FLOOD RISK ASSESSMENT REPORT

FOR

PROPOSED WAREHOUSE DEVELOPMENT

AT

KINGSWOOD ROAD, CITYWEST BUSINESS PARK,

DUBLIN 24

JUNE 2022

ON BEHALF OF

ROCKFACE DEVELOPMENTS LTD.

Prepared by
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1 INTRODUCTION

Enviroguide Consulting (hereafter referred to as EGC) was commissioned by Rockface Developments Ltd. (hereafter referred to as the Client) to undertake a Flood Risk Assessment (FRA) for the Proposed Warehouse Development at Kingswood Road, Citywest Business Park, Dublin 24 (referred to hereafter as the Site).

This report presents the findings of the FRA for the Site.

1.1 Project Objective

The project objective to determine if there is any potential flood risk associated with the Site and proposed development and identify where appropriate any additional assessment and mitigation measures that would be required.

1.2 Project Scope

The FRA involved a Stage 1 and Stage 2 assessment in accordance with the approach and methodology set out in the Department of Environment, Heritage and Local Government (DEHLG) guidance: 'The Planning System and Flood Risk Management. Guidelines for Planning Authorities' (DEHLG, 2009).

The methodology and scope of work undertaken is outlined in Section 2 and the results and recommendations presented in the following sections of the report.

2 METHODOLOGY

2.1 Relevant Guidance

Relevant best practice guidance (Department of Environment, Heritage and Local Government (DEHLG), November 2009. The Planning System and Flood Risk Management Guidelines for Planning Authorities) sets out a risk based sequential approach to flood risk assessment. The three key stages are identified as follows:

- **Stage 1 - Flood Risk Identification** - 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;
- **Stage 2 - Initial Flood Risk Assessment** - To confirm sources of flooding that may affect a plan area or proposed development site to appraise the adequacy of existing information and to determine what surveys and modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. The extent of the risk of flooding should be assessed. Where existing river or coastal models exist, these should be broadly used to assess the extent of the risk of flooding, and the potential impact of the proposed development on flooding elsewhere and of the scope of possible mitigation measures; and
- **Stage 3 - 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 area or existing development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve the use of an existing or construction of a hydraulic model of the river or coastal cell across a wide enough area to appreciate the catchment wide impacts and hydrological processes involved.

2.1.1 Flood Zones

The objective of an FRA is to assess all types of flood risk to a development. The assessment should investigate potential sources of flood risk and include for the effects of climate change. The assessment is required to examine the impact of the development and the effectiveness of flood mitigation and management procedures proposed. It should also present the residual risks that remain after those measures are put in place.

This approach is based on the identification of flood zones for river and coastal flooding. According to best practice guidance (DEHLG, November 2009) flood zones are geographical areas within which the likelihood of flooding is in a particular range, and they are a key tool in flood risk management within the planning process. There are three types / levels of flood zones defined for the purposes of these guidelines, as presented in Table 2-1.

Table 2-1. Flood Zone Definitions

Flood Zone Definitions
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 flooding).
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 100 and 0.5% or 1 in 200 for coastal flooding).
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 flooding Flood Zone C covers all areas of the plan which are not in zones A or B.
*Source - Extract from DEHLG, November 2009. The Planning System and Flood Risk Management Guidelines for Planning Authorities

2.1.2 Justification Test

Once a flood zone has been identified, the guidelines set out the different types of development appropriate to each zone to determine whether the development is considered appropriate or whether a Justification Test is required (refer to Table 2-2).

The Justification Test is used to assess the appropriateness of developments in flood risk areas. The test is comprised of 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 and Flood Zone to Illustrate Appropriate Development and that Required to Meet the Justification Test

Vulnerability Class	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
*Source - Extract from DEHLG, November 2009. The Planning System and Flood Risk Management Guidelines for Planning Authorities			

2.2 Scope of Assessment

This FRA has been carried out in accordance with relevant best practice guidance (DEHLG, November 2009) and comprised the completion of the following key stages, using the phased approach:

- Stage 1 - Flood Risk Identification; and

- Stage 2 - Initial Flood Risk Assessment

The scope of works undertaken comprised of a desk-based study including review of published information for the Site, design information for the proposed development provided by the Client and a site walkover inspection and survey.

2.2.1 Site Walkover

A site walkover inspection and survey was undertaken by EGC on the 19th January 2022 to identify and assess the Site setting and receiving water bodies and assess any potential constraints in relation to Flood Risk Assessment.

2.2.2 Desk- Based Studies

This task involved undertaking a detailed review of all available desk-based information in relation to historic flooding and potential future flood risk including the following published information:

- Geological Survey of Ireland Online mapping (GSI, 2022);
- Environmental Protection Agency Online mapping (EPA, 2022);
- Office of Public Works website and Online mapping (OPW, 2022);
- Office of Public Works Eastern Catchment Flood Risk & Management Study (CFRAM, 2017);
- Office of Public Works and RPS Group Plc., June 2010. The Irish Coastal Protection Strategy Study - Phase II – South East Coast (ICPSS, 2010);
- Office of Public Works and RPS Group Plc., October 2020. Irish Coastal Wave and Water Level Modelling Study 2018. Phase 1 – Extreme Water Levels (ICWWS, 2020); and
- South Dublin County Council, January 2016. South Dublin County Council Development Plan 2016 – 2022 (SDCC, 2016-2022);
- South Dublin County Council, May 2021. South Dublin County Council Development Plan 2022-2028 DRAFT (SDCC, 2022-2028);

The following relevant reports and drawings in relation to the design of the Proposed Development Site were also reviewed (refer to Appendix A):

- Kavanagh Burke Consulting Engineers, 17th June 2022. Drainage Design Report (Job No. D1736); and
- Kavanagh Burke Consulting Engineers, June 2022. Drainage and Watermain Layout (Drawing No. D3).

All available information from the desk-based studies have been evaluated and the findings are presented in this report.

3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

Rockface Developments Limited intend to apply for permission for development at a 2.56 Ha site at Kingswood Road and Kingswood Avenue, Citywest Business Campus, Dublin 24. The lands are generally bounded to the south-east by Kingswood Avenue, south-west and north-west by existing built development and to the north-east by Kingswood Road.

The development will comprise the provision of a warehouse with ancillary office and staff facilities and associated development. The warehouse will have a maximum height of 18 metres with a gross floor area of 11,691 sq. m including a warehouse area (10,604 sq. m), ancillary staff facilities (499 sq. m) and ancillary office area (588 sq. m).

The development will also include: a vehicular and pedestrian entrance to the site from Kingswood Road, a separate HGV entrance from Kingswood Avenue; 64 No. ancillary car parking spaces; covered bicycle parking; HGV parking and yards; level access goods doors; dock levellers; access gates; hard and soft landscaping; canopy; lighting; boundary treatments; ESB substation; plant; and all associated site development works above and below ground.

The provision of surface water drainage, foul and watermains connections for the development are described below.

3.1 Surface Water Drainage

The surface water drainage for the Site has been designed in accordance the Greater Dublin Strategic Drainage Strategy (GDSDS) as specified in the Drainage Design Report (Kavanagh Burke Consulting Engineers, 17th June 2022).

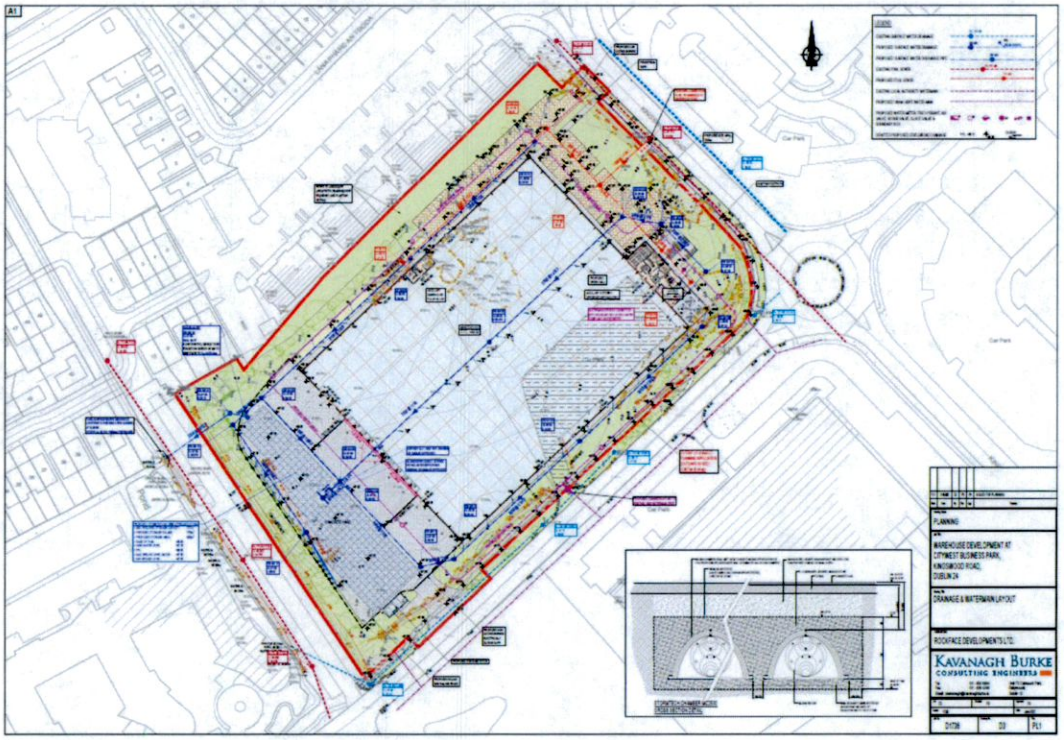
Surface water runoff collected onsite will be discharged, via appropriate treatment and attenuation to the Baldonnell Upper River (River Waterbody Code: IE_EA_09C020250) located approximately 0.02km southwest of the Proposed Development Site.

The surface water drainage strategy for the Proposed Development will incorporate Sustainable Drainage Systems (SuDS) features including: tree pits, permeable paving, trapped road gullies. The appropriate attenuation designed for a 1 in 100 year storm event with the allowance for climate change, silt trap and Class I By-pass petrol / oil interceptor.

Discharge from the Site will be attenuated and discharged via a site-specific vortex flow control device at greenfield rates. The Class I By-pass Separator will include standard measures such as sealed manhole chambers to prevent the infiltration of surface water runoff infiltrating the Class I By-pass Separator. The use of non-return valves is also incorporated to prevent any surcharging of the onsite drainage system including the interceptor and attenuation tank.

The surface water drainage layout for the Proposed Development is presented in Figure 3-1 (also refer to Appendix A).

Figure 3-1. Surface Water Drainage (Kavanagh Burke Consulting Engineers, June 2022)



3.2 Foul Water

The Drainage Design Report (Kavanagh Burke Consulting Engineers, February 2022) identifies that foul water from the Site will be discharged to the existing Irish Water (IW) foul sewer network to the northeast of the Site along Kingswood Road (refer to Figure 3-1) subject to agreement with IW.

3.3 Water Supply

The Drainage Design Report (Kavanagh Burke Consulting Engineers, February 2022) identifies that water supply to the Proposed Development will be provided from a connection to the existing IW mains supply to the southeast of the Site along Kingswood Avenue (refer to Figure 3-1) subject to agreement with IW.

4 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

4.1 Site Location and Description

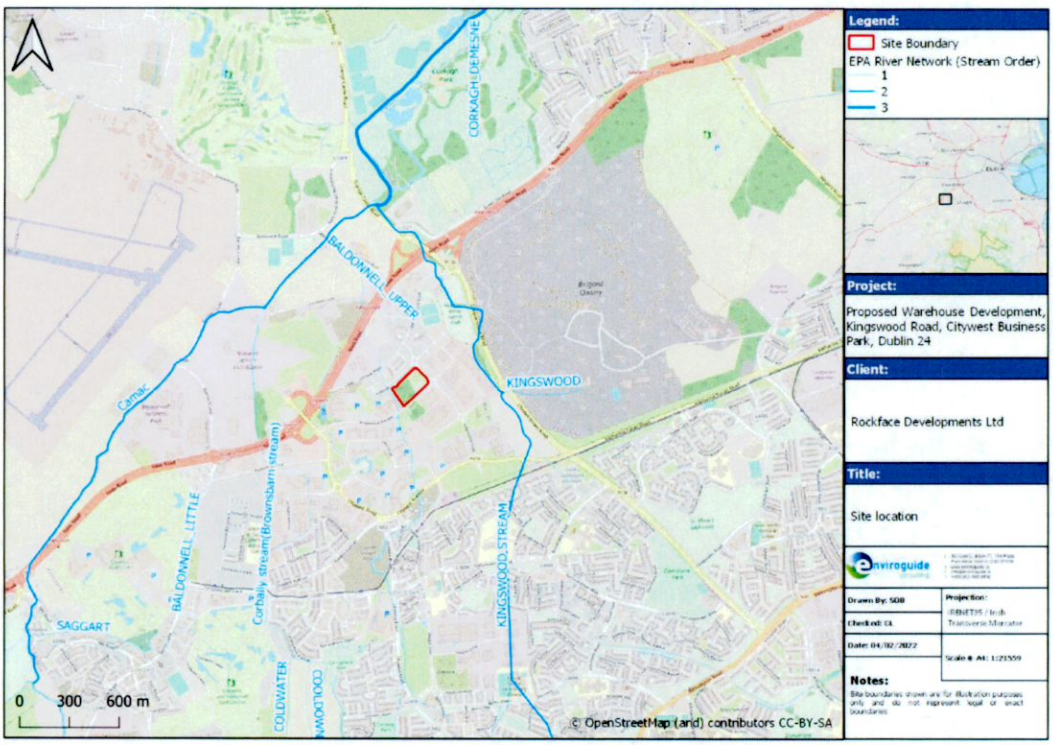
The Site is located at Kingswood Road, City West Business Park, Dublin 24 within an urban setting with the surrounding lands comprising commercial and residential land uses.

The Site is 2.56 hectares (Ha) and currently comprises a small derelict carparking area along the southeast boundary of the Site surrounded by undeveloped grass lands. The Site is bound to the southeast by Kingswood Avenue, to the northeast by Kingswood Road, to the northwest by commercial units (offices) and to the southwest by SAP Ireland Ltd., a commercial development within the City West Business Park.

The Proposed Development Site is within lands that are zoned 'EE – Enterprise and Employment' under the South Dublin County Council Development Plan 2016-2022 (SDCC 2016-2022).

The Site location is presented in Figure 4-1.

Figure 4-1. Site Location



4.2 Topography

The topographical survey of the Site indicated that the Site slopes gently to the west with the overall topography ranging from approximately 99.6 meters above ordnance datum (mOD) in the east corner to 96.25mOD in the west corner.

4.3 Hydrology

The Site is mapped by the EPA (EPA, 2022) as within the WFD Catchment of the Liffey and Dublin Bay, Hydrometric Area (HA09), the Liffey_SC_090 Sub-catchment (Sub-catchment I.D.: 09_15) and the Camac_020 WFD River Sub Basin (European Code: IE_EA_09C020250).

The closest surface water feature is named locally and recorded on the EPA database (EPA, 2022) as the Baldonnell Upper River (River Waterbody Code: IE_EA_09C020250) located approximately 0.02km southwest of the Site.

The Kingswood Stream (River Waterbody Code: IE_EA_09C020310) and the Corbally Stream (River waterbody Code: IE_EA_09C020250) are located approximately 0.31km northeast and 0.74km southwest of the Site respectively.

The Baldonnell Upper River, the Kingswood Stream and the Corbally Stream flow northwards before converging with the Camac River (River Waterbody Code: IE_EA_09C020250) located approximately 0.9km northwest of the Site which in turn discharges to the Liffey Estuary Upper (European Code: IE_EA_090_0400) located approximately 10.2km northeast of the Site.

The local surface water features within the vicinity of the Site are presented in Figure 4-1.

4.4 Soil and Geology

The soils beneath the Proposed Development Site have been mapped by Teagasc (Teagasc, 2022) as moderately drained fine loamy drift with limestones of the Elton (1000x) soil series.

The subsoils or quaternary sediments beneath the Proposed Development Site are mapped by the GSI (GSI, 2022) as 'bedrock outcrop of subcrop (Rck)'.

The bedrock beneath the Site is mapped as the Lucan Formation (Stratigraphic Code: LU; New Code CDLUCN) which is comprised of dark-grey to black, fine-grained, occasionally cherty, mictric limestones that weather paler, usually to pale grey from the lower Carboniferous period. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. The formation ranges from 300m to 800m in thickness (GSI, 2022).

4.5 Hydrogeology

The GSI (GSI, 2022) has classified the bedrock of the Lucan Formation beneath the Proposed Development Site and surrounding area as a Locally Important Aquifer (Ll) (i.e. bedrock which is moderately productive only in Local Zones.

The GSI have assigned a groundwater vulnerability rating of "High (H)" for the groundwater beneath the majority of the Site and 'Extreme (E)' below the southern corner of the Site (GSI, 2022) indicating less than 5m of low permeability overburden.

Taking account of the soil drainage, subsoil permeability, thickness and type, the ability of the aquifer to accept the recharge, and rainfall, the GSI (GSI, 2022) have identified a groundwater recharge coefficient of 22.5% to 25% of effective rainfall with a calculated average capped recharge of 77mm/year to 93mm/year across the majority of the Site. A small portion of the Site along the southwest boundary has been identified by the GSI (GSI, 2022) to have a groundwater recharge coefficient of 60% and capped recharge of 200mm/year.

There are no identified or recorded karst landforms features (enclosed depressions, turloughs, springs etc.) identified at the Site or within a 2km radius of the Site (GSI, 2022).

5 STAGE 1 - FLOOD RISK IDENTIFICATION

5.1 Strategic Flood Risk Assessment

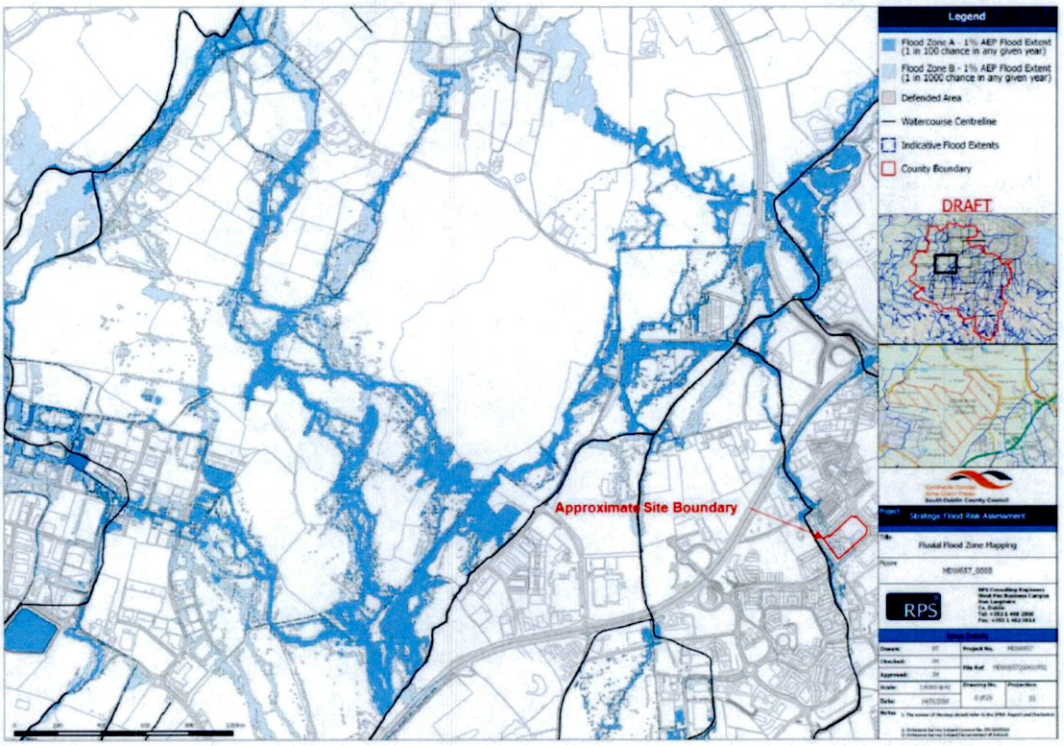
The Strategic Flood Risk Assessment (SFRA), which was prepared to accompany the SDCC, 2016-2022 Development Plan, assesses all the types of flood risk within the SDCC jurisdiction area, identifying principal rivers and sources of flooding, producing flood maps, assessing potential impacts of climate change, and identifying the location of any flood risk management infrastructure. The Development Plan also states: '*It is the policy of the Council to continue to incorporate Flood Risk Management into the spatial planning of the County, to meet the requirements of the EU Floods Directive and the EU Water Framework Directive.*'

It is noted that at the time of writing this report the Draft South Dublin County Development Plan 2022-2028 (SDCC, 2022-2028) was available for public viewing but does not come into effect until August 2022. The Draft SFRA which accompanies the SDCC, 2022-2028 Draft Development Plan was reviewed for the purpose of establishing the potential flood risks at the Site.

5.1.1 Fluvial Flooding

Fluvial flood mapping published in the SFRA (SDCC, 2016-2022) identifies that the Site is located within 0.1% AEP flood extent (i.e., Flood Zone B) for fluvial flooding of the Baldonnell Upper River (refer to Figure 5-1).

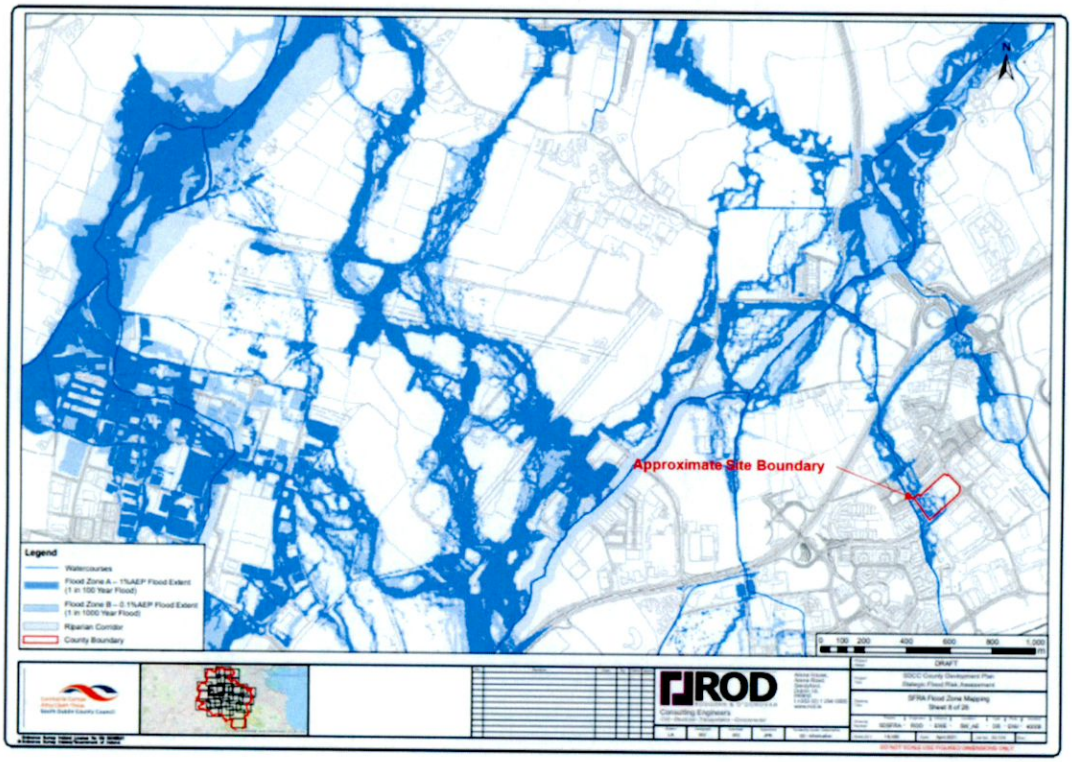
Figure 5-1. Fluvial Flood Mapping (SDCC, 2016-2022)



Fluvial flood mapping published in the Draft SFRA (SDCC, 2022-2028) identifies that the Site is potentially located within 1% AEP flood extent (i.e., Flood Zone A) for fluvial flooding of the

Baldonnell Upper River (refer to Figure 5-1). It is noted that the SDCC, 2022-2028 Development Plan including SFRA do not come into effect until August 2022 and are subject to amendments and further public consultation prior to being issued. The predictive flood data for the Baldonnell Upper River for the SDCC maps are based on the current CFRAM data. Therefore, the predictive CFRAM data is used to undertake an assessment of the potential for flood at the proposed Development Site.

Figure 5-2. Fluvial Flood Mapping (SDCC, 2022-2028)



5.1.2 Coastal Flooding

As documented in the SFRA (SDCC, 2016-2022), coastal flooding is not a concern for SDCC as it is a landlocked county.

Tidal surging of surface water is addressed in the Irish Coastal Protection Strategy Study (ICPSS, 2010) and the Eastern Catchment Flood Risk Assessment and Management (CFRAM, 2017) maps (refer to Sections 5.2.1 and 5.3.3 respectively).

5.1.3 Pluvial Flooding

Pluvial flood mapping published in the SFRA (SDCC, 2016-2022) and mapping published in the Draft SFRA (SDCC, 2022-2028) identifies that the Site is not within an area at risk of the 1%AEP and 0.1% AEP flood extents for pluvial flooding (refer to Figure 5-3 and Figure 5-4).

Figure 5-3. Pluvial Flood Mapping (SDCC, 2016-2022)

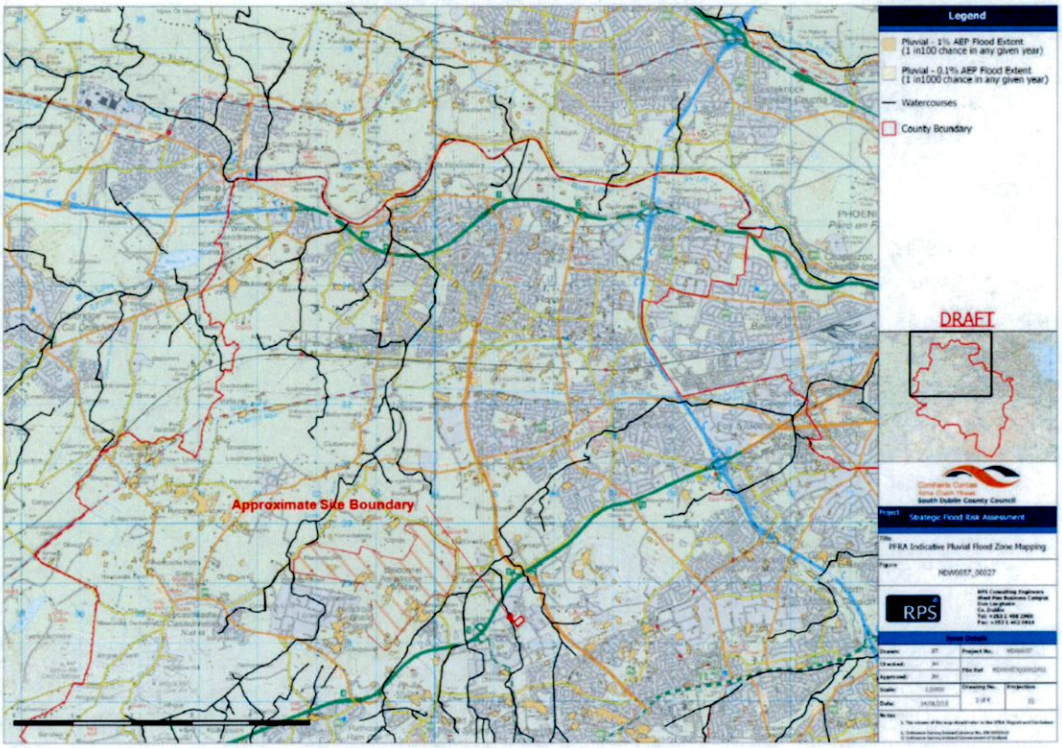
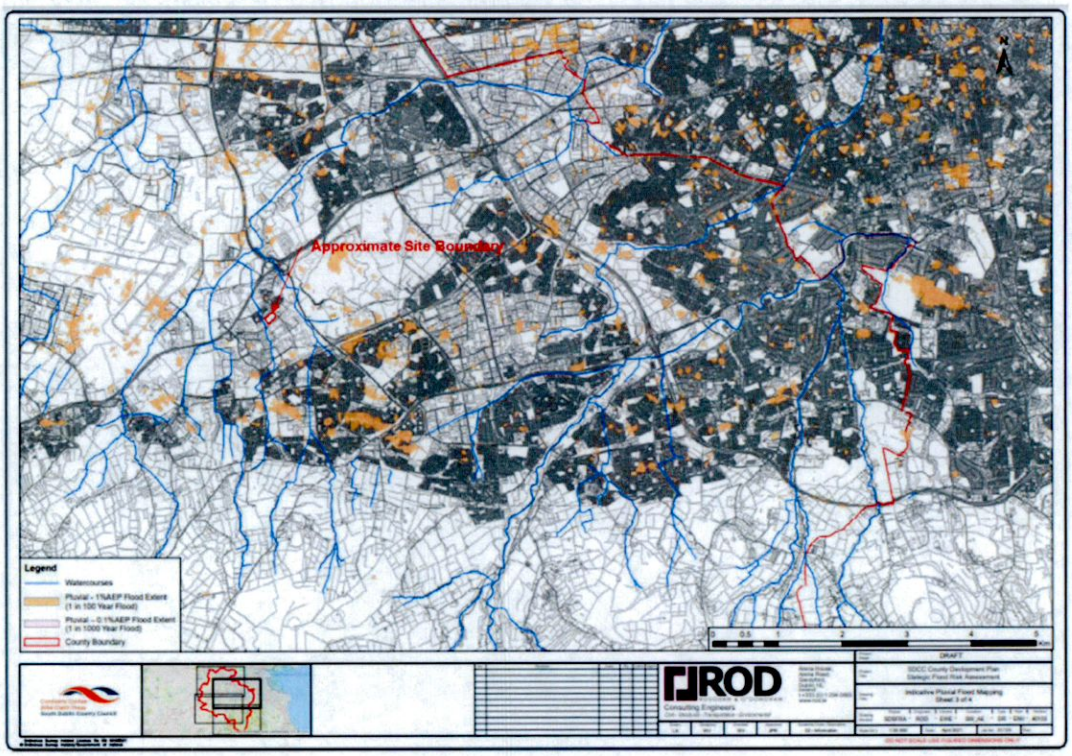


Figure 5-4. Pluvial Flood Mapping (SDCC, 2022-2028)



5.2 Irish Coastal Protection Strategy Study

5.2.1 Coastal Flooding

Coastal flood mapping published by the Office of Public Works and RPS Group Plc. (ICPSS, 2010 and ICWWS, 2020) was consulted, and identifies that coastal flooding does not extend upstream as far as the Site along the Camac River and its tributaries (i.e., Baldonnell Upper River).

5.3 Eastern CFRAM Predictive Flood Risk Mapping

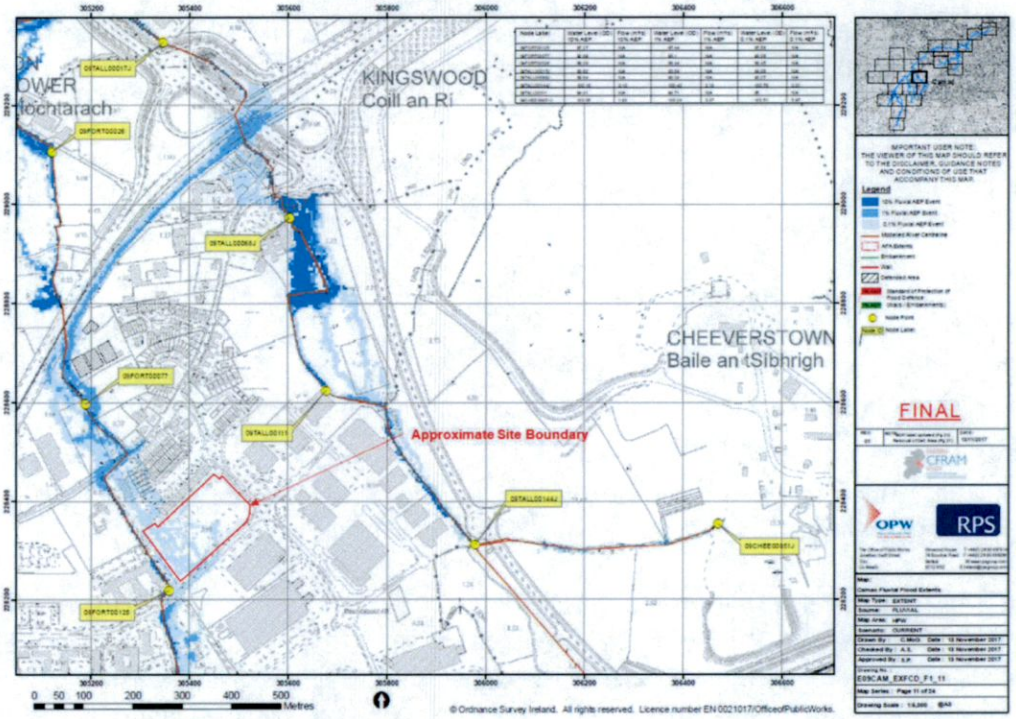
The Eastern Catchment Flood Risk Assessment and Management (CFRAM) study commenced by the OPW in the eastern district in June 2011 through to the end of 2016. The study is focusing in the areas known to have experienced flooding in the past and areas that may be subject to flooding in the future, either due to development pressures or climate change.

5.3.1 Fluvial Flooding

Fluvial flood mapping published by the OPW as part of the Eastern CFRAM Programme was consulted (CFRAM, 2017) and the Site is identified to be located within 0.1% AEP flood extent for fluvial flooding of the Baldonnell Upper River (refer to Figure 5-5).

The flood extents for the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS) take into account the potential impacts of climate change (i.e., 20% and 30% increase in rainfall) and other possible future changes. The Site is mapped to be potentially within the 1% AEP flood extents for HEFS and MRFS. However, it is noted that the OPW database does not contain detailed map information in relation to MRFS and HEFS future flood scenarios for the water courses in the vicinity of the Proposed Development. Therefore, the potential flood impacts and future flood events taking account of climate change are assessed based on the available CFRAM data and in accordance with best practice guidance (DEHLG, November 2009).

Figure 5-5. Fluvial Flood Mapping (CFRAM, 2017 – E09CAM_EXFCD_F1_06)



There is published CFRAM data and predicted flood levels for the Baldonnell Upper River near the Site. The predicted flood levels from the CFRAM, 2017 Fluvial Flood Maps (refer to *Figure 5-5*) at node locations 09FORT00125 and 09FORT00077 located on the Baldonnell Upper River approximately 0.23km southwest and upstream and 0.25km northwest and downstream of the Site respectively are presented in Table 5-1.

The proposed Site levels are 0.92m above the maximum predicted flood water levels for 0.1% AEP and 1.06m above the 1% AEP. While the lowest elevations of concrete yard area are 0.06m above the maximum predicted flood water levels for the 1% AEP and 0.18m below the 0.1% AEP.

Table 5-1. Predicted Flood Levels (CFRAM, 2017)

Node Label	Water Level (mOD) 10% AEP	Water Level (mOD) 1% AEP	Water Level (mOD) 0.1% AEP	Proposed Site Level (mOD)
09FORT00125	97.27	97.44	97.68	Warehouse: 98.5 Concrete Yard: 97.5 to 98.35
09FORT00077	92.89	93.10	93.26	

5.3.2 Pluvial Flooding

Pluvial flood mapping published by the OPW as part of the Eastern CFRAM Programme was consulted (CFRAM, 2017) was consulted, however, there is no mapped information for the Site.

5.3.3 Coastal Flooding

Coastal flood mapping published by the OPW as part of the Eastern CFRAM Programme was consulted (CFRAM, 2017) was consulted, however, there is no mapped information for the Site.

The Site is located outside the flood extents for the for MRFS and HEFS flood extents for coastal flooding which take into account the potential impacts of climate change and other possible future changes.

5.4 Geological Survey of Ireland

5.4.1 Groundwater Flooding

The GSI groundwater flood maps (GSI, 2022) did not identify any potential groundwater flood risk at the Site.

There are no identified or recorded karst landforms features (enclosed depressions, turloughs, springs etc.) identified at the Site or within a 2km radius of the Site (GSI, 2022).

5.5 National Flood Hazard Mapping

The OPW national flood hazard mapping (NFHM) (OPW, 2022) was consulted to obtain reports of recorded flooding within 2km radius of the Site. The NFHM database lists two (2No.) reoccurring flood events and eight (8No.) single flood events within a 2km radius of the Proposed Development Site and the closest is 0.41km from the Site (refer to Figure 5-6 and Table 5-2).

Figure 5-6. Past Flood Events within 2.5km of the Site (Source: OPW, 2022)

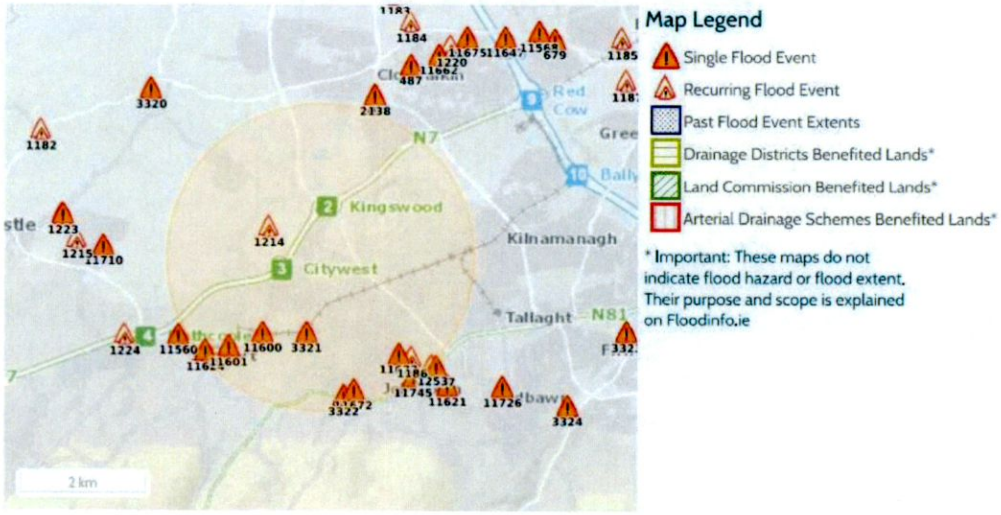


Table 5-2. Recorded Flood Events within 2.5km (Source: OPW, 2022)

Flood I.D.	Flood Type	Flood Event	Date (dd/mm/yyyy)
1186	Recurring	Killinarden Stream Jobstown	N/A
1214	Recurring	Baldonnell Barney's Lane	N/A

Flood I.D.	Flood Type	Flood Event	Date (dd/mm/yyyy)
3322	Single	Jobstown N81	05/11/2000
11745	Single	Flooding at Blessington Road, Podzolics, Dublin 24	01/05/2012
3321	Single	Fortunestown Lane	06/11/2000
11600	Single	Flooding at Fortunestown Lane, Citywest, Co. Dublin	24/10/2011
11601	Single	Flooding at Garter Lane, Saggart, Co. Dublin	24/10/2011
11624	Single	Flooding at Mill Road, Saggart, Co. Dublin	24/10/2011
11672	Single	Flooding at Belfry Drive / De Selby Park, Dublin 24	24/10/2011
11673	Single	Flooding at Bawnlea Crescent and Avenue, Tallaght, Co. Dublin	24/10/2011

There are no recorded historic flood events or hazards recorded for the Site and adjoining property.

6 STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

6.1 Appraisal of the Availability and Adequacy of Existing Information

Based on the findings of the desk-based assessment and taking account of additional available information (refer to Section 5) it is considered that there is sufficient technical information to complete the Initial Flood Risk Assessment for the Site.

6.2 Evaluation of Potential Sources of Flooding

The types of flooding sources which could potentially affect the Proposed Development have been evaluated and are discussed below.

6.2.1 Fluvial Flood Risk

The carparking area and access road to the Site from Kingswood Road are located outside the 0.1% AEP, 1% AEP and 10% AEP flood extents and therefore there is no identified risk of fluvial flooding.

The concrete yard area and a portion of the warehouse at the Site are located within the 0.1% AEP flood extents for fluvial flooding and outside the 1% AEP and 10% AEP based on the current CFRAM, 2017 and SDCC 2016-2022 SFRA flood maps, however as the Draft SDCC, 2022-2028 SFRA maps indicate that portions of the Site are potentially within the 1% AEP this was assessed further.

The predicted flood levels from the CFRAM, 2017 Fluvial Flood Maps (refer to *Figure 5-5*) at node locations 09FORT00125 and 09FORT00077 located on the Baldonnell Upper River approximately 0.23km southwest and upstream and 0.25km northwest and downstream of the Site respectively were used to assess the potential for fluvial flooding at the Site by comparing these to the proposed Site levels (refer to Table 6-1).

Table 6-1. Predicted Flood Levels (CFRAM, 2017) and Calculated Freeboard

Node Label	Water Level (mOD) 10% AEP	Water Level (mOD) 1% AEP	Water Level (mOD) 0.1% AEP	Proposed Site Level (mOD)
09FORT00077	92.89	93.10	93.26	Building: 98.5 Concrete Yard: 97.5 to 98.35
09FORT00125	97.27	97.44	97.58	
09FORT00125 + Freeboard (0.5m)*	97.77	97.94	98.08	
Freeboard - Warehouse	1.26	1.06	0.92	
Freeboard - Concrete yard	0.23	0.06	-0.08	
*SDCC, 2016-2022 SFRA				

The proposed finished floor level at the Site for the warehouse is 98.5mOD which is set to 1.06m above the predicted 1% AEP flood level (97.44mOD) and therefore allows for the minimum required 500mm (0.5m) freeboard allowance in accordance with the recommendations of the SDCC, 2016-2022 SFRA (refer to Table 6-1). Furthermore, there is a freeboard allowance of 0.92m above the 0.1% AEP flood level (97.58mOD) (refer to Table 6-1). Therefore, taking account of the freeboard above the 0.1% AEP, should the effects of climate change be realised, there will be no risk associated with fluvial flooding of the warehouse at the Site.

The finished floor level of the concrete yard area rises from 97.5mOD in the southwest to 98.35mOD where it adjoins the southwest elevation of the warehouse. Therefore, there is a potential flood risk identified to the low-lying area of the concrete yard which is set to 0.08m below the predicted 0.1% AEP flood level (97.44mOD).

It is noted that the manhole chambers to the Class I By-pass Separator and attenuation tank, located below the concrete yard area, will be sealed to prevent the infiltration of surface water in the event of a flood at the Proposed Development Site. Furthermore, the use of non-return valves is also incorporated to prevent any surcharging of the onsite drainage system including interceptor and attenuation tank.

6.2.2 Coastal Flood Risk

The SFRA (SDCC, 2016-2022) has not identified any risk of flooding to the Site given that it is located within a landlocked county. Coastal flood mapping (ICPSS, 2010, ICWWS, 2020 and CFRAM, 2017) was consulted, and identifies that coastal flooding does not extend upstream as far as the Site along the Camac River and its tributaries including the Baldonnell Upper River.

6.2.3 Pluvial Flood Risk

Based on the available published flood maps (Section 5.1.3 and Section 5.3.2) there is no identified pluvial flood risk identified at the Site.

The surface water drainage design for the Site has been designed to cater for surface water runoff from impermeable areas, within the proposed development, in accordance with the GDSDS and will contain the 1 in 100-year event plus 20% climate change allowance.

Discharge from the site will be attenuated to greenfield runoff rates via an appropriately sized attenuation tank and vortex flow control device prior to discharging to the Baldonnell Upper River.

Therefore, taking account of the design of the surface water drainage at the Site, it is considered that there will be no risk of pluvial flooding at the Site or elsewhere as a result of the Proposed Development.

6.2.4 Groundwater Flood Risk

There are no historical records of groundwater flooding at the Proposed Development Site which not within an area mapped with potential for groundwater flooding (GSI, 2022).

There are no identified or recorded karst landforms features (enclosed depressions) identified at the Site or within a 2km radius of the Proposed Development Site (GSI, 2021) and the absence of depressions / groundwater seeps or springs was verified during the site walkover survey. Therefore, taking account of the hydrogeological setting of the Site, the potential risk of groundwater flooding is considered low.

6.3 Flood Risk Evaluation

The carparking area and access road to the Site from Kingswood Road are located outside the 0.1% AEP flood extents where there is no identified flood risk.

Based on the available published data within the Draft SDCC, 2022-2028 SFRA maps and an assessment of potential sources of flood, the concrete yard area and a portion of the

warehouse at the Site are potentially located within the 1% AEP flood extents where the probability of coastal or fluvial flooding is high. However, given the proposed finished floor levels and freeboard allowance of 0.92mOD above the 0.1% AEP fluvial flood depth, it is considered that there is low potential fluvial flood risk to the warehouse at the Site.

There is no identified risk of pluvial flooding at the Site taking account of the existing conditions and the design proposals for surface water management at the Site.

The Site is not within an area at risk of groundwater flooding.

7 ASSESSMENT FOR APPROPRIATE DEVELOPMENT

7.1 Flood Zone for the Proposed Development

Following a review of the available data, it is considered that the concrete yard area and a portion of the warehouse at the Site are located within Flood Zone A where the probability of flooding from rivers and the sea is high (greater than 1% or 1 in 100 for river flooding and 0.5% or 1 in 200 for coastal flooding).

The remaining areas of the Site including the carparking area and access road to the northeast of the Site area located within 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 flooding).

7.2 Vulnerability Class of Development

The proposed development at the Site comprises the construction of a warehouse with ancillary offices and staff facilities and is therefore considered a 'less vulnerable development' in accordance with Table 3.1 of the DEHLG, November 2009 guidelines (refer to Table 7-1 below).

Table 7-1: Classification of Vulnerability of Different Types of Development

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

Vulnerability Class	Land Uses and types of development which include*:
	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	
*Source - Extract from DEHLG, November 2009. The Planning System and Flood Risk Management Guidelines for Planning Authorities	

7.3 Evaluation of Appropriate Development

The Site is located within lands that are zoned 'EE – Enterprise and Employment' under the SDCC 2016-2022 Development Plan. As such, the proposed development at the Site is deemed suitable for the policies and objectives assigned to this area.

As mentioned in Section 5.1.1, fluvial flood mapping published in the Draft SDCC, 2022-2028 SFRA identifies that the Site is located within Flood Zone A. The SDCC, 2022-2028 Development Plan including SFRA does not come into effect until August 2022 and will be subject to amendments and further public consultation prior to being issued. However, in accordance with Table 2-2 a Justification Test was undertaken at the Site on the basis that the Site is located in Flood Zone A.

7.3.1 Justification Test for the Proposed Development

The Justification Test for Development Management has been undertaken in accordance with the DEHLG, 2009 Guidelines as outlined in Table 7-2 below.

Table 7-2. Justification Test for Development Management

Justification Test Criteria
When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2 (DEHLG, 2009), the following criteria must be satisfied:
Justification Test – Criteria 1
The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
Justification Test – Criteria 2
The proposal has been subject to an appropriate flood risk assessment that demonstrates: (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk; (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible; (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and (iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes. The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context. Note: See section 5.27 in relation to major development on zoned lands where sequential approach has not been applied in the operative development plan. Refer to section 5.28 in relation to minor and infill developments.
Source - Extracted from DEHLG Guidelines, 2009

7.3.2 Justification Test – Criteria 1

The Proposed Development at the site meets this criterion as follows:

- As mentioned above, the Site is located within lands that are zoned 'EE – Enterprise and Employment' under the SDCC 2016-2022 Development Plan and therefore, the industrial warehouse at the proposed development Site is deemed suitable for the policies and objectives assigned to this area.

7.3.3 Justification Test – Criteria 2

Under Criteria 2 it must be demonstrated that the Proposed Development is not at undue risk of flooding, nor does it increase the risk of flooding elsewhere. It also needs to demonstrate low residual risk and resilience to climate change. Criteria 2 includes four specific sub-criteria which must be addressed with appropriate flood mitigation measures, where necessary, to ensure the development complies fully with the Development Management Justification Test.

A summary of the mitigation and design measures with respect to the four sub-criteria which must be addressed in Criteria 2 are discussed below.

(i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk.

During the development of the site there will be no alterations to the flow path of the Baldonnell Upper River and therefore the current hydrological conditions will be maintained in the water course.

Site drainage has been designed in accordance with GDSDS and SUDS principles and therefore includes adequate attenuation for surface water runoff from the Site which will be attenuated to discharge at greenfield runoff rates via an appropriately sized attenuation tank and vortex flow control device prior to discharging to the Baldonnell Upper River.

Therefore, taking account of the design of the surface water drainage at the Site, it is considered that there will be no risk of pluvial flooding at the Site or elsewhere as a result of the proposed development and the requirements of this criterion are achieved.

(ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible.

As outlined in Section 6.2.1 there is no identified risk of flooding to the access route and building at the Site.

The drainage design includes flow control (non-return) valves and sealed covers for the Class I By-Pass Separator and attenuation tank to prevent any surcharging to the onsite drainage system and is therefore defended against any surface water breach and environmental harm.

Therefore, it is considered that requirements of this criterion are achieved.

(iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any

future flood risk management measures and provisions for emergency services access.

Based on the proposed design elevation that there is no mitigation or flood protection measures required for the proposed design. There are no restrictions on access for the emergency services via the carparking area in the northeast of the Site and there is no potential flood risk identified.

Therefore, it is considered that the requirements of this criterion are achieved.

(iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The proposed development at the Site is for a warehouse development and as the Site is located within lands that are zoned 'EE – Enterprise and Employment' under the SDCC 2016-2022 Development Plan it is considered that this criterion is achieved.

8 CONCLUSIONS

EGC has completed an FRA in accordance with the guidelines set out in 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' (DEHLG, November 2009) and based on the findings of the assessment the following can be concluded:

- The Proposed Development is for the construction of a proposed warehouse development including ancillary offices and staff facilities at Kingswood Road, Citywest Business Park, Dublin 24.
- The Proposed Development is considered to be a 'less vulnerable development' in accordance with Table 3.1 of the DEHLG, 2009 guidelines.
- Following a review of the available data, it is considered that the concrete yard area and a portion of the warehouse at the Site are located within Flood Zone A where the probability of flooding from rivers and the sea is high (greater than 1% or 1 in 100 for river flooding and 0.5% or 1 in 200 for coastal flooding).
- The remaining areas of the Site including the carparking area and access road to the northeast of the Site area located within 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 flooding).
- Given the proposed finished floor levels and taking account of the freeboard above the 0.1% AEP, should the effects of climate change be realised, there will be no risk associated with fluvial flooding of the warehouse at the Site.
- There is no identified risk of flooding elsewhere associated with the proposed development.
- The requirements of the Justification Test Criteria are achieved for the proposed development.
- Therefore, the proposed development is considered Justified in accordance with guidelines set out in 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' (DEHLG, November 2009).

9 REFERENCES

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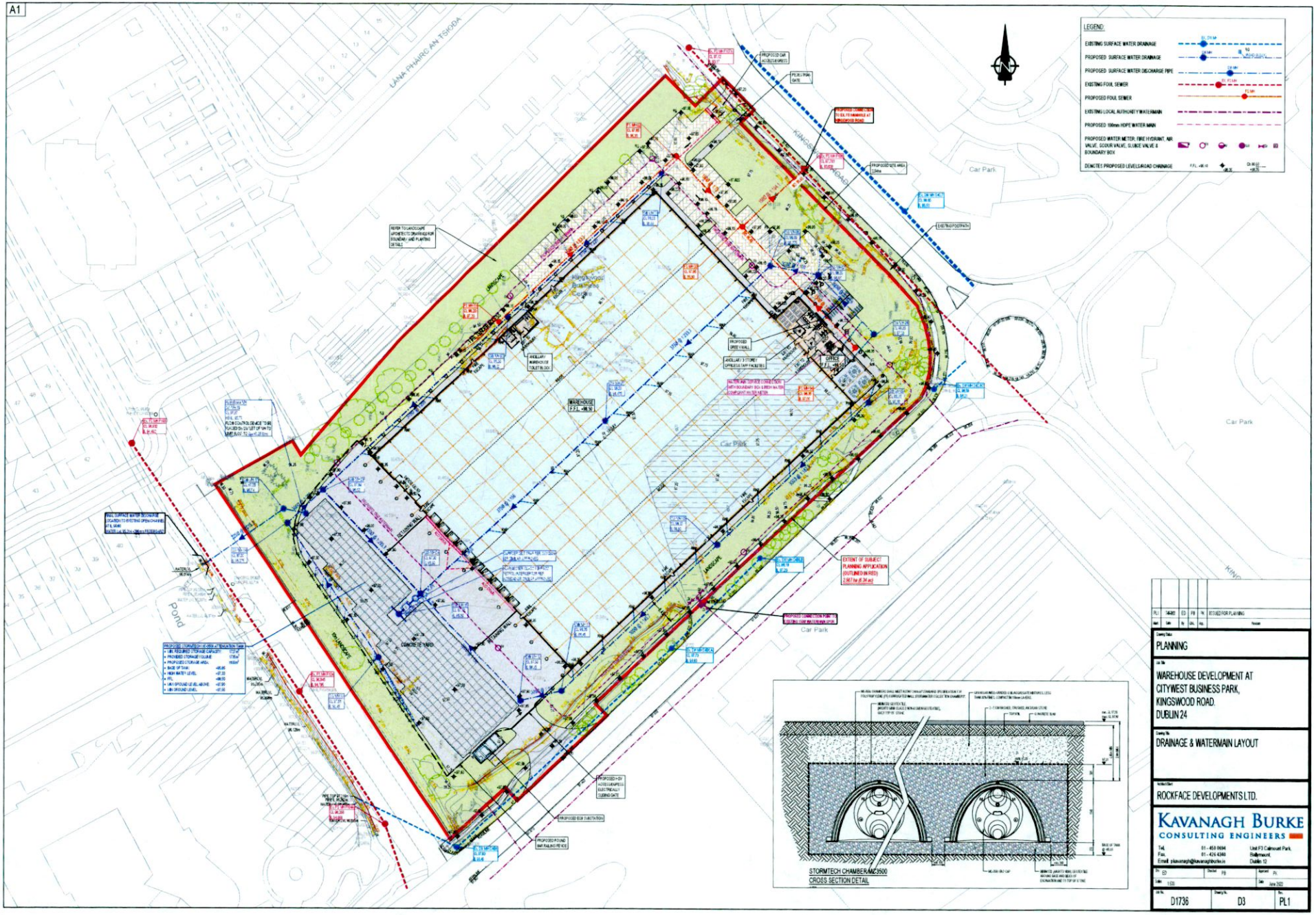
Appendix A


A1
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EXISTING SURFACE WATER DRAINAGE
PROPOSED SURFACE WATER DRAINAGE
PROPOSED SURFACE WATER DISCHARGE PIPE
EXISTING FOUL SEWER
PROPOSED FOUL SEWER
EXISTING LOCAL AUTHORITY WATERMAIN
PROPOSED 100mm HDPE WATER MAIN
PROPOSED WATER METER, FIRE HYDRANT, AIR VALVE, SCOUR VALVE, SLUICE VALVE & BOUNDARY BOX
DENOTES PROPOSED LEVELS/ROAD CHAINAGE
Car Park
Pond
EXTENT OF SUBJECT PLANNING APPLICATION (OUTLINED IN RED) 2.667 ha (6.34 ac)
STORMTECH CHAMBER MC3500 CROSS SECTION DETAIL
PLANNING
WAREHOUSE DEVELOPMENT AT CITYWEST BUSINESS PARK, KINGSWOOD ROAD. DUBLIN 24
DRAINAGE & WATERMAIN LAYOUT
ROCKFACE DEVELOPMENTS LTD.
KAVANAGH BURKE
CONSULTING ENGINEERS
D1736
D3
PL1

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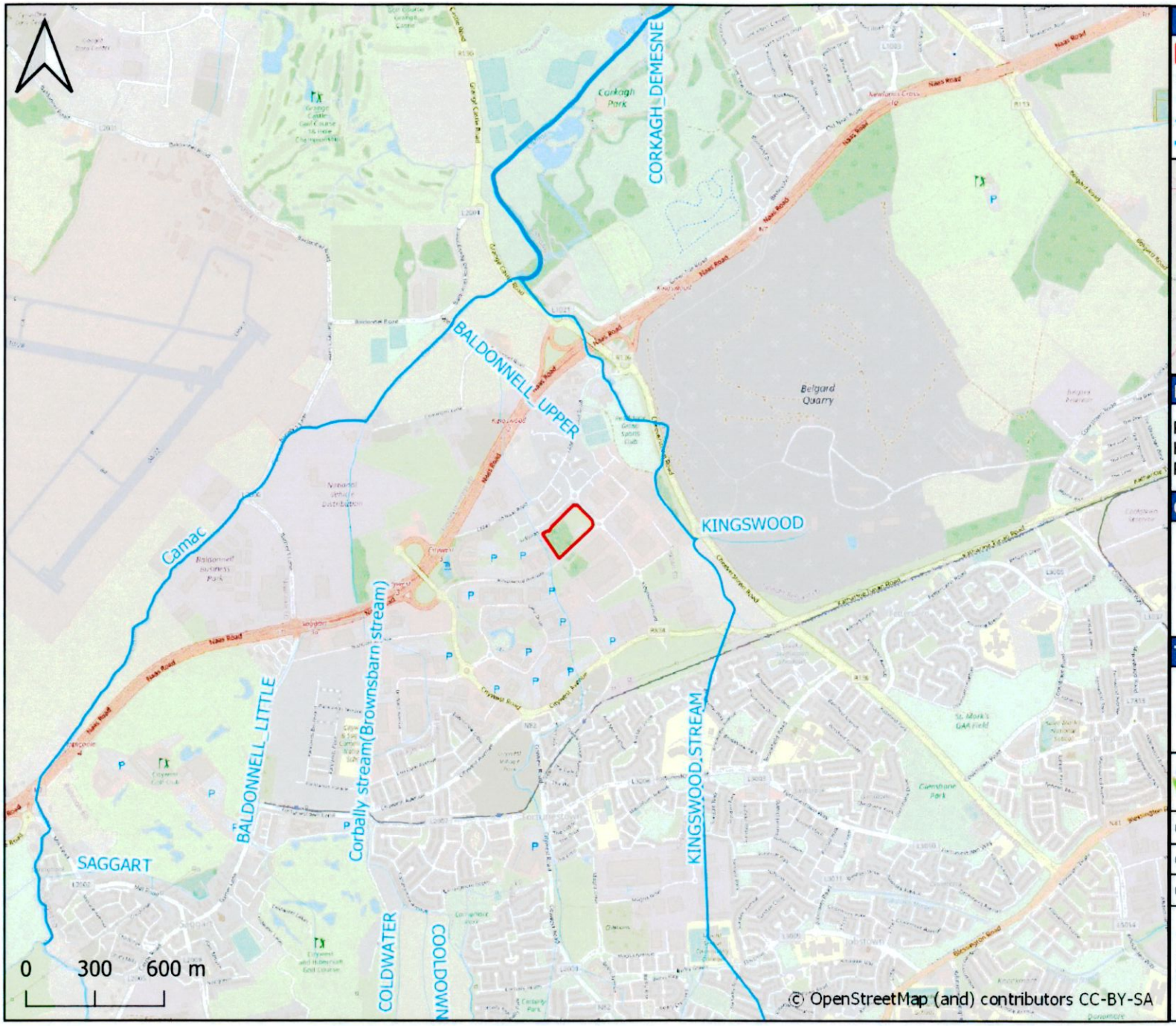
Appendix B



Legend:

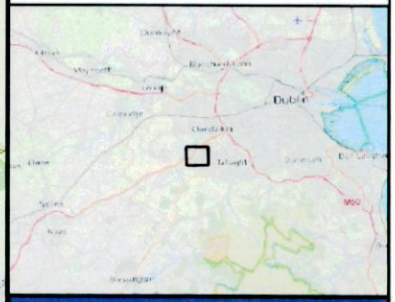
Site Boundary

EPA River Network (Stream Order)

1

2

3



Project:

Proposed Warehouse Development, Kingswood Road, Citywest Business Park, Dublin 24

Client:

Rockface Developments Ltd

Title:

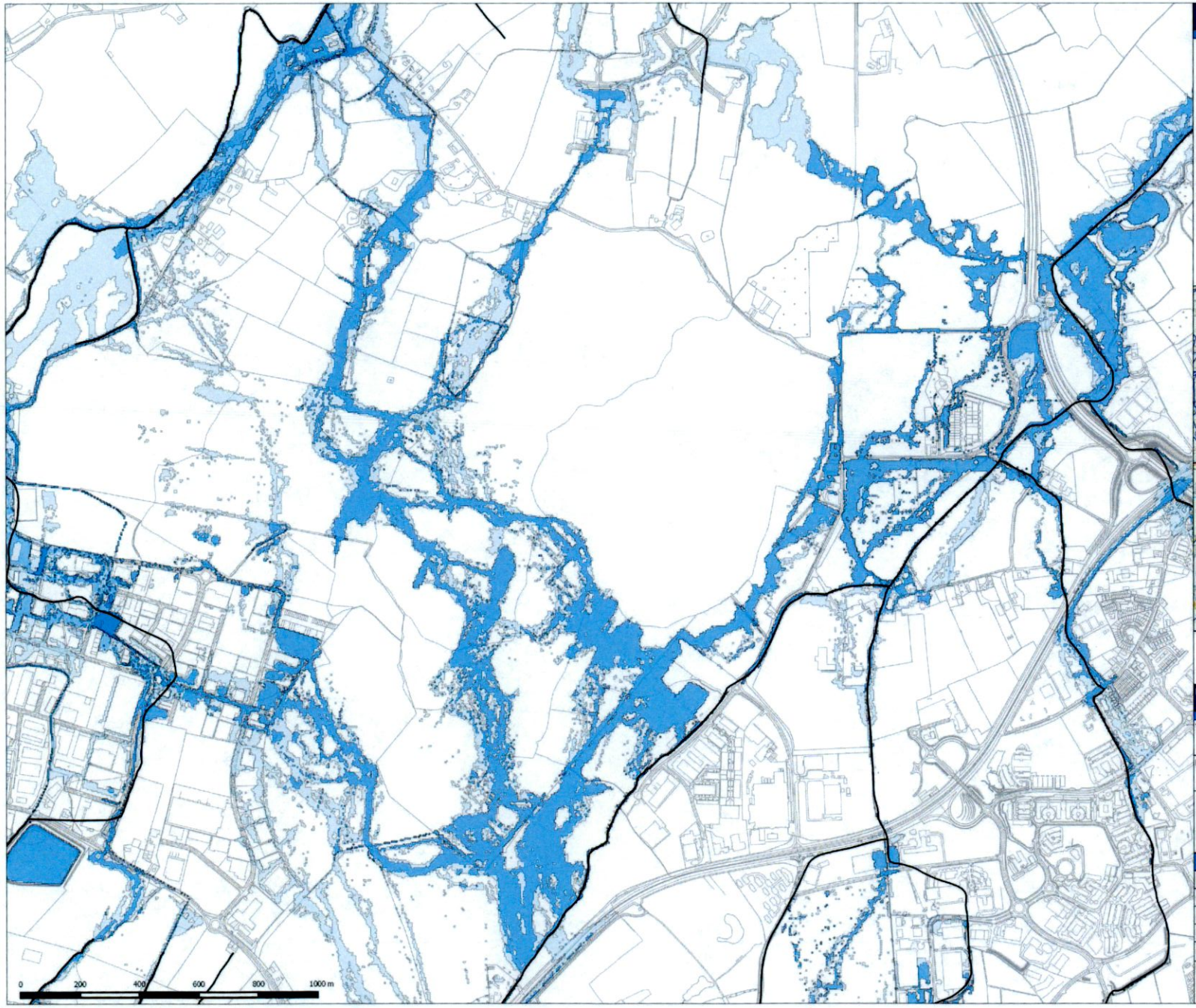
Site location

Enviroguide Consulting

Drawn By: SOB	**Projection:** IRENET95 / Irish Transverse Mercator
Checked: CL	
Date: 04/02/2022	**Scale @ A4: 1:21559**

Notes:

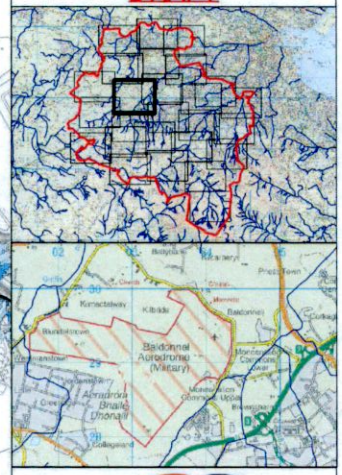
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries



Legend

- Flood Zone A - 1% AEP Flood Extent (1 in 100 chance in any given year)
- Flood Zone B - 1% AEP Flood Extent (1 in 1000 chance in any given year)
- Defended Area
- Watercourse Centreline
- Indicative Flood Extents
- County Boundary

DRAFT



Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Project: Strategic Flood Risk Assessment

Title: Fluvial Flood Zone Mapping

Figure: MDW657_0008

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Issue Details

Drawn:	ST	Project No.	MDW0657
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Approved:	JH		
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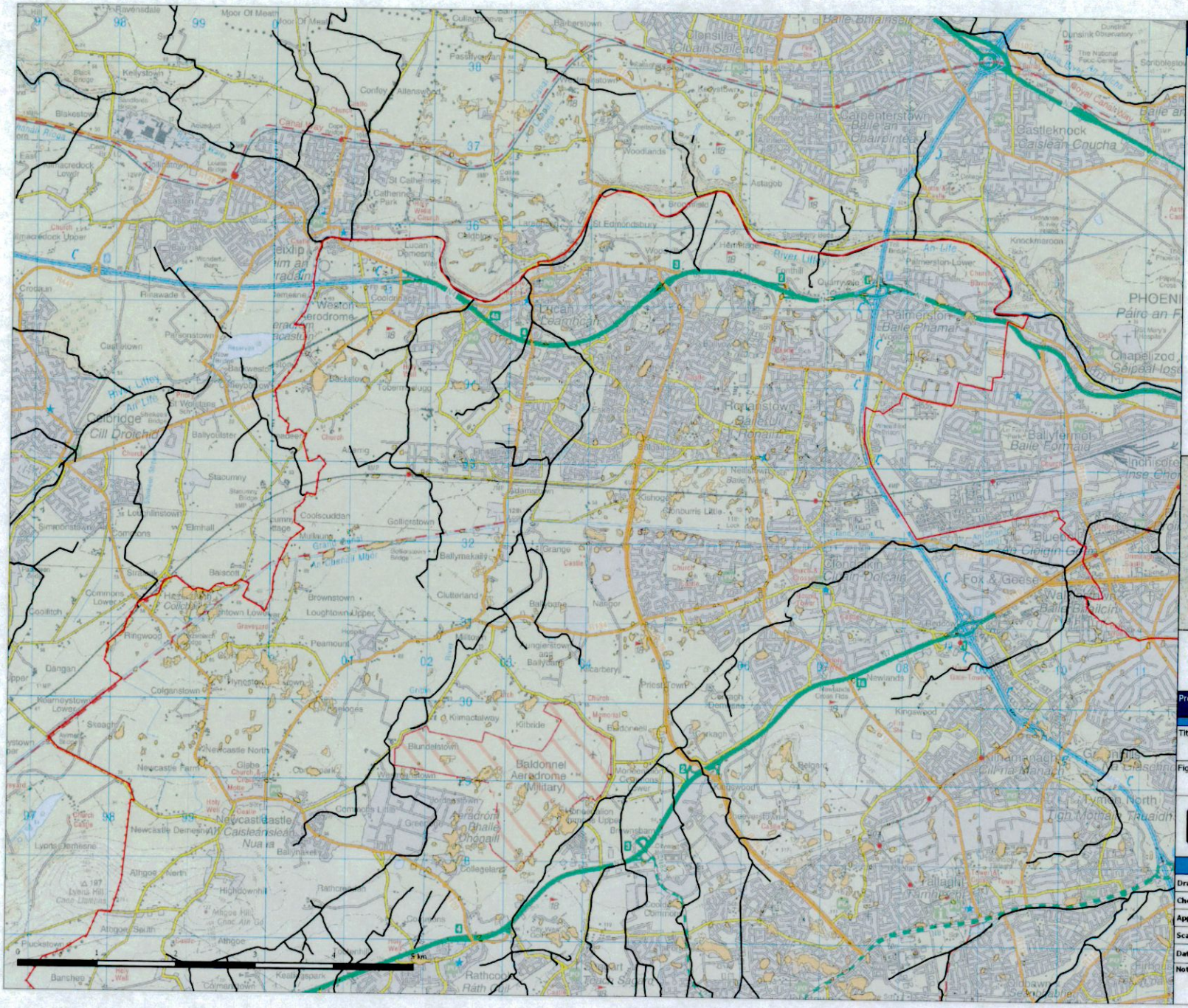
Date:	14/01/2016	8 of 26	IG

Notes
1. The viewer of this map should refer to the SFRA Report and Disclaimer


Legend
Pluvial - 1% AEP Flood Extent
(1 in100 chance in any given year)
Pluvial - 0.1% AEP Flood Extent
(1 in1000 chance in any given year)
Watercourses
County Boundary
DRAFT
Comhairle Contae
Átha Cliath Theas
South Dublin County Council
Project
Strategic Flood Risk Assessment
Title
PFRA Indicative Pluvial Flood Zone Mapping
Figure
MDW0657_00027
RPS
RPS Consulting Engineers
West Pier Business Campus
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Tel: +353 1 488 2900
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Issue Details
Drawn: BT
Checked: JH
Approved: JH
Scale: 1:20000
Date: 14/01/2016
Project No. MDW0657
File Ref MDW0657QG0012F02
Drawing No. 1 of 4
Projection IG
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1. The viewer of this map should refer to the SFRA Report and Disclaimer
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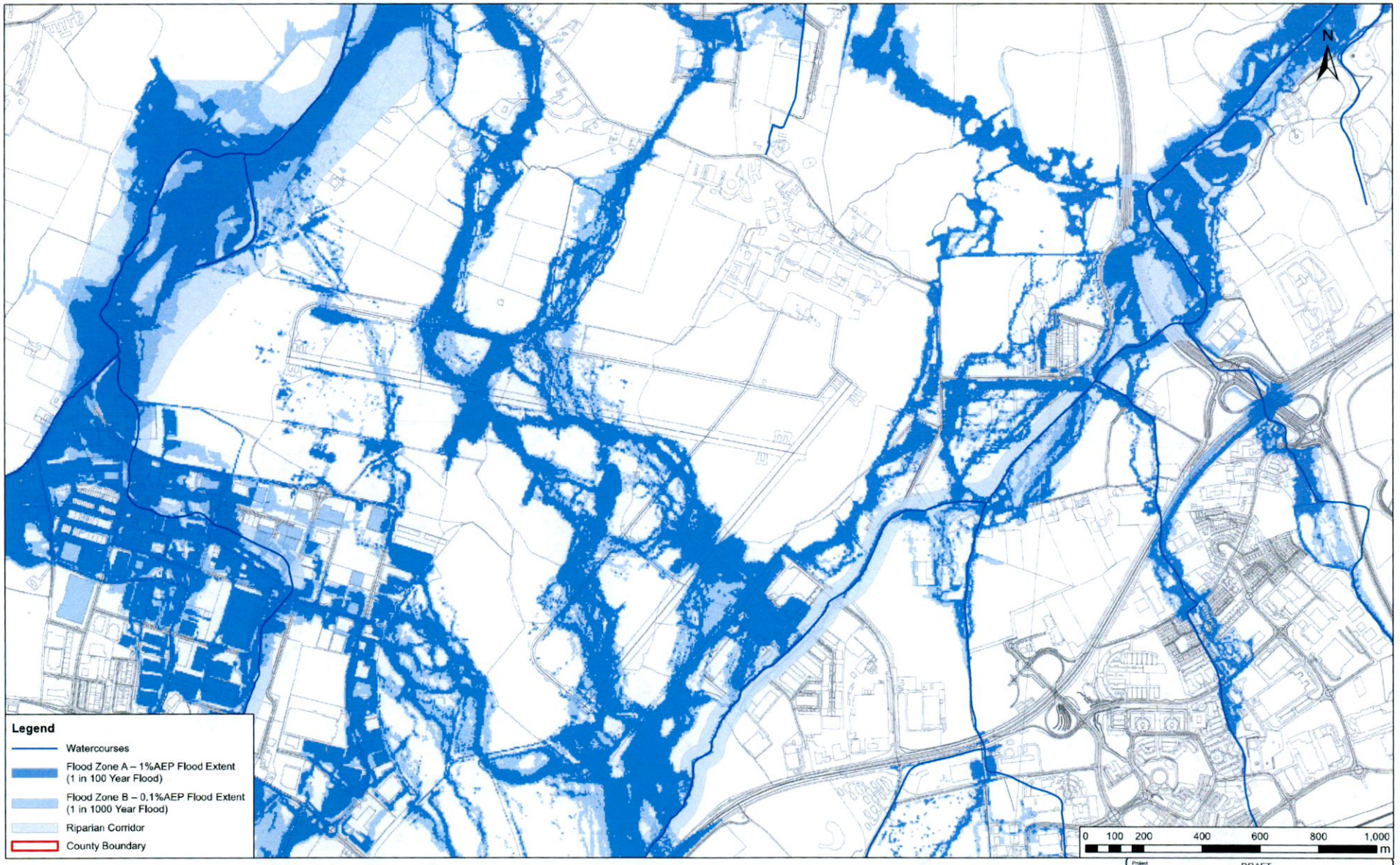

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South Dublin County Council

No.	Revision	Date	By	Chk'd	Appr'd

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Drawn	Designed	Checked	Approved	Suitability Code - Description
LA	WV	WV	JPR	S2 - Information

Project Stage: DRAFT

Project Title: SDCC County Development Plan
Strategic Flood Risk Assessment

Drawing Title: SFRA Flood Zone Mapping
Sheet 8 of 26

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	SDSFRA	ROD	EWE	SW_AE	DR	ENV	40008

Scale (A1)	Date	Job No	Rev.
1:6,000	April 2021	20.126	

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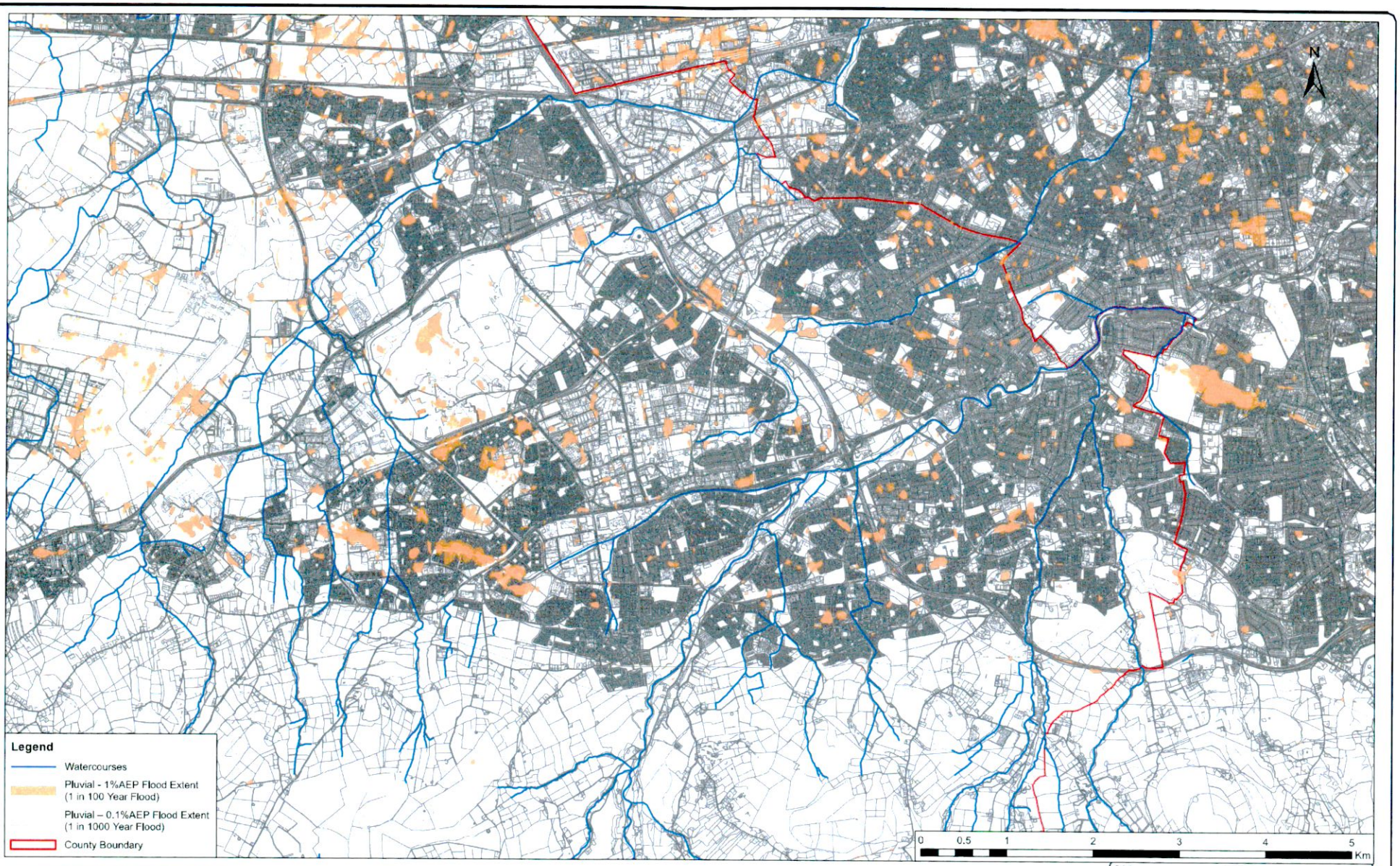

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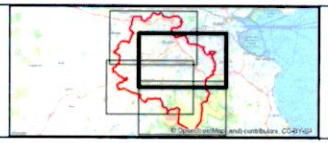

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Drawn	Designed	Checked	Approved	Suitability Code - Description
LA	WV	WV	JPR	S2 - Information

Project Stage	DRAFT
Project Title	SDCC County Development Plan Strategic Flood Risk Assessment
Drawing Title	Indicative Pluvial Flood Mapping Sheet 3 of 4

Drawing Number	Project	Originator	Volume	Location	Type	Role	Number
	SDSFRA	ROD	EWE	SW_AE	DR	ENV	40103

Scale (A1)	Date	Job No	Rev.
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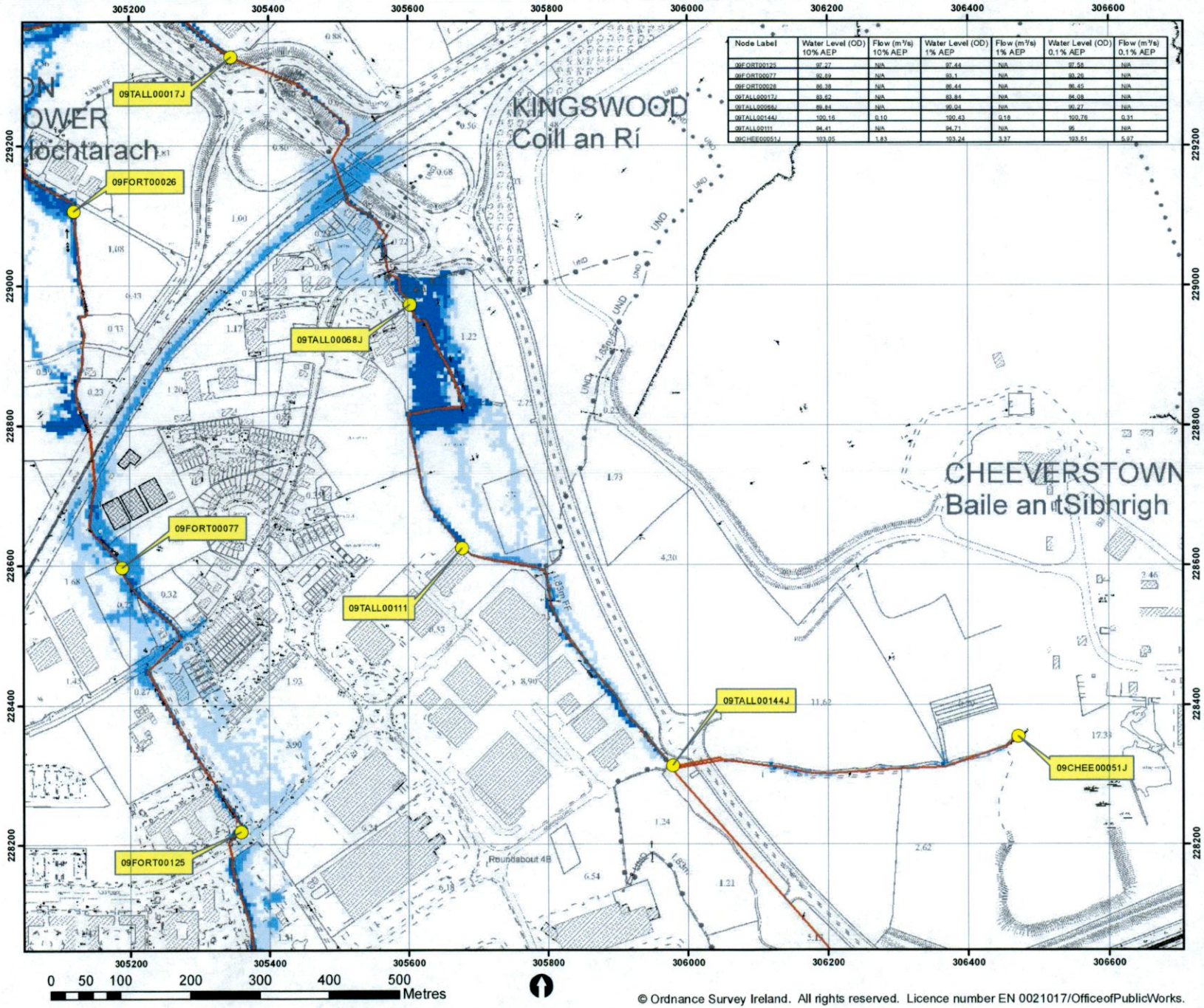
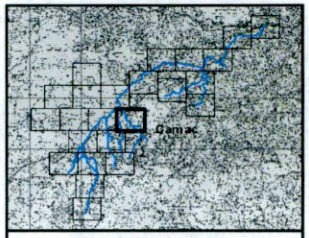


Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09FORT00125	97.27	N/A	97.44	N/A	97.58	N/A
09FORT00077	92.89	N/A	93.1	N/A	93.26	N/A
09FORT00026	86.38	N/A	86.44	N/A	86.45	N/A
09TALL00017J	83.52	N/A	83.84	N/A	84.08	N/A
09TALL00068J	89.84	N/A	90.04	N/A	90.27	N/A
09TALL00144J	100.16	0.10	100.43	0.18	100.76	0.31
09TALL00111	94.41	N/A	94.71	N/A	95	N/A
09CHEE00051J	103.05	1.83	103.24	3.37	103.51	5.97



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
- Embankment
- Wall
- Defended Area
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- Node Point
- Node ID — Node Label

FINAL

REV:	NOTE:	DATE:
01	SOP label updated (Pg 21) Removal of Def. Area (Pg 21)	13/11/2017

EASTERN CFRAM STUDY

OPW

RPS

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Map:	Camac Fluvial Flood Extents
Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 13 November 2017
Checked By :	A.S. Date : 13 November 2017
Approved By :	S.P. Date : 13 November 2017
Drawing No. :	E09CAM_EXFCD_F1_11
Map Series :	Page 11 of 24
Drawing Scale :	1:5,000 @A3