It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. Noise and vibration impacts associated with the development have been fully considered within Chapter 10 of the EIA Report.

As detailed in Chapter 10 Noise and Vibration, the construction programme will create typical construction activity related noise on site with potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels. The potential for vibration at neighbouring sensitive locations during construction is typically limited to excavation works and lorry movements on uneven road surfaces. Due to the distance of sensitive locations to site works however, there is little likelihood of structural or even cosmetic damage to existing neighbouring dwellings as a result of vibration.

In terms of noise associated with the additional construction traffic on local roads is stated to be: ***Negative, Slight and Short-Term***.

In terms of vibration, due to the distance of activities from the Proposed Development to the nearest sensitive locations and by controlling vibration levels to those detailed in Table 10.7 the associated effect is stated to be: ***Neutral, Imperceptible and Short-Term.***

5.5.1.6 Potential Impact from Traffic and Transportation on Human Health

The World Health Organisation Report 'Health Effects and Risks of Transport Systems: The Hearts Project' (World Health Organisation, 2006) states that road traffic is a major cause of adverse health effects - ranking with smoking and diet as one of the most important determinants of health in Europe. The report states;

> *"Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians"*

In the Department of Communications, Climate Action & Environment document *Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy* vehicle emissions are included as a key source of health impacts in Ireland (Department of the Environment, Climate and Communications. (DOCCA&E, 2017)).

It is anticipated that the largest construction traffic impact would occur in 2026, when Building E shall have been completed and commissioned, Building F shall have been constructed and shall be undergoing final fill-out and Building G shall be under construction.

An assessment of the additional traffic movements associated with the Proposed Development during the construction phase is presented in Chapter 13 (Traffic and Transportation). The assessment uses data obtained from a similar data centre of similar scale and that used a similar construction methodology to the Proposed Development. This data was then used to estimate peak daily construction traffic relating to the two larger data centre buildings within the Proposed Development (Buildings F and G).

Given the temporary nature of the peak construction phase, the overall impact of the construction phase is considered ***short-term***, ***negative*** and ***not significant.***

5.5.1.7 Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health

The Proposed Development has the potential for an impact on the health and safety of workers employed during the construction phase. The activities of the applicant's contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) to minimise the likelihood of any impacts on workers' health and safety.

As outlined in Section 5.3.3 there is a negligible risk of external natural disasters; including landslides, seismic activity, volcanic activity and sea level rise. There is a negligible risk of major accidents to occur at the facility due to the lack of proximity to Seveso/Control of Major Accident Hazards (COMAH) Regulations sites.

As stated in Chapter 7 (Hydrology) the site is in Flood Zone C and is not at risk of flooding from a 1% or 0.1% Annual Exceedance Probability (AEP) event. The flood zonation confirms that the site is suitable for this type of industrial development

The potential effect is therefore ***imperceptible***, and unlikely, in respect of Major Accident Hazards or Natural Disasters on Population and Human Health during the Construction Phase of the Proposed Development.

### 5.5.2 Operational Phase

5.5.2.1 Potential Impacts on Businesses and Residences

The main potential impacts on local businesses and residences associated with the Proposed Development will be in relation to nuisances; air quality, noise, visual impact and traffic. The potential impacts and mitigation measures to address them are dealt with within the corresponding chapters of this EIA Report as follows:

- Chapter 9 – Air Quality and Climate
- Chapter 10 – Noise and Vibration
- Chapter 11 – Landscape and Visual Impact
- Chapter 13 – Traffic and Transportation

It is not expected there will be any likely significant effects on local residential figures in association with the operation of the Proposed Development.

It is predicted that there will be a slight positive impact on local business activity with employees and visitors using facilities during the day and night. Once operational, c. 50 full time employees will be present on site daily in each building for Buildings F and G, including external staff, maintenance contractors and visitors, as required. The number of external staff, maintenance contractors and visitors will typically be c. 15 staff per day. (Staff will be present on a shift basis, so numbers will vary throughout the day with up to 7 no. of the staff on night shifts each day). Building E will have c. 4 full time employees present on site daily.

The Proposed Development will also have a positive impact in the provision of additional capacity in an ever-increasing demand for cloud computing and data storage. The operator offers a broad set of global compute, storage, database, analytics, application and deployment services that help organisations (both locally,

nationally and internationally) operate faster, lower ICT costs and scale applications. The provision of these services will also improve individuals online experience and accessibility

5.5.2.2 Potential Impacts on Amenity and Tourism

The Proposed Development once operational will have no impact on local tourism or shopping amenities. The Proposed Development will not create any wastewater discharge which could have a potential impact on local amenities or the local population. There will be no impact on the local parks or the larger amenity areas.

Landscape impacts (ref: Chapter 11) will be not significant and will generally range from moderate to slight. Landscape and visual effects from the wider locality, including from the residential areas to the west of the R121, will be ***not significant*** or ***imperceptible***.

The potential effect on tourism and amenity is therefore considered to be ***imperceptible***, and unlikely, respect of the Proposed Development on Amenity and Tourism for the Operational Phase of the Proposed Development.

5.5.2.3 Potential Impact from Land and Water Emissions on Human Health

With reference to Chapter 6 (Land, Soils, Geology and Hydrogeology) the following risks have been considered in relation to the operational phase of the development:

- During the operational phase there is a small potential for leaks/ spillages from the fuel storage (bulk storage and local storage at the back-up generators) to occur on site. In addition to this there is a potential for minor leaks/spillages from vehicles along access roads and in parking areas. Any accidental emissions of hydrocarbons could cause soil/groundwater contamination if the emissions are unmitigated. However, as the site is predominantly hardstand, any contaminated water would largely discharge through the stormwater sewers rather than to ground.
- As above, in the event of a fire at the facility, firewater could become contaminated and in the absence of mitigation may contaminate soil and groundwater.
- There are no discharges to ground included in the design and no abstractions from the aquifer.

The magnitude of the impact for the operational phase without mitigation and design measures is ***Long-term*** in duration with ***not significant effect*** rating to the underlying aquifer present across the Proposed Development site.

With reference to Chapter 7 (Hydrology) there is a potential for leaks and spillages from the fuel tank to occur on site. In addition to this there is a potential for leaks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental emissions of oil, petrol or diesel / renewable diesel could cause contamination if the emissions enter the water environment unmitigated. Subject to availability, it is expected that fuel for the Proposed Development will be renewable diesel.

In the event of a fire at the facility, firewater will also need to be contained or it may contaminate receiving waters.

The magnitude of the impact for the operational phase without mitigation and design measures is ***Long-term*** in duration with ***not significant effect*** rating to the hydrological environment present across the Proposed Development site.

#### 5.5.2.4 Potential Impact from Air Emissions on Human Health

As outlined in Chapter 9 (Air Quality & Climate), the potential impact to air quality during the operational phase of the Proposed Development is a breach of the ambient air quality standards as a result of air emissions from the back-up diesel / renewable diesel generators. However, as outlined in Section 9.6, an iterative stack height determination was undertaken as part of the air dispersion modelling study to ensure that an adequate release height was selected for all emission points to aid dispersion of the plume and ensure compliance with the ambient air quality limit values at all locations beyond the site boundary.

#### 5.5.2.5 Potential Impact from Noise and Vibration Emissions on Human Health

Exposure to excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report 'Noise Impacts on Health', (European Commission, 2015), the most common effects of noise on the vulnerable include;

- Annoyance
- Sleep Disturbance
- Heart and circulation problems
- Quality of Life
- Cognitive Process
- Hearing

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. Noise and vibration impacts associated with the development have been fully considered within Chapter 10 of the EIA Report.

The primary sources of outward noise from the Proposed Development in the operational context are deemed long term and will involve:

- building services noise;
- emergency site operations; and
- additional vehicular traffic on public roads.

To assess the noise impact of the proposed operations, Section 10.5.2 of Chapter 10 details an assessment in which five scenarios were used starting with typical day to day operations to emergency operations. The results of the assessment are detailed in Appendix 10.5 of Chapter 10.

In terms of noise associated with day-to-day activities the associated effect is stated to be as follows: ***Negative, Slight to Moderate and Long Term***

There is no source of vibration associated with the day-to-day operation of the development that will give rise to impacts at nearby noise sensitive locations. In terms of these the operational phase of the development the associated effect is stated to be ***Neutral, Imperceptible and Long Term***.

### 5.5.2.6 Potential Impact from Traffic and Transportation on Human Health

The World Health Organisation Report 'Health Effects and Risks of Transport Systems: The Hearts Project' (World Health Organisation, 2006) states that road traffic is a major cause of adverse health effects - ranking with smoking and diet as one of the most important determinants of health in Europe. The report states;

> *"Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians"*

In the Department of Communications, Climate Action & Environment document *Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy* vehicle emissions are included as a key source of health impacts in Ireland (DCCAE, 2017).

An assessment of the additional traffic movements on 3 no. junctions associated with the Proposed Development during the operational phase is presented in Chapter 13 (Traffic and Transportation). The assessment was completed, and comparisons made against the Do Nothing scenario. It showed that junction performances were lowered but still within capacity.

A review of the collision data was completed using the RSA Database. Based on the analysis found, it was concluded that the number of collisions recorded in the area surrounding the site over the 5 most recent years of data is low compared with collision rates in other zones, with no collision black spots or notable collision patterns that would indicate a road safety design flaw on the road infrastructure surrounding the site.

The Proposed Development will not add a significant amount of additional traffic to the surrounding road network during operation. Design of the proposed construction and main site access junctions with Cruiserath Road and the R121 (NE) (undertaken as part of the permitted Building A development); respectively; has been done such that adequate sightlines are provided for all road users.

### 5.5.2.7 Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health

The Proposed Development has been designed with consideration given to the health and safety risks of people living and working in the vicinity. The facility has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience.

As outlined in Section 5.3.3 there is a negligible risk of external natural disasters; including landslides, seismic activity, volcanic activity and sea level rise. There is a negligible risk of major accidents to occur at the facility due to the lack of proximity to Seveso/Control of Major Accident Hazards (COMAH) Regulations sites.

As stated in Chapter 7 (Hydrology) the site is in Flood Zone C and is not at risk of flooding from a 1% or 0.1% Annual Exceedance Probability (AEP) event. The flood zonation confirms that the site is suitable for this type of industrial development.

The potential effect is therefore ***imperceptible***, and unlikely, respect of Major Accident Hazards or Natural Disasters on Population and Human Health Operational Phase of the Proposed Development.

## 5.6 REMEDIAL AND MITIGATION MEASURES

### 5.6.1 Construction Phase

The mitigation measures to address the potential impacts on population and human health from the Proposed Development have been assessed within the corresponding specialist chapters; Chapter 6 (Land, Soils, Geology and Hydrogeology); Chapter 7 (Hydrology); Chapter 9 (Air Quality and Climate), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual); Chapter 13 (Traffic and Transportation).

#### 5.6.1.1 Businesses and Residences

There are no potential likely significant impacts on Businesses and Residences therefore additional measures are not required. Any impact will be further mitigated by the use of binding hours of construction as well as the measures set out in Chapter 6 (Land, Soils, Geology and Hydrogeology); Chapter 7 (Hydrology); Chapter 9 (Air Quality and Climate), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual); Chapter 13 (Traffic and Transportation).

#### 5.6.1.2 Landscape Amenity and Tourism

With reference to Chapter 11 (Landscape and Visual), the main mitigation by avoidance in this instance is the siting of the Proposed Development in a landscape zoning that can facilitate such a development type where it is surrounded by commercial and industrial developments of a similar scale and nature.

#### 5.6.1.3 Land and Water Emissions

All mitigation measures outlined within Chapter 6 and Chapter 7 will address the main activities of potential impact which include:

- Control of soil excavation and export from site;
- Sources of fill and aggregates for the Proposed Development;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

These mitigation measures will be implemented alongside the Construction Environmental Management Plan (CEMP), as well as any additional measures required pursuant to planning conditions which may be imposed. The construction phase mitigation measures set out in the CEMP will be implemented by the construction Contractor to ensure that pollution and nuisances arising from site clearance and construction activities is prevented where possible and managed in accordance with best practice environmental protection.

Spillages to ground of fuels that could result in soil and/or groundwater quality impacts will be mitigated by:

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;

- The pump or valve will be fitted with a lock and will be secured when not in use;
- All bowsers to carry a spill kit and operatives must have spill response training; and
- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

5.6.1.4 Air Emissions

Mitigation measures proposed to minimise the potential effects on human health in terms of air quality during the construction phase are set out in Chapter 9, Section 9.6.1. These include measures for dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to ensure that no dust nuisance occurs a series of measures drawing on will be implemented, drawing on best practice guidance from Ireland, the UK and the USA.

The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

5.6.1.5 Noise and Vibration Emissions

Mitigation measures proposed to minimise the potential effects on human health in terms of noise and vibration during the construction phase are set out in Chapter 10.

These measures make reference to BS5228 Parts 1 and 2, and include conditions such as, limiting the hours during which site activities likely to create high levels of noise or vibration are permitted, and monitoring levels of noise and/or vibration during critical periods at sensitive locations.

An indicative construction noise and vibration management plan is included in Appendix 10.6 of Chapter 10 which will be considered in terms of the day to day operation of the site. This will focus on opening up and maintaining lines of communication with the local community to address issues in relation to noise and/or vibration and to advise the community of periods where specific activities take place (e.g. rock breaking) that have an increased potential in giving rise to issues off site.

Vibration values are set out in Table 10.7 of Chapter 10 and it is recommended that vibration from construction activities to off-site residences be limited to these values.

5.6.1.6 Traffic and Transportation

With reference to Chapter 13 (Traffic and Transportation) during the construction phase of the development, the following measures will be put in place to reduce the impact on the surrounding environment:

1. The contractor will be required to provide wheel cleaning facilities, and regular cleaning of the sites construction and main access road will be carried out.

2. Temporary car parking facilities for the construction workforce will be provided within the site and the surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads.

3. Monitoring and control of construction traffic will be ongoing during construction works. Construction traffic will be managed to avoid unnecessary trips during peak hours.

#### 5.6.1.7 Major Accident Hazards and/or Natural Disasters

The potential effect is imperceptible, and unlikely, in respect of Major Accident Hazards or Natural Disasters on Population and Human Health during the Construction Phase of the Proposed Development. Therefore, no specific mitigation measures are required.

### 5.6.2 Operational Phase

The mitigation measures to address the potential impacts on population and human health from the Proposed Development have been assessed within the corresponding specialist chapters; Chapter 6 (Land, Soils, Geology and Hydrogeology); Chapter 7 (Hydrology); Chapter 9 (Air Quality and Climate), Chapter 10 (Noise and Vibration); Chapter 11 (Landscape and Visual); Chapter 13 (Traffic and Transportation).

#### 5.6.2.1 Businesses and Residences

There are no potential likely significant impacts on Businesses and Residences therefore additional measures are not required.

#### 5.6.2.2 Amenity and Tourism

With reference to Chapter 11 (Landscape and Visual), the main mitigation by avoidance in this instance is the siting of the Proposed Development in a landscape zoning that can facilitate such a development type where it is surrounded by commercial and industrial developments of a similar scale and nature.

#### 5.6.2.3 Land and Water Emissions

The Proposed Development will have limited potential for site activities to impact on the land, geological and hydrogeological environment of the area.

An Environmental Safety and Health Management System will be established prior to operating which will include site-specific mitigation measures and emergency response measures.

The primary potential impact relates to a failure of control measures or accidental spill of diesel / renewable diesel fuel which is stored and used on site for back-up power generation.

In order to minimise any impact on the underlying subsurface strata from material spillages, the fuel storage tank is located above ground in a designated fuel storage bund with an impervious base. This is bunded to a volume of 110% of the capacity of the tank within the bund (plus an allowance of 30 mm for rainwater ingress). Drainage from the bund will be diverted for collection and safe disposal. Fuel delivery to the bulk storage tank will take place within a designated contained unloading area. Diesel / renewable diesel will be piped from the bulk storage tank to belly tanks at each of the

back-up generator units. The belly tanks will be double skinned. Delivery of fuel will be undertaken following a documented procedure which minimises risk of spills and spill containment/clean-up kit shall be readily available on site.

A significant proportion of the development area will be covered in hardstand (37,271m$^2$). This provides protection to the underlying aquifer but also reduces local recharge in this area of the aquifer. As the area of aquifer is large this reduction in local recharge will have no significant change in the natural hydrogeological regime.

As detailed in Chapter 7 Hydrology, a number of systems are proposed to aid in the overall improvement of water quality, and they are;

- Permeable paving;
- Rainwater Harvesting system;
- Bio-Retention areas;
- Hydrocarbon interceptors;
- Wetlands to the west of the proposed Building E;
- Attenuation facility with flow control device, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change to limit the surface water discharge from the site during extreme rainfall events.

The SUDs measures also propose to maintain the run-off from the site to pre-development greenfield rates. Further information is detailed in Chapter 7 Hydrology.

#### 5.6.2.4 Air Emissions

The stack heights of the back-up diesel / renewable diesel generators for the Proposed Development have been designed in an iterative fashion to ensure that adequate heights were selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards at all off-site locations (including background concentrations). No additional mitigation measures are proposed for the operational phase of the development.

#### 5.6.2.5 Noise and Vibration Emissions

Chapter 10 of this EIA Report outlines that noise from external plant will be minimised by purchasing low noise generating equipment and incorporating appropriately specified in line attenuators for stacks and exhausts where necessary. With due consideration as part of the detailed design process, this approach will result in the site operating well within the constraints of the best practice guidance noise limits that have been adopted as part of this detailed assessment.

The noise impact assessment detailed in Chapter 10, has demonstrated that mitigation measures are not required for the additional vehicular traffic on public roads.

#### 5.6.2.6 Traffic and Transportation

As stated in 5.5.2.6, the assessment of additional traffic movements on 3 no. junctions associated with the Proposed Development showed that the junction performances were lowered but still within capacity. A review of the collision data showed no collision black spots or notable collision patterns that would indicate a road safety design flaw on the road infrastructure surrounding the site. The Proposed Development will not add a significant amount of additional traffic to the surrounding road network during operation and adequate sightlines are provided for all road users. As stated in Section

13.6.2 of Chapter 13 there are no mitigation measures required for traffic and transportation for the operational phase.

5.6.2.7 Major Accident Hazards and/or Natural Disasters

The potential effect is imperceptible, and unlikely, in respect of Major Accident Hazards or Natural Disasters on Population and Human Health during the Operational Phase of the Proposed Development. Therefore, no specific mitigation measures are required.

## 5.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

### 5.7.1 Construction Phase

5.7.1.1 Businesses and Residences

It is predicted that there will be a slight positive impact on local business activity during the construction phase with the increased presence of construction workers using local facilities. This job creation will result in a ***positive***, local to regional, ***imperceptible***, ***short-term*** socioeconomic impact.

The presence of these site personnel in the area during the construction phase will create a slight additional demand in the area for services, particularly for food from local shops, restaurants and cafés. There will also be economic benefits for providers of construction materials and other supporting services, e.g., quarries. This is predicted to result in a positive, local to regional, ***indirect, not-significant, short-term*** socioeconomic impact.

Overall the construction phase is predicted to have an ***imperceptible, temporary*** *and* ***neutral*** impact on local businesses and residences. The residual impacts on local businesses and residences in relation to air quality, noise, visual impact, and traffic has been summarised in the below sections.

5.7.1.2 Landscape Amenity and Tourism

With reference to Chapter 11 (Landscape and Visual), the significance of construction stage impacts is deemed to be ***not signifcant*** within the immediate surrounds of the site, however this quickly reduces to **not significant to Imperceptible** within the wider study area where construction activities will not be discernible. The quality of the construction stage effects will be **negative**. The Proposed Development will have **no discernible effect** on local tourism as no natural amenities impacted.

5.7.1.3 Land and Water Emissions

Based on the natural conditions present and with appropriate mitigation measures (see Section 6.6 of Chapter 6) to reduce the potential for any impact of accidental discharges to ground during this phase, the predicted impacts on land soils, geology and hydrogeology during construction (following EPA EIA Report Guidelines 2022) are considered to have a ***short-term, imperceptible*** significance, with a ***neutral*** impact on quality.

In relation to water quality during the construction phase after mitigation measures have being introduced, there is no evidence of any significant residual impacts

#### 5.7.1.4 Air Emissions

Once the mitigation measures outlined in Section 9.6 of Chapter 9, are implemented the residual impacts on air quality or climate from the construction of the Proposed Development will be ***short-term*** and ***imperceptible.***

#### 5.7.1.5 Noise and Vibration Emissions

As detailed in Chapter 10 (Noise and Vibration), the construction noise assessment has shown that in accordance with the 'significance' thresholds presented in the *British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise* there will not be a significant impact at residential locations in terms of ambient noise levels subject to the implementation of appropriate mitigation measures on site.

#### 5.7.1.6 Traffic and Transportation

As detailed in Section 13.7 of Chapter 13, the predicted impact on traffic and transportation, will be ***short-term***, ***negative*** and ***not significant*** for the construction phase.

#### 5.7.1.7 Major Accident Hazards and/or Natural Disasters

There are no significant potential impacts on Human Health from Major Accident Hazards and/or Natural Disasters; therefore, there are no predicted impacts.

### 5.7.2 Operational Phase

#### 5.7.2.1 Businesses and Residences

The Proposed Development will result in an ***imperceptible, positive*** impact due to increased employment opportunities and improved accessibility to jobs in the North Blanchardstown area during the operation phases.

The predicted impacts on local businesses and residences in relation to air quality, noise, visual impact, and traffic has been summarised below.

#### 5.7.2.2 Amenity and Tourism

With reference to Chapter 11 (Landscape and Visual), the site is not considered to be significant or sensitive from a landscape and visual aspect. Landscape and visual effects arising from the Proposed Development will be ***not significant***, and will generally range from ***moderate*** to ***slight*** and ***neutral.*** Landscape and visual effects from the wider locality, including from the residential areas to the west of the R121, will be ***not significant*** or ***imperceptible***.

The Proposed Development will have **no discernible effect** on local tourism.

#### 5.7.2.3 Land and Water Emissions

There are no likely significant impacts on the land, geological or hydrogeological environment associated with the proposed operational stage of the site with mitigation in place. As such the impact is considered to have a ***long-term, imperceptible*** significance with a ***neutral*** impact on quality i.e. no effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

There is no evidence of any significant residual impacts; the potential impact on surface water during operation (following the EPA Draft EIA Report Guidelines (2017) is considered to have a ***long term, imperceptible Impact,*** with a ***neutral impact*** on quality

Following the NRA criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible*** for the construction and operational phases.

A site-specific detailed Water Framework Directive (WFD) assessment was carried out for the Proposed Development and is detailed in Appendix 7.3 of Chapter 7. The assessment found that overall there was no predicted effects on the WFD status of the waterbodies i.e. no deterioration of the WFD status of the underlying bedrock aquifer.

#### 5.7.2.4 Air Emissions

Once the mitigation measures outlined in Section 9.6 are implemented, the residual impacts on air quality or climate from the operational phases of the Proposed Development will be ***long-term, negative*** and ranging from ***imperceptible*** to ***slight***.

#### 5.7.2.5 Noise and Vibration Emissions

The robust operational noise assessment of fixed plant associated with the proposed plant has shown that in accordance with the scale in the EPA EIA Report Guidelines 2022 there will be an slight to moderate, negative, long term effect at the closest residences identified on Figure 10.3. That aside, the predicted change in background noise level due to current application is the order of 1.0dB during daytime periods between 2 to 5dB during night time periods. Ambient noise levels are and will continue to be dictated by road traffic noise in the area while a low level of plant noise is expected to be audible during lulls in other sources (e.g. distant traffic noise).

It is reiterated that the predictions presented here assume that day to day plant is operating at full/high duty which is a conservative assumption. In all likelihood the actual noise levels on the ground will be lower than those presented here.

In terms of the nearest commercial property a moderate, negative, long-term effect is predicted however the character of the noise environment in the vicinity of this location will not be altered.

The operational noise assessment of vehicle movements associated with the site has shown that in accordance with the scale in the EPA EIA Report Guidelines 2022 there will be an imperceptible impact off site noise sensitive locations considering existing traffic volumes on the local road network.

#### 5.7.2.6 Traffic and Transportation

The assessment of the additional traffic movements associated with the Proposed Development during the operational phase is presented in Chapter 13 (Traffic and Transportation). The residual traffic impacts of the Proposed Development will be ***slightly negative and imperceptible***.

#### 5.7.2.7 Major Accident Hazards and/or Natural Disasters

There are no significant potential impacts on Human Health from Major Accident Hazards and/or Natural Disasters; therefore, there are no predicted impacts.

## 5.8 RESIDUAL IMPACTS

The residual impacts of the Proposed Development on human beings will be ***imperceptible*** to ***slight***.

The cumulative traffic impact of the development and other surrounding developments has been addressed in Chapter 16 of this EIA Report.

Interactions are addressed in Chapter 17 of this EIA Report.

## 5.8 REFERENCES

Environment Protection Agency, *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022)

Environment Protection Agency, *Advice Notes for Preparing Environmental Impact Statements* Draft (EPA, 2015)

European Commission (EC), *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (EC, 2017).

Central Statistics Office. Statbank Databases (Accessed January 2022, https://www.cso.ie/en/databases/)

Central Statistics Office. Census of Population, 2011 and 2016. (Accessed January 2022, https://www.cso.ie/en/census/)

Central Statistics Office. Labour Force Survey, 2020 (Accessed January 2022, www.cso.ie/en/statistics/labourmarket/labourforcesurveylfs)

Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU)

# 6.0 LAND, SOILS, GEOLOGY & HYDROGEOLOGY

## 6.1 INTRODUCTION

This chapter assesses and evaluates the potential impacts of the Proposed Development on the land, soil, geological and hydrogeological aspects of the site and surrounding area. In assessing likely *potential* and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

## 6.2 METHODOLOGY

### 6.2.1 Guidelines

This chapter evaluates the effects, if any, which the Proposed Development has had or will have on Land, Soils, Geology and Hydrogeology as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015) is also followed in this geological and hydrogeological assessment and classification of environmental effects. Due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI 2013). In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII, 2009) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the land, soil, geological and hydrogeological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication).

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII criteria for rating the magnitude and significance of impacts on the geological related attributes and the importance of hydrogeological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-5 in Appendix 6.1.

The principal attributes (and effects on same) to be assessed include the following:

- Geological heritage sites in the vicinity of the perimeter of the subject site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;

- The quality, drainage characteristics and range of agricultural uses of soil around the site;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site as well or requirement to remove it off-site as waste for disposal or recovery;
- High-yielding water supply springs/ wells in the vicinity of the site to within a 2km radius and the potential for increased risk presented by the Proposed Development;
- Classification (regionally important, locally important etc.) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the Proposed Development associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality;
- Natural hydrogeological/karst features in the area and potential for increased risk presented by the activities at the site; and
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally.

### 6.2.2 Sources of Information

Desk-based geological and hydrogeological information on the substrata underlying the extent of the site and surrounding areas was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping;
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information;
- National Parks and Wildlife Services (NPWS) – Protected Site Register;
- Fingal County Council - illegal landfill information;

Site specific data was derived from the following sources:

- CS Consulting Group, Site-Specific Flood Risk Assessment, Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 (June 2022) – Chapter 7, Appendix 7.2.
- CS Consulting Group (2022) *Engineering Services Report – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15* which accompanies planning application.
- CS Consulting Group (2022) *Outline Construction Management Plan – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15* which accompanies planning application.
- Published EIS for adjacent site Bristol Myers Squibb (BMS) site – *(Jacobs, 2015)*
- Published EIS for Permitted Development, Building A – (AWN, 2017)
- Published EIAR for Permitted Development, Buildings B & C – (AWN, 2019)

## 6.3 RECEIVING ENVIRONMENT

The receiving environment is discussed in terms of; geology, soils, hydrogeology and site history including potential for contamination.

The Proposed Development site is c. 13.14 hectares in extent and is located at Cruiserath Road, Dublin 15 (refer to Chapter 1 Figure 1.1). The Proposed Development site is located in the administrative jurisdiction of Fingal County Council (FCC). This Proposed Development is the third phase of the masterplan strategy for the Data Centre Campus that was granted planning permission in 2017 under FCC planning reg. ref. FW17A/0025 (An Bord Pleanála ref. PL06F.248544) and for two (2) no. data centre buildings which are under construction on the eastern portion of the masterplan site (permitted under FCC reg. ref. FW19A/0087) in 2019.

### 6.3.1 Topography & Setting

The topography is relatively consistent and flat across the site (approximately +85 metres above ordinance datum (mAOD)) with the land surface gently sloping from south to north.

The site was previously used for arable crops and has been left fallow for the past number of years. Much of the surrounding land has been developed in the past 10-15 years for industrial and commercial use (to the east and south) and residential (to the west) uses. However, in recent years the site has changed uses from agricultural to industrial due to the Data Centre Campus that was granted planning permission in 2017 under FCC planning reg. ref. FW17A/0025 (An Bord Pleanála ref. PL06F.248544) and in 2019 (permitted under FCC reg. ref. FW19A/0087).

The Proposed Development site is adjoined within the overall landholding by the two (2) no. permitted data centre buildings which are under construction at the east (permitted under FCC reg. ref. FW19A/0087) and by permitted Building A to the which has been constructed to the south. At the Western Boundary of the site is the Cruiserath Road R121 (dual carriageway) and residential developments, and the northern boundary of the site adjoins undeveloped land and the Carlton Hotel.

### 6.3.2 Areas of Geological Interest & Historic Land-Use

The GSI online data base was consulted regarding areas of geological interest in the vicinity of the Proposed Development site. This confirmed that no geological heritage site has been identified in the vicinity of the Proposed Development site. The closest County Geological Site is Huntstown Quarry c. 2.5km east of the site. The Priest Town Tectonite (Limestone boulder moraine) is also located c. 4.2km NNW of the site.

Details of the site history and previous land use are included in Chapter 12 Archaeology, Architectural and Cultural Heritage. The assessment of site history (OSI, 2022) confirms that the site has been in agricultural use per the earliest mapping available (1837-1842).

According to the EPA website, there are a number of licensed facilities in the locality (BMS, Ipsen Manufacturing Ltd., Alexion, Mallinckrodt and Hitech Plating Ltd.). There are no licensed waste sites in the vicinity of the site. Previous consultation with FCC confirmed that there are no known Section 22 illegal landfills or other historic landfills within 1 km of the site (AWN telephone communication in 2017). This has been confirmed by subsequential site investigations and recent development at the site.

### 6.3.3 Regional Soils

The general lithological/geological sequence of the overburden within the Dublin area comprises the following units:

| Superficial Deposits |
|---|
| Made Ground |
| Estuarine/alluvial clays and silts |
| Estuarine/alluvial gravels and sands |
| Glaciomarine clays, silts and sands |
| Glacial Till (drift) |
| Glacial gravels and sands |

***Table 6.1*** *Superficial Deposits in Dublin Region*

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

Figure 6.1 presents the soil type predominantly covering the site area; this is classified as BminDW – Basic Deep Well Drained Mineral (grey, brown podzolics, brown earths) (Source: GSI/Teagasc soil mapping). An area of made ground is shown to the south of the site and includes Mulhuddart graveyard. Further to the north and east of the site are soils composed of BminPD - surface water gleys/groundwater gleys basic (Source: GSI/Teagasc soil mapping).


***Figure 6.1*** *Soils map for the Proposed Development site (boundary indicated in red) (Source: www.gsi.ie)*

Figure 6.2 illustrates the subsoil types found surrounding the site. The subsoil type located at the Proposed Development is predominantly classified as TLs – Till type subsoil comprising Limestone till (Carboniferous) of variable texture.

Depth to bedrock has been shown to be very shallow in this area based on previous site investigation at the Proposed Development site and surrounding developed sites. In general bedrock depth varies from at surface to 3.5 m bgl. Further description of site-specific data and aquifer vulnerability is provided in Section 6.3.5 below.


***Figure 6.2*** *Subsoils map for the Proposed Development site (boundary indicated in red) (Source: www.gsi.ie)*

The boulder clays present generally exhibit very low permeability in the order of $1x10^{-7}$ to $1x10^{-9}$ m/s or lower. The glacial boulder clay will tend to act as an aquitard (a confining layer with low permeability) where present in significance thickness.

### 6.3.4 Regional Geology

Inspection of the available GSI mapping (GSI, 2022) shows that the bedrock geology underlying the site belongs to three (3) no. formations: TC - Tober Colleen Formation consisting of calcareous shale and limestone conglomerate; RU - Rush Conglomerate Formation comprising conglomerate, shale, and limestone; and LU - Lucan Formation consisting of 'Calp' limestone (i.e. sequences of dark grey massive limestones, shaley limestones, and massive mudstones). The bedrock geology (100k solid geology; GSI, 2022) of the site is shown on Figure 6.3 below.

No bedrock outcrop was identified on the site. However, bedrock outcrops at a number of locations within this region are shown in Figure 6.2 above (orange shaded layers).

In terms of the structural relationship of the area, the GSI database (refer also to Figure 6.3) does not show any faults on the site or within the immediate vicinity of the site. A series of right lateral strike slip faults are located approximately 2km from the site, which trend in a NE-SW direction. These displace a series of unbedded limestones and a mixture of sandstones, shales and limestones.


***Figure 6.3*** *Bedrock geology map (Source: www.gsi.ie)*

### 6.3.5 Regional Hydrogeology

#### 6.3.5.1 Description of Water Body

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer ($km^2$), well yield ($m^3/d$), specific capacity ($m^3/d/m$) and groundwater throughput ($mm^3/d$). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The bedrock aquifer underlying the site according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map is classified as a (*Pl*) *Poor Aquifer - Generally Unproductive except for Local Zones* on the eastern portion of the site. The western portion of the site the classification is defined as (*Ll*) *Locally Important Aquifer*, i.e. *bedrock aquifer which is moderately productive only in local zones*. Figure 6.4 below presents the current bedrock aquifer map for the area surrounding the site.

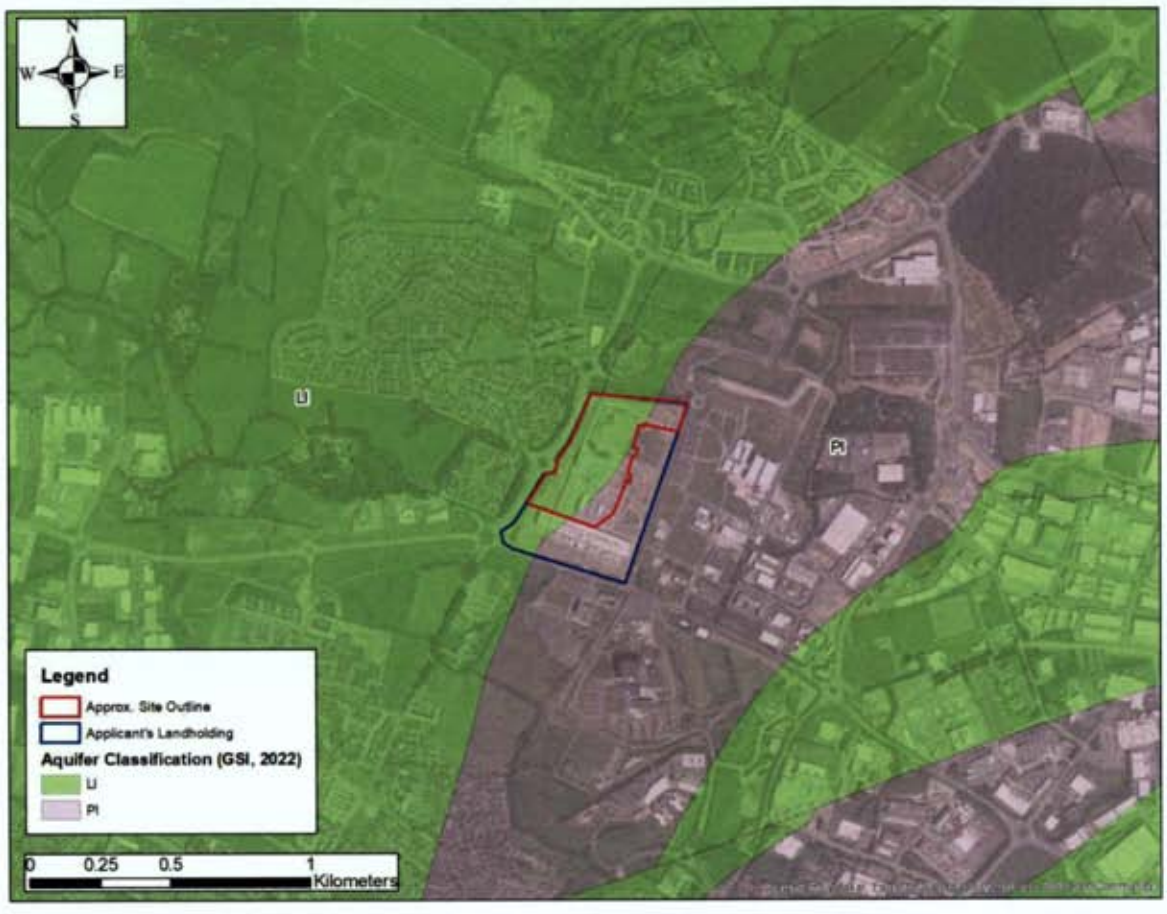


***Figure 6.4*** *Aquifer Classification map (Source: www.gsi.ie)*

The site is underlain by the Dublin Groundwater Body (EU code: IE_EA_G_008) which has been investigated by the GSI and is described as having a groundwater flow regime of *PP* which is *poorly productive bedrock aquifer.*

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

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities. The GSI currently classifies the aquifer vulnerability in the region of the subject site as *High (H)* which indicates an overburden depth of 3m-5m of low permeability soil present (refer Figure 6.5 below). Based on site specific trial pits from previous site investigations at the location of the Proposed Development (see Section 6.3.6 below for more detailed information) confirmed an overburden thickness up to c. 2.0m. As such the vulnerability at the site is considered to be *High to Extreme* vulnerability following the GSI classification system for aquifer vulnerability assessment.

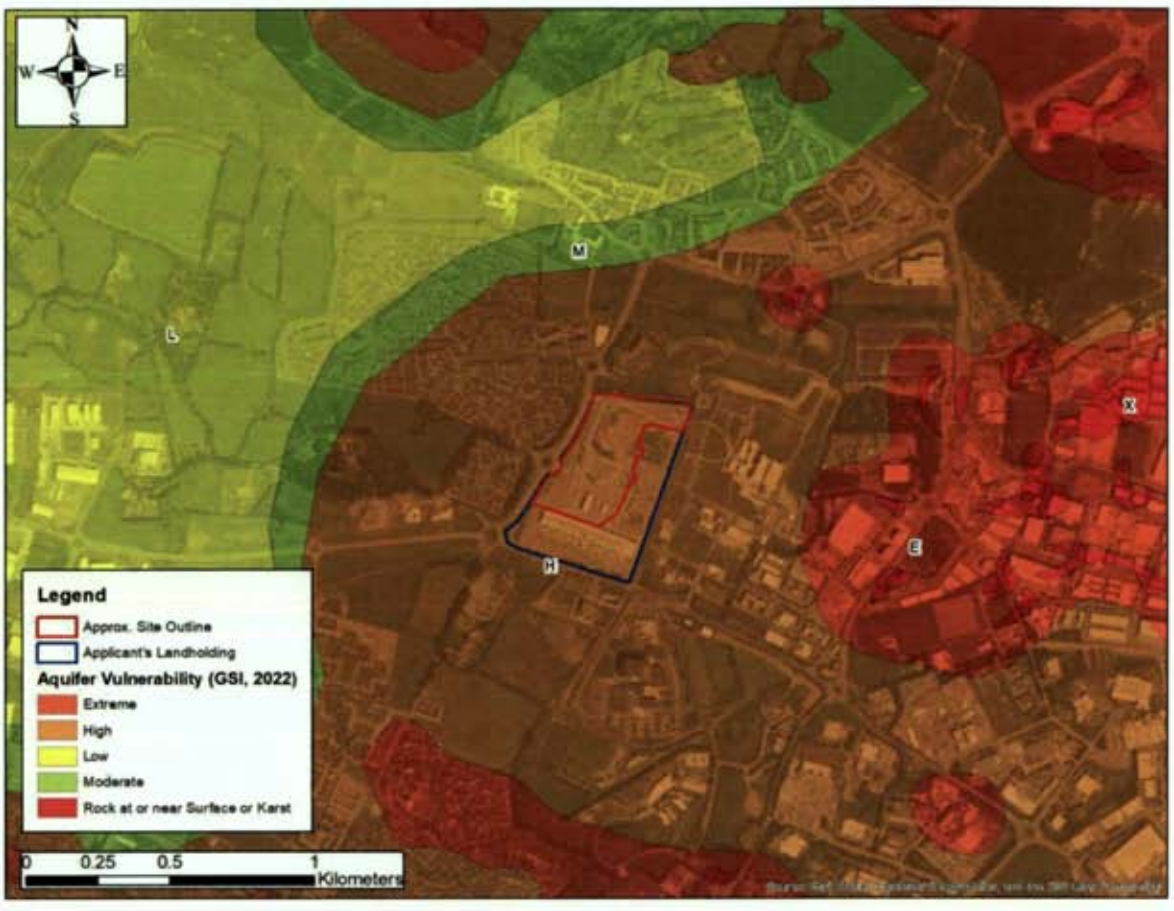


***Figure 6.5*** *Aquifer Vulnerability map (Source: www.gsi.ie)*

6.3.5.2 Groundwater Wells and Flow Direction

There are no recorded groundwater resource protection zones in the area of the proposed site, i.e. zones surrounding a groundwater abstraction area.

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. This current index, however, shows a number of groundwater monitoring and abstraction wells within a 3 km radius of the site; the abstraction wells generally supply a mix of use ranging from domestic to public to industrial use. These wells are generally located in the Calp Limestone with recorded yields ranging between ca. 16m$^3$/d to 115m$^3$/d.

Figure 6.6 below presents the GSI well search for the area surrounding the site (Note this source does not include all wells) and Table 6.1 below summarises the details of some of the wells present within this search area.


***Figure 6.6*** *GSI Well Search (GSI, 2022)*

The flow direction in the overburden generally follows no fixed pattern or trend. Flows of this nature are typical of low permeability clay strata with intermittent fill areas, where often the water level measures represent pore water seepages into the overburden monitoring well (opposed to bedrock wells) or perched groundwater conditions (not bedrock aquifer water). The clay is not considered to be a contamination pathway based on the discontinuous perched/pore water table meaning there is no continuous connectivity of shallow groundwater to a notable groundwater bogy (GWB).

| GSINAME | Name | TYPE | Depth (m) | Depth to Bedrock (m) | EASTING | NORTHING | TOWNLAND | COUNTY | Water Strike (m) |
|---|---|---|---|---|---|---|---|---|---|
| 2923NEW041 | Ladys Well | Spring | | | 306990 | 241010 | TYRRELSTOWN | Dublin | |
| 2923NEW046 | DH 1 | Borehole | 20.8 | 6.2 | 306090 | 243260 | KILMARTIN | Dublin | |
| 2923NEW047 | DH 2 | Borehole | 22.5 | 2.3 | 306890 | 242310 | TYRRELSTOWN | Dublin | |
| 2923NEW048 | DH 3 | Borehole | 12 | 2 | 307210 | 242210 | TYRRELSTOWN | Dublin | |
| 2923NEW049 | DH 4 | Borehole | 22.2 | 2 | 307400 | 242120 | TYRRELSTOWN | Dublin | |
| 2923NEW050 | DH 5 | Borehole | 23 | 2.8 | 307200 | 242610 | TYRRELSTOWN | Dublin | |
| 2923NEW051 | DH 6 | Borehole | 23 | 2.9 | 307480 | 242720 | TYRRELSTOWN | Dublin | |
| 2923NEW052 | DH 7 | Borehole | 24 | 4 | 306840 | 242990 | KILMARTIN | Dublin | |
| 2923NEW053 | DH 8 | Borehole | 24.5 | 5.9 | 307230 | 242880 | KILMARTIN | Dublin | |
| 2923NEW054 | DH 9 | Borehole | 23 | 3 | 307680 | 242350 | HOLLYWOODRATH | Dublin | |
| 2923NEW055 | DH 10 | Borehole | 23.5 | 3.5 | 307820 | 242700 | HOLLYWOODRATH | Dublin | |
| 2923NEW056 | DH 11 | Borehole | 23.5 | 7.5 | 306580 | 242640 | POWERSTOWN | Dublin | |
| 2923NEW057 | DH 12 | Borehole | 23.6 | 6.2 | 306610 | 242460 | POWERSTOWN | Dublin | |
| 2923NEW058 | BH 1 | Borehole | 7.4 | 7.4 | 306070 | 243250 | KILMARTIN | Dublin | 7.4 |
| 2923NEW059 | BH 2 | Borehole | 6.8 | 6.8 | 306830 | 242290 | TYRRELSTOWN | Dublin | 6.7 |
| 2923NEW060 | BH 3 | Borehole | 3 | 3 | 307830 | 242730 | HOLLYWOODRATH | Dublin | 2.7 |

***Table 6.1*** *GSI Well Index Table from well search (GSI, 2022)*

From static water levels (SWL) measured and included in the published EIS for adjacent BMS site (Jacobs, 2015) groundwater flow has been found to be in a southerly direction towards the Tolka River and likely towards the River Liffey on a more regional scale.

6.3.5.3 Groundwater Quality

The European Communities Directive 2000/60/EC established a framework for community action in the field of water policy (commonly known as the Water Framework Directive [WFD]). The WFD required '*Good Water Status*' for all European water by 2015, to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both *'Good Ecological Status'* and *'Good Chemical Status'*.

The Groundwater Body (GWB) underlying the site is the Dublin GWB (EU Groundwater Body Code: IE_EA_G_008). Currently, the EPA (2022) classifies the Dublin GWB as having *'Good Status'*, with a Ground Waterbody Risk score of *'under review'*.

During the site investigation carried out in March 2016, shallow groundwater seepage (perched groundwater within the overburden) was encountered at only two locations, BH6 (at 1.7m BGL) and BH8 (at 1.2m BGL). Groundwater wells were installed for water sample collection. It should be noted no significant water inflows were noted at all other excavations. Groundwater was encountered at BH6 and BH8 (see Figure 6.9 below) within the subsoil however the water table is discontinuous and no significant groundwater dewatering is required for construction as discussed in Section 6.4.

These wells were sampled for a wide range of priority pollutants: Volatile Organic Compounds (VOCs), metals, anions and cations and hydrocarbons (extractable petroleum hydrocarbons and mineral oil). There was only one exceedance of the threshold values (GTV's) as defined by Groundwater Regulations S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended) & S.I. No. 366/2016 - European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016 and the EPA (IGV) Interim Guideline Values from the document Towards Setting Guideline Values for the Protection of Groundwater in Ireland – Interim Report 2003. This exceedance was for nitrate at both locations which is likely to be indicative of the recent/current agricultural use of the site. All other parameters were not detected or were measured at less than the criteria set out in the groundwater regulations S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended) & S.I. No. 366/2016 - European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016 and the EPA's 2003 interim guideline limit values from the document Towards Setting Guideline Values for the Protection of Groundwater in Ireland – Interim Report 2003. A summary of these results is presented in Appendix 6.3.

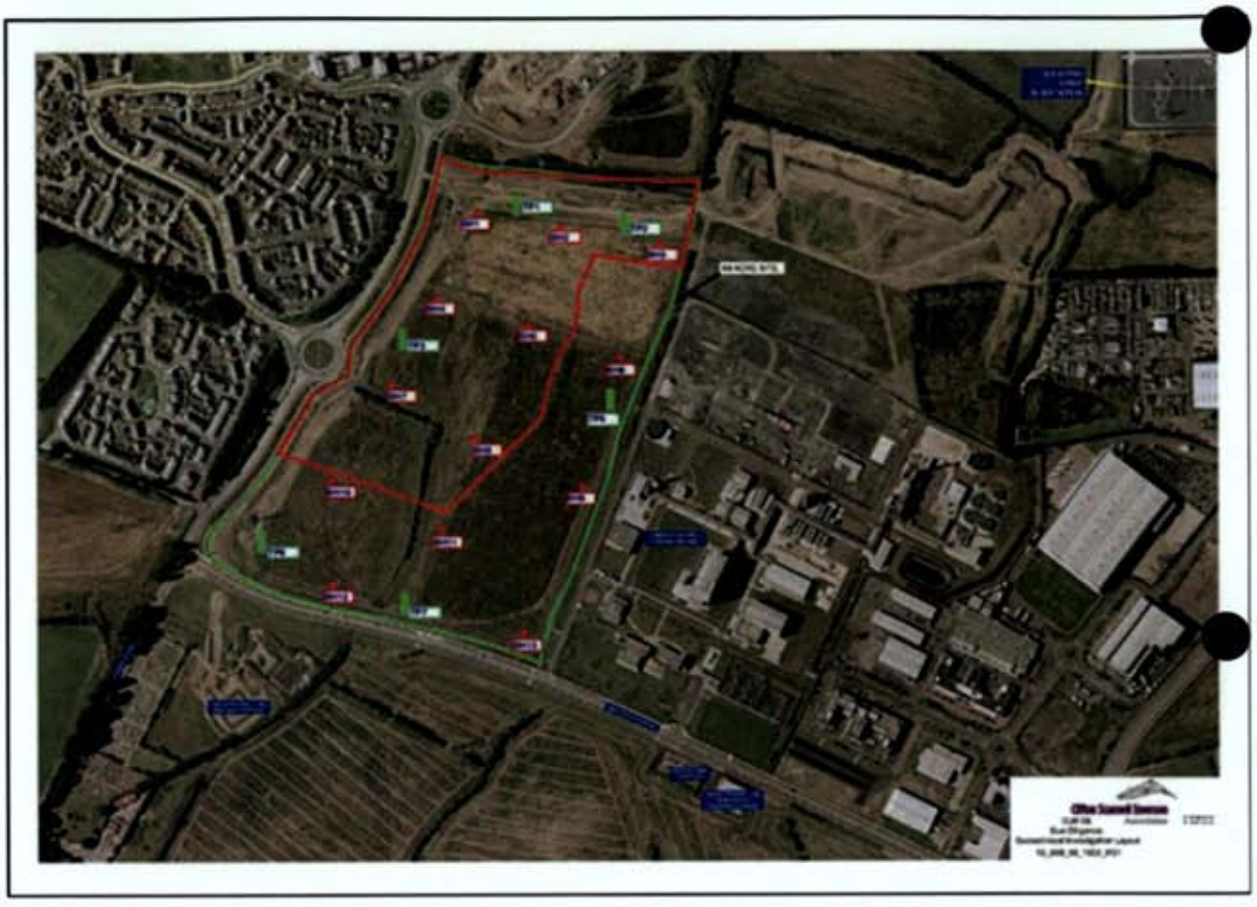

***Figure 6.9*** *2016 Site Investigation Locations (Source: CSEA, 2017). Approx. Site Outline highlighted in red.*

6.3.5.4 Hydrogeological Features

According to the GSI Karst database there is no evidence of karstification (bedrock prone to dissolution leading to underground drainage systems such as caves and large crevices) in this area.

6.3.5.5 Areas of Conservation

There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or immediately adjacent to the facility. The nearest site designated for nature conservation is the Rye Water Valley/Carton SAC (Site Code 001398), which is located approximately 8.82 km to the west and associated with a different catchment. There are no pollutant linkages between the site and this area of conservation. Refer to Chapter 8 Biodiversity of the EIA Report for further details.

6.3.5.6 Cross Sections

Figures 6.10 and 6.11 present the location of representative cross sections through the site to show the local hydrogeology conceptual site model (CSM) which is as follows:

- The site is situated on relatively flat ground within lands zoned for industrial development and with a ground elevation of approximately +85mAOD (Malin Head datum).

- The profile on site is relatively consistent and comprises of sandy gravelly clay overlying weathered Limestone/Shale bedrock. Depth to bedrock is shallow in the region with outcropping of bedrock evident in the surrounding area. Generally, depth to weathered Limestone/Shale bedrock ranges from 0.3 - 2.0mbgl at the site.
- Depth to the water table is generally within the weathered limestone shale bedrock (no continuous perched water table). At the site of the Proposed Development it is approximately 2.1-3.2m below ground level (AWN, 2019, Permitted Development Bulidings B and C).
- Review of the geology and hydrogeology in the surrounding region indicates that there are no sensitive receptors such as groundwater-fed wetlands, significant public water supplies/ Group Water Schemes or geological heritage sites within the immediate vicinity which could be impacted by the Proposed Development.
- The aquifer is a poorly productive bedrock aquifer over part of the site and moderately productive only in local zones for the remainder of the site and is not used for public water supply or generally for potable use.
- There is a direct pathway to the underlying aquifer during construction when the overburden is removed for foundations etc...
- Groundwater flow from the site will be localised based on the discontinuous fracturing within the bedrock in the Dublin Groundwater Body.
- Based on the NRA methodology, the criteria for rating site importance of geological and hydrogeological features, the importance of the features at this site is rated as ***Low Importance***. This is based on the assessment that the attribute has a low-quality significance or value on a local scale.

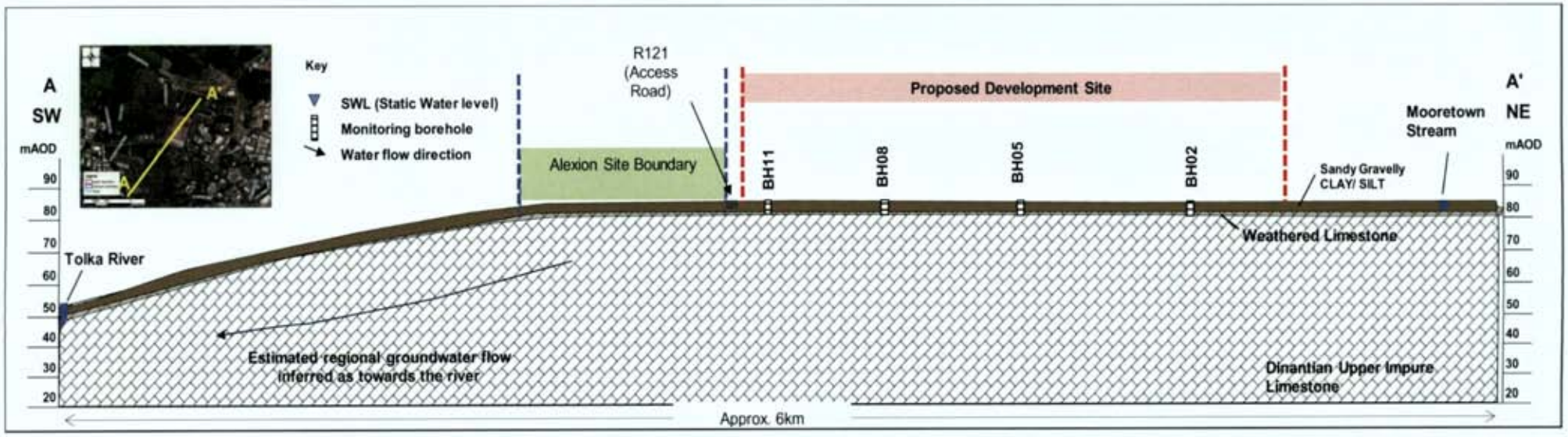


***Figure 6.10*** *A-A' cross section. To note Tober Collen and Rush Conglomerate formations are being grouped and presented as Dinantian limestones. See Figure 6.9 above for SI (site investigation) locations.*

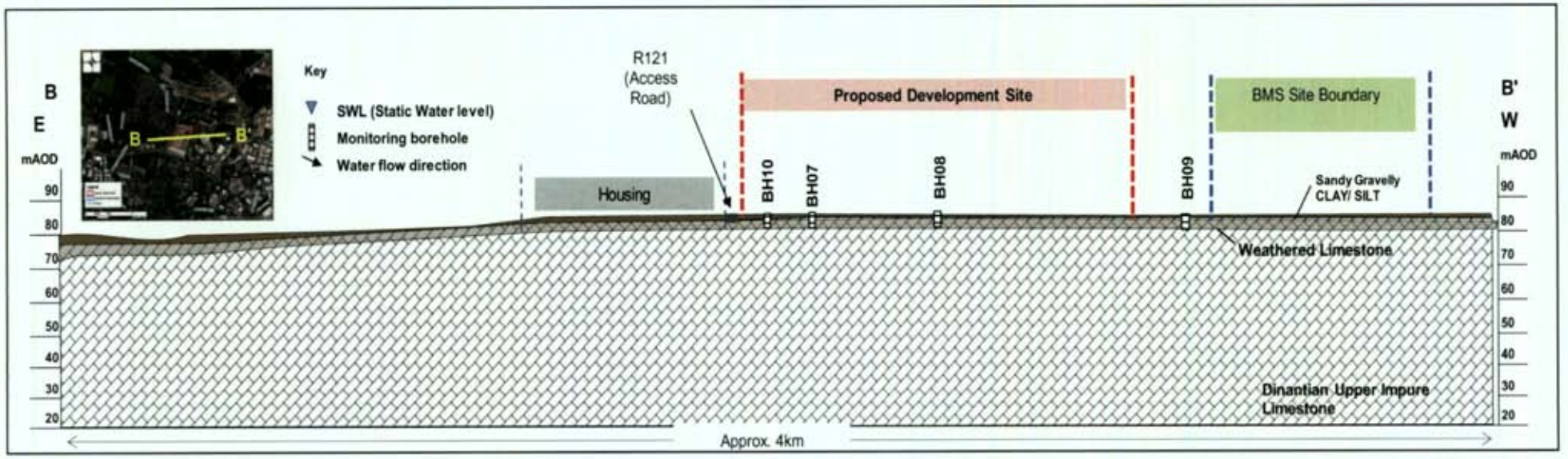


***Figure 6.11*** *B-B' cross section. To note Tober Collen and Rush Conglomerate formations are being grouped and presented as Dinantian limestones. See Figure 6.9 above for SI (site investigation) locations.*

6.3.5.7 Rating of site importance of the geological and hydrogeological features

Based on the NRA methodology (refer Appendix 6.1), the criteria for rating site importance of hydrogeological features, the importance of the hydrogeological features at this site is rated as ***Low Importance***. This is based on the assessment that the attribute has a low-quality significance or value on a local scale. The aquifer is a poorly productive bedrock aquifer over part of the site and moderately productive only in local zones for the remainder of the site and is not used for public water supply or generally for potable use.

### 6.3.6 Local Soils & Geology

A site investigation was undertaken by IGSL under the supervision of AWN at the site in March 2016 as part of an initial due diligence assessment. 19 no. investigation locations (6 no. trials pits and 13 no. boreholes) were completed across the overall landholding. As there have been minimal changes to the site since this investigation (no construction or other activities) the findings and results can be considered to be still valid. Borehole and trial pit logs are presented in Appendix 6.2.

From the site investigation undertaken, the overburden at the site is as follows:

- Soft to firm brown sandy slightly gravelly clay overlying a firm to stiff brown sandy slightly gravelly clay with occasional cobbles, becoming more granular with depth.
- Medium firm – stiff brown grey clayey sandy gravel with occasional cobbles (possibly very weathered bedrock)
- Weathered Limestone/Shale bedrock encountered from 0.3 - 2.0mbgl with the average depth indicated as 1.8mbgl.

Apart from a localised and minor amount of plastic encountered at a shallow level (1.6 – 1.8mbgl) in one borehole (BH8), natural overburden material was encountered with no evidence of any area of contamination across the Proposed Development site. A review of the site investigation data for this and adjacent recent developments at the first and second phase of the data centre developments at the Proposed Development site (southern and eastern boundaries), Mallinckrodt, Alexion and BMS showed natural overburden to be present with no evidence of any areas of waste disposal present. Therefore, the plastic encountered at this one location is localised and is likely derived from past agricultural activities at the site.

### 6.3.7 Economic Geology

The EPA Extractive Industry Register and the GSI mineral database were consulted to determine whether there were/ are any mineral sites close to the subject site. There are no historical mines at or adjacent to the subject property. The closest active quarry is Huntstown Quarry c.2.5km east of the site operated by Roadstone Ltd, North Road, Finglas. The nearest recorded mineral site is c. 1.2km east of the site (relating to traces of lead noted in a neighbouring old limestone quarry).

### 6.3.8 Radon

According to the EPA (now incorporating the Radiological Protection Institute of Ireland) the site location in Cruiserath is a Very Low Radon Area where is it estimated that less than 1% of dwellings (About 1 in 20 homes in this area is likely to have high radon levels) will exceed the Reference Level of 200 Bq/m$^3$. This is the lowest of the five radon categories which are assessed by the EPA.

### 6.3.9 Geohazards

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff and leads to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. There have been no recorded landslide events at the site. The GSI landslide database was consulted and the nearest landslide to the Proposed Development was 4.7km to the south-west, referred to as the M3 J4 Clonee event which occurred on 03rd of February 2014 (GSI_LS16_0042). Due to the local topography and the underlying strata there is a negligible risk of a landslide event occurring at the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network operated by the Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) which has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland operated by DIAS. The seismic data from the stations comes into DIAS in real-time, and is studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish Sea (1.0 – 2.0 $M_l$ magnitude) and ~50 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the Proposed Development site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

### 6.3.10 Land Take

There will be a loss of land available for greenfield/agricultural use due to the development. However, the area of development is relatively small in the context of agricultural land available in the overall region. This change of land use has already been established for the Permitted Development (FCC Reg. Ref. FW17A/0025 & ABP Reg. Ref. PL 06F.248544) and two (2) no. data centre buildings under construction on the eastern portion of the masterplan site (permitted under FCC reg. ref. FW19A/0087).

### 6.3.11 Summary & Type of Geological/Hydrogeological Environment

Based on the regional and site-specific information available the type of Geological/ Hydrogeological Environment as per the IGI Guidelines is:

***Type A – Passive geological/hydrogeological environment.***

A summary of the site geology and hydrogeology is outlined thus:

- The Proposed Development site has been greenfield/agricultural use historically. There is no evidence of any historical waste disposal or source of contamination.
- The site is not underlain by a Regionally Important aquifer.
- The site is underlain by the Tober Colleen, Rush Conglomerate and Lucan formations comprising dark shaley limestone known as Calp.

## 6.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A detailed description of the Proposed Development is provided in Chapter 2 of this EIA Report. The activities associated with the Proposed Development which are relevant to the land, soils, geology and hydrogeological environment are detailed in Table 6.2 below.

| Phase | Activity | Description |
|---|---|---|
| Construction | Discharge to Ground | Run-off percolating to ground at the construction site. |
| | Earthworks: Excavation of Superficial Deposits | Cut and fill will be required to facilitate construction, expansion of drainage network and ancillary works. Subsoil stripping and localised stockpiling of soil will be required for short periods of time during construction. There will be three (3) no. phases to the Proposed Development. It is estimated that a volume of c. 40,671 $m^3$ of cut material shall be generated during the construction of the Proposed Development. The total net fill to formation level that can be reused from the cut material is approx. 5,046 $m^3$. Therefore, a total of approx. 35,625 $m^3$ of cut to be exported off-site. Imported engineered fill from formation level to underside of Finished Level (u/s of tarmac, ground slab etc.) is estimated at approx. 17,560 $m^3$ (estimate-imported engineered material). Topsoil will be reused on site where possible. |
| | Storage of soils/aggregates | Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a compound area to prevent contamination.<br>Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment and solid matter. Materials will be sent off site for recycling where possible and, if not suitable for recycling, materials will be disposed of to an appropriate permitted/licensed waste disposal facility. |
| | Storage of hazardous Material | Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e., fuel storage will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage. |
| | Import/Export of Materials | Excavated material will be reused on site where possible i.e. landscaping and berm construction. In the event that any material cannot be re-used on site, it may be re-used offsite for beneficial use on other sites with appropriate planning/waste permissions/derogations (e.g. in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011) as amended or will be reused, recovered and/or disposed off-site at appropriately authorised waste facilities. The removal of waste from the site will be carried out in accordance with Waste Regulations, Regional Waste Plan (Eastern Midland Region) and Waste Hierarchy/Circular Economy Principals. Refer to Chapter 15 Waste Management for further detail.<br>It is estimated that a volume of c. 40,671 $m^3$ of cut material shall be generated during the construction of the Proposed Development. Therefore, a total of approx. 35,625 $m^3$ of cut to be exported off-site. Imported engineered fill from formation level to underside of Finished Level (u/s of tarmac, ground slab etc.) is estimated at approx. 17,560 $m^3$ (estimate-imported engineered material). |
| | Dewatering | There will be no requirement for dewatering during the construction phase due to the minor excavations needed for the foundations and the nature of the subsoils and bedrock present across the Proposed Development site. |
| Operation | Increase in hard standing area | Altering of local recharge due to increase in hard standing area (even allowing for SuDs). |
| | Storage of hazardous Material | Bulk fuel oil storage (diesel / renewable diesel) is required for operational phase. Buildings F and G will have a 40,000L capacity tank within an adequately sized bund serviced from a contained refuelling pad. Diesel / renewable diesel will be piped from the bulk storage tank to the back-up generator units (each generator will have its own internal double-skinned belly tank). Building H has one generator which will have its own internal double-skinned belly tank with 9,000L capacity. The risk to the aquifer is considered low due to the mitigation in place for containment of bulk oil storage, delivery and distribution and use of oil interceptors on the stormwater system downgradient the offloading area and prior to discharge from the site. |

***Table 6.2*** *Site Activities Summary*

As outlined in Table 6.2 the activities required for the construction phase of the Proposed Development represents the greatest risk of potential impact on the geological environment. These activities primarily pertain to the site preparation, excavation, levelling and infilling activities required to facilitate construction of building foundations, access roads, car parking areas, installation of services and ancillary works.

## 6.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The potential geological and hydrogeological impacts during the construction and operations are presented below. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in section 6.6. Due to the inter-relationship between land, soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 6 and 7 (Hydrology) of the EIAR. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 6.6 below.

### 6.5.1 Construction Phase

The following risks to land soil and groundwater have been considered:

- Excavation of soil and near-surface rock head will be required for levelling of the site to render it suitable for building the building platform. Local removal and reinstatement (including infilling) of the *'protective'* topsoil and subsoil cover across the development area at the site will not change the overall vulnerability category for the site which is already *'high to extreme'*. Capping of significant areas of the site by hardstand/ building following construction and installation of drainage will minimise the potential for contamination of the aquifers beneath the site: the *Poor Aquifer (Pl)* and *the Locally Important Bedrock Aquifer (Ll)* which is moderately productive in local zones only. Site investigation and laboratory analysis has not identified any existing contamination with hazardous substances. Some minor exceedances of nitrogen derivatives from agricultural use were identified via groundwater sample analysis. No treatment of any water (*if required*) will be required during construction works.
- As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer. The potential main contaminants include:
  - Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates) – arising from excavation and ground disturbance;
  - Cement/concrete (increase turbidity and pH) – arising from construction materials;
  - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
  - Wastewater (nutrient and microbial rich) – arising from poor on-site toilets and washrooms.

Accidental spillages which are not mitigated may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoil's and impact the underlying groundwater. Groundwater vulnerability at the site is currently classified as *'High' to 'Extreme'* throughout the Proposed Development site. Any soil stripping will also further reduce the thickness of subsoil and the natural protection they provide to the underlying aquifer.

*Loss of agricultural land*

There will be a limited local loss of agricultural soil however, the area of development is small in the context of the overall agricultural land available in the region. However, as the land holding is being used as a data centre development, it is unlikely that this greenfield portion of the site would be used for agricultural purposes.

These potential impacts are not anticipated to occur following the mitigation measures outlines in Section 6.6.1.

Summary of the Construction Phase Impacts

A summary of construction phase impacts for the Proposed Development (with and without mitigation) following EPA (2022) EIA guidelines is provided below.

The magnitude of the impact for the construction phase without mitigation and design measures is *short-term* in duration with *Not Significant effect* rating to the underlying subsoil and aquifer present across the Proposed Development site.

### 6.5.2 Operational Phase

The following risks have been considered in relation to the operational phase of the development:

- During the operational phase there is a small potential for leaks/ spillages from the fuel storage (bulk storage and local storage at the back-up generators) to occur on site. In addition to this there is a potential for minor leaks/spillages from vehicles along access roads and in parking areas. Any accidental emissions of hydrocarbons could cause soil/groundwater contamination if the emissions are unmitigated. However, as those are hardstand, any contaminated water would discharge through the stormwater sewers rather than to ground.
- As above, in the event of a fire at the facility, firewater could become contaminated and in the absence of mitigation may contaminate soil and groundwater.
- There are no discharges to ground included in the design and no abstractions from the aquifer.

These potential impacts are not anticipated to occur following the mitigation measures outlines in section 6.6.2.

There are no discharges to ground included in the design and no abstractions from the aquifer.

Summary of the Operational Phase Impacts (without mitigation)

A summary of operational phase impacts for the Proposed Development (with and without mitigation) following EPA (2022) EIA guidelines is provided below.

The magnitude of the impact for the operational phase without mitigation and design measures is *Long-term* in duration with *imperceptible effect* rating to the underlying aquifer present across the Proposed Development site.

The magnitude of the impact for the operational phase with mitigation and design measures is *Long-term* in duration with *imperceptible effect* rating to the underlying aquifer present across the Proposed Development site. As design and mitigation measures are in place all spills would go to storm water which are equipped with interceptors and/or be contained within bunds.

### 6.5.3 Do Nothing Scenario

Immediately to the south of the proposed site, permission has been granted for the development of a data centre facility (Building A) and associated ancillary development (FCC Reg. Ref. FW17A/0025 & ABP Reg. Ref. PL 06F.248544) and for two (2) no. data centre buildings under construction on the eastern portion of the masterplan site (permitted under FCC reg. ref. FW19A/0087). Should the Proposed Development not take place, the southern portion of the site and the perimeter of the overall landholding will be subject to clearance and landscaping as part of the Permitted Development. Once this construction is complete, the land, soils, geological and hydrogeological environment would be unchanged with no hardstand cover or soil removal.

## 6.6 REMEDIAL AND MITIGATION MEASURES

The design has taken account of the potential impacts of the development on the soils, geology and hydrogeology environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the surrounding land, soils, geology and hydrogeology.

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

### 6.6.1 Construction Phase

In order to reduce impacts on the soils and geology environment a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation and export from site;
- Sources of fill and aggregates for the Proposed Development;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

*Construction Environmental Management Plan*

An Outline Construction Management Plan (CS Group, 2022) has been prepared for planning which details project-specific construction methodologies. In advance of work starting on site, the works Contractor will prepare a Construction Methodology document taking into account their approach and any additional requirements of the Design Team or Planning Regulator. The Contractor will also prepare a Construction Environmental Management Plan (CEMP). The CEMP will set out the overarching vision of how the construction of the Proposed Development will be managed in a safe and organised manner by the Contractor as per client requirements. The CEMP will be a live document and it will go through a number of iterations before works

commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the Proposed Development.

*Control of Soil Excavation*

Subsoil will be excavated to facilitate the construction of foundations, access roads, expansion of drainage connections and other ancillary works. The Proposed Development will incorporate the reduce, reuse and recycle approach in terms of soil excavations on site. The construction will be carefully planned to ensure only material required to be excavated will be excavated resulting in as much material left in situ as possible.

It is unlikely that contaminated material will be encountered during construction of the Proposed Development. Nonetheless, excavation works will be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that potentially contaminated soils are encountered, the material will be tested and classified as hazardous or non-hazardous in accordance with the EPA Guidance Document: *Waste Classification – List of Waste and Determining if Waste is Hazardous or Non-Hazardous* (2015), HazWasteOnline tool or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with *EC Decision 2003/33/EC*. It will then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

*Export of Material from Site*

It is estimated that a volume of c. 40,671 $m^3$ of cut material shall be generated during the construction of the Proposed Development. The total net fill to formation level that can be reused from the cut material is approx. 5,046 $m^3$. Therefore, a total of approx. 35,625 $m^3$ of cut to be exported off-site. Imported engineered fill from formation level to underside of Finished Level (u/s of tarmac, ground slab etc.) is estimated at approx. 17,560 $m^3$ (estimate-imported engineered material). Topsoil will be reused onsite where possible for regrading, landscaping and berm construction works. Surplus excavated material will be exported from site for reuse, recovery and/or disposal. Refer to Chapter 15 Waste Management for further detail.

Soil being removed from site will be classified by an experienced and qualified environmental professional to ensure that the soil is correctly classified for transportation and recovery/disposal offsite. Refer to Chapter 15 Waste Management for further relevant information.

*Sources of Fill and Aggregates*

All fill and aggregate for the Proposed Development will be sourced from reputable suppliers per the project Contract and Procurement Procedures. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the Proposed Development;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company.

It is anticipated that approximately c. 17,560 $m^3$ engineered fill will be required to facilitate construction.

*Fuel and Chemical Handling*

- when not in use;
- The pump or valve will be fitted with a lock and will be secured when not in use;
- All bowsers to carry a spill kit
- Operatives must have spill response training; and
- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they will be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

The aforementioned list of measures is non-exhaustive and will be included in the CEMP.

The following mitigation measures will be taken at the construction stage in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured

*Control of Water during Construction*

No significant dewatering is envisaged for the site development. However, run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation.

Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. Measures will include managing slope gradients, covering of soil stockpiles where necessary etc. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

Should any discharge of construction water be required during the construction phase, pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement tanks/ponds)

and hydrocarbon interceptors as required. Active treatment systems such as siltbusters or similar may be required depending on turbidity levels.

### 6.6.2 Operational Phase

During the operational phase of the Proposed Development site there is limited potential for site activities to impact on the land, geological and hydrogeological environment of the area. There will be no emissions to ground or the underlying aquifer from operational activities. Drainage will be towards the stormwater sewers.

*Environmental Procedures*

The operator implements an Environmental System at its facilities. Prior to operation of the Proposed Development, a comprehensive set of operational procedures will be established (based on those used at other similar facilities) which will include site-specific mitigation measures and emergency response measures.

*Fuel Storage*

The primary potential impact relates to a failure of control measures or accidental spill of diesel / renewable diesel fuel which is stored and used on site for back-up power generation. Subject to availability, it is expected that fuel for the Proposed Development will be renewable diesel.

Fuel will be stored on site for the operation of back-up generators. Bulk fuel oil storage (diesel / renewable diesel) is required for the operational phase. Buildings F and G will share a 40,000L capacity 'Top Up' tank within an adequately sized bund serviced from a contained refuelling pad in terms of shut off valves and alarms. Diesel / renewable diesel will be piped from the bulk storage tank to the back-up generator unit's double-skinned belly tank. Building E has one generator which will have its own double-skinned belly tank with 9,000L capacity.

In order to minimise any impact on the underlying subsurface strata from material spillages, the proposed bulk fuel storage tank for Building F and G will be located above ground in a designated concrete fuel storage bund on an impervious base. This is bunded to a volume of 110% of the capacity of the tank within the bund (plus an allowance of 300 mm for rainwater ingress). Rainwater collected from the bund will be pumped to the foul drainage network via a Class 1 full retention fuel and oil separator, these pumps will be linked to a level switch and sensor so that if hydrocarbons are detected they will not pump and will alarm to the facility EPMS. Additionally, the fuel and oil separator is monitored on the facility BMS and will alarm if hydrocarbons are detected.

Diesel / renewable diesel will be piped from the bulk storage tanks to belly tanks at each of the back-up generator units. All underground pipework for fuel transfer will be double contained and its quantity has been minimised in planning the site layout. The generator belly tanks will be double skinned.

Fuel delivery to the bulk storage tank and to the Building E generator belly tank will take place within the designated contained unloading areas. These concrete unloading areas will be dished to falls to a channel drain (aco drain) at the back of the unloading area which will collect stormwater run-off from the unloading area and discharge to the surface water drainage network through a Class 1 forecourt full retention fuel and oil separator (by Kingspan Klargester or equivalent). Forecourt separators are full retention separators specified to retain on-site the maximum spillage likely to occur during fuel delivery. The capacity of the separator is 10,000

litres in order to retain the possible loss of the contents of one compartment of a road tanker, which may be up to 7,600 litres. This separator is also monitored on the BMS and will alarm if hydrocarbons detected.

Delivery of fuel will be undertaken following a documented procedure which minimises the risk of spills and spill containment/clean-up kit shall be readily available on site.

High level alarms and sump alarms and Fuel overfill protection will be fitted to all relevant tanks and bunds. All operating staff will have appropriate training in fuel handling and accident response.

Fuel and Oil separators will be regularly maintained to ensure their effective operation.

*Increase in hard stand*

A significant proportion of the development area will be covered in hardstand (37,271m$^2$). This provides protection to the underlying aquifer but also reduces local recharge in this area of the aquifer. As the area of aquifer is large this reduction in local recharge will have no significant change in the natural hydrogeological regime. The use of permeable pavement in the parking areas will allow some percentage of recharge to the underlying bedrock aquifer.

## 6.7 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

This section describes the predicted impact of the Proposed Development following the implementation of the remedial and mitigation measures.

### 6.7.1 Construction Phase

The implementation of mitigation measures outlined in Section 6.6.1 will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the construction phase and that the residual impact will be ***short-term-imperceptible-neutral***. Following the NRA Guidelines on Procedures for the Assessment and Treatment of Geology Hydrology and Hydrogeology for National Road Schemes (2009) criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***Negligible***.

### 6.7.2 Operational Phase

The implementation of mitigation measures highlighted in Section 6.6.2 will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the operational phase and that the residual impact will be ***long-term-imperceptible-neutral.*** Following the NRA criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***Negligible***.

## 6.8 RESIDUAL IMPACTS

### 6.8.1 Construction Phase

Based on the natural conditions present and with appropriate mitigation measures (see Section 6.6) to reduce the potential for any impact of accidental discharges to

ground during this phase, the predicted impacts on land soils, geology and hydrogeology during construction (following EPA EIA Report Guidelines 2022) are considered to have a ***short-term, imperceptible*** significance, with a ***neutral*** impact on quality.

Water Framework Directive Assessment

In terms of the construction phase, this assessment has considered the current water status of the underlying bedrock aquifer (Section 6.3.5.3 above), and potential impacts have been considered (Section 6.5 above). With mitigation measures (Section 6.6 below) in place, it is concluded there will be no degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation and design measures which will be implemented during the construction phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of the underlying bedrock aquifer long-term and as such will not impact on trends in water quality and over all status assessment.

There will be limited impact on the surrounding hydrogeological environment from the activity of dewatering as there is limited dewatering required for the Proposed Development. As such the Proposed Development will not have an impact on the quantitative aspects in consideration of water body status.

The project-specific CEMP which the works Contractor will develop will implement strict mitigation measures to ensure the protection of the hydrological and hydrogeological environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative or morphology of the nearby watercourses.

Overall, the potential effects on the WFD status to the waterbodies are considered *no impact, i.e. no deterioration of the WFD status of the underlying bedrock aquifer.*

A site-specific detailed WFD assessment was carried out for the Proposed Development and is attached to this EIA Report as Appendix 7.3 of Chapter 7 (Hydrology).

### 6.8.2 Operational Phase

There are no likely significant impacts on the land, geological or hydrogeological environment associated with the proposed operational stage of the site with mitigation in place. As such the impact is considered to have a ***long-term, imperceptible*** significance with a ***neutral*** impact on quality i.e. no effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

Following the NRA criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***Negligible*** for the construction and operational phases.

Water Framework Directive Assessment

In terms of the operational phase, this assessment has considered the current water status of the underlying aquifer (Section 6.3.5.3 above), and potential impacts have been considered (Section 6.5 above). With mitigation measures (Section 6.6 below) in place, it is concluded there will be no degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation and design measures which will be implemented during the operational phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction and operational phases, however these are temporary short-lived events that will not impact on the water status of underlying aquifer long-term and as such will not impact on trends in water quality and over all status assessment.

Overall, the potential effects on the WFD status to the waterbodies are considered *no impact, i.e. no deterioration of the WFD status of the underlying bedrock aquifer.*

A site-specific detailed WFD assessment was carried out for the Proposed Development and is attached to this EIA Report as Appendix 7.3.

The overall residual impacts relate to those impacts that would occur after the mitigation measures, as outlined in Section 6.6 above, have taken effect. In the case of the Proposed Development, there is no evidence of any significant residual impacts; the potential impact on land, soils, geology and hydrogeology during operation (following the EPA EIA Report Guidelines (2022) is considered to have a ***Long term, Imperceptible Impact***, with a ***Neutral Impact*** on quality i.e. an impact capable of measurement but without significant consequences. Following the NRA criteria for rating the magnitude and significance of impacts on the land, soils, geology and hydrogeology related attributes, the magnitude of impact is considered ***Negligible.***

The cumulative impact of the development and other surrounding developments on land, soils, geology and hydrogeology has been addressed in Chapter 16 of this EIA Report.

Interactions are addressed in Chapter 17 of this EIA Report.

## 6.10 MONITORING OR REINSTATEMENT

### 6.10.1 Construction Phase

During construction phase the following monitoring measures will be considered:

- Regular visual inspection of surface water run-off and sediments controls e.g., silt traps
- Soil sampling to confirm disposal options for excavated soils.
- .

### 6.10.2 Operational Phase

There will be no requirement for groundwater monitoring as there is no discharge to ground.

## 6.9 REFERENCES

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# APPENDIX 6.1

## NRA CRITERIA FOR RATING THE MAGNITUDE AND SIGNIFICANCE OF IMPACTS AT EIA STAGE

## NATIONAL ROADS AUTHORITY (NRA, 2009)

**Table 1 Criteria for rating site importance of Geological Features (NRA, 2009)**

| Magnitude of Impact | Criteria | Typical Example |
|---|---|---|
| Very High | Attribute has a high quality, significance or value on a regional or national scale.<br><br>Degree or extent of soil contamination is significant on a national or regional scale.<br><br>Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale. | Geological feature rare on a regional or national scale (NHA)<br><br>Large existing quarry or pit<br>Proven economically extractable mineral resource |
| High | Attribute has a high quality, significance or value on a local scale.<br><br>Degree or extent of soil contamination is significant on a local scale.<br><br>Volume of peat and/or soft organic soil underlying route is significant on a local scale. | Contaminated soil on site with previous heavy industrial usage<br>Large recent landfill site for mixed wastes<br>Geological feature of high value on a local scale (County Geological Site)<br>Well drained and/or high fertility soils<br>Moderately sized existing quarry or pit<br>Marginally economic extractable mineral resource |
| Medium | Attribute has a medium quality, significance or value on a local scale<br><br>Degree or extent of soil contamination is moderate on a local scale<br><br>Volume of peat and/or soft organic soil underlying route is moderate on a local scale | Contaminated soil on site with previous light industrial usage<br>Small recent landfill site for mixed wastes<br>Moderately drained and/or moderate fertility soils<br>Small existing quarry or pit<br>Sub-economic extractable mineral resource |
| Low | Attribute has a low quality, significance or value on a local scale<br><br>Degree or extent of soil contamination is minor on a local scale<br><br>Volume of peat and/or soft organic soil underlying route is small on a local scale | Large historical and/or recent site for construction and demolition wastes.<br>Small historical and/or recent landfill site for construction and<br>demolition wastes.<br>Poorly drained and/or low fertility soils.<br>Uneconomically extractable mineral resource. |

***Table 2 Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on soil / geology attribute (NRA, 2009)***

| Magnitude of Impact | Criteria | Typical Examples |
|---|---|---|
| **Large Adverse** | Results in loss of attribute | Loss of high proportion of future quarry or pit |
| **Moderate Adverse** | Results in impact on integrity of attribute or loss of part of attribute | Loss of moderate proportion of future quarry or pit reserves |
| **Small Adverse** | Results in minor impact on integrity of attribute or loss of small part of attribute | Loss of small proportion of future quarry or pit reserves |
| **Negligible** | Results in an impact on attribute but of insufficient magnitude to affect either use or integrity | No measurable changes in attributes |
| **Minor Beneficial** | Results in minor improvement of attribute quality | Minor enhancement of geological heritage feature |
| **Moderate Beneficial** | Results in moderate improvement of attribute quality | Moderate enhancement of geological heritage |
| **Major Beneficial** | Results in major improvement of attribute quality | Major enhancement of geological heritage feature |

***Table 3 Criteria for rating Site Attributes - Estimation of Importance of Hydrogeology Attributes (NRA, 2009)***

| Magnitude of Impact | Criteria | Typical Examples |
|---|---|---|
| **Extremely High** | Attribute has a high quality or value on an international scale | Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status |
| **Very High** | Attribute has a high quality or value on a regional or national scale | Regionally Important Aquifer with multiple well fields<br>Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status<br>Regionally important potable water source supplying >2500 homes<br>Inner source protection area for regionally important water source |

| | | |
|---|---|---|
| **High** | Attribute has a high quality or value on a local scale | Regionally Important Aquifer<br>Groundwater provides large proportion of baseflow to local rivers<br>Locally important potable water source supplying >1000 homes<br>Outer source protection area for regionally important water source<br>Inner source protection area for locally important water source |
| **Medium** | Attribute has a medium quality or value on a local scale | Locally Important Aquifer<br>Potable water source supplying >50 homes<br>Outer source protection area for locally important water source |
| **Low** | Attribute has a low quality or value on a local scale | Poor Bedrock Aquifer<br>Potable water source supplying <50 homes |

**Table 4 Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrogeology Attribute (NRA, 2009)**

| Magnitude of Impact | Criteria | Typical Examples |
|---|---|---|
| **Large Adverse** | Results in loss of attribute and /or quality and integrity of attribute | Removal of large proportion of aquifer.<br>Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems.<br>Potential high risk of pollution to groundwater from routine run-off.<br>Calculated risk of serious pollution incident >2% annually. |
| **Moderate Adverse** | Results in impact on integrity of attribute or loss of part of attribute | Removal of moderate proportion of aquifer.<br>Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems.<br>Potential medium risk of |

| | | |
|---|---|---|
| | | pollution to groundwater from routine run-off.<br>Calculated risk of serious pollution incident >1% annually. |
| **Small Adverse** | Results in minor impact on integrity of attribute or loss of small part of attribute | Removal of small proportion of aquifer.<br>Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems.<br>Potential low risk of pollution to groundwater from routine run-off.<br>Calculated risk of serious pollution incident >0.5% annually. |
| **Negligible** | Results in an impact on attribute but of insufficient magnitude to affect either use or integrity | Calculated risk of serious pollution incident <0.5% annually. |

**Table 5: Rating of Significant Environmental Impacts at EIS Stage (NRA, 2009)**

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

# APPENDIX 6.2

## BOREHOLE LOGS 2016 INVESTIGATION

## AWN CONSULTING (AWN, 2016)

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**Monitoring Well Log** BH 3

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 15/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: G. Walsh |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Firm brown sandy slightly gravelly CLAY with fine to coarse angular gravels. | 1 | | |
| Stiff brown grey sandy gravelly Clay with fine to coarse angular gravels and occasional cobbles | 1.9 | | |
| Dark grey limestone | 2.0 | | |
| **End of Borehole 2.0mbgl**<br>Borehole Dry | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | None | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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**Monitoring Well Log** BH 4

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 16/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: G. Walsh |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft to firm dark brown sandy slightly gravelly CLAY with occasional cobbles. | 1.5 | | |
| Stiff brown grey sandy gravelly Clay with occasional angular cobbles | 1.8 | | |
| Dark grey limestone | 1.9 | | |
| **End of Borehole 1.9mbgl**<br><br>Borehole Dry | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | None | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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**Monitoring Well Log** BH 5

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 16/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: G. Walsh |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Firm to stiff dark brown sandy gravelly CLAY with occasional cobbles. | 0.5 | | |
| Firm to stiff dark brown sandy CLAY with frequent angular cobbles | 1.5 | | |
| Firm to stiff dark brown grey sandy CLAY with frequent angular cobbles of Limestone. | 1.8 | | |
| **End of Borehole 1.9mbgl**<br>Borehole Dry | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | None | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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**Monitoring Well Log** BH 6

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 16/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: G. Walsh |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft to firm light brown sandy CLAY with occasional angular cobbles. | 0.5 | | |
| Soft to stiff light to medium brown sandy gravelly CLAY with occasional angular cobbles. | 1.0 | | |
| Firm to stiff medium to dark brown grey sandy CLAY with frequent angular and subangular cobbles. | 1.7 | | 1.7 ▼ |
| Stiff brownish grey sandy CLAY with medium - large sub-angular cobbles of Limestone. | 2.0 | | |
| **End of Borehole 2.0mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | 1.7 | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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**Monitoring Well Log** BH 7

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 21/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: D. Casey |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft - firm dark brown CLAY with occasional subangular pebbles. | 0.8 |  | |
| Soft - firm grey sandy CLAY with some angular pebbles | 1.3 | | |
| Weathered rock | 1.6 | | |
| **End of Borehole 1.6mbgl** | | | |

| | | |
|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | |
| | Top of Casing (mAOD): | |
| Casing Length (m): | | |
| | Water Strikes (mbgl): | |
| Driller: IGSL | Static Water Level (mbgl): | |

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**Monitoring Well Log** BH 8

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 16/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: G. Walsh |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft to firm medium brown sandy gravelly CLAY with occasional angular cobbles. | | | |
| Soft to stiff greyish brown sandy gravelly CLAY with black organic material. No odour noted from the black material. Plastic noted at c.1.6 - 1.8m | 1.0 | | 1.2 ▼ |
| Possible rock at 1.8m | 1.8 | | |
| **End of Borehole 1.8mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | 1.2 | | |
| Driller: IGSL | Static Water Level (mbgl): | 1.25 | | |

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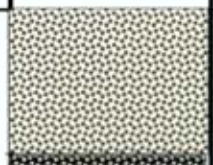
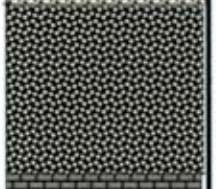
**Monitoring Well Log** BH 9

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 21/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: D. Casey |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft dark brown sandy CLAY with occasional angular cobbles. | 0.6 |  | |
| Very soft grey brown sandy CLAY with some sub-angular pebbles and cobbles | 1.4 |  | |
| Weathered rock at 1.4mbgl | |  | |
| **End of Borehole 1.5mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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**Monitoring Well Log** BH 10

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 21/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: D. Casey |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft dark brown CLAY with occasional subangular pebbles. | | | |
| | 1.0 | | |
| Weathered Bedrock | | | |
| | 1.6 | | |
| **End of Borehole 1.6mbgl** | | | |

| | | |
|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | |
| | Top of Casing (mAOD): | |
| Casing Length (m): | | |
| | Water Strikes (mbgl): | |
| Driller: IGSL | Static Water Level (mbgl): | |

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**Monitoring Well Log** BH 11

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 21/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: D. Casey |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft dark brown CLAY with subangular pebbles. | 0.3 |  | |
| Weathered bedrock | | | |
| **End of Borehole 0.3m** | | | |

| | | |
|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | |
| | Top of Casing (mAOD): | |
| Casing Length (m): | | |
| | Water Strikes (mbgl): | |
| Driller: IGSL | Static Water Level (mbgl): | |

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**Monitoring Well Log** BH 12

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 21/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: D. Casey |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft dark brown CLAY with occasional subangular pebbles. | 0.5 | | |
| Weathered rock | 0.9 | | |
| **End of Borehole 0.9mbgl** | | | |

| | | |
|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | |
| | Top of Casing (mAOD): | |
| Casing Length (m): | | |
| | Water Strikes (mbgl): | |
| Driller: IGSL | Static Water Level (mbgl): | |

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**Monitoring Well Log** BH 13

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 21/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: D. Casey |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft dark brown CLAY with subangular pebbles. | 0.4 | | |
| Weathered bedrock (dark limestone) | 0.7 | | |
| **End of Borehole 0.7m** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method:Cable Percussion | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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| Trial Pit Log | TP 1 |
|---|---|

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 15/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: E.O'Connor |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Soft to firm, brown, slightly sandy CLAY with medium to coarse angular gravels and occasional angular cobbles | 1.0 |  | |
| Firm brown slightly sandy, gravelly clay with angular cobbles and occasional boulders | 1.5 | | |
| Dark Grey Limestone Bedrock at 1.5m | | | |
| **End of Trial Pit 1.5mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method: Excavator | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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| Trial Pit Log | TP 2 |
|---|---|

| | | |
|---|---|---|
| AWN Project Ref: 16_8877<br>Ground Level (mAOD):<br>Grid Reference: | Client: CSEA<br><br>Location: Project G Cruiserath | Drill date: 15/03/2016<br><br>Checked By: E.O'Connor |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Firm brown slightly sandy CLAY with medium to coarse angular gravels | 1.2 | | |
| Stiff, brown clay with medium to coarse angular gravels and weathered limestone cobbles. | 2.0 | | |
| Dark Grey Competent Limestone Bedrock at 2.0m | | | |
| **End of Trial Pit 2.0mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method: Excavtor | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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| Trial Pit Log | TP 3 |
|---|---|

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 15/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: E.O'Connor |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Brown, firm, slightly sandy CLAY with fine to coarse angular gravels | 1.0 | | |
| Firm to stiff, Brown to grey gravelly clay with fine to coarse angular gravels and cobbles | 1.9 | | 1.9 ▼ |
| Dark Grey Limestone Bedrock at 1.9mbgl | | | |
| **End of Trial Pit 1.9mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method: Excavator | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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| Trial Pit Log | TP 5 |
|---|---|

| | | |
|---|---|---|
| AWN Project Ref: 16_8877<br>Ground Level (mAOD):<br>Grid Reference: | Client: CSEA<br><br>Location: Project G Cruiserath | Drill date: 15/03/2016<br><br>Checked By: E.O'Connor |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Dark brown slightly sandy CLAY with fine medium angular gravels | 0.3 | | |
| Dark brown stiff,slightly sandy, very gravelling CLAY with medium to coarse angular gravels | 1.0 | | |
| Stiff, dark brown to grey slightly sandy, gravelly clay with medium to coarse angular gravels and cobbles | 1.2 | | |
| Dark Grey Competent Limestone Bedrock at 2.0m | 1.3 | | |
| **End of Trial Pit 1.3mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method: Excavator | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

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| Trial Pit Log | TP 6 |
|---|---|

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 15/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: E.O'Connor |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Brown, firm, slightly sandy CLAY with fine to medium sub-angular gravels | 0.2 |  | |
| Brown to grey , firm,slightly sandy CLAY with fine to coarse angular gravels | 0.7 | | |
| Firm to stiff, Brown to grey gravelly clay with fine to coarse angular gravels and cobbles | 1.9 | | |
| Dark Grey Limestone Bedrock at 1.9mbgl | | | |
| **End of Trial Pit 1.9mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method: Excavator | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | | | |
| Driller: | Static Water Level (mbgl): | | | |

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| Trial Pit Log | TP 7 |
|---|---|

| | | |
|---|---|---|
| AWN Project Ref: 16_8877 | Client: CSEA | Drill date: 15/03/2016 |
| Ground Level (mAOD): | | |
| Grid Reference: | Location: Project G Cruiserath | Checked By: G. Walsh |

| SUBSURFACE PROFILE | Depth (mbgl) | Lithology | Well Construction |
|---|---|---|---|
| Ground surface | 0.0 | | |
| Brown firm to stiff, slightly sandy CLAY with fine to medium sub-angular gravels | 0.9 | | |
| Stiff, Brown to grey slightly sandy clay with medium to coarse angular gravels with occasional sub-rounded boulders | 1.9 | | 1.9 ▼ |
| Dark Grey Limestone Bedrock at 1.9mbgl | | | |
| **End of Trial Pit 1.9mbgl** | | | |

| | | | | |
|---|---|---|---|---|
| Drill Method: | Hole Diameter: | | | |
| | Top of Casing (mAOD): | | | |
| Casing Length (m): | | | | |
| | Water Strikes (mbgl): | 1.9 | | |
| Driller: IGSL | Static Water Level (mbgl): | | | |

# APPENDIX 6.3

## GROUNDWATER RESULTS COMPARISON TABLE

## AWN CONSULTING (AWN, 2016)

Table 1

**Laboratory Test Results: Leachate sample - Metals, Inorganics, Other**

**Client:** Clifton Scannell Emerson Associates

**Location:** Cruiserath, Dublin 24

**AWN Ref: 16_6877**

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| | | Sample ID | TP1 | TP6 | BH4 | BH4 | BH5 | BH5 | BH6 | BH6 | BH7 | BH7 | BH8 | BH9 | BH9 | Groundwater Regulations S.I. 9 of 2010 | EPA IGVs 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Date sampled | 15/03/2016 | 15/03/2016 | 16/03/2016 | 16/03/2016 | 16/03/2016 | 16/03/2016 | 16/03/2016 | 16/03/2016 | 21/03/2016 | 21/03/2016 | 16/03/2016 | 21/03/2016 | 21/03/2016 | | |
| | | Sample Depth (m) | 1.50 | 1.80 | 0.50 | 2.00 | 0-0.5 | 1.50 | 0-0.5 | 2.50 | 0-0.5 | 1.00 | 1.8-1.8 | 0.40 | 1.00 | | |
| **Parameter** | **Units** | **LOD** | | | | | | | | | | | | | | | |
| Aluminium | mg/l | <0.02 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | 0.15 | 0.2 |
| Antimony | mg/l | <0.002 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | - |
| Arsenic | mg/l | <0.0025 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.0075 | 0.01 |
| Barium | mg/l | <0.003 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | 0.1 |
| Boron | mg/l | <0.002 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | 0.75 | 1 |
| Cadmium | mg/l | <0.0005 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.00375 | 0.005 |
| Calcium | mg/l | <0.2 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | 200 |
| Chromium | mg/l | <0.0015 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.0375 | 0.03 |
| Copper | mg/l | <0.007 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1.5 | 0.03 |
| Lead | mg/l | <0.005 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.01875 | 0.01 |
| Magnesium | mg/l | <0.1 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | 50 |
| Mercury | mg/l | <0.001 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.00075 | 0.001 |
| Molybdenum | mg/l | <0.002 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | - |
| Nickel | mg/l | <0.002 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.015 | 0.02 |
| Potassium | mg/l | <0.1 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | 5 |
| Selenium | mg/l | <0.003 | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |
| Silicon | mg/l | <0.1 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | | |
| Sodium | mg/l | <0.1 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | 150 | 150 |
| Titanium | mg/l | <0.005 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | - |
| Zinc | mg/l | <0.003 | - | 0.003 | 0.003 | 0.003 | 0.003 | - | 0.006 | 0.005 | - | 0.003 | 0.006 | 0.003 | 0.003 | | 0.1 |
| Chloride* | mg/l | <0.3 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | (24 or 187.5) 1 | 30 |
| Fluoride | mg/l | <0.3 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | 1 |
| Nitrate | mg/l | <0.2 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | 37.5 | 25 |
| Sulphate | mg/l | <0.05 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | 187.5 | 200 |
| Total Alkalinity | mg/l | <1 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | | No abnormal change |
| Dissolved Organic Carb | mg/l | <2 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | - |
| Total Dissolved Solids | mg/l | <10 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | | 1000 |
| PAH 6 Total | mg/l | <0.000068 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | 0.000075 | 0.0001 |
| PAH 17 Total | mg/l | <0.000295 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | | |
| EPH (C8-C40) | mg/l | <0.01 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Phenol | mg/l | <0.1 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | 0.0005 |
| Electrical Conductivity | uS/cm | <2 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | (800 or 1875) [1] | 1,000 |
| pH | pH units | <0.01 | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | nt | - | ≥6.5 and ≤9.5 |

**Notes**

- = Guideline Not Available

Results are **Bold** and shaded where they exceed the 2010 Regulations

Results are underlined where they exceed the EPA Interim Guideline

EPA Interim Guideline Values (IGVs) 2003

SI No. 9 of 2010 Groundwater Regulations

µg/l = micrograms per litre

mg/l = milligrams per litre

*Note 1: Different GW Thresholds apply to different status classification tests*

** lower EC Directive value for Cl taken as worst case comparison*

nt = not tested

- Less than the laboratory Limit of Detection (LOD) where shown

**Table 2**

**Laboratory Test Results: Soil-Volatile Organic Compounds (VOC)**

**Client:** Clifton Scannell Emerson Associates

**Location:** Cruiserath, Dublin 24

**AWN Ref:** 16_8877

awnconsulting

| | | Sample ID | TP1 | TP6 | BH4 | BH4 | BH5 | BH5 | BH6 | BH6 | BH7 | BH7 | BH8 | BH9 | BH9 | Groundwater Regulations S.I. 9 of 2010 | EPA IGVs 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Date sampled | 15/03/2016 | 15/03/2016 | 16/03/2016 | 16/03/2016 | 16/03/2016 | 16/03/2016 | 16/03/2016 | 16/03/2016 | 21/03/2016 | 21/03/2016 | 16/03/2016 | 21/03/2016 | 21/03/2016 | | |
| | | Sample Depth (m) | 1.50 | 1.80 | 0.50 | 2.00 | 0-0.5 | 1.50 | 0-0.5 | 2.50 | 0-0.5 | 1.00 | 1.6-1.8 | 0.40 | 1.00 | | |
| **Parameter** | **Units** | **LOD** | | | | | | | | | | | | | | | |
| VOC MS | | | | | | | | | | | | | | | | | |
| Dichlorodifluoromethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methyl Tertiary Butyl Ether | ug/l | <1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 30 |
| Chloromethane | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Vinyl Chloride | ug/l | <0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.375 | |
| Bromomethane | ug/l | <1 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Chloroethane | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |
| Trichlorofluoromethane | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| 1,1-Dichloroethene (1,1 DCE) | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Dichloromethane (DCM) | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| trans-1-2-Dichloroethene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| 1,1-Dichloroethane | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 |
| cis-1-2-Dichloroethene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |
| 2,2-Dichloropropane | ug/l | <1 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Bromochloromethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Chloroform | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | 12 |
| 1,1,1-Trichloroethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | 500 |
| 1,1-Dichloropropene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |
| Carbon tetrachloride | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| 1,2-Dichloroethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | 2.25 | 3 |
| Benzene | ug/l | <1 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.75 | - |
| Trichloroethene (TCE) | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7.50 | 10.00 |
| 1,2-Dichloropropane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Dibromomethane | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |
| Bromodichloromethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| cis-1-3-Dichloropropene | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Toluene | ug/l | <5 | - | - | - | - | - | - | - | - | - | - | - | - | - | | 10 |
| trans-1-3-Dichloropropene | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |
| 1,1,2-Trichloroethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Tetrachloroethene (PCE) | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7.5 | 10 |
| 1,3-Dichloropropane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Dibromochloromethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |
| 1,2-Dibromoethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chlorobenzene | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| 1,1,1,2-Tetrachloroethane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ethylbenzene | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 |
| p/m-Xylene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 |
| o-Xylene | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Styrene | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Bromoform | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Isopropylbenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1,1,2,2-Tetrachloroethane | ug/l | <4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Bromobenzene | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1,2,3-Trichloropropane | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Propylbenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 2-Chlorotoluene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1,3,5-Trimethylbenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 4-Chlorotoluene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| tert-Butylbenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1,2,4-Trimethylbenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| sec-Butylbenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 4-Isopropyltoluene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1,3-Dichlorobenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1,4-Dichlorobenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| n-Butylbenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1,2-Dichlorobenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 |
| 1,2-Dibromo-3-chloropropane | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1,2,4-Trichlorobenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.4 |
| Hexachlorobutadiene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.1 |
| Naphthalene | ug/l | <2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| 1,2,3-Trichlorobenzene | ug/l | <3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | | | | | | | | | | |

**Notes**

| | |
|---|---|
| - | = Guideline Not Available |

Results are **Bold** and shaded where they exceed the 2010 Regulations

Results are underlined where they exceed the EPA Interim Guideline

EPA Interim Guideline Values (IGVs) 2003
SI No. 9 of 2010 Groundwater Regulations

µg/l = micrograms per litre
mg/l = milligrams per litre

*Note 1: Different GW Thresholds apply to different status classification tests*
** lower EC Directive value for Cl taken as worst case comparison*

nt = not tested

| | |
|---|---|
| - | Less than the laboratory Limit of Detection (LOD) where shown |

**Table 3**

**Laboratory Test Results: Groundwater Samples - Metals, Inorganics, Other**

**Client:** Clifton Scannell Emerson Associates

**Location:** Cruiserath, Dublin 24

**AWN Ref: 16_8877**

awnconsulting

| | | Sample ID | BH6 | BH8 | | | | Groundwater Regulations S.I. 9 of 2010 | EPA IGVs 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | | Date sampled | 22/03/2016 | 22/03/2016 | | | | | |
| | | Sample Depth (m) | n/a | n/a | | | | | |
| **Parameter** | **Units** | **LOD** | | | | | | | |
| Aluminium | mg/l | <0.02 | nt | nt | | | | 0.15 | 0.2 |
| Antimony | mg/l | <0.002 | nt | nt | | | | - | - |
| Arsenic | mg/l | <0.0025 | - | - | | | | 0.0075 | 0.01 |
| Barium | mg/l | <0.003 | nt | nt | | | | - | 0.1 |
| Boron | mg/l | <0.002 | nt | nt | | | | 0.75 | 1 |
| Cadmium | mg/l | <0.0005 | - | - | | | | 0.00375 | 0.005 |
| Calcium | mg/l | <0.2 | 0.1485 | 0.1554 | | | | - | 200 |
| Chromium | mg/l | <0.0015 | - | - | | | | 0.0375 | 0.03 |
| Copper | mg/l | <0.007 | - | - | | | | 1.5 | 0.03 |
| Lead | mg/l | <0.005 | - | - | | | | 0.01875 | 0.01 |
| Magnesium | mg/l | <0.1 | 5.3 | 5.3 | | | | - | 50 |
| Mercury | mg/l | <0.001 | - | - | | | | 0.00075 | 0.001 |
| Molybdenum | mg/l | <0.002 | nt | nt | | | | - | - |
| Nickel | mg/l | <0.002 | - | - | | | | 0.015 | 0.02 |
| Potassium | mg/l | <0.1 | 0.0092 | 0.0165 | | | | - | 5 |
| Selenium | mg/l | <0.003 | - | - | | | | - | - |
| Silicon | mg/l | <0.1 | nt | nt | | | | - | - |
| Sodium | mg/l | <0.1 | - | - | | | | 150 | 150 |
| Titanium | mg/l | <0.005 | nt | nt | | | | - | - |
| Zinc | mg/l | <0.003 | - | - | | | | - | 0.1 |
| Chloride* | mg/l | <0.3 | 45.3 | 39.4 | | | | (24 or 187.5) [1] | 30.00 |
| Fluoride | mg/l | <0.3 | nt | nt | | | | - | 1 |
| Nitrate as NO3 | mg/l | <0.2 | 58.8 | 38 | | | | 37.5 | 25 |
| Nitrite as NO2 | mg/l | <0.02 | 0.26 | 0.54 | | | | | |
| Sulphate | mg/l | <0.05 | 20.8 | 34.41 | | | | 187.5 | 200 |
| Ammoniacal Nitrogen as N | mg/l | <0.03 | 1.09 | 1.69 | | | | | |
| Total Alkalinity | mg/l | <1 | 2,166 | 1,370 | | | | - | No abnormal change |
| Dissolved Organic Carbon | mg/l | <2 | nt | nt | | | | - | - |
| Total Dissolved Solids | mg/l | <10 | nt | nt | | | | - | 1,000 |
| PAH 6 Total | mg/l | <0.000068 | nt | nt | | | | 0.000075 | 0.0001 |
| PAH 17 Total | mg/l | <0.000295 | nt | nt | | | | | |
| EPH (C8-40) | mg/l | <0.01 | 0.08 | <0.01 | | | | | |
| Phenol | mg/l | <0.1 | | | | | | - | 0.0005 |
| Electrical Conductivity | uS/cm | <2 | nt | nt | | | | (800 or 1875) [1] | 1,000 |
| pH | pH units | <0.01 | nt | nt | | | | - | ≥6.5 and ≤9.5 |
| | | | | | | | | | |

**Notes**

- = Guideline Not Available

Results are **Bold** and shaded where they exceed the 2010 Regulations

Results are underlined where they exceed the EPA Interim Guideline

EPA Interim Guideline Values (IGVs) 2003
SI No. 9 of 2010 Groundwater Regulations

µg/l = micrograms per litre
mg/l = milligrams per litre

*Note 1: Different GW Thresholds apply to different status classification tests*
** lower EC Directive value for Cl taken as worst case comparison*

nt = not tested

- Less than the laboratory Limit of Detection (LOD) where shown

**Table 4**

**Laboratory Test Results: Groundwater-Volatile Organic Compounds (VOC)**

**Client:** Clifton Scannell Emerson Associates

**Location:** Cruiserath, Dublin 24

**AWN Ref: 16_8877**

awnconsulting

| | | Sample ID | BH6 | BH8 | | | | Groundwater Regulations S.I. 9 of 2010 | EPA IGVs 2003 |
|---|---|---|---|---|---|---|---|---|---|
| | | Date sampled | 22/03/2016 | 22/03/2016 | | | | | |
| | | Sample Depth (m) | n/a | n/a | | | | | |
| **Parameter** | **Units** | **LOD** | | | | | | | |
| VOC MS | | | | | | | | | |
| Dichlorodifluoromethane | ug/l | <2 | - | - | | | | - | - |
| Methyl Tertiary Butyl Ether | ug/l | <1 | - | - | | | | | 30 |
| Chloromethane | ug/l | <3 | - | - | | | | | - |
| Vinyl Chloride | ug/l | <0.1 | - | - | | | | 0.375 | |
| Bromomethane | ug/l | <1 | - | - | | | | - | |
| Chloroethane | ug/l | <3 | - | - | | | | | |
| Trichlorofluoromethane | ug/l | <3 | - | - | | | | | |
| 1,1-Dichloroethene (1,1 DCE) | ug/l | <3 | - | - | | | | | |
| Dichloromethane (DCM) | ug/l | <3 | - | - | | | | | |
| trans-1-2-Dichloroethene | ug/l | <3 | - | - | | | | | |
| 1,1-Dichloroethane | ug/l | <3 | - | - | | | | | 3 |
| cis-1-2-Dichloroethene | ug/l | <3 | - | - | | | | | - |
| 2,2-Dichloropropane | ug/l | <1 | - | - | | | | | |
| Bromochloromethane | ug/l | <2 | - | - | | | | | |
| Chloroform | ug/l | <2 | - | - | | | | | 12 |
| 1,1,1-Trichloroethane | ug/l | <2 | - | - | | | | | 500 |
| 1,1-Dichloropropene | ug/l | <3 | - | - | | | | | - |
| Carbon tetrachloride | ug/l | <2 | - | - | | | | | |
| 1,2-Dichloroethane | ug/l | <2 | - | - | | | | 2.25 | 3 |
| Benzene | ug/l | <1 | - | - | | | | 0.75 | - |
| Trichloroethene (TCE) | ug/l | <3 | - | - | | | | 7.50 | 10.00 |
| 1,2-Dichloropropane | ug/l | <2 | - | - | | | | - | - |
| Dibromomethane | ug/l | <3 | - | - | | | | | |
| Bromodichloromethane | ug/l | <2 | - | - | | | | | |
| cis-1-3-Dichloropropene | ug/l | <2 | - | - | | | | | |
| Toluene | ug/l | <5 | - | - | | | | | 10 |
| trans-1-3-Dichloropropene | ug/l | <2 | - | - | | | | | - |
| 1,1,2-Trichloroethane | ug/l | <2 | - | - | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Tetrachloroethene (PCE) | ug/l | <3 | - | - | | | | 7.5 | 10 |
| 1,3-Dichloropropane | ug/l | <2 | - | - | | | | | |
| Dibromochloromethane | ug/l | <2 | - | - | | | | | - |
| 1,2-Dibromoethane | ug/l | <2 | - | - | | | | | |
| Chlorobenzene | ug/l | <2 | - | - | | | | | 1 |
| 1,1,1,2-Tetrachloroethane | ug/l | <2 | - | - | | | | | - |
| Ethylbenzene | ug/l | <2 | - | - | | | | | 10 |
| p/m-Xylene | ug/l | <3 | - | - | | | | | 10 |
| o-Xylene | ug/l | <2 | - | - | | | | | |
| Styrene | ug/l | <2 | - | - | | | | | |
| Bromoform | ug/l | <2 | - | - | | | | | |
| Isopropylbenzene | ug/l | <3 | - | - | | | | | |
| 1,1,2,2-Tetrachloroethane | ug/l | <4 | - | - | | | | | |
| Bromobenzene | ug/l | <2 | - | - | | | | | |
| 1,2,3-Trichloropropane | ug/l | <3 | - | - | | | | | |
| Propylbenzene | ug/l | <3 | - | - | | | | | |
| 2-Chlorotoluene | ug/l | <3 | - | - | | | | | |
| 1,3,5-Trimethylbenzene | ug/l | <3 | - | - | | | | - | - |
| 4-Chlorotoluene | ug/l | <3 | - | - | | | | | |
| tert-Butylbenzene | ug/l | <3 | - | - | | | | | |
| 1,2,4-Trimethylbenzene | ug/l | <3 | - | - | | | | | |
| sec-Butylbenzene | ug/l | <3 | - | - | | | | | |
| 4-Isopropyltoluene | ug/l | <3 | - | - | | | | | |
| 1,3-Dichlorobenzene | ug/l | <3 | - | - | | | | | |
| 1,4-Dichlorobenzene | ug/l | <3 | - | - | | | | | |
| n-Butylbenzene | ug/l | <3 | - | - | | | | | |
| 1,2-Dichlorobenzene | ug/l | <3 | - | - | | | | | 10 |
| 1,2-Dibromo-3-chloropropane | ug/l | <2 | - | - | | | | | - |
| 1,2,4-Trichlorobenzene | ug/l | <3 | - | - | | | | | 0.4 |
| Hexachlorobutadiene | ug/l | <3 | - | - | | | | | 0.1 |
| Naphthalene | ug/l | <2 | - | - | | | | | 1 |
| 1,2,3-Trichlorobenzene | ug/l | <3 | - | - | | | | | - |
| | | | | | | | | | |

**Notes**

| | |
|---|---|
| - | = Guideline Not Available |

Results are **Bold** and shaded where they exceed the 2010 Regulations

Results are underlined where they exceed the EPA Interim Guideline

EPA Interim Guideline Values (IGVs) 2003
SI No. 9 of 2010 Groundwater Regulations

µg/l = micrograms per litre
mg/l = milligrams per litre

*Note 1: Different GW Thresholds apply to different status classification tests*
** lower EC Directive value for Cl taken as worst case comparison*

nt = not tested

| | |
|---|---|
| - | Less than the laboratory Limit of Detection (LOD) where shown |

# 7.0 HYDROLOGY

## 7.1 INTRODUCTION

This chapter assesses and evaluates the potential impacts of the development on the hydrological aspects of the site and surrounding area (c. 1km distance from the site based on catchment characteristics and connectivity). In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects. The impact on land, soils, geology & hydrogeology is addressed in Chapter 6. Chapter 14 addresses the impacts on water supply, wastewater and storm water drainage.

## 7.2 METHODOLOGY

### 7.2.1 General

This chapter evaluates the effects, if any, which the Proposed Development will have on Hydrology as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015) is also followed in this hydrological assessment and classification of environmental effects. In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII, 2009, previously NRA) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the hydrological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication) set out in Chapter 1 Table 1.2.

The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-3 in Appendix 7.1.

A Water Framework Assessment (WFD) report was carried out for the Proposed Development and the methodology for this assessment is set out within the report. The WFD Assessment is attached as Appendix 7.3.

### 7.2.2 Sources of Information

This assessment was considered in the context of the available baseline information, potential impacts, consultations with statutory bodies and other parties, and other available relevant information. In collating this information, the following sources of information and references were consulted:

- Published Environmental Impact Assessment Report for existing data centre buildings on the site (AWN, 2019);
- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- River Basin Management Plan for Ireland 2018-2021.

- *Draft* River Basin Management Plan for Ireland 2022-2027.
- Fingal County Development Plan 2017-2023.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- South Dublin City Council (2005), Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council; and
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001);
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- CS Consulting Group, Site-Specific Flood Risk Assessment, Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 (June 2022) – Appendix 7.2.
- CS Consulting Group (2022) Engineering Services Report – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 which accompanies planning application.
- CS Consulting Group (2022) Outline Construction & Environmental Management Plan – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 which accompanies planning application.

Other relevant documentation consulted as part of this assessment included the following:

- Published EIS for adjacent Malinckrodt development – *(McElroy, 2015)*;
- Published EIS for adjacent BMS site – *(Jacobs, 2015); and,*
- Published Environmental Impact Assessment Report for existing data centre buildings (A, B and C) on the site (AWN, 2017 & 2019).

## 7.3 RECEIVING ENVIRONMENT

### 7.3.1 Existing Environment

The Proposed Development site is c. 13.14 hectares in extent and is located at Cruiserath Road, Dublin 15 (refer to Chapter 1 Figure 1.1). The Proposed Development site is located in the administrative jurisdiction of Fingal County Council (FCC). This Proposed Development is the third phase of the masterplan strategy for the Data Centre Campus that was granted planning permission in 2017 under FCC planning reg. ref. FW17A/0025 (An Bord Pleanála ref. PL06F.248544) and two (2) no. data centre buildings under construction on the eastern portion of the masterplan site (permitted under FCC reg. ref. FW19A/0087).

The site was previously used for arable crops and has been left fallow for the past number of years. Much of the surrounding land has been developed in the past 10-15 years for industrial and commercial use (to the east and south) and residential (to the west) uses. However, in recent years the site has changed uses from agricultural to industrial due to the Data Centre Campus that was granted planning permission in 2017 under FCC planning reg. ref. FW17A/0025 (An Bord Pleanála ref. PL06F.248544) and in 2019 (permitted under FCC reg. ref. FW19A/0087).

The Proposed Development site is adjoined within the overall landholding by the two (2) no. permitted data centre buildings which are under construction at the east (permitted under FCC reg. ref. FW19A/0087) and by permitted Building A to the South. At the Western Boundary of the site is the Cruiserath Road R121 (dual carriageway) and

residential developments, and the northern boundary of the site adjoins undeveloped land and the Carlton Hotel.

### 7.3.2 Hydrology (Surface Water)

The topography is generally consistent and relatively flat across the site (approximately +85 mAOD). The most significant drainage system in the vicinity is the River Tolka and its tributaries, which are located c. 1.54 km south of the site. The Mooretown Stream lies c. 330 metres (m) north of the site (refer to Figure 7.1).

There are no streams on the Proposed Development or along its boundaries. There is a remnant drainage ditch in the redundant farmland to the southwest of the site within the overall landholding. The ditch was stagnant at the time of the site walkover in April 2019. It is understood that this ditch was filled in as part of the Permitted Development (FCC Reg. Ref. FW17A/0025 & ABP Reg. Ref. PL 06F.248544).


***Figure 7.1*** *Local hydrological environment*

### 7.3.3 Surface Water Quality

The Proposed Development is located within the former ERBD [Eastern River Basin District] (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). It is situated

in Hydrometric Area No. 09 of the Irish River Network. It is located within the Tolka Sub-Catchment (Tolka_SC_010, 09_10).

The WFD requires *'Good Water Status'* for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both *'Good Ecological Status'* and *'Good Chemical Status'*. In 2009 the ERBD River Management Plan (RMP) 2009-2015 was published. In the ERBD RMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g. water regulation structures).

This second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations).

Water bodies identified as being *'At Risk'* of not achieving their environmental objectives need to have targeted measures implemented to achieve objectives under this Plan. The manner and the timeframe in which these targeted measures are implemented need to be prioritised to take account of the finite resources available and of the time and resources needed to develop appropriate measures.

During the development of this Plan, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan cycle to 2021. During the catchment characterisation, the EPA identified those water bodies either *'At Risk'* of not achieving their objectives or *'Under Review'*. The outcome of this prioritisation process was the selection of 190 Areas for Action across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being *'At Risk'* of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the Proposed Project.

The strategies and objectives of the WFD in Ireland have influenced a range Of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014) and amended in 2017 (S.I. No. 464/2017);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009) & 2015 (S.I. No. 386 of 2015);
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) & 2016 (S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010);
- European Communities (Good Agricultural Practice For Protection of Waters) Regulations 2022 (S.I. No. 113 of 2022); and
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011).

Figure 7.2 below presents the EPA quality monitoring points in the context of the site and other regional drainage settings.

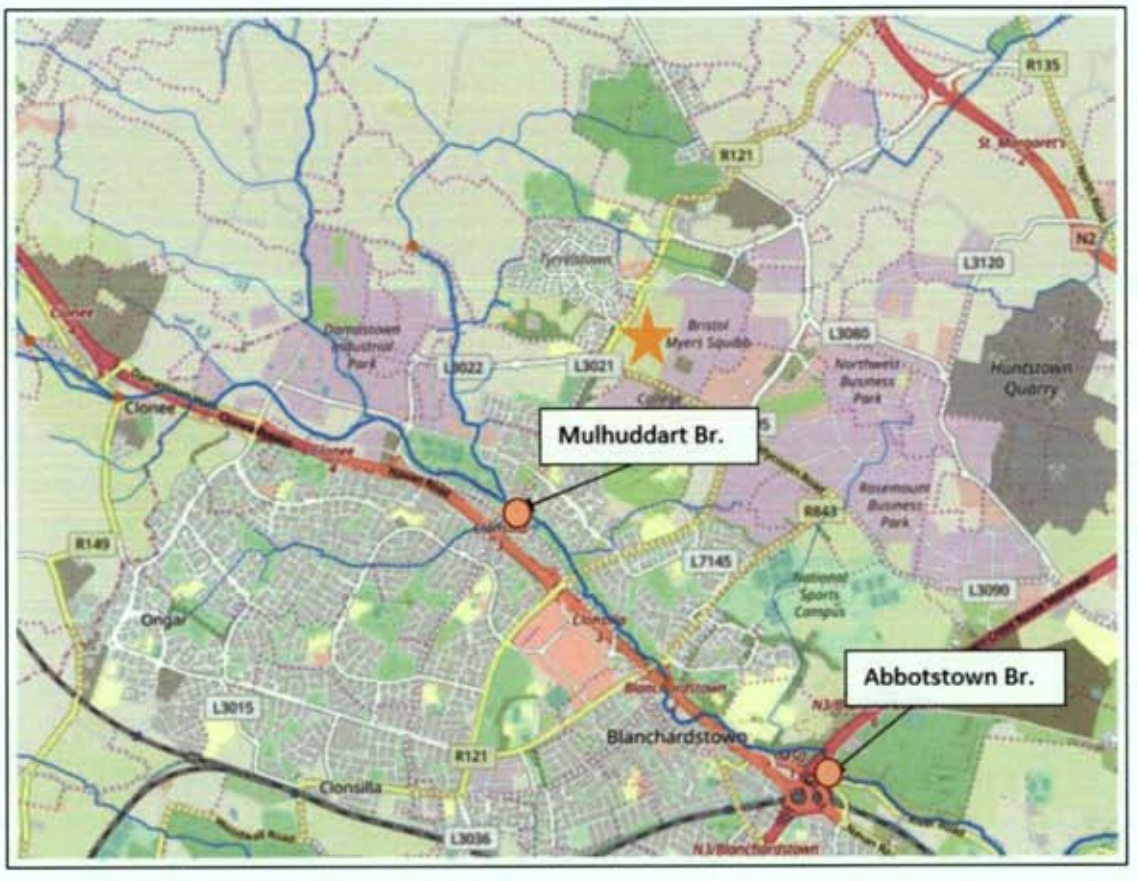



***Figure 7.2*** *Surface Water Quality Monitoring Point (EPA,2022) (Site location indicated with star with active monitoring point locations shown with orange circles)*

Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. With reference to the site setting, the nearest EPA monitoring station is situated along the Tolka River to the south (i.e. downgradient) of the site. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 – Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality. There are two water quality monitoring stations located on the Tolka River downstream of the proposed site which have quality ratings available within the last ten years. The first of these (Mulhuddart Bridge RS09T010800) obtained a Q2-3 -Poor Status (in 2019) & the second station further downstream (Abbotstown Bridge RS09T011000) was Q3 -Poor Status at last measurement (2019).

In accordance with the WFD, each river catchment within the former RBD was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each. Currently, the EPA classifies the WFD Ecological Status for the Tolka waterbody as having '*Poor Status*' (2013-2018) with a current WFD River Waterbody risk score of 1a, '*At risk of not achieving good status*'. Furthermore, the Mooretown Stream, is

grouped with the Powerstown (Dublin)_010 waterbody. This waterbody with its tributaries is classed as *'Poor Status'* (2013-2018) based on current monitoring. Figure 7.3 presents the river waterbody risk EPA map.


***Figure 7.3*** *River Waterbody Score – 1a 'At risk of not achieving good status, WFD Ecological Status: Poor. (Site location indicated with star).*

## 7.3.2.2 Flood Risk

The potential risk of flooding on the site was also assessed. A Site-Specific Flood Risk Assessment was completed and is included as Appendix 7.2 (CS Group, 2022). The assessment identified no flood hazards for the Proposed Development. The Proposed Development resides within Flood Zone C and is not at risk of flooding from a 1% or 0.1% Annual Exceedance Probability (AEP) event. The flood zonation confirms that the site is suitable for this type of industrial development.

The site historically has no recorded flood events as noted in the OPW's flood maps. The Fingal County Councils Strategic Flood Risk Assessment Maps has indicated that the subject lands are located outside the 0.1% AEP Zone.

- Predicted flood mapping for pluvial/tidal & fluvial flood events will not affect the subject lands.

- The Proposed Development will have a storm water attenuation system to address a 1-in-100-year extreme storm events increased by 20% for predicated climate change values. This will significantly reduce the volume of storm water leaving the site during extreme storms which in turn will have the effect of reducing the pressure on the existing public drainage system.
- The likelihood of onsite flooding from the hydrogeological ground conditions are deemed to be minor and within acceptable levels.

Therefore, this development is in compliance with Fingal County Council Development Plan 2017- 2023 – SW03: Allow no new development within floodplains other than development which satisfies the justification test, as outlined in the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).

#### 7.3.2.3 Existing Drainage Systems

There is an existing surface water outfall pipe as permitted under Planning Reg. Reference FW19A/0087, FW17A/0025, and ABP/0186/17 along the eastern boundary of the development site. This surface water pipe further connects to the existing manhole to the north-east.

There is an existing 375mm diameter connection to the foul water system along R121 that flows in the north-south direction.

#### 7.3.2.4 Rating of site importance of the hydrological features

Based on the NRA methodology (refer to Appendix 7.1), for rating the importance of hydrological features, the importance of the hydrological features at this site is rated as ***Low Importance***.

This is based on the assessment that the attribute has a low-quality significance or value on a local scale. The Tolka River is the ultimate receiving waterbody for the site, it is not a source of local potable water, and is not widely used as a local water amenity i.e. not regionally significant as per NRA guidelines

## 7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Proposed Development comprises three new data centre buildings and associated ancillary development (see Chapter 2 for full description of the development). The total additional impermeable area associated with the Proposed Development is approximately 37,271m$^2$.

The characteristics of the Proposed Development with regard to the hydrological environment, related to both construction and operation activities are described below.

### 7.4.1 Construction Phase

The key civil engineering works which will have potential impact on the water and hydrological environment during construction of the Proposed Development are summarised below.

(i) Excavations are required for building foundations (Building E, F & G), access roads, installation of services and the proposed storm water bio retention area (with a capacity of 140m$^3$) to be located west of the Building E it serves;
(ii) Possible discharge of collected rainwater during excavation works and groundworks (the extent of which is dependent on the time of year development works are carried out); and
(iii) Construction activities will necessitate storage of cement and concrete materials, temporary oils and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.

### 7.4.2 Operational Phase

The key activities which will have a potential impact on the hydrological environment during operation of the Proposed Development are summarised below:

(i) Fuel will be stored on site for the operation of back-up generators. Bulk fuel oil storage (diesel / renewable diesel) is required for the operational phase. Subject to availability, it is expected that fuel for the Proposed Development will be renewable diesel. Buildings F and G will share a 40,000L capacity 'Top Up' tank within an adequately sized bund serviced from a contained refuelling pad. Diesel / renewable diesel will be piped from the bulk storage tank to the back-up generator unit's double-skinned belly tank. Building E has one generator which will have its own double-skinned belly tank with 9,000L capacity. Accidental releases may occur during transport/filling etc. if not adequately mitigated. Localised accidental discharge of hydrocarbons (likely small quantities) could also occur in car parking areas and along roads;
(ii) Increase in local overall hardstand by 37,271m$^2$ which can increase flows across the site. However, attenuation is designed which will mitigate these increase flows;
(iii) Surface water will be discharged to the IDA surface water system utilising services installed during the works permitted under permission which includes an attenuation pond (FCC Reg. Ref. FW17A/0025 & ABP Reg. Ref. PL 06F.248544) and the proposed storm water bio retention area (with a capacity of 140m$^3$, refer to the Engineering Report which is attached to this planning application) to be located west of the Building E it serves. The cumulative discharge rate from the overall landholding will not exceed the permitted discharge rate granted under planning reg ref: FW17A/0025 of 126.3l/s. Potential contamination of surface water with hydrocarbons from the car parks and other areas could cause downstream contamination if no controls in place; and,
(iv) Waste water will be discharged to the public foul sewer system (no discharges to ground/surface waters) which are part of the Proposed Development site. These existing and future drainage elements have been permitted under planning reg. refs. FW19A/0087, FW17A/0025, and ABP/0186/17. The existing foul drains connect to an existing manhole in the south-east corner of the overall landholding, from which foul water discharges to the public drainage network. Refer to Section 7.5.2 for assessment of foul water discharge from the Proposed Development site during the operational phase.
(v) Water supply will be from the public watermain (via a connection to the private distribution watermain within the site boundary). There is an average potable water demand of 0.060 l/s with a peak demand of 0.300 l/s. Refer to the Engineering Report attached to this planning application further detail. A confirmation of feasibility has been issued by Irish (ref. CDS22004011) which is attached to the Engineering Report.

(vi) Water storage is provided by water storage tanks. These tanks are 1085m$^3$ tank for energy centre, 540 m$^3$ overground in 4 tanks and 545 m$^3$ underground in one tank.

## 7.5 POTENTIAL IMPACTS OF THE DEVELOPMENT

The potential impacts in relation to surface water during the construction and operational phases are outlined below and the assessment of effects defined based on the description of effects as set out in the EIA Report Guidelines (2022) (Table 1.2 Chapter 1) and the NRA criteria detailed in Appendix 7.1.

### 7.5.1 Construction Phase

*Increased Run-off and Sediment Loading*

Surface water run-off from site preparation, levelling and excavations during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from excavations, exposed ground, stockpiles, and access roads.

During the construction phase at this site there is potential for a slight increase in run-off due to the introduction of impermeable surfaces and the compaction of soils. This will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off and sediment loading which could potentially impact local drainage.

As there is no direct pathway to surface water from this site there is no likely potential impact on offsite watercourses.

In relation to increased runoff and sediment loading the potential effect is considered to be ***short-term – imperceptible*** with a ***neutral*** effect on quality.

*Excavation for foundations, services, and landscaping*

The Proposed Development will require site preparation, excavations and levelling for foundations, the installation of services and landscaping.

As there is no direct pathway to surface water from this site there is no likely potential impact on offsite watercourses.

Some removal of perched rainwater from the excavation may be required. Volumes will be quite low, and all pumped water will be subject to onsite settlement before release.

The potential impact is considered to be ***short term – imperceptible*** and a ***neutral*** effect on quality

*Contamination of Local Water Courses*

During the construction phase, there is a risk of accidental pollution incidences from the following sources:

- Spillage or leakage of fuels (and oils) stored on site.
- Spillage or leakage of fuels (and oils) from construction machinery or site vehicles.
- Spillage of oil or fuel from refuelling machinery on site.

- The use of concrete and cement.
- Storage of chemical on site.

Machinery activities on site during the construction phase may result in contamination of runoff/surface water. Potential impacts could arise from accidental spillage of fuels, oils, paints etc. which could impact surface water if allowed to infiltrate to runoff to surface water systems and/or receiving watercourses. However, implementation of the mitigation measures detailed in Section 7.6 will ensure that this does not occur.

Concreting operations carried out near surface water drainage points during construction activities could lead to discharges to a watercourse. Concrete (specifically, the cement component) is highly alkaline and any spillage to a local watercourse would be detrimental to water quality and local fauna and flora. However, employment of the mitigation measures highlighted in Section 7.6 will ensure that any impact will be mitigated.

As there is no direct pathway to surface water from this site there is no likely potential impact on offsite watercourses. However, there is an indirect pathway via the stormwater drainage system.

In relation to the contamination of local watercourses, the potential impact is ***short-term*** with an ***imperceptible*** and ***neutral*** effect on quality.

Summary of the Construction Phase Impacts

A summary of construction phase impacts for the Proposed Development (with and without mitigation) following EPA (2022) EIA guidelines is provided below.

The magnitude of the impact for the construction phase without mitigation and design measures is *short-term* in duration with *Not Significant effect* rating to the hydrological environment present across the Proposed Development site.

However, with the implementation of design and mitigation measures for the Proposed Development site the impact of the construction phase is ***Temporary*** *to* ***short term*** in duration with an ***Imperceptible*** *effect* rating.

### 7.5.2 Operational Phase

*Surface Water*

There is an indirect connection to the Tolka and tributaries during operation through the stormwater sewer. Proposed discharge rates for the Proposed Development and the overall landholding are addressed in the Engineering Planning Report which accompanies the planning application. The document outlines that the allowable discharge rate (QBAR) is 126.3 l/s for the entire site area of c. 26.14 ha. The permitted surface drainage network has sufficient capacity and has been sized to cater for the Proposed Development as well as the Permitted Development in the overall landholding and includes hydrocarbon interceptors, attenuation basins and a flow control device to limit the discharge from the site to the allowable discharge rate. Details of surface water drainage for the Proposed Development is included in Section 7.6.3 below.

FCC requires all new developments to adhere to the practice of Sustainable Urban Drainage Systems (SUDS) for the control of surface water on site as per Fingal County Council Development Plan 2017-2023. This is highlighted in the Greater Dublin Strategic

Drainage Strategy (2005). SUDS measures have been incorporated into the drainage design for the Proposed Development.

In relation to surface water, the potential impact is considered to be ***Long term - Imperceptible***.

*Wastewater*

The Proposed Development will require a foul water discharge to the existing IDA foul sewer system. The peak flow of the wastewater is 0.297 l/s with an average flow of 0.066 l/s. The proposed wastewater drainage network will collect foul water from the administration blocks of the proposed data centre buildings and will be directed to the existing onsite foul network that is permitted and constructed under planning ref. ref. FW17A/0025 and foul network under construction permitted under planning reg: FW17A/0025 (PB/0186/17) and FW19A/0087. In addition, a small area of rainfall will be collected from the generator flu stacks, which will be directed via a hydrocarbon interceptor to the foul network.

Due to topographical constraints on site, the foul effluent generated from the proposed Building F, and Building G shall be collected in a new pumping station to the east, which pumps the collected foul effluent to an existing stand-off manhole within the data centre campus site. The foul effluent from the stand-off manhole shall be collected in an existing pumping station with 24 hours storage before ultimately discharging by gravity to a 375mm diameter pipe in the R121 Regional Road to the south of the site. The proposed pumping station will provide for 24hour storage for Buildings F and G and the potential future building. The foul effluent generated from the proposed Building E to the west of the existing GIS building will discharge to an existing on-site foul manhole via a 225mm diameter pipe via gravity. There are no requirements for new foul connections outside of the data centre campus confines.

The proposed foul network will be designed in accordance with the Irish Water Code of Practice for Wastewater.

It is not proposed to discharge any trade effluent to the foul sewer as it is proposed that only surface water and foul water will be discharged during the operation of the Proposed Development

In relation to wastewater the potential impact is considered to be ***Long term - Imperceptible***.

*Water Supply*

The Proposed Development will result in an increased demand for water from the public water supply mains (see Chapter 14). Irish Water has been consulted and has advised that sufficient supply will be available to the development. A confirmation of feasibility has been issued by Irish (ref. CDS22004011) which is attached to the Engineering Report.

In relation to water supply, the potential impact is considered to be ***Long term - Imperceptible***.

*Fuel and Other Accidental Spills*

There is a potential for leaks and spillages from the fuel tank to occur on site. In addition to this there is a potential for leaks and spillages from vehicles along access roads, loading

bays and in parking areas. Any accidental emissions of oil, petrol or diesel / renewable diesel could cause contamination if the emissions enter the water environment unmitigated.

In the event of a fire at the facility, firewater will also need to be contained or it may contaminate receiving waters.

As there is no direct pathway to surface water from this site there is no likely potential impact on offsite watercourses. However, there is an indirect pathway via the stormwater drainage system.

The potential impact is ***Long-term Imperceptible*** *effect* with a ***Neutral*** effect on quality.

Summary of the Operational Phase Impacts

A summary of operational phase impacts for the Proposed Development (with and without mitigation) following EPA (2022) EIA guidelines is provided below.

The magnitude of the impact for the operational phase without mitigation and design measures is *Long-term* in duration with *Not Significant effect* rating to the hydrological environment present across the Proposed Development site.

However, with the implementation of design and mitigation measures for the Proposed Development site the impact of the operation phase is *Long-term* in duration with an *Imperceptible effect* rating.

### 7.5.3 Do Nothing Scenario

Should the Proposed Development not take place, the water quality and hydrology will remain unchanged as proposed with the Permitted Development (Data Centre Campus) to the south (ABP Reg. Ref.: PL06F.248544 / FCC Reg. Ref.: FW17A/0025) and the two (2) no. data centre buildings under construction on the eastern portion of the masterplan site (permitted under FCC reg. ref. FW19A/0087) while this section of the site will remain underutilised greenfield site.

## 7.6 REMEDIAL AND MITIGATION MEASURES

### 7.6.1 General

The design of the Proposed Development has taken account of the potential impacts of the development and the risks to the water environment specific to the areas where construction is taking place as described in Section 7.5 above.

There are no watercourses on the site to act as a direct pathway to the Tolka and tributaries, however, caution will be taken to mitigate the potential effects on the local water environment and the indirect pathway via public drainage. These measures seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation.

### 7.6.2 Construction Phase

*Construction Environnemental Management Plan (CEMP)*

An Outline Construction Management Plan (CS Group, 2022) has been prepared for planning which details project-specific construction methodologies. A project-specific CEMP will be prepared and maintained by the appointed contractors during the construction phase of the proposed project. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the CEMP. At a minimum, the manual will be formulated in accordance with the standard best international practice including, but not limited, to:

- CIRIA, (2001), *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)* Construction Industry Research and Information Association;
- CIRIA (2002) *Control of water pollution from construction sites: guidance for consultants and contractors (SPI56)* Construction Industry Research and Information Association;
- CIRIA (2005), *Environmental Good Practice on Site* (C650); Construction Industry Research and Information Association;
- BPGCS005, *Oil Storage Guidelines*;
- CIRIA 697 (2007), *The SUDS Manual*; and
- *UK Pollution Prevention Guidelines,* (PPG) UK Environment Agency, 2004.

*Surface Water Run-off*

As there are no watercourses present on the site, there will be no direct run-off to surface watercourses during the construction phase.

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

Should any discharge of construction water be required during the construction phase, the discharge will be treated using a sediment trap or siltbuster as required.

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the storm water drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.

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

*Fuel and Chemical Handling*

The following mitigation measures will be taken at the construction stage in order to prevent any spillages of fuels and prevent any resulting impacts to the surface water system;

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;

- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit and operatives must have spill response training; and
  - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside concrete bunded areas. The containment measures planned will minimise the risk of release of solid/ liquid material spillages to the water environment. Containment measures will include storage of fuels on site in bunded containers or compartments. The design of all bunds will conform to standard bunding specifications - BS EN 1992-3:2006, *Design of Concrete Structures – Part 3: Liquid retaining and containment measures*;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they should be done so secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

All contractors will be required to implement the robust project-specific CEMP.

All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be required and completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash-down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

*Accidental Releases*

Emergency response procedures will be outlined in the site CEMP and are set out in the OCEMP included with the planning application. All personnel working on the site will be suitably trained in the implementation of the procedures.

*Soil Removal and Compaction*

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

Site investigations carried out at the site in 2016 found no residual contamination on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to

ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

### 7.6.3 Operational Phase

*Environmental Procedures*

The Operator implements an Environmental Management System at each of its facilities. Prior to operation of the Proposed Development, a comprehensive set of operational procedures will be established (based on those used at other similar facilities) which will include site-specific mitigation measures and emergency response measures as outlined below:

*Fuel and Chemical Handling*

The containment measures planned will minimise the risk of release of solid/ liquid material spillages to the water environment. Containment measures will include storage of fuels on site in bunded containers or compartments. The design of all bunds will conform to standard bunding specifications - BS EN 1992-3:2006, *Design of Concrete Structures – Part 3: Liquid retaining and containment measures.*

*Storm Water Drainage*

In accordance with the requirement of The Greater Dublin Strategic Drainage Study, GDSDS, (DCC 2005) the post development run-off volumes from the site are to match the pre-development levels. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) will be implemented.

The SuDS proposals comprise two aspects. The first of these is to reduce the run-off from the site to pre-development greenfield rates. The proposed surface water network will be divided into two catchments. Catchment A will incorporate the new buildings F and G and the future potential building, which are all north of the existing GIS building. Catchment B will incorporate Building E and car park and its associated hardstand areas.

Runoff from Catchment A will be directed to an existing permitted detention pond (planning reg. refs. FW17A/0025 and PB/0186/17) with a volume of 4,450m$^3$. This has been sized to cater for the existing Buildings B and C (requiring 1,840m$^3$) and the proposed Buildings F and G, together with the future potential building (requiring 2,610m$^3$ in total). It has been designed to provide attenuation storage sufficient for a 1-in-100-year storm, including an allowance for the predicted effects of climate change. The existing hydrobrake located to the east of the detention pond shall be amended to change the discharge rate from 33.0 l/sec to 57.8 l/sec, in order to accommodate the new hardstanding area of the Proposed Development. The outfall shall be via gravity to the existing manhole to the south-east of the overall development site.

Runoff from Catchment B will flow to a wetland area with a storage volume of 140m3, located to the west of Building E. This has been designed to provide attenuation storage sufficient for a 1-in-100-year storm, including an allowance for the predicted effects of climate change. Overflow from this wetland area will outfall to an existing on-site storm sewer and will be limited to a discharge rate of 1.0 l/sec.

The cumulative discharge rate from the entire site will not exceed the permitted discharge rate of 126.3 l/s granted under planning reg ref. FW17A/0025.

The second aspect of a SuDS protocol is to enhance, as far as is practical, the overall surface water quality.

A number of systems are proposed to aid in the overall improvement of water quality, and they are;

- Permeable paving;
- A Rainwater Harvesting system;
- Bio-Retention areas;
- Hydrocarbon interceptors;
- A Wetland to the west of the proposed Building E;
- Attenuation facilities with flow control devices, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change factors, to limit the surface water discharge from the site during extreme rainfall events.

See CS Consulting Drawing A104-CSC-XX-00-DR-C-0002 for further details.

The rainwater harvesting system allows rainfall runoff from roof areas to be retained and stored onsite, and subsequently used for cooling of the data centre buildings. A total rainwater harvesting storage volume of 1085m$^3$ is provided for each of the proposed Buildings F and G totalling 2170m$^3$. There will be no impact or reduction to the attenuation volume as most of the rainfall will not occur simultaneously with high cooling demand.

Refer to CS Consulting drawings **A104-CSC-XX-00-DR-C-0002** and **A104-CSC-XX-00-DR-C-0003** for further details of the proposed surface water network and drawing **A104-CSC-XX-00-DR-C-0022** for details of the Rainwater Harvester.

In addition to surface water runoff from the development's hardstanding areas, residual non-contact cooling water and condensate from air handling units (AHUs)and computer room air conditioners (CRACs) are also to be discharged to the surface water drainage network. The peak rate of discharge from the development's AHUs is estimated at 6.100 l/sec (3.050 l/sec at each of the new buildings F and G). The expected annual average discharge rate from the AHU's is 245m$^3$/year per building F and G. It should be noted that these cooling systems will be required for cooling only during periods of hot dry weather and should not coincide with any substantial rainfall event. It is proposed to monitor the flow and quality of this discharge via a flow monitoring kiosk. Refer to CS Consulting drawings **A104-CSC-XX-00-DR-C-0012** for further details of the discharge monitoring arrangement.

Rainwater from the fully impermeable fuel bund area west of proposed Building F shall be manually pumped and discharged to the foul water network via a full retention petrol interceptor as per section 17 of the Greater Regional Code Of Practice for Drainage Works. Rainwater from the fuel delivery bay will be collected via an aco channel at the back of the fuel delivery bay and directed to the surface water network via a separate full retention interceptor.

These attenuation techniques will protect from on-site and off-site flooding which is in compliance with Fingal County Development Plan 2017-2023, SW04: Require the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for

new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks.

*Foul Drainage*

The proposed wastewater drainage network will collect foul water from the administration blocks of the proposed data centre buildings and will be directed to the existing onsite foul network that is permitted and constructed under planning ref. ref. FW17A/0025 and foul network under construction permitted under planning reg: FW17A/0025 (PB/0186/17) and FW19A/0087. In addition, a small area of rainfall will be collected from the generator flue stacks, which will be directed to the foul network.

The proposed foul network will be designed in accordance with the Irish Water Code of Practice for Wastewater.

Please refer to CS Consulting Drawing Number A104-CSC-XX-00-DR-C-0004 for details.

*Water Supply*

To reduce both energy and water use in its data centres, the Operator utilises direct evaporative cooling systems, which predominately utilises outside air to cool servers. This means that for more than 95% of the year it uses no water to cool its facilities. For the remaining 5% of time during high temperatures, cooling is undertaken by adiabatic cooling which requires water supply. The Proposed Development is projected to utilise as little as c. 1110m$^3$ water annually for cooling (Building E is projected to use 62m$^3$ cooling water annually and Buildings F and G are projected to use 524m$^3$ cooling water each per annum). Furthermore, the proposed buildings are designed to harvest up to 95% of the annual cooling water requirements through rainwater harvesting, reducing the water requirement from the mains supply when rainwater is available. Additionally, the Proposed Development includes 2170m$^3$ of on-site water storage. This proposed on site water storage will be designed to maximise the storage and utilisation of rainwater for up to 95% of cooling water needs. Hence providing a reduction in use of mains supply for cooling water. If the water storage is required to be topped up from mains water, it will be during low demand periods and mitigate impacts of the proposed demand to the Dublin Water Supply Area as per the requirements of the Confirmation of Feasibility from Irish Water (ref. CDS22004011)

The total domestic and cooling water requirement for the Proposed Development is 3008m$^3$ per annum. As stated above having the benefit of rainwater harvesting and on-site cooling water storage (fed by rainwater harvesting) will reduce yearly demand.

Residual cooling water, associated with the adiabatic cooling process, will be discharged from the air handling units (AHUs) to the surface water drainage network. This results in a peak rate of discharge from the Air Handling Units (AHUs) of 4.8 l/s for buildings F and G in total. As the cooling water will only be required during periods of hot dry weather, the discharge to the surface water network will not coincide with rainfall events.

No mitigation measures are required in relation to water supply as Irish Water have advised that there is sufficient water supply for the development.

The water system will be metered to facilitate detection of leakage and the prevention of water loss. Dual and low flush toilets, water economy outlets and water saving measures will also be proposed.

## 7.7 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

This section describes the predicted impact of the Proposed Development following the implementation of the remedial and mitigation measures.

### 7.7.1 Construction Phase

The implementation of mitigation measures highlighted in Section 7.6.2 will ensure that the potential impacts on the surface water environment do not occur during the construction phase and that the predicted impact will be ***short-term-imperceptible-neutral***.

Water Framework Directive (WFD) Assessment

In terms of the construction phase, this assessment has considered the current water status of all relevant water bodies (Section 7.3.2.1 above), and potential impacts have been considered (Section 7.5 above). With mitigation measures (Section 7.6 above) in place, it is concluded there will be no degradation of the current water body (either chemically, ecologically and/or quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

Appropriately designed mitigation and design measures will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on long-term water quality trends and over all status assessment.

There will be no impact on the surrounding hydrological (& hydrogeological) environment from the activity of dewatering. As such the Proposed Development will not have an impact on the quantitative aspects of water body status.

The project-specific OCEMP which the works Contractor will develop and implement strict mitigation measures to reduce the risk to the hydrological environment during the construction phase which will reduce the potential risk to the receiving waterbody and therefore, there will be no negative impact on the quantitative or qualitative or morphology of the nearby watercourses (namely the Tolka River). These mitigation measures that will be implemented but are not limited to are set out in this EIA Report and the OCEMP attached to this planning application.

A site-specific detailed WFD assessment was carried out for the Proposed Development and is attached as Appendix 7.3.

### 7.7.2 Operational Phase

The implementation of mitigation measures highlighted in Section 7.6.3 will ensure that the potential impacts on the surface water environment do not occur during the operational phase and that the predicted impact will be ***long-term-imperceptible- neutral.***

Water Framework Directive (WFD) Assessment

In terms of the operational phase, this assessment has considered the current water status of all relevant water bodies (Section 7.3.2.1 above), and potential impacts have been considered (Section 7.5 above). With mitigation measures (Section 7.6 below) in place, it is concluded there will be no degradation of the current water body status (chemically, ecological and quantitatively) or its potential to meet the requirements and/or objectives and measures in the second [current] RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027. There are no discharges of water during the operational phase to any open waterbody/ watercourse and no long-term groundwater dewatering for the Proposed Development. The discharges will be adequately attenuated via SuDS measures, hydrobrake (or equivalent) and oil/water interceptor to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourse (Tolka River and its tributaries). To note there is no direct connectivity to the Tolka River. There is an indirect connection via surface water dranage systems. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained as per specifications to ensure long-term/ on-going integrity of same.

There is no dewatering associated with the operational phase, hence there is no impact on the hydrological environment in terms of baseflow or storage within the underlying aquifer.

Overall, this WFD assessment has shown there is no potential for change in the water body status and risk as a result of the operation of the Proposed Development.

A site-specific detailed WFD assessment was carried out for the Proposed Development and is attached as Appendix 7.3.

## 7.8 RESIDUAL IMPACTS

The residual impacts relate to those impacts that would occur after the mitigation measures, as outlined in Section 7.6 above, have taken effect. In the case of the Proposed Development, there is no evidence of any significant residual impacts; the potential impact on surface water during operation (following the EPA Draft EIA Report Guidelines (2017) is considered to have a ***Long term, Imperceptible Impact***, with a ***Neutral Impact*** on quality i.e. an impact capable of measurement but without significant consequences. Following the NRA criteria for rating the magnitude and significance of impacts on the water and hydrological related attributes, the magnitude of impact is considered ***Negligible.***

## 7.9 MONITORING OR REINSTATEMENT

### 7.9.1 Construction Phase

During the construction phase the following monitoring measures are proposed subject to planning conditions:

- Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or any other items, and that all soil storage is located at least 10 metres from the nearest surface water receptors. A regular log of inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and procedures to be updated accordingly to ensure incidents do not re-occur.

- Daily inspection of surface water run-off from the attenuation pond and sediment controls e.g. silt traps will be carried during the construction phase. Monitoring (continuous or daily) for pH, temperature, conductivity and total organic carbon is to be installed to ensure water quality discharging from site is of good quality and meets the respective S.I. threshold values.
- Regular inspection of construction mitigation measures will be undertaken (refer to Section7.6.2 above) e.g. concrete pouring, refuelling etc.
- Regular visual monitoring of the surface water drainage features to ensure all are free flowing.

### 7.9.2 Operational Phase

Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

Three yearly inspection of bund integrity as per EPA guidance.

The cumulative impact of the development and other surrounding developments on hydrology has been addressed in Chapter 16 of this EIA Report. Interactions are addressed in Chapter 17 of this EIA Report.

## 7.9 REFERENCES


- EPA, (2022). *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (May 2022); Environmental Protection Agency, Co. Wexford, Ireland
- EPA, (2015). Draft *EPA Advice Notes for Preparation of Environmental Impact Statements*; Environmental Protection Agency, Co. Wexford, Ireland
- NRA, (2009). *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*; June 2009. National Roads Authority, Dublin.
- CS Consulting Group, Site-Specific Flood Risk Assessment, Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 (June 2022) – Appendix 7.2.
- CS Consulting Group (2022) Engineering Services Report – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 which accompanies planning application.
- CS Consulting Group (2022) Outline Construction Management Plan – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 which accompanies planning application.

# APPENDIX 7.1

## CRITERIA FOR RATING SITE ATTRIBUTES – ESTIMATION OF IMPORTANCE OF HYDROLOGY ATTRIBUTES

## NATIONAL ROADS AUTHORITY (NRA, 2009)

**Table 1 Criteria for rating Site Attributes - Estimation of Importance of Hydrology Attributes (NRA)**

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

## APPENDIX 7.2

## FLOOD RISK ASSESSMENT

## PREPARED BY CS CONSULTING GROUP.

CS CONSULTING

GROUP

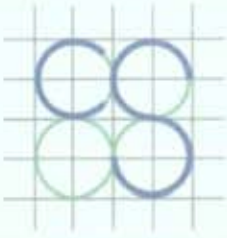
DUBLIN | LONDON | LIMERICK

# Site-Specific Flood Risk Assessment for Proposed Data Centre Development at Cruiserath, Blanchardstown, Co. Dublin

Client: Universal Developers LLC

Job No. A104

November 2022



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# SITE-SPECIFIC FLOOD RISK ASSESSMENT

## PROPOSED DATA CENTRE DEVELOPMENT, CRUISERATH, BLANCHARDSTOWN, CO. DUBLIN

CONTENTS

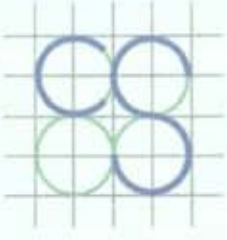




File Location: Job-A104\B_DOCUMENTS\1.0 Planning\1.0 Civil Engineering\1.0 Reports\5.0 SSFRA

| BS 1192 FIELD | A104-CSC-ZZ-XX-RP-C-0002-P4 |
|---|---|

| Job Ref. | Author | Reviewed By | Authorised By | Issue Date | Rev. No. |
|---|---|---|---|---|---|
| A104 | LJ | RFM | OS | 14.11.2022 | P4 |
| A104 | LJ | RFM | OS | 20.09.2022 | P3 |
| A104 | LJ | RFM | OS | 25.07.2022 | P2 |
| A104 | LJ | GF | OS | 18.07.2022 | P1 |
| A104 | LJ | GF | OS | 23.06.2022 | P0 |



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## 1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Universal Developers LLC to prepare Site-Specific Flood Risk Assessment for a proposed data centre development at Cruiserath, Blanchardstown, Co. Dublin.

In preparing this report, CS Consulting has made reference to the following:

- Fingal Development Plan 2017–2023
  (including Strategic Flood Risk Assessment);
- Draft Fingal Development Plan 2023–2029
  (including Strategic Flood Risk Assessment);
- Greater Dublin regional Code of Practice for Drainage Works;
- Office of Public Works Flood Maps;
- Department of the Environment Flooding Guidelines;
- Geological Survey of Ireland Maps;
- Local Authority Drainage Records.

The Site Specific Flood Risk Assessment is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with all other relevant documentation submitted by other members of the project design team.

## 2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

### 2.1 Site Location

The site of the proposed development is located on the lands at Cruiserath, Blanchardstown, Co. Dublin. The area of the present application boundary extends to approx. 13.14ha and is located in the administrative jurisdiction of Fingal County Council (FCC). This proposed development is the next phase of the masterplan strategy for the Data Centre Campus that was granted planning permission in 2017 under FCC planning reg. ref. FW17A/0025 (An Bord Pleanála ref. PL06F.248544).


Figure 1 – Location of proposed development site
*(map data & imagery: EPA, OSM Contributors, Google)*

The location of the proposed development site is shown in **Figure 1** above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in **Figure 2**.

The application site is bounded generally to the west by the R121 regional road (Church Road), to the north by vacant lands and by the Carlton Hotel on Cruiserath Drive, and to the east and south by the remaining extents of the Data Centre Campus Masterplan Area and by the neighbouring Bristol Myers Squibb facility.


Figure 2 – Indicative site extents
*(map data & imagery: OSM Contributors, Google)*

## 2.2 Existing Site Condition

The application site is largely greenfield. A Gas Insulated Switchgear (GIS) building with associated electrical infrastructure (permitted under ABP ref. VA06F.306834) is located within the southernmost portion of the application site, and an area of approx. 16,000m² at the centre of the site currently serves as a construction compound (including car parking) for these construction works and for the 2no. data centre buildings currently under

construction on the eastern portion of the masterplan site (permitted under FCC reg. ref. FW19A/0087).

## 2.3 Description of Proposed Development

The proposed development consists of the following:

- Construction of three data centre buildings (Data Centre E, Data Centre F, and Data Centre G), with a gross floor area (GFA) of c. 1,425 sq.m, c. 20,582 sq.m, and c. 20,582 sq.m respectively, each over two levels (with Data Centre F and G each including two mezzanine levels);
- Data Centre F and G will be located in the north-western portion of the overall landholding, with a primary parapet height of c. 19.8 metres and each will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant and solar panels at roof level;
- Data Centre E (which will be ancillary to Data Centre F and G) will be located within the south-western portion of the overall landholding, with a primary parapet height of c. 13.1 metres and will accommodate data halls, associated electrical and mechanical plant rooms, a loading bay, maintenance and storage space, office administration areas, with plant at roof level;
- Emergency generators and associated flues will be provided within compounds adjoining each of the three data centre buildings (1 no. for Data Centre E, 19 no. for Data Centre F, and 19 no. for Data Centre G);

- The development includes one diesel tank and two filling areas to serve the proposed emergency generators;
- Provision of ancillary structures including two MV buildings, water storage tanks and three bin stores;
- Construction of access arrangements and internal road network and circulation areas, footpaths, provision of car parking (105 no. spaces), motorcycle parking (12 no. spaces) and bicycle parking (56 no. spaces), hard and soft landscaping and planting (including alteration to a landscaped berm to the north of proposed Data Centre E), lighting, boundary treatments, and all associated and ancillary works including underground foul and storm water drainage network, and utility cables.

## 3.0 LEVEL OF SERVICE

There is an existing inherent risk of any flood event occurring during any given year. Typically, this likelihood of occurrence was traditionally expressed as a 1-in-100 chance of a 100-year storm event happening in any given year.

A less ambiguous expression of probability is the Annual Exceedance Probability (AEP), which may be defined as the probability of a flood event being exceeded in any given year. Therefore a 1-in-100-year event has a return period of 1% AEP flood event, similarly a 100% AEP can be expressed as a 1-in-1-year event.

*The Planning System and Flood Risk Management, Guidelines for Planning Authorities* (Flood Risk Management Guidelines), published in 2009 set out the best practice standards for flood risk assessment in Ireland. These are summarised in **Table 1** below (Table 8.1 from Flood Risk Management Guidelines document).

Table 1 – Summary of Level of Service: Flooding Source

| Development Category | Flooding Source | | |
|---|---|---|---|
| | Drainage | River | Tidal/Coastal |
| Residential | 1% AEP | 0.1% AEP | 0.1% AEP |
| Commercial | 1% AEP | 1% AEP | 0.5% AEP |
| Water-compatible (docks, marinas) | - | >1% AEP | >0.5% AEP |

Under these guidelines, a proposed development site has first to be assessed to determine the flood zone category it falls under.

It is a requirement of Fingal County Council, the *Greater Dublin Strategic Drainage Study* (DCC 2005), and the Flood Risk Management Guidelines

that the predicted effects of climate change are incorporated into any proposed design. **Table 2** below indicates the predicted climate change variations.

Table 2 – Predicted climate change variations

| Design Category | Predicted Impact of Climate Change |
|---|---|
| Drainage | 20% Increase in rainfall |
| Fluvial (river flows) | 20% Increase in flood flow |
| Tidal / Coastal | Minimum Finished Floor Level<br>4.0 – 4.15m AOD |

The flooding guidelines categorise the risks associated with flooding into three areas, Zone A, B & C. This categorisation is indicated below.

- **Zone A** – High Probability of Flooding. Where the average probability of flooding from rivers and sea is highest (greater than 1% annually or 1 in 100 for river flooding or 0.5% annually or 1 in 200 for coastal flooding).
- **Zone B** – Moderate Probability of Flooding. Where the average probability of flooding from rivers and sea is moderate (risk between 0.1% annually or 1 in 1000 years and 1% annually or 1 in 100 years for river flooding, and between 0.1% or 1 in 1000 years and 0.5% annually or 1 in 200 for coastal flooding).
- **Zone C** – Low Probability of Flooding. Where the probability of flooding from rivers and sea is moderate (risk is less than 0.1% annually or 1 in 1000 years for both rivers and coastal flooding).

In accordance with the Flood Risk Management Guidelines, dwellings are classified as 'highly vulnerable developments' and commercial units are classified as 'less vulnerable developments'.

A review of Fingal County Council flood risk mapping shows the subject site to be located in **Flood Zone C.** See **Appendix A** and **Figure 3.**

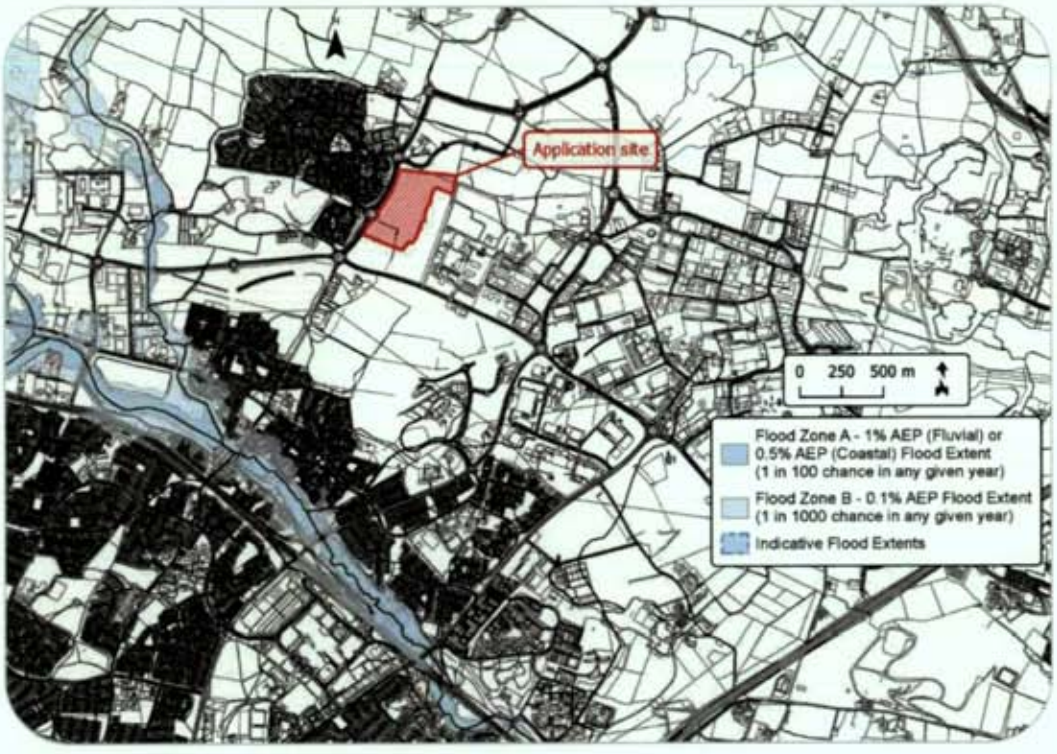



Figure 3 – Extract of Fingal County Council Flood Zone Mapping
*(background image source: Fingal County Council)*

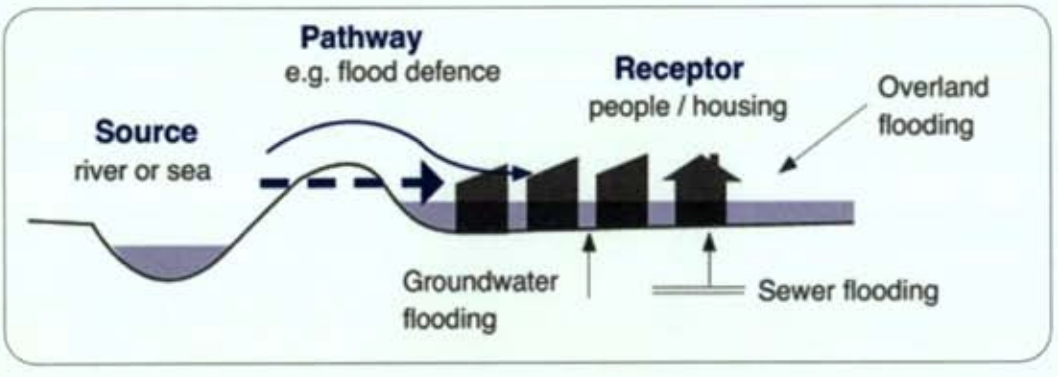



Figure 3 – Source-pathway-receptor model
*(source: The Planning System and Flood Risk Management Guidelines)*

The Flood Risk Management Guidelines have developed an 'appropriateness' matrix for various developments and their potential risk

factor. The table indicates if further analysis is required in the form of a justification test. **Table 3** below outlines the conditions that require a justification test.

Table 3 – Flood Zone vs. Justification Test Matrix

| Development Category | Flood Zone A | Flood Zone B | Flood Zone C |
|---|---|---|---|
| Highly Vulnerable Development | ***Justification Test Required*** | ***Justification Test Required*** | Appropriate |
| Less Vulnerable Development | ***Justification Test Required*** | Appropriate | Appropriate |
| Water-compatible Development | Appropriate | Appropriate | Appropriate |

As noted above, the site is located within **Flood Zone C** and is categorised as a 'less vulnerable development'. As such, a justification test is not required.

## 4.0 FLOOD RISK AND MITIGATION MEASURES

### 4.1 Historical Flooding

A review of the Office of Public Works flooding records database (www.floodmaps.ie) does not indicate historical flooding at the site. See the OPW map-report included in **Appendix B.**

### 4.2 Fluvial Flooding

The proposed development site is located within the Tolka River catchment and is located >1km approx. northwards of the Tolka River and approx. 300m southward of the Mooretown stream.

Recent modelling of the area as party of Fingal County Council's Strategic Flood Risk Assessment, indicated that the subject land is deemed to be located outside the 0.1% AEP fluvial flooding, based on the currently available maps. Therefore, the risk of fluvial flooding is not an issue, and no mitigation measures are required. Refer to **Appendix A** for further details.

### 4.3 Tidal Flooding

A review of the Office of Public Works flooding records confirms that the development site's location is such that it is not affected by tidal water bodies and as such the risk of tidal flooding is negligible.

### 4.4 Pluvial Flooding

Pluvial flooding is flooding which has originated from overland flow resulting from high intensity rain fall. From a review of the OPW flood maps there are no records of flood events due to high rainfall events in the area and assessing the local topography we understand the risk of fluvial flooding to the site is negligible and the development site is deemed not to be at risk

from pluvial flooding. Site entrance levels are above the level of the existing surrounding road network so no off-site flooding is expected to drain into the subject site.

### 4.5 Potential for Proposed Development to Contribute to Off-Site Flooding

The proposed development will require attenuation to be provided to comply with the Fingal Development Plan 2021-2027. Attenuation will be sized for a 1-in-100-year extreme storm event, increased by 20% for the predicted effects of climate change. The attenuation will release the storm water in a controlled manner after the peak storm duration has passed. By restricting the flow, the likelihood of the proposed development adversely affecting the public drainage system or contributing to downstream flooding is mitigated. By restricting the flow, the likelihood of the proposed development adversely affecting the public drainage system or contributing to downstream flooding is mitigated. For further details of the development's attenuation storage systems, refer to the Engineering Services Report submitted under separate cover.

The proposed site development will utilise an attenuation system limiting stormwater discharge to 57.8 l/sec for the catchment area including Buildings F and G, and 1.0 l/s for the catchment area including Building E. The cumulative discharge rate from the entire site will not exceed the permitted discharge rate of 126.3 l/s granted under planning reg. ref. FW17A/0025. On-site storage is provided for a 1-in-100-year extreme storm event, increased by 20% for the predicted effects of climate change. By reducing the run-off from the site into the local authority surface water sewer the potential risk of flooding from pluvial action is deemed to be within acceptable limits.

### 4.6 Existing Off-Site Drainage

It is the understanding of CS Consulting that at present there are no issues with the local drainage arrangements. The subject lands will only discharge a restricted low flow into the public system thereby reducing the hydraulic pressure on the public network during extreme rainfall events. It should also be noted that the historical flooding records do not indicate any off-site flooding at the development site.

### 4.7 Groundwater Flooding

According to the Geological Survey of Ireland (GSI) interactive maps, the subject site is underlain with *Calcareous shale, limestone conglomerate*. The area is listed as overlaying a locally important aquifer which has bedrock which is *moderately productive only in local zones*. The groundwater vulnerability assessment of the site shows that the vulnerability of groundwater in the area is *high*. The proposed alteration to the existing site will not increase the potential for groundwater flooding; as such, the risk is deemed acceptable. See **Appendix C** for GSI mapping and flood map information for background groundwater & geology data for the subject lands.

## 5.0 CONCLUSION

- The site historically has no recorded flood events as noted in the OPW's flood maps. Fingal County Council's Strategic Flood Risk Assessment Flood Zone Mapping indicates that the subject lands are located outside the 0.1% AEP Zone (i.e. within Flood Zone C) and therefore that the proposed development is suitable for this location.

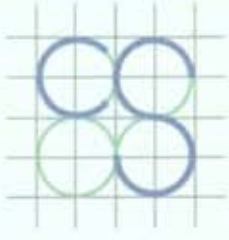
- Predicted flood mapping for pluvial/tidal & fluvial flood events will not affect the subject lands.

- The proposed development will have a storm water attenuation system to address a 1-in-100-year extreme storm events increased by 20% for predicted climate change values. This will significantly reduce the volume of storm water leaving the site during extreme storms which in turn will have the effect of reducing the pressure on the existing public drainage system.

- The likelihood of onsite flooding from the hydrogeological ground conditions is deemed to be minor and within acceptable levels.

# Appendix A

## Fingal County Council Flood Risk Mapping



CS CONSULTING

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## Legend

- Watercourses
- Fingal County Boundary
- Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) Flood Extent (1 in 100 chance in any given year)
- Flood Zone B - 0.1% AEP Flood Extent (1 in 1000 chance in any given year)
- Indicative Flood Extents


Client

Comhairle Contae Fhine Gall
Fingal County Council

Project

Strategic Flood Risk Assessment

Title

Flood Zone Mapping

Figure Map 18 of 24

RPS

West Pier Business Campus,
Dun Laoghaire,
Co Dublin,
Ireland.

Tel: +353 (0) 1 4882900
Fax: +353 (0) 1 2835676
Email: ireland@rpsgroup.com
Web Page: rpsgroup.com/ireland

Issue Details

| | |
|---|---|
| Drawn By: BT | Project No. MDW0716 |
| Checked By: BC | File Ref: MDW0716arc0001D03 |
| Approved By: PM | |
| Scale: 1: 20,000 @ A3 | Drawing No: Rev: |
| Date: 08/03/2017 | Arc0001 A01 |

## Legend

- Watercourses
- Fingal County Boundary
- Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) Flood Extent (1 in 100 chance in any given year)
- Flood Zone B - 0.1% AEP Flood Extent (1 in 1000 chance in any given year)
- Indicative Flood Extents


Client

Comhairle Contae Fhine Gall
Fingal County Council

Project

**Strategic Flood Risk Assessment**

Title

# Flood Zone Mapping

Figure **Map 19 of 24**

RPS

West Pier Business Campus,
Dun Laoghaire,
Co Dublin,
Ireland.

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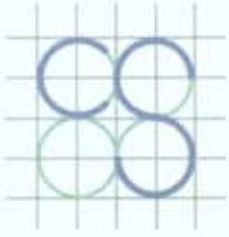
### Issue Details

| | | | |
|---|---|---|---|
| Drawn By: | BT | Project No. | MDW0716 |
| Checked By: | BC | File Ref: | MDW0716arc0001D03 |
| Approved By: | PM | | |
| Scale: | 1: 20,000 @ A3 | Drawing No. | Rev: |
| Date: | 08/03/2017 | Arc0001 | A01 |

# Appendix B

## OPW Historic Flood Maps



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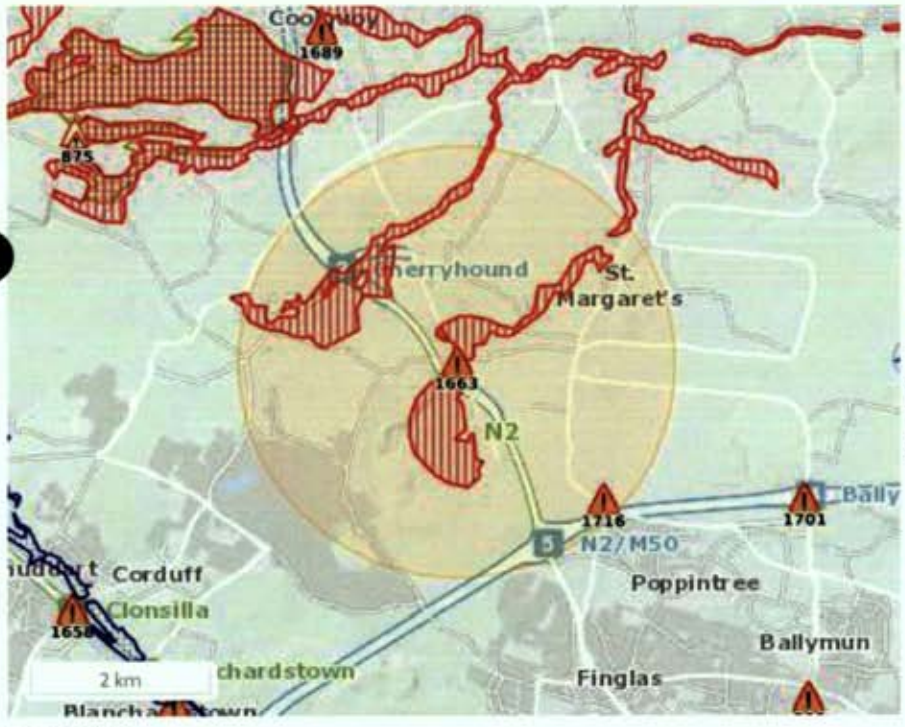
# Past Flood Event Local Area Summary Report

Report Produced: **16/6/2022 15:45**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.






## Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

## 2 Results

| | Name (Flood_ID) | Start Date | Event Location |
|---|---|---|---|
| 1. | Kilshane Cross Nov 2002 (ID-1663) | 13/11/2002 | Exact Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 2. | Dubber Cross Meakstown Swords Area Nov 2002 (ID-1716) | 14/11/2002 | Exact Point |
| | Additional Information: Reports (1) Press Archive (0) | | |

# Appendix C

## GSI Maps

# Geological Survey Ireland Public Data


Scale: 1:10,000
Geological Survey Ireland

0 0.05 0.1 0.2 mi
0 0.1 0.2 0.4 km

Map Centre Coordinates (ITM) 708,609 741,590
6/16/2022, 3:18:27 PM

PSI Licence



## Legend

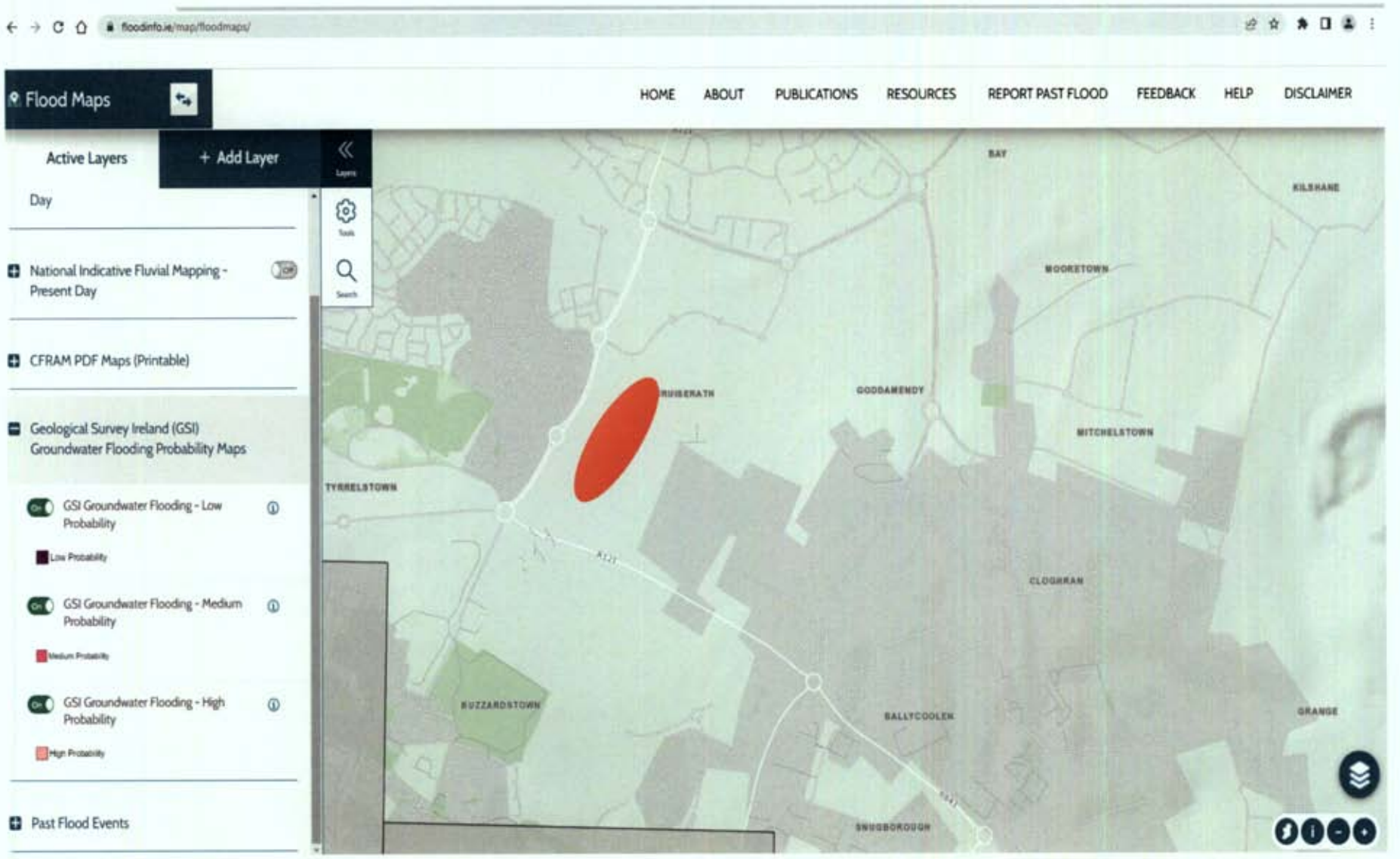
**Structural Symbols 100K ITM 2018**

- Dip of bedding or main foliation, old GSI data
- First foliation parallel to bedding
- Foliation trend, Thorr and Rosses Granites
- Horizontal Bedding
- Strike and dip of bedding, right way up
- Strike and dip of bedding, way up unknown
- Strike and dip of first foliation
- Strike and dip of overturned bedding
- Strike and dip of second foliation
- Strike and dip of third foliation
- Strike and plunge of first generation fold axis
- Strike and plunge of second generation fold axis
- Strike and plunge of third generation fold axis
- Strike of vertical bedding/foliation
- Strike of vertical first foliation
- <all other values>

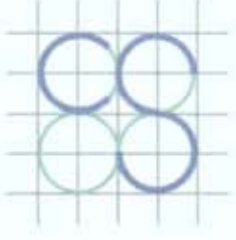
Bedrock Outcrops 100 ITM 2018

**Bedrock Linework 100k ITM 2018**

- Anticlinal Axis
- Antiformal axis
- Aquifer Boundary
- Area
- Coal seam
- Dyke
- Fault
- Ghost Line
- Goniatite marine band (R1-R4)
- Lithological boundary offshore
- Metadolerite sheet, mainly sills
- Paleogene/ Tertiary Dyke
- Synclinal Axis
- Synformal axis
- Tectonic Slide, barbs on hanging-wall
- Thin stratigraphical unit, diagrammatic
- Thrust, barbs on hanging-wall side
- Tuff band
- Unconformity, dots on younger side
- X-Section


floodinfo.ie/map/floodmaps/
Flood Maps
HOME
ABOUT
PUBLICATIONS
RESOURCES
REPORT PAST FLOOD
FEEDBACK
HELP
DISCLAIMER
Active Layers
+ Add Layer
Layers
Tools
Search
Day
National Indicative Fluvial Mapping - Present Day
CFRAM PDF Maps (Printable)
Geological Survey Ireland (GSI) Groundwater Flooding Probability Maps
GSI Groundwater Flooding - Low Probability
Low Probability
GSI Groundwater Flooding - Medium Probability
Medium Probability
GSI Groundwater Flooding - High Probability
High Probability
Past Flood Events
BAY
KILSHANE
MOORETOWN
GODDAMENDY
MITCHELSTOWN
TYRRELSTOWN
CLOGHRAN
BUZZARDSTOWN
BALLYCOOLEN
GRANGE
SNUGBOROUGH

GSI-MAPPING



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# APPENDIX 7.3

# WATER FRAMEWORK DIRECTIVE (WFD) ASSESSMENT

# PREPARED BY AWN CONSULTING LIMITED.

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# WATER FRAMEWORK DIRECTIVE (WFD) ASSESSMENT

# FOR A DATA CENTRE DEVELOPMENT

# AT

# CRUISERATH ROAD, BLANCHARSTOWN, DUBLIN 15

Report Prepared For

**Universal Developers LLC**

Report Prepared By

**Colm Driver BSc MSc PGeo EurGeol,**
Senior Hydrogeologist

Our Reference

CD/227501.0284WR01

Date of Issue

11th November 2022

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T Donnelly, T Hayes, D Kelly, E Porter

## Document History

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## Record of Approval

| Details | Written by | Approved by |
|---|---|---|
| Signature |  |  |
| Name | Colm Driver | Teri Hayes |
| Title | Environmental Consultant | Director |
| Date | 11th November 2022 | 11th November 2022 |

# Contents

## 1.0 INTRODUCTION

AWN Consulting Limited (AWN) has prepared this Water Framework Directive (WFD) Assessment report on behalf of Universal Developers LLC as part of the Environmental Impact Assessment Report (EIAR) for the proposed data centre facilities. A detailed project description is provided in Chapter 2 – Project Description of the EIA Report.

The Proposed Development site is c. 13.14 hectares in extent and is located at Cruiserath Road, Dublin 15. The Proposed Development site is located in the administrative jurisdiction of Fingal County Council (FCC). This Proposed Development is the third phase of the masterplan strategy for the Data Centre Campus that was granted planning permission in 2017 under FCC planning reg. ref. FW17A/0025 (An Bord Pleanála ref. PL06F.248544) and two (2) no. data centre buildings under construction on the eastern portion of the masterplan site (permitted under FCC reg. ref. FW19A/0087).

The site was previously used for arable crops. It is now currently not in use and is greenfield. The eastern boundary of the site is adjacent to the two (2) no. data centre buildings which are under construction on the eastern portion of the masterplan site (permitted under FCC reg. ref. FW19A/0087). The site is bound to the south by permitted Building A, to the west by the Cruiserath Road R121 (dual carriageway) and residential developments, and to the north by undeveloped land and the Carlton Hotel.

This WFD Screening Assessment has been prepared in response to the requirements of the Water Framework Directive. This WFD Screening Assessment is contained as an Appendix to the Environmental Impact Assessment Report (EIAR) and specifically to supplement the Land, Soils, Geology & Hydrogeology Chapter (Chapter 6) and Hydrology (Chapter 7) of the EIAR and should, therefore, be read together with these chapters.

This report was prepared by Colm Driver (BSc MSc PGeo EurGeol), and Teri Hayes (BSc MSc PGeol EurGeol). Colm is a Senior Hydrogeologist with over 5 years of experience in environmental consultancy and water resources studies. Colm is a professional member of the Institute of Geologists Ireland and European Federation of Geologists). He is also an active member of the Irish Group of the Association of Hydrogeologists (IAH).

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 a professional member of the Institute of Geologists Ireland and European Federation of Geologists and has 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.

### 1.1 Background

The topography is generally consistent and relatively flat across the site (approximately +85 mAOD). The most significant drainage system in the vicinity is the River Tolka and its tributaries, which are located c. 1.54 km south of the site. The Mooretown Stream (tributary of the Tolka) lies c. 330 metres (m) north of the site (refer to Figure 1.1, below).

There are no streams on the site itself or along its boundaries. There is a remnant drainage ditch in the redundant farmland to the southwest of the site within the overall landholding. It is understood that this ditch was filled in as part of the Permitted Development (FCC Reg. Ref. FW17A/0025 & ABP Reg. Ref. PL 06F.248544). As such there is no potential during construction for runoff containing sediment or accidental discharges to reach any off-site surface water body even without mitigation.

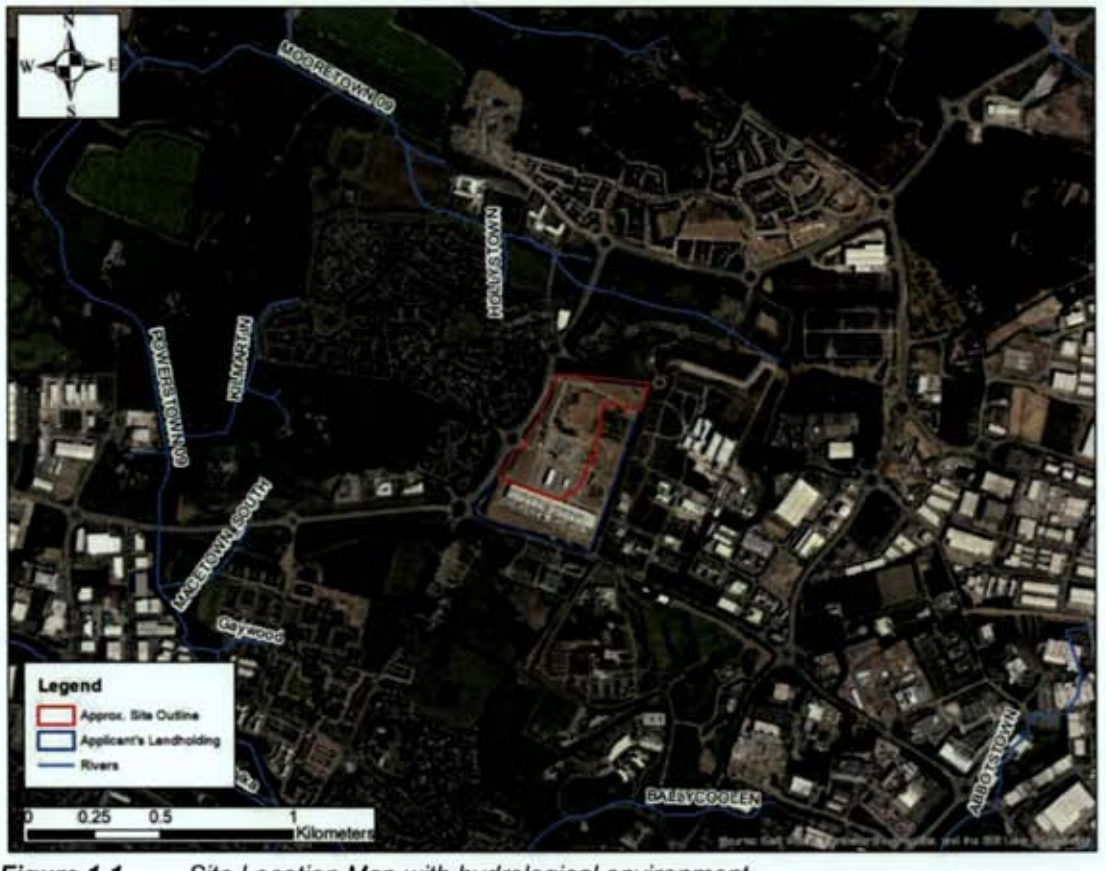


***Figure 1.1*** *Site Location Map with hydrological environment*

## 1.2 Legislative Context

The Water Framework Directive (WFD) 2000/60/EC aims to protect and enhance the quality of the water environment (both surface water and groundwater) across all European Union member states and implementing legislation, e.g., European Communities Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272/2009 (as amended) and European Communities Environmental Objectives (Groundwater) Regulations 2016 S.I. No. 272/2016 (as amended). It takes a holistic approach to the sustainable management of water by considering the interactions between surface (including transitional and coastal waters, rivers, streams and lakes), groundwater and water dependent ecosystems.

Under the WFD, 'water bodies' are the basic management units and are defined as all or part of a river system or aquifer. These water bodies form part of a larger 'river basin districts (RBD), for which 'River Basin Management Plans' (RBMP) are developed by EU member states and environmental objectives are set. RBMPs are produced every six (6) years, in accordance with the river basin management planning cycle.

The WFD requires all EU member states to classify the current condition or 'status or potential' of surface and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies maintain or reach 'good status or potential' during the next river basin management planning cycle. EPA and other

stakeholders such as local authorities are the competent authority for implementing the WFD in Ireland. Article 4(1) of the WFD states "to ensure non-deterioration and the achievement of good surface water status":

- Surface waters: Good chemical and Good Ecological status/potentials
- Groundwater: Good Chemical and Good Quantitative status.

As part of its role, these authorities must consider whether proposals for new developments (other than where exemptions apply Article 4.4 -4.7) have the potential to:

- Cause a deterioration of a water body from its current status or potential; and/ or
- Prevent future attainment of good status or potential where not already achieved.

As a result, new developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the WFD objectives of the potentially affected water bodies.

The requirement to demonstrate compliance with the Article 4(1) test for "no deterioration" by a development was upheld by the High Court in the in Sweetman v An Bord Pleanala (2021 IEHC 16) "Bradan Beo case". The court relied on the *Weser judgement in terms of interpretation of Article 4. In that case, the CJEU concluded that:*

*Article 4 required that Member states were required to refuse authorisation for a project (other than where exemptions apply) where it may cause deterioration of the status of a body or water or where it jepopardises the attainment of good water status.*

- *"deterioration of the status" of the relevant water body includes a fall by one class of any element of the "quality elements" even if the fall does not result in the a fall of the classification of the water body as a whole;*

- *'Any deterioration' in quality elements in the lowest class constitutes deterioration; and*

- *Certainty regarding a project's compliance with the Directive is required at the planning consent stage; hence, where deterioration 'may' be caused, derogations under Article 4.7 of the WFD are required at this stage.*

While deterioration within a status class does not contravene the requirements of the WFD, (except for Drinking Water Directive parameters in drinking water protected areas), the WFD requires that action should be taken to limit within-class deterioration as far as practicable. For groundwater quality, measures must also be taken to reverse any environmentally significant deteriorating trend, whether or not it affects status or potential.

The *no deterioration* requirements are applied independently to each of the elements that come together to form the water body classification as required by Annex V of the Water Framework Directive and Article 4 of the Groundwater Directive (Directive 2006/118/EC).

The WFD requires *'Good Water Status'* for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'In 2009 the ERBD River Management Plan (RMP) 2009-2015 was published. In the ERBD RMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g. water regulation structures). The purpose of this exercise was to identify water

bodies at risk of failing to meet the objectives of the WFD by 2015 and include a programme of measures to address and alleviate these pressures by 2015. This was the first River Basin Management planning cycle (2010-2015). The second cycle river basin management plan for Ireland is currently in place and will run between 2018-2022 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD).

The primary aim of the plan is that Water bodies identified as being '*At Risk*' of not achieving their environmental objectives need to have targeted measures implemented to achieve objectives under this Plan. 190 Areas for Action were identified across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being '*At Risk*' of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the Proposed Development.

## 1.3 Sources of Information

The following sources of information were used:

- Published Environmental Impact Assessment Report for existing data centre buildings (Dub058 & 68/78) on the site (AWN, 2017 & 2019);
- Geological Survey of Ireland- online mapping (GSI, 2022),
- GSI - Geological Heritage Sites & Sites of Special Scientific Interest
- Ordnance Survey of Ireland (OSI),
- Teagasc subsoil database,
- National Parks and Wildlife services (NPWS, 2022) and,
- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- River Basin Management Plan for Ireland 2018-2021.
- *Draft* River Basin Management Plan for Ireland 2022-2027.
- Fingal County Development Plan 2017-2023.
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie)
- South Dublin City Council (2005), Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council; and
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001);
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- CS Consulting Group (2022) Engineering Services Report – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 which accompanies planning application.
- CS Consulting Group (2022) Outline Construction Management Plan – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 which accompanies planning application.

## 2.0 WATER FRAMEWORK DIRECTIVE (WFD) SCREENING

According to the EPA maps, the Proposed Development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and the Tolka River sub-catchment (Tolka_SC_010, 09_10). This catchment includes the Mooretown and Powerstown Streams.

The Groundwater Body (GWB) underlying the site is the Dublin GWB (EU Groundwater Body Code: IE_EA_G_008). Refer to Section 3.6 below for further information.

This WFD Screening has identified three (3) no. surface water bodies and one (1) no. WFD groundwater bodies of relevance due to the close proximity and connection of these waterbodies during the construction and operation of the Proposed Development. To note there is no direct connection to surface water bodies during construction and only indirect connection through surface water drainage system during operation.

The water bodies are listed in Table 2.1 and the locations are presented in Figure 1.1 above. For each the most recent WFD status and risk score is provided (source EPA website - EPA Maps)

***Table 2.1*** *WFD water bodies located within the study area*

| Type | WFD Classification | WFD Status (2013-2018) | WFD Risk | Waterbody Name / ID | Location |
|---|---|---|---|---|---|
| Surface Water | River | *Poor* | *At Risk of Not Achieving Good Status* | Mooretown_09 (IE_EA_09P210700, 09_1438) | Located 0.33 km to the north of the Proposed Development site. |
| | River | *Poor* | *At Risk of Not Achieving Good Status* | Powerstown_09 (IE_EA_09P210700, 09_1407) | Located 1.56 km to the west of the Proposed Development site. |
| | River | *Poor* | *At Risk of Not Achieving Good Status* | Tolka River (IE_EA_09T010800, 09_1459) | Located 1.54 km to the south of the Proposed Development site. |
| Groundwater | Groundwater | Good | *Under Review* | Dublin Groundwater Body (GWB) (IE_EA_G_008) | Groundwater body immediately underlying the Proposed Development site. |

During the construction phase, there is a connection to the underlying bedrock aquifer, while during the operational phase it is proposed that the northern attenuation pond will ultimately drain to the Tolka River, refer to Section 3.4 below.

With consideration of the construction and operational phases of the Proposed Development site and taking into account the mitigation measures and techniques embedded within the project's design (as detailed in Chapter 6: Land, Soils, Geology and Hydrogeology & Chapter 7: Hydrology of the EIAR) it is considered that all WFD water bodies identified in Table 2-1 should be carried through into the WFD Screening Assessment.

# 3.0 EXISTING ENVIRONMENT – WATER BODY STATUS

## 3.1 Water Body Status

### 3.1.1 Background to Surface Water Body Status

Under the WFD, surface water body status is classified on the basis of chemical and ecological status or potential. Ecological status is assigned to surface water bodies that are natural and considered by the EPA not to have been significantly modified for anthropogenic purposes (i.e., culverting). Ecological potential is assigned to artificial and man-made water bodies (such as canals), or natural water bodies that have undergone significant modification. The term 'ecological potential' is used as it may be impossible to achieve good ecological status because of modification for a specific use, such as navigation or flood protection. The ecological potential represents the degree to which the quality of the water body approaches the maximum it could achieve. The worst-case classification is assigned as the overall surface water body status, in a 'one-out all-out' system. This system is summarised below in Figure 3-1.

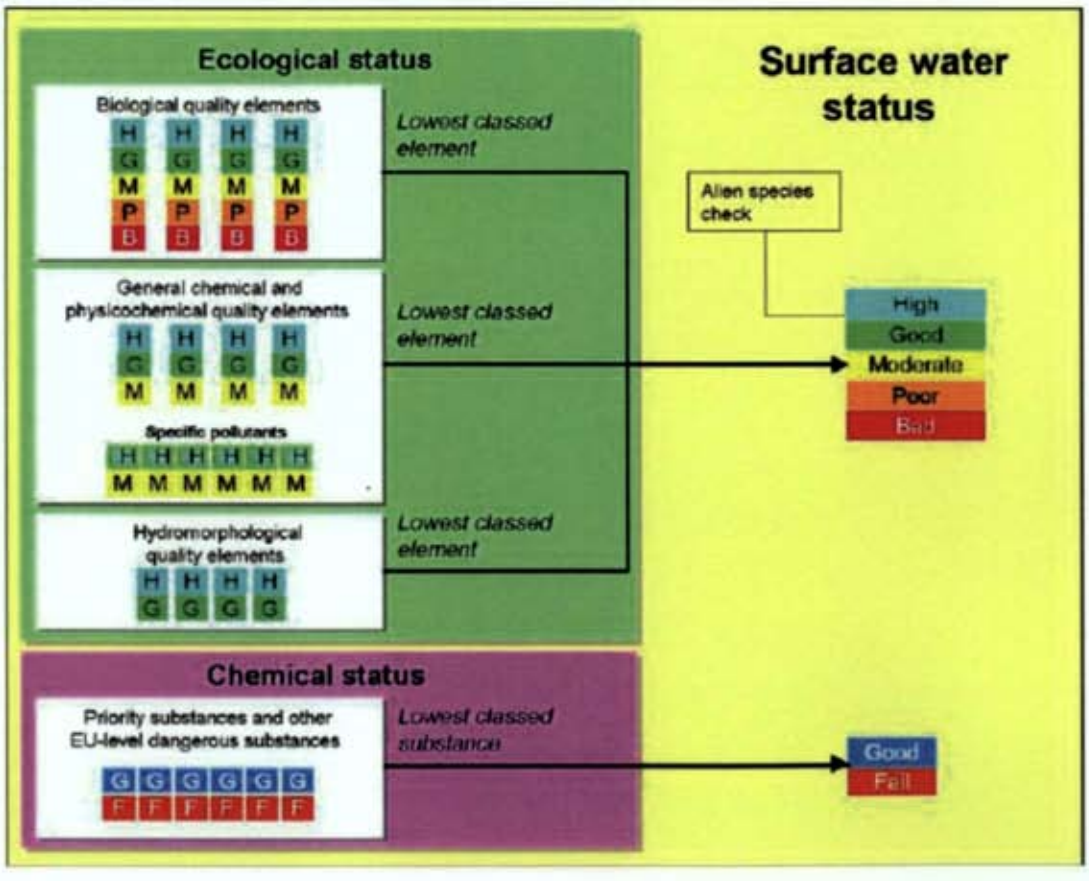


***Figure 3.1*** *WFD classification elements for surface water body status (Environmental Agency, 2015)*

### 3.1.2 Chemical Status

Chemical status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Environmental Quality Standards Directive (2008/105/EC). This is assigned on a scale of good or fail. Surface water bodies are only monitored for priority substances where there are known discharges of these pollutants; otherwise, surface water bodies are reported as being at good chemical status.

### 3.1.3 Ecological Status

Ecological status or potential is defined by the overall health or condition of the watercourse. This is assigned on a scale of High, Good, Moderate, Poor or Bad, and on the basis of four classification elements or 'tests', as follows:

- **Biological:** This test is designed to assess the status indicated by a biological quality element such as the abundance of fish, invertebrates or algae and by the presence of invasive species. The biological quality elements can influence an overall water body status from Bad through to High.
- **Physico-chemical:** This test is designed to assess compliance with environmental standards for supporting physicochemical conditions, such as dissolved oxygen, phosphorus and ammonia. The physicochemical elements can only influence an overall water body status from Moderate through to High.
- **Specific pollutants:** This test is designed to assess compliance with environmental standards for concentrations of specific pollutants, such as zinc, cypermethrin or arsenic. As with the physico-chemical test, the specific pollutant assessment can only influence an overall water body status from Moderate through to High.
- **Hydromorphology:** For natural, this test is undertaken when the biological and physicochemical tests indicate that a water body may be of High status. It specifically assesses elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or 'largely undisturbed' conditions. If the hydromorphological elements do not support High status, then the status of the water body is limited to Good overall status. For artificial or highly modified waterbodies, hydromorphological elements are assessed initially to determine which of the biological and physico-chemical elements should be used in the classification of ecological potential. In all cases, assessment of baseline hydromorphological conditions are an important factor in determining possible reasons for classifying biological and physicochemical elements of a water body as less than Good, and hence in determining what mitigation measures may be required to address these failing water bodies.

## 3.2 Surface Water Quality

Hydrological Environment

The Proposed Development site is located within the former ERBD (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). The Proposed Development site is located in the Eastern River Basin District (ERBD) and the Tolka River WMU (Water Management Unit).

According to the EPA maps, the Proposed Development site lies within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) and the Tolka River sub-catchment (Tolka_SC_010, 09_10). The current EPA watercourse mapping does not include any existing streams within the Proposed Development site boundaries, a review of the historical mapping records provided within the GeoHive website do not indicate any watercourses within the site. Furthermore, there are no boundaries noted during the site works for the Proposed Development. This is confirmed by engineers that carried out a site visit for this EIAR.

The closet mapped stream is the Mooretown stream which is located 0.33 km to the north of the Proposed Development site. The Mooretown Stream joins the Powerstown Stream c. 2.15 km to the north-west of the Proposed Development site (downgradient

– west – of Tyrrelstown Park). The Powerstown Stream discharges into the Tolka River approx. 1.59 km to the south of the Proposed Development, refer to Figure 1.1 above. The Tolka River ultimately flows towards North Dublin Bay and Tolka Estuary, a Natura Site (SPA/SAC/pNHA) located c. 11.74 km to the south-east of the site.

Surface Water Quality

Figure 3.2 below presents the EPA quality monitoring points in the context of the site and other regional drainage settings.


***Figure 3.2*** *Surface Water Quality Monitoring Point (EPA,2022) (Site location indicated with star with active monitoring point locations shown with orange circles)*

Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. With reference to the site setting, the nearest EPA monitoring station is situated along the Tolka River to the south of the site at Mulhuddard Bridge. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

There are two water quality monitoring stations located on the Tolka River downstream of the proposed site which have quality ratings available within the last ten years. The first of these (Mulhuddart Bridge RS09T010800) obtained a Q2-3 – *Poor Status* (2019) & the second station further downstream (Abbotstown Bridge RS09T011000) was Q3 – *Poor Status* at last measurement (2019). Sampling is carried out annually at these monitoring stations.

In accordance with the WFD, each river catchment within the former RBD was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each. Currently, the EPA classifies the WFD Ecological Status for the Tolka waterbody as having '*Poor Status*' (2013-2018) with a current WFD River Waterbody risk score of 1a, '*At risk of not achieving good status*'. Furthermore, the Mooretown Stream, is grouped with the Powerstown (Dublin)_010 waterbody. This waterbody with its tributaries is classed as *'Poor Status'* (2013-2018) based on current monitoring. Figure 3.3 presents the river waterbody risk EPA map.


***Figure 3.3*** *River Waterbody Score - 1a 'At risk of not achieving good status, WFD Ecological Status: Poor. (Site location indicated with star).*

As a whole, the Tolka Subcatchment (Tolka_030) is considered to have an ecological status of *Poor*. This is based on current monitoring carried out at this catchment level along the Tolka River refer to Figure 3.1 below.

SW 2013-2018

| Status | Assessment Technique | Status Confidence | Value |
|---|---|---|---|
| ▸ Ecological Status or Potential | Monitoring | high confidence | Poor |
| Supporting Chemistry Conditions | | | Pass |
| General Conditions | | | Pass |
| Oxygenation Conditions | | | Pass |
| Dissolved Oxygen (% Sat) | | | Pass |
| Other determinand for oxygenation conditions | | | High |
| Acidification Conditions | | | Pass |
| pH | | | Pass |
| Nutrient Conditions | | | Pass |
| Nitrogen Conditions | | | Good |
| Nitrate | | | Good |
| Ammonium | | | High |
| Phosphorous Conditions | | | Moderate |
| Orthophosphate | | | Moderate |

***Figure 3.4*** *Surface Water Quality for the Tolka Catchment (Tolka_030), EPA, 2022.*

The inputting surface waterbodies into this catchment are the Dunboyne Stream, Pinkeen_010 Stream, Powerstown (Dublin)_010 Stream and Tolka_020. The majority of these waterbodies are classed as *Poor* status, with the Dunboyne Stream classed as *Moderate*.

Based on the available monitoring data for the Tolka_030, is classed as *Poor* due to the elevated concentrations of ortho-phosphate as P (unspecified) during recent trended monitoring data, refer to Figure 3.5 below. Monitoring is undertaken annually at this location. In comparison, total oxidised nitrogen and total ammonia is considered *Good* and *Moderate*, respectively based on the available trended monitoring data.

The main pressure associated with the Tolka River (Tolka_030) as well as the Powerstown (Dublin)_010 is mainly agriculture based on the WFD Cycle 2 report produced by the EPA in December 2018 (Subcatchment Assessment (catchments.ie)).

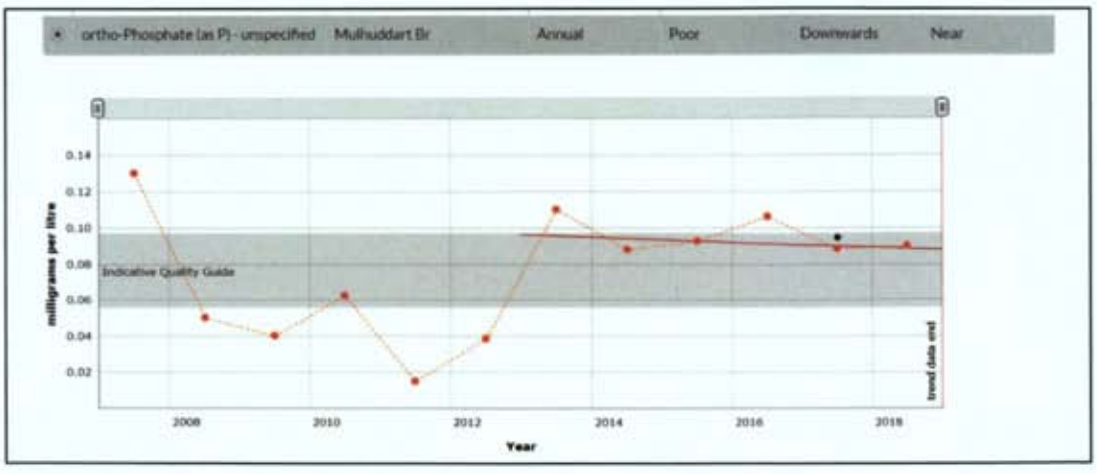


***Figure 3.5*** *Ortho-phosphate concentrations over time for the Tolka Catchment (Tolka_030), EPA, 2022.*

## 3.3 Background to Groundwater Body Status

Under the WFD, groundwater body status is classified on the basis of quantitative and chemical status. Status is assessed primarily using data collected from the EPA monitoring network; therefore, the scale of assessment means that groundwater status is mainly influenced by larger scale effects such as significant abstraction or widespread/ diffuse pollution. The worst-case classification is assigned as the overall groundwater body status, in a 'one-out all-out' system. This system is summarised in Figure 3.6 below.

### 3.3.1 Quantitative Status

Quantitative status is defined by the quantity of groundwater available as baseflow to watercourses and water-dependent ecosystems, and as 'resource' available for use as drinking water and other consumptive purposes. This is assigned on a scale of Good or Poor, and on the basis of four classification elements or 'tests' as follows:

- **Saline or other intrusions:** This test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.
- **Surface water:** This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the ecological status of associated surface water bodies.
- **Groundwater Dependent Terrestrial Ecosystems (GWDTEs):** This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTEs (with respect to water quantity).
- **Water balance:** This test is designed to identify groundwater bodies where groundwater abstraction exceeds the "available groundwater resource", defined as the rate of overall recharge to the groundwater body itself, as well as the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTEs.

### 3.3.2 Chemical Status

Chemical status is defined by the concentrations of a range of key pollutants, by the quality of groundwater feeding into watercourses and water-dependent ecosystems and by the quality of groundwater available for drinking water purposes. This is assigned on a scale of Good or Poor, and on the basis of five classification elements or 'tests' as follows:

- **Saline or other intrusions:** This test is designed to identify groundwater bodies where the intrusion of poor-quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.
- **Surface water:** This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the chemical status of associated surface water bodies.
- **Groundwater Dependent Terrestrial Ecosystems (GWDTEs):** This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTE's (with respect to water quality).

- **Drinking Water Protected Areas (DrWPAs):** This test is designed to identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.
- **General quality assessment:** This test is designed to identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.

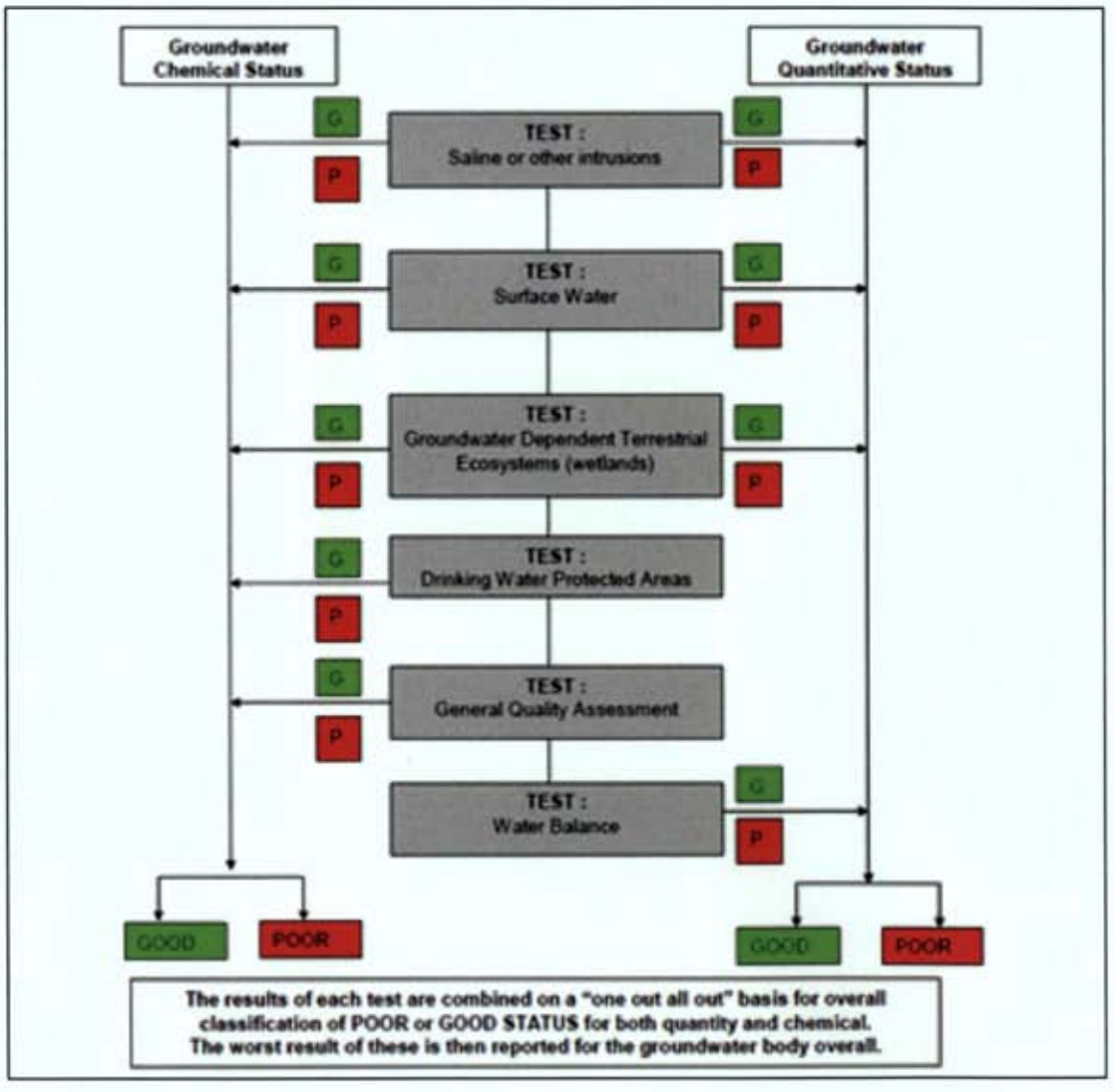


***Figure 3.6*** *WFD classification elements for groundwater body status (Environmental Agency, 2015)*

## 3.4 Groundwater Water Status

Aquifer Classification

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer ($km^2$), well yield ($m^3/d$), specific capacity ($m^3/d/m$) and groundwater throughput ($mm^3/d$). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are

classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The bedrock aquifer underlying the site according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map is classified as a (*Pl*) *Poor Aquifer - Generally Unproductive except for Local Zones* on the eastern portion of the site. The western portion of the site the classification is defined as (*Ll*) *Locally Important Aquifer*, i.e. *bedrock aquifer which is moderately productive only in local zones.*

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

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities. The GSI currently classifies the aquifer vulnerability in the region of the subject site as *High (H)* which indicates an overburden depth of 3m-5m of low permeability soil present.

Based on site specific trial pits from previous site investigations at the location of the Proposed Development (AWN, 2019) confirmed an overburden thickness up to c. 2.0m. As such the vulnerability at the site is considered to be *High to Extreme* vulnerability following the GSI classification system for aquifer vulnerability assessment. This indicates that there is minimal protection cover supplied by the two metre subsoil thickness.

Groundwater Quality

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. 'Good Status' was to be achieved in all waters by 2015, as well as maintaining 'high status' where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

The Groundwater Body (GWB) underlying the site is the Dublin GWB (EU Groundwater Body Code: IE_EA_G_008). Currently, the EPA (2022) classifies the Dublin GWB as having *'Good Status'*, with a Ground Waterbody Risk score of *'under review'*. The Dublin GWB has a *Good Status* for chemical and quantitative categories. Therefore, the overall status is considered *Good*.

During the site investigation carried out in March 2016, shallow groundwater seepage (perched groundwater within the overburden) was encountered at only two locations, BH6 (at 1.7m BGL) and BH8 (at 1.2m BGL) (AWN, 2019). Groundwater wells were installed for water sample collection. It should be noted no significant water inflows were noted at all other excavations. Groundwater was encountered at BH6 and BH8 within the subsoil however the water table is discontinuous and no significant groundwater dewatering is required for construction.

These wells were sampled for a wide range of priority pollutants: Volatile Organic Compounds (VOCs), metals, anions and cations and hydrocarbons (extractable petroleum hydrocarbons and mineral oil). There was only one exceedance of the threshold values (GTV's) as defined by Groundwater Regulations S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended) & S.I. No. 366/2016 - European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016 and the EPA (IGV) Interim Guideline Values from the document Towards Setting Guideline Values for the Protection of Groundwater in Ireland – Interim Report 2003. This exceedance was for nitrate at both locations which is likely to be indicative of the recent/current agricultural use of the site. All other parameters were not detected or were measured at less than the criteria set out in the groundwater regulations S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended) & S.I. No. 366/2016 - European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016 and the EPA's 2003 interim guideline limit values from the document Towards Setting Guideline Values for the Protection of Groundwater in Ireland – Interim Report 2003.

# 4.0 ASSESSMENT CRITERIA

## 4.1 Introduction

As stated above (Section 1.2) Proposed Developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the objectives defined for potentially affected water bodies.

## 4.2 No Deterioration Assessment

The no deterioration baseline for each water body is the status that is reported in Section 3.4 Surface Water Quality and Section 3.6 Groundwater Quality. There are no '*high status*' waterbodies within the study area, while the underlying bedrock aquifer is considered '*Good status*'.

### 4.2.1 Surface Water No Deterioration Assessment

Table 4.1 below presents the matrix used to assess the effect of the Proposed Development on surface water status or potential class. It ranges from a major beneficial effect (i.e., a positive change in overall WFD status) through no effect to deterioration in overall status class. The colour coding used in Table 4.1 is applied to the spreadsheet assessment in Appendix A.

***Table 4.1*** *Surface Water Assessment Matrix*

| Effect | Description/ Criteria | Outcome |
|---|---|---|
| Major Beneficial | Impacts that taken on their own or in combination with others have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire waterbody | Increase in status of one or more WFD element giving rise to a predicted rise in status class for that waterbody. |
| Minor/ localised beneficial | Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the waterbody or any quality elements | Localised improvement, no change in status of WFD element |
| No Impact | No measurable change to any quality elements. | No change |
| Localised / temporary adverse effect | Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary deterioration that does not affect the overall WFD status of the waterbody or any quality elements. Consideration will be given to habitat creation measures. | Localised deterioration, no change in status of WFD element when balanced against mitigation measures embedded in the project. |
| Adverse effect on class of WFD element | Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the WFD status class of one or more biological quality elements, but not in the overall status of the waterbody. Consideration will be given to habitat creation measures. | Decrease in status of WFD element when balanced against positive measures embedded in the project. |
| Adverse effect on overall WFD class of waterbody | Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the ecological status or potential of a WFD quality element, which then lead to a deterioration of status/potential of waterbody. | Decrease in status of overall WFD waterbody status when balanced against positive measures embedded in the project. |

### 4.2.2 Groundwater No Deterioration Assessment

Table 4.2 below presents the matrix used to assess the effect of the Proposed Development on groundwater status class. It ranges from a beneficial effect but no change in status to deterioration in overall status class. The colour coding used in Table 4.2 is applied to the spreadsheet assessment in Appendix A.

***Table 4.2*** *Groundwater Assessment Matrix*

| Magnitude of Impact of the Proposed Development on WFD Element | Effect on WFD Element within the assessment boundary | Effect on Status of WFD element at the Groundwater Body Scale |
|---|---|---|
| Impacts lead to beneficial effect | Combined impacts have the potential to have a beneficial effect on the WFD element. | Improvement but no change to status of WFD element |
| No measurable change to groundwater levels or quality. | No measurable change to WFD elements. | No change and no deterioration in status of WFD element |
| Impacts when taken on their own have the potential to lead to a minor localised or temporary effect | Combined impacts have the potential to lead to a minor localised or temporary adverse effect on the WFD element. | Combined impacts have the potential to lead to a minor localised or temporary effect on the WFD element. No change to status of WFD element and no significant deterioration at groundwater body scale. |
| Impacts when taken on their own have the potential to lead to a widespread or prolonged effect. | Combined impacts have the potential to have an adverse effect on the WFD element. | Combined impacts have the potential to have an adverse effect on the WFD element, resulting in significant deterioration but no change in status class at groundwater body scale. |
| Impacts when taken on their own have the potential to lead to a significant effect. | Combined impacts in combination with others have the potential to have a significant adverse effect on the WFD element. | Combined impacts in combination with others have the potential to have an adverse effect on the WFD element AND change its status at the groundwater body scale |

## 4.3 Future Status Objectives

RBMPs are used to outline water body pressures and the actions that are required to address them. The future status objective assessment considers the ecological potential of a surface water body and the mitigation measures that defined the ecological potential. Assessments in this project are based on mitigation measures defined in the Outline CEMP and EIAR which will not impact on the WFD status and risk as well as the objectives set out in the 2nd Cycle RBMP 2018-2021 and *draft* 3rd Cycle RBMP 2022-2027. The assessment considers whether the Proposed Development has the potential to prevent the implementation or impact the effectiveness of the defined measures.

# 5.0 WATER FRAMEWORK DIRECTIVE ASSESSMENT

## 5.1 General Approach and Project Details

The WFD Assessment uses a spreadsheet tool to assess the effects of the Proposed Development on each of the WFD elements (biological, physico-chemical and hydromorphological surface water elements, and quantitative and chemical groundwater elements).

Both the surface water assessment and the groundwater assessment examine the potential effects of the Proposed Development, which includes the construction and operation of data centre buildings and associated services. A full description of the Proposed Development is detailed in Chapter 2 of the EIA Report.

In terms of the construction phase, an Outline Construction Management Plan (CS Group, 2022) has been prepared for planning which details project-specific construction methodologies and mitigation measures within the EIA Report. A project-specific CEMP will be prepared and maintained by the appointed contractors during the construction phase of the proposed project based on the OCEMP and the EIA Report. The CEMP will cover all potentially polluting activities and include an emergency response procedure and will be based on the available OCEMP and the mitigation measures set out in the EIA Report. All personnel working on the site will be trained in the implementation of the CEMP. At a minimum, the manual will be formulated in consideration of the standard best international practice including, but not limited, to:

- CIRIA, (2001), *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)* Construction Industry Research and Information Association;
- CIRIA (2002) *Control of water pollution from construction sites: guidance for consultants and contractors (SPI56)* Construction Industry Research and Information Association;
- CIRIA (2005), *Environmental Good Practice on Site* (C650); Construction Industry Research and Information Association;
- BPGCS005, *Oil Storage Guidelines*;
- CIRIA 697 (2007), *The SUDS Manual*; and
- *UK Pollution Prevention Guidelines,* (PPG) UK Environment Agency, 2004.

In terms of the operational phase, the development in summary will comprise the data centre buildings, back-up generators, fuel storage, access roads and associated services and landscaping. Bulk fuel oil storage (diesel / renewable diesel) is required for operational phase. Subject to availability, it is expected that fuel for the Proposed Development will be renewable diesel. Buildings F and G will have a 40,000L capacity tank within an adequately sized bund serviced from a contained refuelling pad. Diesel / renewable diesel will be piped from the bulk storage tank to the back-up generator units (each generator will have its own internal double-skinned belly tank). Building E has one generator which will have its own internal double-skinned belly tank with 9,000L capacity. The risk to the aquifer is considered low due to the mitigation in place for containment of bulk oil storage, delivery and distribution and use of oil interceptors on the stormwater system downgradient the offloading area and prior to discharge from the site. Refer to the available Engineering Report attached to this planning application.

All surface water run-off during the construction and operational phases will be treated and attenuated via attenuation activities and other SuD measures. In accordance with the requirement of The Greater Dublin Strategic Drainage Study, GDSDS (Greater Dublin Strategic Drainage Strategy), (DCC 2005) the post development run-off volumes from the site are to match the pre-development levels. In order to limit the

surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented.

The SuDS proposals comprise two aspects. The first of these is to reduce the run-off from the site to pre-development greenfield rates. The proposed surface water network will be divided into two catchments. Catchment A will incorporate the new buildings F and G and the future potential building, which are all north of the existing GIS building. Catchment B will incorporate Building E and car park and its associated hardstand areas.

Runoff from Catchment A will be directed to an existing permitted detention pond (planning reg. refs. FW17A/0025 and PB/0186/17) with a volume of 4,450m$^3$. This has been sized to cater for the existing Buildings B and C (requiring 1,840m$^3$) and the proposed Buildings F and G, together with the future potential building (requiring 2,610m$^3$ in total). It has been designed to provide attenuation storage sufficient for a 1-in-100-year storm, including an allowance for the predicted effects of climate change. The existing hydrobrake located to the east of the detention pond shall be amended to change the discharge rate from 33.0 l/sec to 57.8 l/sec, in order to accommodate the new hardstanding area of the Proposed Development. The outfall shall be via gravity to the existing manhole to the south-east of the overall development site.

Runoff from Catchment B will flow to a wetland area with a storage volume of 140m3, located to the west of Building E. This has been designed to provide attenuation storage sufficient for a 1-in-100-year storm, including an allowance for the predicted effects of climate change. Overflow from this wetland area will outfall to an existing on-site storm sewer and will be limited to a discharge rate of 1.0 l/sec.

The cumulative discharge rate from the entire site will not exceed the permitted discharge rate of 126.3 l/s granted under planning reg ref. FW17A/0025.

The second aspect of a SuDS protocol is to enhance, as far as is practical, the overall surface water quality.

A number of systems are proposed to aid in the overall improvement of water quality, and they are;

- Permeable paving;
- A Rainwater Harvesting system;
- Bio-Retention areas;
- Hydrocarbon interceptors;
- A Wetland to the west of the proposed Building E;
- Attenuation facilities with flow control devices, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change factors, to limit the surface water discharge from the site during extreme rainfall events.

See CS Consulting Drawing A104-CSC-XX-00-DR-C-0002 for further details.

The rainwater harvesting system allows rainfall runoff from roof areas to be retained and stored onsite, and subsequently used for cooling of the data centre buildings. A total rainwater harvesting storage volume of 1085m$^3$ is provided for each of the proposed Buildings F and G totalling 2170m$^3$. There will be no impact or reduction to the attenuation volume as most of the rainfall will not occur simultaneously with high cooling demand.

Key activities for the assessment are as follows:

- **Ground Works:** It is known that ground works will comprise excavation and levelling for foundations, piling (if required) and laying of associated services for the data centre buildings and movement of soil for landscaping purposes.
- **Dewatering:** It is known that no groundwater dewatering or abstraction is required as part of the Proposed Development. This is based on the available site investigations for the Proposed Development site, refer to Chapter 6 Land, Soils, Geology and Hydrogeology of the EIA Report.
- **Construction Environmental Management Plan (CEMP):** It is known that suitable plans will be put in place through the project-specific CEMP (secured in the development consent order) in order to reduce risks to the environment.
- **Surface Water Run-off:** It is known that drainage from the Proposed Development will not have an impact on surface water run-off (and therefore water quality) into the Tolka and its tributaries (Mooretown & Powerstown Streams) WFD water body due to the implementation of the proposed SuDS techniques across the site. In accordance with the requirement of The Greater Dublin Strategic Drainage Study, GDSDS, (DCC 2005) the post development run-off volumes from the site are to match the pre-development levels. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented.

For surface water, the potential effects identified are as a result of:

- Increased run-off and sediment loading;
- Temporary land-take during the construction phase;
- Pollution due to accidental discharges or spillages during the construction phase;
- Scour during the construction phase;
- Permanent land take (increased hardstanding area) during the operational phase; and
- Accidental discharges and spills during the operational phase

For groundwater, the potential effects identified are as a result of:

- Pollution due to discharges or spillages during the construction phase;
  - Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates) – arising from excavation and ground disturbance;
  - Cement/concrete (increase turbidity and pH) – arising from construction materials;
  - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
  - Wastewater (nutrient and microbial rich) – arising from poor on-site toilets and washrooms.
- Excavation of soil and near-surface rock head will be required for levelling of the site to render it suitable for building the building platform. Local removal and reinstatement (including infilling) of the 'protective' topsoil and subsoil cover across the development area at the site will not change the overall vulnerability category for the site which is already *'high to extreme'*. Capping of significant areas of the site by hardstand/ building following construction and installation of drainage will minimise the potential for contamination of the aquifers beneath the site.
- Piling and below ground working causing mobilisation of contaminants during the construction and operational phases.

Appendix A contains the surface water and groundwater assessments where the above potential effects are considered. The colour coded system referred to in Table 4-1 and Table 4-2 above is used to give a visual impression of the assessment.

### 5.1.1 Summary of Source-Pathway-Receptor (S-P-R) Model

The table below (Table 5.1) describes the S-P-R model for the site and includes the robust mitigation and design measures which will be incorporated into the Proposed Development throughout the construction and operational phases.

***Table 5.1*** *Pollutant Linkage Assessment (with mitigation)*

| Source | Pathways | Receptors considered | Risk of Impact | Mitigation Measures |
|---|---|---|---|---|
| **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 2-5m 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 and Poor 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 mitigation measures (i.e. CEMP) low potential loading, natural attenuation within overburden and discrete nature of fracturing reducing off site migration. | The project-specific CEMP will include robust mitigation measures which are set out in the available OCEMP and the EIA Report, to protect the underlying hydrogeological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the Proposed Development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase. |
| 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 | No pathway | Hydrological environment (Mooretown Stream, Powerstown Stream and Tolka River) | No risk as no pathway identified. | |
| **Operational Impacts (Summary)** | | | | |
| Discharge of untreated water off-site | Direct pathway to hydrological environment via drainage system | Hydrological environment (mainly the Tolka River) | No perceptible risk due to the implementation of the mitigation and design measures which includes SuDS techniques and the use of interceptors along the drainage system. | The Proposed Development is designed to ensure the protection of the underlying hydrogeological environment such as containment of bulk oil storage, delivery and distribution and use of oil interceptors on the stormwater |

| | | | | |
|---|---|---|---|---|
| Discharge to ground of hydrocarbons during re-fuelling of generators or accidental spill from tanks. | Bedrock protected by 2-5m low permeability overburden. Furthermore, there will be hardstanding areas within the contained refuelling areas to protect the underlying aquifer. | Limestone bedrock aquifer (Locally Important aquifer and Poor Aquifer) | No perceptible risk due to the presence of hardstanding areas with designed surface water drainage system with the presence of interceptors. Tanks are double-skinned and will be stored within adequately sized bund serviced from a contained refuelling pad. | system downgradient the offloading area and prior to discharge from the site and the use of SUDs techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented. |

## 5.2 No Deterioration Assessment

### 5.2.1 Hydrological Environment

The Proposed Development is located in proximity to agricultural and drainage drains of the Mooretown Stream which is directly connected to the Powerstown (Dublin)_010 Stream and the further downstream Tolka River (Tolka_030).

There are mitigation and design measures which will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

There is no dewatering required for the Proposed Development. As such the Proposed Development will not have an impact on the quantitative aspects in consideration of water body status.

The project-specific CEMP which the works Contractor will develop will implement strict mitigation measures set out in Section 4 of the OCEMP and EIA Report (with special attention to Chapter 7 Hydrology) to ensure the protection of the hydrological (and hydrogeological) environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative or morphology of the nearby watercourses.

The Outline CEMP and the project-specific CEMP as well as mitigation measures set out in Chapter 5 (Land, Soils, Geology & Hydrogeology) & Chapter 6 (Hydrology) of the EIA Report will mitigate potential impacts on the surrounding hydrological environment from accidental spillages during construction.

There is no direct hydrological connection during the construction phase to the off-site waterbodies.

There are no discharges of water during the operational phase to any open waterbody/watercourse and no long-term groundwater dewatering for the Proposed Development. The discharges will be adequately attenuated via SuDS measures, hydrobrake (or equivalent) and oil/water interceptor to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourse (Tolka River and its tributaries). To note there is no direct connectivity to the Tolka River. There is an indirect connection via surface water driange systems. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term/ on-going integrity of same.

There are no proposed diversions of any drainage ditches or waterbodies as part of the Proposed Development.

There is no dewatering associated with the construction and operational phases, hence there is no impact on the hydrological environment in terms of baseflow.

Overall, the potential effects on the WFD status to the waterbodies are considered *no impact i.e. no change to the WFD status or elements in terms of the hydrological environment.*

### 5.2.2 Dublin Groundwater Body (GWB)

The Proposed Development does not involve groundwater dewatering, which limits the potential construction impacts of the Proposed Development on the underlying groundwater body. During operation there is no current proposal for dewatering.

For the construction phase, there are mitigation and design measures set out in the OCEMP (Section 4) and the EIA Report (with special attention to Chapter 6) which will be implemented during this phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of the underlying bedrock aquifer long-term and as such will not impact on trends in water quality and over all status assessment.

There will be limited impact on the surrounding hydrogeological environment from the activity of dewatering as there is no dewatering required for the Proposed Development. As such the Proposed Development will not have an impact on the quantitative aspects in consideration of water body status.

The project-specific CEMP which the works Contractor will develop will implement strict mitigation measures to ensure the protection of the hydrogeological environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative of the underlying bedrock limestone aquifer (Dublin GWB).

In terms of the operational phase, bulk fuel oil storage (diesel / renewable diesel) is required. Buildings F and G will have a 40,000L capacity tank within an adequately sized bund serviced from a contained refuelling pad. Diesel / renewable diesel will be piped from the bulk storage tank to the back-up generator units (each generator will have its own internal double-skinned belly tank). Building E has one generator which will have its own internal double-skinned belly tank with 9,000L capacity.

In order to minimise any impact on the underlying subsurface strata from material spillages, the proposed bulk fuel storage tank for Building F and G will be located above ground in a designated concrete fuel storage bund on an impervious base. This is bunded to a volume of 110% of the capacity of the tank within the bund (plus an allowance of 300 mm for rainwater ingress). Rainwater collected from the bund will be pumped to the foul drainage network via a Class 1 full retention fuel and oil separator, these pumps will be linked to a level switch and sensor so that if hydrocarbons are detected they will not pump and will alarm to the facility EPMS. Additionally the fuel and oil separator is monitored on the facility BMS and will alarm if hydrocarbons are detected.

Diesel / renewable diesel will be piped from the bulk storage tanks to belly tanks at each of the back-up generator units. All underground pipework for fuel transfer will be double contained and its quantity has been minimised in planning the site layout. The generator belly tanks will be double skinned.

Fuel delivery to the bulk storage tank and to the Building E generator belly tank will take place within the designated contained unloading areas. These concrete unloading areas will be dished to falls to a channel drain (aco drain) at the back of the unloading area which will collect stormwater run off from the unloading area and discharge to the surface water drainage network through a Class 1 forecourt full retention fuel and oil separator (by Kingspan Klargester or equivalent). Forecourt separators are full retention separators specified to retain on-site the maximum spillage likely to occur during fuel delivery. The capacity of the separator is 10,000 litres in order to retain the possible loss of the contents of one compartment of a road tanker, which may be up to

7,600 litres. This separator is also monitored on the BMS and will alarm if hydrocarbons detected.

Delivery of fuel will be undertaken following a documented procedure which minimises the risk of spills and spill containment/clean-up kit shall be readily available on site.

High level alarms and sump alarms and Fuel overfill protection will be fitted to all relevant tanks and bunds. All operating staff will have appropriate training in fuel handling and accident response.

Fuel and Oil separators will be regularly maintained to ensure their effective operation.

Therefore, the risk to the aquifer is considered low due to the mitigation in place for containment of bulk oil storage, delivery and distribution and use of oil interceptors on the stormwater system downgradient the offloading area and prior to discharge from the site.

Overall, the potential effects on the WFD status to the waterbodies are considered *no impact i.e. no change to the WFD status or elements in terms of the underlying hydrogeological environment.*

## 5.3 Future Good Status

Currently, the EPA classifies the WFD Ecological Status for the Tolka waterbody as having '*Poor Status*' (2013-2018) with a current WFD River Waterbody risk score of 1a, '*At risk of not achieving good status*'. The Mooretown Stream is grouped with the Powerstown (Dublin)_010 waterbody. This waterbody with its tributaries is classed as *'Poor Status'* (2013-2018) based on current monitoring. Therefore, the objective is currently not being achieved. The main pressure associated with the Tolka River (Tolka_030) as well as the Powerstown (Dublin)_010 is mainly agriculture based on the WFD Cycle 2 report produced by the EPA in December 2018 (Subcatchment Assessment (catchments.ie)).

As mentioned above, the main pressure is agricultural. Therefore, the main potential contaminates are phosphate and nitrates which are mainly associated with agricultural activities. The Proposed Development will not have any discharges associated with these contaminates. The discharges associated with the Proposed Development will be treated and attenuated prior to discharge off-site. Therefore, the Proposed Development will not have any discharges which will hinder catchment improvement measures.

The 2nd cycle of the RBMP 2018-2021 highlighted that the Upper Tolka was an Area for Action, while the *draft* 3rd cycle of the RBMP 2022-2027 highlighted the Tolka River for restoration. This indicates that the overall waterbody is *Poor,* and the key objective is to restore this waterbody to *Good* status by 2027.

The objective of the Dublin GWB is Good for 2018. Therefore, the objective is currently being met.

At present there are no local targeted measures within the catchments to maintain or achieve improvements to the status of the water bodies. However, the following are some pressures associated with waterbody catchments:

- Physical Modifications.
- Management of pollution from agricultural activities.
- Management of pollution from sewage and waste water.
- Management of pollution from urban environments.
- Changes to natural flow and levels of water.

- Managing invasive non-native species.

Based on the above information it is not considered that any of the aspects of the Proposed Development will prevent the WFD objectives from being achieved or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

## 6.0 CONCLUSIONS

The WFD assessment indicates that, based on the current understanding of the Proposed Development, there is no potential for adverse or minor temporary/ long-term or localised effects on the Mooretown and Tolka surface water body. Therefore, it has been assessed that the Proposed Development will not cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve, future good status or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

The WFD assessment indicates that there is no potential for adverse or minor temporary or localised effects on the Dublin groundwater body. Therefore, it has been assessed that it is unlikely that the Proposed Development will cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

No further assessment of WFD is recommended given that no significant deterioration or change in water body status is expected based on the current understanding of the Proposed Development during construction and operation.

## 7.0 STUDY LIMITATIONS

The conclusions and recommendations listed above are based on our current understanding of the site. This has been formed from review of historical maps, review of current and previous environmental and engineering reports for the Proposed Development site. This information is taken as being accurate and true. In addition, site visits were carried out by AWN and project engineers.

Public databases held by the EPA, GSI, OPW, NPWS and OSI have been consulted and the most recent available data has been referenced.

No subsurface or destructive testing was carried out as part of this assessment.

## 8.0 REFERENCES


- EPA, (2022). Environmental Protection Agency, on-line mapping; Available on-line at: http://gis.epa.ie/Envision [Accessed: 11-07-2022].
- GSI, (2022). Geological Survey of Ireland; Available on-line at: www.gsi.ie [Accessed: 11-07-2022].
- NPWS, (2022). National Parks & Wildlife Service; Available on-line at: www.npws.ie [Accessed: 11-07-2022].
- OPW, (2020). The National Preliminary Flood Risk Assessment (PFRA) Overview Report; Flood Relief & Risk Management Division, Engineering Services, Office of Public Works (OPW).
- OPW, (2022). Office of Public Works; Available on-line at: www.opw.ie [Accessed: 11-07-2022].
- Ordnance Survey of Ireland (OSI)
- Teagasc subsoil database
- River Basin Management Plan for Ireland 2018-2021.
- *Draft* River Basin Management Plan for Ireland 2022-2027.
- Fingal County Development Plan 2017-2023.
- *Draft* Fingal County Development Plan 2023-2029 – with special attention to the water-related policies.
- CS Consulting Group, Site-Specific Flood Risk Assessment, Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 (June 2022) – Chapter 7, Appendix 7.2.
- CS Consulting Group (2022) Engineering Services Report – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 which accompanies planning application.
- CS Consulting Group (2022) Outline Construction Management Plan – Proposed Data Centre Development, Cruiserath, Blancharstown, Dublin 15 which accompanies planning application.

# APPENDIX A

## WATER FRAMEWORK DIRECTIVE ASSESSMENT MATRIX

| Risk screening of potential to cause deterioration of current WFD status | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Surface Water** | **Scheme Elements** | **Data Centre Development** | | | | | | **Mitigation Measures** | **Overall Impact with mitgation measures** |
| | Tolka_SC_010, 09_10 | Phase (Construction/ Operation) | Construction | Construction | Construction | Construction | Operation | Operation | | |
| | Tolka Catchment and associated streams | **Identified Quantitative Impacts** | Increased run-off and sediment loading | Temporary land-take during the construction phase | Pollution due to accidential discharges or spillages during the construction phase | Scour during the construction phase | Increase in Hardstanding | Storage of Fuel | | |
| **WFD Status** | Macrophytes and phytobenthos - combined | Predicted change to status elements (green = none, amber = possibly, red = likely) | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | To Note: No Direct hydrological connection so ngligible potential for impact.<br><br>**Construction:** The project-specific CEMP will include robust mitigation measures to protect the surrounding hydrological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase.<br><br>**Operation:** The proposed development is designed to ensure the protection of the hydrological environment such as containment of bulk oil storage, delivery and distribution and use of oil interceptors on the stormwater system downgradient the offloading area and prior to discharge from the site and the use of SuD techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems (SuDS) will be implemented. | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | Macroinvertebrates | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | Fish | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| **Physio-Chemical Status** | Total Ammonia | Predicted change to status elements (green = none, amber = possibly, red = likely) | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | Total Nitrogen | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | Ortho-Phosphate | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| **Hydromorphological Elements** | Quantity and dynamics of river flow | Predicted change to status elements (green = none, amber = possibly, red = likely) | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | Connection to Groundwater | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | River continuity | | Not Applicable. | Not Applicable. | Not Applicable. | Not Applicable. | Not Applicable. | Not Applicable. | | Not Applicable. |
| | River depth and width variation bed | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | Structure and substrate of river bed | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | Structure of riparian zone | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |

| Risk screening of potential to cause deterioration of current WFD status | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Groundwater** | Scheme Elements | **Data Centre Development** | | | | Mitigation Measures | Overall Impact |
| | IE_EA_G_008 | Phase (Construction/ Operation) | Construction | Construction | Operation | Operation | | |
| | Dublin GWB | Identified Quantitative Impacts | Increased run-off and sediment loading | Pollution due to accidential discharges or spillages during the construction phase | Increase in Hardstanding | Storage of Fuel | | |
| **Quantitative Elements** | **Saline or other intrusions.** To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions. | Predicted change to status elements (green = none, amber = possibly, red = likely) | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | To Note: No direct discharge to ground or signifcant abstraction.<br><br>**Construction:** The project-specific CEMP will include robust mitigation measures to protect the underlying hydrogeological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase. No signficant dewatering is required which could impact on quantitaive status.<br><br>**Operation:** The proposed development is designed to ensure the protection of the underlying hydrogeological environment such as containment of bulk oil storage, delivery and distribution and use of oil interceptors on the stormwater system downgradient the offloading area and prior to discharge from the site and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented. No signficant abstraction is required which could impact on quantitaive status. | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | **Surface water.** To assess the impact of groundwater abstractions on the ecological status of surface water bodies. | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | **Groundwater Dependent Terrestrial Ecosystems (GWDTE's)** To assess the impact of groundwater abstractions on the condition of GWDTE'S. | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | **Water balance** To identify groundwater bodies where abstractions exceed the available resource. | | Not Applicable (no dewatering anticipated) | Not Applicable (no dewatering anticipated) | Not Applicable (no water supply from borehole anticipated) | Not Applicable (no water supply from borehole anticipated) | | Not Applicable |
| **Chemical Elements** | **Saline or other intrusions.** To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions. | Predicted change to status elements (green = none, amber = possibly, red = likely) | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | **Surface water.** To assess the impact of groundwater abstractions on the ecological status of surface water bodies. | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | **Groundwater Dependent Terrestrial Ecosystems (GWDTE's)** To assess the impact of nutrient concentrations in groundwater (primarily phosphates) on GWDTE's. | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | **Drinking Water Protected Areas (DrWPAs)** To identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future. | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |
| | **General quality assessment** To identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater. | | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | No measurable change anticipated. | | No anticipated impacts to the hydrological environment with no deterioration to the WFD Status |

# 8.0 BIODIVERSITY

## 8.1 INTRODUCTION

This chapter provides an assessment of the impacts of the Proposed Development; the construction and operation and decommissioning of Buildings E, F, and G on the ecological environment, i.e. flora and fauna. It has been compiled in compliance with EIA Directive (2011/92/EU) as amended in 2014, the Planning and Development Act 2000 as amended, and the European Commission's guidance on the preparation of the EIA Report (2017) and follows the EPA EIA Report Guidelines (2022).

The Proposed Development site is predominately comprised of recolonising bare ground, wildflower earth banks and artificial (hardstand) surfaces (temporary buildings, construction working areas, gravel roads and worked bare ground) of the existing site at Cruiserath.

The subject site is drained by an existing surface water system which is directed to hydrocarbon interceptors and through an attenuation system and hydrobrake flow control device prior to the controlled discharge of clean water. There are no direct source-pathway-receptor linkages from the Proposed Development areas to the surface water drainage system as described in Chapter 7 (Hydrology).

The likely significant effects of the Proposed Development on biodiversity have been assessed during both the Construction Phase, including impacts on air and water quality, on habitats, and on flora and fauna from construction activities such as earth movement and utility diversions, in addition to effects associated with the Operational Phase of the Proposed Development.

The methodologies used to collate information on the baseline biodiversity environment and assess the likely significant impacts of the Proposed Development are detailed in the following sections.

### 8.1.1 Legislation, Policy & Guidance

#### 8.1.1.1 EU Habitats Directive

The "Habitats Directive" (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A "Special Conservation Area" or SAC is a designation under the Habitats Directive. The Habitats Directive sets out the protocol for the protection and management of SACs.

The Directive sets out key elements of the system of protection including the requirement for Appropriate Assessment of plans and projects.

#### 8.1.1.2 EU Birds Directive

The "Birds Directive" (Council Directive 79/409/EEC amended by Council Directive 2009/147/EC on the Conservation of Wild Birds) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas. This Birds Directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). Appendix I indicates

Annex I bird species as listed on the Birds Directive. A "Special Protection Area" or SPA, is a designation under The Birds Directive.

Special Areas of Conservation and Special Protection Areas form a pan-European network of protected sites known as Natura 2000 sites and any plan or project that has the potential to impact upon a Natura 2000 site requires appropriate assessment.

#### 8.1.1.3 Wildlife Acts (1976 - 2021)

The primary legislation providing for the protection of wildlife in general, and the control of some activities adversely impacting upon wildlife is the Wildlife Act 1976, as amended. The aims of the wildlife act according to the National Parks and Wildlife Service are "... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims." All bird species are protected under the Wildlife Act 1976. The Wildlife (Amendment) Act 2000 was amended improve the effectiveness of the Wildlife Act 1976 to achieve its aims.

#### 8.1.1.4 Birds and Natural Habitats Regulations

The European Communities (Birds and Natural Habitats) Regulations 2011 are also a key piece of legislation (S.I. No. 477/2011) included in the Planning and Development Acts containing legal direction on the protection of flora and fauna . The Planning and Development Acts also incorporates the AA requirements into the planning regime.

The Habitats Directive and the Birds Directive have been transposed into Irish law by Part XAB of the Planning and Development Acts and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

## 8.2 METHODOLOGY

This chapter of the EIA Report concentrates on ecological features within the development area of significance, primarily designated habitats and species. This includes habitats/species listed in Annex I, II and IV of the EU Habitats Directive, rare plants listed in the Flora Protection Order[1] and other semi-natural habitats of conservation value.

The objectives of the assessment are achieved by:

- Identifying baseline conditions of the site and its environs.
- Identifying the sensitivity of receptors with potential to be affected by changes in the baseline conditions.
- Predicting the magnitude of likely changes to the baseline receiving environment.
- Assessing the significance of effect taking into account sensitivity of receptors and magnitude of effect.
- Identifying and assessing appropriate mitigation measures, including alternatives.

[1] Statutory Instruments. S.I. No. 235 Of 2022 Flora (Protection) Order 2022. Government Of Ireland

• Assessing the significance of residual effects, taking account of any mitigation measures.

Desktop research to determine existing records in relation to habitats and species present in the study areas was firstly undertaken. This included research on the National Parks and Wildlife Services (NPWS) metadata website, the National Biodiversity Data Centre (NBDC) database and a literature review of published information on flora and fauna occurring in the Proposed Development study areas (see section 8.2.1 below).

Other environmental information for the study area was reviewed, e.g. in relation to soils, geology, hydrogeology and hydrology (Chapter 6 and Chapter 7 of this EIA Report) in the determination of source vector pathways and links with potentially hydrologically connected areas outside the Proposed Development site. For example the determination of water courses and pathways to off site water bodies or pathways to ground an potentially sensitive aquifers if present.

The potential effects on European sites are assessed in this chapter of the EIA Report in relation to the requirements of the EIA Directive and Irish legislation and does not purport to comprise information for the purposes of the screening assessment to be carried out by the competent authority or authorities pursuant to Article 6(3) of the Habitats Directive. The obligation to undertake appropriate assessment derives from Article 6(3) of the Habitats Directive and is the subject of an Appropriate Assessment Screening Report (Appendix 8.1)

### 8.2.1 Study Area

While the main focus of biodiversity was on the Proposed Development site within the red line boundary, see Figure 8.1 below, the surrounding environment up to 150m from the redline boundary was taken into account in addition to potential biological and hydrological connectivity in relation to European sites in a Zone of Influence which is detailed further in Section 8.3 below.

The ecological surveys were designed based upon the characteristics of the Proposed Development and its likely significant impacts on the baseline environment during construction and/or operation. The study areas are described as follows:

*Habitats*

The area in the Proposed Development footprint where habitats could be directly or indirectly affected during construction/operation.

*Rare and/or Protected Flora*

The area in the Proposed Development footprint where rare and/or protected flora could be directly or indirectly affected during construction/operation.

*Fauna species other than those listed below*

The area in the Proposed Development footprint where fauna species could be directly or indirectly affected during construction/operation.

The study area of this assessment included the footprint of the overall landholding as detailed below and shown on Figure 8.1.

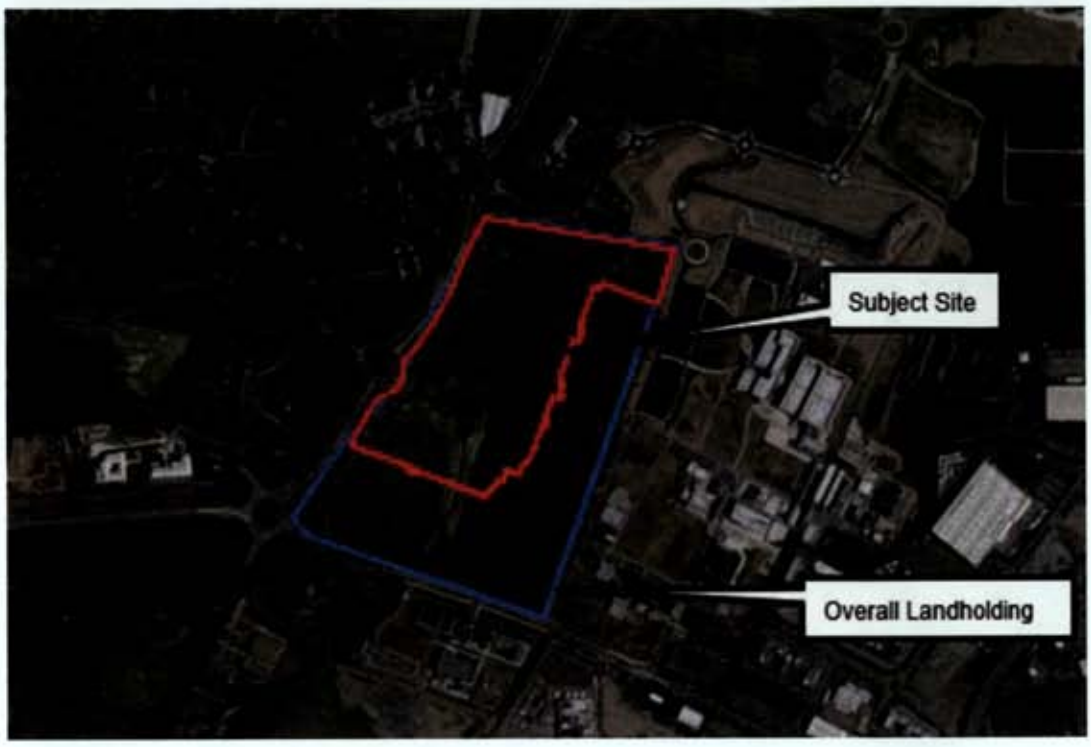


***Figure 8.1*** *Site Location, redline boundary of the Proposed Development and blue line boundary of overall landholding.*

### 8.2.2 Ecology Surveys

#### 8.2.2.1 Habitat Surveys

The habitat survey was carried out in two stages. The first stage comprised desktop research to determine existing records in relation to habitats and species present in the study area as defined by the area of the Proposed Development, site boundaries and surrounding buffer zones up to 150 m away. This distance referred to by the standard ecological impact assessment guidance[2] is adequate to address potential effects on mobile species such as otters or badgers, if present.

The second stage of the survey involved a site visit to establish the existing environment in the footprint of the Proposed Development area. Areas which were highlighted during desktop assessment were investigated in closer detail according to the Heritage Council Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011). Habitats in the Proposed Development area were classified according to the Heritage Council publication "A Guide to Habitats in Ireland" (Fossitt, 2000). This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. This form of classification uses codes to classify different habitats based on the plant species present. Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of "An Irish Flora" (Parnell & Curtis, 2012).

Habitats were surveyed on 6 July 2022 by conducting a study area walkover covering the main ecological areas identified in the desktop assessment within the redline

[2] Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019).

boundary, see Figure 8.1. The survey date is appropriate for surveying flora, birds and non-volant mammals such as badgers. A photographic record was made of features of interest.

There are no key ecological receptors as the site has been prepared for the Permitted Developments (Buildings A, B, C and D). There has been earth movement, mounding, building and associated Permitted Development.

#### 8.2.2.2 Mammals (Excluding Bats)

Signs of mammals such as badgers and otters were searched for while surveying the study area noting any sights, signs or any activity in the vicinity especially along adjacent boundaries.

#### 8.2.2.3 Bats

A desktop assessment of the suitability of the site for usage by bats was undertaken. The site is enclosed as an existing light industrial campus. It was determined by the ecologist that given the overall change in the existing habitats including the Permitted Development, that there was no suitable bat roosting potential and as such a bat detector survey was not necessary to inform the assessment process.

#### 8.2.2.4 Breeding Birds

Breeding Birds were surveyed during the Summer period using standard walked transects and signs were recorded where encountered during the field walkover survey.

A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for winter birds located within or directly adjacent to the Proposed Development areas.

Field surveys carried out (see Section 8.3 below) deemed the overall lands to be unsuitable feeding and/or roosting sites for wintering birds, due to habitat conditions being dominated by mosaics of bare ground and artificial surfaces and/or subject to high levels of disturbance. As such it was not deemed necessary to carry out detailed wintering bird surveys in these areas. The results of the desk-based study have informed the assessment of potential impacts on wintering bird species arising from the Proposed Development.

### 8.2.3 Categorisation of the Baseline Environment

Desktop research to determine existing records in relation to habitats and species present in the study areas included research on the National Parks and Wildlife Services (NPWS) metadata website, and the National Biodiversity Data Centre (NBDC) database. The following resources assisted in the production of this chapter of the report.

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
  - National Parks & Wildlife (NPWS) protected site boundary data;
  - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
  - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
  - Open Street Maps (https://www.openstreetmap.org);

    - Digital Elevation Model over Europe (EU-DEM);
    - Google Earth and Bing aerial photography 1995-2022;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
    - Natura 2000 - Standard Data Form;
    - Conservation Objectives;
    - Site Synopses;
- National Biodiversity Data Centre records:
    - Online database of rare, threatened and protected species;
    - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019) ; and
- Relevant Development Plans;
- Fingal County Development Plan 2017-2023

### 8.2.4 Assessment Methodology

Following desktop assessment and fieldwork, an evaluation of the development area and determination of the potential effects on the flora and fauna of the area is based on the following guidelines and publications:

- Assessment of plans and projects significantly affecting Natura 2000 sites (EC, 2002);
- Managing Natura 2000 Sites (EC, 2018);
- Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2007);
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, December 2009, Rev 2010);
- EPA Guidelines on Information to be contained in an EIA REPORT (EPA, 2022);
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- Ecological Surveying Techniques for Protected Flora & Fauna (NRA, 2008);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019).

<u>Do Nothing Scenario</u>

If the Proposed Development did not occur, the remaining permittedbuildings would be completed, and the site landscaping completed as permitted and the effect on biodiversity would be neutral.

## 8.3 RECEIVING ENVIRONMENT

As described in Section 2.2.1 of Chapter 2 (Description of the Proposed Development), the Subject Site is located entirely within the overall landholding which is already occupied by Buildings A and D, with Buildings B and C currently under construction. As part of the Permitted Development of Building A, infrastructure and landscaping was established across the overall site including the main entrance to the west of the

site from the R121 roundabout, internal road access network, perimeter security fencing, and internal and perimeter site landscaping. The Subject Site is primarily undeveloped comprising recolonised bare ground and planted wildflower earth banks, with the exception of Building D which has recently been constructed within the southernmost portion of the subject site, and an area of approx. 16,000m$^2$ at the centre of the subject site currently serves as a construction compound (including car parking) for the construction of Buildings B and C.

The following sections provide a description of the flora and fauna of the existing environment in the study area.

### 8.3.1 Zone of Influence (ZoI)

The ZoI, or distance over which a likely significant effect may occur will differ across the subject ecological receptors, depending on the predicted impacts and the potential impact source-pathway-receptor linkage(s). The results of both the desk study and the suite of ecological field surveys undertaken have established the habitats and species present along the Proposed Development. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Proposed Development. In some instances, the ZoI extends beyond the study area (e.g. surface water quality effects of a sufficient magnitude can extend, and affect, receptors at significant distances downstream). For example, the pollution of a water course by a significant quantity of a substance that could have an effect on a sensitive habitat or species where the substance was carried downstream to a receiving environment such as a protected coastal estuary.

The ZoI of the Proposed Development in relation to terrestrial habitats is generally limited to the footprint of the Proposed Development and the immediate environs (to take account of shading or other indirect impacts, such as air quality). Hydrogeological / hydrological linkages (e.g. rivers or groundwater flows) between impact sources and wetland / aquatic habitats can often result in impacts occurring at significant distances.

The ZoI of air quality effects is generally local to the Proposed Development and not greater than a distance of 50m from the Proposed Development boundary, and 500m from Construction Compound during the Construction Phase, and up to 200m the Proposed Development boundary during the Operational Phase (refer to Chapter 9 (Air Quality) for more detail).

With regards to hydrological impacts, the distances over which water-borne pollutants are likely to remain in sufficient concentrations to have a likely significant effect on receiving waters and associated wetland / terrestrial habitat is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters, concentrations and types of pollutants (in this case sediment and/or hydrocarbons), volumes of receiving waters, and the ecological sensitivity of the receiving waters. In the case of the Proposed Development, this is unlikely as there are no surface water courses on the Proposed Development site.

The ZoI for impacts to aquatic fauna species, such as Salmonids, is limited to those water courses that will be crossed by the Proposed Development or water bodies to which runoff from the Proposed Development could drain to during construction. There are none present within or adjacent to the Proposed Development.

The ZoI of the Proposed Development in relation to likely significant effects on most breeding bird species is generally limited to habitat loss within the footprint of the Proposed Development.

### 8.3.2 Designated Conservation Areas

The Zone of Influence may be determined by considering the Proposed Development's potential connectivity with European sites, in terms of:

- Nature, scale, timing and duration of all aspects of the proposed works and possible impacts, including the nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of potential source-pathway-receptor linkages (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Location of ecological features and their sensitivity to the possible impacts.

The potential for source pathway receptor connectivity is firstly identified through GIS interrogation and detailed information is then provided on sites with connectivity. European sites that are located within a potential Zone of Influence of the Proposed Development are listed in Table 8.1 and presented in Figure 8.2 below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 19 July 2022. This data was interrogated using GIS analysis to provide mapping, distances, locations and source-pathway-receptor linkages to all sites of conservation concern including pNHAs, NHA and European sites.

All European sites are at least 8km distant from the Proposed Development, with the closest being the Rye Water Valley/Carton SAC, 8.82km to the southwest. There is no direct connectivity to any European site.

| Site Code | Site name | Distance (km)[3] |
|---|---|---|
| 000205 | Malahide Estuary SAC | 12.44 |
| 000206 | North Dublin Bay SAC | 14.34 |
| 000210 | South Dublin Bay SAC | 14.00 |
| 001398 | Rye Water Valley/Carton SAC | 8.82 |
| 004006 | North Bull Island SPA | 14.33 |
| 004024 | South Dublin Bay and River Tolka Estuary SPA | 11.62 |
| 004025 | Malahide Estuary SPA | 12.56 |

***Table 8.1*** *Details of European sites within the potential zone of influence of the project.*

A review of aerial photography, Ordnance Survey Ireland (OSI) mapping and OSI Geographical Information System (GIS) data for rivers and streams indicates that there are no notable surface water features onsite and no direct hydrological source-pathway-receptor linkages to offsite surface water bodies. This was confirmed during fieldwork on 6 July 2022 which included a site walkover of the accessible areas under construction and surrounding the Proposed Development areas outlined in Figure 8.1.

There is no potential for connectivity to any European sites.

[3] Distances indicated are the closest geographical distance between the proposed Project and the European site boundary, as made available by the NPWS. Connectivity along hydrological pathways may be significantly greater.

NHAs are designations under Section 16 of the Wildlife Acts to protect habitats, species or geology of national importance.

In addition to NHAs, there are pNHAs which are also sites of significance for wildlife and habitats and were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. pNHAs are offered protection in the interim period under the county or city development plans which requires that planning authorities give due regard to their protection in planning policies and decisions.

The NHAs and pNHAs identified in Figure 8.2 are located outside the Zone of Influence of the Proposed Development as they have no hydrological or biological connectivity to the Proposed Development.

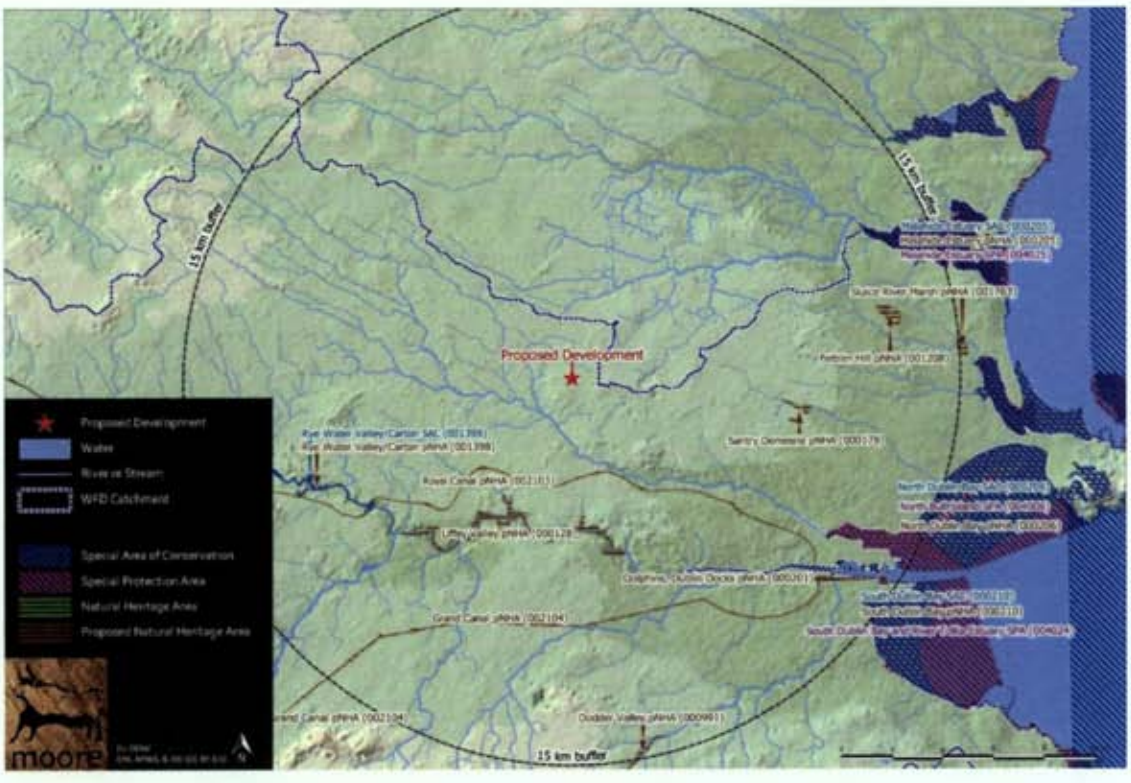


***Figure 8.2*** *Detail of site Location in relation to nearby designated sites.*

### 8.3.3 Habitats, Flora & Fauna

In general, there are few natural habitats in the Proposed Development site area. They have either been modified or are artificial. The following is an overview of the main habitat types present on the subject site. Detailed habitat descriptions are provided in areas that either intersect or have potential for indirect hydrological connectivity with European sites. A list of habitats recorded and their corresponding Fossitt codes (Fossitt, 2000) are presented in Table 8.2. The main habitats are presented on the recent aerial photography (July 2022) in Figure 8.3.

***Table 8.1*** *Details of habitats recorded and their corresponding Fossitt codes.*

| Habitat | Habitat Category | Habitat Type |
|---|---|---|
| (E) Exposed rock and disturbed ground | (ED) Disturbed ground | (ED3) Recolonising bare ground |
| (B) Cultivated and built land | (BC) Cultivated land | (BC4) Flower beds and borders |
| | (BL) Built land | (BL3) Buildings and artificial surfaces |


***Figure 8.2*** *Habitats recorded at the Proposed Development site at Cruiserath.*

8.3.3.1 (ED3) Recolonising ground

This habitat refers to mosaic remnant areas that have been stockpiled with clay and colonised over the period of site preparation. The areas present as a previously disturbed and mounded areas of spoil and the species composition reflects the recolonisation of the spoil over time. Species present includes abundant Rapeseed (*Brassica napus subsp. napus*), abundant Common Vetch, Common ramping fumitory (*Fumaria muralis*), Ragwort, (*Senecio jacobaea*), frequent Red campion (*Silene dioica*), Broadleaved Dock (*Rumex obtusifolius*), Dandelion (*Taraxacum officinale* agg.), Nettle (Urtica dioica), Thistles (*Cirsium* spp.), Creeping buttercup, Clovers (*Trifolium* spp.), Lesser burdock (*Arctium minus*), Ribwort plantain (*Plantago lanceolata*) and occasional Coltsfoot (*Tussilago farfara*).

8.3.3.2 (BC4) Flower beds and birders

This habitat refers to the surrounding berms and earth banks around the overall site which have been retained in situ or supplemented with landscaped flower beds planted with wild flowers. The areas are extensive and were in full bloom during the site visit (on 6 July 2022) providing a myriad of high value biodiversity habitats for insects such

as bumblebee, Butterflies and Moths, among which Speckled Wood (*Pararge aegeria*) and Cinnabar moth (*Tyria jacobaeae*) were most commonly recorded during fieldwork.

8.3.3.3 (BL3) Buildings and artificial surfaces

As previously stated, Building D has recently been constructed within the southernmost portion of the subject site, and an area of approx. 16,000m$^2$ at the centre of the subject site currently serves as a construction compound (including car parking) for the construction of Buildings B and C.

### 8.3.4 Invasive Species

There were no invasive species recorded during the habitat survey.

### 8.3.5 Fauna

8.3.5.1 Badgers

There were no badger setts along field boundaries which would be disturbed and no signs of badgers in the study area. A previous record on site was addressed as part of the Permitted Developments and appropriate mitigation measures successfully employed to address a sett present prior to site preparation.

8.3.5.2 Otters

There are no suitable habitats for otters on the site.

8.3.5.3 Bats

Results from the NBDC datacentre show that there are no records of bats in a specific polygon surrounding the Cruiserath site.

There are no mature trees to be removed and no bat roosts present on site.

8.3.5.4 Birds

Species recorded included regular passerines such as Great Tit (*Parus major*), Chaffinch (*Fringilla coelebs*), Blackbird (*Turdus merula*), Wren (*Troglodytes troglodytes*).

The site is currently under construction and not attractive to birds of conservation concern.

### 8.3.6 Habitat Evaluation

The ecological value of the site was assessed following the guidelines set out in the Institute of Ecology and Environmental Management's Guidelines for Ecological Impact Assessment (2019) and according to the Natura Scheme for evaluating ecological sites (after Nairn & Fossitt, 2004) in the TII Guidelines (formerly NRA) for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009) which contains guidance for evaluating ecological impacts. Judgements on the evaluation were made using geographic frames of reference, e.g. European, National, Regional or Local outlined as follows:

Ecological valuation: Examples

***International Importance:***

- *'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.*
- *Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).*
- *Features essential to maintaining the coherence of the Natura 2000 Network.*
- *Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.*
- *Resident or regularly occurring populations (assessed to be important at the national level) of the following:*
  - *Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or*
  - *Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.*
- *Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).*
- *World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).*
- *Biosphere Reserve (UNESCO Man & The Biosphere Programme).*
- *Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).*
- *Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).*
- *Biogenetic Reserve under the Council of Europe.*
- *European Diploma Site under the Council of Europe.*
- *Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).*

***National Importance:***

- *Site designated or proposed as a Natural Heritage Area (NHA).*
- *Statutory Nature Reserve.*
- *Refuge for Fauna and Flora protected under the Wildlife Acts.*
- *National Park.*
- *Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA);*
- *Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.*
- *Resident or regularly occurring populations (assessed to be important at the national level) of the following:*
  - *Species protected under the Wildlife Acts; and/or*
  - *Species listed on the relevant Red Data list.*
- *Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive County Importance:*
- *Area of Special Amenity.*
- *Area subject to a Tree Preservation Order.*
- *Area of High Amenity, or equivalent, designated under the County Development Plan.*