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ENVIRONMENTAL IMPACT ASSESSMENT SCREENING REPORT

PROPOSED EXTENSION OF THE HEXAGON BUILDING (DATA STORAGE FACILITY), IDA BLANCHARDSTOWN BUSINESS AND TECHNOLOGY PARK, BALLYCOOLIN ROAD AND SNUGBOROUGH ROAD, BLANCHARDSTOWN, DUBLIN 15

Technical Report Prepared For

MCA Architects

Technical Report Prepared By

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Our Reference

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1.0 INTRODUCTION

At the request of MCA Architects (MCA) and on behalf of DCF Technology Limited (henceforth "the applicant"), AWN Consulting Ltd (AWN) has prepared the following Environmental Impact Assessment (EIA) Screening Report to accompany the planning application for development at the former Hexagon Building Site, IDA Blanchardstown Business and Technology Park, Ballycoolin Road and Snugborough Road, Blanchardstown, Dublin 15.

The proposed development consists of an extension of the existing 'Hexagon' data storage facility (with a GFA of 4,055m^2) over two storeys with plant at roof level, an entrance lobby extension to Building C (with a GFA of 5.5m^2), the relocation of existing parking and the provision of alternative parking arrangements, and the provision of 4 no. emergency generators. The proposed development will have an identical use to the existing developments in the Hexagon Building, Building A and Building B. The extension has been designed to integrate with the existing Hexagon Building and form a unified campus with uniform boundary treatment, landscaping and complementary building design. The location of the proposed development, the existing Hexagon Building and Buildings A and B are presented in Figure 1 below.

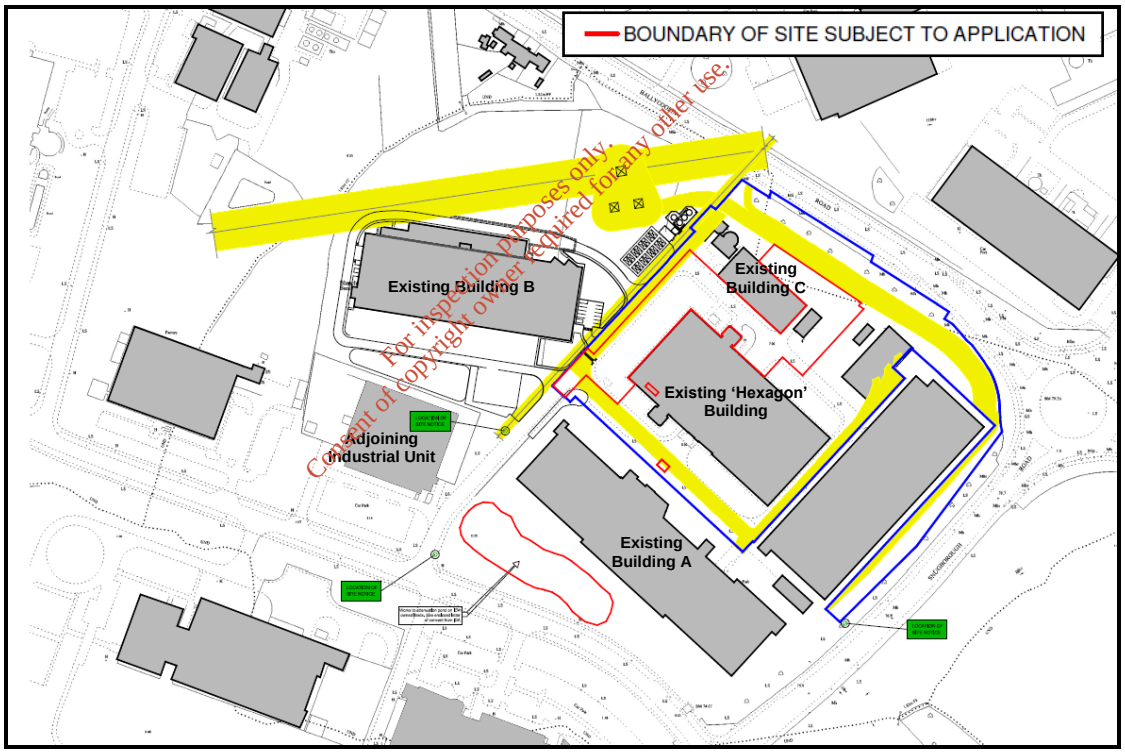

Figure 1 *Site Location and Site Boundary (in red) (Source: MCA Architects, December 2017)*

As described in detail in Section 3.0 of this report, the proposed development is considered to be outside the mandatory requirements for EIA and is sub-threshold. A sub-threshold development may require an EIA where it is likely to have significant effects on the environment. This report has been prepared with the primary aim to provide sufficient information to the planning and environment departments of Fingal County Council (FCC) to allow them to determine potential EIA requirements for the project.

It is AWN's opinion, based on the information provided in the following sections that the proposed development will not have a significant effect on the environment and therefore, an EIA report would not be required on a discretionary basis.

The screening process followed in this report is in accordance with the 2014 EIA Directive (2014/52/EU) and as per Section 3.2 of the Draft EPA "*Guidelines on the Information to be contained in an Environmental Impact Assessment Reports*" (August, 2017) and the Department of Housing, Planning, Community and Local Government's "*Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems Key Issues Consultation Paper*" (May, 2017). The 2014 EIA Directive, the aforementioned Draft EPA Guidelines and Consultation Paper have been referenced in the absence of transposition of the 2014 EIA Directive into Irish law. The requirements are similar to those previously required under the "*EIA Guidance for Consent Authorities regarding Sub-threshold Development*" publication prepared by the Department of Environment, Heritage and Local Government (DoEHLG) in 2003.

Due regard has also been paid to the other EIA guidance in relation to content and methodologies involved in preparation of EIA including Draft EPA *"Advice Notes for preparing Environmental Impact Statements"* (September 2015) as well as the more recently published *"Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment"* (2013).

Screening Process

Screening describes the process of ascertaining whether a development requires an EIA by assessing the project in the context of the statutory mandatory thresholds and discretionary requirements for EIA.

The requirement for EIA for certain types and scales of development is set out in the EIA Directives (85/337/EEC, 97/11/EC, 2003/35/EC, 2008/1/EC and most recently 2014/52/EU) and given primary effect in Ireland by the European Communities (Environmental Impact Assessment) Regulations 1989-2006, Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001-2016. It should be noted that this Screening Report is prepared in accordance with the above Irish legislation in the absence of new Regulations to transpose the 2014 EIA Directive into Irish legislation. However, it is not considered that this will present an issue for the planning authority as we understand that the planning authority can screen out the need to conduct an EIA under either regime.

Article 27 of Directive 2014/52/EU states that *"The screening procedure should ensure that an environmental impact assessment is only required for projects likely to have significant effects on the environment"*.

The EIA Directives list those projects for which an EIA is mandatory (Annex I) and those projects for which an EIA may be required (Annex II). With regard to Annex II projects, Member States can choose to apply thresholds or use case by case examination or a combination of both to assess where EIA is required. In Ireland, a combination of both has been applied. The project proposed is not listed under Annex I EIA Directives and it is below the thresholds as set out in the Planning and Development Regulations 2001-2016 for Annex II projects.

This Screening Report is therefore presented for the sub-threshold development to show that the proposed development is not likely to have a significant effect on the environment.

2.0 DESCRIPTION OF THE DEVELOPMENT

2.1 Existing Development

The location of the proposed development, the existing Hexagon Building and the neighbouring buildings are presented in Figure 1.

The footprint of the proposed extension is currently occupied by a car park, which accommodates 39 no. car parking spaces for employees and visitors to the Hexagon Building (including 2 no. disabled spaces). It is proposed to re-locate the car park beside Building C (which will accommodate 35 no. spaces), with a further 5 no. spaces provided on the north-east side of the Hexagon Building. The disabled spaces will be re-located to close to the Hexagon Building southeast entrance to facilitate better access to the building.

2.2 Proposed Development

The proposed development will consist of the following:

- The proposed extension of the existing 'Hexagon' data storage facility, with a GFA of 4,055 sq.m over two storeys with plant at roof level, and including an additional plant area at roof level of the existing Hexagon Building. The extension will have a maximum overall height of c. 24 metres and will accommodate data storage rooms at ground and first floor levels, electrical room and generator transformers at first floor levels, and stair and lift cores;
- An entrance lobby extension (GFA of 5.5 sq.m) to existing Building C (generator building);
- The provision of 4 no. emergency generators with associated flues within a new palisade fenced compound to the north of Building C (generator building);
- A new 3m high perimeter fence to the north of Building C (generator building) to match existing;
- The provision of 40 no. car parking spaces to the northeast of the Hexagon Building and adjacent to Building C (in place of 39 no. spaces to be removed to accommodate the proposed extension) and the provision of 2 no. disabled parking spaces to the south of the Hexagon Building; and
- All associated site works including drainage, lighting, alteration to attenuation areas to the south of the Hexagon Building to cater for the proposed development, and utility cables.

The development will be an extension to and accessed through the existing 'Hexagon' data storage facility via the existing site entrance serving same. The proposed site layout plan is illustrated in Figure 2.

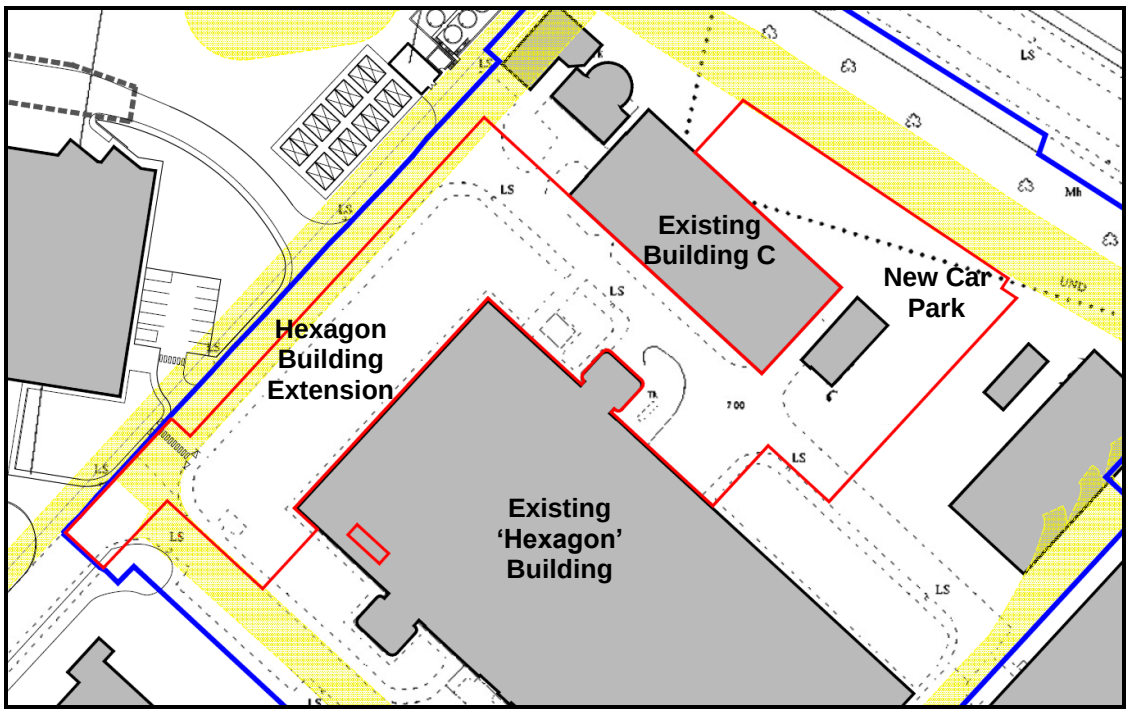

Figure 2 *Proposed Site Layout Plan (Source: MCA Architects, December 2017)*

2.3 Planning Context

A planning report has been prepared by John Spain Associates (JSA) and is enclosed with this application. The following sections present a brief summary of the planning context of the proposed development with particular regard to environmental aspects.

2.3.1 National Planning Policy

The Planning System in Ireland is rooted in the Local Government (Planning and Development) Act 1963. Since the 1963 Act, many separate pieces of legislation and regulations have been implemented by the Department of Communications, Climate Action and Environment. Recent planning legislation was consolidated in 2000. In 2010, the Planning and Development Amendment Act was introduced to amend the Planning Acts of 2000 – 2009 with "s*pecific regard given to supporting economic renewal and sustainable development*".

The Act envisages a closer alignment of the National Spatial Strategy with Regional Planning Guidelines, Development Plans and Local Area Plans, while also clarifying the key obligations required of Planning Authorities under the Birds and Habitats Directives. The Act also aims to improve the throughput and performance of An Bord Pleanála and strengthen the enforcement controls of Planning Authorities.

2.3.2 Regional Planning Policy

The Planning and Development Acts 2000-2017 required that all Regional Authorities shall at the direction of the Minister make Regional Planning Guidelines. There are eight Regional Authorities in Ireland, which were set up in 1994 under the Local Government Act 1991 (Regional Authorities) Establishment Order 1993.

The current Regional Planning Guidelines were made by the Dublin Regional Authority during 2010. The Dublin region covers Greater Dublin including Dublin City Council, Dun Laoghaire Rathdown County Council, Fingal County Council and South

Dublin County Council as well as Meath County Council, Kildare County Council and Wicklow County Council. The lifetime of this plan is between 2010 and 2022.

By 2022 the Greater Dublin Area (GDA) is targeted to be a vibrant, active and sustainable international Gateway region with strong connectivity across the entire GDA region, nationally and worldwide. The city and its environs are targeted in the guidelines to grow by 103,000 persons up to 2022. This represents a significant population growth of 7.5% on 2016.

Other items of note from the Regional Planning Guidelines 2010-2022 report include;

- Employment within the Dublin region is expected to continue to increase and the importance of the recent rapid increase in the ICT sector to sustaining that growth is recognised.
- The potential impact of the improved transport and utilities infrastructure on the region.

2.3.3 Fingal County Council Policy

Similarly, the recently enacted *Fingal County Development Plan 2017-2023* identifies the importance of foreign direct investment.

In the document, Blanchardstown is identified as one of the largest urban centres in the County. It is a classed as a Metropolitan Consolidation Town, which performs the role of one of County's primary development centres.

The Plan states that strategic policy will seek to encourage infill development and intensification of development within appropriate locations in Blanchardstown and promote enterprise and employment particularly in the growth centres such as Blanchardstown.

The proposed development is to be located within an area zoned 'Objective HT' (High Technology) with the aim to;

'Provide for office, research and development and high technology/high technology manufacturing type employment in a high quality built and landscaped environment'

Objective ED95 of the Plan in relation to this land use zoning states the objective to;

"Encourage the development of corporate offices and knowledge based enterprise in the County on High Technology zoned lands and work with key stakeholders, relevant agencies and sectoral representatives to achieve such development"
Economic Development Objectives of note for the proposed development included within the plan include Objective ED110:

"Proactively respond to the needs of enterprises undertaking pharmaceutical, data centre, food production and logistics activities that require bespoke building facilities to meet their specific manufacturing requirements."

2.3.4 Planning Summary

The proposed development is located on suitably zoned lands in an industrial area to the north of Blanchardstown town centre. The proposed use is consistent with the existing Hexagon Building and neighbouring facilities in Buildings A and B and will integrate with these facilities both visually and functionally. The development will

sustain the land use, while minimising transport demand and adding to the overall sustainability of the site.

2.3.5 Planning Permissions

As part of the assessment of the proposed development, account has been taken of planned developments in the area, as well as existing local land uses.

The FCC Planning Department website was consulted in order to generate a list of granted planning permissions from the surrounding areas of the proposed development within the previous 3 years. Table 2.1 below presents a list of the applications granted permission within that period.

FCC Planning Application Reference No. & Applicant	Summary Description of Development	Location of Development	Decision Date
FW15A/0096 Symantec Ltd	Permission for the modification to the North elevation of the existing Block B	Block B, Aurora Site, Ballycoolin Business Park, Ballycoolin Road, Dublin 15	August 26, 2015
FW15A/0115 Ipsen Manufacturing Ireland Ltd.	The construction of a new two storey Pharmaceutical manufacturing building (Gross Floor Area 2187m²), external steel stairs, single storey enclosed electrical plant room (Gross Floor Area 25.4m²), Erection of a new sign and logo (5.28m²) over existing office entrance. And all ancillary and associated site development works. Retention of an existing single storey temporary office building (Gross floor area 85.2m²), for a period of 5 years. 7. Retention of an existing single storey contractors compound (site area 1616m²), for a period of 5 years. (Planning Permission Ref FW09a/0090 refers). 8. And all ancillary and associated site development works	Blanchardstown Industrial Park, Snugborough Road, Blanchardstown, Dublin 15	October 12, 2015
FW15A/0135 ADSIL	Permission for a new 2-storey building for use as electrical rooms for electronic operations, together with mechanical plant rooms, a double vehicle loading bay and ancillary workshops.	Hexagon Building, IDA Blanchardstown Busines & Technology Park, Snugborough Road, Blanchardstown, Dublin 15	November 30, 2015
FW15A/0117 St Stephens Green Funds plc	Permission for development at this site. Full planning permission on a 4.12 hectare site comprising an existing building formerly occupied by Creative Labs Ireland. The proposed development comprises of the change of use of floor-space part single part two storey building from light industrial warehouse use with ancillary office use as a data centre with ancillary office	Site formerly Creative Labs Ireland, Ballycoolin Industrial Estate, Ballycoolin, Blanchardstown, Dublin 15	December 14, 2015
FW17A/0031 Gemini DC Fund	The development will comprise modifications to the existing building as permitted for a change of use to data centre under FCC Ref. FW15A/0117	Unit 1, Block 4B, IDA Business Park, Ballycoolin, Dublin 15	May 2, 2017

FW17A/0034 ADSIL	The development will consist of a single storey extension of 1,111 sq.m. to the north elevation to the previously granted planning application No. FW15A/0135	The Hexagon Building, IDA Blanchardstown Business & Technology Park, Snugborough Road, Blanchardstown, Dublin 15	May 9, 2017
FW17A/0044 ASDIL	The development will consist of upgrade of existing boundary railings and palisade fence by increasing the height of the existing fencing and railings by 0.7 meters to the site boundary.	DUB 8-57, IDA, Blanchardstown Business & Technology Park, Snugborough Road, Blanchardstown, Dublin 15	May 19, 2017
FW17A/0064 IPSEN Manufacturing	The construction of a new process vent abatement plant	Ipsen Manufacturing, Blanchardstown Industrial Park, Blanchardstown, Dublin 15.	June 14, 2017

Table 2.1 Recent Planning Permissions *(Planning search conducted by AWN on 20/11/17)*

3.0 REQUIREMENT FOR AN EIA

The following sections are intended to demonstrate that the proposed development does not require an EIA.

There are four steps in determining need for EIA for projects which are set out below. Should any of the answers to these four questions be positive, then an EIA is required for the project and an EIAR should be prepared.

1A. Is the Project an Annex I or Annex II Project as prescribed in the Directive 97/11/EC (after 85/337/EC) as amended in 2003, 2009 or 2014)?

The proposed development entails an application for an extension to an existing data storage facility. The project is not listed under Annex I of the EIA Directive as prescribed in the Directive 97/11/EC (after 85/337/EC) as amended in 2003, 2009 or 2014. The thresholds for Annex II projects are set out in the Planning and Development Regulations 2001-2016. The site area of c. 1.15 ha (11,500m^2) does not exceed the Part 2, Class 10a threshold (from Planning and Development Regulations 2001-2016 *Schedule 5*) of *"Industrial estate development projects, where the area would exceed 15 hectares"*. This is considered to be the relevant threshold for the proposed development.

1B. Is the project likely to have a significant effect on a Natura 2000 site?

A Screening Study for Appropriate Assessment has been completed and is included in Appendix 1 of this report.

There are a limited number of ecologically designated sites within 15km of the proposed development however the proposal entails no significant emissions. Any emissions that will arise during construction will be managed in accordance with standard construction measures to avoid impact.

It is concluded that there is no potential for significant effects on any Natura 2000 sites as a result of the construction or operation of the proposed development (as detailed in the Screening Study for Appropriate Assessment enclosed as Appendix 1).

2. Is the project on a mandatory list for which EIA is always required?

Ireland's list of projects for which an EIA is required are set out in the Planning and Development Regulations 2001-2016. This list was developed from Annex I and Annex II of the EIA Directives. The activity is not listed under Annex I of the EIA Directives and does not exceed the thresholds set out in the Planning and Development Regulations 2001-2016 for Annex II projects.

The proposed development is an extension to the existing Hexagon Building development. However, the existing development did not require an EIA and, thus, the relevant criteria for extensions to development, as set out in Annex I of the EIA Directive, (i.e. *"Any changes to or extension of projects listed in this Annex* [Annex I] *where such a change or extension in itself meets the thresholds, if any, set out in this Annex"*) does not apply.

3. Is the project on an exclusion list of projects for which EIA is not required?

Schedule 2 Part 1 of the Planning and Development Regulations 2001-2016 sets out a number of projects which are considered exempted development however there is no formal exclusion list for projects which do not require an EIA. The overriding consideration of the EIA directive is to ensure that projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location should be subject to EIA. Please refer to question 4 below for details on Sub-threshold Development.

4. Is the Project likely to have significant effects on the environment?

On the basis of the information above, the proposed development is considered to be outside the mandatory requirements for EIA and sub-threshold for relevant development. The final step in the screening process is to determine the need for an EIA on a discretionary basis.

This is dependent on the sensitivity of the environment and where the project is likely to have significant effects, Article 4(4) of Directive 2014/52/EU requires the developer to provide information on the characteristics of the project and its likely significant effects on the environment, to allow the competent authorities to make a determination on the requirement for an EIA. This information as set out in Schedule 7 of the Planning and Development Regulations 2001-2016 is:

- Characteristics of Proposed Development:
  - Size of the Proposed Development
  - Cumulation with Other Proposed Developments
  - Nature of any associated Demolition Works
  - Use of Natural Resources
  - Production of Waste
  - Pollution and Nuisances
  - Risk of Accidents, having regard to substances or technologies used
- Location of Proposed Development:
  - Existing land use
  - Relative abundance, quality and regenerative capacity of natural resources in the area;
  - Absorption capacity of the natural environment, paying particular attention to the following areas;
    - Wetlands, Coastal Zones, Mountain and Forest Areas, Nature Reserves and parks, Areas classified or protected under legislation including special protection areas, designated pursuant to Directives

79/409/EEC and 92/43/EEC, areas in which environmental quality standards laid down in legislation of the EU have already been exceeded, densely populated areas, landscapes and sites of historical, cultural or archaeological significance.

- Characteristics of the Potential Impacts:
  - The extent of the impact (geographical area and size of the affected population)
  - Trans frontier nature of the impact
  - Magnitude and Complexity of the impact
  - Probability of the Impact
  - Duration, Frequency and Reversibility of the Impact

In addition, Annex II.A of the 2014 EIA Directive states the following information should be provided by the developer for projects listed in Annex II of the Directive:

- A description of the project, including in particular:
  - A description of the physical characteristics of the whole project and, where relevant, of demolition works;
  - A description of the location of the project, with particular regard to the environmental sensitivity of geographical areas likely to be affected.
- A description of the aspects of the environment likely to be significantly affected by the project.
- A description of any likely significant effects, to the extent of the information available on such effects, of the project on the environment resulting from:
  - The expected residues and emissions and the production of waste, where relevant;
  - The use of natural resources, in particular soil, land, water and biodiversity.

The following sections (Sections 4.0, 5.0, 6.0 and 7.0 of this document) will address these requirements and assess whether the proposed development will result in likely significant effects and thereby confirming whether an EIA is required.

4.0 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

4.1 Size of the Proposed Development

The proposed development consists of an extension of the existing 'Hexagon' data storage facility (with a GFA of 4,055m^2) over two storeys with plant at roof level, an entrance lobby extension to Building C (with a GFA of 5.5m^2), the relocation of existing parking and the provision of alternative parking arrangements, and the provision of 4 no. emergency generators. The total site area is c. 1.15 ha (11,500m^2).

The building has been designed to mimimise the impact on the site and to complement the existing Hexagon Building, Building A and B as well as the other nearby industrial buildings.

Please refer to Section 7.8 for assessment of significance of landscape and visual impact.

4.2 Cumulation with Other Developments

The proposed development will be located on an existing developed industrial site within an industrial area. A list of recently permitted developments is provided in

Table 2.1. The potential cumulative impact of the proposed development with these external developments has been considered in this assessment.

The only potentially significant emissions from the development will be air and noise emissions. The potential impact of the air emissions from the site and the cumulative impact with other adjoining and neighbouring developments has been thoroughly assessed as set out in the Air Dispersion Modelling Report (included as Appendix 2) and it is concluded in the report that based on conservative assumptions, that the proposed development will not result in any off-site exceedance of the relevant air quality standards (refer to Section 7.6 for further detail). The potential impact of noise emissions from the development and the cumulative impact with adjoining and neighbouring developments has been modelled and assessed as detailed in the Noise Assessment Report (included as Appendix 3). The Noise Assessment Report concludes that the proposed development will comply with the noise criterion set by FCC for similar developments.

With regard to the other environmental aspects, each project currently permitted or under construction is subject to EIA and/or planning conditions which include appropriate mitigation measures to minimise environmental impacts. As long as mitigation measures for other developments are implemented as permitted, there will be no significant cumulative effects.

4.3 Nature of any associated Demolition Works

Demolition works will be limited to the partial removal of an existing wall and modification of a number of doorways in the Hexagon Building to facilitate the extension to the Hexagon Building, entrance lobby extension to existing Building C and the partial removal of a wall/roof in the emergency generator building (Building C) to facilitate installation of an additional emergency generator. The waste generated will generally comprise metal and concrete. The predicted volume of demolition waste generated will be c. 6.5 m^3. Where possible, materials removed from demolition works will be reused on site as part of the construction works.

There will be no demolition required to facilitate construction of the new emergency generator compound or the new car park.

4.4 Use of Natural Resources (Land, Soil, Water, Biodiversity)

The construction of the development will not use significant quantities of natural resources.

The subject site is an existing industrial site. The proposed extension will be located on the existing car park which is currently surfaced with tarmac. The new cark park and emergency generator compound will be located on areas that are currently surfaced with hardcore/gravel. Some excavations of made ground, topsoil and subsoil will be required but these are expected to be minor. There are limited opportunities for reuse of this material on site. It is anticipated that the majority of the material will require removal from site for offsite reuse, recovery and/or disposal.

During construction, all construction materials will be sourced from local suppliers, where possible, to minimise the impact of natural resources used in the transportation of materials.

Operationally the proposed development requires moderate water resources which will be met via a connection to the existing private water supply network only. A new connection to the mains will not be required.

The site is dominated by the existing Hexagon Building and surrounding hardstanding areas. This is referred to as habitat type *Buildings and artificial surfaces (BL3*). This habitat type is rated as being of low to none ecological value. There are some trees along the boundary which will need to be removed as part of the construction works. The existing trees lost as part of this proposal will be replaced as shown on the drawings.

The proposed development will have a maximum operational electrical demand of 6.2MW, with overall demand for the combined site (i.e. the extension together with the existing Hexagon Building) of c. 47.2MW. The power requirements for proposed development will be provided via the existing substation and grid connection for existing Hexagon Building. No additional external grid connections are required to facilitate the proposed development.

Some civil works will be required within the combined site boundary to provide fibre connectivity from the existing data storage facility to the proposed extension. There are no off-site fibre connection requirements for the proposed development.

4.5 Production of Waste

The proposed development will not generate significant quantities of wastes.

Some waste materials will be generated from the minor demolition works required and site clearance for the proposed development.

Waste produced during the construction of the proposed development will be managed in accordance with a site-specific Construction and Demolition (C&D) Waste Management Plan (included with the planning application submission). This will ensure high levels of reuse, recovery and recycling of construction wastes arising.

The anticipated wastes during operations will be general non-hazardous waste and packaging waste (from staff at offices/canteen etc.), WEEE, empty containers, waste lubricant oil, waste batteries form the battery room and landscaping waste. Please refer to Section 7.11.

4.6 Pollution and Nuisances

Potential short-term nuisances (such as dust and noise etc.) associated with construction and proposed mitigation measures to address them are detailed in the relevant sub-sections of Section 7.0.

Air and noise are the only potentially significant emissions from the proposed development. Air dispersion modelling was undertaken to assess the impact of the air emissions with reference to human health criteria and has taken into account the cumulative impact (of the existing adjoining and neighbouring data storage facilities). The assessment concluded, based on conservative assumptions, that the proposed development will not result in any off-site exceedance of the relevant ambient air quality standards (Refer to Section 7.6). The noise assessment carried out concluded that the noise emissions from the facility will be in compliance with the relevant noise criteria. (Refer to Section 7.7).

The potential for soil and/or water pollution during the operation phase is addressed in relevant sub-sections of Section 7.0 and mitigation measures are proposed to ensure that impact is insignificant.

Therefore, it is considered highly unlikely that the development will result in significant pollution or nuisances.

4.7 Risk of Major Accidents and/or Disasters

The use of diesel in emergency generators does present potential risk in the event of a fire, leak or other loss of containment, however diesel is in daily use at industrial sites and businesses throughout Ireland and the proposed use presents no significant additional risk. It is considered that any additional fire risk from the use of diesel will be dealt with as part of the fire certification process for the development.

4.8 Risks to Human Health

The potential for impacts on human health is addressed in Section 7.1. It is concluded in Section 7.1 that the proposed development will result in no significant impacts on human health.

5.0 LOCATION OF THE PROPOSED DEVELOMENT

5.1 Existing Land Use

The proposed development is located adjacent to three existing data storage facilities in an established industrial area. It is considered that the proposed development is consistent with the existing land uses and the wider industrial/commercial land uses in the surrounding area.

5.2 Relative Abundance, Quality and Regenerative Capacity of Natural Resources in the Area

As outlined in Section 4.3 above, the proposed development does not require significant additional natural resources. It has been confirmed that there is sufficient power available via existing power connections to the existing Hexagon Building.

5.3 Absorption Capacity of the Natural Environment

Each of the sub sections in Section 7.0 below addresses the sensitivity of the existing environment and thereby the absorptive capacity of the natural environment to the potential emissions and nuisances generated by the proposed development. Please refer to Section 7.0.

6.0 CHARACTERISTICS OF THE POTENTIAL IMPACT

6.1 Extent of the Impact (geographical and population size)

The proposed development will generate few emissions which will include noise emissions, emissions to air, surface water runoff from roofs and hardstanding areas and foul water discharges from welfare facilities. The only notable emissions will be additional air emissions from the emergency generators and noise emissions from the generators and other plant. The impact on air quality has been assessed and it was determined that there will be no exceedances of the relevant air quality standards as a result of the proposed development. The impact of noise has been assessed and the proposed development will comply with the noise criterion set by FCC for similar developments. Therefore, there will be no perceptible impact on the surrounding area, environment or the population.

Any construction impacts will be minimised by adhering to best practice construction methods and a Construction Environmental Management Plan (CEMP).

6.2 Trans frontier Nature of the Impact

The proposed development will generate air emissions which will be dispersed locally (See AWN Air Quality Assessment in Appendix 2). The air emissions will not result in any off-site exceedance of the relevant ambient air quality standards. There is no potential for trans frontier impact.

6.3 Magnitude and Complexity of the Impact

The proposed development will generate air and noise emissions which comply with the relevant air quality standards and noise criterion. There will be no perceptible impact on the surrounding area, environment or the population.

6.4 Probability of the Impact

There will be no perceptible impact on the surrounding area, environment or the population therefore the probability of significant impact is low/negligible.

6.5 Duration, Frequency and Reversibility

The lifetime of the facility is not defined however it is anticipated that the facility will continue to operate within the prevailing best practice limits in terms of potential nuisance generation to ensure no significant impact on sensitive receptors.

Upon closure of the facility there will be no long-term impact arising from impacts associated with the proposed development i.e. all impacts arising are anticipated to be reversible.

6.6 Cumulation of the Impact with Other Projects

As detailed in Section 4.2, the only potential significant emissions from the development will be air and noise emissions. The impact of the air emissions from the site and the cumulative impact with other developments has been thoroughly assessed in the Air Dispersion Modelling Report (included as Appendix 2) and it was concluded based on conservative assumptions, that the proposed development will not result in any off-site exceedance of the relevant air quality standards (Ref. to Section 7.6 for further detail). The Noise Assessment Report concludes that the proposed development will comply with the noise criterion set by FCC for similar developments (Ref. to Section 7.7 for further detail).

7.0 ENVIRONMENTAL SENSITIVITY AND IMPACT OF THE PROPOSED DEVELOPMENT

7.1 Socio Economic / Human Health

The subject site is located in the IDA Blanchardstown Business and Technology Park in Blanchardstown within an established industrial area to the north of Blanchardstown town centre.

A wide variety of industrial units are located around the site. Building A is located to the south of the site, Building B to north west and Building C to the north east. Other industrial uses include Luzern Technology Solutions (eCommerce technology and

services provider), The Jelly Bean Factory (food manufacturer), Ipsen Manufacturing Ireland Ltd. (pharmaceutical company), IBM Ireland, Dataplex, Veritas Technologies LLC, eBay, InnaLabs and Safety Solutions.

The nearest residential locations are located to the north west along Ballycoolin Road and to the south west off the Snugborough Road. A primary school is located to the south west of the site in Corduff. The Institute of Technology Blanchardstown is located to the west.

The latest census data (2016) indicates that the Fingal area has a population of 296,214 which is 22.02% of the total Dublin population. The 2016 Census indicated a continuing high growth rate in Fingal, of 8%, in spite of the slowdown in the economy and housebuilding in particular.

The primary potential impacts of the proposed development on human health would be increased air pollution, noise, or pollution of groundwater/watercourses as a result of the proposed development. Visual impact and traffic are also potential but perhaps lesser significant impacts (based on the nature of the development).

As detailed in Section 7.6, air dispersion modelling was undertaken to assess the impact of the development with reference to human health criteria and concluded, based on conservative assumptions, that the proposed development will not result in any off-site exceedance of the relevant ambient air quality standards (Ref. to Section 7.6 for further detail and Air Dispersion Modelling Report included as Appendix 2).

The design of the proposed development has taken due regard of the sensitivity of the surroundings in the IDA Business and Technology Park in Blanchardstown. Noise reduction is a central consideration in the design of the development. Based on the findings of the Noise Impact Assessment Report included in Appendix 3, the predicted noise levels from the development, once operational, comply with the noise criterion set by FCC for similar developments.

There is no significant risk of pollution of soil, groundwater or watercourses associated with the proposed development.

Data storage activities are essentially clean activities carried out within a modern high quality industrial building with limited perceptible signs of the activity once constructed.

In conclusion, it is considered that the proposed development is not likely to have significant effects on socio-economic / human health aspects and would not warrant preparation of an EIA on socio-economic / human health grounds.

7.2 Land, Soils, Geology & Hydrogeology

According to the Geological Survey of Ireland (GSI) website, the proposed development site is underlain by made ground deposits which are further underlain by glacial till derived from carboniferous limestone. The bedrock geology underlying the site and surrounding area is mapped as *Tober Colleen Formation*, described as “mixed sandstones, conglomerates, shales and limestones”. These are heavily interbedded with each other.

The underlying bedrock geology at the site (*Tober Colleen Formation*) has been classified by the GSI as a ‘*Poor Aquifer (Pl)*, this being bedrock which is generally unproductive except in local zones’. No superficial gravel aquifer was mapped at the site. Groundwater vulnerability was generally mapped as being *‘Extreme to X – rock*

at or near the surface' across the site. The groundwater vulnerability in the vicinity of the proposed location of the generators is classed at *'X – rock at or near the surface'.* The groundwater vulnerability is classed as *'Extreme'* at the location of the proposed extension location.

The GSI data indicates that the site does not lie within a drinking water protection area. The GSI well card data shows a small number of wells / boreholes drilled in the wider region with a cluster of wells located c. 1.6 km to the south east of the proposed development site. No yield class or extraction rates were provided for the wells and it is not known if the wells are still in use. Water strikes recorded within the boreholes range from 1.9 m – 2.6 m below the ground level (m bgl). The area is serviced by mains water supply therefore it is unlikely that any wells are used for potable water supply.

The groundwater body (GWB) in the region of the site (Dublin Urban) is classified by the EPA under the Water Framework Directive (WFD) Risk Score system as '*2b – Probably not at risk of achieving good status'*. Currently, the Dublin GWB is classified as *"Good status"* at the proposed development site and surrounding area.

In 2017, a site investigation was undertaken at the site to establish the location of existing services. There was no visual or olfactory evidence of contamination encountered at the site.

7.2.1 Construction Impacts

Construction of the development will require minor excavations to facilitate the construction of foundations and the installation of services. General construction activities will require temporary storage of cement and concrete materials, oils, fuels paints etc. which have the potential to cause localised pollution. It is proposed that a Construction Environmental Management Plan (CEMP) be prepared and provided to FCC in advance of construction. The CEMP will ensure best practice construction with respect to storage of any hazardous substances (fuels, chemicals and other construction materials that may pose a risk to the environment).

7.2.2 Operational Impacts

There is a potential impact on the soil and geology environment during operation from localised accidental releases of fuel from fuel stored on site for the operation of emergency generators and from cars in car parking areas and/or oil leakage from the electrical transformers. Fuel storage will be bunded. The transformer area will also be bunded and will have a sump with a pump which will discharge to the foul drainage system via a petrol interceptor (NSBP003 or similar approved). The pump will be fitted with a leak detection system which will shut down the pumps and raise an alarm in the event of a leak. An environmental management plan will apply to the development during the operational phase incorporating mitigation measures and emergency response measures.

It is considered that there is a limited likelihood of significant effects in terms of the land, soils and geological environment and that the development would not warrant preparation of an EIA on land, soils, geology or hydrogeology grounds.

7.3 Hydrology

The nearest surface water feature to the site is the Abbotstown River which is c. 0.2 km to the south east (at its closest point to the site). The Abbotstown River runs in a northeast-southwest direction prior to forming a confluence with the Tolka River at

Blanchardstown (Tolka Valley Park). There is no river water quality data for the Abbotstown River. The Tolka River at the Tolka Valley Park is the nearest river quality data that is present to the site. This section of the Tolka River is classified as *'Poor'.*

7.3.1 Construction Impacts

During construction excavations will be required to facilitate construction of the development. All excavations will be managed so as to avoid the generation of silt laden run off or release of runoff without appropriate mitigation i.e. treatment via a silt trap and a suitable interceptor.

As for Land, Soils, Geology & Hydrogeology above, it is proposed that a CEMP be prepared and provided to FCC in advance of construction. The CEMP will ensure best practice construction with respect to storage of any hazardous substances (fuels, chemicals and other construction materials that may pose a risk to the environment).

7.3.2 Operational Impacts

Surface water runoff will be generated from roofs and hardstanding areas. However, the extension will be located predominantly on an existing hardstanding area. The new car park will be located on an existing unpaved area but will be surfaced with porous tarmac which will allow the run-off to permeate into the ground and so will not increase the surface water run-off from the site. While the emergency generator compound and the small extension to the emergency generator building will be located on existing unpaved surfaces, the footprint of these areas is relatively small. As such there will only be a slight increase in the surface water runoff from the site as a result of the proposed development. The additional surface water runoff from the extension and associated new external hardstanding areas will be routed the existing internal storm drainage on-site to the existing attenuation pond prior discharge to the public drainage network via a hydrobrake flow control device.

There is the potential for impact on the hydrological environment during operation from localised accidental releases of fuel stored on site for the operation of emergency generators and from cars in car parking areas and/or oil leakage from the electrical transformers. However, fuel storage will be bunded, as will the transformer area (which will also have a sump with a pump which will discharge to the foul drainage system via a petrol interceptor and a leak detection system). As for Land, Soils, Geology & Hydrogeology above, it is proposed that an environmental management plan will apply to the development during the operational phase incorporating mitigation measures and emergency response measures.

It is considered that there is a limited likelihood of significant effects on water quality and that the development would not warrant preparation of an EIA on hydrology grounds.

7.4 Flooding

The Office of Public Works (OPW) on-line database was reviewed with regard to incidences of historical, regional and local flooding relevant to the area. The proposed development site is regarded as a *"Less Vulnerable Development"* as it is planned to be used for commercial use. There were no flood events recorded at the site or immediate area. There are no final flood maps prepared for this site. According to the draft CFRAM maps, there is no modelled flood event impacting on this development. Therefore, this development resides in Flood Zone C. The closet

watercourse is Abbotstown River which is located approximately 0.2km south east of the proposed development.

A stage 1 flood risk assessment was carried out by CSEA and is included in the Engineering Planning Report (which form part of the planning documentation).

There are no historic flood events recorded for the proposed development site and the surrounding area. The nearest flood event is located 1.85 km south west of the proposed development site along the N2 at Blanchardstown. The flooding occurred along the Tolka River in April 2002.

It is considered that any localised drainage issues would be engineered out as required during construction.

It is concluded that the proposed development is located in an area which is not liable to flooding and will not in and of itself result in any additional flood risk.

7.5 Biodiversity

Appendix 1 contains a copy of an Appropriate Assessment (AA) Screening Study completed by Moore Group for the proposed development.

There are a number of Natura 2000 sites i.e. Special Areas of Conservation (SACs) and Special Protected Areas (SPAs) within 15km of the site. These include:

Site Code	Site name	Distance from site (km)
000199	Baldoyle Bay SAC	14.51
000205	Malahide Estuary SAC	12.34
000206	North Dublin Bay SAC	12.86
000210	South Dublin Bay SAC	12.49
001398	Rye Water Valley/Carton SAC	9.3
004006	North Bull Island SPA	12.86
004016	Baldoyle Bay SPA	14.6
004024	South Dublin Bay and River Tolka Estuary SPA	10.11
004025	Broadmeadow/Swords Estuary SPA	12.41

The closest European sites are those located at Ryewater Valley (c. 9.3km from the site) and in the coastal areas of Dublin, including South Dublin Bay SAC, North Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA (c. 10 – 14.5km from the site based on geodesic distance).

There is no meaningful biological or hydrological connectivity between the proposed development site and any Natura 2000 sites.

An analysis of proposed National Heritage Areas (pNHAs) in terms of their role in supporting the species using Natura 2000 sites was also undertaken. The AA Screening Study found no relevant connectivity between the project and the pNHAs.

It is concluded in the attached AA Screening Study that the proposed development, alone or in combination with other projects, will not have a significant effect on any Natura 2000 sites (Refer to Appendix 1).

Additionally, mitigation measures including a CEMP will ensure no negative impact from the development. Mitigation measures include:

- Management of wastes and run off during construction;
- Silt traps and interceptors containing any spills of hydrocarbons; and
- Maintenance programme to ensure drainage infrastructure is regularly inspected and repaired etc. as and when required.

It is concluded that the proposed development will not have a significant effect on biodiversity and the proposed development would not warrant preparation of an EIA on biodiversity grounds.

7.6 Air Quality & Climate

7.6.1 Construction Impacts

The construction of the proposed development will require some excavations and may require some off-site removal of surplus soils etc. with the potential to generate dust. The CEMP for the proposed development will include a dust minimisation plan with the necessary mitigation measures to ensure the construction of the proposed development will not result in dust nuisance.

7.6.2 Operational Impacts

Appendix 2 contains a copy of the Air Quality Assessment completed by AWN for the proposed development.

Air dispersion modelling was undertaken to assess the impact of the development on pollutant concentrations at the site boundary and at nearby residential receptors.

It is concluded in the attached report that the proposed development will not result in any off-site exceedance of the applicable ambient air quality standards (including at the nearest residential receptors). This study has incorporated conservative assumptions designed to overestimate the predicted concentrations at sensitive receptors. In relation to the spatial extent of emissions from the site, ambient concentrations decrease significantly away from the immediate area of the site.

It can be concluded that the proposed development is not likely to have any significant effects in terms of air quality and would not warrant preparation of an EIA on air quality and climate grounds.

7.7 Noise

7.7.1 Construction Impacts

It is proposed that a CEMP will be prepared and provided to FCC in advance of construction. This CEMP will include noise minimisation measures to ensure noise arising from construction is prevented where possible and managed in accordance with best practice.

7.7.2 Operational Impacts

Appendix 3 contains a copy of the Noise Impact Assessment Report prepared by AWN for the proposed development.

The Noise Impact Assessment Report included in Appendix 3, concludes that the predicted noise levels from the development, once operational, will comply with the noise criterion set by FCC for similar developments.

Based on the assessment carried out by AWN, it can be concluded that the proposed development is not likely to have any significant effects in terms of noise and would not warrant preparation of an EIA.

7.8 Landscape and Visual Impact

The *Fingal County Council Development Plan 2017-2023* is the statutory planning control document pertaining to the site and its surrounds. In terms of landscape and visual amenity, the site:

- Is not located within or adjoining an Architectural or General Conservation Area
- Does not have a listing for Trees of Special Amenity Value
- Is not located within or adjoining a Native Woodland Trust
- Is not covered by protected views, scenic routes or viewpoints

Moreover, the proposed development will be located on the site of permitted data storage facility within an industrial area. The proposed development is in keeping with the scale and height of the existing building on the site (i.e. existing Hexagon Building) and other existing industrial buildings in the area (including Building A and B).

The proposed development is consistent with the land use zoning and the character of the permitted facility.

Landscape proposals are included in the architect's report with the planning application documentation.

In conclusion, the proposed development will not give rise to any adverse landscape or visual impacts either from within or outside of the site boundary and would not warrant preparation of an EIA on landscape and/or visual grounds.

7.9 Cultural Heritage/Archaeology

7.9.1 Construction Impacts

The proposed development will be constructed on previously disturbed ground on an industrial site which has been extensively disturbed for previous development. It is considered that any potential archaeological features that may have been present will have previously been disturbed.

As a precaution, a suitably qualified archaeologist could oversee any ground disturbance work (such as for local connections to the gas network and drainage) if deemed necessary by the Local Authority.

7.9.2 Operational Impacts

There will be no operational impacts on archaeology.

In summary, the proposed development will not give rise to any adverse impacts on cultural heritage / archaeology and would not warrant preparation of an EIA on cultural heritage / archaeological grounds.

7.10 Traffic

A Traffic and Transport Assessment is included in the CSEA Engineering Planning Report which is included with the planning application documentation.

7.10.1 Construction Impacts

During the construction phase of the proposed development, there will be additional traffic movements to/from the site from construction personnel, security staff, professional staff (i.e. design team, utility companies), excavation plant, dumper trucks and deliveries/removal of materials (waste/spoil). The impact of the additional traffic movements has been assessed and it was concluded in the Traffic and Transport Assessment that this will have a negligible impact on overall traffic flows. (Refer to the Traffic and Transport Assessment which is included with the planning documentation). Sufficient parking for construction workers will be provided on site.

The majority of construction works will be completed within the site boundary with only minor offsite connection works required.

7.10.2 Operational Impacts

The proposed development will not entail any additional traffic during day to day operation. The maximum no. of staff at the existing Hexagon Building at any one time is typically 35 no. The proposed development will not require any additional staff once operational.

The existing car park currently accommodates 39 no. car parking spaces including 2 no. disabled spaces. This will be replaced by the new car park located beside Building C which will provide 35 no. car parking spaces, with a further 5 no. spaces provided on the north-east side of the Hexagon Building. The 2 no. disabled parking spaces will be relocated to between Building A and the Hexagon Building (close to the Hexagon Building southeast entrance) to facilitate better access to the building.

In summary, the proposed development will have a negligible impact in terms of traffic and would not warrant preparation of an EIA on traffic grounds.

7.11 Resource Use Material Assets and Waste

Other than materials necessary for the construction of the building the proposed development will not require/consume any substantial quantities of additional raw materials or water.

7.11.1 Construction Impacts

The construction of the building will inevitably involve generation of a variety of construction wastes (from excavations, offcuts etc.). These wastes will be managed in accordance with the project specific Construction and Demolition Waste Management Plan which is being submitted with the planning application. The Plan will be updated and refined by the nominated contractor once final methods of construction, building materials, waste collectors and waste receiving facilities have been determined

7.11.2 Operational Impacts

The proposed development will use moderate amounts of power once fully operational. The power required for the proposed development will be available from

the existing connection to the national grid at the Hexagon Building which will be extended to proposed development. No additional external grid connections will be required for the proposed development. It has been confirmed that there is sufficient power available via existing power connections to the existing Hexagon Building. The applicant supports renewable targets by purchasing renewable power from suppliers which encourages renewable generation projects that contribute to the achievement of Ireland's national targets.

All wastes generated by the facility will be managed in accordance with the requirements of the Waste Management Act as amended and associated regulations.

It is considered that the proposed development will not have any significant impact in terms of resources or waste generation and would not warrant preparation of an EIA on the basis of resource use, material assets or waste.

8.0 FINDINGS AND CONCLUSIONS

On the basis of the information set out in Section 3.0 the proposed development does not mandatorily require an EIA and is Sub-threshold. The information set out in Sections 4.0, 5.0, 6.0 and 7.0 confirm that the proposed development is not likely to have any significant environmental effects.

An Appropriate Assessment Screening Study has been prepared (Appendix 1) and it is concluded that the facility is not likely to have any significant effects on designated/protected sites and a full Appropriate Assessment/Natura Impact Statement is not required.

Air dispersion modelling was undertaken to assess the impact of the development with reference to human health criteria and concluded based on conservative assumptions, that the proposed development will not result in any off-site exceedance of the relevant ambient air quality standards (Appendix 2).

Noise Impact Assessment Report (Appendix 3) assessed the potential noise impact of the development and concluded that the proposed development, once operational, will comply with the noise criterion set by FCC for similar developments.

The preparation and compliance with a Construction Environmental Management Plan will ensure potential nuisances from the construction of the facility are avoided and minimised.

Implementation of an Environmental Management Plan once the development is operational will ensure the residual impact is of imperceptible significance.

In summary, the construction and operation of the proposed development will generate few additional emissions and no significant increases in site traffic. It is concluded that no EIA is required with the planning application.

APPENDIX 1

APPROPRIATE ASSESSMENT
SCREENING STUDY
MOORE GROUP – DECEMBER 2017

Report for the purposes of Appropriate Assessment Screening

as required under Article 6(3) of the Habitats Directive

(Council Directive 92/43/EEC)

Proposed Extension of the Hexagon Building
IDA Blanchardstown Business and Technology Park

Prepared by: Moore Group – Environmental Services

20th December 2017

On behalf of Fingal County Council

Client	DCF Technology Limited
Project	Proposed Extension of the Hexagon Building IDA Blanchardstown Business and Technology Park
Title	Report for the purposes of Appropriate Assessment Screening Proposed Extension of the Hexagon Building IDA Blanchardstown Business and Technology Park

Project Number	17280	**Document Ref**	17280 Proposed Extension of the Hexagon Building AAS1 Rev1	
Revision	**Description**	**Author**		**Date**
Rev0	Issued for client review	G. O'Donohoe		17th November 2017
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Rev2	Boundary edits	G. O'Donohoe		18th December 2017
Rev3	Finalised	G. O'Donohoe		20th December 2017
Moore Archaeological and Environmental Services Limited				

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1. Introduction

1.1. General Introduction

This report contains information required for the competent authority to undertake an Appropriate Assessment (AA) process on the effects of a Project consisting of an extension to an existing data storage facility at the former Hexagon Building Site, IDA Blanchardstown Business and Technology Park, Ballycoolin Road and Snugborough Road, Blanchardstown, Dublin 15.

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

i) whether a plan or project is directly connected to or necessary for the management of the site, and
ii) whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.

If the effects are deemed to be significant, potentially significant, or uncertain, or the screening process becomes overly complicated, then the process must proceed to Stage 2 (AA). Screening should be undertaken without the inclusion of mitigation, unless potential impacts clearly can be avoided through the modification or redesign of the plan or project, in which case the screening process is repeated on the altered plan or project.

When screening the project, there are two possible outcomes:

- the project poses no risk of a significant effect and as such requires no further assessment; and
- the project has potential to have a significant effect (or this is uncertain) and AA of the project is necessary.

This report has been prepared by Moore Group - Environmental Services for the applicant and Fingal County Council, and assesses the potential for the proposed development to impact on sites of European-scale ecological importance in accordance with Articles 6(3) and 6(4) of the Habitats Directive. The report was compiled by Ger O'Donohoe (B.Sc. Applied Aquatic Sciences (GMIT, 1993) & M.Sc. Environmental Sciences (TCD, 1999)) who has over 20 years' experience in environmental impact assessment and has completed numerous Appropriate Assessment Screening Reports and Natura Impact Statements in terrestrial and aquatic habitats.

The report assesses the potential for the proposed development to impact on sites of European-scale ecological importance. It is necessary that the Project has regard to Article 6 of the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (referred to as the Habitats Directive). This is transposed into Irish Law by the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477) (referred to as the Habitats Regulations).

1.2. Legislative Background - The Habitats and Birds Directives

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) is the main legislative instrument for the protection and conservation of biodiversity in the EU. Under the Directive Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in a European Union context.

The Birds Directive (Council Directive 79/409/EEC as codified by Directive 2009/147/EC), is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to affect Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out a further assessment if required (Appropriate Assessment (AA)):

> **Article 6(3):** *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to an appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

> **Article 6(4):** *"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of the Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to the beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."*

This Report for Screening is a documentary record of the Appropriate Assessment process on the effects of a project consisting of an extension to an existing data storage facility at the former Hexagon Building Site, IDA Blanchardstown Business and Technology Park, Ballycoolin Road and Snugborough Road, Blanchardstown, Dublin 15, referred to in this case as the Project.

2. Methodology

The Commission's methodological guidance (EC, 2002) promotes a four-stage process to complete the AA, and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1-2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant.

Stage 2 Appropriate Assessment: In this stage, there is a consideration of the impact of the project with a view to ascertain whether there will be any adverse effect on the integrity of the Natura 2000 site either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are predicted impacts, an assessment of the potential mitigation of those impacts.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

To ensure that the Project complies fully with the requirements of Article 6 of the Habitats Directive and all relevant Irish transposing legislation, Moore Group compiled this report for screening of the Project on behalf of the applicant and Fingal County Council to determine if Stage 2 AA is required.

2.1. Guidance

The AA has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General, 2001); hereafter referred to as the EC Article Guidance Document.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC Environment Directorate-General, 2000); hereafter referred to as MN2000.

2.2. Data Sources

- Sources of information that were used to collect data on the Natura 2000 network of sites are listed below:
- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie and Google Earth and Bing aerial photography 1995-2017.
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including; the Natura 2000 network Data Form; Site Synopsis; Generic Conservation Objective data;
    - Online database of rare, threatened and protected species,
    - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2013),
- Relevant Development Plans and Local Area Plans in neighbouring areas.

3. Description of the Project

This report presents screening assessment for an extension to an existing data storage facility at the former Hexagon Building Site, IDA Blanchardstown Business and Technology Park, Ballycoolin Road and Snugborough Road, Blanchardstown, Dublin 15.

The proposed development consists of an extension of the existing 'Hexagon' data storage facility (with a GFA of 4,055m^2) over two storeys with plant at roof level, an entrance lobby extension to Building C (with a GFA of 5.5m^2), the relocation of existing parking and the provision of alternative parking arrangements, and the provision of 4 no. emergency generators. The total site area is c. 1.15 ha (11,500m^2).

Figure 1 shows the location of the proposed development, and Figure 2 shows a detailed view of the existing site. The proposed development will have an identical use to the existing developments in the Hexagon Building, Buildings A and Building B. The location of these buildings in relation to the proposed development is illustrated in Figure 3. The extension has been designed to integrate with the existing Hexagon Building and form a unified campus with uniform boundary treatment, landscaping and complementary building design.

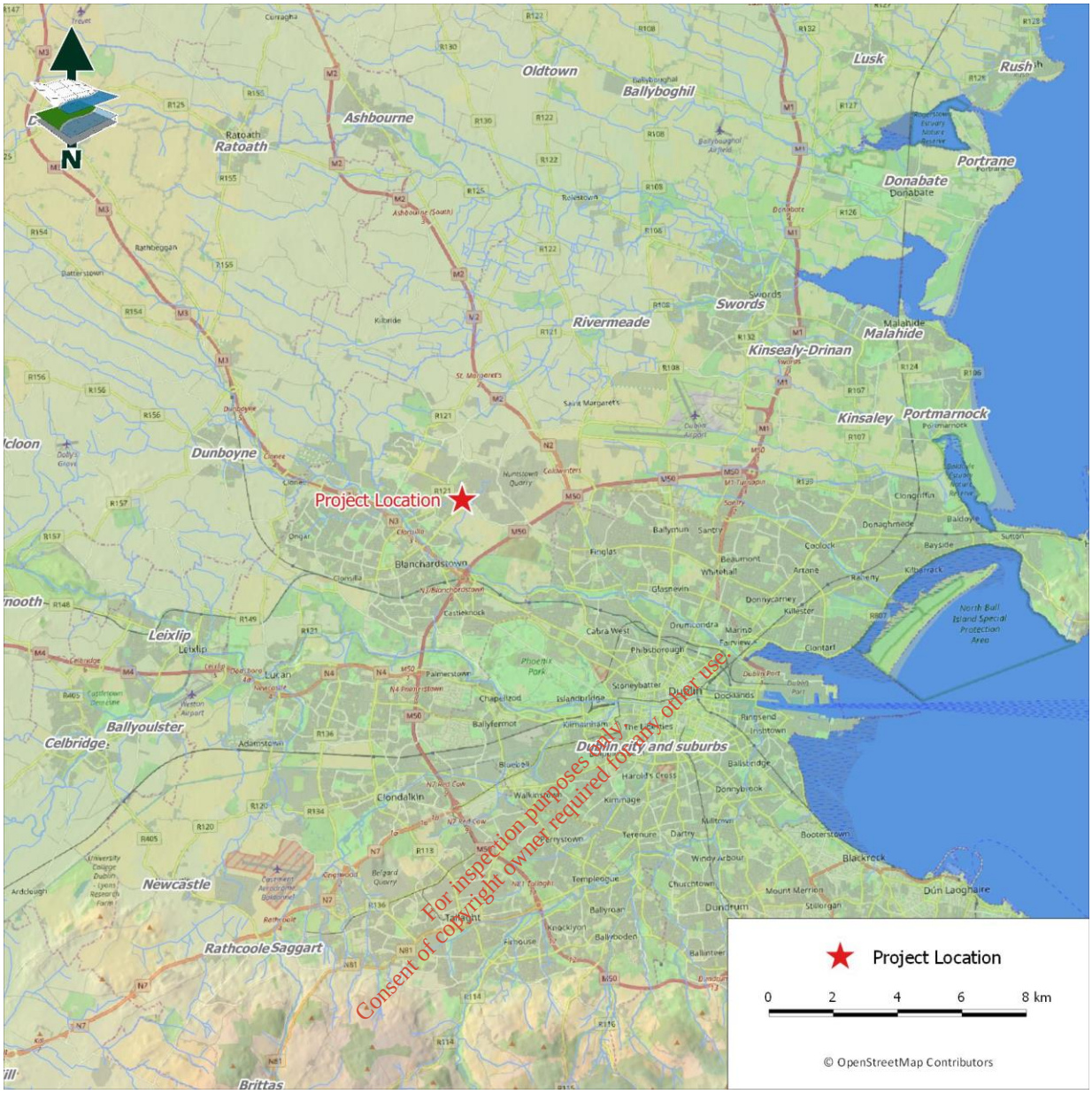

Figure 1. Showing the Project location in Blanchardstown, Dublin 15.

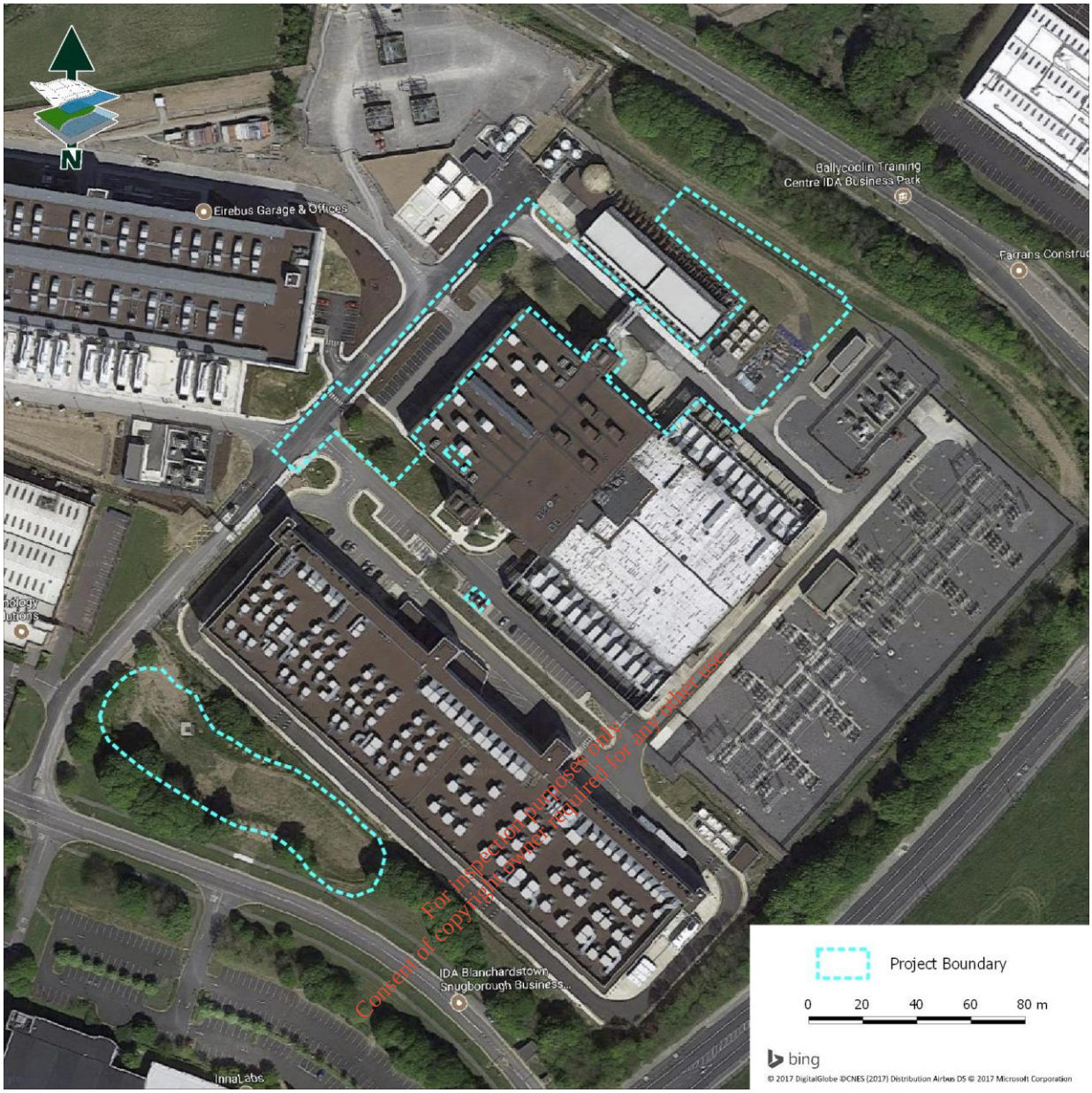

Figure 2. Detailed view of the existing site and proposed application boundary outlined.

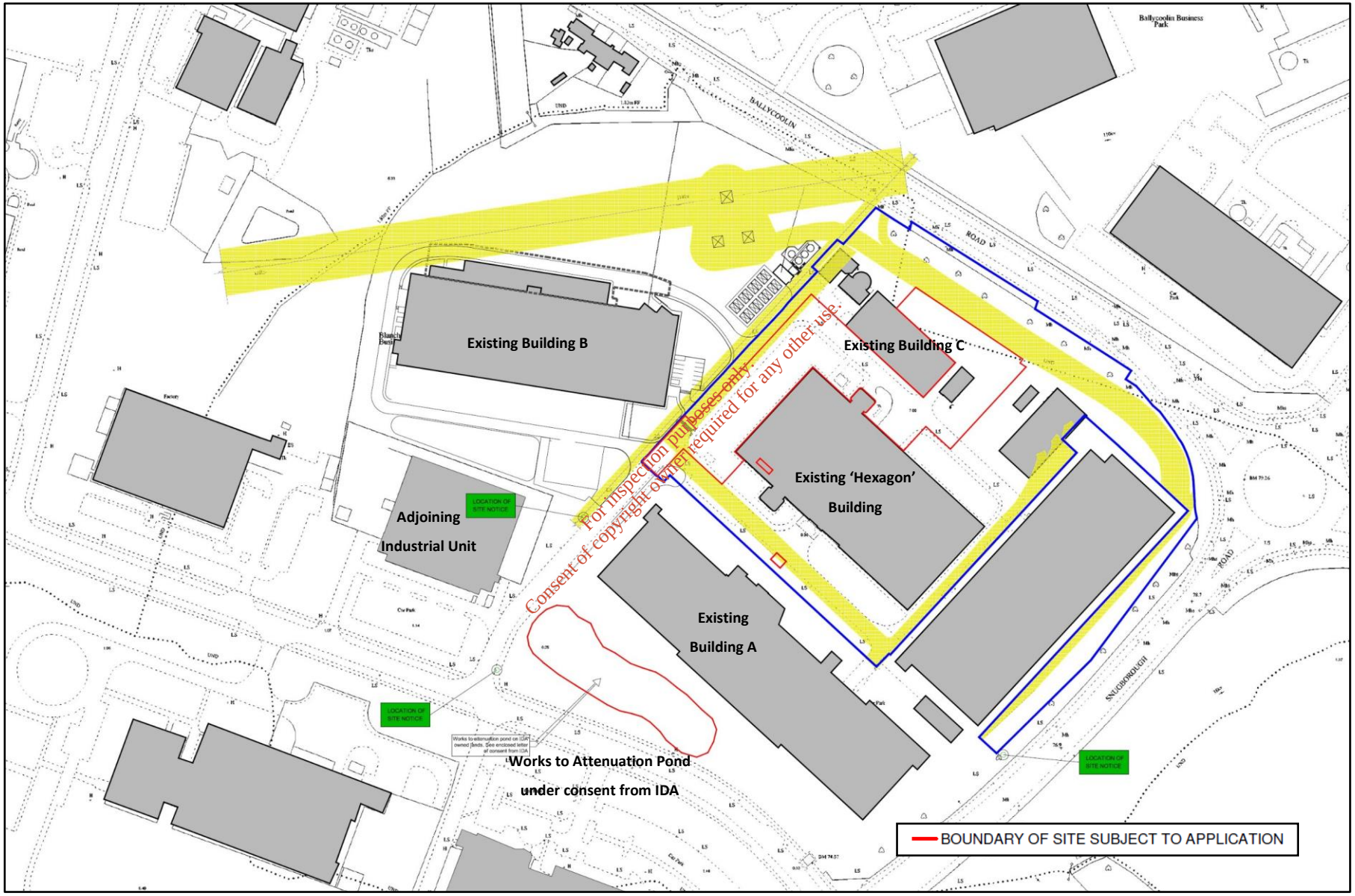

Figure 3. Site plan showing locations of proposed development in relation to the ajoining and neighbouring buildings

4. Identification of Natura 2000 Sites

4.1. Description of Natura Sites Potentially Affected

Departmental guidance suggests an assessment of Natura 2000 sites within a zone of influence of 15 km which can be revised depending on the nature and location of the proposed development and the connectivity with Natura 2000 sites. The project is located within the urban environment of the IDA Blanchardstown Business and Technology Park, see Figure 2. The closest European sites are those located at Ryewater Valley and in the coastal areas of Dublin, including South Dublin Bay SAC (Site Code 000210), North Dublin Bay SAC (Site Code 000206), North Bull Island SPA (Site Code 004006) and South Dublin Bay and River Tolka Estuary SPA (Site Code 004024), see Figure 4.

However, given the scale of the proposed works and that there are no significant emissions predicted from the construction or operational phases, it is considered that there will be no potential for significant effects on any of the European sites listed and these can be excluded at this preliminary screening stage. European sites that are located within 15 km of the Project are listed in Table 1.

Table 1 European Sites located within 15km of the Project.

Site Code	Site name	Distance (km)
000199	Baldoyle Bay SAC	14.51
000205	Malahide Estuary SAC	12.34
000206	North Dublin Bay SAC	12.86
000210	South Dublin Bay SAC	12.49
001398	Rye Water Valley/Carton SAC	9.3
004006	North Bull Island SPA	12.86
004016	Baldoyle Bay SPA	14.6
004024	South Dublin Bay and River Tolka Estuary SPA	10.11
004025	Broadmeadow/Swords Estuary SPA	12.41

Spatial boundary data on the Natura 2000 network was extracted from the NPWS website on the 17th of November 2017.

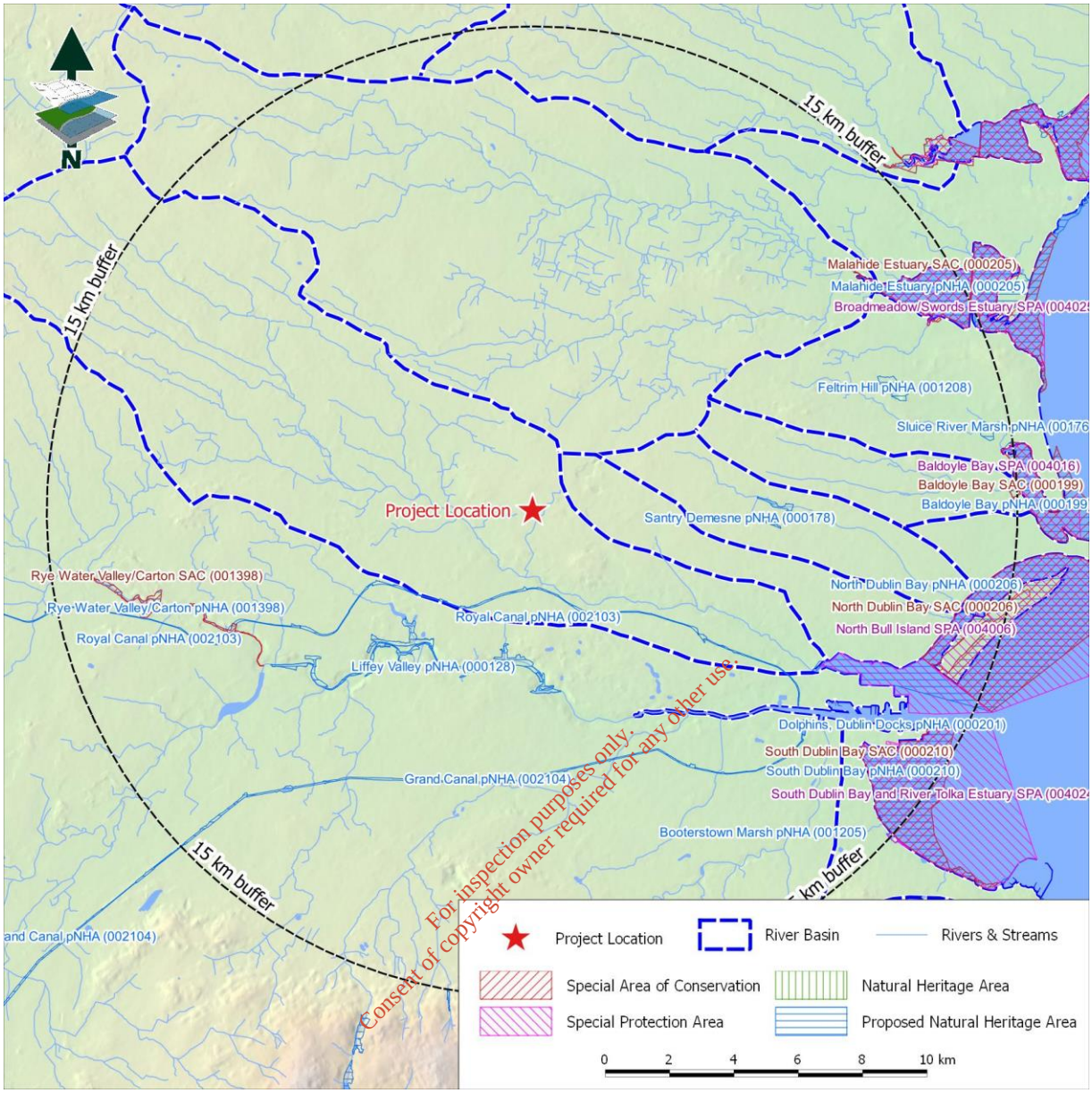

Figure 4. Showing European sites and NHAs/pNHAs in the vicinity of the Project.

4.2. Ecological Network Supporting Natura 2000 Sites

An analysis of the proposed Natural Heritage Areas and designated Natural Heritage Areas in terms of their role in supporting the species using Natura 2000 sites was undertaken. It was assumed that these supporting roles mainly related to mobile fauna such as mammals and birds which may use pNHAs and NHAs as "stepping stones" between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were taken into account during the rest of the AA process.

There are no conservation sites with biological connectivity to the subject site that would be affected by the proposed project.

5. Identification of Potential Impacts & Assessment of Significance

5.1. Potential Impacts

The project is located within the urban environment of the IDA Blanchardstown Business and Technology Park. The closest European sites are those located at Ryewater Valley and in the coastal areas of Dublin, including South Dublin Bay SAC (Site Code 000210), North Dublin Bay SAC (Site Code 000206), North Bull Island SPA (Site Code 004006) and South Dublin Bay and River Tolka Estuary SPA (Site Code 004024), see Figure 4.

However, given the scale of the proposed works and that there are no significant emissions predicted from the construction or operational phases, it is considered that there will be no potential for significant effects on any of the European sites listed and these can be excluded at this preliminary screening stage.

5.2. Assessment of Potential Cumulative Effects

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

As part of the Screening for an Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination or cumulative effects / impacts of the proposed development with other such plans and projects on the Natura 2000 sites.

The proposed development will have no predicted impacts on European sites, therefore in-combination impacts can be ruled out.

The Fingal Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of influence of the project site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the development area and surrounding townlands in which the development site is located, would be avoided.

Any new applications for the project area will be assessed on a case by case basis by Fingal County Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

6. Screening Statement

It has been objectively concluded by Moore Group Environmental Services that:

1. The project is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The project, alone or in combination with other projects, is not likely to have significant effects on the European sites considered in this assessment.
3. It is possible to rule out likely significant impacts on any European sites considered in the assessment.
4. It is possible to conclude that there would be no significant effects, no potentially significant effects and no uncertain effects if the project were to proceed.

It is the view of Moore Group Environmental Services that it is not necessary to undertake any further stage of the Appropriate Assessment process.

A finding of no significant effects report is presented in Appendix A in accordance with the EU Commission's methodological guidance (European Commission, 2001).

7. References

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010).

European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission Environment DG (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. European Commission, Brussels.

European Commission (2007) Guidance document on Article 6(4) of the 'Habitats Directive '92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

Appendix A

FINDING OF NO SIGNIFICANT EFFECTS REPORT

Finding no significant effects report matrix

Name of project or plan

Proposed Extension of the Hexagon Building

Name and location of the Natura 2000 site(s)

The project is located within the urban environment of the Blanchardstown IDA Business and Technology Park, see Figure 2. The closest European sites are those located at Ryewater Valley and in the coastal areas of Dublin, including South Dublin Bay SAC (Site Code 000210), North Dublin Bay SAC (Site Code 000206), North Bull Island SPA (Site Code 004006) and South Dublin Bay and River Tolka Estuary SPA (Site Code 004024).

Description of the project or plan

This report presents screening assessment for an extension to an existing data storage facility at the Hexagon Building, IDA Blanchardstown Business and Technology Park, Ballycoolin Road and Snugborough Road, Blanchardstown, Dublin 15.

The proposed development consists of an extension of the existing 'Hexagon' data storage facility (with a GFA of 4,055m^2) over two storeys with plant at roof level, the relocation of existing parking and the provision of alternative parking arrangements, and the provision of 4 no. emergency generators. The total site area is c. 1.15 ha (11,500m^2).

Is the project or plan directly connected with or necessary to the management of the site(s)

No

Are there other projects or plans that together with the projects or plan being assessed could affect the site

The proposed development will have no predicted impacts on European sites, therefore in-combination impacts can be ruled out.

The Fingal Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of influence of the project site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the development area and surrounding townlands in which the development site is located, would be avoided.

Any new applications for the project area will be assessed on a case by case basis by Fingal County Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

THE ASSESSMENT OF SIGNIFICANCE OF EFFECTS

Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.

The project is located within the urban environment of the IDA Blanchardstown Business and Technology Park. The closest European sites are those located at Ryewater Valley and in the coastal areas of Dublin, including South Dublin Bay SAC (Site Code 000210), North Dublin Bay SAC (Site Code 000206), North Bull Island SPA (Site Code 004006) and South Dublin Bay and River Tolka Estuary SPA (Site Code 004024), see Figure 4.

However, given the scale of the proposed works and that there are no significant emissions predicted from the construction or operational phases, it is considered that there will be no potential for significant effects on any of the European sites listed and these can be excluded at this preliminary screening stage.

Explain why these effects are not considered significant.

See above.

List of agencies consulted: provide contact name and telephone or e-mail address

The requirement for Appropriate Assessment Screening was confirmed through informal pre-planning consultation with Fingal County Council.

Response to consultation

N/A.

DATA COLLECTED TO CARRY OUT THE ASSESSMENT

Who carried out the assessment

Moore Group Environmental Services.

Sources of data

NPWS database of designated sites at www.npws.ie

National Biodiversity Data Centre database http://maps.biodiversityireland.ie

Level of assessment completed

Desktop Assessment.

Where can the full results of the assessment be accessed and viewed

Fingal County Council Planning Section.

OVERALL CONCLUSIONS

It has been objectively concluded by Moore Group Environmental Services that:

1. The project is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The project, alone or in combination with other projects, is not likely to have significant effects on the European sites considered in this assessment.
3. It is possible to rule out likely significant impacts on any European sites considered in the assessment.
4. It is possible to conclude that there would be no significant effects, no potentially significant effects and no uncertain effects if the project were to proceed.

It is the view of Moore Group Environmental Services that it is not necessary to undertake any further stage of the Appropriate Assessment process.

APPENDIX 2

AIR DISPERSION MODELLING REPORT
AWN CONSULTING – DECEMBER 2017

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AIR DISPERSION MODELLING OF STANDBY GENERATORS FOR HEXAGON BUILDING EXTENSION, BLANCHARDSTOWN, DUBLIN 15

Technical Report Prepared For

MCA Architects
4 Hanover Wharf
Asgard Road
Dublin 2

Technical Report Prepared By

Claire Flynn, MSc MIAQM

Our Reference

CF/17/9843AR01_2

Date Of Issue

20 Dec 2017

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CF/17/9843AR01_1	06 Dec 2017	Minor edits to text	Executive Summary Section 4.0 Section 6.1 Section 7.3
CF/17/9843AR01_2	20 Dec 2017	Minor revision to modelling input data and results. Minor edits to text.	Executive Summary Section 1.0 Section 4.0 Section 5.0 Section 6.0 Section 7.0

Record of Approval

Details	Written by	Checked by
Signature		
Name	Claire Flynn	Avril Challoner
Title	Senior Air Quality Consultant	Senior Air Quality Consultant
Date	20/11/17	20/11/17

EXECUTIVE SUMMARY

Air dispersion modelling was carried out by AWN Consulting Ltd using the United States Environmental Protection Agency's regulatory model AERMOD. The modelling of air emissions from the site was carried out to assess concentrations of nitrogen dioxide (NO_2) at a variety of locations beyond the site boundary. The modelling was undertaken to assess the impact to ambient air quality from the testing of the standby generators and the infrequent emergency operation of the standby generators including those associated with the existing Hexagon Building, Building A and Building B as well as the proposed standby generators for the Hexagon Building Extension.

The proposed Hexagon Building Extension will have 4 standby generator stacks which will have a minimum height of 11m above ground level. The existing Building C which houses the standby generators associated with the existing Hexagon Building has been modelled with 19 standby generators (18 existing generators plus one proposed generator) with vertical emission points at a height of 5.3m. The existing Building A has been modelled with 22 standby generators with a stack height of 20.4m and the existing Building B has been modelled with 16 standby generators with a stack height of 23.2m. In total, there will be 61 standby diesel generators at the Hexagon Building Campus upon completion of the proposed Hexagon Building Extension.

USEPA Guidance suggests that for emergency operations, an average hourly emission rate should be used rather than the maximum hourly rate (USEPA, 2011). As a result, the maximum hourly emission rates from the standby generators were reduced by $\frac{100}{8760}$ and the generators were modelled over a period of one full year. In reality, the standby generators are likely to run for only 24 - 48 hours per year.

A second methodology has recently been published by the UK Environment Agency (UK EA) and is based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value (18 exceedances are allowable per year before the air standard is deemed to have been exceeded). The assessment assumes a hypergeometric distribution to assess the likelihood of exceedance hours coinciding with the operational hours of the standby generators. The guidance also states that there should be no running time restrictions on standby generators when providing power on site during an emergency. Both the methodology advised in USEPA guidance as well as the approach described in the UK EA guidance have been applied in this study to ensure a robust assessment of predicted air quality impacts from the standby generators.

Results

<u>USEPA Methodology</u>

Emissions from the site assuming scheduled testing as well as emergency operation of the standby generators for 100 hours per year will lead to an ambient NO_2 concentration (including background) which is 51% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 91% of the annual limit value at the worst-case location at or beyond the site boundary.

<u>UK EA Methodology</u>

The results indicate that in the worst-case year, the emergency generators can operate for up to 214 hours per year before there is a likelihood of an exceedance of the ambient air quality standard (at a 95th percentile confidence level). However, the UK guidance recommends that there should be no running time restrictions placed on these generators which (aside from testing) are only used to provide power on site during an emergency scenario.

Conclusion

Air dispersion modelling of the site including the proposed Hexagon Building Extension based on both scheduled testing of the standby generators and emergency operation of the standby generators indicates that there will not be any off-site exceedances of the applicable ambient NO_2 air quality standards.

Potential Impact on Climate Change and Transboundary Pollution

The NO_X, SO_2 and NMVOC indirect emissions associated with the operation of the data storage facility will not be significant in relation to the national emissions ceilings. No significant on-site CO_2 emissions will occur as a result of the proposed development whilst the use of electricity for the proposed Hexagon Building Extension would indirectly result in emissions equivalent to an upper limit of 0.03% of Ireland's national annual CO_2 emissions. The cumulative electricity usage for the entire Hexagon Building Campus including the proposed Hexagon Building Extension would be equivalent to 0.26% of Ireland's national annual CO_2 emissions.

CONTENTS

1.0 INTRODUCTION

Air dispersion modelling was carried out by AWN Consulting Ltd for and on behalf of MCA Architects using the United States Environmental Protection Agency's regulated model AERMOD. The modelling of air emissions from the site was carried out to assess concentrations of nitrogen dioxide (NO_2) at a variety of locations beyond the site boundary. The modelling was undertaken to assess the impact to ambient air quality from the testing of the standby generators and the infrequent emergency operation of the standby generators including those associated with the existing Hexagon Building, Building A, Building B and Building C as well as the standby generators for the proposed Hexagon Building Extension.

The proposed Hexagon Building Extension will have 4 standby generator stacks which will have a minimum height of 11m above ground level. The existing Building C which houses the standby generators associated with the existing Hexagon Building has been modelled with 19 standby generators (18 existing generators plus one proposed generator) with vertical emission points at a height of 5.3m. The existing Building A has been modelled with 22 standby generators with a stack height of 20.4m and the existing Building B has been modelled with 16 standby generators with a stack height of 23.2m. In total, there will be 61 standby diesel generators at the Hexagon Building Campus upon completion of the proposed Hexagon Building Extension. The modelled emission points from the standby generators are all vertical emission points which will allow the release to benefit from the initial mechanical and buoyant momentum.

The air dispersion modelling input data consisted of information on the physical environment, design details for all emission points on-site and five full years of meteorological data. Using this input data, the model predicted ambient concentrations at various receptors for each hour of the meteorological year. This study adopted a worst-case approach which will lead to an over-estimation of the actual levels that will arise.

2.0 METHODOLOGY

Emissions from the site have been modelled using the AERMOD dispersion model (Version 16216r) which has been developed by the U.S. Environmental Protection Agency (USEPA) and the American Meteorological Society (AMS). The model is recommended as an appropriate model for assessing the impact of air emissions from industrial facilities in the EPA Guidance document "*Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (2010)*".

The model is a "new-generation" steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources. The model is an enhancement of the Industrial Source Complex-Short Term 3 (ISCST3) model which has been widely used for emissions from industrial sources. Details of the model are given in Appendix A1. Fundamentally, the model has made significant advances in simulating the dispersion process in the boundary layer. This will lead to a more accurate reflection of real world processes and thus considerably enhance the reliability and accuracy of the model particularly under those scenarios which give rise to the highest ambient concentrations.

Due to the proximity to surrounding buildings, the PRIME Building Downwash Program (BPIP Prime) has been incorporated into the model to determine the influence (wake effects) of these buildings on dispersion in each direction considered.

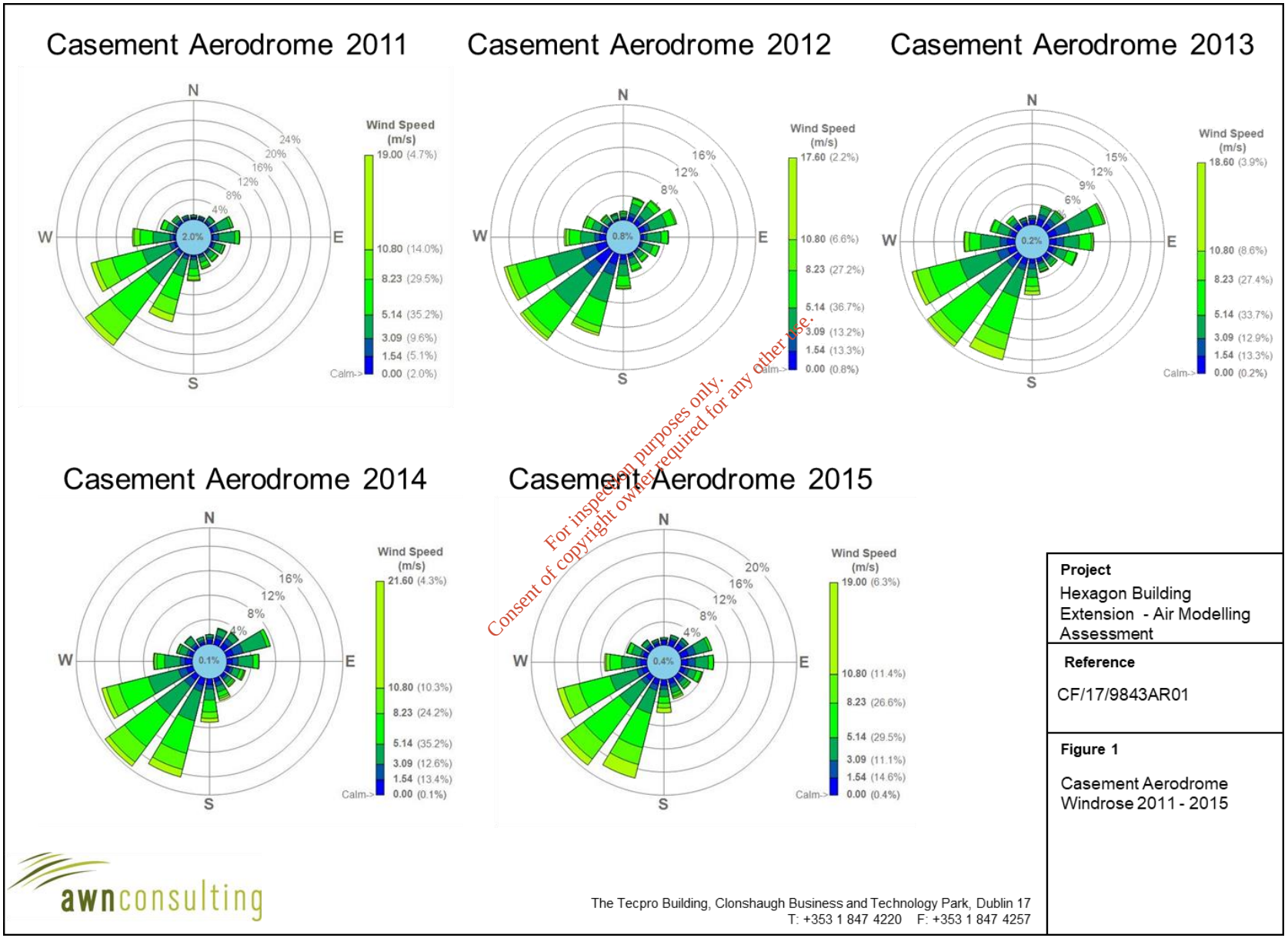
The AERMOD model incorporated the following features:

- Receptor Grid and Discrete receptors were identified at which concentrations would be modelled. Receptors were mapped with sufficient resolution to ensure all localised "hot-spots" were identified without adding unduly to processing time. The receptor grids were based on Cartesian grids with the site at the centre. An outer grid measured 5 x 5 km with the site at the centre and with concentrations calculated at 200m intervals. A smaller denser grid measured 2 x 2 km with concentrations calculated at 50m intervals. Boundary receptor locations were also placed along the boundary of the site, at 50m intervals, giving a total of 4,503 calculation points for the model. The impact of the standby generators was also measured at nearby residential receptors which were added to the model as discrete receptors.

- All on-site buildings and significant process structures were mapped into the computer to create a three dimensional visualisation of the site and its emission points. Buildings and process structures can influence the passage of airflow over the emission stacks and draw plumes down towards the ground (termed building downwash). The stacks themselves can influence airflow in the same way as buildings by causing low pressure regions behind them (termed stack tip downwash). Both building and stack tip downwash were incorporated into the modelling.

- Hourly-sequenced meteorological information has been used in the model covering the years 2011 – 2015 from Casement Aerodrome as shown in Figure 1. AERMOD incorporates a meteorological pre-processor AERMET 7 which allows AERMOD to account for changes in the plume behaviour with height using information on the surface characteristics of the site. AERMET 7 calculates hourly boundary layer parameters for use by AERMOD, including friction velocity, Monin-Obukhov length, convective velocity scale, temperature scale, convective boundary layer (CBL) height, stable boundary layer (SBL) height and surface heat flux (see Appendix A2).

- Terrain has been mapped out in the model using SRTM data (30m resolution) using AERMAP.



Project
Hexagon Building Extension - Air Modelling Assessment

Reference
CF/17/9843AR01

Figure 1
Casement Aerodrome Windrose 2011 - 2015

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2.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health- or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 1).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the *Air Quality Standards Regulations 2011* incorporating *European Commission Directive 2008/50/EC*, which has set limit values for the pollutants NO_2 / NO_X (see Table 1).

Pollutant	Regulation Note1	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3 NO_2
		Annual limit for protection of human health	40 µg/m^3 NO_2
		Annual limit for protection of vegetation	30 µg/m^3 NO + NO_2

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Table 1 EU Air Quality Standards (based on European Commission Directive 2008/50/EC) (transposed as S.I. 180 of 2011)

3.0 RECEIVING ENVIRONMENT

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "Air Quality Monitoring Annual Report 2016" (EPA 2017a) details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA 2017a). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, Blanchardstown is categorised as Zone A (EPA 2017a).

With regard to NO_2, continuous monitoring data from the EPA (EPA 2017a, 2017b), at suburban Zone A background locations in Rathmines, St Anne's Park, Dun Laoghaire, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 15.7 - 20.0 µg/m^3 in 2016. Sufficient data is available for stations in Rathmines and Ballyfermot to observe long-term trends since 2010 (EPA 2017a, 2017b), with results ranging from 16 - 25 µg/m^3 and few exceedances of the one-hour limit value. Based on these results, an estimate of the background NO_2 concentration in the region of the proposed development in 2017 is 17 µg/m^3.

In relation to the annual average background, the ambient background concentration was added directly to the process concentration with the short-term peaks assumed to have an ambient background concentration of twice the annual mean background concentration.

Station	Station Classification Council Directive 96/62/EC	Averaging Period	Year					
			2011	2012	2013	2014	2015	2016
Rathmines	Urban Background	Annual Mean NO_2 ($\mu g/m^3$)	20	21	19	17	18	20
		99.8th%ile 1-hr NO_2 ($\mu g/m^3$)	98	96	92	105	105	88
Ballyfermot	Suburban Background	Annual Mean NO_2 ($\mu g/m^3$)	-	-	16	16	16	17
		99.8th%ile 1-hr NO_2 ($\mu g/m^3$)	-	-	82	93	127	90
Dun Laoghaire	Suburban Background	Annual Mean NO_2 ($\mu g/m^3$)	18	18	16	15	16	19
		99.8th%ile 1-hr NO_2 ($\mu g/m^3$)	101	107	92	86	91	105
Swords	Suburban Background	Annual Mean NO_2 ($\mu g/m^3$)	14	15	15	14	13	16
		99.8th%ile 1-hr NO_2 ($\mu g/m^3$)	105	99	87	137	93	96
St. Anne's Park	Suburban Background	Annual Mean NO_2 ($\mu g/m^3$)	-	-	12	14	14	-
		99.8th%ile 1-hr NO_2 ($\mu g/m^3$)	-	-	63	63	67	-

Table 2 Trends In Dublin (Zone A) Air Quality - Nitrogen Dioxide ($\mu g/m^3$)

4.0 PROCESS EMISSIONS

The proposed Hexagon Building Extension will require 4 standby generators with a minimum stack height of 11m. The proposed location for the 4 standby generators associated with the Hexagon Building Extension is to the northeast of the Existing Building C which has a height of 9.8m at its highest point. The emission points for the generators will be a minimum of 11m in height and have been assumed to be clustered in the centre of the 4 proposed standby generators. The existing Building A has been modelled with 22 standby generators with a stack height of 20.4m and the existing Building B has been modelled with 16 standby generators with a stack height of 23.2m. The existing Building C which houses the standby generators associated with the existing Hexagon Building has been modelled with 19 standby generators (18 existing standby generators plus one proposed additional standby generator) with vertical emission points at a height of 5.3m. For the purpose of this assessment, none of the standby generators have been modelled as back-up generators to provide redundancy for the other standby generators i.e. all 61 standby generators are assumed to be running simultaneously in the event of a power failure to the site.

The scenario modelled for this assessment includes the batch testing once per week of all standby generators on site (at 25% loading for a maximum of 15 minutes each, in pairs, sequentially) as well as the emergency operation of all standby generators at 80% load for 100 hours per year calculated according to USEPA protocol. In reality, it is unlikely other than during their initial commissioning that the standby generators would be used for emergency operations for more than 48 hours per year. Additionally, the scheduled testing of the standby generators will last no longer than 5-10 minutes at very low load. Thus, the worst-case approach used in this study will lead to an over-estimation of the actual levels that will arise.

USEPA Guidance suggests that for emergency operations, an average hourly emission rate should be used rather than the maximum hourly rate (USEPA, 2011). As a result, the maximum hourly emission rates from the standby generators were reduced by $\frac{100}{8760}$ and the generators were modelled over a period of one full year.

A second methodology has recently been published by the UK Environment Agency. The consultation document is entitled “Diesel Generator Short-Term NO_2 Impact Assessment” (UK EA, 2016). The methodology is based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value (18 exceedances are allowable per year before the air standard is deemed to have been exceeded). The assessment assumes a hypergeometric distribution to assess the likelihood of exceedance hours coinciding with the operational hours of the standby generators. The cumulative hypergeometric distribution of 19 and more hours per year is computed and the probability of an exceedance determined. The guidance suggests that the 95th percentile confidence level should be used to indicate if an exceedance is likely. The guidance suggests that the assessment should be conducted at the nearest residential receptor or at locations where people are likely to be exposed and that there should be no running time restrictions on these generators when providing power on site during an emergency.

Both the methodology advised in the USEPA guidance as well as the approach described in the UK EA guidance have been applied in this study to ensure a robust assessment of predicted air quality impacts from the standby generators. The methodology for converting NO_X to NO_2 was based on the ozone limiting method (OLM) approach based on an initial NO_2/NO_X in-stack ratio of 0.1 and a background ozone level of 55 µg/m^3. Results for both methodologies are reported in Section 5.0.

The source information for the modelled emission points has been summarised in Table 3.

The batch testing assumes that once per week, 2 generators are tested each hour until all generators on the site have been tested e.g. hour 1 – Generators 1 and 2 are run together, hour 2 – Generators 3 and 4 are run together and so on until all generators on site have been tested. The batch testing in total takes 31 hours / week split over four days for all 61 back-up generators on site to be tested each week.

Stack Reference	Height Above Ground Level (m)	Exit Diameter (m)	Cross-Sectional Area (m^2)	Temp (K)	Exit Velocity (m/sec actual)	NO_x Mass Emission (g/s)
Prop. Hexagon Bldg. Extension Standby Diesel Generators (80% load)	11.0	0.50	0.196	768.8	35.3	5.72 Note 1 / 0.065 Note 2
Existing Hexagon Bldg Standby Diesel Generators (80% load)	5.3	0.325	0.083	784.3	98.0	3.94 Note 1 / 0.045 Note 2
Existing Hexagon Bldg - Proposed Additional Standby Diesel Generator (80% load)	5.3	0.325	0.083	768.8	83.5	5.72 Note 1 / 0.065 Note 2
Existing Bldg A Standby Diesel Generators (80% load)	20.4	0.50	0.196	784.3	41.4	3.94 Note 1 / 0.045 Note 2
Existing Bldg B Standby Diesel Generators (80% load)	23.2	0.50	0.196	768.8	35.3	5.72 Note 1 / 0.065 Note 2
Testing of Prop. Hexagon Bldg. Extension Standby Diesel Generators (25% load)	11.0	0.50	0.196	746.4	14.8	0.506 Note 3
Testing of Existing Hexagon Bldg Standby Diesel Generators (25% load)	5.3	0.325	0.083	537.7	34.3	0.345 Note 3
Testing of Hexagon Bldg - Additional Standby Diesel Generator (25% load)	5.3	0.325	0.083	746.4	35.1	0.506 Note 3
Testing of Existing Bldg A Standby Diesel Generators (25% load)	20.4	0.50	0.196	537.7	14.5	0.345 Note 3
Existing Bldg B Standby Diesel Generators (25% load)	23.2	0.50	0.196	746.4	14.8	0.506 Note 3

Note 1 Maximum emission rates based on 80% load used to model emissions during emergency operation of generators for UK EA assessment methodology
Note 2 Reduced emission rates based on USEPA protocol (assuming 100 hours / annum) used to model emissions during emergency operation of generators (80% load)
Note 3 Emission rates used to model scheduled emissions during testing at 25% load conducted once per week.

Table 3 Summary of Source Information for NO_x Emissions from Standby Generators

5.0 RESULTS & DISCUSSION

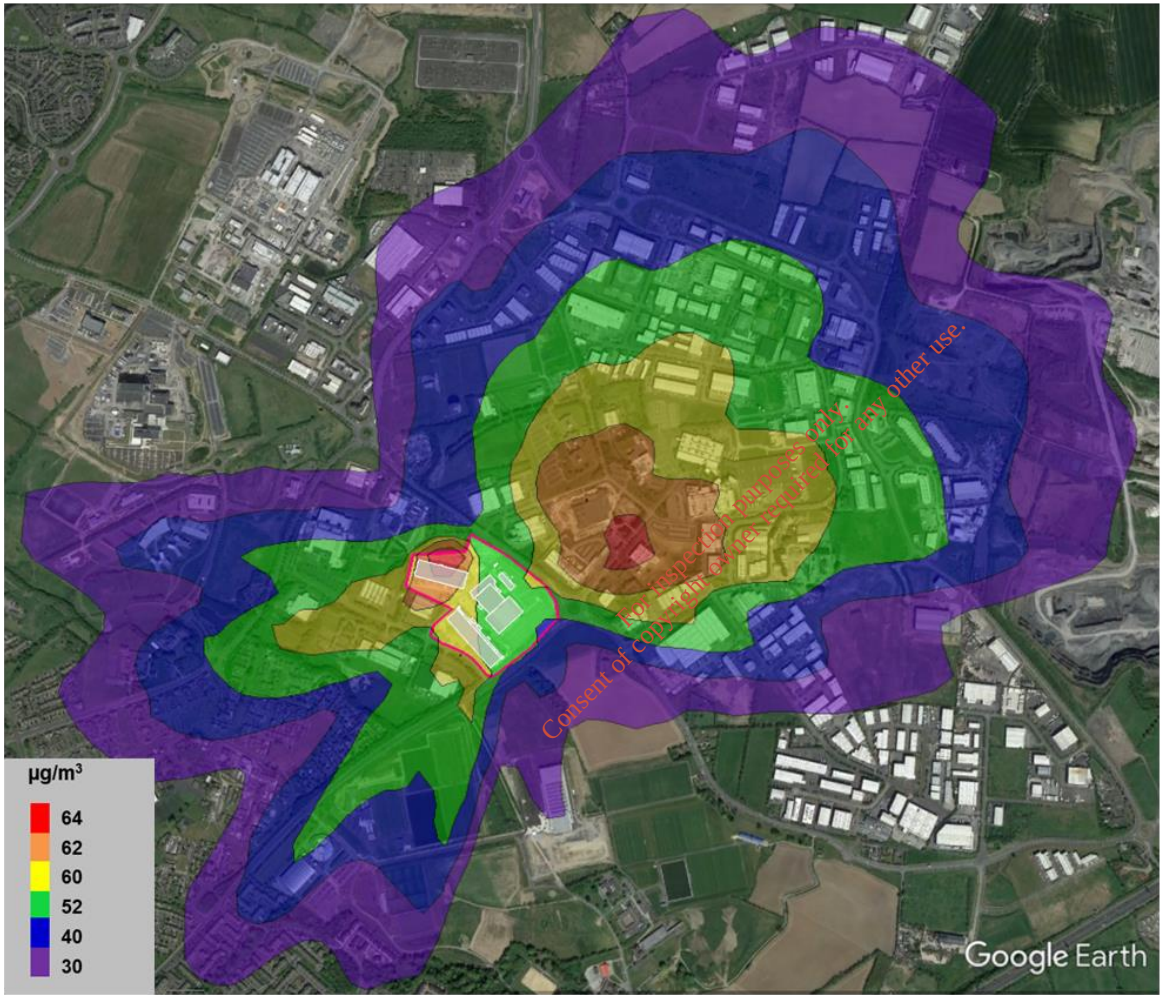
5.1 USEPA Methodology

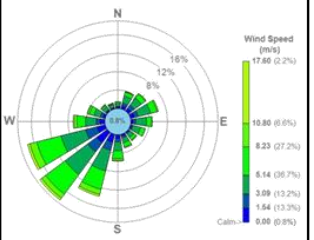
The NO_2 modelling results at the boundary of the site and beyond are detailed in Table 4 based on operation of the standby diesel generations for 100 hours per year based on the USEPA methodology (USEPA, 2011) as well as considering weekly scheduled testing of all standby generators. The results indicate that the ambient ground level concentrations are within the relevant air quality standards for NO_2. For the worst-case year, emissions from the site lead to an ambient NO_2 concentration (including background) which is 51% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 91% of the annual limit value at the worst-case off-site receptor site with a sharp fall-off in concentration away from the peak location. The geographical variations in the 1-hour mean (99.8th percentile) and annual mean NO_2 ground level concentrations are illustrated as concentration contours in Figures 2 and 3.

Pollutant / Year	Annual Mean Background (µg/m^3)	Averaging Period	Process Contribution NO_2 (µg/m^3)	Predicted Environmental Concentration NO_2 (µg/m^3)	Standard (µg/m^3) Note 1
NO_2 / 2011	34	99.8th%ile of 1-hr means	66.6	100.6	200
	17	Annual Mean	19.5	36.5	40
NO_2 / 2012	34	99.8th%ile of 1-hr means	67.0	101.0	200
	17	Annual Mean	18.4	35.4	40
NO_2 / 2013	34	99.8th%ile of 1-hr means	66.2	100.2	200
	17	Annual Mean	17.6	34.6	40
NO_2 / 2014	34	99.8th%ile of 1-hr means	66.9	100.9	200
	17	Annual Mean	18.8	35.8	40
NO_2 / 2015	34	99.8th%ile of 1-hr means	66.5	100.5	200
	17	Annual Mean	19.1	36.1	40

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011)

Table 4 Dispersion Model Results – NO_2





Background Mapping from Google Earth

Maximum 1-hr NO_2 Concentrations (not including background)

Maximum Concentration = 67.0 µg/m³

Boundary Of Facility

N

Project
Hexagon Building Extension - Air Modelling Assessment

Reference
CF/17/9843AR01

Figure 2
Maximum 1-Hr NO_2 Concentrations (µg/m³) (Year 2012)

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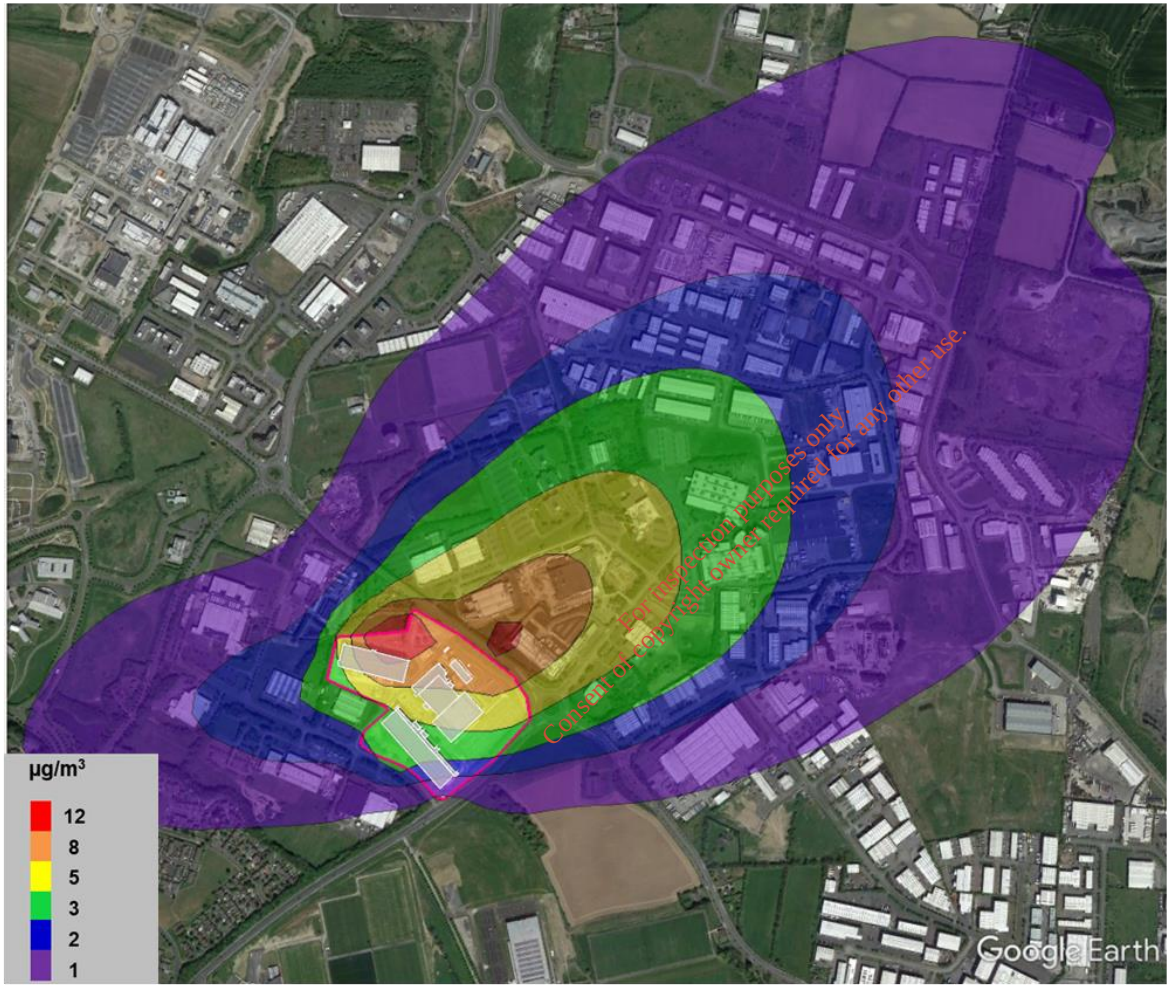

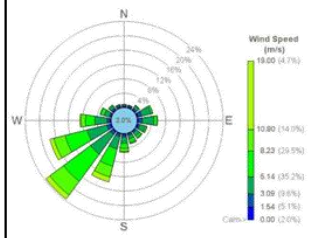

Background Mapping from Google Earth

Annual Mean NO_2 Concentration (not including background)

Maximum Concentration = 19.5 µg/m^3

Boundary Of Facility

N

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Reference
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Figure 3
Annual Mean NO_2 Concentrations (µg/m^3) (Year 2011)

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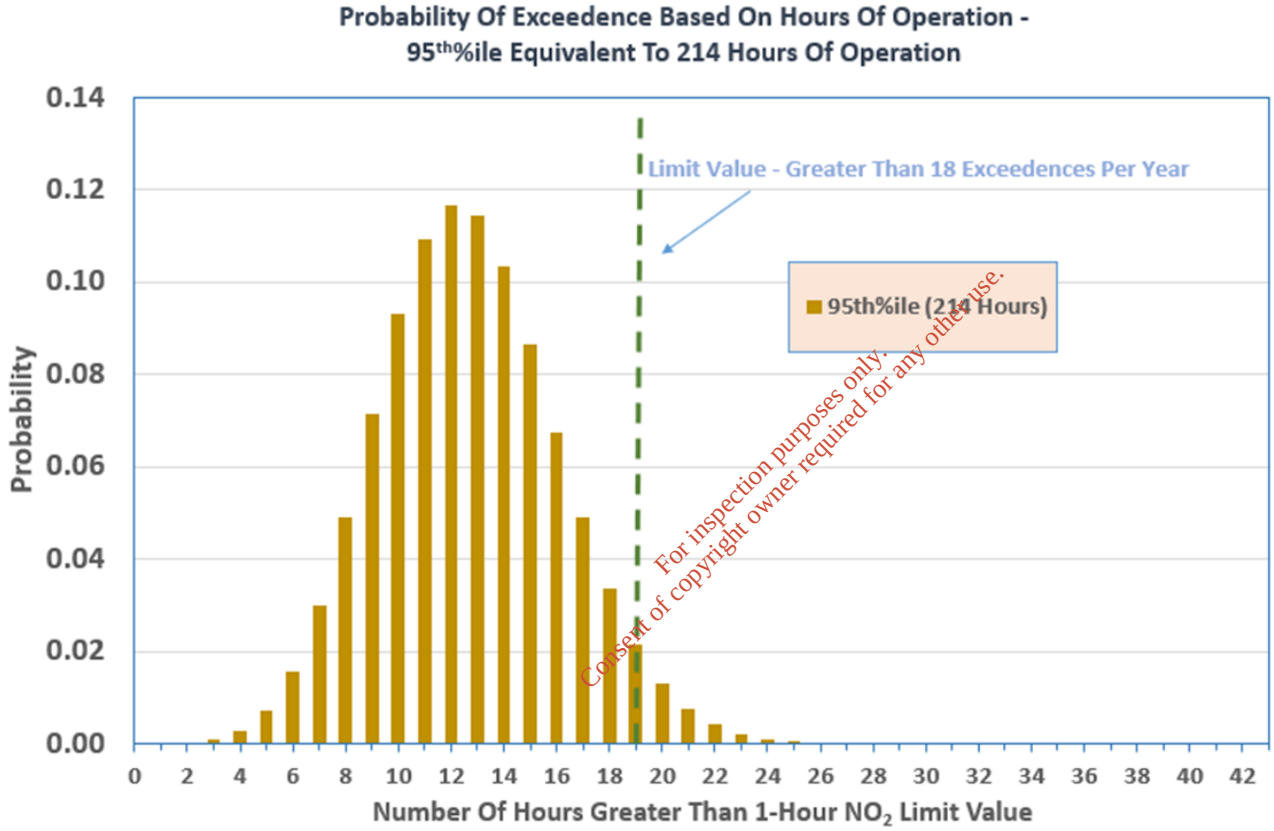
5.2 UK EA Methodology

The methodology, based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value assuming a hypergeometric distribution, has been undertaken at the worst-case residential receptor. The cumulative hypergeometric distribution of 19 and more hours per year is computed and the probability of an exceedance determined as outlined in Table 5. The results have been compared to the 95th percentile confidence level to indicate if an exceedance is likely at various operational hours. The results indicate that in the worst-case year, the emergency generators can operate for up to 214 hours per year before there is a likelihood of an exceedance of the ambient air quality standard (at a 95th percentile confidence level). Figure 4 shows the statistical distribution predicted for the 95th percentile (based on 214 hours of operation per year). However, the UK guidance recommends that there should be no running time restrictions on these generators when providing power on site during an emergency.

Pollutant / Meteorological Year	Hours of operation (Hours) (95th%ile) Allowed Prior To Exceedance Of Limit Value	UK Guidance – Probability Value = 0.05 (95th%ile)[Note 1]
NO_2 / 2011	402	**0.05**
NO_2 / 2012	286	
NO_2 / 2013	214	
NO_2 / 2014	247	
NO_2 / 2015	306	

Note 1 Guidance Outlined In UK EA publication "Diesel Generator Short-term NO_2 Impact Assessment" (EA, 2016)

Table 5 Hypergeometric Statistical Results at Worst-case Residential Receptor – NO_2



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Project
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Reference
CF/17/9843AR01

Figure 4
Probability Of Exceedance Based On Hours Of Operation – 95th%ile Equivalent To 214 Hours Of Operation For The Standby Generators

6.0 POTENTIAL IMPACTS ON CLIMATE CHANGE & TRANSBOUNDARY POLLUTION

6.1 Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$. In relation to Ireland, 2020 emission targets are 25 kt for SO_2 (65% below 2005 levels), 65 kt for NO_X (49% reduction), 43 kt for VOCs (25% reduction), 108 kt for NH_3 (1% reduction) and 10 kt for $PM_{2.5}$ (18% reduction).

European Commission Directive 2001/81/EC and the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005. The data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X. Directive (EU) 2016/2284 "On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC" was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3, $PM_{2.5}$ and CH_4. In relation to Ireland, 2020-29 emission targets are for SO_2 (65% below 2005 levels), for NO_X (49% reduction), for VOCs (25% reduction), for NH3 (1% reduction) and for $PM_{2.5}$ (18% reduction). In relation to 2030, Ireland's emission targets are for SO_2 (85% below 2005 levels), for NO_X (69% reduction), for VOCs (32% reduction), for NH_3 (5% reduction) and for $PM_{2.5}$ (41% reduction).

Directive (EU) 2016/2284 "On The Reduction Of National Emissions Of Certain Atmospheric Pollutants And Amending Directive 2003/35/EC And Repealing Directive 2001/81/EC" was published in December 2016. The Directive will apply the 2010 National Emission Ceiling Directive limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$. In relation to Ireland, 2020-29 emission targets are for SO_2 (65% below 2005 levels), for NO_X (49% reduction), for NMVOCs (25% reduction), for NH_3 (1% reduction) and for $PM_{2.5}$ (18% reduction). In relation to 2030, Ireland's emission targets are for SO_2 (85% below 2005 levels), for NO_X (69% reduction), for NMVOCs (32% reduction), for NH_3 (5% reduction) and for $PM_{2.5}$ (41% reduction).

The NO_X, SO_2 and NMVOC indirect emissions associated with the operation of the data storage facility will not be significant in relation to the national emission ceilings.

6.2 Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002. For the purposes of the European Union burden sharing agreement under Article 4 of the Kyoto Protocol, in June 1998, Ireland agreed to limit the net growth of the six Greenhouse Gases under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012 .

The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP23) took place in Bonn, Germany from the 6th to the 17th of November 2017 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015

and is an important milestone in terms of international climate change agreements. The "Paris Agreement", agreed by 200 nations, has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress has also been made on elevating adaption onto the same level as action to cut and curb emissions.

The EU, on the 23/24th of October 2014, agreed the "2030 Climate and Energy Policy Framework". The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under "Renewables and Energy Efficiency", an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

In relation to the EU 20-20-20 targets for CO_2, Ireland has a target of a 20% reduction in non-Emission Trading Scheme (non-ETS) greenhouse gas emissions by 2020 relative to the 2005 levels. The EPA confirmed that the 2015 levels are on target but that projections from 2016 – 2020 indicate that the target is unlikely to be met.

The standby diesel generators modelled for the purpose of this assessment will only be used in the event of a power failure at the site. During normal operations at the facility, the electricity will be supplied from the national grid. Electricity to operate the facility will be purchased from the available energy suppliers including power stations and renewable generation sources such as wind power. The Electricity Supplier for the site currently holds a Commission for Energy Regulation (CER) certified fuel mix disclosure, guaranteeing every megawatt-hour (MWh) that they supply in the market is generated from renewable sources.

Importantly, electricity providers form part of the EU-wide Emission Trading Scheme (ETS) and thus greenhouse gas emission from these electricity generators are not included when determining compliance with the targeted 20% reduction in the non-ETS sector. Thus, emissions from electricity generators will not affect the EU 20-20-20 target of a 20% reduction in non-Emission Trading Scheme (non-ETS) greenhouse gas emissions by 2020. Consequently, the proposed development will have no impact on whether Ireland meets the targets set for 2020. In terms of future obligations (after 2020), the EU policy of operating the ETS (on a EU-wide basis) for large industrial emitters including electricity generators will continue up to 2030 as a minimum and thus electricity generation will have no impact on the non-ETS targets up to 2030 as a minimum.

The CO_2 emissions from electricity to operate the facility will not be significant in relation to Ireland's national annual CO_2 emissions. A Report titled 'Energy Related Emissions In Ireland - CO_2 From Fuel Combustion (2016)' published by the Sustainable Energy Authority of Ireland (SEAI) states the average CO_2 emission factor for electricity generated in Ireland was 0.468 $kgCO_2/kWh$ in 2015. This average CO_2 emission factor is based on the national power generating portfolio. On the basis that the proposed Hexagon Building Extension will consume 6.2 MW of power, this equates to 43 GWh annually based on the assumption of the national fuel mix. This translates to approximately 20,334 tonnes of CO_2eq per year. Latest Environmental Protection Agency (EPA) figures taken from 'Ireland's Greenhouse Gas Emission Projections' indicate that total CO_2 generation in Ireland was of the order of 59.9 million tonnes CO_2eq in 2015. The proposed Hexagon

Building Extension would contribute approximately 0.03% of Ireland's national annual CO_2 emissions assuming an electrical supply from a typical national grid source mix. The entire Hexagon Building Campus including the proposed Hexagon Building Extension will consume 47.2 MW of power which would translate to approximately 154,804 tonnes of CO_2eq per year which is 0.26% of the Ireland's national annual CO_2 emissions.

7.0 SUMMARY

The results are summarised below for both the USEPA and UK EA methodologies.

7.1 USEPA Methodology

Emergency operations has assumed the operation of 61 standby diesel generators at 80% load, for 100 hours per year using the USEPA methodology (USEPA, 2011). Emissions from the site under this emergency scenario will lead to an ambient NO_2 concentration (including background) which is 51% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 91% of the annual limit value at the worst-case location at or beyond the site boundary.

7.2 UK EA Methodology

The emergency generators were also assessed using the UK EA methodology (EA, 2016) with the impacts assessed at the worst-case residential receptor. The results were compared to the 95th percentile confidence level to indicate if an exceedance was likely at various operational hours. The results indicated that in the worst-case year, the emergency generators can operate for up to 214 hours per year before there is a likelihood of an exceedance of the ambient air quality standard (at a 95th percentile confidence level). However, the UK guidance recommends that there should be no running time restrictions placed on these generators which (aside from testing) are only used to provide power on site during an emergency scenario.

7.3 Potential Impact on Climate Change and Transboundary Pollution

The NO_X, SO_2 and NMVOC indirect emissions associated with the operation of the data storage facility will not be significant in relation to the national emission ceilings. No significant on-site CO_2 emissions will occur as a result of the proposed development whilst the use of electricity for the proposed Hexagon Building Extension would indirectly result in emissions equivalent to an upper limit of 0.03% of Ireland's national annual CO_2 emissions. The cumulative electricity usage for the entire Hexagon Building Campus including the proposed Hexagon Building Extension would be equivalent to 0.26% of Ireland's national annual CO_2 emissions.

7.4 Conclusion

Air dispersion modelling of the site including the proposed Hexagon Building Extension based on both testing of the standby generators and emergency operation of the standby generators indicates that there will not be any off-site exceedances of the applicable ambient NO_2 air quality standards. This study has incorporated conservative assumptions designed to overestimate the predicted concentrations at sensitive receptors. In relation to the spatial extent of emissions from the site, ambient concentrations decrease significantly away from the immediate area of the site.

7.0 REFERENCES

EirGrid (2017) All-Island Generation Capacity Statement 2017 – 2026"

EPA (2010) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)

EPA (2017a) Air Quality Monitoring Report 2016 (& previous annual reports 1997-2015)

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Iqbal (1983) An Introduction To Solar Radiation

UK EA (2016) Diesel Generator Short-term NO_2 Impact Assessment (*Consultation Draft*)

USEPA (1999) "Comparison of Regulatory Design Concentrations: AERMOD vs. ISCST3 vs. CTDM PLUS"

USEPA (2017) AERMOD Description of Model Formulation and Evaluation

USEPA (2004) User's Guide to the AERMOD Meteorological Preprocessor (AERMET)

USEPA (2005) Guidelines on Air Quality Models, Appendix W to Part 51, 40 CFR Ch.1

USEPA (2011) Additional Clarification Regarding Application of Appendix W Modelling Guidance for the 1-Hour National Ambient Air Quality Standard

UK DEFRA (2016) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM. TG(16)

APPENDIX A1

DESCRIPTION OF THE AERMOD MODEL

The AERMOD dispersion model has been recently developed, in part, by the U.S. Environmental Protection Agency (USEPA, 2017). The model is a steady-state Gaussian model used to assess pollutant concentrations associated with industrial sources. The model is an enhancement on the Industrial Source Complex-Short Term 3 (ISCST3) model which has been widely used for emissions from industrial sources. The 2005 Guidelines on Air Quality Models has promulgated AERMOD as the preferred model for a refined analysis from industrial sources, in all terrains.

Improvements over the ISCST3 model include the treatment of the vertical distribution of concentration within the plume. ISCST3 assumes a Gaussian distribution in both the horizontal and vertical direction under all weather conditions. AERMOD, however, treats the vertical distribution as non-Gaussian under convective (unstable) conditions while maintaining a Gaussian distribution in both the horizontal and vertical direction during stable conditions. This treatment reflects the fact that the plume is skewed upwards under convective conditions due to the greater intensity of turbulence above the plume than below. The result is a more accurate portrayal of actual conditions using the AERMOD model. AERMOD also enhances the turbulence of night-time urban boundary layers thus simulating the influence of the urban heat island.

In contrast to ISCST3, AERMOD is widely applicable in all types of terrain. Differentiation of the simple versus complex terrain is unnecessary with AERMOD. In complex terrain, AERMOD employs the dividing-streamline concept in a simplified simulation of the effects of plume-terrain interactions. In the dividing-streamline concept, flow below this height remains horizontal, and flow above this height tends to rise up and over terrain. Extensive validation studies have found that AERMOD performs better than ISCST3 for many applications and as well or better than CTDMPLUS for several complex terrain data sets (USEPA, 1999).

AERMOD has made substantial improvements in the area of plume growth rates in comparison to ISCST3 (USEPA 2017). ISCST3 approximates turbulence using six Pasquill-Gifford-Turner Stability Classes and bases the resulting dispersion curves upon surface release experiments. This treatment, however, cannot explicitly account for turbulence in the formulation. AERMOD is based on the more realistic modern planetary boundary layer (PBL) theory which allows turbulence to vary with height. This use of turbulence-based plume growth with height leads to a substantial advancement over the ISCST3 treatment.

Improvements have also been made in relation to mixing height (USEPA 2017). The treatment of mixing height by ISCST3 is based on a single morning upper air sounding each day. AERMOD, however, calculates mixing height on an hourly basis based on the morning upper air sounding and the surface energy balance, accounting for the solar radiation, cloud cover, reflectivity of the ground and the latent heat due to evaporation from the ground cover. This more advanced formulation provides a more realistic sequence of the diurnal mixing height changes.

AERMOD also contains improved algorithms for dealing with low wind speed (near calm) conditions. As a result, AERMOD can produce model estimates for conditions when the wind speed may be less than 1 m/s, but still greater than the instrument threshold.

APPENDIX A2

AERMET

AERMOD incorporates a meteorological pre-processor AERMET. AERMET allows AERMOD to account for changes in the plume behaviour with height. AERMET calculates hourly boundary layer parameters for use by AERMOD, including friction velocity, Monin-Obukhov length, convective velocity scale, convective (CBL) and stable boundary layer (SBL) height and surface heat flux. AERMOD uses this information to calculate concentrations in a manner that accounts for changes in dispersion rate with height, allows for a non-Gaussian plume in convective conditions, and accounts for a dispersion rate that is a continuous function of meteorology.

The AERMET meteorological preprocessor requires the input of surface characteristics, including surface roughness (z_0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. A morning sounding from a representative upper air station, latitude, longitude, time zone, and wind speed threshold are also required.

Two files are produced by AERMET for input to the AERMOD dispersion model. The surface file contains observed and calculated surface variables, one record per hour. The profile file contains the observations made at each level of a meteorological tower, if available, or the one-level observations taken from other representative data, one record level per hour.

From the surface characteristics (i.e. surface roughness, albedo and amount of moisture available (Bowen Ratio)) AERMET calculates several boundary layer parameters that are important in the evolution of the boundary layer, which, in turn, influences the dispersion of pollutants. These parameters include the surface friction velocity, which is a measure of the vertical transport of horizontal momentum; the sensible heat flux, which is the vertical transport of heat to/from the surface; the Monin-Obukhov length which is a stability parameter relating the surface friction velocity to the sensible heat flux; the daytime mixed layer height; the nocturnal surface layer height and the convective velocity scale which combines the daytime mixed layer height and the sensible heat flux. These parameters all depend on the underlying surface.

The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use types was carried out in line with USEPA recommendations.

Surface roughness

Surface roughness length is the height above the ground at which the wind speed goes to zero. Surface roughness length is defined by the individual elements on the landscape such as trees and buildings. In order to determine surface roughness length, the USEPA recommends that a representative length be defined for each sector, based on an upwind area-weighted average of the land use within the sector, by using the eight land use categories outlined by the USEPA. The inverse-distance weighted surface roughness length derived from the land use classification within a radius of 1km from Casement Aerodrome Meteorological Station is shown in Table A1.

Sector	Area Weighted Land Use Classification	Spring	Summer	Autumn	Winter[Note 1]
0-360	100% Grassland	0.050	0.100	0.010	0.010

Note 1: Winter defined as periods when surfaces covered permanently by snow whereas autumn is defined as periods when freezing conditions are common, deciduous trees are leafless and no snow is present (Iqbal, 1983). Thus for the current location autumn more accurately defines "winter" conditions at the proposed facility.

Table A1 Surface Roughness based on an inverse distance weighted average of the land use within a 1km radius of Casement Aerodrome Meteorological Station.

Albedo

Noon-time albedo is the fraction of the incoming solar radiation that is reflected from the ground when the sun is directly overhead. Albedo is used in calculating the hourly net heat balance at the surface for calculating hourly values of Monin-Obuklov length. A 10km x 10km square area is drawn around the meteorological station to determine the albedo based on a simple average for the land use types within the area independent of both distance from the station and the near-field sector. The classification within 10km from Casement Meteorological Station is shown in Table A2.

Area-weighted Land Use Classification	Spring	Summer	Autumn	Winter[1]
0.5% Water, 30% Urban, 0.5% Coniferous Forest 38% Grassland, 19% Cultivated Land	0.155	0.180	0.187	0.187

(1) For the current location autumn more accurately defines "winter" conditions in Ireland.

Table A2 Albedo based on a simple average of the land use within a 10km × 10km grid centred on Casement Aerodrome Meteorological Station.

Bowen Ratio

The Bowen ratio is a measure of the amount of moisture at the surface of the earth. The presence of moisture affects the heat balance resulting from evaporative cooling which, in turn, affects the Monin-Obukhov length which is used in the formulation of the boundary layer. A 10km x 10km square area is drawn around the meteorological station to determine the Bowen Ratio based on geometric mean of the land use types within the area independent of both distance from the station and the near-field sector. The classification within 10km from Casement Meteorological Station is shown in Table A3.

Geometric Mean Land Use Classification	Spring	Summer	Autumn	Winter[1]
0.5% Water, 30% Urban, 0.5% Coniferous Forest 38% Grassland, 19% Cultivated Land	0.549	1.06	1.202	1.202

(1) For the current location autumn more accurately defines "winter" conditions in Ireland.

Table A3 Bowen Ratio based on a geometric mean of the land use within a 10km × 10km grid centred on Casement Aerodrome Meteorological Station.

APPENDIX 3

NOISE IMPACT ASSESSMENT
AWN CONSULTING – DECEMBER 2017

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NOISE IMPACT ASSESSMENT EXTENSION TO HEXAGON BUILDING

Technical Report Prepared For

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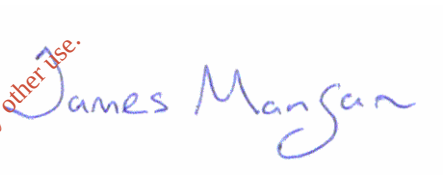
Signature		
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Date	6 December 2017	6 December 2017

EXECUTIVE SUMMARY

A number of data storage facility buildings have previously been developed and is operational on a site at the IDA Business Park, Snugborough Road, Abbotstown, Dublin 15. This assessment has been prepared to inform the planning permission for the development of an extension to the Hexagon building and considers the potential noise impact of the installation of building services plant associated with the extension that will operate on a day to day basis. The lands in question fall under to jurisdiction of Fingal County Council (FCC).

Due to the continuous nature of site operations, noise emissions have been assessed based on the background noise levels monitored during night-time periods prior to development on the site. The criteria have been based on historical surveys before the development of the original facility in order to give due consideration of the issue of 'background creep'. The target criteria for cumulative site noise emissions has been proposed as 40dB $L_{Aeq,15min}$. To date the development of the existing site operations and the building has predicted levels of the order of 40dB $L_{Aeq,15min}$ at the nearest noise sensitive properties. Therefore, in order not to increase these levels a design goal of **30dB $L_{Aeq,15min}$** has been adopted in relation to noise emissions from the proposed additional plant items associated with this proposed extension.

Also in terms of emergency operations the predicted noise levels at the nearest noise sensitive locations are the order of 50dB(A). Therefore, in order to not increase these levels further the contribution of the mechanical plant and additional generators associated with the extension shall not exceed **40dB $L_{Aeq,15min}$.**

Noise levels have been predicted to the nearest noise sensitive locations from the installation (i.e. private residences on Ballycoolin Road and within the Westway and Sheephill estates) Twenty-three assessment locations have been considered. The installation of mechanical plant associated with the proposed extension has been considered, as has the operation of generators under emergency conditions.

Day to Day The predicted noise levels from the day to day site operations of the proposed extension are in the range of 18 to 30dB $L_{Aeq,T}$. The predicted noise levels are at least 10dB(A) below the predicted noise levels associated with the overall operations on the site and the cumulative predicted noise levels satisfy the criteria that are associated with the development.

Emergency The predicted noise levels from the day to day site operations of the proposed extension are in the range of 31 to 40dB $L_{Aeq,T}$. The predicted noise levels are at least 10dB(A) below the predicted noise levels associated with the overall emergency operations on the site and the cumulative predicted noise levels satisfy the criteria that are associated with the development.

CONTENTS

1.0 INTRODUCTION

A number of data storage facility buildings have previously been developed and is operational on a site at the IDA Business Park, Snugborough Road, Abbotstown, Dublin 15. This assessment has been prepared to inform the planning permission for the development of the building extension to the existing Hexagon building and considers the potential noise impact of the installation of building services plant associated with the building that will operate on a day to day basis and the operation of generator units in an emergency scenario. The lands in question fall under to jurisdiction of Fingal County Council (FCC).

The site in question is illustrated in Figure 1 below. The nearest residential noise sensitive locations are located to the north west of the development along Ballycoolin Road at a distance of approximately 120m from the nearest site buildings. There are also residential dwellings to the south-east of the site along Ballycoolin Road, to the south of the site within the Westway and Sheephill estates and to the west of the site along Blanchardstown Road North. In addition, there are a number of commercial and industrial operations located on lands to the north, east, south and west of the site.

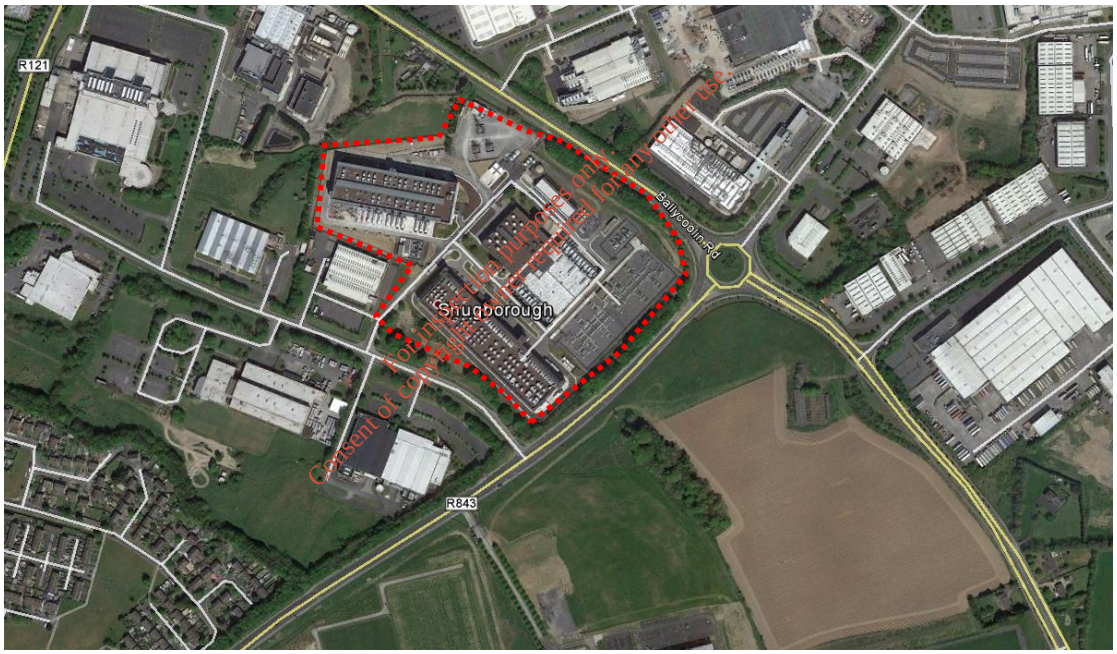

Figure 1 Site Location & Context

As part of the overall development of the site there is a requirement for the installation of additional building services plant. This report has been commissioned in order to assess the potential noise impact of these new elements of the site infrastructure. The assessment detailed in this report considers the following methodology:

- Review of the relevant planning conditions in relation to noise associated with the site and application of a suitable noise criterion for the proposed extension.
- Assessment of the proposed development through the development of a detailed 3D noise model of the site and adjoining noise sensitive locations.
- Specification of remedial measures (if required).

A glossary of the acoustic terminology used throughout this report has been presented in Appendix A.

2.0 FUNDAMENTALS OF ACOUSTICS

In order to provide a broader understanding of some of the technical discussion in this report, this section provides a brief overview of the fundamentals of acoustics and the basis for the preparation of this noise assessment.

A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. In order to take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB).

The audible range of sounds expressed in terms of Sound Pressure Levels is 0dB (for the threshold of hearing) to 120dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3dB.

The frequency of sound is the rate at which a sound wave oscillates, and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. Several weighting mechanisms have been proposed but the 'A-weighting' system has been found to provide one of the best correlations with perceived loudness. SPL's measured using 'A-weighting' are expressed in terms of dB(A). An indication of the level of some common sounds on the dB(A) scale is presented in Figure 2.

The 'A' subscript denotes that the sound levels have been A-weighted. The established prediction and measurement techniques for this parameter are well developed and widely applied. For a more detailed introduction to the basic principles of acoustics, reference should be made to an appropriate standard text[1].

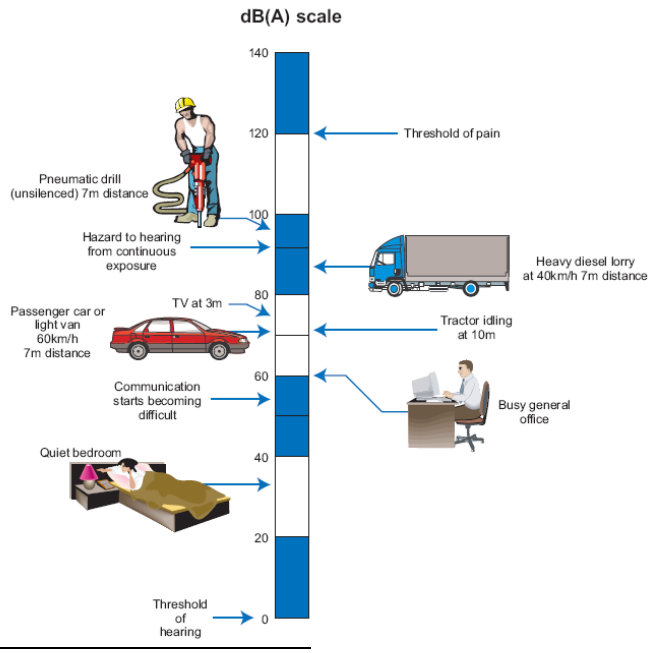

Figure 2
Level of Typical Common Sounds on the dB(A) Scale – (*NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004*)

[1] For example, *Woods Practical Guide to Noise Control* by Ian Sharland.

3.0 NOISE CONDITION

Based on discussion with Fingal County Council the following noise criteria interpretation is applied to the site:

8. The applicant shall conform to the requirements of the Planning Authority thus.

(a) The following limit values for noise shall not be exceeded at the nearest residential noise sensitive locations to the site for day to day normal operations,

- *Daytime (07:00 to 19:00hrs)* *50dB $L_{Ar,15min}$;*
- *Evening (19:00 to 23:00hrs)* *45dB $L_{Ar,15min}$;*
- *Night-time (23:00 to 07:00hrs)* *40dB $L_{Aeq,15min}$*

(b) During daytime and evening periods rigorous efforts shall be made to avoid clearly audible tones and impulsive noise at all sensitive locations.

(c) During night-time period no tonal or impulsive noise from the facility shall be clearly audible or measureable at any noise sensitive location (EPA, Guidance Note for Noise (NG4), April 2012).

(d) The following limit values for noise shall not be exceeded at the nearest commercial locations to the site for day to day normal operations,

- *Commercial Properties* *55dB $L_{Aeq,15min}$;*

(e) In terms of emergency operations where generator units are in operation off site noise levels at the nearest noise sensitive residential locations shall not exceed 50dB $L_{Aeq,15min}$.

Day to Day A review of the noise assessment submitted in relation to the planning application for the existing buildings confirms that the predicted noise levels at the nearest noise sensitive locations are the order of 40dB(A). Therefore, in order to not increase these levels further the contribution of the mechanical plant associated with the extension shall not exceed **30dB $L_{Aeq,15min}$**.

Emergency Also in terms of emergency operations the predicted noise levels at the nearest noise sensitive locations are the order of 50dB(A). Therefore, in order to not increase these levels further the contribution of the mechanical plant and additional generators associated with the extension shall not exceed **40dB $L_{Aeq,15min}$**.

4.0 NOISE MODEL DEVELOPMENT

As part of the previous planning applications detailed 3D noise models were developed in order to predict the noise impact associated with the existing buildings on the Hexagon Building campus. This model has been updated to reflect the proposed extension under consideration here. The following sections outline the details of the noise modelling software and modelling methodology.

4.1 Noise Propagation Calculation

Brüel & Kjær Predictor Type 7810 is a proprietary noise calculation package for computing noise levels in the vicinity of industrial sites. Calculations are based on *ISO9613-2:1996 Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation*. This method has the scope to take into account a range of factors affecting the sound propagation, including:

- the magnitude of the noise source in terms of sound power;
- the distance between the source and receiver;
- the presence of obstacles such as screens or barriers in the propagation path;
- the presence of reflecting surfaces;
- the hardness of the ground between the source and receiver;
- attenuation due to atmospheric absorption, and;
- meteorological effects such as wind gradient, temperature gradient, humidity (these have significant impact at distances greater than approximately 400m).

Calculations have been performed in octave bands from 63Hz to 8kHz as well as in overall dB(A) terms.

4.2 Brief Description of ISO9613-2: 1996

ISO9613-2:1996 calculates the noise level based on each of the factors discussed previously in Section 4.1. However, the effect of meteorological conditions is significantly simplified by calculating the average downwind sound pressure level, $L_{AT}(DW)$, for the following conditions:

- wind direction at an angle of ±45° to the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and;
- wind speed between approximately 1ms^{-1} and 5ms^{-1}, measured at a height of 3m to 11m above the ground.

The equations and calculations also hold for average propagation under a well-developed moderate ground based temperature inversion, such as commonly occurs on clear calm nights. The basic formula for calculating $L_{AT(DW)}$ from any point source at any receiver location is given by:

$$L_{fT}(DW) = L_W + D_c - A \qquad \textit{Eqn. 4.2.1}$$

Where:

$L_{fT}(DW)$	is an octave band centre frequency component of $L_{AT(DW)}$ in dB relative to 2x10^{-5}Pa;
L_W	is the octave band sound power of the point source;
D_c	is the directivity correction for the point source;
A	is the octave band attenuation that occurs during propagation, namely attenuation due to geometric divergence, atmospheric absorption, ground effect, barriers and miscellaneous other effects.

The estimated accuracy associated with this methodology is shown in Table 1 below:

Height, h*	Distance, d†	
	0 < d < 100m	100m < d < 1,000m
0<h<5m	±3dB	±3dB
5m<h<30m	±1dB	±3dB

Table 1 Estimated Accuracy for Broadband Noise of L_{AT}(DW)

* h is the mean height of the source and receiver.
† d is the mean distance between the source and receiver.

N.B. These estimates have been made from situations where there are no effects due to reflections or attenuation due to screening.

4.3 Initial Configuration of the Noise Model

The input to the noise model was an overall site plan, a set of buildings and noise sources. The buildings in the model were restricted to those on the development site, adjacent buildings and nearby noise sensitive locations. The ground model is assumed to be flat as site inspections confirmed that there is no significant undulation in the land between the site under assessment and the nearby noise sensitive locations.

Each noise source was input as sound power in octave bands. The Brüel & Kjær Predictor software accepts sound power levels in octave bands from 63Hz to 8kHz.

The noise levels are based on conditions that would be expected on a standard summer's evening when cooling demands would be high.

Each source also has its own position, height and directivity.

In terms of the calculation, a ground attenuation factor (general method) of 1.0 and no metrological correction were assumed for all calculations. Figure 3 (overleaf) illustrates a 3D representation of the developed noise model.

The following atmospheric attenuation was assumed for all calculations.

Temp (°C)	% Humidity	Octave Band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
10	70	0.12	0.41	1.04	1.92	3.66	9.70	33.06	118.38

Table 2 Atmospheric Attenuation Assumed for Noise Calculations (dB per km)

4.4 Output of the Noise Model

Predicted noise levels are calculated for a set of receiver points, which can be chosen by the user. The results include an overall level in dB(A) and an A-weighted spectrum for each item in a list of the contributing sources. The items in the list can be ranked in order of their contribution, and thus the noisiest items can be identified.

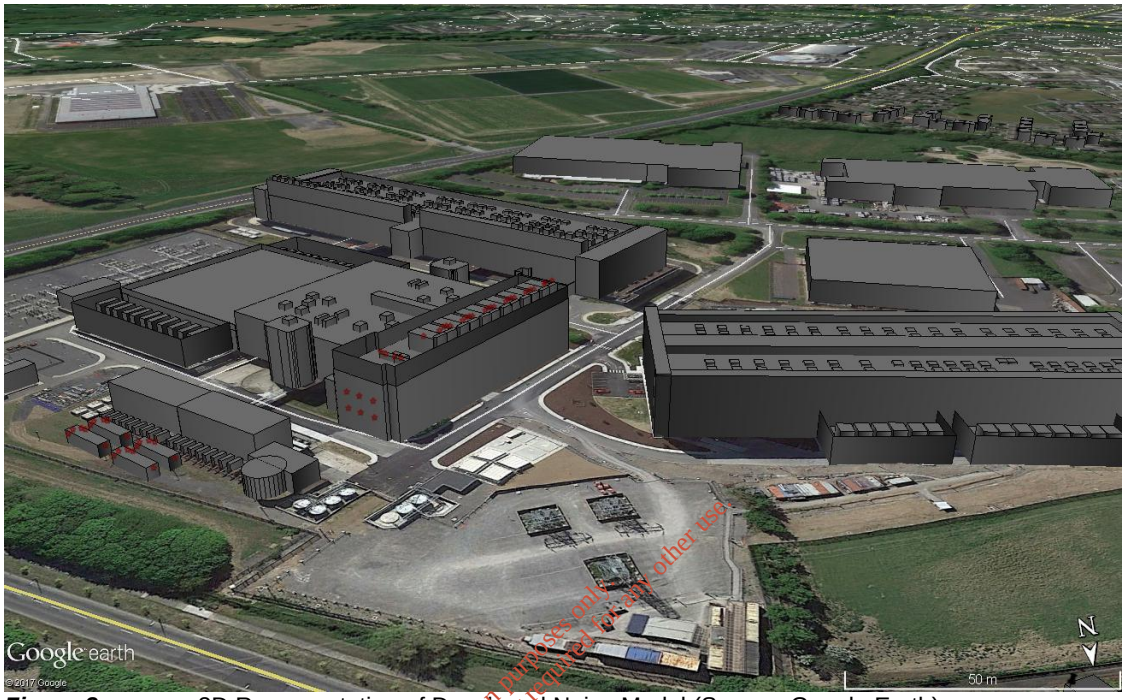

Figure 3 3D Representation of Developed Noise Model (Source: Google Earth)

5.0 NOISE ASSESSMENT

5.1 Additional Noise Sources

5.1.1 Roof Top AHU

Data has been supplied[2] and reviewed. The A weighted sound pressure levels presented in the supplied document have been corrected to linear sound power levels for inclusion in the noise model. Table 3 presents the noise data assumed for this updated assessment.

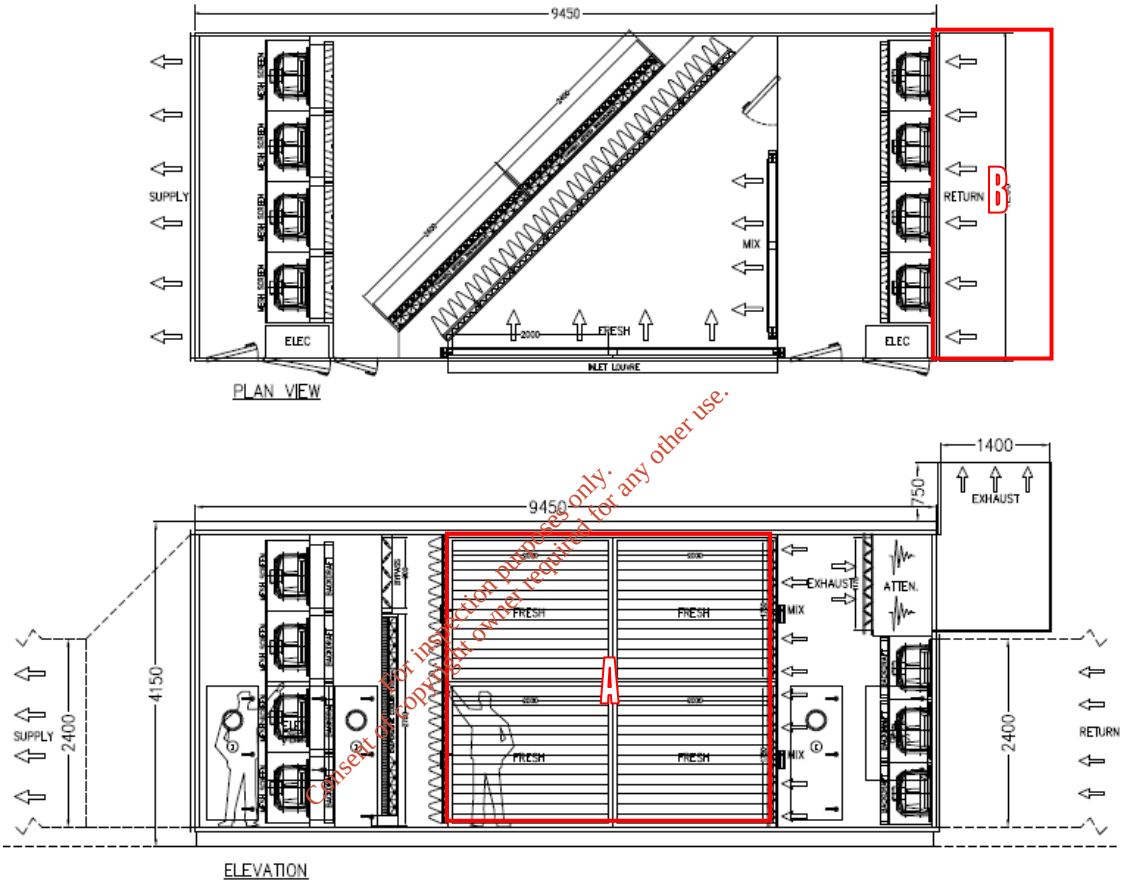

Figure 4 Roof Top AHU Plant

Source	L_w - Octave Band Centre Frequency								dB (A)
	63	125	250	500	1k	2k	4k	8k	
A – Intake	83	87	84	79	77	73	66	57	82
B – Exhaust	79	83	79	75	72	68	61	53	78

Table 3 L_w levels Utilised in Noise Model – AHU Plant

It is assumed that casing noise breakout from these plant items is not significant and this is confirmed by the supplied data.

[2] Q17-AMAZON-CONCEPT ROOF AHU - SOUND DETAILS - 21-11-2017

5.1.2 ER/Catcher Room AHU (CRAH Unit)

Based on data supplied in the supplied Dannan report "ER/Catcher Room Air Handling Unit – (CRAH Unit) the following noise data has been assumed here:

Source	L_w - Octave Band Centre Frequency								dB (A)
	63	125	250	500	1k	2k	4k	8k	
C – Intake	65	75	76	71	63	60	53	48	72

Table 4 L_w levels Utilised in Noise Model – CRAH Unit

Based on a review of drawings 6 CRAH units have been considered as illustrated in Figure 5.

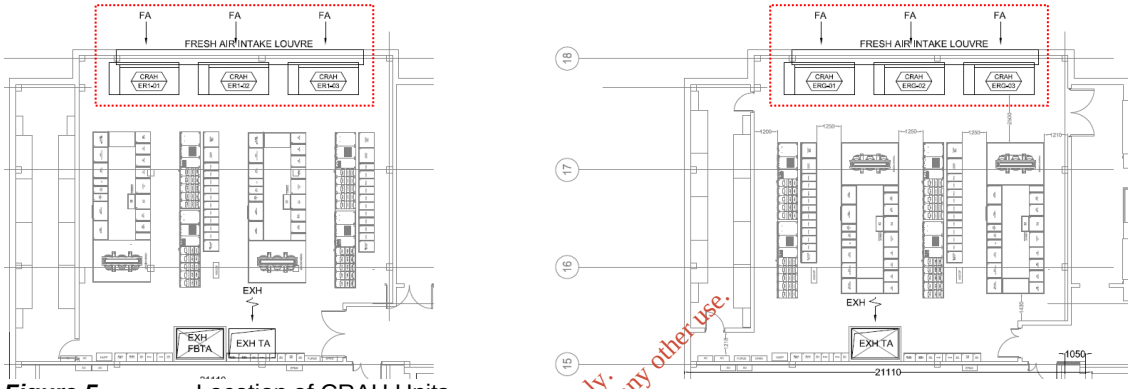

Figure 5 Location of CRAH Units

5.1.3 Extract Fans

Four extract fans have been assumed on roof level with the L_w level as per Talbe 5.

Source	L_w - Octave Band Centre Frequency								dB (A)
	63	125	250	500	1k	2k	4k	8k	
D – Extract	68	70	72	80	71	78	73	66	84

Table 5 L_w levels Utilised in Noise Model – Extract Fans

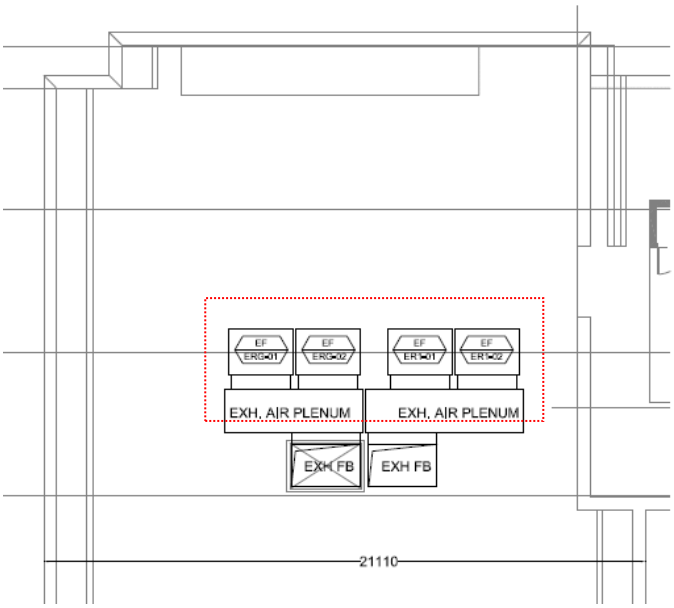

Figure 6 Location of Extract Fans

5.1.4 Emergency Generators

Four emergency generators are considered and located as per Figure 7. Table 6 outlines the assumed L_w data for the units which is based on generator units associated with Building B corrected to achieve a level of 80dB(A) at 1m from all sides and across the roof of the units.

Source	L_{wA} - Octave Band Centre Frequency								dB (A)
	63	125	250	500	1k	2k	4k	8k	
E – Roof	93	87	91	85	83	85	80	77	93
F – Side (x2)	95	89	94	88	86	88	81	76	93
G – Front	90	84	89	83	80	82	76	70	88
H – Rear	90	84	89	83	80	82	76	70	88

Table 6 L_w levels Utilised in Noise Model – Generator Units

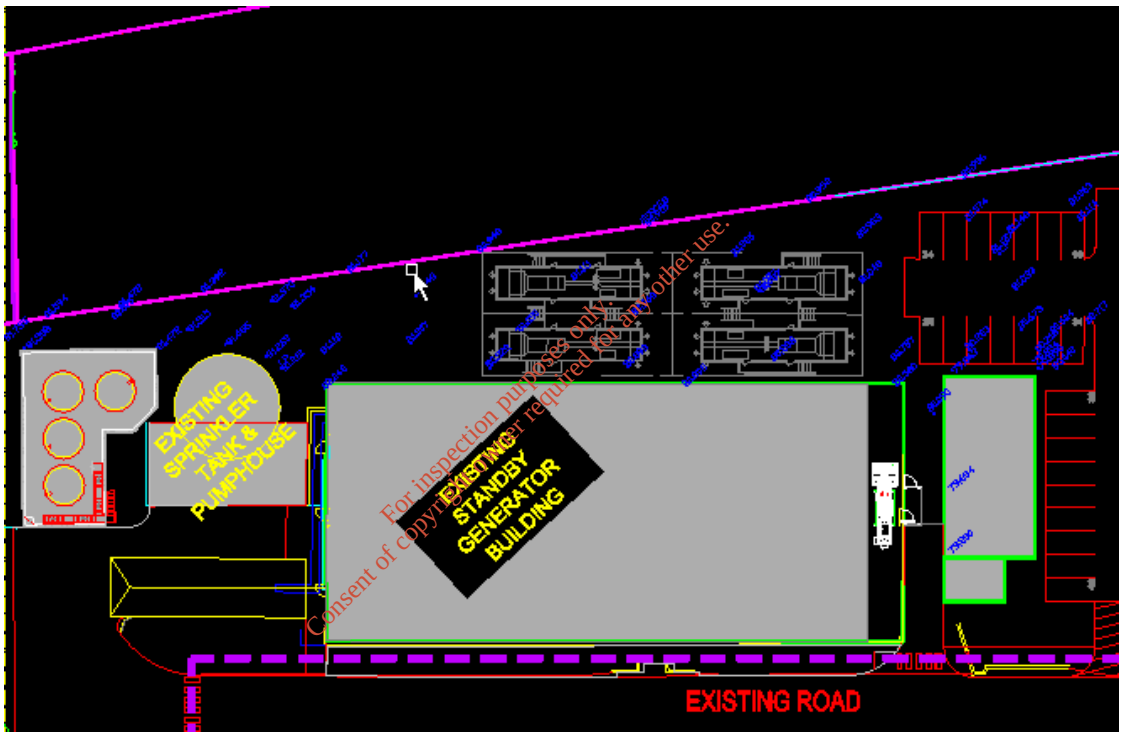

Figure 7 Location of Generator Units

5.2 Receiver Locations

Figure 8 (Page 16) identities the receiver locations that noise predictions have been prepared for. Note all predictions have been made to first floor level of nearby residences as have noise contours presented within this report (i.e. 4m above ground level).

5.3 Assessment of Development

Based on the information supplied in the previous sections Tables 7 and 8 present the predicted noise levels at the receptor locations identified for Day to Day and Emergency scenarios respectively.

5.3.1 Day to Day Scenario

Location	Co – Ordinates		Reference	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,15min}$	Complies?
	N	E				
R01	308,809	240,762	Ballycoolin Rd NW of Site	29	30	✓
R02	308,823	240,758		30		✓
R03	308,806	240,738		30		✓
R04	309,603	240,243	Ballycoolin Rd East of Site	19		✓
R05	309,603	240,159		18		✓
R06	309,617	240,126		18		✓
R07	309,548	240,111		19		✓
R08	308,622	240,107	Westway and Sheephill Estates	22		✓
R09	308,588	240,142		23		✓
R10	308,532	240,172		22		✓
R11	308,517	240,184		22		✓
R12	308,493	240,216		22		✓
R13	308,487	240,240		21		✓
R14	308,471	240,251		21		✓
R15	308,446	240,242		21		✓
R16	308,402	240,263		20		✓
R17	308,367	240,268		20		✓
R18	308,334	240,310		20		✓
R19	308,289	240,328		20		✓
R20	308,217	240,362		19		✓
R21	308,195	240,368		18		✓
R22	308,198	240,496	Blanchardstown Rd North	19		✓
R23	308,225	240,531		19		✓

Table 7 Predicted Noise Levels from Proposed Extension (Extension Specific) – Day to Day

Predicted noise levels from the proposed extension satisfy the 30dB $L_{Aeq,15min}$ criterion at all locations assessed for Day to Day operations.

5.3.2 Emergency Scenario

Location	Co – Ordinates		Reference	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,15min}$	Complies?
	N	E				
R01	308,809	240,762	Ballycoolin Rd NW of Site	38	40	✓
R02	308,823	240,758		40		✓
R03	308,806	240,738		37		✓
R04	309,603	240,243	Ballycoolin Rd East of Site	28		✓
R05	309,603	240,159		25		✓
R06	309,617	240,126		25		✓
R07	309,548	240,111		25		✓
R08	308,622	240,107	Westway and Sheephill Estates	23		✓
R09	308,588	240,142		23		✓
R10	308,532	240,172		23		✓
R11	308,517	240,184		23		✓
R12	308,493	240,216		23		✓
R13	308,487	240,240		23		✓
R14	308,471	240,251		22		✓
R15	308,446	240,242		22		✓
R16	308,402	240,263		21		✓
R17	308,367	240,268		21		✓
R18	308,334	240,310		21		✓
R19	308,289	240,328		21		✓
R20	308,217	240,362		20		✓
R21	308,195	240,368		20		✓
R22	308,198	240,496	Blanchardstown Rd North	21		✓
R23	308,225	240,531		22		✓

Table 8 Predicted Noise Levels from Proposed Extension (Extension Specific) – Emergency

Predicted noise levels from the proposed extension satisfy the 40dB $L_{Aeq,15min}$ criterion at all locations assessed for Emergency operations.

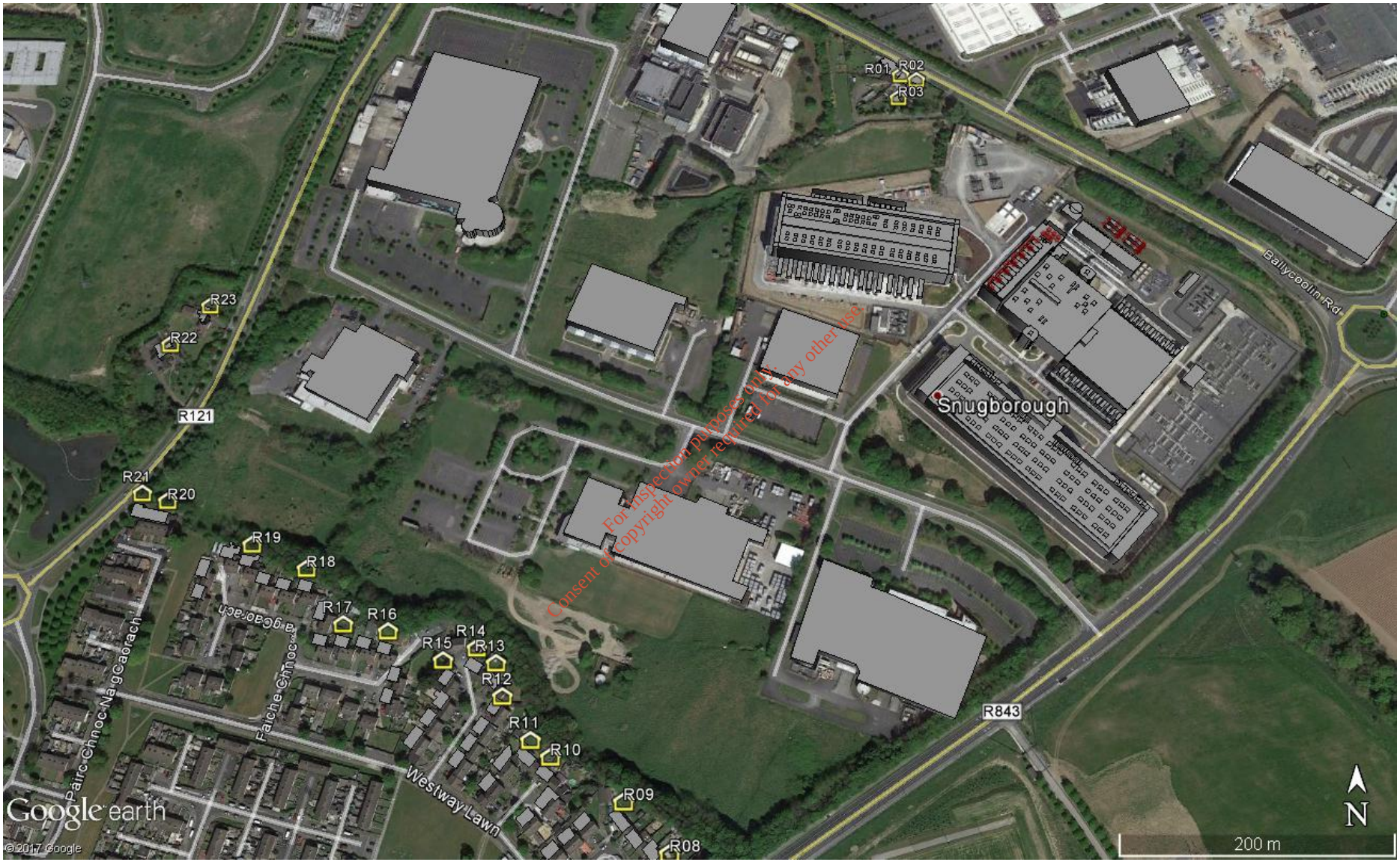

Figure 8 Noise Assessment Locations (Source: Google Earth)

6.0 DISCUSSION

6.1 Day to Day Operations

The predicted day to day scenario noise levels are within the adopted design goal at all the residential locations assessed. Figure 9 (Page 18) presents a noise contour of the wider area that illustrates the noise impact associated with the extension project under consideration here. Predicted noise levels from the extension range from 18 to 30dB $L_{Aeq,15min}$. All predicted levels comply with the extension specific noise criterion of 30dB $L_{Aeq,15min}$.

The predicted noise levels associated with the overall site are presented in the original planning application noise assessment Ref: DK/15/9583NR02a. Table 9 reviews the cumulative levels for the site considering the contribution from the proposed extension and compares the cumulative levels to the site criterion of 40dB $L_{Aeq,15min}$.

Location	Reference	Extension Predicted dB $L_{Aeq,T}$	Overall Site Predicted dB $L_{Aeq,T}$	Cumulative Site Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,15min}$	Complies?
R01	Ballycoolin Rd NW of Site	29	39	39	40	✓
R02		30	39	40		✓
R03		30	40	40		✓
R04	Ballycoolin Rd East of Site	19	31	31		✓
R05		18	31	31		✓
R06		18	31	31		✓
R07		19	31	31		✓
R08	Westway and Sheephill Estates	22	35	35		✓
R09		23	35	35		✓
R10		22	34	34		✓
R11		22	34	34		✓
R12		22	35	35		✓
R13		21	35	35		✓
R14		21	35	35		✓
R15		21	34	34		✓
R16		20	34	34		✓
R17		20	34	34		✓
R18		20	34	34		✓
R19		20	33	33		✓
R20		19	32	32		✓
R21		18	32	32		✓
R22	Blanchardstown Rd North	19	32	32		✓
R23		19	32	32		✓

Table 9 Assessment of Predicted Cumulative Noise Levels – Day to Day

All predicted levels comply with the adopted criterion of 40dB $L_{Aeq,15min}$.

Figure 9 Predicted Noise Contour – Day to Day Operation (Source: Google Earth)

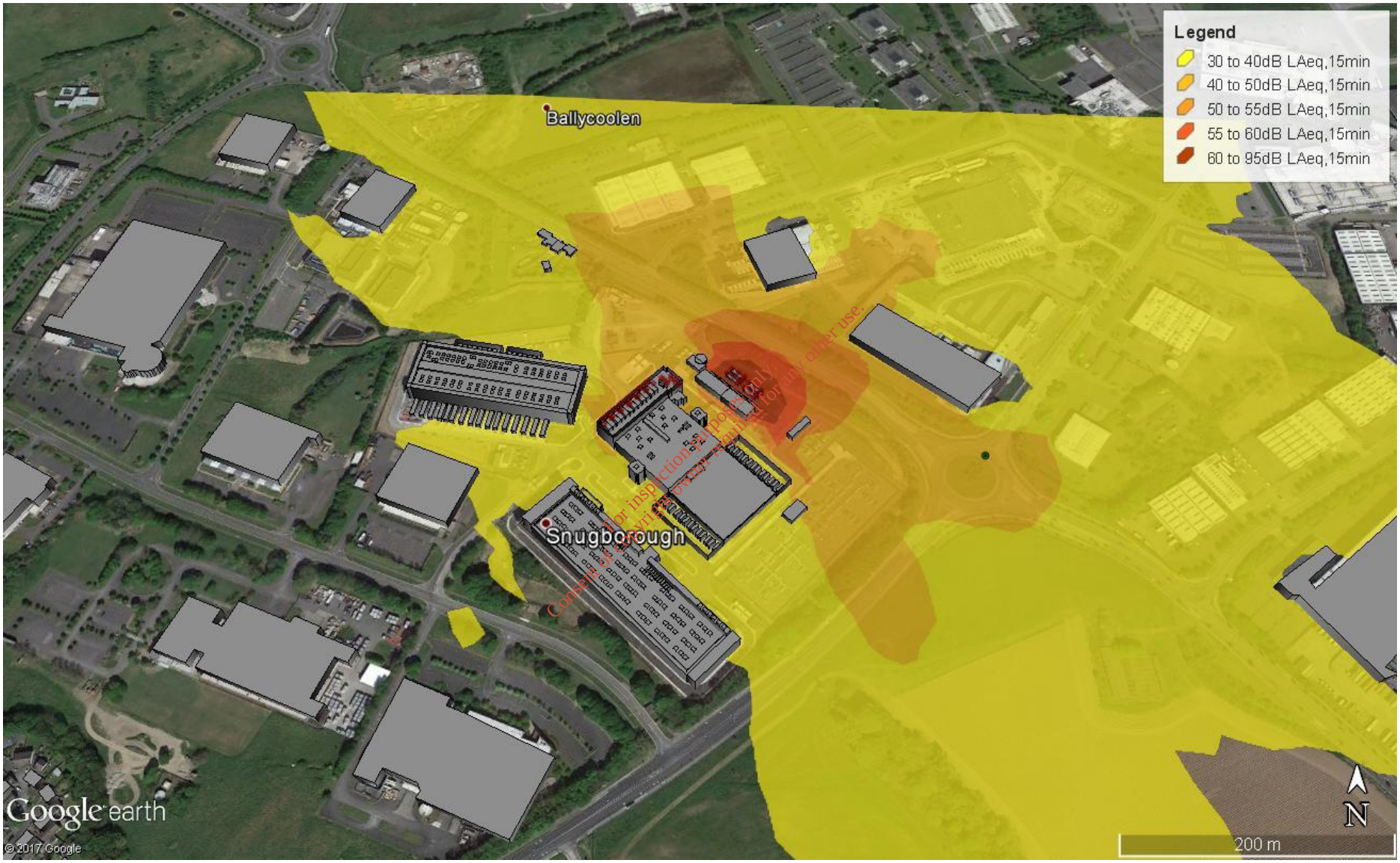

Figure 10 Predicted Noise Contour – Emergency Operation (Source: Google Earth)

6.2 Emergency Operations

The predicted emergency scenario noise levels are within the adopted design goal at all the residential locations assessed. Figure 10 (Page 19) presents a noise contour of the wider area that illustrates the noise impact associated with the extension project under consideration here. Predicted noise levels from the extension range from 31 to 40dB $L_{Aeq,15min}$. All predicted levels comply with the extension specific noise criterion of 40dB $L_{Aeq,15min}$ for emergency operations.

The predicted noise levels associated with the overall site under emergency operations are presented in the original planning application noise assessment Ref: DK/15/9583NR01. Table 10 reviews the cumulative levels for the site considering the contribution from the proposed extension and compares the cumulative levels to the site criterion of 50dB $L_{Aeq,15min}$.

Location	Reference	Extension Predicted dB $L_{Aeq,T}$	Overall Site Predicted dB $L_{Aeq,T}$	Cumulative Site Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,15min}$	Complies?
R01	Ballycoolin Rd NW of Site	38	50	50	50	✓
R02		40	50	50		✓
R03		37	50	50		✓
R04	Ballycoolin Rd East of Site	28	40	40		✓
R05		25	39	39		✓
R06		25	39	39		✓
R07		25	39	39		✓
R08	Westway and Sheephill Estates	23	40	40		✓
R09		23	40	40		✓
R10		23	40	40		✓
R11		23	40	40		✓
R12		23	40	40		✓
R13		23	40	40		✓
R14		22	40	40		✓
R15		22	40	40		✓
R16		21	40	40		✓
R17		21	41	41		✓
R18		21	40	40		✓
R19		21	40	40		✓
R20		20	38	38		✓
R21		20	38	38		✓
R22	Blanchardstown Rd North	21	38	38		✓
R23		22	39	39		✓

Table 10 Assessment of Predicted Cumulative Noise Levels – Operational

All predicted levels comply with the adopted criterion of 50dB $L_{Aeq,15min}$.

7.0 CONCLUSIONS

A number of data storage facility buildings have previously been developed and is operational on a site at the IDA Business Park, Snugborough Road, Abbotstown, Dublin 15. This assessment has been prepared to inform the planning permission for the development of an extension to the Hexagon building and considers the potential noise impact of the installation of building services plant associated with the extension that will operate on a day to day basis. The lands in question fall under to jurisdiction of Fingal County Council (FCC).

Due to the continuous nature of site operations, noise emissions have been assessed based on the background noise levels monitored during night-time periods prior to development on the site. The criteria have been based on historical surveys before the development of the original facility in order to give due consideration of the issue of 'background creep'. The target criteria for cumulative site noise emissions has been proposed as 40dB $L_{Aeq,15min}$. To date the development of the existing site operations and the building has predicted levels of the order of 40dB $L_{Aeq,15min}$ at the nearest noise sensitive properties. Therefore, in order not to increase these levels a design goal for the extension of **30dB $L_{Aeq,15min}$** has been adopted.

Also in terms of emergency operations the predicted noise levels at the nearest noise sensitive locations are the order of 50dB(A). Therefore, in order to not increase these levels further the contribution of the mechanical plant and additional generators associated with the extension shall not exceed **40dB $L_{Aeq,15min}$**.

Noise levels have been predicted to the nearest noise sensitive locations from the installation (i.e. private residences on Ballycoolin Road and within the Westway and Sheephill estates) Twenty-three assessment locations have been considered. The installation of mechanical plant associated with the proposed extension has been considered, as has the operation of generators under emergency conditions.

Day to Day The predicted noise levels from the day to day site operations of the proposed extension are in the range of 18 to 30dB $L_{Aeq,T}$. The predicted noise levels are at least 10dB(A) below the predicted noise levels associated with the overall operations on the site and the cumulative predicted noise levels satisfy the criteria that are associated with the development.

Emergency The predicted noise levels from the day to day site operations of the proposed extension are in the range of 31 to 40dB $L_{Aeq,T}$. The predicted noise levels are at least 10dB(A) below the predicted noise levels associated with the overall emergency operations on the site and the cumulative predicted noise levels satisfy the criteria that are associated with the development.

APPENDIX A
GLOSSARY OF ACOUSTIC TERMINOLOGY

ambient noise — The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.

background noise — The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).

broadband — Sounds that contain energy distributed across a wide range of frequencies.

dB — Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 μPa).

dB L_{pA} — An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

Hertz (Hz) — The unit of sound frequency in cycles per second.

impulsive noise — A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.

$L_{Aeq,T}$ — This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T).The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.

L_{AFN} — The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.

L_{AFmax} — is the instantaneous slow time weighted maximum sound level measured during the sample period (usually referred to in relation to construction noise levels).

$L_{Ar,T}$ — The Rated Noise Level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and impulsiveness of the sound.

L_{AF10} — is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

APPENDIX A
GLOSSARY OF ACOUSTIC TERMINOLOGY (Continued)

L_{AF90} — Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.

L_{AT}(DW) — equivalent continuous downwind sound pressure level.

L_{fT}(DW) — equivalent continuous downwind octave-band sound pressure level.

low frequency noise — LFN - noise which is dominated by frequency components towards the lower end of the frequency spectrum.

noise — Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise.

noise sensitive location — NSL – Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.

octave band — A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.

rating level — See $L_{Ar,T}$.

sound power level — The logarithmic measure of sound power in comparison to a referenced sound intensity level of one picowatt (1pW) per m^2 where:

$$Lw = 10Log\frac{P}{P_0} \text{ dB}$$

Where: p is the rms value of sound power in pascals; and
P_0 is 1 pW.

sound pressure level — The sound pressure level at a point is defined as:

$$Lp = 20Log\frac{P}{P_0} \text{ dB}$$

APPENDIX A
GLOSSARY OF ACOUSTIC TERMINOLOGY (Continued)

specific noise level	A component of the ambient noise which can be specifically identified by acoustical means and may be associated with a specific source. In BS 4142, there is a more precise definition as follows: 'the equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval ($L_{Aeq, T}$)'.
tonal	Sounds which cover a range of only a few Hz which contains a clearly audible tone i.e. distinguishable, discrete or continuous noise (whine, hiss, screech, or hum etc.) are referred to as being 'tonal'.
$^1/_3$ octave analysis	Frequency analysis of sound such that the frequency spectrum is subdivided into bands of one–third of an octave each.