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Friday 8 June 2018

Elf Farm Supplies Pty Ltd
108 Mulgrave Road
MULGRAVE NSW 2756

Our Reference 160787-01-01L-DD
Rev 01

For the attention of Blake Edwards

Acoustic Review and Assessment
Southern Acoustic Barrier
Mulgrave Substrate Plant, Mulgrave

1.0 INTRODUCTION

Acoustic Consulting Engineers Pty Ltd was engaged by Elf Farm Supplies Pty Ltd to review the acoustic requirements for the southern acoustic wall encompassing the bale storage area to the east of the Mulgrave substrate plant.

Acoustic Consulting Engineers Pty Ltd has reviewed previous documentation to provide the context and background to the original acoustic wall specification and to inform an alternative design.

Additional site attended noise measurements for the front end loaders and calculations have been reviewed by Acoustic Consulting Engineers Pty Ltd to support changes to the recommendations for the southern acoustic wall.

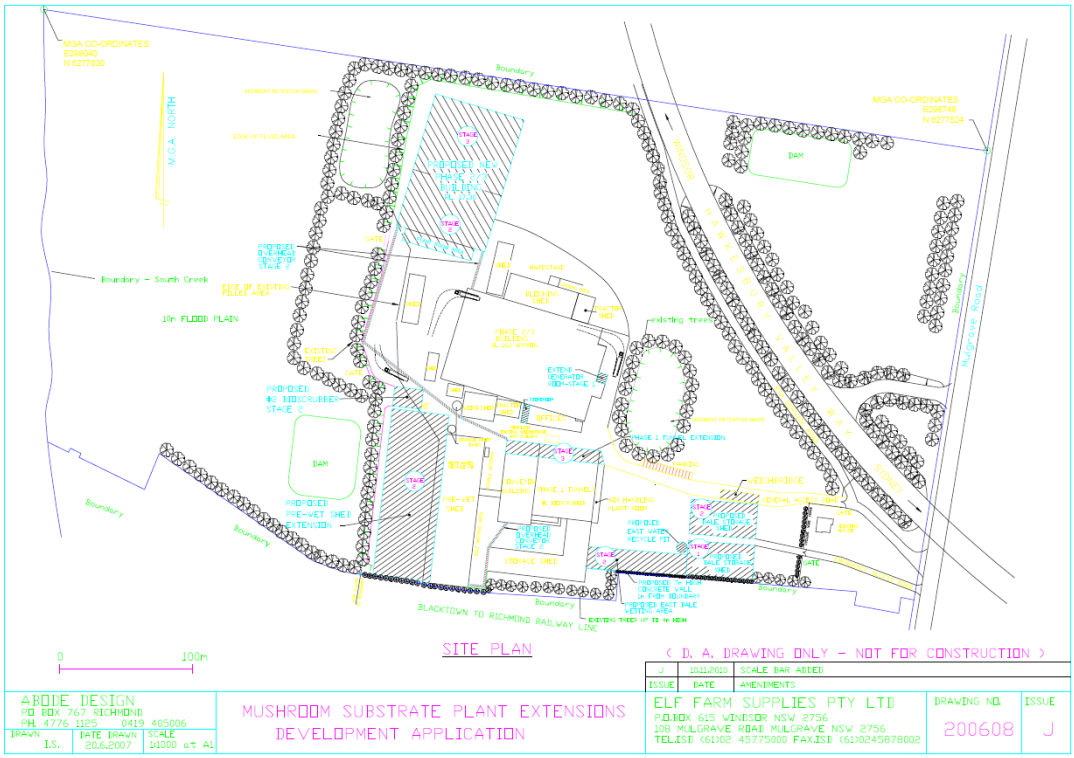
2.0 BACKGROUND

2.1 Expanded Operations - 2010

Elf Farm Supplies Pty Ltd submitted an application to the Department of Planning for the expansion of the Mulgrave Substrate Plant in 2010. Atkins Acoustics and Associates Pty Ltd prepared an *'Operation and Construction. Noise Impact Assessment. Mushroom Substrate Plant. Mulgrave' Report No. 40.6411.R1:CFCD4 Rev03* dated June 2010 to accompany the application.

The 2010 noise modelling and assessment relied on information provided by Elf Farm Supplies Pty Ltd, Perram and Partners and Abode Design (Drawing No.: 200608 Issue J). A review of the concept drawing identified a seven (7) metre high wall extending from the bale storage sheds west towards the raw materials storage area. The purpose of this wall was to provide structural support for a boom watering system for pre-wetting of the straw bales prior to processing. The acoustic assessment considered this acoustic wall for the noise modelling, rather than the acoustic assessment recommending a specific wall height.

Figure 1: Site Layout (Drawing No. 200608 Issue J)



In the noise modelling, a six (6) metre high acoustic wall was incorporated and a Komatsu WA320 front end loader with continuous use and measured operating sound power level of 104dB(A) for day, evening and night use was adopted.

The development was approved by the Department of Planning and Infrastructure (11 January 2012) under Application No. 08_0255.

2.2 Amended Operations - 2014

In 2014, following ongoing development and review of available technologies including odour control, Elf Farm Supplies Pty Ltd proposed to modify the approved development in order to increase efficiencies in site operations and provide improved odour control facilities.

The changes are principally constrained to the western portion of the site and occupy the area that was to accommodate the approved pre-wet shed expansion. In line with available technology for the production of mushroom substrate, it is proposed to modify the method of production from an open mixing shed to enclosed processing within tunnels. This process would allow for the existing Blender, previously identified and ranked as a significant noise source to overall site noise emissions to be de-commissioned.

The existing bio-scrubber system and approved second bio-scrubber would be replaced with a new emissions plant including ammonia scrubbers and bio-filter. Additional ancillary components of the development include enclosure of the

existing raw material yard, a bale breaking line, enclosed conveyer systems and ducted ventilation systems.

No changes to the bale storage area or equipment utilised in this area were proposed, accordingly the assessment adopted the 2010 recommendations with respect to this area. The results and findings of the assessment prepared by Atkins Acoustics and Associates Pty Ltd were presented in the *'Preliminary Acoustic Review. Amended Operations. Mushroom Substrate Plant. Mulgrave' Report No. 45.6932.L2:CFCD7* dated 17 February 2015.

2.3 Current Operations – 2014-2017

Elf Farm Supplies Pty Ltd negotiated with the Department of Planning to delay the construction of the southern acoustic wall adjacent the bale storage area and proposed that a 'temporary acoustic barrier' be constructed around the perimeter of the bale storage area to the south and east comprising of stacked straw bales to a nominal height of 3.6m (RL19.6) above finished ground level (RL16) in the storage area. Elf Farm Supplies Pty Ltd has also advised that the construction of the bale storage sheds would not proceed at this time.

Acoustic Consulting Engineers Pty Ltd was advised by Elf Farm Supplies Pty Ltd that the site has generally operated with a stacked straw bale wall to a nominal height of 3.6m around the perimeter (south and east) of the bale storage area for the last six (6) years without a noise complaint from these activities.

3.0 PROPOSAL

Elf Farm Supplies Pty Ltd is seeking to clarify and modify the southern acoustic wall requirements and reduce the wall height from the seven (7) metres, which was proposed for structural reasons to support the bale pre-wet boom system. The 2012 approved eastern external bale wetting area as identified in DWG 200608 J is no longer required (as noted in the 2015 Mod 1 EA).

Acoustic Consulting Engineers Pty Ltd was advised that the Komatsu WA320 front end loader no longer operates on this site. Bale unloading and transfer to buildings now utilises a Hyundai HL757-9 or Liebherr 550 front end loader (quieter equipment).

Acoustic Consulting Engineers Pty Ld has provided a review and assessment of the requirements of the southern acoustic wall (taking account of lower source noise level) in order to satisfy project noise goals and operational noise assessment objectives.

With reference to Approval MP 08_0255 MOD 1 dated 14 March 2016 (*Condition 26*), the Department of Planning replaced the noise assessment objectives set out in *Condition 19 of Schedule 3* (taking into consideration of the predicted noise levels presented in Atkins Acoustics and Associates *Report No. 45.6932.L2:CFCD7* dated 17 February 2015).

The noise assessment objectives set out in Approval MP 08_0255 MOD 1 dated 14 March 2016 are as follows:

19. *The Proponent shall ensure that the operational noise generated by the Substrate Plant site does not exceed the criteria in Table 2.*

Table 2 Operational Noise Impact Assessment Criteria, dB(A)

Receiver / Location	***Day/Evening L_{Aeq} (15 minute)***	***Night L_{Aeq} (15 minute)***
R1 – 46 Mulgrave Road, Mulgrave	*43*	*43*
R2 – Mulgrave Industrial Area	*42*	*42*
R3 – 2 Railway Road, Mulgrave	*42*	*37*
R4 – 126 Mulgrave Road, Mulgrave	*44*	*41*
R5 – Chisholm Place, South Windsor	*44*	*42*

Note: Noise generated by the Project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

4.0 NOISE ASSESSMENT

Acoustic Consulting Engineers Pty Ltd attended the Mulgrave Substrate Plant to conduct site audit measurements during normal bale unloading and stacking operations utilising the Hyundai HL757-9 or Liebherr 500 front end loaders. The results of the measurements confirmed normal operational L_{Aeq} sound power levels of 98dB(A) and 97dB(A) respectively, including reversing beepers.

The current front end loaders operating noise levels are 6-7dB lower than that from the Komatsu WA320 front end loader previously operating in this area and considered in the 2010 and 2014 noise assessments.

A review of the attenuation provided by a four (4) metre barrier compared to a seven (7) metre barrier for the closest receivers confirmed a difference of 4dB. The lower noise attenuation provided by the reduced barrier height is more than compensated by the lower source noise level from the current front end loader operating in this area.

In light of the lower front end loader source noise level, Acoustic Consulting Engineers Pty Ltd has considered a nominal acoustic barrier height of four (4) metres above finished bale storage level (RL16) resulting in an acoustic barrier along the southern and eastern sides of the bale storage area with a nominal RL20.

It is noted that the proposed changes to the southern acoustic wall only impact on reference receiver locations R3 and R4.

Considering distance separation (FEL at closest and farthest positions in storage area) and shielding provided by proposed high acoustic barrier (four (4) metres high)), the predicted noise level contributions from the front end loader to the affected receiver locations are:

R3 – 2 Railway Road, Mulgrave 30-33dB(A) $L_{Aeq,15min}$

R4 – 126 Mulgrave Road, Mulgrave 33-37dB(A) $L_{Aeq,15min}$

For comparison purposes, the predicted noise level contributions from the Komatsu WA320 front end loader with a seven (7) metre barrier are 33-35dB(A) at receiver location R3 and 36-39dB(A) at receiver location R4.

For reference, the predicted cumulative operational noise levels under various weather conditions are extracted from Atkins Acoustics and Associates' *Report No. 45.6932.L2:CFCD7* and reproduced below.

The predicted cumulative operational noise levels at receiver locations R3 and R4 take account of the reductions in noise contributions from the current front end loader. However, due to contributions from other plant and equipment, the predicted cumulative operational noise levels remain unchanged.

R1 – 46 Mulgrave Road, Mulgrave	37-43dB(A) $L_{Aeq,15min}$
R2 – Mulgrave Industrial Area	38-40dB(A) $L_{Aeq,15min}$
R3 – 2 Railway Road, Mulgrave	35-37dB(A) $L_{Aeq,15min}$
R4 – 126 Mulgrave Road, Mulgrave	37-41dB(A) $L_{Aeq,15min}$
R5 – Chisholm Place, South Windsor	39-42dB(A) $L_{Aeq,15min}$

5.0 FINDINGS and RECOMMENDATIONS

The results of the site attended noise audits for the existing front end loaders and noise level contribution predictions confirm that the noise assessment objectives (*Condition 19* of MP 08_0255) can be achieved (with reduced barrier height) at the affected receiver locations identified as R3 – 2 Railway Road, Mulgrave and R4 – 126 Mulgrave Road, Mulgrave.

The predicted noise contributions from the proposed changes are slightly lower than the equivalent noise levels for the operation of the Komatsu WA320 front end loader with a seven (7) metre high acoustic barrier. Albeit, due to contributions from other plant and equipment, the predicted cumulative operational noise levels presented in Atkins Acoustics and Associates' *Report No. 45.6932.L2:CFCD7* remain unchanged.

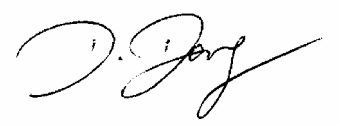
The original seven (7) metre high barrier as documented on Design Drawing No.: 200608 Issue J was intended to provide structural support to the bale wetting boom equipment. The height of this wall was not driven by acoustic requirements, and the concept wall height was simply adopted in the 2010 and 2014 noise assessments. As the eastern external bale wetting area identified in DWG 200608 J is no longer required, the height of the acoustic wall to the south and east of the bale storage area could be amended.

From the findings of this acoustic review and assessment, the following measures are recommended:

- bale unloading, storage and transfer of bales within the bale storage area utilise the existing Hyundai HL757-9 and Liebherr 550 front end loaders, or equivalent loaders with an operating sound power level of not more than 98dB(A);
- existing reversing beepers on loaders be replaced with broad band level varying 'quacker' reversing alarms; and
- acoustic wall (Hebel, precast concrete or equivalent) be constructed to the south (adjacent southern boundary) and east edge of the bale storage area not less than four (4) metres above finished ground level of area (nominally RL16) resulting in a nominal barrier height of RL20.

We trust the information in this report is satisfactory. Please do not hesitate to contact our office should further information or clarification be required.

Yours sincerely,



Dan Dang
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