

Green Park Youghal Pavilion

Site Specific Flood Risk Assessment

224125-PUNCH-XX-XX-RP-C-0002

September 2022

Document Control

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1 Introduction

1.1 Background

PUNCH Consulting Engineers were appointed by Cork County Council to carry out a Site-Specific Flood Risk Assessment for the proposed amenity open space development within the existing Green Park, in Youghal, Co. Cork.

The assessment is carried out in full compliance with the requirements of “The Planning System & Flood Risk Management Guidelines” published by the Department of the Environment, Heritage and Local Government in November 2009.

The proposed site layout is detailed in a series of planning drawings provided by John McLaughlin Architects in the planning documentation.

1.2 Existing Site

The site location is shown in Figure 1-1 below. The proposed Pavilion structure is located within the Green Park amenity open space, which is bordered by Carleton Wharf residential apartment blocks to the north, **O’Brien Place roadway** and The Walter Raleigh and several private domestic dwellings to the west, long stretch beach to the south and the Youghal Harbour waterbody to the east. The existing outdoor open space amenity green park is a formal Victorian style park with manicured lawn and a central linear arrangement of protected monuments. The park is bounded by a raised promenade to the south and east with a single access point to the beach at the southwest corner. The park is generally relatively flat falling at a gradient of approximately 1 in 80, from approximately 2.1m AOD at the east, to 3.2m AOD towards the west of the site. No significant structures are present within the park, apart from stairs and ramp access points, statues, sculptures, and fountains.



Figure 1-1: Location of the Proposed Development

1.3 Nature of the Proposed Development

The proposed development comprises of construction of a pavilion structure within the existing Green Park. The proposed levels range from 3.3mAOD to 4.2mAOD. An extract from the site layout is shown below in Figure 1-2.

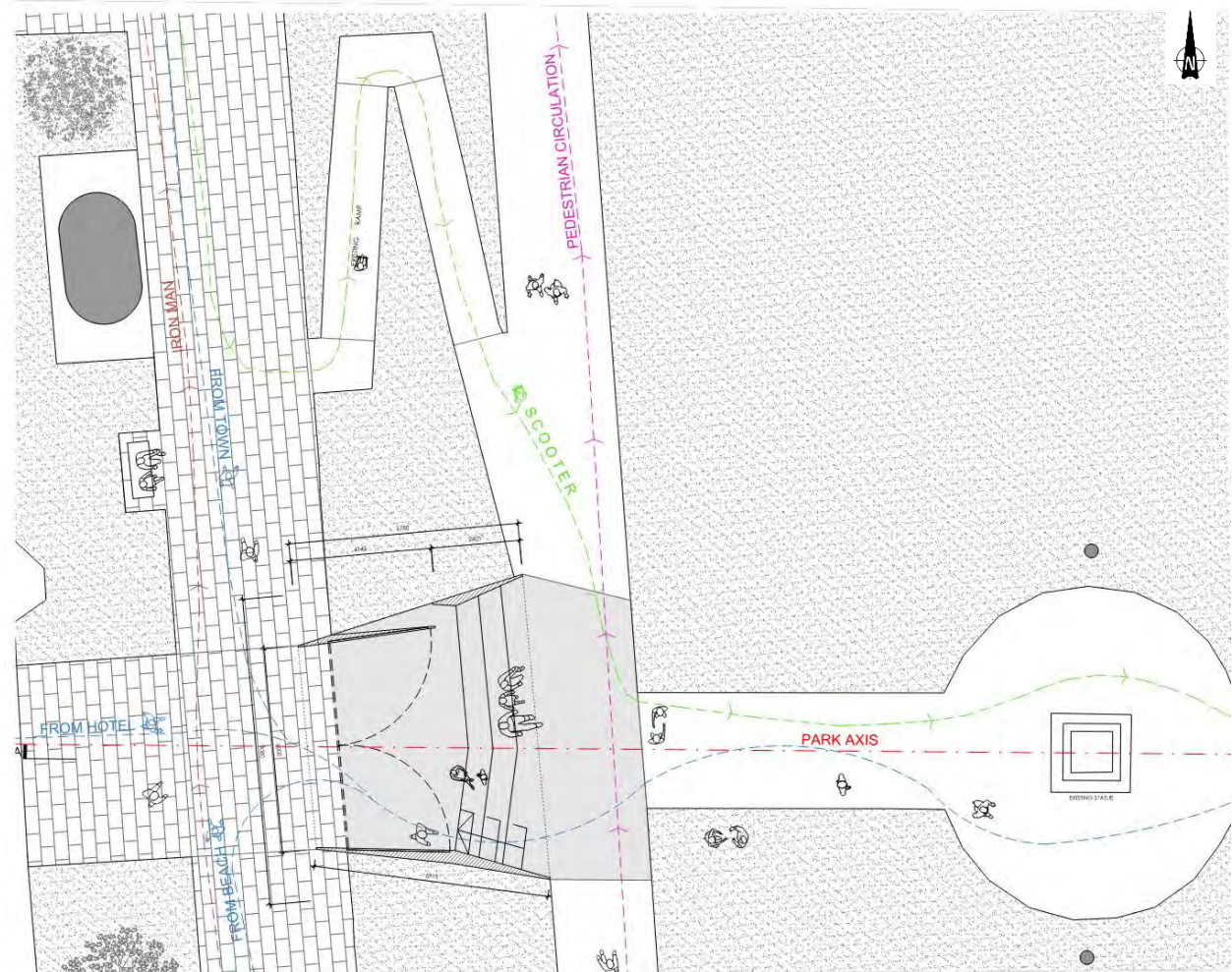


Figure 1-2: Extract from Proposed Site Layout

The proposed structure is an open pavilion with side walls for support. The area around the pavilion will be finished with a concrete slab with the creation of steps to match the existing levels.

2 Relevant Guidance

2.1 The Planning System and Flood Risk Management Guidelines

In September 2008, “The Planning System and Flood Risk Management” 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. The core principle of the guidelines is to adopt a flood risk 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 in Table 2-1 below. It should be noted that these do not take into account the presence of flood defences, as there remain risks of overtopping and breach of the defences.

Table 2-1: Flood Zone Designation

Flood Zone	Type of Flooding	Annual Exceedance Probability (AEP)
Flood Zone A	Coastal	Less than a 1:200 (0.5% AEP) year event
	Fluvial	Less than a 1:100 (1% AEP) year event
Flood Zone B	Coastal	Greater than a 1:200 (0.5% AEP) and less than a 1:1000 (0.1% AEP) year event
	Fluvial	Greater than a 1:100 (1% AEP) and less than a 1:1000 (0.1% AEP) year event
Flood Zone C	Coastal	Greater than a 1:1000 (0.1% AEP) year event
	Fluvial	Greater than a 1:1000 (0.1% AEP) year event

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.

A three staged approach to undertaking an FRA is recommended:

Stage 1: Flood Risk Identification - Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment;

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

Stage 3: Detailed Flood Risk Assessment - 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 Stage 1.

2.2 Development Plan

As set out in Chapter 11 Water Management, Volume 1 of the Cork County Development Plan (CCDP) 2022, the most up to date data has been used to inform the Flood Zone mapping. The eastern most part of the Green Park is located within Flood Zone A. The central part of the park is partially within Flood Zone B, and most of the park, specifically the western part is within flood Zone C. This is shown in



Figure 2-1: CCDP Flood Zone Extents

The land on which the development is proposed is currently zoned as “Green Infrastructure” in the Cork County Development Plan, as shown in Figure 2-2 below.



Figure 2-2: CCDP Land Use Zoning

2.3 Local Area Plan

With reference to East Cork Municipal District Local Area Plan 2017, developments in or near areas shown as being subject to a possible risk of future flooding are recommended to consider the need to undertake a Stage 1 of the site-specific flood assessment.

3 Flood Risk Identification

3.1 Existing Hydrogeological Environment

The existing hydrological environment is characterised primarily by the presence of the Blackwater Mouth estuary, which is located in close vicinity of the proposed development, circa 50m to the east of the site. The hydrological environment around the site is shown in Figure 3-1 below.



Figure 3-1: Hydrological Environment around the site

3.2 Topographical Survey

A topographical survey of the site and its environs was completed by Cork County Council in November 2021. The site is generally level with a fall of 400mm from west to east across the park. The green area of the park is generally up 1.3m below the surrounding walkway with a 1.5m high wall bordering the south and east sides of the park. The survey details a manhole in the southeast corner of the park, near the existing fountain and several on the footpath to the east of the park.

3.3 Site Walkover

Desktop study only has been carried out as part of Stage 1 of the site-specific flood assessment process.

3.4 Site Geology

The geology of the site was reviewed using data from the Geological Survey of Ireland (available at www.gsi.ie). The soil type at the location of the proposed development is identified as ‘Made Ground’ as seen in Figure 3-2. The surrounding areas comprise mainly of ‘Made Ground’ as well.

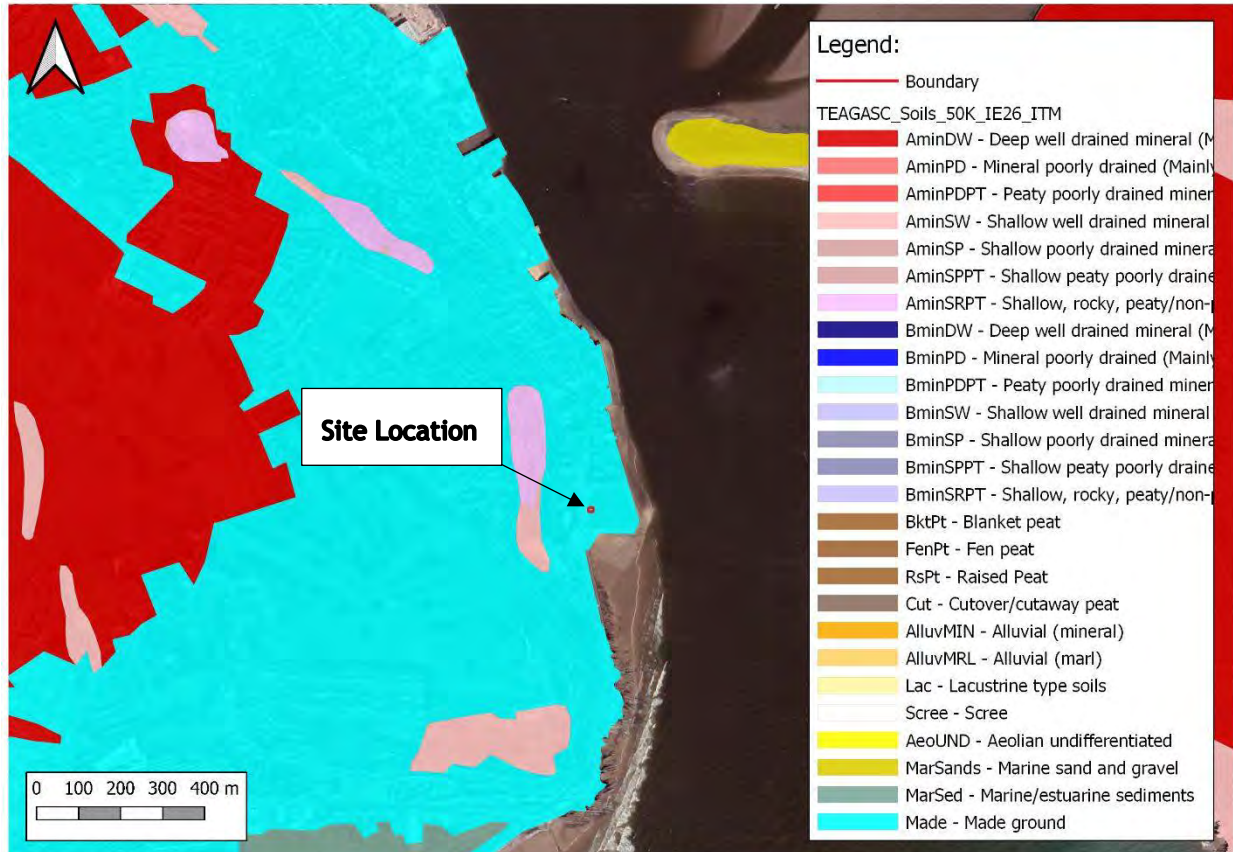


Figure 3-2: Geology of the surrounding area (source: Geological Survey of Ireland (www.gsi.ie))

3.5 Groundwater Flooding

Review of the GSI groundwater flooding maps was carried out. No groundwater flooding was identified at the proposed development location.

3.6 Review of Existing Surface Water Infrastructure

Online records existing drainage record drawing. The drawings indicate there is an existing combined sewer running along O'Brien's Place, flowing in a northwardly direction, as well as a combined sewer running through the south portion of the Green Park in an easterly direction. There is no indication of the diameter of the sewer, or the connections from the Green Park to same, as can be seen in Figure 3-3.



Figure 3-3: Existing Stormwater drainage in the vicinity of the site

3.7 Review of Historic Mapping

A review of the OSI Historical maps¹ was carried out. Figure 3-4 shows an extract from the 5-inch historic map for the site, while Figure 3-5 shows an extract from the 25-inch historic map for the site. The site is not indicated as “liable to flood” in the available historic OSI maps.



Figure 3-4: Extract from OSI historical 6-inch map

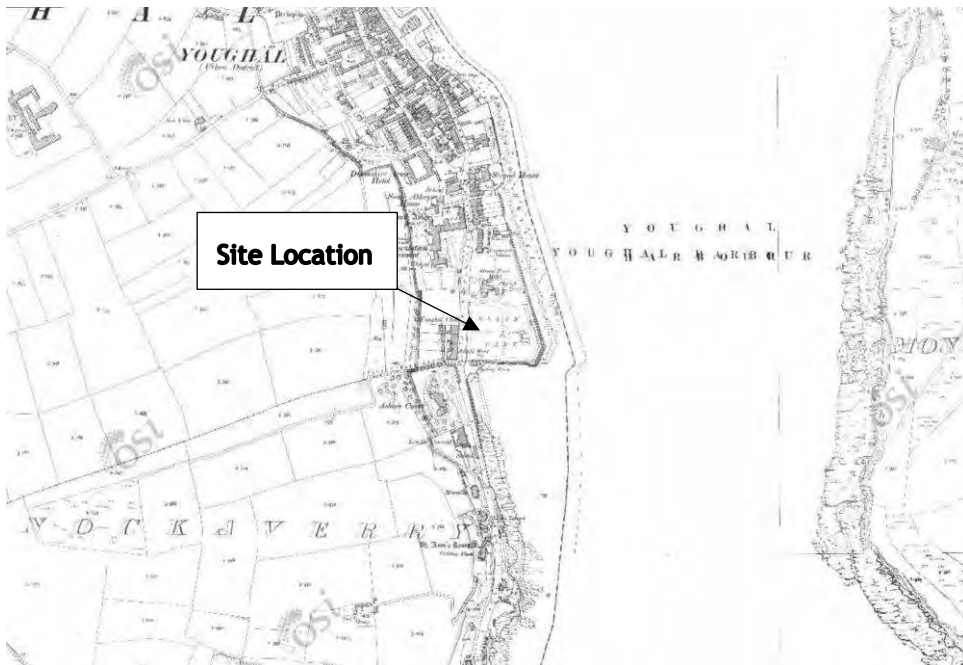


Figure 3-5: Extract from OSI historical 25-inch map

3.8 History of Flooding

The Office of Public Works (OPW) Flood Hazard Mapping website holds a record of historic flood events. A review of the database indicated that there have been no recorded instances of flooding on the proposed site, however several flooding instances have been reported within a radius of 2.5km of the proposed development, as shown in Figure 3-6.

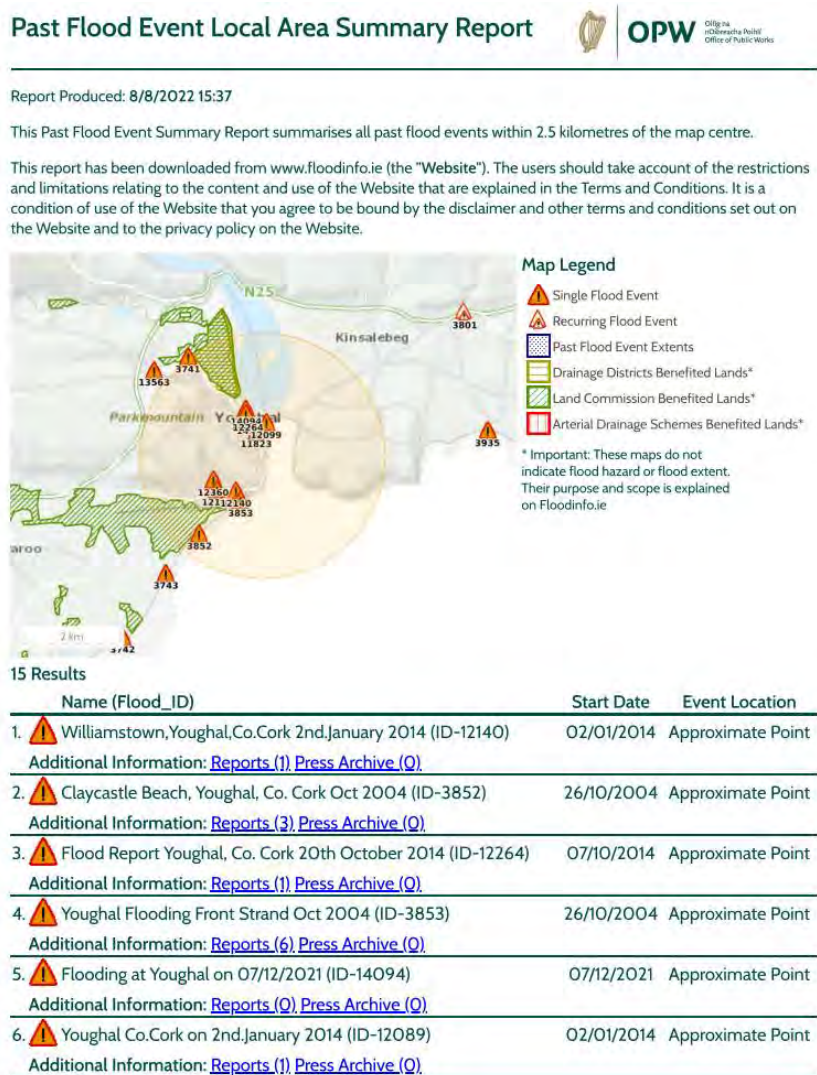


Figure 3-6: Extract from OPW Floodmaps Database Report
(ref: <http://www.floodmaps.ie/index.aspx?ReturnUrl=%2fView%2fDefault.aspx>)

Please note that this is not a guaranteed record of all flood events.

3.9 National Indicative Fluvial Mapping

The OPW published the National Indicative Fluvial Mapping (NIFM) in 2021 and they are now publicly available on <https://www.floodinfo.ie/map/floodmaps/>. The NIFM is a series of preliminary mapping of catchments greater than 5km² which are not covered in the CFRAMS programme. These maps are **‘predictive’ flood maps showing indicative areas predicted to be inundated during a theoretical fluvial flood event with an estimated probability of occurrence.**

No indicative fluvial flooding has been identified at the location of the proposed development.

3.10 CFRAMS Mapping

As part of the CFRAMS programme, mapping is available online for public viewing, and the local area has been assessed as part of the South Western CFRAMS. The OPW has published detailed flood hazard mapping for the area based on results from the CFRAMS. This includes flood extent and flood depth mapping for a number of return periods for fluvial and coastal flood events. The CFRAMS assessment in this area is based on hydraulic modelling of the river Blackwater and its tributaries, as well as the tidal modelling.

The CFRAM indicative flood extents for the present day scenario show the southern and eastern part of the site being within the high probability of flooding zone for both the fluvial and coastal flooding events, as shown in Figure 3-7 below.



Figure 3-7: CFRAM Indicative Flood Extents

Figure 3-8 below is an extract from the relevant South Western CFRAMS fluvial flood map and Figure 3-9 overleaf is an extract from the relevant South Western CFRAMS coastal flood map for the area surrounding the proposed development site. Full CFRAMS maps for the area are included in Appendix A of this report.

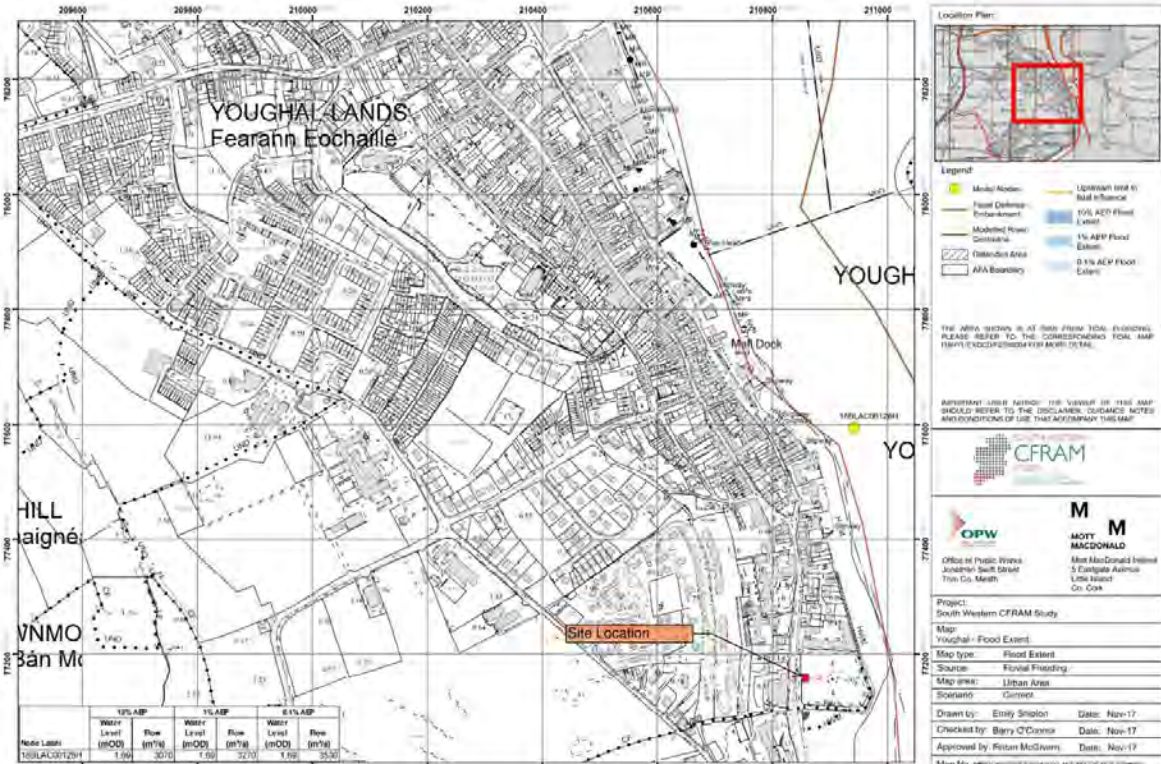


Figure 3-8: Extract from the CFRAMS fluvial map for the area (site indicated in red) Maps available: <http://www.floodinfo.ie/map/floodmaps/>

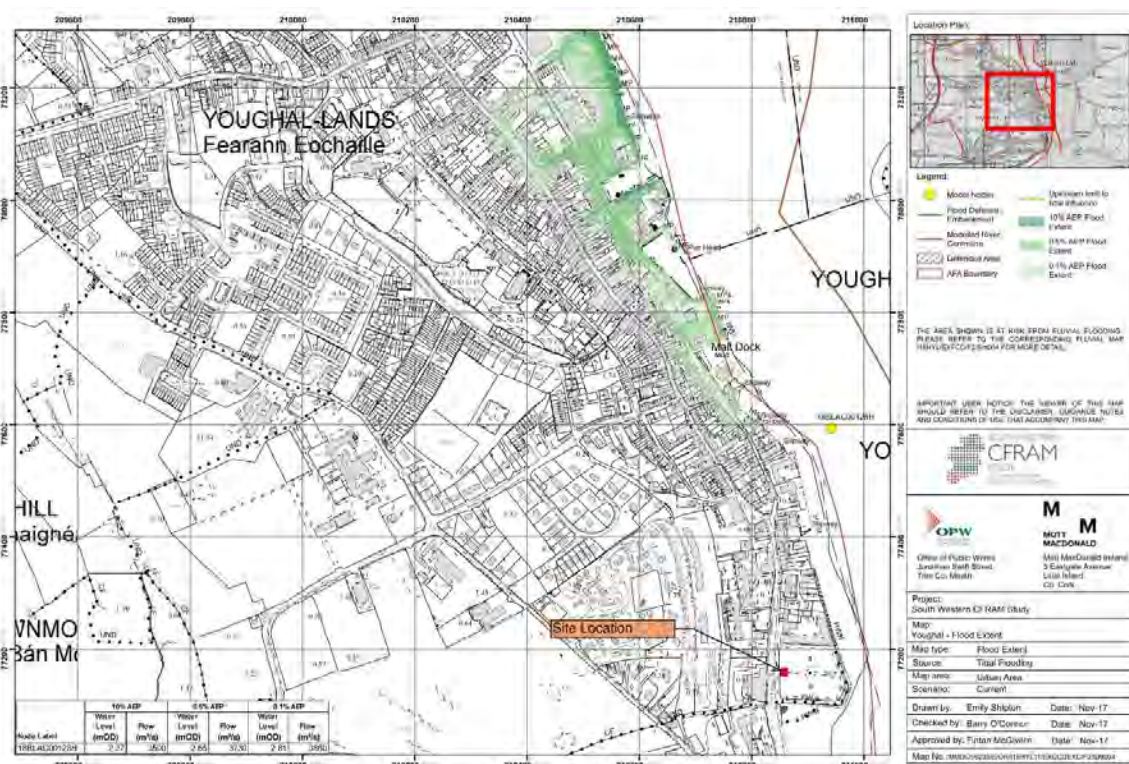


Figure 3-9: Extract from the CFRAMS coastal map for the area (site indicated in red) Maps available: <http://www.floodinfo.ie/map/floodmaps/>

The CFRAM South Western Study mapping indicates that there is no fluvial or tidal flooding on the site. The closest node to the site notes flood levels as per Table 3-1 below:

Table 3-1: CFRAM Fluvial/Coastal Predicted Flood Levels in Blackwater Estuary in Vicinity of Site

Node	Flood Type	10% AEP (mAOD)	1% AEP (mAOD)	0.5% AEP (mAOD)	0.1% AEP (mAOD)
18BLAC00128H	Tidal	2.37	-	2.65	2.81
18BLAC00128H	Fluvial	1.69	1.69	-	1.69

3.11 Existing Flood Defences

The CFRAM maps shown in Figures 3-8 and 3-9 do not identify a flood defence in the vicinity of the site, however the flood extents seem to indicate that the raised promenade walkway acts as a flood defence, as the predicted flood levels as indicated in Table 3-1 are partially higher than existing ground levels within the park.

3.12 Estimate of Flood Zone

PUNCH Consulting Engineers have reviewed the available information as outlined in the above sections. We have concluded that the site is partially located in Flood Zone A for the Blackwater Mouth floodplains and is therefore at high risk of flooding.

4 Conclusions

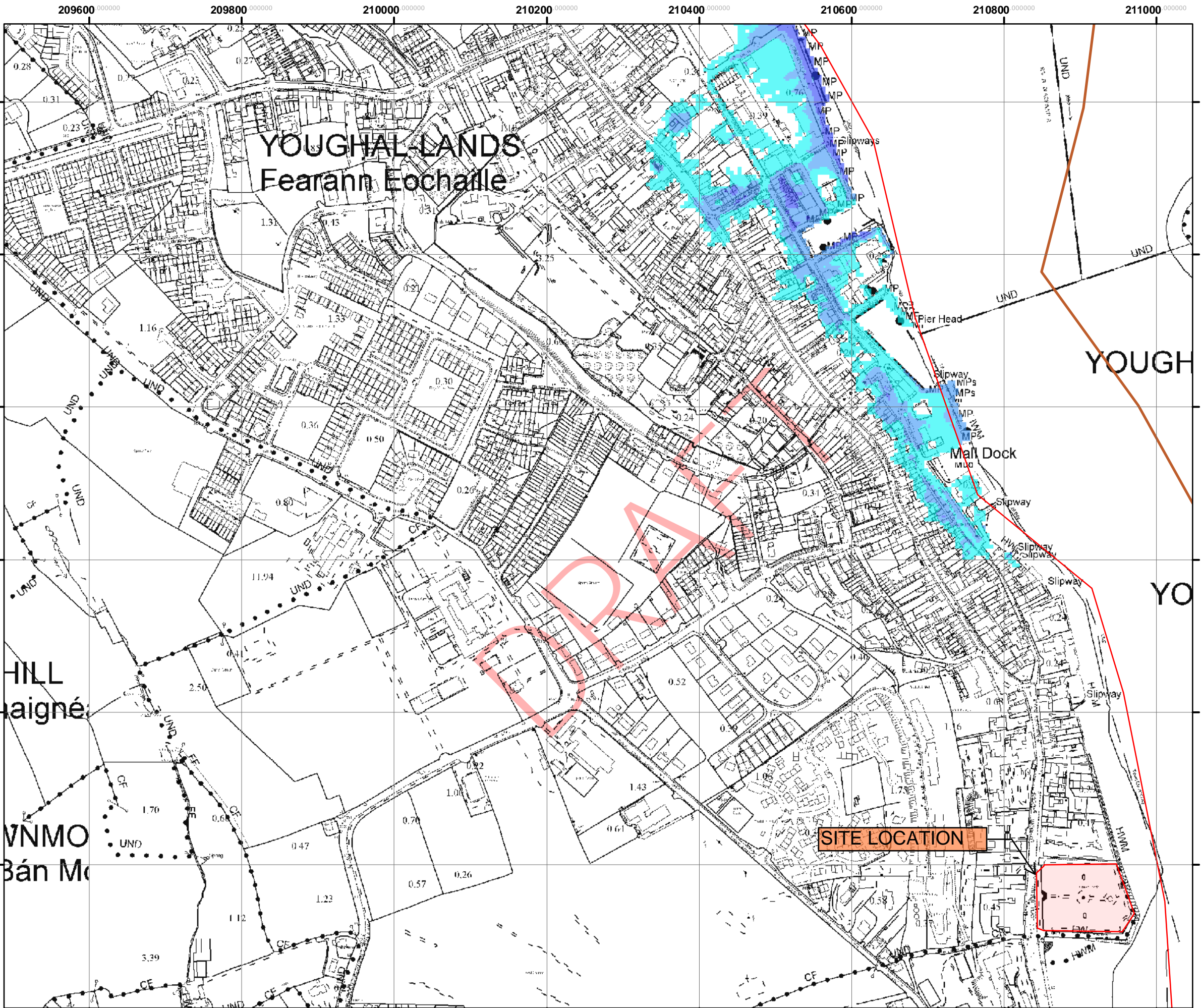
PUNCH Consulting Engineers were appointed by Cork County Council to carry out a Site-Specific Flood Risk Assessment for a proposed pavilion structure within an existing amenity open space known as Green Park, in Youghal, Co. Cork.

This Site-Specific Flood Risk Assessment has been carried out in accordance with **“The Planning System & Flood Risk Management Guidelines”** published by the Department of the Environment, Heritage and Local Government in November 2009, and the Cork County Development Plan 2022.

A review of the flood risk in the area was carried out as the development is located in close vicinity of the Blackwater estuary, approximately 50m to the east of the development.

Flood Maps produced as part of the CFRAMS were consulted to establish the Flood Zone. It was determined that the proposed development site is currently located in Flood Zone A for both the Fluvial and Tidal flooding. Due to the fact that the development is classed as water-compatible, it is deemed appropriate without carrying out a Justification Test.

Appendix A CFRAMS Mapping



Legend:

- Modelled River Centreline
- AFA Boundary

Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1.0m
- 1.0 - 1.5m
- 1.5 - 2.0m
- >2.0m

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

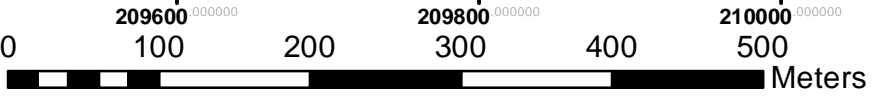
THIS AREA IS AT RISK FROM FLUVIAL AND TIDAL FLOODING. PLEASE REFER TO THE CORRESPONDING FLUVIAL/TIDAL MAP.

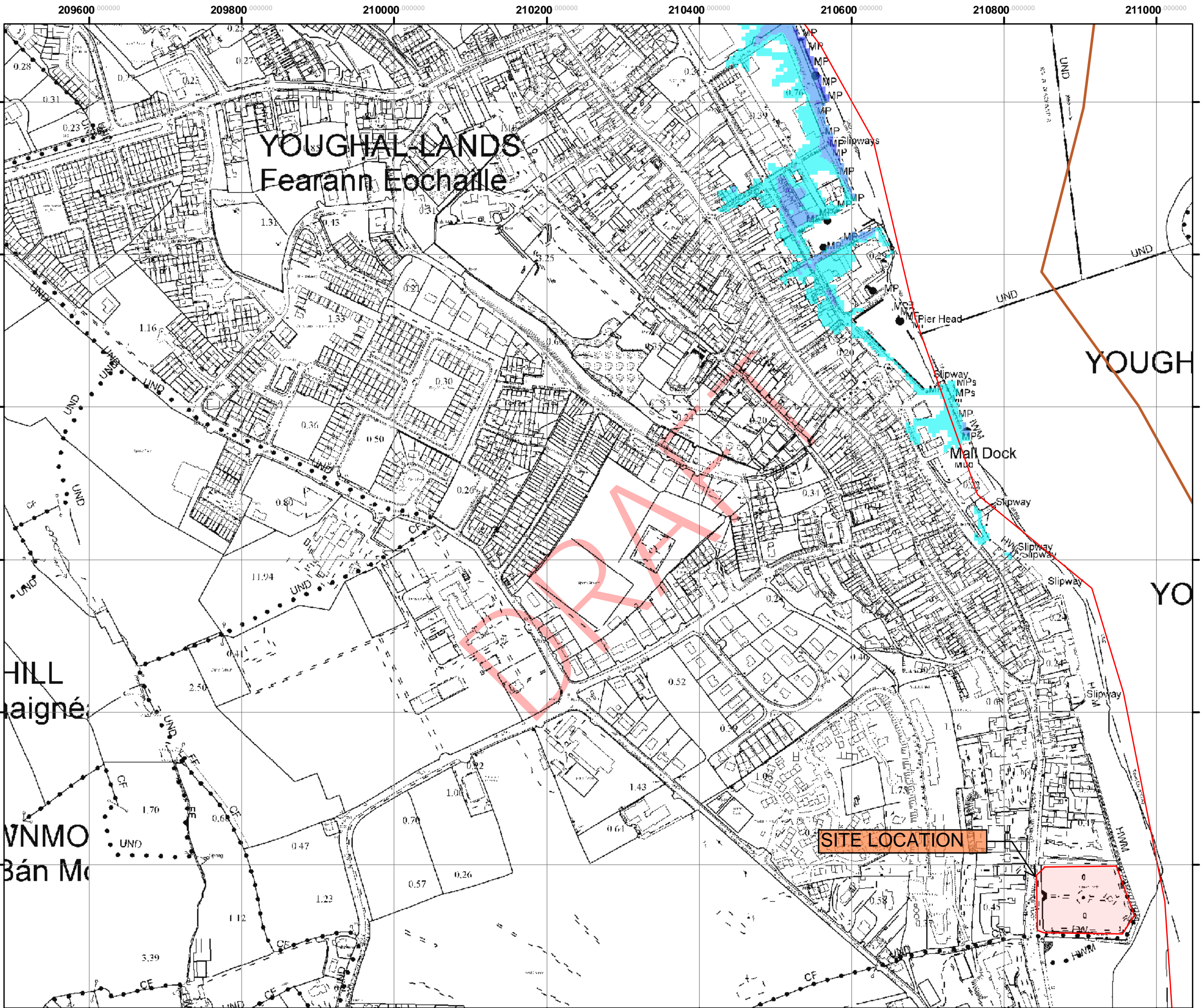


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Project: South Western CFRAM Study	
Map: Youghal - Flood Depth - Tidal 0.1% AEP	
Map type:	Flood Depth
Source:	Tidal Flooding
Map area:	Urban Area
Scenario:	Current
Drawn by:	Lee Cutting
Date:	June 2016
Checked by:	Marianne Piggott
Date:	June 2016
Approved by:	Christian Hetmark
Date:	June 2016
Map No.: MMD/296235/E/DR/118HYL/DPCCD001/F/Sht005	
Sheet:	5 of 7
Revision:	F
Drawing Scale:	1:5,000
Plot Scale:	1:1@A3





Legend:

- Modelled River Centreline
- AFA Boundary

Flood Depth

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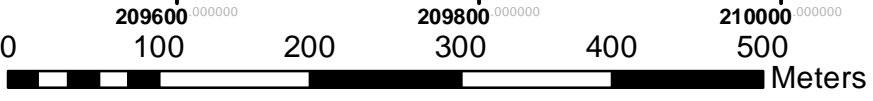


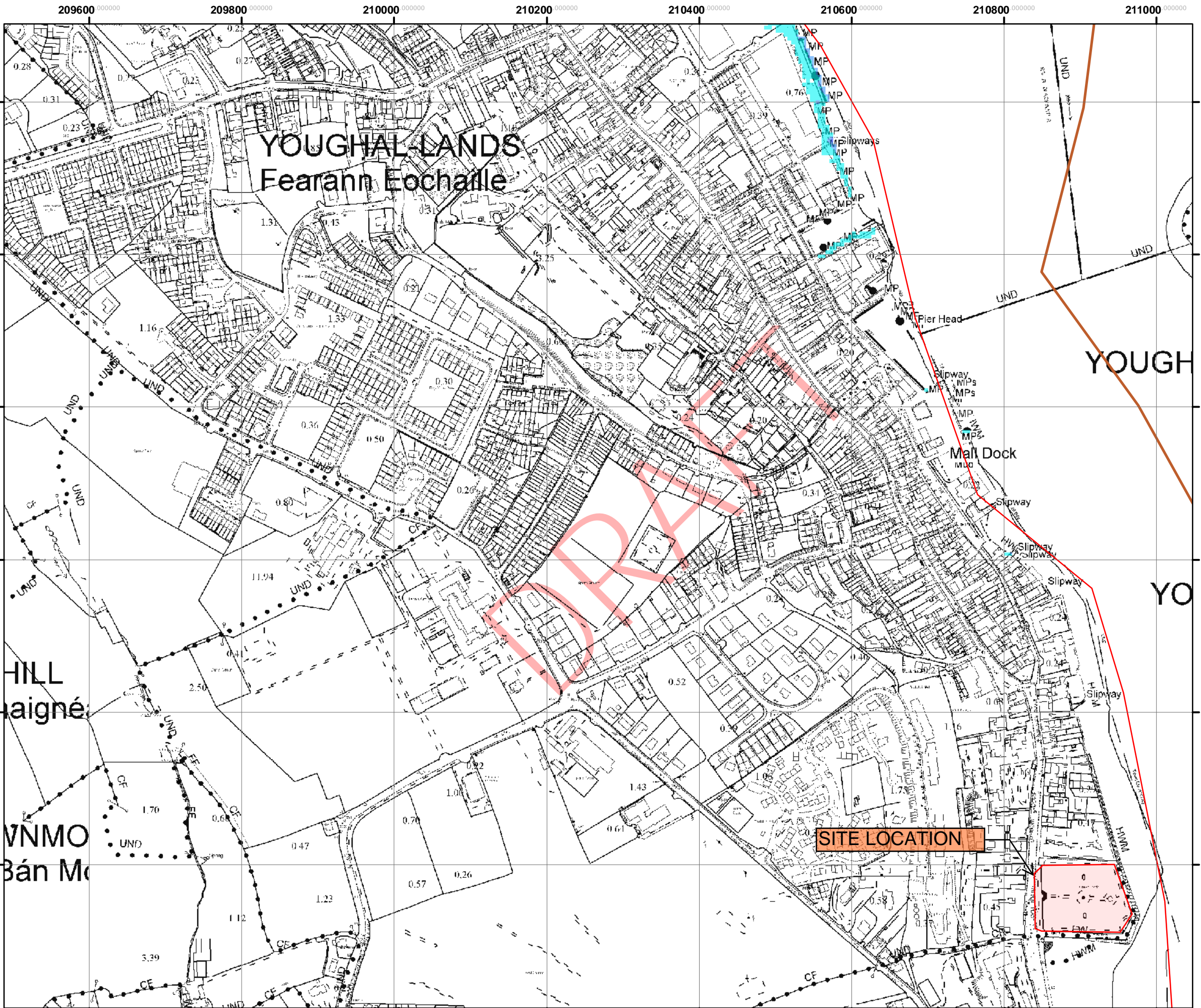
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Co. Cork

Project: South Western CFRAM Study	
Map: Youghal - Flood Depth - Tidal 0.5% AEP	
Map type:	Flood Depth
Source:	Tidal Flooding
Map area:	Urban Area
Scenario:	Current
Drawn by:	Lee Cutting
Date:	June 2016
Checked by:	Marianne Piggott
Date:	June 2016
Approved by:	Christian Hetmark
Date:	June 2016
Map No.: MMD/296235/E/DR/118HYL/DPCCD005/F/Sht005	
Sheet:	5 of 7
Revision:	F
Drawing Scale:	1:5,000
Plot Scale:	1:1@A3





Legend:

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- AFA Boundary

Flood Depth

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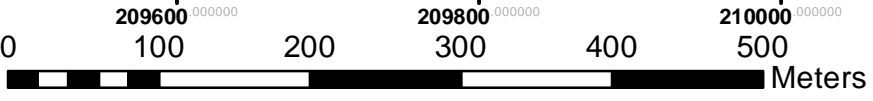


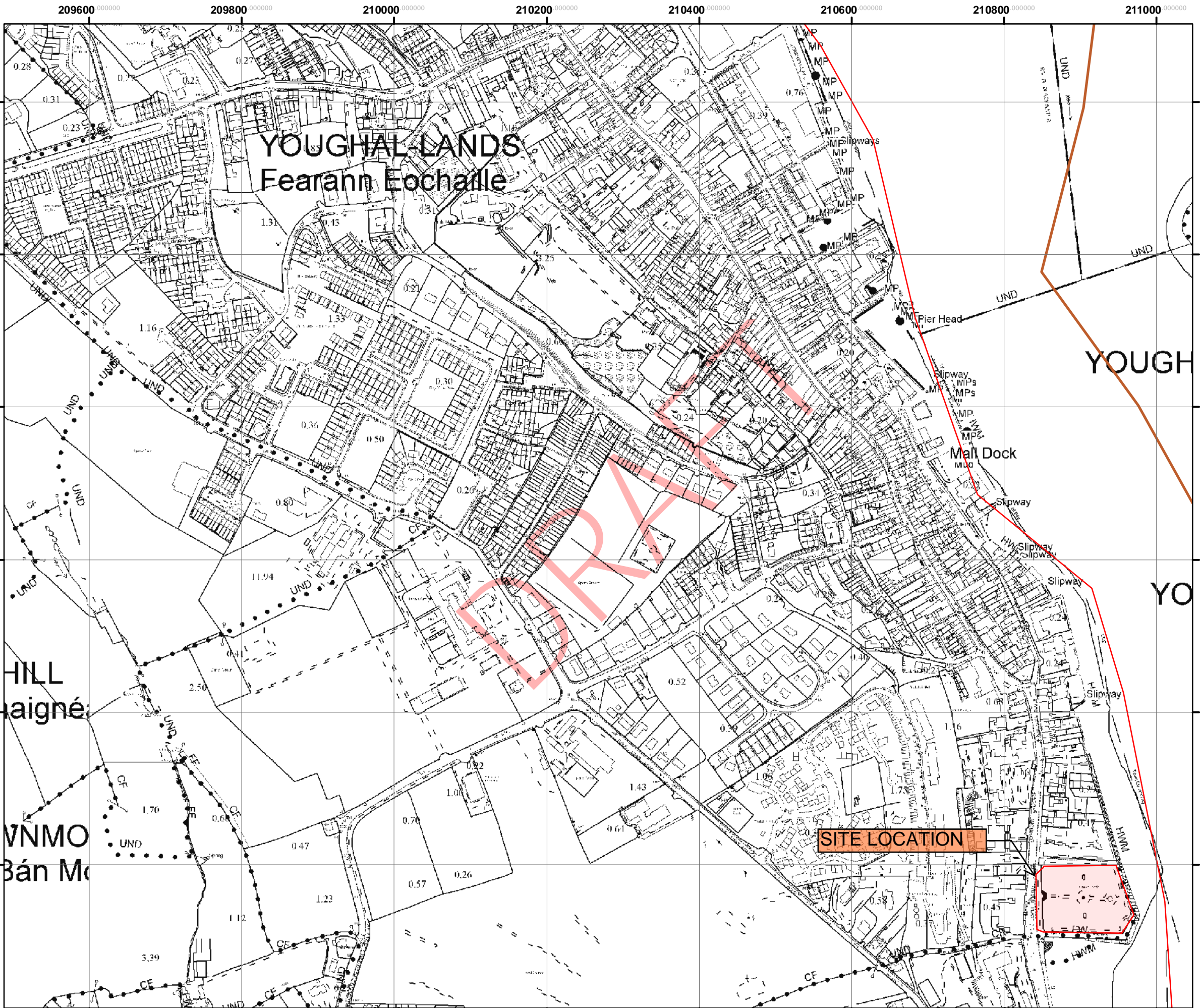
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Project: South Western CFRAM Study	
Map: Youghal - Flood Depth - Tidal 10% AEP	
Map type:	Flood Depth
Source:	Tidal Flooding
Map area:	Urban Area
Scenario:	Current
Drawn by: Lee Cutting	Date: June 2016
Checked by: Marianne Piggott	Date: June 2016
Approved by: Christian Hetmark	Date: June 2016
Map No.: MMD/296235/E/DR/118HYL/DPCCD100/F/Sht005	
Sheet: 5 of 7	Revision: F
Drawing Scale: 1:5,000	Plot Scale: 1:1@A3





Legend:

- Modelled River Centreline
- AFA Boundary

Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
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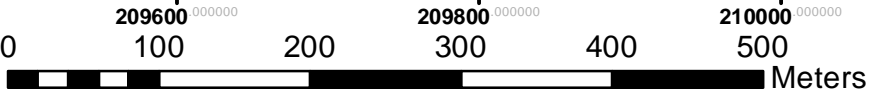
THIS AREA IS AT RISK FROM FLUVIAL AND TIDAL FLOODING. PLEASE REFER TO THE CORRESPONDING FLUVIAL/TIDAL MAP.

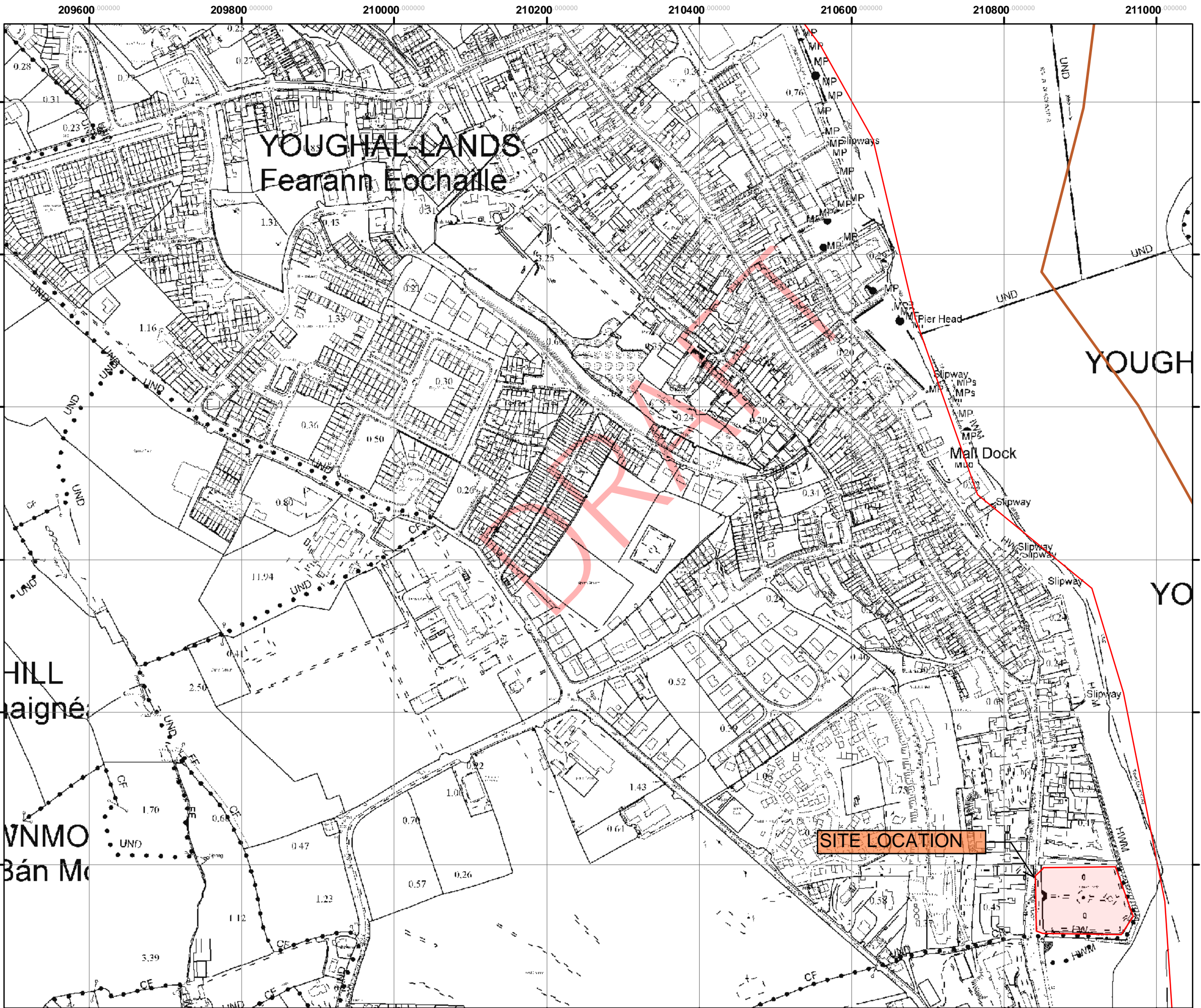


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Project: South Western CFRAM Study	
Map: Youghal - Flood Depth - Fluvial 0.1% AEP	
Map type:	Flood Depth
Source:	Fluvial Flooding
Map area:	Urban Area
Scenario:	Current
Drawn by: Lee Cutting	Date: June 2016
Checked by: Marianne Piggott	Date: June 2016
Approved by: Christian Hetmark	Date: June 2016
Map No.: MMD/296235/E/DR/118HYL/DPFCD001/F/Sht005	
Sheet: 5 of 7	Revision: F
Drawing Scale: 1:5,000	Plot Scale: 1:1@A3





- Legend:**
- Modelled River Centreline
 - AFA Boundary
- Flood Depth**
- 0 - 0.25m
 - 0.25 - 0.5m
 - 0.5 - 1.0m
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 - 1.5 - 2.0m
 - >2.0m

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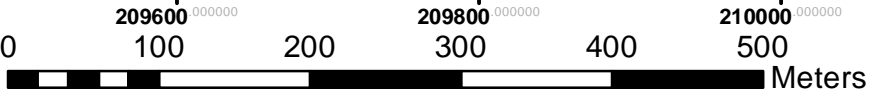
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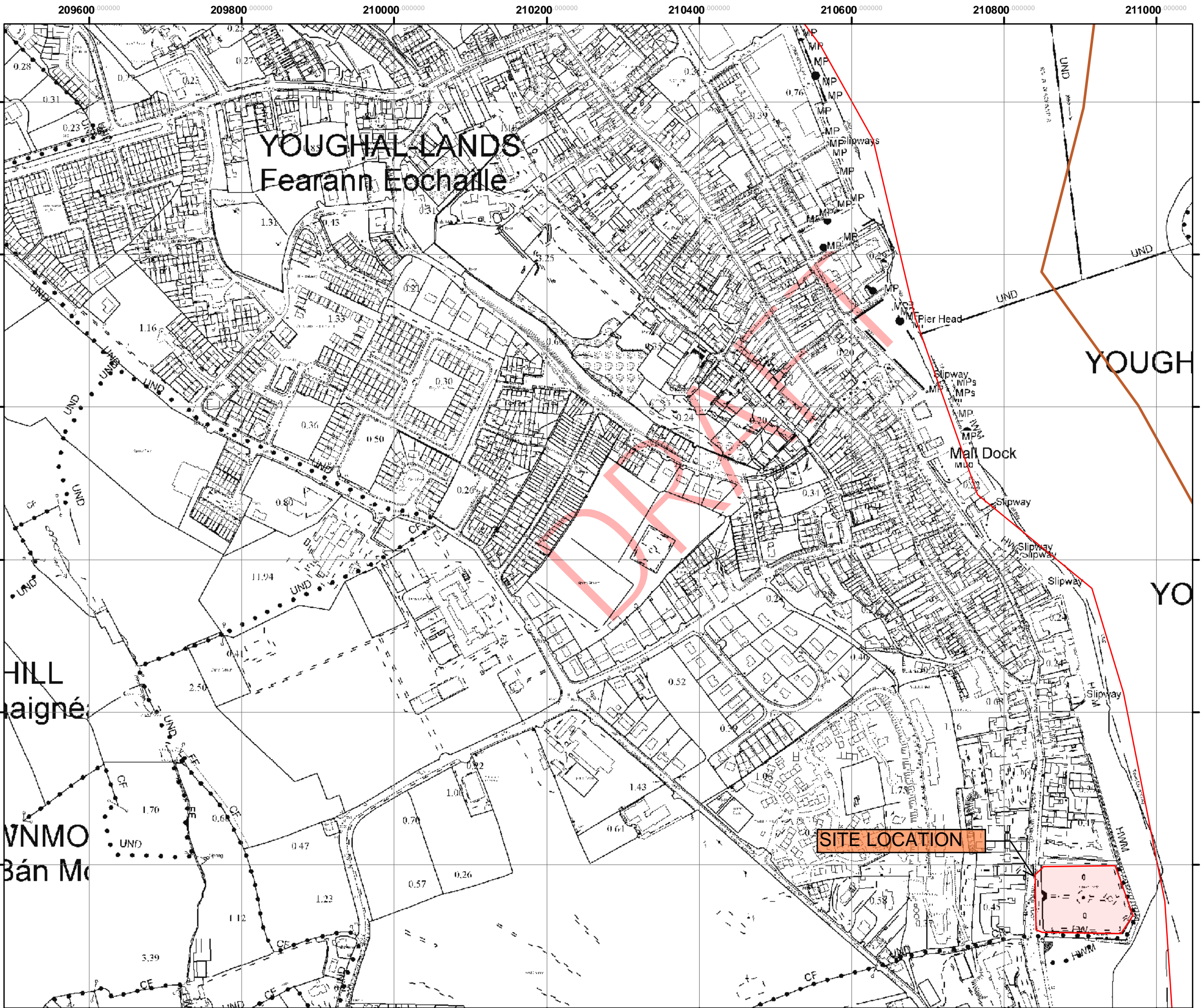


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Project: South Western CFRAM Study	
Map: Youghal - Flood Depth - Fluvial 1% AEP	
Map type:	Flood Depth
Source:	Fluvial Flooding
Map area:	Urban Area
Scenario:	Current
Drawn by: Lee Cutting	Date: June 2016
Checked by: Marianne Piggott	Date: June 2016
Approved by: Christian Hetmark	Date: June 2016
Map No.: MMD/296235/E/DR/118HYL/DPFCD010/F/Sht005	
Sheet: 5 of 7	Revision: F
Drawing Scale: 1:5,000	Plot Scale: 1:1@A3





Legend:

- Modelled River Centreline
- AFA Boundary

Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1.0m
- 1.0 - 1.5m
- 1.5 - 2.0m
- >2.0m

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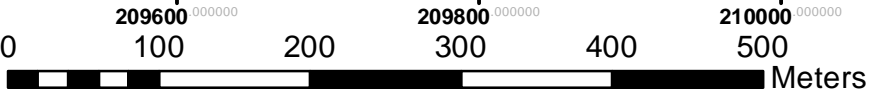


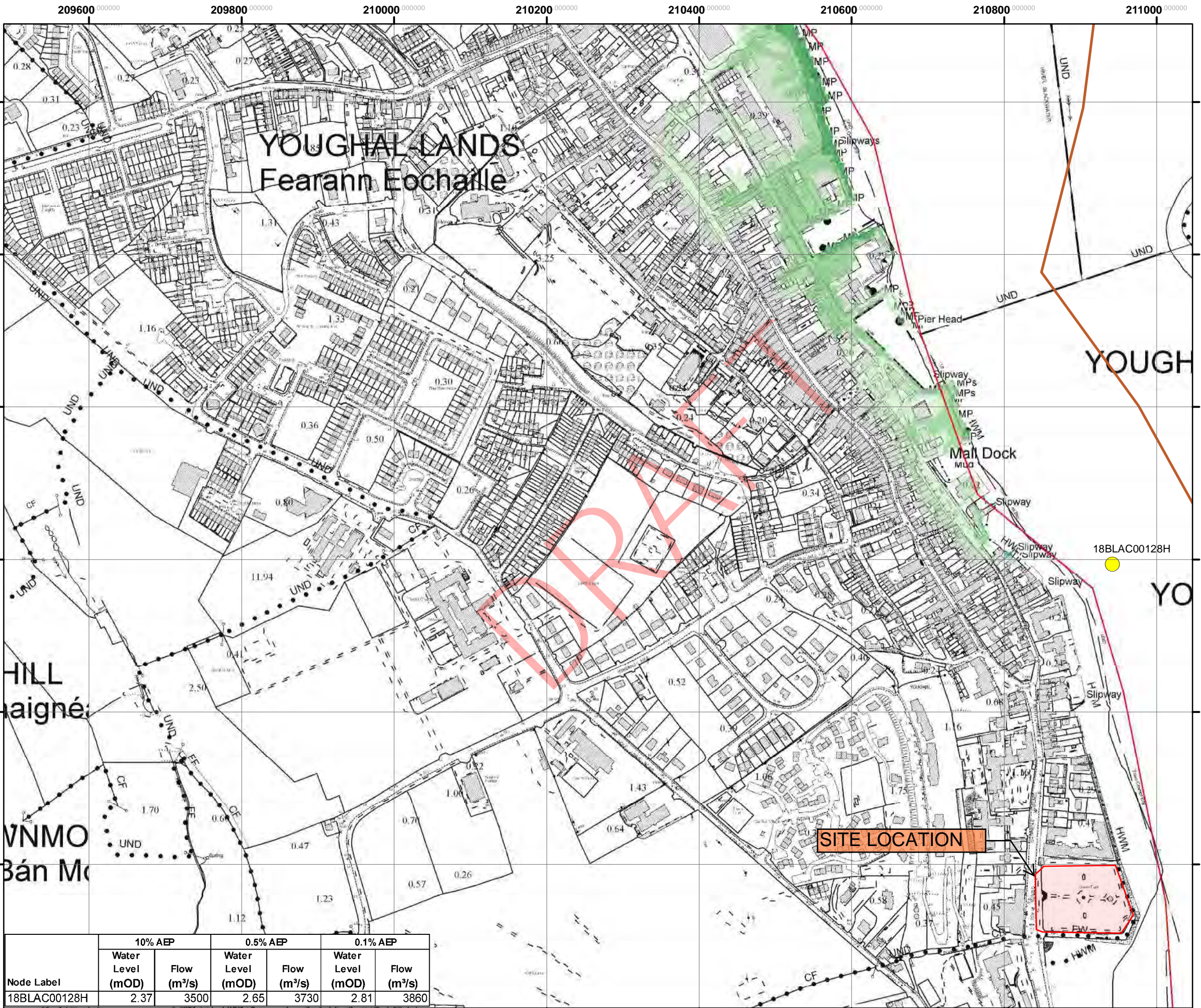
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Project: South Western CFRAM Study	
Map: Youghal - Flood Depth - Fluvial 10% AEP	
Map type:	Flood Depth
Source:	Fluvial Flooding
Map area:	Urban Area
Scenario:	Current
Drawn by:	Lee Cutting
Date:	June 2016
Checked by:	Marianne Piggott
Date:	June 2016
Approved by:	Christian Hetmark
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Map No.: MMD/296235/E/DR/118HYL/DPFCD100/F/Sht005	
Sheet:	5 of 7
Revision:	F
Drawing Scale:	1:5,000
Plot Scale:	1:1@A3





- Legend:**
- Model Nodes
 - Flood Defence - Embankment
 - Modelled River Centreline
 - Defended Area
 - AFA Boundary
 - - - Upstream limit to tidal influence
 - 10% AEP Flood Extent
 - 0.5% AEP Flood Extent
 - 0.1% AEP Flood Extent

THE AREA SHOWN IS AT RISK FROM FLUVIAL FLOODING. PLEASE REFER TO THE CORRESPONDING FLUVIAL MAP 18HYL/EXFCD/F2/Sh004 FOR MORE DETAIL.

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Project: South Western CFRAM Study

Map: Youghal - Flood Extent

Map type: Flood Extent

Source: Tidal Flooding

Map area: Urban Area

Scenario: Current

Drawn by: Emily Shipton Date: Nov-17

Checked by: Barry O'Connor Date: Nov-17

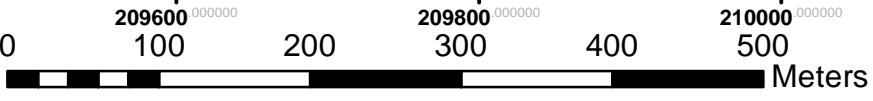
Approved by: Fintan McGivern Date: Nov-17

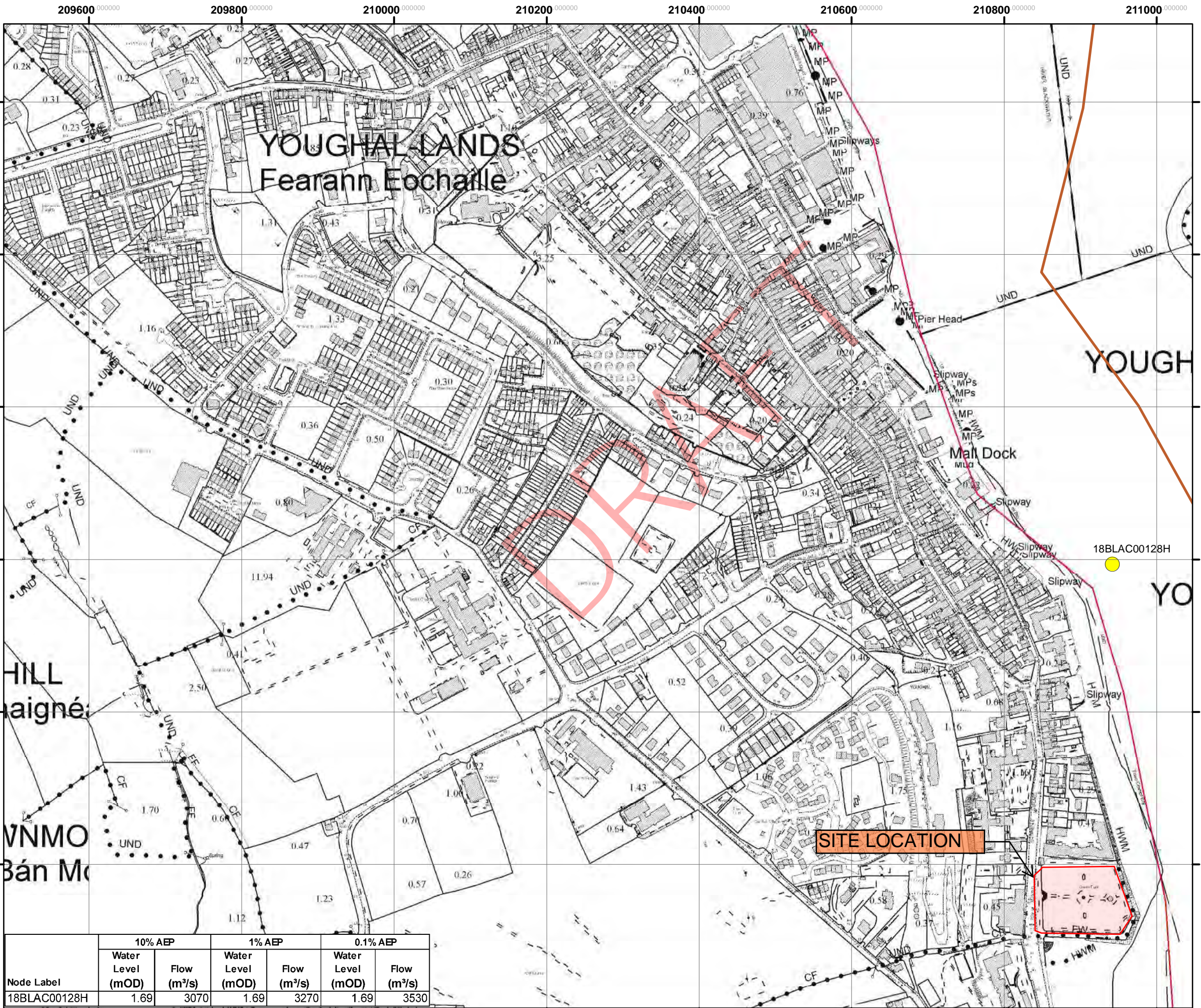
Map No.: MMD/296235/E/DR/18HYL11/EXCCDEX/F2/Sh004

Sheet: 4 of 7 Revision: F2

Drawing Scale: 1:5,000 Plot Scale: 1:1@A3

Node Label	10% AEP		0.5% AEP		0.1% AEP	
	Water Level (mOD)	Flow (m ³ /s)	Water Level (mOD)	Flow (m ³ /s)	Water Level (mOD)	Flow (m ³ /s)
18BLAC00128H	2.37	3500	2.65	3730	2.81	3860





- Legend:**
- Model Nodes
 - Flood Defence - Embankment
 - Modelled River Centreline
 - Defended Area
 - AFA Boundary
 - Upstream limit to tidal influence
 - 10% AEP Flood Extent
 - 1% AEP Flood Extent
 - 0.1% AEP Flood Extent

THE AREA SHOWN IS AT RISK FROM TIDAL FLOODING. PLEASE REFER TO THE CORRESPONDING TIDAL MAP 18HYL/EXCCD/F2/SHt004 FOR MORE DETAIL.

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



Office of Public Works
Jonathan Swift Street
Trim Co. Meath

M M
MOTT MACDONALD

Mott MacDonald Ireland
5 Eastgate Avenue
Little Island
Co. Cork

Project:	South Western CFRAM Study	
Map:	Youghal - Flood Extent	
Map type:	Flood Extent	
Source:	Fluvial Flooding	
Map area:	Urban Area	
Scenario:	Current	

Drawn by:	Emily Shipton	Date:	Nov-17
Checked by:	Barry O'Connor	Date:	Nov-17
Approved by:	Fintan McGivern	Date:	Nov-17

Map No.:	MMD/296235/E/DR/18HYL11/EXFCDEXF/F2/SHt004		
Sheet:	4 of 7	Revision:	F2
Drawing Scale:	1:5,000	Plot Scale:	1:1@A3

Node Label	10% AEP		1% AEP		0.1% AEP	
	Water Level (mOD)	Flow (m³/s)	Water Level (mOD)	Flow (m³/s)	Water Level (mOD)	Flow (m³/s)
18BLAC00128H	1.69	3070	1.69	3270	1.69	3530

