

# National CFRAM Programme

## 'A strategy for reduction & management of flood risk'



**Dr John Martin**  
**Office of Public Works**

# 1. Introduction

'The application of hydraulic modelling on the national CFRAM programme, and the future modelling requirements for detailed development of flood relief schemes programmed over the coming decade.'

## 2. Ireland's Flood Risk Management Strategy

- Catchment-based flood risk assessment & management (CFRAM) programme
- Aligned with the EU 'Floods' Directive (2007/60/EC) and the 'Report of the Flood Policy Review Group' (IE, 2004)
- Systematic sequence of:
  - 'Preliminary Flood Risk Assessment' [to identify potential flood risk areas]
  - Developing Flood Hazard & Risk Maps [for those areas]
  - Preparing Flood Risk Management Plans
  - Implementation & Review

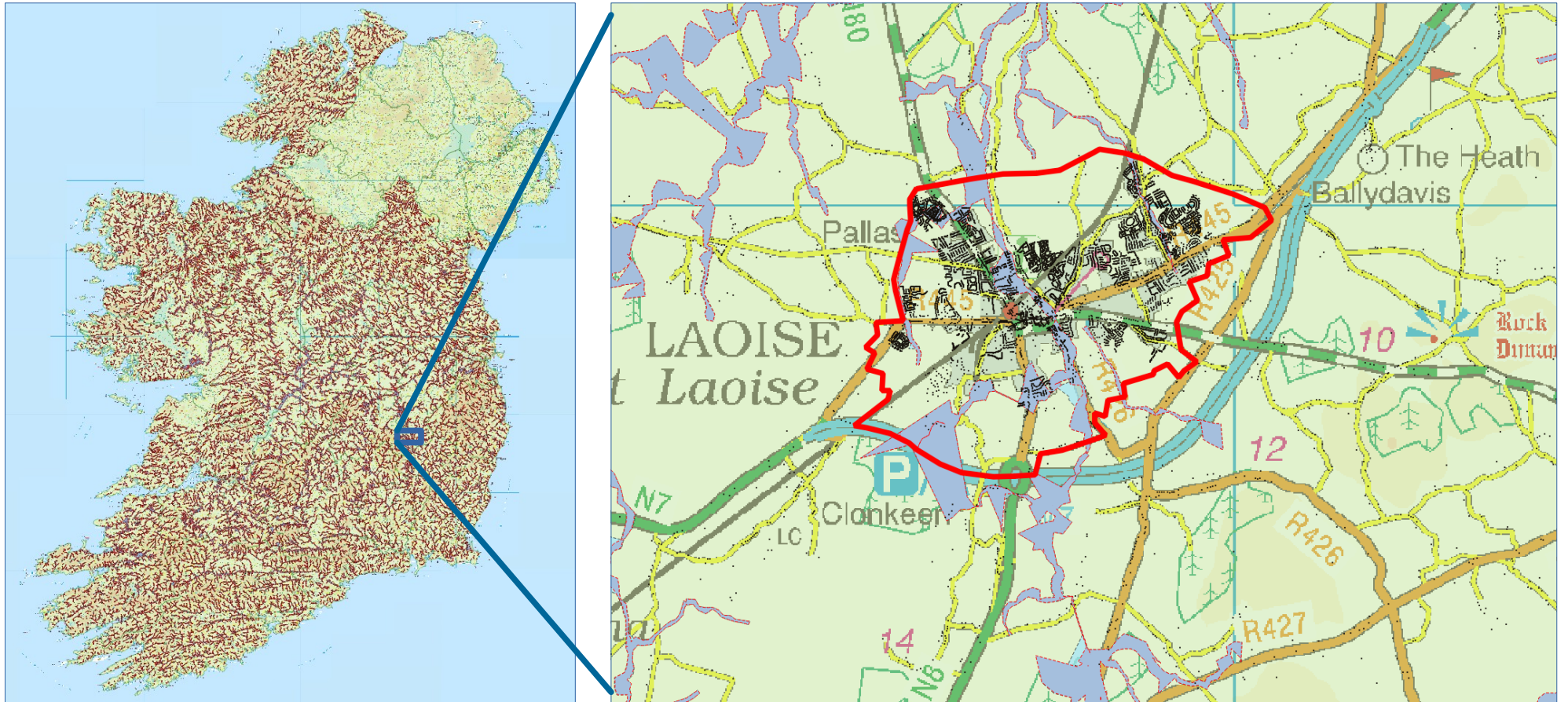
## 3. National Preliminary Flood Risk Assessment

- Digital Height Model [5m, IfSAR]
- Indicative Flood Region Mapping
- Risk Assessment based on Communities [GeoDirectory]
- Flood Event Archive + Consultation
- = Designation of 300 x 'Areas for Further Assessment'



US09





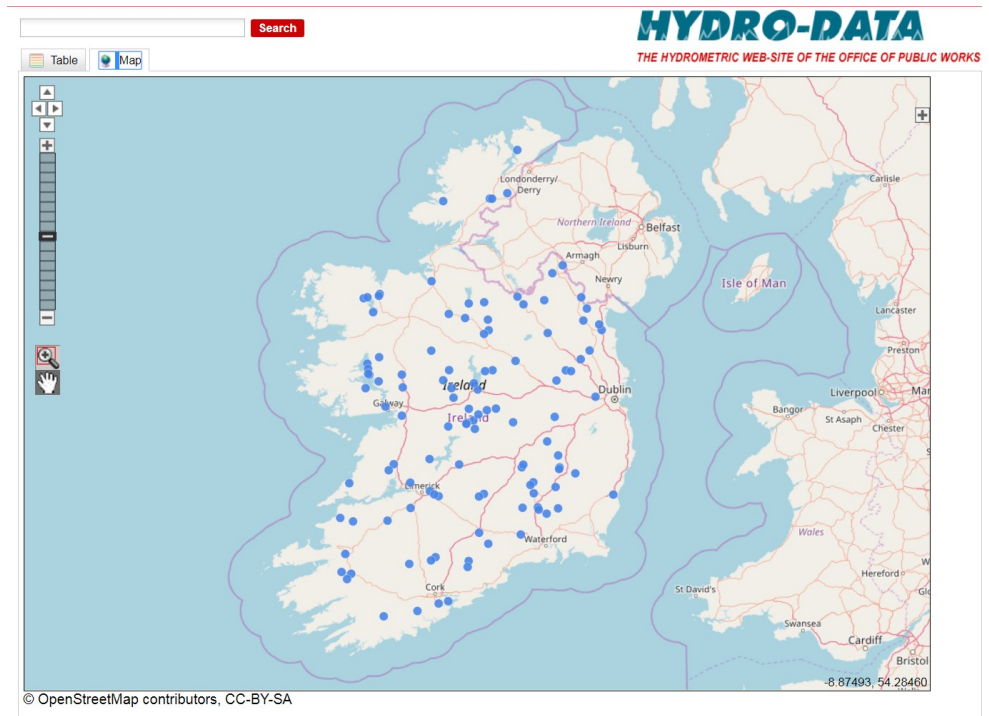






## 5. Flow Estimation

- Extensive Hydrometric Network
- Hydrological Flow Estimations - 'Flood Studies Update' (FSU) Web-portal
- 8x Annual Exceedence Probabilities







Notice: This web site uses cookies to track usage patterns and calculate system loads. See the OPW Privacy Statement for details.

- Home
- Latest Readings
- Archive
- Station groups
- Report a problem
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- API



Data CC-BY-SA by OpenStreetMap  
Scale = 1 : 108K

### Disclaimer

Use of this site is subject to the disclaimer on the Home page.

## Sensors on Station 26333 Athlone Weir U/S

**OPW Latest data: Feb. 7, 2018, 8 a.m. (UTC / GMT)** staff gauge level 3.597 m. OD level 35.744 m.

Water level for past 5 weeks	Water level for past week.	Water level for past day.	Summary for Water level
Temperature for past 5 weeks	Temperature for past week.	Temperature for past day.	Summary for Temperature
Voltage for past 5 weeks	Voltage for past week.	Voltage for past day.	Summary for Voltage
Ordnance datum for past 5 weeks	Ordnance datum for past week.	Ordnance datum for past day.	Summary for Ordnance datum

### Datum

26333 Athlone Weir U/S 32.147m above Ordnance Datum at Malin Head OSGM15.



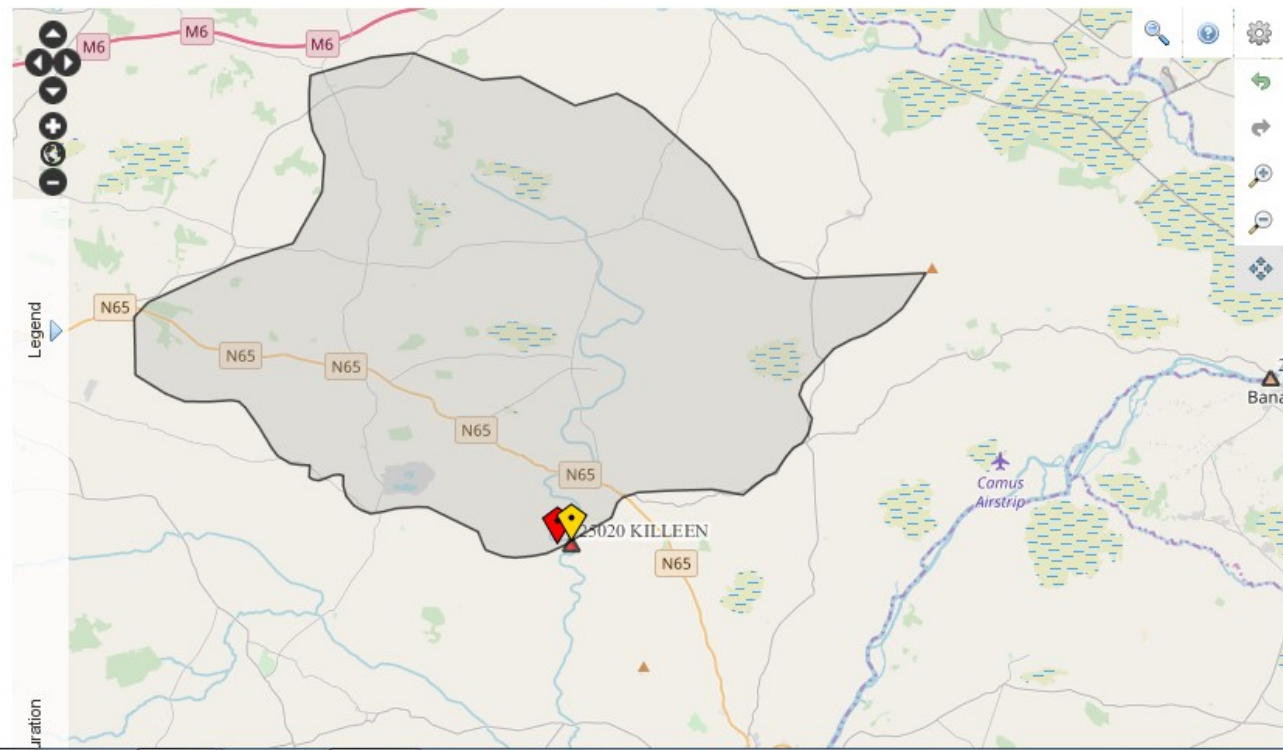
HOME

APPLICATIONS



Rainfall and Flood Estimation Applications

Current session: JM Trial (Pending)



Subject site

Clicked coordinates:  
 [-924965.0952, 7010646.4422]

**Subject site properties**

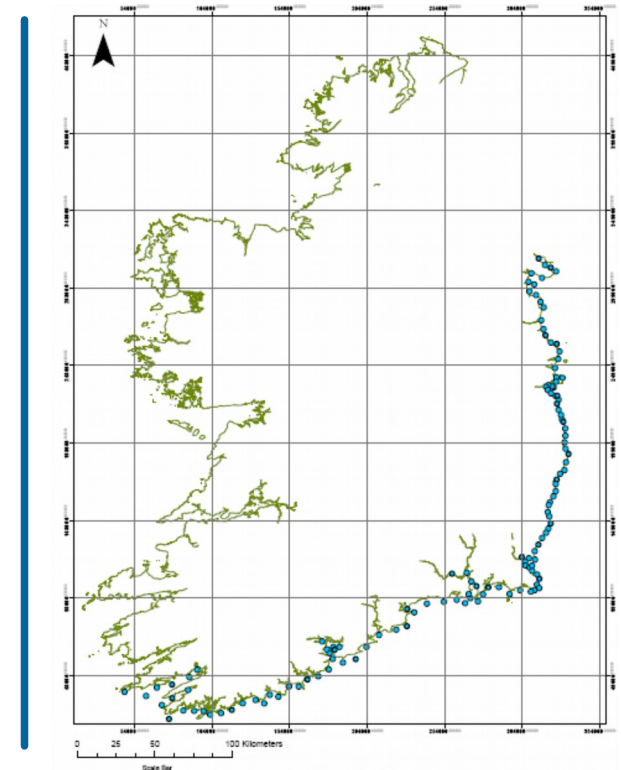
Location Number	25020
Contributing Catchment Area	197.0902 km <sup>2</sup>
BFISOIL	0.67
SAAR	1014.7 mm
FARL	0.999
DRAIN2	0.967 km/km <sup>2</sup>
S1085	1.8431 m/km
ARTDRAIN2	0.7771
URBEXT	0.0044
Centroid distance	648.806 km
Coordinates	[-924322.9941, 7010739.4769]

**QMED values**

PCD estimate	29.7977m <sup>3</sup> /s
PCD urban estimate	29.9922m <sup>3</sup> /s

## 5. Extreme Sea Level Prediction - ICPSS Outputs

- Combined tide/storm surge extreme WL predictions for Irish Coast using Mike 21 f/m model (published 2013)
- Predictions for following AEP events (referenced to Ordnance Datum, Malin OSGM02):
  - 0.1%, 0.5%, 1%, 2%, 5%, 10%, 20% & 50%
- Currently being updated under Irish Coastal Wave & Water Level Study (ICWWS-2018, OPW)





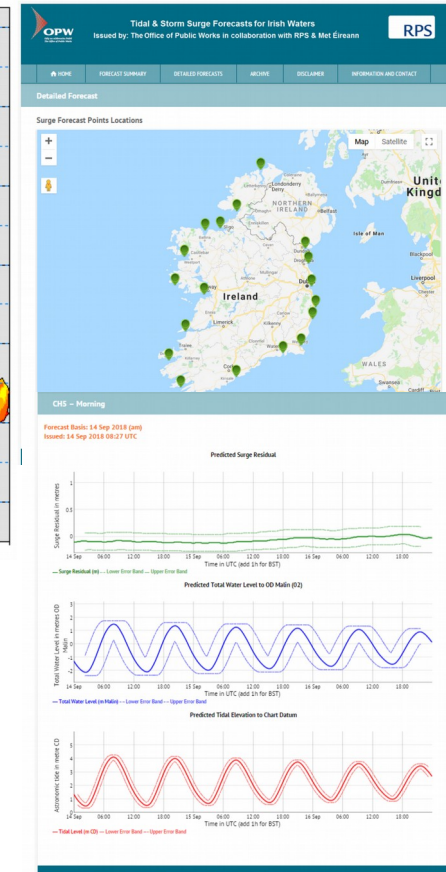
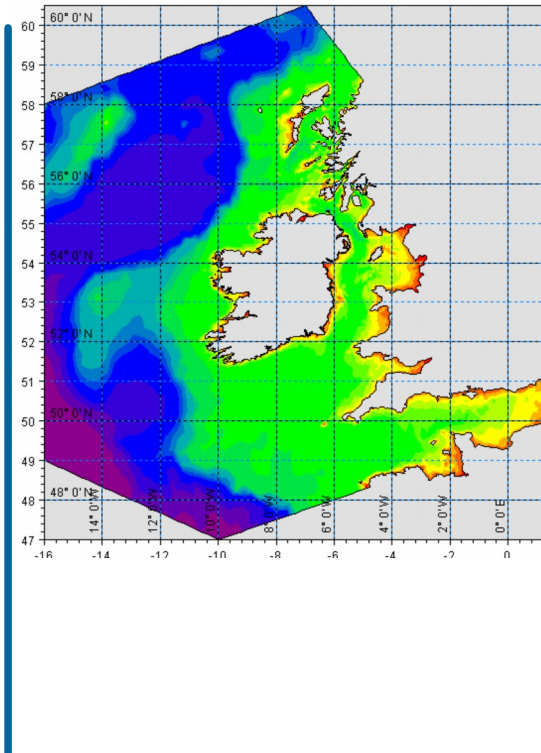
# 5. Extreme Sea Level Prediction - ICPSS Outputs

## Development of Surge Prediction Model (WP5)

- ICPSS has developed storm surge prediction models and capability for the Coast of Ireland
- One such model is the Irish Sea Tidal Surge Model, a Mike 21 flexible mesh model (domain shown)

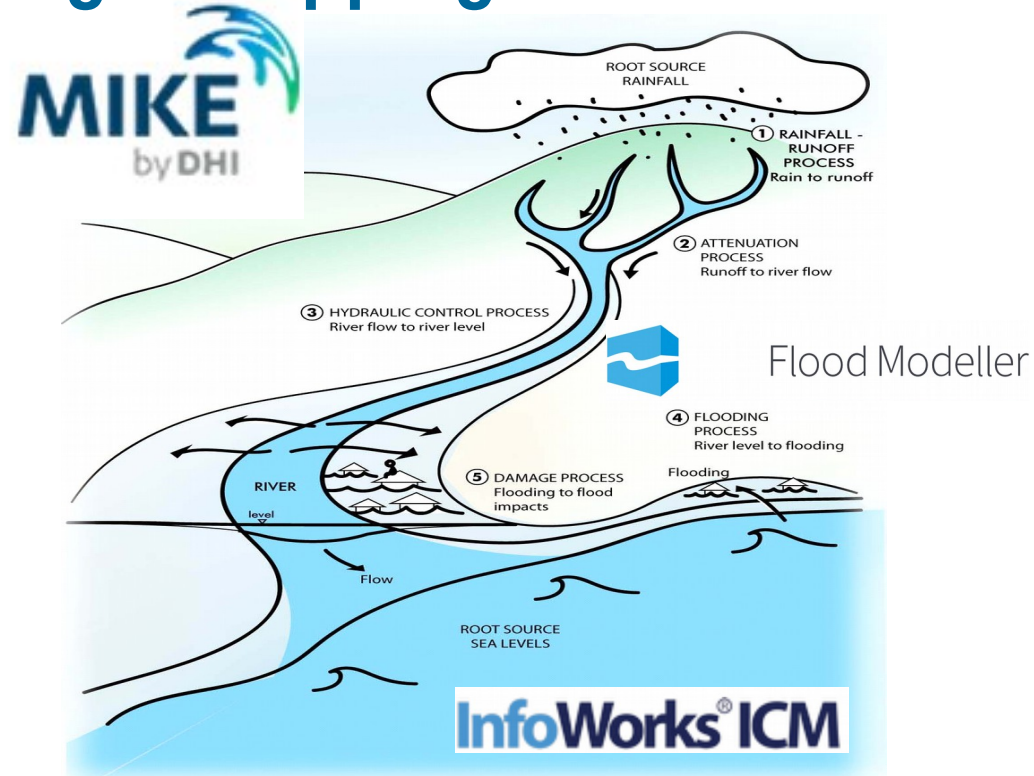
## Development of Coastal Flood Forecasting System (WP6)

- OPW, in conjunction with RPS Consulting Engineers and Met Éireann, has developed a storm surge forecasting system for the Coast of Ireland that is now used operationally.



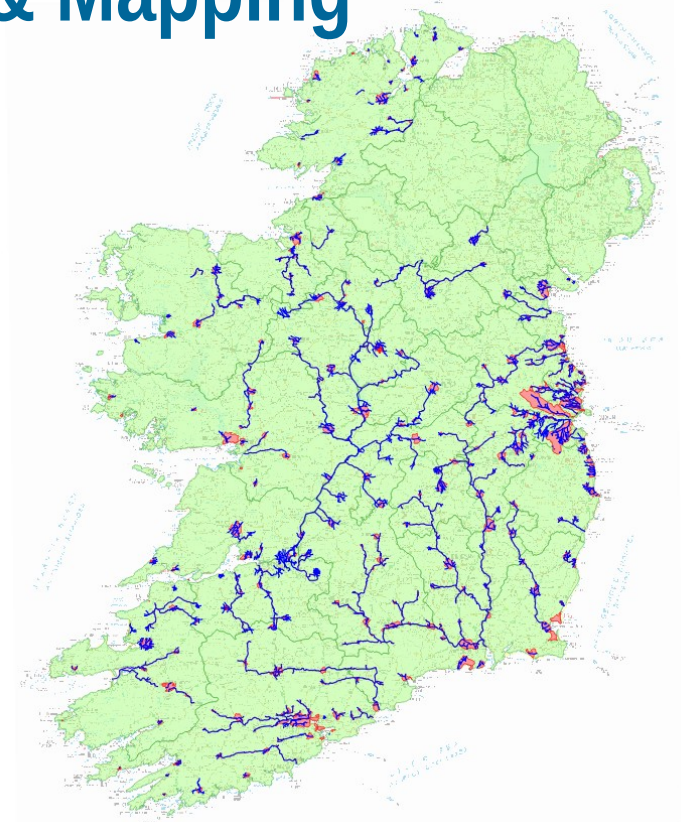
## 6. Flood Modelling & Mapping

- Hydraulic Flow Modelling –  
Mike11/21/NAM (Mike Flood)  
ISIS/Tuflow (FloodModellerPro),  
Infoworks ICM
- Risk & Damage Assessment Tool  
– NPV Damages
- Detailed Flood Mapping  
(Consultation)

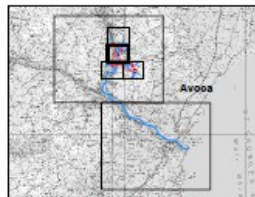
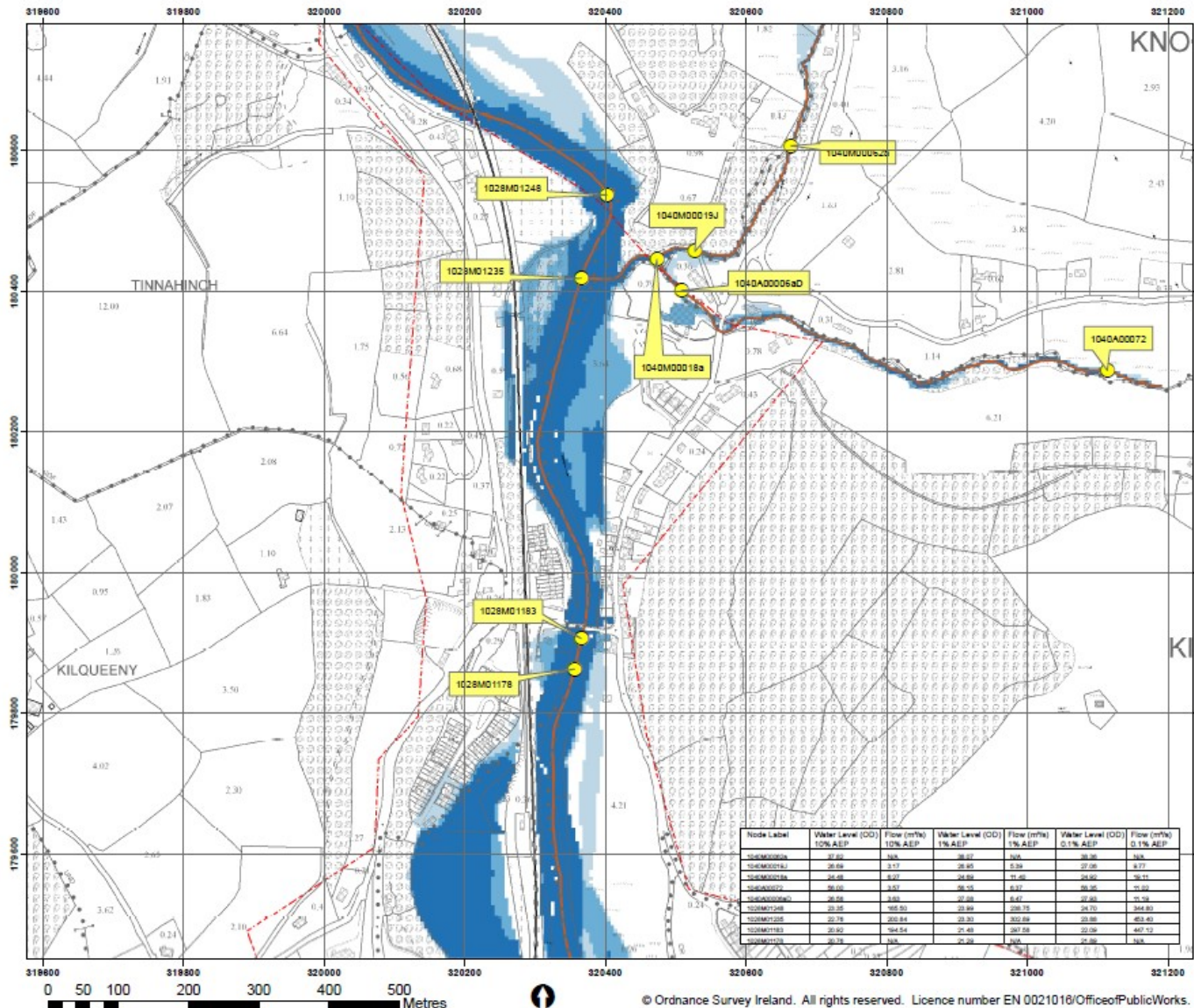


## 6. Flood Modelling & Mapping

- Hydraulic Flow Modelling –  
Mike11/21/NAM (Mike Flood)  
ISIS/Tuflow (FloodModellerPro),  
Infoworks ICM
- 6,700 km of river channel;
- 9,400 sq.km of floodplain  
survey/3D models
- 90 Coastal Communities







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

- Legend**
- 10% Fluvial AEP Event
  - 1% Fluvial AEP Event
  - 0.1% Fluvial AEP Event
  - Modelled River Centreline
  - AFA Estems
  - Node Point
  - Node ID

FINAL

REV:	NOTE:	DATE:
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The Office of Public Works  
Jonathan Self Street  
Dublin  
Co. Meath

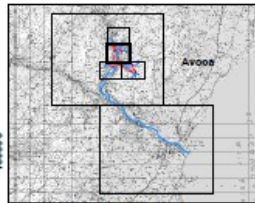
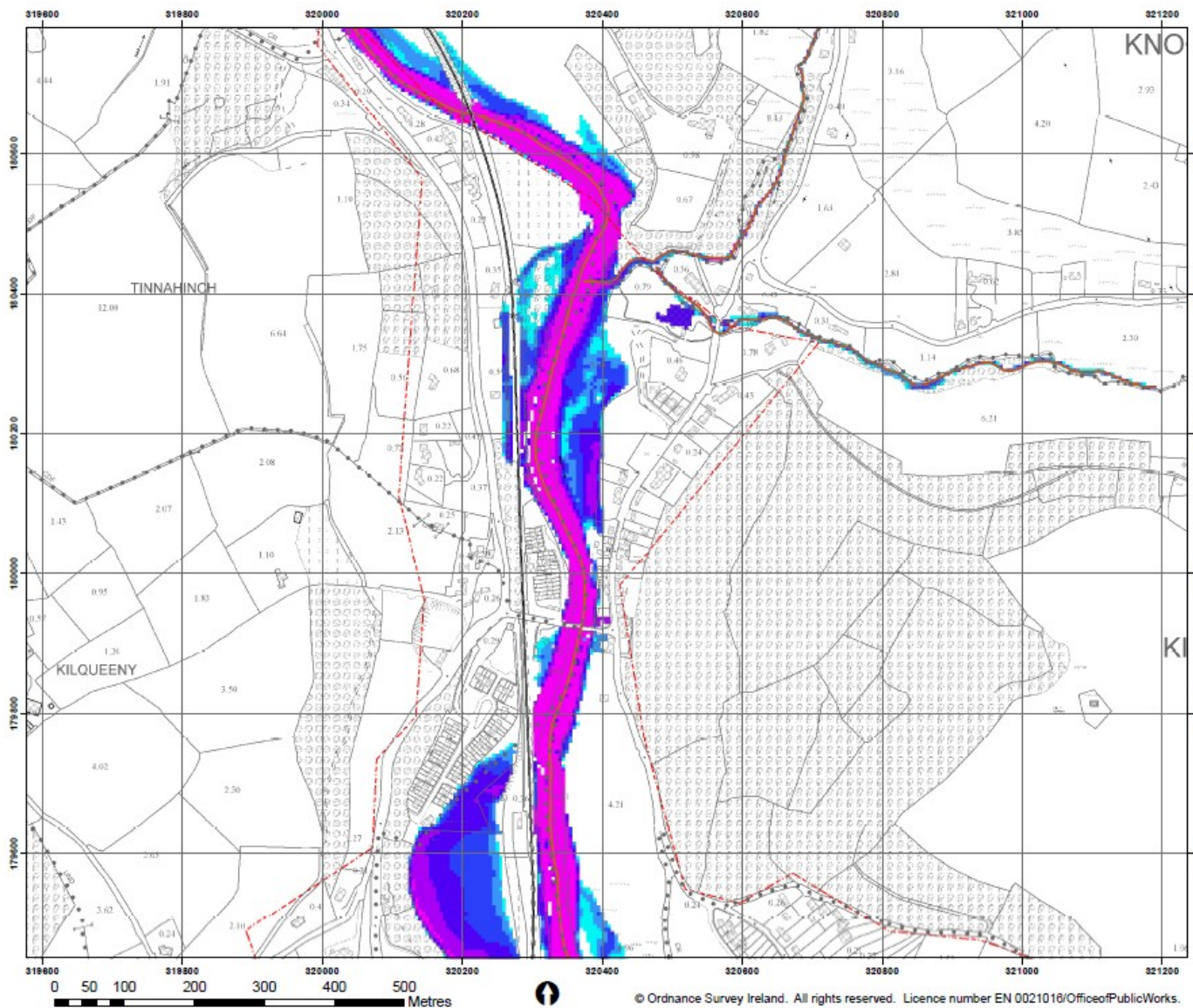
Elwood House  
T: +44(0) 20 50 927514  
74 Boucher Road  
F: +44(0) 20 50 952289  
Salford  
W: www.rps.com  
E: rps@rps.com

Map:  
Avoca Fluvial Flood Extents

Map Type: EXTENT
Source: FLUVIAL
Map Area: HPW
Scenario: CURRENT
Drawn By: C.C. Date: 22 July 2016
Checked By: J.C. Date: 22 July 2016
Approved By: G.G. Date: 22 July 2016
Drawing No.: E10AVO_EXFCD_F0_04
Map Series: Page 4 of 6
Drawing Scale: 1:5,000 @A3

Node Label	Water Level (OD) 10% AEP	Flow (m <sup>3</sup> /s) 10% AEP	Water Level (OD) 1% AEP	Flow (m <sup>3</sup> /s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m <sup>3</sup> /s) 0.1% AEP
1040M00052J	37.59	363	38.87	368	39.39	368
1040M00019J	28.69	3.17	28.85	3.29	27.06	4.77
1028MD1235	26.58	4.24	26.56	34.28	26.62	26.71
1040A00005aD	26.02	2.87	26.25	3.57	26.25	21.22
1040M00018a	26.58	3.89	27.08	4.47	27.09	11.18
1028MD1248	22.25	155.53	22.69	238.75	24.70	344.83
1028MD1178	22.25	225.84	22.83	322.86	23.88	423.48
1028MD1183	22.82	345.54	23.49	497.59	23.92	627.73
1028MD1248	20.75	368	21.49	508	21.89	588





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

- Legend**
- 1% Fluvial AEP Flood Depth**
- 0 - 0.25m
  - 0.25 - 0.5m
  - 0.5 - 1m
  - 1.0 - 1.5m
  - 1.5 - 2m
  - >2m
- Modelled River Centreline**
- AFA Extents**

**FINAL**

REV:	NOTE:	DATE:
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The Office of Public Works  
 Jordanwell House  
 Tim  
 Co. Wick  
 0712 892

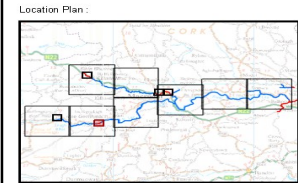
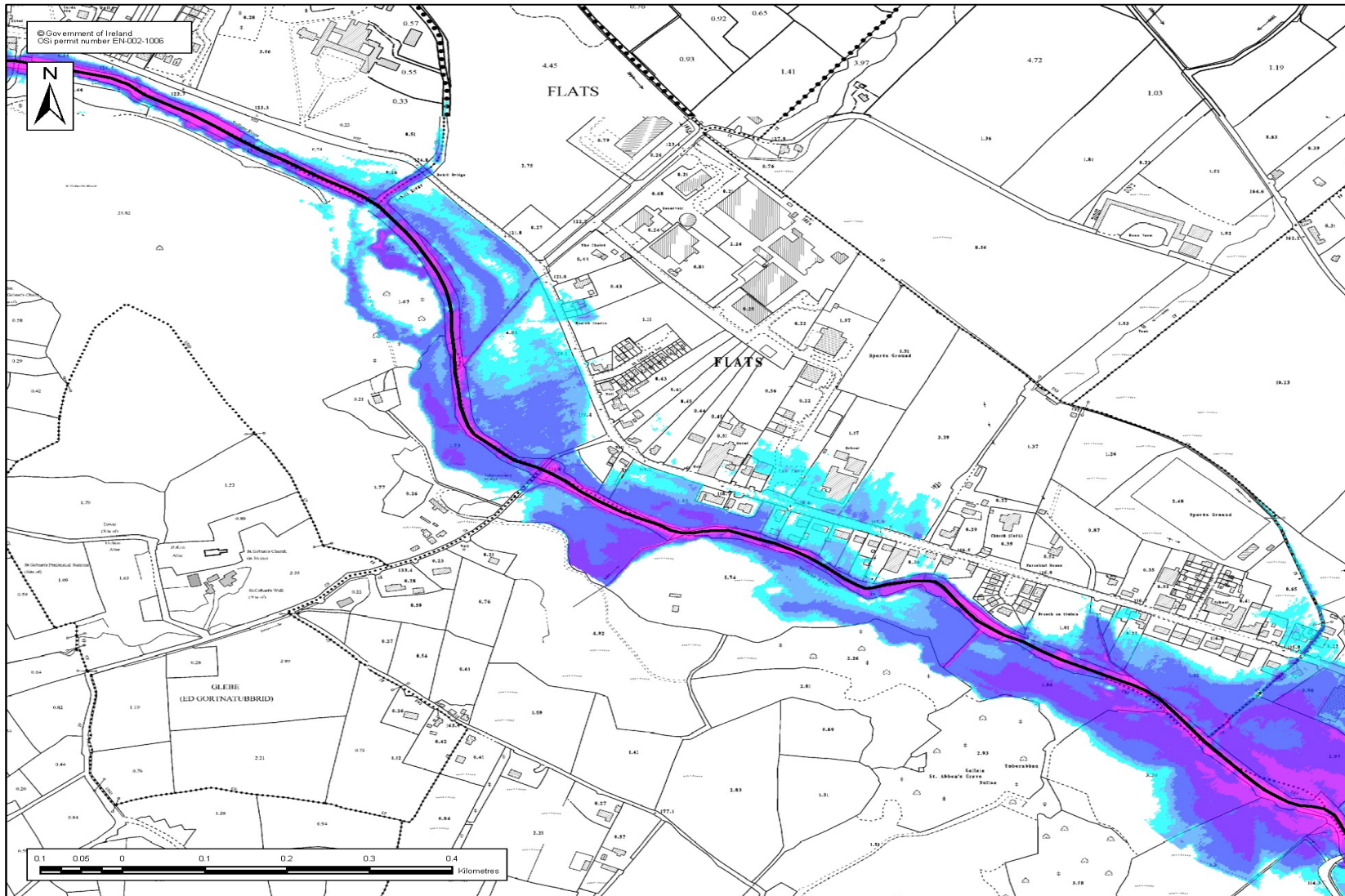
Enniscorthy House  
 T +44(0) 28 50 6075/4  
 F +44(0) 28 50 6070/8  
 W www.opw.gov.ie  
 E tim@opw.gov.ie

**Map:**

Avoca Fluvial Flood Depths

Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By:	C.C. Date: 21 July 2016
Checked By:	J.C. Date: 21 July 2016
Approved By:	G.G. Date: 21 July 2016
Drawing No.:	E10AVO_DPFCD010_F0_04
Map Series:	Page 4 of 8
Drawing Scale:	1:5,000 @A3





**DEPTH MAP 10% AEP**

- Legend Depth Grid:
- 0 - 0.25 m
  - 0.25 - 0.50 m
  - 0.50 - 1.00 m
  - 1.00 - 1.50 m
  - 1.50 - 2.00 m
  - > 2.00 m
  - River Centreline

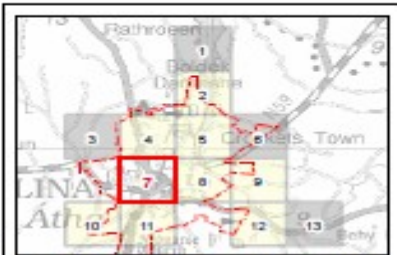
**USER NOTE :**  
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**Halcrow**  
 www.halcrow.com  
 Halcrow Group Ireland  
 3A Eastgate Road  
 Eastgate  
 Little Island  
 Cork  
 Ireland

**OPW**  
 Office of Public Works  
 17-19 Lower Hatch Street  
 Dublin 2  
 Ireland

Project	
LEE CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY	
Map:	
UPPER LEE MODEL FLOOD EXTENT MAP	
Map Type	DEPTH
Return Period	10% AEP EVENT
Source	FLUVIAL FLOODING
Map area	URBAN AREA
Scenario	CURRENT
Figure By	Valeria Medina Date: 22 April 2009
Checked By	Juan Fernandez Date: 22 April 2009
Approved By	Jenny Pickles Date: 22 April 2009
Figure No.	Revision
<b>M5/UA/DEP/10/003</b>	<b>0</b>
Drawing Scale: 1:5,000	Plot Scale: 1:1 @A3





Gray squares have no relevant receptors for this suite of risk maps so no maps have been produced.

- AFA Boundary
- Modelled River Centreline

**0.1% AEP  
Inhabitants (No / Ha)**

- 1 - 5
- 5 - 20
- 20 - 40
- > 40

**Important user note:**  
The viewer of this map should refer to the disclaimer guidance notes and conditions of use that accompany this map.  
This draft map is for consultation purpose only and should not be used for any other purpose.



The Office of Public Works  
Jonathan Ball Street  
Four  
Co. Meath



JBA Consulting  
25 Gorse Wood  
Cullyhanna  
Limerick, Ireland



**WESTERN  
CFRAM  
STUDY**  
CATCHMENT FLOOD RISK  
ASSESSMENT AND MANAGEMENT

Map No.	Ballina No. Inhabitants (0.1% AEP)		
Map Type	Specific Risk	No. Inhabitants (0.1% AEP)	
Map Area	HPW	Source	Model
Drawn by	JAM	Date	Mar 2015
Checked by	RR	Date	Mar 2015
Approved by	RPW	Date	Mar 2015
Map No.	WBANUN_RM0001_C01	Sheet	7 of 10





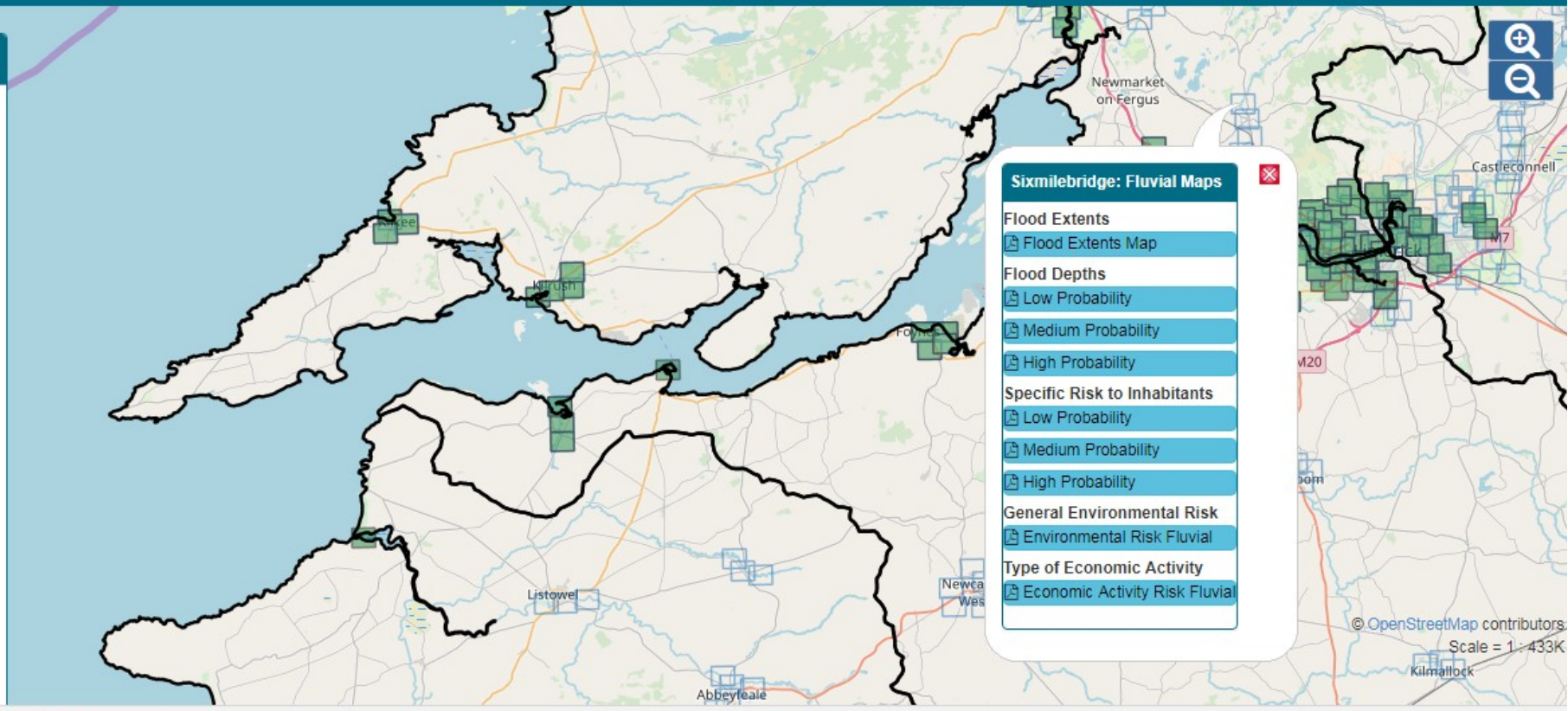
Info Box

Please click a tile to access the maps available for this location.

Flood Hazard & Risk Maps

- Fluvial Flooding
- Coastal Flooding
- Pluvial Flooding
- UoM Area Outside Jurisdiction

- Open Street Map
- OSi Map
- Fluvial
- Coastal
- Pluvial



**Sixmilebridge: Fluvial Maps**

- Flood Extents
  - Flood Extents Map
- Flood Depths
  - Low Probability
  - Medium Probability
  - High Probability
- Specific Risk to Inhabitants
  - Low Probability
  - Medium Probability
  - High Probability
- General Environmental Risk
  - Environmental Risk Fluvial
- Type of Economic Activity
  - Economic Activity Risk Fluvial

## 7. Development of Flood Risk Management Measures

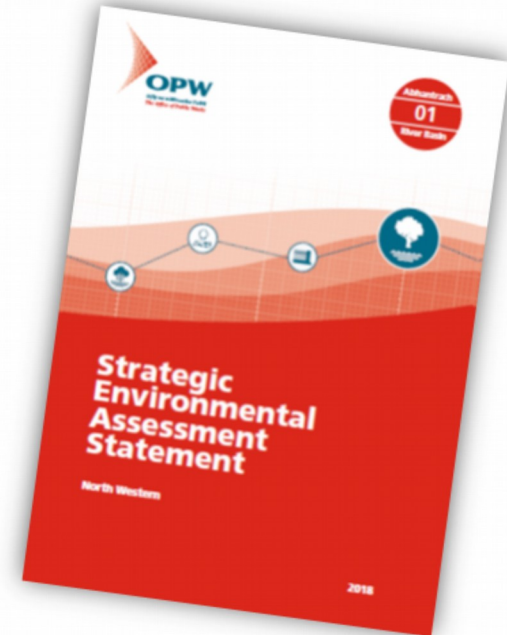
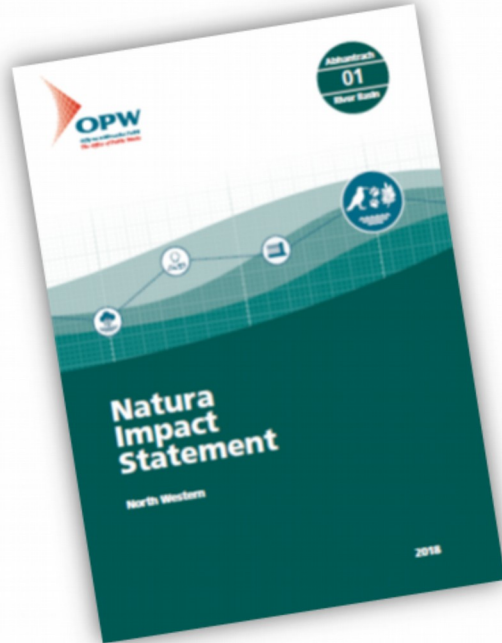
- Development of FRM Measures (Scenario & option testing and modelling)
- Multi-criteria Assessment of Options
- Flood Risk Management Plans



*Clonmel Flood Relief Scheme, OPW*



# 7. Development of Flood Risk Management Measures



## 8. Consultation

- 'Crowd-sourced'  
Historic Flood Event  
Database
- Web-based FRMP &  
Flood Maps Tool
- **Floodinfo.ie**



The screenshot shows the homepage of Floodinfo.ie. At the top, there is a navigation menu with links for HOME, ABOUT, INTERACTIVE MAP, PUBLICATIONS, RESOURCES, PAST FLOODS, and GAEILGE. The main header features the OPW logo and the text 'Welcome to FloodInfo.ie'. Below this, a central text block states: 'Providing access to Flood Plans and Flood Maps developed by the OPW and information on flood risk management in Ireland.' To the right of this text are two prominent buttons: 'View Flood Plans' (with an icon of an open book and a pencil) and 'View Flood Maps' (with an icon of a map and a location pin). Below these buttons are three columns of content. The first column, 'Flood Risk Management', includes a photo of a flood wall and text about OPW's role as the lead organization for flood risk management in Ireland since 1995. The second column, 'Flood Plans', includes a photo of a flood gate and text about detailed flood risk and management measures for 300 areas. The third column, 'Flood Maps', includes a map image and text about providing a detailed picture of flood risk for various scenarios. At the bottom of the page, there is a cookie consent banner.

## 9. Upcoming Flood Relief Schemes

50 of 118 Schemes Now Progressing to Detailed Design:

5 schemes above €15m

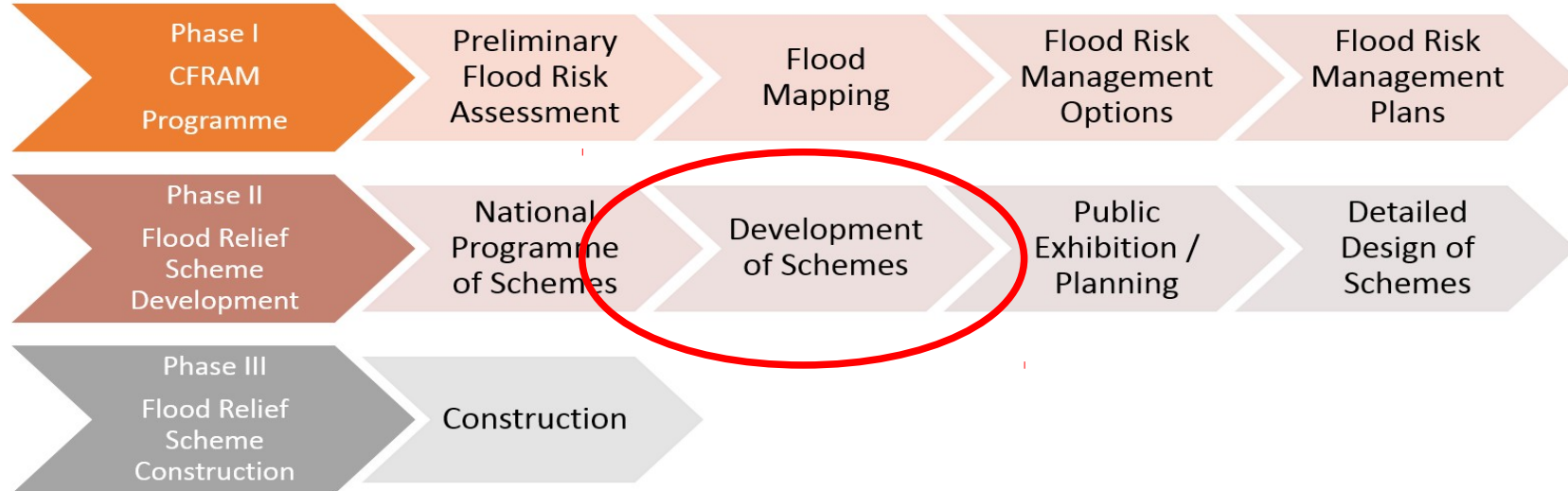
- 14 of the 82 schemes between €1m to €15m
  - 31 schemes each less than €1m



## 9. Upcoming Flood Relief Schemes

- OPW & Local Authorities engaging pro-actively on arrangements / structures to be put in place to advance the project-level development and assessment of Flood Relief Schemes, including environmental assessment as necessary, and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation.

## 9. Upcoming Flood Relief Schemes

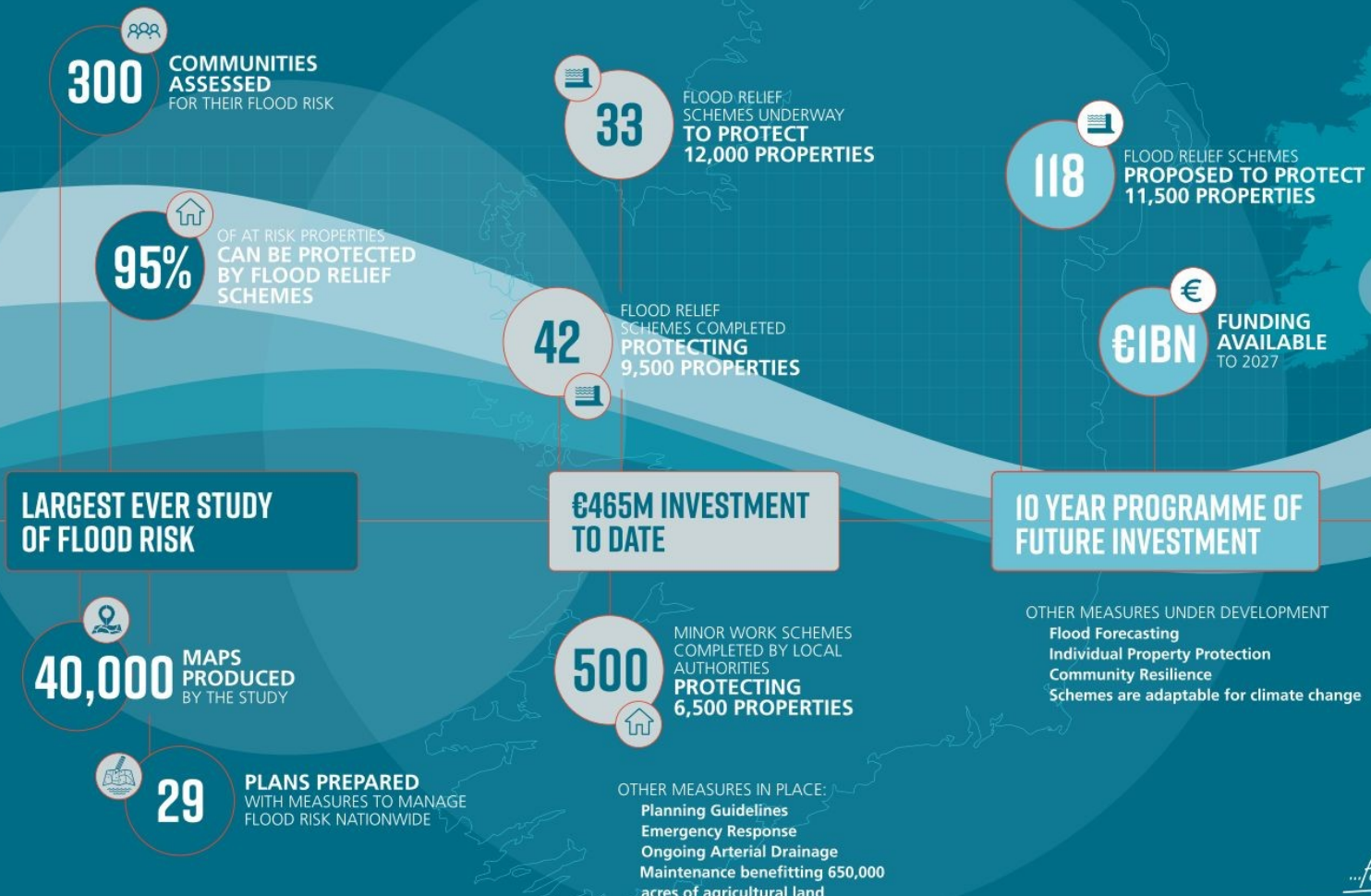


## 10. Next Cycle of Floods Directive...

- Rural and dispersed risk e.g. for individual homes, farm properties, agricultural risk and access roads to properties;
- Potential impacts of climate change and other future developments;
- Assets critical to normal societal function that may be at risk from flood events;
- Measures with benefits for both WFD and flood risk management objectives, e.g. natural water retention measures.



## Whole of Government Approach to Managing Flood Risk



...for plans and maps