



6070

EXTERNAL NOISE IMPACT ANALYSIS

TRAFFIC NOISE IMPACT ASSESSMENT

WYATTVILLE PARK BTR

Loughlinstown
Co. Dublin

Green Urban Living N11 Ltd

DKP-M17-6070-1P
2021-05-26

Document control

DKP project no: M17
 DKP document no: 6070
 Project file no: DKP-M17-6700

Circular	Issue >	1#	1P
Clients	Green Urban Living N11 Ltd		
Architects	Wilson Architecture		<input checked="" type="checkbox"/>
Planning consultants	KPMG Future Analytics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Engineers	BMCE		
Landscape architects	TBSstudio		

Issue	1#	2021-03-12	Draft issue
Issue	1P	2021-05-26	Final

Document issue status ID

Sketch/draft
 P Planning
 C Concept
 D Design
 G General information
 T Tender
 W Works/construction
 Z As-build/constructed

Issue	Prepared	Checked	Approved
1	201	208	208
2	208	202	201

ING Gerard (Craig) van Deventer CEng., BE(mech)., HDip CIOB, MCIBSE

M : [00] 353 (0)87 260 8080
 E : gerard@dkpartnership.com

DKPartnership
 70 Main Street, Applewood , Swords, Co. Dublin, Ireland
 Reen Kenmare Co. Kerry

post@dkpartnership.com
 www.dkpartnership.com

T : [00] 353 (0) 1813 1930
 T : [00] 353 (0)64664 1686

 **Contents**

Section		Page
1	Introduction	4
2	Executive summary	5
3	Project geographical overview.....	7
4	Approach, procedure and assessment criteria.....	8
5	Results and conclusion	10

1 Introduction

1.1 Report purpose

This report details the effects of existing back ground noise on the perceived noise levels within the habitable rooms of the new proposed development. These impacts and final predicted noise levels within the relevant habitable rooms are compared against recommendations set out in the relevant standards to establish if any particular mitigation actions are required or not.

1.2 Instruction

DKPartnership (DKP) have been commissioned by Green Urban Living N11 Ltd to carry out the analysis and report for the proposed development on lands associated with St. Laurence College, Wyattville Park, Loughlinstown, Co. Dublin.

1.3 Development description

The development will principally consist of the demolition of the existing AstroTurf and hardcourt area and the construction of: 256 no. Build-to-Rent apartments (105 no. 1-bed, 145 no. 2-bed and 6 no. 3-bed) in 4 no. blocks ranging in height from 1 to 8 no. storeys above ground level including and connected by single storey podiums with internal communal amenities and facilities; a crèche with outdoor play area; a café; communal and public open space and play facilities; a permanent multimodal access off Wyattville Park Road; a pedestrian/cycle link from the N11 to Wyattville Park; a temporary construction access off the N11; car, motorcycle and bicycle parking; and a set down area. Furthermore, the school side development will consist of: the provision of a new AstroTurf pitch and associated floodlighting; a bin store/vehicle shed; and a new vehicular and pedestrian entrance off Wyattville Park Road. The development will also include all ancillary site services and works to facilitate the development.

2 Executive summary

2.1 Analysis conducted

This report details the effects of any noise impacts of the existing back ground noise levels on the new development and in particular the habitable rooms within the proposed development using the survey data from noise measurements and EPA noise mapping taken of the relevant area and compares these with the maximum recommended noise data for residential units published by the world health organisation, CIBSE guides and BS8233.

2.2 Standards and regulations overview

The following guideline/standards have been applied and used for information:

The European Environmental Noise Regulations 2018 (S.I. No. 549), the National Planning Framework 2040, the British Standard BS 8233 and the World health Organisation (WHO)

2.3 Methodology

The new development faces the N11 to the South & West, the playing field and main buildings associated with Saint Laurence College to the North-West & North and residential dwellings / gardens to the North-East, East and South East.

Any noise from the residential units and the college site is not assumed to be of any significance or would cause rise to noise nuisance hence the only possible noise nuisance generated which may effect the new proposed development is most likely the traffic noise on the N11. To calculate the predicted noise levels at the relevant facades and ambient (internal) noise level within the habitable rooms of the apartments we need to establish the background noise outside the facades of the buildings. Once established we can calculate the noise reduction over the external façade construction and the internal room noise level. This is then compared with the CIBSE/WHO/BS8233 maximum recommended Noise Criteria (NC) for habitable rooms detailing the NC requirements for different environments.

2.4 Calculated noise levels at the facades

From table 5.2 summarised in table 2.1 below we note that the minimum and maximum noise levels as a result of the N11 traffic noise at all of the facades of all of the blocks in the new proposed development resulted in day time noise levels of between 51 and 64 dB and night time noise levels of between 46 to 59 dB.

Traffic noise N11	7.00-23.00 L _{den} / LA _{EQ16}	23.00-7.00 L _{night} / LA _{EQ8}	
Minimum-Maximum all blocks	51 – 64 dB	46 – 59 dB	

Table 2.1 (see table 5.2 for full details of each façade of each block)

2.5 New development noise impact assessment criterion

To determine any possible actions from the predicted day time (51 to 64 dB) noise levels and predicted night time (46 to 59 dB) noise levels at the facades of the relevant blocks in the new development we compare these with the noise impact assessment criterion table 5.3 summarised in table 2.2 and note these noise levels to fall in the “B” category where the noise impact would need to be considered.

Traffic noise	7.00-23.00 L _{den} / LA _{EQ16}	23.00-7.00 L _{night} / LA _{EQ8}	Assessment / Action.
Category “B”	55 – 66 dB	45 – 59 dB	Noise impact need to be considered

Table 2.2 (See table 5.3 for a full listing of all of the categories)

2.6 Noise reduction of facades.

The new proposed development will be of modern construction and as part of the new building regulations and in particular Part L, requirement will need to have a high level airtightness standard giving the construction a relative high noise reduction capability. For this report we have applied conservative “standard” noise reduction capabilities.

	Solid external walls	Glazing	Façade average	Comments
Noise reduction capability standard	> 50 dB	35 dB	35.5 dB	Applied for assessment

Table 2.3 (See table 5.4 for full list of noise reduction data)

2.7 Predicted noise levels in habitable rooms

The resultant internal ambient room noise levels shown in the table below are the results of the N11 traffic 16 hour day time back ground noise and 8 hour night time back ground noise levels less the noise reduction capability of the facades (table 2.3 / 5.4) of the new proposed development.

Location	7.00-23.00 L_{den} / L_{Aeq16}	23.00-7.00 L_{night} / L_{Aeq8}
Block D façade South-East, South-West, North-West (4,1,2)	28.5 dB	23.5 dB
Block D façade North-East (3)	24.5 dB	19.5 dB
Block C façade South-East, South-West, North-West (4,1,2)	25.5 dB	20.5 dB
Block C façade North-East (3)	21.5 dB	16.5 dB
Block B façade South-East, South-West, North-West (4,1,2)	22.5 dB	17.5 dB
Block B façade North-East (3)	18.5 dB	13.5 dB
Block A façade South-East, South-West, North-West (4,1,2)	19.5 dB	14.5 dB
Block A façade North-East (3)	15.5 dB	10.5 dB

Table 2.4 (as 5.5)

2.8 Conclusion

Comparing the calculated internal room noise levels ranging from 28.5 dB(A) to <15.5dB(A) during the day time (7.00-23.00) period and 23.5 dB(A) to <10.5dB(A) during the night time (23.00-7.00) period as shown in table 2.4 / 5.5 with the WHO/CIBSE/BS8233 recommended maximum habitable room noise level shown in table 4.2 we conclude that the resultant noise levels are just below the “Very good / Country” levels and we deem this to be satisfactory and within the recommendations of the relevant standards and guides. We further conclude that the receiving facades environment of all blocks falls mostly under category B in the Noise impact assessment criterion table 4.1 and although this would be acceptable in a suburban environment we recommend that some noise impact measures ought to be considered as outlined in section 2.9 below.

2.9 Recommendations and / or mitigation measures

To ensure the above internal room “Very good” ambient noise level standards are met the facades (1,2,4) facing the N11 to some degree of block D, should have a noise reduction capability of ≥ 38 dB and any openings i.e. ventilation grills, should have a noise reduction capability of ≥ 34 dB.

To ensure the above internal room “Very good” ambient noise level standards are met the facades (1,2,4) facing the N11 to some degree of blocks C, B, A should have a noise reduction capability of ≥ 36 dB and any openings i.e. ventilation grills, should have a noise reduction capability of ≥ 33 dB

3 Geographical overview

3.1 Project overview

Image 3.1, the (google maps) site map below is a basic overview of the site with proposed development approximately outlined in the area site map.



Image 3.1 Approximate proposed development site

4 Approach and methodology

4.1 Methodology applied

The new development faces the N11 to the South & West, the playing field and main buildings associated with Saint Laurence College to the North-West & North and residential dwellings / gardens to the North-East, East and South East. Any noise from the residential units and the college site is not assumed to be of any significance or would cause rise to noise nuisance hence the only possible noise nuisance generated which may effect the new proposed development is most likely the traffic noise on the N11. To calculate the predicted noise levels at the relevant facades and ambient (internal) noise level within the habitable rooms of the apartments we need to establish the background noise outside the facades of the buildings. Once established we calculate the noise reduction over the external façade construction and the final internal room noise level. This is then compared with the CIBSE/WHO/BSEN8233 maximum recommended Noise Criteria (NC) for habitable rooms detailing the NC requirements for different environments.

4.2 Noise level survey

Based on the above assumptions the N11 traffic noise is to be assessed for impacts as this would be the predominant source on the new development using actual survey data of the existing back ground noise levels by means of a 24 hour (16hour + 8hour) local monitoring survey on Friday December 19th 2020 and the data provided by the EPA noise maps. The survey point location is +/- 4m from the curb on the N11 into the new proposed development site.



● Approximate location survey point.

4.3 Irelands noise framework

Environmental noise is unwanted sound arising from all areas of human activity such as noise from transport (road, rail, air traffic) as well as from industrial activities. The EPA is the national authority for overseeing the implementation of the Regulations. This role includes noise mapping and action planning for the purpose of the Directive. The EPA has made available the strategic noise mapping of agglomeration, major airports, major roads and major rail networks, in the form of noise contours for the L_{den} (day, evening, night) and L_{night} (night) periods. A noise map is a graphical representation of the predicted situation with regards to noise in a particular area with different colours representing different noise levels in decibels dB(A). All noise maps are presented in terms of two noise indicators: L_{den} and L_{night} .

- L_{den} is the day-evening-night noise indicator and it represents the noise indicator for overall annoyance. It is 'weighted' to account for extra annoyance in the evening and night periods. The Environmental Noise Directive defines an L_{den} threshold of 55 dB for reporting on the numbers of people exposed.
- L_{night} is the night time noise indicator and is used in the assessment of sleep disturbance. An L_{night} threshold of 50 dB is defined for reporting on the numbers of people exposed. These indicators are based on year long averages of the day (07:00-19:00), evening (19:00-23:00) and night (23:00-07:00) time periods.

4.4 Legislation and guidelines

The following guideline / standards have been applied:

- National Planning Framework 2040. Document sets out the Government's planning policies for Ireland and how these are expected to be applied. the aim is to prevent both new and existing development from contributing to or being put at unacceptable risk from or being adversely affected by unacceptable levels of noise pollution
- European Environmental Noise Regulations 2018 (S.I. No. 549). (Environmental Noise Regulations 2006).
- British Standard BS 8233 Sound insulation and noise reduction for buildings. BS 8233 contains guidance on the minimum recommended levels of noise reduction from external sources and general guidance on maximum habitable room noise standards.
- British Standard BS 4142:1997 'Method for Rating industrial noise affecting mixed residential and industrial areas'. To be used for assessing the effect of noise of an industrial nature, including mechanical services plant noise.
- World health Organisation(WHO). Published External Environmental Noise Guidelines for the European Region which sets out how noise pollution in towns and cities is increasing, and that excessive noise particularly from transport sources is a health risk.

4.5 Traffic noise criterion at the facades of residential receptors

The table below shows the different noise categories as published by BS 8233 in residential area's for the day time and night time periods with the relevant assessment criterion.

Traffic noise	7.00-23.00 L_{den} / L_{Aeq16}	23.00-7.00 L_{night} / L_{Aeq8}	Assessment / Action.
Cat "A"	<= 55 dB	<= 45 dB	Noise need not to be considered
Cat "B"	55 – 66 dB	45 – 59 dB	Noise impact need to be considered
Cat "C"	66 – 72 dB	59 – 66 dB	Noise impact mitigation need to be considered
Cat "D"	> 72 dB	> 66 dB	Unless quieter sites are not available residential use should not be considered

Table 4.1

4.6 Maximum recommended room noise level guidelines

The table below shows the maximum recommended noise levels for residential dwellings as published by BS 8233, CIBSE and the world Health Organisation for habitable rooms in different environments as illustrated below;

Room type	Very good / Country	Good / Suburban	Reasonable / Urban	City centre
Bed room	25	30	35	40
Living room	30	35	40	45

Table 4.2

4.7 Predicted noise nuisance complaints

The table below shows the predicted level of compliant for residential dwellings as a result of exceeding the particular sound level. This table is an appraisal in terms of both the margin of excess above the measured back ground noise and existing sound environment which may already have a high ambient or residual sound level. It is also noted that not all differences or impacts lead to complaints and that not every complaint is proof of an adverse impact.

Level over the back ground noise	Compliant indication
10 dB or more	Likely to cause noise nuisance complaints
5 dB	May give rise to some extend of noise nuisance complaints
0 dB	Unlikely to give rise to noise nuisance complaints

Table 4.3

4.8 Noise measurement

The noise survey measurements have been performed using a Bruel & Kjaer Type 2260 sound level meter and Bruel & Kjaer 4231 sound level calibrator.

5 Development noise emission assessment

5.1 Survey results

The table below details the summarised noise survey data from the noise survey location covering the high and maximum sound exposure and average equivalent weighted noise levels for day and night on Friday December 19th 2020. We note that high and maximum sound exposure data is only given for general information as this relates to a single (short time) event which is averaged as part overall weighted equivalent noise levels.

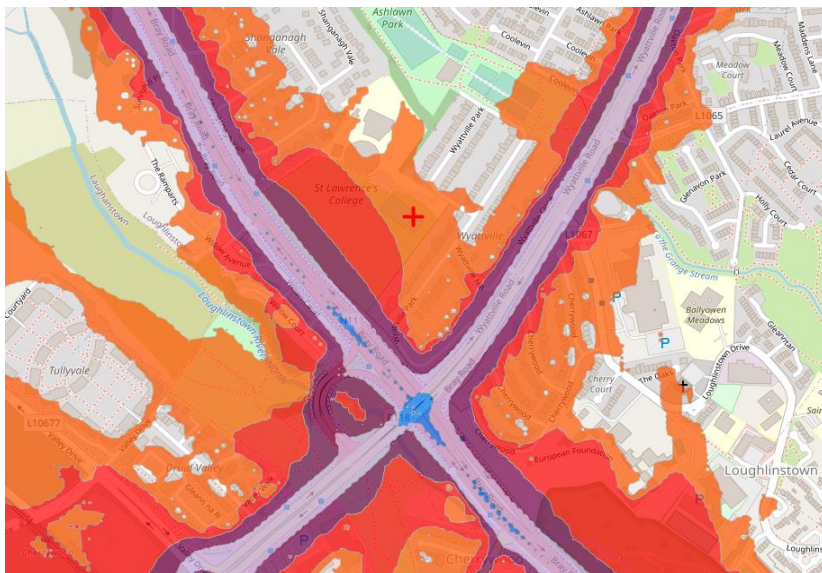
Survey results

Location	Single sound exposure	Maximum noise level	Day noise indicator	Night noise indicator
Survey point	92 dB(A)	76 dB(A)	65 dB(L _{AEQ16})	58 dB(L _{AEQ16})

Table 5.1

5.2 EPA data

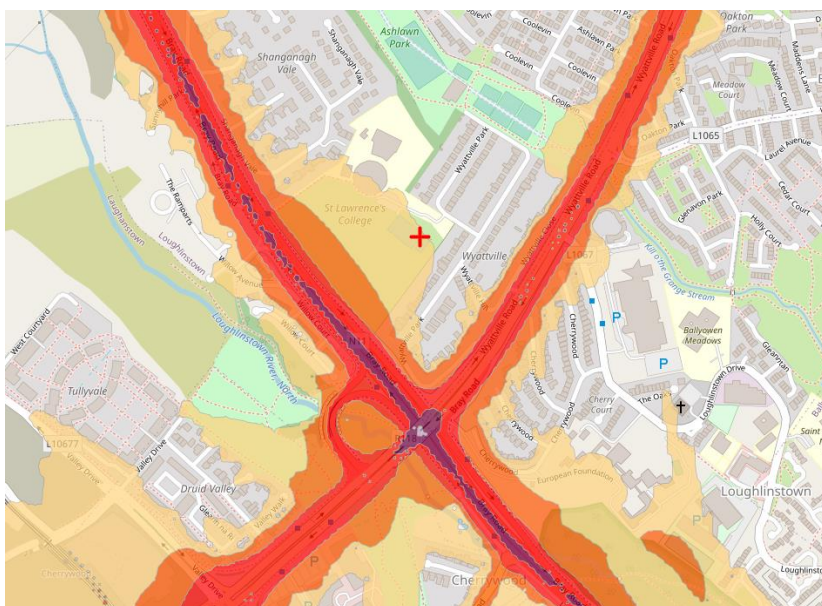
Below are the EPA generated traffic noise maps for the day time (L_{den}) and night time (L_{night}) period we have downloaded as a double check on the survey results.



EPA Day time (L_{den}) noise data map.

- 50-54 dB
- 55-59 dB
- 60-64 dB
- 65-69 dB

Image 4.1 EPA noise map Wyattville/Loughlinstown area day time.



EPA Night time (L_{night}) noise data map.

Image 4.2 EPA noise map Wyattville/Loughlinstown area night time.

We note the survey results to be in line with the EPA noise data maps of the greater Wyattville park / Saint Laurence college area.

5.3 Receiving environment

For the purpose of this exercise we will assess the noise levels on each block separately and not take in account the perceived noise reduction of any obstacles (other blocks) to arrive at a conservative result.



The new development faces the N11 to the South & West, the playing field and main buildings associated with Saint Laurence College to the North-West & North and residential dwellings / gardens to the North-East, East and South East.

Any noise from the residential units and the college site is not assumed to be of any significance nor would it cause rise to noise nuisance hence the main source of possible noise nuisance would be the traffic noise generated by the N11. The façade of block D is +/- 12m from the survey point, the facades of block B +/- 65m, the facades of block C +/- 100m and the facades of block D +/- 145m. The facades of the new proposed development are all a certain distance away from the survey point whereas this would account for a noise reduction calculated at " $L_r = L_w \cdot 20 \log_{10} \cdot \text{distance to receiver} - 10.9$ " we have also taken in account the EPA data with regards to the final predicted noise levels at the relevant facades. The table below details the final predicted & calculated noise levels at the relevant facades.

Final noise levels at facades.

Location	7.00-23.00 L_{den} / L_{AEQ16}	23.00-7.00 L_{night} / L_{AEQ8}
Block D façade South-East, South-West, North-West (4,1,2)	64 dB	59 dB
Block D façade North-East (3)	60 dB	55 dB
Block C façade South-East, South-West, North-West (4,1,2)	61 dB	56 dB
Block C façade North-East (3)	57 dB	52 dB
Block B façade South-East, South-West, North-West (4,1,2)	58 dB	53 dB
Block B façade North-East (3)	54 dB	49 dB
Block A façade South-East, South-West, North-West (4,1,2)	55 dB	50 dB
Block A façade North-East (3)	51 dB	46 dB

Table 5.2

5.4 New development noise impact assessment criterion

To determine any possible action from the predicted noise levels at the relevant facades we use the noise assessment criterion table set out below. We note that both the day time (51 to 64 dB) and night time (46 to 59 dB) perceived noise levels at the facades of the relevant blocks in the new development all fall in the category **B** where the noise impact would need to be considered. See table 5.3 below.

Noise impact assessment criterion.

Traffic noise	7.00-23.00 L_{den} / L_{AEQ16}	23.00-7.00 L_{night} / L_{AEQ8}	Assessment / Action.
Cat "A"	≤ 55 dB	≤ 45 dB	Noise need not to be considered
Cat "B"	55 – 66 dB	45 – 59 dB	Noise impact need to be considered
Cat "C"	66 – 72 dB	59 – 66 dB	Noise impact mitigation need to be considered
Cat "D"	> 72 dB	> 66 dB	Unless quieter sites are not available residential use should not be considered

Table 5.3

5.5 Noise impact consideration

The new proposed development will be of modern construction and as part of the new building regulations and in particular Part L, requirement will need to have a high level airtightness standard giving the construction a relative high noise reduction capability. For this report we have applied conservative "standard" noise reduction capabilities.

Noise reduction capability of a modern façade.

	Solid external walls	Glazing	Façade average	Comments
Noise reduction capability good	> 55 dB	40 dB	40.5 dB	
Noise reduction capability standard	> 50 dB	35 dB	35.5 dB	Applied for assessment
Noise reduction capability low	> 45 dB	30 dB	30.5 dB	

Table 5.4

We note these noise reduction capabilities are conservative figures and the final façade noise reduction capability is more than likely to be higher than represented in the table above.

5.6 Predicted noise levels in habitable rooms

The resultant internal ambient room noise levels at the relevant facades in the relevant blocks shown below in table 5.5 are the result of the predicted traffic day time and night time back ground noise as shown in table 5.2 minus the noise reduction capability of the facades (table 5.4) of the new proposed development.

Calculated internal room noise level after façade noise reduction (*traffic noise impact only).

Location	7.00-23.00 L_{den} / L_{AEQ16}	23.00-7.00 L_{night} / L_{AEQ8}
Block D façade South-East, South-West, North-West (4,1,2)	28.5 dB	23.5 dB
Block D façade North-East (3)	24.5 dB	19.5 dB
Block C façade South-East, South-West, North-West (4,1,2)	25.5 dB	20.5 dB
Block C façade North-East (3)	21.5 dB	16.5 dB
Block B façade South-East, South-West, North-West (4,1,2)	22.5 dB	17.5 dB
Block B façade North-East (3)	18.5 dB	13.5 dB
Block A façade South-East, South-West, North-West (4,1,2)	19.5 dB	14.5 dB
Block A façade North-East (3)	15.5 dB	10.5 dB

Table 5.5

* The predicted noise levels are calculated using the traffic noise data and the internal rooms are also subject to back ground noise from within the dwelling not taken in account for this particular exercise.

5.7 Conclusion

Comparing the calculated internal room noise levels ranging from 28.5 dB(A) to <15.5dB(A) during the day time (7.00-23.00) period and 23.5 dB(A) to <10.5dB(A) during the night time (23.00-7.00) period as shown in table 5.5 with the WHO/CIBSE/BS8233 recommended maximum habitable room noise level shown in table 4.2 we conclude that the resultant noise levels are just below the “Very good / Country” levels and we deem this to be satisfactory and within the recommendations of the relevant standards and guides. We further conclude that the receiving facades environment of all blocks falls mostly under category B in the Noise impact assessment criterion table 4.1 and although this would be acceptable in a suburban environment we recommend that some noise impact measures ought to be considered as outlined in section 5.8.

5.8 Recommendations and / or mitigation measures

To ensure the above internal room “Very good” ambient noise level standards are met the facades facing (1,2,4) the N11 of block D, should have a noise reduction capability of ≥ 38 dB and any openings i.e. ventilation grills, should have a noise reduction capability of ≥ 36 dB.

To ensure the above internal room “Very good” ambient noise level standards are met the facades facing (1,2,4) the N11 of blocks C, B, A should have a noise reduction capability of ≥ 36 dB and any openings i.e. ventilation grills, should have a noise reduction capability of ≥ 33 dB