

PROOF OF EVIDENCE

REPORT REFERENCE:

SA - 7741

PLANNING INSPECTORATE REFERENCE:

APP/A1720/C/23/3336046

CLIENT:

Fareham Borough Council

SITE:

Titchfield Festival Theatre

73 St Margarets Lane

Titchfield

Fareham

Hampshire, PO14 4BG

SURVEY DATES:

5th – 7th April 2024

Report By



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1 QUALIFICATIONS & EXPERIENCE

Mr Brian James Scrivener MIOA

I am an acoustic consultant and engineering specialist. I hold a Diploma in Acoustics and Noise Control Engineering and studied at Nescot Technical College in Epsom. I qualified in June 2003 but have been working in the acoustics industry since 1997. I am a full member of the Institute of Acoustics. I am the Technical Director and owner of Sound Advice Acoustics Ltd and we have recently won the Institute of Acoustics Peter Lord Award for Innovative Design.

The Dundonald Church project in London won the Peter Lord Award 2023, from the Institute of Acoustics – the Award honours people whose contributions to acoustics or to the Institute have been particularly noteworthy. The acoustics at Dundonald were truly remarkable and a major contributor to the quality of the spaces.

Sound advice Acoustics Ltd is now a well-established consultancy company with many national and overseas contracts to fulfil.

Sound Advice Acoustics Ltd has full UKAS accredited in accordance with BS EN ISO 17025: 2017 'General Requirements for the Competence of Testing and Calibration Laboratories', to carry out pre-completion sound insulation tests in accordance with the Building Regulations Approved Document E 2003 'Resistance to the Passage of Sound'.

The evidence which I have prepared and provide for this appeal in this proof of evidence is true and has been prepared and is given in accordance with the guidance of my professional institution, and I confirm that the opinions expressed are my true and professional opinions.

I have worked on many music venues on a professional level and involved in amateur dramatics on a personal level and am fully aware of their operational procedures. My client base includes HG Construction, Alumno, McCarty & Stone, Persimmon Homes, Taylor Wimpey, Transport for London, Morrisons, Marks & Spencer and many more throughout the UK giving detailed analysis of noise levels affecting local residents, businesses and other establishment that could be adversely affected by noise.

2 INTRODUCTION

2.1 Instruction

Sound Advice Acoustics Ltd have been instructed by Fareham Borough Council to undertake a Noise Impact Assessment (NIA) to understand the acoustic impact of the Titchfield Festival Theatre (TFT) on the surrounding residential premises. Noise measurements have been undertaken between 5th and 7th April 2024 when TFT was showing 'Calamity Jane'. This show was selected for this assessment due to its popularity to draw large numbers to the venue, to allow us to ascertain a typical scenario for noise levels associated with these performances.

2.2 Planning Enforcement

This assessment has been undertaken as the council have issued an enforcement notice against the Theatre for changing the use of part of their site without planning permission. This Proof of Evidence (PoE) has been issued with regards to the acoustic elements pertaining to Titchfield Festival Theatre 71-73 St Margarets Lane, Fareham, Hants, PO14 4BG (Appeal Site). This relates to the newly constructed Arden Theatre towards the rear of the site. It should be noted that the Titchfield Festival Theatre already has planning permission for two smaller theatres within the same site.

2.3 Site Visits

I have visited the site several times on a professional consulting level over the assessment period which included Friday 5th & Saturday 6th April 2024. I am also very familiar with the location as I've visited the Theatre several times on a personal level to see shows. I live locally in Locks Heath, only a few miles away from the venue.

2.4 Scope of Report

The measurements have been undertaken in accordance with ISO 1996 – Part 2: 2017 to determine the existing operational noise levels from the Theatre during a typical performance. This report aims to establish the following:

- Existing background noise levels within the area;
- Assess the potential noise impact on the nearby residential dwellings;
- Review noise from Vehicle Movements;
- Review noise from Patron Noise;
- Review noise breakout from the venue itself.

2.5 Planning Practice Guidance and Noise

2.5.1 Planning Practice Guidance for Noise (PPG-Noise)

March 2014 saw the publication of the Planning Practice Guidance for Noise (PPG-Noise) and this was subsequently updated in 2023. The Planning Practice Guidance and Noise sets out details of how potential noise impacts should be evaluated.

‘Local planning authorities’ plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- ✓ *whether or not a significant adverse effect is occurring or likely to occur;*
- ✓ *whether or not an adverse effect is occurring or likely to occur; and*
- ✓ *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.’

2.5.2 The National Planning Policy Framework 2023 (NPPF)

Paragraph 191 of the National Planning Policy Framework 2023 (NPPF) states the following:

Paragraph 191

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.
- b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.6 Noise Policy Statement for England 2010 (NPSE).

The purpose of this document is to include all aspects of environmental noise within assessments i.e. environmental noise, neighbour noise and neighbourhood noise. Noise is to be considered alongside other relevant issues relating to the site and should not be considered in isolation, according to the NPSE.

There are several key phrases within the NPSE aims and these are discussed below.

2.6.1 “Significant Adverse” and “Adverse”

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

2.6.2 NOEL – No Observed Effect Level

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

2.6.3 LOAEL – Lowest Observed Adverse Effect Level

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

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

2.6.4 SOAEL – Significant Observed Adverse Effect Level

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

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

2.7 Planning Policy Guidance

PPG Noise paragraph 006 states that:-

At the lowest extreme, when noise is not perceived to be present, there is by definition no effect. As the noise exposure increases, it will cross the 'no observed effect' level. However, the noise has no adverse effect so long as the exposure does not cause any change in behaviour, attitude or other physiological responses of those affected by it. The noise may slightly affect the acoustic character of an area but not to the extent there is a change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

As the exposure increases further, it crosses the 'lowest observed adverse effect' level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

Increasing noise exposure will at some point cause the 'significant observed adverse effect' level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.

At the highest extreme, noise exposure would cause extensive and sustained adverse changes in behaviour and / or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided.

Paragraph: 005 Reference ID: 30-005-20190722

Revision date: 22 07 2019

2.8 British Standard 8233: 2014

Calculations are to be made in accordance with BS 8233: 2014 Sound Insulation and Noise Reduction for Buildings Code of Practice. BS 8233: 2014 set the following parameters as target levels that should be designed to within rooms such as Living Rooms and Bedrooms.

7.7 Specific Types of Building

7.7.1 Dwelling houses, flats and rooms in residential use (when unoccupied)

This subclause applies to external noise as it affects the internal acoustic environment from sources without a specific character, previously termed “anonymous noise”. Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered in Table 4. For dwellings, the main considerations are:

- a) for bedrooms, the acoustic effect on sleep; and*
- b) for other rooms, the acoustic effect on resting, listening and communicating.*

NOTE: Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate.

2.8.1 Internal Ambient Noise Levels for Dwellings

In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4.

Indoor ambient noise levels for dwellings			
Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35 dB L _{Aeq} 16 HOUR	--
Dining	Dining Room / Area	40 dB L _{Aeq} 16 HOUR	--
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq} 16 HOUR	30 dB L _{Aeq} 8 HOUR

It should be noted the criteria of L_{Aeq} 30 dB is set for bedrooms within BS 8233: 2014 for night time periods 23:00 – 07:00, whereas daytime levels are set to L_{Aeq} 35 dB 07:00 – 23:00. However, the assessments are made at 22:30 hrs when it’s entirely plausible for residents to be sleeping. Furthermore, the show times may vary and result in later finishing times, bringing the 30 minute leaving noise period closer to the 23:00 hr night time bracket.

The following table summarises the noise exposure hierarchy, based on the likely average response of those affected.

Response	Examples of Outcome	Increasing Effect Level	Action
No Observed Effect Level			
Not Present	No Effect	No Observed Effect	No Specific Measures Required
No Observed Adverse Effect Level			
Present and not Intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level			
Present and Intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and Reduce to a Minimum
Significantly Observed Adverse Effect Level			
Present and Disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significantly Observed Adverse Effect	Avoid
Present and Very Disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect Level	Prevent

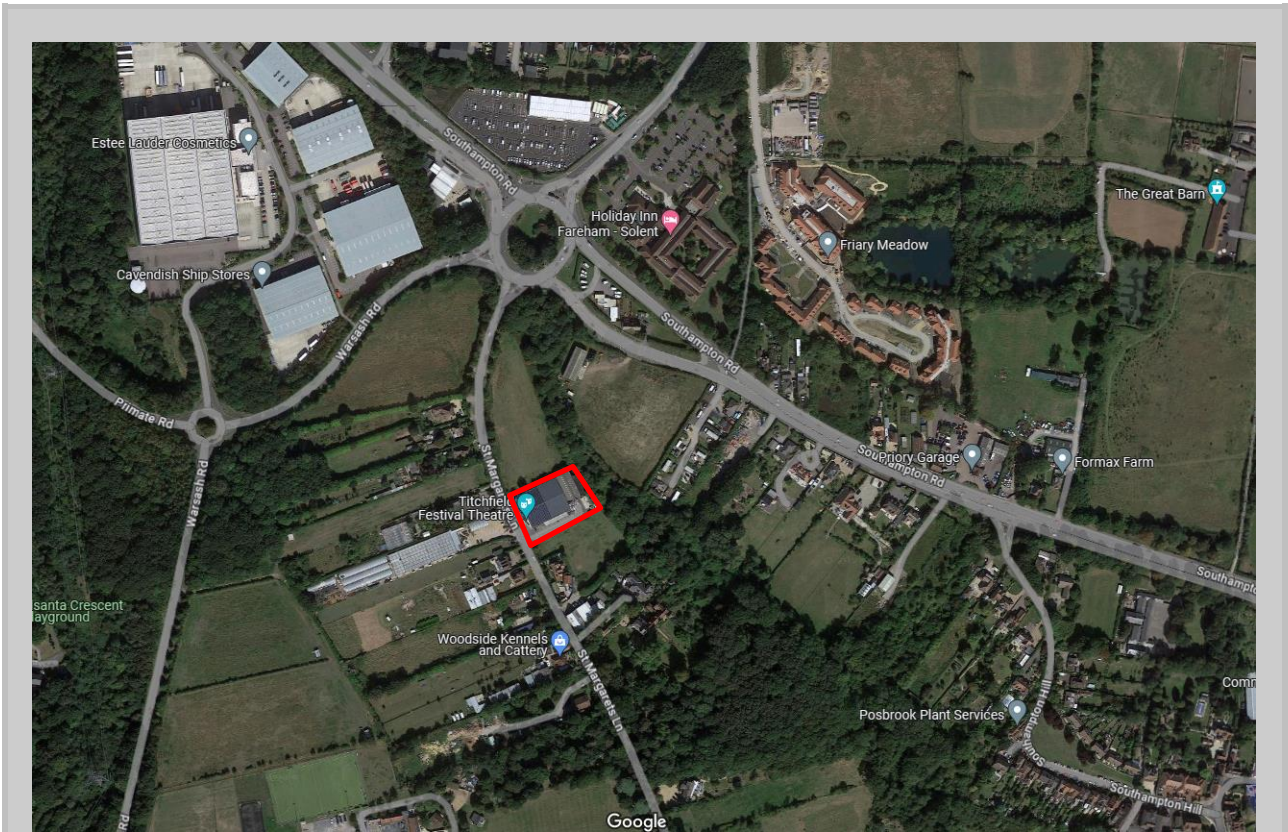
I therefore attribute the following relationship between these effect levels and the excess over background to be a true comparison between these statements and values. In the absence of any definitive standard or guidelines relating specifically to patron noise from theatres, the following categories are derived from BS 4142: 2014 +A1:2019. While patron noise falls outside the scope of this standard, it sets a good point of reference for assessing acoustic effects on background noise level increases from noise sources and their direct relationship with these limits.

PPG Assessment	PPG Effect Level	Assessment Conclusion	Excess Over Background
No Observed Effect Level (NOEL)	No Observed Effect	Low Impact	< 0 dB(A)
No Observed Adverse Effect Level (NOAEL)	No Observed Adverse Effect		0 – <5 dB(A)
Lowest Observed Adverse Effect Level (LOAEL)	Observed Adverse Effect	Adverse Impact	5 – <10 dB(A)
Significantly Observed Adverse Effect Level (SOAEL)	Significantly Observed Adverse Effect	Significant Adverse Impact	+10 dB(A) Contextual Scale
	Unacceptable Adverse Effect Level		

3 SITE LOCATION & PROCEDURE

3.1 Layout

The site is located on St Margarets Lane, Titchfield.



3.2 Measurement Locations

3.2.1 Positioning

Noise Measurements were located at the Boundary of St Margarets Cottage on the land between this and the Theatre as well as a second position to the north east of the land, in line with that of position 1 to give a representative assessment of noise emanating from TFT during a typical performance. External Living spaces are also to be protected from commercial noise and therefore the rear garden area of St Margarets Cottage has been considered noise sensitive.

The land separating St Margarets Cottage & Priory Cottage from the TFT is owned by Hampshire County Council, who granted Sound Advice Acoustics Ltd permission to access this land for the purpose of this noise impact assessment.

3.3 Measurement Procedure

Whilst there is a front entrance to the other theatres within this site, these already have planning permission and therefore any performances associated with these fall outside of the scope of this assessment and have not been assessed. If the Arden Theatre was operating at the same time as either or both of the other Theatres at the venue, there would almost certainly be a cumulative impact to consider. The evaluated noise levels were emanating from the Arden theatre only as this was the only one in use during the analysed data period.

Continuous 1 minute external noise levels were recorded between 19:00 hrs on 5th April 2024 and 08:47 on 8th April 2024. Noise levels over the performance time periods have been extrapolated and analysed, primarily from position 1 as a worst case scenario to the nearest affected noise sensitive premises associated with St Margarets Cottage.

In order to assess the potential impact from the site, measurement samples were split into 1minute measurements to highlight any periods of noise increase that would be associated with the use of TFT before, during and after a typical performance. In addition, site inspections were undertaken during both the Friday 5th April and Saturday 6th April's performance, before during and after to witness the activities and associated noise levels during these periods. It should be noted the Sunday performance was between 14:30 and 17:00 hrs and these have been captured as well.

4 OBSERVATIONS ON SITE

During the periods of the performances, I walked around the outside of the site and at no time entered onto their property. All observations were made outside the land of TFT. During my site visits, it is my opinion that TFT were not aware of my presence and therefore operated as normal.

4.1 Local Residents

There are residential properties locate all along St Margarets Lane that have the potential to be affected by noise from TFT. However, St Margarets Cottage & Priory Cottage are the most likely to be affected due to the side entrance to the Arden Theatre.

I visited St Margarets Cottage (nearest noise sensitive premises to the Arden Theatre) and Priory Cottage on Friday 5th April 2024. During my visit, I discussed with the local residents their opinion of the operational elements of the Theatre and they raised concerns with regards to noise. Further concerns were raised in relation to the operations of the Arden Theatre being operated with the roller shutter door and other apertures open during rehearsals, rented out elements as well as performances during the summer. These were not witnessed during my assessment but have been considered within my recommendations and proposed planning conditions.

4.2 Graphed Results

It can be seen from the captured data that noise levels have increased at position 1 and 2 during the periods of arrival prior to the performance, the finale and patrons and vehicles leaving the venue.

4.3 Vehicle Noise

Prior to the performance, vehicles were witnessed arriving and being marshalled either into the venue or into the parking area of the garden centre opposite the venue. These vehicles arriving at the Theatre itself total 15-20 cars due to limited parking. Those arriving travel very slowly into the parking areas and no real increase in noise level or disturbance was witnessed.

After the performance had finished, those cars within the venues car park itself left very slowly due to other patrons leaving the Theatre and being in the way of the cars. As a result, the vehicles were not deemed to be a disturbance from this area. This area appeared to be again marshalled due to the presence of patrons on foot. Whilst these and those cars within the car park of the adjacent garden centre were leaving, I walked along St Margarets Lane and generally the cars were leaving at a sensible speed and had little to no acoustic impedance on the local residents. Whilst visiting some of the residents I did witness some loud cars and motorbikes accelerating along St Margarets Lane causing an increase in noise levels. These were not related to the TFT.

4.4 Noise Breakout from Titchfield Festival Theatre

During the performance the acoustic breakout appears to be minimal with only a few elements of crescendos during the show being audible at the boundary of St Margarets Cottage. These appeared to be emanating from the roof section of the building which is often one of the weaker elements of a venue of this type. It was noted that the entrance doors remained open throughout the performances, but music and amplified voices were not witnessed to be emanating from these doors.

There is a large roller shutter door possible used for access for scenery loading, unloading as well as other access uses to the Arden Theatre. This door was closed throughout the performances and noise was not emanating from here.

Towards the finale of the show the crescendo of music and voices became more audible at the residential boundary of St Margarets Cottage. Due to the close proximity of the A27, traffic noise becomes a more dominant element contributor to the overall background noise levels. Therefore, instantaneous noise measurements would not have highlighted any significant increase in noise levels at either of the measurement positions or the neighbouring residential premises. However, it was audible and were residents sat in their gardens in an evening, these would be audible. Again, these appeared to be emanating from the roof structure of the venue.

4.5 Patron Noise

Generally, with people arriving, the noise levels were low. With a capacity of 463 seats and assuming a sold out performance, not everyone arrives at the same time and this arrival process is spread out over approximately 30-60 minutes prior to the performance. Whilst there is an increased number of people on St Margarets Lane, the possibility of a Significant Adverse Impact to local residents is low.

With regards to the end of the performance, when the show has finished, patrons and staff begin to leave the venue quite quickly. On each of the evening performance, it took approximately 20-30 minutes for everyone to leave. During this time, Patron noise is clearly audible at the measurements locations as well as on St Margarets Lane. The data captured confirms this and shows an increase in noise levels during these time periods over and above the natural trend of the prevailing background noise levels.

Between 22:00hrs and 23:00hrs I witnessed loud speaking, some shouting, group singing of the musical numbers just seen on stage. Children were also witnessed adding to the noise levels with excitement from the show. Generally, there is a noticeable and audible increase in noise levels emanating from Patrons leaving the venue from the main side entrance.

4.6 Roller Shutter Door & Other Elements

During my several site visits, the main roller shutter door, other doors, and windows remained closed, and I didn't witness any time when these were open. The local residents have raised their concerns relating to the summer months when there have been possible times when performances or rehearsals have occurred with some or all of these aforementioned opened. This I could not confirm during my assessments.

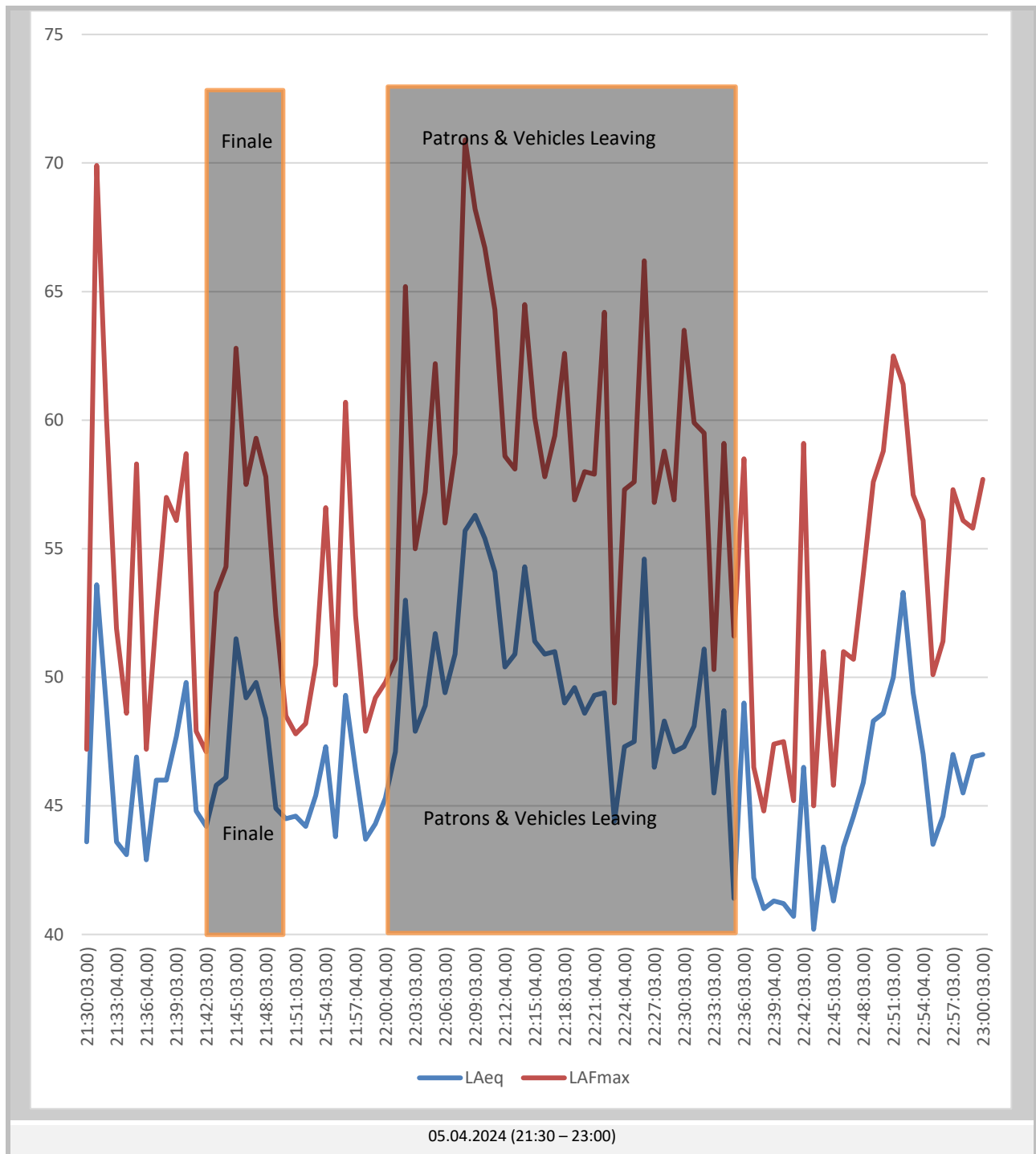
5 RESULTS

5.1 Summary of Results

The following demonstrates the summary of results from the data collected from position 1 during the assessment period from 5th – 8th April 2024. Position 2 was used for a reference point at the same distance from the Arden Theatre as position 1.

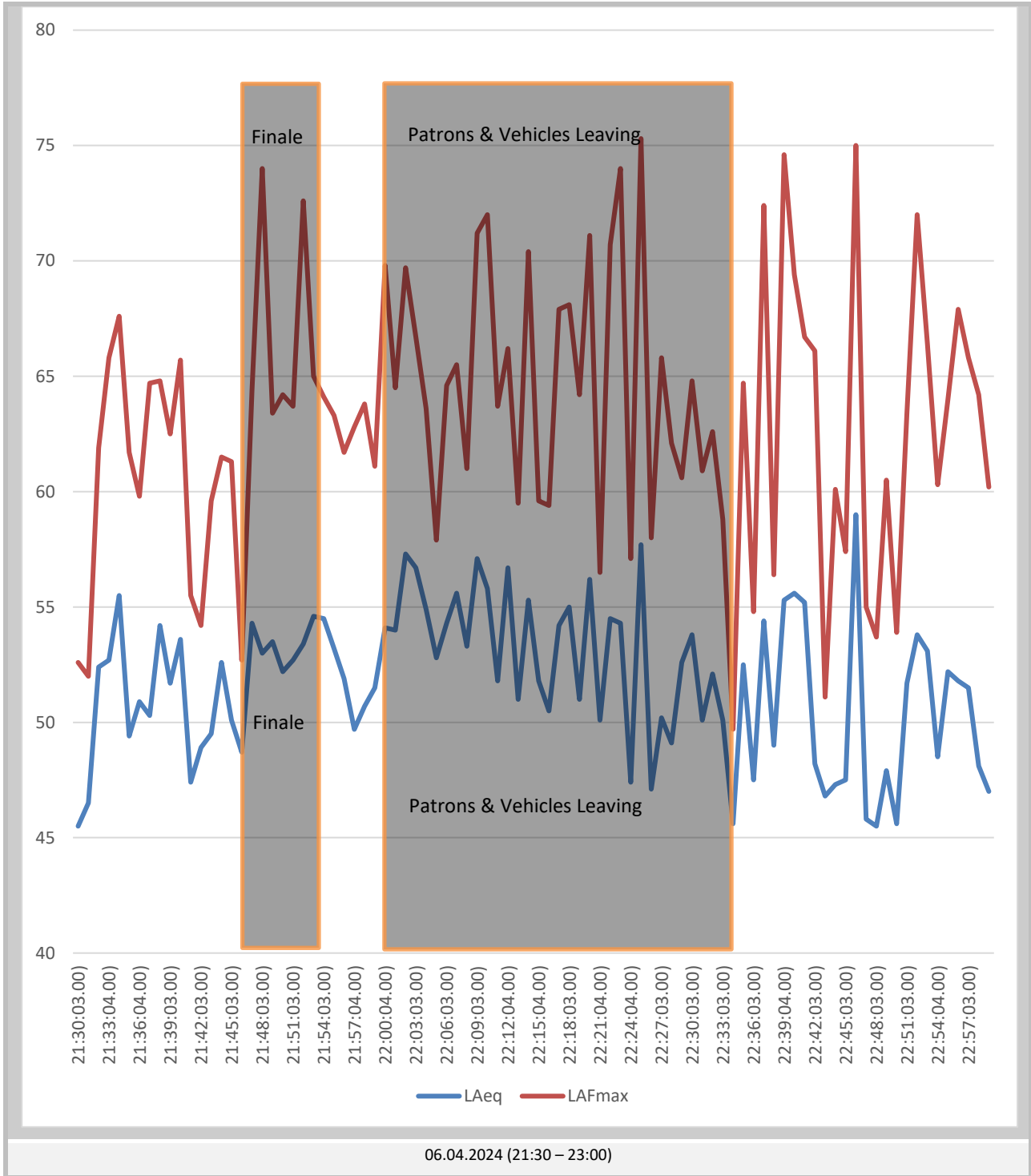
5.2 Position 1 Friday 5th April 2024 (21:30 – 23:00)

The following graphical data has been extrapolated to highlight the period when the performance came to an end. The performance of Calamity Jane finished at 22:00 hrs and the patrons and associated vehicles had all left the venue and local area by 22:30 hrs.



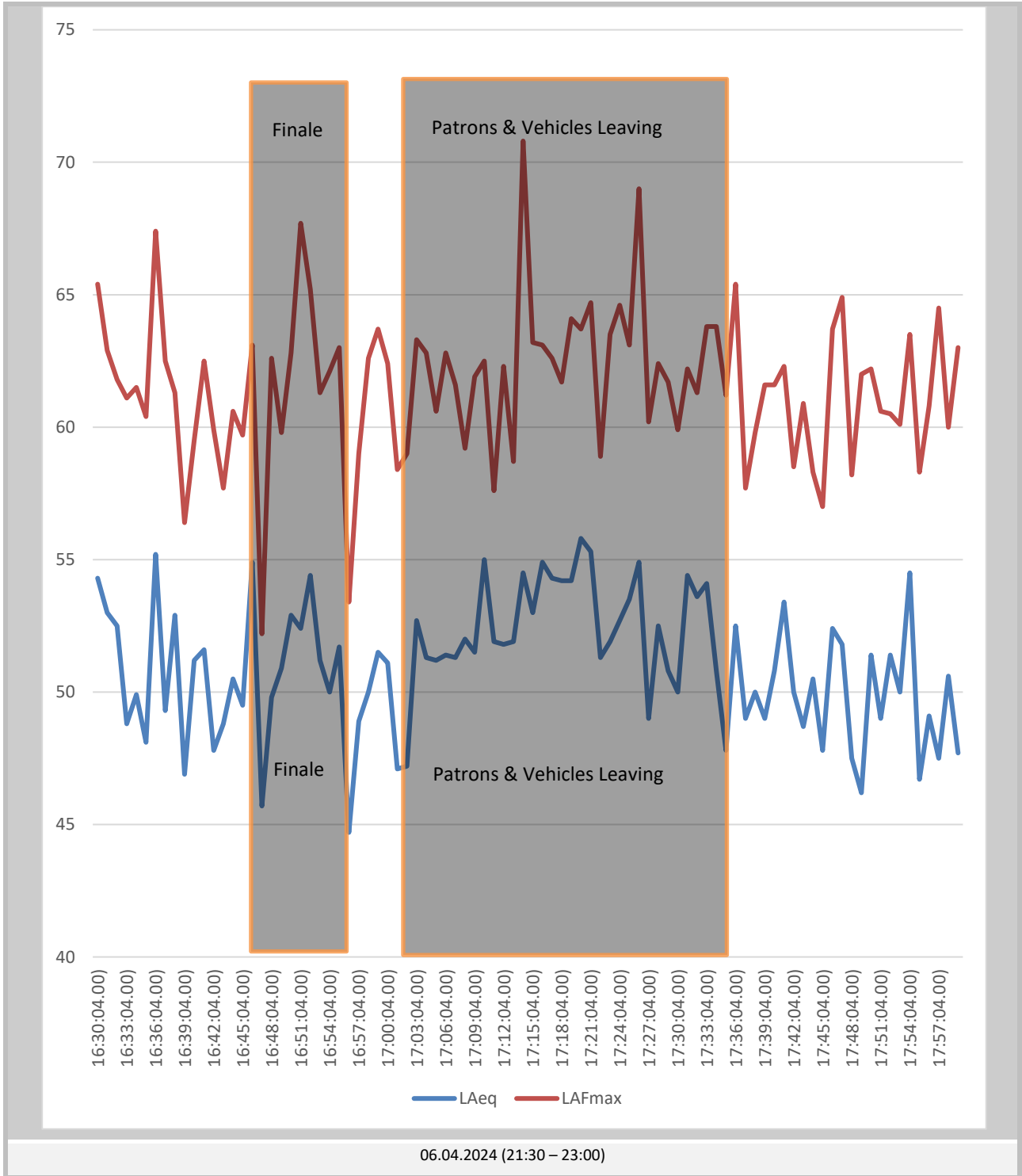
5.3 Saturday 6th April 2024 (21:30 – 23:00)

The following graphical data has been extrapolated to highlight the period when the performance came to an end. The performance of Calamity Jane finished at 22:00 hrs and the patrons and associated vehicles had all left the venue and local area by 22:30 hrs.



5.4 Sunday 7th April 2024 (16:30 – 18:00)

The following graphical data has been extrapolated to highlight the period when the performance came to an end. The performance of Calamity Jane finished at 22:00 hrs and the patrons and associated vehicles had all left the venue and local area by 22:30 hrs.



5.5 Position 1 - Assessments

The following assessment have been made at position 1 as a worst case scenario to the nearest affected noise sensitive premises. The following table demonstrates the $L_{Aeq\ 30\ MINUTE}$ dB and $L_{Amax\ 30\ MINUTE}$ dB levels directly before patrons leave the building, during the 30minute period when they are leaving and the acoustic influence from the ambient noise levels. The 30 minute period had been used as the assessment period for this analysis as this is a representative period of time between the activity accruing and the prevailing background noise levels.

The calculation demonstrated within Appendix C of this proof, demonstrate a +0.4 dB(A) increase from the measurement position 1 to the first floor window of St Margarets Cottage. This is due to distance and reflection factors.

5.6 $L_{Aeq\ 30\ MINUTE}$ dB Assessment

Performance	Friday	Saturday	Sunday
	dB(A)	dB(A)	dB(A)
Patrons Leaving Noise Level ($L_{Aeq\ 30min}$ dB)	51.2	54.2	51.1
Ambient Noise Level ($L_{Aeq\ 30min}$ dB)	46.9	51.8	51.2
Corrected Noise Level ($L_{Aeq\ 30min}$ dB)	49.2	50.5	41.1
Distance & Reflection Correction	0.4	0.4	0.4
Calculated Level at Residential`	49.6	50.9	41.5
Background Noise Level ($L_{A90\ 30min}$ dB)	41.4	44.3	43.1
Excess Over Background	8.2	6.6	-1.6
Assessment Conclusion	Adverse Impact (5-10 dB)	Adverse Impact (5-10 dB)	Low Impact (<0 dB)
Conclusion	LOAEL	LOAEL	NOEL

5.7 $L_{Amax\ 30min}$ dB Assessment

Performance	Friday	Saturday	Sunday
	dB(A)	dB(A)	dB(A)
During Performance ($L_{Amax\ 30min}$ dB)	54.8	65.1	63.5
Patrons Leaving ($L_{Amax\ 30min}$ dB)	62.5	68.0	61.4
Distance & Reflection Correction	0.4	0.4	0.4
Calculated Level at Residential	62.9	68.4	61.8
Background Noise Level ($L_{Amax\ 30min}$ dB)	56.3	66.5	62.3
Excess Over Background	6.6	1.9	-0.5
Assessment Conclusion	Adverse Impact	Low Impact	Low Impact
NPPF Conclusion	LOAEL	NOAEL	NOEL

The above table demonstrates the effects of the L_{Amax} dB noise levels calculated at the façade of St Margarets Cottage.

5.8 Assessment Conclusion

The above table demonstrates that with regards to Friday & Saturday, patrons leaving the site have seen the background noise level exceeded the background noise level between +5 dB and +10 dB above background resulting in a conclusion of ‘Adverse Impact’ and LOAEL, which coincides with the visual and audible observations made on site. The Sunday performance is less intrusive as the more central daytime background noise levels are masking the isolated noise levels associated with patrons leaving. These results also confirm my professional opinion that the noise associated with patrons leaving the venue have the potential to constitute a noise nuisance during the 30 minute period they were witnessed leaving the venue. Therefore, remedial works have been calculated to indicate what would be required to lower this acoustic impact to a conclusion of at least ‘No Observed Adverse Effect – Low Impact’.

PPG Assessment	PPG Effect Level	Assessment Conclusion	Excess Over Background
No Observed Effect Level (NOEL)	No Observed Effect	Low Impact	< 0 dB(A)
No Observed Adverse Effect Level (NOAEL)	No Observed Adverse Effect		0 – <5 dB(A)

6 POSSIBLE REMEDIAL WORKS

6.1 Outline

Generally, the acoustics to the venue appear to have been considered during the construction stage and implemented to a degree. There are several areas of noise control that could be increased that would ensure the acoustic integrity of the venue be increased to a suitable level at which the residents nearby would not be adversely affected by noise.

6.2 Noise Breakout

Consider the possibility of increasing the acoustic transmission performance of the roof itself, or alternatively limit the noise levels internally to ensure the finale elements are not audible at the nearest residential premises. If the venue already has an internal noise limiting system, this can be tweaked to achieve the desired effect. Both of these are common place recommendations within venues of this nature.

6.3 Vehicle Noise

Generally, vehicle noise is not a concern as is well marshalled at the site. It may be advantageous for the venue to display some generic signs reminding them to leave the venue quietly and considerately. Again, this is common place within venues of this nature where you have nearby residential or noise sensitive premises.

6.4 Future Parking

It is understood an application has been made for a more permanent car park opposite the site. An acoustic study should be undertaken to demonstrate the noise implications of this car park and if there's a further need for acoustic screens etc to protect neighbouring properties.

6.5 Patron Noise

6.5.1 Outline

The patron noise from the venue is likely to be the biggest acoustic factor and realistically there is only one solution that could be implemented to reduce these noise levels. Install an acoustic screen along the south eastern entrance boundary of the venue. This should be absorptive on the venue side. Install suitable external absorptive material on the outside wall of the venue in various locations to break up and reflective noise onto this external surface. This is likely to reduce noise levels at St Margarets Cottage and Priory Cottage by up to 5 dB(A) with the use of a 2.0m acoustic screen, which would be a noticeable difference. The reduction at Kites Croft opposite the Theatre would only benefit from a -1 dB(A) reduction from 46 dB(A) down to 45 dB(A) regardless of screen height. However, with a 2.0m screen in place, the highest noise level is still that at St Margarets Cottage at 46 dB(A).

6.5.2 Screen Height Attenuation Values

The following table demonstrates the effects of higher acoustic fencing/screening, but this would most likely require planning permission.

Scenario	Calculated Façade Reduction in Noise Level dB(A)		
	St Margarets Cottage	Priory Cottage	Kites Croft
No Acoustic Screen	51 dB(A)	40 dB(A)	46 dB(A)
2.0m Acoustic Screen	46 dB(A)	35 dB(A)	45 dB(A)
	-5 dB(A)	-5 dB(A)	-1 dB(A)
2.5m Acoustic Screen	45 dB(A)	32 dB(A)	45 dB(A)
	-6 dB(A)	-8 dB(A)	-1 dB(A)
3.0m Acoustic Screen	42 dB(A)	30 dB(A)	45 dB(A)
	-9 dB(A)	-10 dB(A)	-1 dB(A)

See Appendix C for 3D Models

6.5.3 Assessment of Acoustic Screen Height.

Based on the data collected from the performances of Calamity Jane during the times patron noise was identified, the construction of a 2.0m acoustic screen has been calculated to demonstrate its effectiveness both within the garden area of St Margarets Cottage and within a first floor bedroom with the window open. Obviously the greater the height of the barrier, the greater the attenuation achieved at St Margarets Cottage and Priory Cottage, however, the 2.0m acoustic screen could be constructed under permitted development rights.

7 ASSESSMENT L_{Aeq} 30 MINUTE dB

7.1 Existing Calculated

The following corrected noise levels have been replicated on the CADNA A calculations to calculate the resultant noise levels at St Margarets Cottage with and without the proposed acoustic screen during the Saturday night’s performance.

Performance Day	Corrected Noise Level at Position 1 L_{Aeq} 30min dB	Calculated Noise Level at St Margarets Cottage	BS 8233: 2014 Partially Open Window	Calculated Internal Noise Level
Saturday	L_{Aeq} 30min 50.6 dB	L_{Aeq} 30min 51.0 dB	-15 dB(A)	L_{Aeq} 30min 36.0 dB
See Appendix D for 3D Models				

The above table demonstrates calculated noise levels within the bedroom of St Margarets Cottage to be in excess of the bedroom criteria of L_{Aeq} t 30 dB during daytime hours and L_{Aeq} t 25 dB during night time hour.

It is recognised that the above criteria is designed for a steady noise source such as continuous noise from the A27, railway lines, aircraft over a greater period of time. However, in the absence of any other specific patron related standard or guideline, this criteria demonstrates a suitable internal criteria for sporadic events that could have the potential to cause a noise nuisance to occupants. BS 8233: 2014 (Annex G.1 para.4) suggests a partially open window will give an overall façade attenuation of approximately 15 dB.

7.1.1 With 2.0m Acoustic Screen

Performance Day	Corrected Noise Level at Position 1 L_{Aeq} 30min dB	Calculated Noise Level at St Margarets Cottage	BS 8233: 2014 Partially Open Window	Calculated Internal Noise Level
Saturday	L_{Aeq} 30min 50.6 dB	L_{Aeq} 30min 46.0 dB	-15 dB(A)	L_{Aeq} 30min 31.0 dB
See Appendix D for 3D Models				

The above demonstrates an internal noise level within St Margarets Cottage of L_{Aeq} 30min 31.0 dB during a period when patrons are leaving with a 2.0m screen constructed. Whilst this level exceeds the recommended internal level of L_{Aeq} 30min 30.0 dB by +1 dB, this increase is marginal and unlikely to affect the residents. The 2.0m screen could be constructed under a permitted development rights and this could be offset against the +1 dB increase, which is negligible.

8 PROPOSED PLANNING CONDITIONS

Based on the assessments and conclusion of this report, the following planning conditions are proposed to ensure the venue can operate with a Good Acoustic Design.

8.1 Noise Limiting

8.1.1 Proposed Planning Condition

Noise levels are to be limited within the premises to ensure any and all activities within the Arden Theatre are not audible at any nearest noise sensitive premises between the hours of operation.

8.1.2 Reasoning

It is my professional opinion that the existing internal music and noise levels are only just acceptable in relation to noise breakout from the building structure itself. In my professional opinion, whilst some music and singing voices were audible during the finale, these were not loud enough to cause a noise nuisance but were getting very close. This is based on the noise levels not exceeding those of the witnessed performance of Calamity Jane. By installing a noise limiting system, this ensures operational noise levels will not increase any further than witnessed.

8.2 Doors & Other Apertures.

8.2.1 Proposed Planning Condition

With the exception of the entrance doors to the Arden Theatre, all other doors and windows are to remain closed during any performance or rehearsal period when the theatre is in use.

8.2.2 Reasoning

If any other doors, windows, or apertures are left open during rehearsals, or performances any other situations where music or singing is undertaken, the acoustic integrity of the structure in its entirety, will be acoustically diminished. Our assessments have demonstrated the existing operational procedure with the doors and windows closed are acceptable. The Arden Theatre would need to produce evidence to the contrary that they could operate with doors and windows open, although my professional opinion would be that this is highly unlikely.

8.3 Acoustic Screen

8.3.1 Proposed Planning Condition

Prior to the first operation of the Arden Theatre, a 2.0m acoustic barrier along the entire length of the south eastern boundary shall be installed with a minimum mass of 14 kg/m², be absorptive on the inner face, facing the Arden Theatre, be sealed to the ground, be continuous in length and have not gaps or hit and miss configurations. The acoustic screen shall be retained thereafter. Details to be submitted to and approved in writing by Fareham Borough Council.

8.3.2 Reasoning

The acoustic screen along the boundary of the Arden Theatre land and the Hampshire County Council land is necessary to mitigate the noise levels from patrons down to a more appropriate noise level at St Margarets Cottage.

9 CONCLUSION

Sound Advice Acoustics Ltd have been instructed by Fareham Borough Council to undertake a Noise Impact Assessment (NIA) to understand the acoustic impact of the Titchfield Festival Theatre (TFT) on the surrounding residential premises. Noise measurements have been undertaken between 5th and 7th April 2024 during a performance of 'Calamity Jane'. This performance was selected for this assessment due to its popularity to draw large numbers to the venue to allow us to ascertain a typical scenario for noise levels associated with these performances.

Assessments have been made and generally the acoustics for the Arden Theatre have been considered at the early stages of development. However, there are some areas for improvement that would result in the local residents being less affected by noise during performances and rehearsals.

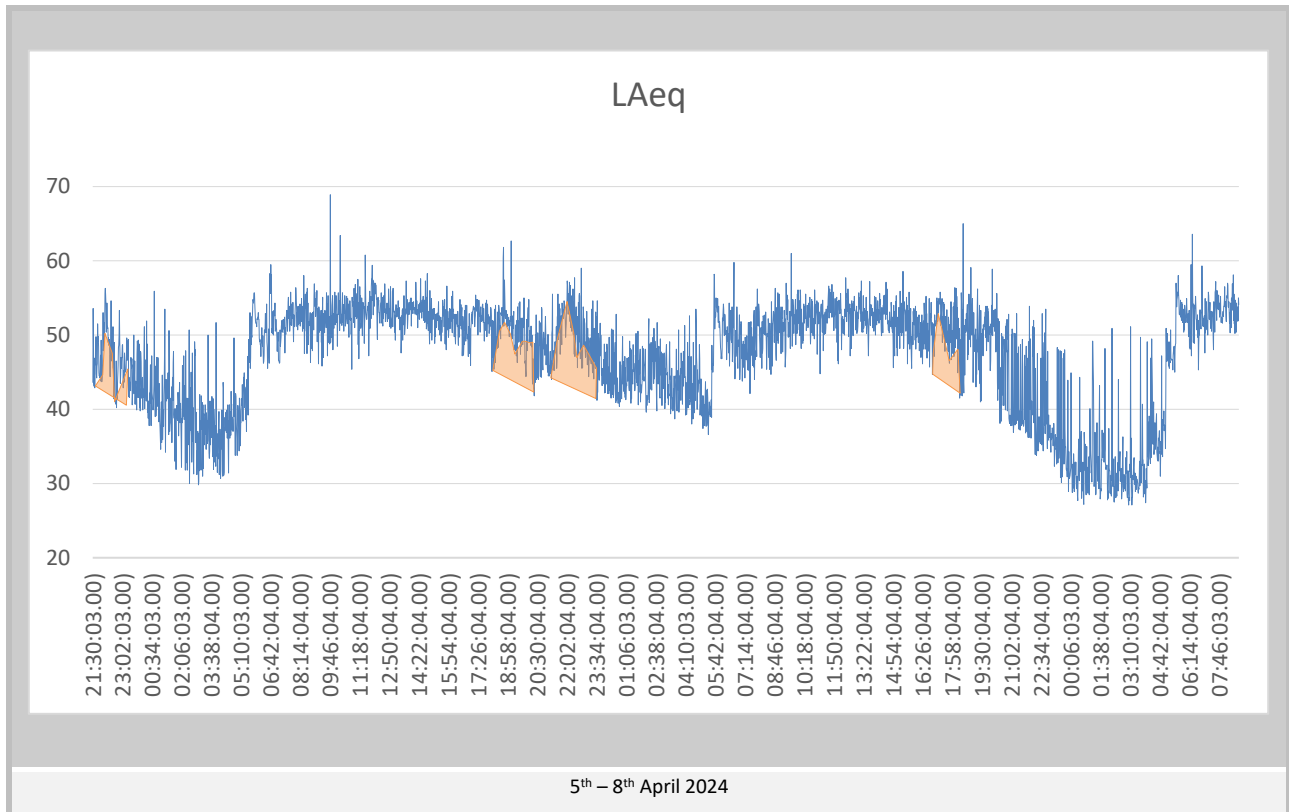
This proof has demonstrated the existing noise levels associated with patron noise is currently having a 'Lowest Observed Adverse Effect Level (LOAEL) - Adverse Impact' on the residents at St Margarets Cottage, which has been identified as the nearest noise sensitive premises to the Arden Theatre. Recommendations have been made within this report together with proposals for planning conditions that should be introduced, to reduce these noise levels to a conclusion of 'No Observed Adverse Effect Level (LOAEL) - Low Impact' should planning permission be considered.

10 APPENDIX A - RESULTS

10.1 5th – 8th April 2024

10.2 Complete Site Measurement Period

The following demonstrates the overall measurement period with the sections of TFT activities highlighted.



11 APPENDIX B – PERFORMANCE NOISE LEVELS

11.1 5th April 2024 (21:30 – 23:00)

File	Date	Time	LAeq	LAFmax	LA90		LAeq	LAFmax	LA90
DURING PERFORMANCE	(2024/04/05	21:30:03.00)	43.6	47.2	41.8		47.3	58.4	42.5
	(2024/04/05	21:31:03.00)	53.6	69.9	43				
	(2024/04/05	21:32:03.00)	48.8	60.1	43.3				
	(2024/04/05	21:33:04.00)	43.6	51.9	41.3				
	(2024/04/05	21:34:03.00)	43.1	48.6	40.6				
	(2024/04/05	21:35:03.00)	46.9	58.3	40.7				
	(2024/04/05	21:36:04.00)	42.9	47.2	41				
	(2024/04/05	21:37:03.00)	46	52.4	43.3				
	(2024/04/05	21:38:04.00)	46	57	44.1				
	(2024/04/05	21:39:03.00)	47.7	56.1	43.3				
	(2024/04/05	21:40:03.00)	49.8	58.7	41.7				
	(2024/04/05	21:41:03.00)	44.8	47.9	42.6				
	(2024/04/05	21:42:03.00)	44.2	47.1	42.7				
	(2024/04/05	21:43:03.00)	45.8	53.3	41.8				
	(2024/04/05	21:44:04.00)	46.1	54.3	43.5				
	(2024/04/05	21:45:03.00)	51.5	62.8	40.6				
	(2024/04/05	21:46:03.00)	49.2	57.5	44.7				
	(2024/04/05	21:47:03.00)	49.8	59.3	43.1				
	(2024/04/05	21:48:03.00)	48.4	57.8	43.6				
	(2024/04/05	21:49:03.00)	44.9	52.4	41.9				
	(2024/04/05	21:50:03.00)	44.5	48.5	39.9				
	(2024/04/05	21:51:03.00)	44.6	47.8	43				
	(2024/04/05	21:52:04.00)	44.2	48.2	41.3				
	(2024/04/05	21:53:03.00)	45.4	50.5	43.2				
(2024/04/05	21:54:03.00)	47.3	56.6	42.5					
(2024/04/05	21:55:04.00)	43.8	49.7	41.4					
(2024/04/05	21:56:03.00)	49.3	60.7	43.7					
(2024/04/05	21:57:04.00)	46.4	52.4	44					
(2024/04/05	21:58:03.00)	43.7	47.9	41.3					
(2024/04/05	21:59:03.00)	44.3	49.2	41.1					
PATRONS & CARS LEAVING	(2024/04/05	22:00:04.00)	45.3	49.8	43.4		51.2	62.5	46.1
	(2024/04/05	22:01:03.00)	47.1	50.7	45.1				
	(2024/04/05	22:02:03.00)	53	65.2	47				
	(2024/04/05	22:03:03.00)	47.9	55	46.5				
	(2024/04/05	22:04:03.00)	48.9	57.2	45.5				
	(2024/04/05	22:05:03.00)	51.7	62.2	45.3				
	(2024/04/05	22:06:03.00)	49.4	56	46.3				
	(2024/04/05	22:07:03.00)	50.9	58.7	47.5				
	(2024/04/05	22:08:04.00)	55.7	70.9	50.2				
	(2024/04/05	22:09:03.00)	56.3	68.2	49				
	(2024/04/05	22:10:03.00)	55.4	66.7	49.8				
	(2024/04/05	22:11:03.00)	54.1	64.3	47.7				
	(2024/04/05	22:12:04.00)	50.4	58.6	47.2				
	(2024/04/05	22:13:04.00)	50.9	58.1	47				
	(2024/04/05	22:14:03.00)	54.3	64.5	48.9				
	(2024/04/05	22:15:04.00)	51.4	60.1	46.8				
	(2024/04/05	22:16:04.00)	50.9	57.8	47.6				
	(2024/04/05	22:17:03.00)	51	59.4	46.5				
	(2024/04/05	22:18:03.00)	49	62.6	42.2				
	(2024/04/05	22:19:03.00)	49.6	56.9	46				
	(2024/04/05	22:20:03.00)	48.6	58	42.8				
	(2024/04/05	22:21:04.00)	49.3	57.9	44.1				
	(2024/04/05	22:22:03.00)	49.4	64.2	44.5				
	(2024/04/05	22:23:03.00)	44.4	49	41.6				
(2024/04/05	22:24:04.00)	47.3	57.3	42.9					
(2024/04/05	22:25:03.00)	47.5	57.6	42.1					
(2024/04/05	22:26:03.00)	54.6	66.2	46.1					
(2024/04/05	22:27:03.00)	46.5	56.8	41.2					
(2024/04/05	22:28:03.00)	48.3	58.8	41.9					
(2024/04/05	22:29:03.00)	47.1	56.9	42.9					
(2024/04/05	22:30:03.00)	47.3	63.5	42.7					
NO ACTIVITY AT THEATRE	(2024/04/05	22:31:04.00)	48.1	59.9	41.8		46.9	56.3	41.4
	(2024/04/05	22:32:03.00)	51.1	59.5	45.1				
	(2024/04/05	22:33:03.00)	45.5	50.3	43.5				
	(2024/04/05	22:34:03.00)	48.7	59.1	40.7				
	(2024/04/05	22:35:04.00)	41.4	51.6	37				
	(2024/04/05	22:36:03.00)	49	58.5	37.7				
	(2024/04/05	22:37:03.00)	42.2	46.5	40.1				
	(2024/04/05	22:38:03.00)	41	44.8	38.2				
	(2024/04/05	22:39:04.00)	41.3	47.4	37.7				
	(2024/04/05	22:40:04.00)	41.2	47.5	37.9				
	(2024/04/05	22:41:03.00)	40.7	45.2	38				
	(2024/04/05	22:42:03.00)	46.5	59.1	39.4				
	(2024/04/05	22:43:04.00)	40.2	45	37				
	(2024/04/05	22:44:03.00)	43.4	51	40				
	(2024/04/05	22:45:03.00)	41.3	45.8	38.8				
	(2024/04/05	22:46:03.00)	43.4	51	41.1				
	(2024/04/05	22:47:04.00)	44.6	50.7	40.2				
	(2024/04/05	22:48:03.00)	45.9	54	42.8				
	(2024/04/05	22:49:04.00)	48.3	57.6	42.6				
	(2024/04/05	22:50:03.00)	48.6	58.8	41.4				
	(2024/04/05	22:51:03.00)	50	62.5	43.9				
	(2024/04/05	22:52:03.00)	53.3	61.4	42.4				
	(2024/04/05	22:53:03.00)	49.4	57.1	45.2				
	(2024/04/05	22:54:04.00)	47	56.1	43.8				
(2024/04/05	22:55:04.00)	43.5	50.1	39					
(2024/04/05	22:56:04.00)	44.6	51.4	38.9					
(2024/04/05	22:57:03.00)	47	57.3	43.2					
(2024/04/05	22:58:03.00)	45.5	56.1	42.8					
(2024/04/05	22:59:04.00)	46.9	55.8	43.3					
(2024/04/05	23:00:03.00)	47	57.7	38.1					

11.2 6th April 2024 (21:30 – 23:00)

File	Date	Time	L _{Aeq}	L _{AFmax}	L _{A90}		L _{Aeq}	L _{AFmax}	L _{A90}
DURING PERFORMANCE	(2024/04/06)	21:30:04.00	45.5	52.6	43.3		52.1	65.1	47.7
	(2024/04/06)	21:31:04.00	46.5	52	44.2				
	(2024/04/06)	21:32:04.00	52.4	61.9	46.7				
	(2024/04/06)	21:33:04.00	52.7	65.8	44.1				
	(2024/04/06)	21:34:04.00	55.5	67.6	44.4				
	(2024/04/06)	21:35:04.00	49.4	61.7	45.2				
	(2024/04/06)	21:36:04.00	50.9	59.8	48.3				
	(2024/04/06)	21:37:04.00	50.3	64.7	46.3				
	(2024/04/06)	21:38:04.00	54.2	64.8	48.1				
	(2024/04/06)	21:39:04.00	51.7	62.5	48.8				
	(2024/04/06)	21:40:04.00	53.6	65.7	47.7				
	(2024/04/06)	21:41:04.00	47.4	55.5	46				
	(2024/04/06)	21:42:04.00	48.9	54.2	46.3				
	(2024/04/06)	21:43:04.00	49.5	59.6	47.2				
	(2024/04/06)	21:44:04.00	52.6	61.5	47.5				
	(2024/04/06)	21:45:04.00	50.1	61.3	47.3				
	(2024/04/06)	21:46:04.00	48.7	52.7	47.1				
	(2024/04/06)	21:47:04.00	54.3	64.4	49.2				
	(2024/04/06)	21:48:04.00	53	74	47.5				
	(2024/04/06)	21:49:04.00	53.5	63.4	49.1				
	(2024/04/06)	21:50:04.00	52.2	64.2	48.4				
	(2024/04/06)	21:51:04.00	52.7	63.7	48.7				
	(2024/04/06)	21:52:04.00	53.4	72.6	48.7				
	(2024/04/06)	21:53:04.00	54.6	65	50.2				
	(2024/04/06)	21:54:04.00	54.5	64.1	51.3				
	(2024/04/06)	21:55:04.00	53.2	63.3	48.8				
	(2024/04/06)	21:56:04.00	51.9	61.7	47.8				
	(2024/04/06)	21:57:04.00	49.7	62.8	46.9				
	(2024/04/06)	21:58:04.00	50.7	63.8	47.4				
	(2024/04/06)	21:59:04.00	51.5	61.1	47.6				
	(2024/04/06)	22:00:04.00	54.1	69.8	50.7				
	(2024/04/06)	22:01:04.00	54	64.5	50.3				
	(2024/04/06)	22:02:04.00	57.3	69.7	50				
	(2024/04/06)	22:03:04.00	56.7	66.7	53.1				
(2024/04/06)	22:04:04.00	54.9	63.6	51.7					
(2024/04/06)	22:05:04.00	52.8	57.9	51					
(2024/04/06)	22:06:04.00	54.3	64.6	50.8					
(2024/04/06)	22:07:04.00	55.6	65.5	51.7					
(2024/04/06)	22:08:04.00	53.3	61	50.3					
(2024/04/06)	22:09:04.00	57.1	71.2	49.7					
(2024/04/06)	22:10:04.00	55.8	72	50.4					
(2024/04/06)	22:11:04.00	51.8	63.7	48.2					
(2024/04/06)	22:12:04.00	56.7	66.2	48.4					
(2024/04/06)	22:13:04.00	51	59.5	47.9					
(2024/04/06)	22:14:04.00	55.3	70.4	47.5					
(2024/04/06)	22:15:04.00	51.8	59.6	47.7					
(2024/04/06)	22:16:04.00	50.5	59.4	47.9					
(2024/04/06)	22:17:04.00	54.2	67.9	47.7					
(2024/04/06)	22:18:04.00	55	68.1	49					
(2024/04/06)	22:19:04.00	51	64.2	47.6					
(2024/04/06)	22:20:04.00	56.2	71.1	49.9					
(2024/04/06)	22:21:04.00	50.1	56.5	48.5					
(2024/04/06)	22:22:04.00	54.5	70.7	47.6					
(2024/04/06)	22:23:04.00	54.3	74	46.2					
(2024/04/06)	22:24:04.00	47.4	57.1	44.1					
(2024/04/06)	22:25:04.00	57.7	75.3	45.7					
(2024/04/06)	22:26:04.00	47.1	58	44.6					
(2024/04/06)	22:27:04.00	50.2	65.8	45.9					
(2024/04/06)	22:28:04.00	49.1	62.1	45.8					
(2024/04/06)	22:29:04.00	52.6	60.6	47.1					
(2024/04/06)	22:30:04.00	53.8	64.8	45.4					
NO ACTIVITY AT THEATRE	(2024/04/06)	22:31:04.00	50.1	60.9	45.5		51.8	66.9	44.3
	(2024/04/06)	22:32:04.00	52.1	62.6	45.6				
	(2024/04/06)	22:33:04.00	50.1	58.8	45.3				
	(2024/04/06)	22:34:04.00	45.6	49.7	44.1				
	(2024/04/06)	22:35:04.00	52.5	64.7	43.4				
	(2024/04/06)	22:36:04.00	47.5	54.8	44.4				
	(2024/04/06)	22:37:04.00	54.4	72.4	46.9				
	(2024/04/06)	22:38:04.00	49	56.4	45.1				
	(2024/04/06)	22:39:04.00	55.3	74.6	45				
	(2024/04/06)	22:40:04.00	55.6	69.4	45.1				
	(2024/04/06)	22:41:04.00	55.2	66.7	43.5				
	(2024/04/06)	22:42:04.00	48.2	66.1	43.5				
	(2024/04/06)	22:43:04.00	46.8	51.1	43.2				
	(2024/04/06)	22:44:04.00	47.3	60.1	43.4				
	(2024/04/06)	22:45:04.00	47.5	57.4	43.7				
	(2024/04/06)	22:46:04.00	59	75	44.8				
	(2024/04/06)	22:47:04.00	45.8	55	43.1				
	(2024/04/06)	22:48:04.00	45.5	53.7	43.8				
	(2024/04/06)	22:49:04.00	47.9	60.5	43.1				
	(2024/04/06)	22:50:04.00	45.6	53.9	43.6				
	(2024/04/06)	22:51:04.00	51.7	63.4	43.9				
	(2024/04/06)	22:52:04.00	53.8	72	42.9				
	(2024/04/06)	22:53:04.00	53.1	66.4	42.8				
	(2024/04/06)	22:54:04.00	48.5	60.3	44.2				
	(2024/04/06)	22:55:04.00	52.2	64	44.9				
	(2024/04/06)	22:56:04.00	51.8	67.9	45.8				
	(2024/04/06)	22:57:04.00	51.5	65.8	44.6				
	(2024/04/06)	22:58:04.00	48.1	64.2	42.9				
	(2024/04/06)	22:59:04.00	47	60.2	43.4				
	(2024/04/06)	23:00:04.00	47.1	57.1	44.8				

11.3 7th April 2024 (15:30 – 17:00)

File	Date	Time	LAeq	LAFmax	LA90		LAeq	LAFmax	LA90
DURING PERFORMANCE	(2024/04/07	15:30:04.00)	53.5	63.2	44.7		51.9	63.5	45.0
	(2024/04/07	15:31:04.00)	53.4	62.1	48				
	(2024/04/07	15:32:04.00)	53.3	63.9	46.6				
	(2024/04/07	15:33:04.00)	52.5	63.5	45.3				
	(2024/04/07	15:34:04.00)	50.5	62.2	44.8				
	(2024/04/07	15:35:04.00)	52	62.7	43.8				
	(2024/04/07	15:36:04.00)	55.1	64.8	45				
	(2024/04/07	15:37:04.00)	51.8	63.8	44.2				
	(2024/04/07	15:38:04.00)	54	64.2	44				
	(2024/04/07	15:39:04.00)	46.1	60.3	42.8				
	(2024/04/07	15:40:04.00)	53.3	63.9	43.4				
	(2024/04/07	15:41:04.00)	50.7	61.7	44.9				
	(2024/04/07	15:42:04.00)	50	60.4	43.5				
	(2024/04/07	15:43:04.00)	48.8	58.5	44.9				
	(2024/04/07	15:44:04.00)	55.8	68.1	45.8				
	(2024/04/07	15:45:04.00)	52.8	61.4	43.2				
	(2024/04/07	15:46:04.00)	48.1	60	42.9				
	(2024/04/07	15:47:04.00)	51.3	59.6	43.2				
	(2024/04/07	15:48:04.00)	51.8	59.8	43.9				
	(2024/04/07	15:49:04.00)	53.6	64.6	45.1				
	(2024/04/07	15:50:04.00)	49	57	42.9				
	(2024/04/07	15:51:04.00)	47.2	62.1	43.5				
	(2024/04/07	15:52:04.00)	45.5	51.9	43.2				
	(2024/04/07	15:53:04.00)	49.8	59.6	45.5				
	(2024/04/07	15:54:04.00)	48.7	58.5	45.9				
	(2024/04/07	15:55:04.00)	51.7	68.7	46.2				
	(2024/04/07	15:56:04.00)	48.7	56.6	46.3				
	(2024/04/07	15:57:04.00)	53.2	70.3	46.9				
	(2024/04/07	15:58:04.00)	51.9	61.1	46.2				
	(2024/04/07	15:59:04.00)	53.6	64.4	45.9				
PATRONS & CARS LEAVING	(2024/04/07	16:00:04.00)	51.4	60.6	44.9		51.1	61.4	44.6
	(2024/04/07	16:01:04.00)	53.3	66.5	46.5				
	(2024/04/07	16:02:04.00)	53.3	61.6	46.2				
	(2024/04/07	16:03:04.00)	49.3	60.3	45.2				
	(2024/04/07	16:04:04.00)	53.9	61.4	47				
	(2024/04/07	16:05:04.00)	48.1	53.2	45.1				
	(2024/04/07	16:06:04.00)	53.2	62.3	45.8				
	(2024/04/07	16:07:04.00)	51.1	63	46				
	(2024/04/07	16:08:04.00)	49.7	61.1	44.7				
	(2024/04/07	16:09:04.00)	49.9	61	44.7				
	(2024/04/07	16:10:04.00)	52.4	63.3	44				
	(2024/04/07	16:11:04.00)	50.6	60.1	43.2				
	(2024/04/07	16:12:04.00)	51.3	60.8	44.5				
	(2024/04/07	16:13:04.00)	49	60	44.5				
	(2024/04/07	16:14:04.00)	52.7	62.1	44.5				
	(2024/04/07	16:15:04.00)	47.9	56.8	44.1				
	(2024/04/07	16:16:04.00)	49.4	59.1	45				
	(2024/04/07	16:17:04.00)	50.2	56.5	46				
	(2024/04/07	16:18:04.00)	50	61	43.8				
	(2024/04/07	16:19:04.00)	51.7	63.2	44				
	(2024/04/07	16:20:04.00)	47	54.7	44.3				
	(2024/04/07	16:21:04.00)	50.8	60.3	45.1				
	(2024/04/07	16:22:04.00)	50.3	60.4	44.1				
	(2024/04/07	16:23:04.00)	52.7	63.1	43.6				
	(2024/04/07	16:24:04.00)	48.3	59	43.2				
	(2024/04/07	16:25:04.00)	46.1	55.2	42.3				
	(2024/04/07	16:26:04.00)	50.9	61.1	43.2				
	(2024/04/07	16:27:04.00)	51.5	62.2	42.6				
	(2024/04/07	16:28:04.00)	51.9	63.3	42.3				
	(2024/04/07	16:29:04.00)	48.1	56.5	43.8				
(2024/04/07	16:30:04.00)	54.3	65.4	44.9					
NO ACTIVITY AT THEATRE	(2024/04/07	16:31:04.00)	53	62.9	44.4		51.2	62.3	43.1
	(2024/04/07	16:32:04.00)	52.5	61.8	43.8				
	(2024/04/07	16:33:04.00)	48.8	61.1	41.6				
	(2024/04/07	16:34:04.00)	49.9	61.5	43.3				
	(2024/04/07	16:35:04.00)	48.1	60.4	42.9				
	(2024/04/07	16:36:04.00)	55.2	67.4	43.7				
	(2024/04/07	16:37:04.00)	49.3	62.5	43.7				
	(2024/04/07	16:38:04.00)	52.9	61.3	44				
	(2024/04/07	16:39:04.00)	46.9	56.4	42.8				
	(2024/04/07	16:40:04.00)	51.2	59.5	43.4				
	(2024/04/07	16:41:04.00)	51.6	62.5	43.3				
	(2024/04/07	16:42:04.00)	47.8	59.9	42.8				
	(2024/04/07	16:43:04.00)	48.8	57.7	43.5				
	(2024/04/07	16:44:04.00)	50.5	60.6	42.9				
	(2024/04/07	16:45:04.00)	49.5	59.7	42.6				
	(2024/04/07	16:46:04.00)	54.9	63.1	45.1				
	(2024/04/07	16:47:04.00)	45.7	52.2	42.9				
	(2024/04/07	16:48:04.00)	49.8	62.6	41.5				
	(2024/04/07	16:49:04.00)	50.9	59.8	42.5				
	(2024/04/07	16:50:04.00)	52.9	62.8	43.1				
	(2024/04/07	16:51:04.00)	52.4	67.7	43.2				
	(2024/04/07	16:52:04.00)	54.4	65.2	45.5				
	(2024/04/07	16:53:04.00)	51.2	61.3	42.7				
	(2024/04/07	16:54:04.00)	50	62.1	41.7				
	(2024/04/07	16:55:04.00)	51.7	63	42.3				
	(2024/04/07	16:56:04.00)	44.7	53.4	42.2				
	(2024/04/07	16:57:04.00)	48.9	59	41.8				
	(2024/04/07	16:58:04.00)	50	62.6	41				
	(2024/04/07	16:59:04.00)	51.5	63.7	43.3				
	(2024/04/07	17:00:04.00)	51.1	62.4	43.5				

12 APPENDIX C – ACOUSTIC SCREEN MODELS

12.1 No Acoustic Screen



12.2 2.0m Acoustic Screen



12.3 2.5m Acoustic Screen



12.4 3.0m Acoustic Screen



13 APPENDIX D - ENVIRONMENTAL CONDITIONS

		Barometric Pressure	Wind Speed	Wind Direction	Precipitation
Friday 5 th April 2024	Start 19:10	1001.2mb	0.0 m/s	None	None
	Finish 22:40	1001.1mb	0.0 m/s	None	None
Saturday 6 th April 2024	Start 19:00	998.0mb	9.8 m/s	South Westerly	None
	Finish 22:40	997.9mb	7.9 m/s	South Westerly	None
Sunday 7 th April 2024	Start 14:00	999.7mb	2.5 m/s	South Westerly	None
	Finish 17:30	999.5mb	1.9 m/s	South Westerly	None

Please note: Friday & Saturdays data was recorded on site with Sunday's data taken from the nearest weather station from the met office 1.7miles east of the site.


14 APPENDIX E - APPARATUS

The equipment was calibrated using a sound pressure level of 114.0 dB at an octave band centre frequency of 1000Hz with reference to $2 \times 10^{-5} \text{ Nm}^{-2}$ before and after the tests and the equipment set to have no inaccuracy greater than 0.2dB.

All the following equipment was calibrated in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS) on the following dates. Calibration schedules are implemented within Sound Advice Acoustics Ltd in accordance with UKAS directive LAB 23.

14.1 RION ML52 NOISE METER s/n 00242696

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Integrated Sound Level Meter	Rion	NL-52	00242696	2 Years	23.06.2023	23.06.2025
Microphone (With Windshield)	Rion	Uc-59	06178	2 Years	23.06.2023	23.06.2025
Microphone Pre – Amplifier	Rion	Nh-25	32724	2 Years	23.06.2023	23.06.2025



CERTIFICATE OF CALIBRATION

Date of Issue: 23 June 2023 **Certificate Number: TCRT23/1453**

Issued by: ANV Measurement Systems
Beaufort Court
17 Rosebuck 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

Approved Signatory: *[Signature]*
K. Mistry

Page 1 of 2 Pages

Customer
Sound Advice Solutions
Unit 2
West Links
Tollgate
Chandlers Ford
Hants
SO53 3TG

Order No.
PO-0152

Description
Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00242696
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	32724
Rion	Microphone	UC-59	06178
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 22 June 2023 **ANV Job No.** TRAC23/06282
Date Calibrated 23 June 2023

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
	15 June 2021	TCRT21/1405	ANV Measurement Systems

This certificate provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION **Certificate Number** TCRT23/1453
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	<input checked="" type="checkbox"/>	Yes

Specified or equivalent Calibrator Specified
Customer or Lab Calibrator Lab Calibrator
Calibrator adaptor type if applicable NC-74-002
Calibrator cal. date 30 May 2023
Calibrator cert. number UCRT23/1727
Calibrator cal cert issued by 0653
Calibrator SPL @ STP 94.02 dB Calibration reference sound pressure level
Calibrator frequency 1001.99 Hz Calibration check frequency
Reference level range 25 - 130 dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-10
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	24.59	23.67	± 0.30 °C
Humidity	49.7	43.1	± 3.00 %RH
Ambient Pressure	101.33	101.33	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	93.8	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	
	dB	UR	dB	UR	dB	UR
	11.9		15.9		21.1	
					0.12	

Uncertainty of the electrical self generated noise ±

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 the Guide to the Expression of Uncertainty in Measurement published by ISO.
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: K. Zablocki **R 1**
Additional Comments
None

14.2 NORSONIC 140 NOISE METER s/n 1403570

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Integrated Sound Level Meter	Norsonic	140	1403570	2 YEARS	01.11.2023	01.11.2025
12.5mm Microphone (with windshield)	Norsonic	1225	91865	2 YEARS	21.07.2022	21.07.2024
Microphone Pre – Amplifier	Norsonic	1209	12486	2 YEARS	21.07.2022	21.07.2024

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030



Certificate of Calibration and Conformance

Certificate number: **U45844**

Test Object: **Sound Level Meter, BS EN IEC 61672-1:2003 Class 1
Associated Frequency Analyser to BS EN IEC 61260:1996 Class 1**

Producer: **Norsonic AS.**
Type: **140**
Serial number: **1403570**
Customer: **Sound Advice Acoustics Ltd**
Address: **2 West Links, Tollgate, Chandlers Ford,
Hampshire, SO53 3TG**
Contact Person: **Brian Scrivener**
Order No: **PO-0161**

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	Producer	Type	Serial No	Certificate No
Microphone	Norsonic	1225	96052	45843
Calibrator*	Norsonic	1251	30873	U43256
Preamplifier	Norsonic	1209	12514	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:
Wind shield Norsonic Nor1451 (ø 60mm)
Attenuator N/A
Extension cable N/A
These items have been taken into account wherever appropriate.

Instruction Manual: Im140_1Ed8R0En Firmware Version: 2.1.670 The test object is a single channel instrument.

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	98.42 ±0.08	22.60 ±0.3	47.65 ±0.7

Calibration Dates:
Received date: 25/10/2023 Reviewed date: 01/11/2023
Calibration date: 01/11/2023 Issued date: 01/11/2023

Technicians: (Electronic certificate)

Calibrated by: *Katie Brown*

Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Sim-Cert-Master-V3-07

Certificate of Calibration and Conformance

Continuation of Certificate number: **U45844**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	BS EN IEC 61672-1:2003
Periodic Tests:	BS EN IEC 61672-3:2006
Pattern Evaluation:	BS EN IEC 61672-2:2003
Filter Evaluation:	BS EN IEC 61260:1996 Class 1

Conformance:

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.1 #9	Passed
Self-generated noise - IEC 61672-3 Ed.1 #10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 #11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 #12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 #13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 #14	Passed
Toneburst response - IEC 61672-3 Ed.1 #16	Passed
Peak C sound level - IEC 61672-3 Ed.1 #17	Passed
Overload indication - IEC 61672-3 Ed.1 #18	Passed
1/1octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed
1/3octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed

Comments

Correct level with associated calibrator is 114.0dB(A).

Statement of Conformance

The sound level meter submitted has successfully completed the periodic tests of the standard listed for the environmental conditions under which the tests were performed. As public evidence(1) was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with the manufacturer's standard to demonstrate that the model of sound level meter fully conformed to the requirements of the said standard, the sound level meter submitted for testing conforms to the relevant class of the said standard.

(1 - evidence is held on file at the calibration laboratory)

Filter Calibration

The filter functions have been found to conform, by electrical testing, to the relative attenuation requirement of the standard noted over the range of frequencies shown in the attached test report.

Observations

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. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Decision Rule

Basic Meter Function - The decision rules will be applied in accordance with the procedure as described in BS EN 61672-3:2006.

Certificate of Calibration and Conformance

Page 2 of 3

Continuation of Certificate number: U45844

Filter Function - A PASS or PASSED statement indicates that the instrument conforms with the relevant accuracy requirements of the testing standard AND the expanded measurement uncertainty (k = 2 for approximately 95 % coverage probability) is no greater in magnitude than the accuracy requirements defined in BS EN IEC 61260:1996 standard.

This certificate relates only to the items tested above.

**** End of Certificate ****

14.3 NORSONIC CALIBRATOR 1251 s/n 31310

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Calibrator	Norsonic	1251	31310	1 YEAR	22.09.2023	22.09.2024

Laboratory Location

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030



Certificate of Calibration and Conformance

Certificate number: **U45450**

Test Object: **Sound Calibrator**

Producer: **Norsonic AS.**
Type: **1251**
Serial number: **31310**
Customer: **Sound Advice Acoustics Limited**
Address: **Unit 2, West Links, Tollgate,
Chandlers Ford, Hampshire. SO53 3TG.**
Contact Person: **Brian Scrivener**
Order No: **PO0158**

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.04	0.06	1000.14	0.37
Measurement 2	114.04	0.05	1000.14	0.35
Measurement 3	114.05	0.06	1000.14	0.35
Result (Average):	114.04	0.06	1000.14	0.36
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement

Pres:0.0005 dB/kPa Temp:0.003 dB/°C Humi:0 dB/%RH Load volume: 0.0003 dB/mm3

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	99.35 ±0.040	21.2 ±0.1	58.6 ±0.7

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\NOR1251_31310_M1.nmf

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	12/09/2023	Reviewed date:	22/09/2023
Calibration date:	22/09/2023	Issued date:	22/09/2023

Technicians: (Electronic certificate)

Calibrated by: **Palanivel Marappan B.Eng(Hons), M.Sc**
Reviewed by: **Jenny Crawford**

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Calb-Cert-Master-V3-06

Certificate of Calibration and Conformance

Continuation of Certificate number: U45450

Reference Microphone: WSM10 (D) - GRAS40AG-282243

Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Instruments and Program

A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Comments

Statement of Conformance and Calibration

As public evidence was available*, from a testing organisation 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 BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.

*This evidence is held on file at the calibration laboratory.

Notes:

The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in BOLD are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Observations:

Decision Rule:

The decision rules have been applied in accordance with the procedure as described in BS EN 60942:2003

This certificate relates only to the items tested above.

** End of Certificate **

#END OF REPORT#