HYDROLOGICAL & HYDROGEOLOGICAL QUALITATIVE RISK ASSESSMENT

for

WESTERN WAY SHD, 36-40 DOMINICK STREET UPPER, DUBLIN 7 CO. DUBLIN

Technical Report Prepared For

Western Way Developments Ltd

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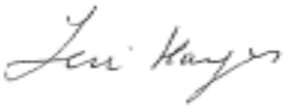
Signature		
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1.0 INTRODUCTION

1.1 Site Location & Hydrological Setting

AWN have been requested by Western Way Developments Ltd. to carry out a Hydrological and Hydrogeological Qualitative Risk Assessment for a proposed Strategic Housing Development located on the site of the disused Hendrons facility at 36-40 Dominick Street Upper, Broadstone, Dublin 7.

The Proposed Development comprises demolition of the existing warehouse buildings and no. 36 Dominick Street Upper, while retaining and incorporating the Hendrons Building into a shared living scheme including neighbourhood uses. The scheme will include 280 no. shared living rooms with an occupancy of 281 no. residents (refer to the schedule of accommodation tabulated below), internal and external amenity space over 5 no. blocks ranging in height from 4 no. storeys to 9 no. storeys, secure bicycle parking, site-wide landscaping, ESB substation and switch-room and site development works all on the 0.33 hectare site.

The entrance to the development is via Dominick Street to an open courtyard between the blocks, with the main entrances to the buildings opening out to the courtyard. There is also a public amenity space proposed on the upper ground floor of the existing Hendrons building, with direct access from Dominick Street Upper.

The development proposes no car parking at the site and does not allow for any residential parking at or near the premises. However, there will be vehicular access via the main entrance for emergency vehicles,

The existing building complex on the site includes a basement. The development will include a lower ground floor level which sits below the level of the adjacent footpath, and a partial basement to house a communication room, plant room and storage space.

The subject site is located c. 1 km to the north of the River Liffey. The surrounding environment can be described as a mix of both commercial setting and residential. Dublin Bay Special Area of Conservtion (SAC)/ Special Protection Area (SPA)/ proposed Natural Heritage Area (pNHA) is located c. 3 km to the east of the site (refer to Figure 1.1 below).

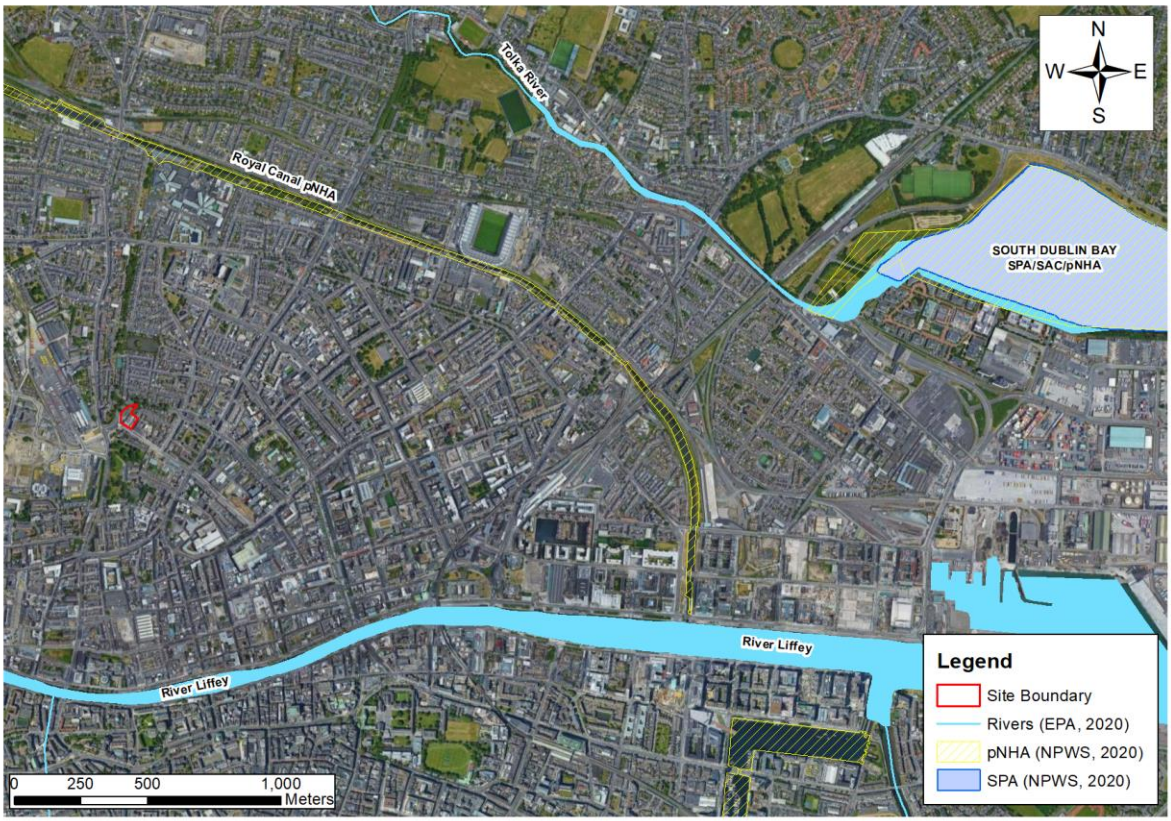

Figure 1.1 Site Location in relation to local drainage and Natura Sites

The nearest surface water receptor is the abovementioned River Liffey. There would be an indirect discharge to this surface water body from the Proposed Development site through the public stormwater sewer which outfalls into the river (following SuDS and an attenuation process) as described in Section 1.3 below.

The Royal Canal pNHA is located approximately 930m to the north of the site. (refer to Figure 1.1 above). The canal is fully lined therefore there is no hydrological connection with this water body.

A review of the EPA (2020) on-line database indicates there are no other protected areas in the vicinity of the Proposed Development site. The nearest protected areas is the mentioned South Dublin Bay SPA/SAC/pNHA which is c. 3km to the east of the site.

1.2 Objective of Report

The scope of this desktop review is to assess the potential for any likely significant impacts on receiving waters within protected areas during construction or post 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 River Liffey and Dublin Bay. The assessment relies on information regarding design provided by Western Way Developments Ltd. as follows:

- Engineering Assessment Report. Proposed Shared Living Strategic Housing Development at Western Way, Dublin 7 (Waterman Moylan Engineering Consultants, November 2020).
- Flood Risk Assessment. Proposed Shared Living Strategic Housing Development at Western Way, Dublin 7 (Waterman Moylan Engineering Consultants, November 2020).
- Screening Report for Appropriate Assessment of shared accommodation development at Constitution Hill, Dublin 7 (Openfield Ecological Services, November 2020);
- Ecological Impact Statement of shared accommodation development at Constitution Hill, Dublin 7 (Openfield Ecological Services, November 2020);
- Ground Investigation Report. 36-40 Dominick Street Upper, Dublin 7 (Ground Investigations Ireland, October 2020).

This report was prepared by Marcelo Allende (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 and a member of the International Association of Hydrogeologists (Irish Group). 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.

1.3 Description of Drainage

The nearest surface water receptors is Dublin Bay Coastal Water Body (WFD code: IE_EA_090_0000), which is located c. 3 Km to the east of the Proposed Development site (refer to Figure 1.1 above). The River Liffey (Transitional Waterbody code IE_EA_090_0400, EPA code: 09L01) is the nearest river to the site and it also discharges into the Dublin Bay coastal water which hosts SAC, SPA and NHA habitats.

The subject site is currently drained to the public sewer network. There is an existing surface water sewer located on Dominick Street Upper which in turn eventually discharges to the River Liffey. Therefore, the site is hydraulically connected to the Dublin Bay.

Proposed Drainage

The Proposed Development will be served by separate foul and stormwater drainage systems. These will discharge off site both foul and storm going to the combined sewer which currently exist within Dominick Street Upper road. The combined sewer discharges to the Dublin Bay following pumping and treatment at Ringsend WasteWater Treatment Plant (WWTP).

The Proposed Development will be served by a piped gravity system. It is proposed to discharge the restricted (following attenuation) surface water runoff from the Proposed Development to an existing public combined sewer network located at Palmerston Place which is connected to the existing sewer on Dominick Street Upper.

The design of the surface water drainage network has taken cognisance of the objectives and guidance contained in the Greater Dublin Strategic Drainage Study (GDSDS). A series of SuDS elements are incorporated in the design, which will comprise treatment via the use of a green roofs (sedum) and permeable paving with pollutant filter. The drainage system will reduce the rate of run-off from the Proposed Development by a combination of an underground StormTech (or similar) surface water attenuation tank and a flow control device (Hydrobrake or similar) for a flow limited runoff rate. The design has been based on the site critical duration storm for the 1 in 100-year return period in attenuation storage volume calculations and an increase in rainfall event depth by 20% to take account of climate change. The requirement for the attenuation storage volume will be 91.38m^3.

The existing site is almost 100% hardstanding, with minimal planted areas, and as such the introduction of SuDS features as outlined above will result in a net reduction in the surface water discharging from the site compared to the current scenario.

Foul water will be drained separately by gravity. It is proposed to discharge the foul effluent generated by the Proposed Development to an existing 300mm diameter sewer on Palmerston Place, which discharges to the existing 1,020mm brick combined sewer on Dominick Street Upper. This foul sewer eventually discharges to Ringsend Waste Water Treatment Plant (WWTP) where it is treated and ultimately discharges to Dublin Bay. The WWTP operates under an EPA licence D0034-01.

According to the Flood Risk Assessment carried out by Waterman Moylan (2020), there is a no risk of flooding affecting the site from tidal, fluvial, pluvial or groundwater sources. The site lies within a Flood Zone C (i.e., where the probability of flooding from rivers is less than 0.1% or 1 in 1000). Any flood events will not cause flooding of the Proposed Development, and the development will not affect the flood storage volume or increase flood risk elsewhere even without the improved management of stormwater at the facility.

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 Tolka River sub-catchment (WFD name: Tolka_SC_020, Id 09_4) (EPA, 2020) which is managed by the Dublin County Council (DCC).

The nearest surface water receptor is the River Liffey Transitional Water Body which is located c. 1Km to the south of the Proposed Development site and belongs to the Liffey Estuary Upper WFD (European Code IE_EA_090_0400). The Liffey Transitional Water Body discharges into the Dublin Bay (c. 5.7 Km to the east of the site).

The subject site is currently drained by the public sewer network via an existing surface water sewer located in Dominick Street Upper which ultimately discharges into the River Liffey.

The Environmental Protection Agency (EPA, 2020) on-line mapping presents the available water quality status information for water bodies in Ireland.

The Liffey Estuary Upper has a WFD status (2013-2018) of 'Good'. Dublin Bay has also a WFD status of 'Good'. The Liffey Estuary Upper waterbody has a WFD risk score of 'At risk of not achieving good status' while the Dublin Bay waterbody has 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 Liffey Estuary Upper and Dublin Bay is classed as 'Good'.

The most recent surface water quality data for the Liffey Estuary Upper and Dublin Bay (2019-2020) indicate that they are 'Unpolluted'. 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.

2.2 Aquifer Description and Superficial Deposits

Mapping from the Geological Society of Ireland (GSI, 2020) 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 (2020) 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 and is classified as '*Poorly productive bedrock'*. The most recent WFD groundwater status for this water body (2013-2018) is '*Good*' with a current WFD risk score of '*Not at risk*'.

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 (2020) guidance presently classifies the bedrock aquifer vulnerability in the region of the subject site as '*Low*' which indicates a general overburden depth potential of >10m. This shows that the aquifer is well protected by low permeability glacial clays. The aquifer vulnerability class in the region of the site is presented as Insert 2.1 below.

Figure 2.1 Aquifer Vulnerability

Site investigations carried out by Ground Investigations Ireland (GII, 2020), which include 5 no. trial pits and 3 no. foundation inspection pit drilled to a depth of up to 3 m below ground level, did not encountered the bedrock.

The GSI/ Teagasc (2020) mapping database of the quaternary sediments in the area of the subject site indicates the principal subsoil type in the area comprises Limestone till Carboniferous (TLs, i.e. Till derived from limestones) and Till derived from granites (TGr).

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. The sources pathways and receptors are presented in the following sections with the overall impact presented in section 3.4.

3.1 Assessment of Plausible Sources

Potential sources during both the construction and operational phases are considered. For the purposes of undertaking an assessment of 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.

Construction Phase

The following sources are considered plausible 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 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. If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.

(iv) Construction requires soil excavation and removal. Unmitigated run-off could contain a high concentration of suspended solids during earthworks.

(v) In addition, excavated soil may contain contaminants which are eventually found in made ground (e.g., dissolved metals). Unmitigated run-off could be affected by these elements from the excavated soils during earthworks.

These could be considered intermittent short-term events, i.e. if adequate mitigation measures, which will be incorporated in the Construction Environmental Management Plan (CEMP), fail.

Operational Phase

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. The development does not include car parking at the site, However, vehicular access will be possible via the main entrance for emergency vehicles. As such, the potential for leakage of petrol/ diesel fuel is negligible. A worst-case scenario of 70 litres has been considered.

(ii) The stormwater drainage system comprises green roofs (sedum) and permeable paving with pollutant filter, and a bunded attenuation storage tank. The storage system will discharge following improved attenuation into the existing public surface water sewer located at Palmerston Place. As such the potential for any silt laden runoff is negligible.

(iii) The development will be fully serviced with separate foul and stormwater sewers which will have adequate capacity for the facility and discharge limits as required by Irish Water licensing requirements. Discharge from the site to the public foul sewer will be sewage and grey water only due to the 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 and to meet environmental legislative requirements as set out in such licence (D0034-01).

3.2 Assessment of Pathways

The following pathways have been considered within this assessment:

The potential for offsite migration due to any construction discharges is low as there is no significant pathway in the aquifer or through land ditches or streams.

(i) Vertical migration to the underlying limestone is minimised due to the recorded '*Low*' vulnerability present at the site resulting in good aquifer protection from any localised diesel/ fuel oil spills during either construction or the negligible potential during operational phases. The site is underlain by Calp limestone which is a 'Locally Important Limestone 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.

(ii) There is an indirect hydrological linkage for construction/ operation run-off or any small hydrocarbon leaks from the site to River Liffey (indirect discharge from leaking off site drains) and Dublin Bay SAC/SPA/pNHA through the combined sewer (3 km approximately from Proposed Development to Dublin Bay).

(iii) There is no 'direct' pathway for foul sewage to any receiving water body (as identified above). There is however an 'indirect pathway' through the public combined sewer which 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 bedrock aquifer;
(ii) River Liffey and Dublin Bay SAC/SPA/pNHA.

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 low chemical storage on site. The overburden thickness, low permeability nature of till and a lack of fracture connectivity within the limestone bedrock aquifer 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 site.

There is no direct open-water pathway between the site and Dublin Bay. However, there is an indirect pathway through the stormwater drainage should any silt-laden stormwater from construction, potential concentration of contaminants (e.g. dissolved metals) drained from eventually contaminated excavated soil or hydrocarbon-contaminated water from a construction vehicle leak manage to enter the public sewer. The suspended solids and other contaminants (mainly dissolved metals) will naturally settle within the drainage pipes close to the site.

In the event of a worst case hydrocarbon leak of 1000L, there is potential (if unmitigated at the site) for temporary hydrocarbon concentrations in excess of background levels (water quality objectives as outlined in S.I. No. 272 of 2009 and S.I. No. 77 of 2019 amendment) within the sewer. There is also a potential for temporary dissolved metals concentrations in case an eventually contaminated soil is drained by storm water (if unmitigated at the site either). However, there is no likely exceedance of water quality objectives as outlined in S.I. No. 272 of 2009 and S.I. No. 77 of 2019 amendment at the Dublin Bay SPA/SAC/pNHA due to attenuation and dilution along the river channel (3 km approximately from source area to Dublin Bay).

During operation, the potential for sediment runoff is low based on the SUDs design measures which will result in improved water quality compared to current. In addition the potential for hydrocarbon discharge is quite minimal based on the fact that no car parking areas will be allowed. The drainage design also incorporates a pollutant interceptor system and significant attenuation prior to discharge to the public sewer. As such there is no likely impact above water quality objectives as outlined in S.I. No. 272 of 2009 and S.I. No. 77 of 2019b) for a worst case scenario either within the Liffey or Dublin Bay.

It can be concluded that the in-combination effects of surface water arising from the Proposed Development taken together with that of other developments will not be significant based on the low potential chemical and sediment loading. In additional all developments are required to incorporate SUDs measures in accordance objectives and guidance contained in the Greater Dublin Strategic Drainage Study (GDSDS).

The peak wastewater discharge is calculated at an average wastewater discharge of 1.68 litres/sec, and will be collected in the public sewer and treated at Irish Water's WWTP at Ringsend prior to discharge to Dublin Bay. The connection to the sewage network requires the consent of Irish Water, having considered the capacity of their infrastructure (current and future). This WWTP is required to operate under an EPA licence (D0034-01) and to meet environmental legislative requirements.

The Ringsend WWTP received planning permission for upgrading works in 2012. Works commenced on this upgrade in February 2018, and are due to be completed in 2021. This upgrade involves the provision of a long sea outfall and ancillary elements to improve the functionality and operability of the facility. This upgrade will deliver a 25% increase in capacity.

Planning is also underway for a new wastewater treatment plant in North Dublin which will give greater treatment capacity for the catchment. The 2019 planning permission facilitated upgrading works to meet nitrogen and phosphorus standards set out in the licence and which are temporarily exceeded currently. The design includes aerobic granular sludge which will result in treatment of sewage to a higher quality than current thereby ensuring effluent discharge to Dublin Bay will comply with the Water Framework Directive, Urban Wastewater Treatment Directive and Bathing water Directive. It is understood at this point in time that the upgrade to use of aerobic granular sludge and other phased upgrades will achieve a population equivalent of 2.4 million and are to be completed between by 2027 to 2028. As outlined in the EIAR provided with the 2018 planning submission, modelling has shown that the upgrades which are 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.

Even without treatment at the Ringsend WWTP, the peak effluent discharge, calculated for the Proposed Development as 1.68 litres/sec which would equate to 0.015% 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: DIN and MRP represent the soluble inorganic fraction of Total Nitrogen and Total Phosphorus present in water, which is available for biological uptake) available quite close to the outfall for the treatment plant (Ringsend WWTP 2012 EIS, Ringsend WWTP 2018 EIAR). The modelling shows that the future Total Nitrogen and Total Phosphorus levels are expected to be at or below the licence levels as a direct result of the improved treatment works (Chapter 5 Figure 5-16 Chapter 5 of the 2018 EIAR plots the extent of the zone of influence of the effluent from the Ringsend WWTP on the predicted modelled output for winter depth averages for DIN. The zone of influence is shown to be largely confined to the area between the Great South Wall on the south side to the Bull Wall on the north side but it also extends into a small area in the inner part of Dublin Bay at Clontarf, a lagoon west of Bull Island and a small section of open sea to the south east of Bull Island). The modelling also shows that enrichment is also occurring from run-off from the Tolka and Liffey.

Recent water quality assessment for Dublin Bay also shows that Dublin Bay on the whole, currently continues to meet the criteria for ‘Unpolluted’ water quality status (EPA, 2020).

The assessment has also considered the effect of cumulative events, such as release of sediment laden water combined with a hydrocarbon leak on site (during construction). As there is adequate assimilation and dilution between the site and the Natura sites (Dublin Bay), it is concluded that no perceptible impact on water quality would occur at the Natura 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 proposed developments or planned development pursuant to statutory plans in the greater Dublin, Meath and Kildare areas discharging to 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 Dublin Bay currently continues to meet the criteria for ‘Unpolluted’ water quality status (EPA, 2020).
- The Ringsend WWTP upgrade which is currently being constructed will result in improved water quality 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 sites.

The assessment has also considered the effect of cumulative events, such as release of sediment laden water combined with a hydrocarbon leak on site. As there is adequate assimilation and dilution between the site and the Natura sites (Dublin Bay), it is concluded that no perceptible impact on water quality would occur at the

Natura 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 developments discharging to Ringsend WWTP will not be significant having regard to the size of the calculated discharge from the Proposed Development.

Source	Pathways	Receptors considered	Risk of Impact
Construction Impacts			
Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle/	Bedrock protected by >10m low permeability overburden. Migration within weathered/ less competent limestone is low (Calp limestone has discrete local fracturing rather than large connected fractures).	Limestone bedrock aquifer (locally important aquifer)	Low risk of localised impact to shallow weathered limestone due to protective overburden. No likely impact on the status of the aquifer 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 or dissolved metals	Indirect pathway through stormwater drainage to Dublin Bay water course (distance source-receptor: 3 Km)	River Liffey and Dublin Bay SAC/SPA/pNHA	No perceptible risk – Distance from source to Dublin Bay Natura site (3 km approx.) Potential contaminant loading will be attenuated diluted and dispersed prior to reaching the Natura site
Operational Impacts			
Foul effluent discharge to sewer	Indirect pathway to Dublin Bay through public sewer	Dublin Bay SAC/SPA/pNHA	No perceptible risk – Even without treatment at Ringsend WWTP, the peak effluent discharge (1.68 litres/sec which would equate to 0.015% of the licensed discharge 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).
Discharge to ground of hydrocarbons from car leak	Indirect pathway through stormwater drainage to Dublin Bay water course (distance source-receptor: 3 km)	River Liffey and Dublin Bay SAC/SPA/pNHA	No perceptible risk – Negligible loading of chemical and distance from source to water quality objectives as outlined in S.I. No. 272 of 2009 and S.I. No. 77 of 2019 amendment (Dublin Bay Natura site is c. 3 km) allowing for adequate attenuation and dilution.

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 open water (i.e. River Liffey or Dublin Bay SAC/SPA/pNHA). There are indirect source pathway linkages from the Proposed Development through public sewers to the Dublin Bay (3 km downgradient of the proposed site) and foul sewer discharge to Ringsend WWTP which ultimately discharges into Dublin Bay.

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 sites within Dublin Bay.

Finally, in line with good practice, mitigation measures are included during construction to minimise the potential for any accidental releases off site. During operation, the potential for an impact to ground or storm water is negligible and there are design measures incorporated within the Proposed Development to manage stormwater run-off quality. 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.

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