Technical Note

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To	Etex Building Performance Ltd	**Date**	16 June 2023
	Royal Portbury Docks Redland Avenue Easton-in-Gordano Bristol BS20 0FB	**Our Reference**	12012C-20-R02-01
		Existing Permit No	EPR/XP3036SZ
		Issued By	David Sproston BSc MIOA MCIEH (Associate Director)
		Approved By	Jon Sims BEng BSC MIOA (Associate Director)
Subject	**SUPPLEMENTRARY NOISE ASSESSMENT FOR ENVIRONMENTAL PERMIT: ETEX BRISTOL SUBSTANTIAL PERMIT VARIATION**		

Introduction

Noise Consultants Limited ('NCL') prepared a noise assessment in connection with a substantial permit variation for the Etex Building Performance's (EBP) site (the 'Site') at Royal Portbury Docks in Bristol in March 2023[1].

Several changes to the site have been proposed since the permit variation application was submitted and the noise assessment provided, including a new ball mill within Etex's existing manufacturing plant building. Upon examination of the permit variation, the Environment Agency (EA) have requested that noise associated for the new ball mill is considered and assessed accordingly.

This Technical Note includes a combination of qualitative and quantitative assessment of the noise aspects associated with the proposed new ball mill.

Competency

The noise modelling and assessment contained in this technical letter have been undertaken by the author of the original assessment, David Sproston (now Associate Director, NCL), who is deemed competent to undertake this work.

[1] NCL report ref: 12012C-20-R01-03, Dated 7 March 2023

Background, Description of Proposals and Assessment Scope

Etex has extant planning consent[2] for a new plasterboard production line and warehouse facility (the 'Development') alongside their existing Bristol plasterboard plant (collectively, the 'Site'). Operations at the existing plant are permitted by the Environment Agency (ref. EPR/XP3036SZ).

The Development (new plant) comprises the construction of 3 no. new buildings in the southernmost area of the Site, consisting of a Gypsum store, Calcination Workshop and a main building housing a 50 million square metre per year capacity board line. The assessment of noise from this Development at the nearest identified noise-sensitive receptors (NSRs) has been completed and submitted with the permit variation. The assessment included baseline noise monitoring and operational noise predictions from a noise modelling exercise, with the results assessed in accordance with BS 4142:2014[3] and the EA's document '*Guidance – Noise and vibration management: environmental permits*' (the 'Guidance'). The assessment found that in the absence of any specific noise mitigation measures, operational noise from the site was well below the 'typical' background and residual sound levels at all times, and would not result in unacceptable noise impact at the nearest NSRs.

The new plant has generated the need for an accelerator product (BMA) that is used in the plasterboard manufacturing process. This requires a new workshop (the 'BMA workshop') within the existing plant. The main operations and processes associated with the new BMA Workshop are summarised in **Table 1**. The location of the BMA Workshop is indicated in **Figure 1**.

Table 1: High-Level BMA Workshop Processes

Stage / Zone	Process
1	Pneumatic transfer of dried ground gypsum from Bin 3 in the existing plaster mill to a silo close the BMA workshop
2	Hoppers feeding lignosulphonate and BMA into one or two new ball mills located in an acoustic enclosure within the new BMA Workshop.
3	Transfer of BMA from the ball mill(s) to one new 4t internal silo with big bag loading station
4	Transfer of BMA from the ball mill(s) to one existing external 30t silo located externally, adjacent to the BMA workshop, with bulk lorry filling station.

Stage 1 is expected to be significantly quieter than all other sources of noise in this area of and should not increase internal noise from their current levels.

The ball mill(s) in Stage 2 are required to grind, blend and reduce lignosulphonate and BMA to finer particulates for use in latter manufacturing processes, and will be the noisiest element of the BMA workshop operation. The Project Definition Document[4] requires that the ball mill(s) are located within an acoustic enclosure[5] to ensure that the resulting noise level around the outside of the enclosure is ≤80 dB L_{Aeq}.

Stage 3 is also expected to be significantly quieter than all other sources of noise in this area of the plant and should not increase internal noise from their current levels.

[2] North Somerset Council, Planning Application ref: 20/P/2122/FUL, Approved 9th April 2021
[3] British Standards Institute, BS 4142: 2014 'Methods for rating and assessing industrial and commercial sound' (2014)
[4] EBP Document Ref: FAI-123-BMA-SPE-028v04
[5] The specification of the acoustic enclosure is yet to be determined

An existing Silo will be utilised in Stage 4 and is not a new source of noise. It is anticipated that bulk loading of HGV's will occur twice per week, and in the daytime only (as EBP is a shunt-only operation at night). The existing plant generates a significant number of vehicle trips around the site (which are inaudible at the nearest NSRs, and consequently, the additional 2 trips per week and loading are not considered to represent a potentially significant increase in the overall noise immission at the NSRs.

Therefore, this assessment focuses on noise break-out from new ball mills within the existing plant building.

Figure 1: Location of Ball Mill Workshop and Modelled Noise Emitters

Assessment Methodology

As with the assessment submitted with the permit application, the calculation of additional operational sound from the operation of the ball mill(s) has been undertaken by a noise modelling exercise, as this readily permits source noise levels, sound insulation, screening and the effects of dispersion to be input, the results analysed and evaluated, and any necessary mitigation to be evaluated and optimised.

It is expected that the ball mill would operate continuously over a 24-hour period, alongside all other manufacturing processes and activities. Therefore, operational noise at the nearest NSRs has been predicted on a cumulative basis. This includes all noise sources considered in the noise assessment submitted with the permit application, and noise break-out from the BMA workshop.

The predicted cumulative operational noise levels have then been assessed in accordance with BS 4142:2014[3], as required by the Guidance. For consistency, this assessment utilises baseline sound levels, noise criteria, and assessment locations utilised in the previous noise assessment[1], and are not reproduced here in the interest of brevity.

Assessment

Noise Modelling and Calculation Parameters

The Predictor-LimA® computational sound propagation model used in the previous noise assessment, configured to calculate sound levels in accordance with ISO 9613-2:1996[6], has also been utilised in this assessment. Full details of the modelling procedure can be found in the previous noise assessment[1].

Source Data – Ball Mill(s)

The assessment assumes that the internal noise level impinging on the external wall and roof around the BMA workshop will be 80 dB L_{Aeq}. This represents the highest noise level permissible under the requirements of the Project Definition Document.

Sound Insulation Data – Building Envelope

To predict noise break-out from the main building around the BMA workshop, it is necessary to associate an appropriate sound reduction/transmission loss for the external walls and roof. The composition of these elements has not been confirmed. However, steel cladding is known to form the external walls and roof, with Perspex roof lights present.

Since it has not been possible to obtain reliable sound insulation test data for each element of the building envelope, octave-band sound insulation performance for each element type has been calculated using Insul®. External wall and roof cladding may be thermally insulated. This has, however, not been assumed to be present and, to undertake a reasonably robust assessment, one layer of profiled steel cladding has been assumed for all the external walls. The composite sound reduction index (SRI) of the roof of the main building has been calculated based on the respective areas of cladding and roof lights, and a -3dB correction applied to be within Insul's confidence limits (95%). A summary of the adopted sound reduction of the walls and roof are summarised in **Table 2**. The locations of the roof and facades emitters in the noise model are shown in **Figure 1**, and are substantially larger than the designated area/external walls for the BMA workshop to provide a reasonably robust assessment.

Table 2: Noise Modelling Inputs – Adopted Building Envelope SRI

Type	Construction	Building / Façade Element	Octave-band Sound Reduction (dB, Hz)								Broadband Sound Reduction (dB R_w)
			63	125	250	500	1k	2k	4k	8k	
Wall	Euroclad 32/1000 profiled sheet (100%)	External wall	6	9	12	14	13	16	18	18	15
Roof	Euroclad 32/1000 profiled sheet (89%) + Zenon Pro 30 Outer Sheet Rooflights (11%)	Roof	6	8	12	14	14	16	19	15	15

Results and Assessment – Main Operations

The predicted cumulative operational noise levels are summarised in **Table 3**.

The predicted Specific sound levels (dB $L_{Aeq,T}$) for the main operation of the new plant and the new ball mill are at least 11 dB below the background (dB $L_{A90,T}$) and residual (dB $L_{Aeq,T}$) sound levels and are therefore unlikely to be audible or discernible against the underlying noise climate at the NSRs.

[6] International Standard Organisation. ISO 9613 2:1996 '*Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*' (1996).

Accordingly, no acoustic feature corrections have been applied. With reference to BS 4142:2014 and prior to consideration of context, this indicates the operation of the new plant will have a 'low impact'.

At R9, the predicted specific sound levels are at least 16 dB(A) and 26 dB(A) below the background and residual sound levels (respectively) which are dominated by road traffic. At R11, the closest existing receptor(s) to the Site, the predicted specific sound levels are at least 11 dB(A) below the background and residual sound levels which are dominated by industrial noise from the Port and wider area. Operational noise levels at R12 and R14 predicted specific sound levels are at least 16 dB(A) and 17 dB(A) below the background and residual sound levels (respectively) which are dominated by road traffic or industrial noise from the Port. This is a positive indication that noise from the new plant will be inaudible at both receptors.

Overall, predicted operational noise levels only increase at R12, and by a marginal 1dB, which is not considered significant.

Therefore, given that the cumulative rating levels for the new plant and ball mill are well below the background sound levels, that operational sound from the new plant is unlikely to be audible, it is concluded that the operation of both the new plant, ball mill, and existing plant (which is inaudible), would not result in unacceptable noise impact at the nearest noise-sensitive receptors to the site.

Table 3: Assessment of Specific Sound Levels – Main Operations

Description	Assessment Location (NSR Ref)			
	R9	R11	R12	R14
Daytime (07:00-23:00hrs, inc. HGV Movements)				
Predicted Specific Sound Level dB $L_{Aeq,T}$	39	39	30	32
Character corrections, dB	0	0	0	0
BS 4142:2104 Sound Rating Level, rounded to nearest dB, dB $L_{Ar,Tr}$	39	39	30	32
Background Sound Level (BSL), dB L_{A90}	66	52	46	50
Sound Rating Level – BSL (dB)	-27	-13	-16	-18
Existing Residual Sound Level (RSL dB $L_{Aeq,T}$)	70	52	54	63
Sound Rating Level – RSL (dB)	-31	-13	-24	-31
Assessment Outcome	'Low Impact'			
Night-time (23:00-07:00hrs)				
Predicted Specific Sound Level dB $L_{Aeq,T}$	39	39	30	32
Character corrections, dB	0	0	0	0
BS 4142:2104 Sound Rating Level, rounded to nearest dB, dB $L_{Ar,Tr}$	39	39	30	32
Background Sound Level (BSL), dB L_{A90}	55	50	44	43
Sound Rating Level – BSL (dB)	-16	-11	-14	-11
Existing Residual Sound Level (RSL dB $L_{Aeq,T}$)	65	50	47	49
Sound Rating Level – RSL (dB)	-26	-11	-17	-17
Assessment Outcome	'Low Impact'			

Uncertainty

Factors of uncertainty are summarised in **Table 10** of the previous noise assessment. It is concluded that the magnitude of uncertainty is low and when considered would not change the outcome of the assessment.

Conclusion

The calculation of operational sound from the new plant and new ball mill within the existing manufacturing plant has been undertaken by a noise modelling exercise, and the results assessed in accordance with BS 4142:2014. The assessment has found noise from the site to be well below the 'typical' background and residual sound levels at all times, and therefore will not result in unacceptable noise impact at the nearest NSRs. Consequently, no specific noise mitigation measures are considered necessary.

Best Regards

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Associate Director