

River Ridge Recycling
56 Craigmore Road, Garvagh

LA01/2017/0522/F

Removal of Condition 5 and Variation of Condition 9 of
C/2014/0287/F

Noise Report

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1. INTRODUCTION

Planning application LA01/2017/0522/F made by River Ridge Recycling is for:

“Removal of Condition 5 and variation of Condition 9 of C/2014/0287/F – The fast acting doors on the refuse derived fuel building shall provide a sound reduction index of 24 dB RW in the closed position and shall operate in accordance with the Rupert Taylor Ltd documentation between the hours of 19.00-07.00”

Condition 5 of C/2014/0287/F states “There shall be no vehicle movements to or from the refuse derived fuel building between the hours of 18.00-08.00.

This report provides assessment of the effect of implementing the planning permission if granted in the context of the relevant planning policy in Northern Ireland.

The documents taken into account are the planning documents on the Northern Ireland Planning Portal, a report by SLR dated April 2015 and an addendum document produced by SLR dated 15 September 2015, the Noise Policy Statement for Northern Ireland (NPSNI), British Standard 4142:2014, the World Health Organization Night Noise Guidelines (NNG) and Guidelines for Community Noise.

2. NOISE POLICY

In September 2014 the Noise Policy Statement for Northern Ireland (NPSNI) was published. Its stated objectives are that through the effective management and control of environmental, neighbour and neighbourhood noise the Noise Policy aims to:

1. Avoid or mitigate significant adverse impacts on health and quality of life;
2. Mitigate and minimise adverse impacts on health and quality of life; and
3. Where possible, contribute to the improvement of health and quality of life.

Associated with the first aim, the guidance introduces the concept of the Significant Observed Adverse Effect Level (SOAEL) and with the second aim the Lowest Observed Adverse Effect Level “LOAEL”. The guidance itself does not assign numerical values in terms of noise indices to LOAEL and SOAEL.

The NPSNI states in its “Definitions” section:

“There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSNI leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSNI provides the necessary policy flexibility until further evidence and suitable guidance is available.”

The first aim of the NPSNI states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development. The second aim is to mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. The second aim of the NPSNI refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

The Principles of the Northern Ireland Sustainable Development Strategy are set out in Appendix A of the NPSNI.

With regard to the planning application which is the subject of this report. It is necessary to consider whether implementing it would avoid or mitigate significant adverse impacts on health and quality of life; whether mitigation and minimisation of adverse impacts on health and quality of life will occur; and whether there is a possibility of contributing to the improvement of health and quality of life.

3. CRITERIA FOR ASSESSING NOISE EFFECTS

Since the planning application deals only with noise between 1800-0700 it is only necessary here to consider noise effects in the evening and night. The most extensive guidance is available with respect to night, and this is addressed first.

Night

Guidance on what noise level might be associated with the NOEL and LOAEL concepts in the case of transportation noise is found in the Night Noise Guidelines for Europe on page 99 in a discussion on health effects:

“However, noise-induced motility is a sign of arousal, and frequent (micro-) arousal and accompanying sleep fragmentation can affect mood and functioning next day and lead to a lower rating of the sleep quality. Therefore, motility is relevant for adverse health effects, but more than a few intervals with noise-induced motility are needed for inducing such effects. Although additional, more sophisticated analyses could be performed to refine this estimate, we propose $L_{Amax} = 32$ dB(A) as the currently best estimate of the threshold for motility induced by transportation noise. The threshold found for EEG awakening was $L_{Amax} = 35$ dB(A), that is, only a little higher than the 32 dB(A) found for noise-induced awakenings. This would mean that the NOEL $_{Amax}$ for transportation noise events is most likely at most 32 dB(A), and definitely not higher than 35 dB(A). It is important to note that the above given NOEL $_{Amax} \sim 32$ dB(A) and NOEL $_{Amax} \sim 42$ dB(A) are indoor levels, in the sleeping room. Although events below 32 dB(A) are audible, and, hence, further research may show more sensitive effects than motility, on the basis of the present available evidence we propose to assume that NOEL $_{Amax} = 32$ dB(A) and set a health-based night-time noise limit that is tolerant for transportation noise events with $L_{Amax} 32$ dB(A). On the other hand, since adverse health effects need to be prevented by health-based limits and even though vulnerable groups may require lower limits, on the basis of the present available evidence we propose to assume that NOAEL $_{Amax} = 42$ dB(A) and set a health-based night-time noise limit that does not tolerate transportation noise events with $L_{Amax} > 42$ dB(A).”

The Night Noise Guidelines go on to consider the concept of L_{night} which is the annual energy average in terms of the L_{Aeq} index between the hours of 2300-0700.

“On the basis of the above proposal, it would be possible to derive a night-time noise guideline value in terms of L_{night} . Such a guideline value would indicate the level below which no short-term effects are to be expected that would lead to temporary reduced health or chronic disease. Such a guideline value needs to be compared with guideline values derived directly with a view to preventing temporary reduced health and chronic diseases. In particular, for self-reported sleep disturbance, which is an expression of reduced well-being and may be an indication of effects that could contribute to cardiovascular disease, exposure–effect relationships have been derived on the basis of an extensive set of original data from studies from various countries (Miedema, Passchier-Vermeer and Vos, 2003; Miedema, 2004). The percentage of people

reporting high noise-induced sleep disturbance (%HS) levels off at 45 dB(A) but at a non-zero effect level. The remaining effect may be caused by events not incorporated in the exposure assessment and it appears that if all noise contributions would be incorporated in the exposure metric, high noise-induced sleep disturbance would vanish between 40 dB(A) and 45 dB(A), say at 42 dB(A). Since values found for other temporary reduced health effects or chronic diseases, in particular cardiovascular diseases, will be higher, and considering self-reported sleep disturbance as an adverse effect, this would suggest $L_{\text{night}} = 42 \text{ dB(A)}$ as the NOAEL to be compared with the value derived from the short-term effects. Note that this is an outdoor level, which would, assuming partly opened windows and an actual insulation of 15 dB(A), correspond to an indoor equivalent night-time sound level of 27 dB(A). The above discussion is based on motility, EEG awakenings, and conscious awakening. In addition, EEG micro-/minor arousals, and autonomic reactions have been discussed above.”

The L_{Aeq} index, and therefore the L_{night} index, are functions of the noise level, duration and number of events. The NNG L_{Amax} figures are expressed in terms of the L_{ASmax} index as evidenced calculations in its Appendix 2. All NNG figures are free field as defined in footnote 1 on its page XVII.

The guidance provided in the WHO NNG relates to transportation noise. Its applicability to noise from the application site depends on the extent to which noise from the site is comparable to noise from road vehicles and aircraft. While noise from the site would contain contributions from vehicles, it differs in terms of the temporal characteristics and may include features not dominant in transportation noise. For this purpose guidance is provided in British Standard 4142:2014 “Methods for rating and assessing industrial and commercial sound”. This standard was written after the issue of the Noise Policy Statement for England, on which the Noise Policy for Northern Ireland is based. It provides an assessment method which leads to conclusions that have relevance to those policies, in that it uses compatible phraseology referring to “adverse impact” and “significant adverse impact”. Its method is based on a comparison of a rating level with the background sound level, and the rating level is calculated from the specific sound level (i.e. the sound level produced by the source being assessed) plus any adjustment for the characteristic features of the sound. This adjustment is variously referred to in the Standard as an acoustic feature correction, a character correction or a rating penalty.

In this case, the background sound includes noise from the application site other than the sources to which Conditions 5 and 9 apply, and the comparison is between the rating level and the background taking the context into account. The Standard advises that where initial estimate of the impact needs to be modified due to the context, all pertinent factors including the absolute level of sound should be taken into account. That is the case here.

The SLR report considered the characteristics of the sound, and applied a character correction of 7 dB. Condition 10 of C/2014/0287/F requires that the acoustic feature correction be not more than 5 dB.

Applying a 5dB penalty to the WHO Night Noise Guidelines leads to the conclusions that NOAEL (No Observed Adverse Effect Level, a lower and more demanding threshold than LOAEL in the NPSNI) is an indoor night-time sound level of 37 dB L_{ASmax} . The WHO NNG state that the recommended night noise guideline of 40 dB $L_{night, outside}$ is equivalent to the lowest observed adverse effect level (LOAEL) for night noise. This becomes 35 dB $L_{night, outside}$ after allowing for a 5 dB character correction or penalty. The outside-to inside correction used by the NNG is not straightforward, because $L_{night, outside}$ is determined over an annual period, and account it taken of the proportion of time that residents have their windows open or closed. The guidelines assume that a typical outside-to-inside difference over a year is 21 dB, being a composite of the 15 dB reduction for a partially open window and a 30 dB reduction for a closed window. Taking the worst case this gives a value for LOAEL of $37+15 = 52$ dB L_{ASmax} outside.

Evening

With regard to evening, two matters need to be taken into account. Sleep criteria may apply to evening as well as night particularly in the case of young children. People may be less sensitive to noise in the evening than at night to extent that they may be engaged in activities which are less noise sensitive such such as watching television. In some weather conditions people may be out of doors in the evening. With regard to the first two points, noise that satisfies night noise criteria will also satisfy evening noise criteria. With regard to outdoor noise, there is reference in the 1999 World Health Organization Guidelines for Community Noise (overtaken by the NNG with respect to night noise) to a guideline for an outdoor living area of 55 dB $L_{Aeq 16h}$ as a threshold of serious annoyance, daytime and evening and 50 dB $L_{Aeq 16h}$ as a threshold of moderate annoyance, daytime and evening. BS 4142, which assesses outdoor noise, is applicable at any time of day.

4. FORECAST NOISE LEVELS

The SLR report predicted a worst case rating level of 35.4 $L_{Aeq 1h}$ for night in the period 0500-0700 (28.4 dB without the 7 dB penalty). The value of $L_{night, outside}$ would be lower than this as it uses an 8-hour time period rather than a 1-hour period. Converting $L_{Aeq 1h}$ for the period 0500-0700 to $L_{Aeq 8h}$ is a reduction of 6dB, and there would be a further slight reduction after allowing for non-working days through the year. The assumptions used to derive this were 2 HGV movements, use of a telehandler and a forklift. The application for the deletion of condition 5, if successful, would result in 4 movements per hour of a tractor

unit entering the RDF building, pulling a trailer out of the RDF building into the RDF yard where it will be set down.

Adjusting activity as assumed in the SLR report, the value of L_{night} will be similar to the SLR figure for $L_{\text{Aeq 1h}}$ between 0500-0700 and the forecast noise level would be below LOAEL in terms of $L_{\text{night, outside}}$. In terms of L_{Amax} , SLR consider noise from the dropping of a skip and noise from vehicles. The SLR Addendum indicates that the LPA considers the sound power level of dropping a skip to be 130 dB and the SLR calculations a sound power level of 105 dB(A) for vehicles. At 540m distance to the nearest location, location 1, these sound power levels would give L_{Amax} values assuming soft ground cover, of 61 dB 36 dB respectively.

With regard to the variation to Condition 9, assuming the doors are normally closed, the governing test is the L_{Amax} value. The internal noise level is specified in condition 6 as 80 dB $L_{\text{Aeq 15min}}$, and it may be assumed that maximum sound levels during that 15 minutes would be not more than about 85 dBA. Assuming a door area of 15m² when open, this would give an L_{ASmax} of less than 30 dB.

With regard to evening, the SLR report find that in the worst-case location the BS4142 conclusion is about 8 dB better than the point at which there is likely to be an indication of an adverse impact, depending on the context.

5. CONCLUSIONS

The considerations set out above lead to the conclusion that if criteria for noise at night (2300-0700) lead to a favourable conclusion, then the evening conclusion will also be favourable. The considerations also lead to the conclusions that the most sensitive criterion at night is L_{ASmax} . The threshold of LOAEL as in the Noise Policy Statement for Northern Ireland as derived from the Night Noise Guidelines for Europe after applying an acoustic feature penalty of 5 dB is 52 dB L_{ASmax} outside and 35 dB $L_{\text{night, outside}}$.

If condition 5 were removed and Condition 9 amended as in the application, L_{ASmax} levels of 61 dB could occur due to the dropping of a skip. L_{ASmax} levels due to vehicle movements would be of the order of 36 dB. L_{ASmax} levels due to the opening of the fast acting doors would be of the order of 35 dB. In some weather conditions the soft ground attenuation taken into account may be reduced but not so much as to raise these levels near to the LOAEL for L_{ASmax} .

With the exception of the skip noise, these levels do not exceed LOAEL and are consequently well below SOAEL. They therefore fulfil the first two aims of the NPSNI. The third aim, where possible to contribute to the improvement of health and quality of life proves not to be possible.

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If Condition 5 is removed as originally drafted, it will be necessary to ensure that there are no skip movements involving the dropping of skips at night, and this can be secured by planning condition.
