New Century Tipis Manchester

Condition Discharge Report

31800/RP2

19 November 2024

For:
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Document Control

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Appendix A – Acoustic Terminology

1.0 Introduction

Hann Tucker Associates (HTA) has been appointed to carry out noise measurements at the site of the New Century Tipis to demonstrate compliance with and to discharge Parts b of Condition 3 and Condition 4 imposed by Manchester City Council (MCC). Hann Tucker attended site to coordinate with the sound engineers and set limiting noise levels in compliance with those set in Sections 8.1 and 8.2 in the Noise Impact Assessment (31800-RP1-Rev2-WR), as well as measuring noise levels of any plant on site.

The wording of Condition 3b can be seen below.

> *"b) Prior to occupation of the development a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.*

The wording of Condition 4 can be seen below.

> *"a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences.*
>
> *b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.*

This report presents the measured levels during the set-up of the PA speaker as well as the assessment of the plant items.

2.0 Condition Criteria

The criteria for the tipis temporary installation are detailed in the following sections. The operation of the site should not extend past 23:00 or begin before 07:00 as agreed with MCC, as such this period has been omitted from further discussion.

2.1 Condition 3 – Music Noise

The condition states that the following criteria should be met at the different receptors:

Location	Period	Proposed Sound Pressure Level Criteria at 1-metre from Building Facade ($L_{eq,5min}$ dB) for Typical Activities							
		63	125	250	500	1000	2000	4000	8000
Office	Weekday Day (07:00-19:00)	62	59	53	53	52	46	39	30
Residential	Weekend Day (07:00-19:00)	53	49	46	46	45	38	31	22
	Evening (19:00-23:00)	53	49	46	46	45	38	31	22

The proposed limits for up to 12No evening events, subject to MCC approval, are presented below given as free-field noise levels.

Location	Period	Proposed "Event" $L_{Aeq,\ 15min}$ (dB) Criteria at 1-metre from the Noise Sensitive Façade
Offices	Weekday Day (07:00-19:00)	64
Residential	Weekend Day (07:00-19:00)	69
Offices	Evening (19:00-23:00)	69

Based on achieving the above, the following were calculated at a distance of 1m from the tipis and will serve as the criteria for the on-site proposition testing.

Activity Type	Period	Proposed Sound Pressure Level Limit at 1-metre from Tipis ($L_{eq,5min}$ dB)							
		63	125	250	500	1000	2000	4000	8000
Typical	Weekday	65	61	55	55	54	48	42	33
	Weekend Day & Evening	81	76	72	73	72	65	62	64
Up to 12No Events[1]	Weekday	83	74	63	62	62	56	49	41
	Weekend Day & Evening	101	96	92	93	92	85	82	84

2.2 Condition 4 – Plant Noise

The wording of Condition 4 states that plant should be controlled to 5 dB below the typical background on site. This would result in a limit of 44 dB L_{ArTr} to be achieved at the nearby office receptor (ie the Probation Centre).

However, given the plant on-site, this may not be achievable. As such, discussions were had with the Local Authority's on the subject of relaxing this criteria. Subsequently the criteria have been relaxed; the statement from MCC can be seen below:

> *"Whilst we would not accept a relaxation of the condition on the grounds that 56 dB is the agreed level for music noise emissions, we would be OK with relaxing it providing that the smaller unit (EC32) is used instead of the larger unit (EC55). This would represent a noise that is +1dB over the background level at the offices, which would be a low impact."*

The existing background noise level at the site is considered to be 49 dB L_{A90} so a limit of 50 dBA L_{ArTr} is considered to be the agreed criterion.

3.0 Noise Survey

3.1 Procedure

Fully attended noise measurements were undertaken for the period of approximately 10:00 to 12:30 hours, during the set-up of the PA speakers. Music was played at a given volume within the tipis while measurements were taken externally to establish the internal limits that result in the criteria set out in Section 2.1 being achieved.

Additional measurements of the plant items were also undertaken at 1m from the installed heaters.

Measurements were taken continuously of the L_{eq} and L_{90} sound pressure levels over appropriate periods.

3.2 Equipment

The following equipment was utilised for the environmental noise monitoring:

Description	Manufacturer	Type	Serial Number	Last Calibration
Type 1 Sound Level Meter	Larson Davis	LxT	5103	29/05/2024
Type 1 Calibrator	Larson Davis	Cal200	3083	27/03/2024

4.0 Survey Results

4.1 Typical "Non-Event" Levels

The following table details the measured levels at 1m from the tipis with the "Typical Weekday" volume playing internally.

Category	Period	Sound Pressure Level at 1-metre from Tipis (L_{eq} dB)							
		63	125	250	500	1000	2000	4000	8000
Measured Level	Typical weekday	64	58	57	55	53	48	40	31
Criteria		65	61	55	55	54	48	42	33
Exceedance		-1	-3	2	0	-2	0	-3	-2

The above levels indicate that the measured sound levels all comply with the criteria set with the exception of the 250 Hz band at 1-metre from the boundary of the tipis. It should be noted that the exceedance is 2 dB which can be considered negligible and is unlikely to impact the levels of noise egress in reality.

The following table details the measured levels at 1m from the tipis with the "Typical Weekend Day and Weekday Evening" volume playing internally:

Category	Period	Sound Pressure Level at 1-metre from Tipis (L_{eq} dB)							
		63	125	250	500	1000	2000	4000	8000
Measured Level	Typical Weekend Day & Evening	80	69	63	62	60	54	44	32
Criteria		81	76	72	73	72	65	62	64
Exceedance		-1	-8	-9	-11	-12	-11	-18	-32

As seen in both the tables above, the typical levels are expected to meet the agreed criteria providing that the internal noise level produced by the PA are as they were when the measurements we carried out. Please refer to Section 5.1 for details of how this will be achieved.

4.2 Event Levels

It was advised that weekday events will not be undertaken, however, it was found on site that the "Typical Weekend Day & Evening" level was sufficient to meet the "Weekday Event" criteria. As such, for the purposes of setting limiting noise levels they have been set to the same level.

However, the following table details the measured levels at 1m from the tipis with the "Weekend Day and Weekday Evening" volume playing internally:

Category	Period	Sound Pressure Level at 1-metre from Tipis (L_{eq} dB)							
		63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Measured Level	Weekend Day & Evening Event	100	88	82	75	72	68	61	51
Criteria		101	96	92	93	92	85	82	84
Exceedance		-1	-8	-10	-18	-20	-17	-21	-33

As seen in both the tables above, the event levels are expected to meet the agreed criteria providing that the internal noise level produced by the PA are as they were when the measurements we carried out. Please refer to Section 5.1 for details of how this will be achieved.

4.3 Plant Noise Emissions

Measurements of the identified heaters on-site were undertaken at a distance of approximately 1-metre to establish a source level. The results of these measurements can be seen in the table below:

Plant Item	Sound Pressure Level at 1-metre from plant item (L_{eq} dB)								
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dBA**
Arcotherm EC55	69	84	80	82	82	80	75	68	**86**
Arcotherm EC32	71	77	78	77	74	72	69	61	**79**

As seen in the above table, the EC55 (the larger heater) is approximately 7 dB louder than the smaller EC32 unit.

5.0 Discussion

5.1 Condition 3 (Entertainment Noise)

Reference levels in relation to the volume attenuator have been demonstrated to comply with the limits agreed with the Local Authority. Hann Tucker has been advised that the attenuator has been electronically programmed by the sound engineer on site so that only the 3No confirmed levels can be set.

In relation to access to the volume control, Hann Tucker has been advised by the Client that the attenuator will only be accessible by the general manager who is on shift at any time. It was also agreed on site that the subwoofer will be turned off during the typical daytime period (07:00-19:00 hours) to comply with the criteria.

The measured levels in Sections 4.1 and 4.2 demonstrate that the entertainment levels at the site are suitable for the discharge of Part B of Condition 3.

5.2 Condition 4 (Plant Noise)

Based on the measured data, it is likely that the plant noise egress criteria set out in Sectio 2.2 will not be achieved is the larger (EC55) heater is in operation.

It has been confirmed by the Client that only the smaller heater (EC32) will run and the unit will be located away from the Probation Offices such that the tipis provide acoustic screening.

As such, the table below shows the calculated level at the office receptors with only the smaller EC32 unit in operation:

Plant Noise Assessment	Sound Pressure Level at 1 metre (dBA)
EC32	79
Distance Loss (to 20 metres)	-26
Screening Loss (Provided by Tipi)	-5
Calculated Level at Receptor	**48**
Criteria	**50**

Plant Noise Assessment	Sound Pressure Level at 1 metre (dBA)
EC32	79
Distance Loss (to 20 metres)	-26
Screening Loss (Provided by Tipi)	-5
Calculated Level at Receptor	**48**
Difference	**-2**

Based on the above levels, it is demonstrated that the measured plant noise levels at 1-metre from the office receptor are suitable for the discharge of Condition 4.

Appendix A

Acoustic Terminology

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

$L_{Aeq,T}$ — $L_{Aeq,T}$ is the equivalent continuous A-weighted sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

$L_{Aeq,working\ day}$ — $L_{Aeq,working\ day}$ is the equivalent continuous A-weighted sound pressure level. It is an average of the total sound energy measured over the working day as defined in Section 3.3.

L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.