HYDROLOGICAL QUALITATIVE RISK ASSESSMENT

for

PROPOSED RESIDENTIAL DEVELOPMENT AT BELGARD SQUARE EAST, BELGARD ROAD AND BLESSINGTON ROAD, TALLAGHT, DUBLIN 24

Technical Report Prepared For

Ravensbrook Limited

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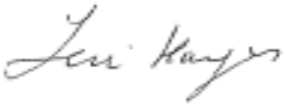
Signature		
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1.0 INTRODUCTION

1.1 Background

AWN have been requested by Ravensbrook Ltd to carry out a Hydrological Qualitative Risk Assessment for a proposed strategic housing development which comprises a mixed-use development including 310 no. “Build-to-Rent” residential apartments, a creche and commercial units (c. 2,289 sqm) on a c. 1.26 ha site at Belgard Square East, Belgard Road and Blessington Road, Tallaght, Dublin 24.

The proposed development will consist of the demolition of existing boundary wall and construction of:

- c. 2,289 sqm of retail/commercial floor space across 10 no. units including retail, restaurant/café and Class 2 financial/professional services and office use, and a crèche (257sqm) at ground and first floor levels;
- 310 no. build to rent residential apartments including 99 no. one bedroom units, 203 no. 2 bedroom units and 8 no. three bedroom units within a part 6 to part 12 no. storey development across 3 blocks over partial basement;
- c. 2,223 sqm of communal external amenity space provided in the form of a ground floor garden and external terraces at fifth, sixth, seventh and eighth floor levels; c. 1,026 sqm of public open space provided in the form of a central courtyard with landscaped areas at site perimeters;
- c. 1,785 sqm of resident support facilities and services and amenities provided at basement, ground and first floor levels;
- Vehicular access to the basement development from a new access point at Belgard Square East;
- A new tertiary route will be provided in the southern part of the site linking Belgard Square East and Belgard Road;
- Provision of 130 no. car parking spaces (including 8 no. club car spaces and 6 no. disabled access spaces) at basement level in addition to 5 no. set down spaces (4 no. serving creche) and 1 no. disabled access space at ground level, layby on Belgard Square East, 6 no. motorcycle spaces and a total of 763 no. bicycle parking spaces;
- Provision of 4 no. Ø0.3m microwave link dishes to be mounted on 2 no. steel support pole affixed to lift shaft overrun, all enclosed in radio friendly GRP shrouds, together with associated equipment at roof level at Block B;
- Provision of 3 no. ESB substations with switch rooms and plant rooms at basement level, hard and soft landscaped areas, bin and bicycle stores, public lighting, attenuation, green roof, plant at roof level, service connections and all ancillary site development works.

1.2 Hydrological Setting

The site is currently a brownfield site consisting primarily of hardstanding surfacing. No existing buildings are present on site. The surrounding environment can be described as predominantly industrial, commercial and residential. According to the EPA river network (EPA maps, https://gis.epa.ie/EPAMaps/Water accessed on 13-04-2022), the nearest surface water receptor are the Tymon River and the Jobstown Stream, which are located c. 370 m to the northeast and c. 410 m to the south of the site respectively (Refer to Figure 1.1 below).

The Tymon River crosses the Tymon Park and becomes the Poddle River downstream c. 2.7 km northeast of the site. The Poddle River eventually discharges into the River Liffey in Dublin Centre c. 9 km to the northeast of the site. The Jobstown Stream is a tributary of the Dodder River to which joins it at the Dodder

Valley Park c. 2 km to the southeast of the proposed development site. The Dodder River ultimately discharges into the River Liffey at Ringsend c. 11 Km to the northeast of the site.

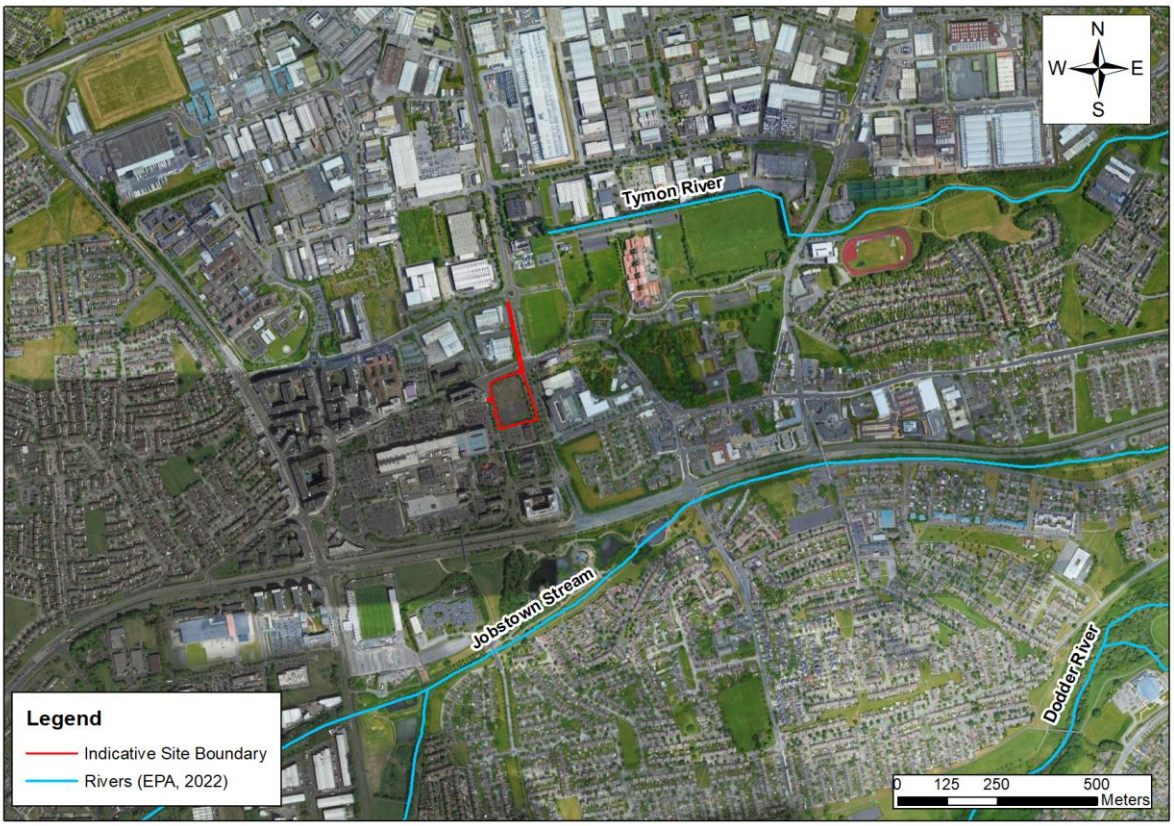

Figure 1.1 *Site Location in relation to local drainage*

A review of the EPA (2022) on-line database indicates there are no NPWS protected areas in the immediate vicinity of the Proposed Development site. The nearest Natura 2000 Sites with potential hydrological link are South Dublin Bay Special Area of Conservation (SAC)/ Special Protection Area (SPA)/ proposed Natural Heritage Area (pNHA) sites which are c. 11 km to the east of the site. There will be an indirect discharge to the Dublin Bay waterbody from the Proposed Development site through the stormwater and foul water site drainage as described in Section 1.3 below.

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 development, 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 operation impacts (construction run-off and domestic sewage) from the proposed development on water quality and overall water body status within the Dublin Bay (where the relevant European Sites are located), including bathing water locations. The assessment relies on information regarding construction and design provided by Ravensbrook as follows:

- Engineering Services Report. Proposed Residential Development. Belgard Square, East, Tallaght, Dublin 24. CS Consulting, May 2022;

- Flood Risk Assessment. Proposed Residential Development. Belgard Square, East, Tallaght, Dublin 24. CS Consulting, May 2022.

This report was prepared by Marcelo Allende (BSc BEng), and Teri Hayes (BSc MSc PGeol EurGeol). Marcelo is a Water Resources Engineer with over 15 years of experience in environmental consultancy and water resources studies. Marcelo is an Environmental Consultant with AWN Consulting, a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI).

Teri 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 Drainage

The nearest surface water receptor is the Tymon River (WFD code: IE_EA_09P030800; EPA segment code 09_1029) which, according to the EPA maps, begins its course c. 370m to the northeast of the proposed development site (refer Figure 1.1 above). The Jobstown Stream (WFD code: IE_EA_09D010620; EPA segment code 09_369) is located c. 410 m south of the site.

There is a 225mm diameter public storm drain on Belgard Road to the east of the development site. An existing 1,050mm diameter public storm sewer is present on Belgard Square East to the east of the subject development. A spur from this sewer is present in the north of the subject development site, in proximity to the site's boundary with Blessington Road. These surface water sewers flows southerly towards the Dodder River.

The development consists of a surface water drainage network which will discharges into the 1,050 mm diameter sewer on Belgard Square East. The drainage will be attenuated in two dedicated areas of the projected basement. An internal 225mm surface water sewer shall connect the two attenuation rooms.

Outflow from the site will be limited to greenfield runoff rates by utilising vortex flow control devices (or similar approved) and petrol interceptors before discharging to the existing surface water sewer. SuDS devices and the attenuation system will be provided to cater for up to a 1-in-100 year rainfall event and 20% climate change. The appropriate SuDS features included in this proposal include green roofs, local tree pits and landscape areas.

With regard to the foul water, at present the existing public drainage network is located in Belgard Square East to the west of the subject development site. In addition, SDCC drainage records indicate a 225mm diameter foul sewer flowing north to south adjacent to the site.

All foul effluent generated from the proposed development from the upper floors shall be collected in separate foul pipes and flow under gravity, via the new 225mm sewer, to the existing 225mm diameter foul sewer on Belgard Square East to the west of the site via a new connection.

The foul sewer eventually discharges to the Ringsend Waste Water Treatment Plant (WWTP) where it is treated and ultimately discharges into South Dublin Bay. The WWTP and pumping station operate under an EPA licence D0034-01.

According to the Flood Risk Assessment carried out by CS Consulting (2022), all proposed residential development is located in Flood Zone C (i.e., where the probability of flooding from rivers is less than 0.1% or 1 in 1000 years – probability of fluvial flooding is low risk); therefore, the proposed development is not at risk of inundation from any of the modelled flood events, including the climate change and residual risk scenarios.

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 lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and River Dodder sub-catchment (WFD name: Dodder_SC_010, Id 09_16) (EPA, 2022).

The Environmental Protection Agency (EPA, 2022) on-line mapping presents the available water quality status information for water bodies in Ireland. The Tymon River belongs to the Poddle_010 WFD surface waterbody which has a ‘Poor’ Status (EPA, 2022) and its WFD risk score is ‘At risk of not achieving good status’. The Jobstown Stream (Dodder_040 WFD surface waterbody) has a ‘Poor’ WFD status and is also ‘At Risk of not achieving good status’. This poor status is related to its biological status (invertebrate); all chemical conditions have been classified as ‘good’. The most recent quality data (2019) for the Dodder River also indicate that it is ‘Unpolluted’ in the vicinity of the site (Old Bawn Bridge).

The Coastal Waterbody Dublin Bay has a WFD status (2013 – 2018) of ‘Good’ and a WFD risk score of ‘Not at risk’. The ecological status (which comprises biological and chemical status) of transitional and coastal water bodies during 2013-2018 for Dublin Bay is classed as ‘Good’. The most recent surface water quality data for the Dublin Bay on trophic status of estuarine and coastal waters indicate that they are ‘Unpolluted’ (based on *Water Quality in 2020*, EPA, 2021)’. Under the 2015 ‘Trophic Status Assessment Scheme’ classification of the EPA, ‘Unpolluted’ means there have been no breaches of the EPA’s threshold values for nutrient enrichment, accelerated plant growth, or disturbance of the level of dissolved oxygen normally present.

As the Proposed Development will have no additional stormwater run-off, when compared with the current situation, during a stormwater event, the development will, therefore, have no measurable impact on the water quality in any overflow situation at Ringsend WWTP apart from a minor contribution from foul sewage. As explained in Section 3.4 below, the maximum contribution of foul sewage (peak flow of 10.98 l/s) from the Proposed Development is 0.099% of the peak hydraulic capacity at Ringsend WWTP. The proposed stormwater and foul water networks within the site will be entirely independent systems and rainfall will have no impact on foul flows to the Ringsend WWTP.

It should be noted that the bathing status has no direct relevance to the water quality status of the Natura 2000 sites due to rapid mixing and dilution resulting in no measurable change in water quality within the overall water body.

2.2 Aquifer Description and Superficial Deposits

Mapping from the Geological Society of Ireland (GSI, 2022 http://www.gsi.ie, accessed on 13-04-2022) indicates the bedrock underlying the site is part of the Lucan Formation (code CDLUCN) and made up of dark limestone and shale (Calp). The lithological description comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. The beds are predominantly fine-grained distal turbidites in the north Dublin Basin. The formation is intermittently exposed on the coast between Rush and Drumanagh Head. The formation ranges from 300m to 800m in thickness. 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)

Presently, from the GSI (2022) National Bedrock Aquifer Map, the GSI classifies the bedrock aquifer beneath the subject site as a '*Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones*'. The proposed development is within the '*Dublin*' groundwater body (Ground Waterbody Code: IE_EA_G_008) and is classified under the WFD Status 2013-2018 (EPA, 2021) as having '*Good status'*. The WFD Risk Score system for this GWB is under review.

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. The GSI (2022) guidance presently classifies the bedrock aquifer vulnerability in the region of the subject site as '*Moderate*' which indicates a general overburden depth potential of 5-10m. This shows that the aquifer is naturally protected by low permeability glacial clays. The aquifer vulnerability class in the region of the site is presented as Figure 2.1 below.

Figure 2.1 *Aquifer Vulnerability (Source: GSI, 2022)*

The GSI/ Teagasc (2022) mapping database of the quaternary sediments in the area of the subject site indicates the principal subsoil type in the residential area comprises Limestone till Carboniferous (TLs, i.e. Till derived from limestones).

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 during earthworks. 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 foundations, no significant dewatering is expected given the low permeability overburden underlying the site.

Operational Phase

The following sources (or risk scenarios) are considered plausible post construction:

(i) The development site includes car parking areas at the ground level. Leakage of petrol/ diesel fuel may occur from these areas, run-off may contain a worst-case scenario of 70 litres for example. Any corresponding risk here would be mitigated by the interception storage system which comprises permeable paving and filter drains.

(ii) The stormwater drainage system follows SuDS measures, which are composed of green roof, attenuation system, vortex flow restricting devices (Hydrobrake or similar) and petrol interceptors before discharging into the public surface water sewer following the characteristics of a greenfield run-off. It should be noted that the worst-case scenario (70 litres) under consideration here disregards the effect of SuDS and petrol interceptors.

(iii) The development will be fully serviced with separate foul and stormwater sewers which will have adequate capacity for the facility as it was confirmed by Irish Water (refer to Engineering Service Report) and it is required by its licensing requirements. Discharge from the site to the public foul sewer will be sewage and grey water only due to the predominantly residential nature of the proposed development. The foul discharge from the site will join the public sewer and will be treated at the Irish Water 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. It is noted that a planning permission for a new upgrade to this facility was received in 2019 and is currently in the process of construction/ implementation.

This plant operates under an EPA licence (D0034-01) and is currently in the process of being upgraded to a PE of 2.4million to meet the increased demand of the Dublin area. The most recent Annual Environmental Report (AER 2020) shows it is currently operating for a PE peak loading of 2.27million

while originally designed for 1.64million. However, the current maximum hydraulic load (832,269 m^3/day) is less than the Peak hydraulic capacity as constructed (959,040 m^3/day) i.e. prior to any upgrade works.

Irish Water is working to provide infrastructure to achieve compliance with the Urban Wastewater Treatment Directive for a population equivalent of 2.1million in the second half of 2023. When all the proposed works are complete in 2025, the Ringsend Wastewater Treatment Plant will be able to treat wastewater for up to 2.4 million population equivalent.

These upgrade works (described in section 3.4 below) have commenced and comprise a number of phases and are ongoing and expected to be fully completed by 2025.

(iv) There is no bulk fuel or chemical storage included in the development design.

3.2 Assessment of Pathways

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

The potential for offsite migration due to any construction discharges is moderate as there would be pathway through land ditches/ streams within or surrounding the site.

(i) Vertical migration to the underlying limestone is minimised due to the recorded '*Moderate*' vulnerability present at the site resulting in good aquifer protection from any localised diesel/ fuel oil spills during either construction or operational phases. The site is underlain by calcareous shale and limestone conglomerate which is a '*Locally Important Aquifer*'. This aquifer is 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.

(ii) There is no direct hydrological linkage for construction and operation run-off or any small hydrocarbon leaks from the site to South Dublin Bay. There is an indirect connection as stormwater discharges into the Dodder River (c. 1.7 km to the southeast of the site) through the existing drainage infrastructure.

(iii) There is no 'direct' pathway for foul sewage to any receiving water body. There is however an 'indirect pathway' through the public sewer ultimately discharges to the Irish Water WWTP at Ringsend prior to discharge to Dublin Bay post treatment.

3.3 Assessment of Receptors

The receptors considered in this assessment include the following:

(i) Underlying limestone aquifer;
(ii) South Dublin Bay and River Tolka Estuary SPA (site code: 4024), and the South Dublin Bay SAC (0210).

Other Natura 2000 Sites within Dublin Bay that may be hydrologically connected to the proposed development site, but are located further away (North Dublin Bay SAC (site code: 0206) and the North Bull Island SPA (site code: 4006)) 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) and significant dilution through its pathway.

3.4 Assessment of Source Pathway Receptor Linkages

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.

The potential for impact on the aquifer is low based on the absence of any bulk chemical storage on site. The overburden thickness, low permeability nature of till and a lack of fracture connectivity within the limestone will minimise the rate of off-site migration for any indirect discharges to ground at the site. As such there is no potential for a change in the groundwater body status or significant source pathway linkage through the aquifer to any Natura 2000 site.

There is no direct open-water pathway between the site and South Dublin Bay. However, there is an indirect pathway through the stormwater drainage which discharges into the Dodder River. Should any silt-laden stormwater from construction or hydrocarbon-contaminated water from a construction vehicle leak/tank leak manage to enter into the surface water sewer, the suspended solids will naturally settle within the sewer; 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 stormwater reaches the nearest Natura 2000 Sites (South Dublin Bay, c. 11 km downgradient).

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, an attenuation system and oil/ petrol interceptors 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 and interceptor systems 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 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.

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 of any hazardous material 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 (South Dublin Bay, which is located 11 km from the site).

The peak wastewater discharge is calculated at 10.98 l/s (CS, 2022). The sewage discharge will be licensed by Irish Water and will be separated from stormwater on the site, collected in the public sewer, and treated ultimately Irish Water's WWTP at Ringsend prior to discharge to Dublin Bay. As outlined in section 3.1 (iv), upgrade works commenced in 2018 and are expected to be fully completed by 2025. The

upgrade works will result in treatment of sewage to a higher quality than current, thereby ensuring effluent discharge to Dublin Bay will comply with the Urban Wastewater Treatment Directive by Q4 2023.

The project is being progressed in stages to ensure that the plant continues to treat wastewater to the current treatment levels throughout the delivery of the upgrade. The project comprises three key elements and underpinning these is a substantial programme of ancillary works:

- Provision of additional secondary treatment capacity with nutrient reduction (400,000 population equivalent);
- Upgrade of the 24 existing secondary treatment tanks to provide additional capacity and nutrient reduction, which is essential to protect the nutrient-sensitive Dublin Bay area; and
- Provision of a new phosphorous recovery process.

In February 2018, the work commenced on the first element, the construction of a new 400,000 population equivalent extension at the Ringsend Wastewater Treatment Plant. These works are at an advanced stage with testing and commissioning stages expected to be completed in the second half of 2021.

The 2019 planning permission facilitated upgrading works to meet nitrogen and phosphorus standards set out in the licence, which are temporarily exceeded currently. Works on the first of four contracts to retrofit the existing treatment tanks with aerobic granular sludge technology commenced in November 2020. Award of the second contract is due in Q3 2021 and the third and fourth contracts are scheduled to commence in late 2021 and mid 2023 respectively.

The application for the upgrade of the WWTP in 2012 and the revised upgrade in 2018 was supported by a detailed EIAR. As outlined in the EIAR, modelling of water quality in Dublin Bay has shown that the upgrades (which are now currently underway) will result in improved water quality within Dublin Bay. The 2018 EIAR predicts that the improvement in effluent quality achieved by the upgrade will compensate for the increase in flow through the plant. The ABP inspector's report summarises the positive findings of the modelling for the post WWTP upgrade scenario on Dublin Bay water quality in sections 12.3.5 and 12.3.12 of his report and the overall positive impact for human health and the environment in his conclusions in section 12.9.1.

In addition, the EIAR report acknowledges that under the do-nothing scenario "*the areas in the Tolka Estuary and North Bull Island channel will continue to be affected by the cumulative nutrient loads from the river Liffey and Tolka and the effluent from the Ringsend WWTP*", which could result in a deterioration of the biological status of Dublin Bay (Irish Water, 2018). Nevertheless, these negative impacts of nutrient over-enrichment are considered "unlikely" (Irish Water, 2018). This is because historical data suggests that pollution in Dublin Bay has had little or no effect on the composition and richness of the benthic macroinvertebrate fauna. Therefore, the do-nothing scenario predicts that nutrient and suspended solid loads from the WWTP will "continue at the same levels and the impact of these loadings should maintain the same level of effects on marine biodiversity". Therefore, it can be concluded that significant effects on the current status of the European sites within Dublin Bay from the current operation of Ringsend WWTP are unlikely. This conclusion is not dependent upon any future works to be undertaken at Ringsend.

Even without treatment at the Ringsend WWTP, the peak effluent discharge,

calculated for the proposed development as 10.98 l/s (which would equate to 0.099% of the licensed discharge at Ringsend WWTP [peak hydraulic capacity]), would not have a measurable 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). This assessment is supported by hydrodynamic and chemical modelling within Dublin Bay which has shown that there is significant dilution for contaminants of concern (DIN and MRP) available quite close to the outfall for the treatment plant (Ringsend WWTP 2012 EIS, Ringsend WWTP 2018 EIAR; refer to Section 12.4.22, ABP-301798-18 Inspector's report). The most recent water quality assessment of Dublin Bay WFD Waterbody undertaken by the EPA (Water Quality in 2020: An Indicator Report, 2021) also shows that Dublin Bay on the whole, currently has an 'Unpolluted' water quality status (refer to www.catchments.ie).

With regard to bathing waters in Dublin Bay, as mentioned above the Proposed Development will have no impact on the water quality in any overflow situation apart from a minor contribution (0.08% of the peak hydraulic capacity at Ringsend WWTP) from foul sewage.

It should be noted that the Ringsend WWTP upgrade has experienced capacity issues during rainfall events and therefore overflows can occur following periods of heavy rainfall. These overflows occur as a result of the impact on treatment capacity during heavy rainfall events due to surges primarily caused by the historical combined drainage system in Dublin. As the Proposed Development will not contribute any additional stormwater drainage to the WWTP, the development will therefore have no measurable impact on the water quality in any overflow situation.

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 adequate assimilation and dilution between the site and the Natura 2000 sites (Dublin Bay, which is c. 11 km from the site), 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. 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 Dublin, Meath and Kildare areas, which will be discharged into Ringsend WWTP will not be significant having regard to the size of the calculated discharge from the Proposed Development and having regard to the following:

- Recent water quality assessment for Dublin Bay shows that they currently continue to meet the criteria for 'Unpolluted' water quality status (EPA, data until July 2021).
- The Ringsend WWTP upgrade which is currently being constructed will result in improved water quality by Q4 2023 to ensure compliance with Water Framework Directive requirements.
- All new developments are required to comply with SuDS which ensures management of run-off rate within the catchment of Ringsend WWTP.
- The natural characteristics of Dublin Bay result in enriched water rapidly mixing and degrading such that the plume has no appreciable effect on water quality at Natura 2000 sites.

As the Proposed Development will have no additional stormwater run-off during a

stormwater event over and above the current level, surface water run-off from the development in the operational phase will therefore have no impact on the current water quality in any overflow situation at Dublin Bay.

It should also be noted that the bathing status has no direct relevance to the water quality status of the Natura sites due to rapid mixing and dilution resulting in no measurable change in water quality within the overall water body.

In addition, there is no long term discharge planned which could have an impact on the status of the water body. In the scenario of an accidental release (unmitigated leaks mentioned above) there is potential for a temporary impact only which would not be of a sufficient magnitude to effect a change in the current water body status.

Finally, in a worst-case scenario of an unmitigated leak and not considering the operation of the SuDS and interceptor already included in the design, no perceptible risk to any Natura 2000 Sites is anticipated given the distance from source to South Dublin Bay protected areas (c. 11 km). Potential contaminant loading will be attenuated, diluted and dispersed near source area.

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 low permeability overburden. Migration within weathered/ less competent limestone is low (limestone has discrete local fracturing rather than large connected fractures).	Limestone bedrock aquifer (Locally Important aquifer)	Low risk of migration through poorly connected fracturing within the limestone (Locally Important Aquifer) rock mass. No likely impact on the status of the aquifer/off site migration due to low potential loading, natural attenuation within overburden and discrete nature of fracturing reducing off site migration.
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 stormwater drainage to Dublin Bay waterbody (distance source-receptor: 11km)	South Dublin Bay SAC/SPA/pNHA	Potential for local temporary exceedances of statutory water quality standards at outfall. However, no perceptible risk to water requirements for the Natura 2000 sites in Dublin Bay based on loading and high level of dilution in the surface water sewer and on the distance of c. 11 km between the source and Dublin Bay.
Operational Impacts (Summary)			
Foul effluent discharge to sewer	Indirect pathway to Dublin Bay through public sewer	South Dublin Bay SAC/SPA/pNHA	No perceptible risk – Even without treatment at Ringsend WWTP, the average effluent discharge (10.98 l/s which would equate to 0.099% 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).
Unmitigated discharge to ground of hydrocarbons from car leak (70 litres worst case scenario)	Indirect pathway through stormwater drainage to Dublin Bay waterbody (distance source-receptor 11km)	South Dublin Bay SAC/SPA/pNHA	No perceptible risk – taking into account the extent of loading of contaminant, distance between the source and Dublin Bay is c. 11 km and significant dilution in the surface water sewer 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.

During construction and operation phases there is no direct source pathway linkage between the proposed development site and open waters. There is no direct source pathway linkage between the Proposed Development site and any Natura 2000 sites (i.e. South Dublin Bay SAC/SPA/pNHA). There are indirect source pathway linkage from the Proposed Development through the stormwater drainage which discharges into the Dublin Bay and through the foul sewer which will eventually discharge to the Ringsend WWTP and ultimately discharges to South Dublin Bay SAC/SPA/pNHA. The future development has a peak foul discharge that would equate to 0.099% 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 an attenuation system and petrol interceptors 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.

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.

5.0 REFERENCES

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