

Harry Reynolds Road Pedestrian and Cycle Route

Flood Risk Assessment

Fingal County Council

January 2020



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This document has 23 pages including the cover.

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Client signoff

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1. Introduction

Atkins are required as part of the planning submission to Fingal County Council to prepare a Flood Risk Assessment (FRA) for the proposed Harry Reynolds Road Pedestrian & Cycle Path, Balbriggan.

1.1. Relevant Guidance

This FRA has been undertaken in consideration with 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG November 2009, which is the latest guidance document.

The guidance has been issued to ensure that flood risk is a key consideration for developers, planning & regional authorities and the public in preparing and submitting development proposals. The principles of the guidance are as follows:

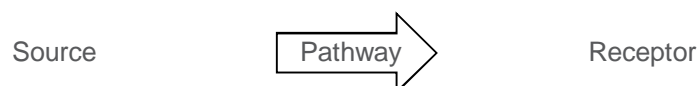
- Avoid the risk, where possible
- Substitute less vulnerable users, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible.

A staged approach is recommended within the guidance document in relation to identifying and assessing flood risk. The three stages of appraisal and assessment are as follows:

- Stage 1 Flood risk identification
- Stage 2 Initial flood risk assessment
- Stage 3 Detailed flood risk assessment

1.2. Flood Risk

Flood risk can be quantified by relating the probability of the flood event occurring to the consequence of the flood. Probability, in flood event terms, is gauged by potential annual occurrence/return period and flood consequence is dependent on the nature of the flood hazard and the vulnerability of the inundated area. The source-pathway-receptor model considers the components of flood risk.



The source is the hazard with the potential to cause harm through flooding (e.g. rainfall, high sea levels). The pathway is the mechanism by which the source can affect the receptor (e.g. inadequate drainage, overtopping of coastal defences) and finally, the receptor is anything which is affected by the flood event (e.g. people, infrastructure, property).

1.3. Causes of Flooding

The Planning System and Flood Risk Management Guidelines requires a FRA to consider all potential causes of flooding including the following:

- Coastal flooding
 - Inland flooding
 - Overland flow
 - River flooding
 - Flooding from artificial drainage systems
 - Groundwater flooding
 - Estuarial flooding
- Failure of infrastructure

1.4. Floodplains

A river flood plain is a low-lying area which receives excess flood water when the flow within the watercourse exceeds the capacity of the channel. A coastal flood plain is an area which, during high tide or increased sea levels, becomes inundated with sea water.

1.5. Assessing Flood Risk

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' three flood zones are designated in the consideration of flood risk to a particular site. The three flood zones are described in Table 1-1 below.

Table 1-1 - Flood Zone Description

Flood Zone	Description
Flood 'Zone A'	where the probability of flooding from watercourses is the highest (greater than 1% or 1 in 100 year for watercourse flooding or 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone B'	where the probability of flooding from watercourses is moderate (between 0.1% or 1 in 1000 year and 1% or 1 in 100 year for watercourse flooding, and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone C'	where the probability of flooding from watercourses and the sea is low or negligible (less than 0.1% or 1 in 1000 year for both watercourse and coastal flooding). Flood Zone 'C' covers all areas which are not in Zones 'A' or 'B'.

The planning implications for each of the flood zones are:

Zone A - High probability of flooding. Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation, would be considered appropriate in this zone.

Zone B - Moderate probability of flooding. Highly vulnerable development, such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses, sites used for short-let for caravans and camping and secondary strategic transport and utilities infrastructure, and water-compatible development might be considered appropriate in this zone. In general however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in Zone C and 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.

Zone C - Low probability of flooding. Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

2. Scheme Description

2.1. Scheme Location

The proposed scheme is located within and surrounding the Harry Reynolds Road, Balbriggan, Co. Dublin. Road upgrade works are proposed along Chieftain's Drive and Harry Reynolds Road in addition to short sections of carriageways on approach to the Harry Reynolds Road. Footpath upgrade works are proposed within Balbriggan Town Park in addition to the construction of new pedestrian/cycle link between Castlemill Link Road and Chieftain's Drive. It is also proposed to upgrade an existing pedestrian laneway which links Curran Park to the Harry Reynolds Road. The general scheme extents are displayed in Figure 2-1 below.

Figure 2-1 - Scheme Location



2.2. Existing Conditions

In general, the existing kerbline of the carriageways within the scheme extents are bound by grassed verges which buffer the pedestrian footpath. Surface water drainage from the existing roads discharge to storm sewers which ultimately discharge to the Irish Sea via several headwalls along the Balbriggan coastline. Appendix A includes site photographs of the area taken in June 2018.

2.3. Topography

The existing ground levels across the scheme extents fall steadily in an easterly direction towards the coastline from 30mAOD to 12 mAOD. Figure 2-2 below displays the contours surrounding the scheme area, obtained from the GeoHive website viewer. In addition, a topographical survey was undertaken by Apex Surveys on behalf of Fingal County Council in December 2018 to aid the road upgrade design. The survey has been reviewed and ground levels found to be in keeping with the contour map below.

Figure 2-2 - Local Topography



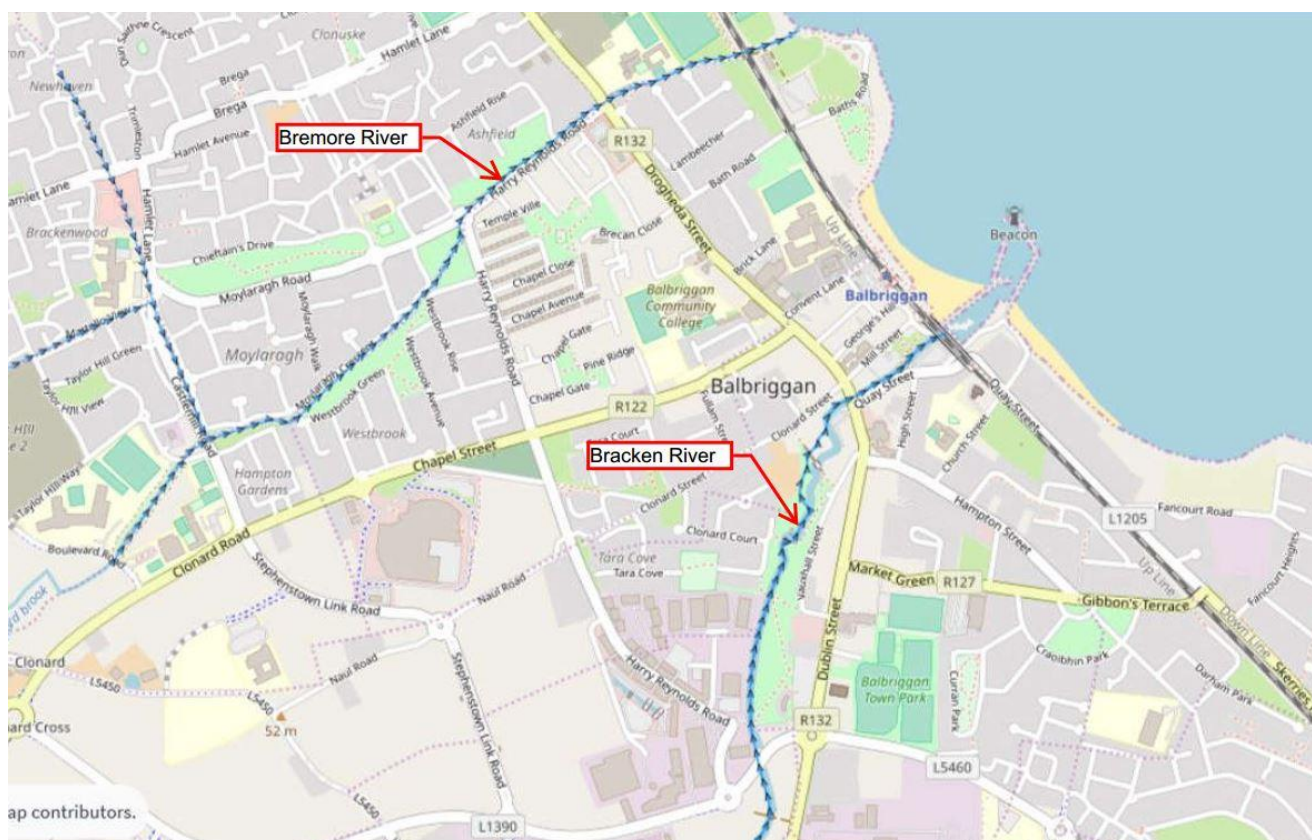
2.4. Local Hydrology

There are two existing watercourses within the scheme extents, as displayed in below. Neither watercourses have been assigned a Water Framework Directive Status for the 2010 – 2015 period. The Bremore River (EPA Code 08B41) is located to the north of the scheme and originates in the Clonard area to the west of Balbriggan. The river then flows in an easterly direction towards Harry Reynolds Road where it is then culverted through the town eventually discharging to the Irish Sea. The Bremore River has a catchment area of 2.5km².

The Bracken River (EPA Code 08M01) is located to the south of the scheme and originates to the west of the M1 motorway. The river then flows in an easterly direction through the centre of Balbriggan Town before discharging into the Irish Sea. The Bracken River has a catchment area of 27.8km².

The Irish Sea coastline buffers the town of Balbriggan to the east. This section of the Irish Sea (Northwestern) has been assigned a Water Framework Directive status of Good for the 2010 – 2015 period.

Figure 2-3 - Local Hydrology



2.5. Geology

The scheme extents are underlain by till and Irish Sea till derived from Lower Palaeozoic sandstone and shales. Alluvium deposits also buffer the existing open watercourses within the area.

2.6. Proposed Development

The National Transport Agency (NTA) have developed a Greater Dublin Area (GDA) Cycle Network Plan and as part of this Fingal County Council (FCC) proposes to deliver a high quality cycle route along Harry Reynolds Road in Balbriggan. The aim of the proposed scheme is the development of a cycle route which provides a quality of service in accordance with the National Cycle Manual and which provides an optimal balance of provision between the various competing transport modes along the route corridor.

Detailed drawings of the proposed upgrade works are included within the planning submission. The proposed pedestrian and cycle route is predominantly aligned along the Harry Reynolds Road which runs in a general north south direction alongside Stephenstown industrial estate and a number of residential areas and housing developments in Balbriggan town. Within the northern section of the scheme area the proposed route incorporates a link to Chieftain's Drive and within the southern section of the scheme area the route is proposed to run along Hamilton Road. The route links schools located at the northern and southern extents of the study area with residential areas and existing cycle paths alongside the route which is one of the objectives of the Cycle Network Plan (CNP). The overall aim of the CNP is to promote increased recourse to cycling as a means of transport.

To deliver this proposed scheme and provide a dedicated pedestrian and cycle track, works including; removal of existing grassed verges, removal of existing kerblines, construction of raised tables, raised two-way cycle tracks and new footpaths etc. are all required. Details of the proposed works are displayed in the planning drawings.

3. Flood Risk Identification

3.1. Flood Risk Investigation

In accordance with the planning guidelines, a *Stage 1 Flood risk identification* is required to be undertaken to identify if there are any flooding or surface water management issued related to the proposed development that may warrant further investigation. Initially, the following possible flood mechanisms for the Harry Reynolds Road Pedestrian & Cycle Path, Balbriggan have been identified:

Table 3-1 - Possible Flooding Mechanisms

Source/Pathway	Significant?	Comment/Reason
Coastal flooding	Yes	The scheme is located at a coastal area.
Overland flow	No	The surrounding topography is relatively shallow.
River flooding	Yes	The Bremore and Bracken Rivers are located within the scheme extents.
Flooding from artificial drainage systems	No	There is no significant urban drainage infrastructure in the immediate vicinity of the scheme.
Groundwater flooding	No	There are no significant springs or groundwater discharges recorded in the immediate vicinity of the scheme.
Estuarial flooding	No	The site is not at an estuarial location.
Failure of infrastructure	No	There are no hydraulic structures in the direct vicinity of the scheme.

Table 3-1 above demonstrates that the scheme is potentially at risk of flooding from coastal and/or fluvial flooding.

3.1.1. Office of Public Works Flood Maps

The Office of Public Works (OPW) has recently launched an interactive map viewer (<http://www.floodinfo.ie/map/floodmaps/>) which displays the predicted flood extents for both rivers and coastal areas over various return periods. The viewer was consulted in relation to the Harry Reynolds Road Pedestrian & Cycle Path, Balbriggan. Detailed flood maps are available for the Balbriggan area and the maps specific to the site (BNS/HPW/EXT/CURS/T/001 & BNS/HPW/EXT/CURS/001) have been included in Appendix B of this report.

From review of the detailed fluvial map it is evident that there are two locations within the scheme which are at risk from flooding (denoted by red circle).

The area to the North at the junction of Harry Reynolds Road and Drogheda Street is at risk of fluvial flooding from the Bremore River during a 1 in 1000 year (0.1% AEP) event. The map notes that there is a low confidence in the displayed flooding extents. It is predicted that the flooding at this location occurs when the culvert capacity is exceeded resulting in surcharging of the adjoining manholes.

The area to the South at the intersection of the Harry Reynolds Road and the Bracken River is at risk of fluvial flooding from the watercourse during all return periods (i.e. 1 in 10, 100 & 1000 year events). The map notes that there is a high confidence in the displayed flooding extents of a 1 in 100 year event and a low confidence in the extents displayed for a 1 in 10 & 1 in 1000 year event. The flood extents indicate that flooding is mainly contained within the channel at this location.

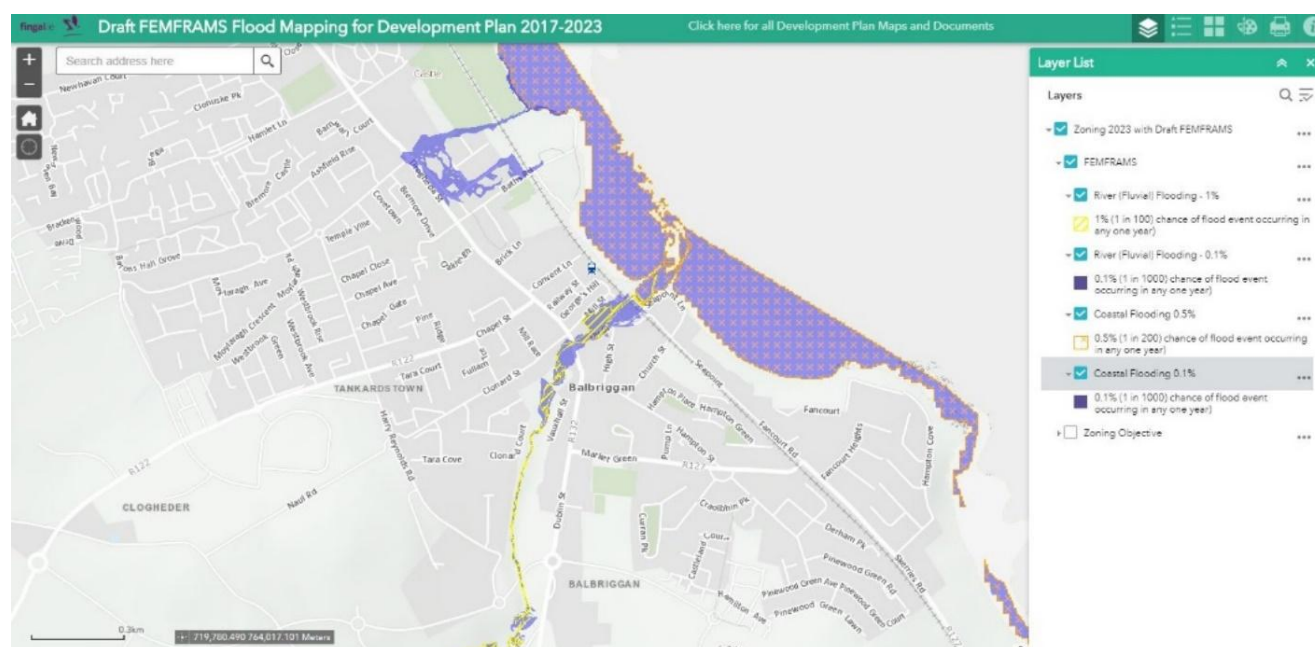
From review of the detailed coastal map it is evident that the area at the intersection of the Harry Reynolds Road and the Bracken River (denoted by red circle) is at risk of coastal flooding from the Irish Sea during all return periods (i.e. 1 in 10, 200 & 1000 year events). The map notes that there is a high confidence in the displayed flooding extents of a 1 in 200 year event and a low confidence in the extents displayed for a 1 in 10 & 1 in 1000 year event.

The topographical survey, detailed in Section 2.3 above, was reviewed in relation to the flood risk posed to the scheme at the intersection of the Harry Reynolds Road and the Bracken River. The drawing for this section has been included within Appendix C of this report. From review, the bed level upstream of the culvert crossing the proposed scheme is 13.449mAOD and the existing road level is 16.917 mAOD. Due to the variance in level between the watercourse and the existing road level, it is not anticipated that out of channel flooding of the Bracken River for a 1 in 100 year flood event would extend onto the Harry Reynolds Road carriageway.

3.1.2. Fingal Development Plan 2017-2023

The Strategic Flood Risk Assessment (SFRA) produced as part of the Fingal Development Plan 2017-2023 was consulted for review. The report details that sections of Balbriggan lie within Flood Zone A and B and that the extents of flooding are largely confined to green areas and car parking areas adjacent to the Bracken River. The Development Plan Justification Test, extracted from the SFRA, for the Balbriggan town centre is contained within Appendix D of this report. Figure 3-1 below displays the extents of flooding indicated on Fingal County Councils Draft FEMFRAMS Viewer. The extents displayed are in keeping with those contained within the OPW Flood Maps (Appendix B).

Figure 3-1 - Fingal County Council FEMFRAMS



3.1.3. OPW Flood Hazard Website

The OPW Flood Hazard Mapping website (www.floodinfo.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the scheme. The report generated for the general scheme area is included as Appendix E to this report.

The Flood Hazard Mapping Report indicates historic flooding points and a recurring flood point within the Balbriggan area. Details of the flood points relative to the Balbriggan area are as follows:

- OPW Flood Hazard Mapping – Phase 1; meeting minutes (April 2005)
Bremore, Balbriggan (Flood ID No 1648, 2183) – Road flooding due to surface water drainage capacity problem.
- Report on Flooding in Fingal Area in 2000 & 2002
Bremore Court – property flooded. A contract to construct new surface water culvert under the N1 is to commence in early 2003. Some flooding occurred at this location over the period 13th – 15th November 2002 but it is not considered as extensive as that which occurred in 2000.
- Report on Flooding in North County Dublin November 14th & 15th, 2002

Covetown – The foul sewer on Drogheda Street became surcharged and caused F.S. flooding on the roads and drives of Covetown. The overflow on the foul sewer at the Street at St. Moliga's National School was in full operation. The F.S. was close to overflowing in the toiler of house opposite National School.

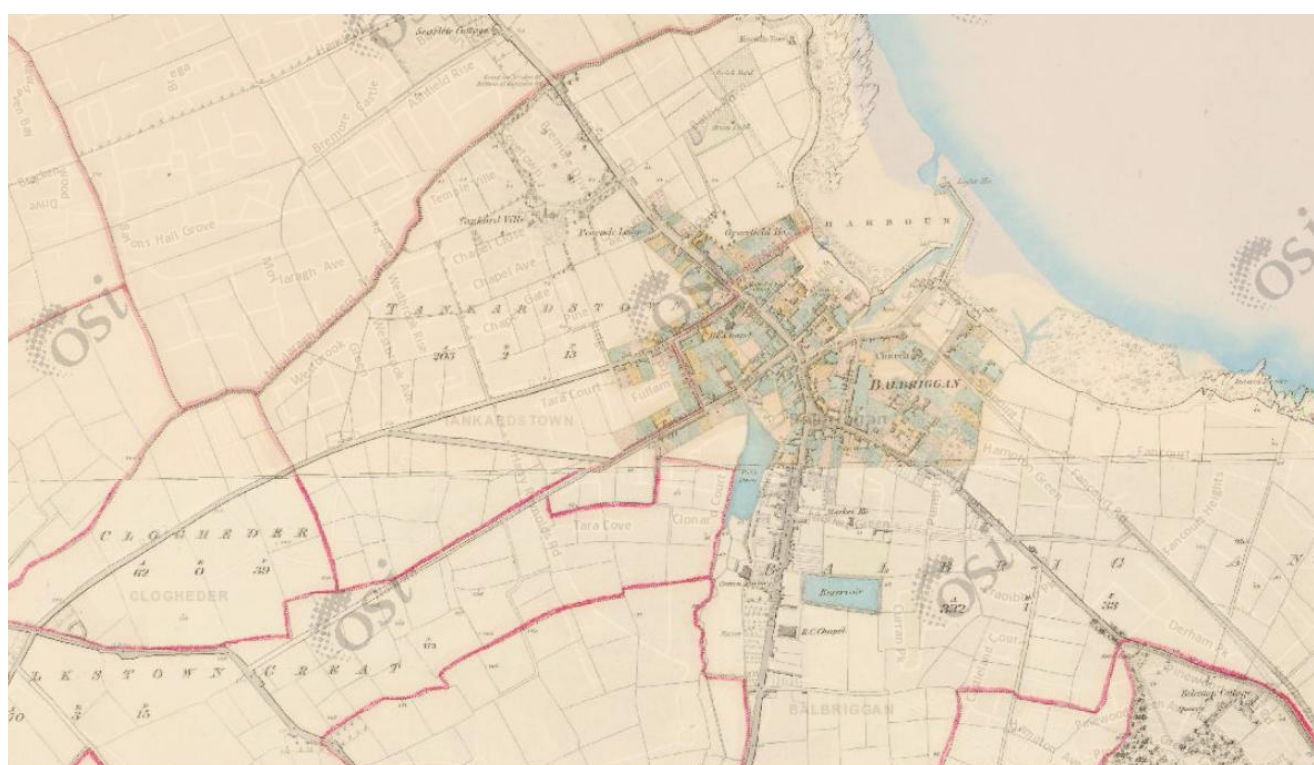
Bath Road – There was surface water flooding in the vicinity of the Railway bridge on Bath Road. The S.W. drainage was unable to take the water away.

From review of the OPW historical flooding data, it is apparent that out of sewer flooding from both surface and foul water sewers has occurred in the past at Bremore Court and Covetown which are both located to the East of the scheme area. However, it is assumed that remedial works have elevated these historic flooding issues as there are no further recorded events after 2002.

3.1.4. Ordnance Survey Historic Mapping

The GeoHive map viewer (<http://map.geohive.ie/mapviewer.html>) was consulted to review available historic mapping for the proposed scheme which can contain evidence of historical flooding incidences or occurrences. The maps consulted were the pre-1900's historic 6-inch colour and 25-inch maps. With reference to the pre-1900's historic maps, no indication of historical or anecdotal instances of flooding were observed within the environs of the scheme. However, both maps indicated that a permanent water body (Mill Dam) was present within Balbriggan Town Park pre-1900's, see Figure 3-2 below.

Figure 3-2 - Historic 6 Inch Colour Map



3.1.5. OPW/EPA/Local Authority Hydrometric Data

The OPW, EPA and Local Authority hydrometric data stations were reviewed on the EPA HydroNet website which confirmed that there are no stations near the scheme or there are no stations on the upstream sections of the two reviewed watercourses (i.e. Bremore and Bracken Rivers).

3.2. Conclusion of Flood Risk Identification

The purpose of the Stage 1 Flood risk identification process is to establish whether a flood risk issue currently exists or may exist in the future. If a potential flood risk issue is identified the risk will be investigated in further detail by undertaking a Stage 2 – Initial flood risk assessment. However, if no potential flood risk is identified then the overall assessment can conclude at this point.

In relation to the proposed Harry Reynolds Road Pedestrian & Cycle Path, Balbriggan, the upgrade works to the existing carriageway are minimal, there will be no regrading or change to existing levels across the scheme. The most noticeable change is the proposed removal of grassed verges along the carriageway. The removal of the grassed verge will increase the surface water runoff from the footpath and proposed cycle track, it is assumed that this could significantly contribute to an increase in existing surface water runoff from the Harry Reynolds Road discharging to the Irish Sea.

Fluvial flood risk to the north east section of the scheme from the Bremore River is predicted to occur from a 1 in 1000 year event, classifying this section of the scheme as lying within Flood Zone B. As the works in this area along Drogheda Street are limited to resurfacing only, it is not anticipated that the works will increase the flood risk at this location or elsewhere.

Fluvial and coastal flood risk at the intersection of the Harry Reynolds Road scheme upgrade and the Bracken River is predicted to occur from a 1 in 100 year and 1 in 200 year event respectively, classifying this section of the scheme as lying within Flood Zone A. From review of the predicted flood plain extents, the topographical survey completed for this scheme and a review of the watercourse, it is not anticipated that this section of the Harry Reynolds Road is risk of fluvial or coastal flooding from the Bracken River.

Therefore, based on the Stage 1 - Flood risk identification findings discussed above the flood risk study shall be concluded at this point as the scheme is not at risk from flooding

Recommendations

The following recommendations should be considered;

- Suitable Sustainable Urban Drainage systems (SUDs) are to be used within the proposed cycle route to reduce surface water from both the existing footpath and proposed cycle track following the removal of the grassed verge.
- Porous Asphalt is to be implemented along the cycle track in accordance with the latest revision of NSAI SR28 and the CIRIA report C753 'The SuDS Manual V-6'.
- Soil Infiltration testing to be carried out prior to design of SuDS options to ensure site is suitable.
- The proposed Porous Asphalt is to discharge into existing surface water drainage network at locations to be agreed with Fingal County Council.
- Regular checks and maintenance of the SuDS systems are required and are to be considered as part of the overall drainage design for the proposed cycle track. This will ensure both the design life of the SuDS systems, ongoing improved water quality and reduction of peak water runoff.

Appendices

Appendix A. Site Photographs





Photo No.1

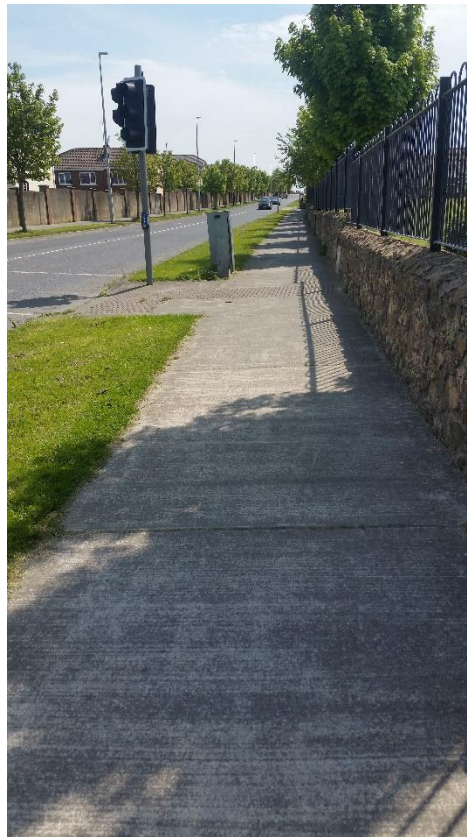


Photo No.2



Photo No.3



Photo No.4



Photo No.5

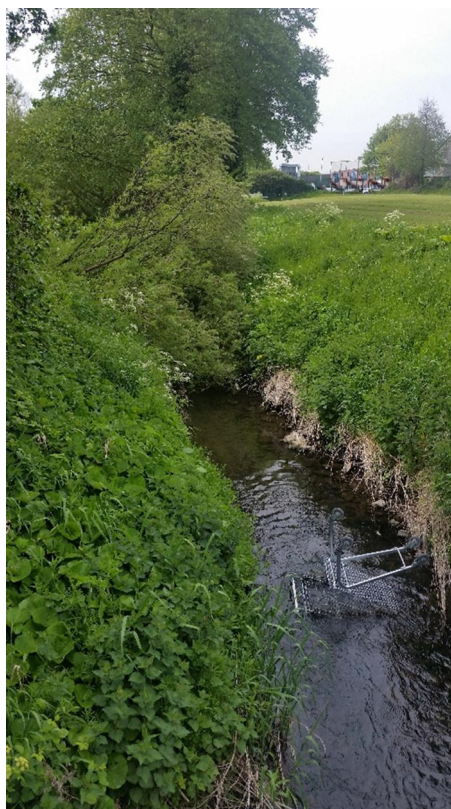


Photo No.6



Photo No.7



Photo No.8

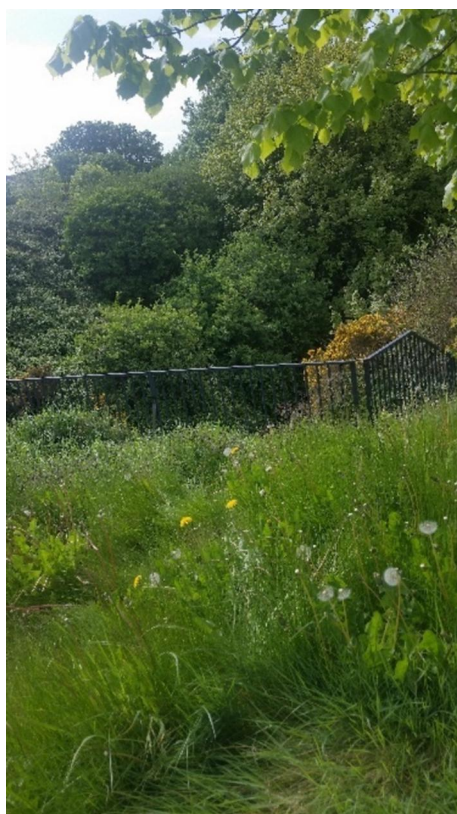


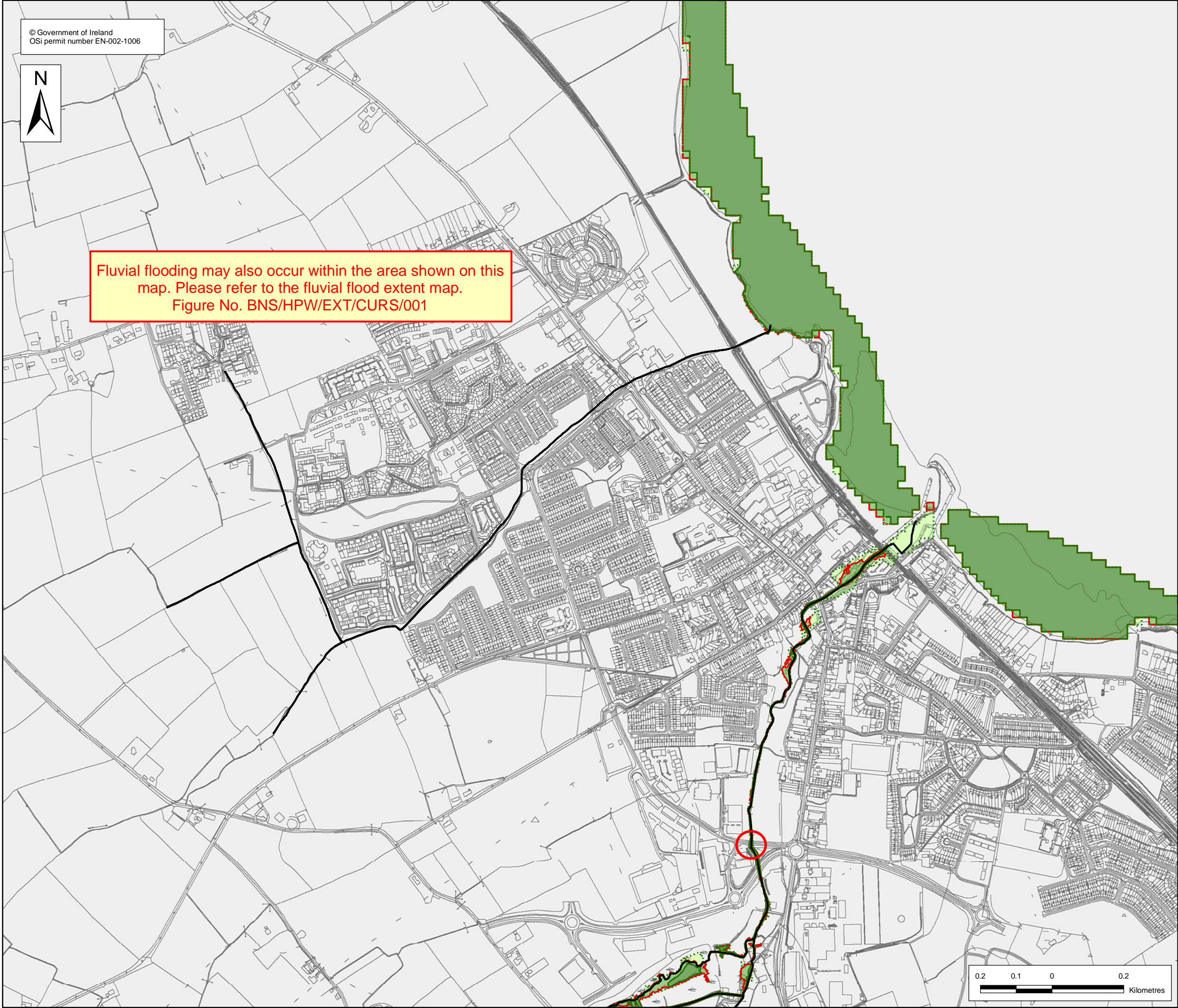
Photo No.9



Photo No.10

Appendix B. OPW Flood Maps

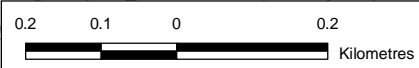
B.1. BNS/HPW/EXT/CURS/T/001 (COASTAL)



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Fluvial flooding may also occur within the area shown on this map. Please refer to the fluvial flood extent map. Figure No. BNS/HPW/EXT/CURS/001



EXTENT MAP

- Legend:
- 10 % AEP Flood Extent (1 in 10 chance in any given year)
 - 0.5 % AEP Flood Extent (1 in 200 chance in any given year)
 - 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
 - Defended area
 - High Confidence (<20m) (10% AEP)
 - Medium Confidence (<40m) (10% AEP)
 - Low Confidence (> 40m) (10% and 0.1% AEP)
 - High Confidence (<20m) (0.5% AEP)
 - Medium Confidence (<40m) (0.5% AEP)
 - Low Confidence (>40m) (0.5% AEP)
 - Estimate route of existing drain
 - Node Point
 - Node label with level data (refer to table)
 - Node level with flow & level data (refer to table)
 - High confidence
 - Medium confidence
 - Low confidence
- refer to table

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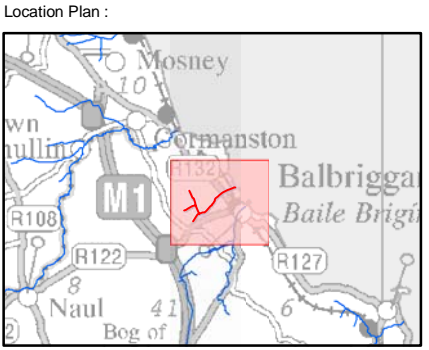
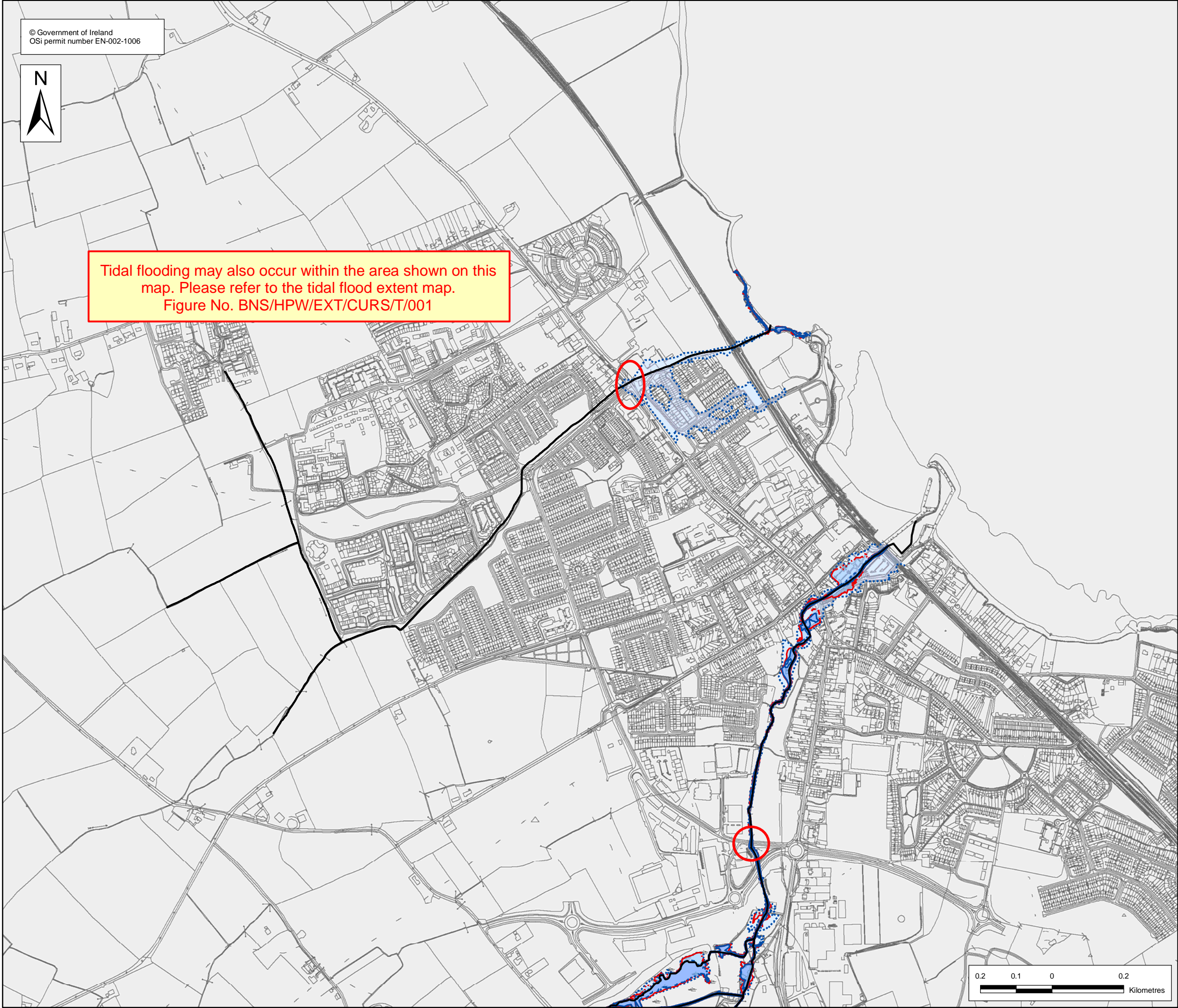
Project :
FEM FRAMS
Map : BALBRIGGAN NORTH STREAM MODEL
FLOOD EXTENT MAP

Map Type : FLOOD EXTENT
Source : TIDAL FLOODING
Map area : HIGH PRIORITY WATERCOURSE
Scenario : CURRENT
Figure By : Mara Ruiz Date : 17 January 2011
Checked By : Sergio Herbón Date : 17 January 2011
Approved By : Clare Dewar Date : 17 January 2011

Figure No. :
BNS/HPW/EXT/CURS/T/001
Revision
1

Drawing Scale : 1:10,000 Plot Scale : 1:1 @ A3

B.2. BNS/HPW/EXT/CURS/001 (FLUVIAL)



EXTENT MAP

Legend:

- 10 % AEP Flood Extent
(1 in 10 chance in any given year)
- 1 % AEP Flood Extent
(1 in 100 chance in any given year)
- 0.1 % AEP Flood Extent
(1 in 1000 chance in any given year)
- Defended area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% AEP)
- Low Confidence (>40m) (10% and 0.1% AEP)
- High Confidence (<20m) (1% AEP)
- Medium Confidence (<40m) (1% AEP)
- Low Confidence (>40m) (1% AEP)
- Estimate route of existing drain
- Node Point
- Node label with level data (refer to table)
- Node level with flow & level data (refer to table)
- High confidence
- Medium confidence
- Low confidence

refer to table

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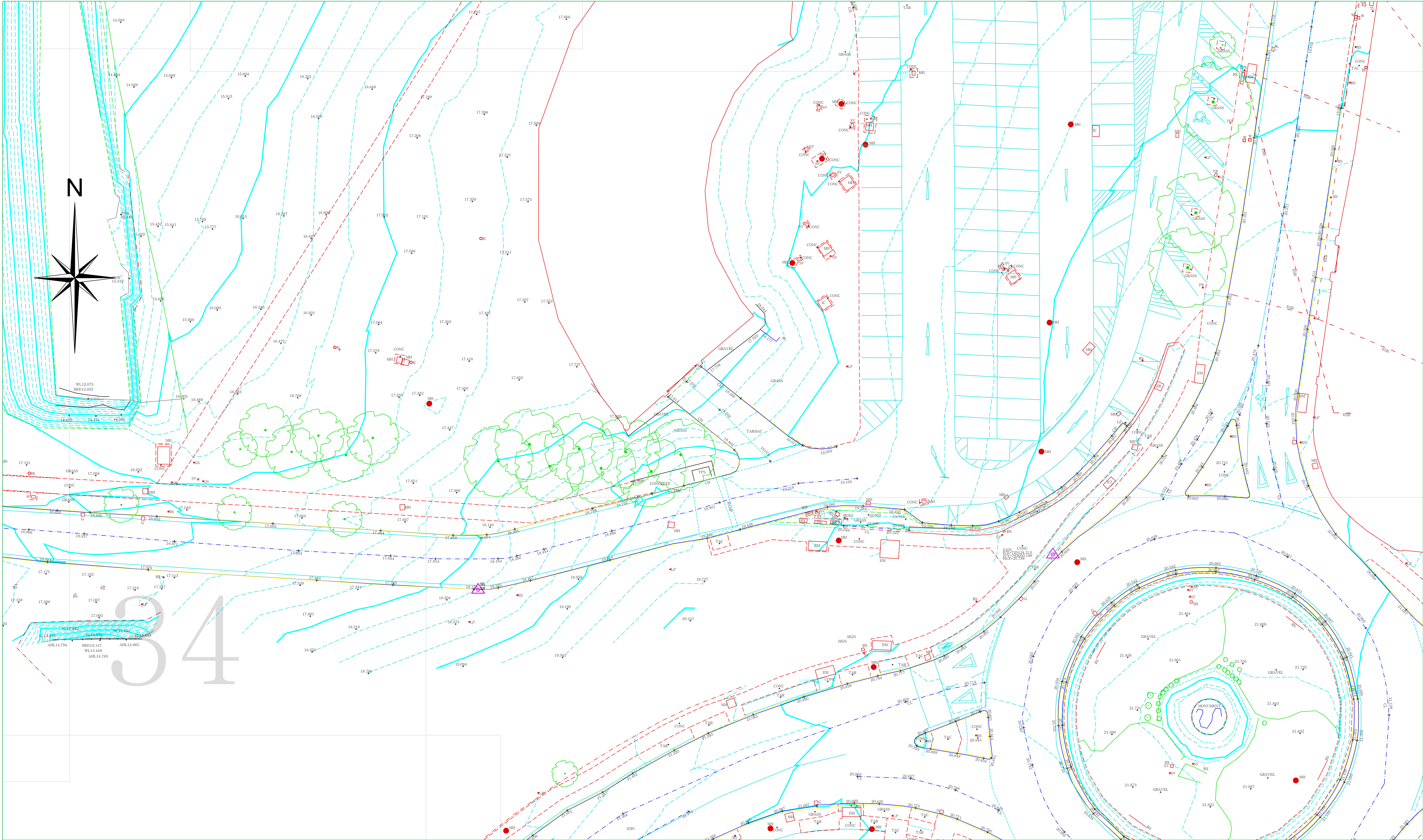
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Clients :

Project : FEM FRAMS	
Map : BALBRIGGAN NORTH STREAM MODEL FLOOD EXTENT MAP	
Map Type :	FLOOD EXTENT
Source :	FLUVIAL FLOODING
Map area :	HIGH PRIORITY WATERCOURSE
Scenario :	CURRENT
Figure By : Mara Ruiz	Date : 8 August 2010
Checked By : Sergio Herbón	Date : 8 August 2010
Approved By : Clare Dewar	Date : 8 August 2010
Figure No. : BNS/HPW/EXT/CURS/001	Revision 0
Drawing Scale : 1:10,000	Plot Scale : 1:1 @ A3

Appendix C. Topographical Survey Extract



APEX
SURVEYS

www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

RURAL/NATURAL FEATURES :

- BUSH
- SAPLING
- TREE
- HEDGE
- TROUGH
- CATTLE GRID
- LINEWORK:
- EMBANKMENT TOP
- DRAIN
- BREAKLINE
- BUILDING
- KERB BOTTOM
- WALL
- PATH/CHANGE SURFACE
- OHEAD ELECTRICITY
- OHEAD TELECOM

STREET FURNITURE :

- BOLLARDS
- BUS STOP
- CRASH BARRIER
- GATE
- ELECTRICITY POLE
- EARTHING ROD
- LAMP POST
- MARKER POST
- SIGN POST
- TRAFFIC LIGHT
- TELEPHONE BOX
- TELEPHONE POLE
- POST
- POST BOX
- ROADSIGN
- BORE HOLE
- TRIAL PIT

SERVICES :

- AIR VALVE
- ARMSTRONG JUNCTION
- CABLE TV IC
- COVER LEVEL
- EIRCOM COVER
- EIRCOM JUNCTION BOX
- ELECTRICAL CABLE PIT
- ESAT COVER
- ESB COVER
- ESB JUNCTION BOX
- FIRE HYDRANT
- GAS VALVE
- GULLY
- INSPECTION COVER
- MANHOLE
- SEPTIC TANK
- SLUICE VALVE
- STOPCOCK

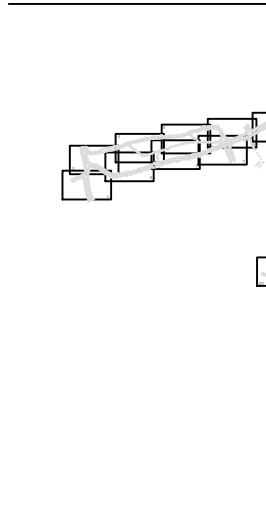
SERVICES :

- SERVICE BOX (UNKNOWN)
- TRAFFIC COVER
- VENT
- WATER METER
- UNABLE TO LIFT

LEVELS :

- BED LEVEL
- EAVE LEVEL
- FLOOR LEVEL
- INVERT LEVEL
- ROAD LEVEL
- RIDGE LEVEL
- SOFFIT LEVEL
- SPOT LEVEL
- TOP OF WALL LEVEL
- WATER LEVEL
- SURVEY CONTROL STATION

SHEET LAYOUT :



PLAN PRODUCED BY:

APEX
SURVEYS

CONTACT INFORMATION:

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Unit 78 Dunboyne Business Park
Dunboyne, Co. Meath, Ireland
www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

CLIENT:

Fingal County Council

PROJECT:

Harry Reynolds Road
Balbriggan

GRID SYSTEM:

Irish Transverse Mercator
Main Head (OSGM15)
Drawing Contains Scale Factor

REVISIONS:

No.	Date	Description
002	04/12/18	Additional Information Added
003	17/12/18	Additional Information Added
004	04/01/19	Section Information Added
005	15/01/19	Additional Information Added

SCALE : 1/200

DRG No: 3525

SHEET: 34 of 43

DATE : 04/12/2018

DESCRIPTION : 2D Topographical

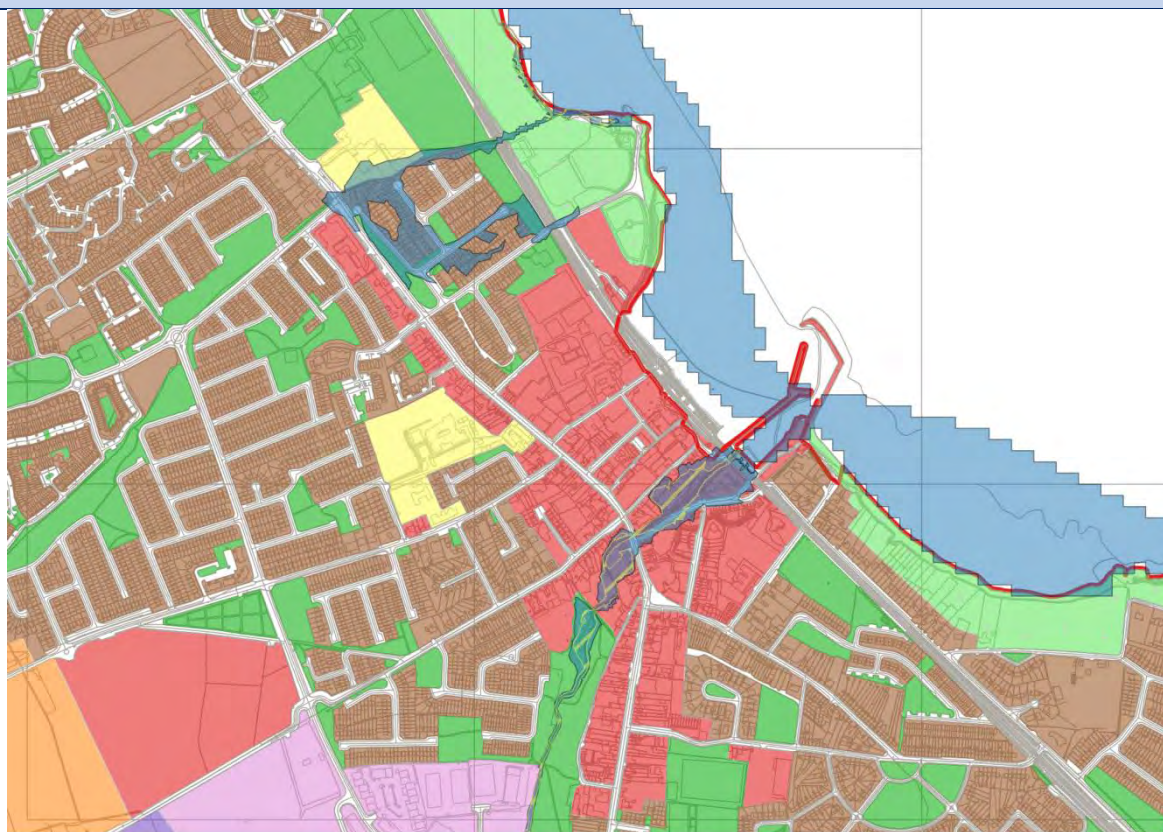
SURVEYED BY : Apex Surveys

PROCESSED BY : Apex Surveys

CHECKED BY : Alan Brady

Appendix D. Development Plan Justification Test

Development BALBRIGGAN



Criteria 1	Balbriggan is a coastal town in the north of the county It is a long established area and fairly well developed.
Criteria 2	The existing zoning remains compatible with the long established use and existing residential developments.
Criteria 3	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Masterplan process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> ▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain. ▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B. ▪ Development in Flood Zone A should be either open space or water compatible. ▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels. ▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis s and the land given to storage must be land which does not flood in the 1% AEP flood event.
<p>Conclusion Pass. It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.</p>	

Appendix E. OPW Flood Hazard Map

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: Dublin

NGR: O 202 637

This Flood Report has been downloaded from the Web site 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 1:29,225

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.

4 Results



1. Covetown Balbriggan Nov 2002

County: Dublin

Additional Information: Reports (1) More Mapped Information

Start Date: 14/Nov/2002

Flood Quality Code:3



2. Bath Road Nov 2002

County: Dublin

Additional Information: Reports (1) More Mapped Information

Start Date: 14/Nov/2002

Flood Quality Code:3



3. Bremore Court Balbriggan Nov 2000

County: Dublin

Additional Information: Reports (2) More Mapped Information

Start Date: 05/Nov/2000

Flood Quality Code:3



4. Bremore Balbriggan Recurring

County: Dublin

Additional Information: Reports (2) More Mapped Information

Start Date:

Flood Quality Code:3

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