



AIRTIGHT & NOISECHECK LIMITED

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24HOUR NOISE IMPACT ASSESSMENT FOR

CORDAGE 32 LTD
UNIT 3 BROADBRIDGE BUSINESS CENTRE
DELLING LANE
BOSHAM
WEST SUSSEX
PO18 8NF

SITE ADDRESS

THE HORSE & GROOM PUBLIC HOUSE
EAST STREET
SUDBURY
SUFFOLK
CO10 2TU

TESTING DATE: 8TH – 10TH OCTOBER 2021
REPORT DATE: 13TH OCTOBER 2021

A rectangular box containing a handwritten signature in grey ink, which appears to be 'Michael Vine'.

Acoustic Engineer:

Michael Vine

Date: 8th – 10th October 2021



AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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Customer Name:

Date: 8th – 10th October 2021

Cordage 32 Ltd
Unit 3 Broadbridge Business Centre
Delling Lane
Bosham
West Sussex
PO18 8NF

Site Address:

The Horse & Groom Public House
East Street
Sudbury
Suffolk
CO10 2TU

Acoustic Engineer:

Mr. Michael Vine

Norsonic Environmental Analyser 121 – serial No 31375, Cal due November 2022

Analyser complies with the following standards:

IEC 60651 type 1
IEC 60804 type 1
IEC 61260 class 1
IEC 225
ANSI S1.4-1985 type 1
ANSI1.43 -1997 type 1
ANSI S1.11-1986 order 3type1D
DIN 45 657
Norsonic Production Standard set for the Nor121.

Measurement Microphones – Gras 40AF, serial No 62522 – calibration due November 2022

Acoustic Calibrator - (Type 1251) – Serial No 31169, Calibration due March 2022

Measurement Procedure:

To undertake a further detailed noise impact assessment to determine the impact of:

1. Public House noise from indoors and outdoors during a live music event

A further noise impact assessment has been undertaken to take into account the noise associated with a live music event in operation at the venue. The assessment was undertaken between 8th – 10th October 2021 with the following events in operation:

1. 8th October – Live band – Jolly Polly & the Pirates
2. 9th October – Live band – Less than perfect

These bands were playing live music over the weekend period. It is understood that the music stopped at 2300hrs as per the requirements of The Live Music Act 2012



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Assessment Criteria:

The NPPF came into effect in March 2012 and was updated in July 2021. It replaced other documents such as PPG24. The NPPF provides several objectives and aims that are directed towards avoiding significant adverse impacts and reducing others on quality of life and health. This document states that:

The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

The NPSE (Noise Policy Statement for England) states the following aims with respect to noise policy:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of the Government policy on sustainable development:

*avoid significant adverse impacts on health and quality of life;
mitigate and minimise adverse impacts on health and quality of life; and
where possible, contribute to the improvement of health and quality of life.*

BS8233: 2014 'Guidance of Sound Insulation and Noise Reduction for Buildings' defines a range of ambient noise levels for design purposes, in order that appropriate conditions are achieved in certain internal environments. These internal requirements are listed in the table below.

BS8233: Table 5 – Indoor Ambient noise levels in spaces when they are unoccupied.

Activity	Location	0700-2300	2300-0700
Resting	Living Rooms	35dB LAeq,16hour	-
Dining	Dining Room/Area	40dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hour	30dB LAeq,8hour

Night time noise events can have a significant impact on sleep disturbance. There is no specific guidance presented in BS8233 regarding a noise limit to maximum night time noise ($L_{Amax, F}$). As part of this assessment the number of night time noise events will be considered in a qualitative manner with an internal $L_{Amax, F}$ of 45dB used as an initial screening tool to identify night-time noise events that may be of significance to sleeping conditions in bedrooms.

The noise sources apparent at the site is the noise associated with the public house garden area, car park and internal noise.

Pro PG: Planning & Noise 2017 (Professional Practice Guidance on Planning & Noise) issued by ANC/IOA/CIEH has also been referenced. This document came into effect in May 2017. This document is a guidance document and not a Code of Practice or British Standard.

This document states that there is a staged approach to such schemes, with the first phase being a risk assessment undertaken at the site, followed by a detailed assessment considering the recommended internal values by measuring the external noise levels.

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 noise.

LOAEL – Lowest Observed Adverse Effect Level This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level This is the level above which significant adverse effects on health and quality of life occurs.



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Live Music Act, 2012:

April 2015 Update to Live Music Act 2012 Guidance

The Live Music Act 2012 de-regulated live music in venues, providing certain criteria are met. This means that it is now possible to hold a gig in an alcohol licensed venue, without the need to be licensed for Live Music or applying for a temporary event notice (TEN).

The Legislative Reform (Entertainment Licensing) Order 2014, in force from 6th April 2015, further deregulates live music.

What does the 2012 Act allow?

- The venue must be licensed for the sale of alcohol for consumption on the premises i.e. a pub, club, restaurant or bar.
- Alcohol must be on sale during the performance.
- A work place

If the above apply, then live music is deregulated either where:

- It is *unamplified* and takes place between 8am and 11pm with no limit on the audience number; or
- It is *amplified*, the audience is 200 or less and it takes place between 8am and 11pm.

As long as the above criteria are met, any conditions attached to your license relating to live music will not apply and are therefore not enforceable by any of the responsible authorities. Examples of such conditions range from "Doors and windows needing to be closed", to complex conditions relating to noise limiters and maximum specified sound levels.

Changes to the law

The Legislative Reform (Entertainment Licensing) Order 2014

Live music – audience limit

Since the Live Music Act came into force, the DCMS have carried out a review to determine whether the provision of live music has increased without negatively impacting on licensing objectives (set out in the Licensing Act 2003). As a result of the review the audience limit for amplified music sees an increase from 200 to 500 as of 6 April 2015. This limit is in line with the maximum numbers of persons permitted under a TEN.

Recorded music

The Live Music Act 2012 did not apply to recorded music, only live music.

This has now been amended based on the argument that it is not always possible to distinguish between live music and recorded music, as demonstrated by the popularity of electronic dance music acts on the live music scene.



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As of the 6th April 2015, all recorded music in alcohol “on-licensed” premises played between 8am and 11pm, to an audience of up to 500 people, will no longer require a licence or conditions in respect of regulated entertainment be enforceable.

Noise nuisance – a reminder

Whenever a venue hosts live music or play recorded music they need to be mindful of the many legal provisions which aim to combat noise nuisance. These still apply despite the Live Music Act and the Legislative Reform (Entertainment Licensing) Order. In particular Local Authorities have powers to immediately deal with excessive noise coming from licensed premises, during night hours – between 11pm and 7am. Local residents can make complaints against outlets which can be acted on immediately. Before 11pm music noise from a venue can still be deemed a nuisance if Council Officers deem that nearby residents are suffering intrusive noise from de-regulated entertainment. If your current licence has conditions that aim to limit noise, it would be sensible to continue to observe these to protect yourselves from complaints.

Removal of the exemption

Licence restrictions relating to live music or recorded music will no longer apply in the circumstances set out above. However, it is important that you observe the legal criteria, for example don't play beyond 11pm or have more than 500 in the audience. Failure to comply could mean your licence being reviewed or even prosecution. If your licence is reviewed the licensing authority is able to impose additional conditions on your licence and remove your right to the new exemptions. Prosecution for licensing offences carries a maximum fine of £20,000 and/or up to 6 months imprisonment. Venues without the benefit of Live and Recorded Music on their licence would lose the right host these types of activities entirely.

Guidance

In brief, the effect of these changes is to promote live music venues however it does potentially increase competition as any premises with an alcohol licence can be used to host gigs, whether they have been deemed suitable or are fit for purpose. It gives some flexibility to established venues, to be sensible in respect of any current licence conditions on a concert-by-concert basis. As explained, the exemption can be removed so venues should be very careful in respect of causing noise issues to local residents. It should be stressed that conditions relating to the sale of alcohol will still apply, if alcohol is being sold. Conditions may include restrictions on age limits, alcohol being ancillary to a table meal, last entry times or a requirement to provide door supervisor/s.

Non-Commercial Premises

From 6 April 2015, live music and recorded music, will not require a licence if it takes place between 08:00 and 23:00, for an audience of no more than 500 persons, in non-residential Local Authority premises, hospitals, schools or community premises (church, village and community halls or similar).

With the above act in mind, it is recommended that all music events cease by 2300hrs and that the venue ensure the music noise level at the residential façade is not intrusive during events. The venue should still ensure suitable conditions and measures are implemented to reduce the impact of the events on the residential dwellings.



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Executive Summary:

Airtight & Noisecheck Ltd were instructed by Cordage 32 Ltd to undertake a further Noise Impact Assessment (NIA) at The Horse & Groom, East Street, Sudbury. A planning application has been made to convert the current outbuilding into 1 x residential dwelling to the rear of the public house. The local authority raised the issue that the initial assessment was not undertaken during a live event taking place. The dwelling will be located to the Northwest (rear) of the public house car park and public house garden. In addition, the car park remains in its current location and situated to the Southeast of the converted dwelling, along with the smaller public house garden. There will only be 6 no car parking spaces.

The survey was undertaken for a 48hour period using one microphone location. The microphone location for the proposed dwelling (at proposed façade) was used to determine the impact of the following noise sources on the proposed dwellings:

1. Car Park and general activity within the car park – located 15m away
2. Public House Garden – located 20m away
3. Public House Plant – located 15m away
4. Road traffic noise – located between 15-25m away
5. Noise associated with the venue with a live event in operation

The report clearly shows the required sound reductions needed for the scheme & these measures can be implemented to the residential dwelling to ensure the necessary criteria is achieved.

The conclusions of this report illustrate that the noise associated with the Public House & road traffic noise will not have an adverse impact on the proposed residential dwellings. Robust mitigation measures & measures taken by the client & public house will ensure that the residents will not be adversely affected by the noise associated with various sources in operation. It is recommended that an alternative ventilation system will be required to the dwelling to maintain the acoustic criteria, no windows will face the public house and therefore it is deemed that natural ventilation will be applicable by opening these elements. It is anticipated that future residents of the dwelling should be able to ventilate the dwellings naturally by opening windows on other elevations throughout the day time and night time period. This is an effective and recognised measure in reducing overheating in residential dwellings, by way of situating noise sensitive windows in quieter locations away from the noise source. The side elevation of the dwelling will be located away from the road noise and screened from it by the buildings, ensuring a lower noise level at this façade. There will be no windows serving any noise sensitive rooms on the elevation facing the public house, all windows serving noise sensitive rooms will be located on other facades. The average noise levels at the site are very low and thus the future residents should not be adversely affected by the noise associated with the public house. However, there may be times whereby the residents wish to close their windows and as such an alternative approach to ventilation should be looked at.

The measures to be taken by the client & venue should ensure a satisfactory acoustic climate for the future residents of the proposed dwelling. Furthermore, the calculated noise levels for the car park and public house garden should not have an adverse impact on the proposed scheme. The noise associated with the closing of car doors etc is noted as being a one-off noise, but these noise levels should not be treated in isolation but compared to the average noise levels. A bespoke assessment has been used as part of this assessment. Also, the centre of this noise source will be 15m away from the proposed dwelling thus the noise will decay significantly over this distance and the noise should not be intrusive.

The noise from the public house chiller extraction system was audible at the residential façade, however this is outside of the site boundary for the client and therefore no works are possible to the unit itself, so the comprehensive and robust sound reduction measures have been taken at receptor location to minimise impact. The plant does get switched off at circa 2330hrs, but it appears to come back on at circa 0500hrs and whilst the noise won't be intrusive, measures should be taken to reduce the impact during the noise sensitive hours.

The road traffic noise was the dominant noise source apparent at the site. This was measured for completeness despite not being part of the listed conditions of consent/required criteria from the LPA.



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Acoustic Design Statement:

The site is situated next to a busy road, and in a residential area. East Street is located to the front (East), with Upper East Street to the side (North). The public house to the East of the proposed dwelling. The average noise levels are low, this combined with the mitigation measures to be implemented should ensure a suitable standard of living. Noise will decay over distance and the necessary noise criteria should be achieved by suitable mitigation measures to the building façade & glazing. The client will take steps and implement mitigation measures to ensure the impact of the external & internal noise should not have an adverse impact on the future residential dwellings. These steps include:

1. Installation of alternative ventilation to the dwelling (MVHR system with summer bypass or Acoustic Wall Vent)
2. Thermal mass applied to the dwellings to improve overheating – natural ventilation will be acceptable to elevations
3. Natural ventilation will ensure a good thermal comfort & a balance between the internal noise levels & overheating
4. Install a robust glazing system to the dwellings to protect the residents from the external noise emissions when closed
5. 1.8m close boarded Timber fence erected on the boundary between the public house car park and proposed dwelling amenity space
6. Minimise effect of plant at receptor by way of orientation of noise sensitive rooms and windows away from venue
7. Install acoustic wall lining to the Eastern façade – facing the PH to improve sound attenuation here
8. Install acoustic fence along boundaries of both public house & residential gardens

The initial risk assessment has indicated that the day time and night time noise levels fall into the negligible to low category for the front facades, indicating noise should not be an issue when determining the planning application. Pro PG states that the following for negligible sites *'These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds'*. And the following for low category sites *'At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development'*. There are windows serving habitable rooms located on facades not facing the public house and the amenity space will be screened by a timber boundary fence.

If the mitigation measures are implemented, then there is no reason to suggest that the future occupants of the scheme cannot be adequately protected from the external noise emissions. The more robust measures are to be implemented to the front facades facing the road network, although natural ventilation can be achieved by opening windows on the rear elevations.

Extensive & comprehensive mitigation measures will be applied to the dwelling and building specifications to minimise the impact of the plant, these measures include:

1. *Locate windows serving noise sensitive dwellings away from the public house façade and locate them on screened façade*
2. *Bathrooms/Eaves Space located on Eastern façade to further protect noise sensitive rooms*
3. *Upgrade façade facing the public house with an internal wall lining to improve acoustic performance*
4. *Reconfigure the internal layout to accommodate the noise sensitive rooms*

It is understood that the public house will hold music events going forward, and as a result of this, this further assessment was undertaken during 2 x live events in operation at the venue.

The noise associated with the public house must be taken in context, in so much that for long periods there will be very little noise associated with the venue and garden area and therefore the impact will be greatly reduced for large periods of time. As this report states, it is accepted that there will be some periods whereby the noise increase, but the extensive measures listed within this report should ensure these increases in noise levels will not have an adverse impact in the future residents of the proposed dwelling.



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1 Objective:

1.1 To demonstrate that the noise sources apparent at the site and associated with a music event will not have an adverse impact on the proposed residential scheme to be located to the East of the public house. A planning application has been made to convert the current outbuilding into 1 x residential dwelling in the current public house car park area, located to the Northwest of the Public House beyond the car park. In general terms, the front elevation of the dwelling will face the road network & public house with the rear & side elevations screened. The amenity space for the dwelling will be located to the rear of the dwelling and thus screened from the activity associated with the road & public house.

2 Calibration:

2.1 The measurement microphone was calibrated before and after testing in the measurement location and there were no drifts recorded during the assessments.

3 Site Layout & Microphone Position:

3.1 Sudbury is a market town in Suffolk, England, on the River Stour near the Essex border, 60 miles north-east of London. East Street lies to the Northeast of the Town Centre and quite a busy through road. Upper East Street runs to the North of the scheme with the public house situated on the corner of East Street and Upper East Street.

3.2 The proposed site is located in a residential area with dwellings situated in all locations. East Street is located immediately to the front of the public house and to the East of the scheme. The public house car park is to remain to the West of the public house, with the proposed dwelling located to the West of the public house (in the outbuilding). The public house garden will also reduce in size and be situated immediately to the South of the public house & to the East of the proposed dwelling. The public house car park will only have 6 x parking spaces and be located immediately to the rear of the public house building.

3.3 The measurement microphone was located:

- 1- At the proposed front façade of the dwelling – facing the road network & public house. It was at least 2m from the ground and in excess of 3.5m from any other reflective surface

4 Weather Conditions:

4.1 The weather was dry during the measurement procedure; the temperature ranged between 13-20 degrees and there was some light cloud & wind for short periods of the day time. There was no rain during the measurement period.

5 Measurement Duration:

5.1 The continuous measurements were taken for 48hour period, the public house was open, with outside areas also being use. The road traffic using the local road network was at normality and thus offered a fair reflection of the noise associated with the road network. There were two live events taking place over the measurement period.

6 Results – proposed dwellings:

6.1 The purpose of this measurement was to satisfy the conditions shown on page 3 of this report. The levels will be compared to the necessary British Standards & relevant documents, also some bespoke measurements will be adopted.



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LAeq 16hour & 8hour Noise Levels:

Mic Location	LAeq 16hour Value	Reduction needed for BS8233 compliance	LAeq 8hour Value	Reduction for BS8233 compliance	L_{max} Value	Reduction for compliance
ML1 – Friday	55dBA	20dB	52dBA	22dB	68dBA	23dB
ML1 - Saturday	55dBA	20dB	50dBA	20dB	64dBA	19dB

7 Average Results Conclusion:

7.1 The tables listed above clearly indicate the required sound reduction values at the proposed site. It is clear to see that the measured levels are low at the residential façade, with the public house in operation and in use. There were two x live events taking place over the weekend period and the average measured levels remained low throughout the measurement period. The venue will also implement a noise management plan (NMP) that will ensure measures are taken during such events.

7.2 For clarification, the levels above can be compared to the original noise levels undertaken when a live music event was not in operation. The levels above are +1dB above the original assessment for the LAeq 16hour values, +3 to +5dB above the LAeq 8hour values and equal to and +4dB above the L_{max} values. Whilst these levels do show an increase, the level of increase will may only just be audible to the human ear and they should not affect the calculated internal noise levels due to the mitigation measures being proposed to the dwelling.

7.3 Based on the measured noise levels, the proposed mitigation measures, the location of the development and the type of noise apparent it is anticipated that the noise will fall between The NOEL value (No adverse effect level) and the LOAEL (Lowest observed adverse effect level) and as such the noise should not have a detrimental effect on the future residents providing adequate measures are implemented to the building fabric & elements. For noise sources at the LOAEL, it is anticipated that the noise will be noticeable but not be intrusive if suitable mitigation measures are implemented to the development.

7.4 Based on the measured levels and assuming a glazing specification offering a sound reduction of 35dBA (easily meets the levels required above) is installed the following internal levels would be achieved:

Room	External Level	Sound Reduction of windows	Internal Level	Criteria Met
Lounge	55dBA	35dB	20dBA	Yes
Bedroom – LAeq	50-52dBA	35dB	15-17dBA	Yes
Bedroom - L _{max}	64-68dBA	35dB	29-33dBA	Yes

7.5 The levels above indicate that the internal levels can be achieved with the windows closed & for the majority of the time period with windows open. The table below shows the calculated single figure values of the habitable rooms on the rear façade with windows open. Section 2.30 and Figure 2 of the Pro PG document states that the internal guidelines of BS8233: 2014 can be relaxed by 5dBA (40dBA LAeq 16hour and 35dBA LAeq 8hour) when the dwellings are necessary or desirable and also that residents will accept a slight increase in noise levels to ensure natural ventilation. A relaxation of 5dBA will still ensure a reasonable standard of living.

No windows will be placed on the Eastern façade of the dwelling, they will be located on screened facades. If the screening offered by the building (circa -15dB) or the boundary fence (circa -10dB) be applied to the measured values then the internal levels can be calculated accordingly.

Room & period	External Value	Reduction offered by boundary fence	Reduction offered by open window	Calculated Internal Value
Lounge - Day	55dBA	-10dB	-13dB	32dBA
Bedroom - Night	52dBA	-10dB	-13dB	29dBA



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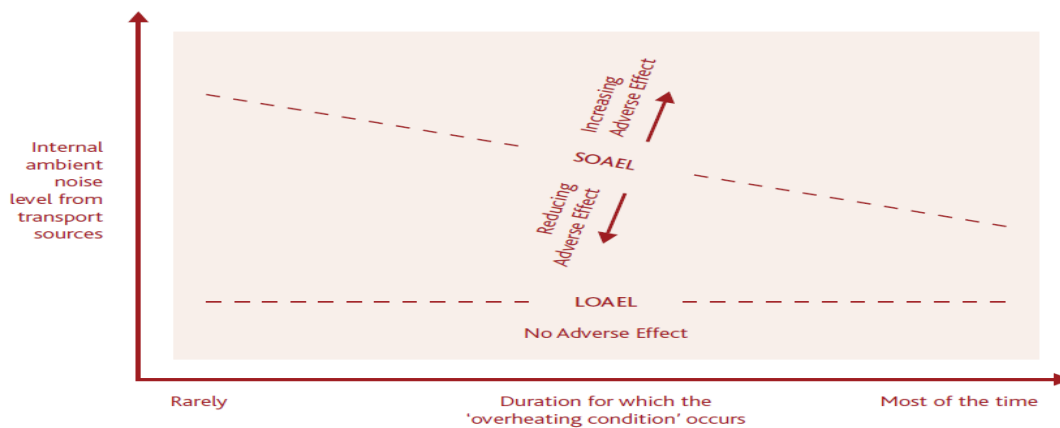
7.6 The levels shown in the table above indicate that a reasonable standard of living can be achieved with open windows for road traffic noise & public house noise using the -10dB offered by the fence (the rear windows will be exposed to even less due to the increased screening offered by the building fabric). The residents can open and close their windows at their own discretion to achieve a suitable tradeoff between overheating and noise ingress. It is anticipated that the rear & side elevations can have open windows for long periods of the day time and night time. It is accepted that the average values are not the only method of calculations for such schemes and as such, specific calculations are shown below.

7.7 Table 3.3 – Guidance for level 2 assessment of noise from transport services in the ANC AVO guide states that ‘Noise causes a material change in behaviour e.g., having to keep windows closed most of the time’ if the following levels are exceeded for longer periods of time:

Internal ambient noise levels		
L _{Aeq} 16hour 0700-2300	L _{Aeq} 8hour 2300-0700	Individual noise events 2300-0700
>50dB	>42dB	Normally exceeds 65dB L _{AmaxT}

7.8 Using the above guidance (sliding scale as shown in the diagram below) the calculated internal levels at the front façade with the windows open are also shown below. It is anticipated that the future occupants will accept an increase in the noise levels for periods of time to ensure a good thermal comfort for the dwellings. They will not be exposed to these levels for long period of time as they will be able to open and close the windows at their own discretion and the rear elevations can be open as they wish.

Figure 3-2 Qualitative guidance on combined effect of internal ambient noise level and duration for the overheating situation



7.9 Based on the measured levels and anticipated internal levels offered by natural ventilation, an alternative ventilation system may be prudent to the rooms located on the front elevation only. A system such as an MVHR is required when natural ventilation may not be possible. However, due to being able to open windows & the low measured levels for the majority of the time, a system such as acoustic trickle vents could be an acceptable approach to the rooms on the front elevations.

8 L_{Amax} Measurements – proposed dwellings:

8.1 Due to the proposed dwellings being located close to the public house, the L_{Amax} values between 2100-2300hrs have been viewed and are shown below:



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Friday	2100-2200	2200-2300	2300-0000	Saturday	2100-2200	2200-2300	2300-0000
	64	66	67		72	78	67
	76	60	73		68	65	75
	73	64	68		70	84	61
	68	62	69		82	66	72
	62	65	73		67	65	67
	73	71	65		67	67	65
	68	67	83		77	63	67
	75	70	76		66	61	64
	67	75	69		70	66	67
	64	71	83		61	65	64
	72	62	63		66	62	61
	64	64	68		67	63	69

8.2 The table above shows the highest $L_{Amax, 5\text{minute}}$ value over the evening period. It is clear to see that there is a relatively constant level of between 65-65dBA for the time period between 2100-0000hrs. The level of 75dBA was exceeded only 8 times over the weekend period during the above times. The highest measured values were 83dBA on the Friday evening and 84dBA on Saturday, which equates to a sound reduction of 39dB if applied to the night time criteria (even though the noise occurred at 2210hrs). The level of 83dBA occurred at 2340hrs and this will require a sound reduction of circa 38dBA. The proposed mitigation measures to the building and on the eastern façade, would ensure suitable protection against such noise sources with windows closed. During these periods with the windows closed, the alternative ventilation would ensure suitable levels of ventilation would serve the dwelling whilst the windows are closed.

8.3 In addition, a calculation assuming the level of 84dBA at the façade, would lead to an internal value on the Western façade of 56dBA. This is assuming -15dB offered by natural screening of the building and -13dB for an open window. Whilst this figure is higher than the recommended internal values for L_{Amax} , they shouldn't lead to a change in behaviour of they are not present for long durations.

8.4 The events will not always include live music and for many months of the year the windows will be closed and thus the impact even less. It is anticipated that the residents may accept the slightly higher noise levels for a short period of time if they have their windows open, but they have the capability to close the windows as they see fit thereafter.

8.5 The measures taken by the client (reconfiguration of the internal layout, no windows on Eastern façade, alternative ventilation & acoustically upgrading the Eastern façade) combined with the proposed NMP to be implemented by the venue should ensure the noise associated with live music events will not lead to an adverse impact for the residents.

8.6 It must also be noted that the live music will stop at 2300hrs and therefore the noise thereafter will not be from the music event. There will be activity from people leaving the public house, but the music will stop at 2300hrs. The mitigation measures listed will ensure these noise events will not have an adverse impact on the residents of the dwelling.

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9 Car Park Noise & Vehicle Movements – Proposed dwellings:

9.1 The public house & car park was in operation during the assessment, the levels measured directly at the proposed façade. To back up the findings of this report, the following calculations have been performed for vehicle movements within the relocated car park area. The conclusions indicate that the noise associated with the car park should not have an adverse impact on the future residents.

9.2 The following equation has also been used to try and determine the noise associated with vehicle movements etc. This calculation uses the single event level (SEL) which is the noise level apparent for 1second of an event, then these levels are compared to a reference time period to take numerous SEL events into account. It is accepted that single events (one off) could be audible at the residential façade, but it is not representative to use this single figure in isolation but rather to compare these over a suitable time period. There are no single calculations to assess car park noise and vehicle movements, so a combination of calculations has been used as part of this assessment.

	Car Movements	
SEL dB(A)	68 @ 10m	
No of events	25	
Distance, m	15	
Distance correction	-3 (point source equation)	
Reference period	15mins	
Correction for reference period	-16	
Barrier correction	-0	Total
Total Noise at dwelling		49

9.3 The correction for the reference period is determined using the equation on the following page & the SEL value used is 68dB @10m which equates to a value of 88dB at 1m which represents a door closing etc.

9.4 The above table uses the following equation to determine the noise level over a time period. The time period for this assessment has been reduced to 15mimniutes, with the number of events 25 in that time period.

$$L_{Aeq}(T) = SEL + 10 \log N - 10 \log T$$

where $L_{Aeq}(T)$ = Equivalent continuous sound pressure level over time period T

SEL = 'Single Event Level', i.e., the 1 second L_{Aeq} which has the same total A-weighted energy as the entire event

N = Number of events in time period T

T = Time period in seconds

9.5 The calculations & table above indicate that the noise associated with the vehicle movements & doors closing would be circa 49dBA at the proposed residential façade (39dBA at the side elevation). It is anticipated that the residential façade will be circa 15m from the centre of the car park. A level of 49dBA would require a sound reduction of 19dB to meet the internal criteria set out in BS8233: 2014. The mitigation measures to be implemented to the residential dwellings will offer 35dB so this level of protection will ensure the noise associated with the car park is adequately mitigated against. The calculated levels are similar to the average noise levels at the façade, which fall into the negligible to low category for noise exposure as stated in the ProPG document.

9.6 A car door closing has been measured at L_{Amax} value of 74-78dBA at 1m and using the reductions for distance (15m) would give a calculated level of 50-54dBA at the façade. This value would meet the requirements for the L_{Amax} levels assuming an open window.



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9.7 The car park will be located to the front of the proposed dwellings, with the centre of the car park being circa 15m from the residential façade. The proposed finish of the car park is believed to be tarmac as it is currently. Noise readings have been taken from another site when vehicles using tarmac and vehicle movements. The measured levels were 65dBA at 2m. Using the following equation, the levels at the façade can be calculated:

$$L_2 = L_1 - 20 \log (r_2/r_1)$$

Due to the location and size of the car park, a point source has been used:

$$L_2 = 65 - 20 \log (15/2) = \mathbf{48dBA}$$
 at the residential façade

9.8 A level of 48dBA at the proposed façade is similar to the measured levels on site and would lead to an internal value of 35dBA, which is very close to the requirements of BS8233: 2014 for the night time period and meets the levels for a reasonable standard of living (with the +5dB relaxation as listed in section 7.2 of this report).

9.9 All of the above calculations indicate that the noise associated with vehicle movements and people using the car park should not increase the adverse impact for the future residents of the scheme. The calculated levels are similar to the existing measured levels on site and therefore should not lead to an adverse impact for the future residents.

10 Residential Amenity Space:

10.1 This report clearly illustrates that the noise levels at the front facade are currently 54dB LAeq 16hour without any further mitigation, this level is already below the upper limit as listed in BS8233: 2014. Once the dwelling is converted & the amenity space screened, the acoustic boundary fence will screen the proposed amenity space from the road traffic & public house noise to the East. Therefore, it is anticipated that the final LAeq 16hour values for the amenity space will meet the lower limit requirements set out in BS8233: 2014.

10.2 A 1.8m high acoustic barrier will be erected along the boundary line of the residential garden area. This will screen the garden from the venue and noise sources.

11 People using the Public House Garden Area:

11.1 The garden was in use during the measurement period. The national restrictions were lifted for public houses, so the garden was in use and the weather was dry & warm for the measurements period. The door serving the garden area is located on the Southern elevation and does not face the dwelling directly. In an attempt to ascertain another level within a garden area, the following calculation has been used on this occasion to try and determine the rating level at the façade based on the garden being busy. The following document has been used to determine the noise created by small groups of people:

11.2 The following equations are another method of trying to establish the noise associated with a public house garden as they noise levels may vary depending on how busy the area is and what time of year it is.

11.3 A 1.8m acoustic barrier will be erected along the boundary of the public house garden, this will reduce the noise impact created within this space and screen the activity from the dwelling.



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'Prediction of noise from small to medium sized groups'

M.J Hayne, J.C Taylor, R.H Rumbe & D.J Mee – 2-4th November 2011, Gold Coast Australia

11.2 This document uses the following equation to determine noise levels from small to medium sized groups:

$$L_{Aeq} = 21 \log N + 43 \text{dB(A)}$$

N = number of people

11.3 Due to the size of the garden area, a figure of 30 people using the garden area at any one time would seem fair, so this is the figure used for this calculation:

$$L_{Aeq} = 21 \log 30 + 43 \text{dB(A)} = 74 \text{dBA at source}$$

11.4 Based on the equation above, the noise created by 30 people using the garden area would create a noise level of 74dBA. This level can then be calculated at distance using the following equation:

$$L_2 - 20 \log (r_2/r_1)$$

Therefore:

$$74 - 20 \log (20/1) = 48 \text{dBA}$$

11.5 The above equation has been used to try and determine the level of the garden area on the proposed dwellings and substantiate the measured levels, it is appreciated that elements such as shouting and raised voices may also increase the rating level, however the calculated value of **48dBA** is assumed for a distance of 20m (centre of relocated public house garden to residential facade). This level is -6dBA lower than the $L_{Aeq 16\text{hour}}$ value and +1dB higher than the night time value, but such a level should not be deemed intrusive, and this level is in the absence of any further mitigation. Please note it is impossible to determine the number of people within the Garden area at any one time, however, a figure of 30 people would seem a fair assessment for a garden of this size.

11.6 In addition to the above, a further reduction must be applied for the proposed close boarded timber fence to be erected along the residential amenity space boundary line around the proposed residential garden. Such a barrier will ensure a further reduction of circa 10dB giving an assumed level of 38dBA in the amenity space & at the main bedroom window. This is below the recommended lower level for amenity space and thus should ensure a suitable acoustic environment.

11.7 It is accepted that the noise levels associated with the garden area may vary and there will be times when voices are raised, however for the majority of the time the measured levels would be a fair reflection of the noise associated with the public house garden. In addition, it is understood that all events (quiz's, bingo etc) will take place internally and therefore the impact will be a lot less.

12 Average Values Conclusion:

12.1 Based on the measured values on site and the bespoke calculations for car park noise and vehicle movements it is anticipated that the future residents of the proposed scheme will be able to enjoy a reasonable standard of living and that the noise associated with the noise sources listed above will not have an adverse impact on the future residents.

12.2 The average noise levels were measured at the proposed residential façade over a 24hour period with an event in progress during the evening. Based on the measured levels at the site, these noise levels should not have an adverse impact on the proposed residential dwelling.



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13 Required Levels of Mitigation – Average values:

Elevation	Noise Source	Level of Sound Reduction
Facing the road traffic & public house	Road traffic, PH, car park & garden	23dBA
Eastern Facade	Event in operation	39dBA for the façade – L _{Amax} analysis

14 Building Specifications:

14.1 It is anticipated that the sound reduction of the windows can be met by the installation of acoustic trickle vents. These are vents that offer high levels of sound reduction whilst still offering ventilation to residential dwellings. The products listed below should offer the necessary sound reduction for the site.

Product	Sound Reduction - Open	Sound Reduction - Closed
Simon Acoustic Vent EHA	36dB	38dB

14.2 However, due to the venue having events moving forward, a more robust approach to the dwelling is recommended. An MVHR system or alternative ventilation system could be implemented to ensure suitable levels of ventilation. Some possible systems are shown below:

Make	Model	Type
Vent-Axia	Sentinel Kinetic Plus	Whole House Ventilation

14.3 If an MVHR system is to be installed then it will have to be located in a location that will not impact on the noise sensitive bedrooms. It could be located in the common area or above a communal staircase for instance. It will need regular maintenance so an access panel will be required. It is recommended that the system is located away from the noise sensitive bedrooms and situated above or inside a purpose-built area within the communal area. Please note – this type of installation may be excessive for this development.

Make	Model	Type
Titon Direct	Sonair F+	Wall mounted acoustic Ventilation

14.4 The above system is a wall mounted ventilation unit that allows for ventilation when the windows are closed, with high levels of sound reduction.

14.5 Façade Detail – The proposed façade is believed to be something similar to: - Aggregate block cavity wall, minimum 100mm blocks (minimum density 1350kg/m³), minimum 75mm cavity between leaves, finished with 13mm plaster. This system should achieve a sound reduction of between 50-52dB DnT, w + Ctr 'Code of Practice BS8233: 2014, Page 60 – Table E.1B – Airborne sound insulation of walls and partitions. Also, a cavity wall system comprising of 7N concrete blocks (two separate frames), have a sound reduction of approximately 53dB (predicted weighted sound reduction index values of Celcon Blockwork – from H&H Celcon). The Eastern façade will be upgraded with an acoustic wall lining (details listed in section 15.10). Such a system will increase the acoustic performance of this façade and ensure the reduction for all noise levels (L_{Aeq} & L_{Amax}) can be achieved.

14.6 Roof Detail – The proposed roof detail is believed to be similar to: Tiles on felt, pitched roof with 100mm mineral wool on plasterboard ceiling. This system should achieve a sound reduction of 43dB R_w 'BS8233: 2014, page 41 - Table 8 - The sound insulation of roofs'.

14.7 Windows - The proposed windows to be used is unknown but standard double-glazed systems offer a sound reduction of between 30-35dB, so this should be adequate for the site. A level of 18dBA has been determined from the attended visit and thus the specifications listed below will offer this level of reduction. Looking at the L_{Amax} values, a sound reduction of 26dBA could be applied.

Possible Units	Thickness	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Overall reduction
SG Solaglass 6-20-10	36mm	26	30	35	39	35	44	37-2=35dB
SG Solaglass 6-24-10	40mm	25	31	37	40	36	45	38-3=35dB

14.8 There are many other suitable products, and the client will have to show compliance for the windows before installation, the manufacturer will have the acoustic data for the windows.



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15 Plant Noise Levels:

15.1 The plant for the public house is located on the rear facade at the rear of the building. It currently faces the proposed dwelling, at a distance of circa 15m. The plant comprises of a chiller system serving the public house. The client is unable to reduce the noise at source as this is not part of their development remit, so measures will be taken at receptor to reduce the impact.

15.2 The plant noise for the public house was measured at source. The levels are shown in the table below. The plant will be located circa 15m from the proposed residential facade.

L_{Aeq} 5min value	L_{A90} value – at residential boundary – Modal value throughout the night time period
69dBA @1m	35dBA

Results		Commentary
Ambient Sound Level	Sound Pressure Level = 69dBA	Measured at 1m with plant in operation
Residual Sound Level	60dBA	Measured at source with plant off
Specific Sound Level	68dB	
Acoustic Feature Corrections	+3dB for intermittency +3 for distinguished at façade	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-23dB for distance	-23dB for point source reduction (1m to 15m)
Rating Level	51dBA	Calculation based on above
Background Sound level	35dBA	Measured at proposed location
Excess of rating over background	+16dB	
Assessment indicates adverse impact at the façade		The calculations have used measured levels for the plant

15.3 BS4142: 2014 states that:

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

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

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

15.4 The rating level applies to the specific noise level (noise of extraction system) - the residual noise (the noise level apparent once the specific noise is switched off). These levels are compared to the background noise levels (L_{A90}), which is the level apparent in the absence of any noise source.

15.5 The above table shows a rating level of 51dBA at the residential façade. If a full BS4142 assessment was undertaken, the plant would need to be reduced by circa -10 to -16dB. The L_{A90 15min} modal values between 2300-0700hrs was 35dBA. There are periods when the L_{A90} is less than and more than the modal value listed. The plant seems to be switched off at circa 2300hrs so a more representative level would be the L_{A90 1hour} between 2200-2300hrs which was 41dBA leading to a required reduction of -10dB. This must be taken into context, whilst the plant was audible at the façade it was not intrusive during the attended visit, and it is unlikely to cause an adverse impact regardless of it being audible. It is however, considered that the measures to be taken by the client at the receptor location will ensure the plant is negligible inside the dwelling at the nearest noise windows.

15.6 The mitigation can be achieved by improving the performance of the façade facing the public house and relocating the windows serving the noise sensitive rooms away from the façade facing the public house. Some measures are listed in the Acoustic design statement, including:



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1. *Locate windows serving noise sensitive dwellings away from the public house façade and locate them on screened façade*
2. *Bathrooms/Eaves Space located on Eastern façade to further protect noise sensitive rooms*
3. *Upgrade façade facing the public house with an internal wall lining to improve acoustic performance*
4. *Reconfigure the internal layout to accommodate the noise sensitive rooms*

15.7 The calculated internal values at the noise sensitive rooms with windows open are shown below, based on a rating level of 51dBA at the residential façade.

Noise Source	External Value	Reduction offered by building	Reduction offered by open window	Calculated Internal Value
Plant Level	51dBA	-15dB	-13dB	23dBA

15.8 The above table calculates that the internal level within the noise sensitive room should be circa 23dBA, this is based on the building acting as screen for the noise levels and then the -13dB offered by an open window. This level is below the recommended night time levels and should not lead to any sleep disturbance or any other disturbance for the future residents.

15.9 The lounge will be located to the South of the dwelling with the boundary fence protecting this façade so using a sound reduction of -10dB for such a fence, an internal level of 28dBA can be calculated within this room, again a very low levels that should not lead to an adverse impact.

15.10 In addition to the orientation of the rooms, a further upgrade to the façade facing the public house could be installed, this could be something similar to:

1. Proposed façade as stated by client
2. Maintain cavity
3. Erect an internal wall lining along the Eastern façade using timber/metal studs
4. Place mineral wool between the studs
5. Fix 1 x acoustic plasterboard to the studs

15.11 Such a system will improve both the thermal and acoustic performance of the facade and therefore reduce internal noise levels further. These measures coupled with the possibility of the alternative ventilation solution serving the dwelling should lead to a good standard of living for the future residents of the proposed dwelling.

15.12 As stated, the client cannot undertake any measures to the plant itself, but the measures listed above will offer the required levels of sound reduction need to ensure the plant will not have an adverse impact on the future residents of the scheme.

15.13 The 1st floor bedroom will also be situated in the roof space so it will automatically be set further back due to the eaves space of the building, thus creating further sound reduction by way of screening and sound attenuation.

15.14 The measures listed above are extensive, comprehensive, and robust and will improve the acoustic criteria for the future residents of the dwelling and protect them not only from the noise associated with the plant but all other noise sources too.



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16 Results Summary:

16.1 The findings of this survey indicate that the average noise associated with the public house, including patron activity, patron vehicles, plant noise & events will not have an adverse impact on the proposed dwelling providing the adequate mitigation measures are applied.

16.2 The noise associated with the road traffic; public house garden & car park will not have an adverse impact on the proposed residential dwelling to be located to the West of the public house. The noise associated with an event has increased the L_{Amax} levels at the site, but it is anticipated that the upgraded mitigation of the Eastern façade and the reconfigured orientation of the internal layout should ensure no adverse impact from the noise source.

16.3 The results of the various detailed calculations indicate that the noise emissions associated with the car park & public house will not have an adverse impact on the proposed residential dwelling. The levels of sound reduction required for the proposed dwellings is clearly listed and can easily be achieved.

16.4 The mitigation measures listed within this report offer suitable sound reduction for the necessary building elements and if they are implemented throughout the site then the future residents should be able to enjoy an appropriate standard of living. Upon implementation of the mitigation measures, the internal & external criteria of BS8233: 2014 should be met within the noise sensitive bedrooms at the proposed development.

16.5 Planning ProPG states that a good acoustic design process is a vital part of new developments. The client has taken steps to ensure that the future occupants are protected from the noise source, these steps include:

1. Installation of alternative ventilation to the dwelling (MVHR system with summer bypass or Acoustic Wall Vent)
2. Thermal mass applied to the dwellings to improve overheating – natural ventilation will be acceptable to elevations
3. Natural ventilation will ensure a good thermal comfort & a balance between the internal noise levels & overheating
4. Install a robust glazing system to the dwellings to protect the residents from the external noise emissions when closed
5. 1.8m close boarded Timber fence erected on the boundary between the public house car park and proposed dwelling amenity space
6. Minimise effect of plant at receptor by way of orientation of noise sensitive rooms and windows away from venue
7. Install acoustic wall lining to the Eastern façade – facing the PH to improve sound attenuation here
8. Install acoustic fences to boundaries of both the public house & residential gardens

16.6 The measures taken by the client & venue should ensure the future residents will not be adversely affected by the noise sources associated with the public house & car park and thus a suitable acoustic criteria can be achieved. In addition, the road traffic noise was also monitored and this to can be mitigated against satisfactorily using the robust mitigation measures shown within this report.

16.7 The L_{Amax} levels have been assessed in numerous ways and it is accepted that there may be some cases whereby the L_{Amax} levels increase, but this will happen on a regular basis and will not only apply to the noise emissions created by the public house. This report has offered suitable mitigation measures that can be implemented to ensure the existing & future residents are not adversely affected by the noise associated with the public house and car doors closing etc. The venue can also help to control these elements by asking the patrons to leave quietly etc.

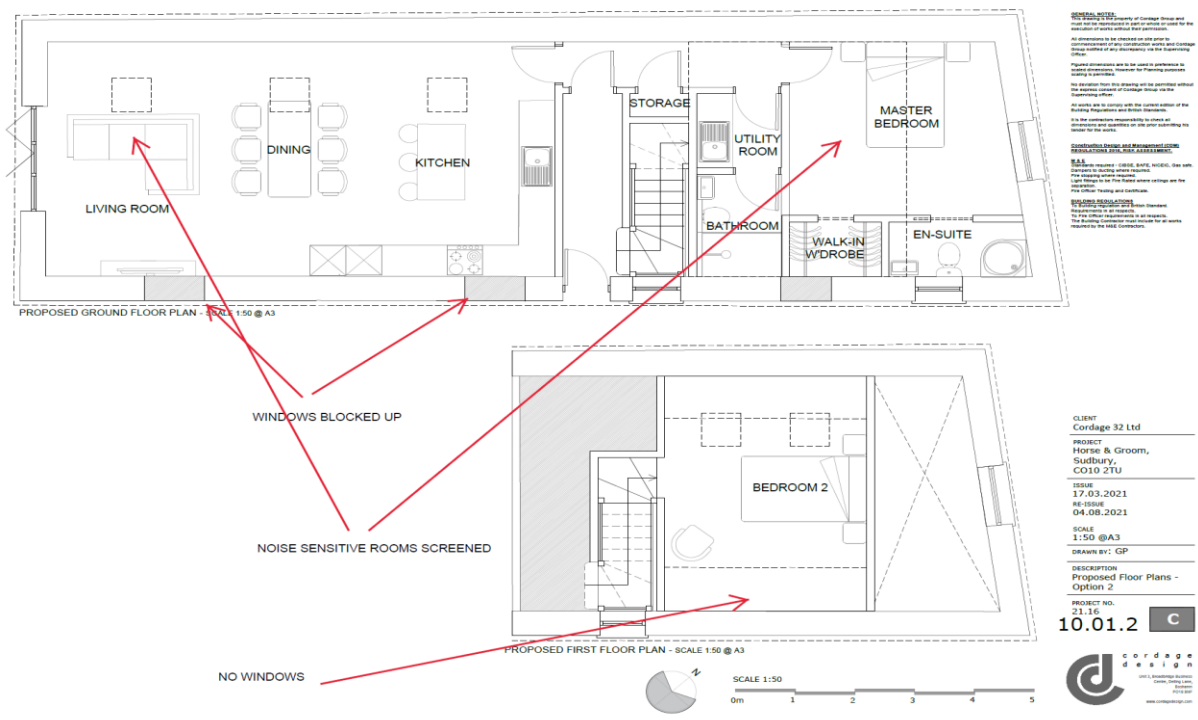
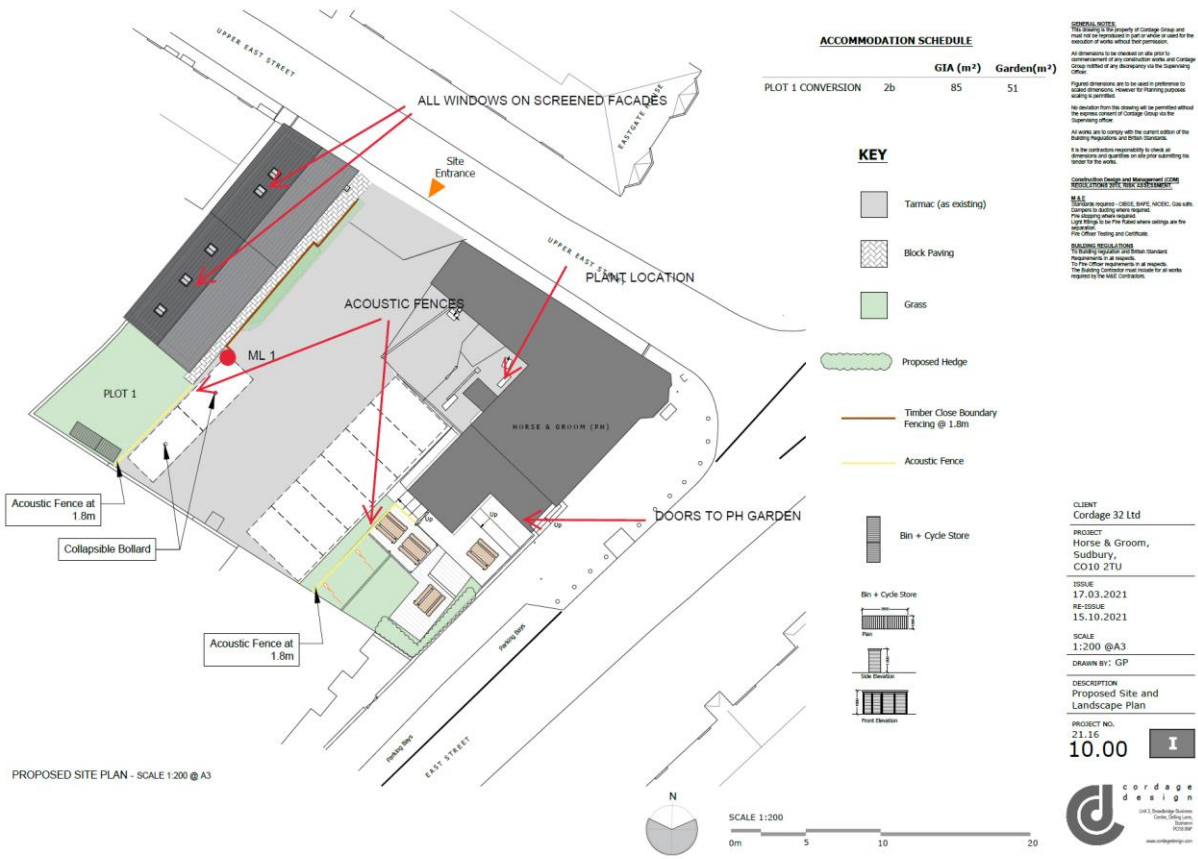
16.8 Any future music events will stop no later than 2300hrs and therefore will not continue into the early hours of the night time period.

16.8 Ongoing monitoring and communication will be prudent to ensure a reasonable standard of living for all parties. It is also recommended that an NMP is discussed & possibly implemented to the venue operation. This will help to reduce the impact of such events at the residential facade.



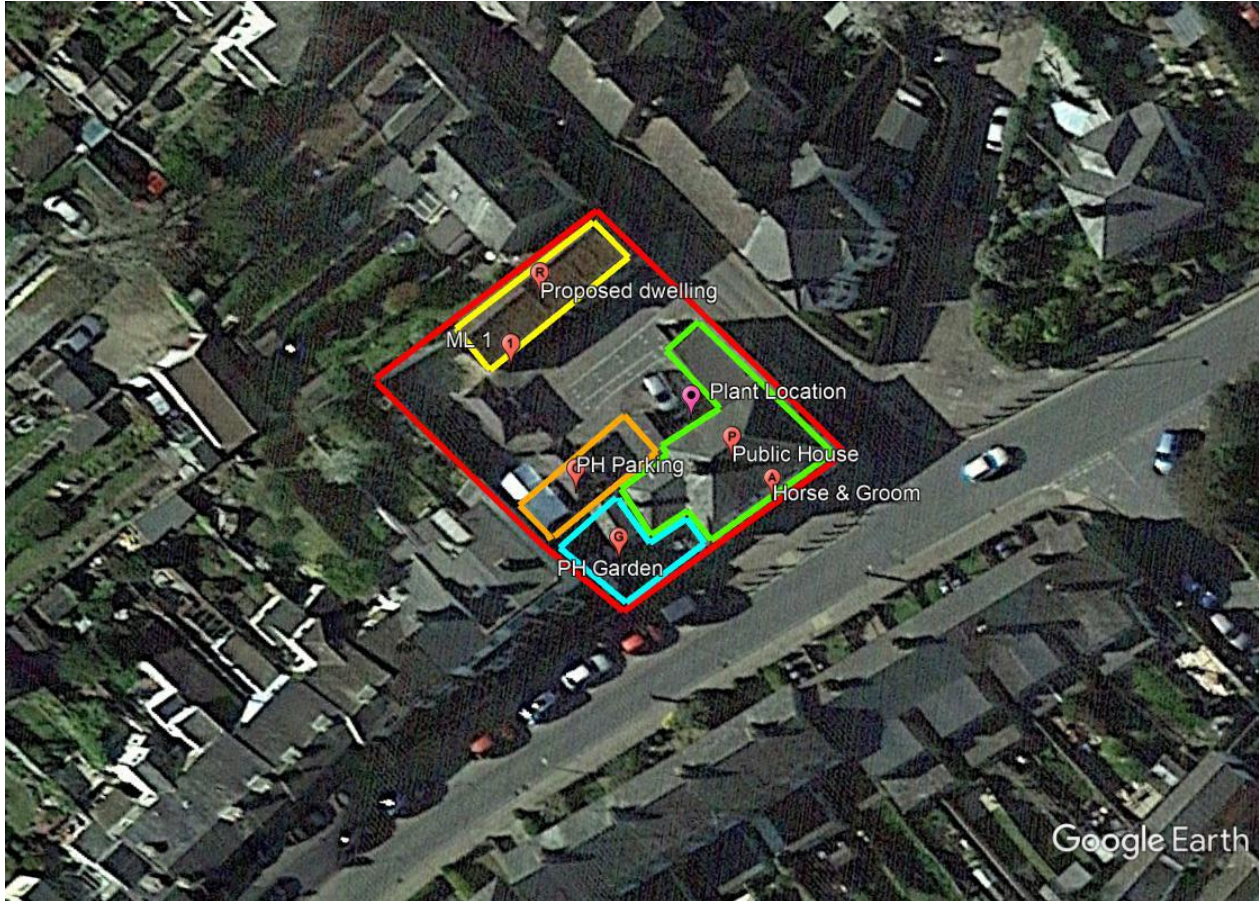
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17 Site Plans:



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18 Google Maps:





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APPENDIX

Continuous equivalent noise level, LAeq — The steady noise level (usually in dBA) which, over the period of time under consideration, contains the same amount of sound energy as the time varying noise.

LAm_{ax} - The maximum value that the A-weighted sound pressure level reaches during a measurement period.

dB (A) — The A-weighted sound pressure level.

Decibel (dB) — A unit used for many acoustic qualities to indicate the level of sound with respect to a reference level.

A-weighting — A frequency weighting that relates to the response of the human ear.

Background noise level — Prevailing noise level in a specified environment measured in the absence of the noise being studied.

Habitable Room — A room used for sleeping or recreation/relaxation

D_{ne, w} Weighted element normalised level difference — A single-number quantity which characterises the airborne sound insulation of a small building elements.

EPU — Environmental Protection Unit

R_w Weighted sound reduction index — A single-number quantity which characterises the airborne sound insulation of a material or building element measured in the laboratory.

LA₁₀ — The A-weighted noise level exceeded for 10% of the measurement duration.

LA₉₀ - The A-weighted noise level exceeded for 90% of the measurement duration.

British Standards & associated documents:

Code of Practice: BS8233: 2014 - Sound Insulation and noise reduction for buildings.

World Health Organization (WHO) - Guidelines for Community Noise.

Pro PG — Planning & Noise, Residential Development — 2017



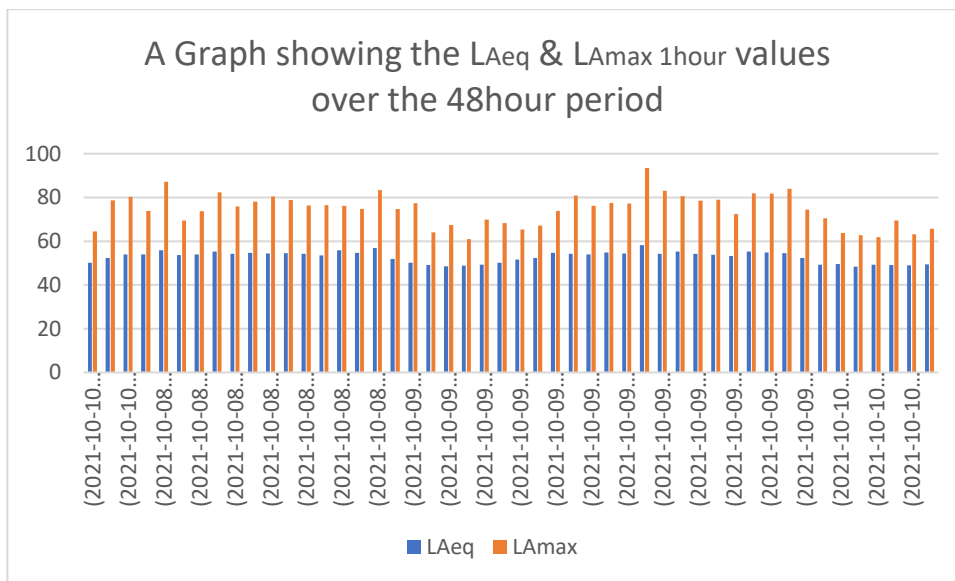
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1hour values – external

Time Period	LAeq	LAmx
(2021-10-10 07:00:00.290)	50.2	64.5
(2021-10-10 08:00:00.290)	52.4	78.7
(2021-10-10 09:00:00.290)	54	80.3
(2021-10-08 10:00:00.290)	53.9	73.8
(2021-10-08 11:00:00.290)	55.9	87.2
(2021-10-08 12:00:00.290)	53.7	69.4
(2021-10-08 13:00:00.290)	54	73.7
(2021-10-08 14:00:00.290)	55.3	82.3
(2021-10-08 15:00:00.290)	54.3	75.9
(2021-10-08 16:00:00.290)	54.7	78.1
(2021-10-08 17:00:00.290)	54.4	80.5
(2021-10-08 18:00:00.290)	54.6	78.8
(2021-10-08 19:00:00.290)	54.3	76.4
(2021-10-08 20:00:00.290)	53.5	76.5
(2021-10-08 21:00:00.290)	55.8	76.2
(2021-10-08 22:00:00.290)	54.7	74.7
(2021-10-08 23:00:00.290)	56.8	83.4
(2021-10-09 00:00:00.290)	51.9	74.7
(2021-10-09 01:00:00.290)	50.1	77.4
(2021-10-09 02:00:00.290)	49.1	64
(2021-10-09 03:00:00.290)	48.6	67.4
(2021-10-09 04:00:00.290)	48.8	60.9
(2021-10-09 05:00:00.290)	49.2	69.9
(2021-10-09 06:00:00.290)	50.1	68.3
(2021-10-09 07:00:00.290)	51.6	65.3
(2021-10-09 08:00:00.290)	52.4	67.1
(2021-10-09 09:00:00.290)	54.7	73.9
(2021-10-09 10:00:00.290)	54.3	80.8
(2021-10-09 11:00:00.290)	54	76.2
(2021-10-09 12:00:00.290)	54.8	77.5
(2021-10-09 13:00:00.290)	54.4	77.2
(2021-10-09 14:00:00.290)	58.2	93.5
(2021-10-09 15:00:00.290)	54.3	83
(2021-10-09 16:00:00.290)	55.2	80.6
(2021-10-09 17:00:00.290)	54.2	78.5
(2021-10-09 18:00:00.290)	53.8	79
(2021-10-09 19:00:00.290)	53.2	72.4
(2021-10-09 20:00:00.290)	55.3	81.9
(2021-10-09 21:00:00.290)	54.8	81.7
(2021-10-09 22:00:00.290)	54.5	84



(2021-10-09 23:00:00.290)	52.4	74.5
(2021-10-10 00:00:00.290)	49.2	70.5
(2021-10-10 01:00:00.290)	49.5	63.7
(2021-10-10 02:00:00.290)	48.4	62.7
(2021-10-10 03:00:00.290)	49.3	61.8
(2021-10-10 04:00:00.290)	49.1	69.5
(2021-10-10 05:00:00.290)	49	63.1
(2021-10-10 06:00:00.290)	49.4	65.7



5min levels – external

Time Period	LAeq	LAmx
(2021-10-10 07:00:00.290)	50	58.8
(2021-10-10 07:15:00.290)	50.1	64.3
(2021-10-10 07:30:00.290)	50.5	64.5
(2021-10-10 07:45:00.290)	50.2	59.8
(2021-10-10 08:00:00.290)	54.1	78.7
(2021-10-10 08:15:00.290)	50.2	65.6
(2021-10-10 08:30:00.290)	51.9	66.1
(2021-10-10 08:45:00.290)	52.7	68.2
(2021-10-10 09:00:00.290)	52	69.8
(2021-10-10 09:15:00.290)	56.4	80.3
(2021-10-10 09:30:00.290)	52.8	67.6
(2021-10-10 09:45:00.290)	53.2	70.8
(2021-10-08 10:00:00.290)	54.2	72.8
(2021-10-08 10:15:00.290)	54.3	73.6
(2021-10-08 10:30:00.290)	53.4	64.6
(2021-10-08 10:45:00.290)	53.5	73.8



(2021-10-08 11:00:00.290)	53.2	62.4
(2021-10-08 11:15:00.290)	55.4	80
(2021-10-08 11:30:00.290)	59	87.2
(2021-10-08 11:45:00.290)	53.5	63.7
(2021-10-08 12:00:00.290)	53.5	68.2
(2021-10-08 12:15:00.290)	53.4	69.4
(2021-10-08 12:30:00.290)	53.8	65.2
(2021-10-08 12:45:00.290)	54	65.5
(2021-10-08 13:00:00.290)	53.7	68.3
(2021-10-08 13:15:00.290)	54.2	72.8
(2021-10-08 13:30:00.290)	54.1	72
(2021-10-08 13:45:00.290)	54	73.7
(2021-10-08 14:00:00.290)	57.6	82.3
(2021-10-08 14:15:00.290)	53.9	66.8
(2021-10-08 14:30:00.290)	54.3	71.8
(2021-10-08 14:45:00.290)	54.2	67.7
(2021-10-08 15:00:00.290)	54.8	70.9
(2021-10-08 15:15:00.290)	53.9	65.8
(2021-10-08 15:30:00.290)	53.9	75.9
(2021-10-08 15:45:00.290)	54.7	69.8
(2021-10-08 16:00:00.290)	56.4	78.1
(2021-10-08 16:15:00.290)	53.5	69.6
(2021-10-08 16:30:00.290)	54.3	69.9
(2021-10-08 16:45:00.290)	54.2	69.5
(2021-10-08 17:00:00.290)	55.8	80.5
(2021-10-08 17:15:00.290)	53.8	66.6
(2021-10-08 17:30:00.290)	53.4	65.5
(2021-10-08 17:45:00.290)	54	68.7
(2021-10-08 18:00:00.290)	56.9	78.8
(2021-10-08 18:15:00.290)	53.8	72.6
(2021-10-08 18:30:00.290)	53.6	65
(2021-10-08 18:45:00.290)	52.8	68.5
(2021-10-08 19:00:00.290)	53.2	70.5
(2021-10-08 19:15:00.290)	54.2	74.1
(2021-10-08 19:30:00.290)	54.7	69.1
(2021-10-08 19:45:00.290)	54.8	76.4
(2021-10-08 20:00:00.290)	54.4	76.5
(2021-10-08 20:15:00.290)	54.2	74.4
(2021-10-08 20:30:00.290)	52.3	65.1
(2021-10-08 20:45:00.290)	52.9	72
(2021-10-08 21:00:00.290)	56.1	76.2
(2021-10-08 21:15:00.290)	55.1	72.5
(2021-10-08 21:30:00.290)	56.8	74.6
(2021-10-08 21:45:00.290)	54.6	72.3
(2021-10-08 22:00:00.290)	52.6	65.9



(2021-10-08 22:15:00.290)	54.1	71
(2021-10-08 22:30:00.290)	56.2	74.7
(2021-10-08 22:45:00.290)	55.1	71.3
(2021-10-08 23:00:00.290)	56.6	72.8
(2021-10-08 23:15:00.290)	56.7	73.2
(2021-10-08 23:30:00.290)	57	82.7
(2021-10-08 23:45:00.290)	56.8	83.4
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(2021-10-09 00:30:00.290)	51.3	74.7
(2021-10-09 00:45:00.290)	50.3	63.6
(2021-10-09 01:00:00.290)	52.3	77.4
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(2021-10-09 01:30:00.290)	49.4	58.4
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(2021-10-09 02:15:00.290)	49.2	60.6
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(2021-10-09 02:45:00.290)	49.6	64
(2021-10-09 03:00:00.290)	48.7	67.4
(2021-10-09 03:15:00.290)	49	63
(2021-10-09 03:30:00.290)	48.3	55.3
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(2021-10-09 04:15:00.290)	47.7	60
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(2021-10-09 04:45:00.290)	49.1	58.2
(2021-10-09 05:00:00.290)	49.5	69.9
(2021-10-09 05:15:00.290)	49.1	62.3
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(2021-10-09 06:00:00.290)	49.3	65.2
(2021-10-09 06:15:00.290)	50.2	65.4
(2021-10-09 06:30:00.290)	51.2	68.3
(2021-10-09 06:45:00.290)	49.5	58.5
(2021-10-09 07:00:00.290)	50.2	65.3
(2021-10-09 07:15:00.290)	51.3	60.9
(2021-10-09 07:30:00.290)	51.7	60.7
(2021-10-09 07:45:00.290)	52.9	65
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(2021-10-09 08:45:00.290)	53.8	67.1
(2021-10-09 09:00:00.290)	54.3	73.9
(2021-10-09 09:15:00.290)	56.3	71.4



(2021-10-09 09:30:00.290)	54.4	70.3
(2021-10-09 09:45:00.290)	53	64.8
(2021-10-09 10:00:00.290)	53.1	64.4
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(2021-10-09 10:30:00.290)	55.8	80.8
(2021-10-09 10:45:00.290)	54.5	68.7
(2021-10-09 11:00:00.290)	53	65.7
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(2021-10-09 11:30:00.290)	53.2	64.8
(2021-10-09 11:45:00.290)	53.8	70
(2021-10-09 12:00:00.290)	54.5	75.1
(2021-10-09 12:15:00.290)	56	77.5
(2021-10-09 12:30:00.290)	54.4	71.6
(2021-10-09 12:45:00.290)	53.9	70.5
(2021-10-09 13:00:00.290)	53.7	66.4
(2021-10-09 13:15:00.290)	53.9	74.8
(2021-10-09 13:30:00.290)	54.1	72.5
(2021-10-09 13:45:00.290)	55.7	77.2
(2021-10-09 14:00:00.290)	54.7	72.8
(2021-10-09 14:15:00.290)	62.6	93.5
(2021-10-09 14:30:00.290)	55.2	74.6
(2021-10-09 14:45:00.290)	53.2	71.7
(2021-10-09 15:00:00.290)	53.7	80.7
(2021-10-09 15:15:00.290)	55.6	83
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(2021-10-09 15:45:00.290)	55	77.8
(2021-10-09 16:00:00.290)	54.5	80.6
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(2021-10-09 17:00:00.290)	54.2	71.5
(2021-10-09 17:15:00.290)	55.7	78.5
(2021-10-09 17:30:00.290)	53.4	66
(2021-10-09 17:45:00.290)	53.2	67.2
(2021-10-09 18:00:00.290)	52.6	65.9
(2021-10-09 18:15:00.290)	53.8	71.4
(2021-10-09 18:30:00.290)	55.3	79
(2021-10-09 18:45:00.290)	53	72.6
(2021-10-09 19:00:00.290)	52.6	68
(2021-10-09 19:15:00.290)	52.6	67.9
(2021-10-09 19:30:00.290)	54	72.4
(2021-10-09 19:45:00.290)	53.4	70.4
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(2021-10-09 20:15:00.290)	53.8	74.1
(2021-10-09 20:30:00.290)	57.6	81.9



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(2021-10-09 21:00:00.290)	54.8	72
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(2021-10-09 21:45:00.290)	54.2	67
(2021-10-09 22:00:00.290)	56.2	84
(2021-10-09 22:15:00.290)	53.6	66.7
(2021-10-09 22:30:00.290)	53.6	66
(2021-10-09 22:45:00.290)	54	64.8
(2021-10-09 23:00:00.290)	53.3	74.5
(2021-10-09 23:15:00.290)	54.1	72.2
(2021-10-09 23:30:00.290)	50.9	67.3
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(2021-10-10 00:00:00.290)	51.1	70.5
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(2021-10-10 01:00:00.290)	50.4	63.7
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(2021-10-10 01:30:00.290)	49	62.4
(2021-10-10 01:45:00.290)	49.2	59.6
(2021-10-10 02:00:00.290)	49.2	61
(2021-10-10 02:15:00.290)	48.6	58.5
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(2021-10-10 02:45:00.290)	46.3	60.4
(2021-10-10 03:00:00.290)	49.3	61.8
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(2021-10-10 03:45:00.290)	48.6	56.6
(2021-10-10 04:00:00.290)	48.8	59
(2021-10-10 04:15:00.290)	49	59.2
(2021-10-10 04:30:00.290)	49.2	69.5
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(2021-10-10 05:00:00.290)	49.5	56.1
(2021-10-10 05:15:00.290)	48.9	63.1
(2021-10-10 05:30:00.290)	48.5	60.8
(2021-10-10 05:45:00.290)	49	59.6
(2021-10-10 06:00:00.290)	49.5	65.7
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(2021-10-10 06:30:00.290)	48.5	64.9
(2021-10-10 06:45:00.290)	50.6	62.2

