

OCTOBER 7, 2024



BS4142:2014 ASSESSMENT OF LINDOP PREPARATION CENTRE, GWERSYLLT, WREXHAM

JAMES FLITTON

E2 HOUSE,
41 Business Park,
S Park Way,
Wakefield
WF2 0XJ

Table of Contents

1. INTRODUCTION
2. SITE DETAILS
3. LEGISLATION
4. RESULTS
5. ANALYSIS OF RESULTS
6. CONCLUSION AND FURTHER COMMENTS
7. CREDENTIALS

APPENDIX A – ACOUSTIC TERMINOLOGY
APPENDIX B – CERTIFICATES OF CALIBRATION
APPENDIX C – WEATHER CHART
APPENDIX D – CADNAA CALCULATION SHEET

1.0 Introduction

- 1.0.1 This report has been commissioned to determine the noise impact of the development of the Lindop Preparation Centre, Gwersyllt, Wrexham.
- 1.0.2 The assessment has been conducted in line with the BS4142:2014+A1:2019 as this is a potentially new industrial noise source for the area.

2.0 Site Details

- 2.0.1 The site is located just off of Hardwick Drive, just south of Gwersyllt train station. The area is mainly residential with the 3 buildings that make up the small industrial estate where the proposed development is situated.
- 2.0.2 The proposed unit consists of a small mechanical working area, spray area and body part repair section through the building. the exact layout is shown in figure 5.
- 2.0.3 The closest Noise Sensitive Receptors (NSRs) are located on Hardwick Drive to the South-East, and Fairwood drive to the North. It is unlikely that there will be any impact to properties along Old Mold Road due to the distance and also the main existing noise source for the area, the A541 (Mold Road).
- 2.0.4 As the noise sources are already in existence, background monitoring locations were taken up to the South-East and then just North of the development. A 3rd attended noise measurement was then taken outside each of the roller-shutters to measure the noise breakout when they are closed. As audio recording were also used, the measurement to the North was edited to remove any noise from the car workshop so that a true background noise level could be used for the BS4142:2014 assessment in the absence of the noise sources.
- 2.0.5 The South-East measurement was lamppost mounted, with the Northern measurement conducted by fixing a microphone to the boundary fence in the direction of the NSRs (Noise Sensitive Receptors).

2.1 Location of Monitors

- 2.1.1 The noise location was chosen based on the closest available proximity to the closest NSRs.

Figure 1 – North boundary location



Figure 2 – South-East (Hardwick Drive)



Figure 3 – one of attended locations (South)



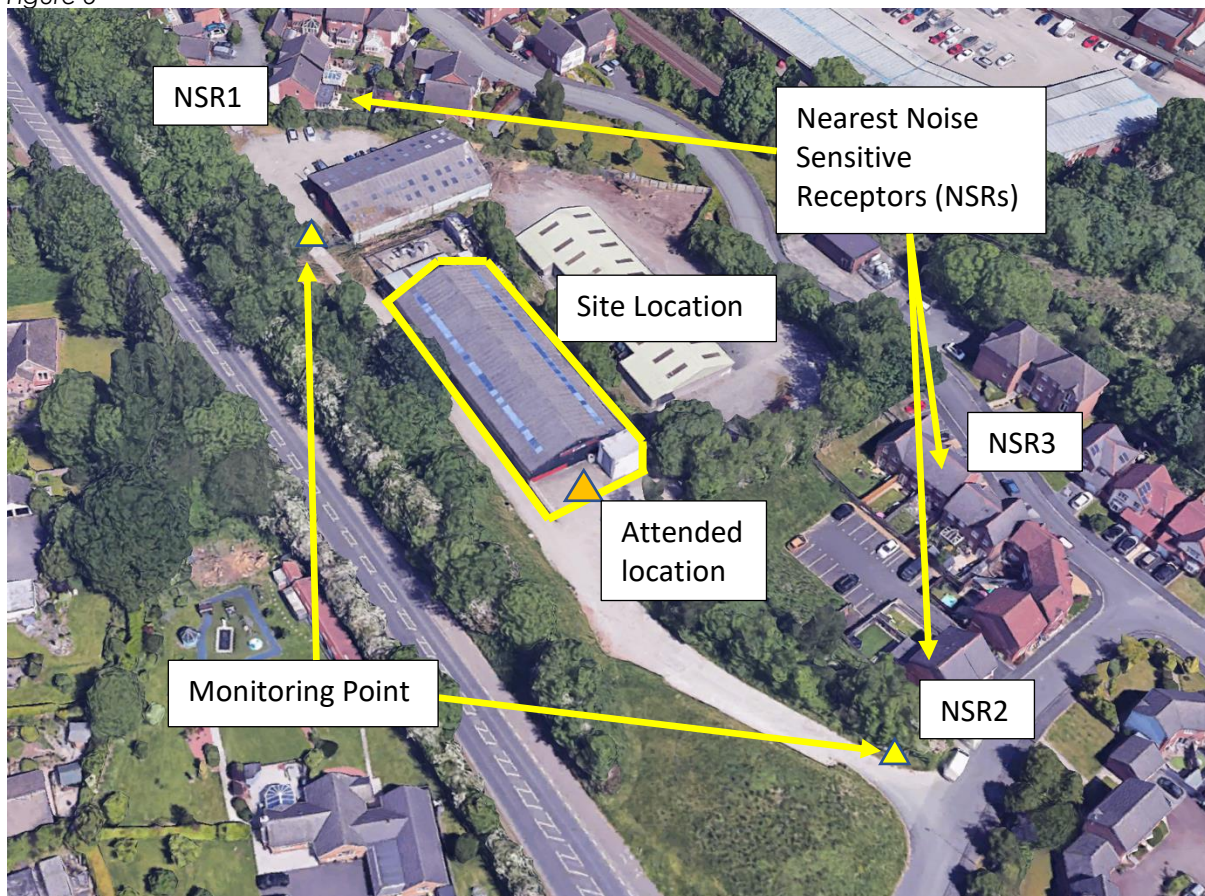
- 2.1.2 Measurements were made in 15 minute periods, on 1 second averaging, to allow for the removal of anomalies and increased accuracy. The data was averaged into L_{Aeq1hr} daytime and $L_{Aeq15min}$

night-time with data also recorded for L_{A90} in both day and night periods for the BS4142:2014 assessment.

- 2.1.3 The monitoring was conducted using 2 x Type 1 NTi XL2 sound level meters with batteries and outdoor microphone protection.
- 2.1.4 All measurements were taken after a field calibration was undertaken to ensure accuracy and repeatability of measurements.
- 2.1.5 Further data such as wind speed, wind direction, rainfall intensity, temperature and cloud cover were all recorded at the beginning and end of the assessment at the monitoring location.
- 2.1.6 Any anomalies (such as noise by the engineer during setup and collection of the kit) were removed from the survey for a true reflection of the ambient levels in the vicinity. This was done by recording audio throughout the survey at each location and listening back through the files during the analysis process to confirm what was recorded manually during the survey.

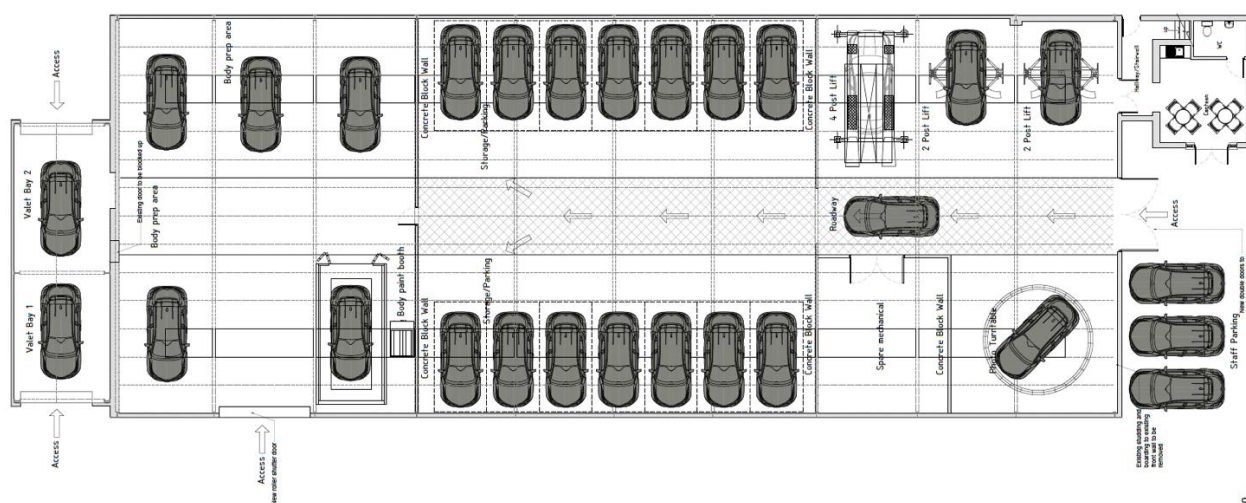
2.2 Plan Views of Site with Designated Work Areas

Figure 3



2.3 Proposed Development

Figure 4



50

3.0 Legislation

3.0.1 The Planning Policy Wales sets out the Government's economic, environmental and social planning policies. Section 3.22 states;

"Planning authorities should develop and maintain places that support healthy, active lifestyles across all age and socio-economic groups, recognising that investment in walking and cycling infrastructure can be an effective preventative measure which reduces financial pressures on public services in the longer term. The way a development is laid out and arranged can influence people's behaviours and decisions and can provide effective mitigation against air and noise pollution."

3.0.2 The guidance also sees traffic consideration and management as key when it comes to noise impact assessments. Section 4.1.45 states

"Local authorities must adopt an integrated approach to traffic management. They should consider how different measures can complement one another and contribute to the achievement of

wider planning and transport objectives, implementing the Active Travel Act and reducing exposure to air and noise pollution, taking into account the needs of the disabled and less mobile sections of the community."

- 3.0.3 Section 6 of the document also tackles the likely social and well-being impacts of the preservation of 'distinctive and natural places'. Section 6.7.1 refers to the need to protect the soundscape of areas;

"Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

This is then continued in reference to noise in section 6.7.4;

"The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so."

- 3.0.4. It is possible to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:
- The effect may be determined by reference to guideline noise values. British Standard (BS) 8233:2014 and World Health Organisation (WHO) "Guidelines for Community Noise" contain such guidelines.
 - Another method is to compare the resultant noise level against the background noise level (LA90) of the area. This is the method employed by BS 4142:2014 to determine the likelihood of complaint from noise of an industrial nature. It is best suited to the assessment of steady or pseudo-steady noise.

3.1 BS4142:2014 +A1 (2019)

- 3.1.1 Noise effects on residential properties due to the current operational hours and extended hours have been assessed according to the guidance in BS 4142:2014. This standard primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e. the 'specific sound' from the proposed development) at residential sensitive receptors.
- 3.1.2 The specific sound level may then be corrected for the character of the sound (e.g. perceptibility of tones and/or impulses), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
- 3.1.3 According to BS 4142:2014, the background sound levels adopted for the assessment should be representative of the periods being assessed. The standard recommends that the background sound level should be collected from continuous measurements of normally not less than 15-minute intervals. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night-time period because it can be subject to a wide variation in background sound levels between the shoulder night periods.
- 3.1.4 The method chosen for this section of the report is to use the data collected at the nearest NSR for the day and night periods to provide the ambient and background noise levels. The mode $L_{Aeq,1hr}(\text{Day})$ and $L_{Aeq,15min}(\text{Night})$ value will then be used for each time period over the course of the measurement as the most appropriate way of creating a representative value.
- 3.1.5 The specific sound levels have been determined separately in terms of the $L_{Aeq,1hr}$ during the daytime $L_{Aeq,15min}$ during the night-time. Daytime is typically between 07:00 and 23:00 hours and night-time is typically between 23:00 and 07:00 hours, so these periods have been adopted for this assessment.
- 3.1.6 At each of the most likely sensitive receptor locations, the rating level has been determined from the predicted specific sound level. Where it has considered it to be appropriate, a rating penalty has

been applied for tonality, impulsivity and/or intermittent specific sounds as described in the commentary to paragraph 9.2 of BS4142:2014. This has been applied with consideration for the main sound sources from site that contribute to the level of specific sound at the receptor location.

- 3.1.7 As per the requirements of the standard, an initial estimate of the impact of the specific sound has been obtained by subtracting the measured background sound level from the rating level of the specific sound. Table 2 provides the initial evaluation of impact following this method.

Table 1

Magnitude	Difference Between rating Level and Background Level	Comments
High	+10dB	Significant Adverse impact Likely
Medium	+5 to +10dB	Adverse impact Likely
Low	0 to +5 dB	Adverse impact unlikely
Negligible	Less than 0dB	Low Chance of Adverse Impact

- 3.1.8 Following the initial evaluation of impact, the context of the sound has also been considered, which is a key requirement of the Standard. In evaluation of the context, the following factors have been considered:

- the absolute level of the sound;
- the character and level of the residual sound compared to the character and level of the specific sound and
- the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

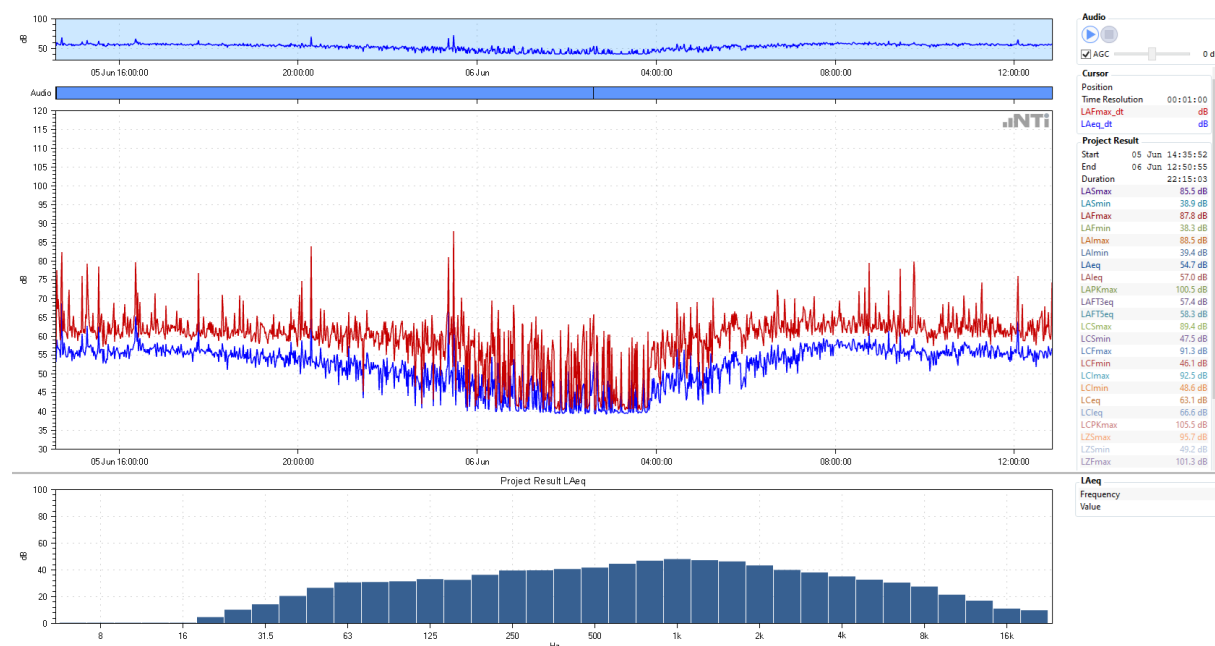
4.0 Results

4.1 Northern Boundary – 14.35pm 05/06/24 – 12.50pm 06/06/24

Table 2

<i>Timer Period</i>	Start Date/Time	L_{Amax}	L_{Aeq1hr} (Mode)	L_{Aeq15min} (Mode)	L_{A90}
<i>Day (0700-2300)</i>	14.35pm 05/06/24	83.8dBA	56.4dBA		51.1dBA
<i>Night (2300-0700)</i>	23.00pm 05/06/24	87.8dBA		53.2dBA	39.3dBA

Figure 5



Comments

Constant traffic and generator 'hum' from just outside of the main building.

*based on Appendix C

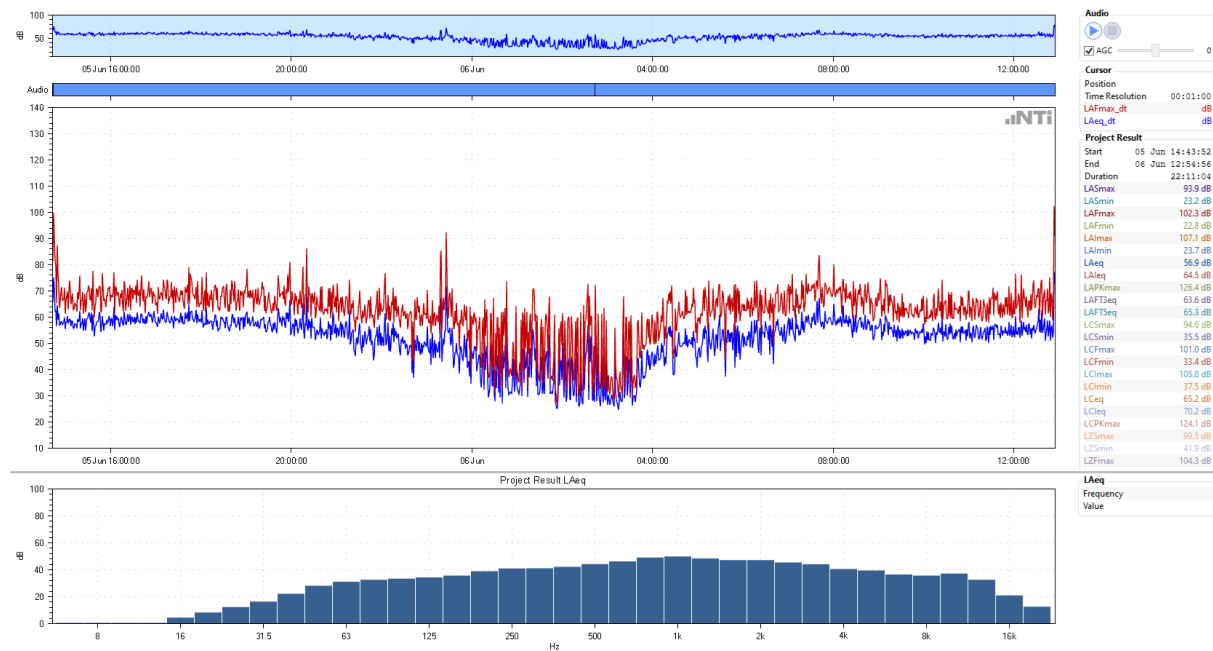
Time Period	Cloud Cover	Temperature (Celcius)	Presence of fog/snow/ice	Wind Speed (m/s)	Wind Direction
Installation	5	14	No	2.8	NE
Collection	2	12	No	0.3	NNW

4.2 South-East (Hardwick Drive) 14.43pm 05/06/24 – 12.54pm 06/06/24

Table 3

Timer Period	Start Date/Time	L _A max	L _A eq1hr (Mode)	L _A eq15min (Mode)	L _A 90
Day (0700-2300)	14.43pm 05/06/24	86.1 dBA	58.4 dBA		51.0 dBA
Night (2300-0700)	23.00pm 05/06/24	73.9 dBA		47.6 dBA	27.8 dBA

Figure 6



Comments

Constant traffic and some birdsong. Single traffic pass-by events causing spikes at night

*based on Appendix C

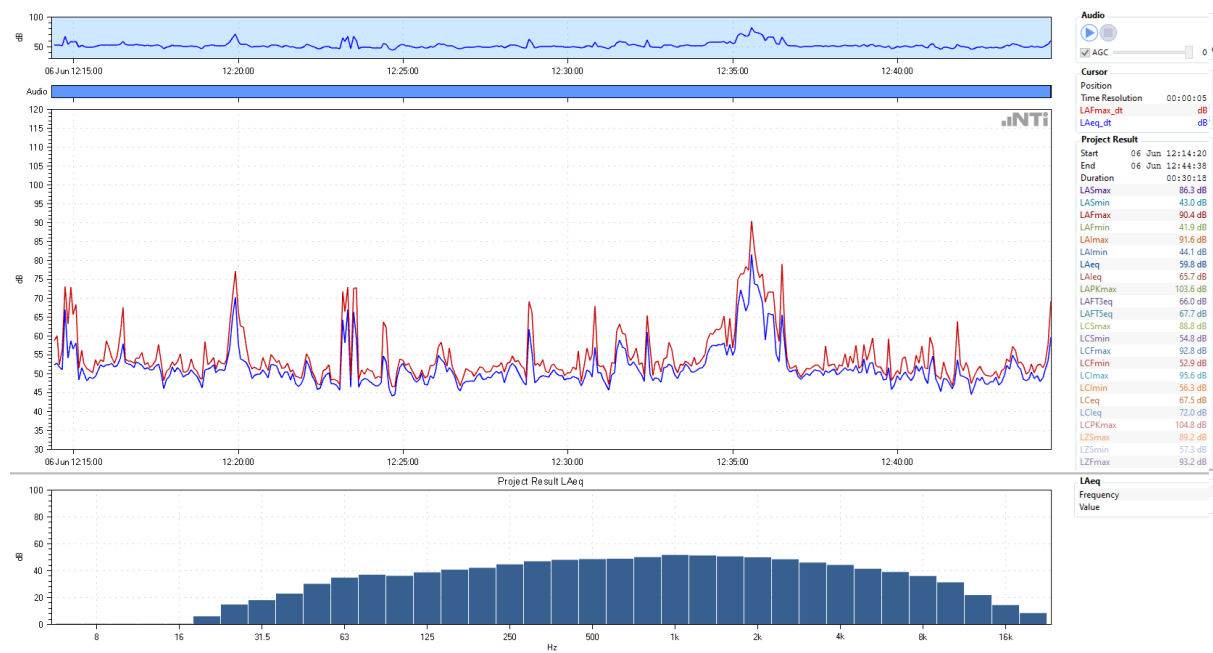
Time Period	Cloud Cover	Temperature (Celcius)	Presence of fog/snow/ice	Wind Speed (m/s)	Wind Direction
Installation	5	14	No	1.9	NE
Collection	2	13	No	0.8	NNW

4.3 Attended - South Attended (Roller Shutter Open) 12.14pm 06/06/24 – 12.44pm 06/06/24

Table 4

Timer Period	Start Date/Time	L _A max	L _A eq15min	L _A 90
Day (0700-2300)	12.14pm 06/06/24	90.4dBA	58.6dBA	47.7dBA

Figure 7



Comments

Spikes from garage noise including grinding, ramp raising and the starting of engines to move vehicles.

*based on Appendix C

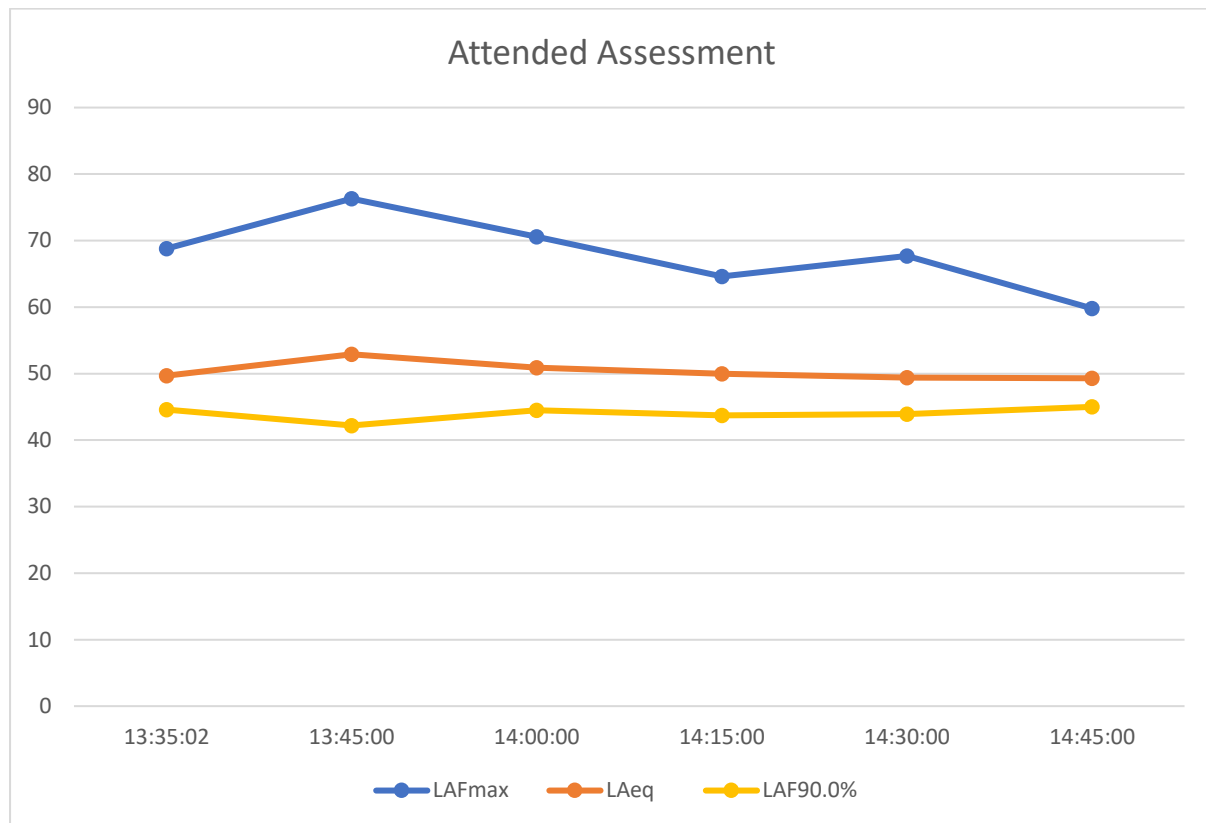
Cloud Cover	Temperature (Celcius)	Presence of fog/snow/ice	Wind Speed (m/s)	Wind Direction
2	13	No	1.7	NNW

4.3 Attended -South Attended (Roller-Shutter closed) 13.35pm 03/09/24 – 14.45pm 03/09/24

Table 5

Location	Start Date/Time	L _{Amax}	L _{Aeq15min} (Mode)	L _{A90}
Day (0700-2300)	13.35pm 03/09/24	76.3dBA	50.3dBA	43.9dBA

Figure 7



Comments

Internal noise faintly audible at 5m from roller doors

Cloud Cover	Temperature (Celcius)	Presence of fog/snow/ice	Wind Speed (m/s)	Wind Direction
2	23	No	2.2	NW

5.0 Analysis of Results

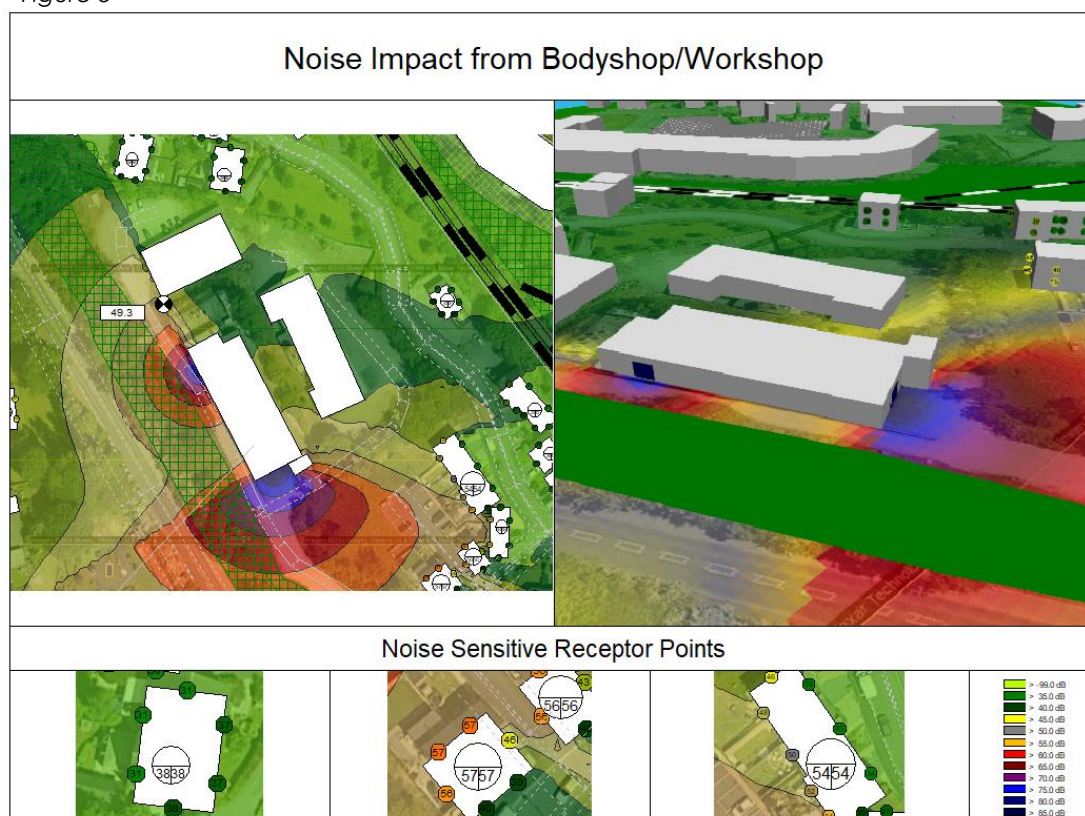
5.1 Calculated Results

- 5.1.1 The specific noise level for the workshop unit has been calculated using the CadnaA noise modelling software. This is based on the input details from the attended assessment from the garage doors on the south-east façade, and then the highest levels measured from noise emanating from the second garage door opening to the North of the site ($L_{A_{Max}}$). these are values are being compared to the shutters being closed on the South-side only in order to provide a best-practice guideline for the site.

5.1.2 As the source wasn't continuous this calculation method has been used to take into account screening affects from the surrounding buildings and terrain, the height away from the source and the fact that the measurement was taken at the boundary points and not at the nearest NSR (Noise Sensitive Receptor) due to the lack of secure positions to leave monitoring equipment for the full duration.

5.1.3 Figure 8 below shows the calculated value for the nearest NSRs based on the measured input data for the noise sources at either end of the workshop with the roller-shutter doors open at both ends. Appendix D shows the full calculation spec to include barrier attenuation, ground attenuation and reflections.

Figure 8



5.1.4 With the calculated specific noise level being at a maximum of 57dBA at the closest NSR window, and 54dBA at the next; 54dBA has been used in the calculations in table 6 to assess the noise impact of the units. The workshop is not expected to continue into the night-time hours (11pm-7am) and therefore this time period has not been considered in table 5. The highest levels are predicted to be at NSR2 and therefore this has been used in the BS4142:2014 assessment.

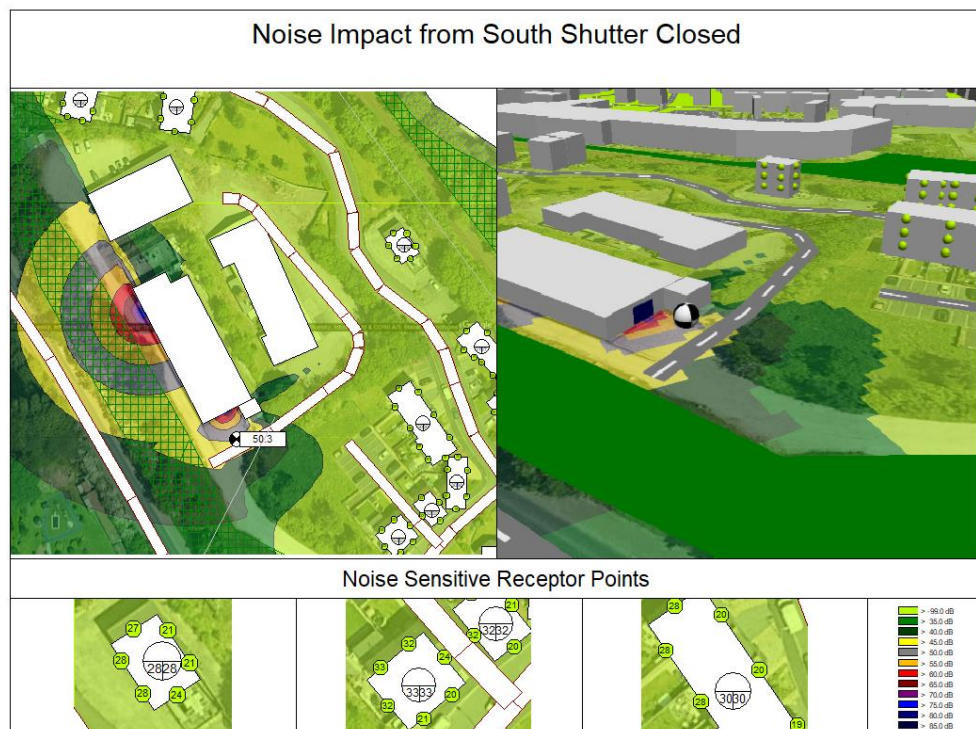
Table 6

<i>Measurement Type</i>	<i>Parameter</i>	<i>Result</i>	<i>Comment</i>
Day			
<i>Ambient sound</i>	L_{Aeq}	58dBA	Measured at NSR-Source present
<i>Residual sound level</i>	L_{Aeq1hr}	58dBA	Measured at NSR-Source not present
<i>Background sound level</i>	L_{A901hr}	51dBA	Measured at NSR-Source present
<i>Specific Sound Level</i>	L_{Aeq1hr}	57dBA	Modelled
<i>Acoustic Feature Correction</i>	dBA	+6	Some impulsive noise likely to be audible
<i>Rating Level</i>	dBA	63dBA	
<i>Difference of Background vs Rating level</i>	dBA	+12dB	
<i>Likelihood of complaints</i>			Significant Adverse Impact Likely

5.1.5 This can now be compared to the second assessment where the roller-doors were shut. This measurement was performed on a fully-functioning day where all sections of the site were operational to make sure that the worst-case internal noise level had been achieved for the measurement hour.

5.1.6 Figure 9 shows the noise impact on the surrounding area when the shutter-doors are closed.

Figure
9



5.1.7 With the calculated specific noise level now being at a maximum of 33dBA at the closest NSR window, and 32dBA at the next; 33dBA has been used in the calculations in table 4 to assess the noise impact of the units.

Table 5

Measurement Type	Parameter	Result	Comment
Day			
Ambient sound	L _{Aeq}	50dBA	Measured at NSR- Source present
Residual sound level	L _{Aeq1hr}	58dBA	Measured at NSR- Source not present
Background sound level	L _{A901hr}	51dBA	Measured at NSR- Source present
Specific Sound Level	L _{Aeq1hr}	33dBA	Modelled
Acoustic Feature Correction	dBA	+6	Some impulsive noise likely to be audible
Rating Level	dBA	39dBA	
Difference of Background vs Rating level	dBA	-18dB	

Likelihood of complaints

Low Chance of adverse impact

6.0 Conclusion and Further Comments

6.1 Discussion of Levels

- 6.1.1 The specific noise level of the workshop are above the required levels, in accordance with BS4142:2014, for there to be the likelihood of adverse impact on the nearest NSR when the roller shutters are left open (particularly on the South-side). Therefore, mitigation should be considered for the removal of adverse impact on the surrounding Noise Sensitive Receptors (NSRs).
- 6.1.2 The agreed method for this is to have the roller shutters closed at all times, except when vehicles are being driven into the area. Once this has been completed the doors should shut immediately behind the entering vehicle. Whether this is automated or a manual process – this should become part of the written procedure to make sure it is adhered to by all staff.
- 6.1.3 With the implementation of the suggested mitigation measures, the workshop/bodyshop will then be compliant in accordance with BS4142:2014 and reduce the likelihood of any adverse impact on the surrounding NSRs below acceptable levels.

7.0 Credentials

Name	Title	Credentials
James Flitton BSc AMIOA	Acoustic Consultant	CSCS Professionally Qualified person
		Associate Member Institute of Acoustics
		IOA Diploma in Acoustics & Noise Control
		Affiliate Member of IDE
		Affiliate Member of IOR

Signed



Appendix A – Acoustic Terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10}(s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.

Parameter	Description
L _{90,T}	A noise level index. The noise level exceeded for 90% of the time over the period T. Generally used to describe background noise level.

Appendix B – Survey Instrumentation

Type	Manufacturer	Model	Serial Number	Last Cal	Cal Due
SLM	NTi	XL2-TA	A2A-22077-F0	07/02/2023	06/02/2025
Pre-amp	NTi	MA220	11392	07/02/2023	06/02/2025
Microphone	NTi	MC230A	A24696	07/02/2023	06/02/2025
SLM	NTi	XL2-TA	A2A-21300-F0	12/07/2023	11/07/2025
Pre-amp	NTi	MA220	13799	12/07/2023	11/07/2025
Microphone	NTi	MC230A		12/07/2023	11/07/2025
Calibrator	NTi	CAL2000	20850	18/07/2024	18/07/2025

Appendix C – Weather Conditions Chart Used

Weather Conditions				
Measurement Location	Date/Time	Description	Beginning of Survey	End of Survey
As indicated on Error! Reference source not found.		Temperature:		
Cloud Cover Symbol Scale in oktas (eighths)  0 Sky completely clear  1  2  3  4 Sky half cloudy  5  6  7  8 Sky completely cloudy  (9) Sky obstructed from view		Precipitation:		
		Cloud cover (oktas - see guide)		
		Presence of fog/snow/ice		
		Presence of damp roads/wet ground		
		Wind Speed (m/s)		
		Wind Direction		
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)		

Appendix D – CadnaA Calculation Tables (Doors Open)

Receiver
Name: NSR1
ID:
X: 30498841.20 m
Y: 5880195.85 m
Z: 4.00 m

vert. Area Source, ISO 9613, Name: "South Roller Door", ID: ""																				
Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	la dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)
5	30498887.39	5880099.76	0.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	51.6	0.2	14.2	0.0	0.0	10.7	0.0	0.0	24.9
8	30498887.39	5880099.76	1.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	51.6	0.2	7.6	0.0	0.0	16.2	0.0	0.0	26.0
11	30498887.39	5880099.76	2.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	51.6	0.2	4.8	0.0	0.0	17.3	0.0	0.0	27.8

vert. Area Source, ISO 9613, Name: "North Roller Shutter", ID: ""																				
Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	la dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)
14	30498861.56	5880133.18	0.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	47.4	0.1	11.8	0.0	0.0	12.5	0.0	0.0	17.6
17	30498861.56	5880133.18	1.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	47.4	0.1	6.3	0.0	0.0	15.7	0.0	0.0	19.8
24	30498861.56	5880133.18	2.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	47.4	0.1	4.0	0.0	0.0	16.0	0.0	0.0	21.9

Receiver
Name: NSR2
ID:
X: 30498939.30 m
Y: 5880067.19 m
Z: 4.00 m

vert. Area Source, ISO 9613, Name: "South Roller Door", ID: ""																				
Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	la dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)
19	30498887.39	5880099.76	0.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	46.7	0.1	11.4	0.0	0.0	0.0	0.0	0.0	43.4
20	30498887.39	5880099.76	1.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	46.7	0.1	6.1	0.0	0.0	0.0	0.0	0.0	48.6
22	30498887.39	5880099.76	2.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	46.7	0.1	3.9	0.0	0.0	0.0	0.0	0.0	50.9

vert. Area Source, ISO 9613, Name: "North Roller Shutter", ID: ""																				
Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	la dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)
28	30498861.56	5880133.18	0.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	51.2	0.2	14.0	0.0	0.0	10.6	0.0	0.0	13.4
29	30498861.56	5880133.18	1.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	51.2	0.2	7.5	0.0	0.0	15.2	0.0	0.0	15.2
30	30498861.56	5880133.18	2.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	51.2	0.2	4.7	0.0	0.0	15.9	0.0	0.0	17.3

Receiver
Name: NSR3
ID:
X: 30498948.24 m
Y: 5880091.84 m
Z: 4.00 m

vert. Area Source, ISO 9613, Name: "South Roller Door", ID: ""																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	la	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB			(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
4	30498887.39	5880099.76	0.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	46.8	0.1	11.4	0.0	0.0	3.5	0.0	0.0	39.9
7	30498887.39	5880099.76	1.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	46.8	0.1	6.1	0.0	0.0	4.8	0.0	0.0	43.8
10	30498887.39	5880099.76	2.71	0	DEN	500	92.6	6.0	0.0	3.0	0.0	46.8	0.1	3.9	0.0	0.0	4.9	0.0	0.0	46.0

vert. Area Source, ISO 9613, Name: "North Roller Shutter", ID: ""																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	la	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
13	30498861.56	5880133.18	0.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	50.6	0.2	13.7	0.0	0.0	11.1	0.0	0.0	13.7
15	30498861.56	5880133.18	1.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	50.6	0.2	7.4	0.0	0.0	15.9	0.0	0.0	15.3
18	30498861.56	5880133.18	2.71	0	DEN	500	80.4	6.0	0.0	3.0	0.0	50.6	0.2	4.7	0.0	0.0	17.1	0.0	0.0	16.7

(Doors Closed)

Receiver
Name: NSR1
ID:
X: 30498941.34 m
Y: 5880154.72 m
Z: 4.00 m

vert. Area Source, ISO 9613, Name: "", ID: ""																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	la	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
8	30498860.72	5880135.23	2.48	0	DEN	500	80.4	6.0	0.0	3.0	0.0	49.4	0.2	0.7	0.0	0.0	15.8	0.0	0.0	23.3
10	30498860.72	5880135.23	1.48	0	DEN	500	80.4	6.0	0.0	3.0	0.0	49.4	0.2	4.1	0.0	0.0	14.4	0.0	0.0	21.3
12	30498860.72	5880135.23	0.48	0	DEN	500	80.4	6.0	0.0	3.0	0.0	49.4	0.2	10.2	0.0	0.0	9.8	0.0	0.0	19.8

vert. Area Source, ISO 9613, Name: "", ID: ""																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	la	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
14	30498887.24	5880101.94	2.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	48.6	0.1	0.4	0.0	0.0	13.8	0.0	0.0	14.3
16	30498887.24	5880101.94	1.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	48.6	0.1	3.1	0.0	0.0	13.6	0.0	0.0	11.7
18	30498887.24	5880101.94	0.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	48.6	0.1	9.0	0.0	0.0	10.1	0.0	0.0	9.4

Receiver
Name: NSR 2
ID:
X: 30498939.73 m
Y: 5880065.54 m
Z: 4.00 m

vert. Area Source, ISO 9613, Name: "", ID: ""																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	la	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
22	30498860.72	5880135.23	2.48	0	DEN	500	80.4	6.0	0.0	3.0	0.0	51.5	0.2	0.7	0.0	0.0	14.5	0.0	0.0	22.5
23	30498860.72	5880135.23	1.48	0	DEN	500	80.4	6.0	0.0	3.0	0.0	51.5	0.2	4.5	0.0	0.0	13.2	0.0	0.0	20.0
24	30498860.72	5880135.23	0.48	0	DEN	500	80.4	6.0	0.0	3.0	0.0	51.5	0.2	11.0	0.0	0.0	8.6	0.0	0.0	18.0

vert. Area Source, ISO 9613, Name: "", ID: ""																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	la	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
25	30498887.24	5880101.94	2.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	47.1	0.1	0.4	0.0	0.0	0.0	0.0	0.0	29.6
26	30498887.24	5880101.94	1.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	47.1	0.1	2.9	0.0	0.0	0.0	0.0	0.0	27.1
27	30498887.24	5880101.94	0.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	47.1	0.1	8.3	0.0	0.0	0.0	0.0	0.0	21.7

Receiver
Name: NSR3
ID:
X: 30498944.23 m
Y: 5880101.10 m
Z: 4.00 m

vert. Area Source, ISO 9613, Name: "", ID: ""																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	la	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB		dB	dB	dB	dB	dB	dB	dB	dB	dB	dB(A)
6	30498860.67	5880135.33	2.48	0	DEN	500	80.4	5.7	0.0	3.0	0.0	50.1	0.2	0.7	0.0	0.0	15.7	0.0	0.0	22.4
9	30498861.58	5880133.58	2.48	0	DEN	500	80.4	-6.5	0.0	3.0	0.0	50.0	0.2	0.7	0.0	0.0	15.7	0.0	0.0	10.3
11	30498860.67	5880135.33	1.48	0	DEN	500	80.4	5.7	0.0	3.0	0.0	50.1	0.2	4.3	0.0	0.0	14.0	0.0	0.0	20.5
13	30498861.58	5880133.58	1.48	0	DEN	500	80.4	-6.5	0.0	3.0	0.0	50.0	0.2	4.2	0.0	0.0	14.1	0.0	0.0	8.4
15	30498860.67	5880135.33	0.48	0	DEN	500	80.4	5.7	0.0	3.0	0.0	50.1	0.2	10.5	0.0	0.0	9.4	0.0	0.0	18.9
17	30498861.58	5880133.58	0.48	0	DEN	500	80.4	-6.5	0.0	3.0	0.0	50.0	0.2	10.4	0.0	0.0	9.4	0.0	0.0	6.8

vert. Area Source, ISO 9613, Name: "", ID: ""																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	la	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
19	30498887.24	5880101.94	2.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	46.1	0.1	0.4	0.0	0.0	5.9	0.0	0.0	24.7
20	30498887.24	5880101.94	1.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	46.1	0.1	2.7	0.0	0.0	6.5	0.0	0.0	21.7
21	30498887.24	5880101.94	0.65	0	DEN	500	67.7	6.6	0.0	3.0	0.0	46.1	0.1	7.8	0.0	0.0	4.9	0.0	0.0	18.3