

## Axis Phase 3 Bicester – Noise Technical Note

784-B030696

22<sup>nd</sup> March 2022

### INTRODUCTION

This technical note presents the findings of an updated noise assessment in relation to operational noise for the proposed employment development located at land to the west of Howes Lane, known as ‘Axis J9, Phase 3.’ This technical note has been prepared to assess the potential impacts of operational noise at nearby receptors, following changes to the proposed layout at the site. This technical note follows on from the noise assessment produced for the development dated 6<sup>th</sup> August 2021.

Tetra Tech undertook a noise assessment to support a planning application consisting of eleven separate units across four buildings, which concluded mitigation was required in the form of in the form of two 2.5m high acoustic barriers in addition to an intrinsic 4.0 acoustic barrier to the east of the site. Following receipt of updated plans for the site, an updated noise assessment in-line with the methodology and assessment used in the 2021 noise assessment has been undertaken, in order to determine the effects on the previously assessed sensitive receptors, with the inclusion of updated mitigation measures following receipt of detailed layouts for the site. As the impacts of construction, building services plant (for which operational limits were set, as no information regarding fixed plant is currently known) and traffic noise from the site are not anticipated to have materially changed from the original assessment, this updated assessment has been produced to evaluate the changes in operational effects only.

### MODEL INPUT DATA – OPERATIONAL PHASE

A summary of the operational phase noise levels used within the 2021 assessment for daytime and night-time  $L_{Aeq}$  and night-time  $L_{Amax}$ , are presented in Table 1 below.

As a worst-case assumption, 20 HGVs have been predicted to arrive/leave along the access road per hour. Therefore, as a worst-case scenario, it has been calculated that 20 HGVs arrive/leave in a 1-hour period during the daytime (07:00 – 23:00) period. During night-time (23:00-07:00) the assessment has used 25% of the predicted HGVs/vans arriving/leaving, in any 15-minute period. The HGV/van movements have been included as a line source in the model.

**Table 1 Summary of Noise Source, Noise levels during Daytime & Night-time**

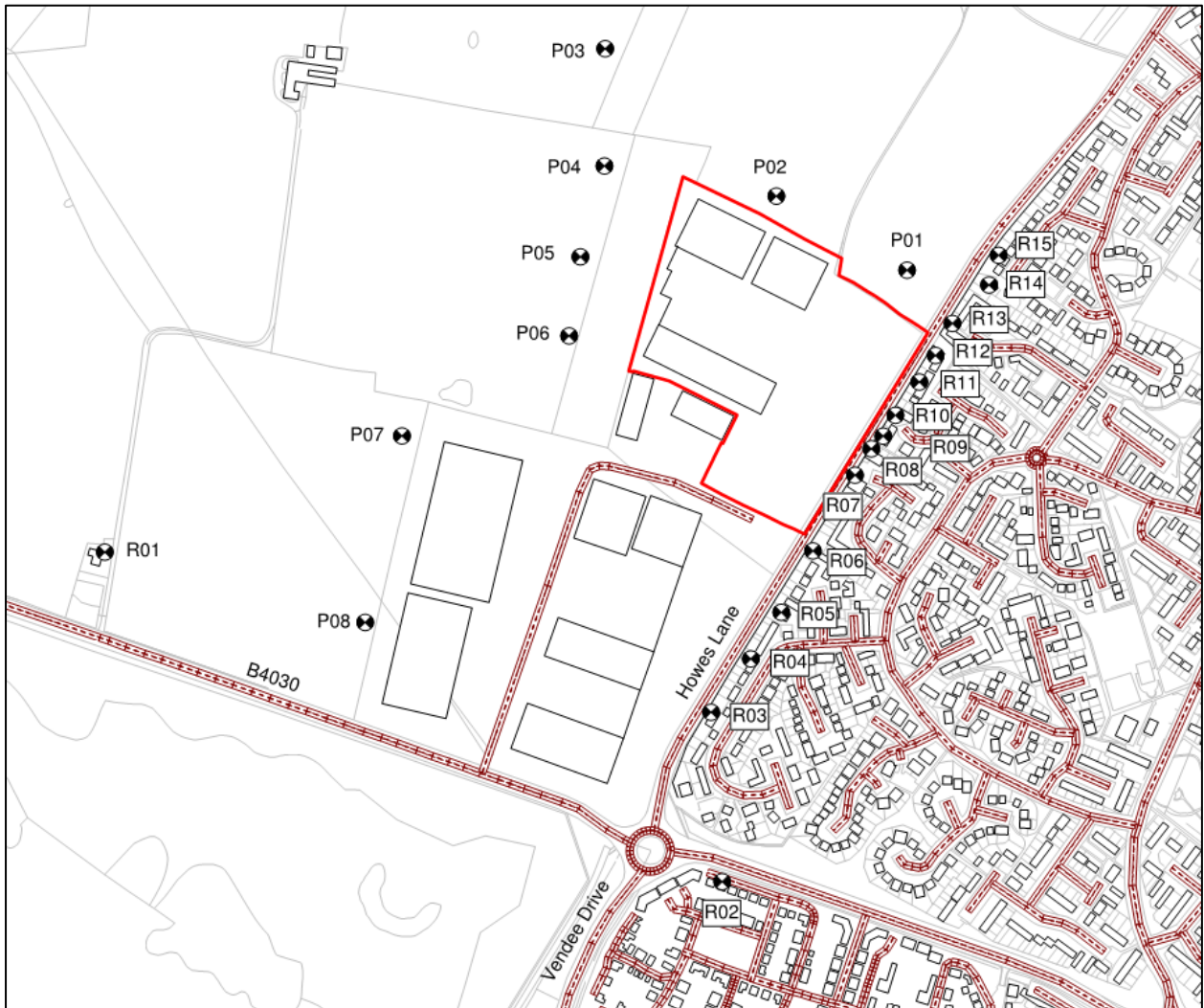
Noise Source	Noise Level (dB) at 3m distance		
	Daytime $L_{Aeq}$	Night-time $L_{Aeq}$	Night-time $L_{Amax}$
HGV Loading	71.3	76.2	89.4
HGV Movements	47.5	47.5	73.0
Van Loading	60.6	62.5	80.3
Car Parking	53.0	53.0	71.9

For the purposes of this technical note, the previously identified sensitive receptor locations from the hybrid planning application have been assessed, with details outlined in Table 2 and Figure 1 below.

**Table 2 Sensitive Receptor Locations**

Ref.	Description	Height (m) Daytime / Night-time
R01	Himley Farm, Middleton Stoney Road	1.5 / 6.0
R02	11 Colwell Close	1.5 / 6.0
R03	78 Isis Avenue	1.5 / 6.0
R04	64 Isis Avenue	1.5 / 6.0
R05	50 Isis Avenue	1.5 / 4.0
R06	30 Isis Avenue	1.5 / 4.0
R07	20 Wensum Crescent	1.5 / 4.0
R08	21 Wensum Crescent	1.5 / 4.0
R09	21 Beckdale Close	1.5 / 4.0
R10	29 Beckdale Close	1.5 / 4.0
R11	51 Beckdale Close	1.5 / 4.0
R12	59 Beckdale Close	1.5 / 4.0
R13	18 Dove Green	1.5 / 4.0
R14	10 Derwent Road	1.5 / 4.0
R15	12 Derwent Road	1.5 / 4.0
P01	Northern Proposed Development	1.5 / 4.0
P02	Northern Proposed Development	1.5 / 4.0
P03	Western Proposed Development	1.5 / 4.0
P04	Western Proposed Development	1.5 / 4.0
P05	Western Proposed Development	1.5 / 4.0
P06	Western Proposed Development	1.5 / 4.0
P07	Western Proposed Development	1.5 / 4.0
P08	Western Proposed Development	1.5 / 4.0

Figure 1 Sensitive Receptor Locations



## OPERATIONAL NOISE INTRUSION - CUMULATIVE

The following assessment presents a comparison of the results of the previous Tetra Tech noise assessment (Ref. B030696 dated 06<sup>th</sup> August 2021). The assessment submitted in support of the original planning application identified the requirement for a 2.5m acoustic barrier to be incorporated between units 3 & 4 in order to achieve the target noise intrusion criteria. As noise sources in proximity to the west of the site are not considered to have materially changed, this additional acoustic barrier has been retained for all assessments made. All additional acoustic barriers to the east of the site (the additional 2.5m barrier and intrinsic 4.0m barrier to the east of the site) have been removed from assessments.

Table 4-6 below presents the external noise levels at nearby sensitive receptors from all sources of potential operational noise associated with the Development (including HGV/van movements, unloading, parking and staff parking). Internal  $L_{Aeq}$  and  $L_{Amax}$  noise levels have been assessed both with windows-open, where a reduction from a partially open window of 15 dB has been used. For reference, the target noise intrusion criteria are presented within Table 3. Daytime noise levels (including proposed mitigation) are shown illustratively on Figure 2.

**Table 3 Noise Intrusion Criteria Values**

Period	L <sub>Aeq</sub> Criteria	L <sub>AMax</sub> Criteria	Source
Daytime	35 dB L <sub>Aeq,16Hours</sub>	-	BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings – Code of practice'
Night-Time	30 dB L <sub>Aeq,8Hours</sub>	45 dB L <sub>AMax</sub>	BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings – Code of practice'  World Health Organisation 'Guidelines on Community Noise' 1999

**Table 4 Residential Dwellings: Cumulative Noise Intrusion Levels L<sub>Aeq</sub> (Daytime)**

Location	External Façade Levels L <sub>Aeq(1 hr)</sub>	Internal L <sub>Aeq(1 hr)</sub> with windows open	Internal L <sub>Aeq(1 hr)</sub> with windows closed	BS 8233 / WHO Criteria – Internal L <sub>Aeq</sub>
R01	29.5	14.5	0.0	35
R02	32.1	17.1	2.1	35
R03	39.6	24.6	9.6	35
R04	39.0	24.0	9.0	35
R05	38.0	23.0	8.0	35
R06	36.5	21.5	6.5	35
R07	35.4	20.4	5.4	35
R08	36.7	21.7	6.7	35
R09	37.4	22.4	7.4	35
R10	37.8	22.8	7.8	35
R11	37.2	22.2	7.2	35
R12	36.3	21.3	6.3	35
R13	31.3	16.3	1.3	35
R14	31.4	16.4	1.4	35
R15	29.3	14.3	0.0	35
P01	36.7	21.7	6.7	35
P02	37.1	22.1	7.1	35
P03	33.0	18.0	3.0	35
P04	36.5	21.5	6.5	35
P05	40.5	25.5	10.5	35
P06	41.4	26.4	11.4	35
P07	33.5	18.5	3.5	35
P08	31.4	16.4	1.4	35

All values are sound pressure levels in dB re: 2x 10<sup>-5</sup> Pa.

**Table 5 Residential Dwellings: Cumulative Noise Intrusion Levels  $L_{Aeq}$  (Night-time)**

Location	External Façade Levels $L_{Aeq(15\text{ min})}$	Internal $L_{Aeq(15\text{ min})}$ with windows open	Internal $L_{Aeq(15\text{ min})}$ with windows closed	BS 8233 / WHO Criteria – Internal $L_{Aeq}$
R01	31.7	16.7	1.7	30
R02	34.6	19.6	4.6	30
R03	43.9	28.9	13.9	30
R04	42.6	27.6	12.6	30
R05	41.9	26.9	11.9	30
R06	40.5	25.5	10.5	30
R07	41.6	26.6	11.6	30
R08	42.7	27.7	12.7	30
R09	42.2	27.2	12.2	30
R10	42.5	27.5	12.5	30
R11	41.6	26.6	11.6	30
R12	40.8	25.8	10.8	30
R13	36.4	21.4	6.4	30
R14	35.3	20.3	5.3	30
R15	33.9	18.9	3.9	30
P01	39.3	24.3	9.3	30
P02	37.6	22.6	7.6	30
P03	34.7	19.7	4.7	30
P04	38.9	23.9	8.9	30
P05	42.9	27.9	12.9	30
P06	44.6	29.6	14.6	30
P07	34.4	19.4	4.4	30
P08	33.4	18.4	3.4	30

All values are sound pressure levels in dB re:  $2 \times 10^{-5}$  Pa.

**Table 6 Existing Residential Dwellings: Cumulative Noise Intrusion Levels  $L_{Amax}$  (Night-time)**

Location	External Façade Levels $L_{Amax}$	Internal $L_{Amax}$ with windows open	Internal $L_{Amax}$ with windows closed	WHO Criterion – Internal $L_{Amax}$
R01	35.0	20.0	5.0	45
R02	37.1	22.1	7.1	45
R03	47.9	32.9	17.9	45
R04	47.3	32.3	17.3	45
R05	46.0	31.0	16.0	45
R06	47.9	32.9	17.9	45
R07	50.5	35.5	20.5	45
R08	50.0	35.0	20.0	45
R09	48.7	33.7	18.7	45
R10	48.3	33.3	18.3	45
R11	46.6	31.6	16.6	45
R12	46.1	31.1	16.1	45
R13	42.7	27.7	12.7	45
R14	40.9	25.9	10.9	45
R15	40.2	25.2	10.2	45
P01	49.3	34.3	19.3	45
P02	45.2	30.2	15.2	45
P03	39.2	24.2	9.2	45
P04	43.4	28.4	13.4	45
P05	46.9	31.9	16.9	45
P06	49.7	34.7	19.7	45
P07	39.3	24.3	9.3	45
P08	35.7	20.7	5.7	45

All values are sound pressure levels in dB re:  $2 \times 10^{-5}$  Pa.

The cumulative assessment presented in the tables above shows that internal daytime  $L_{Aeq}$ , night-time  $L_{Aeq}$  and night-time  $L_{Amax}$  noise levels from all sources of noise at the proposed Site and from Phase 1 and 2 are predicted to be within the WHO/BS 8233 criteria at all existing and proposed sensitive receptors with windows open or closed. All residential receptors are also predicted to be within the BS 8233 lower limit of 50dB for gardens and private external spaces.

For reference, Table 7 below shows a comparison of cumulative internal noise levels assuming a windows-open scenario from the August 2021 noise assessment and the updated assessment presented within this technical note given the removal of Units 6-11.

**Table 7 Comparison of August 2021 and March 2022 Cumulative Noise Intrusion**

Location	Aug 2021 Layout			Mar 2022 Layout			Difference		
	Daytime L <sub>Aeq</sub> (1 hr)	Night-time L <sub>Aeq</sub> (15min)	Night-time L <sub>Amax</sub>	Daytime L <sub>Aeq</sub> (1 hr)	Night-time L <sub>Aeq</sub> (15min)	Night-time L <sub>Amax</sub>	Daytime L <sub>Aeq</sub> (1 hr)	Night-time L <sub>Aeq</sub> (15min)	Night-time L <sub>Amax</sub>
R01	14.5	16.7	20.0	14.5	16.7	20.0	0.0	0.0	0.0
R02	17.2	19.6	22.1	17.1	19.6	22.1	-0.1	0.0	0.0
R03	24.6	28.9	32.9	24.6	28.9	32.9	0.0	0.0	0.0
R04	24.0	27.6	32.3	24.0	27.6	32.3	0.0	0.0	0.0
R05	23.1	26.9	31.0	23.0	26.9	31.0	-0.1	0.0	0.0
R06	22.0	25.5	32.8	21.5	25.5	32.9	-0.5	0.0	0.1
R07	23.3	23.4	32.7	20.4	26.6	35.5	-2.9	3.2	2.8
R08	23.7	24.4	39.2	21.7	27.7	35.0	-2.0	3.3	-4.2
R09	24.0	23.6	37.5	22.4	27.2	33.7	-1.6	3.6	-3.8
R10	23.1	20.8	35.7	22.8	27.5	33.3	-0.3	6.7	-2.4
R11	23.9	19.5	32.2	22.2	26.6	31.6	-1.7	7.1	-0.6
R12	23.0	19.1	25.6	21.3	25.8	31.1	-1.7	6.7	5.5
R13	19.2	18.6	24.0	16.3	21.4	27.7	-2.9	2.8	3.7
R14	17.6	19.6	25.9	16.4	20.3	25.9	-1.2	0.7	0.0
R15	15.4	18.4	25.2	14.3	18.9	25.2	-1.1	0.5	0.0
P01	22.9	24.7	37.2	21.7	24.3	34.3	-1.2	-0.4	-2.9
P02	22.4	22.7	30.2	22.1	22.6	30.2	-0.3	-0.1	0.0
P03	18.1	19.7	24.2	18.0	19.7	24.2	-0.1	0.0	0.0
P04	21.6	23.9	28.4	21.5	23.9	28.4	-0.1	0.0	0.0
P05	25.5	27.9	31.9	25.5	27.9	31.9	0.0	0.0	0.0
P06	26.4	29.6	34.7	26.4	29.6	34.7	0.0	0.0	0.0
P07	18.5	19.4	24.3	18.5	19.4	24.3	0.0	0.0	0.0
P08	16.5	18.4	20.7	16.4	18.4	20.7	-0.1	0.0	0.0

All values are sound pressure levels in dB re: 2x 10<sup>-5</sup> Pa.

The results presented above demonstrate that, with the previously prescribed 2.5m acoustic barrier to the west retained, the target noise intrusion criteria within dwellings are predicted to be met (assuming a 15dB reduction through an open window) despite cumulative noise levels being higher at a number of receptors. As such, given the absolute noise criteria is still met at all assessed sensitive receptors, the noise impacts related to the updated site layout are not considered to be significant. An indicative cumulative daytime noise contour plot is shown on Figure 2 below.

**Figure 2** Indicative Daytime Noise Contour Plot ( $L_{Aeq, 1hour}$ )



## OVERALL CHANGE IN NOISE LEVEL

This assessment has been undertaken to compare worst-case noise levels from the ‘existing ambient noise levels’ ( $L_{Aeq}$ ) to the ‘proposed scheme’ noise at identified existing and proposed residential receptors. The differences between the ‘existing’ and the ‘proposed’ development scenarios including deliveries, car parking and plant noise during the daytime and night-time are presented in Tables 8 and 9 below.



Table 8 Overall Change in Noise Levels  $L_{Aeq}$  (Daytime)

Location	External $L_{Aeq}$ Noise Level at (Existing Baseline)	External $L_{Aeq}$ Noise Level at 1 metre from façade (with Proposed)	Difference Between Existing and Proposed
R01	71.8	71.8	0.0
R02	62.3	62.3	0.0
R03	62.3	62.3	0.0
R04	70.7	70.7	0.0
R05	70.7	70.7	0.0
R06	70.7	70.7	0.0
R07	70.7	70.7	0.0
R08	70.7	70.7	0.0
R09	70.7	70.7	0.0
R10	70.7	70.7	0.0
R11	70.7	70.7	0.0
R12	70.7	70.7	0.0
R13	70.7	70.7	0.0
R14	70.7	70.7	0.0
R15	70.7	70.7	0.0
P01	70.7	70.7	0.0
P02	70.7	70.7	0.0
P03	70.7	70.7	0.0
P04	70.7	70.7	0.0
P05	70.7	70.7	0.0
P06	70.7	70.7	0.0
P07	71.8	71.8	0.0
P08	71.8	71.8	0.0

**Table 9 Overall Change in Noise Levels  $L_{Aeq}$  (Night-time)**

Location	External $L_{Aeq}$ Noise Level at (Existing Baseline)	External $L_{Aeq}$ Noise Level at 1 metre from façade (with Proposed)	Difference Between Existing and Proposed
R01	63.1	63.1	0.0
R02	52.7	52.8	0.1
R03	52.7	53.2	0.5
R04	61.1	61.2	0.1
R05	61.1	61.2	0.1
R06	61.1	61.1	0.0
R07	61.1	61.1	0.0
R08	61.1	61.2	0.1
R09	61.1	61.2	0.1
R10	61.1	61.2	0.1
R11	61.1	61.1	0.0
R12	61.1	61.1	0.0
R13	61.1	61.1	0.0
R14	61.1	61.1	0.0
R15	61.1	61.1	0.0
P01	61.1	61.1	0.0
P02	61.1	61.1	0.0
P03	61.1	61.1	0.0
P04	61.1	61.1	0.0
P05	61.1	61.2	0.1
P06	61.1	61.2	0.1
P07	63.1	63.1	0.0
P08	63.1	63.1	0.0

The results presented in the tables above show the change in noise levels between the existing monitored  $L_{Aeq}$  noise levels and the cumulative contribution from the proposed scenario. The differences between the 'existing' and 'proposed' scenario are no greater than 0.1 dB(A) at all receptors which is considered to be negligible (noise level changes of  $\pm 3$  dB are generally imperceptible to the human ear). Therefore, in terms of the change in noise level associated with store deliveries, noise effects fall within the No Observed Adverse Effect Level.

## CONCLUSIONS

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The assessments presented above demonstrate that operational noise associated with the current development plans across the site are expected to fall within the relevant noise guidance, assuming the proposed 2.5m acoustic barrier between along the western boundary Units 3 & 4 is retained.

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