ACOUSTIC ASSESSMENT REPORT FOR STORAGE HUB DEVELOPMENT:

TASKERS, LONG LANE, AINTREE, LIVERPOOL

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1.0 Introduction

Azymuth Acoustics is appointed by Taskers to provide an acoustic assessment of noise levels in the vicinity of a proposed storage / click and collect hub development on a site on the Liver Industrial Estate located off Lane Lane in Airntree.

It is understood that the acoustic assessment is required as part of the planning permission for the development.

This report is intended to provide information required in order to comply with the planning conditions likely to apply to general environmental noise criteria for this type of development. In particular the report sets out the following details:

- The results of a baseline noise survey undertaken at the Long Lane site.
- The appropriate assessment criteria and guidance relating to noise in the environment as associated with this kind of development.
- An assessment of the appropriate level of protection against noise that should be provided so as to protect users of the building from environmental noise and also to protect the wider environment from noise resulting from operation of the development.

2.0 Baseline Noise Survey

2.1 Measurement Procedures

The instrumentation used for the noise survey consisted of a SvanTek 945 Type 1 precision sound level meter (ser. # 03507, cal. # ACSL 14982) and a 01dB Cal 01 SL sound calibrator (ser. # 990492, cal. # ACSL 14980.) The equipment was calibrated before and after the noise measurements.

The sound level meter measured A-weighted (fast response) noise levels as well as octave band noise levels for all measurements recorded.

2.2 Summary of Measured Noise Levels

Noise measurements were undertaken by Dominic McCann at the locations identified in Figure 1 below. The survey was undertaken on 10th and 11th May 2016. Weather at the time of measurements was dry with a light breeze during the daytime and evening/night-time periods (less than 3m/s).

Figure 1: Summary of noise measurement locations (marked in red on aerial photograph)

Full results of the noise levels recorded by Azymuth Acoustics during the course of the noise survey are included in Appendix B of this report.

The following table summarises the results of the noise measurements.

Position	Period	L_{Amax}	L_{Aeq}	L_{A1}	L_{A10}	L_{A90}
1) Liver Industrial Estate	Day	75.0	57.6	67.6	59.0	50.4
1) Liver Industrial Estate	Eve/Night	53.9	44.8	49.4	46.7	42.4
2) Liver Industrial Estate	Day	73.3	54.9	62.6	57.4	48.5
3) Mater Close	Day	63.8	47.6	55.0	49.3	42.9
4) Charnock Road	Eve/Night	60.4	47.5	54.7	48.7	44.1

Table 1: Summary of noise survey results (free field, dBA)

2.3 Description of the Noise Climate

The site is located close to Long Lane (the B5187) which is characterised by a mixture of commercial / industrial uses to the north and west of the site and residential areas to the south and east of the site. The nearest residential properties are approx. 190m from the site boundary. Long Lane connects with Walton Hall Avenue (the A580 or East Lancashire Road) and on the motorway network. The A580 is located approx. 420m to the south of the site.

During all periods measured, the main source of noise in the vicinity of the site was road traffic using Long Lane and the other local roads. The traffic on Long Lane was (for periods observed during the noise survey) comprised primarily of cars, but included a significant number of HGVs and other commercial vehicles.

3.0 Noise Assessment Criteria

In order to assess the extent of any measures which might be necessary in order to comply with suitable conditions relating to the potential noise sources, Azymuth Acoustics has reviewed various guidance documents and standards, these include:

- British Standard 8233
- British Standard 4142

3.1 British Standard 8233: 2014

BS 8233 provides a code of practice for the sound insulation of a variety of building types affected by general environmental noise. It provides recommendations for control of noise in and around buildings and suggests appropriate criteria / limits for a variety of different situations including residential properties.

The following table summarises the noise limits suggested by BS 8233:2014 applying to residential properties.

Room Type	Noise limit 07:00-23:00hrs $L_{Aeq,16hr}$	Noise limit 23:00-07:00hrs $L_{Aeq,8hr}$
Living Room	35	-
Dining Room	40	-
Bedroom	35	30

Table 2: Noise Limits for Residential Properties Suggested in BS 8233:2014

An internal noise limit of 35 dB L_{Aeq} equates to nominally 47 dB L_{Aeq} as an external noise level outside an open window.

3.2 British Standard 4142: 2014

British Standard 4142: 2014 “Methods for assessing and rating industrial sound” describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse 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.

BS41424 notes that: *Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.*

4.0 Assessment of Noise Levels

4.1 Existing Noise Levels

Daytime noise levels around the site are generally in the range 54 to 58dB L_{Aeq} with background noise levels in the range 48 to 50 dB L_{A90}. At night noise levels are typically 44 to 48 dB L_{Aeq} with background noise levels in the range 42 to 44 dB L_{A90}.

4.2 Noise Limits at Nearest Receptors

Table 3 below details noise limits for any mechanical plant installed as part of the development based on the proposed layout of the site; it is understood that the building will be set back approximately 190-240m from the nearest properties on Barford Road and Walton Grange.

Location	Noise limit (daytime / evening)	Noise limit (daytime / evening)
Residential properties on Betula Close or Walton Grange	45 $_{Aeq,\,7r}$	35 $_{Aeq,\,7r}$

Table 3: Noise limits close to nearest noise sensitive receptors (dBA)

The noise levels set out above have been developed so as to ensure that noise from any commercial activity associated with the development does not have a significant effect on ambient noise levels in the vicinity of nearby residences.

4.3 Additional or Generated Traffic Noise

It is understood from the transport statement (Mott MacDonald transportation report dated 29/04/16) for the development that:

Existing employees within Liver Industrial Estate would be relocated to the new building without the need to employ additional staff;

- HGV movements will remain the same; and
- The Click and Collect facility will be relocated from the existing service offered at the Tasker store within the Liver Industrial Estate.
- Therefore it is anticipated that the development will result in small changes to vehicular movements within the Liver Industrial Estate, without any impact on Long Lane or any other section of the local highway network.

The transport statement also sets out the servicing and delivery strategy for the commercial premises at the site, sustainable travel, public transport and accessibility etc.

The main findings of the transport statement from a noise perspective would be that the noise levels in the area and along the roads accessing the site would remain unchanged.

5.0 Recommendations for Noise Mitigation

5.1 Glazing Specifications

The measured noise levels at location 1 (close to the site boundary) would suggest the building may be glazed using standard thermal double glazing e.g. 4/12/4mm sealed units with an (airborne sound insulation) R_W value approx. 30dB. This type of glazing (or similar) would be suitable for all office and rest room accommodation.

5.2 Other Elements of the Building Envelope

Satisfactory sound insulation specifications will be met using standard construction methods and materials e.g. brickwork or composite façades, pitched composite roof with thermal insulation.

5.3 Externally Mounted Plant (and Plant Atmosphere Connections)

It is understood that the building will not require any specific mechanical or ventilation plant in order to service the building. Thus it is assumed that the building will only incorporate small extract fans for enclosed toilet spaces etc. The levels of noise from this type of ventilation is likely to have minimal effect on the noise climate in the area.

6.0 Conclusions

Azymuth Acoustics has undertaken an environmental noise assessment relating to the proposed Taskers development off Long Lane, Aintree, Liverpool.

Daytime noise levels on the site are typically around 54 to 58dB L_{Aeq} with background noise levels in the range 48 to 50 dB L_{A90}. At night the noise levels are typically 44 to 48dB L_{Aeq} with background noise levels in the range 42 to 44 dB L_{A90}.

A receptor (night-time) noise limit of 35 dB $L_{Aeq,7}$ for Betula Close has been established in order to ensure that noise from the site has no significant effect on ambient noise levels in the vicinity of nearby residences.

Finally the report contains recommendations for appropriate sound insulation values for the glazing and other elements of the external building envelope.

Appendix A

Glossary of Acoustic Terms

Decibel (dB)

This is the unit used to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro Pascal to 100 Pascal.)

dB(A)

This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. A-weighting) to compensate for the sensitivity of the human ear to sound of different frequencies. The A-weighting curve is implemented in sound level meters using an electronic filter that approximately corresponds to the frequency response of the ear.

Octave Band Noise Level

The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz. The ear is also generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum can be divided into frequency bands. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it.

L_{Aeq}

This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over a given time period.

L_{A90}

This is the dB(A) level exceeded for 90% of the time. This is indicative of the general background noise level in the absence of higher level short duration noise events that occur during the measurement period.

L_{A10}

This is the dB(A) level exceeded for 10% of the time.

Sound Reduction Index (SRI)

Difference measured between the amount of energy flowing towards the wall in the source room and the total amount of energy flowing towards the wall in the source room and the total amount of energy entering the receiving room (usual range 100 - 3150 Hz for one third octave band values). The SRI varies with frequency and is measured in a laboratory in either octave or one-third octave bands.

$$SRI = L1 - L2 + 10 \log (S/A)$$

Where: L1 = Noise level in the source room

L2 = Noise levels in the receiving room

S = Surface area of test specimen

A = Equivalent acoustic absorption area in the receiving room

Weighted Sound Reduction Index (R_w)

This is a weighted single figure descriptor of the sound insulation performance of a partition measured under laboratory conditions. The procedure used to quantify the R_w is to compare the sound reduction index (SRI) in each of the one-third octave bands from 100Hz to 3150Hz against a set of standard reference curves.

Appendix B

Full Results of Noise Survey

Start	Pos	Duration	L_{Amax}	L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}	63	125	250	500	1000	2000	4000	8000
10/05/2016																
11:13	1	00:05:00	73.5	58.9	71.5	60.4	52.6	50.5	63.8	59.5	57.6	54.8	56.3	49	43	37.7
11:18	1	00:05:00	77.2	58.1	66.9	60.2	54.5	50.8	64.9	57.8	56.2	52.7	55.3	49.7	45.3	38.9
11:23	1	00:05:00	75	56.2	66	57.5	52.3	50.6	63.9	57.7	55.6	51.1	53.1	48	40.7	32
11:28	1	00:05:00	71.5	54.4	64.1	55.7	51.9	50.2	61.6	57.4	55	50	51	45.5	37.8	27.6
11:33	1	00:05:00	78	58.7	69.5	61.3	52.4	50.1	62.7	56.8	54.5	51.4	56.9	49.6	38.9	30.9
11:42	2	00:05:00	73.7	55.5	64.3	58.6	52.6	48.2	64.7	56.3	51.6	50.1	50.8	50.4	40.1	32.4
11:47	2	00:05:00	77.7	54.8	60.9	56.7	51.5	47.9	64.6	55	52.5	51.3	51.5	46	40.3	31
11:52	2	00:05:00	74.4	54.7	62.6	57.5	52.5	48	63.9	55.3	52.1	51.4	51.3	46.5	40.7	30.8
11:57	2	00:05:00	67.5	54.5	62.4	56.9	53.1	49.8	62.7	57.9	53.7	51.5	50.4	46.2	39.4	29.9
12:12	3	00:05:00	72.3	47.1	54.2	46.4	43.9	42	55.6	49.1	47.2	47	41.1	36.8	31.8	25.9
12:17	3	00:05:00	73.6	50.3	61.9	52.4	44	42	62.8	56	50.4	45.2	45.2	43	37.4	31.1
12:22	3	00:05:00	57.9	45.9	51.7	47.9	44.9	43.1	55.3	47.5	43.1	41.9	41.4	38.2	35.4	30
12:27	3	00:05:00	61.9	47.1	53	49.6	45.9	44.1	60.3	52.4	44.1	43.2	42.5	38.8	36.3	31.6
12:32	3	00:05:00	61.5	48	55.7	49.9	46.6	44.6	58.1	52.3	48	44.5	43.7	39.2	34.6	28.8
12:37	3	00:05:00	55.4	45.7	51.5	48	44.9	43	59	51.3	46	41.2	41.4	37	32.1	28.3
12:42	3	00:05:00	63.9	45.8	54.4	48.1	43.7	41.9	60.4	50.2	43.5	41.6	41.5	37.2	33	26.6
12:47	3	00:05:00	63.6	48.6	57.6	51.9	45.9	42.6	62.4	52	43.4	41.9	42.3	42.5	38.3	39.9
11/05/2016																
22:27	1	00:05:00	55.7	45.7	50.2	48.2	44.8	43.2	53.1	48.3	43.7	41.2	43.1	37.3	26.3	19.9
22:33	1	00:05:00	56.4	44.9	49.9	46.8	44.2	42.5	53.1	46.7	42.2	40.1	42.2	37.1	26	18.6
22:39	1	00:05:00	50.3	44.4	48.4	46.2	43.9	42	52.8	45.7	40.6	39.5	42	35.8	25.4	17
22:45	1	00:05:00	53.2	43.8	49	45.4	43.3	41.7	53.5	45.2	40	39.1	41.6	34.6	25.1	17.9
22:55	4	00:05:00	57.2	46.3	51	48	45.7	43.8	56.2	48.6	45.7	42.3	42.8	37.2	32.7	26.8
23:00	4	00:05:00	56.6	47.1	51.9	49	46.6	44.6	58.1	49.5	45.2	42.8	43.9	38.4	33.6	27.4
23:05	4	00:05:00	63.6	47.5	55.7	48.9	46.2	44.1	57	48.7	44.8	42.7	43.7	38.3	38.4	32
23:10	4	00:03:02	64	48.6	60.2	48.9	45.9	43.8	57.5	49.2	44.3	42	43.2	37.8	43.1	37.7