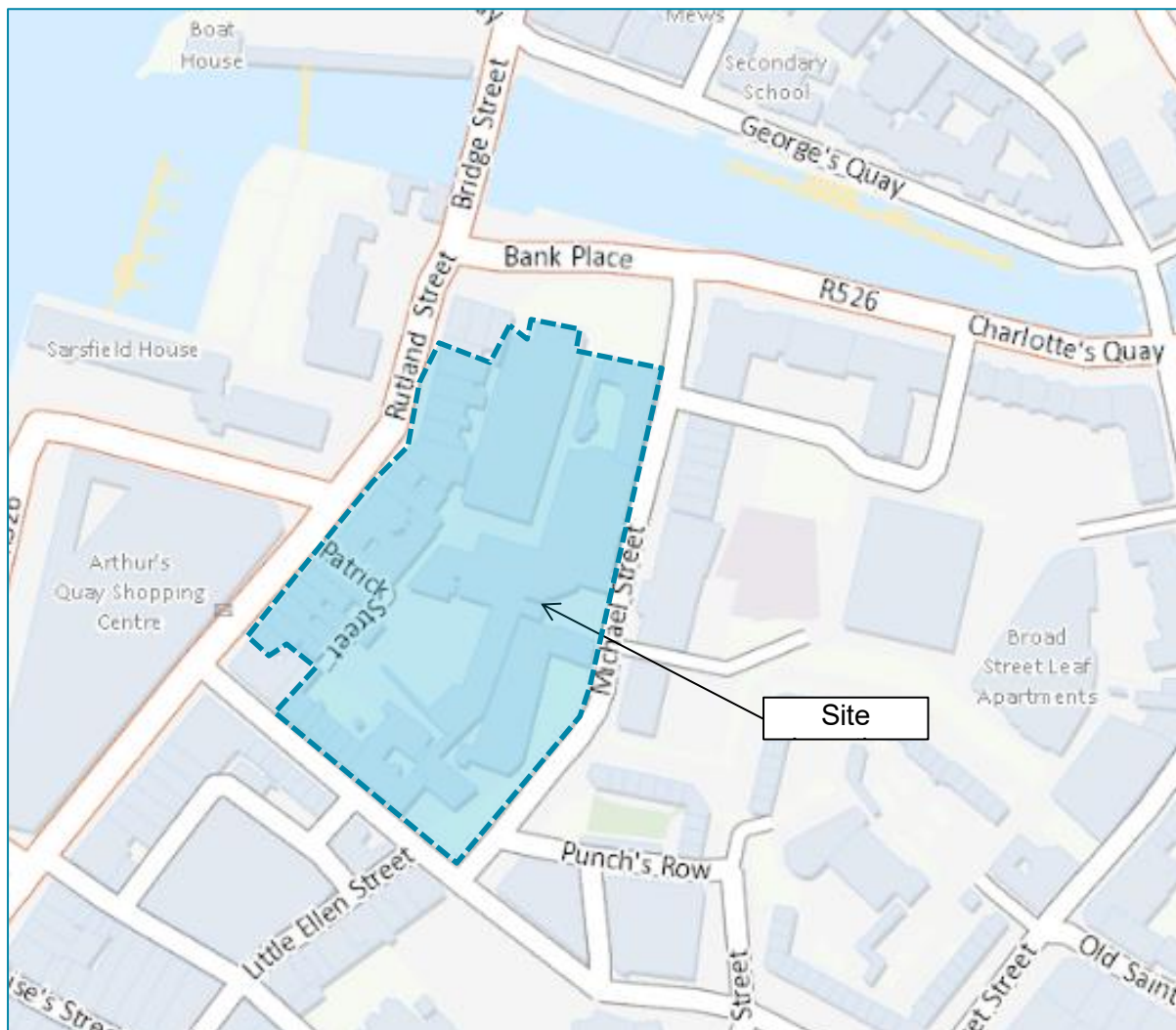


Figure 1 – Site Location – Project Opera, Limerick

### 1.3 Proposed Development

It is proposed to redevelop the ‘Opera Site’ (2.35 ha) that occupies the majority of a city block in Limerick City. The block is bounded to the west by Patrick Street and Rutland Street, to the north by Bank Place, to the east by Michael Street and to the south by Ellen Street.

The development site includes two Protected Structures, a range of existing terraced Georgian houses along Rutland Street, Patrick Street and Ellen Street, which are interspersed by Twentieth Century interventions on the corner of Patrick Street, Ellen Street and Rutland Street. The development site also includes various Twentieth Century Industrial/warehousing/workspace buildings, primarily located towards the centre of the site at Bogue's Yard and Watch House Lane, and north fronting Bank Place. A surface carpark with c.100 spaces is located to the south-east corner of the site.

The main re-development relates to demolition of all the Twentieth Century buildings and later additions to the rear of existing heritage structures, which is accompanied by new-build elements and proposed renovation and adaptive re-use of the Protected Structures and the majority of other structures of heritage value within the site.

The development comprises a mixed-use scheme of primarily office uses, supported by a range of retail / non-retail services, café/restaurant, licenced premises, apart-hotel, civic/cultural uses (including the City Library), residential use, open spaces, access routes and ancillary areas. The development also includes environmental improvement works to the adjacent public streets.

For further details please refer to the EIAR which provides a full description of the proposed development. Please refer to the drawings accompanying this application for further details of the proposed development.



Figure 2 – Project Opera Site Extent



## 2. The Planning system and Flood Risk Management Guidelines

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 Guidelines give guidance on flood risk and development and recommend a precautionary approach when considering flood risk management in the planning system. 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 objective of a Site-Specific Flood Risk Assessment (FRA) is to assess all types of flood risk to a development. The assessment should investigate potential sources of flood risk and include for the effects of climate change/ The assessment is required to examine the impact of the development and the effectiveness of flood mitigation and management procedures proposed. It should also present the residual risks that remain after those measures are put in place.

As set out in the Flood Risk Management Guidelines, the assessment of flood risk “*requires an 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)*”.

The sequential approach is based on the identification of flood zones for river and coastal flooding. “Flood Zones” are geographical areas used to identify areas at various levels of flood risk. It should be noted that these do not consider the presence of flood defences, as risks remain of overtopping and breach of the defences. There are three flood zones defined (refer to Figure 3):

**Flood 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).

**Flood 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).

**Flood 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).



**Figure 3 – Indicative Flood Zone Map (Extract from the Guidelines, Figure 2.3)**

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. 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. The current Limerick City and County Development Plan (2010-2016\_Extended) was adopted following the publication of the Flood Risk Management Guidelines.

The Guidelines set out a staged approach to assessment. The stages of assessment are:

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

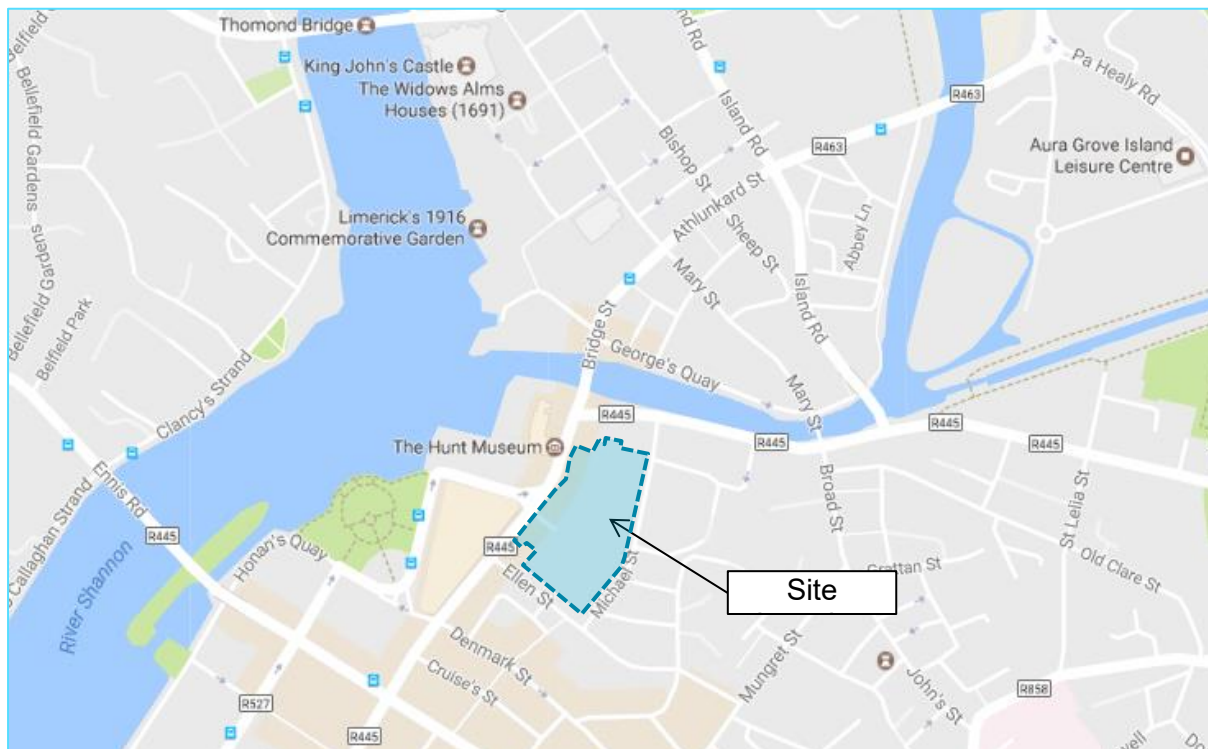
**Initial Flood Risk Assessment (Stage 2)** - Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measures.

**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 of a Stage 1 and 2 Flood Risk Assessment.

### 3. Flood Risk Identification (Stage 1)

The development is situated approximately 30m south of Abbey River and 150m east of the River Shannon which may generate a coastal and/or fluvial flood risk. Potential flooding from these threats will be considered in greater detail in the following sections.



**Figure 4 – Location of Project Opera demonstrating proximity to River Shannon and Abbey River**

#### 3.1 History of Flooding

As part of the overall exercise to establish the potential flood risk to the development site, AECOM Carried out a review of available and recorded information on flooding in the area. The following sources were consulted as part of the review:

- OPW Flood Records,
- Historic Flood Records.

##### 3.1.1 OPW Flood Hazard Mapping

The Office of Public Works (OPW) collates available reports of flooding from all sources (e.g. fluvial, pluvial, coastal, etc.) on a nationwide basis. The OPW's website ([www.floodmaps.ie](http://www.floodmaps.ie)) was consulted to obtain reports of recorded flooding within and surrounding the site.

The information available on this website that there are no reported instances of flooding in the area, see Figure 5. The full local area report from [www.floodmaps.ie](http://www.floodmaps.ie) is enclosed in Appendix A.

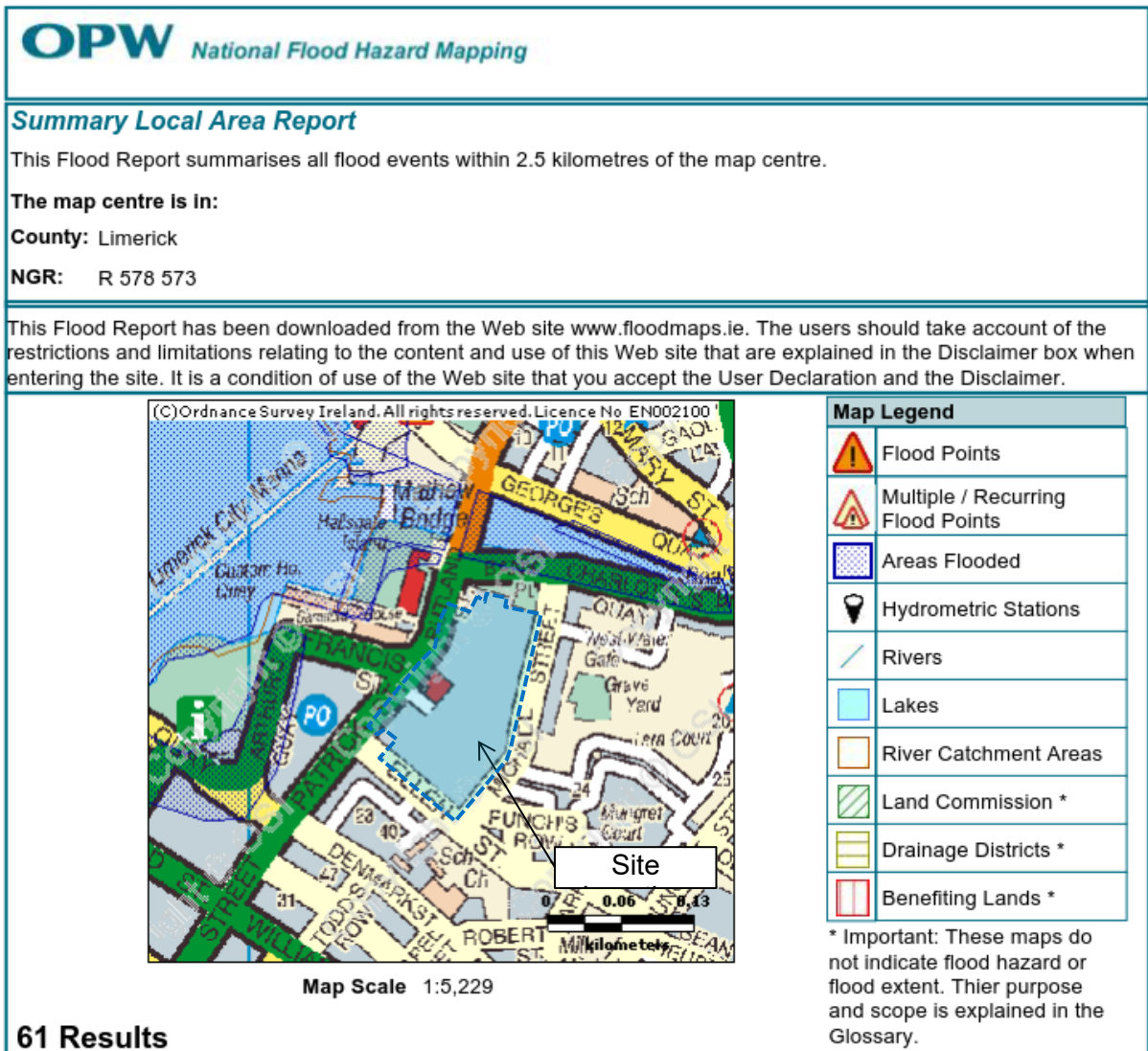


Figure 5 – Historic flood events in the vicinity of the subject site

### 3.1.2 Historic Mapping – Osi

Historical mapping available on OSi.ie was reviewed to identify historic flood plains and areas liable to flooding. There are no records of historic flooding within or surrounding the site.

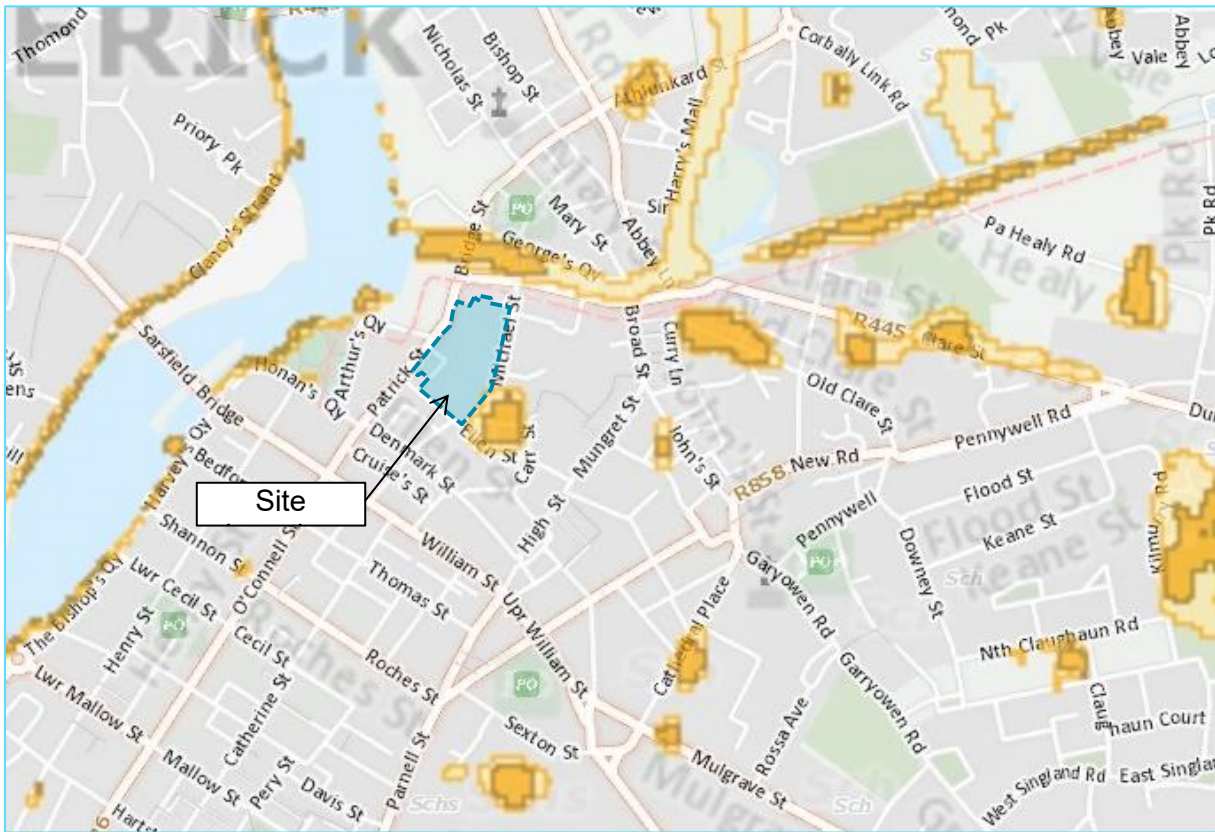
## 3.2 Indicative Flood Risk Mapping

### 3.2.1 OPW PFRA Mapping

The CFRAM (Catchment Flood Risk Assessment and Management) programme is a national programme which produced a series of Preliminary Flood Risk Assessment (PFRA) which cover the entire country. This assessment was carried out based on available and readily derivable information to identify areas where there may be a significant risk of flooding. The PFRA has been undertaken by:

- Reviewing records of flooding that has happened in the past;
- Undertaking analysis to determine which areas might flood in the future, and what the impacts might be; and
- Consulting with Local Authorities and other Government departments and agencies.

The PFRA mapping available for the development site identifies an area to the east of the site that may be at risk of pluvial flooding. Figure 6 is an extract from myplan.ie and illustrates areas that might be at risk of pluvial flooding in the vicinity of the site.



**Figure 6 – Pluvial Flood Zones in Limerick City Centre as defined by the Draft CFRAM Maps ([www.myplan.ie](http://www.myplan.ie))**

The site of the proposed development is not predicted to be at risk of pluvial flooding.

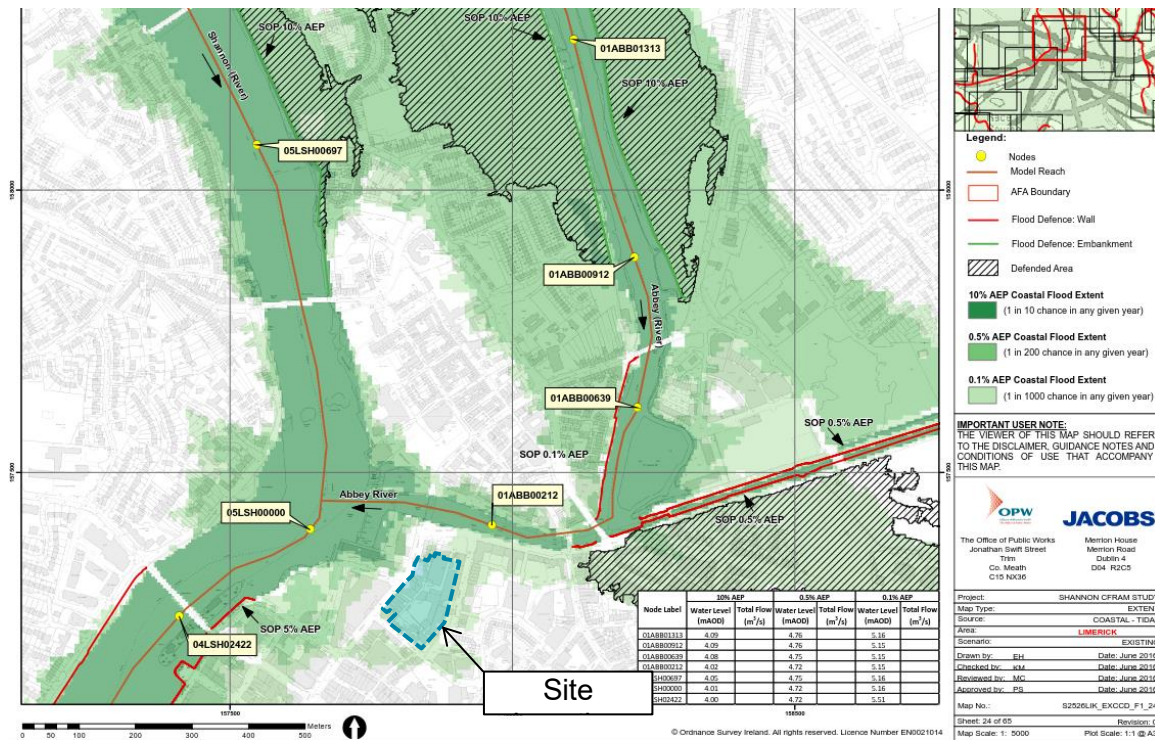
It is important to mention that the proposed development will be carefully managed in terms of surface water runoff and provision will be made for significant rainfall events. The surface water drainage network will be designed to cater for storm water from both roof of the building, car park and pedestrian areas on the entire premises of the development in accordance with the Limerick City and County Development Plan and will contain the 1 in 100-year event plus 20% climate change allowance. The outfall from the proposed development to the Abbey River will be fitted with a flap valve to ensure flood protection.

### 3.2.2 CFRAM Mapping

The objective of the PFRA was to identify areas where the risk associated with flooding might be significant. These areas, which are referred to as ‘Areas for Further Assessment’ or AFAs, are where a more detailed assessment was then undertaken to more accurately assess the extent and degree of flood risk.

The detailed assessments, which focused on the AFAs were undertaken through CFRAM Studies. The Shannon CFRAM Study was an extensive study on flood risk in the Shannon catchment which supersedes the Preliminary Flood Risk Assessments (PFRA). The latest maps were published in June 2016 and are available for viewing on the <http://maps.opw.ie/floodplans/>. These maps include predicted flood extents and levels for fluvial and coastal flood events for current and mid-range future scenarios.

Figure 7 is an extract from the predictive coastal flood risk mapping produced as part of the Shannon CFRAM Study. (Map S2526LIK\_EXCCD\_F1\_24 dated June 2016 is included in Appendix B).



**Figure 7 – Extract of the Coastal Flood Extent from the Shannon CFRAM Study Map S2526LIK\_EXCCD\_F1\_24 (June 2016)**

The Shannon CFRAM Study provides estimates of coastal flood water levels for different Annual Exceedance Probabilities (AEP). Table 1 shows the coastal flood water levels for relevant nodes close to the site.

**Table 1 – Coastal Flood Water Levels in the vicinity of the site for various AEPs**

Node	Water Level (m OD) for 10% AEP	Water Level (m OD) for 0.5% AEP	Water Level (m OD) for 0.1% AEP
01ABB00212 (Abbey River)	4.02	4.72	5.15
05LSH00000 (River Shannon)	4.01	4.72	5.16
04LSH02422 (River Shannon)	4.00	4.72	5.51

It is noted that the proposed development is located in an area defined as being at risk from a 1 in 1,000-year return period coastal flood event. The road levels of Patrick Street, Ellen Street and Rutland Street are all located above the 1 in 200-year coastal flood event level.

Fluvial flooding is the result of a river exceeding its channel capacity and excess water spilling out onto the adjacent floodplain. Given the proximity of the development to the Rivers Shannon and Abbey, flood risk from these water courses must be considered.

Figure 8 is an extract from the predictive fluvial flood risk mapping produced as part of the Shannon CFRAM Study. (Map S2526LIK\_EXFCD\_F1\_24 dated June 2016 is included in Appendix C.)

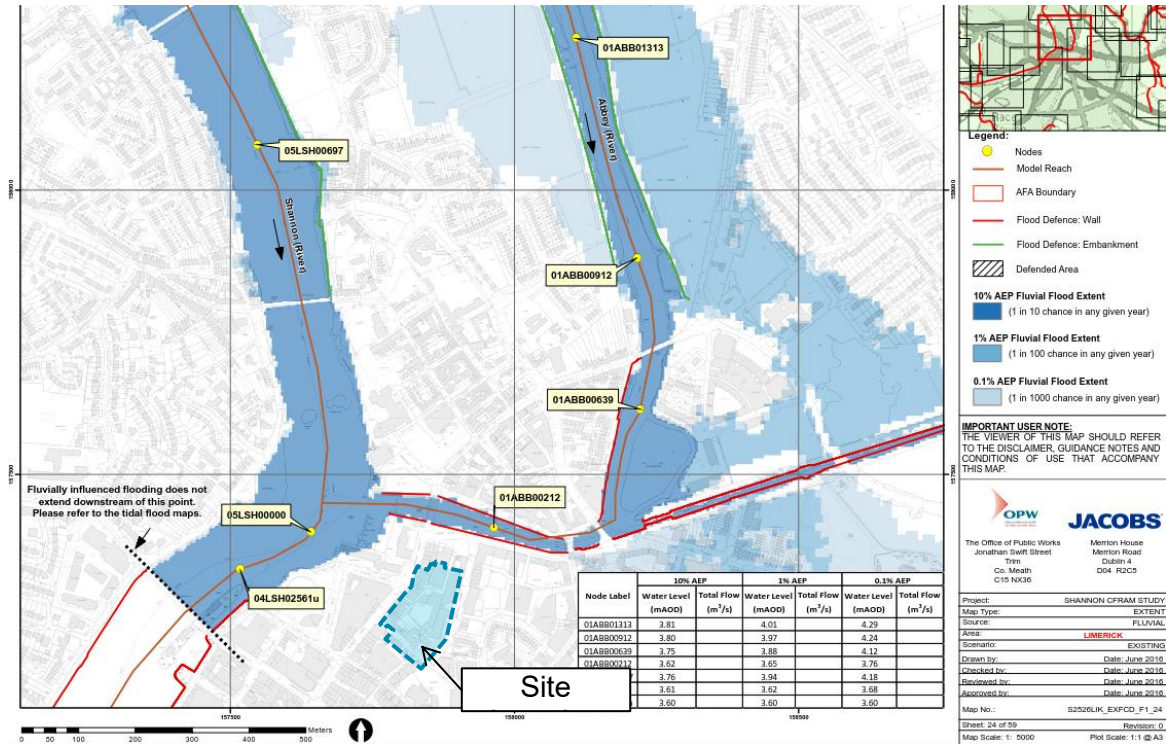


Figure 8 – Extract of the Fluvial Flood Extent from the Shannon CFRAM Study Map S2526LIK\_EXFCD\_F1\_24 (June 2016)

Table 2 shows the fluvial flood water levels for the two rivers in close proximity to the site.

Table 2 – Fluvial Flood Water Levels in the vicinity of the site for various AEPs

Node	Water Level (m OD) for 10% AEP	Water Level (m OD) for 1% AEP	Water Level (m OD) for 0.1% AEP
01ABB00212 (River Abbey)	3.62	3.65	3.76
05LSH00000 (River Shannon)	3.61	3.62	3.68
04LSH02561u (River Shannon)	3.60	3.60	3.60

The proposed development is not located in an area predicted to be at risk of fluvial flooding during a 1 in 100-year or 1 in-1000-year return period fluvial flood event.

## 4. Flood Risk Assessment (Stage 2)

### 4.1 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. In general, the relevant flood risks to the proposed development are:

- **Coastal**

Coastal flooding is the result of sea levels which are higher than normal and result in sea water overflowing onto the land. Given the proximity of the development to the tidal reaches of the River Shannon and the known flooding issues around Limerick, it is considered that there is a risk associated with coastal flooding for this site.

- **Fluvial**

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain. While the subject site is located close the Shannon and Abbey Rivers, the risks associated with fluvial flooding are low.

- **Pluvial**

Pluvial flooding is the result of rainfall-generated overland flows which arise before runoff can enter any watercourse or sewer. It is usually associated with high intensity rainfall. the risk of pluvial flooding to the proposed development is low.

### 4.2 Flood Zone

There are no historical records of flooding within the development site, however a potential risk of coastal flooding has been indicated by predictive flood risk mapping. A section of the site is shown to be within the predicted 1 in 1,000-year return period (0.1% AEP) coastal flood extent and is therefore located within Flood Zone B.

Flood Zone B is defined in the Planning System and Flood Risk Management Guidelines where the probability of flooding from rivers and the sea 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 year and 0.5% or 1 in 200 for coastal flooding).

### 4.3 Vulnerability

Once a flood zone has been identified, the Guidelines set out the different types of development appropriate to each zone as per Table 3. 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. 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 4 indicates the matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test.



**Table 3 - Classification of vulnerability of different types of development**

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

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

**Table 4 - Vulnerability and appropriate flood zones - Table 3.2 of the Planning System and Flood Risk Management Guidelines**

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

The guidelines note that highly vulnerable development would generally not be considered appropriate in Flood Zone B, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses are considered appropriate in this zone.

In general, less vulnerable development should only be considered for this zone if adequate lands or sites are not available in Flood Zone C and if the site is subject to a Flood Risk Assessment to the appropriate level of detail to demonstrate that flood risk to and from the development can or will adequately be managed.

Therefore, if highly vulnerable development is proposed for the site, it must be demonstrated that flood risk to and from the development can be adequately managed and the proposals must pass the Justification Test.

## 4.4 Mitigation Measures

The design of all new development should ensure that the flood risk to surrounding properties is not increased as a result of the development. This is generally achieved through the incorporation of Sustainable Drainage Systems and compensation for any loss of floodplain as a precautionary response to the potential incremental impacts in the catchment. There is no requirement to compensate for the loss of flood storage in the case of coastal flooding.

The proposed development will incorporate super-elevated entrance/exits as a mitigation measure to prevent any flood waters entering the main structure or the underground structure. The finished floor level of the building is set higher than the surrounding ground levels and a new surface water drainage system will be in place to cater for the 1 in 100-year return period rainfall event.

All essential infrastructure serving the proposed development, such as primary transport and utility distribution including electricity generating power sub-stations etc., which are considered highly vulnerable development elements will be sited above the 1 in 1,000-year return period coastal flood water level of 5.16 m OD Malin i.e. in Flood Zone C.

The Planning System and Flood Risk Management Guidelines recommends that minimum floor levels for a new development should be set above the 1 in 100-year return period river flood level or 1 in 200-year return period coastal flood level including an allowance for climate change, with an appropriate freeboard. The OPW Assessment of Potential Future Scenarios, Flood Risk Management Draft Guidance”, 2009 gives advice on the expected impacts of climate change and the allowances to provide for future flood risk management in Ireland. Based on the mid- range future scenario (MRFS) and including an allowance of 0.5mm/year for land movement. Table 5 includes the recommended allowances for climate change.

Based on a flood level of +4.72 m OD Malin, a climate change allowance of 500mm and an allowance of 100mm for land movement, the appropriate Finished Floor Level is 5.32 m OD Malin.

**Table 5. Recommended allowances for climate change (taken from OPW – Assessment of Potential Future Scenarios for Flood Risk Management)**

Parameter	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500 mm	+1000 mm
Land Movement	-0.5 mm/year	-0.5 mm year*
Urbanisation	No general allowance Review on case by case basis	No general allowance Review on case by case basis
Forestation	-1/6Tp**	-1/3Tp** +10% SPR***

**Notes:**

\* Applicable to the southern part of the country (Dublin – Galway and south of this)

\*\* Reduce the time to peak (Tp) by a third, this allows for the potential accelerated run-off that may arise as a result of drainage of afforested land.

\*\*\* add 10% to the Standard Percentage Run-off (SPR) rate; this allows for increased run-off rates that may arise following felling of forestry.

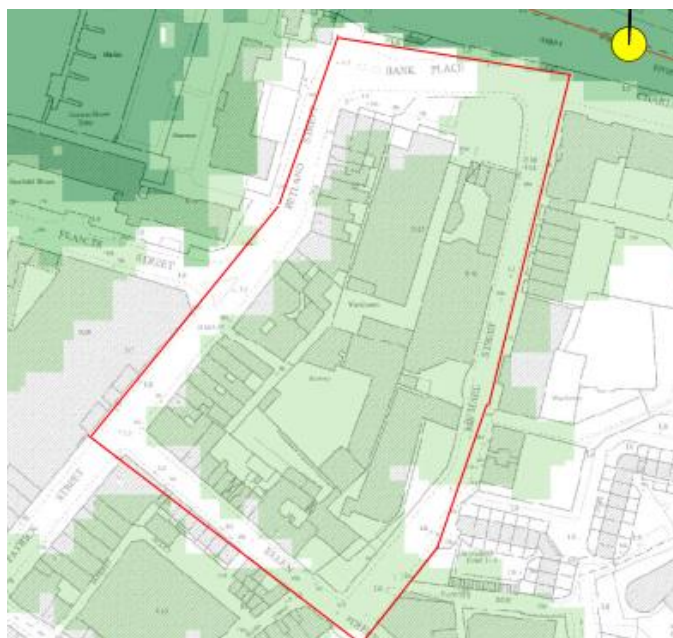
In case of emergency there is vehicular access for Fire and Ambulance services to the building via Rutland Street, Patrick Street and Ellen Street westbound as these roads are outside of the areas identified as being at risk of flooding by the Shannon CFRAM study.

The residual flood risk should be managed through the use of emergency plans and evacuation procedures, developed to suit specific building occupant needs.

## 4.5 Justification Test

The proposed residential and ApartHotel elements of the development are classed as 'Vulnerable' and the site is located in Flood Zone B with respect to coastal flooding. The apartments are in the buildings on Ellen Street and are on the 1<sup>st</sup> floor level and above.

The residential townhouses are located in the existing Georgian buildings in Patrick Street, Ellen Street and Rutland Street. The existing ground levels associated with the building in Patrick Street, Ellen Street and Rutland Street are above the 1 in 1000-year return period coastal flood level and are outside of the areas identified as being at risk of flooding by the Shannon CFRAM project.



**Figure 9 – Extent of Flooding Patrick Street, Ellen Street and Rutland Street**

As the Development Plan has zoned the land for the proposed use while accounting for the 2009 Guidelines it is considered that Justification Test Box 4.1 has been passed at a strategic level. The Justification Test Box 5.1 is completed in Table 6.

Table 6 - Justification Test Box 5.1

Item	Response
1.0 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.	<p>The Opera Site is identified on zoning maps as being located in the City Centre Retail Area where retailing is prioritised, but not to the exclusion of other uses. Variation No. 4 of the Plan (Limerick 2030) updates this provision. For the Opera Site it states:</p> <p><i>Opera Site offers the potential to locate significant development adjacent to the core retail area. In particular, the development of a modern office-based employment development, a third level campus with associated retail/residential/community uses.</i></p>
2.0 The proposal has been subject to an appropriate flood risk assessment that demonstrates:	
2.1 The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk.	<p>Run-off from the development will be discharged to attenuation tanks and discharge restricted to 4 l/s/ha (as set out in the development plan). Therefore, there will be a net reduction in the run-off rates from the proposed site when compared with the existing site.</p> <p>As the risk of flooding is associated with coastal flooding there is no requirement to consider loss of flood storage.</p>
2.2 The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible.	Mitigation measures are set out in Section 4.4.
2.3 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	Mitigation measures are set out in Section 4.4.

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2.4 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 mitigation measures are unobtrusive and in keeping with the character of the existing Georgian development.
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## 4.6 Flood Risk Management

Flood risk management under the EU Floods Directive aims to minimise the risks arising from flooding to people, property and the environment. Minimising risk can be achieved through structural measures that block or restrict the pathways of floodwaters, such as river defences or non-structural measures that are often aimed at reducing the vulnerability of people and communities such as flood warning, effective flood emergency response, or resilience measures for communities or individual properties.

## 5. Conclusion

This Flood Risk Assessment has been prepared for the purposes of assessing the flood risk to the proposed Project Opera development which is located in Limerick City.

As the development is in close proximity to the Shannon and Abbey Rivers, coastal flooding is considered to be the primary threat. A review of the Shannon CFRAM Study indicates that the proposed development is located in an area predicted to be at risk of coastal flooding during a 1 in 1000-year return period event. This places the site of the proposed development in Flood Zone B. Buildings with a commercial element are classed as less vulnerable developments and these are considered a suitable land use for Flood Zone B. The proposed residential and Apart Hotel elements of the overall development are classed as 'vulnerable' development as the site is located in Flood Zone B and as such Justification Test Box 5.1 was undertaken.

The residential townhouses are located in the existing Georgian buildings in Patrick Street, Ellen Street and Rutland Street. The ApartHotel is also located on Ellen Street. The existing ground levels associated with the buildings in Patrick Street, Ellen Street and Rutland Street are above the 1 in 1000-year return period coastal flood level and are outside of the areas identified as being at risk of flooding by the Shannon CFRAM Study.

It is noted that all essential infrastructure serving the proposed development, such as primary transport and utility distribution including electricity generating power sub-stations etc., which are considered highly vulnerable development elements will be sited above the 1 in 1,000-year return period coastal flood water level i.e. in Flood Zone C.

Although the proposed development is in close proximity to Rivers Shannon and Abbey the risk associated with fluvial flooding is low. This is supported by the lack of recorded fluvial flood events in the vicinity of the proposed development.

The proposed development incorporates super-elevated entrance/exits as a mitigation measure to prevent any flood waters from entering the main structure or the underground structure.

In case of emergency there is vehicular access for Fire and Ambulance services to the building via Rutland Street, Patrick Street and Ellen Street westbound as these roads are outside of the identified CFRAM flood risk. It is also noted that the proposed development will not increase the flood risk elsewhere.

## Appendix A – OPW Flood Hazard Mapping

## Summary Local Area Report

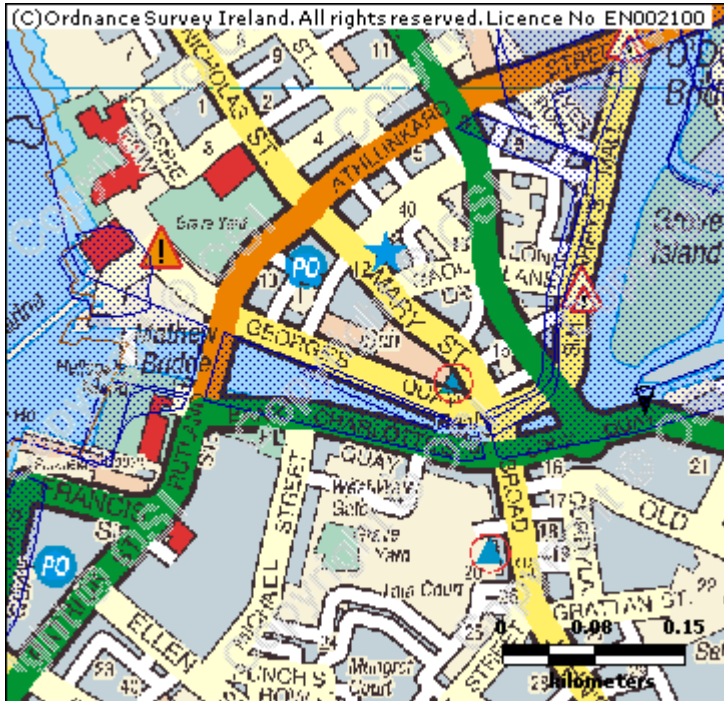
This Flood Report summarises all flood events within 2.5 kilometres of the map centre.

The map centre is in:

County: Limerick

NGR: R 579 574

This Flood Report has been downloaded from the Web site [www.floodmaps.ie](http://www.floodmaps.ie). The users should take account of the restrictions and limitations relating to the content and use of this Web site that are explained in the Disclaimer box when entering the site. It is a condition of use of the Web site that you accept the User Declaration and the Disclaimer.



Map Scale 1:6,298

Map Legend	
	Flood Points
	Multiple / Recurring Flood Points
	Areas Flooded
	Hydrometric Stations
	Rivers
	Lakes
	River Catchment Areas
	Land Commission *
	Drainage Districts *
	Benefiting Lands *

\* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained in the Glossary.

## 62 Results

	1. Shannon Banks 23/11/2009 County: Clare Additional Information: Reports (1) More Mapped Information	Start Date: 23/Nov/2009 Flood Quality Code:2
	2. Limerick City Area Nov 2009 County: Additional Information: Reports (2) More Mapped Information	Start Date: 19/Nov/2009 Flood Quality Code:3
	3. Shannon Lower Feb 1990 County: Clare, Limerick, Tipperary Additional Information: Photos (1) Reports (2) Press Archive (15) More Mapped Information	Start Date: 01/Feb/1990 Flood Quality Code:2
	4. Shannon December 1954 County: Clare, Galway, Leitrim, Limerick, Longford, Offaly, Roscommon, Tipperary, Westmeath Additional Information: Reports (4) Press Archive (16) More Mapped Information	Start Date: 01/Dec/1954 Flood Quality Code:1
	5. Shannon Dock Road Limerick Dec 1999 County: Limerick	Start Date: 25/Dec/1999 Flood Quality Code:2



Additional Information: Reports (5) Press Archive (1) More Mapped Information

 6. Clare St Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:2

Additional Information: Reports (3) Press Archive (1) More Mapped Information

 7. Shannon Westfields Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:2

Additional Information: Reports (3) Press Archive (2) More Mapped Information

 8. Corrib Drive Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:2


Additional Information: Reports (3) Press Archive (1) More Mapped Information

 9. Ballysimon Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:2


Additional Information: Reports (3) Press Archive (2) More Mapped Information

 10. Greenfield Road Rossbrien Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:2

Additional Information: Reports (3) Press Archive (1) More Mapped Information

 11. Shannon O'Malley Park Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:2

Additional Information: Reports (3) Press Archive (1) More Mapped Information

 12. Shannon Ballynanty Killeely Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Clare, Limerick Flood Quality Code:3


Additional Information: Reports (2) Press Archive (1) More Mapped Information

 13. Shannon Fields Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Clare, Limerick Flood Quality Code:3

Additional Information: Reports (2) Press Archive (1) More Mapped Information

 14. Glenagross Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:3


Additional Information: Reports (2) Press Archive (1) More Mapped Information

 15. Healy's Field O'Briens Pk Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:3

Additional Information: Reports (3) Press Archive (1) More Mapped Information

 16. Groody Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:3















Additional Information: Reports (3) Press Archive (1) More Mapped Information














 17. Shannon Athlunkard St Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:3















Additional Information: Reports (10) Press Archive (1) More Mapped Information

 18. Corbally St Mary's Pk Limerick Dec 1999 Start Date: 25/Dec/1999  
County: Limerick Flood Quality Code:3

Additional Information: Reports (9) Press Archive (2) More Mapped Information

	19. Clancy's Strand Harry's Mall Limerick Dec 1999 County: Limerick	Start Date: 23/Dec/1999 Flood Quality Code:3
Additional Information: Photos (2) Reports (17) Press Archive (3) More Mapped Information		
	20. Corbally R463 Limerick Dec 1999 County: Limerick	Start Date: 25/Dec/1999 Flood Quality Code:2
Additional Information: Reports (5) Press Archive (1) More Mapped Information		
	21. Kilmurry Road Limerick Dec 1999 County: Limerick	Start Date: 25/Dec/1999 Flood Quality Code:2
Additional Information: Reports (2) Press Archive (1) More Mapped Information		
	22. St Patrick's Road Well Field Limerick Dec 1999 County: Limerick	Start Date: 25/Dec/1999 Flood Quality Code:2
Additional Information: Reports (2) Press Archive (1) More Mapped Information		
	23. Clancy O'Callaghan's Strand Limerick Feb 1997 County: Limerick	Start Date: 10/Feb/1997 Flood Quality Code:2
Additional Information: Photos (1) Reports (3) More Mapped Information		
	24. Clancy's O'Callaghan's Strand Limerick Jan 1995 County: Limerick	Start Date: 17/Jan/1995 Flood Quality Code:3
Additional Information: Reports (1) Press Archive (1) More Mapped Information		
	25. Custom House Quay Sarsfield St Limerick Feb 2002 County:	Start Date: 11/Feb/2002 Flood Quality Code:2
Additional Information: Reports (2) More Mapped Information		
	26. Shannon Condell Road Limerick Feb 2002 County:	Start Date: 11/Feb/2002 Flood Quality Code:3
Additional Information: Reports (3) More Mapped Information		
	27. Athlunkard Street Limerick Feb 2001 County: Limerick	Start Date: 04/Feb/2001 Flood Quality Code:4
Additional Information: Reports (2) More Mapped Information		
	28. Harry's Mall Limerick Jan 1995 County:	Start Date: 17/Jan/1995 Flood Quality Code:3
Additional Information: Reports (2) More Mapped Information		
	29. Limerick Condell Road Feb 1990 County:	Start Date: 01/Feb/1990 Flood Quality Code:3
Additional Information: Photos (2) More Mapped Information		
	30. Clancy's Strand Limerick Feb 2002 County:	Start Date: 11/Feb/2002 Flood Quality Code:2
Additional Information: Photos (2) Reports (7) More Mapped Information		
	31. OCallaghans Strand Limerick Feb 2002 County: Limerick	Start Date: 11/Feb/2002 Flood Quality Code:3
Additional Information: Reports (3) More Mapped Information		
	32. Limerick City 1st February 2014	Start Date: 01/Feb/2014

	County: Limerick Additional Information: Reports (1) More Mapped Information	Flood Quality Code:3
	33. Limerick City 3rd January 2014 County: Limerick Additional Information: Reports (1) More Mapped Information	Start Date: 03/Jan/2014 Flood Quality Code:3
	34. Shannon Limerick Dec.2006 County: Clare, Limerick Additional Information: Photos (1) Reports (1) More Mapped Information	Start Date: 01/Dec/2006 Flood Quality Code:2
	35. Corbally Limerick Feb 2002 County: Limerick Additional Information: Reports (3) More Mapped Information	Start Date: 27/Feb/2002 Flood Quality Code:3
	36. Limerick Feb 2002 - Killely County: Limerick Additional Information: Reports (1) More Mapped Information	Start Date: 11/Feb/2002 Flood Quality Code:2
	37. St Mary's Park Limerick Feb 2002 County: Limerick Additional Information: Reports (1) More Mapped Information	Start Date: 11/Feb/2002 Flood Quality Code:3
	38. Shannon Harrys Mall Limerick Feb 2002 County: Additional Information: Reports (2) More Mapped Information	Start Date: 11/Feb/2002 Flood Quality Code:3
	39. Clancy's Strand Limerick 17/10/2001 County: Additional Information: Photos (1) More Mapped Information	Start Date: 17/Oct/2001 Flood Quality Code:2
	40. Shannon Long Pavement Parteen Limerick Dec 2000 County: Limerick Additional Information: Reports (1) More Mapped Information	Start Date: 01/Dec/2000 Flood Quality Code:4
	41. Harry's Mall Limerick Feb 2000 County: Additional Information: Photos (1) More Mapped Information	Start Date: 08/Feb/2000 Flood Quality Code:2
	42. Abbey River Athlunkard St Limerick Jan 00 County: Limerick Additional Information: Photos (2) Reports (1) More Mapped Information	Start Date: 01/Jan/2000 Flood Quality Code:2
	43. Verdant Place Limerick Dec 1999 County: Limerick Additional Information: Reports (3) More Mapped Information	Start Date: 25/Dec/1999 Flood Quality Code:2
	44. Lee Estate Island road Limerick Feb 1997 County: Limerick Additional Information: Reports (1) More Mapped Information	Start Date: 10/Feb/1997 Flood Quality Code:2

	45. Harry's Mall Limerick Feb 1997 County:	Start Date: 10/Feb/1997 Flood Quality Code:2
Additional Information: Photos (1) Reports (4) More Mapped Information		
	46. Meadowbrook Limerick Feb 1997 County: Limerick	Start Date: 10/Feb/1997 Flood Quality Code:3
Additional Information: Reports (3) More Mapped Information		
	47. Reboge Limerick Feb 1997 County: Limerick	Start Date: 10/Feb/1997 Flood Quality Code:3
Additional Information: Reports (3) More Mapped Information		
	48. Condell Road Limerick Feb 1997 County:	Start Date: 10/Feb/1997 Flood Quality Code:3
Additional Information: Reports (2) More Mapped Information		
	49. Corbally Limerick Feb 1997 County: Limerick	Start Date: 10/Feb/1997 Flood Quality Code:3
Additional Information: Photos (1) Reports (3) More Mapped Information		
	50. Dock Road Bishops Quay Limerick Feb 1997 County: Limerick	Start Date: 10/Feb/1997 Flood Quality Code:3
Additional Information: Reports (3) More Mapped Information		
	51. Corrib Drive Limerick Oct 1995 County: Limerick	Start Date: 24/Oct/1995 Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information		
	52. Limerick Dock Rd Jan 1995 County: Limerick	Start Date: 25/Jan/1995 Flood Quality Code:3
Additional Information: Photos (1) More Mapped Information		
	53. Longpavement Road Limerick Jan 1995 County: Limerick	Start Date: 17/Jan/1995 Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information		
	54. Limerick Abbey River Athlunkard area May 1994 County: Limerick	Start Date: 03/May/1994 Flood Quality Code:2
Additional Information: Photos (2) Reports (2) More Mapped Information		
	55. Clancy's Strand Limerick Jan 1994 County:	Start Date: 26/Jan/1994 Flood Quality Code:2
Additional Information: Photos (5) Reports (1) More Mapped Information		
	56. Sarsfield St Arthur's Quay Limerick City Feb 1990 County:	Start Date: 21/Feb/1990 Flood Quality Code:2
Additional Information: Photos (8) More Mapped Information		
	57. Limerick City Clancy's Strand Feb 1990 County:	Start Date: 01/Feb/1990 Flood Quality Code:2
Additional Information: Photos (1) More Mapped Information		
	58. Cathedral Place Limerick Recurring	Start Date:



County: Limerick

Flood Quality Code:3

Additional Information: Reports (2) More Mapped Information

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59. Shannon Corbally Limerick Recurring

Start Date:

County: Limerick

Flood Quality Code:3

Additional Information: Reports (2) Press Archive (7) More Mapped Information

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60. Monaclinoe Drainage Area - Limerick Recurring

Start Date:

County: Limerick

Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information

---



61. South Circular Road St Mary's Limerick Recurring

Start Date:

County: Limerick

Flood Quality Code:4

Additional Information: Reports (1) More Mapped Information

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62. Limerick Adjacent Courthouse undated

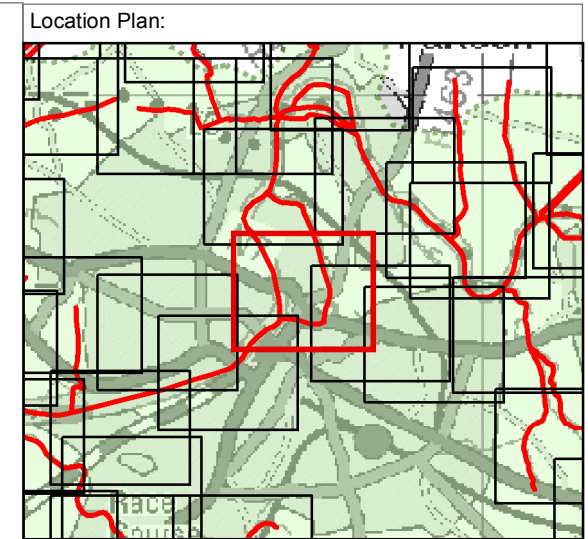
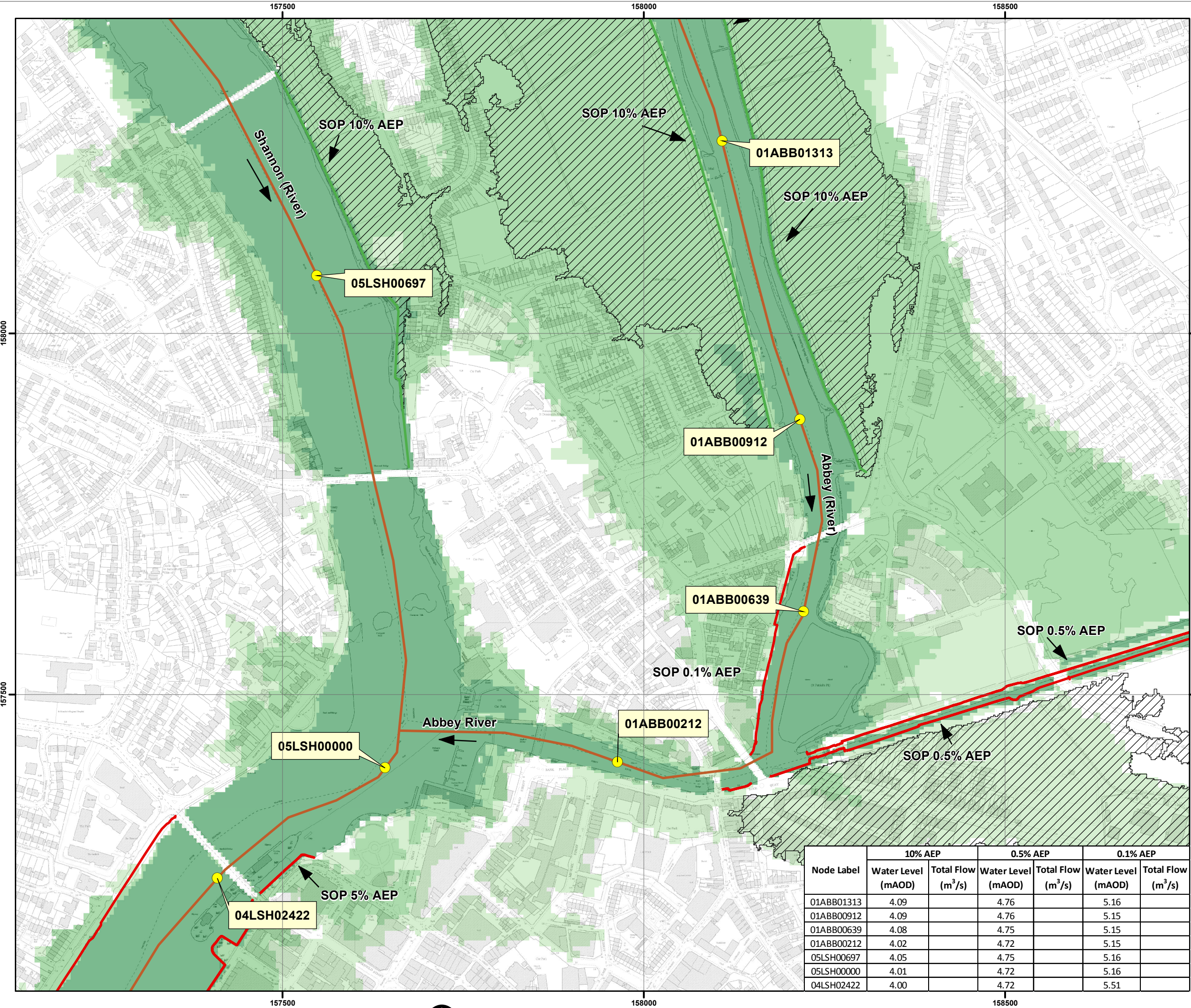
Start Date:

County: Limerick

Flood Quality Code:3

Additional Information: Photos (1) More Mapped Information

# Appendix B - Shannon CFRAM Coastal Flood Extent Map



- Legend:**
- Nodes
  - Model Reach
  - AFA Boundary
  - Flood Defence: Wall
  - Flood Defence: Embankment
  - Defended Area
- 10% AEP Coastal Flood Extent**  
 (1 in 10 chance in any given year)
- 0.5% AEP Coastal Flood Extent**  
 (1 in 200 chance in any given year)
- 0.1% AEP Coastal Flood Extent**  
 (1 in 1000 chance in any given year)

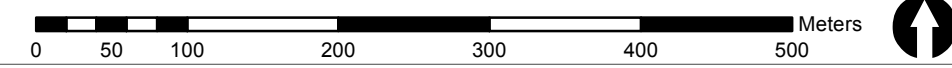
**IMPORTANT USER NOTE:**  
 THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.



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

Merrion House  
 Merrion Road  
 Dublin 4  
 D04 R2C5

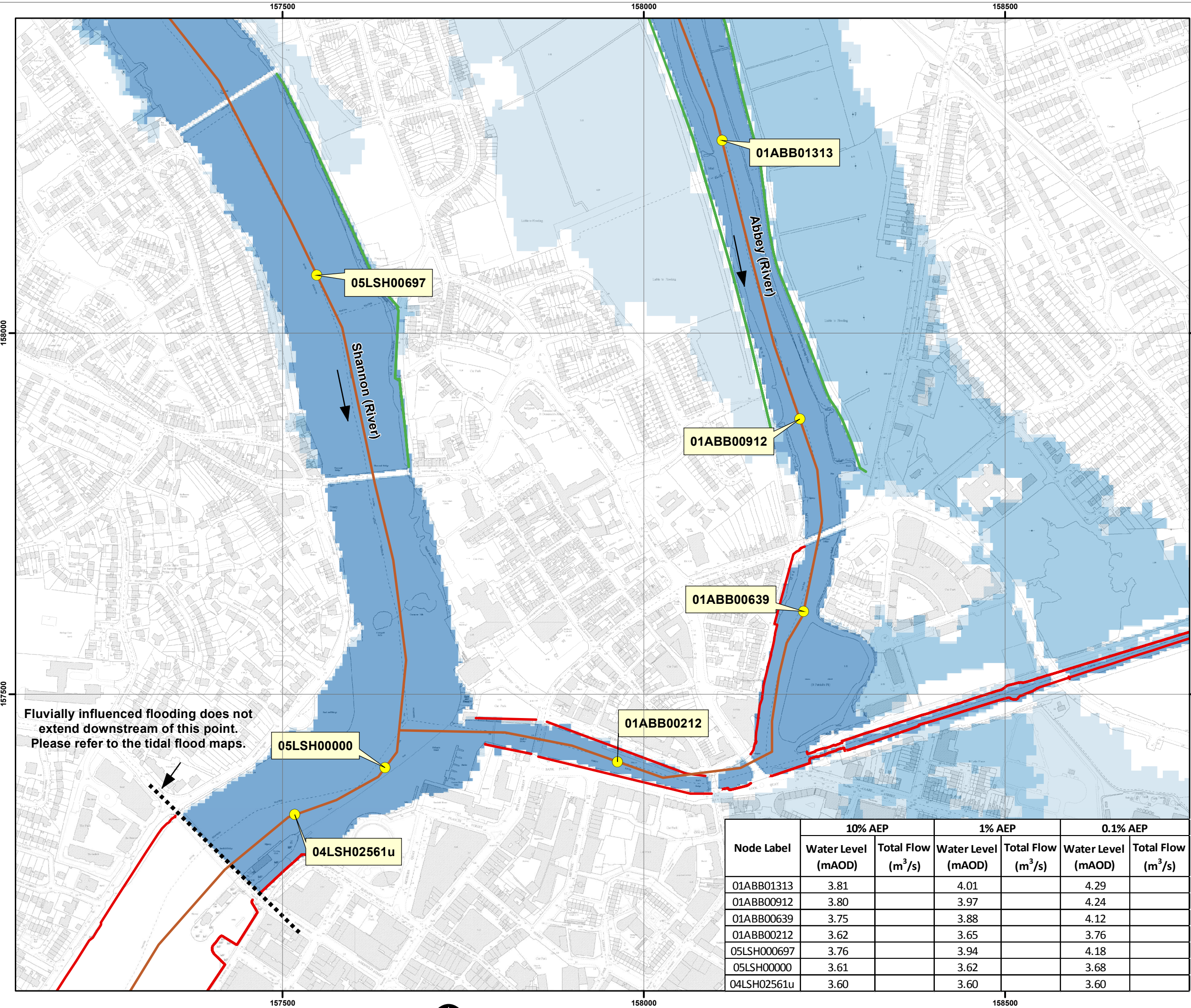
Node Label	10% AEP		0.5% AEP		0.1% AEP	
	Water Level (mAOD)	Total Flow (m <sup>3</sup> /s)	Water Level (mAOD)	Total Flow (m <sup>3</sup> /s)	Water Level (mAOD)	Total Flow (m <sup>3</sup> /s)
01ABB01313	4.09		4.76		5.16	
01ABB00912	4.09		4.76		5.15	
01ABB00639	4.08		4.75		5.15	
01ABB00212	4.02		4.72		5.15	
05LSH00697	4.05		4.75		5.16	
05LSH00000	4.01		4.72		5.16	
04LSH02422	4.00		4.72		5.51	



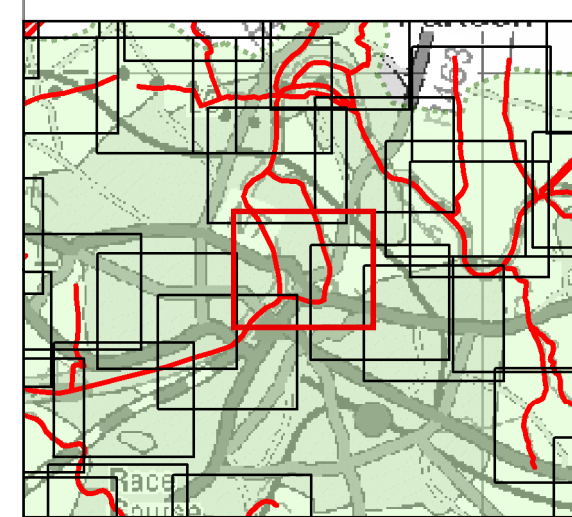
Project:	SHANNON CFRAM STUDY
Map Type:	EXTENT
Source:	COASTAL - TIDAL
Area:	LIMERICK
Scenario:	EXISTING
Drawn by:	EH
Checked by:	KM
Reviewed by:	MC
Approved by:	PS
Date:	June 2016
Map No.:	S2526LIK_EXCCD_F1_24
Sheet:	24 of 65
Map Scale:	1: 5000
Plot Scale:	1:1 @ A3
Revision:	0

## Appendix C – Shannon CFRAM Fluvial Flood Extent Map





Fluvially influenced flooding does not extend downstream of this point. Please refer to the tidal 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

Node Label	10% AEP		1% AEP		0.1% AEP	
	Water Level (mAOD)	Total Flow (m <sup>3</sup> /s)	Water Level (mAOD)	Total Flow (m <sup>3</sup> /s)	Water Level (mAOD)	Total Flow (m <sup>3</sup> /s)
01ABB01313	3.81		4.01		4.29	
01ABB00912	3.80		3.97		4.24	
01ABB00639	3.75		3.88		4.12	
01ABB00212	3.62		3.65		3.76	
05LSH000697	3.76		3.94		4.18	
05LSH00000	3.61		3.62		3.68	
04LSH02561u	3.60		3.60		3.60	

Project:	SHANNON CFRAM STUDY
Map Type:	EXTENT
Source:	FLUVIAL
Area:	<b>LIMERICK</b>
Scenario:	EXISTING
Drawn by:	Date: June 2016
Checked by:	Date: June 2016
Reviewed by:	Date: June 2016
Approved by:	Date: June 2016

Map No.:	S2526LIK_EXFCD_F1_24
Sheet: 24 of 59	Revision: 0
Map Scale: 1: 5000	Plot Scale: 1:1 @ A3

