HYDROLOGICAL & HYDROGEOLOGICAL QUALITATIVE RISK ASSESSMENT

for

PROPOSED DEVELOPMENT AT 42A PARKGATE STREET DUBLIN

Technical Report Prepared For

Stephen Little and Associates

Technical Report Prepared By

Luke Maguire BSc
Environmental Consultant

Our Reference

LM/P247501.0583

Date of Issue

10th December 2024

awnconsulting

The Tecpro Building,
Clonshaugh Business & Technology Park,
Dublin 17, Ireland.

T: + 353 1 847 4220
F: + 353 1 847 4257
E: info@awnconsulting.com
W: www.awnconsulting.com

Cork Office
Unit 5, ATS Building,
Carrigaline Industrial Estate,
Carrigaline, Co. Cork.
T: + 353 21 438 7400
F: + 353 21 483 4606

Document History

Document Reference		Original Issue Date	
LM/P247501.0583		10th December 2024	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

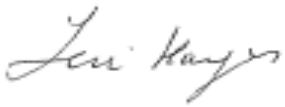
Details	Written by	Approved by
Signature		
Name	Luke Maguire	Teri Hayes
Title	Environmental Consultant	Director Water Services
Date	10th December 2024	10th December 2024

TABLE OF CONTENTS

Figures

Tables

1.0 INTRODUCTION

1.1 Background

AWN have been requested by Stephen Little and Associates Ltd to carry out a Hydrological and Hydrogeological Qualitative Risk Assessment for a proposed large-scale mixed-use residential and commercial development located at the former Hickey's site, 42A Parkgate Street, Dublin 8, circa 7.2km west of the Irish Sea.

The existing development site area is a circa 0.82 hectares previously developed brownfield site which comprises approximately 95% existing roof and hardstanding areas and contains / is occupied by a number of low-rise buildings which are to be demolished for the proposed enabling works.

The site is located adjacent to the River Liffey, the fronting abuts onto Parkgate Street to the north and Heuston Station to the south. The subject development is bounded to the southeast Wolfe Tone Quay and by Transport Infrastructure Ireland to the west. The Proposed Development is largely surrounded by a mixture/combination of low density residential properties, commercial and industrial land

The topography of the site is characterised by a gentle slope/gradient in elevation from northeast to southwest with minor localised undulations. Ground elevation levels across the site range from approximately 3.5mOD to 5.5mOD, with the higher elevated area located in the northeast and the low-lying area at the southwest corner of the site (https://en-ie.topographic-map.com, 2024).

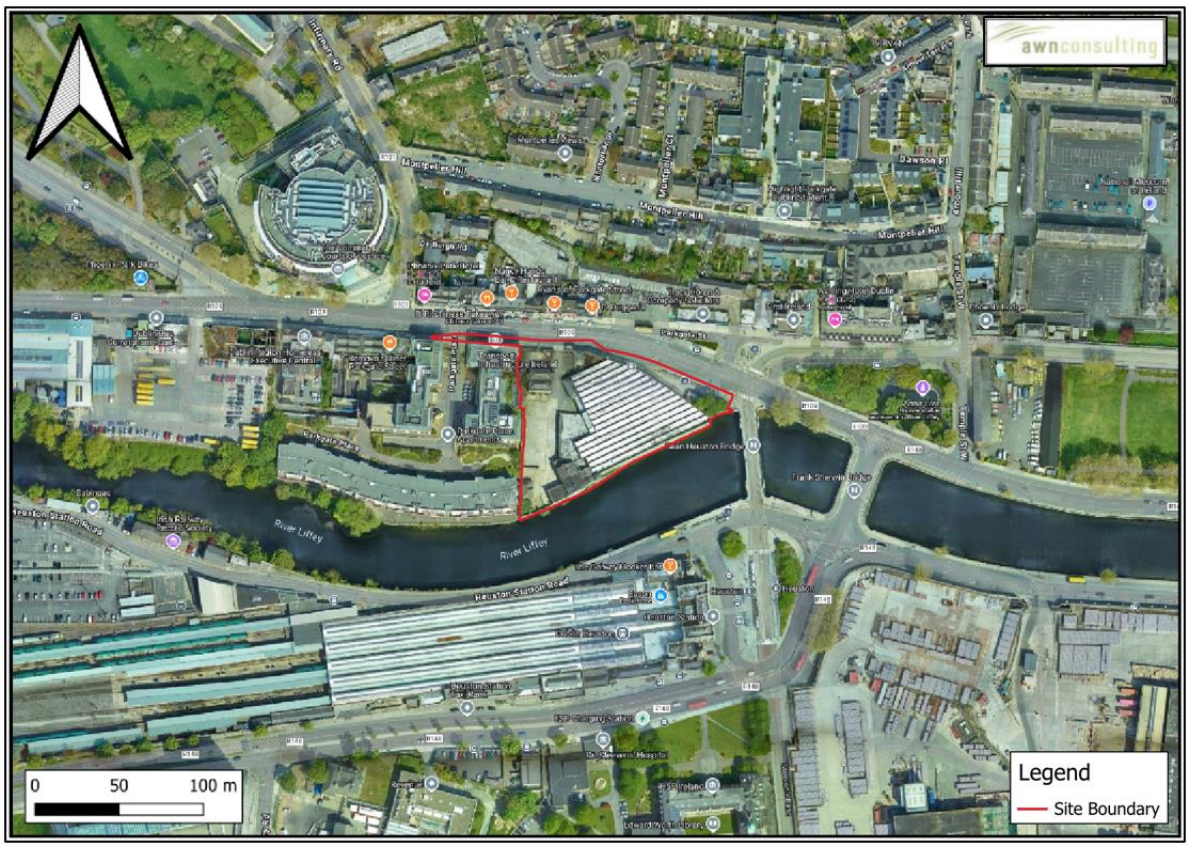


Figure 1.1* Site *location map.

The Proposed Development consists of Large-scale Residential Development comprising mixed use residential, community and commercial redevelopment, accommodated in 2no. blocks (Block B1 and Block C) ranging in height from 8 to 13

storeys with basement and undercroft, and including: 316no. apartments (178no. 1-bed units and 138no. 2-bed units) with private balconies/terraces; co-working/community/cultural space available for public hire; ground level retail. And all associated and ancillary demolition, conservation, landscaping and site development works including bicycle parking; car parking; public open space; communal open space; 2no. new pedestrian site entrances at Parkgate Street, connecting to proposed public plaza and the proposed riverside amenity walkway; 1no. new vehicular access via Parkgate Street to surface areas at western edge of the site. All at No. 42A Parkgate Street, Dublin 8 (Protected Structures on site).

A surface water drainage strategy has been developed by ARUP Consulting Engineers. Sustainable drainage systems will be employed into the design with surface water run-off from the development discharging through a minimum of a two-stage treatment train process prior to discharge by gravity to the River Liffey.

It should be noted that the foul peak effluent discharge, calculated for the Proposed Development as 8.47 l/s would equate to 0.076% of the licensed discharge at Ringsend WWTP [peak hydraulic capacity].

The CEMP will ensure rainfall and all stormwater during construction 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.

The potential impacts on the receiving water environment considered are:

- The management of foul, surface water run-off and accidental oil leaks during construction phase.
- Connection to foul sewer and stormwater sewer during operation. Due to the nature of the Proposed Development, it has been assumed that there will be no bulk oil storage during the operational phase.

1.2 Hydrological Setting

The Proposed Development site is located within the former Eastern River Basin District (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 nearest surface water receptor is the Liffey Estuary Upper (WFD Code: IE_EA_090_0400; which is located along the southern boundary of the Proposed Development site. This transitional waterbody flows eastwards and in turn becomes the Liffey Estuary Lower transitional waterbody circa 2.8km downstream (hydrological distance), before ultimately discharging to Dublin Bay approximately 7.2 km east (linear distance) from the subject site. As mentioned above, this bay hosts Natura 2000 Sites (such as South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC & North Dublin Bay SAC).

The existing drainage systems on the site are mainly separate with the surface water system discharging unrestricted into the River Liffey and the foul system into the existing sewerage network on Parkgate Street. The remaining existing site localised roof areas discharges to a combined 450mm sewer on Parkgate Street.

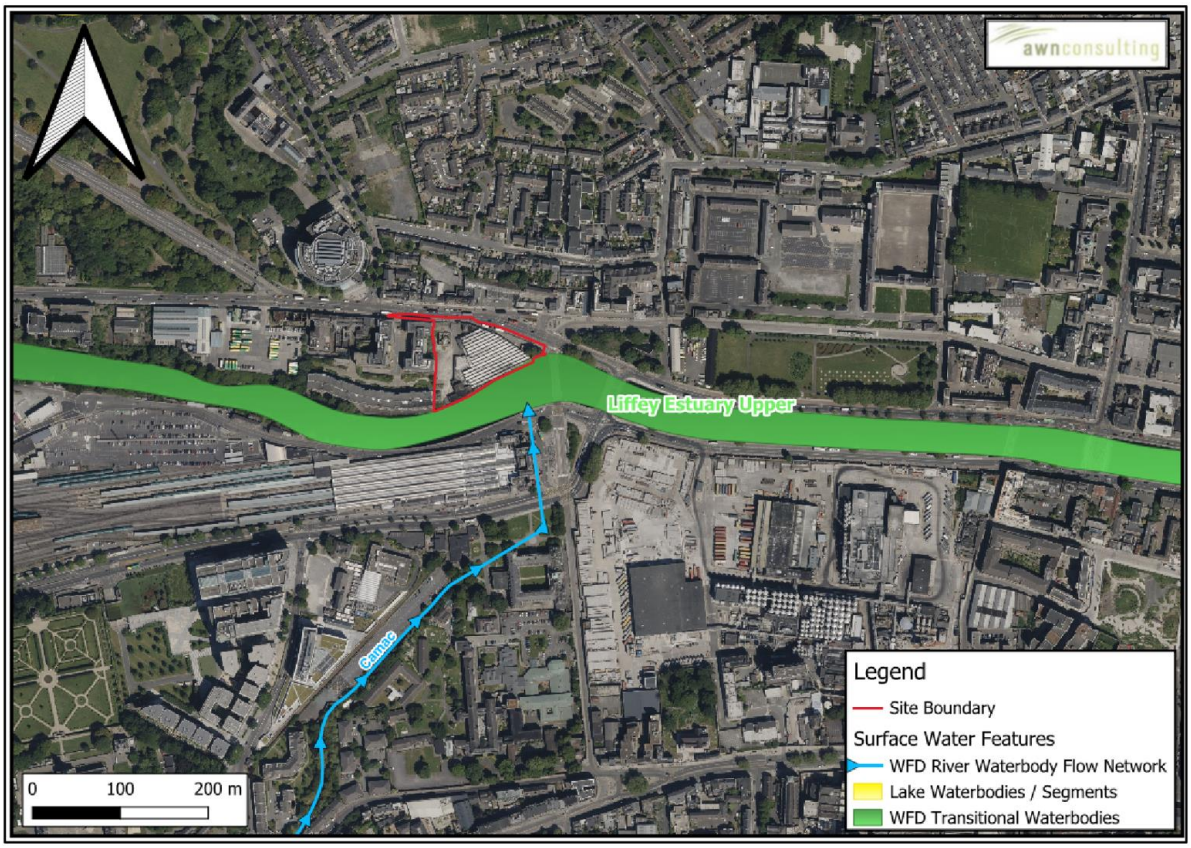


Figure 1.2: Local Hydrological Environment in the context of the site (EPA, 2024).

A review of the EPA (2024) on-line database indicates, there are no NPWS protected areas in the immediate vicinity of the Proposed Development site. The Natura 2000 Sites within Dublin Bay which is c. 7.2 Km to the east of the site include South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC & North Dublin Bay SAC.

The site currently has a direct hydrological connection / linkage with the Dublin Bay and its associated designated SPA/SAC/pNHA sites through overland flow to the Liffey Estuary. There would be an indirect discharge to Dublin Bay waterbody from the Proposed Development site through the stormwater site drainage which outfalls directly into the Liffey Estuary as described in Section 1.4 below

There would be an indirect discharge to Dublin Bay from the Proposed Development site through the foulwater site drainage which is treated at Ringsend WwTP prior to discharge at Dublin Bay as described in Section 1.4 below.

Refer to figure 1.3 below which displays / depicts the designated portected Natura 2000 conservation sites in the context of the subject development site.

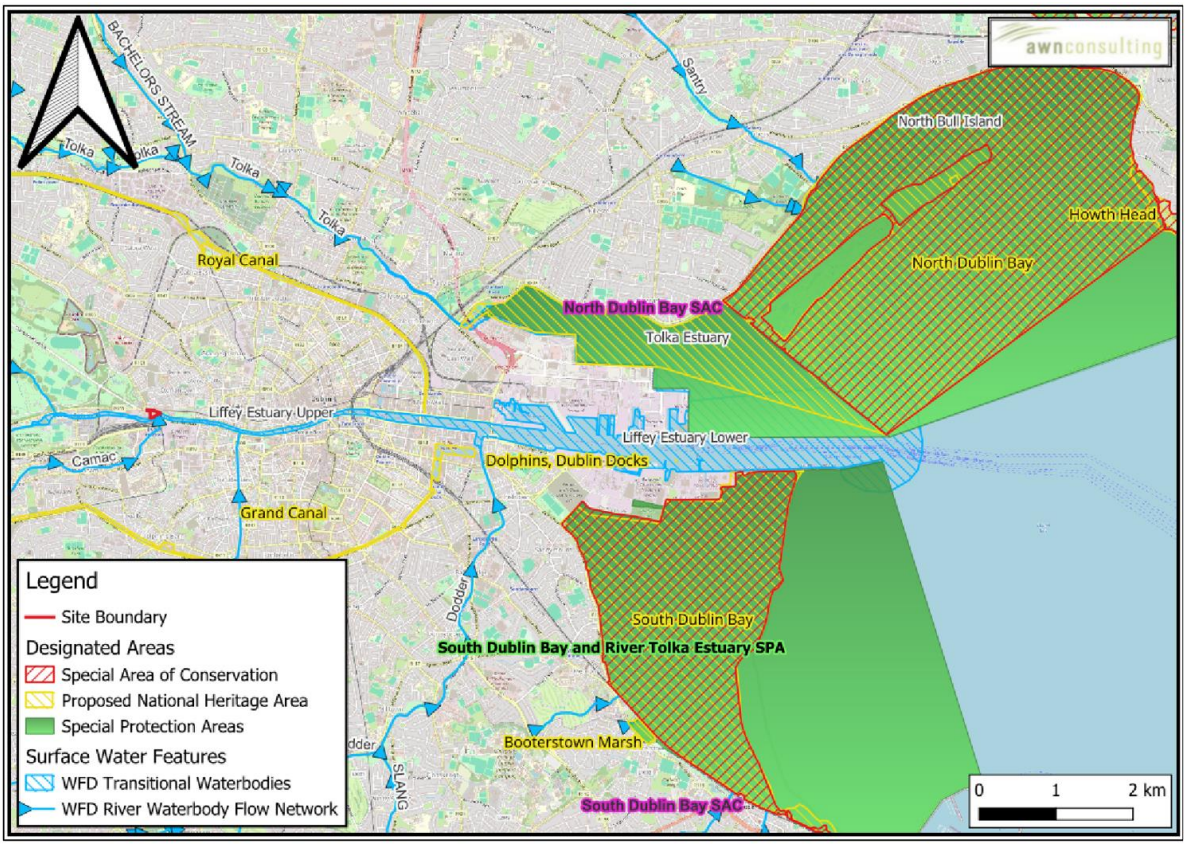


Figure 1.3: Designated Natura 2000 conservation (SAC/SPA) areas (EPA, 2024).

1.3 Objective of Report

The scope of this desktop review is to assess the potential for any likely significant impacts on receiving waters and protected areas during construction or post development once operational/occupied, in the absence of taking account of any measures intended to avoid or reduce harmful effects of the proposed project (i.e. mitigation measures).

In particular, this review considers the likely impact of construction and operational impacts (construction run-off and domestic sewage) from the Proposed Development on water quality and overall water body status within the Liffey Estuary transitional waterbody and Dublin Bay (SPA/SAC/pNHA) where the relevant European Sites are located, including bathing water locations. The assessment relies on information regarding construction and design provided by Arup (2024), as follows:

- Drainage and Watermain Report. 42A Parkgate Street. ARUP (2024);
- Construction Environmental Management Plan, 42A Parkgate Street. ARUP (2024).

This report was prepared by Luke Maguire, and Teri Hayes.

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 (Geology, Hydrology, Hydrogeology, Geochemistry, Geophysics, Climate and Environmental studies) from Trinity College University of Dublin and has worked on a range of developments including Residential developments, pharmaceutical plants, medical device facilities, ICT facilities and energy projects.

Luke has experience in contaminated soil analysis, basement impact assessments, bulk excavations and largescale dewatering processes. Additionally, Luke has gained experience in Environmental Impact Assessment (EIAR), stage 1 & 2 Flood Risk Assessments, Hydrological Risk Assessment , and WFD Assessment Reporting and has worked in multiple Environmental monitoring disciplines such as Chemical Wastewater, Ground Gas, Surface Water, and Groundwater Monitoring at numerous sites across Dublin.

Teri Hayes is a hydrogeologist with over 25 years of experience in water resource management and impact assessment. She has a Masters in Hydrogeology and is a former President of the Irish Group of the Association of Hydrogeologists (IAH) and has provided advisory services on water related environmental and planning issues to both public and private sector bodies. She is qualified as a competent person as recognised by the EPA in relation to contaminated land assessment (IGI Register of competent persons www.igi.ie). Her specialist area of expertise is water resource management eco-hydrogeology, hydrological assessment and environmental impact assessment.

1.4 Description of Current and Proposed Drainage

Existing and Proposed Surface Water Drainage

The existing drainage systems on the site are mainly separate with the surface water system discharging unrestricted into the River Liffey and the foul system into the existing sewerage network on Parkgate Street. There is an existing 450mm combined sewer on Parkgate Street discharging in an easterly direction into a 750mm combined sewer on Wolfe Tone Quay, which eventually discharges into the Municipal Wastewater Treatment Plant at Ringsend. Approximately 6% of the existing roof area of the site discharges to the existing sewer on Parkgate Street.

Construction Phase

The CEMP outlines the planned management of water during construction. During construction, 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.

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, Resource Manager, and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

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 will be employed on site during the construction phase. All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

A temporary positive drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff by the site during construction. Accordingly, all drainage will be treated prior to discharge from site. No direct discharges made to storm or land drains where there is potential for cement or residues in discharge.

Existing surface water drainage on the site discharges to the River Liffey. It is envisaged that one of the existing surface water discharge points shall be maintained for the duration of the works, subject to Local Authority agreement. All other existing surface water discharge points to the River Liffey shall be decommissioned.

Sediment tanks / basins and silt traps shall be incorporated and installed before any major site grading takes place.

The employment of good construction management practices will minimise the risk of pollution of soil, surface water and groundwater. The following site-specific measures will be implemented for the Proposed Development which will include:

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding; and
- Run-off will be controlled to minimise the water effects in outfall areas; and
- All concrete mixing and batching activities will be located in areas away from watercourses and drains; and
- Site clean-ups, use of disposal bins, etc.) will be implemented on the site.

In order to prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Development. The contractor's sanitary facilities will discharge into the existing combined sewer on Parkgate Street or as otherwise agreed with Dublin City Council.

Shallow dewatering may be required for local excavations, such as pile cap or lift pit locations. Any local dewatering is to be discharged to the River Liffey by agreement with the Local Authority and will include necessary treatment as required, such as silt traps and settlement tanks. Alternatively, dewatering may be reinjected to the subsurface through a number of wells or injection points across the site. Similar treatment measures will be adopted prior to reinjection.

Operational Phase

The development will be serviced by completely separate foul and surface water drains connecting to the receiving systems on Parkgate Street and the River Liffey, respectively. The proposed Surface Water Management Plan (ARUP, 2024) is in line with the key requirements of the Dublin City Council Drainage Division Planning & Development Control Section.

Sustainable drainage systems will be incorporated into the design with surface water run-off from the development discharging through a minimum of a two-stage treatment train process prior to discharge by gravity to the River Liffey.

The drainage systems shall be designed in accordance with Part H of the Building Regulations, EN 752: Drain and Sewer Systems outside Buildings, The Greater

Dublin Regional Code of Practice for Drainage Works, Uisce Éireann's Code of Practice for Water and Wastewater and to DCC Drainage Division and Uisce Éireann requirements.

Surface water run-off from the development shall drain by gravity and discharge to the River Liffey. Sustainable drainage systems will be incorporated into the development and will include green roofs, raingardens, filter strips, filter drains, rainwater harvesting for irrigation purposes and surface water treatment systems. Surface water run-off will go through a minimum of two-stage treatment prior to discharge by gravity to the River Liffey. The proposed SuDS measures will reduce the quantity and improve the quality of water discharging into the receiving system.

Run-off from roofs and paved areas will discharge unrestricted to the River Liffey above the 1 in 200-year tidal event plus 20% climate change of 3.82m OD. A non-return valve will be located at the outfall headwall in agreement with DCC Drainage Division.

The site-specific design surface water management plan comprises of SuDS surface water measures / techniques which serve to provide a degree of treatment comprised of a minimum of two stage treatment train approach including interception and primary and secondary treatment of surface water runoff prior to discharge to the River Liffey. This stormwater management and treatment approach is in line with The CIRIA SuDS Manual C753 and includes the following features:

- Greenroof
- Bio-retention Raingarden / raised planters
- Rainwater harvesting
- Filter Drains
- Filter strips
- Catchpits
- Proprietary treatment system

The inclusion and incorporations of the above listed SUDS will reduce run-off volumes and improve run-off water quality, with discharge rates from site being restricted and reduced and provide a surface water management / treatment train and promote source control throughout the development while also providing attenuation storage at source.

The Block C1 located in the southwest portion/corner of the site is permitted to include a basement and RC water tanks for water storage.

The proposed surface water system is simulated for the critical 1 in 100 year return including climate change. There are no attenuation systems in place as the proposed surface water system discharges unrestricted to the River Liffey above the 1 in 200-year tidal event plus 20% climate change of 3.82m OD.

A limited attenuation volume will be provided by the greenroof drainage layer system below the geotextile filter fabric, which will provide a time delay between the rainfall event and discharge into the system thereby reducing peak flow discharge rates (up to 40% of the average annual rainfall can be absorbed and released back into the atmosphere by transpiration and evaporation).

Filter strips proposed in the Private Amenity landscaped area between Blocks B1 and C will provide interception from impermeable areas before discharging into the filter drains or surface water drainage system. This additional measure will promote sedimentation and filtration thereby providing primary treatment. Therefore, rainfall

run-off from paved areas discharging into the filter strips will go through treatment train including interception and primary treatment

Raingardens proposed adjacent to Block B1 will allow surface water run-off from paved areas to pond temporarily before filtering through vegetation and underlaying soil before discharge into the system. Paved areas at ground level will discharge into the proposed raingardens. The raingardens will serve as a bioretention system providing interception as the water discharges through plants, shrubs and landscape medium. The planters will provide temporary retention for the 1 in 1-year event in the shallow depressions. Sand based material circa 750 – 850mm deep will be used to filter the water passing through. Further filtration will be provided by the geotextile filter membrane prior to discharge into the surface water system.

Refer to figure 1.4 and 1.5 overleaf and the ARUP Drainage and Watermain Planning Report (2024) for further details.

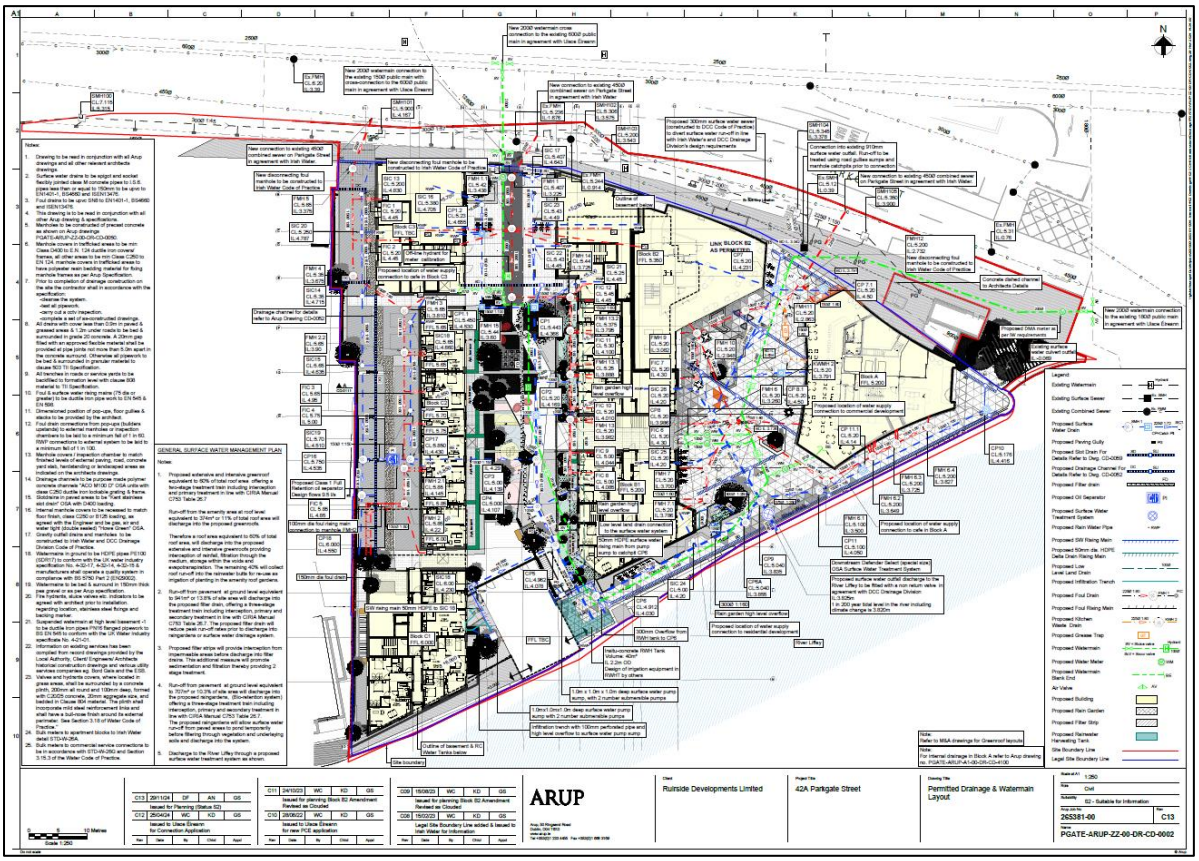


Figure 1.4 Extract from Surface Water Management Plan depicting permitted drainage and watermain layout (Source: ARUP, 2024)

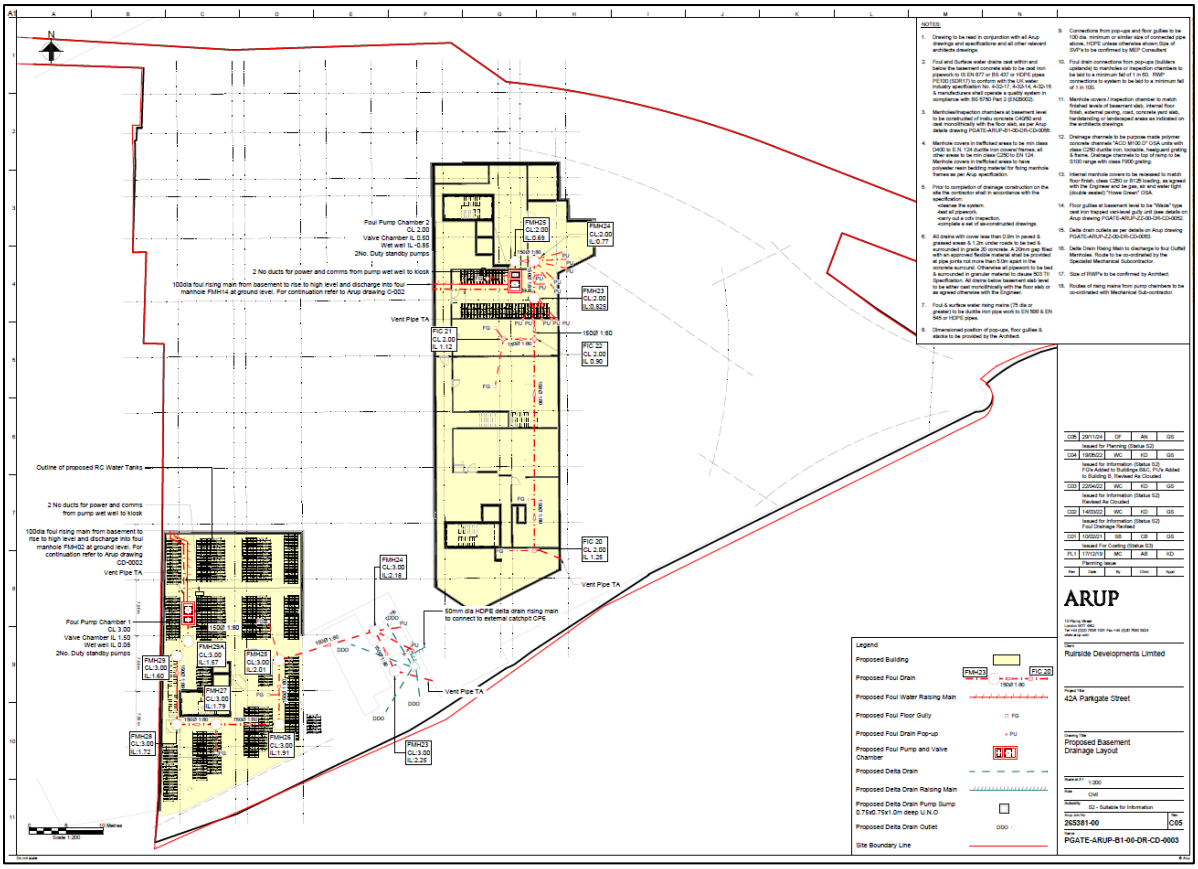


Figure 1.5 Extract from Surface Water Management Plan depicting proposed basement drainage layout (Source: ARUP, 2024).

Flood Risk

A Flood Risk Assessment was conducted by ARUP (2020) for the subject development site which derived the following findings and conclusions:

Examination of recorded past / historic flood events as detailed on floodinfo.ie (OPW) indicates no records of historical flooding within the site boundary. However, there are two recorded flood events in the vicinity of the site which have been identified from an examination of the OPW Flood Hazard Mapping website (www.floodmaps.ie)19. These flood events occurred at the Ashling Hotel approximately 100m from the Proposed Development and at the Bridgewater Quay Apartments approximately 400m from the Proposed Development. Flood depths for both these events was between 0.1m and 0.5m.

Predicted flood hazard mapping for fluvial flood events shows that the majority of the development site is at low risk of flooding from this source (i.e., Flood Zone C- Where the probability of flooding is low- less than 0.1% AEP or 1 in 1000 for both river and coastal flooding). However, there is a risk of fluvial and tidal/coastal flooding from the River Liffey along the southern boundary of the site. This is indicated in the fluvial flood extents maps produced as part of Eastern CFRAM study which show that a minor portion of the site bordering the River Liffey lies within Flood Zone A (Where the probability of flooding is highest (greater than 1% AEP or 1 in 100 for river flooding and 0.5% AEP or 1 in 200 for coastal flooding and where a wide range of receptors would be vulnerable).

An examination of the OPW's *National Preliminary Flood Risk Assessment (PFRA)* mapping indicated that there is potential for pluvial flooding in the study area.

The site is in close proximity to the River Liffey and the site investigation conducted during August and September 2019 identified hydraulic connectivity between the groundwater levels and the tidal levels. As the existing ground levels are higher than the tidal levels the risk of groundwater flooding is considered to be low.

As per the OPW Flood Risk Management Guidelines a Justification Test for the development was required and was undertaken as part of the Flood Risk Assessment.

The Plan-Making Justification Test relevant to the Proposed Development was completed and passed as part of the Strategic Flood Risk Assessment (SFRA) undertaken for the *Dublin City Council Development Plan 2016 - 2022*.

The Development Management Justification Test requires that two criteria must be met which are outlined in Section 5.15 of the *Planning System and Flood Risk Management Guidelines for Planning Authorities*. With regards to the first criterion, the applicable policy context is the *Dublin City Council Development Plan 2016-2022*. The development plan as adopted took full account of the OPW Guidelines and incorporated the SFRA as part of the appraisal of the plan. It can therefore be states that this criterion is passed. With regard to the second criterion, it is considered that it has also been met by virtue of the fact that:

- The Proposed Development will not increase the risk of flooding at adjacent sites; and

- The Proposed Development includes measures to minimise flood risk (listed / stated below).

Surface water within the site will be managed through the provision of a treatment system. The SuDS system will restrict runoff discharge from the site and provided a degree of attenuation as per the governing development plan guidelines.

In summary the majority of key areas of the proposed residential dwellings are located within Flood Zone C, however the following mitigation measures and management of residual flood risk render the site suitable for the development of mixed-use residential units / dwellings:

- The 1 in 200 year (0.5% AEP) maximum tidal water level at the site is 3.27mOD. As this level is higher than the 1% AEP fluvial water level, it will be used as the flood level for the site.

- The design will account for climate change by considering a 500mm increase in the water levels in the estuary as per the Mid-Range Future Scenario.

- A freeboard of 300mm has therefore been adopted as part of the study.

- Given the 200-year design tidal level at our site of interest was estimated to be 3.27mOD. Allowing for climate change and freeboard the recommended design level of the Proposed Development can be calculated as:

  3.27mOD (200-year tidal level) + 0.50m (climate change allowance) + 0.30m (freeboard allowance) = ***4.07mOD*** *Malin*

- It is proposed to set the ground floor levels of the proposed buildings of the development between 5.2mOD and 6.0mOD, which corresponds to between 1.13m and 1.93m above the minimum recommended site flood defence level. Accordingly Flood risk to the buildings of the Proposed Development is therefore remote and The development therefore complies with the OPW Planning Guidelines.

- The basement area of the Proposed Development will be split into two sections: an undercroft in the southwest corner of the site at a level of 3.00mOD, and a basement in Block B1 with a floor level of 3.0mOD. To mitigate against the risk of groundwater ingress the basement will be fully sealed and tanked to ensure water cannot penetrate it.

- The internal riverwalk (at the southwest corner of the site) will be graded to facilitate the future tie into the existing boardwalk along the River Liffey at a level of approximately 2.9mOD. The proposed internal riverwalk slopes and steps down from an access and egress point at the ground level public plaza which is at a level of approximately 4.9mOD.

- It can be seen from the figure that a section of the internal river walk is below the 1 in 200-year tidal flood level of 3.27m and the recommended site flood defence level of 4.12mOD. The access and egress point to the building at this location, however, is at a level of 4.9mOD and is not a main access and egress point to the building. It is proposed that a security door be installed at this point which can be closed during a flood event. No other access and egress routes to the site will be compromised during flood events.

- Pluvial flood risk: In the event of an extreme rainfall event and/or blockage of the drainage system of the site, the capacity of the drainage system could be exceeded, leading to surface water ponding at the site. There is a risk of surface water ingress to the proposed buildings as existing ground levels on Parkgate Street generally fall in a south-easterly direction towards the buildings. In order to mitigate against surface water ingress to the Proposed Development, all doorways and entrance points to the building should be raised above external ground levels by 150mm. Subsequently, a minor fall should also be provided on all paved surfaces to direct surface water to the drainage system, or a drainage channel should be installed across the entrance point to collect surface water. Further mitigation actions have been taken at the development site to mitigate against the risk of pluvial flooding. An agreement has been reached with Uisce Éireann and Dublin City Council for the development to redirect some of the gullies on Parkgate Street from the combined sewer and into a new surface water sewer which will run through the site to discharge directly into the River Liffey. This will remove part of the surface runoff from the combined sewer and will relieve the drainage system in the area, reducing the risk of pluvial flooding in the vicinity of the site.

Existing and Proposed Foul Water Drainage

There is an existing 450mm combined sewer on Parkgate Street discharging in an easterly direction into a 750mm combined sewer on Wolfe Tone Quay, which eventually discharges into the Municipal Wastewater Treatment Plant at Ringsend.

The drainage systems shall be designed in accordance with Part H of the Building Regulations, EN 752:Drain and Sewer Systems outside Buildings, The Greater Dublin Regional Code of Practice for Drainage Works, Uisce Éireann's Code of Practice for

Water and Wastewater and to DCC Drainage Division and Uisce Éireann requirements. DCC drainage construction standards in accordance to the Greater Dublin Regional Code of Practice for Drainage Works shall be applied to all surface water infrastructure proposed in the public way.

Foul drainage from the development shall be drained by a separate system to that of the surface water drainage system. Foul drainage from the development will drain by gravity and discharge to the existing 450mm foul sewer on Parkgate Street.

Foul drainage from basement level within Blocks B and C (which is part of the consented scheme) shall drain by gravity to a central pumping chamber and be pumped via a rising main to an external foul manhole prior to discharge by gravity to the existing 450mm foul sewer on Parkgate Street. Incidental run-off from the basement car park will discharge through a Class 2 full retention petrol interceptor before discharge via a pump chamber and rising main to the external foul gravity drainage system. Foul outfall manholes will be constructed to Uisce Éireann's Code of Practice.

The foul drainage system will be designed to take discharges from residential apartments, small office, retail, café/restaurants and gym. Drainage from kitchen/canteen facilities will discharge through a grease separator designed in accordance with IS EN 1825 Part 1 and Part 2 and / or to Uisce Éireann requirements.

Three new foul connections will be required to the existing sewerage system on Parkgate Street in agreement with Uisce Éireann. Based upon details submitted as part of the original COF application, reference CDS23006543, Uisce Éireann confirmed that subject to a specific condition, a connection to the foul sewer network can be facilitated. Uisce Éireann Confirmation of Feasibility Statement outlined the condition to construct a new surface water sewer on Parkgate Street to reduce the equivalent surface water peak flows from their network, to accommodate the Proposed Development. A connection application has been submitted to Uisce Éireann in May 2024, reference CDS2300654301, and awaiting connection agreement to be put in place for the development.

Arup has carried out an equivalent surface water area catchment design and has agreed with Dublin City Council Drainage Division and Uisce Éireann for the construction of a new surface water sewer on Parkgate Street to remove surface water run-off from Uisce Éireann network.

2.0 ASSESSMENT OF BASELINE WATER QUALITY, RIVER FLOW AND WATER BODY STATUS

A reliable Conceptual Site Model (CSM) requires an understanding of the existing hydrological and hydrogeological setting. This is described below for the Proposed Development site and surrounding hydrological and hydrogeological environs.

2.1 Hydrological Catchment Description

The Proposed Development site is located within the former Eastern River Basin District (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).

According to the EPA maps, the Proposed Development site as defined by the EPA nomenclature (EPA, 2024) lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and Tolka_SC_020 sub-catchment (WFD Id 09_4) (EPA, 2024). The Liffey Estuary Upper flows along the southern site boundary. This

transitional waterbody flows eastwards and in turn becomes the Liffey Estuary Lower transitional waterbody circa 2.8km downstream (hydrological distance), before ultimately discharging to Dublin Bay approximately 7.2 km east (linear distance) from the subject site. As mentioned above, this bay hosts Natura 2000 Sites (such as South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC & North Dublin Bay SAC).

The Environmental Protection Agency (EPA, 2024) on-line mapping presents the available water quality status information for water bodies in Ireland. Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses.

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.

With reference to the site setting, there is no active EPA surface waterbody monitoring station downstream from the site along the Liffey Estuary Upper and Liffey Estuary Upper. In relation to the Proposed Development site, the nearest (active) surface waterbody EPA monitoring station is:

- '*LIFFEY - 0.2 km d/s Chapelizon Br (Lynch's Lane)*' (EPA Code: RS09L012360), which is located in the LIFFEY_190 waterbody adjacent to Chapelizod Industrial Estate c. 3.4 km upstream (west) of the Proposed Development site.

The most recent water quality status recorded by the EPA (2022) at this monitoring station (EPA Code: RS09L012360) is classified as Q3 Poor which denotes a moderately polluted waterbody. This Value is based primarily on the relative proportions of pollution sensitive to tolerant macroinvertebrates (the young stages of insects primarily but also snails, worms, shrimps etc.) resident at a river site.

In accordance with the WFD, each river catchment within the former RBD was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each.

In addition to the biological assessment method outlined above the EPA also classified water bodies in accordance with the WFD water quality status. Rivers, lakes, estuaries, and coastal waters can be awarded one of five statuses: High, Good, Moderate, Poor, Bad. Groundwater has just two statuses – Good and Poor.

The River Liffey belongs to the LIFFEY_190 WFD surface waterbody (European code: IE_EA_09L012360) and is currently classified by the EPA as having *'Poor'* WFD water quality status (2016-2021 period) and is '*At risk of not achieving good status*'. The main pressures identified on the LIFFEY_190 are associated with the presently 'poor' ecological (and biological invertebrate) status or potential.

The Liffey Estuary Upper transitional waterbody (European Code: IE_EA_090_0400) is currently classified by the EPA as having '*Good*' WFD water quality status (2016-2021 period) and is under '*Review*' in relation to the Risk WFD score. The main

pressures identified on the Liffey Estuary Upper are associated with the presently 'Moderate' hydromorphological and biological conditions.

The Liffey Estuary Lower transitional waterbody (European Code: IE_EA_090_0300) is currently classified by the EPA as having '*Moderate*' WFD water quality status (2016-2021 period) and is '*At risk*' of not achieving good status. The main pressures identified on the Liffey Estuary lower are associated with the presently '*Moderate*' ecological and biological status or potential in relation to phytoplankton and invertebrates.

The foul effluent from the site will discharge to the public sewer network and will be treated at the Ringsend Water Wastewater Treatment Plant (WWTP, D0034-01) prior to subsequent discharge to Dublin Bay. This WWTP is required to operate under an EPA licence and meet environmental legislative requirements as set out in its licence. There will also be indirect hydrological connection to Dublin Bay through the foul water discharge which will be treated off site at Ringsend (WWTP).

2.2 Aquifer Description & Superficial Deposits

Inspection of Mapping from the Geological Society of Ireland (GSI, 2024 http://www.gsi.ie, accessed on 06-12-2024), indicates the bedrock geology of the site and the immediate surrounding area is dominated by the Lucan Formation (code CDLUCN) which comprises of Dark limestone & shale (`calp). The GSI database does not indicate any geological (tectonic) faulting traversing the site or in the vicinity of subject development.

The GSI database presently lists no karst features in the immediate vicinity of the subject site and significant or extensive karstification would not be expected in this type of limestone.

The GSI also classifies the principal aquifer types in Ireland as:

- Lk - Locally Important Aquifer - Karstified
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Rkd - Regionally Important Aquifer (karstified diffuse)

The bedrock aquifer underlying the site according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map is classified as a (*Ll*) *'Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones'.*

The site is also underlain by a *(Lg) Locally important gravel aquifer* (refer to figure 2.1 below).

The Proposed Development is within the '*Dublin GWB*' groundwater body (Ground Waterbody Code: IE_EA_G_008) and is classified under the WFD Status 2016-2021 (EPA, 2024) as having '*Good status'*. The WFD Risk Score system (3rd cycle) for this GWB is under 'review'.

Figure 2.1 Aquifer Classification (source: GSI, 2024)

The Quaternary geological period extends from around 1.5 million years ago to the present day. This can be further sub-divided into the Pleistocene Epoch, which covers the Ice Age period, and which extended up to 10,000 years ago and the Holocene Epoch, which extends from that time to the present day.

The GSI Teagasc / subsoil database public data viewer (2024) mapping database of the quaternary sediments in the area of the subject site indicates the principal subsoil type in the area comprises Urban / Made Ground. Adjacent lands to the south of the site are underlain by alluvial deposit sediments related to the course of the Liffey Estuary. Lands to immediately north of the site are underlain by Till derived from limestones (TLs).

Aquifer / groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/ fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of/ or of mixtures of peat, sand, gravel, glacial till, clays or silts).

The GSI displays varied aquifer vulnerability across the extent of the site. The GSI currently denotes a ‘Low’ (L) vulnerability classification underlaying the northern portion of the Proposed Development site thereby indicating an overburden (subsoil) thickness ranging from +10m of low permeability soils. The mapping database indicates the aquifer vulnerability underlying the southern portion of the site is classified as ‘Moderate’ (M) vulnerability, which corresponds to 5-10m of low

permeability subsoil / overburden thickness. This shows that the aquifer is moderately to well protected by Made Ground and gravels. Refer to Figure 2.2 below.

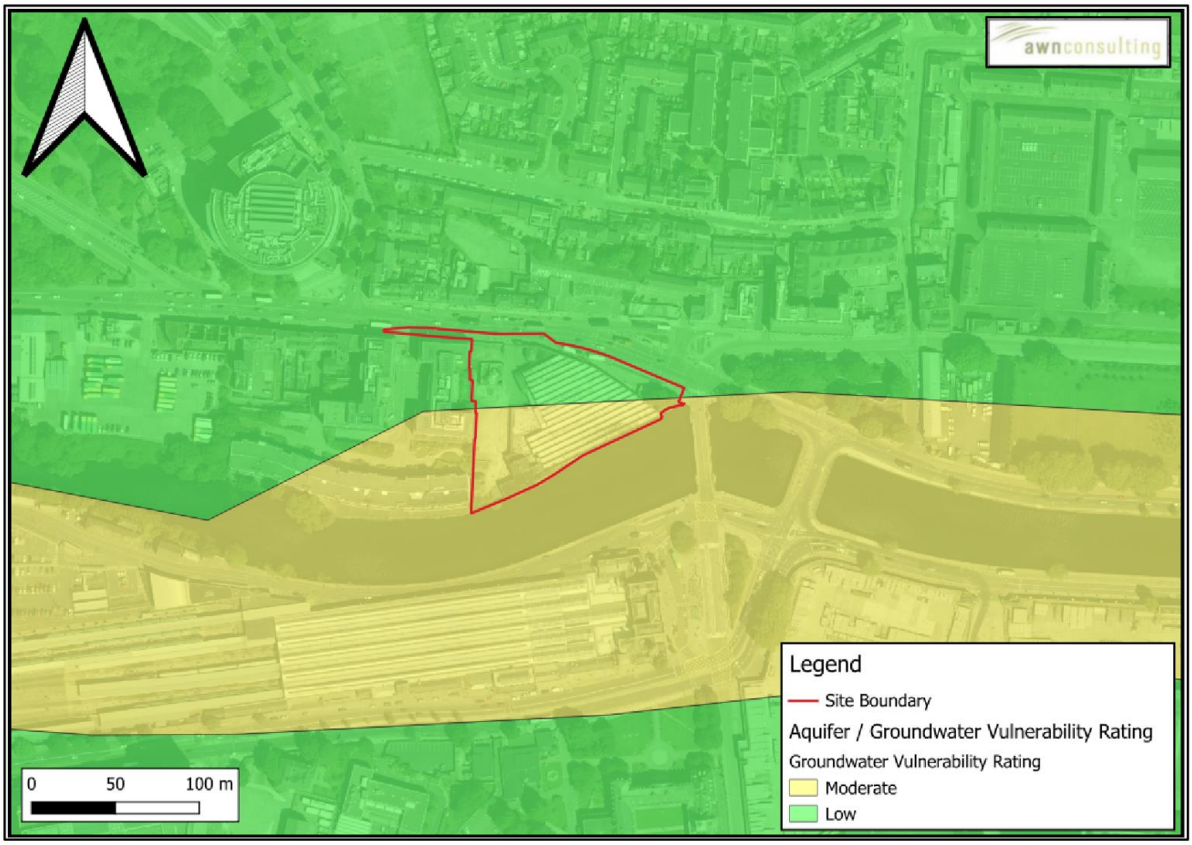


Figure 2.2 Aquifer Vulnerability (source: GSI, 2024)

3.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is developed based on a good understanding of the hydrological and hydrogeological environment, plausible sources of impact and knowledge of receptor requirements. This in turn allows possible Source Pathway Receptor (S-P-R) linkages to be identified. If no S-P-R linkages are identified, then there is no risk to identified receptors.

3.1 Assessment of Plausible Sources

Potential sources during both the construction and operational phases are considered. For the purposes of undertaking the potential of any hydrological/ hydrogeological S-P-R linkages, all potential sources of contamination are considered *without taking account of* any measures intended to avoid or reduce harmful effects of the proposed project (mitigation measures) i.e. a worst-case scenario. Construction sources (short-term) and operational sources (long-term) are considered below.

<u>Construction Phase</u>

The following potential sources are considered plausible risk scenarios for the proposed construction site:

(i) Hydrocarbons or any hazardous chemicals will be stored in specific bunded areas. Refuelling of plant and machinery will also be carried out in bunded areas to minimise risk of any potential being discharged from the site. As a worst-case

scenario, a rupture of a 1,000-litre tank to ground is considered in this analysis which disregards the effect of bunding. This would be a single short-term event.

(ii) Leakage may occur from construction site equipment. As a worst-case scenario an unmitigated leak of 300 litres is considered. This would be a single short-term event.

(iii) Use of wet cement is a requirement during construction. Run-off water from recent cemented areas will result in highly alkaline water with high pH. As this would only occur during particular phases of work this is again considered as a single short-term event rather than an ongoing event.

(iv) Construction requires soil excavation and removal. Unmitigated run-off could contain a high concentration of suspended solids and contaminants such as hydrocarbons during earthworks, given the presence of contamination beneath the site according to site investigations. These could be considered intermittent short-term events, i.e. on the basis that adequate mitigation measures which are already incorporated in the Construction Environmental Management Plan (CEMP) fail.

(v) During the excavations for the development foundations, shallow dewatering is expected. In the absence of mitigation, rainfall run-off and dewatering water during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, or downstream infrastructure or watercourses. In addition to the unintentional spillages of the primary sources of contaminants mentioned above, there is also a risk that rainfall run-off and dewatering water from excavation activities becoming contaminated by these sources. If not appropriately mitigated through containment, management, and monitoring, this could result in the mobilisation of these contaminants, leading to more widespread impacts on the surrounding environment. Any local dewatering prior to the bulk excavation is to be discharged to the River Liffey by agreement with the Local Authority and will include necessary treatment as required, such as silt traps and settlement tanks. Alternatively, dewatering may be reinjected to the subsurface through a number of wells or injection points across the site. Similar treatment measures will be adopted prior to reinjection.

<u>Operational Phase</u>

The following sources are considered plausible post construction:

(i) The Proposed Development does not require any bulk chemical storage and therefore the potential for water quality impact is negligible.

(ii) Leakage of petrol/ diesel fuel may occur from individual cars in parking areas; run-off may contain a worst-case scenario of 70 litres for example. Any corresponding risk here would be mitigated by the interception and attenuation provided by previously mentioned SuDS features .

(iii) The surface water (stormwater) drainage system follows SuDS measures that include green roofs, bio-retention Raingarden / raised planters, rainwater harvesting, RC water tanks (basement), filter drains, filter strips, catchpits and a proprietary treatment system, which is required considering the urban nature of the development and density / open space requirements (among others).

This system has been designed in order to reduce runoff quantity and increase water quality / amenity value of discharge prior to outfall into the Liffey Estuary. As such the potential for silt laden runoff is low. It should be noted that the worst-case scenario (70 litres) under consideration here disregards the effect of SuDS.

(iv) SUDS features such as rain gardens / bioretention systems, filter drains and filter strips will provide a surface water treatment train and promote source control throughout the development while also providing a degree of attenuation at source before flow outfalls to the natural water system, the Liffey Estuary.

(i) The Proposed Development will be fully serviced with separate foul and surface water drainage 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 predominant residential nature of the Proposed Development. Foul drainage from basement level within Blocks B1 and Block C shall drain by gravity to a central pumping chamber and be pumped via a rising main to an external foul manhole prior to discharge by gravity to the existing 450mm foul sewer on Parkgate Street. Incidental runoff from the basement car park will discharge through a Class 2 full retention petrol interceptor before discharge via a pump chamber and rising main to the external foul gravity drainage system. Foul outfall manholes will be constructed to Uisce Éireann's Code of Practice.

(ii) The foul discharge from the site will join the public sewer and will be treated at the Uisce Eireann Ringsend Wastewater Treatment Plant (WWTP) prior to subsequent discharge to Dublin Bay. This WWTP is required to operate under an EPA licence (D0034-01) and meet environmental legislative requirements as set out in such licence.

3.2 Assessment of Pathways

The following pathways have been considered within this assessment with impact assessment presented in Section 3.4:

The potential for offsite migration due to any construction discharges is low as there is no significant pathway in the aquifer and all construction water is passed through treatment installed prior to discharge offsite

(i) Vertical migration pathway to the underlying limestone is a moderate potential risk due to the '*High*' aquifer vulnerability present at the site resulting from the presence of a locally important gravel aquifer which reduces the aquifer protection (increased permeability) from any localised diesel/ fuel oil spills during either construction or operational phases, providing a pathway to the Liffey Estuary through the gravels. The site is also underlain by a Dark limestone & shale (`Calp) which is a '*Locally Important Aquifer*' characterised by discrete local fracturing with little connectivity rather than large, connected fractures which are more indicative of Regional Aquifers. As such, flow paths are generally local to short distances.

(ii) There is a hydrological linkage for construction and operation run-off or any small hydrocarbon leaks from the site to the Liffey Estuary. The Liffey Estuary Upper flows east, in turn connecting downstream to the Liffey Estuary Lower, which ultimately discharges to the Dublin Bay. However, as the stormwater discharge is fully treated by the permitted SuDS features / mechanisms

attenuation, silt remediation/treatment and hydrocarbon/petrol interceptor (operational basement level within Blocks B1 and Block) during construction and operation, there is no potential for water quality SI threshold concentrations to be exceeded at the Liffey Estuary or Dublin Bay.

(iii) There is no 'direct' pathway for foul sewage to any receiving water body. There is an indirect pathway for foul sewage through the foul sewer network which ultimately discharges to the Uisce Eireann Ringsend WWTP prior to final discharge to the Dublin Bay post treatment. 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 Dublin Bay.

3.3 Assessment of Receptors

The receptors considered in this assessment include the following:

(i) Underlying limestone locally important bedrock aquifer;
(ii) Underlying Locally important gravel aquifer
(iii) Liffey Estuary Upper & Liffey Estuary lower transitional waterbodies; and hydrologically connected Dublin Bay

Other nearby conservation / protected Sites within the region of the subject development were excluded from the assessment due to their distance from the subject site, the potential loading of contaminant from the site (risk scenarios presented in Section 3.1), significant dilution factor through its pathway or lack of hydrological connectivity. The Royal Canal pNHA is located approximately 2.6 km north of the site at the point of closest proximity, however this watercourse is a lined feature and therefore, no hydrological connection / linkage exists between the Ryal Canal pNHA and the development site.

3.4 Assessment of Source Pathway Receptor Linkages

The Proposed Development site has a hydrological pathway or connection to any of the above listed areas of protection and conservation which are located downgradient of the development site.

There is no direct open-water pathway between the Proposed Development and Liffey Estuary, Dublin Bay and the Irish Sea. However, there is an indirect pathway with Dublin Bay through the local surface water drainage design which directly discharges into the Liffey Estuary Upper, albeit via an extremely lengthy distance / pathway and a significant dilution factor downstream in the estuaries. Should any silt-laden stormwater from construction or hydrocarbon-contaminated water from a construction vehicle leak/tank leak manage to enter into the mentioned watercourse, the suspended solids will naturally settle within the surface water drainage treatment train and mentioned Liffey Estuary; however, in the event of a worst case hydrocarbon leak of 1,000 litres this would be diluted to background levels (water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019) by the time the surface water drainage reaches the nearest Natura 2000 Sites (Dublin Bay, 7.2 km downgradient).

The Proposed Development has an indirect hydrological connection / linkage to the Liffey Estuary WFD Transitional Waterbodies and Dublin Bay (and its associated natura 2000 sites) via the local drainage and permitted surface water design, albeit the source pathway linkage is over a significant distance allowing for significant attenuation and large dilution factor downstream within the river catchment, estuary

and Dublin Bay. The proposed surface water drainage discharges into the Liffey Estuary Upper, which in turn merges / joins with the Liffey Estuary Upper downstream and ultimately discharges to Dublin Bay and subsequently the Irish Sea.

Table 3.1 below summarises the plausible pollutant linkages (S-P-R) considered as part of the assessment and a review of the assessed risk is also summarised below.

Construction Phase

Existing surface water drainage on the site discharges to the River Liffey. It is envisaged that one of the existing surface water discharge points shall be maintained for the duration of the works, subject to Local Authority agreement. All other existing surface water discharge points to the River Liffey shall be decommissioned.

Any local dewatering prior to the bulk excavation is to be discharged to the River Liffey by agreement with the Local Authority and will include necessary treatment as required, such as silt traps and settlement tanks. Alternatively, dewatering may be reinjected to the subsurface through a number of wells or injection points across the site. Similar treatment measures will be adopted prior to reinjection.

The potential for impact on the aquifer is moderate based on the absence of any bulk chemical storage on site. The overburden thickness and potential for moderately deep bedrock could have an impact on the aquifer in the event of a significant spill. Any silt-laden stormwater from construction or hydrocarbon-contaminated water from a construction vehicle leak/tank leak will be treated on site. No exceedance of water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019) is likely by the time the stormwater reaches the nearest Natura 2000 Sites which would involve a large dilution factor.

Operational Phase

During operation, the potential for a release is low as there is no bulk fuel/chemical storage and no silt laden run-off. Stormwater will be collected by a drainage system which includes SuDS measures that provide a degree of attenuation and a treatment system prior to discharge off-site (albeit these measures have been disregarded for this analysis). In addition, the potential for hydrocarbon discharge is quite minimal based on an individual vehicle (70 litres) leak being the only source for hydrocarbon release. However, even if the operation of the proposed SuDS are excluded from consideration, there is no likely impact above water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019) in the worst case scenarios described above at section 3.2 and there will be no significant effect on any European site. The volume of contaminant release is low and combined with the significant attenuation and treatment through SuDS measures and class 2 interceptors (basement carpark) on site and within the stormwater drainage network, hydrocarbons will dilute to background levels with no likely impact above water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019 at any Natura 2000 sites.

No perceptible risk – Even without treatment at Ringsend WWTP, the average effluent discharge (8.47 l/s which would equate to 0.076% of the peak hydraulic capacity at Ringsend WWTP), would not impact on the overall water quality within Dublin Bay and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive). 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 (Ringsend WWTP AER, 2022). The foul effluent would not have a measurable impact on the overall water quality within Liffey Estuary (Upper / Lower), Dublin Bay or the Irish Sea and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive).

A number of design measures 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 class 2 hydrocarbon/petrol 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 treatment) to the existing local drainage which comprises the Liffey Estuary Upper and from basement carpark the public sewer through interceptors. No further mitigation measures are to be required during the operational phase.

As there are no likely exceedances of water quality thresholds at the Liffey Estuary Upper / Liffey Estuary Lower transitional waterbodies or the Dublin Bay *(South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC & North Dublin Bay SAC).*

No likely significant cumulative impacts are predicted in relation to the hydrological environment as a result of the Proposed Development in combination with other existing, permitted or proposed developments. All the operational cumulative developments are required to manage discharges in accordance with S.I 272/2009 and 77/2019 amendments. As such, there will be no cumulative impact to surface water quality and therefore there will be no cumulative impact on the Surface Waterbody Status. The operation of the Proposed Development is concluded to have a long-term, imperceptible significance with a neutral impact on surface water quality.

It can be concluded that the in-combination effects of surface water arising from the Proposed Development taken together with that of other permitted developments will not be significant based on the in-combination low potential chemical and sediment expected loading. Therefore, based on the loading considered in the worst case scenarios mentioned in Section 3.1 above during construction and operation phases, there is subsequently no potential for impact on downgradient Natura 2000 habitats (those within and associated with the Dublin Bay, such as South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC & North Dublin Bay SAC).

The Proposed Development design incorporates and employs sustainable urban drainage system and uses green roofs, rain gardens / bioretention areas, filter drains, filter strips, rainwater harvesting, petrol / hydrocarbon interceptors (latter restricted basement designated carpark areas / zones) and basement RC Water tanks (storage). Therefore, the risk of accidental discharge has been adequately addressed through design.

The assessment has also considered the effect of cumulative events, such as release of sediment laden water combined with a hydrocarbon leak on site (1,000 litres as a worst case scenario during the construction phase). As there is treatment train and silt remediation measures incorporated on site during the construction / operational phase and further assimilation and dilution factor between the site and the Natura 2000 sites downstream of the site (South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC & North Dublin Bay SAC), it is concluded that no perceptible impact on water quality would occur at the Natura 2000 sites as a result of the construction or operation of this Proposed Development.

- All new developments are required to comply with SuDS which ensures

management of run-off rate within the catchment of Ringsend WWTP.

Table 3.1 below presents a summary of the risk assessment undertaken.

Source	Pathways	Receptors considered	Risk of Impact
Construction Impacts (Summary)			
Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle (1,000 litres worst case scenario).	Bedrock protected by 5-10m to +10m overburden. Migration via the gravel aquifer is moderate-high. Migration within weathered/ less competent limestone is low (limestone has discrete local fracturing rather than large connected fractures).	Limestone bedrock aquifer (Locally Important Limestone bedrock aquifer and locally important gravel aquifer)	Moderate risk of vertical migration through the underlying gravel aquifer to the Liffey Estuary. Low risk to Limestone bedrock aquifer and through poorly connected fracturing within the limestone rock mass (Locally Important Limestone bedrock aquifer).
Discharge to ground of runoff water with High pH from cement process/ hydrocarbons from construction vehicles/run-off containing a high concentration of suspended solids	Indirect pathway through surface drainage to Dublin Bay (distance source-receptor: circa 7.2 Km)	Dublin Bay *(associated* SAC/SPA/pNHA *sites)*	Potential for local temporary exceedances of statutory water quality standards at outfall (Liffey Estuary Upper). However, no perceptible risk to water requirements for the Natura 2000 sites in Dublin Bay based on loading and high / significant level of dilution downstream in the Liffey Estuary Upper, Liffey Estuary Lower and on the distance of c. 7.2 Km between the source and Dublin Bay.
Operational Impacts (Summary)			
Foul effluent discharge to sewer	Indirect pathway to Dublin Bay through public sewer and WWTP	Dublin Bay (associated SAC/SPA/pNHA sites)	No perceptible risk – Ringsend WWTP is a licenced facility, required to manage discharge in accordance with EPA requirements.
Unmitigated discharge to ground of hydrocarbons from car leak (70 litres worst case scenario)	Pathway through surface water drainage to Liffey Estuary and Dublin Bay downstream (distance source-receptor 7.2 Km)	Dublin Bay (associated SAC/SPA/pNHA sites)	No perceptible risk – Given the negligible loading of contaminant, distance between the source and Dublin Bay is c. 7.2 Km and significant dilution factor downstream in the Liffey Estuary and Dublin Bay will ensure any released hydrocarbons are at background levels (i.e., with no likely impact above water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019).

Table 3.1 Pollutant Linkage Assessment (without mitigation)

4.0 CONCLUSIONS

A conceptual site model (CSM) has been prepared following a desk top review of the site and surrounding environs. Based on this CSM, plausible Source-Pathway-Receptor linkages have been assessed assuming an absence of any measures intended to avoid or reduce harmful effects of the proposed project (i.e. mitigation measures) in place at the Proposed Development site.

There is no direct source pathway linkage between the Proposed Development site and any Natura 2000 sites (i.e. South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC & North Dublin Bay SAC). There is indirect source pathway linkage from the Proposed Development through the surface water drainage design which discharges into the Liffey Estuary Upper transitional waterbody. There is also an indirect connection through the foul sewer which will eventually discharge to the Ringsend WWTP and ultimately discharges to Dublin Bay and the associated hydrologically connected South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC & North Dublin Bay SAC. The future development has a peak foul discharge that would equate to 0.076% of the licensed discharge at Ringsend WWTP (peak hydraulic capacity).

Even disregarding the operation of design measures including an attenuation system and petrol interceptors on site, it is concluded that there will be imperceptible impacts from the Proposed Development to the water bodies due to emissions from the site stormwater drainage infrastructure to the wider drainage network. It should be noted the proposal also includes and employs SuDS which serve to provide a degree of attenuation and petrol interceptors in the basement car parking areas as part of best practice project design, and these features will provide additional filtration from the site to the drainage network.

It is concluded that there are no pollutant linkages as a result of the construction or operation of the Proposed Development which could result in a water quality impact which could alter the habitat requirements of the Natura 2000 sites within Dublin Bay or Liffey Estuary (Upper and Lower counterparts) transitional waterbodies.

Finally, and in line with good practice, appropriate and effective mitigation measures will be included in the construction design, management of construction programme and during the operational phase of the Proposed Development. With regard the construction phase, adequate mitigation measures will be incorporated in the Construction Environmental Management Plan (CEMP). These specific measures will provide further protection to the receiving soil and water environments. However, the protection of downstream European sites is in no way reliant on these measures, and they have not been taken into account in this assessment.

During construction and operation phases there is a source pathway linkage between the Proposed Development site and Dublin Bay (SPA/SAC's). However, there is no potential for exceedance of water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019) as there is permitted treatment and a degree of attenuation (from SuDS features) on site during construction and operation.

As previously mentioned, the foul (wastewater) peak flow effluent / discharge, calculated for the Proposed Development as 8.47 l/s would equate to 0.076% of the licensed discharge at Ringsend WWTP [peak hydraulic capacity]. The Ringsend WwTP has capacity for this proposed foul effluent (AER, 2022). 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 (Ringsend WwTP AER, 2022). As such this flow would not have a measurable impact on the overall water quality within Dublin Bay and the Irish Sea and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive).

It is concluded that there is a low pollutant linkages as a result of the construction or operation of the Proposed Development which could result in a water quality impact which could alter the habitat requirements of the Natura 2000 sites within and associated with Dublin Bay.

5.0 REFERENCES

- EPA, (2024). Environmental Protection Agency. Available on-line at: https://gis.epa.ie/EPAMaps/ [Accessed: 20-03-2024];
- GSI (2024). Geological Survey of Ireland; Available on-line at: http://www.gsi.ie [Accessed: 24-03-2024];
- NPWS (2024). National Parks & Wildlife Service. Protected Site Register. Available on-line at: http://webgis.npws.ie/npwsviewer/ [Accessed: 23-09-2024];
- Drainage and Watermain Planning Report. Parkgate Street Blocks B1 & C, Dublin 8. ARUP (2024);
- Construction Environmental Management Plan, Parkgate Street Blocks B1 & C, Dublin 8. ARUP (2024);
- Site Specific Flood Risk Assessment, Parkgate Street Blocks B1 & C, Dublin 8. ARUP (2024);
- Annual Environmental Report (AER), Ringsend (D0034-01) Wastewater Treatment Plant, Uisce Éireann (UÉ), 2022;
- River Basin Management Plan for Ireland 2018-2021;
- Draft River Basin Management Plan for Ireland 2022-2027;
- Dublin City Development Plan 2022-2028;
- 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
- Ireland Topographic Map, Elevation, Terrain. https://en-ie.topographic-map.com (2024).