Appendix N
Flood Risk Assessment

Ringsend to City Centre Core Bus

Corridor Scheme

Site Specific Flood Risk Assessment

TABLE OF CONTENTS

1. INTRODUCTION

As part of the preliminary design process, Roughan & O'Donovan Consulting Engineers has carried out a Flood Risk Assessment for corridor 16, Ringsend to City Centre of the Bus Connect Project. This report has been prepared to assess the flood risk to the subject site and adjacent lands as a result of the proposed development. This assessment has been carried out in accordance with the "The Planning System and Flood Risk Management, Guideline for Planning Authorities (November 2009) and "Circular PL 2/2014" dated 13. August 2014, appendix.

1.1 Description of Study Area

The extents of the corridor 16 are shown Figure 1.1. The corridor leads from Ringsend to City Centre. This development consists of the reconfiguring of existing impervious paved areas into a Bus and Cycle lane corridor with accompanying footpaths and involves the development of approximately 3.2km bus lane and 5km cycle lanes. Minor pervious surface (grassed areas) will be transformed into impervious areas, Sustainable Drainage Systems (SuDS) will be implemented to mitigate the alterations to runoff. As a consequence, the works are considered to be a minor development that does not adversely change the flow regime of the existing drainage regime.

The corridor 16 follows the river Liffey along City Quay and North Wall Quay starting at Tom Clarke Bridge and ending at Moss Street. The Liffey rises in the Wicklow Mountains, flows for ~132km through counties Wicklow, Kildare and Dublin before entering the Irish Sea at Dublin Bay. The catchment area of the Liffey is ~1,256km^2.

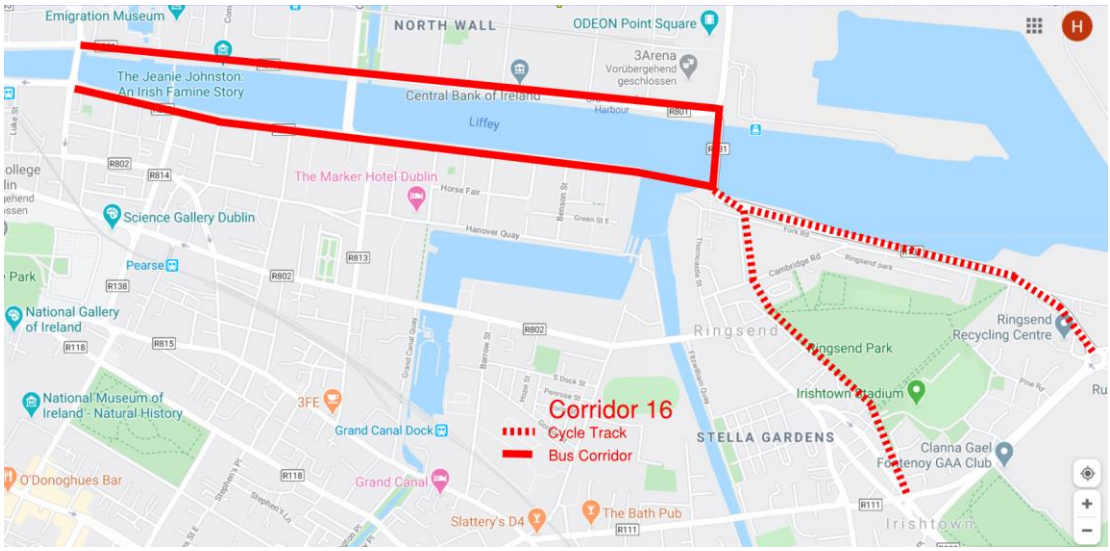


Figure 1.1 **Corridor 16, Ringsend City Centre (map underlay source: Google Maps). Solid line indicates Bus Corridor. Dashed line indicates Cycleway.**

2. FLOOD RISK

2.1 Introduction

This report has been prepared in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' herein referred to as 'The Guidelines' as published by the Office of Public Works (OPW) and Department of Environment, Heritage and Local Government (DoHLG) in 2009 and Circular PL 2/2014.

2.2 Identification of Flood Risk

Flood risk is a combination of the likelihood of a flood event occurring and the potential consequences arising from that flood event and is then normally expressed in terms of the following relationship:

Flood risk = Likelihood of flooding x Consequences of flooding.

To fully assess flood risk 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) is required. Figure 2.1 below shows a source-pathway-receptor model reproduced from 'The Guidelines' (DEHLG-OPW, 2009).

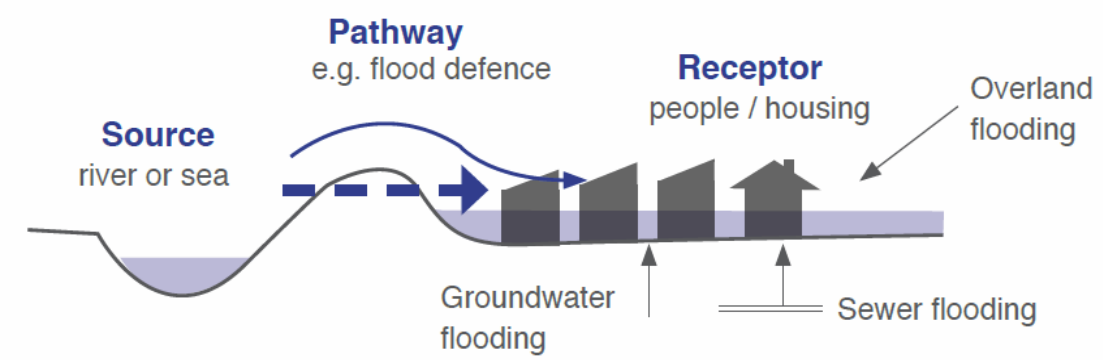


Figure 2.1 Sources, Pathways and Receptors of Flooding

The principal sources of flooding generally are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains. The receptors can include people, their property and the environment. All three elements as well as the vulnerability and exposure of receptors must be examined to determine the potential consequences.

The Guidelines set out a staged approach to the assessment of flood risk with each stage carried out only as needed. The stages are listed below:

- *Stage I Flood Risk Identification* – to identify whether there may be any flooding or surface water management issues.
- *Stage II Initial Flood Risk Assessment* – to confirm sources of flooding that may affect an area or proposed development, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps.
- *Stage III Detailed Flood Risk Assessment* – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on

flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

2.3 Likelihood of Flooding

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is generally expressed as a return period or annual exceedance probability (AEP). A 1% AEP flood indicates a flood event that will be equalled or exceeded on average once every hundred years and has a return period of 1 in 100 years. Annual Exceedance probability is the inverse of return period as shown Table 2.1 below.

Table 2.1 Correlation Between Return Period and AEP

Return Period (years)	Annual Exceedance Probability (%)
1	100
10	10
50	2
100	1
200	0.5
1000	0.1

2.4 Definition of Flood Zones

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. These are split into three categories in The Guidelines:

Flood Zone A

Flood Zone A where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal/tidal flooding);

Flood Zone B

Flood Zone B where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 or 0.5% or 1 in 200 for coastal/tidal flooding);

Flood Zone C

Flood Zone C where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal/tidal flooding. Flood Zone C covers all plan areas which are not in zones A or B.

It is important to note that when determining flood zones the presence of flood protection structures should be ignored. This is because areas protected by flood defences still carry a residual risk from overtopping or breach of defences and the fact that there is no guarantee that the defences will be maintained in perpetuity.

2.5 Sequential Approach & Justification Test

The Guidelines outline the sequential approach that is to be applied to all levels of the planning process. This approach should also be used in the design and layout of a development and the broad philosophy is shown in Figure 2.2 below. In general, development in areas with a high risk of flooding should be avoided as per the

sequential approach. However, this is not always possible as many town and city centres are within flood zones and are targeted for development.

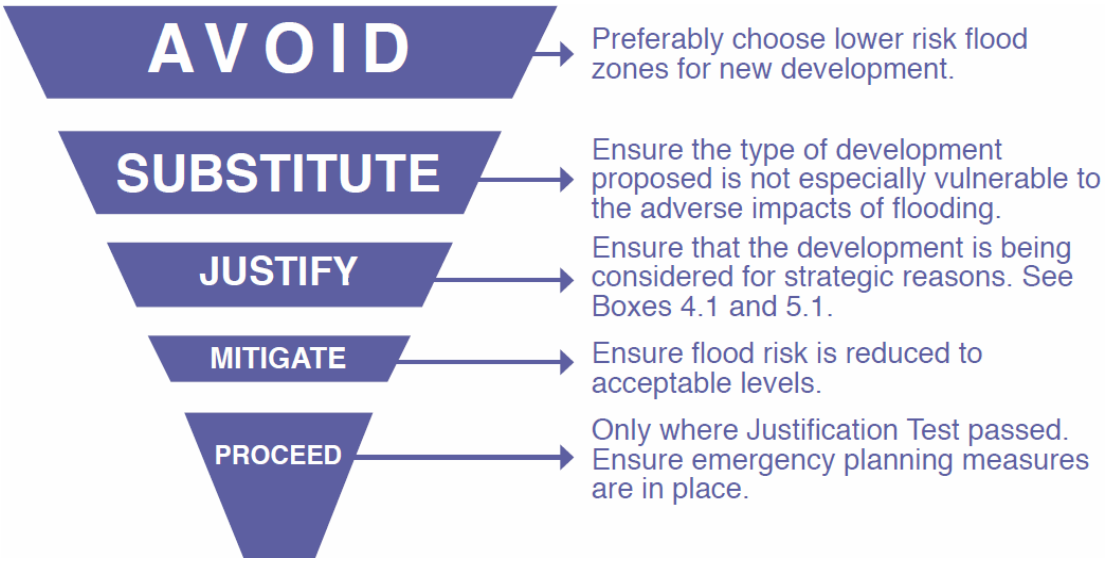


Figure 2.2 Sequential Approach (Source: The Planning System and Flood Risk Management)

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of developments that are being considered in areas of moderate or high flood risk. The test comprises the following two processes.

- The first is the Plan-making Justification Test and is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding.
- The second is the Development Management Justification Test and is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

Table 2.2 Matrix of Vulnerability Versus Flood Zone to Illustrate Appropriate Development that is Required to Meet the Justification Test (Source: The Planning System and Flood Risk Management)

	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

3. STAGE 1: FLOOD RISK IDENTIFICATION

3.1 General

This Stage 1 Flood Risk Identification includes a review of the existing information and the identification of any flooding or surface water management issues in the study area that may warrant further investigation.

3.2 Vulnerability of the Proposed Site

As per the OPW Guidelines, the proposed development is classified as a“Less Vulnerable” development as it comprises local transport infrastructure (refer to Figure 3.1 below).

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	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.
Less vulnerable development	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.
Water-compatible development	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	

Figure 3.1 Classification of vulnerability of different types of development (The Planning System and Flood Risk Management, Guidelines for Planning Authorities, November 2009)

3.3 Information Sources Consulted

The following information sources were consulted as part of the Stage 1 Flood Risk Identification:

Table 3.1 Information Sources Consulted

Source	Data Gathered
Catchment Flood Risk Assessment and Management Study (CFRAM)	Fluvial, Pluvial, Coastal flooding data contained within the Eastern and Dodder CFRAMS
Irish Coastal Protection Strategy Study (ICPSS)	Coastal flooding
Geological Survey of Ireland (GSI) Maps	GSI Teagasc subsoils map consulted to identify if alluvial sediments are shown to be present at development site that may indicate the presence of a watercourse and historic floodplains.
Historical Maps	OSI 25" mapping assessed
News Reports	News reports published in newspapers or digital news websites.

3.4 Primary Sources of Baseline Data

(i) Catchment Flood Risk Assessment and Management Study

The Plan area is covered within the Eastern and Dodder CFRAM study areas. The CFRAM programme led by the OPW, provides a detailed assessment of flooding in areas identified as AFA's during the PFRA study. Catchment wide Flood Risk Management Plans were also developed as part of the programme.

The published CFRAM mapping indicates that the Bus Connect corridor 16 has a potential to flood in 1% and 0.1% Fluvial AEP events. The route is also indicated to flood in the 0.5% and 0.1% AEP tidal flood events. Additionally, the CFRAM mapping indicates pluvial flooding within the vicinity of the subject site.

The published CFRAM flood maps are reproduced in Appendix B.

(ii) Irish Coastal Protection Strategy Study

The Irish Coastal Protection Strategy Study (ICPSS) Phase 3, undertaken by the OPW, covers coastal flooding throughout Ireland. The aims of the ICPSS were to establish extreme coastal flood extents, produce coastal flood extent and flood depth maps and assess and quantify the hazard and potential risk associated with coastal erosion.

The ICPSS flood maps indicate that sections of the subject site are within the 0.5% AEP coastal flood extent.

The published ICPSS flood maps are reproduced in Appendix B.

(iii) OPW National Flood Hazard Mapping

The OPW National Flood Hazard Mapping Web Site (www.floodmaps.ie) was examined to identify any recorded flood events within the vicinity of the subject site. Flood Events have been recorded within the proximity of Ringsend. However, these were recorded on the opposite bank of the river Dodder, no flood events are indicated on the Ringsend east of the river Dodder.

The OPW Flood Hazard Mapping is reproduced in Appendix B.

(iv) Secondary Sources of Baseline data

The following sources were also examined to identify areas that may be liable to flooding:

Table 3.2 Secondary Sources of Baseline Data

Source	Data Gathered
GSI Maps	GSI Teagasc subsoils map shows the subject site is underlain by made ground. Refer to Appendix B for GSI maps.
Historical Maps	No areas of the site have been identified as liable to flooding. However, much of the Ringsend area appears to be reclaimed land. Refer to Appendix B for Historical Maps.
News Reports	There are reports about areas in the proximity of the corridor 16, reported to have flooded in 1971. Refer to Appendix B, News Reports.

3.5 Source – Pathway – Receptor Model

The following source-pathway-receptor model has been developed using the information examined in the Stage I Flood Risk Identification to categorise the sources of flooding, where it flows to (pathway) and the people and infrastructure affected by it (receptors). The likelihood and consequences of each type of flooding have also been assessed to determine the risk. These are summarised in Table 3.3 (taken from Appendix A of the Guidelines).

Table 3.3 Source-Pathway-Receptor Model

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Fluvial flooding	Overbank flow from the River Dodder	Corridor 16	*High*	*Moderate* (Flooding of local transport infrastructure)	*Moderate*
Surface Water / Pluvial flooding	Extreme rainfall events and inadequate surface water drainage	Corridor 16	*High*	*Moderate* (Flooding of transport infrastructure)	*Moderate*
Coastal flooding	Extreme tides, storm surges or wave overtopping	Corridor 16	*High*	*Moderate* (Flooding of transport infrastructure)	*Moderate*
Ground-water Flooding	Rising groundwater levels	Corridor 16	*Low* (No reports or geological indicators)	*Moderate* (Flooding of transport infrastructure)	*Low*

3.6 Stage 1 Conclusions

Available information indicates that sections of the proposed route are liable to flood from various sources. As per the OPW guidelines a Stage 2 Initial Flood Risk Assessment is required.

4. STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

4.1 General

The Stage 2 Initial Flood Risk Assessment will confirm the of sources of flooding that may affect the proposed development site and appraise the adequacy of existing information.

4.2 Fluvial & Coastal Flooding

CFRAM and ICPSS maps indicates that the proposed route is at risk from fluvial and coastal flooding. Sections of the route have been identified to be within Flood Zone A as per the Guidelines. Nonetheless, the proposed development requires minimal changes to land cover and will likely have a negligible impact on the existing fluvial flood regime. The proposed Corridor 16 runs within an existing dense urban area. There are no proposed changes to contributing catchment areas and all discharge is to be attenuated to existing greenfield runoff rates.

Although the proposed route has been identified as liable to flood from fluvial sources, the nature of the proposed development means the impact will likely be negligible. As per Circular PL 2/2014 of Environmental, Community and Local Government (13.08.2014), appendix, minor proposals in areas of flood risk (such as the proposed scheme) are unlikely to raise significant flooding issues as long as they do not increase flood risk. The development will not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities and will be flood resilient in design. As per Circular PL 2/2014 the proposed scheme does not require a Justification Test and is suitable for the associated flood risk. Therefore, no further assessment is required with regard to fluvial flood risk.

4.3 Surface Water Flooding

Surface water flooding occurs when the local drainage system cannot convey stormwater flows from extreme rainfall events. The rainwater does not drain away through the normal drainage pathways or infiltrate into the ground but instead ponds on or flows over the ground instead. Surface water flooding is unpredictable as it depends on a number of factors including ground levels, rainfall and the local drainage network. The drainage network for any development on the site will incorporate Sustainable Drainage Systems (SuDS) for the purpose for managing surface water in terms of both flow and quality. Therefore, the risk of surface water flooding is considered low and no further assessment is required.

4.4 Pluvial Flooding

Pluvial flooding results from heavy rainfall that exceeds ground infiltration capacity or more commonly in Ireland where the ground is already saturated from previous rainfall events. This causes ponding and flooding at localized depressions. Pluvial flooding is commonly a result of changes to the natural flow regime such as the implementation of hard surfacing. CFRAM maps indicates that some areas of the site are at risk of pluvial flooding. The implementation of SuDS (including bioswales, permeable paving and tree pits) will mitigate against potential pluvial flooding. Therefore, the risk of pluvial flooding is considered low and no further assessment is required.

4.5 Groundwater Flooding

Ground water flooding is a result of upwelling in occurrences where the water table or confined aquifers rises above the ground surface. This tends to occur after long periods of sustained rainfall and/or very high tides. High volumes of rainfall and

subsequent infiltration to ground will result in a raising of the water table. Groundwater flooding tends to occur in low-lying areas, where with additional groundwater flowing towards these areas, the water table can rise to the surface causing groundwater flooding. No previous reports or geological indicators were found for groundwater flooding within the vicinity of the proposed scheme. Therefore, the risk of groundwater flooding is considered low and no further assessment is required.

5. FLOOD RISK ASSESSMENT CONCLUSIONS

The Bus Connect corridor 16 has been assessed for existing and future sources of flood risk. The primary source of flood risk identified for the corridor is from fluvial and coastal flooding from the adjacent River Liffey / Dublin Bay. Sections of the site have been identified to be within Flood Zone A. The proposed Bus Connect corridor 16 is categorised as local transport infrastructure according to the OPW Guidelines. The assessment undertaken as part of this FRA indicates that the development will have negligible impact on flooding and the surface water drainage network within the catchment. SuDS will be provided where appropriate to manage runoff quantity and quality.

Corridor 16 comprises a reconfiguring of the existing surface layout within a relatively dense urban area. As per Circular PL 2/2014 of Environmental, Community and Local Government (13.08.2014), appendix, minor proposals in areas of flood risk (such as the proposed scheme) are unlikely to raise significant flooding issues as long as they do not increase flood risk. The development will not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities and will be flood resilient in design. As per Circular PL 2/2014 the proposed scheme does not require a Justification Test. Thus, the proposed development is suitable for the associated flood risk as per the OPW Guidelines.

APPENDIX A

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Catchment: The area that is drained by a river or artificial drainage system.

Catchment Flood Risk Assessment and Management Studies (CFRAMS): A catchment-based study involving an assessment of the risk of flooding in a catchment and the development of a strategy for managing that risk in order to reduce adverse effects on people, property and the environment. CFRAMS precede the preparation of Flood Risk Management Plans (see entry for FRMP).

Climate change: Long-term variations in global temperature and weather patterns, which occur both naturally and as a result of human activity, primarily through greenhouse gas emissions.

Core of an urban settlement: The core area of a city, town or village which acts as a centre for a broad range of employment, retail, community, residential and transport functions.

Detailed flood risk assessment: A methodology to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of flood hazard and potential risk to an existing or proposed development, of its potential impact on flood elsewhere and of the effectiveness of any proposed measures.

Estuarial (or tidal) flooding: Flooding from an estuary, where water level may be influenced by both river flows and tidal conditions, with the latter usually being dominant.

Flooding (or inundation): Flooding is the overflowing of water onto land that is normally dry. It may be caused by overtopping or breach of banks or defences, inadequate or slow drainage of rainfall, underlying groundwater levels or blocked drains and sewers. It presents a risk only when people, human assets and ecosystems are present in the areas that flood.

Flood Relief Schemes (FRS): A scheme designed to reduce the risk of flooding at a specific location.

Flood Defence: A man-made structure (e.g. embankment, bund, sluice gate, reservoir or barrier) designed to prevent flooding of areas adjacent to the defence.

Flood Risk Assessment (FRA): FRA can be undertaken at any scale from the national down to the individual site and comprises 3 stages: Flood risk identification, initial flood risk assessment and detailed flood risk assessment.

Flood Risk Identification: A desk- based study to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation.

Flood Hazard: The features of flooding which have harmful impacts on people, property or the environment (such as the depth of water, speed of flow, rate of onset, duration, water quality, etc.).

Floodplain: A flood plain is any low-lying area of land next to a river or stream, which is susceptible to partial or complete inundation by water during a flood event.

Flood Risk: An expression of the combination of the flood probability, or likelihood and the magnitude of the potential consequences of the flood event.

Flood Storage: The temporary storage of excess run-off, or river flow in ponds, basins, reservoirs or on the flood plain.

Flood Zones: A geographic area for which the probability of flooding from rivers, estuaries or the sea is within a particular range.

Fluvial flooding: Flooding from a river or other watercourse.

Groundwater flooding: Flooding caused by groundwater escaping from the ground when the water table rises to or above ground level.

Initial flood risk assessment: A qualitative or semi-quantitative study to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information, to provide a qualitative appraisal of the risk of flooding to development, including the scope of possible mitigation measures, and the potential impact of development on flooding elsewhere, and to determine the need for further detailed assessment.

Freeboard: Factor of safety applied for water surfaces. Defines the distance between normal water level and the top of a structure, such as a dam, that impounds or restrains water.

Justification Test: An assessment of whether a development proposal within an area at risk of flooding meets specific criteria for proper planning and sustainable development and demonstrates that it will not be subject to unacceptable risk nor increase flood risk elsewhere. The justification test should be applied only where development is within flood risk areas that would be defined as inappropriate under the screening test of the sequential risk-based approach adopted by this guidance.

Likelihood (probability) of flooding: A general concept relating to the chance of an event occurring. Likelihood is generally expressed as a probability or a frequency of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is based on the average frequency estimated, measured or extrapolated from records over a large number of years and is usually expressed as the chance of a particular flood level being exceeded in any one year. For example, a 1-in-100 or 1% flood is that which would, on average, be expected to occur once in 100 years, though it could happen at any time.

Ordnance Datum (or OD) Malin: is a vertical datum used by an ordnance survey as the basis for deriving altitudes on maps. A spot height may be expressed as AOD for “above ordnance datum”. Usually mean sea level (MSL) is used for the datum. In the Republic of Ireland, OD for the Ordnance Survey of Ireland is Malin Ordnance Datum: the MSL at Portmoor Pier, Malin Head, County Donegal, between 1960 and 1969. Prior to 1970, Poolbeg Ordnance Datum was used: the low water of spring tide at Poolbeg lighthouse, Dublin, on 8 April 1837. Poolbeg OD was about 2.7 metres lower than Malin OD.

Management Train/Treatment Train: the sequence of drainage components that collect, convey, store and treat runoff as it drains through the site.

Mitigation: The term is used to describe an action that helps to lessen the impacts of a process or development on the receiving environment. It is used most often in association with measures that would seek to reduce negative impacts of a process or development.

Pathways: These provide the connection between a particular source (e.g. high river or tide level) and the receptor that may be harmed (e.g. property). In flood risk management, pathways are often ‘blocked’ by barriers, such as flood defence structures, or otherwise modified to reduce the incidence of flooding.

Pluvial flooding: Usually associated with convective summer thunderstorms or high intensity rainfall cells within longer duration events, pluvial flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer. The intensity of rainfall can be such that the run-off totally overwhelms surface water and underground drainage systems.

Regional Planning Guidelines (RPG): These provide the regional context and priorities for applying national planning strategy to each NUTS III region and encourage greater co-ordination of planning policies at the city/county level. RPGs are an important part of the flood policy hierarchy as they can assist in co-ordinating flood risk management policies at the regional level.

Resilience: Sometimes known as "wet-proofing", resilience relates to how a building is constructed in such a way that, although flood water may enter the building, its impact is minimised, structural integrity is maintained, and repair, drying and cleaning and subsequent reoccupation are facilitated.

Receptors: Things that may be harmed by flooding (e.g. people, houses, buildings or the environment).

Residual risk: The risk which remains after all risk avoidance, substitution and mitigation measures have been implemented, on the basis that such measures can only reduce risk, not eliminate it.

Sequential Approach: The sequential approach is a risk-based method to guide development away from areas that have been identified through a flood risk assessment as being at risk from flooding. Sequential approaches are already established and working effectively in the plan-making and development management processes.

Sustainable Drainage System (SuDS): Drainage systems that are considered to be environmentally beneficial, causing minimal or no long-term detrimental impact.

Site-specific Flood Risk Assessment: An examination of the risks from all sources of flooding of the risks to and potentially arising from development on a specific site, including an examination of the effectiveness and impacts of any control or mitigation measures to be incorporated in that development.

Source: Refers to a source of hazard (e.g. the sea, heavy rainfall).

Strategic Flood Risk Assessment: The assessment of flood risk on a wide geographical area against which to assess development proposed in an area (Region, County, Town).

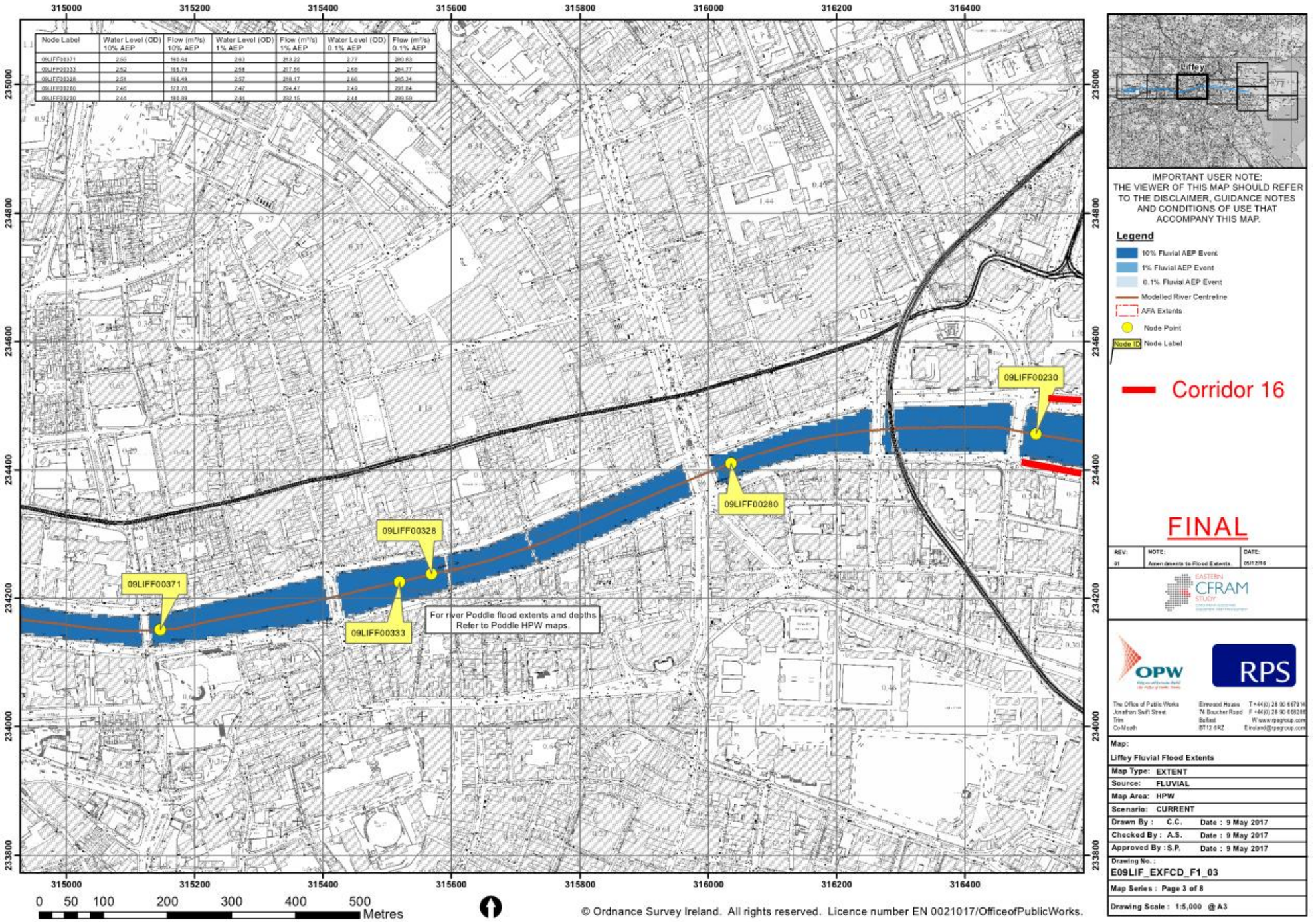
Vulnerability: The resilience of a particular group of people or types of property or habitats, ecosystems or species to flood risk, and their ability to respond to a hazardous condition and the damage or degree of impact they are likely to suffer in the event of a flood. For example, elderly people may be more likely to suffer injury, and be less able to evacuate, in the event of a rapid flood than younger people.

Source: *The definitions above are sourced from the DoEHLG Guidelines for Planning Authorities on 'The Planning System and Flood Risk Management, 2009' and Ciria 753 "the SuDS Manual".*

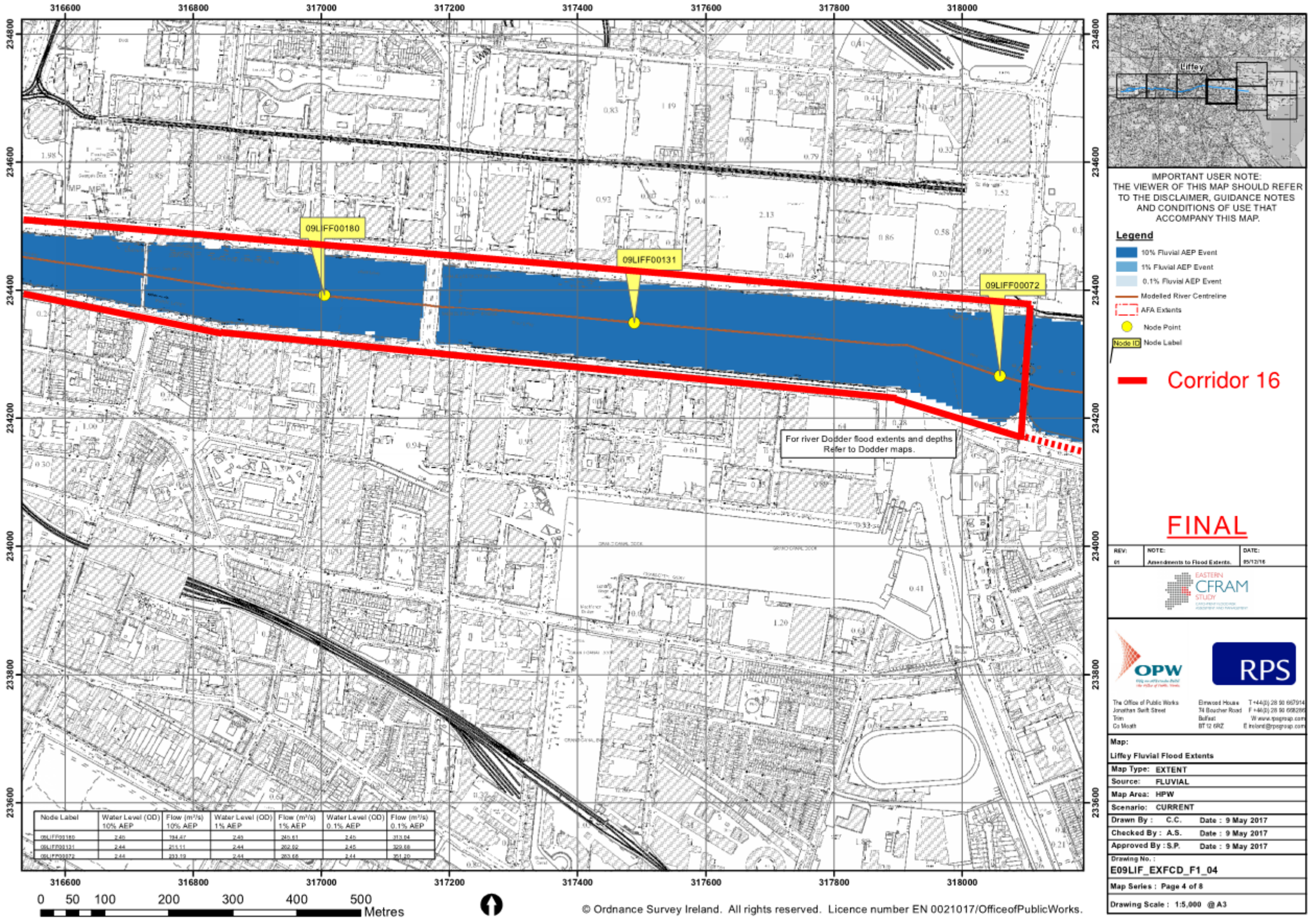
APPENDIX B

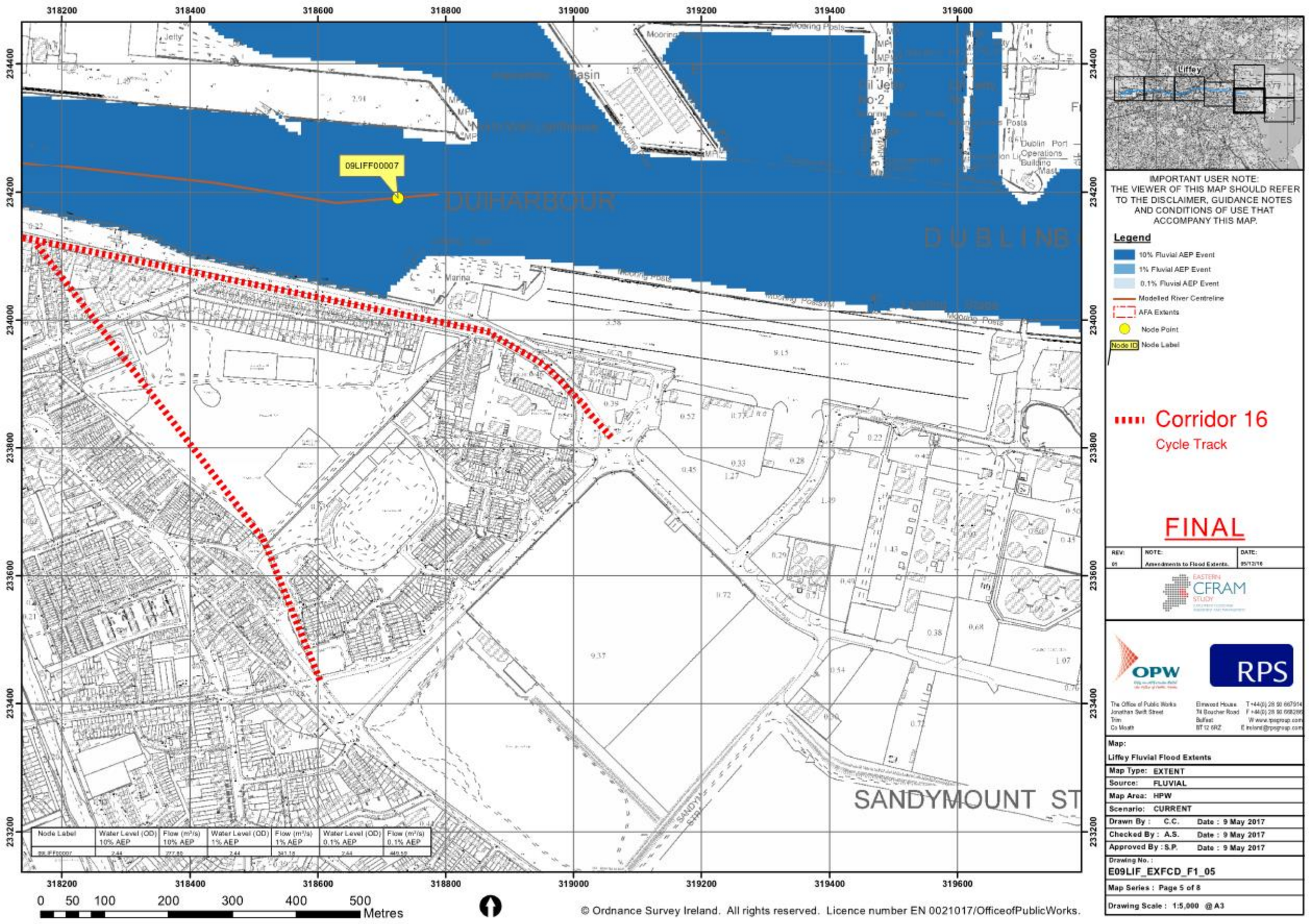
INDICATIVE FLOOD SOURCES

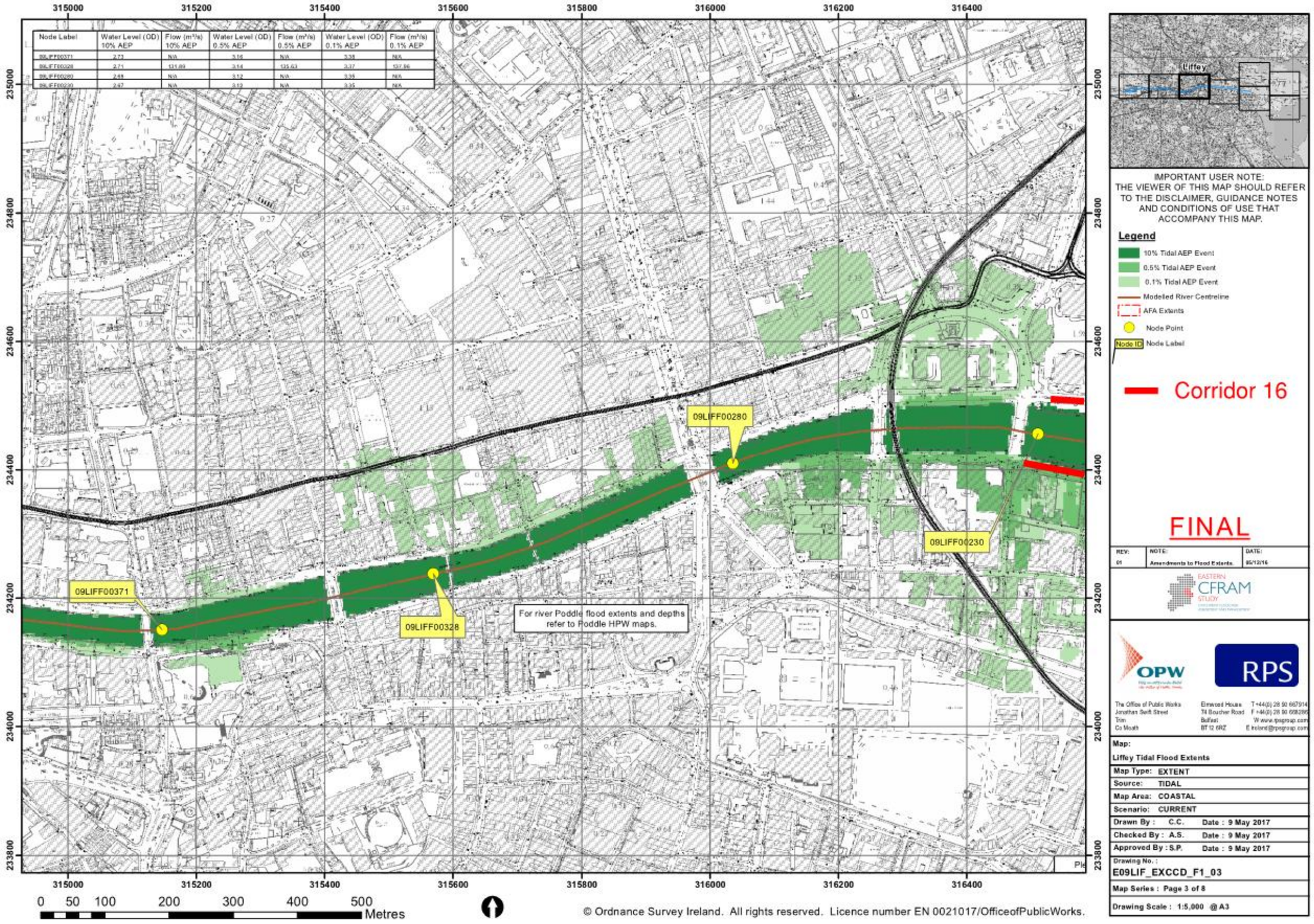
Catchment Flood Risk Assessment and Management Study



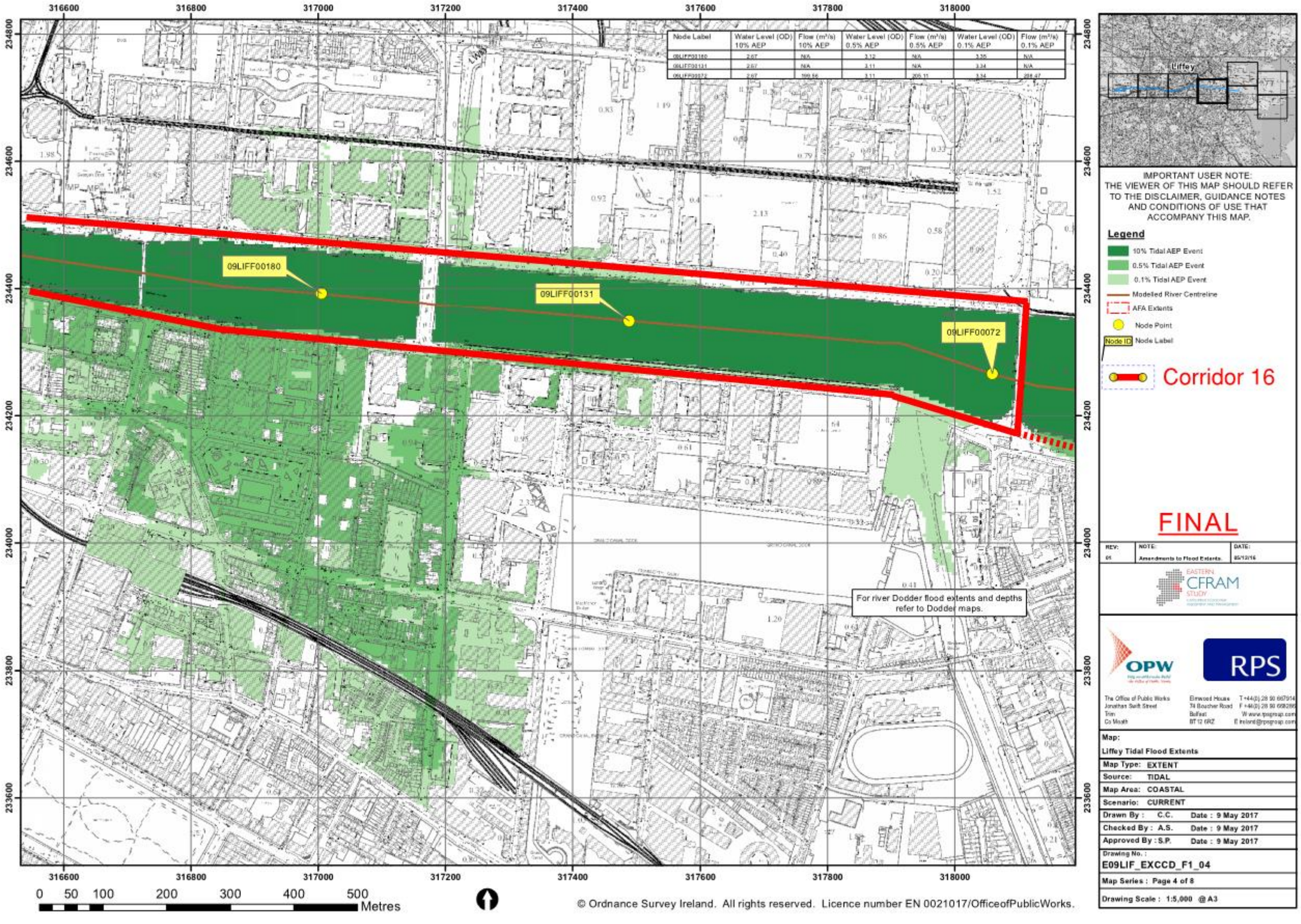
Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09LIFF00371	2.55	149.64	2.63	213.22	2.77	280.63
09LIFF00333	2.52	155.78	2.58	217.56	2.68	284.77
09LIFF00328	2.51	164.49	2.57	218.17	2.66	285.34
09LIFF00280	2.46	172.73	2.47	224.47	2.49	291.84
09LIFF00230	2.44	180.89	2.45	232.15	2.44	299.59


316600
316800
317000
317200
317400
317600
317800
318000
234800
234600
234400
234200
234000
233800
233600
09LIFF00180
09LIFF00131
09LIFF00072
For river Dodder flood extents and depths Refer to Dodder maps.
Node Label | Water Level (OD) 10% AEP | Flow (m³/s) 10% AEP | Water Level (OD) 1% AEP | Flow (m³/s) 1% AEP | Water Level (OD) 0.1% AEP | Flow (m³/s) 0.1% AEP
09LIFF00180 | 2.45 | 194.47 | 2.45 | 249.61 | 2.45 | 313.04
09LIFF00131 | 2.44 | 211.11 | 2.44 | 262.82 | 2.45 | 329.68
09LIFF00072 | 2.44 | 233.19 | 2.44 | 283.66 | 2.44 | 351.20
0 50 100 200 300 400 500 Metres
© Ordnance Survey Ireland. All rights reserved. Licence number EN 0021017/OfficeofPublicWorks.
Liffey
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 Extents
Node Point
Node ID Node Label
Corridor 16
FINAL
REV: 01
NOTE: Amendments to Flood Extents.
DATE: 05/12/16
EASTERN CFRAM STUDY
OPW
RPS
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44(0) 28 90 667914
F +44(0) 28 90 668289
W www.rpsgroup.com
E lreland@rpsgroup.com
Map:
Liffey Fluvial Flood Extents
Map Type: EXTENT
Source: FLUVIAL
Map Area: HPW
Scenario: CURRENT
Drawn By : C.C. Date : 9 May 2017
Checked By : A.S. Date : 9 May 2017
Approved By : S.P. Date : 9 May 2017
Drawing No. :
E09LIF_EXFCD_F1_04
Map Series : Page 4 of 8
Drawing Scale : 1:5,000 @ A3

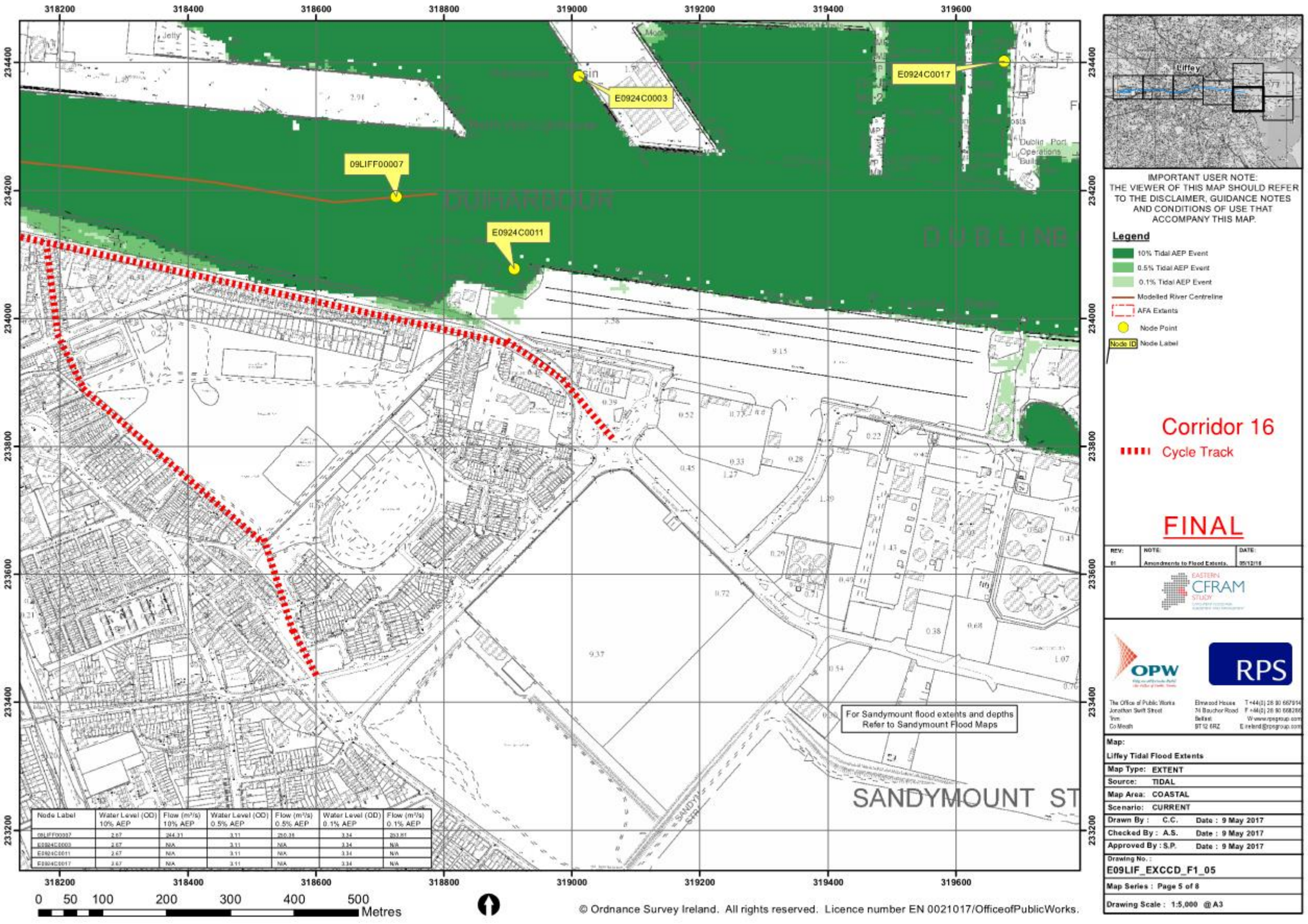

318200
318400
318600
318800
319000
319200
319400
319600
234400
234200
234000
233800
233600
233400
233200
09LIFF00007
DUBLIN
DUBLIN PORT
SANDYMOUNT ST
Node Label
Water Level (OD) 10% AEP
Flow (m³/s) 10% AEP
Water Level (OD) 1% AEP
Flow (m³/s) 1% AEP
Water Level (OD) 0.1% AEP
Flow (m³/s) 0.1% AEP
09LIFF00007
2.44
277.80
2.44
341.18
2.44
449.55
0 50 100 200 300 400 500
Metres
© Ordnance Survey Ireland. All rights reserved. Licence number EN 0021017/OfficeofPublicWorks.
Liffey
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 Extents
Node Point
Node ID Node Label
Corridor 16
Cycle Track
FINAL
REV: 01
NOTE: Amendments to Flood Extents.
DATE: 05/12/16
EASTERN CFRAM STUDY
OPW
RPS
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44(0) 28 90 667914
F +44(0) 28 90 668289
W www.rpsgroup.com
E ireland@rpsgroup.com
Map:
Liffey Fluvial Flood Extents
Map Type: EXTENT
Source: FLUVIAL
Map Area: HPW
Scenario: CURRENT
Drawn By : C.C. Date : 9 May 2017
Checked By : A.S. Date : 9 May 2017
Approved By : S.P. Date : 9 May 2017
Drawing No. :
E09LIF_EXFCD_F1_05
Map Series : Page 5 of 8
Drawing Scale : 1:5,000 @ A3



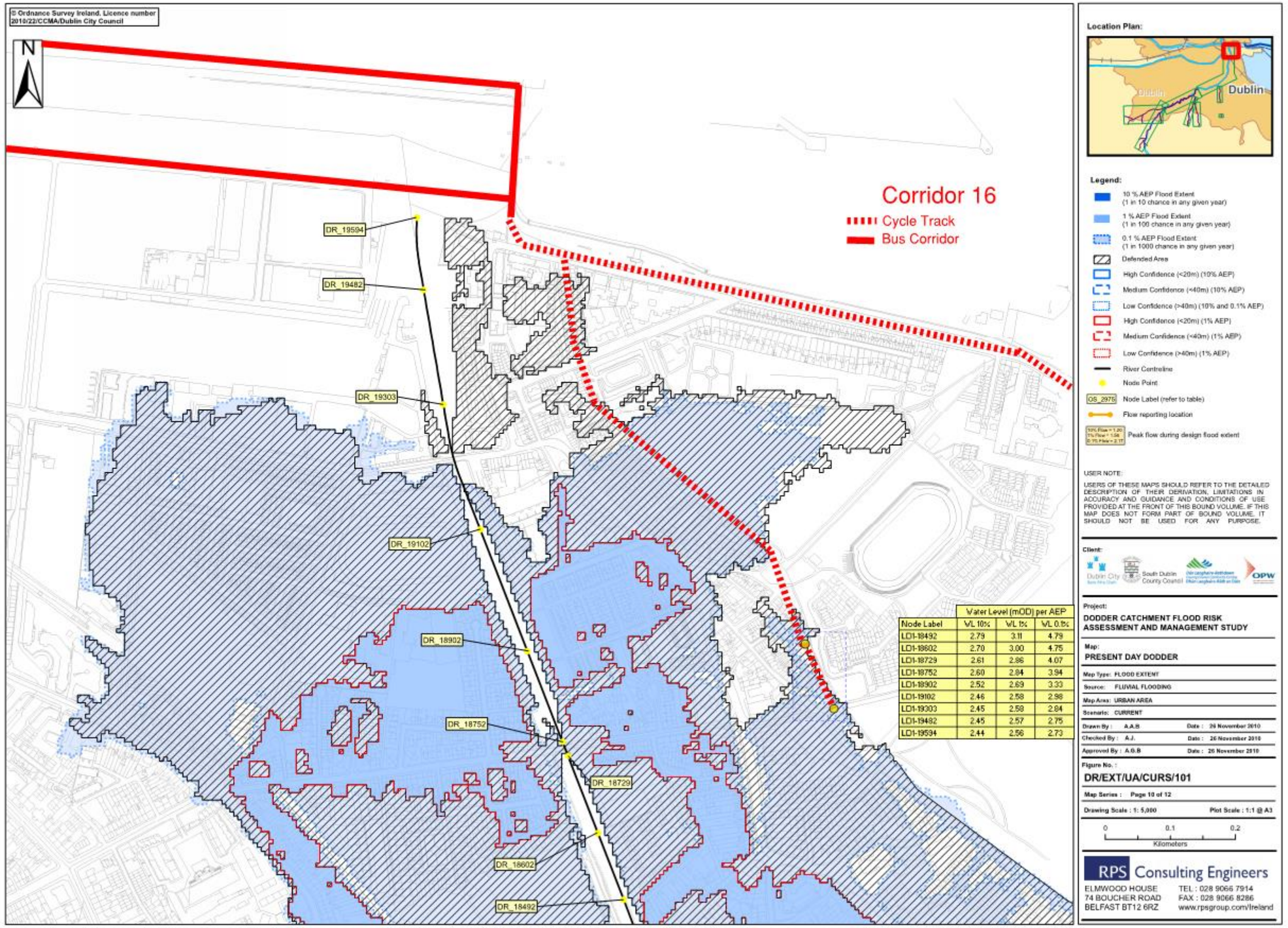
Node Label	Water Level (OD) 10% AEP	Flow (m^3/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m^3/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m^3/s) 0.1% AEP
09LIFF00371	2.73	N/A	3.16	N/A	3.35	N/A
09LIFF00328	2.71	131.89	3.14	135.63	3.37	137.86
09LIFF00280	2.48	N/A	3.12	N/A	3.35	N/A
09LIFF00230	2.47	N/A	3.12	N/A	3.35	N/A



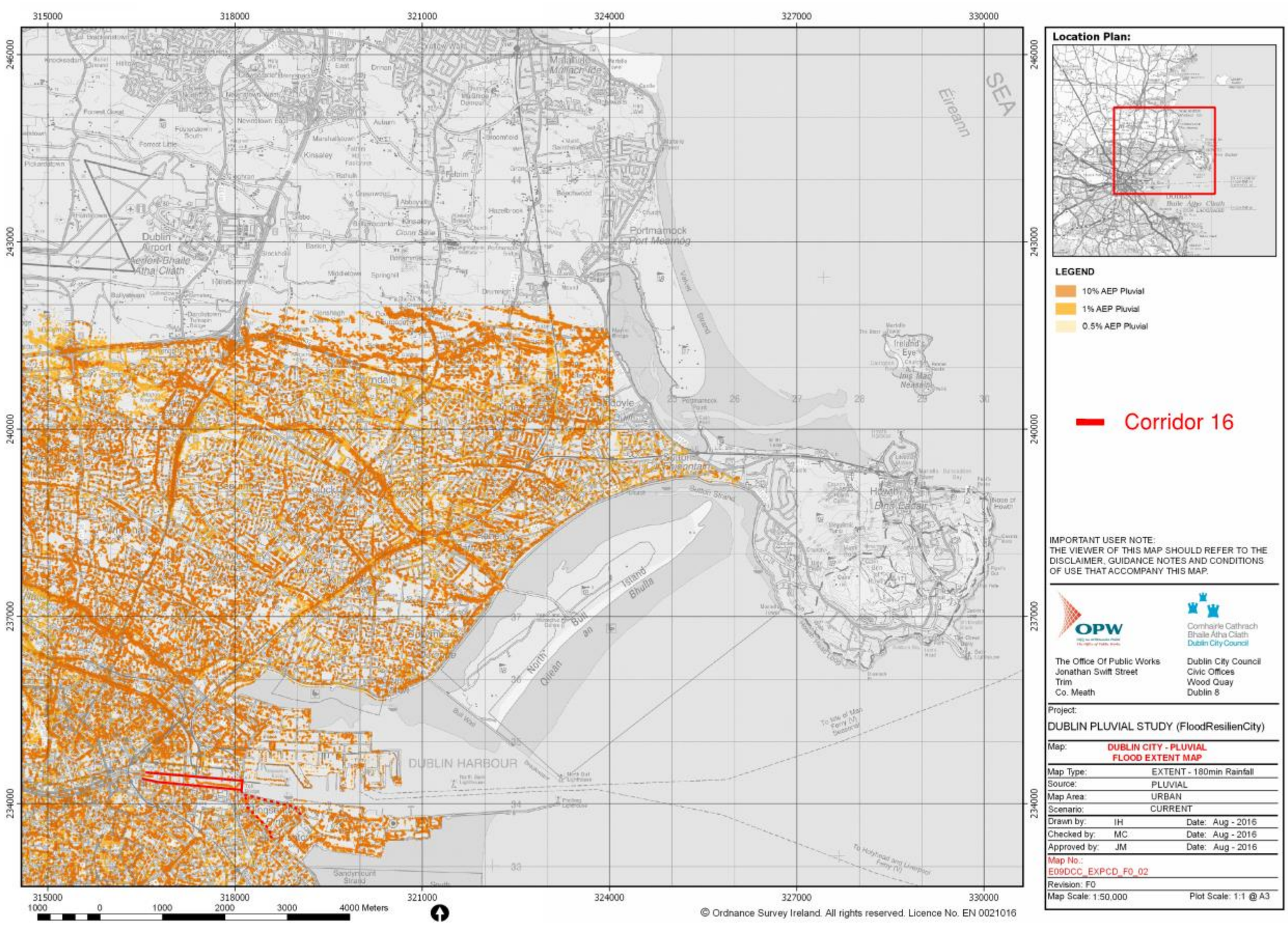
Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09LIFF00180	2.67	N/A	3.12	N/A	3.35	N/A
09LIFF00131	2.67	N/A	3.11	N/A	3.34	N/A
09LIFF00072	2.67	199.56	3.11	205.11	3.34	208.47



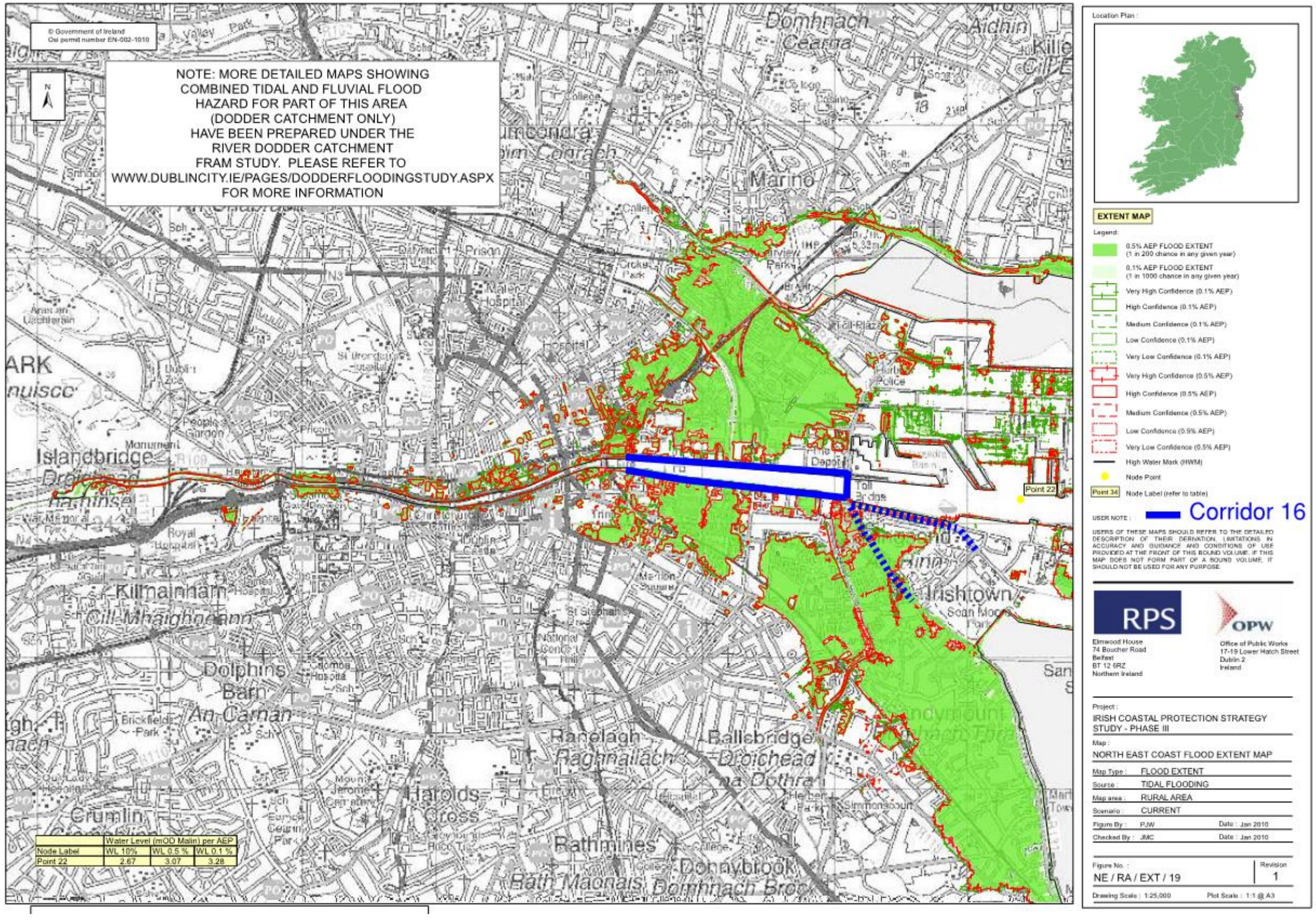
Node Label	Water Level (OD) 10% AEP	Flow (m^3/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m^3/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m^3/s) 0.1% AEP
09LIFF00007	2.67	244.31	3.11	250.38	3.34	253.81
E0924C0003	2.67	N/A	3.11	N/A	3.34	N/A
E0924C0011	2.67	N/A	3.11	N/A	3.34	N/A
E0924C0017	2.67	N/A	3.11	N/A	3.34	N/A



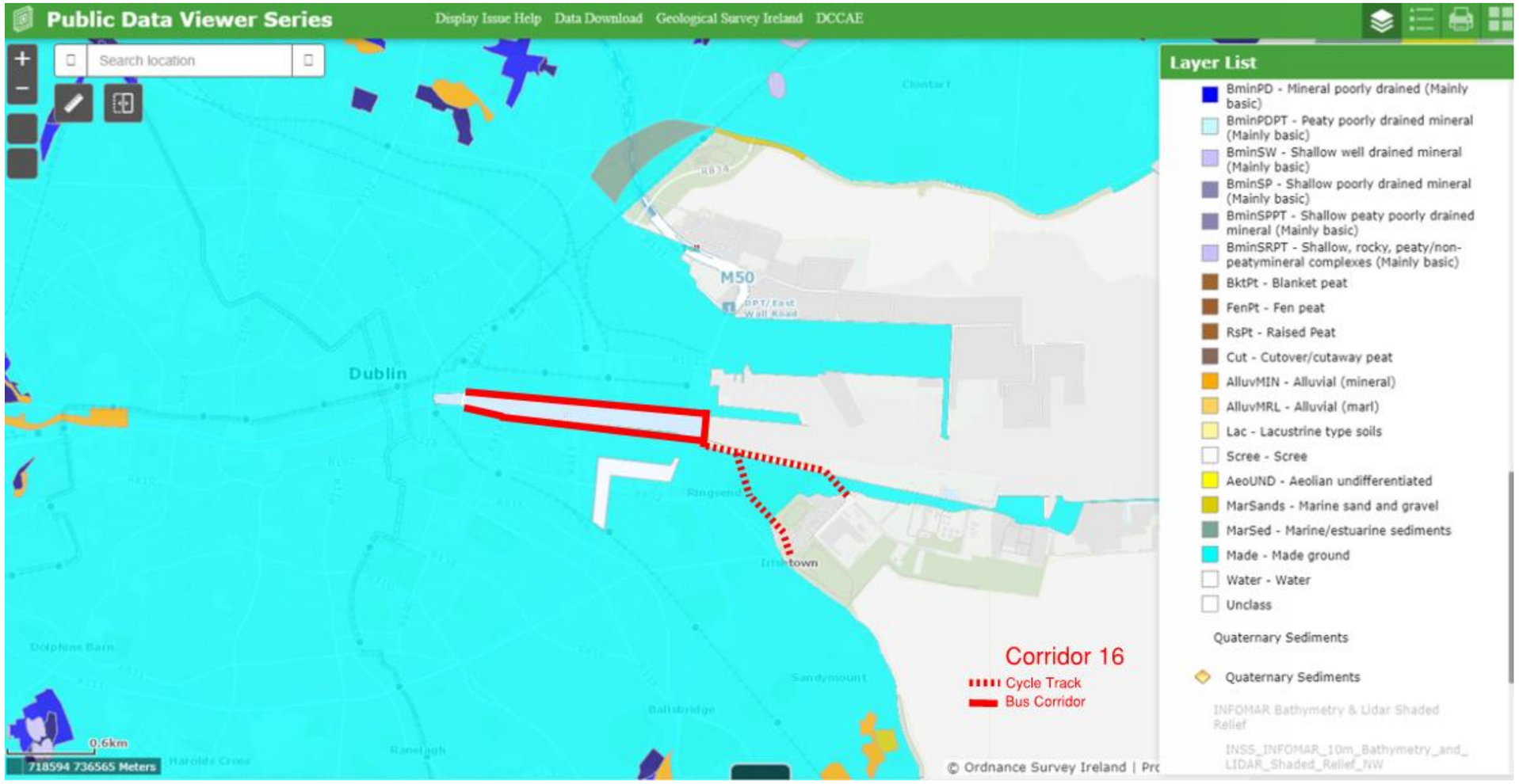
	Water Level (mOD) per AEP		
Node Label	WL 10%	WL 1%	WL 0.1%
LD1-18492	2.79	3.11	4.79
LD1-18602	2.70	3.00	4.75
LD1-18729	2.61	2.86	4.07
LD1-18752	2.60	2.84	3.94
LD1-18902	2.52	2.69	3.33
LD1-19102	2.46	2.58	2.98
LD1-19303	2.45	2.58	2.84
LD1-19482	2.45	2.57	2.75
LD1-19594	2.44	2.56	2.73



Irish Coastal Protection Strategy Study

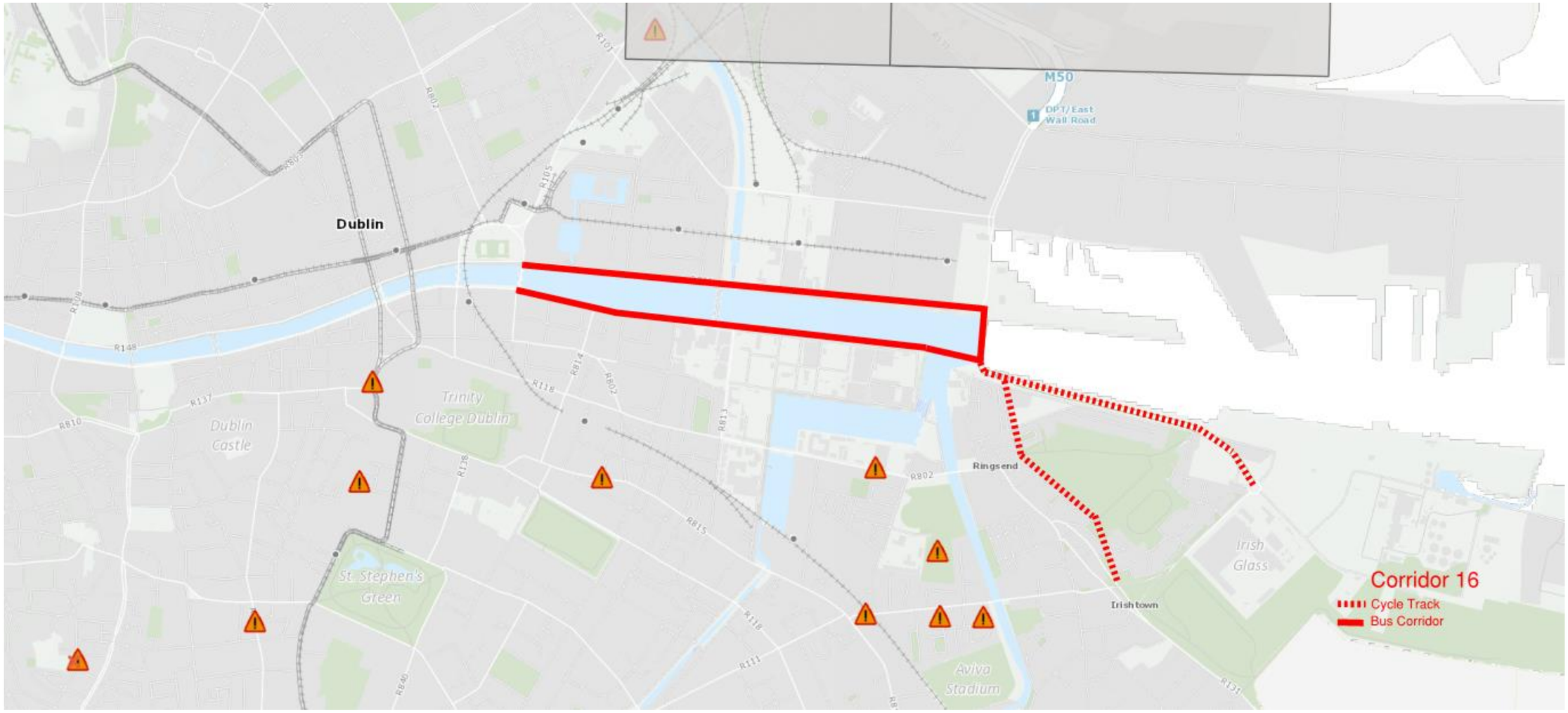


Geological Survey of Ireland: Teagasc Subsoil Mapping



Historical Maps: 6” Cassini

Records / News Reports



Reports | Photos | Press Articles

Search Reports

Showing 1 to 4 of 4 entries

	Report Type	Report Name	Date	Description
VIEW	Report	Rainfall in the Dublin Area on 11 June 1963	/08/1971	Met Éireann Report. Contains meteorological data on June 1963 flooding in Dublin. Refers to areas of Dublin where flooding occurred.
VIEW	Report	Flooding South City - 11th June 1963	05/11/1963	Dublin City Council memo. Description of multiple locations affected by flooding on 11 June 1963 in Dublin Area including some rainfall and flow data. The Local Authority who provided this Flood Information Item wishes to point out that a number of defence assets were put in place since one or more of the flood events described by this item. For further details please contact the Local Authority.
VIEW	Report	Newspaper cut-out July 2nd 1963 - Dublin thunderstorms	02/07/1963	Rainfall info. Dublin area - June 1963. The Local Authority who provided this Flood Information Item wishes to point out that a number of defence assets were put in place since one or more of the flood events described by this item. For further details please contact the Local Authority.
VIEW	Map(Paper)	General Plan of Storm Area	/06/1963	Dublin June 1963 flood. Flooded areas and rainfall marked on 1: 25,000 map. The Local Authority who provided this Flood Information Item wishes to point out that a number of defence assets were put in place since one or more of the flood events described by this item. For further details please contact the Local Authority.

Reports | Photos | Press Articles

Search Articles

Showing 1 to 2 of 2 entries

	Title of Newspaper	Date	Title of Article	Date of Flood	Places Mentioned	Rivers, Lakes, Seas Mentioned
VIEW	Irish Independent	12/06/1963	Fierce Storm Damage: Blocks of Houses are Evacuated	11/12 June 1963	Dublin: Kilmacud, Londonbridge Rd., Merrion, Dun Laoghaire, Merrion Gates, Booterstown, Donnybrook, Stillorgan, Dundrum, Milltown, Clonskeagh	
VIEW	Irish Times	12/06/1963	Flood Havoc Hits Dublin Suburbs	11/12 June 1963	Dublin Suburbs: Stillorgan, Blackrock, Merrion, Sandymount, Kilmacud, Goatstown, Milltown, Ranelagh, Clonskeagh, Ballsbridge, Dundrum.	