SITE-SPECIFIC FLOOD RISK ASSESSMENT

for

A PROPOSED STRATEGIC HOUSING DEVELOPMENT

at

BALLYMANY ROAD, NEWBRIDGE, CO. KILDARE

for

BRIARGATE DEVELOPMENTS NEWBRIDGE LIMITED

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CONTENTS

1.0 INTRODUCTION

This Site-Specific Flood Risk Assessment has been prepared by Muir Associates Limited (MAL) to accompany a planning application for a Strategic Housing Development at Ballymany Road, Newbridge, Co. Kildare.

The location of the proposed development is indicated in Figure 1.1 presented below:

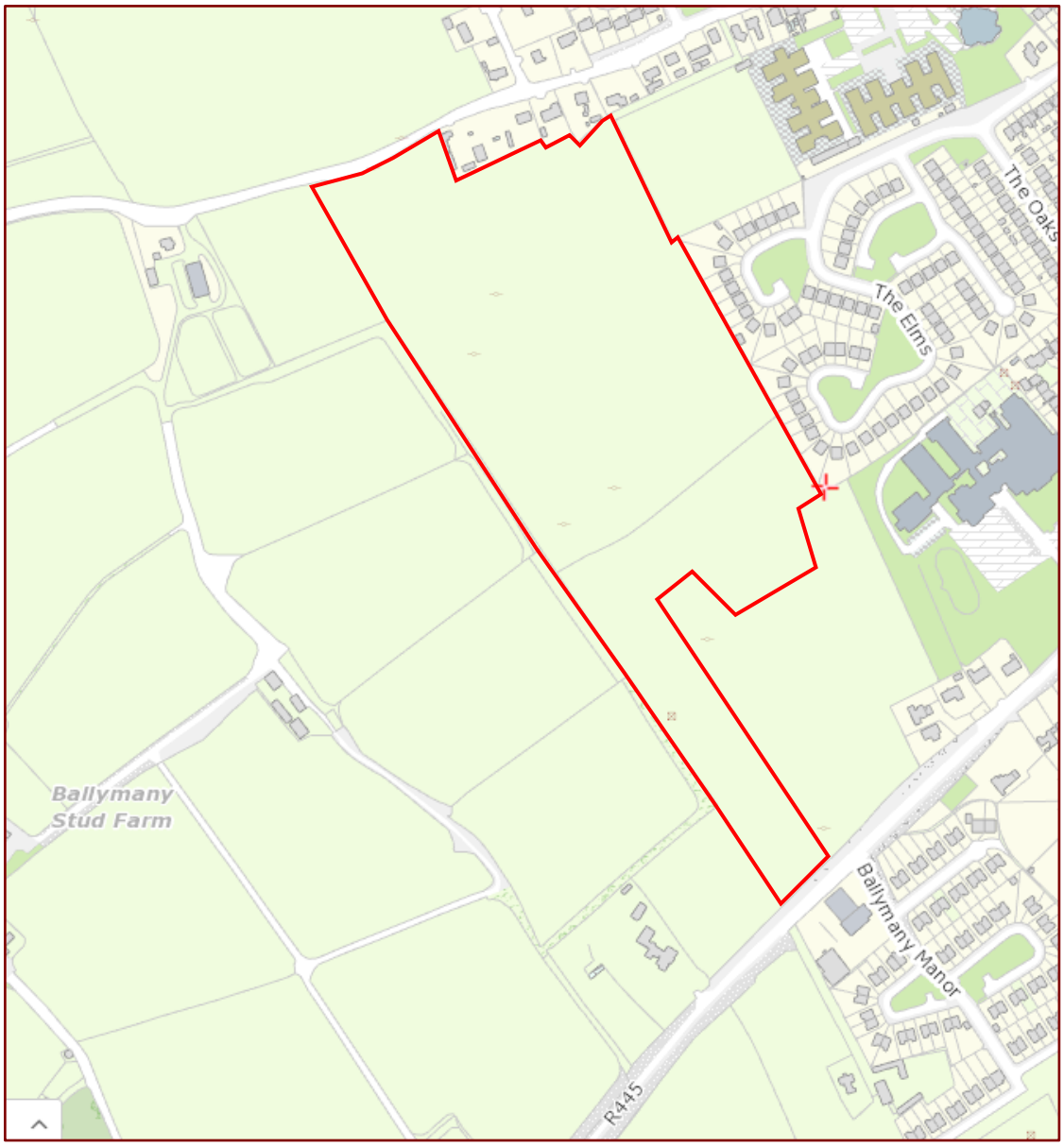


Figure 1.1: Site Location Map;

The Flood Risk Assessment was undertaken in accordance with the guidance contained in the following documents:

- *The Planning System and Flood Risk Management Guidelines for Planning Authorities* (Department of Environment, Heritage and Local Government and the Office of Public Works);
- *C624 Development and Flood Risk* (Construction Industry Research and Information Association, CIRIA) and;
- *Strategic Flood Risk Assessment of the Kildare County Development Plan 2017-2023*

The Flood Risk Assessment also takes cognisance of the following information:

- Architectural drawings for the proposed development;
- Engineers drawings for the proposed development;
- OPW National Preliminary Flood Risk Assessment;
- OPW Eastern CFRAM Study;
- Topographical survey information;
- Geological Survey of Ireland (GSI) Maps.

2.0 PROPOSED DEVELOPMENT

The Strategic Housing development with creche, served by a Link Road will consist of the following:

- Construction of 336 No residential units consisting of 245 No houses, 27 No apartments and 64 No duplex units;
- The 245 No houses will comprise 2-storey, detached, semi-detached and terraced units to include:
  - 17 no. 2-bed houses;
  - 184 no. 3-bed houses;
  - 44 no. 4-bed houses;
- The 27 No apartments are located in a part 3-storey and part 4-storey building and include:
  - 13 No 1-bed units;
  - 13 No 2-bed units;
  - 1 No 3-bed unit;
- The 64 no. duplexes are located across 6 no. 2 to 3-storey buildings and include:
  - 32 No 1-bed units;
  - 16 No 2-bed units;
  - 16 No 3-bed units;
- A 2-storey creche;
- Car parking, bicycle parking, internal roads, services infrastructure, bin stores and bicycle stores;
- Footpath improvements along Standhouse Road;
- Landscaping, play areas, boundary treatment and public lighting;
- All associated site works and services.

A full development description is provided in the planning report which accompanies the planning application.

3.0 SITE CONTEXT

The proposed development is located on a site to the northwest of the R445 Ballymany Road in Newbridge, Co Kildare. The existing ground levels on the subject site vary from approximately 107.0mAOD in the south east of the site to 95.0mAOD in the north west of the site. Some significant earthworks were previously undertaken on the site which has reduced a substantial portion of the site to formation level. Some stockpiles from this initial earthmoving exercise remain on the site.

4.0 REFERENCE MATERIAL

The source material examined to gain an understanding of the historical flooding on or close to the proposed development site is listed in the Introduction to this document. In addition, the Office of Public Works (OPW) collates available reports on flooding from all sources (e.g., fluvial, pluvial, coastal, infrastructure) on a nationwide basis. The OPW website (http://www.floodmaps.ie) contains flood hazard map information in relation to locations that may be at risk from flooding. The information obtained from the OPW website is presented in Appendix A of this report.

Thus, prior to considering the specifics of the proposed development, records of historical and predicted flooding in the area were researched. As noted earlier the primary source of such information is the OPW and the following is a summary of the findings:

- **OPW National Flood Hazard Mapping,** The Summary Local Area Report does not indicate any record of flooding within the proposed development site. It does record a recurring flood event approximately 400m to the northeast of the site on the R445 Ballymany Road. The related report notes that the flooding appears to be related to runoff from the Hotel Carpark after significant heavy rain.
- **OPW National Preliminary Flood Risk Assessment Mapping;** This map indicates predicted flooding along the River Liffey and the Greatconnell River to the north east and in the Cloncumber Stream to the northwest of the site. An extract from the related PFRAM map is presented in Figure 4.1 below.
- **OPW Eastern CFRAM Study Newbridge Fluvial Flood Extents Mapping;** These maps indicate flooding associated with the River Liffey and the Greatconnell River. There is no predicted flooding with the proposed development site. An extract from the OPW CFRAM website mapping https://www.floodinfo.ie is presented in Figure 4.2 below:

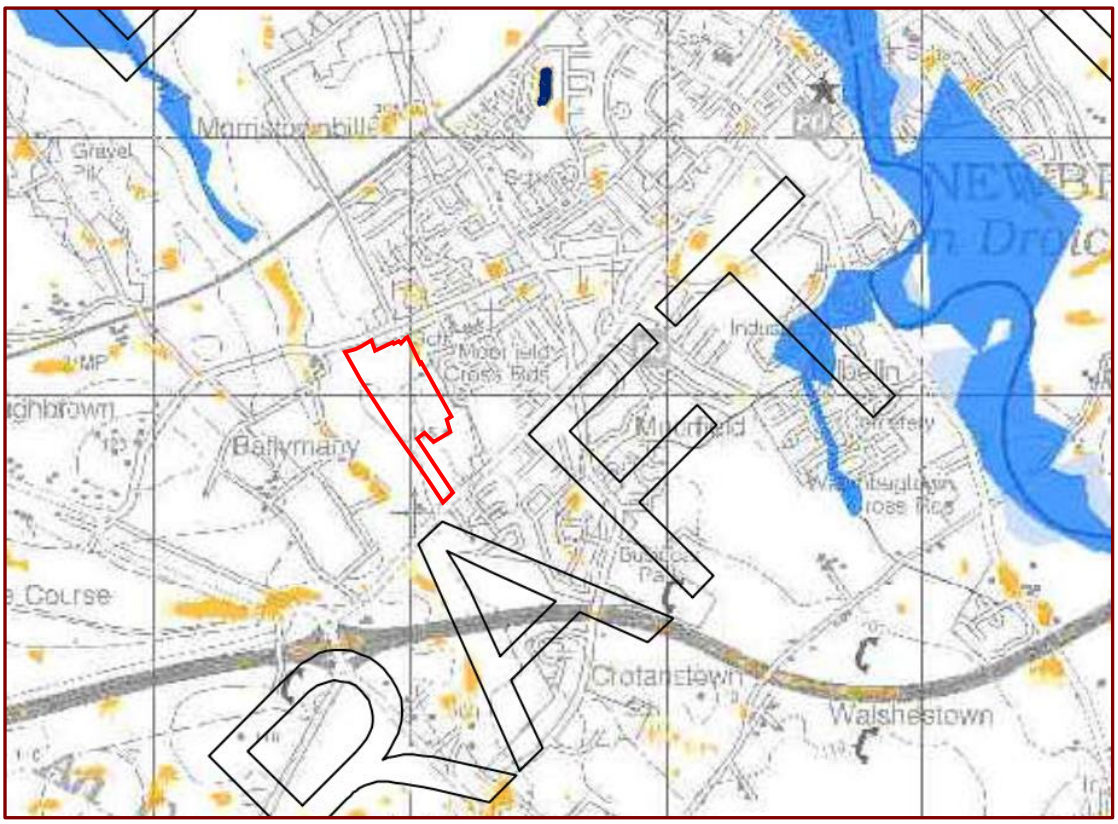


Figure 4.1: Extract from the OPW PFRA Map for the area;

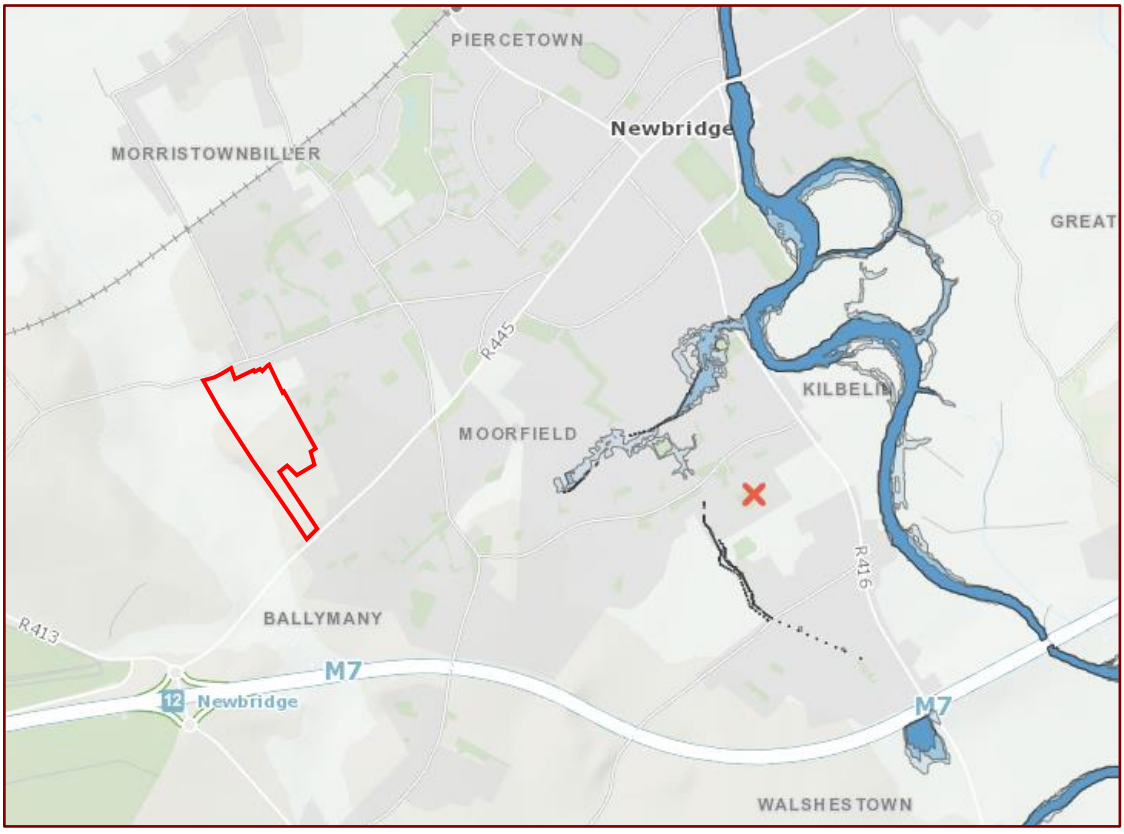


Figure 4.2: Extract from the https://www.floodinfo.ie website;

The Planning System and Flood Risk Management Guidelines for Planning Authorities adopts a sequential approach to managing flood risk by reducing exposure to flooding through land-use planning. The approach adopted by the Guidelines identified three types or levels of flood zones which are defined in the Guidelines as follows:

- **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 1000 year and 0.5% or 1 in 200 for coastal flooding); and
- **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.

5.0 FLOOD RISK ASSESSMENT

The current relevant Flood Risk Assessment guidance appropriate for the assessment of flood risk is to be found in the "**Guidelines for Planning Authorities"** titled **"The Planning System and Flood Risk Management"** published in November 2009 by the Office of Public Works (OPW) and the Department of Environment, Heritage and Local Government (DOEHLG).

The objectives of this report, given the location, nature and scale of the proposed development are to assess the flood risks to and arising from the proposed development. In order to achieve this objective, the Planning System and Flood Risk Management Guidelines for Planning Authorities requires that *the risks be mitigated and managed through location, layout, and design of the development to* ***reduce flood risk to an acceptable level*** and that **no *unacceptable residual flood risk*** *to the development, its occupants or users and adjoining property remains*.

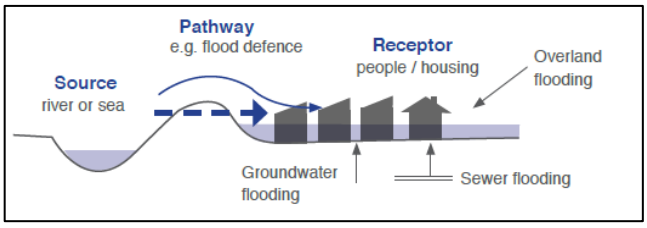


Figure 5.1: Source – Pathway – Receptor Model – OPW The Planning System and Flood Risk Management;

A Source – Pathway – Receptor model (see **Figure 5.1** above) was produced to summarize the possible sources of floodwater, the people, and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals) and the pathways by which flood water for a 0.1% AEP (Annual Exceedance Probability) and 1% AEP storms could reach the receptors (**Table 5.1** below). It provides probability and magnitude of the sources, the

performance and response of pathways and the consequences to the receptors in the context of the proposals.

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Fluvial	River Liffey – out of bank flooding	Remote Lands	Low	Low	Low
Surface Water from the proposed internal drainage system (Pluvial)	Blockage and/or surcharging of the proposed surface water drainage network	People and Property (the proposed development)	Possible	Low	Low
Surface Water from the existing surrounding drainage system (Pluvial)	Blockage and/or surcharging of the existing surface water drainage network	People and Property (the proposed development)	Possible	Low	Low
Groundwater Flooding	Rising groundwater levels within the subject site	People and Property (the proposed development)	Low	Low	Low
Human or Mechanical Error (Pluvial)	Failure of proposed SuDS measures (e.g., Hydrobrake failure)	People and Property (the proposed development)	Possible	Low	Low

Table 5.1: Source – Pathway – Receptor analysis;

The sources of flooding considered for this site are Tidal, Fluvial, Pluvial, Groundwater, Human or Mechanical and Construction. Each of these potential flooding sources is considered in more detail, in turn, below:

5.1 Tidal

The development is not considered to be at risk of tidal flooding given its proximity and elevation relative to the nearest point to the Irish Sea.

5.2 Fluvial

The nearest watercourses to the proposed development site are the Cloncumber Stream (EPA Code 14C17) to the northwest and the Greatconnell Stream (EPA Code 09G15) to the east. The Cloncumber Stream is within the River Barrow catchment and the Greatconnell Stream is within the River Liffey (EPA Code 09L01) catchment. The Cloncumber Stream rises to the north of the Dublin-Cork railway line which is approximately 500m to the northwest of the proposed development site. The Greatconnell Stream rises approximately 500m to the east of the proposed development site. This stream is a tributary of the Newbridge Stream (EPA Code 09N05) which flows into the River Liffey and has been modelled as part of the Newbridge Fluvial Flood Extents Eastern CFRAM Study. The available flood hazard mapping indicates that the subject site is located within Flood Zone C (i.e., outside the 1 in 1,000-year event flood zone).

Given the information presented in Section 4 of this report it is likely that flooding from fluvial sources will not pose a significant risk to the proposed development and the predicted flooding illustrated on the available maps and the general topography in the area would suggest that the risk of flooding from these sources is remote.

Thus, having considered the potential source of flooding from fluvial sources together with the likely impact of the proposed development on fluvial watercourses it is concluded that there is no unacceptable risk of flooding and that there is no unacceptable residual flood risk to the proposed development, its occupants, adjoining land users or property.

5.3 Pluvial

Pluvial flooding refers to flooding events that are caused by extreme rainfall. Such floods occur when the ground cannot absorb rainwater effectively or urban drainage systems are overwhelmed by excessive water flow.

It is proposed to discharge the surface water runoff from the proposed development to the existing storm water sewer in Standhouse Road via a series of geocellular attenuation storage facilities located on the site. The surface water discharge to Standhouse Road will be controlled by a flow control device which will limit the discharge rate to the greenfield site peak runoff rate. There are also 2 No soakaways which will discharge surface water runoff directly to ground.

There is no record of any pluvial flooding within the development site or within proximity of the site. The sources of pluvial flood risk and related stormwater impacts are assessed immediately below:

The flood risk associated with surface water has been considered for two sources described, in turn, as follows:

- On-site surface water: surface water runoff generated on-site by the proposed development and its impact on both the proposed development and the surrounding land uses.
- Off-site surface water: surface water runoff generated off-site and its impact on the proposed development. The impact of the development on existing flood routes is also considered as part of the report.

The on-site and off-site surface water sources are considered in turn, below:

5.3.1 On-Site Surface Water Sources

The design of the surface water disposal for the proposed development has been based on a combination of infiltration and the attenuated surface water runoff being discharged to the existing surface water network on Standhouse Road.

Given that an appropriate surface water management system is to be provided as part of the proposed development the risk of flooding from onsite sources is deemed to be sufficiently low to be acceptable. An overland flood routes map is presented in Figure 5.2 below. SuDS provisions will be maximised in order to assist mitigation of the pluvial flood risk (refer to the SuDS Section of Engineering Planning Report which accompanies this planning application).

Thus, having considered the proposed development and the potential of flooding from on-site surface water sources it is concluded that there is no unacceptable risk of flooding and that there is no unacceptable residual flood risk to the proposed development, its occupants, adjoining land uses or property.

5.3.2 Off Site Surface Water Sources

As noted earlier no evidence has been obtained of any surface water flooding off site that would be likely to have an impact on the proposed development site.

The proposed finished ground floor levels will be set at a level to avoid any potential surface water runoff from the higher existing finished ground levels on the site and to ensure that the routing of surface water runoff will generally remain unaltered.

Thus, having considered the proposed development and the potential of flooding from off-site surface water sources it is concluded that there is no unacceptable risk of flooding and that there is no unacceptable residual flood risk to the proposed development, its occupants, adjoining land users or property.

Given that there is no record of previous or predicted pluvial flooding in the area and given that an appropriate surface water management system is to be incorporated as part of the proposed development it has been concluded that there is no unacceptable flood risk from pluvial sources.

Figure 5.2: Overland Flood Routes Map;

5.4 Groundwater

There is no record of groundwater flooding within the development site or in proximity of the site in the Geological Survey of Ireland Groundwater Flooding Data.

Having considered the proposed development and the potential of flooding from groundwater sources it is concluded that there is no significant risk of flooding and there is no unacceptable residual flood risk to the proposed development, its occupants, adjoining land users or property.

5.5 Human or Mechanical

There does not appear to be any Human or Mechanical factors external to the site in the area that would give rise to any unacceptable flood risk.

Consideration of the risk of flooding caused by a failure of the onsite piped network system to convey surface water (such as an obstruction in the pipe) has influenced the finished ground floor levels such that they will be set at the maximum reasonably practicable level taking account of all other design considerations. Therefore, the risk of flooding due to human or mechanical factors is deemed to be sufficiently low to be acceptable.

6.0 RESPONSE TO THE WATER SERVICES PLANNING SECTION COMMENTS CONTAINED IN THE KILDARE COUNTY COUNCIL SECTION 6(4)(B) REPORT

The issues listed below were raised by the Water Services Planning Section in their report dated 03.11.2020 and a related response to each item is also provided:

The Submitted Site-Specific Flood Risk Assessment (SSFRA) is preliminary and indicative in nature and does not contain the level of detailed required of a SSFRA for SHD planning application purposes: The Site-Specific Flood Risk Assessment now submitted has examined all potential sources of flooding based on the available information.

The SSFRA submitted with the planning application should be in accordance with the "Flood Risk Management guidelines for use in the Planning System" and make appropriate allowance for the effects of future climate change on all relevant flood sources: The Site-Specific Flood Risk Assessment now submitted has been prepared based on the OPW guidance.

All references to the Kill river and N7 in section 4 of the submitted Site-Specific Flood Risk Assessment (SSFRA) shall be removed and the sub-sections amended accordingly: The Site-Specific Flood Risk Assessment now submitted has been updated accordingly.

The fluvial flood risk is not considered the primary flood risk source to the proposed development as per section 5.2 SSFRA: The Site-Specific Flood Risk Assessment now submitted has been updated accordingly.

The pluvial flood risk is the primary flood risk source and SuDS provision shall be maximised to assist mitigation of this flood risk: The Site-Specific Flood Risk Assessment now submitted has been updated accordingly.

The flood risk identified in OPW PFRA flood mapping and associated with the effect of climate change adjusted 30-year and 100-year storm events on the proposed drainage systems as above shall be assessed. The Proposed surface water drainage network has been analysed for a range of storm durations for a 100-year return period with the inclusion of 20% climate change (refer to Engineering Planning Report).

The overland flow element of pluvial flood risk shall be examined in more detail in the SSFRA. The pre-existing and post-development flow routes and any raising of ground levels and replacement of permeable boundary treatments with impermeable ones at site boundaries shall be considered in this regard: The Site-Specific Flood Risk Assessment now submitted has been updated to incorporate an examination of the flow routes.

On-site flow routes should be directed to open spaces and existing suitable drainage systems. Where feasible on-site flow routes have been directed to open spaces.

Groundwater flood risk whilst not typically an issue in Kildare shall be assessed in the context of the groundwater monitoring programme to be undertaken and OPW PFRA flood mapping: The Site-Specific Flood Risk Assessment now submitted has been updated accordingly.

Any loss of on-site flood storage zones identified on OPW PFRA flood mapping as a result of the proposed development will require the provision of an equivalent volume of compensatory flood storage within the boundaries of the subject site: The OPW PFRA map and the CFRAM map for the site (refer to Figures 4.1 and 4.2 presented above) does not indicate any flooding on the site of the proposed development. Thus, no compensatory storage is required or proposed for the site.

Residual flood risks shall also be assessed in detail in SSFRA especially those associated with exceedance of the climate change 100 year storm event, high groundwater and water levels in the receiving sewer on Standhouse road and mechanical failure-human error regarding the proposed drainage systems and have regard to the response arrangements proposed in the drainage maintenance regimes pre-taking in charge: The surface water drainage network analysis with an inclusion of 20% for climate change is submitted in Engineering Planning Report There is no evidence of high groundwater levels on the subject site.

Residual flood risks arising from these events should be directed away from properties and the associated flood risks especially where buildings are at a lower level than adjoining internal roadways shall be examined in greater detail. Surface water run-off from the proposed development is routed away from properties, the proposed finished floor levels are at a higher level then adjoining roadways.

It shall be clearly demonstrated in SSFRA that neither the proposed development is at risk of flooding and nor does it create a new or increase and existing flood risk to public roads, link

road or adjacent properties: The proposed surface water drainage network design complies with the Greater Dublin Regional Code of Practice for Drainage Works and as a such mitigates the risk of flooding on the site and to existing adjacent properties and public roads.

Emergency vehicle access and egress into and around the proposed development shall not be compromised: the layout of the proposed development does not compromise emergency vehicle access.

The prospective applicant should have regard to pre-planning meeting details including PP 4846, previous planning decisions and the IW and LA WSD reports on the subject site including 16658 and adjacent sites including SHD202005 (ABP 20307851): All of the above referenced reports have informed the preparation of the Site Specific Flood Risk Assessment and the Engineering Planning Report.

7.0 CONCLUSIONS

Based on all of the foregoing it has been concluded that the proposed development is appropriate in terms of meeting the flood risk and stormwater impact policies and objectives of the Kildare County Development Plan 2017-2023 and that the proposed development is:

- Considered to have the required level of flood protection;
- Does not increase the flood risk to other third parties or lands;
- Meets the various requirements of the OPW Guidelines in relation to flood risk.

Thus, it is reasonable therefore to conclude, given the vulnerable categorisation of the proposed development, that the flood risk and stormwater impact is acceptable such that there is no inappropriate risk of flooding arising from or an inappropriate residual flood risk to the proposed development, its occupants or users and adjoining properties from any of the following sources:

- Tidal
- Fluvial
- Pluvial
- Ground Water
- Human / Mechanical

Accordingly, the site has been evaluated as appropriate for residential development when assessed in accordance with the requirements of ***The Planning System and Flood Risk Management Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government and the Office of Public Works).***

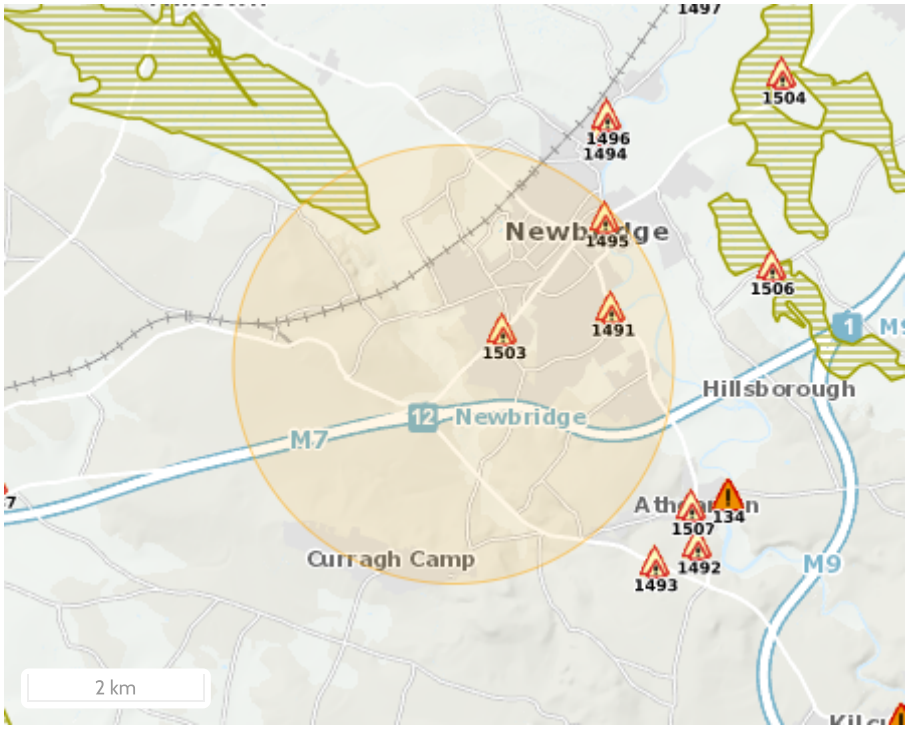
APPENDIX A – Information from the OPW Flood Maps Website
http://www.floodmaps.ie

Past Flood Event Local Area Summary Report

Report Produced: **25/4/2021 8:54**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "**Website**"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

3 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Kilbelin, Newbridge Recurring (ID-1491)	n/a	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
2.	Newbridge College, Newbridge Recurring (ID-1495)	n/a	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
3.	Moorfield, Newbridge Recurring (ID-1503)	n/a	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		