Noise Management PLAN

Morris & Co (Handlers) Ltd

Bankwood Lane
New Rossington
Doncaster
South Yorkshire
DN11 0PS

Permit number: EPR/JP3190CL
Grid Reference: SK 60607 98912

Revision History

Version	Date	Comments	Author	Approved by
1	Nov 2020	First version	Jo Mcanulty	Tom Morris
2	Jan 2022	Section 1.3 - Noise Sensitive Receptors map updated Section 2.2 – Operational hours Saturday finish 12pm Appendix 4 added - Environmentally Sound Dec21 report	Jo Mcanulty	Tom Morris

1 Introduction

As a waste recycling facility the site is required to operate under an Environmental Permit and one of the conditions of that permit is to have an environmental management system.

The site currently operates 3 core documents relating to mitigating environmental risks within the companies environmental management system:

- Summary of Management Systems - this document highlights the steps taken to control day to day environmental risks.
- Accident Management Plan – this document considers the company's response to accidents on site.
- Fire Prevention Plan – this document identifies the potential Environmental hazards with a review to meeting the 3 Environment Agency objectives:

The site also has a number of controlled procedures and plans including this document – Noise Management Plan and Odour Management Plan, Fly Management Plan and Dust Management Plan. Please note that the core documents and site management plans should be read in conjunction with the procedures and controlled document list held within the environmental management system.

1.1 – Purpose

This Noise Management Plan (NMP) is intended to be used as a reference working document for all staff. It outlines the main potential noise sources identified on site, the mitigation measures implemented to reduce the risk of noise nuisance and the monitoring, maintenance and recording methods to be used during the lifetime of the sites operation. The NMP has a dual function of showing how existing controls control noise release potential and identifying where improvements can be made.

1.2 - Overview of the Site

Site is located to the south of J3 M18 at Bankwood Lane, New Rossington.
Please see Site Location Plan (drawing no 02).

The site is regulated by the Environment Agency under Environmental Permit no. EPR/JP3190CL.

The Environmental Permit details the permitted waste types and quantities for the site.

- The licence permits the holder to operate a Metal Recycling Site and Vehicle Depollution & Dismantling Facility. The site no longer accepts ELV (End of Life Vehicle) waste and therefore this summary relates to the Metal Recycling performed on site.
- The total quantity of waste that can be accepted on the site is 75,000 tonnes per year (permit variation submitted August 2020[1] to increase annual throughput to 180,000 tonnes).
- On a daily basis, the site receives ferrous metals removed from bottom ash and this is processed on site.
- Metal recyclables are predominately received loose on articulated or bulk carrier vehicles.
- Loose material, once checked and accepted upon delivery, is stored on the outside yard area in dedicated bays.
- Material following treatment is stored on the outside yard area in dedicated bays.
- Treatment of waste is performed on site, the majority of the treatment processes are inside a building.

[1] Variation submitted August 2020 returned with request for further information, variation to be resubmitted.

1.3 – Noise Sensitive Receptors

For the purpose of this assessment, a radius of 1km has been adopted for potential sensitive receptors. Please see Receptor Plan drawing no: 10 (appendix 1)

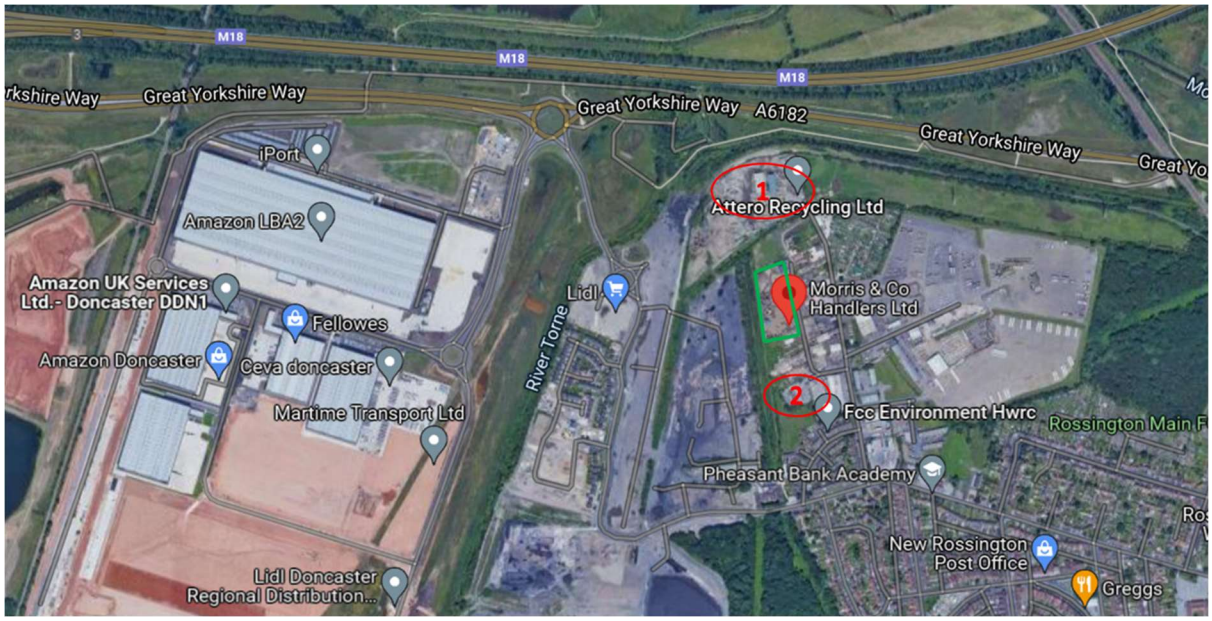
Potential sensitive receptors within 200 metres of the site are identified.
Key:

1. Parker Skip Hire
2. Commercial Vehicle Breakers
3. GL Filtration

R. Residential

The Bankwood Industrial Estate has various operators of waste management facilities. The facilities handle different waste types, the sites that have the potential to generate noise are highlighted below.

Overview of layout of area within 200 metres of the site is as follows:



Key

1. Waste treatment and transfer station (Eco Power Environmental)
2. Household Waste Recycling Centre

1.4 – Drawings

All Morris & Co sites have the same numbering on the drawings, however some sites may not require the full suite of drawings as the sites are slightly different i.e owned or rented. The drawing numbers are maintained across the different sites for referencing purposes.

All site plans are 1:5,000 size and able to be printed to A1 size. All new staffs are shown the site drawings during induction training to make them familiar with the site.

The drawings for the site are:

Drawing Title	Drawing Number
Site Location Plan	02
Site Ownership Boundary Plan	03
Environmental Permit Boundary	04
Fire Hydrant Locations	05
Fire Protection Plan	06
Site Infrastructure Plan	07
Material Storage Plan	08
Site Drainage Plan	09
Receptor Plan 1km	10
Odour sniff test points	11

2 Site Operations

2.1 – Overview of The Operation and Products

On a daily basis, the site receives incinerator metal. The incinerator metal goes through a treatment shredding operation to separate and extract different metal grades to increase the recycling rate.

The site also occasionally receives non-ferrous from mixed biological treatment (NFMBT), ferrous from mixed biological treatment (FMBT), mixed steel UBCs and aluminium UBCs. All of these grades also go through the shredding equipment.

2.2 – Operational Hours

Day	Staff on site	Operational hours	Weighbridge hours
Mon – Fri	6.30 – 19.00	7.30 - 18.00	7.30 – 16.30
Sat	6.30 – 14.00	7.30 - 12.00	Closed
Sun / BH	Maintenance only as required	Closed	Closed

2.3 – Potential Noise Sources on Site

The Noise Report[2] completed by Castings Technology International (CTI) dated November 2020 identified the following sources of sound detectable at the boundary. Table 1 copied below from the report includes a gauge of the significance of each source's contribution to boundary level sound. These are given as high, medium or low as suggested in Technical Guidance Note H3: Horizontal Guidance for Noise Part 2.

Table 1: Description of Sound Sources

	Sound Source Description	Continuous or Intermittent?	If Intermittent, How Frequent?	Fixed or Mobile?	Hours of Operation	Sound Character Description	Contribution to Site Emission
1	Shredder operation	Continuous	-	Fixed	07:30 – 18:00	Clangs, crashing	High
2	Grabber operation	Semi-continuous	-	Mobile	07:30 – 18:00	Clangs, crashing, engine revving	High
3	Shovel loader operation	Semi-continuous	-	Mobile	07:30 – 18:00	Clangs, crashing, engine revving	High
4	FLT use	Intermittent	As required	Mobile	07:30 – 18:00	Engine revving, moving alarm, thuds, clangs	Medium
5	Vehicles/lorry deliveries	Intermittent	As required	Mobile	07:30 – 18:00	Engine revving	Medium

[2] CTI Report Ref: E73527 – copy at Appendix 3 below

The separate noise report[3] completed by Environmentally Sound Ltd on 22nd December 2021 highlighted the following sources of noise at section 2b:

- Shredder
- Telehandlers – Sennebogen 830E (electric) and Sennebogen 818E (diesel)
- Case front loader
- Articulated vehicles

The potential sources of noise identified were therefore the same on both reports.

3 Noise Management

3.1 – Hierarchy for Noise Management

The site can effectively reduce noise simply by being aware of its presence as an issue for the site and by adopting procedures when carrying out everyday activities. Such procedures can be collectively called 'noise management' and can be particularly important where substantial noise control has been incorporated in a plant design.

The hierarchy for control should be to:

1. Prevent generation of noise at source by good design and maintenance.
2. Minimise or contain noise at source by observing good operational techniques and management practice.
3. Increase the distance between the source and receiver.
4. Sympathetic timing and control of unavoidable noisy operations.

3.2 – Noise Control Measures

The following control measures are performed on site:

- All equipment for treatment operations are within a building
- Hours of operation are working day hours only
- Residential development is more than 50m away
- Neighbouring industrial businesses are waste facilities and heavy industrial and therefore the background noise of the industrial estate is elevated.
- The site does not accept fire extinguishers in the waste and thus there is no risk of explosion
- The site does not use a metal shear
- The site does not handle heavy metals, only soft metals are received on site, thus reducing noise
- There is no process on site that requires metals to be dropped from a height
- On site mobile plant and machinery complies with current legislative requirements.

3.3 – Conclusion of Noise Assessment Reports

The full CTI Noise Assessment Report can be found at Appendix 3 below and the full Environmentally Sound Ltd Dec 2021 report can be found at Appendix 4.

[3] Environmentally Sound Ltd report 22nd December 2021 – copy at Appendix 4 below

Conclusion from CTI Noise Assessment Report:

Discussion and Conclusions *

Corrections were added for impulsivity to the specific sound level in both BS 4142 assessments, + 6 dB for the Davy Road assessment as impulsivity from the shedder, grabber, and shovel loader operations were clearly audible at the monitoring location, and + 3 dB for the Bankwood Crescent assessment as impulsivity from the shedder, grabber, and shovel loader operations were perceptible at the monitoring location.

At the Davy Road location during the daytime, the excess of rating over background was - 3.6 dB. When this figure is considered as it is, it suggests that the sound from Morris & Co is of low impact, depending on the context. At the Bankwood Crescent location during the daytime, the excess of rating over background was + 4.4 dB. When this figure is considered as it is, it suggests that the sound from Morris & Co is potentially of adverse impact, depending on the context.

The consideration of context is important. Unfortunately the ambient and residual / background measurements could not be carried out on the same day, which probably would have been preferred as the residual noise environment would then have been more similar. There was some building activity fairly near to both monitoring locations, especially to the west of Morris & Co, as new estates are still being built in the area, but it was attempted to minimise these influences by pausing the sound level meter for loud / close activity. However, it is thought that these influences led to a misleading excess of rating over background for the Davy Road location, as the residual sound level was raised and similar to the ambient sound level. Given that the shredder, grabber, and shovel loader operations were clearly audible from Morris & Co during the ambient measurement with a + 6 dB acoustic correction being applied for this, it is the impression that the sound from Morris & Co should be potentially of adverse impact at the Davy Road location.

However as already discussed, Morris & Co undertook the significant measure of building an enclosure around their shredder and conveyors last year to reduce their site sound emissions, and they have received no complaints from nearby dwellings since doing this. It was noticed from the location of the building sites to the west of the site that the plan includes additional residential development closer to the Morris & Co site. Should this be the plan, it would need to be undertaken with careful consideration (e.g. residences built with appropriate acoustic protections in place).

Conclusion from Environmentally Sound Dec 2021 Report:

Conclusion

There is no noticeable difference between the noise levels recorded when running the shredder at different loads. The noise variation between running at 800A and 1100A is less than 3dB.

3.4 - Maintenance

The site follows the Plant Maintenance Procedure (ProMaintenance) for all maintenance on site. In high level detail, plant is maintained by:

- Regular servicing in accordance with manufacturers recommendations
- Issues highlighted in daily pre-operational checksheets

There are daily pre-operational checksheets for all fixed and mobile plant (when in use) and a job sheet is completed for each specific machine which covers ongoing repairs and hours. It is recognised that regular servicing and maintenance of the plant minimises the risk of overheating. The sheets are handed into the weighbridge where a summary report is collated for mechanics. The report is given back when the items completed.

3.4 – Training

Training of new and existing employees is undertaken as per the Training Procedure (ProTrain) and is the responsibility of the Site Manager or Finance Officer dependent on role.

All new employees are inducted. There is an induction program which includes (but not limited too):

- Company awareness including no smoking policy

- Health and Safety
- Environmental permit awareness
- Emergency evacuation procedure

Following induction the employee is added to the company Training Matrix, where key training requirements are added dependent on role. The Training Matrix provides the full list of training available, trained, in progress or requiring training, all staff should make themselves familiar with this document, it is a live document and updated on an ongoing basis. The Training Matrix includes details of internal training, external training, SSOW[4]/RA[5]/COSHH training one to one mentoring, toolbox talks or practice drills completed.

An illustration of the Training Matrix is below, further training is carried out than listed below, this is just an illustration. Also the names of the site staff are completed in the live document and a copy of the Training Matrix for the Rossington site is readily available on the Compliance Drive.

Visitors are supervised whilst on site. At the visitors sign in area, there is an instruction sheet to the site that makes them aware of the correct safety and fire prevention procedures whilst on site.

Illustration only – Training Matrix:

STAFF TRAINING MATRIX

Skill / Name	Induction inc H&S	Manual Handling	EA Technical Comp	WamitabContinuing Competence Certificate Transfer/Treatment of HW	Load Accetance and Rejection Procedure	Waste Receipt, Separation and Storage	Env Permit Awareness	Fire Prevention Plan	Fire Marshall & Extinguisher Users	Evacuation and emergency response	Spill Response	Noise Management Plan	Daily Checks and Maintenance - Baler	Daily Checks and Maintenance - shredder	Daily Checks and maintenance - 360	Daily Checks and Maintenance - Wheeled Loading Shovel	Daily Checks and maintenance - Counter Balance Forktruck	Plant re-fueling	Loading / Unloading
Site Manager																			
Site Supervisor																			
Operator 1																			
Operator 2																			
Operator 3																			

Trained	
Training in Progress	
Able to Train Others	
Training Required	

4 Noise Monitoring

4.1 – Noise Monitoring

Noise levels are considered daily by the site manager at the entrance to the site and recorded on the Daily Environmental Checksheet.

[4] Safe System of Work

[5] Risk Assessment

4.2 – Managing Noise Complaints

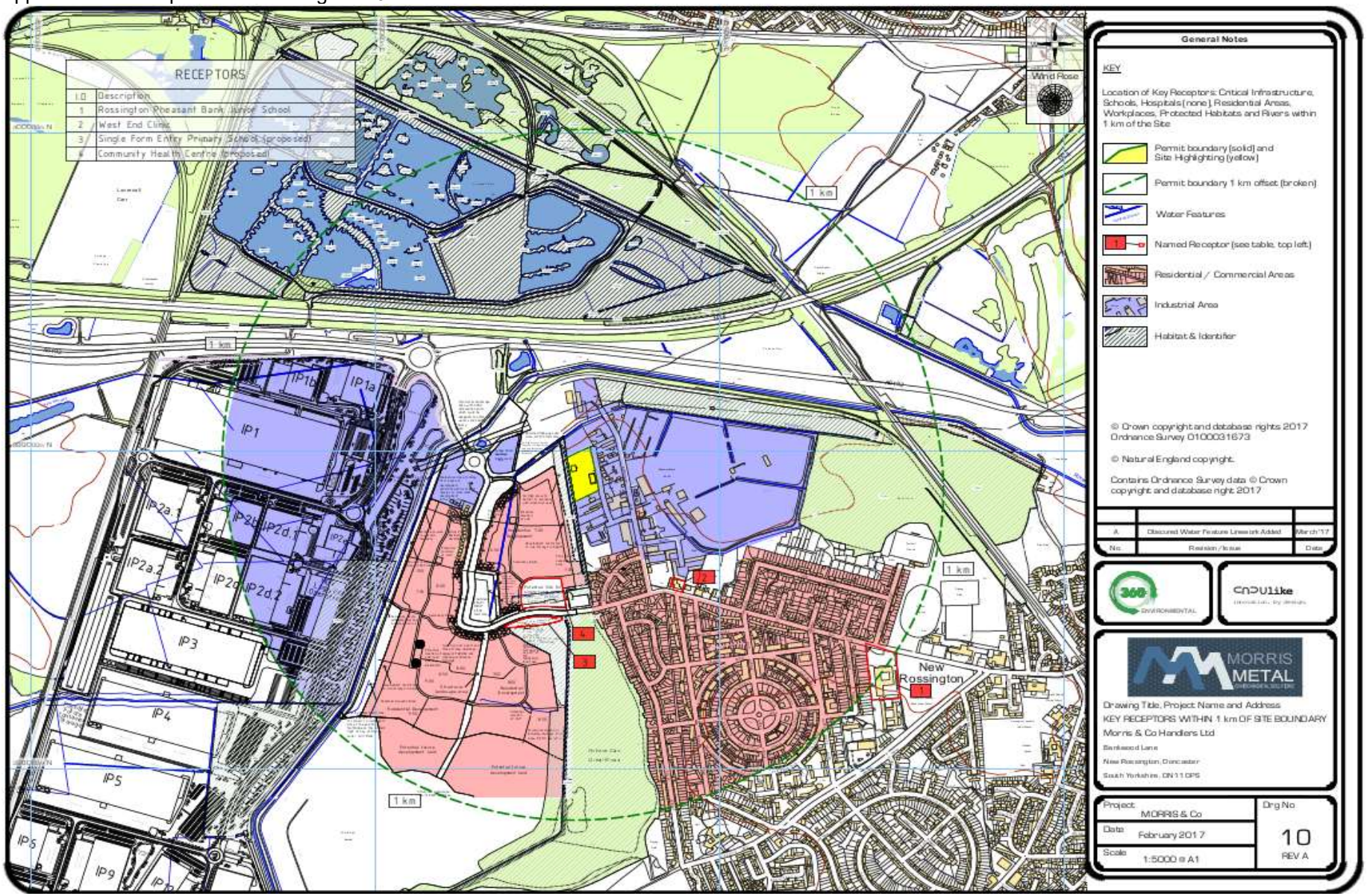
If complaints were received regarding noise the Noise Complaint Form together with a record of any likely causes noted at the time should be completed. The complaint shall be investigated and a concluding record made. A copy of the Noise Complaint Form can be found at Appendix 2 below.

4.3 – Keeping NMP up to date

The NMP is a live document and any of the following circumstances may warrant a review:

- Noise complaint
- Installation of new equipment
- Change in metal types accepted on site
- Development of site infrastructure i.e increased external storage area
- Recommendations received from external parties or highlighted during ongoing risk assessments

Appendix 1 – Receptor Plan Drawing No.10



Appendix 2 – Noise Complaint Form

Noise Complaint Form

Complaint No:.....

Time and date of complaint:	Name and address of complainant: Telephone number of complainant: Email of complainant:
Location of caller in relation to the site?	

Date of noise event:	
Time of noise event:	
Duration of offending noise:	
Weather conditions at the time of offending noise (i.e., dry, rain, fog, snow):	
Temperature (very warm, warm, mild, cold or degrees if known):	
Wind strength (none, light, steady, strong, gusting):	
Wind direction (eg from NE):	
Complainant's description of noise: o What kind of noise is it?	
o Duration of the offending noise (time):	
o Is it a constant or intermittent noise in this period:	
o Does the complainant have any other comments about the noise?	

Are there any other complaints relating to this noise? (either previously or relating to the same exposure):	
Operating conditions at the time of the offending noise and any deviations from standard practices at the time:	
Do you accept that the noise is likely to be from your activities?	
What was happening on site at the time the noise occurred?	
Follow up, time and date caller contacted:	
Actions taken:	
Is an amendment to the Noise Mgt Plan required?	

Form completed by:	Date:	Signed:

Noise Complaint Form Version 1

Advanced Manufacturing Park,
Brunel Way, Rotherham, S60 5WG
Tel: +44 (0)114 2158 300
Registered in England & Wales No 8531295

UKAS Testing Laboratory No 0144

ENVIRONMENTAL SOUND ASSESSMENT

November 2020

Morris & Co (Handlers) Limited

Bankwood Lane Industrial Estate
Rossington
Doncaster
DN11 0PS

Customer Ref: JA003

Advanced Manufacturing Research Centre

0144

A division of Castings Technology International Ltd
Registered in England and Wales No 8531295

Introduction

Castings Technology International Ltd. was requested by Morris & Co (Handlers) Limited to undertake an environmental sound assessment of their Rossington site in order to assist in satisfying the requirements of the Environmental Permitting Regulations 2016 and provide information useful for the ongoing management of existing and future environmental sound. The purpose of this report was to locate and identify the main sources of sound on site and evaluate the potential impact of site emissions to potentially sensitive receptors. The main sources of sound were identified by Peter Holdsworth of Cti. Peter took measurements required for the evaluation during visits to the closest potentially sensitive receptors in November 2020.

The sound measurements made to facilitate the BS4142 sound assessment are UKAS accredited (marked #). The actual BS 4142 assessment, including the calculations and any comments made, and therefore sections marked * are not UKAS accredited.

Assessment methods and equipment

The assessment was undertaken in accordance with the Environment Agency guidance, with reference to the following documents:

- IPPC H3 Horizontal Guidance for Noise Part 2 – Noise Assessment and Control, Section 2
- The sound measurements are undertaken following CTI Operating Procedure (OP) 313, and are accredited by UKAS (marked #). The BS 4142 assessment undertaken in the report follows OP 305, which is not UKAS accredited.

Measurements and evaluation of the sound impact were undertaken in accordance with *BS 4142:2014 Methods for rating and assessing industrial and commercial sound*, using a Type 1 integrating sound level meter. A summary of the assessment procedure is given in Appendix II, along with a description of the instrumentation and measurement practice.

Complaint history and planning conditions *

Complaint history and noise source history

There were 4 complaints from residences to the west of Morris & Co regarding nuisance noise in 2020, although the odd one was before 7.30 am (before Morris & Co begins operations), so this was thought to be from another site. There have been no complaints since Morris & Co built an enclosure surrounding the main operations (shredder, conveyors, etc.).

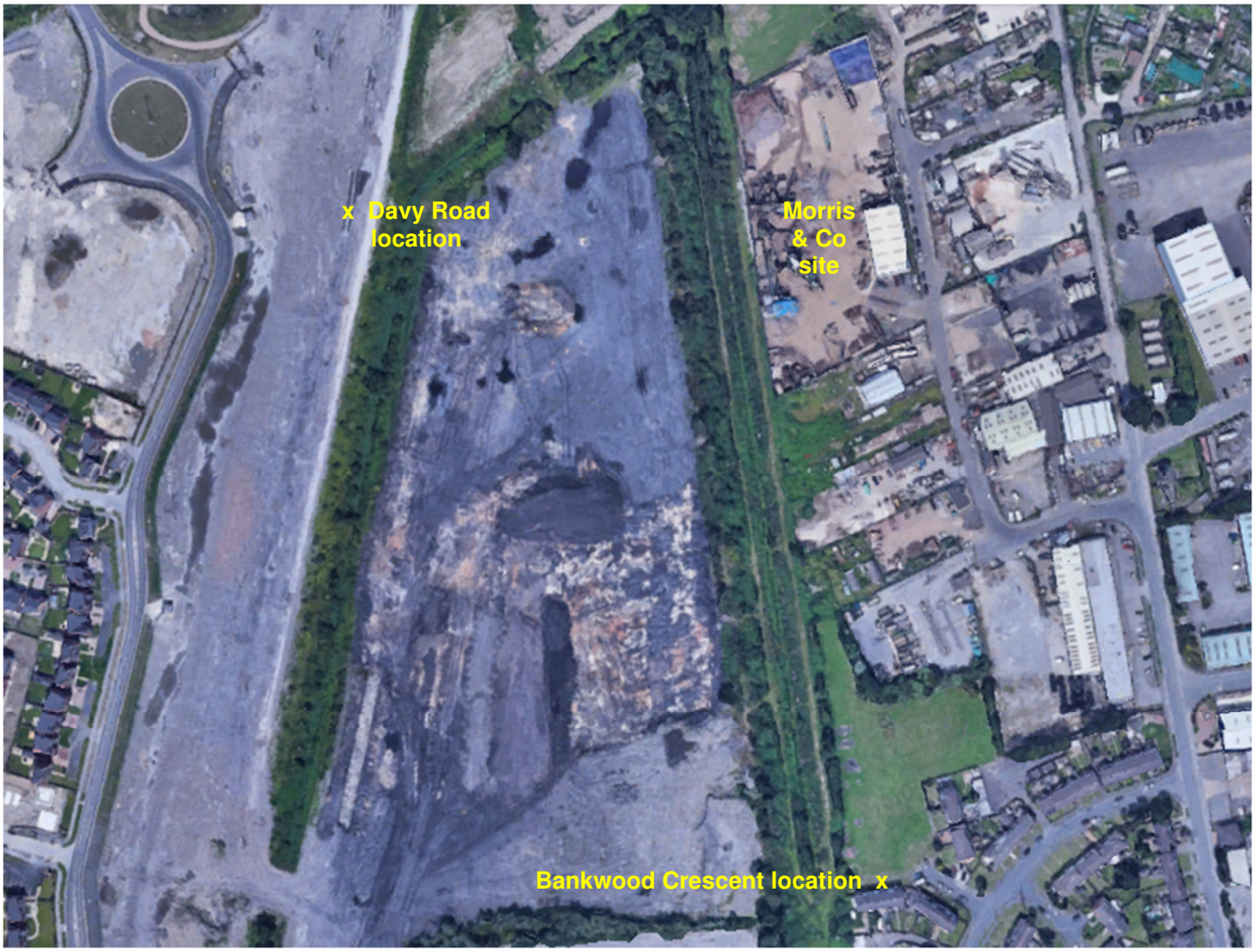
Sound conditions as listed in the Company's Permit to Operate are as follows:

There are no sound conditions listed in the Company's Permit to operate.

Surrounding area and potential receptors *

A view of the site, surrounding area and location of potentially sensitive receptors is given in Figure 1 on page 3.

Figure 1: View of the Morris & Co (Handlers) Limited site, surrounding area, and location of potentially sensitive receptors (note this aerial photo does not show all the residential development to the west, south west, and south of the site, as it was taken prior to such development).



Description of sound sources *

The sources of sound detectable at the boundary are listed in Table 1, which includes a gauge of the significance of each source's contribution to boundary level sound. These are given as high, medium or low as suggested in Technical Guidance Note H3: Horizontal Guidance for Noise Part 2.

Table 1: Description of Sound Sources

	Sound Source Description	Continuous or Intermittent?	If Intermittent, How Frequent?	Fixed or Mobile?	Hours of Operation	Sound Character Description	Contribution to Site Emission
1	Shredder operation	Continuous	-	Fixed	07:30 – 18:00	Clangs, crashing	High
2	Grabber operation	Semi-continuous	-	Mobile	07:30 – 18:00	Clangs, crashing, engine revving	High
3	Shovel loader operation	Semi-continuous	-	Mobile	07:30 – 18:00	Clangs, crashing, engine revving	High
4	FLT use	Intermittent	As required	Mobile	07:30 – 18:00	Engine revving, moving alarm, thuds, clangs	Medium
5	Vehicles/lorry deliveries	Intermittent	As required	Mobile	07:30 – 18:00	Engine revving	Medium

Initial risk assessment *

Vibration

No vibration can be felt outside the site buildings; there is no apparent risk of vibration generated on site affecting the nearby potential sensitive receptors.

Sound

The houses to the west of the Morris & Co site were assessed to be the most likely potentially sensitive sound receptors, given their proximity and clear line of sight to the Company. Additionally, there has been a history of complaints from these residences. A reconnaissance of the area also discovered potentially sensitive residential receptors to the south of the site. Two measurement locations were chosen for BS 4142 assessment, one at Davy Road to the west of Morris & Co and one at Bankwood Crescent to the south of the site. The measurement positions at these potentially sensitive receptor locations were chosen at easily accessible locations; on the driveway of number 5 for Davy Road, and outside number 25 at Bankwood Crescent. When the Company is fully operational, the sound from the shredder operation and other machinery (grabber, shovel loader) is clearly audible at the Davy Road location to the west of the site, with these operations being perceptible at the Bankwood Crescent location.

Daytime ambient sound measurements were taken at these locations during normal Morris & Co operations. Daytime residual / background sound measurements were taken at the potentially sensitive receptor locations when the site was not in operation. Measurements were taken at approximately 1.5 metres above ground level.

Weather conditions pre-determine whether or not measurements can be made. Assessments of wind speed are made either by using a hand-held anemometer, or by using the Beaufort Scale, and should they exceed 5 meters per second (11 miles per hour) or Beaufort 1 (light air), measurements should be carried out at another time. Measurements also cannot be undertaken during weather conditions such as sub-zero temperatures, precipitation or fog, as these may affect either the instrumentation, or the measurements being taken.

BS 4142 Assessments *

BS 4142 is used to assess the significance of sound of an industrial nature from the margin by which the rating level of the specific sound exceeds the background level and the context in which the sound occurs. Typically, the greater this difference, the greater the magnitude of the impact.

- A difference of around +10 dB or more is likely to be an indication of significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- 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 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.

Daytime BS 4142 Assessment to west of site at Davy Road:

Weather conditions: no precipitation, wind gusts no greater than 1 m/s for all measurements	
Ambient sound level:	$L_{Aeq(15min)}$ = 51.2 dB #
Residual sound level:	$L_{Aeq(15min)}$ = 51.0 dB #
Specific sound level by calculation:	$L_{Specific}$ = 37.7 dB
Acoustic correction: Shredder, grabber, and shovel loader operations clearly audible from Morris & Co during ambient measurement	+ 6 dB (clearly perceptible impulsivity)
Rating level:	= 43.7 dB
Background sound level:	$L_{A90(15min)}$ = 47.3 dB #
Excess of rating over background level:	- 3.6 dB
The assessment indicates that the sound from Morris & Co is of low impact, depending on the context	

Daytime BS 4142 Assessment to south of site at Bankwood Crescent:

Weather conditions: no precipitation, wind gusts no greater than 1 m/s for all measurements	
Ambient sound level:	$L_{Aeq(15min)}$ = 44.4 dB #
Residual sound level:	$L_{Aeq(15min)}$ = 42.4 dB #
Specific sound level by calculation:	$L_{Specific}$ = 40.1 dB
Acoustic correction: Shredder, grabber, and shovel loader operations perceptible from Morris & Co during ambient measurement	+ 3 dB (just perceptible impulsivity)
Rating level:	= 43.1 dB
Background sound level:	$L_{A90(15min)}$ = 38.7 dB #
Excess of rating over background level:	+ 4.4 dB
The assessment indicates that the sound from Morris & Co is potentially of adverse impact, depending on the context	

Note: only the actual recorded measurements marked # are UKAS accredited

These results relate only to those measured during the site visit and the acoustic environment present at that time.

All measurements marked # have an expanded uncertainty of ± 1.04 dB. The expanded uncertainty is that related to the actual measurement, and is based on a standard uncertainty multiplied by a coverage factor K=2 to provide a level of confidence of approximately 95%. There may be other uncertainties that cannot be easily estimated which relate to the surrounding environment that can change from day to day, and may have some influence on the measurements.

Assessment based on indicative BAT requirements *

Indicative BAT requirements in the H3 Guidance states that the operator should:

- "employ basic good practice measures for the control of noise" and "ensure that the noise from the installation does not give reasonable rise for annoyance"
- "justify where either rating levels from the installation exceed the numerical value of the background level, or absolute levels of 50 L_{Aeq} by day or 45 L_{Aeq} by night are exceeded."

Even the residual sound (without Morris & Co present) level was greater than the daytime 50 L_{Aeq} level at the Davy Road location, with it being noted that traffic on the West End Lane and other residual sound sources were influential. There was also what sounded like an engine sound present from a site to the north of Morris & Co, although this was deemed to not be too intrusive. The calculated specific sound level for both BS 4142 assessments were well below the daytime 50 L_{Aeq} level. It appears from evidence so far that the installation of an enclosure over the shredder and conveyors at Morris & Co was a significant control measure to reduce sound at the boundary.

Discussion and Conclusions *

Corrections were added for impulsivity to the specific sound level in both BS 4142 assessments, + 6 dB for the Davy Road assessment as impulsivity from the shedder, grabber, and shovel loader operations were clearly audible at the monitoring location, and + 3 dB for the Bankwood Crescent assessment as impulsivity from the shedder, grabber, and shovel loader operations were perceptible at the monitoring location.

At the Davy Road location during the daytime, the excess of rating over background was - 3.6 dB. When this figure is considered as it is, it suggests that the sound from Morris & Co is of low impact, depending on the context. At the Bankwood Crescent location during the daytime, the excess of rating over background was + 4.4 dB. When this figure is considered as it is, it suggests that the sound from Morris & Co is potentially of adverse impact, depending on the context.

The consideration of context is important. Unfortunately the ambient and residual / background measurements could not be carried out on the same day, which probably would have been preferred as the residual noise environment would then have been more similar. There was some building activity fairly near to both monitoring locations, especially to the west of Morris & Co, as new estates are still being built in the area, but it was attempted to minimise these influences by pausing the sound level meter for loud / close activity. However, it is thought that these influences led to a misleading excess of rating over background for the Davy Road location, as the residual sound level was raised and similar to the ambient sound level. Given that the shredder, grabber, and shovel loader operations were clearly audible from Morris & Co during the ambient measurement with a + 6 dB acoustic correction being applied for this, it is the impression that the sound from Morris & Co should be potentially of adverse impact at the Davy Road location.

However as already discussed, Morris & Co undertook the significant measure of building an enclosure around their shredder and conveyors last year to reduce their site sound emissions, and they have received no complaints from nearby dwellings since doing this. It was noticed from the location of the building sites to the west of the site that the plan includes additional residential development closer to the Morris & Co site. Should this be the plan, it would need to be undertaken with careful consideration (e.g. residences built with appropriate acoustic protections in place).

Report prepared by:

Peter Holdsworth
Monitoring Consultant

Reviewed by:

Jon Donohoe
Environment Manager

Date: 4th January 2021

APPENDIX I: Equipment Used

The following data is common to all the measurements reported in this appendix:	
Method	
All measurements taken follow Cti OP 313 using a Cirrus CR:171B integrating sound level meter at selected positions based on L_{Aeq} and L_{A90}	
Sound Level Meter	Cti Reference CTI 541
Make, Model and Serial No	Cirrus CR:171B – GO78298
Details of last verification test	Calibration Laboratory: Cirrus Research PLC Date: 31st July 2019
Next Due	July 2021
Calibrator	Cti Reference CTI 542
Make, Model and Serial No	Cirrus CR:515 - 77760
Details of last verification test	Calibration Laboratory: Cirrus Research PLC July 2020
Next Due	July 2021

APPENDIX II: Methodology

Instrumentation and Measurement Practice

The meter used for measurements was a Cirrus CR:171B integrating sound level meter, serial number GO78298, with Noisetools version: 1.6.4.7200 software. The meter was calibrated before and after measurement visits at 93.7 dB using a Cirrus CR:515 acoustical calibrator. Unless otherwise stated no significant drift was observed. The microphone was mounted on a tripod during measurements at a height of approximately 1.5 m. Measurements were taken at fast setting unless otherwise stated. Conditions were considered appropriate for the measurement of sound at all times and any deviations from the method are noted in the measurement reports.

A brief explanation of the most widely used UK standard for assessment of environmental sound, "*BS4142:2014 Methods for rating and assessing industrial and commercial sound*", is given below;

1. make measurements at the assessment location, including the "problem" sound, in terms of L_{Aeq} – termed the "ambient" sound level.
2. a measurement is then made of all the sound excluding the "problem" sound in terms of both L_{Aeq} and L_{A90}; these measurements are termed the "residual" and "background" sound levels respectively. Where the "problem" sound is continuous the background level can be measured at a "representative" position.
3. the "residual" L_{Aeq} is then subtracted (logarithmically) from the "ambient" L_{Aeq} measurement to produce the sound level produced by the "problem" sound alone – termed the "specific" sound level.
4. if the "problem" sound is tonal (containing a noticeable hiss, whine or hum), is impulsive (contains bangs clatters, clicks or thumps), is intermittent or contains other sound characteristics that are readily distinctive, the specific sound level shall be subjectively corrected to produce the "rating level".
5. the "background" L_{A90} measurement is then compared against the "rating level".

if the "rating level" exceeds the "background" by a difference of >10 dB, this is an indication of a significant adverse impact depending upon context. A difference of around +5 dB is likely to be an indication of an adverse impact depending upon context. When the rating level does not exceed background levels it is an indication of a low impact dependant upon context.

During the daytime, measurements of the "problem" sound are averaged over a representative period of up to one hour, whereas at night the average is performed over a period of up to 15 minutes. The standard should not be used where BOTH the background sound and the rating level are low i.e. the background should not be below 30 L_{A90} AND the rating level below 35 dB(A).

The standard requires that the weather conditions are recorded and are such that the weather does not cause spurious measurements, e.g. the wind speed should not normally be greater than 5 m/s (11 mph), and that there should be no precipitation.

The measurements taken using the Cirrus CR:171B integrating sound level meter are subject to an expanded uncertainty of ±1.04 dB. The expanded uncertainty is related to the actual measurement, and is based on a standard uncertainty multiplied by a coverage factor K=2 to provide a level of confidence of approximately 95%. There may be other uncertainties that cannot be easily estimated which relate to the surrounding environment that can change from day to day, and may have some influence on the measurements.

Clause 12 of *BS4142:2014 Methods for rating and assessing industrial and commercial sound* states that the following information shall be reported:

a) Source under investigation as follows:
   i) Description of source and of specific sound;
   ii) Hours of operation;
   iii) Mode of operation (e.g. continuous, twice a day, only in hot weather);
   iv) Description of premises in which source is situated.
b) Subjective impressions including:
   i) Dominance or audibility of specific sound;
   ii) Main sources contributing to the residual sound.
c) Location of measurement positions, their distance from the specific sound source and the topography of the intervening ground, distance from specific sound source and any reflecting surface other than the ground including a dimensioned sketch with a north marker.
d) Sound measuring instruments including calibrator or pistonphone used:
   i) Type;
   ii) Manufacturer;
   iii) Serial number;
   iv) Details of latest verification test, including dates.
e) Operational test:
   i) Reference level of calibrator or pistonphone;
   ii) Meter reading before and after measurements with calibrator or pistonphone applied
f) Weather conditions, including:
   i) Wind speed and direction;
   ii) Presence of conditions likely to lead to temperature inversion (e.g. calm nights with little cloud cover);
   iii) Precipitation;
   iv) Fog.
g) Date and time of measurements.
h) Specific sound level:
   i) Measured sound level(s);
   ii) Residual sound level and method of determination;
   iii) Specific sound level and method of determination;
   iv) Justification of methods;
   v) Details of any corrections applied.
i) Measurement time intervals.
j) Reference time interval(s).
k) Rating level;
   i) Specific sound level;
   ii) Any acoustic features of the specific sound;
   iii) Rating level.
l) Background sound level and measurement time interval and in the case of measurements taken at an equivalent location, the reasons for presuming it to be equivalent;
m) Excess of the rating level over the measured background sound level and the assessment.

APPENDIX III: Glossary of acoustical terms

A weighting	A frequency weighting devised to attempt to take into account the fact that human response to sound is not equally sensitive to all frequencies. The indicated sound reading will correlate, approximately, with human response.
Ambient sound	Defined in BS 4142 as the totally encompassing sound in a given situation at a given time, usually composed of many sources near and far.
Background sound level	Defined in BS 4142 as the L_{A90} value of the residual sound.
Continuous	In the context of the table of sound sources in this report, a sound is said to be continuous if it is present continually between its hours of operation. It does not relate to the how steady or impulsive the sound is.
Impulsive	Technically a sound of less than 200 ms duration. In this report it refers to any sound that is notable because it happens quickly, such as a bang of dropping scrap, the squeak of a bag house reverse jet or bump of vehicles running over speed humps.
Intermittent	In the context of the table of sound sources in this report, a sound source is intermittent if it is audible for periods within a specified time, but the exact time varies. E.g. Consider an extraction fan that is used on demand during the day shift (6am – 4pm). Although the sound emitted from the fan is steady and may intuitively be called 'continuous', the fact that the fan is used in an unpredictable pattern during the day shift means that it will be described as intermittent. The source will be said to be "intermittent between 6am and 4pm on demand, emitting a steady hum."
L_{Aeq}	Continuous equivalent sound level. The steady A weighted sound level which, over the period of time under consideration, contains the same amount of (A weighted) sound energy as the time-varying sound.
L_{AFMAX}	The Maximum RMS A weighted sound pressure level in the measurement period. Using fast standard average time (125 ms).
L_{AFMIN}	The Minimum RMS A weighted sound pressure level in the measurement period. Using fast standard average time (125 ms).
L_n	The level that was exceeded for n% of the measurement period. Generally L_{90} is considered background. L_{10} is considered a measure of the peaks.
Masking	Acoustical phenomenon whereby a sound is inaudible due to the prevalence of a second source that serves to "mask" the other sound. If the "masking" sound ceases the otherwise inaudible sound can be clearly heard. It is sometimes considered important NOT to remove a continuous sound source if it is providing a mask of some other, potentially more annoying sound.
Octave	The range between two frequencies whose ratio is 2:1.
Overload [%]	The percentage of the measurement time that the sound pressure level exceeded the maximum range of the sound meter. These levels are rendered void and do not contribute to statistical measurements.
Rating level	The specific sound level plus any adjustment for characteristic features of the sound.
Residual sound	Defined in BS 4142 as the ambient sound remaining when the specific sound under investigation is absent. If these conditions cannot be measured directly, a representative value must be sought.
RMS	Root Mean Square. The RMS value is the square root of the sum of the squares of a set of values. Used to find an average displacement from zero of a data set when samples are both positive and negative.

END OF REPORT

Appendix 4 – Environmentally Sound Ltd Noise Assessment December 2021

ENVIRONMENTALLY SOUND®
ENGINEERING FOR THE ENVIRONMENT

Noise Report

for

Morris and Co. (Handlers) Limited

at

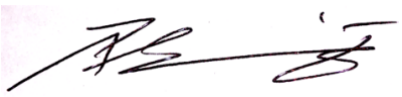
Bankwood Lane
Rossington
Doncaster
DN11 0PS

conducted on
22 December 2021

by

Environmentally Sound Limited

Tel: 01908 643433
Email: info@environmentallysound.co.uk

Report prepared by 

P. A. Schmitz CEng MIoA
Date: 6 January 2022

Registered in England and Wales Company No. 03619727
VAT registration number: GB 337816773

Table of Contents

Summary

The noise levels of all machinery on site were evaluated. Noise assessments were taken at several locations in and around the site.

From the data recorded, it is evident that the noisiest machine on site is the shredder; considering that it shreds metal, it is not surprising.

As Morris and Co. (Handlers) Limited would like to run the shredder at a higher power rating (to increase throughput), the Environmental Agency requested more noise level data and analysis on running the shredder at a higher current of 1100A.

It was decided to run a back-to-back test to ascertain the change in noise level during operation. The test was conducted by running the shredder at 800A, 1100A and then again at 800A.

When running the shredder at 1100A, it had no significant increase in noise level, but a lower noise level was recorded. See Appendix F for recorded data, analysis, and discussion.

As there are other noise sources on site, noise level recordings were performed in and around the Morris and Co. site. These recordings are also discussed in this report and are included in Appendix E.

For all the recordings taken outside the premises, the background noise ranged between 50dBA and 60dBA, where the latter was taken at the far reach of the field to the north of the site (location 4).

At location 6, it was observed that the noise came from the north-east, as the sound was of diesel engines under variable load. Morris and Co. (Handlers) Limited do not run large diesel engines on site.

Introduction

Morris and Co. (Handlers) Limited, care of Joanne McAnulty, approached Environmentally Sound Limited to perform a BS 4142 noise assessment. At the time there was no definite reason for the BS 4142 noise assessment, other than a general interest from the director of Morris and Co. Limited.

Our approach was to assess the noise sources on site, and gather as much information as possible, should the possibility for noise modelling arise. Several locations inside the premises and outside the premises were assessed, and can be used to validate the noise model, i.e. check the noise levels coincide with those of the noise model.

Environmentally Sound Limited used the British Standard procedure BS 4142:2014 '*Method for rating and assessing industrial and commercial sound*' to determine the impact of the various noise sources on the site. Noise recordings were taken on and around the site of all the noise sources that were operational on the day of our site visit.

On the day of the assessment, an email from the Environmental Agency (EA) was shared and discussed with Environmentally Sound Limited. The EA had concerns over the previous noise assessment report and requested further information. This noise assessment report addresses their concerns by providing noise data and the analysis thereof.

Reference Appendix A for the detail of the email from the Environment Agency, and Appendix E and Appendix F for the noise elves recorded, analysis and discussion of the results.

Raw data and analysis results are stored on file at Environmentally Sound Limited, should further analysis be requested by Morris and Co. (Handlers) Limited, and/or the planning authorities.

1. Scope

The scope of this assessment is to determine the noise level of various equipment and machinery used on the recycling site, and to provide the information requested by the EA.

As stated in the British Standards BS 4142:2014, the standard is used in this report to assess the

> *"sound of an industrial and/or a commercial nature, which includes:*
>
> > *c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and*
> >
> > *d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site."*

2. Noise Survey

The information of the noise assessment is reported in this section. It is in the format as stated in the BS 4142 standard. It includes all the requested detail prescribed in section 12 of BS 4142:2014.

a) Statement of qualifications

The noise survey was performed by Paul Schmitz CEng MIoA of Environmentally Sound Limited, a member of the Institute of Acoustics and an experienced chartered engineer in noise and vibration assessments using data acquisition equipment for over 25 years.

b) Sources being assessed

1) Description of the main sound sources, the specific sound and the background noise

The specific source in question is the shredder, which emanates the highest level of noise. (Morris and Co. (Handlers) Limited would like to increase the current drawn by the shredder from 800A to 1100A; the availability of the higher current is limited by the capacity of the electricity substation).

Other noise sources that were recorded during the noise survey were

- The telehandlers: Sennebogen 830E (electric option) and the Sennebogen 818E (diesel).
- The Case front loader that is more mobile than the telehandlers and is operational across the entire site.
- Articulated trucks that transport the recycling in and out of the site.

Reference Appendix A for images of the equipment and machinery.

Note: There are several conveyor belts on site that were not operational at the time.

2) Hours of operation

The site operates

- between 07:30 and 18:00 Monday to Friday, and
- 07:30 to 12:00 on Saturdays.

3) Mode of operation

The equipment on site is not active all the time during licensed operation times; however, the noise recordings were taken when the machinery and equipment were operating at full capacity, representative of maximum sound level.

4) Operational load

Varies with recycling capacity.

5) Location of main sound sources

Reference Appendix B for the site layout

c) Subjective Impression

1) Dominance or audibility of the specific sound

See section l) of this report for detailed information on the specific sound

2) Main sources contributing the residual sound

All the sources mentioned in 3b, and the surrounding area.

d) Sensitivity of the receptor

The microphone was placed at various locations in and around the recycling site. Reference Appendix C for detail of the measurement locations.

Location 6 is in proximity of new residential housing. Environmentally Sound Limited were informed of recent noise complaints from these residents and opted to survey the noise at location 6.

e) Measurement locations

Reference Appendix C for detail of the measurement locations.

f) Sound measuring system

Sound Level Meter

1) Type and model: Rion Sound Level Meter N-52

2) Manufacturer: Rion

3) Serial number: 00610205 (see Appendix D)

Calibrator

1) Type and model: Rion Sound Level Meter N-52

2) Manufacturer: Rion

3) Serial number: 34235943 (see Appendix D)

g) Operational test

1) Reference level of calibrator

94dB at 1kHz

2) Meter readings

± 0.1dB change at the end of the measurement

h) Weather Conditions

The sound level measurements were taken outdoors, inside and outside of the premises. The specific noise levels came from outside sources, and therefore the weather conditions for the time of the noise measurements are included.

1) wind direction: wind still before sunrise; light breeze later the morning from a NE direction
2) still with moderate breeze gusts
3) Precipitation: none
4) Fog: none

5) wet ground: no
6) frozen ground or snow covered: frost all over
7) Temperature: -3°C to 3°C
8) Cloud cover: clear in the morning getting cloudier towards midday (5/8 cloud).

i) Date and time of measurements

Wednesday 22 December 2021 07:00 to 13:00.

j) Measurement time intervals

Data was acquired every 10ms.

k) Reference time intervals

L_p Store Interval	10ms
L_{eq} Calculation Interval	5 minutes

l) Specific sound level

The specific sound source is that of the shredder, as this machine emanates the highest sound levels.

Other equipment and machinery were also assessed, and all noise level information, calculations and analyses are in Appendix E and Appendix F.

m) Background sound levels

The background sound levels vary, due to the activity of the equipment and machinery onsite. See Appendix E and appendix F for the background noise levels at various times of the day.

n) Rating levels

See section l) for the discussion of all the sources contributing to the ambient sound.

o) Excess of the rating level(s) over the measured background sound level(s)

See section l) for the discussion of all the sources contributing to the ambient sound.

p) Conclusions

It is understood that the Environmental Agency (EA) are seeking physical recordings of the noise present at the site of Morris and Co. (Handlers) Limited.

In this report, several recordings were taken at various locations in and around the Morris and Co. site. However, the most pressing information, the noise emanating from the shredder, is now justified.

The shredder is the nosiest machine on site. As requested in the email from the EA (Appendix A), the shredder was run at two different current settings, namely 800A and 1100A. Following data analyses, it is concluded that the shredder does not increase in noise level by a significant amount when the current is increased. See Appendix F.

3. Noise Mitigation

Although there is mobile machinery onsite, they have a significant lower noise level rating to that of the shredder. The machine with the highest noise level is the shredder.

The shredder is situated under a roof covering. The sides of this shelter are not building height, but rather from the roof down by a few metres. At ground level there is no cladding and noise is free to radiate from vibrating surfaces.

Should it be of interest to Morris and Co. Limited, extending the sides lower down towards the ground or all the way, could provide further noise mitigation. Especially if the source of the noise is addressed.

However, to make financially efficient improvements, further investigation of the shredder to where the noise originates and propagates is recommended. (As mitigating the noise at its source is the most cost-effective approach).

Appendix A: Email from the Environmental Agency

Further to the below, as discussed the EA has requested the information by the 7th January 2022, therefore if the report could be available for Tom to review prior to that time that would be fine.

Below are the comments received regarding the noise survey;

There are a number of gaps and potential issues with the noise impact assessment that has been provided.
One of the issues with the lack of information, is how the increase in tonnage at the site will be realised operationally. Is it that they are just going to be operating the plant for longer over the day or does it mean they are operating the shredder with an increased loading and if so how will this change in operation impact the noise emissions.
No predictive modelling has been carried out. Hence why there will be no noise modelling files, although you should still have the raw data from the noise surveys.

However, there may not be a need to carry out predictive modelling but if there isn't this needs to be justified and evidenced in the report. I do acknowledge that just because they are putting more waste through the shredder over the operational day doesn't necessarily mean the noise impact will increase significantly, it may be that it will be a similar level of noise but for more time rather than an increase noise level because of an increased loading rate. But this is what we are interested in and they need to assess this. If the loading rate will increase, one way for example would be to do some noise measurements when they run the shredder at the loading that they would be operating at after the variation is issued, a trial run so they can assess the noise from it. If this is not possible then predictive monitoring will be required. However, it is not for us to advise you on how to carry out the noise impact assessment but for your noise consultant. The important point is that predictive noise modelling needs to be carried out or justified as to why this is not necessary.

I can't tell from the report what the rational was. It is unclear what they have assessed. I can't tell from the report how they have considered the change in operation because the report does not cover this. I don't know how they are going to get this extra waste through and what affect that will have on the noise at the receptors as they haven't actually told us, the period of which they take the noise measurements is supposed to be a worst case scenario and reflect the noise that will come from the shredder once we grant the variation. So how they are going to operate it in the future, how long they have measured for, why have they done that, is that a worst case, all information that needs to be in a noise report to support your assessment because at the moment we have no appreciation how the noise assessment relates to the future operation. It is just an instantaneous noise assessment.

If the report had made this clear and had explained the reasoning behind the

Figure A 1: The email form the Environmental Agency forwarded to Environmentally Sound Limited by Joanne McAnulty (Morris and Co. (Handlers) Limited).

methodology and provided justification and evidence such that they could conclude that in all likelihood, even with the variation there will be no significant additional noise impact because for example, we are not going to be operating any differently, but just operating for longer then at least that would have given us something to assess and the confidence to duly make the application. But we don't know this at the moment and we can't make assumptions. Currently we have sufficient justification to say we can't duly make the application.

BS4142 says:
3.5 Where it is not possible to determine the specific sound level by measurement of the ambient sound level and the residual sound level at the assessment location(s), for example, because the difference between the ambient sound level and the residual sound level is ≤3 dB, determine the specific sound level by a combination of measurement and calculation. Report the method of calculation in detail and give the reason for using it. This has not been done even though the difference between their measured ambient and residual (at both NSR's) is <3dB. The consultant has subtracted the residual from the ambient to get the specific sound, which in this case, wouldn't be appropriate.

The competency qualifications have not been stated. Our guidance and BS covers the competency requirements and this needs to be evidenced. In addition the noise report needs to be a standalone document. Please make sure you provide the raw data from the noise survey(s) and if you decide predictive modelling is required then provide the modelling files.
I attach the latest guidance which is available on our web site. I also attach some guidance we would use to assist in pre-application discussions with operators.

How long do they think it could take to resubmit the NIA? If it can be quick we will wait. I am minded that this application has already been not duly made previously and I am trying to avoid this happening for a second time. However, we can't wait for weeks on this. But of course Christmas is going to add to the time frame. Perhaps you could have a think about this, decide what you want to do, whether you can justify not carrying out predictive modelling, how long it will take you to amend the report etc. Remember even if you justify not carrying out predictive modelling we still need the raw data and we need the report amending as described above.

You will need time to have a think about the way forward and then can we arrange a call to discuss this but this must be done this week and as early this week as possible. Let me know when you can make the call, thank you.

Figure A 2: (continued) The email form the Environmental Agency forwarded to Environmentally Sound Limited by Joanne McAnulty (Morris and Co. (Handlers) Limited).

Appendix B: Equipment operational on site

The photos in this section show all the equipment that is used on site, except for the articulated trucks the transport the recycling.

Figure B 1: Sennebogen 830E telehandler operational at the shredder.

Figure B 2: This image shows the proximity of the Sennebogen 830E telehandler, the Case front loader, and the shredder.

Figure B 3: The Sennebogen 818E loading an articulated truck

Appendix C: Site layout

An aerial photo of the area and the location of Morris and Co. (Handlers) Limited is shown in Figure C 1. This is an outdated aerial photo, as we do not have the facilities to take aerial photos on the day.

Figure C 1: Location and the layout of the Morris and Co. (Handlers) Limited recycling site showing the locations where noise level measurements were obtained.

Superimposed on the aerial phot is the Morris and Co. Limited site borders, and the locations at which noise levels were acquired, numbered from one to seven.

To the west of the site assessed, there is a clearing. Today, this clearing is a housing estate. At location 6 noise elves were taken, as the houses in this facility have apparently complained about noise; therefore, we assessed this location.

North of Morris & Co., there is another recycling facility, and what they recycle is unknown to us. Noise recordings were conducted at both location 2 and 4 to assess that noise coming from that site. This was performed to understand the noise level generated by site other to that of Morris and Co.

Appendix D: RION N-52 Calibration Certificate

ANV MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

ilac-MRA UKAS CALIBRATION 0653

Date of Issue: 05 August 2021

Certificate Number: UCRT21/1961

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

B. Giles

Customer	ANV Measurement Systems Beaufort Court 17 Roebuck Way Milton Keynes MK5 8HL			
Order No.	ANV MS HIRE			
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators			
Description	Acoustic Calibrator			
Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Rion	Calibrator	NC-74	34235943

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS21/08514	
Date Received	04 August 2021	
Date Calibrated	05 August 2021	
Previous Certificate	*Dated*	13 September 2019
	Certificate No.	UCRT19/2025
	Laboratory	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT21/1961
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

94.03 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	1002.61 Hz	±	0.13 Hz
The total distortion was	1.57 %	±	6.5 % of Reading

During the measurements environmental conditions were

Temperature	22	to	23	°C
Relative Humidity	52	to	58	%
Barometric Pressure	99.6	to	99.7	kPa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

..... END .....

Note:

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: B. Bogdan R 2

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 28 April 2021 **Certificate Number: UCRT21/1546**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	ANV Measurement Systems Beaufort Court 17 Roebuck Way Milton Keynes MK5 8HL			
Order No.	ANV MS HIRE			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00610205
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	10199
	Rion	Microphone	UC-59	02547
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	27 April 2021	ANV Job No.	UKAS21/04278	
Date Calibrated	28 April 2021			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	25 June 2020	UCRT20/1560	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number
UCRT21/1546
Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Lab Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		21 April 2021	
Calibrator cert. number		UCRT21/1518	
Calibrator cal cert issued by		0653	
Calibrator SPL @ STP		94.02 dB	Calibration reference sound pressure level
Calibrator frequency		1001.96 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.81	23.49	± 0.30 °C
Humidity	32.1	37.0	± 3.00 %RH
Ambient Pressure	99.56	99.56	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	93.9	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.5	dB	UR	16.9	dB	UR	23.1	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: B. Bogdan R 2

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

Appendix E: Sound level recordings and analyses

Location 1 at 07:05

The statistics of Figure E 1 illustrate that the background sound levels at 07:05, before the site operations convene, is 50dBA. The lowest noise level recorded at this time was 45dBA, although the presence was minimal.

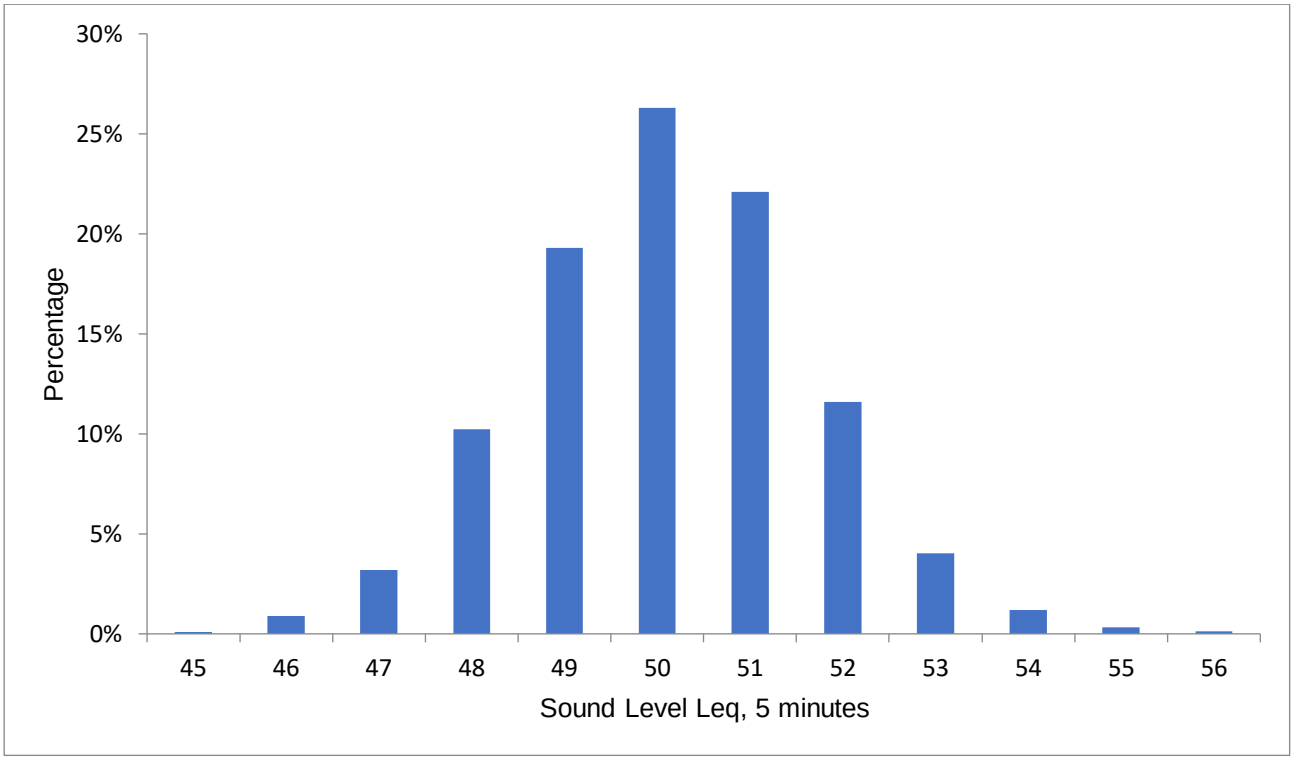


Figure E 1: This histogram shows the distribution of the noise levels recorded and their overall percentage contribution to the environment.

Location 1 at 08:15

The noise level meter was situated near the centre of the property, which is within 20 meters of the shredder. The shredder emanates the highest sound levels and is the major noise 'generator' on site. Therefore, it is the machine that has the highest weighting to the noise produced on site.

Figure E 2: Image shows the proximity of the telehandler to the shredder and its conveyor belt.

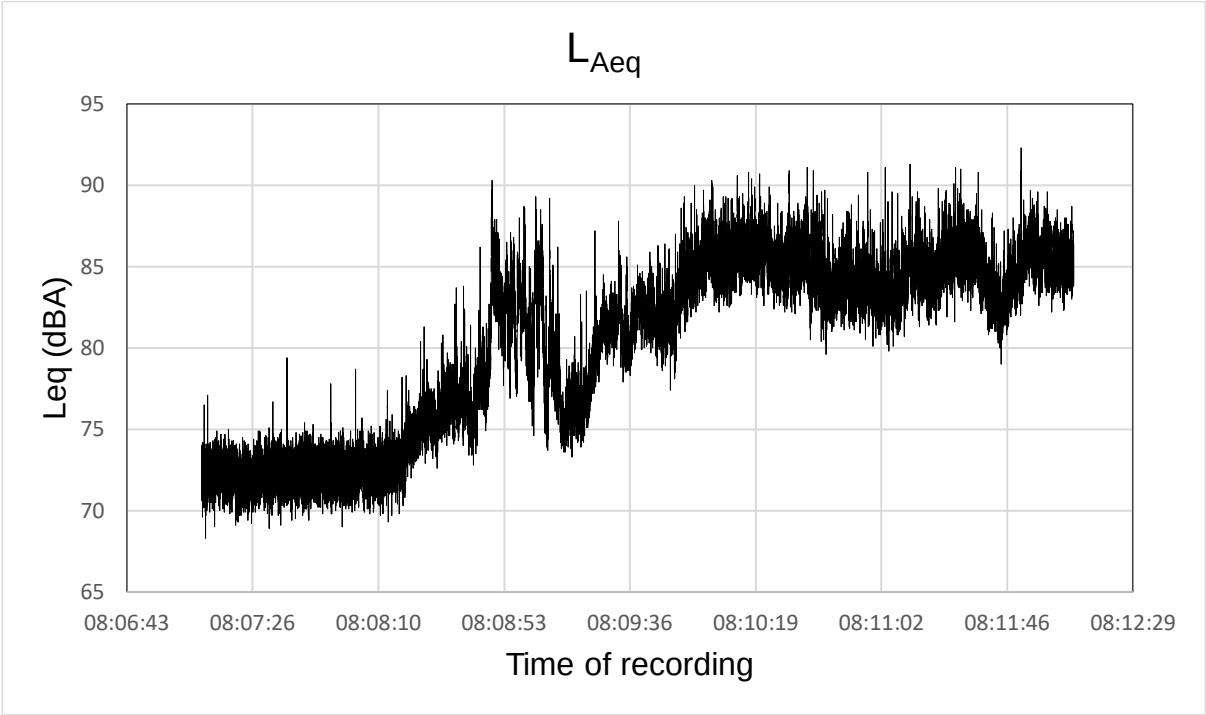


Figure E 3: L_{Aeq} of the shredder and telehandler

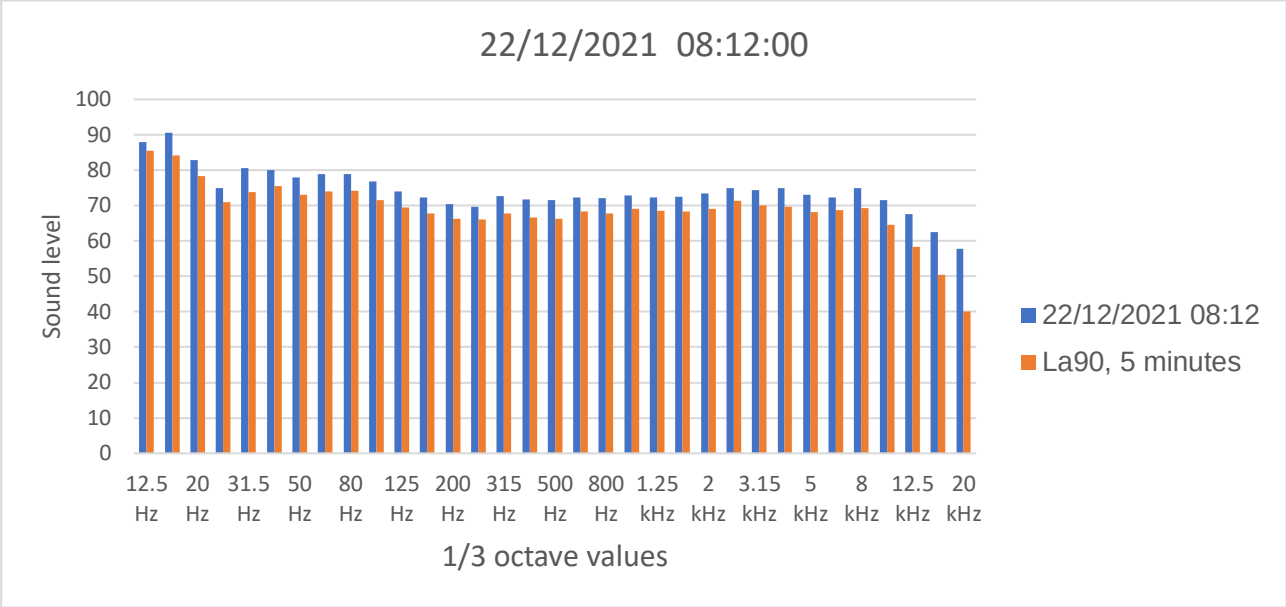


Figure E 4: L_{Aeq} and L_{A90} recorded at 08:12

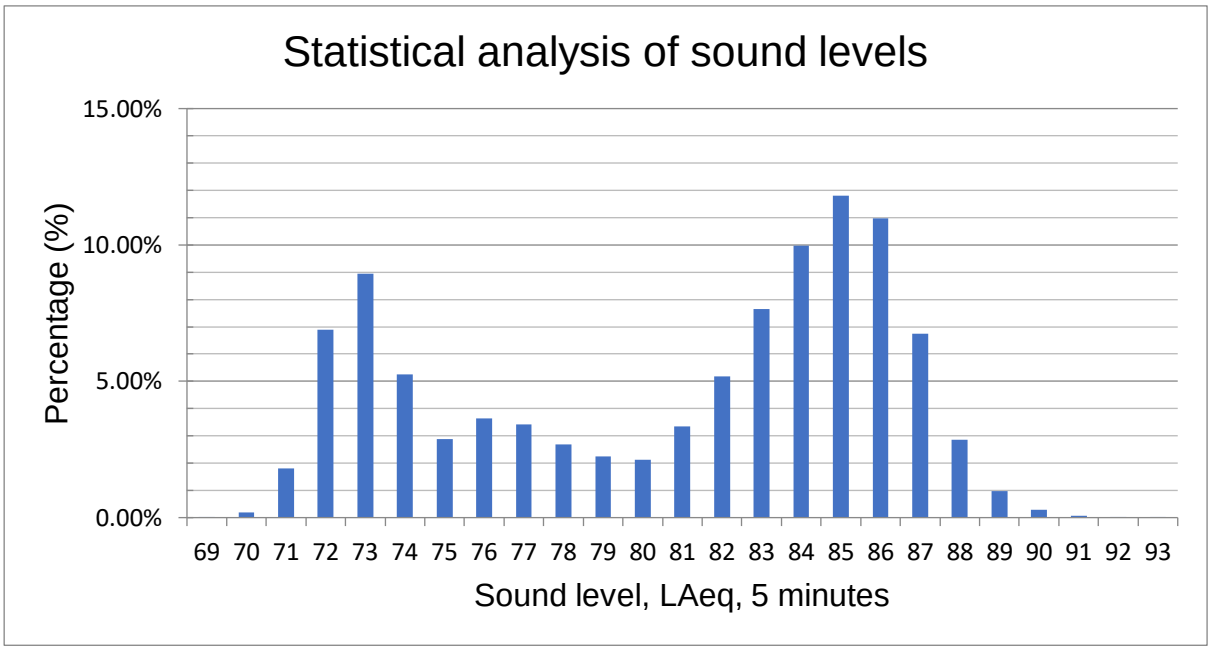


Figure E 5: Statistical analysis of the noise recording taken at location 1

In this histogram (Figure E 5), it is evident that the recording is that of the telehandler and the front loader passing between the sound level meter and the telehandler; this is the reason for high percentage sound level at 73dBA and 85dBA.

Location 2

Reference Appendix C for the detail of the recording locations.

Figure E 6: Noise level meter positioned close to the boundary wall.

A measurement was taken here to shield the noise from Morris and Co., and therefore noise from other sites in the vicinity were captured. `like the recycling site to the north of Morris and Co. limited.

Figure E 7: Facing North to another recycling facility

Noise from Morris and Co. was not audible. However, noise from diesel engines from a site north of this field were audible. The analyses of the noise is discussed in the figures hereafter.

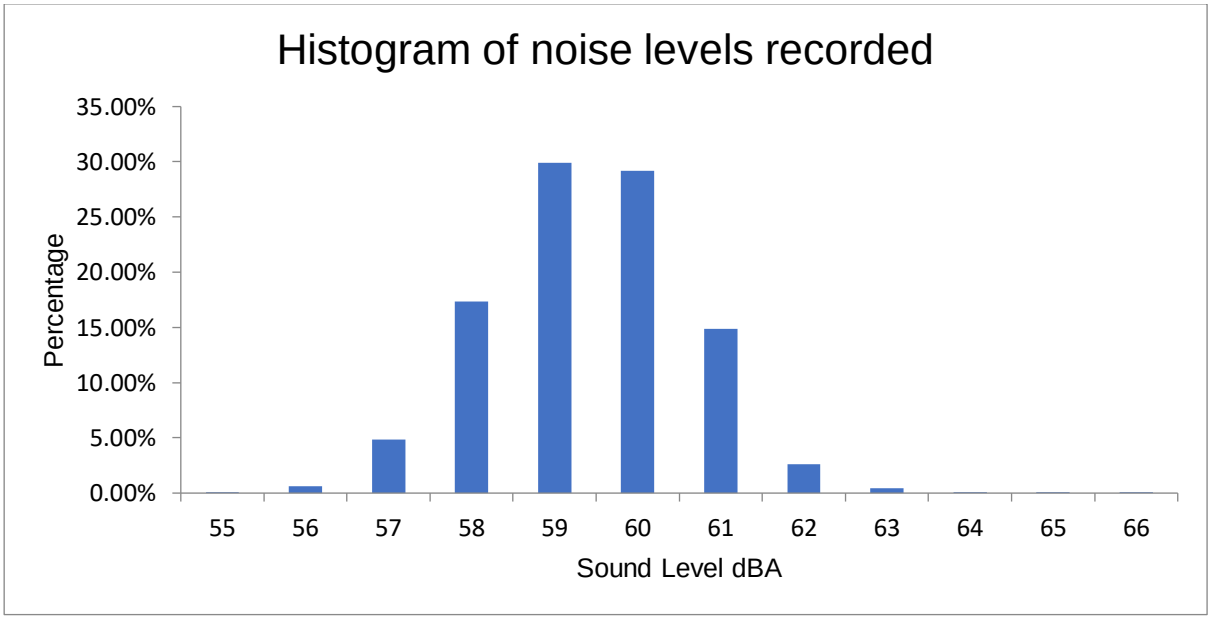


Figure E 8: A histogram of the noise levels recorded at location 2.

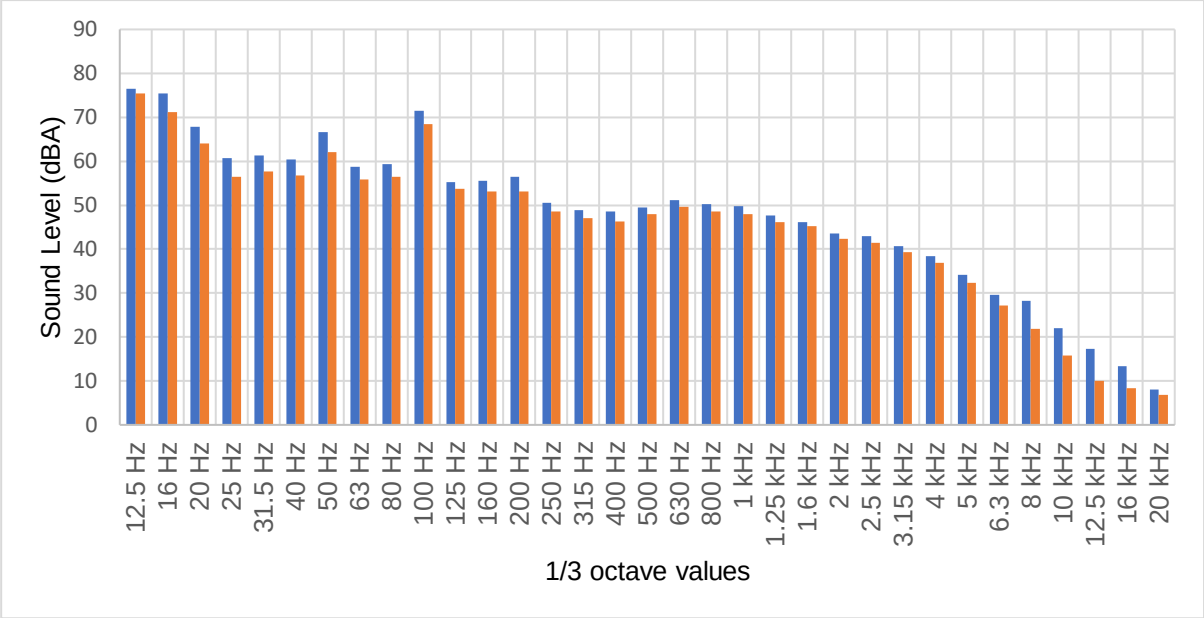
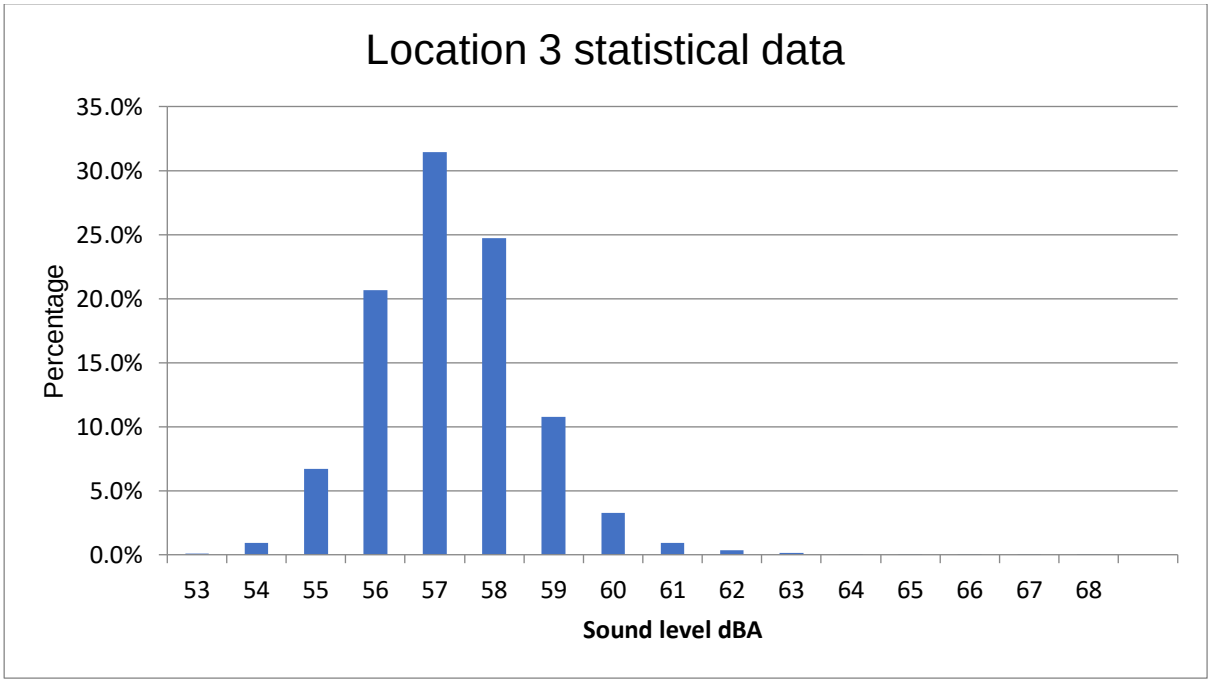


Figure E 9: L_{Aeq} and L_{A90} recorded at 08:25

Location 3

Reference Appendix C for the detail of the recording locations. At this position the shelter for the shredder is visible over the boundary wall. The analyses of the noise signal is shown hereafter in this section.



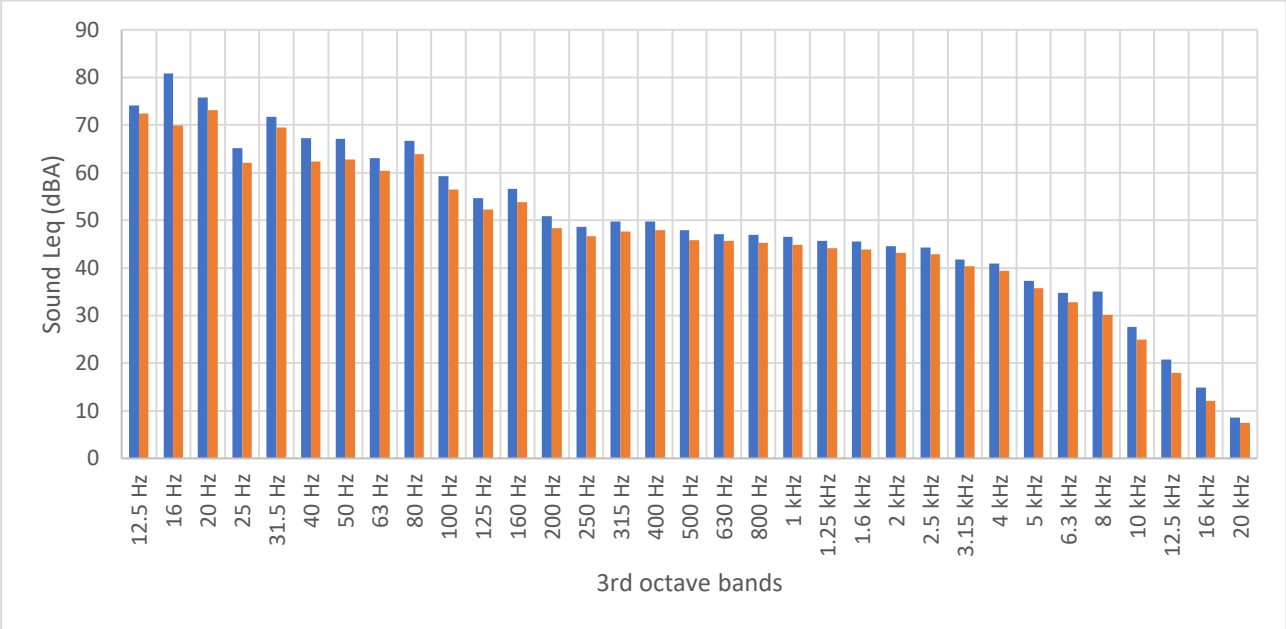


Figure E 10: L_{Aeq} and L_{A90} recorded at location 3

Location 4

Reference Appendix C for the detail of the recording locations. This location is at the far corner of the field to the north of Morris and Co., at the location of the Rossington Drain.

The audible noise a t this location was the sound of diesel engines straining under variable load. This appeared to emanate from a site other than Morris and Co.; considering the machinery on Morris and Co. site, no large diesel engines are operated on Morris and Co. site, as their shredder and other machinery are powered by electricity.

Figure E 11: Sound level meter was positioned to the northern corner of the field to the north of Morris and Co.

A histogram and 1/3 octave bands are shown in Figure E 12 and Figure E 13, respectively. In Figure E 12 the dominant noise level is 57dBA, and is therefore considered the background noise, as demonstrated in the BS4142 standard.

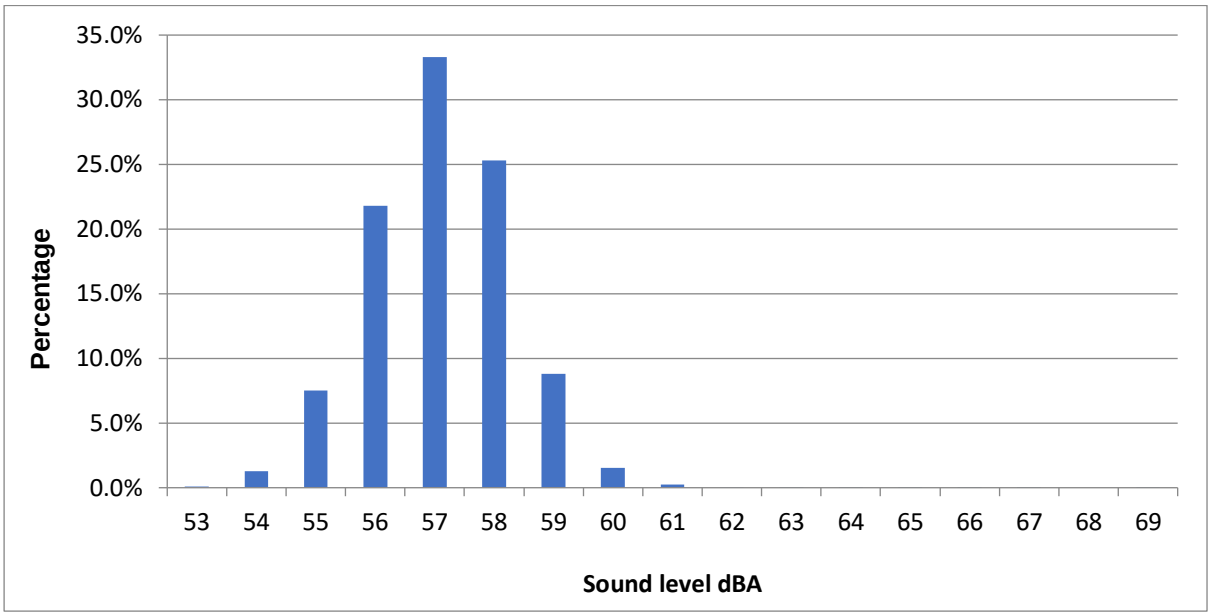


Figure E 12: Statistical analysis of the sound levels recorded at location 4

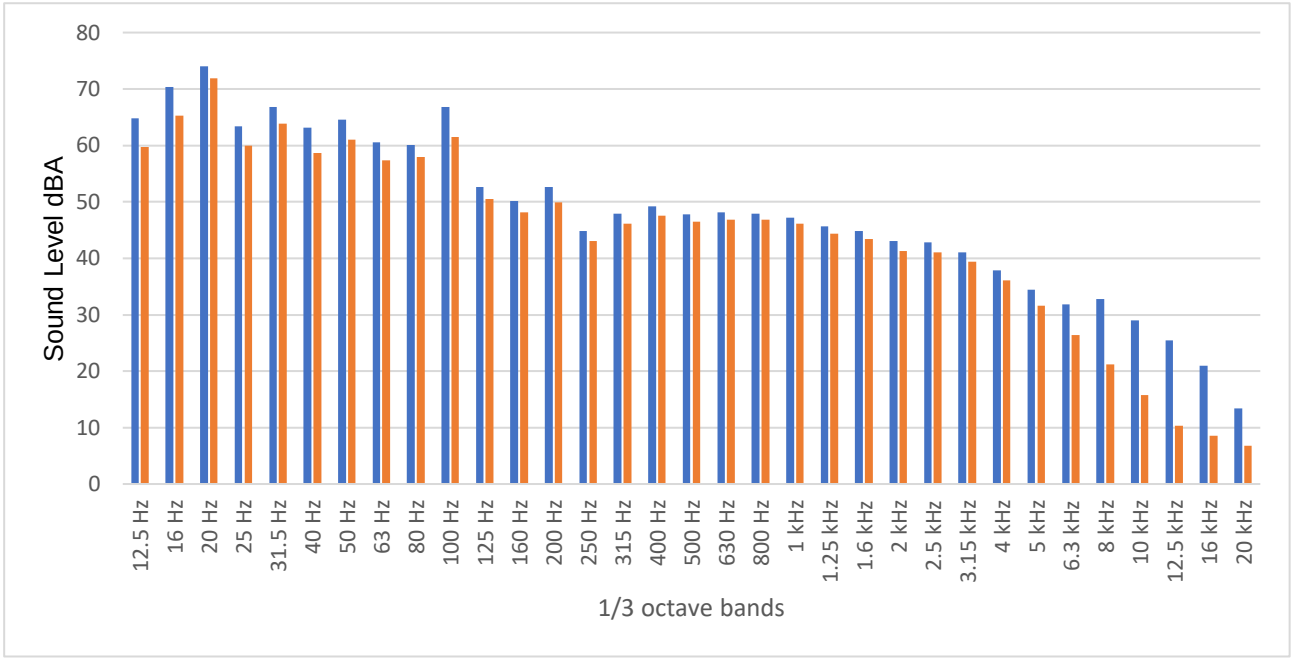


Figure E 13: L_{eq} and L_{A90} recorded at location 4

Location 5

For reference's sake a noise assessment was made on the road to the east of Morris and Co. Reference Appendix C for the detail of the recording locations.

The background noise at this location was calculated to be 58dBA. Considering that the background noise recorded on site before operating hours was 50dBA, the background noise here is less than 10dBA above the background noise of this are before operation.

Figure E 14: Sound level meter located at location 5, camera pointing north.

Figure E 15: Sound level meter located at location 5, camera pointing south.

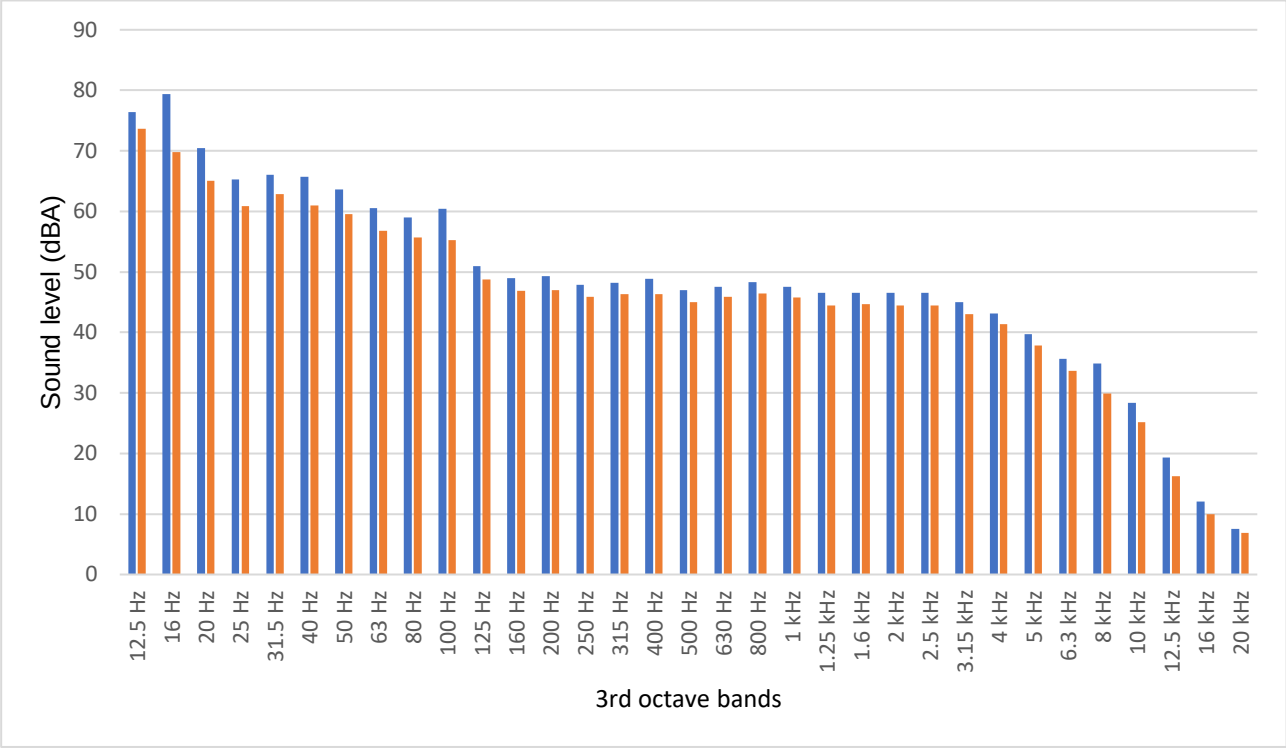


Figure E 16: L_{eq} and L_{A90} recorded at location 5

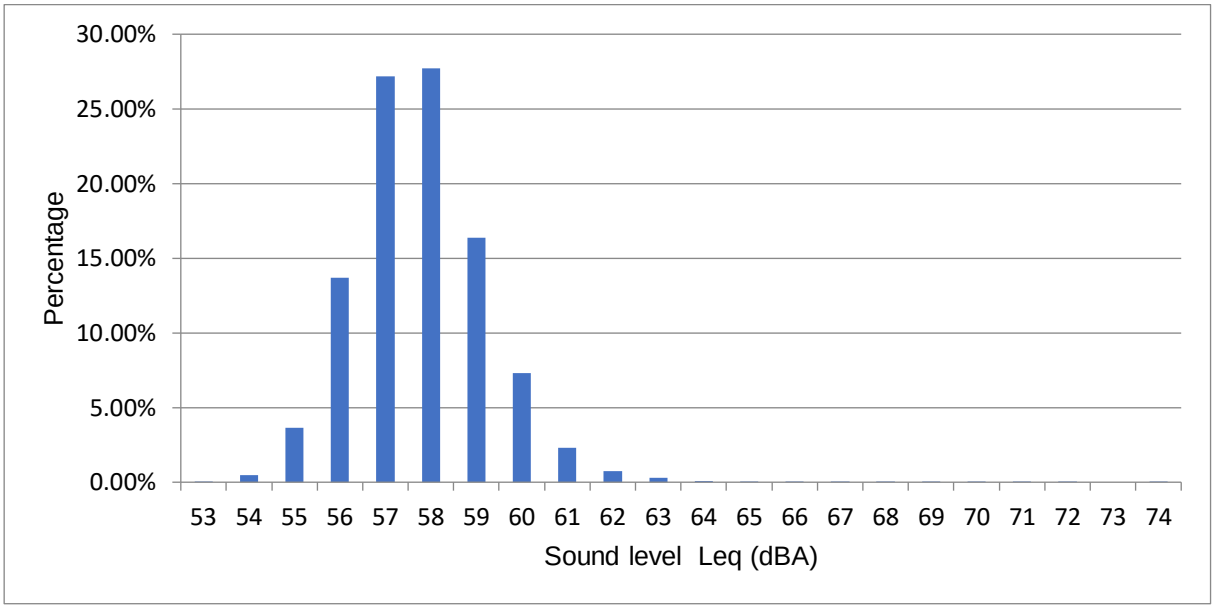


Figure E 17: Statistical analysis of the sound levels recorded at location 5

Location 6

A new development is to the east of the Morris and Co. site, It was suggested that a noise assessment should be included to ascertain the noise level present at the residential area.

A noise recording was taken at location 6 and is discussed in this section.

Figure E 18: View towards the other recycling facility

Figure E 19: The view in the opposite direction towards the hosues in the new development.

At this location, motorway noise was audible, as well as the diesel engines from the recycling site to the north of Morris and Co.

The eco noise barrier is evident in Figure E 18, shown on the right of the photo. At this location, noise from the highway is evident with the diesel engine audible from a site to the north of Morris and Co.

At the time of the recording, there was a slight breeze from the south-west. If the wind prevailed from the north-east, the sound of the diesel engines would be greater, and the highway noise less. In that circumstance, these houses would hear higher noise levels.

As there are now new houses in this area (Figure E 19), if the wind prevails from a north-eastern direction, the noise will be more audible. Should a noise complaint be made by the residence in these homes. The prevailing wind direction must be considered, and the nature of the noise.

Morris and Co. Limited have a shedder that operates on electricity. Therefore, the sound of diesel engines straining under load does not come from the Morris and Co.

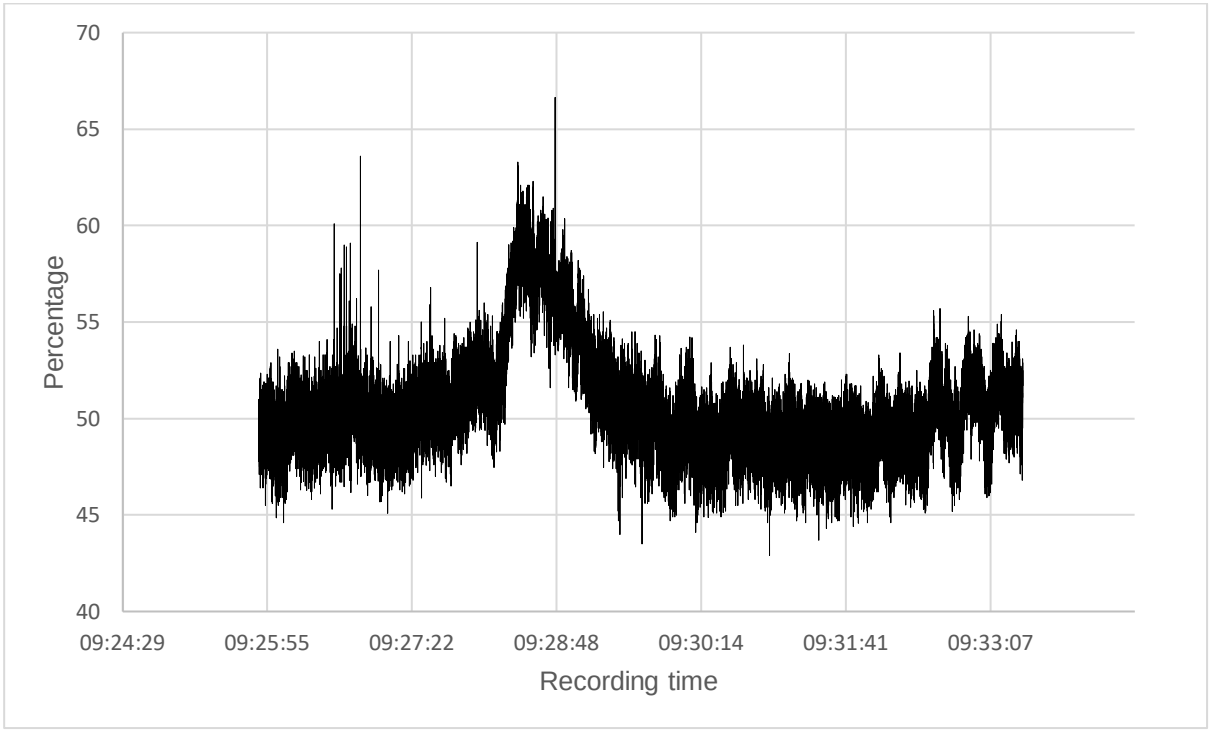


Figure E 20: The noise recording taken at location 6.

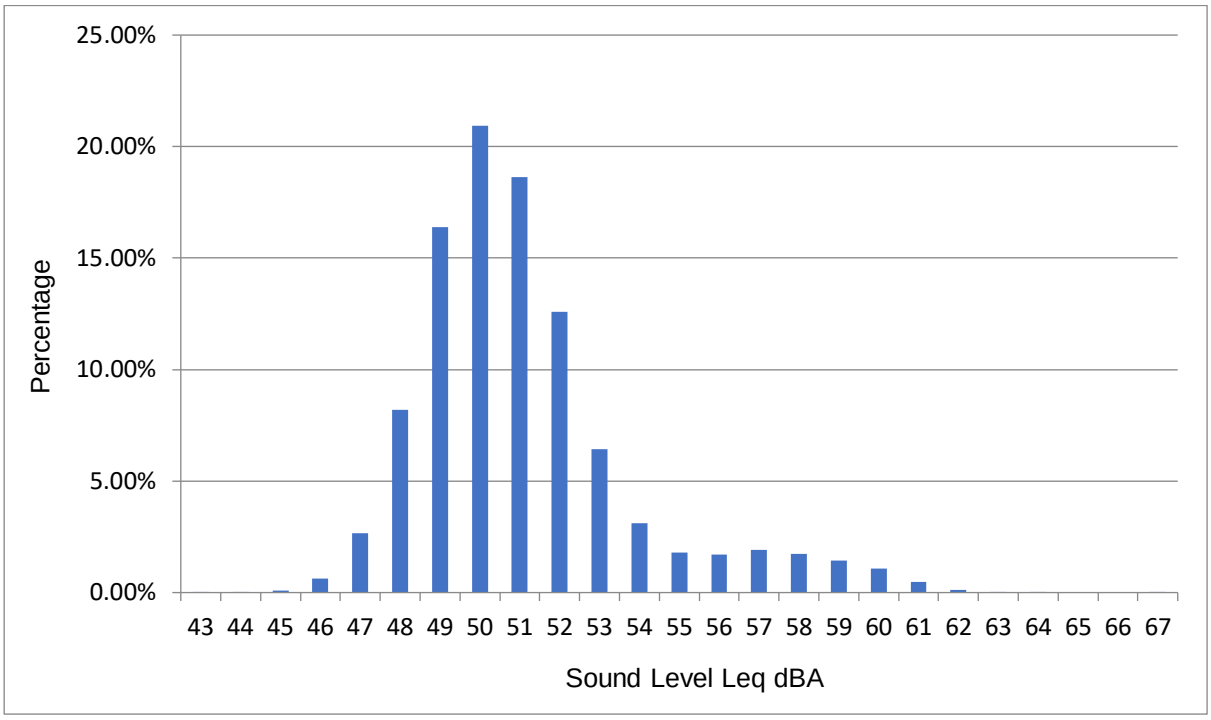


Figure E 21: Statistical analysis of the sound levels recorded at location 6

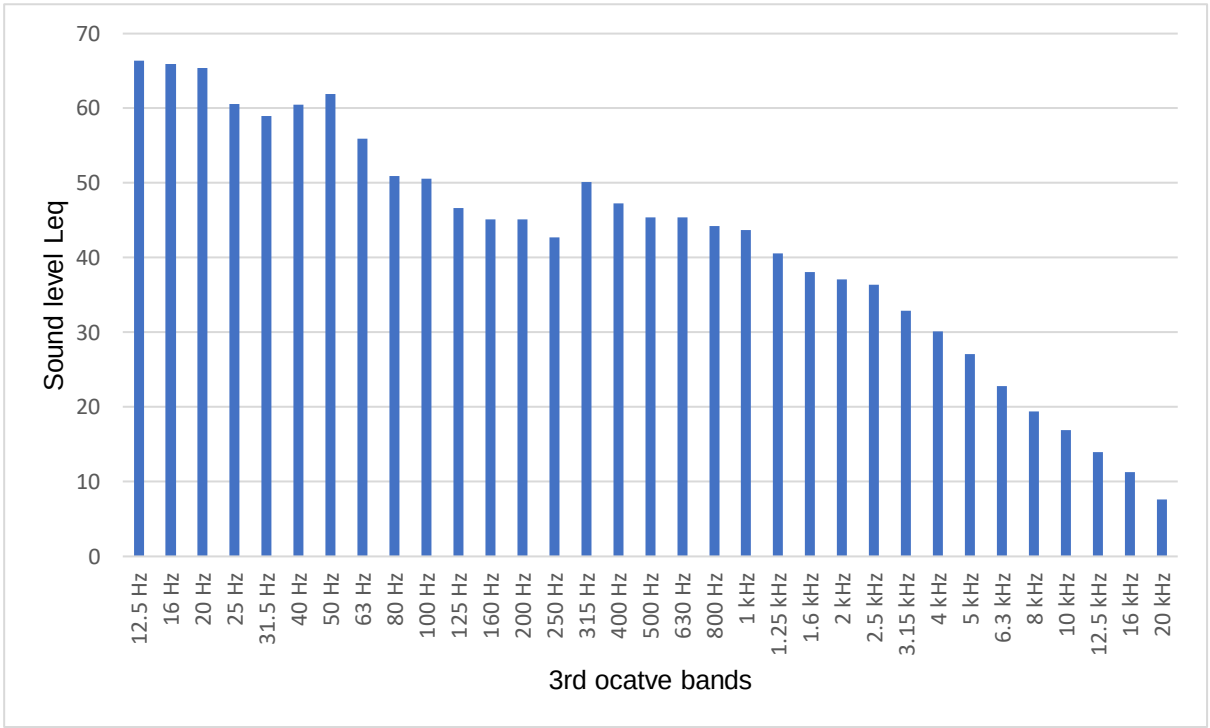


Figure E 22: L_{eq} and L_{A90} recorded at location 6

Location 7

A noise assessment was made at location 7 of the Sennebogen 818E during operation. Unfortunately, the noise at this location included the noise from the shredder as well, and the noise measured at this location is not a true reflection of the noise from the Sennebogen 818E.

Figure E 23: The Sennebogen 818E in operation

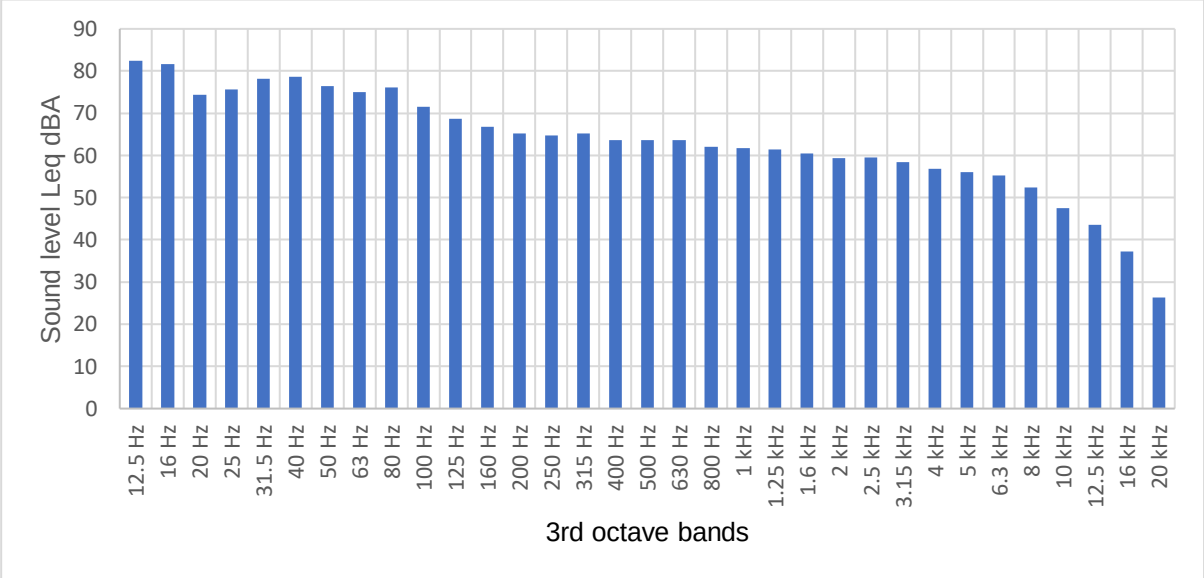


Figure E 24: L_{eq} and L_{A90} recorded at location 7

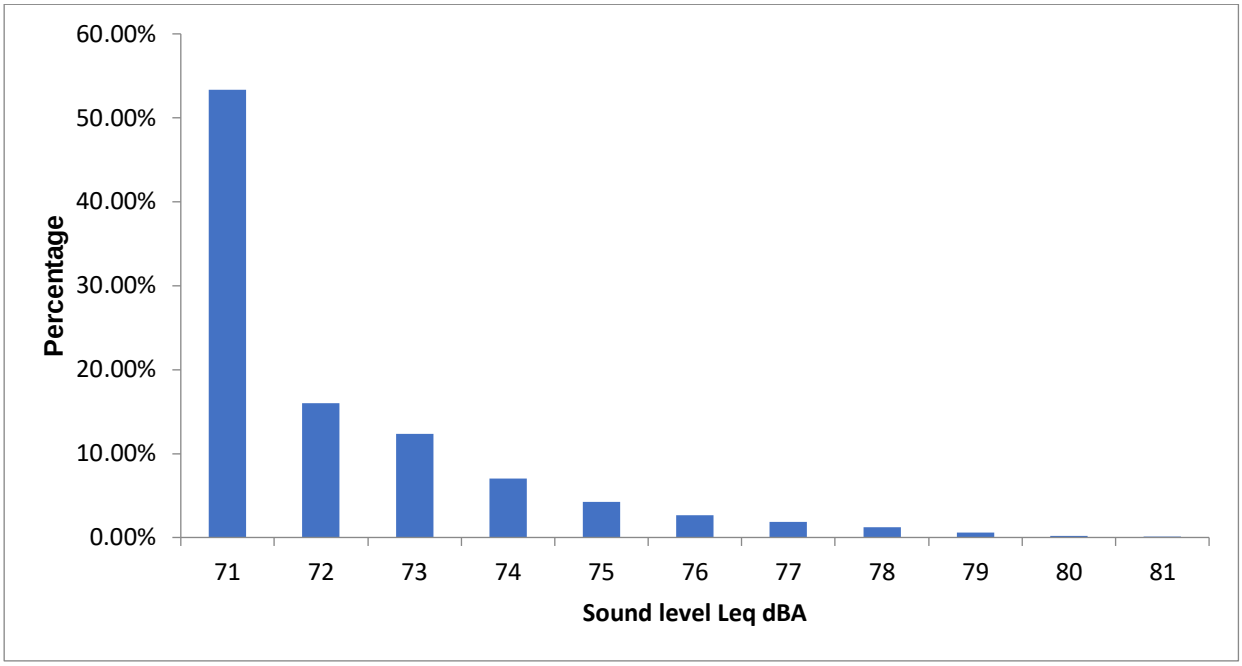


Figure E 25: Statistical analysis of the sound levels recorded at location 7

Appendix F: Shredder noise assessment

The shredder was operated under two different load conditions to determine whether the noise level emanated from the shredder would increase.

Therefore, the load (current drawn by the shredder motor) was adjusted during the noise level recording as follows:

- 10.42am 800A current
- 10.46 increased to 1100amp (problems with C1 feed so not running full load all the time)
- 10.56 back to 800amp.

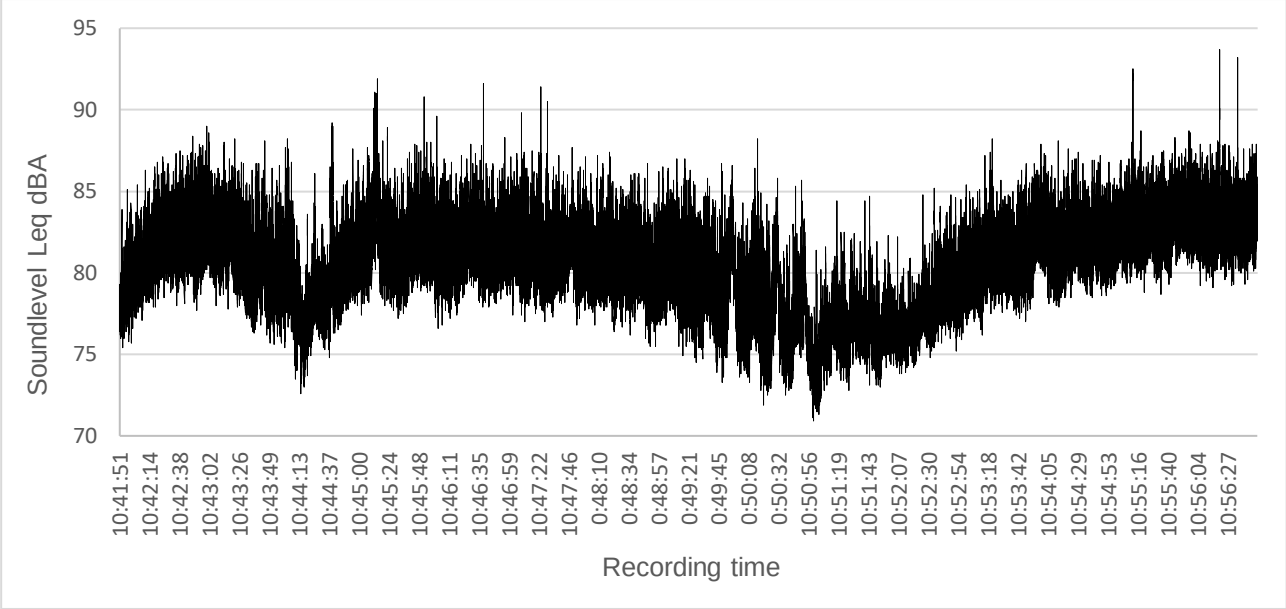


Figure E 26: Excerpt of the noise levels recorded while the shredder was operating under different load conditions.

The fact that the shredder did not run at full capacity for the entire duration of drawing 1100A is evident in Figure E 26. This is evident by the undulations of the signal.

We requested that a back-to-back test be conducted to ascertain whether the noise level increases when the shredder is operating at a higher power rating (higher current).

It is evident from the results hereafter that at both instance when the shredder operated at 800A, the noise levels were similar.

800A load from 10:42 to 10:46

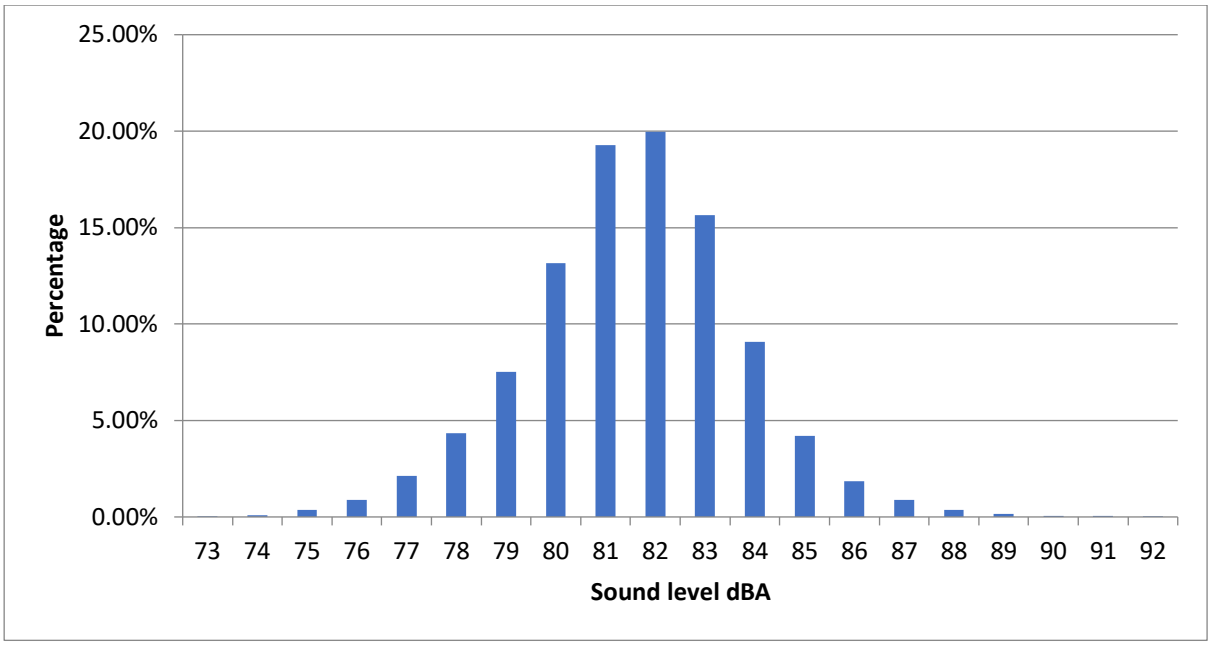


Figure E 27: Statistical distribution of sound levels at 800A

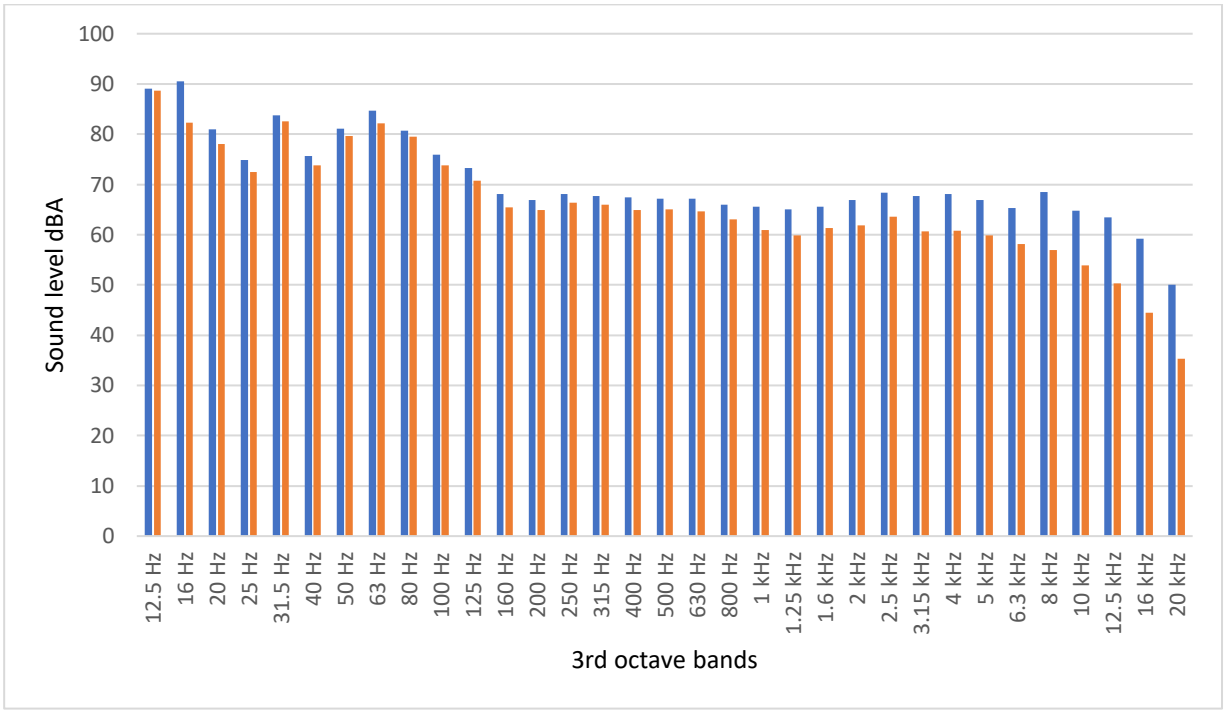


Figure E 28: L_{eq} and L_{A90} of the shredder at 800A

1100A load from 10:46 to 10:56

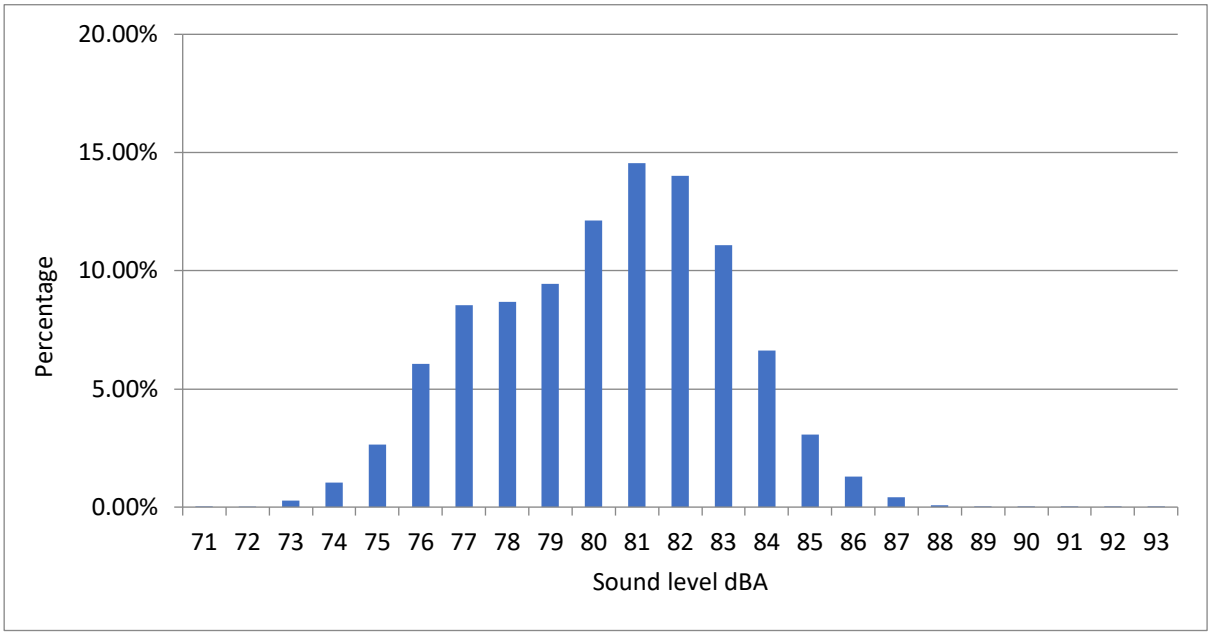


Figure E 29: Statistical distribution of sound levels at 1100A

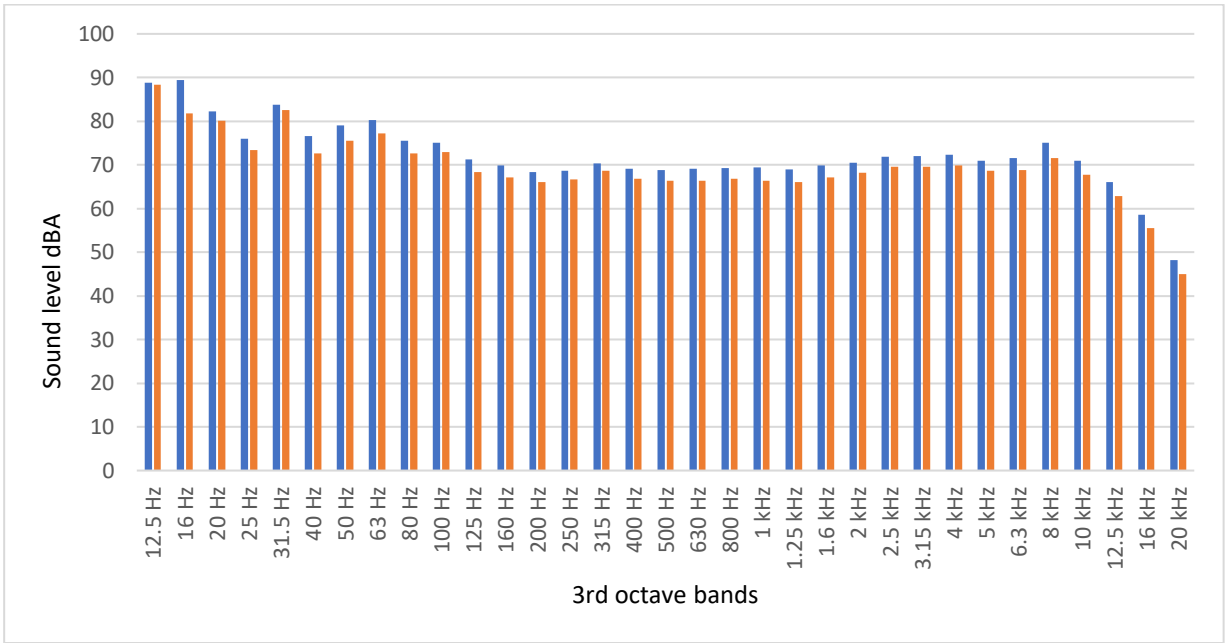


Figure E 30: L_{eq} and L_{A90} of the shredder at 1100A

800A load from 10:56 onwards

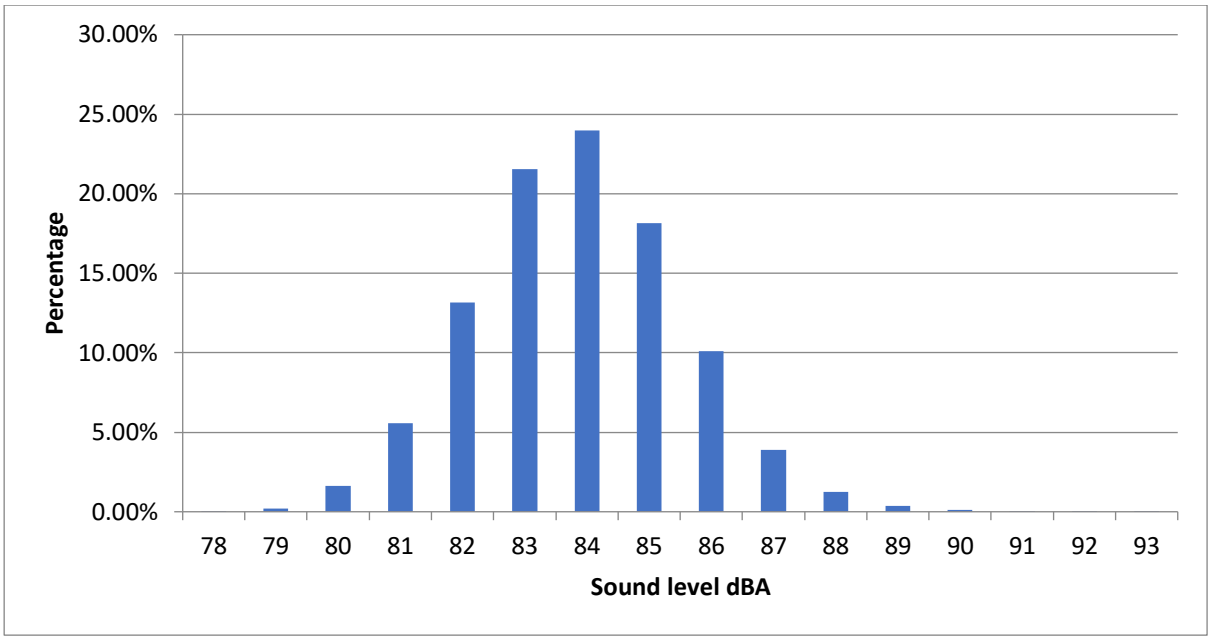


Figure E 31: Statistical distribution of sound levels at 800A

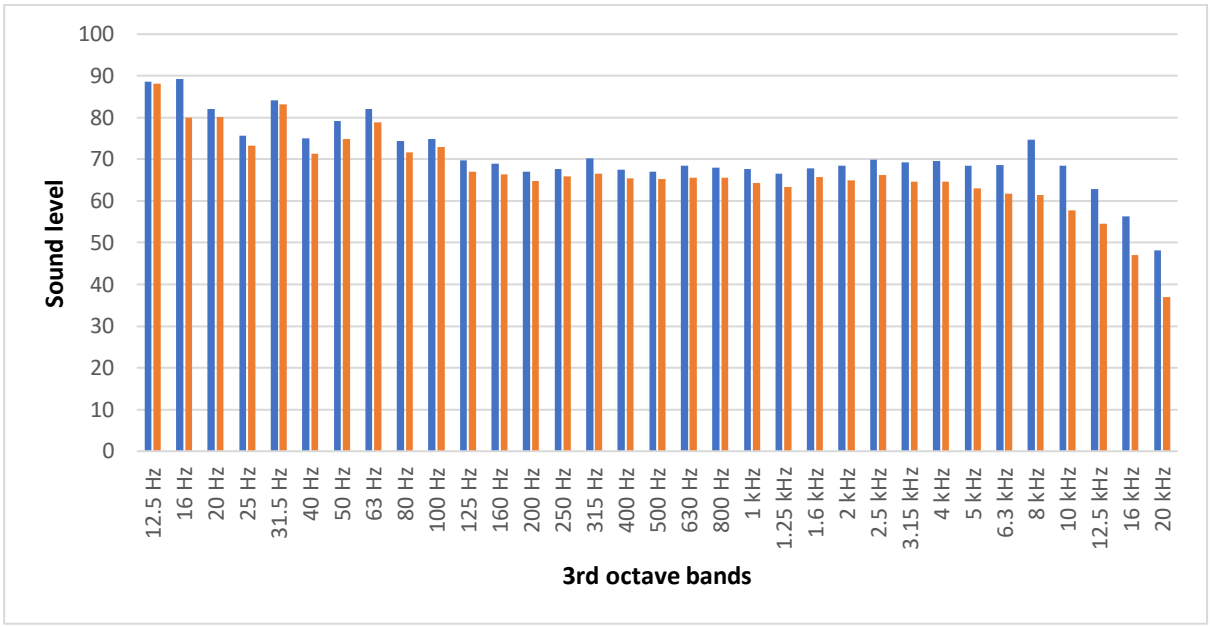


Figure E 32: L_{eq} and L_{A90} of the shredder at 800A

Back to back 800A runs

Comparing figure 27 and figure 31

- The 800A tests that were conducted either side of the 1100A run, are similar to each other; but the results are not ideal for back-to-back testing. This is because it is impossible to replicate the exact same amount of material through the shredder for two separate runs.

- The topography of the graphs is similar to each other, with the highest percentage of noise being in the order of 20% or greater.

- The dominant sound levels are different, with one indication 82dBA as the dominant sound level and the latter 84dBA.

Comparing figure 28 and figure 32

- The third octave plots in both figures are similar.

- The L_{A90} values are noticeably lower than the L_{eq} values.

800A vs 1100A runs

- Referencing Figure E 29, the dominant sound level present in this recording has a much lower percentage to those of the figures for 800A, which is below 15%.

- In Figure E 29, the different values of sound levels recorded are across a broader bandwidth to those for 800A.

- In Figure E 30, the L_{eq} and L_{A90} values are closer to each other than those for 800A current.

Conclusion

There is no noticeable difference between the noise levels recorded when running the shredder at different loads. The noise variation between running at 800A and 1100A is less than 3dB.