

11. HYDROLOGY

11.1 Introduction

This chapter of the EIAR comprises an assessment of the likely impact of the proposed development on the hydrological environment as well as identifying proposed mitigation measures to minimize any impacts

The information contained within this chapter should be read in conjunction with the design drawings and suite of reports, which accompany this planning application.

The potential impacts associated with the proposed development, if any, are assessed with regards to the following proposed water demands:

1. Potable Water Supply demands;
2. Waste Water flows;
3. Surface Water Drainage flows
4. Floodwaters

The material assets impact from all of the above drainage infrastructure has been covered within Chapter 17 – Material Assets, Site Services, drainage and Water Supply.

11.2 Methodology

The assessment of the potential impact of the activity on water and hydrology was carried out according to the methodology specified in the following guidance documents:

- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Statements (2017);

EPA Advice Notes on Current Practice (in the Preparation of EIS) (2003)

The following sources of information were consulted to establish the baseline environment:

- Public Foul Drainage (Irish Water and DLRCC Records);
- Public Water Main Networks (Irish Water and DLRCC Records);
- Public Surface Water Drainage (Irish Water and DLRCC Records);
- Office of Public Works flood mapping data (www.floodmaps.ie);
- 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);
- The Geological Survey of Ireland (GSI) well card and groundwater records for the area were inspected, with reference to hydrology;
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (CIRIA 532, 2001);
- The Geological Survey of Ireland (GSI) well card and groundwater records for the area were inspected, with reference to hydrology and hydrogeology;
- Base maps – Ordnance Survey of Ireland;

- Flood hazard Maps and flooding information for Ireland, www.floodmaps.ie - Office of Public Works (OPW);
- CFRAM/ PFRA Maps (OPW);
- Geological Survey of Ireland (GSI) maps on superficial deposits.
- Site Investigation, Allegro warehouse, Carmanhall Road, Sandyford, Report Reference 6740 dated September 1998.

11.3 Receiving Environment

11.3.1 Hydrology

There are no water courses in close proximity to the site. The nearest water course is Carysfort Maretimo Stream.

11.3.2 Hydrogeology

Groundwater was not encountered in the probes and trial pits that were installed as part of the site investigation.

The Geological Survey of Ireland (GSI) Groundwater Data Viewer indicates that the Groundwater Vulnerability is classified as moderate. Refer to Figure 11.1 below.

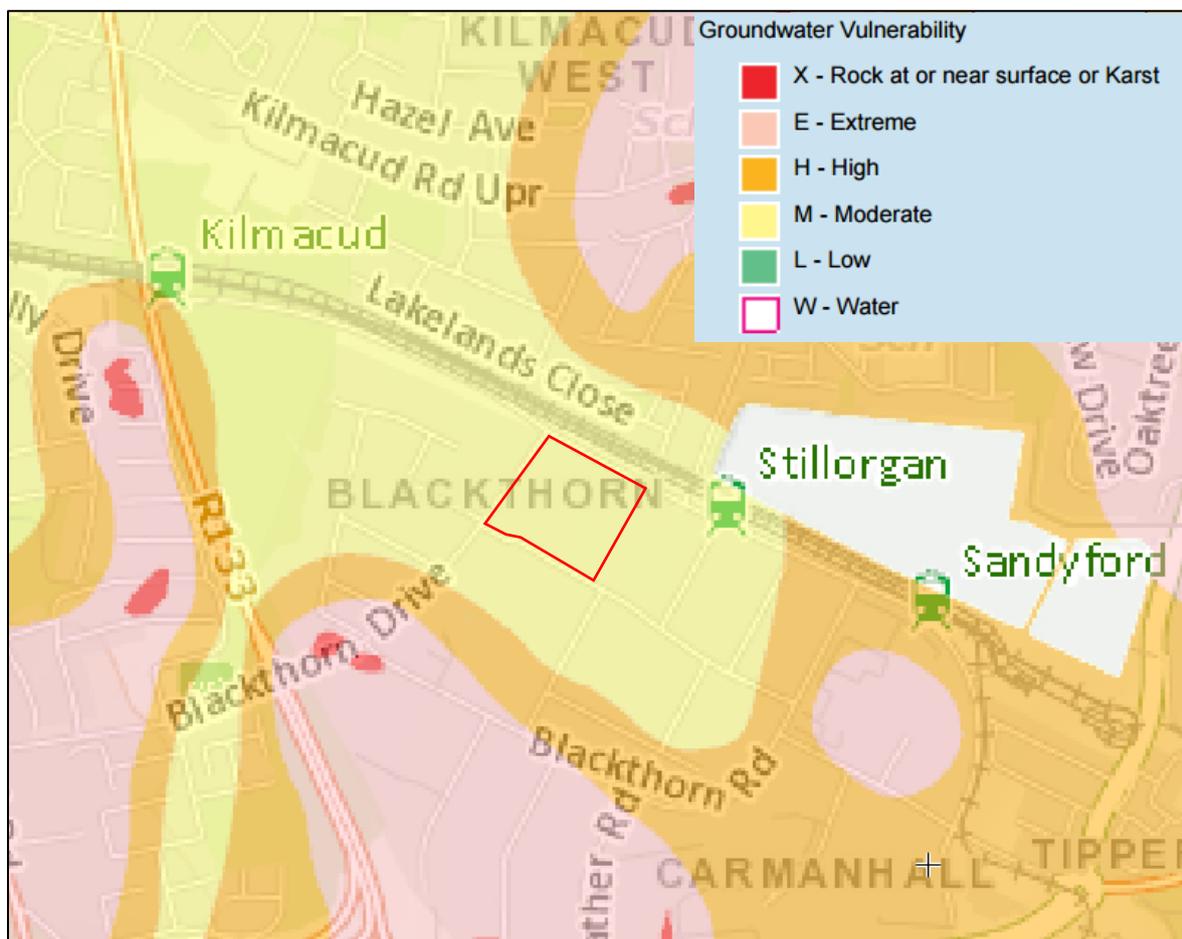


Figure 11.1 – Groundwater vulnerability

Figure 11.2 below is an extract of the GSI National Draft Bedrock Aquifer Map for the subject site which indicates that the site is underlain by a Poor Aquifer – Bedrock. This type of aquifer is Generally Unproductive except for Local Zones.

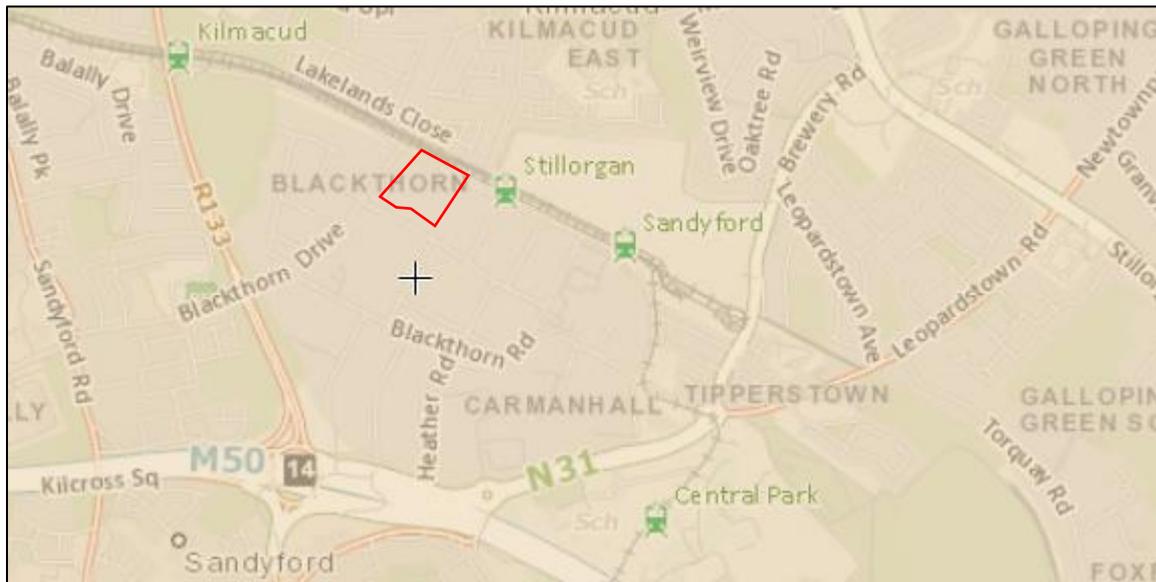
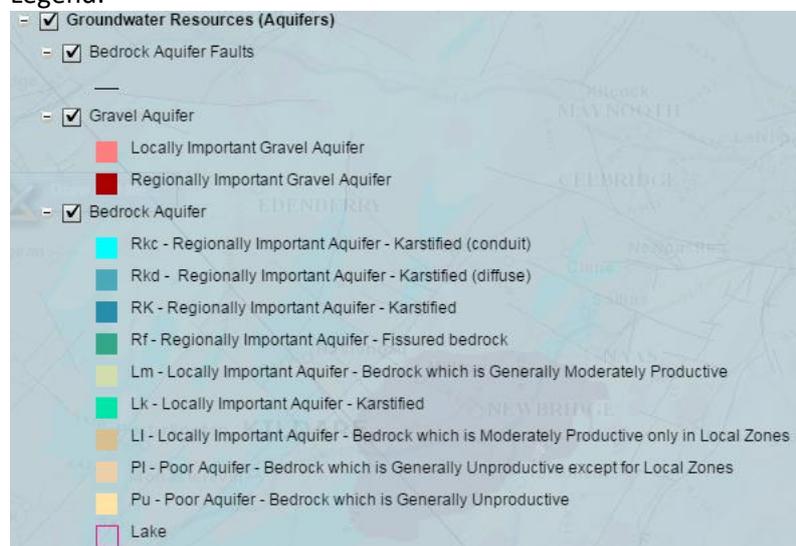


Figure 11.2 – Bedrock Aquifer

Legend:



The basement for the building has been partially constructed within the existing ground profile.

11.3.3 Flood Risk

11.3.3.1 OPW Flood Hazard Mapping

The office of Public Works (OPW) Flood Hazard Mapping website holds a record of historic flood events. A review of this database indicated that, while there have been reported incidences of flooding in the local area, none of these records report a flooding incident at the site of the proposed development.

It is understood that minor flooding has in the past occurred along the Carmanhall Road at the North of the Beacon South Quarter development. This did not impact upon the site of the proposed development. The flooding was a result of surcharging of drains in the area following intense rainfall and not by fluvial flooding from the Carysfort Maretimeo.

11.3.3.2 Eastern CFRAM Study

As part of the CFRAMS programme, mapping is available online for public viewing¹, and the area surrounding the site has been assessed as part of the Eastern CFRAMS study. The OPW has published detailed flood hazard mapping for the Dublin southern environs based on the results of the Eastern CFRAM study. This includes flood extent mapping for a number of return period events and flood depth mapping for each of the potential flood events.

Figure 11.3 below is an extract of the Eastern CFRAMS map for Sandyford Industrial Area.

The CFRAMS assessment is based on hydraulic modelling of the Carysfort Maretimeo stream including the various culverted sections.

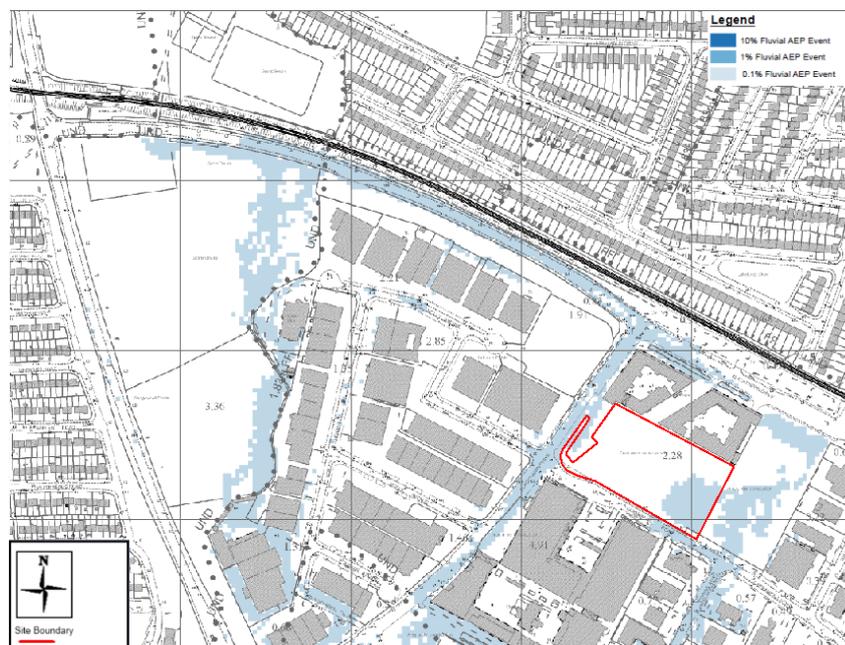


Figure 11.3: Extract from CFRAMS flood map for Sandyford area

As can be seen from the map above, the site of the proposed development is partially located in the fluvial Flood Zone B (the 1 in 1000 year flood zone). The flooding results from surcharging at a location, along the route of the Carysfort Maretimeo approximately 650 m south from the site of the proposed development, via an overland flow route.

Modelled floodwaters surcharge at this location (MH6) and flow through the Sandyford Industrial Area along Bracken Road and also parallel to the Dunmartin Link Road towards the Sandyford industrial area via Blackthorn Drive. Flood depth mapping shows the site to be subject to floodwater depths of over 2 m during a 1 in 1000 year event in the existing unfinished basement. Carmanhall Road, to the south of the development was subject to <250mm of floodwaters.

¹ See <http://www.floodinfo.ie/map/floodmaps>

Refer to the Site Specific Flood Risk Assessment of the proposed development for further detail with regard to the existing flood conditions.

11.3.3.3 Sandyford Urban Framework Plan

The design of the development has taken consideration of the objectives of the Sandyford Urban Framework Plan, where practicable.

11.3.4 Foul Drainage

Record drawings provided by Dun Laoghaire-Rathdown County Council / Irish Water indicate the following existing foul sewer infrastructure:

- A 525 mm diameter public foul water sewer bordering the RB Central site to the north-east along Blackthorn Drive,
- An 225mm diameter public foul water sewer to the south of the proposed development, on Carmanhall Road,
- A 600 mm diameter foul water sewer running along Blackthorn Drive on the western boundary of RB Central site.

Refer to Engineering Planning Report for further details.

11.3.5 Surface Water Drainage

Record drawings provided by Dun Laoghaire-Rathdown County Council indicate that the site is currently serviced by an existing 600 mm diameter surface water sewer running west to east along Carmanhall Road.

The site was formerly occupied by the Allegro Warehouse which had a 100% impermeable site. That site condition was assessed based on a 1 in 2 year return period, with the peak surface water run-off from the site (1.23 ha) as approximately 189 l/s.

There were no specific proposals such as attenuation tanks or permeable paving to limit the run-off from the site as part of the currently constructed Rockbrook development.

Refer to Engineering Planning Report for further details.

11.3.6 Watermains

Record drawings provided by Dun Laoghaire-Rathdown County Council / Irish Water indicate the following watermain records:

- An existing 350 mm diameter watermain bordering the site to the south-west, along Carmanhall Road.
- An existing 6" (150mm diameter) partly bordering the site to the south-west, along Carmanhall Road.
- An existing 150mm and 100mm diameter watermain along Blackthorn Drive, to the west

Refer to Engineering Planning Report for further details.

11.4 Characteristics Of The Proposed Development

11.4.1 Hydrology

It is not proposed to alter the hydrology of the surrounding area as part of the proposed development.

11.4.2 Hydrogeology

The basement walls are intended to be constructed such to permit some infiltration of water from the surrounding groundwater, to the depth of the lowest basement level.

This water will be drained by gullies and/or pumps within the basement, and discharged to the surrounding foul sewerage network.

11.4.3 Flood Risk

The Site Specific Flood Risk Assessment has compared the proposed scenario versus a situation prior to the partially constructed building and basement is completed. Flood defence measures are to be implemented to manage the resulting flood waters on Carmanhall Road. The surrounding flood water will rise by circa 50mm at the 1:1000 year return period.

Refer to the Site Specific Flood Risk Assessment of the proposed development for further detail with regard to the proposed flood risk.

11.4.4 Foul Drainage

It is proposed to discharge foul effluent from the proposed development by gravity using a new foul sewer connection, to an existing 375 mm diameter public foul sewer on the southern side of RB Central site, along Carmanhall Road.

Based on the development comprising 428 dwellings, as well as minor ground floor commercial uses, the total additional foul sewerage flows as a result of the development are as summarised in the below table

Table 11.1 – Additional Foul Sewerage Flows

Foul Sewerage Flows from Development	
Dry Weather Flow	263.85 cu.m/day or 3.05 l/s
Peak Flow	872.7 cu.m/day or 10.1 l/s

Additional foul drainage will be required to service the construction phase of the development. This is subject to the exact quantity of construction workers and their requirements. This water use will be short term in nature.

Refer to the engineering planning report for further details regarding foul water drainage.

11.4.5 Surface Water Drainage

It is proposed to drain the entire site via a network of surface water pipework. This surface water pipework is to be separated from the foul pipework.

The surface water drainage is to be collected in an attenuation tank and reduced to a greenfield equivalent rate of 10.1l/s for the 1% AEP return period before discharging to the public surface water sewer network.

It is proposed to connect the development surface water discharge to existing 600mm diameter surface water main on Carmanhall Road. All existing connections to the development site are intended to be removed.

Surface water quality will also be treated through the use of SUDS measures. For this development, the following SuDS measures are proposed:

- Green roof across 60% of the roof
- Landscaping on the suspended ground floor structure
- Rainwater harvesting below the attenuation tank to reuse to ground floor landscape areas

Refer to the engineering planning report for further details regarding surface water drainage.

11.4.6 Water Supply

It is proposed to connect the site's water supply to an existing 150mm diameter main to the south west of the site.

On the basis of the development comprising 428 dwellings as well as minor ground floor commercial uses, the total additional water supply flows as a result of the development are as summarised in the below table.

Table 11.2 – Additional Water Supply Flows

Water Flows from Development	
Average Daily Flow	239.86 cu.m/day or 2.78 l/s
Average Day Peak Week Flow	299.83 cu.m/day or 3.47 l/s
Peak Demand	1499.13 cu.m/day or 17.35 l/s

Additional water supply will be required to service the construction phase of the development. This is subject to the exact quantity of construction workers and their requirements. This water use will be short term in nature.

Refer to the engineering planning report for further details regarding water supply use.

11.5 Potential Impact Of The Proposed Development

11.5.1 Construction Phase

Any potentially damaging fluids that spill on natural soils may have an impact on the natural hydrogeological environment.

At construction phase, construction workers will require the short term use of potable water and will create short term foul waste water.

11.5.2 Operational Phase

The proposed dwellings and associated development will utilise additional potable water and waste water. If capacity is not available within the existing public networks, upgrades may be required.

If surface waters are not managed appropriately, it could lead to flooding or surface water surcharging in the downstream pipework.

If flood waters are not managed appropriately, the displaced flood water from the site could lead to flooding of the development, or adjacent premises.

11.5.3 Do Nothing' Scenario

The current site is a partially constructed basement, with sections exposed to the elements.

There is no potable water or foul water demand from the current site.

Surface water currently discharges to the lowest basement and either remains as standing water or infiltrates into the exposed sections of soil.

Low frequency event flood waters discharge to the basement areas and infiltrate into the surrounding soil.

11.6 Ameliorative, Remedial Or Reductive Measures

11.6.1 Construction Phase

The contractor will be required to implement best practice measures in accordance with DLRCC planning requirements during construction.

Accidental spills and leaks are to be managed. Refer to the Land and Soils section of this report for further discussion regarding the management of accidental spills and leaks.

11.6.2 Operational Phase

The impact of water supply and waste water has been assessed by Irish Water, and they have advised that the development is feasible without upgrade to their networks. Thus, no ameliorative, remedial or reductive measures are required.

Low flow fixtures are intended throughout the development, and these will serve to reduce the potable water consumption, and thus reduce any foul water discharge.

Surface water from the proposed development will be reduced from current levels to match a greenfield equivalent rate using an attenuation tank. Surface water will be treated by proposed landscape areas on roofs and at ground floor level, as well as by infiltration into the ground below the attenuation tank.

Flood waters from the surrounding area have been assessed with allowance for the proposed development. The development is designed such to prevent flood waters from affecting habitable areas, basements and other associated areas. Appropriate protection has also been provided to adjacent areas to prevent flooding of habitable areas, basements and other associated areas.

11.6.3 'Do Nothing' Scenario

If the development is implemented without the proposed mitigation measures, the potential impacts would not be managed.

11.7 Predicted Impact Of The Proposed Development

11.7.1 Construction Phase

If the contractor implements best practice measures during construction, the hydrological effects will be limited.

11.7.2 Operational Phase

Considering that Irish Water have advised that the development can be facilitated without upgrade to their potable water and wastewater networks, the predicted impact in this regard is considered to be managed.

Surface water from the development will be managed within the site, with flows reduced to minimise the effect on the adjacent surface water network.

Floodwaters resulting from the development will be facilitated within the existing offsite areas without negatively affecting the surrounding buildings.

11.7.3 'Do Nothing' Scenario

If the development is implemented without the proposed mitigation measures, the potential impacts would not be managed.

11.8 Monitoring

Construction stage elements should be monitored by the contractor for compliance with all relevant standards.

The operational phase of the building should be monitored by the management company for the building. The operational phase of the public surface water, potable water and waste water networks should be monitored by Irish Water and DLRCC.

11.9 Reinstatement

If any mitigation measures are damaged, they should be reinstated as soon as possible.

11.10 Interactions And Potential Cumulative Impacts

11.10.1 Interactions

There is an interaction with population and human health as well as biodiversity. The mitigation measures outlined in this report would be advantageous to both of these elements.

11.10.1.1 Soils And Hydrology

Any environmentally damaging fluids that infiltrate into the soil will have an effect on the surrounding hydrological network. This is discussed further in the Land and Soils section of this report. There is no anticipated cumulative effect.

11.10.1.2 Material Assets – Site Services, Drainage and Water Supply, And Hydrology

The hydrological requirement of the development will in part prescribe the site services that are required for the development. There is no anticipated cumulative effect.

11.10.1.3 Population and Human Health, And Hydrology

There is an interaction with population and human health. The use of public water and wastewater would be advantageous to population and human health. There is no anticipated cumulative effect.

11.10.1.4 Biodiversity And Hydrology

There is an interaction with biodiversity. The surface water mitigation measures outlined in this report would be advantageous to biodiversity since they will help establish an environment closely resembling the greenfield environment. There is no anticipated cumulative effect.

11.10.2 Potential Cumulative Impacts

In the event that both surface water mitigation and flood water mitigation measures are not implemented, there would be a cumulative impact in extreme rainfall scenarios.