

Digital Netherlands VIII B.V.
(Netherlands)

INXN DUB15/16

Noise Impact Assessment

Issue 1 | 29 July 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Appendix A

Plan layout of Proposed Development

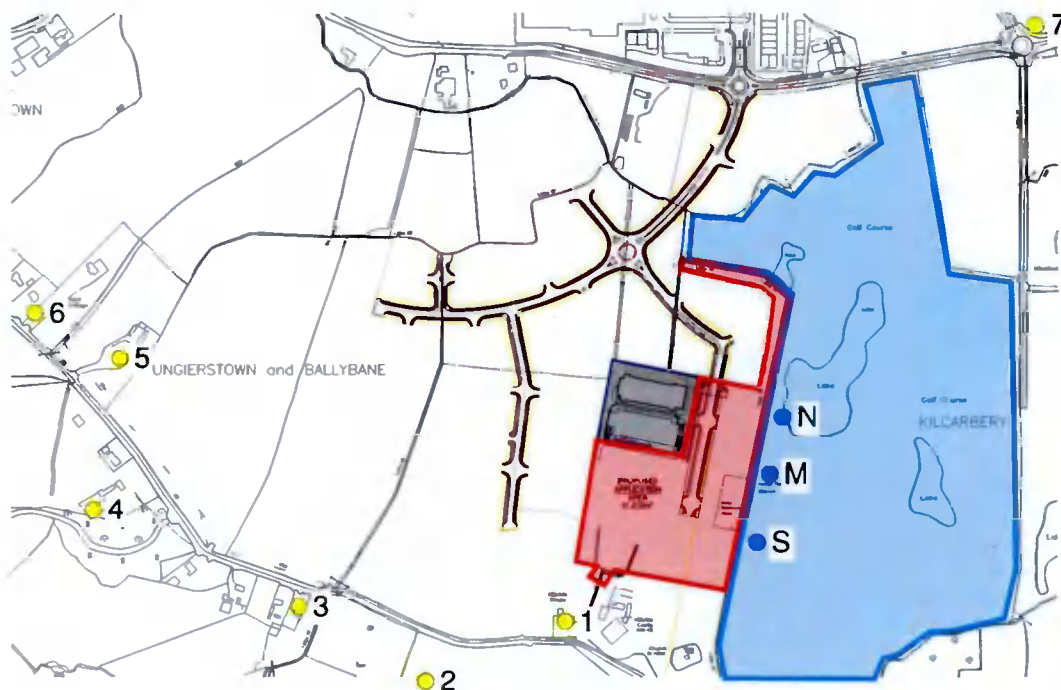
Executive Summary

Digital Netherlands VIII B.V. (Netherlands) is proposing an extension to the existing facility at Profile Park (DUB13/14) that will incorporate:

- Two new data centre buildings – DUB 15 and DUB 16, with associated office blocks and cooling plant
- An energy centre with gas turbines to power the Proposed Development
- Diesel generator yards to provide emergency power to the Proposed Development

Arup has been commissioned to undertake a Noise Assessment of the Proposed Development.

The Proposed Development (in red) is located directly adjacent to Grange Castle Golf Course (in blue), and nearby to several residential receptors (in yellow), as illustrated in the figure below.



To better understand the baseline acoustic environment, Arup undertook noise measurements to the south of the Proposed Development, close to the nearest noise sensitive receptor. The measured night-time noise levels were lower than measurements undertaken for other developments in the vicinity and may result in unreasonably low noise limits for the Proposed Development should the baseline be taken into account when determining noise limits.

Noise limits for the Proposed Development are based on the *Dublin Agglomeration Action Plan Relating to The Assessment and Management of Environmental Noise, December 2018 – November 2023 (Noise Action Plan) Volume 4 South Dublin County Council (SDCC Noise Action Plan)*, the

recommended internal levels in the *South Dublin County Council Noise Control Pre Planning Guidance* (SDCC Pre-Planning Guidance), and the including EPA Office of Environmental Enforcement (OEE) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* (EPA NG4). The SDCC Noise Action Plan has been prepared in accordance with the requirements of the Environmental Noise Regulations 2006, Statutory Instrument 140 of 2006. These regulations give effect to the EU Directive 2002/49/EC relating to the assessment and management of environmental noise.

Noise limits for other developments in the vicinity of the Proposed Development have been based on measured baseline levels. If noise limits were proposed based on measured baseline levels for the Proposed Development, it would result in unreasonably low night-time noise limits that would not be achievable. For this reason, noise limits that are aligned with the SDCC Noise Action Plan are proposed.

The proposed noise limits are presented in the table below.

Time period	Proposed Limit	Comment
Day/evening 07:00 – 23:00	55 dBL _{Aeq,1hr}	Based on limits in EPA NG4, SDCC Noise Action Plan, and existing measured noise levels at NMT1
Night 23:00 – 07:00	40 dBL _{Aeq,1hr}	Based on levels in EPA NG4, SDCC Noise Action Plan, the SDCC Pre-Planning Guidance and existing measured noise levels at NMT1
Emergency operations – residential receptors	60 dBL _{Aeq,1hr}	Based on guidance in EPA NG4
Emergency operations – amenity receptors	65 dBL _{Aeq,1hr}	Based on guidance in EPA NG4

Cumulative noise levels at sensitive receptors are also assessed against the significance criteria outlined in the table below.

Change in Sound Level (dB)	Subjective Reaction	Significance Level
None	No change	No change
<3	Inaudible	Imperceptible
4-5	Perceptible	Slight
6-10	Up to doubling of loudness	Moderate
11-15	Over a doubling of loudness	Significant
>16		Profound

Source: Based on a number of noise documents including EPA Guidelines, BS4142 and PPG24

3D noise modelling has been undertaken in SoundPLAN, considering the following scenarios:

- Scenario 1 – normal operation running 24 hours a day, powered by the gas turbines in the energy centre (assessed against night-time noise limits)
- Scenario 2 – emergency operation, powered by diesel generators (assessed against emergency noise limits)
- Scenario 3 – diesel generator testing running only during the day-time period, with only one diesel generator running, and the gas turbines in the energy centre running (assessed against day-time noise limits)

Noise modelling has shown that predicted noise levels will comply with limits at nearby noise sensitive receptors.

There is expected to be a significant impact on one receptor during Scenario 2 (emergency conditions). Emergency conditions are not expected to occur regularly, frequently, or for long periods of time. For this reason, the significant noise impact during emergency conditions is not expected to negatively impact the general acoustic amenity of the receptor.

1 Introduction

Arup has been commissioned by Digital Netherlands VIII B.V. (Netherlands) to undertake a noise impact assessment of the proposed extension to the existing data centre at Profile Park (the 'Proposed Development'). The location of the Proposed Development is within the South Dublin County Council and is presented in Figure 1.

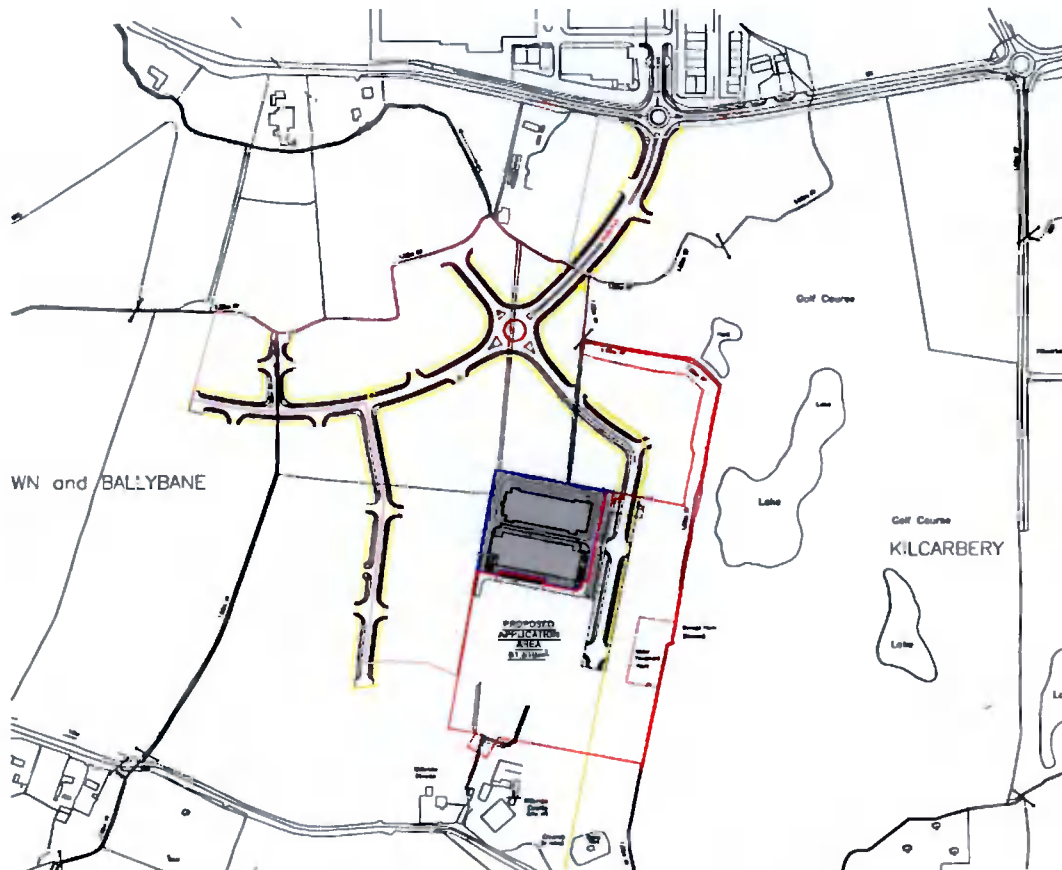


Figure 1: Location of proposed development (red line boundary) from B+R Architects

This report considers the Proposed Development in relation to the surrounding noise sensitive receptors, including nearby residents and adjacent Grange Castle Golf Course. Arup undertook noise measurements to quantify the existing acoustic environment near to the Proposed Development.

Predicted noise levels from the Proposed Development from a 3D noise model are assessed against proposed project noise limits derived from South Dublin County Council documents, and EPA guidance, considering the existing acoustic environment. Noise mitigation measures are recommended as necessary based on this assessment.

Operational phase vibration has not been considered in this report as none of the proposed plant at the Proposed Development is expected to impact any nearby sensitive receptors.

2 The Proposed Development

The Proposed Development will consist of 2 main data centre buildings (DUB 15 and DUB 16), supported by gas generators housed in energy centre buildings to the north, and emergency diesel generators in generator yards to the south and west of the main buildings. These are in addition to 2 existing data centre buildings on the site.

A masterplan of the site is presented in **Appendix A**.

The Proposed Development includes various pieces of mechanical plant that are considered in this noise assessment, including:

- Gas generators
- Emergency diesel generators
- Roof top chillers
- Roof top condensers
- Air handling units

2.1 Noise sensitive receptors

The EPA Office of Environmental Enforcement (OEE) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* (EPA NG4) provides the following definition for a noise sensitive location (NSL):

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.

There are several noise sensitive receptors near to the Proposed Development. The approximate locations of each are shown in **Figure 2**.

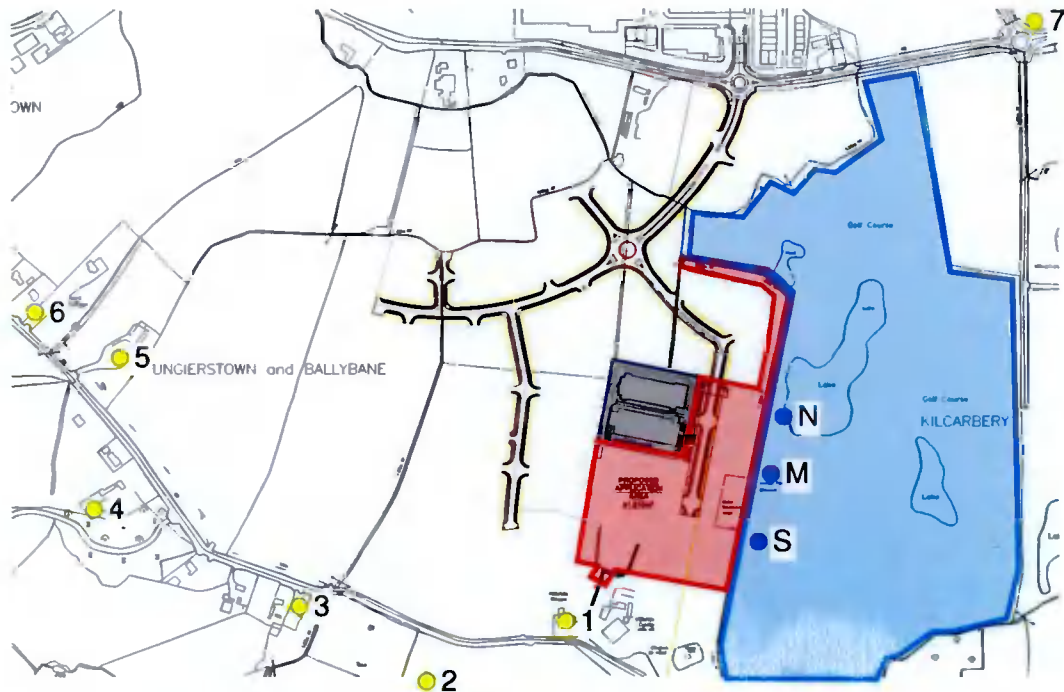


Figure 2: Noise sensitive receptors near the Proposed Development – residential in yellow, Grange Castle Golf Course in blue (from B+R Architects)

The closest residential noise sensitive receptor to the Proposed Development is the farmhouse to the south of the site, which is approximately 71 m south of the Proposed Development.

Grange Castle Golf Course is considered a noise sensitive receptor according to the EPA NG4 definition above.

The noise sensitive receptors are discussed in more detail in Section 3.4.4.

3 Assessment Methodology

3.1 Introduction

This report considers the existing baseline noise levels near the site of the Proposed Development, the predicted construction and operational noise levels of the Proposed Development and the impact of the predicted change in noise levels.

Operational mitigation measures applied in the design are incorporated into the model and detailed in this report. Construction mitigation measures are also described.

The following general methodology has been adopted for this assessment:

- Review of appropriate guidance, limits and significance criteria relative to the site operations (refer to Section 3.2)
- Baseline noise monitoring at the nearest noise sensitive receptors in proximity to the site to identify existing levels of noise near the Proposed Development (refer to Section 3.3)
- Development of a detailed 3D noise model to assess the impact of the operation of the Proposed Development (refer to Section 3.4) and prediction of construction noise levels
- Assessment of predicted impacts (construction and operation) including discussion of the predicted levels against the appropriate criteria and existing noise levels outlined and proposal of mitigation measures (refer to Section 4).

3.2 Relevant Guidance, Limits and Significance Criteria

3.2.1 Construction Phase Noise

Transport Infrastructure Ireland's (TII) Good Practice Guidance for the treatment of Noise during the planning of National Road Schemes (TII, 2014) sets out levels of acceptability for noise levels during the construction phase of developments.

These limits are outlined in **Table 1**.

Table 1: Good Practice Guidance for maximum noise levels at the façade of nearby dwellings during construction

Days and Times	$L_{Aeq}(1hr)$ dB	$L_{pAmax, slow}$ dB
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60	65
Saturday 08:00 to 16:30hrs	65	75
Sundays and Bank Holidays 08:00 to 16:30hrs	60	65

It should be noted that the noise criteria quoted in the table are specific to construction activities only (i.e., these levels are not cumulative with the existing noise environment from road traffic and other surrounding sources).

3.2.2 Operational Phase Noise

3.2.2.1 Planning conditions

The study site has been subject to a number of planning applications (listed below). The planning permission conditions associated with these applications have been reviewed with regard to noise emissions.

- **SD11A/0023** – Development of a data processing building on 4.04 ha site with 4 no. buildings. Application granted permission. Date of Final Grant 15 June 2011.
- **SD12A/0002** – Revisions and alterations to the permitted development SD11A/0023. Date of Final Grant 10 April 2012.
- **SD17A/0377** – Revisions and alterations of the permitted development of a data processing facility under planning Ref: SD12A/0002 on a 3.85 ha site. Date of Final Grant 15 December 2017.

SD11A/0023

Condition 12 of the planning conditions sets out the following in relation to noise emissions from the development:

- a) The L_{Aeq} over 15 minutes at the site shall not exceed 44 dB between the hours of 0700 and 2300 and shall not exceed 39 dB between 2300 and 0700.*
- b) All noise abatement measures as outlined within the noise assessment documentation submitted shall be implemented in full*
- c) Routine surveillance/maintenance shall be carried out to ensure that the sound from cooling units does not become tonal*
- d) Any ventilation of internal areas to the external air shall be achieved without causing a noise nuisance by use of splitters or other abatement techniques*

Reason: In the interest of public health

SD12A/0002

Condition 12 of the planning conditions sets out the following in relation to noise emissions from the development:

- a) The L_{Aeq} over 15 minutes at the site shall not exceed 42 dB (excluding periods of emergency power generation)*

- b) *All noise abatement measures detailed in the noise assessment documentation submitted to the Planning Authority shall be implemented in full*
- c) *Routine surveillance/maintenance shall be carried out to ensure that the sound from cooling units does not become tonal*
- d) *Any ventilation of internal area to the external air shall be achieved without causing a noise nuisance by use of splitters or other abatement techniques*
- e) *Standby generators shall only operate in the event of a power failure or for routine testing. Routine testing shall be carried out on weekdays between the hours of 10:00 and 17:00*

Reason: In the interest of public health and to prevent the creation of a noise nuisance.

SD17A/0377

Condition 9 of the planning conditions sets out the following in relation to noise emissions during the operation of the development as per planning Ref. SD17A/0377:

- a) *Noise due to normal operation of the proposed development, expressed as L_{Aeq} over 15 minutes at the façade of any noise sensitive location, shall not exceed the daytime background level i.e., 0700 to 1900 by more than 10 dB(A) and shall not exceed the background level for evening and night-time (currently 19:00 – 07:00) as determined in S.I. No. 140/2006 – Environmental Noise Regulations 2006*
- b) *Noise levels from the proposed development shall not be so loud, so continuous, so repeated, of such duration or pitch or occurring at such times to give reasonable cause for annoyance to a person in any residence, adjoining premises or public place in the vicinity.*
- c) *All mechanical plant and ventilation inlets and outlets should be sound insulated and/or fitted with sound attenuators as necessary to ensure that the noise level as expressed as L_{Aeq} over 15 minutes at 1 meter from the façade of any noise sensitive location does not exceed the background level by more than 10 dB(A) for daytime and shall not exceed the background level for evening and night-time (currently 19:00 – 07:00) as determined in S.I. No. 140/2006 – Environmental Noise Regulations 2006*

Reason: In the interest of public health by prevention of unacceptable levels of noise pollution which could interfere with normal sleep and rest patterns and/or when people could reasonably expect a level of quietness, and to uphold the Council's amenity policies set out in the by more than 10 dB(A) South Dublin County Development Plan.

3.2.2.2 Summary of Planning Conditions

Planning conditions relating the subject site all take into account the existing baseline noise levels at the site. The noise limits for these planning conditions are based on the measured background noise levels, and in general, night-time operations are restricted such that noise produced during the night-time period may not exceed the existing background noise levels.

3.2.2.3 Dublin Agglomeration Action Plan Relating to the Assessment and Management of Environmental Noise – December 2018 to November 2023 (Noise Action Plan) – Volume 4 South Dublin County Council

The *Dublin Agglomeration Action Plan Relating to The Assessment and Management of Environmental Noise, December 2018 – November 2023 (Noise Action Plan) Volume 4 South Dublin County Council* (SDCC Noise Action Plan) is a document published to provide guidance around avoiding, preventing, and reducing the harmful effects, including annoyance, arising from long term exposure to environmental noise.

The noise action plan sets out target and desirable low and undesirable high sound levels as follows:

- Desirable low sound levels:
 - < 50 dBA L_{night}
 - < 55 dBA L_{day}
- Undesirable high sound levels:
 - > 55 dBA L_{night}
 - > 70 dBA L_{day}
- Absolute values for defining a Quiet Area:
 - < 45 dBA L_{night}
 - < 55 dBA L_{day}
 - < 55 dBA L_{den}

L_{night} and L_{day} are the L_{eq} s across the day and night-time periods, and L_{den} is the L_{eq} across the day/evening/night period, with 5 dB added to the evening noise level, and 10 dB added to the night-time noise level to account for the lower noise levels during those times.

The SDCC Noise Action Plan has been prepared in accordance with the requirements of the Environmental Noise Regulations 2006, Statutory Instrument 140 of 2006. These regulations give effect to the EU Directive 2002/49/EC relating to the assessment and management of environmental noise.

Guidance in the noise action plan is usually considered for road traffic and rail noise, but is used to inform appropriate noise levels for the proposed development.

3.2.2.4 SDCC Noise Control Pre Planning Guidance

The South Dublin County Council has prepared a document with pre-planning guidance to assist with the decision of whether to prepare a detailed noise report for a planning application, called the *South Dublin County Council Noise Control Pre Planning Guidance* (SDCC Pre-Planning Guidance).

Recommended internal L_{Aeq} target levels for residential buildings (based on UK guidance) are provided in the guide and are presented in **Table 2**.

Table 2: Recommended internal noise levels based on UK guidance

Activity	Location	Day and Evening	Night (23:00 – 07:00)
Resting	Living room	35 dBL _{Aeq,16hr}	-
Dining	Dining room	40 dBL _{Aeq,16hr}	-
Sleeping	Bedroom	35 dBL _{Aeq,16hr}	30 dBL _{Aeq,8hr}

These internal noise levels are used as guidance for proposed external noise levels relating to the Proposed Development.

3.2.2.5 EPA Guidance

Noise limits set out in EPA Guidance documents, including the EPA Office of Environmental Enforcement (OEE) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* (EPA NG4), are outlined in **Table 3**. These limits are the recommended noise limit criteria from Table 1 of EPA NG4.

Table 3: EPA NG4 Recommended Noise Limit Criteria at Noise Sensitive Locations

Description	Limit ($L_{Aeq,1hr}$) dB
Day-time operation	55
Evening-time operation	50
Night-time operation	45

EPA NG4 as gives guidance around noise limits for emergency operation, including that noise criteria may be increased during emergency operations.

3.2.2.6 Significance Criteria

The potential noise impact due to the Proposed Development is assessed through the application of significance criteria. These are established by calculating the change in L_{Aeq} as a consequence of the operation of the Proposed Development compared to the baseline and categorising the significance (refer to **Table 4**).

Table 4: Changes in Noise Level ($L_{Aeq,1hr}$) – Significance Criteria

Change in Sound Level (dB)	Subjective Reaction	Significance Level
None	No change	No change
<3	Inaudible	Imperceptible
4-5	Perceptible	Slight
6-10	Up to doubling of loudness	Moderate
11-15	Over a doubling of loudness	Significant
>16		Profound

Source: Based on a number of noise documents including EPA Guidelines, BS4142 and PPG24

3.3 Baseline Noise Monitoring Methodology

3.3.1 Monitoring Locations

An environmental noise survey was undertaken to quantify the existing noise environment between 23 and 25 June 2021. The survey was conducted in general accordance with ISO 1996: Acoustics- Description, measurement and assessment of environmental noise (Part 1 & 2) (ISO, 2017) by Simon Grennan of Arup.

Noise monitoring was carried out at two locations at the closest noise sensitive receptor. These are:

- **NMT1** – located at the rear of the closest residential receptor to the south of the Proposed Development. This is approximately 70 m south of the Proposed Development.
- **NMT2** – located near the road, south of the nearest residential receptor to the Proposed Development.

The approximate locations of the noise monitors are shown in **Figure 3**.



Figure 3: Noise Monitoring Locations (image from Google Maps)

3.3.2 Instrumentation

Brüel & Kjær 2250 Light Type 1 Sound Level Meters were used to carry out the noise assessment. This type of meter complies with the International Electrotechnical Commission (IEC) Specification for Sound Level Meters: IEC 61672-1:2002 (IEC, 2002).

The calibration of the sound level meter was checked prior to the commencement and after the completion of the monitoring using a Brüel & Kjær 4231 Acoustic Calibrator. A windshield was used to provide the microphone with effective wind protection.

3.3.3 Weather Conditions

Weather conditions at the time of the noise survey were recorded by Met Éireann at the Casement weather station and are reported in **Table 8** and **Table 9** below.

3.3.4 Measurement Parameters

The following parameters were recorded to assess the impact of environmental noise:

- L_{Aeq} – A-weighted equivalent continuous steady sound level during the sample period, effectively representing an average value;
- L_{Amax} – maximum A-weighted sound pressure level occurring in a specified time period;
- L_{A10} – the A-weighted sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise; and
- L_{A90} – the A-weighted sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The “A” suffix denotes the fact that the sound levels have been “A-weighted” to account for the non-linear nature of human hearing.

Data was logged over 15 minute periods.

Day-time is defined as 07:00 to 23:00, and night-time is 23:00 to 07:00.

3.4 3D Noise Modelling Methodology

3.4.1 Introduction

Noise levels due to operation of the Proposed Development have been determined using the noise modelling software SoundPLAN (version 8.2).

The following inputs were included in the model:

- Ground type and elevation;
- Operational noise sources;
- Location of receptors; and
- The buildings and other structures.

3.4.2 Ground Type and Elevation

The surface type was input into the model based on satellite images from Google Maps.

It is assumed that there is no significant change in ground elevation over the site.

3.4.3 Emission Sources and Scenarios used for SoundPlan Modelling

The computer modelling has been based on the information, drawings, sketches and noise data provided by Arup in May 2021, and through discussions with equipment suppliers and mechanical engineers. Details were provided on the location and sound power level of each source at their expected operational rating.

3.4.3.1 Construction Phase

Two construction scenarios were modelled using SoundPLAN:

- Site preparation, including the following sources:
 - 2x tracked excavators
 - 2x dump trucks
 - 2x rollers
- Construction, including the following sources:
 - 1x piling rig
 - 2x cement trucks
 - 1x concrete vibrator
 - 1x tower crane
 - 1x wheeled excavator

It is assumed that all plant is operating 66 % of the time, and only during the day-time period. All plant is assumed to be operating simultaneously during each stage.

Construction noise source sound power levels are presented in **Table 5** and have been sourced from *BS 5228: Code of practice for noise and vibration control on construction and open sites – Part 1: Noise, Table C*.

Table 5: Noise emission data of plant for site preparation and construction phases

Noise Source	No. of units (total at DUB 15 + 16)	Sound Power Level (dB _{L,Aeq})	Octave Band Centre Frequency, Hz							
			63	125	250	500	1k	2k	4k	8k
Tracked excavator (loading dump truck)	2	113	110	106	110	109	109	106	100	92
Dump truck (empty)	2	115	114	107	107	107	107	112	97	88
Dozer towing roller	2	109	111	105	105	104	104	103	96	84
Vibratory piling rig	1	116	111	110	107	110	112	110	105	95
Cement mixer truck (discharging)	2	103	108	97	94	98	99	97	92	86
Poker vibrator	1	106	110	108	108	101	97	100	98	93
Tower crane	1	105	112	107	108	104	98	91	85	79
Wheeled excavator	1	111	115	112	108	109	106	103	97	95

3.4.3.2 Operational Phase

Three operational scenarios were modelled using SoundPLAN:

- Scenario 1 – normal operational conditions (24 hours a day)
 - Gas turbines in energy centre running 100% of the time
 - Diesel generators not running
- Scenario 2 – emergency operational conditions
 - Gas turbines in energy centre not running
 - Diesel generators running 100% of the time
- Scenario 3 – emergency generator testing (day-time only)
 - Gas turbines in energy centre running 100% of the time
 - One diesel generator running for 1 hour

The Proposed Development will operate on a 24 hour basis, and all equipment has been assumed to be operational simultaneously unless otherwise stated in the scenario descriptions above. Noise source sound power level data is provided in **Table 6**.

Overall broadband sound power levels are given for all equipment. Octave band sound power levels are given for equipment where it is known.

Table 6: Noise emission data of plant at maximum rating for operational phases

Noise Source	No. of units (total at DUB 15 + 16)	Sound Power Level (dB _{L,A,eq})	Octave Band Centre Frequency, Hz										
			63	125	250	500	1k	2k	4k	8k			
External air-cooled chiller - attenuated	64	63											
Air Handling Units Intake – Data Hall	16	51											
Air Handling Units Intake – UPS/Electrical Rooms	4	50											
Air Handling Units Exhaust – UPS/Electrical Rooms	4	45											
Air Handling Units Intake – PBB Area – attenuated	2	78											
Air Handling Units Exhaust – PBB Area – attenuated	2	78											
Battery room condensers	64	69											
POP room condensers	8	75											
IDF condensers	4	69											
Battery room extractor fan	4	35											
Switchroom condensers	4	69											
UPS AHU condensers	4	69											
PBB condensers – PBB VRF	12	70											
Air handling unit – PBB area condenser	2	69											

Noise Source	No. of units (total at DUB 15 + 16)	Sound Power Level (dB _{L_{Aeq}})	Octave Band Centre Frequency, Hz										
			63	125	250	500	1k	2k	4k	8k			
Emergency diesel generators – attenuated	32	75											
Gas turbine generators – attenuated	5	86	32	58	67	78	83	81	75	65			

The following assumptions have been made in the modelling assessment:

- A 9 m high solid noise barrier surrounds all generator yards
- A 4 m high solid parapet is constructed on the main data centre buildings
- A 7 m high solid noise wall is built around the north, east and south sides of the energy centre, approximately 3 m from the energy centre building itself.

3.4.4 Noise sensitive receptors

The nearest noise sensitive receptors to the proposed development are to the south and east of the site. The location of the sensitive receptors relative to the Proposed Development is presented in **Figure 4**, and listed in **Table 7**.

Table 7: Noise sensitive receptors

Receiver Number/ Name	Description	Distance from site boundary [m]	Type of receiver
Golf course N	Northern location on golf course	Directly adjacent	Amenity Free standing
Golf course M	Middle location on golf course	Directly adjacent	Amenity Free standing
Golf course S	Southern location on golf course	Directly adjacent	Amenity Free standing
NSR 1	Empty farmhouse*	71	Residential Attached to building
NSR 2	Casement Aerodrome accommodation	225	Residential Attached to building
NSR 3	Farmhouse	459	Residential Attached to building
NSR 4	Childcare centre	830	Residential Attached to building
NSR 5	Farmhouse	730	Residential Attached to building
NSR 6	Farmhouse	893	Residential Attached to building

Receiver Number/ Name	Description	Distance from site boundary [m]	Type of receiver
NSR 7	Semi-detached houses	992	Residential Attached to building

*Discussions with the owner of the farmhouse at NSR 1 have shown that the farmhouse is currently unoccupied and would require significant upgrades (including to the windows) to be a liveable residence.

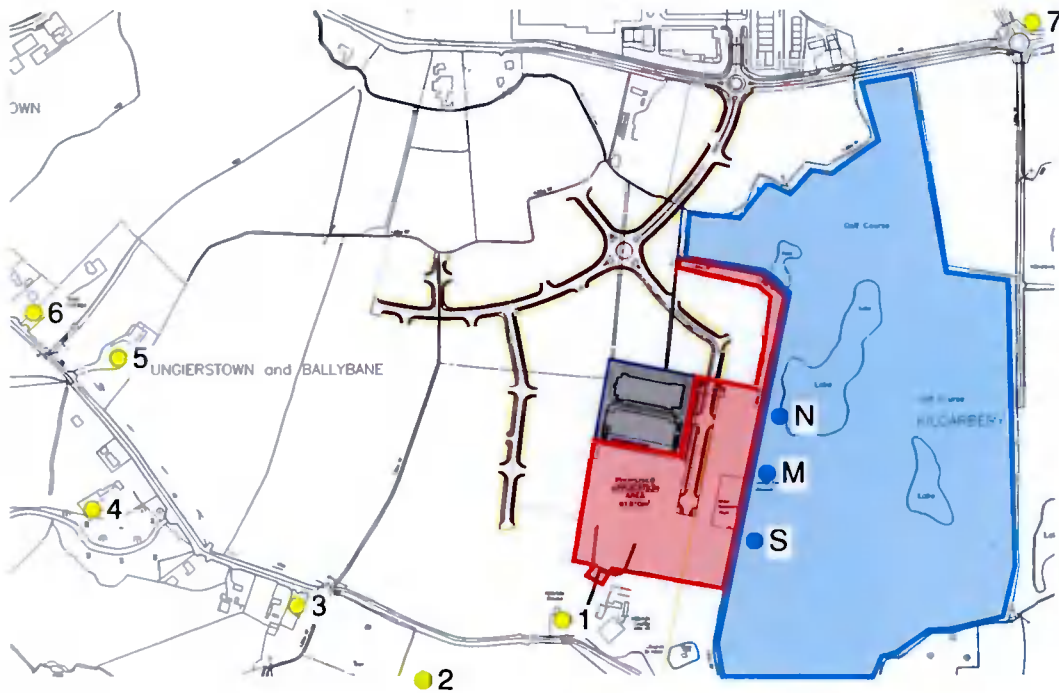


Figure 4: Location of noise sensitive receivers relative to Proposed Development (receivers shown in yellow, golf course shown in blue). Sourced from Google Earth.

The closest residential noise sensitive receptor is the farmhouse at NSR 1, with the next closest sensitive receptor being the residents adjacent to Casement Aerodrome at NSR 2.

Where receivers in the noise model are attached to buildings, they have been assumed to be 4 m high, as per the height of a second storey bedroom.

All receivers that are free-standing have been assumed to be 1.5 m high.

3.4.5 Building data

Building data comprised the length, width, and height of each building. The dimensions, roof heights and location of the buildings were taken from site plans for the buildings on the Proposed Development site, and from Google Maps for the surrounding buildings.

4 Baseline Noise Levels

4.1 Introduction

As outlined in Section 3.4, a baseline noise survey was undertaken to quantify the existing noise environment for the nearest noise sensitive receptors.

4.2 Monitoring results

A summary of the measurement results is presented in **Table 8** and **Table 9**.

Table 8: Noise measurement results for NMT1

Measurement Period	Average L _{Aeq,15min} [dB]	Average L _{Amax} [dB]	Average L _{A10} [dB]	Average L _{A90} [dB]	Temp. [°C]	Rainfall [mm]	Mean Wind Speed [m/s]
Day, evening 07:00 – 23:00	61	75	63	45	Max 18.8	4.0	4 – 6
Night 23:00 – 07:00	54	69	48	39	Min 9.6	3.9	4 – 6

Table 9: Noise measurement results for NMT2

Measurement Period	Average L _{Aeq,15min} [dB]	Average L _{Amax} [dB]	Average L _{A10} [dB]	Average L _{A90} [dB]	Temp. [°C]	Rainfall [mm]	Mean Wind Speed [m/s]
Day, evening 07:00 – 23:00	45	56	46	39	Max 18.8	4.0	4 – 6
Night 23:00 – 07:00	40	50	40	34	Min 9.6	3.9	4 – 6

The dominant noise source at both NMT1 and NMT2 is traffic from Baldonnell Road. Intermittent plane noise from Casement Aerodrome was loud, but infrequent.

Other noise sources at NMT2 included distant industrial noise, the wind in the trees, and birdsong.

5 Proposed noise limits

5.1 Construction Phase

Noise limits as per TII guidance are proposed to be adopted for the construction phase of the Proposed Development. The noise limits are presented in **Table 10**.

Table 10: Good Practice Guidance for maximum noise levels at the façade of nearby dwellings during construction

Days and Times	$L_{Aeq}(1hr)$ dB	$L_{pAmax, slow}$ dB
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60	65
Saturday 08:00 to 16:30hrs	65	75
Sundays and Bank Holidays 08:00 to 16:30hrs	60	65

5.2 Operational Phase

Considering the guidelines discussed in Section 3.2 and the measured noise levels presented in Section 4.2, it is proposed that the planning conditions for noise be based on the *Dublin Agglomeration Action Plan Relating to The Assessment and Management of Environmental Noise, December 2018 – November 2023 (Noise Action Plan) Volume 4 South Dublin County Council (SDCC Noise Action Plan)*, the *South Dublin County Council Noise Control Pre Planning Guidance (SDCC Pre-Planning Guidance)*, and the *EPA Office of Environmental Enforcement Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA NG4)*.

Planning conditions in the area that have previously been based on background noise levels, have stipulated a night-time noise limit of 39 $dBL_{Aeq,1hr}$ based on no exceedance of the existing baseline background noise level.

The noise measurements undertaken show that the average night-time noise level at NSR 1 is 34 dBA externally. This is unexpectedly low. Any night-time limit requiring that the measured background level be maintained would be unachievable.

A noise limit that is aligned with the SDCC Noise Action Plan and the SDCC Pre-Planning Guidance is proposed. Noise limits for the Proposed Development are presented in **Table 11**.

Table 11: Proposed noise limits at noise sensitive locations near the Proposed Development

Time period	Proposed Limit	Comment
Day/evening 07:00 – 23:00	55 dBL _{Aeq,1hr}	Based on limits in EPA NG4, SDCC Noise Action Plan, and existing measured noise levels at NMT1
Night 23:00 – 07:00	40 dBL _{Aeq,1hr}	Based on levels in EPA NG4, SDCC Noise Action Plan, the SDCC Pre-Planning Guidance and existing measured noise levels at NMT1
Emergency operations – residential receptors	60 dBL _{Aeq,1hr}	Based on guidance in EPA NG4
Emergency operations – amenity receptors	65 dBL _{Aeq,1hr}	Based on guidance in EPA NG4

It is proposed that an allowance of up to 10 dBA be given for emergency operations. 10 dBA has been added to the noise limit for amenity receptors, and 60 dBA has been chosen for residential locations, to allow for a reasonable level of acoustic amenity indoors, assuming the windows will be closed, and there will be a minimum sound level difference of 20 dBA from inside to outside the residence.

Achieving these noise levels is in line with the EPA NG4 guidance, as well as the guidance and desired noise levels in the SDCC Noise Action Plan and Pre-Planning Guidance.

Additionally, considering that a 10 dBA reduction in noise level is expected through an open window, the proposed noise limits in **Table 11** mean that the internal noise levels will comply with night-time recommended internal noise levels as per the SDCC Pre-Planning Guidance.

The significance of cumulative effects will be assessed according to **Table 4** in Section 6.2.

6 Impact Assessment

6.1 Construction Phase of Proposed Development

6.1.1 Construction Phasing and Plant

The construction phase of the Proposed Development will involve site clearance and excavation and the building works.

It is not possible to prescribe a detailed construction programme at this stage. However, for the purposes of this assessment, two construction phases are considered – site preparation and site construction. **Table 12** outlines the results for both phases at the nearest sensitive receptors (see **Figure 2**). Only the nearest noise sensitive receptors have been considered in this analysis. If the predicted noise levels comply at the nearest sensitive receptors then they will be deemed to comply at receptors further away as well.

A variety of items of plant may be in use, such as excavators, lifting equipment, dumper trucks, compressors, generators, and piling activities. There will be vehicular movements to and from the site that will make use of existing roads and site access points.

It is assumed that construction hours will be during the day, Monday to Saturday.

Table 12: Predicted construction noise levels at noise sensitive receptors

Receiver number/ description	Predicted noise level – site preparation [dBL _{Aeq,1hr}]	Predicted noise level – construction [dBL _{Aeq,1hr}]	Noise limit [dBL _{Aeq,1hr}]	Complies?
Golf course N	56	53	65	Yes
Golf course M	59	56	65	Yes
Golf course S	60	56	65	Yes
NSR 1	64	61	65	Yes
NSR 2	56	55	65	Yes

Section 3.2.1 provides information on the indicative levels of acceptability for noise levels during the construction phase, as set out in TII Guidance.

The results of the assessment indicate that for both the site preparation and construction phases, the daytime noise limit of 70 dBL_{Aeq,1hr} on weekdays, and the more stringent limit of 65 dBL_{Aeq,1hr} for Saturdays can be complied with at the nearest sensitive receptors. These calculations are indicative only and are used for the purposes of comparison only with the adopted criteria and do not include the provision of any mitigation measures.

6.2 Operational Phase of Proposed Development

6.2.1 Scenario 1: Normal operation

Scenario 1 (normal operation) is defined in Section 3.4.3.

6.2.1.1 Predicted Impact at Amenity Receptors

The results of the noise modelling for Scenario 1 are presented in **Table 13**, relative to each amenity receptor. The predicted noise levels presented in **Table 13** have been compared to the relevant noise limit as adopted for this assessment, as shown in **Table 11**.

Table 13: Scenario 1 Noise Modelling Results at Amenity Receptors

Sensitive Receptor	Model Output L_{Aeq} (dB)	Noise Limit [dB(A)]	Compliance with limits?
Golf course – north	51	55	Yes
Golf course – centre	46	55	Yes
Golf course – south	42	55	Yes

Noise levels at the golf course are predicted to comply with the noise limits.

6.2.1.2 Predicted Impact at Residential Receptors

The results of the noise modelling for Scenario 1 are presented in **Table 14** relative to each residential sensitive receptor. The predicted noise levels presented in **Table 14** are compared to the most stringent noise limit as outlined in **Table 11** and also to the existing baseline noise level recorded at each residential receptor, as outlined in **Table 8** and **Table 9**. Values are presented at the worst-case façade and floor and assessed against the night-time noise levels.

Cumulative noise levels are assessed taking into account the existing measured baseline noise levels at sensitive receptors, as well as noise from the proposed Profile Park Power Station.

Table 14: Scenario 1 Noise Modelling Results at Residential Receptors

Sensitive Receptor	Model Output L_{Aeq} [dB]	Noise Limit [dB]	Compliance with limits?	Baseline noise level (night) [dB $L_{Aeq,thr}$]	Predicted power station noise level [dB]	Cumulative Noise Level [dB] ¹	Change in noise level [dB]	Significance criteria
NSR 1	39	40	Yes	40	36	43	+3	Imperceptible
NSR 2	37	40	Yes	54	-	54	+0	No change

¹ Where cumulative noise level = Model Output L_{Aeq} dB + Baseline noise level (night) + Predicted power station noise

6.2.2 Scenario 2: Emergency Mode

Scenario 2 (emergency operation) is defined in Section 3.4.3.

6.2.2.1 Predicted Impact at Amenity Receptors

The results of the noise modelling for Scenario 2 are presented in **Table 15**, relative to each amenity receptor. The predicted noise levels presented in **Table 15** have been compared to the relevant noise limit as adopted for this assessment, as shown in **Table 11**.

Table 15: Scenario 2 Noise Modelling Results at Amenity Receptors

Sensitive Receptor	Model Output L _{Aeq} (dB)	Noise Limit [dB(A)]	Compliance with limits?
Golf course – north	46	65	Yes
Golf course – centre	53	65	Yes
Golf course – south	61	65	Yes

When operating under Scenario 2, the operational phase of the Proposed Development is predicted to be compliant with relevant noise limits at all the nearest amenity receptors.

6.2.2.2 Predicted Impact at Residential Receptors

The results of the noise modelling for Scenario 2 are presented in **Table 16**, relative to each residential sensitive receptor. The predicted noise levels presented in **Table 16** have been compared to the relevant noise limit as adopted for this assessment, as outlined in Section 3.2.2 and also to the baseline noise level recorded at each residential receptor, as shown in **Table 8** and **Table 9**.

Table 16: Scenario 2: Noise Modelling Results at Residential Receptors

Sensitive Receptor	Model Output L _{Aeq} [dB]	Noise Limit [dB]	Compliance with limits?	Baseline noise level (day) [dB L _{Aeq,thr}]	Predicted power station noise level [dB]	Cumulative Noise Level [dB] ¹	Change in noise level [dB]	Significance criteria
NSR 1	55	60	Yes	40	36	55	+15	Significant
NSR 2	50	60	Yes	54	-	56	+2	Imperceptible

¹ Where cumulative noise level = Model Output L_{Aeq} dB + Baseline noise level (day) + Predicted power station noise

When operating under Scenario 2, the operational phase of the Proposed Development is predicted to be compliant with relevant noise limits at all the nearest residential receptors.

A significant change in noise conditions is expected for NSR 1 in the emergency scenario.

The expected impact of these noise levels is discussed in Section 8.2.

6.2.3 Scenario 3: Normal operation plus testing of generators

Scenario 3 (normal operation plus testing of generators) is defined in Section 3.4.3.

6.2.3.1 Predicted Impact at Amenity Receptors

The results of the noise modelling for Scenario 3 are presented in **Table 17**, relative to each amenity receptor. The predicted noise levels presented in **Table 17** have been compared to the relevant noise limit as adopted for this assessment, as shown in **Table 11**.

Table 17: Scenario 3 Noise Modelling Results at Amenity Receptors

Sensitive Receptor	Model Output L _{Aeq} (dB)	Noise Limit [dB(A)]	Compliance with limits?
Golf course – north	51	55	Yes
Golf course – centre	47	55	Yes
Golf course – south	49	55	Yes

Noise levels at the golf course are predicted comply with the noise limits.

6.2.3.2 Predicted Impact at Residential Receptors

The results of the noise modelling for Scenario 3 are presented in **Table 18**, relative to each residential sensitive receptor. The predicted noise levels presented in **Table 18** have been compared to the relevant day-time noise limit as adopted for this assessment, as outlined in Section 3.2.2 and also to the baseline noise level recorded at each residential receptor, as shown in **Table 8** and **Table 9**.

Table 18: Scenario 2: Noise Modelling Results at Residential Receptors

Sensitive Receptor	Model Output L _{Aeq} [dB]	Noise Limit [dB]	Compliance with limits?	Baseline noise level (day) [dB L _{Aeq,thr}]	Predicted power station noise level [dB]	Cumulative Noise Level [dB] ¹	Change in noise level [dB]	Significance criteria
NSR 1	45	55	Yes	45	36	48	+3	Imperceptible
NSR 2	39	55	Yes	61	-	61	+0	No change

¹ Where cumulative noise level = Model Output L_{Aeq} dB + Baseline noise level (day) + Predicted power station noise

When operating under Scenario 3, the operational phase of the Proposed Development is predicted to be compliant with relevant noise limits at all the nearest residential receptors.

The expected impact of these noise levels is discussed in Section 8.2.

6.2.4 Cumulative Noise Considerations

A cumulative noise assessment is necessary as part of the operational phase of the proposed development. The assessment above considers the impact of the proposed development as well as other existing sources.

Greener Ideas Ltd. submitted a planning application for a gas fired power plant in Profile Park in June 2021. The development will provide an electrical output of up to 125 MW and is expected to provide some level of power supply to the proposed development once operational in 2025. When the Profile Park Power

Plant is operational, the gas generation on site will no longer be required, therefore, so the predicted noise levels due to site operations will be lower than those outlined.

Noise from the proposed power plant is assessed in the *Profile Park Power Plant – Environmental Impact Assessment Report* by Tobin Consulting Engineers predicted the noise levels due to that development at NSR1 (R01) to be 36dB_LAeq. This level has no effect on the projected noise level at NSR1 and therefore no significant cumulative effects are predicted.

7 Mitigation Measures

7.1 Construction Phase

The following section describes relevant measures to minimise the potential for noise disturbance to the surrounding area which will be employed by the contractor to ensure the construction noise criteria are not exceeded.

The Contractor will take specific noise and vibration abatement measures and comply with the recommendations of BS 5228: Part 1 (2014) and the European Communities (*Noise Emission by Equipment for Use Outdoors*) Regulations, 2001.

The measures to be implemented on site include, but are not limited to:

- Selection of quiet plant/location of plant; plant which will have the least impact in term of noise will be selected.
- Plant will only be left running during works and will be switched off at all other times. Plant will not be left idling.
- Hours of work – all construction related works, other than emergency works and security will be carried out during normal construction working hours, as outlined in Section 5.1.1.

During the construction phase noise and vibration monitoring will be carried out at the nearest sensitive locations to ensure compliance with limit values, refer to **Table 1**. Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*. In the event of an exceedance of the noise limits during the construction phase, additional mitigation measures, for example additional screening of noisy plant, will be implemented.

Works will not be undertaken outside of normal working hours without the written permission of the local authority.

7.2 Operational Phase

The following attenuation strategies for noise sources will be employed at the Proposed Development. These measures have been incorporated into the assessment above:

- Gas turbine generators will be attenuated to achieve a maximum sound pressure level at 1 m from any point of the generator of 65 dBA
- Diesel generators will be attenuated to achieve a maximum sound pressure level at 1 m from any point of the generator of 75 dBA
- Dry air chillers will be attenuated to achieve a maximum sound pressure level at 1 m from any point of the chiller of 55 dBA
- Condensers and AHUs will be attenuated to achieve a maximum sound pressure level at 1 m from any point of 70 dBA

- A minimum 9 m high solid noise wall will be constructed around all diesel generator yards, with louvres as shown on in Appendix A
- A minimum 4 m high solid noise parapet will be constructed on the main data centre buildings to shield receptors from chiller noise
- A minimum 7 m high solid noise wall will be constructed around the north, east, and south sides of the gas generator yard

Each standby generator will only be tested once a week, for a maximum duration of one hour. Standby generators will only be tested one at a time and only during the day-time.

8 Residual Impacts

8.1 Construction Phase

A noise assessment of the construction phase impacts has shown that compliance with limit values can be achieved.

8.2 Operational Phase

8.2.1 Golf Course

Noise levels from the proposed development are predicted to comply with noise limits at the golf course. Noise from the proposed development will be audible at certain locations on the golf course, but the character of the noise will be constant, with no tonal or impulsive qualities that would distract players on the golf course.

Noise from the proposed development is not expected to negatively impact the acoustic amenity of the golf course.

8.2.2 Residential Receptors

Noise levels from the proposed development are predicted to comply with noise limits at nearby residential receptors for normal operations as well as emergency conditions.

Although noise levels are compliant at residential receptors, a significant change in noise level will occur in the noise level at NSR1 under emergency conditions. The emergency condition will occur for a short time period, will not happen regularly or frequently, and as such will not have a significant impact on the overall acoustic amenity of surrounding receptors.

9 References

British Standards Institution (BSI), 2009+2014. BS 5228-1: 2014 Code of practice for Noise Vibration Control on Construction and Open Sites - Noise. British Standards Institution, United Kingdom.

British Standards Institution (BSI), 2009. BS 5228-2: 2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration. British Standards Institution, United Kingdom.

Transport Infrastructure Ireland (TII) (2014), Good Practice Guidance for the treatment of Noise during the planning of National Road Schemes

The UK Highways Agency (2011), Design Manual for Roads and Bridges (DMRB) Volume III, Section 3, Part 7 Noise and Vibration

An Bord Pleanála Decision Ref PL06F.248544

International Electrotechnical Commission (IEC) (2002), Specification for Sound Level Meters: IEC 61672-1:2002

EPA, (2017) Revised Guidelines on the Information to be contained in Environmental Impact Statements, DRAFT. Johnstown Castle, Co. Wexford

EPA, 2012. Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Scheduled Activities (NG4). Environmental Protection Agency, Wexford, Ireland.

International Standards Organisation (ISO), 1996:2017: Acoustics – Description, measurement and assessment of environmental noise - Part 1-4. ISO, Geneva, Switzerland.

British Standards Institution (BSI) (2014), BS 5228: Part 1 (2014) and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001.

Dublin Agglomeration Action Plan Relating to The Assessment and Management of Environmental Noise, December 2018 – November 2023 (Noise Action Plan) Volume 4 South Dublin County Council

South Dublin County Council Noise Control Pre Planning Guidance

Profile Park Power Plant – Environmental Impact Assessment Report, Tobin Consulting Engineers

Appendix A

Plan layout of Proposed
Development

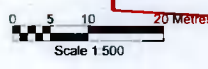
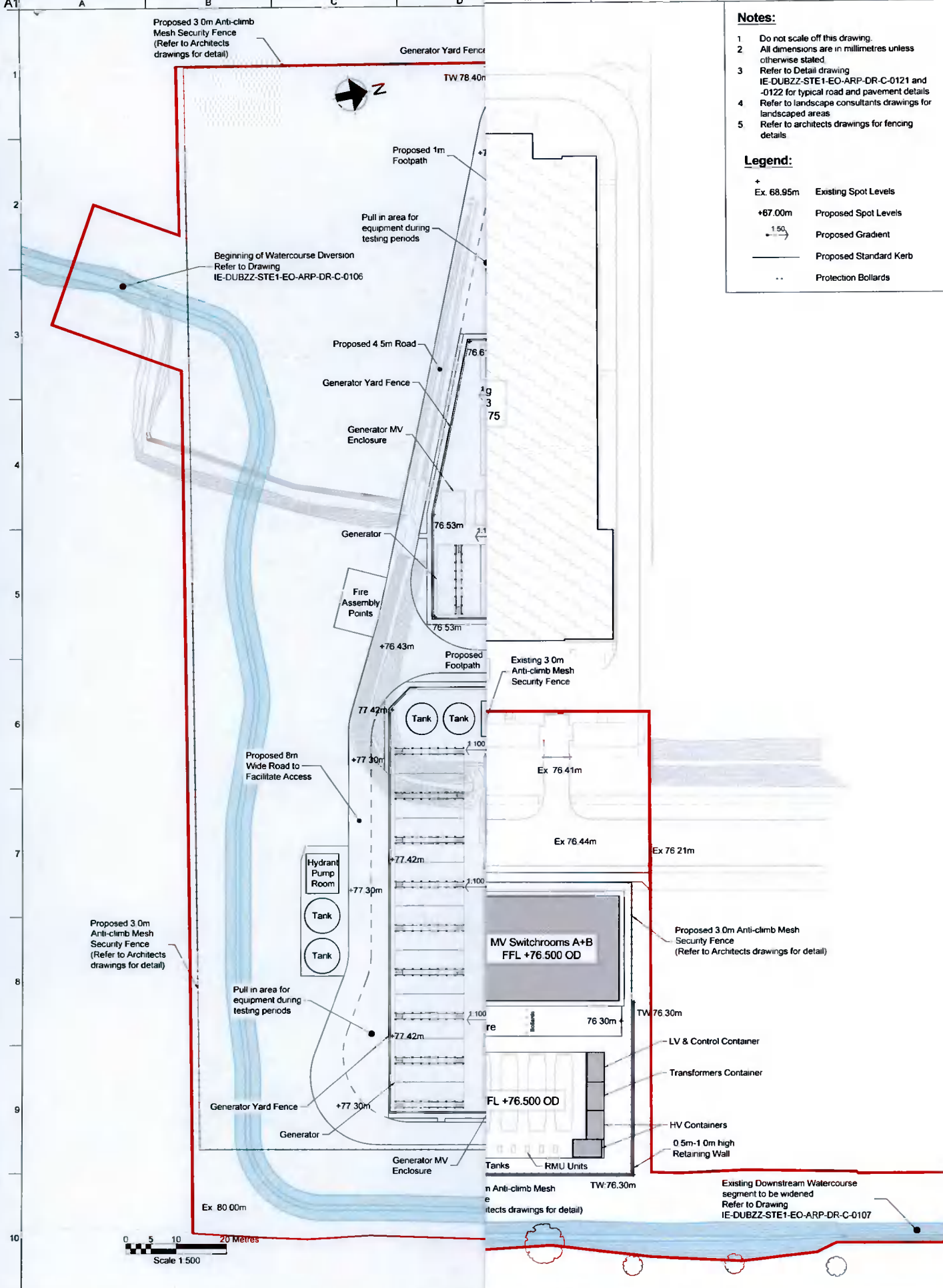


Notes:

- 1 Do not scale off this drawing.
- 2 All dimensions are in millimetres unless otherwise stated.
- 3 Refer to Detail drawing IE-DUBZZ-STE1-EO-ARP-DR-C-0121 and -0122 for typical road and pavement details.
- 4 Refer to landscape consultants drawings for landscaped areas.
- 5 Refer to architects drawings for fencing details.

Legend:

- + Ex. 68.95m Existing Spot Levels
- +67.00m Proposed Spot Levels
- 1.50 Proposed Gradient
- Proposed Standard Kerb
- .. Protection Bollards



Drawing Title
Proposed Finished Levels

Scale at A1	1:500
Role	Civil
Sustainability	Planning
Asip Job No	280503-00
Rev	C01
Name	IE-DUBZZ-STE1-EO-ARP-DR-C-0101

