

# **IPPC Documents**

## **Variation Noise Monitoring**

### **C3.10**

**Waste recycling facility and baling plant**

***Hal Far, l/o Birżebbuġa***

**Variation of IP0004/12/A**

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The proposed changes in the noise monitoring for the shredder concern the noise monitoring receptors and the frequency of monitoring. These will be reduced from 7 locations to three whereas the frequency will be reduced from annual to once every three years.

The proposed coordinates for noise monitoring which are shown in Figure 1 are as follows:

|             |                            |
|-------------|----------------------------|
| Location 1: | 35° 49.263'N, 14° 30.781'E |
| Location 2: | 35° 49.113'N, 14° 30.814'E |
| Location 3: | 35° 49.256'N, 14° 30.865'E |

### Standards and method used

Baseline environmental sound levels shall be measured using sound level meters conforming to type 1 or better of the latest versions of British Standard EN 61672-1:2013 Electro-Acoustics, Sound Level Meters, Specifications.

The sound level meters shall be field-calibrated before and after monitoring using an acoustic calibrator conforming to the latest version of British Standard EN 60942:2018 Electro-Acoustics – Sound Calibrators.

All sound level meters shall be calibrated to a traceable standard by a UKAS-accredited laboratory, or equivalent, within a 24-month period before the survey and all acoustic calibrators shall be calibrated to a traceable standard by a UKAS-accredited laboratory, or equivalent, within a 12-month period before the survey.

Operational and baseline sound measurements shall be undertaken by a suitably qualified person at the locations identified above. The sound measurements would cover periods of time when the shredder is operational and periods when it is not. The shredder is operated during standard operating times.

The sound survey would be undertaken in conjunction with the following measurement protocol (BS 4142:2014+A1:2019):

- Midweek daytime – 1 x 15min measurements at each location avoiding rush-hour periods whilst the shredder is **operating normally**; and
- Midweek daytime – 1 x 15min measurements at each location avoiding rush-hour periods whilst the **shredder has ceased operating**.

The sound level meter shall be positioned such that the microphone is located 1.2 to 1.5m above local ground level in free-field conditions, i.e. at least 3.5m from the nearest vertical, reflecting surface. At all the survey locations the measurements would be undertaken at 3.5m away from the

façade of each property facing the development site.



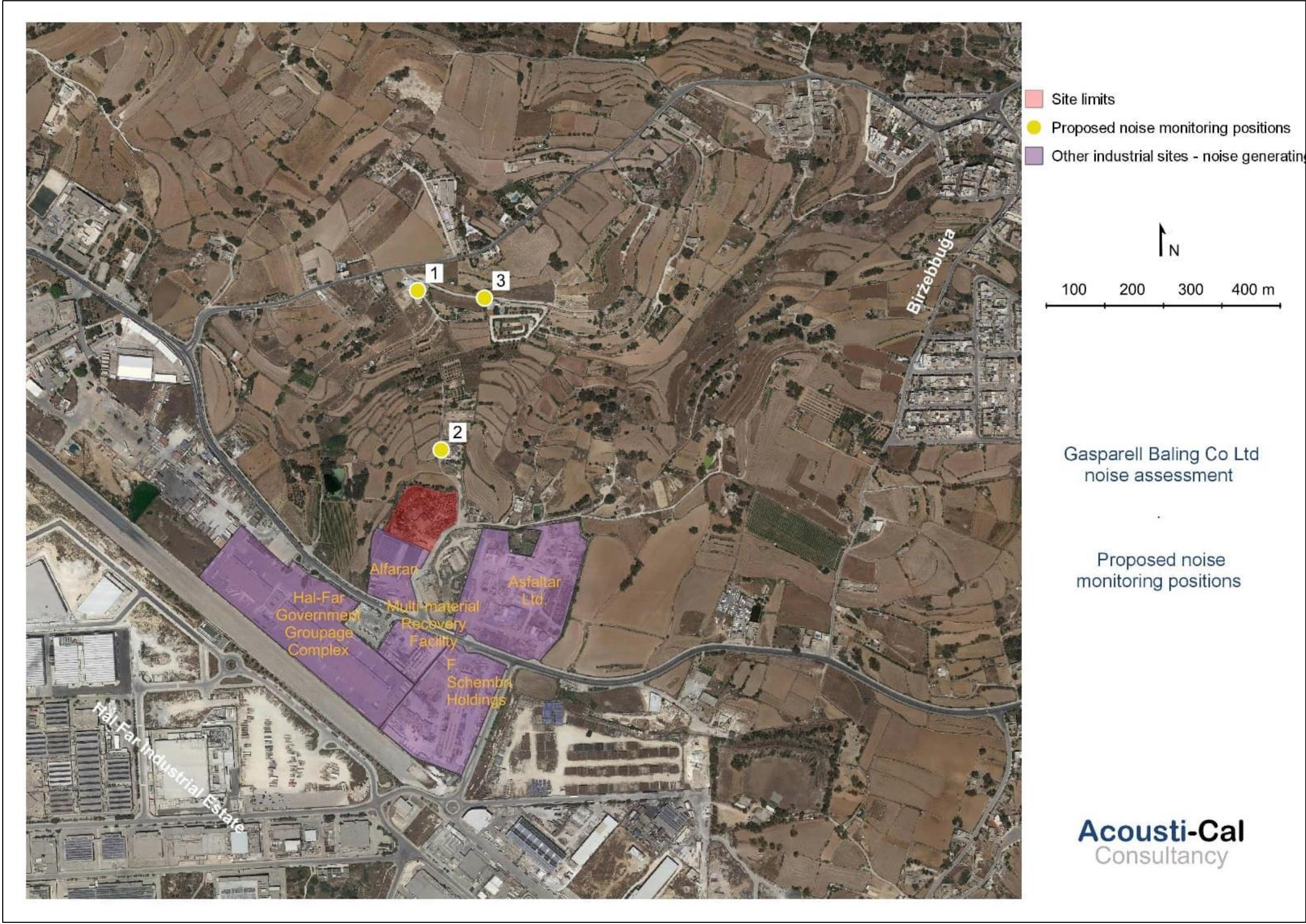


Figure 1: Site plan showing proposed noise sensitive receptors (yellow circles) with respect to Gasparell site (Red polygon)



The measurements would be attended at all times with noise levels being logged every 1- minute, so any noise events not associated with the site which could influence the results of the monitoring can be removed from the data set. The following noise indices would be recorded:

- $L_{Aeq,T}$  : The A-weighted equivalent continuous noise level over the measurement period T;
- $L_{A90}$  : The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise;
- $L_{A10}$  : The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe road traffic noise; and
- $L_{Amax}$ : The maximum A-weighted noise level during the measurement period.

BS4142:2014 is intended to be used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby sensitive receptor locations within the context of the existing sound environment.

The assessment of impact contained in BS4142:2014 is undertaken by comparing the sound rating level, i.e. the specific level of the source plus any penalties, to the measured representative background sound level outside the sensitive receptor location.

In accordance with BS4142:2014, the significance of an industrial or commercial sound source depends on both the margin by which the rating level exceeds the background sound level and the context in which the sound occurs. It is therefore essential to place the sound in context.

BS4142:2014 provides the following definitions:

- Ambient Sound: Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. NOTE: The ambient sound comprises the residual sound and the specific sound when present.
- Ambient Sound Level,  $L_a = L_{Aeq,T}$ : Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
- Background Sound Level,  $L_{A90,T}$ : A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given interval, T, measured using time weighting F and quoted to the nearest whole number of decibels (dB).
- Rating Level,  $L_{Ar,Tr}$ : Specific sound level plus any adjustment for the characteristic features of the sound.
- Specific Sound Level,  $L_s = L_{Aeq,T}$ : Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T.
- Specific Sound Source: Sound source being assessed.

BS4142:2014 defines the impact of the specific sound by subtracting the measured background sound level from the rating level. This assessment is detailed in Table 1 and is reproduced from Section 11 of BS4142:2014 where it states: “Typically, the greater this difference, the greater the magnitude of impact”.

*Table 1: BS4142:2014 Assessment of impacts*

| <b>Rating Level minus Background Sound Level</b> | <b>Assessment of Impacts</b>  |
|--|---|
| Around +10dB or more                             | A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context. |
| Around +5dB                                      | A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.                     |

In addition, BS4142:2014 states:

“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

BS4142:2014 also notes that, “adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact”.

To account for the acoustic character of proposed sound sources, BS4142:2014 provides the following with respect to the application of penalties to account for “the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention”.

- **Tonality** – “For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;
- **Impulsivity** – A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;
- **Intermittency** – When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty

- of 3dB can be applied; and
- Other Sound Characteristics – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.”

Finally, BS4142:2014 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

### **Information collated during surveys**

During each measurement period (shredder on and shredder off scenarios) the surveyor would make detailed notes which would include the following:

- details of the instrumentation used including calibration details;
- details of the prevailing weather conditions on the day/night of the survey, including;
  - temperature;
  - humidity;
  - cloud cover;
  - wind speed and
  - direction;
  - any precipitation present;
- details of the ground conditions between each receptor and the proposed development site;
- the audibility of the shredder at each location during the operational survey;
- critical listening log of events to detail other main audible sound sources at each measurement location during each time period and the general soundscape;
- details of any short-term noise events (i.e. car braking suddenly) which could influence the baseline survey results; and
- details of other pieces of equipment that will be operating at the same time as the shredder. This equipment is expected to comprise of two excavators, each with a 275Kw horsepower engine.

### **Assessment Methodology and Significance Criteria**

The guidance provided the Environment and Resources Authority, ERA for noise assessments held on the shredder stated that the operational noise sources should be quantified and impact on all noise sensitive receptors should be established with reference to the agreed acceptability criteria as specified within the same guidance and illustrated below.

Once the magnitude of noise impact has been described the level of significance of impact is determined based on the sensitivity of the existing or proposed noise receptors.

The impact assessment methodology is used after potential noise impacts, which are likely to arise as a result of the proposed project, have been identified. This study is required if the proposed development



will create noise (Noise Generating Development – NGD) which may affect nearby noise sensitive receptors, for example, a new commercial activity near existing residential properties.

The level of significance is determined in relation to the magnitude of impact together with the sensitivity of the receptor. Different Noise Sensitive Receptors (NSR) can be classified in three levels of sensitivity: High, Medium and Low as seen below in Table 2.

*Table 2: Level of Sensitivity Associated with Various NSRs*

| Sensitivity | Description of NSRs  |
|-------------|--|
| High        | Receptors where people or operations are vulnerable to noise, such as: Residential, Recreational Areas, Educational Institutions, Hospitals, Homes for the elderly, Places of worship. |
| Medium      | Receptors are moderately sensitive to noise, if it causes some distraction or disturbance, such as: Offices, Bars/Cafes/Restaurant.  |
| Low         | Receptors where distraction or disturbance from noise is minimal, such as: Night Clubs, Sports Ground, Factories.  |

After all noise sensitive receptors have been identified and prioritised according to their level of sensitivity as identified in the Table 2, the magnitude of the impact is classified as none/negligible, minor, moderate or major according to the noise monitoring study as shown in Table 3.

*Table 3: Classification of Magnitude on Noise Impact Criteria from different Noise Sources*

| Noise Source                         |  | Noise Level (dB) | Magnitude of Adverse Impact |
|--------------------------------------|--|------------------|-----------------------------|
| Road Traffic (Change in Noise level) |  |                  |                             |
| Target Levels                        | Forecast - Existing Traffic Noiselevel   | >5               | Major                       |
|                                      | <3dB<br><br>Day Time: LAeq[16hrs(07:00-23:00)]<br>Night Time: LAeq[8hrs(23:00- 07:00)]   | ≤5 but ≥3        | Moderate                    |
|                                      |  | <3 but ≥1        | Minor                       |
|                                      |  | <1 but ≥0        | Negligible                  |
|                                      |  | 0                | No Change                   |
| Industrial or Commercial Noise       |  |                  |                             |
| Target Levels                        | Rating Level – Background Noiselevel<br><br>(L <sub>Ar</sub> )-(L <sub>A90</sub> ) < 5dB | >10              | Major                       |
|                                      |  | ≤10 but ≥5       | Moderate                    |
|                                      |  | <5 but ≥3        | Minor                       |
|                                      |  | <3 but ≥0        | Negligible                  |
|                                      |  | 0                | No Change                   |

The different levels of significance relating the magnitude of impact with the sensitivity of the receptor are defined in Table 4.

Table 4: Level of significance

| Magnitude of Adverse Impact | Level of Significance Relative to NSR |               |               |
|-----------------------------|---------------------------------------|---------------|---------------|
|                             | Low                                   | Medium        | High          |
| Major                       | Moderate                              | Substantial   | Severe        |
| Moderate                    | Minor                                 | Moderate      | Substantial   |
| Minor                       | Minor                                 | Minor         | Moderate      |
| Negligible/No Change        | Minor/Neutral                         | Minor/Neutral | Minor/Neutral |

The levels of significance are as detailed:

- **Severe** environmental significance is associated with the impacts where mitigation is not practical or would be ineffective and could influence the decision whether or not to proceed with the project.
- **Substantial** environmental significance is associated with the effects that are important considerations, which could result in adverse effects if they are not mitigated.
- **Moderate** environmental significance could have an influence on the decision unless it is mitigated.
- **Minor/Neutral** environmental significance will not have an influence on the decision or require modification on the project design or alternative mitigation and noise need not be considered as a determining factor in the decision process.

ERA guidance also states that the assessment should take into account the relevant factors, but is not limited to:

- the cumulative effects with other existing sources including traffic and new development;
- additional effects of road traffic associated with the operations on site; and identification and analysis of impact of all noise generated within the proposed development on itself.

The measured baseline sound levels would be compared to the measured operational sound levels and assessed in accordance with the guidance contained in British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound and the Environmental Noise Impact Study TORs – Industrial which were issued by the ERA.