

6.0 HYDROLOGY

6.1 INTRODUCTION

This chapter assesses and evaluates the likely significant effects of the development on the hydrological aspects of the site and surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

This Chapter has been written and prepared by Luke Maguire Environmental Consultant and Geoscientist (BSc) at AWN Consulting and Marcelo Allende (BSc, BEng) is a Principal Environmental Consultant (Hydrologist) at AWN Consulting.

Luke Maguire; is an Environmental Consultant at AWN with over 4 years of experience in Environmental Consulting and water resources. Luke holds a B.Sc. in Geoscience from Trinity College University of Dublin and has worked on a range of developments including pharmaceutical plants, medical device facilities, ICT facilities and energy projects. Luke has experience in contaminated soil sampling and analysis, basement impact assessments, bulk excavations and largescale dewatering processes. Additionally, Luke has gained experience in Environmental Impact Assessment (EIA), Due Diligence Reporting, Hydrological and Hydrogeological Risk Assessment, Flood Risk Assessment and WFD Assessment Reporting and has worked in multiple Environmental monitoring disciplines such as Chemical Wastewater (Intel), Ground Gas, Surface Water, and Groundwater Monitoring at numerous sites across Dublin.

Marcelo Allende is a Principal Environmental Consultant (Hydrologist) with AWN Consulting with over 20 years of experience in water resources technical studies, conceptual and numerical hydrological/hydrogeological modelling and environmental consultancy. Marcelo holds a degree in Water Resource Civil Engineering (BEng, Hons) from the University of Chile and a Bachelor of Science in Engineering (BSc, Hons). He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, surface and groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments (Stage 1,2 and 3), Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI).

6.2 METHODOLOGY

6.2.1 Criteria for rating of effects

This chapter evaluates the effects, if any, which the development has had or will have on Hydrology as defined in the Environmental Protection Agency (EPA) '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports*' (EPA, 2022). In addition, the document entitled '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*' by the Transport Infrastructure Ireland (TII, 2009, previously NRA) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the hydrological environment is based on the standard EIA impact predictions table included in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication).

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to

minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact.

The principal attributes (and effects) to be assessed include the following:

- River and stream water quality in the vicinity of the site (where available);
- Surface watercourses near the site and potential impact on surface water quality arising from proposed development related works including any discharge of surface water run-off;
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.

6.2.2 Sources of Information

- Desk-based hydrological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:
- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).
- River Basin Management Plan for Ireland 2022-2027.
- Fingal County Development Plan 2023-2029.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001); and
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- Site specific data was derived from the following sources:
- Design site plans and drawings; and
- Consultation with the client.

Site specific data was derived from the following sources:

- Engineering Services Report. Proposed Residential Development at Flemington South LRD (Paul McGrail Consulting Engineers, 2025).
- Construction Environmental Management Plan (CEMP). Proposed Residential Development at Flemington South LRD (Paul McGrail Consulting Engineers, 2025)
- Flood Risk Assessment (FRA). Proposed Residential Development at Flemington South LRD (Paul McGrail CE, 2025)
- The proposed development design site plans and drawings; and Consultation with the project design engineers.
- Civil Engineering Pre-Planning Briefing Note, Paul McGrail Consulting Engineers, 2025.
- Site Investigation Report. Proposed New Housing development Naul Road Balbriggan IGSL Ltd (2019).
- EPA (2025). EPA Map Viewer (accessed in November 2025).
- GSI (2025). GSI Map Viewer (accessed in November 2025).

6.2.3 Relevant Legislation & Guidance

- Environmental Protection Agency (EPA) Advice notes on current practice in the preparation of Environmental Impact Statement (EPA, 2003) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Institute of Geologists Ireland (IGI) - Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001).
- Water Framework Directive (WFD) - Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy. This relates to the improvement of water quality across Ireland including rivers and groundwater bodies.
- River Basin Management Plan 2018-2021 (including regional plans by Local Authority Waters Programme (Waters and Communities 2020)).
- River Basin Management Plan 2022-2027.
- Waste Management Acts 1996 as amended;
- European Communities Environmental Objectives (Groundwater) Regulations 2010, S.I. No. 9/2010, as amended;
- European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016, S.I. No. 366/2016;
- Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (Groundwater Directive);
- European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019;
- Environment Agency (EA), Land contamination: risk assessment (EA 2020);
- BS 10175:2011 + A2:2017 Investigation of potentially contaminated sites. Code of practice (British Standards Institute 2017);
- CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA 2001);
- Environmental Protection Agency, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013);
- Local Authority planning guidance as applicable;
- Uisce Eireann EIA Scoping;
- Consolidated EIA Directive 2011/92/EU and 2014/52/EU.

6.3 RECEIVING ENVIRONMENT

The receiving environment is discussed in terms of hydrology.

The development will consist of the construction of 815 no. dwellings, open space, ancillary infrastructure, community/retail floorspace and 2 no. creches on an overall combined site area of 24.96 hectares and on multiple portions of separate parcels of land characterized by an agricultural function located at Flemington Lane in Balbriggan, North Co. Dublin.

The development site is located approximately 1.6 km west of the Balbriggan district town centre. The subject development is partially bounded by the Clonard Road (regional Route R122) and Bridgefoot and adjacent agricultural lands to the south and west, respectively. The site is bounded by Flemington Lane and agricultural lands to the north and by Taylor Hill Grange Residential Estate, among other adjacent / neighbouring residential housing estates to the east.

The site comprises multiple fields separated by internal and boundary hedgerows. Surface water, rainfall, is generally percolated to ground or runs-off via overland flow towards onsite drainage ditches and the Clonard Brook Stream in the south of the site.

The topography is relatively consistent with the site generally falling in elevation from northeast to southwest and characterized by minor localized undulations. The elevation falls from approximately 47m AOD (Above Ordnance Datum) to approximately 42m AOD from northeast to southwest. A portion of the central western section of the site located adjacent to the Clonard Road lies on elevated land at approximately 66m AOD. The topography in the southern portion of the site slopes / falls towards the Clonard Brook Stream / surface watercourse which flows to the south of the site, flowing in an east-northeast direction towards the Irish Sea at Balbriggan (EPA, 2025).

6.3.1 Hydrology

The proposed development site is located within the former ERBD (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). The proposed development site is located in the Eastern River Basin District (ERBD).

According to the EPA maps, the entire proposed development site lies within the Nanny-Delvin Catchment (Catchment ID: 08). The vast majority of the proposed development resides within the PALMERSTOWN_SC_010 Sub-Catchment (Sub-Catchment ID: 08_2). The northernmost portion of the site is located within the Delvin_SC_010 Sub-Catchment (Sub-Catchment ID: 08_1). The current EPA watercourse mapping shows no watercourses within the proposed development site.

The main hydrological feature of the area is the Bremore River and its tributaries, the Clogheder Stream and Clonard Brook Stream (CLONARD_or_FOLKSTOWN_GREAT). The Bremore River outfalls / discharges to the Irish Sea (North-West Irish Sea SPA) north of Balbriggan Town Centre approximately 1.7 km east of the subject development (linear distance).

The site is drained by ditches which may convey flow to the east/southeast towards the Clonard Brook Stream, the Clogheder Stream and Bremore River during periods of heavy rainfall. These manmade ditches only serve the subject site and the agricultural fields immediately west and does not convey any upstream watercourse.

The GSI mapping database shows one Well / Spring (GSI Name: 2925NEW089) within the site. This historic Spring is known as 'Lady Well', which indicated to be located in the Flemington townland within the northern portion of the site (adjacent to the northern boundary, location accuracy to 20m). According to observations noted during site inspections/surveys conducted by Altamar (2025), the 'Lady's Well' Springs does not display a surface expression of a well structure (although could be concealed by overgrowth of vegetation) and does not display discharge of any significant surface water flow to be incorporated into or contribute significantly to the local or regional hydrological catchment / environment. Any discharge from this Spring is very minor in magnitude and localised, thus it does not significantly feed any river / surface watercourse or flow and is incorporated into the local drainage catchment likely via discharges to ground/soil in the immediate area of the upwelling water. Refer to Chapter 5 for the baseline details (Section 5.3.5.2), potential impacts (Section 5.5.2.1 & 5.5.2.3) and mitigation measures (Section 5.6.1.5) associated with this feature.

Figure 6.1: Hydrological Environment



6.3.2 Surface Water Quality

The WFD requires ‘*Good Water Status*’ for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. ‘*Good status*’ means both ‘*Good Ecological Status*’ and ‘*Good Chemical Status*’. In 2009 the first River Basin Management Plan (RBMP) 2009-2015 was published. The second cycle river basin management plan was carried out between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD). The third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 – A River Basin Management Plan for Ireland (Dept. of Housing Local Government & Heritage, Sept 2024) has since been published.

During the development of this Plan, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan cycle to 2021. During the catchment characterisation, the EPA identified those water bodies either ‘*At Risk*’ of not achieving their objectives or ‘*Under Review*’. The outcome of this prioritisation process was the selection of 190 Areas for Action across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being ‘*At Risk*’ of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the Proposed Project.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019)
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010); and
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011)
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988
- Local Government (Water Pollution) Acts 1977-1990
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Constructional Sites;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA/TII, 2006).

Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

In relation to the subject site, there are no EPA quality monitoring station points in close proximity or within any of the previously mentioned watercourses in hydrological connection to the site.

The Clonard Brook Stream and Bremore River belongs to the MATT_010 WFD surface water body (European Code: IE_EA_08M010900) whose most recent WFD River (surface) water status (2019-2024) is 'Poor' with a current WFD risk score (3rd risk cycle) of '*At risk of not achieving good status*'. This rating and the main pressures identified on the MATT_010 waterbody is attributed to poor ecological and biological status or potential (Catchments.ie, 2025).

According to the Palmerstown_SC_010 (Code: 08_2) Subcatchment Assessment report (WFD 2nd Cycle, 2018) the main pressures associated with the Matt_010 (adjacent, and downstream/downgradient of the site) include urban run-off (involving diffuse sources run-off) and Hydromorphology (involving Channelisation).

6.3.3 Bathing Waters and Recreational Waterbodies

The local environment also includes areas of natural resources that relate to populations and human health that may be impacted by the proposed development, this includes economic resources, recreational and bathing waters, and drinking water resources.

A review of Environmental Sensitivity Mapping online maps that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the MATT_010 River Waterbody (Clonard Brook Stream or the downstream Bremore River).

6.3.4 Utilities and Drainage Infrastructure

There is no existing foul connection for the proposed site.

Presently, there is no existing watermain connection for the proposed site.

Currently, there is no artificial drainage infrastructure within the site. The proposed development is located in agricultural land which currently drains by overland flow to the local drainage ditches which convey flow to the MATT_010 River Waterbody to the east and southeast of the site. For further details on utilities refer to Chapter 13 – Material Assets – Utilities.

6.3.5 Surface Water Drinking Supplies / Resources

A review of the Environmental Protection Agency's (EPA) online mapping, which includes the Register of Protected Areas (RPA) established under the Water Framework Directive (WFD), indicates the field drainage ditches that traverse the site and river waterbodies in the vicinity of the site which are listed above in section 6.3.1 are not located within a designated Surface Water Drinking RPA. This classification of drinking water river lines has been delineated in accordance with the European Communities (Drinking Water) (No. 2) Regulations 2007 (SI No. 278/2007). This regulatory framework aims to ensure the protection of water resources utilised for human consumption, thus safeguarding public health and the environment.

6.3.6 Flood Risk Assessment

Paul McGrail Consulting Engineers have conducted and prepared a Stage 1 Flood Risk Assessment. This Site-Specific Flood Risk Assessment has been undertaken in accordance with the FRM guidelines. The review of the available data on fluvial, pluvial, tidal/coastal and groundwater flooding shows that the entire proposed development site is within Flood Zone C for flooding. The proposed development may be categorised as “Appropriate” as per the FRA Guidelines (OPW, 2009) as the development consists of essential infrastructure and thus qualifies as a “Highly Vulnerable Development”. However, given that the site is outside the extents of Flood Zone A and Flood Zone B and is located entirely within coastal and fluvial Flood Zone C, the development is subsequently deemed appropriate at the subject site/lands and hence a Justification Test for Development Management is not required in this case.

No residual risk is foreseen as the development is located outside any flooding zones associated with future scenarios. (Paul McGrail CE, 2025). Based on this information the proposed development complies with the appropriate policy guidelines for the area which include the Fingal County Development Plan 2023-2029. Overall, it is concluded that this Proposed Development and the surrounding area is at low risk from flooding. As mentioned above, this type of development is deemed appropriate for the flood risk zone (Paul McGrail CE, 2025).

The details of each category of flood extents, flood zonation and probability for the subject site are summarized below:

Predictive flood maps from Floodinfo.ie mapping dataset were examined in order to determine flood risk in the vicinity of the site. A review of the historic flood information did not highlight historical flood events (single or reoccurring) onsite or the immediate vicinity surrounding area. Floodinfo.ie (formerly floodmaps.ie) was consulted to identify historical flooding events within the vicinity of the site. The nearest

past flood event is approximately 1.6km southwest of the site, it is related to a recurring flood event at Naul Balbriggan Road, Dalahassey.

6.3.6.1 Fluvial (River) and Coastal (Tidal)

Predictive flood maps involving detailed hydraulic modelling of river and coastal waterbodies was undertaken as part of the National CFRAM study. As part of the CFRAM programme provisional flood maps had been produced by the OPW which have been used in this assessment. The FRA flood maps do not indicate any flooding risk throughout the subject site.

Accordingly, the flood risk mapping demonstrates that the proposed development site is entirely outside the Flood Zones A and B; i.e., within Flood Zones C for Fluvial (refer to Figure 6-2 & 6-3 below) and Coastal flooding (refer to Figure 6-4 & 6-5 below). The subject area is in Flood Zone C i.e., the probability and risk of flooding is low (less than 0.1% AEP- Annual Exceedance Probability or in 1 in 1000 year) for Fluvial and coastal (tidal) flooding (Floodinfo.ie, 2025).

Figure 6.2: CFRAM Fluvial Flood Extend (OPW/Floodinfo.ie, 2025)

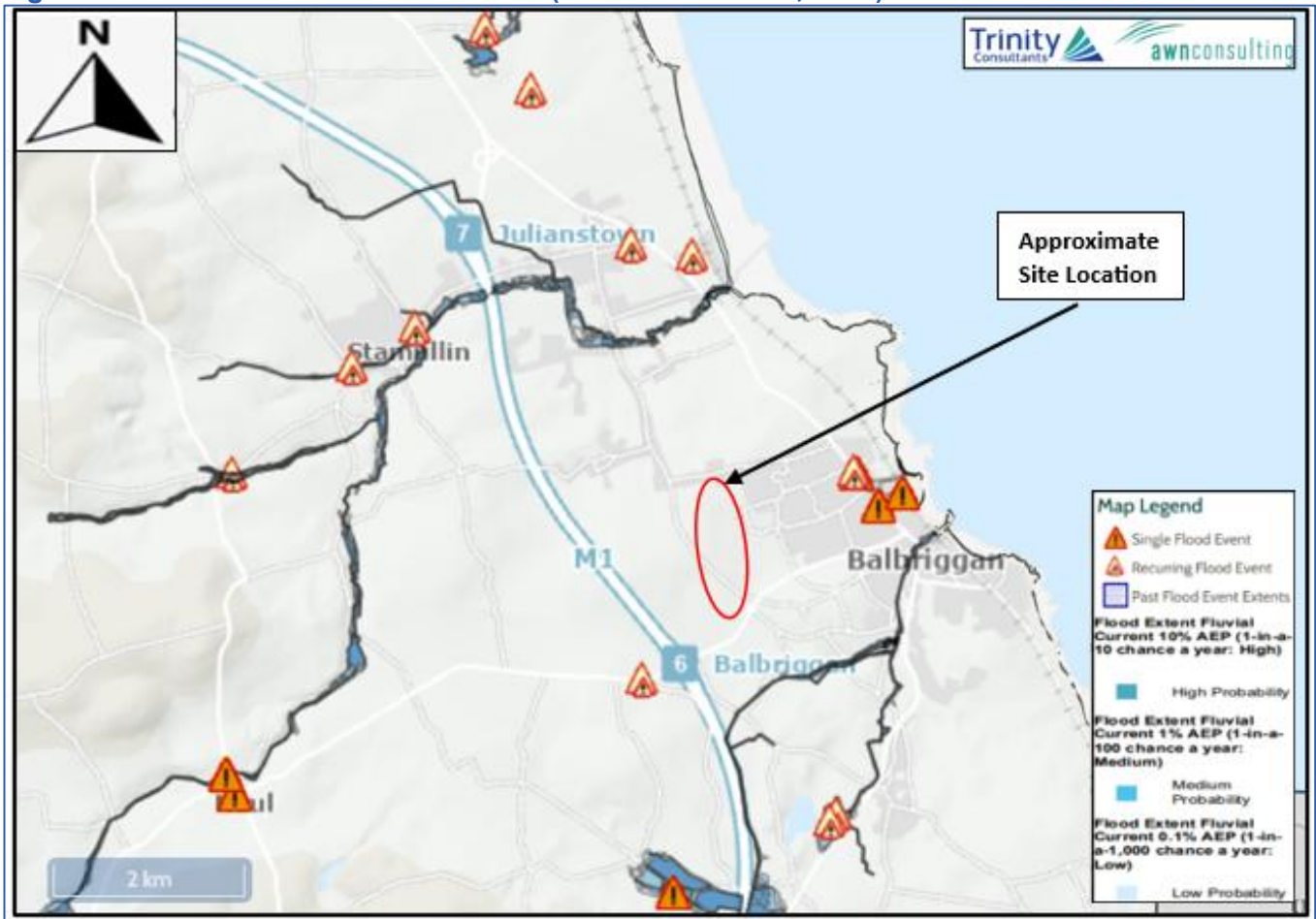
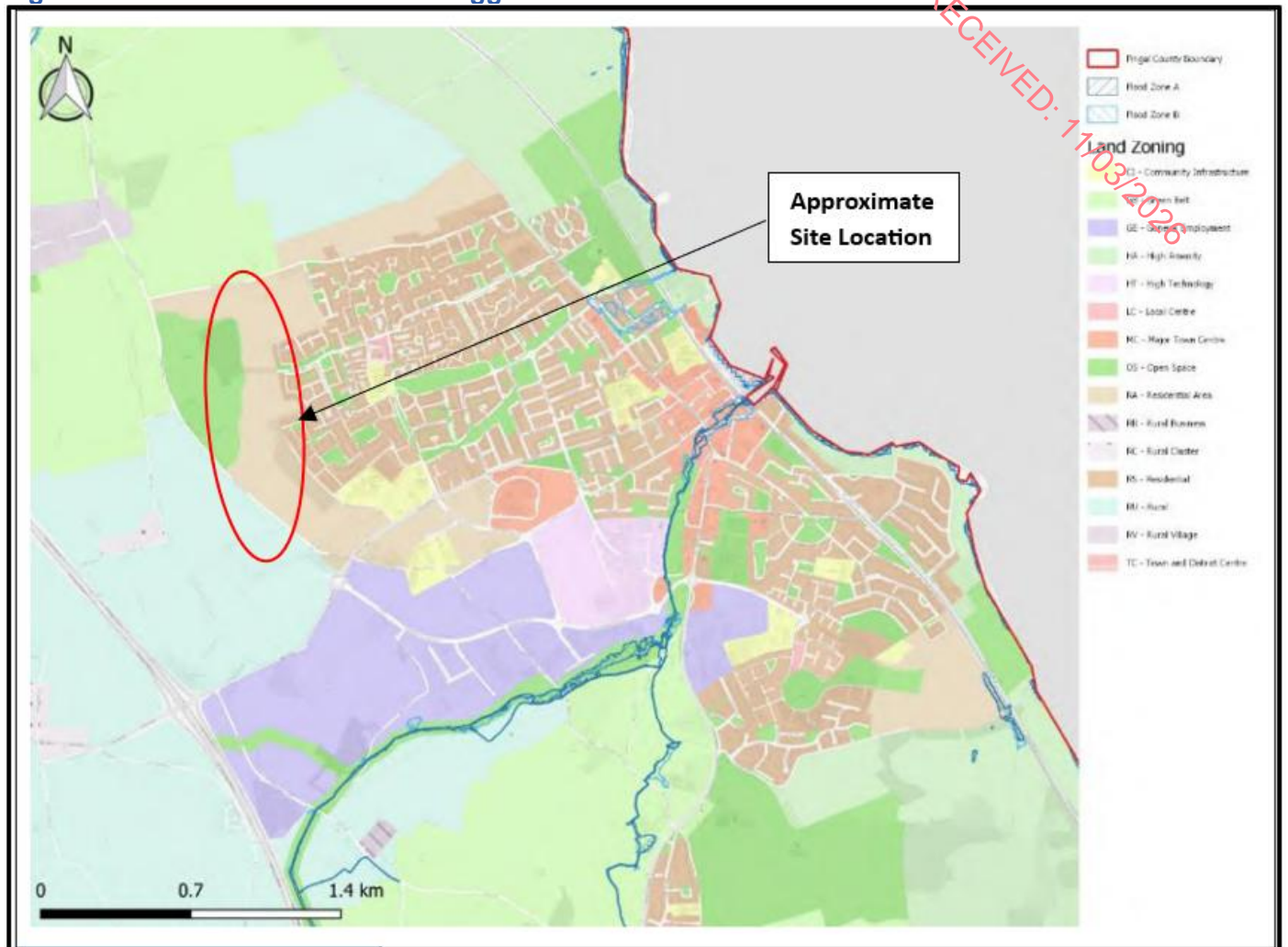
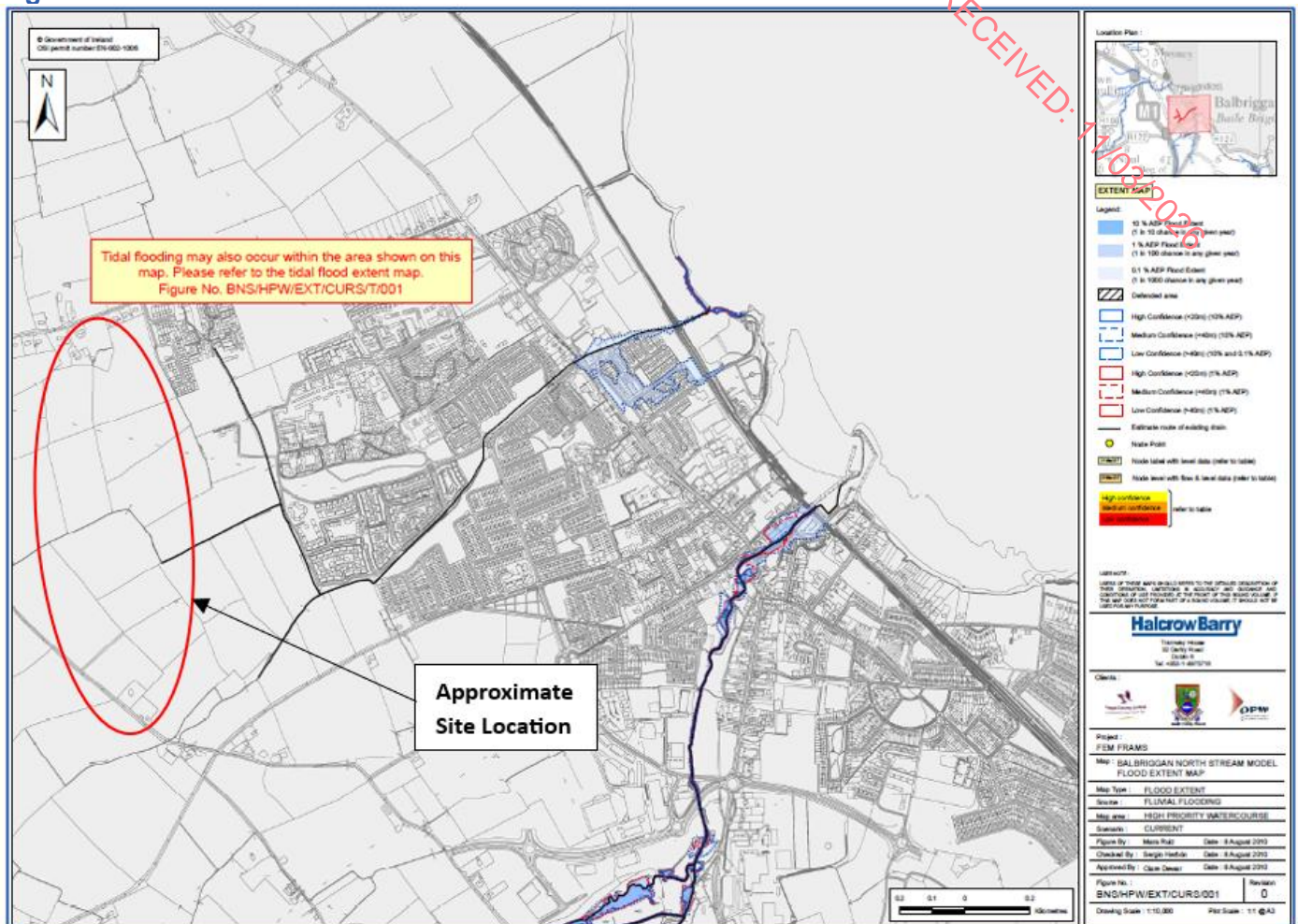


Figure 6.3: Flood Zonation for Balbriggan



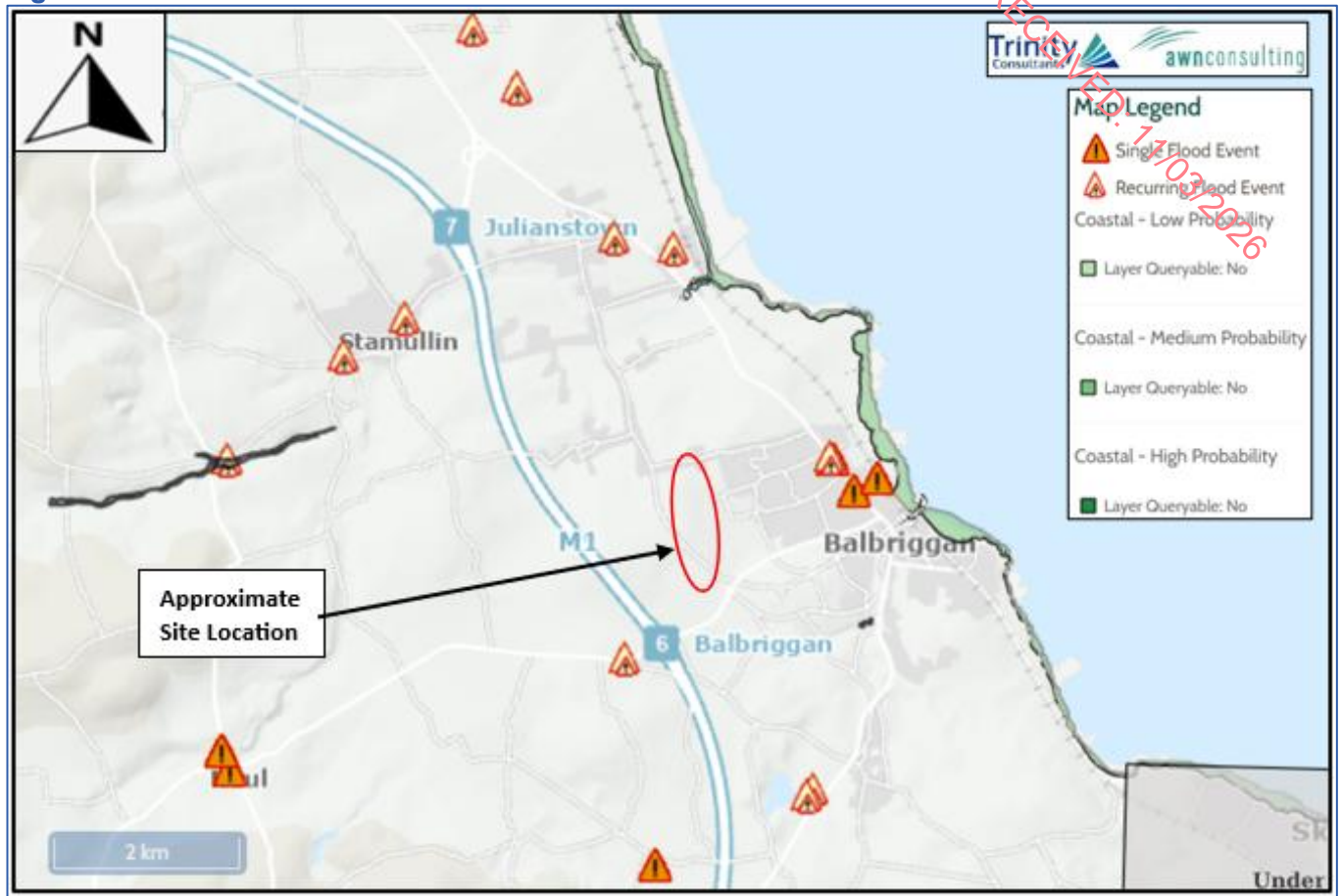
(Fingal County Council Strategic Flood Risk Assessment (2023))

Figure 6.4: Fluvial Flood Risk Extent



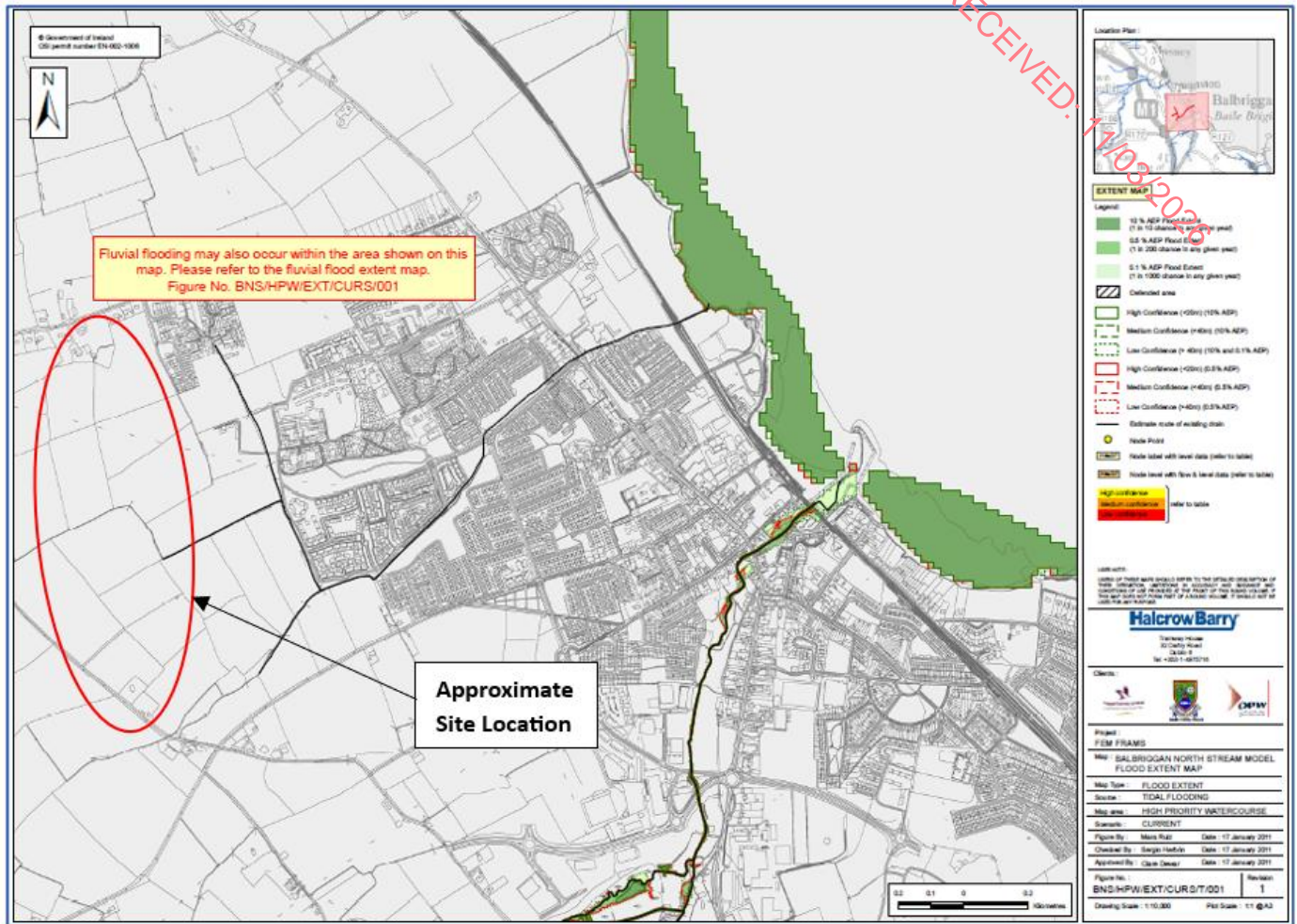
(Hallcrow Barry Limited- Fingal County Council, 2010)

Figure 6.5: CFRAM Coastal Flood Extend



(OPW/Floodinfo.ie, 2025)

Figure 6.6. Coastal Flood Risk Extent



(Hallcrow Barry Limited-Fingal County Council, 2011)

6.3.6.2 Pluvial

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter a watercourse or sewer. It is usually associated with high intensity rainfall and typically occurs in the summer months. The SFRA Indicative Pluvial Flood Maps were also reviewed. No pluvial flood risk for the site or vicinity was identified.

6.3.6.3 Groundwater

Groundwater is the water that soaks into the ground from rain and can be stored beneath the ground. Groundwater floods occur when the water stored beneath the ground rises above the land surface. Groundwater flooding can be due to high water tables and increased recharge following extended periods of wet weather and usually associated with the karst areas of the west of Ireland. An analysis of datasets available online through GSI Mapping was undertaken to determine the potential for groundwater flooding. According to GSI Groundwater Flooding Probability mapping, the site lies outside the groundwater low, medium and high probability flood zone extents, and therefore resides in flood zone C for groundwater flooding. The Groundwater Data Viewer shows no indication of any karst features within the site boundary.

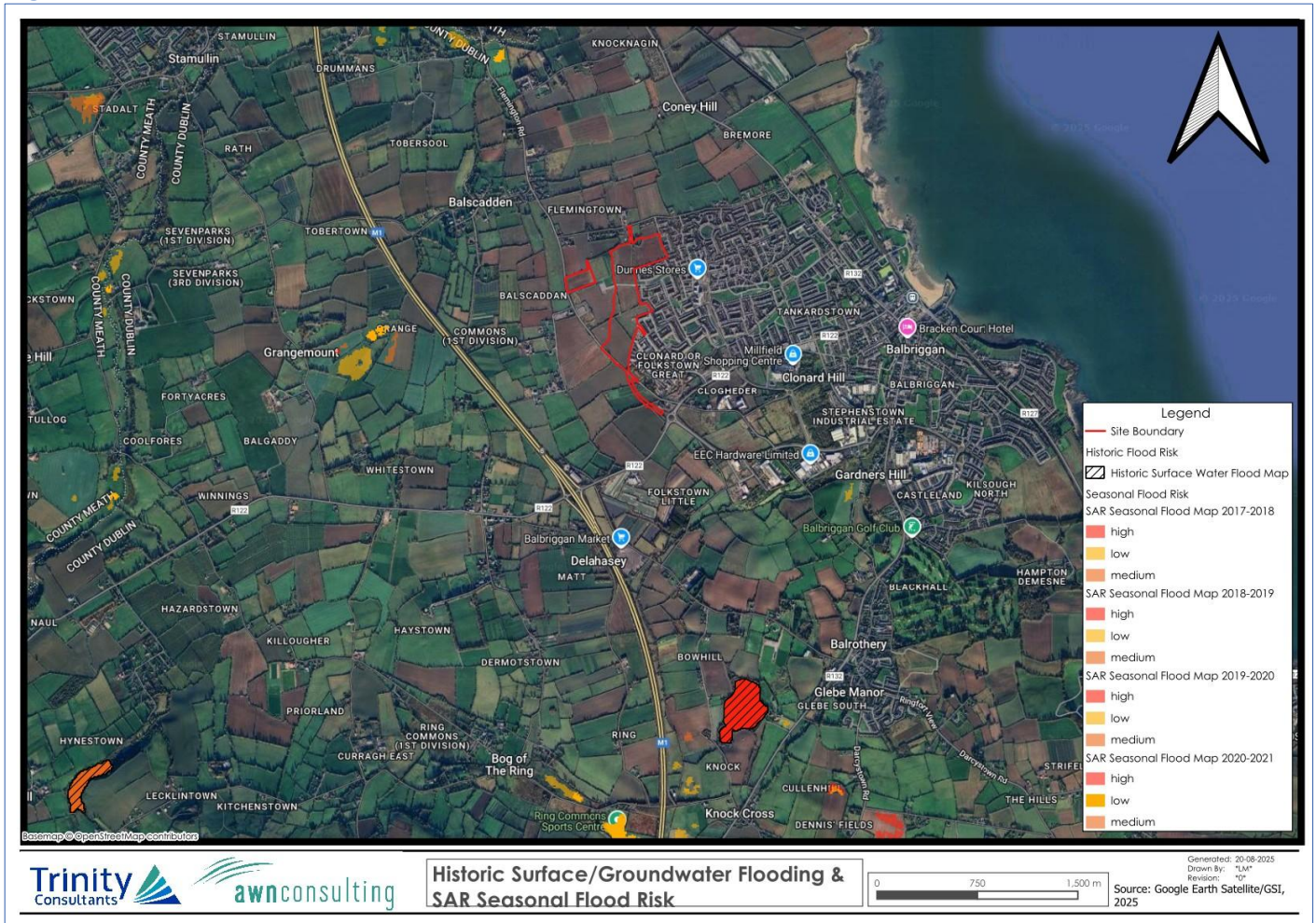
6.3.6.4 SAR Seasonal

The Synthetic Aperture Radar (SAR) Seasonal Flood Maps shows observed peak flood extents which took place between Autumn 2015 and Summer 2021. The maps were made using Synthetic Aperture Radar

(SAR) images from the Copernicus Programme Sentinel-1 satellites. SAR systems emit radar pulses and record the return signal at the satellite. Flat surfaces such as water return a low signal. Based on this low signal, SAR imagery can be classified into non-flooded and flooded areas. Flood extents were created using Python 2.7 algorithms developed by Geological Survey Ireland.

Review of the SAR seasonal flood extents indicates that the site extent and the immediate vicinity does not contain SAR Seasonal flood extent zones i.e. the development site boundary is devoid of any SAR Seasonal flood extent zones (refer to figure 6.7 below).

Figure 6.7: Historical Surface/Groundwater Flood Extents & SAR Seasonal Flood risk extents



6.3.7 Areas of Conservation

According to the NPWS (2025) on-line database there are no special protected areas (SPA) or special areas of conservation (SAC) on or within the boundary of the proposed development site. The lands in which the development is located have no formal designations.

In addition, there is a potential indirect hydrological pathway / connection to nationally designated sites in North-West Irish Sea via the Clonard Brook Stream and Bremore River which flow in an east/northeasterly direction before its outfall to the Irish Sea. The relevant natura 2000 site is:

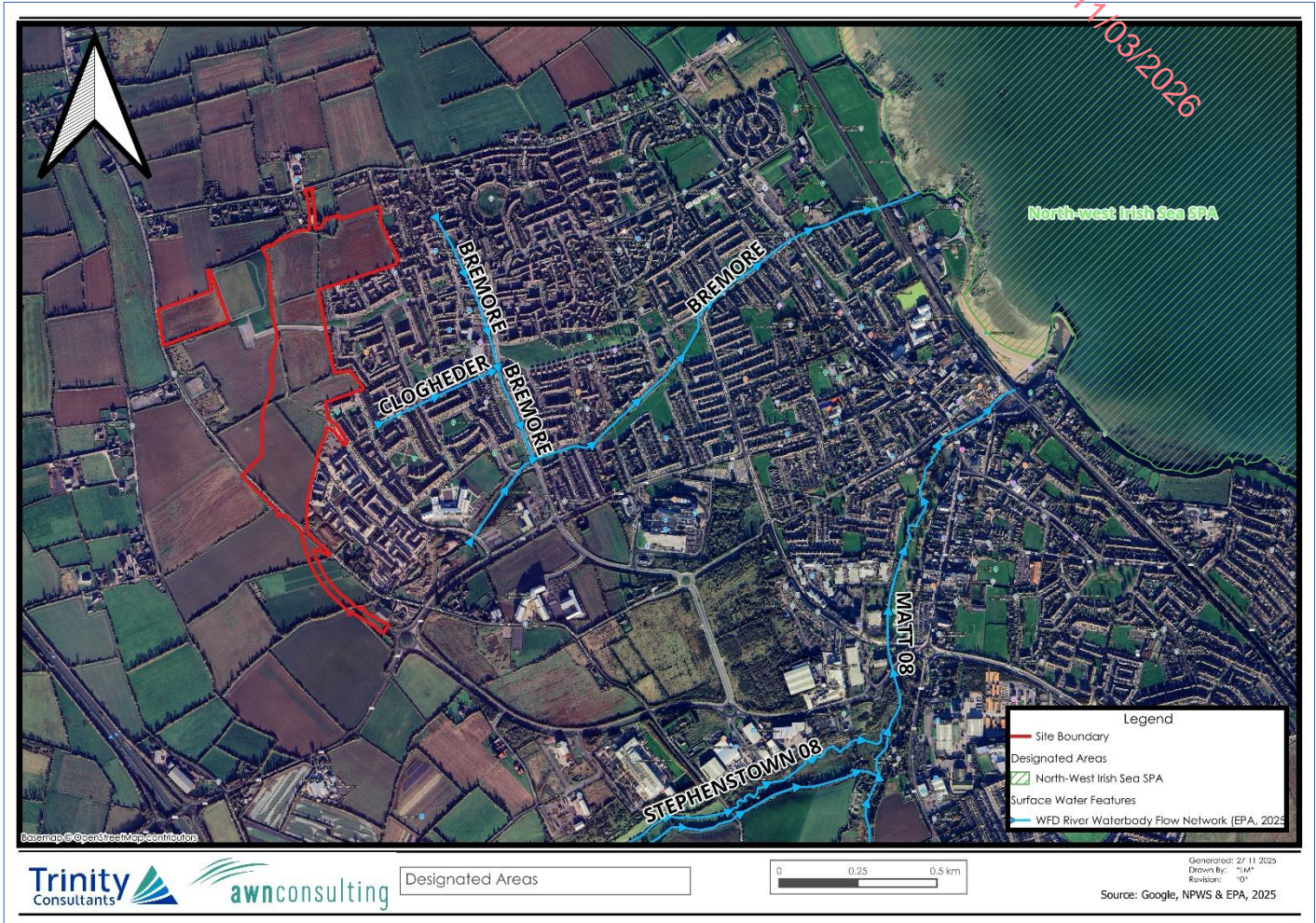
- North-West Irish Sea SPA (Site Code: IE004236) c. 1.7 km to the east of the site.

It is noted that based on the significant distance and dilution (mixing) factor downstream/downgradient in the catchment and along the potential pathway to these receptors there is no likelihood of an accidental

release of hydrocarbons or silt from the proposed development resulting in any change in surface water quality contributing to these habitats.

Figure 6.8: Designated Areas (Natura 2000 Conservation / Protected Sites)

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6.3.8 Rating of Importance of Hydrological Attributes

Based on the TII methodology (2009) (See Appendix 6.1) the importance of the hydrological features at this site is rated as 'Medium' importance based on the assessment that the attribute has a hydrological connection with protected European Sites and the attribute has a medium/moderate quality or value on a local scale. The lands are not an area of water supply, within a flood zone or an amenity area.

There is an objective (WFD) to maintain Good status or not impact on programme of measures to achieve Good status of this surface water receptor (Bremore River / Clonard Stream / Matt_010) during construction and operation.

6.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

In summary, the proposed development will consist of the following:

- Construction of 815 no. dwellings, open space, community/retail floorspace and 2 no. creches on an overall site area of 24.96 hectares.
- The development includes the provision of C-Ring Road to link into the existing R122 roundabout with vehicular access also from the Boulevard, Hamlet Lane, & Flemington Lane.
- Provision of surface water attenuation measures, connection to water supply, provision of foul drainage infrastructure to Irish Water specifications and all ancillary site development, construction, and landscaping works;
- The proposed development includes a SuDS drainage design, boundary treatments, lighting, servicing and utilities, signage, and associated and ancillary works, including site development works above and below ground. All ancillary site development, landscaping and construction works to facilitate foul, water and service network connections.

Refer to chapter 2 – Description of the proposed development for further detail.

In relation to hydrology the relevant characteristics are as follows:

- Increase in hardstanding.
- Provision of underground attenuation tanks and associated infrastructure as part of the surface water systems along with installation of bypass hydrocarbon / petrol interceptors.
- All ancillary site development, landscaping and construction works to facilitate foul, water and service network connections.

6.4.1 Construction Phase

The key civil engineering works which relate to the land, soil geology, and hydrogeological environment during construction of the proposed development are summarised below:

- During the construction phase, excavated soil and stones (c. 75,038 m³) will be generated from the excavations required to facilitate site levelling to the necessary base level and construction of new foundations. It is anticipated that c. 19,507 m³ of this excavated soil and stone will be reused on site. It is anticipated that c. 55,531 m³ of excavated material will subsequently need to be removed off site and disposed of at a fully authorised soil recovery facility.
- Storage of aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc; There will be a requirement for deliveries of imported engineering fill (sands and gravels), and other construction materials including, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road. Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the topsoil will be re-used on site for backfill (levels in some areas need to be raised) and landscaping with some export required. Any surplus topsoil material will be transported off site and disposed of at a fully authorised soil recovery facility / site.
- Temporary storage of fuel required on site for construction traffic will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.

- Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

6.4.2 Operational Phase

There will be an increase in hardstanding and a resultant increase in run-off rate for storm water (which will be fully attenuated) due to the proposed development. The proposed development characteristics which relate to the water and hydrological environment during operation of the proposed development are summarised below:

6.4.2.1 Proposed Surface Water Drainage

In accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the proposed development shall restrict the stormwater run-off to greenfield run-off rates or Qbar rate. The new development will comprise a separated drainage system, wherein the vast majority of surface water will be attenuated on site for up to a 1 in 100-year storm event plus an additional 20% allowance for climate change in line with DCC Drainage Division guidelines.

The surface water design has been designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works and Sewers for adoption. The drainage network will be served by 5No. catchment attenuating to the green-field runoff at the hydrobrake located in the outfall manhole from each attenuation system (refer to Figure 6-8 below). The last hydrobrake manhole has been allowed for the 50l/s attenuated flow coming from the catchment 02, as part of the Planning application for Taylor Hill, Balbriggan, Phase 3.

The proposal is acceptable subject to all SuDS systems being in accordance with the Cira document C753 'The Suds Manual', no surface water or rainwater discharging into the foul water system under any circumstances, and the surface water drainage complying with the "Greater Dublin Regional Code of Practice for Drainage Works, Version 6.0", FCC, April 2006.

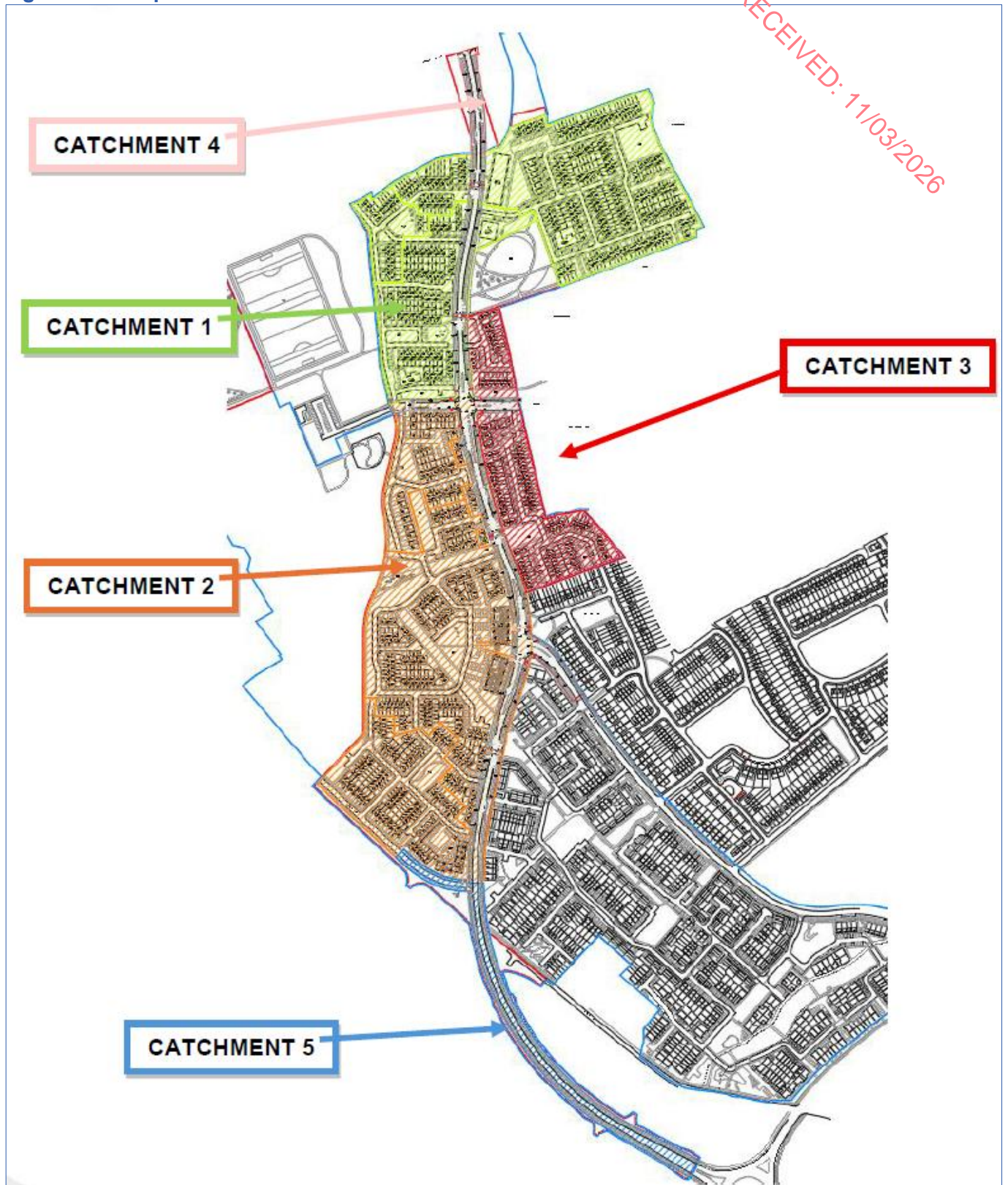
There are 5No. surface water connection points for this site which it will be into the Flemington Lane at the north boundary of the site, on the Flemington Park at northeast of the boundary, at existing Taylor Hill Terrace, at the north of the Boulevard Road with allowance of 50l/s as part of the granted permission from Taylor Hill Phase 3A, 3B & 3C and to the last connection to the existing Roundabout at R122.

The drainage strategy / arrangement will follow and comply with the following design standards:

- The Greater Dublin Strategic Drainage Study (GDSDS), Volume 2.
- The Greater Dublin Regional Code of Practice for Drainage Works.

The proposed Surface Water Management Plan is in line with the key requirements of the Dublin City Council Drainage Division Planning & Development Control Section. The proposed surface water drainage system takes cognisance of the Fingal County Council Development Plan 2023 – 2029 with respect to SuDS. The proposed SuDS measures provide a minimum of two stage treatment train approach including interception and primary and secondary treatment of surface water run-off. This treatment approach is in line with The CIRIA SuDS Manual C753 and is outlined below.

Figure 6.9: Proposed Catchment Areas



In accordance with the requirements of Dublin City Council, the proposed surface water drainage system designed for this development includes / incorporates a number (multitude) of Sustainable Urban Drainage Systems (SuDS) measures which serve a dual purpose in managing stormwater and will be incorporated

to reduce run-off volumes and improve run-off water quality. The proposed SuDs mechanisms will comprise the following:

- Bioretention areas / Systems
- Tree Pits
- Modular Permeable paving
- Silt Traps
- Swales
- Detention Basin
- Petrol (Hydrocarbonds) Interceptor – Prior to out falling into main system
- Hydrobrake flow control – prior to out falling into the main system.
- Stormtech Underground Attenuation Storage

For the drawings which depict the proposed drainage designs layout and further details on the proposed drainage design, refer to the Engineering Services Report, prepared by Paul McGrail Consulting Engineers Limited (2025), included as part of this Application.

6.4.2.2 Proposed Foul (Wastewater) Water Drainage

Strict separation of surface water and wastewater will be implemented within the development. The proposed development will be fully serviced with separate foul and stormwater sewers which will have adequate capacity for the facility and discharge limits as required by Irish Water licensing requirements.

The internal foul network has been designed in accordance with Irish Water Code of Practice for Wastewater Infrastructure. The proposed development will have 6No. of discharge points for the to an existing 225, 300 and 375 diameter foul sewer at Flemington Park, Hamlet Lane and Boulevard Road, respectively.

The foul water from the development will discharge via soil vent pipes within the buildings by gravity flow before connecting into the existing separate foul sewer network within the development. The foul sewerage for each house will have a separate connection to the proposed 225mm and 150mm diameter foul sewer along the road.

A Pre-Connection Enquiry has been submitted to Uisce Eireann Confirmation of Feasibility is included in this application. Refer to Appendix B of the Engineering Services Report, prepared by Paul McGrail Consulting Engineers Limited (2025), included as part of this Application.

It is calculated that the proposed development will have a total hydraulic loading of 12500 L/day of foul effluent generated during the operational phase of the development. This equates to an average flow of 0.145 litres/second (based on 8-hour occupancy) and a peak flow of 0.651 litres/second.

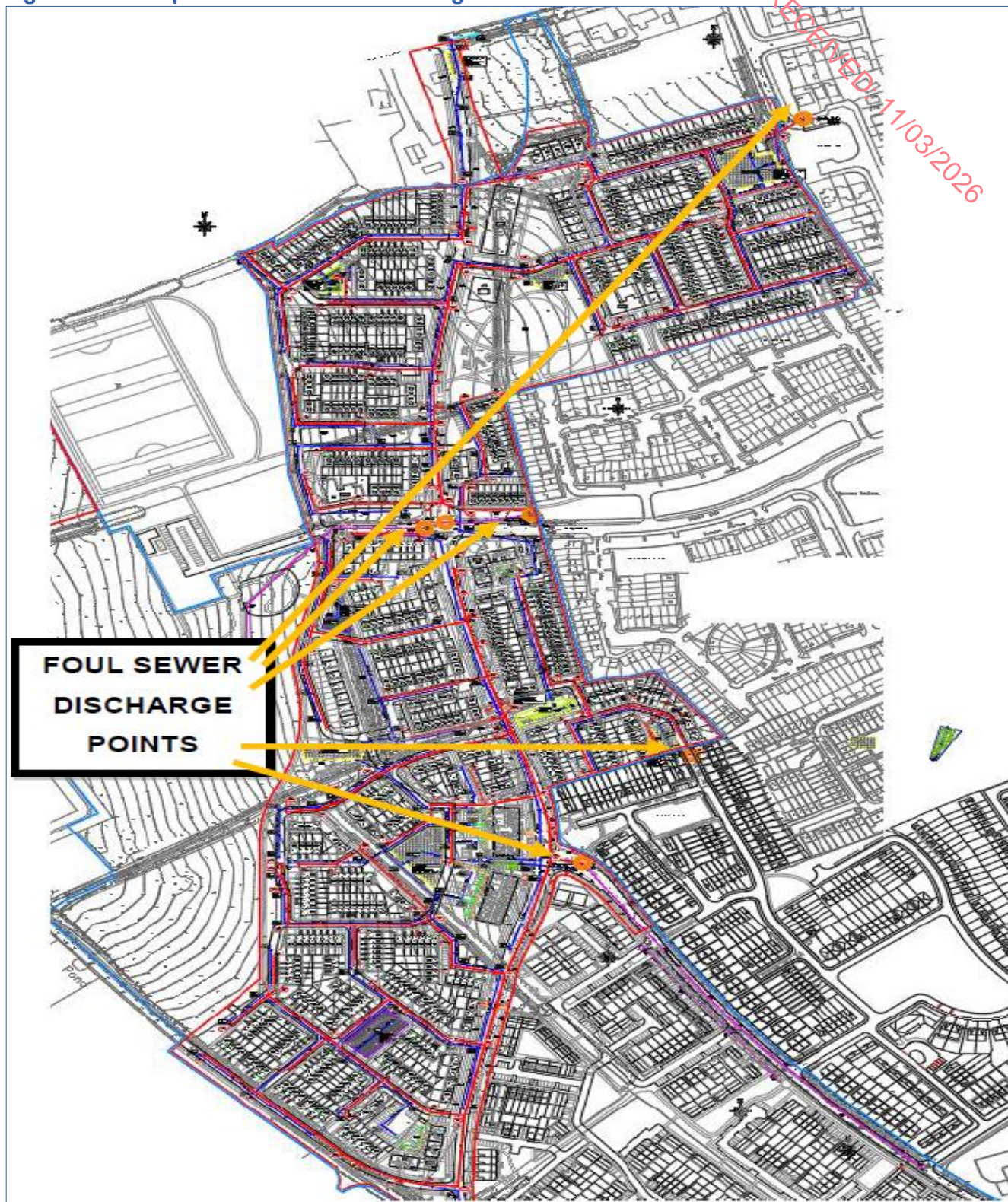
The foul discharge from the site will join the public sewer and will be discharged and treated at the Balbriggan Water Wastewater Treatment Plant (WWTP, D0023-01) prior to subsequent discharge to Northwestern Irish Sea coastal waterbody. This WWTP is required to operate under an EPA licence and meet environmental legislative requirements as set out in its licence.

There is an indirect hydrological connection to the North-West Irish Sea SPA, via treated foul wastewater arising at the site from the Balbriggan WWTP (EPA Licence :D0023-01).

There is no 'direct' pathway for foul sewage to any receiving water body (as identified above). There is an indirect hydrological connection to the North-west Irish Sea SPA, via treated foul wastewater arising at the site from the Balbriggan WWTP (EPA Licence :D0023-01). However, as the WWTP is required to operate in compliance with licence requirements, there is no potential for water quality exceeding SI threshold concentrations to be exceeded at the North-West Irish Sea.

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Figure 6.10: Proposed Foul Sewer Discharge Points



6.5 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

This section details the potential impacts to land, soil and groundwater associated with the proposed development. As outlined below the activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the geological and hydrogeological

environment. These activities primarily pertain to the site preparation, excavation and infilling activities required to facilitate construction of the proposed development.

6.5.1 Do-Nothing Impact

There are no predicted impacts should the proposed development not proceed. If the proposed development were not to go ahead (i.e., in the Do-Nothing scenario) there would be no excavation or construction or operational impact at this site. There would, therefore, be a **neutral** effect on the land, geological and hydrogeological environment.

The site is zoned for residential development, and it is likely that in the absence of this subject proposal, that a development of a similar nature would be progressed on the site that accords with national and regional policies and, therefore, the likely effects would be similar to this proposal, as described in the following sections.

6.5.2 Construction Phase

6.5.2.1 Potential Impacts on Surface Water Quality

Land clearing, earthworks and excavations for foundations and services will necessitate the removal of vegetation cover and the excavation of soil and subsoils. As a result, there is potential for run-off water to become contaminated with pollutants/silt released during construction activity. If not mitigated, contaminated water can pose a temporary risk to the onsite field drainage ditches and the downstream catchment comprising main hydrological features which include the Bremore River and its tributaries, the Clogheder Stream and Clonard Brook Stream.

During construction of the development, the potential of contamination is associated with the following sources:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms. Construction phase sewerage will be taken by tanker off site for disposal at a licensed waste management facility.

Based on the distance of separation to Natura sites (pathway length) and the significant dilution factor downstream in the catchment, there is no likelihood of an impact on the surface water quality in the Bremore River Waterbody or Natura sites (North-West Irish Sea SPA).

In the absence of mitigation measures the potential impacts during the construction phase on surface water quality are **negative, significant** and **temporary**.

In the absence of mitigation measures the potential impacts during the construction phase on surface water quality and status of the Natura 2000 sites of interest (North-West Irish Sea SPA) are **imperceptible** and **temporary**.

6.5.2.2 Potential Impacts on Surface Water Flow and Quantity

The gradual introduction of impermeable surfaces and the compaction of soils across the construction site as a result of the land clearing and earthworks will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off which could potentially impact local drainage if not adequately attenuated. This increase in the rate

and volume of direct surface run-off can result in increased sediment loading, scouring impacts on local drainage and watercourse.

Based on the pathway distance to Natura 2000 site and significant dilution factor (and mixing) downstream in the catchment and North-West Irish Sea, and the contribution from multiple other watercourses downstream would make the development impacts on flow insignificant. Therefore there is no likelihood of an impact on the surface water flow in the Bremore River and its tributaries, the Clogheder Stream and Clonard Brook Stream or North-West Irish Sea SPA Natura 2000 site.

In the absence of mitigation measures the potential impacts during the construction phase on surface water quality and flow are **negative, not significant** and **short term**.

6.5.2.3 Potential Impacts on Human Health and Population

A reduction in water quality via unmitigated pollutants entering the stream or surface waterbody has the potential to lead to negative impacts on human health and populations. However, it is noted that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Clogheder Stream, Clonard Brook Stream and the Bremore River.

Without the consideration of mitigation measures, the potential impacts during the construction phase on human health and populations due to changes to the hydrological environment are **neutral, imperceptible** and **short term**.

6.5.2.4 Potential Impacts on Water Framework Directive Status

There is a potential of localised accidental discharges during the construction phase (as set out in Section 6.5.1). However, these are temporary short-lived events that will not impact on the surface water status of the Clogheder Stream, Clonard Brook Stream, Bremore River river waterbodies or the downstream Northwestern Irish Sea coastal waterbody and as such will not impact on trends in water quality and overall WFD status assessment.

There is no potential impact on Water Framework Directive status or Programme of Measures to achieve good status.

Even in the absence of mitigation measures, the potential impact on Water Framework Directive status of the Clogheder Stream, Clonard Brook Stream, Bremore River waterbodies or the downstream North-West Stream coastal waterbody or their respective potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and third RBMP 2022-2027 during the construction phase is considered to be **negative, imperceptible** and **short term (temporary)**.

6.5.2.5 Overall Impact of Construction Phase

Without the consideration of mitigation measures, the construction phase of the proposed development will likely have a **negative, short-term, slight** impact without mitigation in place.

6.5.3 Operational Phase

6.5.3.1 Potential Impacts on Surface Water Quality

The proposed development incorporates a sustainable drainage system that is to be integrated with the development's landscaping features and comprises a combination of multiple measures in relation to flow control, interception storage, attenuation storage and catchment conveyance features. In addition, petrol / hydrocarbon interceptors are included within the network to treat any localised spill prior to discharge off site. Refer to Proposed Drainage Layout drawings included with this Application for details of the proposed surface water (stormwater) network.

A sustainable urban drainage system (SuDS) approach to stormwater management will be used throughout the site where possible. The overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequency, thereby reducing pollutant concentrations in stormwater.

There is no requirement for bulk oil / fuel storage or loading onsite. Surface water runoff from roads, car parking areas can potentially contain slightly elevated levels of contaminants such as hydrocarbons which will be collected within on-site drainage and treated in petrol (hydrocarbon) interceptors with no resultant impact on the local drainage network and the downstream Clogheder Stream, Clonard Brook Stream, Bremore River and Northwestern Irish Sea coastal waterbody.

Even without treatment at the Balbriggan WWTP, the peak foul effluent discharge, calculated for the proposed development as 0.651 l/s (which would equate to 0.116% of the licensed discharge at Balbriggan WWTP [peak hydraulic capacity]), would not have a measurable impact on the overall water quality within North-West Irish Sea SPA and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive). The Balbriggan WWTP has capacity for the above proposed peak foul effluent. The annual mean hydraulic loading is less than the peak Treatment Plant Capacity. The annual maximum hydraulic loading is less than the peak Treatment Plant Capacity. According to the latest AER (Annual Environmental Report) for Balbriggan WWTP, the capacity of the facility will not be exceeded (within the next 3 years) before 2027 (AER, 2024).

This assessment is supported by hydrodynamic and chemical modelling within Northwest Irish Sea which has shown that there is significant dilution for contaminants of concern (DIN and MRP). This modelling indicates that while some localized areas may experience elevated nutrient levels (DIN and MRP), there is significant dilution overall. The models predict that for many scenarios, particularly those without specific discharges, the water quality improves substantially, and that for discharges, the impact is generally confined to a small mixing zone around the outfall, with quality often returning to good or high status outside this area.

The most recent water quality assessment of the Northwestern Irish Sea WFD coastal Waterbody undertaken by the EPA (Water Quality in 2019-2024) also shows that North-west Irish Sea on the whole, currently has an 'Good' water quality status (refer to www.catchments.ie).

As such this flow and treatment at Balbriggan WWTP would not have a measurable impact on the overall current water quality and Water Body Status within the Northwestern Irish Sea Coastal Waterbody and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive).

In the absence of mitigation measures the potential impacts during the operational phase on surface water quality are **negative, not significant** and **long-term**.

6.5.3.2 Potential Impacts on Surface Flow and Quantity

The surface water drainage from the proposed development site has been designed with bioretention areas, tree pits, attenuation tanks, detention basins and flow control devices (hydrobrake) to ensure that there is no increase in flow rates and volumes, from the development site, being discharged to the receiving infrastructure and waterbodies; thus, causing no adverse impact on adjoining and other downstream properties.

The proposed project is located within Flood Zone C, which indicates low flood risk. The design of the development and drainage infrastructure will ensure that, in accordance with Greater Dublin Strategic Drainage Study (GDSDS), the proposed development shall restrict the stormwater run-off to Qbar greenfield run-off rates. Surface water runoff exceeding the allowable outflow rate for the catchment will be stored in underground attenuation tanks for rainfall events up to a 1 in 100-year return period, with an allowance for climate change of 20%.

The proposed increase in hardstanding area (c. 5.26 Ha / 52,600m²) has the potential to resulting in increase in run-off from the site if attenuation on site is not adequately designed. The resultant increase in run-off from the proposed increase in hardstanding area has been mitigated by attenuation on site.

As previously discussed in Section 6.5.3.1 above, a review of the Balbriggan Annual Environmental report (AER, 2024) confirmed that there is adequate capacity for foul water. As the stormwater and foul water will be separated on site, the Proposed Development will not contribute any additional stormwater drainage to the WWTP.

With design measures in place, the impact on surface water flow and quality are **neutral, imperceptible, and long-term**.

6.5.3.3 Potential Impacts on Human Health and Population

A reduction in water quality via unmitigated pollutants entering the onsite local drainage ditches, Bremore River or its tributaries, the Clogheder Stream and Clonard Brook Stream (as set out in Section 6.5.3.1) has the potential to lead to negative impacts on human health and populations. Hydrocarbons and petroleum products for example have the greatest risk for human health when they are in drinking water. However, it is noted that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Clogheder Stream, Clonard Brook Stream and Bremore River. However, as yet unknown recreational, bathing or surface water abstractions may exist.

The potential for unmitigated off-site flooding as a result of the increased hardstanding areas will not have potential to impact on human health, populations, and material assets.

In the absence of mitigation measures the potential impacts during the operational phase on human health and populations due to changes to the hydrological environment are **negative, not significant and long term**.

6.6 MITIGATION MEASURES

The design has taken account of the potential impacts of the development on the hydrological environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the surrounding water bodies. This section outlines the measures that will be employed in order to minimise the impact on land, soils, and groundwater of the proposed development.

6.6.1 Construction Phase

A Preliminary Construction & Environmental Management Plan (CEMP) has been prepared in respect of the proposed development by Paul McGrail Consulting Engineers Ltd, included with the application documentation and contained in this EIA (see Appendix D, Volume III of the EIA). It contains the best practice measures and protocols to be implemented during the construction phase of the proposed development to avoid / minimise environmental impacts, as well as any additional measures required pursuant to planning conditions which may be imposed. This document outlines the best practice construction techniques and methodologies which will be implemented onsite during construction of the proposed development including measures to protect waterbodies. The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The mitigation and control measures outlined in the CEMP and this EIA will be employed on site during the construction phase.

The CEMP and mitigation measures set out in this EIA will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures.

Construction works and the proposed mitigation measures are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA, 2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741); and
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).

To ensure the CEMP remains fit for purpose, it will be regarded as a live document. The appointed contractor will be responsible for updating the CEMP, as required; e.g. to reflect the publication of relevant new or revised guidelines and / or new statutory requirements. The full schedule of environmental commitments (i.e. all mitigation measures set out in the CEMP, Environmental Impact Assessment Report and Natura Impact Statement submitted as part of the planning application, as well as any applicable conditions of development consent) will be included in the CEMP by the appointed contractor.

According to the subject CEMP, all existing surface water drainage elements shall be maintained free from waste materials generated during the construction of the proposed development, including the initial site clearance and excavation. Routine visual inspections by the contractor shall reduce any risk of excess construction materials causing obstructions to surface water drainage and any potential flooding occurring. A maintenance schedule and operational schedule must be established by the contractor for silt and pollution control measures during the construction period. This should be undertaken in consultation with the relevant statutory authorities.

The CEMP provides actions and measures which will be undertaken for the purpose of environmental management and pollution prevention during the construction phase. As there is potential for run-off to indirectly discharge to the local drainage network consisting of drainage ditches which convey flow and discharge to the Bremore River (and its tributaries, the Clogheder Stream and Clonard Brook Stream). In order to manage the potential impact associated with sediment and sediment runoff the following mitigation measures will be implemented during the construction phase:

- SuDS will be constructed in line with manufacturer's guidelines / best practice methods.
- Foul drainage from site offices and compound, where not directed to the existing wastewater network, will be contained and disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations to prevent the pollution of watercourses.
- Process water used during construction will be disposed of appropriately. Rainwater will also accumulate on the site during construction. This water will be discharged directly via suitable pollution control and attenuation measures either directly to ground within the site or to foul sewer systems via portions of the existing wastewater network.
- Where available proposed permanent connections to the public sewer systems required for the operational phase may be used temporarily for the construction phase, to optimise efficiencies and avoid the creation of new outfalls for temporary construction only.
- A Construction Drainage Control System will be put in place so that all silt laden water will be diverted to temporary settlement storage tanks prior to discharge. This discharge, and the associated pollution control measures, will be subject to the approval of the Local Authority.
- Temporary construction surface drainage and sediment control measures, including the use of SUDS, will be provided before earthworks commence. The drainage design follows the natural topography of the site and utilises petrol/hydrocarbon/oil interceptors, silt traps along all gullies, house inspection chambers and SuDS manholes. Accordingly, all discharges to surface waters will be suitably treated through silt remediation (silt traps) and petrol/hydrocarbon/oil interceptors prior to discharge. There will be no direct discharge of surface water from any element of the works without proper attenuation and treatment.
- Pipe systems and orifices will be checked for blockages or partial blockages.
- A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available on site.

- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate.

6.6.1.1 Run Off & Suspended Solids

Rainfall at the construction site will be managed and controlled for the duration of the construction works until the permanently intercepted and attenuated surface water drainage system of the proposed site is complete. In the meantime, rainwater will continue to discharge to ground as current.

- It is anticipated that there will be 10m minimum buffer zone to the water course which on the site which comprise field drainage ditches (no main water courses / river waterbodies exist within the extent of the site boundary).
- Run-off from the working site or any areas of exposed soil shall be channelled and intercepted at regular intervals for discharge to silt remediation / settlement measures. A temporary positive drainage system shall be installed prior to the commencement of the construction works, to collect surface water runoff from the site during construction. A temporary surface water management will throttle runoff and allow silt and suspended solids to be settled out and removed before being discharged in a controlled manner to the agreed outfall.
- During construction, any surfaces which are intended to enable infiltration must be protected from compaction. This includes protecting from heavy traffic or storage materials.
- Any surface water run-off collecting in excavations will likely contain a high sediment load. This will not be allowed to discharge directly to the local drainage network.
- Water contaminated with silt will not be allowed to enter a watercourse or drain as it can cause pollution. All parts of the drainage system will be protected from construction runoff to prevent silt clogging the system and causing pollution downstream. Silt reduction measures to prevent this include, early construction of sediment management basins, channelling runoff away from watercourses and surface water drains and erosion prevention measures. Following construction, subsoil that has been compacted during construction should be broken up prior to the re-application of topsoil to reinstate the natural infiltration performance of the ground.
- During construction, any surfaces which are intended to enable infiltration must be protected from compaction. This includes protecting from heavy traffic or storage materials.
- Silt deposited during construction will be removed.
- Soils will be stabilised and protected from erosion whilst planting becomes established.
- Hydrocarbons or any hazardous chemicals will be stored in specific bunded areas. Refuelling of plants and machinery will also be carried out in bunded areas to minimise risk of any potential pollutants being discharged from the site.
- Pollution control measures will be implemented to control run-off from the site and prevent run-off which is potentially contaminated with sediments or hazardous chemicals entering the drainage network.
- Foul drainage from site offices and compound, where not directed to the existing wastewater network, will be contained and disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations to prevent the pollution of watercourses.
- A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available on site. Construction staff will be familiar with the emergency procedures and use of the equipment.
- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.
- Silt reduction measures on site and settlement measures (e.g. silt traps and settlement tanks/ponds or equivalent);
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate.
- Aggregate will be established at the site entrance points from the construction site boundary extending for at least 10 m.

- The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection.
- Construction materials, including aggregates etc. will be stored a minimum of 50-meter buffer distance from any surface water bodies and surface water drainage points.
- Aggregate materials such as sands and gravel will be stored in clearly marked receptacles within a secure compound area to prevent contamination.
- Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.
- Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site.

6.6.1.2 Wastewater Management

Foul drainage from site offices and compound, where not directed to the existing wastewater network, will be contained and disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations to prevent the pollution of watercourses.

6.6.1.3 Cement /concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Washouts will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer submit to agreement with Irish Water / FCC.

Pouring of cement-based materials for works will only be carried out in dry conditions. Pumped concrete will be monitored to ensure there is no accidental discharge. Mixer washings and excess concrete will not be discharged directly into the drainage network. Concrete washout areas will be created to avoid any accidental discharge from the proposed development site.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

6.6.1.4 Hydrocarbons and other construction chemicals

The following mitigation measures will be implemented during the construction phase to prevent any spillages to ground of fuels and other construction chemicals and prevent any spillages resulting to surface water and groundwater systems:

- Designation of bunded refuelling areas on the Site;
- Provision of spill kit facilities across the Site;
- Where mobile fuel bowsers are used, the following measures will be taken:
 - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
 - The pump or valve will be fitted with a lock and will be secured when not in use;
 - All bowsers to carry a spill kit and operatives must have spill response training;
 - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, double skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognized standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site). In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

6.6.1.5 Human Health and Population

It has been established (Section 6.3.3) that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Clonard Brook stream, Clogheder Stream or the Bremore River. On a precautionary basis, the mitigation measures set out above in Section 6.6 will be implemented during the construction works for the protection of human health and populations.

6.6.1.6 Human Health and Population

It has been established (Section 6.5.2) that while, there is a potential of accidental discharges during the construction phase this will not impact on trends in water quality and overall WFD status assessment. On a precautionary basis, the mitigation measures previously set out in Section 6.6 above, will be implemented during the construction works for the protection of surface water status and achievement of the programme of measures.

6.6.2 Operational Phase

6.6.2.1 Surface Water Quality

The design has taken account of the potential impacts of the development on surface water quality; measures have been incorporated in the design to mitigate these potential impacts.

The surface water design has been designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works and Sewers for adoption.

The proposed development design includes hardstand cover across the site, and the stormwater drainage network design includes sustainable drainage systems (SuDS). These measures by design ensure the stormwater leaving the site is to be attenuated and treated within the new development site boundary to ensure suitable quality, before discharging to the Clonard Brook stream, which subsequently outfalls to the nearby Bremore River.

Any localised car leaks will therefore be intercepted by and discharge to the proposed surface water / stormwater drainage network and be treated in Petrol interceptors (oil separators) prior to outfalling into the main system and downstream catchment. Therefore, the risk of accidental discharge has been adequately addressed through design. SuDS are drainage systems that are environmentally beneficial, causing minimal or no long-term detrimental damage. The SuDs design is set out in the Engineering Services Report (2025) and uses above-ground storage detention basins (interception system), underground attenuation storage, bioretention systems, flow control devices (Hydrobrake), grass swales, modular permeable paving (porous surfacing), and petrol (hydrocarbon) interceptors.

The proposed SuDS measures will reduce the risk of flooding downstream of the subject site. The purpose of the SuDs design is to:

- Treat runoff and remove pollutants to improve quality;
- Restrict outflow and to control quantity;
- Increase amenity value.

The proposed development does not include for any bulk chemical storage including fuel storage. As the site will be paved and drained, any fuel spills from cars will drain to the petrol (hydrocarbon) interceptors on the stormwater drainage system. All stormwater drainage is through the permitted attenuation.

According to Fingal 2023-2029 Strategic Environmental Assessment (SEA), objective IUO26 states developments must 'ensure a minimum 10m wide riparian buffer strip measured from the top of the bank either side of all watercourses', which applies to lands within development boundaries as per FCC. A riparian buffer along the Clonard stream has been established and landscaped as part of the Balbriggan Phase 4 residential development. This will improve the flow and habitat characteristics of the stream both on and off site. The riparian zones will be fisheries compliant and will contain features for biodiversity enhancement.

The layout of the proposed surface water drainage network is shown on Paul McGrail Consulting Engineers Ltd (2024) Drawing Set included with this Application. It is proposed to strictly separate the surface water and wastewater drainage networks, which will serve the proposed development, and provide independent connections to the surface water and wastewater sewer networks respectively.

6.6.2.2 Surface Water Quality

The design has taken account of the potential impacts of the development on surface water flow; measures have been incorporated in the design to mitigate these potential impacts.

As set out in the Engineering Services Report (2025), flow restriction is achieved by means of a hydro-brake installed at the outfall of each surface water catchment within the development, with the excess storm water stored on site for the duration of the storm periods of up to 1 in 100 years. The surface water network has been designed to provide sufficient capacity to contain and convey all surface water run-off associated with the 1-in-100-year event to the detention basins and underground attenuation storage without any overland flooding.

Surface water runoff exceeding the allowable outflow rate for the catchment will be stored in detention basins for rainfall events up to a 1 in 100-year return period with an allowance for climate change of 20%. The proposed development includes a new surface water network which will mitigate any potential for pluvial risk to the site in line with SuDS measures.

6.7 RESIDUAL IMPACTS

6.7.1 Construction Phase

6.7.1.1 Hydrology

The implementation of the mitigation measures outlined above in Section 6.6 of this chapter will ensure that targeted rates of impact to hydrology (Quality, Quantity and Flow) are achieved at the site of the Proposed Development during construction and operational phases. When mitigation measures are implemented throughout construction the predicted impact on the environment will be short-term, imperceptible, and neutral. With the measures outlined in the EIAR and CEMP, the predicted impact will be **neutral, imperceptible, and short-term**.

6.7.1.2 Human Health and Population

The implementation of the mitigation measures outlined in Section 6.6 of this chapter will ensure that the potential impacts on human health and populations during the construction phase are adequately mitigated. The residual effect on during the construction phase is considered to be **neutral, imperceptible, and short-term**.

6.7.1.3 Water Framework Directive

Even in the absence of the mitigation measures detailed above in Section 6.6, there will be no predicted degradation of the current Clogheder Stream, Clonard Brook Stream, Bremore River and North-West Irish Sea (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and third RBMP 2022-2027.

There are appropriately designed mitigation measures which will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of river and coastal waterbodies and as such will not impact on trends in water quality and over all status assessment.

The residual effect on Water Framework Directive Surface/Rive and Coastal waterbodies during the construction phase is considered to be **neutral, imperceptible and short-term**.

6.7.2 Operational Phase

6.7.2.1 Hydrology

The implementation of the mitigation measures detailed above in Section 6.6, will ensure that the potential impacts on hydrology (Quality, Quantity and Flow) once the proposed development is constructed and operational are adequately mitigated. The residual effect on surface water quality, quantity and flow during the operational phase is considered to be **neutral, imperceptible, and long-term**.

Following the TII criteria (refer to **Appendix 6.1 of the EIAR**) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.7.2.2 Human Health and Population

The implementation of the mitigation measures detailed above in Section 6.6, will ensure that the potential impacts on human health and populations once the proposed development is constructed and operational are adequately mitigated. The residual effect on human health and populations during the operational phase is considered to be **neutral, imperceptible, and long-term**.

6.7.2.3 Water Framework Directive Status

There is no potential for adverse or minor temporary or localised effects on the Clogheder Stream, Clonard Brook Stream, Bremore River and North-West Irish Sea as a result of the Proposed Development.

Therefore, it has been assessed that it is unlikely that the proposed development will cause any significant deterioration or change on its water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third RBMP 2022-2027.

Even in the absence of the mitigation measures detailed in Section 9.6, there will be no predicted degradation of the current surface waterbodies (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the third RBMP 2022-2027.

There are appropriately designed mitigation and design measures which will be implemented during the construction and operation phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction and operational phases, however these are temporary short-lived events that will not impact on the water status of underlying aquifer long-term and as such will not impact on trends in water quality and over all status assessment.

The residual effect on Water Framework Directive Surface waterbodies bodies (River & Coastal) during the construction phase is considered to be **neutral, imperceptible and long-term**.

6.7.3 Residual Impacts on the Lady's Well Spring

Refer to Chapter 5 Section 5.7.3 for the table which presents a hydrological and hydrogeological **Source-Pathway Receptor Assessment** during the construction and operation phases with respect to the Lady's Well Spring.

6.8 MONITORING OR REINSTATEMENT

The management of land, soils and ground water during the construction phase will be monitored by the Contractor to ensure compliance with above-listed mitigation measures, and relevant waste management legislation and local authority requirements.

6.8.1 Construction Phase

During construction phase the following monitoring measures will be implemented:

- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off to surface waterbodies and drainage ditches which comprise the local drainage network; and
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Pouring of cement-based materials for works will only be carried out in dry conditions.
- Regular inspection of surface water run-off and sediments controls (e.g., settlement & silt remediation measures e.g. silt traps / distilling tanks).

6.8.2 Operational Phase

No future surface water monitoring is proposed for the proposed development due to the low hazard potential at the site.

Hydrocarbon / petrol interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions.

Maintenance of the surface water drainage system, including hydrocarbon interceptors, and foul sewers as per normal urban developments is recommended to minimise any accidental discharges the local surface water drainage network / catchment.

6.9 INTERACTIONS

Due to the inter-relationship between land, soils, geology, hydrogeology and hydrology, the assessed impacts and mitigation measures discussed will be considered applicable to both chapters.

This section discusses interactions between this Chapter and other specialist environmental topics considered in this EIA. The main interactions of importance to land, soils, geology, and hydrogeology relate to Biodiversity (Chapter 4), Land Soil Geology & Hydrogeology (Chapter 5), and Air Quality (Chapter 7) as follows:

6.9.1 Biodiversity

The proposed development may have temporary negative impacts on biodiversity at site level during construction with resultant impact on local biodiversity. It will not impose any significant impact on European Designated sites due to the treatment integrated in the surface water (stormwater) and foul (wastewater) drainage strategy and associated mitigation measures (as previously outlined in section 6.6 of Chapter 6- Hydrology) coupled with the large distance involved in the pathway and significant dilution factor downstream in the catchment and the Northwest Irish Sea. Therefore, there is no potential for impacts on water quality within European Designated sites.

6.9.2 Land, Soil, Geology, and Hydrogeology

As mentioned above, there is a close inter-relationship between land, soils, geology, hydrogeology (Chapter 5) and Hydrology. During construction of the proposed development, there will be soil excavation that could impact surface water quality if not adequately mitigated. There will be a reduced recharge to the underlying aquifer due to hard cover and installation of a drainage system.

There are no potentially significant interactions identified between land, soils, geology and hydrogeology, and Hydrology during the operational phase.

6.9.3 Climate and Flood Risk

The proposed development will not have negative impact on flood risk as a result of climate change. The proposed development is located within Flood Zone C. The proposed drainage plan incorporates adequate attenuation taking consideration of a climate safety factor.

6.9.4 Air Quality

During construction of the proposed development, there will be a proportion of dust created during construction enabling works and construction activities that could impact air quality if not adequately mitigated.

6.9.5 Waste

Excavation could result in encountering contaminated soil which has the potential to runoff to surface waterbodies (i.e. onsite field drainage ditches) via overland flow if not adequately mitigated. This will undergo environmental testing and be disposed of at a suitable licenced waste facility as required.

6.9.6 Indirect and/or Secondary Impacts

The proposed development requires excavation works which if not managed appropriately could give rise to the generation of dust.

In accordance with EPA Guidelines (2022), secondary or indirect impacts refer to environmental effects that occur away from the project site or through complex impact pathways. Having regard to the nature, scale and location of the proposed residential development, and the specific works involved during

construction and operation, there is no potential for significant indirect or secondary impacts on hydrology. The development does not rely on functionally interdependent activities occurring off-site that would give rise to such effects.

6.10 CUMULATIVE IMPACTS

A list of developments in the vicinity of the subject lands is contained in Chapter 17 of this EIAR. All cumulative developments that are already built and in operation contribute to our characterisation of the baseline environment. As such, any further environmental impacts that the proposed development may have in addition to these already constructed and operational cumulative developments has been assessed in the preceding sections of this chapter.

6.10.1 Construction Phase

There are existing residential and commercial developments close by, along with the multiple permissions in the area. This chapter has been prepared with reference to the list of other developments in the locality.

In relation to the potential cumulative impact on hydrology during the construction phases, the construction works which would have potential cumulative impacts are as follows:

Surface water contamination due to accidental hydrocarbon/cement leakage to ground and runoff / overland flow to surface waterbodies.

A Construction Environmental Management Plan (CEMP) (2025) is included with the application documentation (refer to Appendix D, Volume III of the EIAR). This together with the mitigation measures set out in Section 6.6 outlines the best practice construction techniques and methodologies which will be implemented during construction of the proposed development to minimise potential for contamination.

The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

The works contractors for other planned or permitted developments will also be obliged to ensure that measures are in place to protect soil and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010, S.I. 366 of 2016 and S.I. 287 of 2022)).

The implementation of mitigation and monitoring measures detailed in Section 6.6; and 6.8 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological environment during the construction phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be **neutral, imperceptible, and short-term.**

6.10.2 Operational Phase

In relation to the potential cumulative impact on hydrogeology during the operational phases, the operational activities which would have potential cumulative impacts are as follows:

- Increased hard standing areas will reduce local recharge to ground and increase surface water run-off potential if not limited to the green field run-off rate from the Site. Cumulatively this development and others in the area will result in localized reduced recharge to ground and increase in surface run-off;

- Increased risk of minor accidental discharge of hydrocarbons from car parking areas and along roads is possible unless diverted to surface water system with petrol interceptor;

Increase in wastewater loading and water supply requirement is an impact of all development. Each development will require approval from the Uisce Eireann (formerly IW, Irish Water) confirming available capacity in the water and wastewater infrastructure. The surface water and foul drainage infrastructure and water supply requirements for the proposed development have been designed to accommodate the proposed development and a confirmation of feasibility received.

All nearby developments will also be obliged to ensure that measures are in place to protect soil and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 9 of 2010, S.I. 366 of 2016 and S.I. 287 of 2022)).

The implementation of mitigation measures detailed above in Section 6.6 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological environment during the operational phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be **neutral, imperceptible, and long-term**.

6.10.3 Cumulative Impacts in relation to Lady's Well during the construction and operational phases

The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to protect surface water and groundwater quality in compliance with legislative standards for receiving groundwater quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 as amended by S.I. 366 of 2016 and by S.I. 287 of 2022) and surface water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019)).

The implementation of mitigation measures detailed in in Chapter 5 (Section 5.6.1 & 5.6.2) and Chapter 6 (Section 6.6.1 & 6.6.2), as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal/negligible cumulative potential for change to the hydrological and hydrogeological environment around the Lady's Well Spring during the construction and operational phases of the Proposed Development.

6.11 DIFFICULTIES ENCOUNTERED

There were no significant difficulties encountered in compiling the specified information for this EIA Chapter.

6.12 SUMMARY

There will be **no long-term residual impact** on hydrological receptors, either within or in the vicinity of the proposed development as a result of the proposed development.

6.13 REFERENCES

- Environmental Protection Agency Act 1992 as amended.
- European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017).
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