

CHAPTER 8

WATER

8.0 WATER

8.1 INTRODUCTION

This chapter assesses and evaluates the potential impacts on the hydrological aspects of the site and surrounding area impacts associated with the proposed development at Fosterstown North, Swords, Co. Dublin. The proposed development, for which a seven year permission is sought, comprises a Strategic Housing Development of 645 residential units, a community facility, a childcare facility, 5 no. commercial units, car and cycle parking, landscaping, public and communal open space, road upgrades and vehicular access and associated internal roads, pedestrian and cycle paths and all associated site and infrastructural works. A full description of the development can be found in Chapter 2.

This chapter was completed by Marcelo Allende (BSc BEng) a Water Resources Engineer with over 15 years of experience in environmental consultancy and water resources studies. He is an Environmental Consultant with AWN Consulting, a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI). He has prepared hydrological and hydrogeological impact assessments for numerous EIARs for a range of projects including commercial, residential, industrial, pharmaceutical and data centre developments.

8.2 STUDY METHODOLOGY

8.2.1 *Criteria for Rating Impacts*

This chapter evaluates the effects, if any, which the proposed development will have on Hydrology as defined in the Environmental Protection Agency (EPA) 'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2017). The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015) is also followed in this hydrological assessment and classification of environmental effects. In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009) 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 EIAR 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 Draft EPA Guidelines (2017) 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 and are presented in Tables 1-3 in Appendix 8.1.

The principal attributes 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.

8.2.2 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;
- River Basin Management Plan for Ireland 2018-2021.
- 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)
- Dublin City Council (2005), Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council; and
- ‘Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors’ (CIRIA 532, 2001);
- Fingal County Development Plan and the Fosterstown Masterplan
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Site specific data was derived from the following sources:

- Engineering Assessment Report. Proposed Strategic Housing Development at Fosterstown North, Dublin Road / R132, Swords, Co. Dublin. Waterman Moylan (April 2022)
- Flood Risk Assessment. Proposed Strategic Housing Development at Fosterstown North, Dublin Road / R132, Swords, Co. Dublin. Waterman Moylan (April 2022);
- Construction and Environmental Management Plan. Proposed Strategic Housing Development at Fosterstown North, Dublin Road / R132, Swords, Co. Dublin. Waterman Moylan (April 2022);
- Construction Environmental Management Plan. Proposed Strategic Housing Development at Fosterstown North, Dublin Road / R132, Swords, Co. Dublin. Waterman Moylan (April 2022);
- Report on a Site Investigation for a Development at Swords Co. Dublin IGSL, 2005 and
- Various design site plans and drawings.

8.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SITUATION)

8.3.1 Site Area Description

The subject lands are contained within the Fosterstown Masterplan area, consisting of the southern portion of the designated land. The site is located in Fosterstown North, Swords, Co. Dublin and is bound to the north by a greenfield site subject to an extant permission, to the east by the R132 and to the south and west by the Boromhe residential development. The subject site is located 2 km north of Dublin Airport and 1 km south of Swords main street. The total site area is approximately 4.635 hectares and is currently greenfield in nature. The site falls from the existing high point in the southwest corner with a level of 47.88 metre above ordinance datum (mAOD) Malin to the low point in the northeast corner of the site with a level of 36.75 mAOD Malin. The site slopes sharply to the northeast with an average slope of 1:34. There is an existing watercourse (Gaybrook Stream) along the entirety of the northern boundary of the site which flows from west to east. The site is currently accessed by a gate from the R132.

8.3.2 Hydrology

The proposed development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and Broadmeadows River sub-catchment (WFD name: Broadmeadow_SC_010, Id 08_3) (EPA, 2022; refer to Figure 8.1 and 8.2 below). There is an existing watercourse to the north of the subject site, the Gaybrook Stream. The site currently drains unrestricted to this watercourse. The Gaybrook Stream discharges into the Broadmeadows Transitional Waterbody or Malahide Estuary c. 3.7 km to the northeast of the subject site. This waterbody hosts Natura 2000 sites (Malahide Estuary SAC/SPA). The Broadmeadow transitional waterbody is the nearest water receptor and is located c. 2.3 Km northeast of the proposed development.



Figure 8.1: Hydrological Environment (EPA, 2022)



Figure 8.2: Local Hydrological Environment (EPA, 2022)

8.3.3 Existing Foul Water Service

There are 2 no. foul sewers in the vicinity of the site. An existing 300mm diameter foul sewer to the east located in the R132 and an existing 300mm diameter foul sewer to the south of the proposed development located in Boromhe Willows.

8.3.4 Surface Water Quality

The proposed development is located within the former ERBD (Eastern River Basin District, 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). It is situated in Hydrometric Area No. 09 of the Irish River Network and is located within the Liffey and Dublin Bay Catchment.

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 ERBD River Basin Management Plan (RBMP) 2009-2015 was published. In the ERBD RBMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g. water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD by 2015 and include a programme of measures to address and alleviate these pressures by 2015. This was the first River Basin Management planning cycle (2010-2015). The second cycle river basin management plan for Ireland is currently in place and will run between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD).

This second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). In more general terms, three key lessons have emerged from the first cycle and the public consultation processes. These lessons have been firmly integrated into the development of the second cycle RBMP. Firstly, the structure of multiple RBDs did not prove effective, either in terms of developing the plans efficiently or in terms of implementing those plans. Secondly, the governance and delivery structures in place for the first cycle were not as effective as expected. Thirdly, the targets set were too ambitious and were not grounded on a sufficiently developed evidence base. The second cycle RBMP has been developed to address these points.

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);
- 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; and
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998.

The local hydrological network (Gaybrook Stream) is associated with the WFD surface waterbody Gaybrook_010. The most recent published status (www.epa.ie – River Waterbody WFD Status 2013-2018) of this waterbody is 'Poor' and its environmental risk is currently 'Under Review' by the WFD. There are no hydrological connection to water bodies with 'Unassigned' WFD status.

Q Values are used to express the biological water quality by the EPA, based on changes in the macro invertebrate communities of riffle areas brought about by organic pollution. Q1 indicates a seriously polluted water body, Q5 indicates unpolluted water of high quality. There are no Q values determined for the Gaybrook Stream as there are no EPA water quality monitoring stations along this watercourse.

The most recent Q Values for the nearby Sluice and Ward rivers suggest that both watercourses are Q3 and Q3-4, respectively which means a 'Moderately Polluted' and 'Slightly polluted' pollution status. It would be expected a similar condition for the Gaybrook Stream based on the similar existing environment during its pathway.

8.3.5 Areas of Conservation

According to the NPWS (2022) on-line database there are no European Sites (Special Protection Areas or Special Areas of Conservation) on or in the vicinity of the subject site. The closest Natura 2000 European sites are the Malahide Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Proposed Natural Heritage Area (pNHA) which are located c. 2.3 Km to the northeast of the subject site.

8.3.6 Flood Risk

According to the site specific Flood Risk Assessment carried out by Waterman Moylan (2022), the developed site is shown not to be at a significant risk from flooding and to not create a significant risk to adjoining areas or downstream.

The subject site has been analysed for risks from tidal and fluvial flooding from the Gaybrook Stream, pluvial flooding, groundwater and drainage system failures due to human error or mechanical system failure. As the flood risk from all sources can be mitigated, reducing the flood risk to low or very low, the proposed development is considered acceptable in terms of flood risk.

8.3.7 Rating of Importance of Hydrological Attributes

Based on the TII methodology (2009) (See Appendix 8.1) the importance of the hydrological features at this site is rated as 'Low importance' based on the assessment that the attribute has a low quality significance or value on a local scale.

However, it should be considered that there would be an indirect hydrological connection between the site and Malahide Estuary protected sites (SAC, SPA, NHA). The Natura Impact Statement submitted as part of the application details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of the Proposed Development on the aforementioned European Sites.

Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been recommended to offset them. As a result of the Appropriate Assessment, it has been concluded that, with the implementation of the mitigation measures detailed in this Chapter, the Proposed Development will not adversely affect the integrity of the above European Sites (or any other).

In addition, there are no hydrological connection to water bodies with '*Unassigned*' WFD status and therefore potentially affected by the project.

8.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development comprises a Strategic Housing Development of 645 no. residential units (comprising 208 no. 1 bedroom units, 410 no. 2 bedroom units, and 27 no. 3 bedroom units), in 10 no. apartment buildings, with heights ranging from 4 no. storeys to 10 no. storeys, including undercroft / basement levels (for 6 no. of the buildings). The proposals include 1 no. community facility in Block 1, 1 no. childcare facility in Block 3, and 5 no. commercial units (for Class 1-Shop, or Class 2- Office / Professional Services or Class 11- Gym or Restaurant / Café use, including ancillary takeaway use) in Blocks 4 and 8.

The development includes a total of 363 no. car parking spaces (63 at surface level and 300 at undercroft / basement level). 1,519 no. bicycle parking spaces are provided at surface level, undercroft / basement level, and at ground floor level within the blocks. Bin stores and plant rooms are located at ground floor level of the blocks and at undercroft / basement level. The proposal includes private amenity space in the form of balconies / terraces for all apartments. The proposal includes hard and soft landscaping, lighting, boundary treatments, the provision of public and communal open space including 2 no. playing pitches, children's play areas, and an ancillary play area for the childcare facility.

The proposed development includes road upgrades, alterations and improvements to the Dublin Road / R132, including construction of a new temporary vehicular access, with provision of a new left in, left out junction to the Dublin Road / R132, and construction of a new signalised pedestrian crossing point, and associated works to facilitate same. The temporary vehicular access will be closed when vehicular access to the lands is made available from the lands to the north. The proposal includes internal roads, cycle paths, footpaths, vehicular access to the

undercroft / basement car park, with proposed infrastructure provided up to the application site boundary to facilitate potential future connections to adjoining lands.

The development includes foul and surface water drainage, green roofs and PV panels at roof level, 5 no. ESB Substations and control rooms (1 no. at basement level and 4 no. at ground floor level within Blocks 2, 4, 7, and 8), services and all associated and ancillary site works and development.

The principal aspects related to the hydrological environment are presented in the following sections.

8.4.1 Surface Water Drainage

8.4.1.1 Construction Phase

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. A temporary drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff by the site during construction.

On-site treatment measures will be installed to treat surface water run-off from the site prior to discharge to the receiving surface water sewer. This treatment will be achieved by the construction of cut off trenches along the lowest parts of the site. Cut off trenches will incorporate straw bales to reduce sediment loading, settlement tanks/ponds, the instillation of proprietary surface water treatment systems including class 1 full retention petrol interceptors and spill protection control measures. Settlement tanks/ponds will be sized to deal with surface run-off and any groundwater encountered.

All measures will be approved prior to commencement with the Pollution Section of Fingal County Council. A sampling chamber with shut down valve will be installed downstream of the settlement pond/tank and water quality monitoring will be carried out here prior to discharge to the surface water sewer and subsequently to the nearby watercourse.

No significant dewatering will be required during the construction phase which would result in the localised lowering of the water table. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavation is kept relatively dry.

The measures outlined in Section 8.8 will be put in place during the construction phase to ensure protection of surface waterbodies. Construction works are informed by best practice guidance from Inland Fisheries Ireland on the prevention of pollution during development projects:

- 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 (20160; and
- Environmental Good Practice on Site (3rd edition) (C692).

8.4.1.2 Operational Phase

There is an existing watercourse to the north of the subject site, the Gaybrook Stream. The site currently drains unrestricted to this watercourse. Surface water for the proposed development will be discharged at a restricted rate to the existing watercourse mimicking the existing greenfield run-off rates or 2 l/s/ha. Attenuation will be provided to restrict surface water runoff from the proposed development to the required runoff rate.

The proposed surface water drainage system for this development has been designed as a SUDS system which comprises filter drains, green roofs, permeable surfacing, detention basins, and an attenuation tank in the basement together with flow control devices and a petrol interceptor to treat run-off and remove pollutants to improve quality, restrict outflow and control quantity.

Strict separation of surface water and wastewater will be implemented within the development. Surface water local drains will be a minimum 225mm dia. and generally will consist of uPVC (to IS123) or concrete socket and spigot pipes (to IS 6). These drains will be laid to comply with the requirement of the Building Regulations 2010, in accordance with the recommendations contained in the Technical Guidance Documents, Section H and will be laid strictly in accordance with the taking in charge requirements of Fingal County Council.

8.4.2 Foul Water

As mentioned above, there are 2 no. foul sewers in the vicinity of the site. An existing 300mm diameter foul sewer to the east located in the R132 and an existing 300mm diameter foul sewer to the south of the proposed development located in Boroimhe Willows. As part of the development, it is proposed to connect the foul water drainage by gravity to the existing foul sewer in R132 via two new connections.

The 2 no. proposed foul water connection points are located to the northeast and to the southeast of the bulk of the subject site, separating the foul drainage into 2 no. networks or catchments.

Blocks 1,2 and 3 (Southern Catchment) will be connected to the east of the development on R132. The remainder of the development (Northern Catchment) will be connected to the same public sewer in the R132 to the northeast of the site. The existing 300mm diameter sewer discharges foul water to the Swords Wastewater Treatment Plant (WWTP).

The Swords WWTP was recently upgraded to increase treatment capacity from a population equivalent of 60,000 to a population equivalent of 90,000. The upgraded treatment plant will protect and improve quality of receiving waters at the inner Broadmeadow Estuary, using tertiary treatment by filtration, and disinfection using ultra-violet treatment.

8.4.3 Water Supply

It is proposed to service the development via a 200mm diameter PE watermain laid in a loop around the building blocks and within the internal road and footpath arrangement. 2No connections will be made onto the existing watermain within the R132, one on the south at the entrance to the development, and one on the north. Each connection will include provision for an Irish Water Bulk Meter. An updated Confirmation of Feasibility was received from Irish Water on 17 February 2021.

8.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

An analysis of the potential impacts of the Proposed Development on the hydrological environment during the construction and operation is outlined below. Due to the inter-relationship between land, soils, geology and hydrogeology and surface water the following impacts discussed will be considered applicable to Chapter 7.0. Material Assesses is also considered an interaction. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 8.8 below

The site would have indirect hydrological connections with the Malahide Estuary SAC/SPA/pNHA through the local surface water drainage network (via the Gaybrook Stream). Given the potential loading and the distance from source to the Natura sites (over 2.3 Km downstream) and associated dilution factor, this risk would be imperceptible as any accidental discharge of potential contaminant would be attenuated, diluted and dispersed below statutory guidelines (i.e., S.I. European Communities Environmental Objectives Regulations, 2009 [S.I. No. 272 of 2009 as amended by SI No. 77 of 2019]), However, the Natura Impact Statement submitted as part of the application details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of the Proposed Development on the aforementioned European Sites.

Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been recommended to offset them. As a result of the Appropriate Assessment, it has been concluded that, with the implementation of the mitigation measures detailed in this Chapter, the Proposed Development will not adversely affect the integrity of the above European Sites (or any other).

8.5.1 Construction Phase

8.5.1.1 Increased Sediments Loading in Run-off

Surface water runoff during the construction phase may contain increased silt levels or become polluted from construction activities. Runoff containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from dewatering excavations, exposed ground, stockpiles and access roads. Mitigation measures highlighted in Section 8.8 below will be employed to remove the risk to affect the local hydrological environment.

During the construction phase at this site there is potential for an increase in run-off due to the compaction of soils. This 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 and sediment loading which could potentially impact local drainage.

If contaminated soil/water is encountered, it will be required to be removed by a licensed waste contractor. Further soil sampling will be undertaken during pre-development works. The contractor will be required to submit a Construction Waste Management Plan (CWMP) to the local authority for approval which will address all types of material to be disposed of.

8.5.1.2 Accidental Spills and Leaks

As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer.

During construction of the development, there is a risk of accidental pollution incidences from the following sources if not adequately mitigated:

- Spillage or leakage of oils and fuels stored on site;
- Spillage or leakage of oils and fuels from construction machinery or site vehicles;
- Spillage of oil or fuel from refuelling machinery on site; and
- The use of concrete and cement during pad foundation construction.

Machinery activities on site during the construction phase may result in contamination of runoff/surface water. Potential impacts could arise from accidental spillage of fuels, oils, paints etc. which could impact surface water if allowed to infiltrate to runoff to surface water systems and/or receiving watercourses. However, implementation of the mitigation measures detailed below will ensure that this does not occur.

Concreting operations carried out near surface water drainage points during construction activities could lead to discharges to a watercourse. Concrete (specifically, the cement component) is highly alkaline and any spillage to a local watercourse would be detrimental to water quality and local fauna and flora. However, employment of the mitigation measures highlighted below will ensure that any impact will be mitigated.

The potential impacts on the hydrological environment during the construction phase and in absence of mitigation is expected be short term-slight/moderate-negative.

8.5.2 Operational Phase

There are no direct discharges to any open water courses included in the design. The surface water network has been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100 year event to the attenuation basins without any overland flooding including an additional allowance of 20% in rainfall intensities due to climate change. Discharge flow will be restricted to the greenfield equivalent runoff for the catchment area.

The development will be fully serviced with separate foul and stormwater public sewers which will have adequate capacity for the facility and discharge limits as required by Irish Water licencing requirements. Discharge from the site to the public foul sewer will be sewage and grey water only due to the nature of the proposed development. The foul discharge from the site will join the public sewer and will be treated at the Irish Water Swords Wastewater Treatment Plant (WWTP) prior to subsequent discharge to Malahide Estuary. This WWTP is required to operate under an EPA licence and meet environmental legislative requirements as set out its licence. The WWTP is currently operating within its capacity

The proposed development site includes car parking area at the site. Leakage of petrol/ diesel fuel may occur from these areas; run-off may contain a worst-case scenario of 70 litres for example. However, in the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed and any releases to drainage will be mitigated through hydrocarbon interceptors.

There will be an increase in hardstanding area (c. 3.18 Ha) associated with the development area. This will have a minor effect on local recharge to ground; however, the impact on the overall hydrological regime will be insignificant, considering the proportion of this area with respect to the entire catchment.

The potential impacts on the hydrological environment during the operational phase and in absence of mitigation is expected be short term-slight/moderate-negative.

8.6 'DO NOTHING' IMPACT

Under the Do Nothing Scenario no construction works will take place and potential impacts from construction activities will not occur (i.e., increase of sediments loading in run-off or accidental spills and leaks). Impacts due to potential leakage of petrol from car parking areas during operational phase will also not occur. The hydrological environment will remain as per the baseline and will change in accordance with trends within the wider area (including influences from new developments in the surrounding area, etc.). Therefore, this scenario can be considered neutral in terms of water and hydrology.

8.7 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

The design has taken account of the potential impacts of the development on the hydrology 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 hydrology. These are described in Sections 8.8.1 and 8.8.2 below.

The site is drained by the public stormwater and foul water network. This network ultimately flows in a northerly direction towards the Malahide Estuary which hosts Natura Sites (SPA/SAC/pNHA) and is located c. 2.3 Km to the northeast of the site. Thus, the site would have an indirect hydrological connection with the Malahide Estuary through the local drainage networks.

In line with the AA/NIS submitted as part of this application and as stated above, where potentially significant adverse impacts on Malahide Bay SPA/SAC/pNHA, were identified, a range of mitigation and avoidance measures

have been recommended to offset them. With the implementation of the mitigation measures detailed in this section, the Proposed Development will not adversely affect the integrity of the above European Sites (or any other).

Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures discussed will be considered applicable to all. Waste Management is also considered as an interaction in some sections.

8.7.1 Construction Phase

WAT CONST 1: Construction Environmental Management Plan (CEMP)

A Construction Environmental Management Plan (CEMP) has been prepared by Waterman Moylan (2022) for the proposed development and is included with the planning documentation. In advance of work starting on site, the works Contractor will prepare a detailed CEMP. The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association;
- CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association
- CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

In order to reduce impacts on the hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site.

WAT CONST 2: Surface Water Run-off

As there is potential for run-off to enter current stormwater systems and indirectly discharge to a watercourse, mitigations will be put in place to manage run-off during the construction phase.

The contractor will appoint a suitably qualified person to act as Ecological Clerk of Works (ECoW) to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment. Measures such as silt fencing, straw bales and trenches will be inspected regularly by the ECoW to ensure they are effective and in good repair. Should any measures be damaged or ineffective, they will be repaired or replaced as per the instruction of the ECoW.

Temporary cut off trenches will be excavated along the north of the Site in advance of stripping topsoil; to intercept sediment laden surface water flows prior to their reaching the Gaybrook Stream. These cut off trenches will be connected to a temporary settlement pond. Straw bales will be placed within the cut off trenches at strategic locations and at the outfall from the settlement pond.

Any run-off will be intercepted on site, where the ground falls towards adjoining properties or public roads/footpaths. This will be achieved with open drains or French drains and collected for treatment based on the conditions of a FCC and/or Irish Water licence, prior to pumping to the surface sewer network. During any discharge of surface water from the basement/excavations, the quality of the water will be improved through the provision of settlement tanks and will be regularly monitored visually for hydrocarbon sheen and suspended solids. Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of Fingal County Council before discharge to the surrounding drainage network.

Direct uncontrolled run-off into the drainage ditch running through the site will not be allowed. 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.

Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 50 m buffer zone between machinery and watercourses/ stormwater sewer/ drainage ditch, refuelling of machinery off site) and hydrocarbon interceptors. Designated parking at least 50m from any watercourse. The site compound will be located at least 50m from any watercourse. Contractor to prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. It is therefore proposed that the water be discharged via the existing stormwater sewer network. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the sewer. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. Due to the very low permeability of the Dublin Boulder Clay and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated. Based on GSI information (refer to Chapter 7), it is not anticipated that there will be rock removal required for the proposed single storey basements in the development, for building foundations, for service trenches or for any other works.

Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. 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. Soil from works will be stored away from existing drainage features to remove any potential impact.

Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained.

As detailed in the CEMP, regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the site foreman at the commencement of works. Trigger levels for halting works and re-examining protection measures will be: pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.

WAT CONST 3: Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas at locations at least 50m from any body of water, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site) which will be away from surface water gulleys, the existing open ditch or drains. 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. Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse.

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. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemical which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer’s Representative.

WAT CONST 4: Soil Removal and Compaction

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains (see Surface Water Run-off section above). Movement of material will be minimised to reduce degradation of soil structure and generation of dust.

All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Given the current greenfield condition of the subject site, no contamination is expected to be encountered during excavation works on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

8.7.2 Operational Phase

WAT OPER 1: Sustainable Urban Drainage Systems

The proposed development will provide a significant improvement to the local drainage catchment as it is proposed to provide full attenuation in compliance with the requirements of the Greater Dublin Strategic Drainage Study. A number of design measures (SuDS measures detailed in Section 8.4 above and in the Engineering Assessment Report) will be put in place to minimise the likelihood of any spills entering the water environment to include the design of the car park with hydrocarbon interceptors. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.

It is proposed to ultimately discharge surface water from the proposed development, post attenuation and outflow restrictions into the existing local drainage.

8.8 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

8.8.1 Construction Phase

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the hydrological environment do not occur during the construction phase and that the residual impact will be **short term-imperceptible-neutral**. Following the TII criteria (refer to Appendix 8.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

8.8.2 Operational Phase

The implementation of mitigation measures outlined above will ensure that the predicted impacts on the hydrological environment do not occur during the operational phase and that the residual impact will be **long term-imperceptible-neutral**. Following the TII criteria (refer to Appendix 8.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

8.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

This section considers the potential cumulative impacts or effects on the hydrological environment of the proposed development with other existing, planned and permitted developments in the locality.

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. The cumulative impact (as far as practically possible) of the proposed development with any/all relevant existing or permitted developments as set out in Chapter 2, Appendix 2.1 (Relevant Planning History). The likelihood of cumulative effects are discussed in Sections 8.10.1 and 8.10.2 below for construction and operational phases.

8.9.1 Construction Phase

3 no. relevant planning applications from a Water chapter perspective have been identified within the 500m and 1,000m radius of the subject site. The first application relates to the permitted Strategic Housing Development to the northern part of the Fosterstown Masterplan lands. The remaining 2 no. applications relate to smaller scale residential and commercial development. All developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (S.I No 77/2019 EU Environmental Objectives (Surface Waters) Amendment Regulations 2019) such that they would be required to manage runoff and fuel leakages. As such, it can be concluded that the in-combination effects of surface water arising from the

Proposed Development taken together with that of other developments will not be significant based on the low potential chemical and sediment loading.

The residual cumulative impact on water and hydrology for the construction phase is anticipated to be neutral, imperceptible, and short term for the construction phase, once appropriate mitigation measures to manage water quality runoff in compliance with legislative requirement are put in place for each development.

8.9.2 Operational Phase

The existing and permitted projects set out in Appendix 2.1 (Relevant Planning History) have been considered in this assessment. Increase in wastewater loading and water supply requirement is an impact of all development: Each development will require approval from 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 has been designed to accommodate the future indicative substation development.

Each permitted development are required by the Local Authority to comply with the Greater Dublin Strategic Drainage Strategy (GDSDS) and Local Authority requirements by providing suitable attenuation on site to ensure greenfield run-off rates and ensure that there is no increase in offsite flooding as a result of development.

It can also be concluded that the cumulative or in-combination effects of effluent arising from the Proposed Development with that of other permitted proposed developments, or with development planned pursuant to statutory plans in the greater Swords areas, which will be discharged into Swords WWTP will not be significant having regard to the size of the calculated discharge from the Proposed Development and having regard that the Swords WWTP was upgraded in 2016 to increase treatment capacity from a population equivalent of 60,000 to a population equivalent of 90,000. According to the 2020 AER (Irish Water, 2021), the facility has surplus organic capacity of 11,391 PE remaining and will not be exceeded within the next three years. As such, it is not envisaged that the Proposed Development has the potential to act in combination with other developments and lead to overloading at Swords WWTP based on its current treatment capacity. The upgraded treatment plant will protect and improve quality of receiving waters at the inner Broadmeadow Estuary, using tertiary treatment by filtration, and disinfection using ultra-violet treatment.

The residual cumulative impact on water and hydrology for the operational phases is anticipated to be **neutral, imperceptible** and **long-term**, once appropriate mitigation measures to manage water quality runoff in compliance with legislative requirement are put in place for each development.

8.10 MONITORING

8.10.1 Construction Phase

The Project Ecologist will supervise the sampling of suspended solids downstream prior to commencement of works, and weekly during remediation works. Samples will be analysed on site. Should results show a 10% increase in suspended solids downstream of the site this will be brought to the attention of the contractor by the Project Ecologist and any suitable contingency measures will be instigated.

Routine inspections of construction activities will be carried out on a daily basis by the contractor staff to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place. Environmental inspections will ensure that the works are undertaken in compliance with the Project CEMP and that the requirements of the Conditions of Planning, the NIS and associated documentation are being adhered to during construction.

As detailed in the CEMP, regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location will be agreed between the project ecologist and the site foreman at the commencement

of works. Trigger levels for halting works and re-examining protection measures will be: pH >9.0 or pH <6.0; and/or suspended solids >25 mg/l. These trigger levels are based on those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.

The Contractor will develop their own site inspection programme, which will include an inspection procedure and relevant forms to record any issues. Only suitably-trained staff will undertake environmental site inspections. The Project Ecologist will keep records of works undertaken. Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase.

In addition, soil sampling will be carried out to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling, etc.

8.10.2 Operational Phase

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 to surface water.

For the SUDS strategy to work as designed it is important that the entire drainage system is well maintained. It will be the responsibility of the site management team to ensure the drainage system is maintained during construction and until handover of the development to the Management Company. The Management Company will then assume responsibility for the maintenance and upkeep of the surface water drainage network including all SuDS. Maintenance and cleaning of gullies, manholes (including catch pits) and attenuation tanks will ensure adequate performance.

8.11 REINSTATEMENT

Not applicable to water and hydrology.

8.12 INTERACTIONS

The most significant interactions with surface water is between land, soils, geology and hydrogeology population and human health and air quality. Due to the inter-relationship between groundwater and surface water the discussed impacts are considered applicable to Chapter 7 (Land and Soils). The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all surface and groundwater legislative limits and therefore the predicted impact is short-term, negative and imperceptible with respect to the construction phase and long-term, neutral and imperceptible with respect to the operational phase.

8.13 DIFFICULTIES ENCOUNTERED IN COMPILING

There were no difficulties encountered when compiling this assessment.

8.14 REFERENCES

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).

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.

Irish Water (2021). AER Swords WWTP

**APPENDIX 8.1: CRITERIA FOR RATING THE MAGNITUDE AND SIGNIFICANCE OF IMPACTS AT EIA STAGE
NATIONAL ROADS AUTHORITY (NRA-TII, 2009)**

Table 1 Criteria for Rating Site Attributes – Estimation of Importance of Hydrological Attributes (NRA)

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes. Quality Class A (Biotic Index Q4, Q5). Flood plain protecting more than 50 residential or commercial properties from flooding. Nationally important amenity site for wide range of leisure activities.
High	Attribute has a high quality or value on a local scale	Salmon fishery. Locally important potable water source supplying >1000 homes. Quality Class B (Biotic Index Q3-4). Flood plain protecting between 5 and 50 residential or commercial properties from flooding. Locally important amenity site for wide range of leisure activities.
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery. Local potable water source supplying >50 homes. Quality Class C (Biotic Index Q3, Q2- 3). Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities. Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1). Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

Table 2 Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrological Attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss or extensive change to a waterbody or water dependent habitat. Increase in predicted peak flood level >100mm. Extensive loss of fishery. Calculated risk of serious pollution incident >2% annually. Extensive reduction in amenity value.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm. Partial loss of fishery. Calculated risk of serious pollution incident >1% annually. Partial reduction in amenity value.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm. Minor loss of fishery. Calculated risk of serious pollution incident >0.5% annually. Slight reduction in amenity value.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level. Calculated risk of serious pollution incident <0.5% annually.
Minor Beneficial	Results in minor improvement of attribute quality	Reduction in predicted peak flood level >10mm. Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually.
Moderate Beneficial	Results in moderate improvement of attribute quality	Reduction in predicted peak flood level >50mm. Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually.
Major Beneficial	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm

Table 3 Rating of Significant Environmental Impacts at EIS Stage (NRA)

Importance of Attribute	Magnitude of Importance			
	Negligible	Small Adverse	Moderate Adverse	Large Adverse
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/moderate	Profound/Significant	Profound
High	Imperceptible	Moderate/Slight	Significant/moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate