Appendix B

NOISE ASSESSMENT

45.6932.L2:CFCD7

ATKINS ACOUSTICS

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ELF FARM SUPPLIES
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Attention: Terry Perram

17 February 2015

ACOUSTIC REVIEW
MODIFIED OPERATIONS
MUSHROOM SUBSTRATE PLANT
MULGRAVE

1.0 Background

Atkins Acoustics was engaged by Perram & Partners on behalf of Elf Farm Supplies Pty Ltd to prepare an operation and construction noise assessment for the expansion of the existing mushroom substrate plant at Mulgrave. The results and findings of that assessment were presented in *'Operation and Construction. Noise Impact Assessment. Mushroom Substrate Plant. Mulgrave'* Report No. 40.6411.R1:CFCD4 Rev03 dated June 2010.

Project specific noise goals (PSNG) for the site were established for referenced residential and industrial properties in the vicinity of the plant. The $L_{Aeq,15min}$ PSNG are presented below:

Receiver	Day/Evening	Night
R1 – 46 Mulgrave Road, Mulgrave	47	43
R2 – Mulgrave Industrial Area	65-70	
R3 – 2 Railway Road, Mulgrave	47	42
R4 – 126 Mulgrave Road, Mulgrave	47	42
R5 – Chisholm Place, South Windsor	46	44

The above PSNG have been utilised to determine compliance or otherwise of the proposed changes to the operations at the Mulgrave Substrate Plant.

For reference, the development was approved by the Department of Planning and Infrastructure (11 January 2012) under Application No. 08_0255 and Conditions of Consent imposed. In terms of specific operational noise limits, Condition 19 states:

Operational Noise Criteria

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	*42*	*42*
R2 – Mulgrave Industrial Area		
R3 – 2 Railway Road, Mulgrave		
R4 – 126 Mulgrave Road, Mulgrave	*44*	*39*
R5 – Chisholm Place, South Windsor		

Notes:
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.

The above operational noise criteria imposed by DoP utilised predicted noise levels from the original design proposal and information available at that time, rather than the PSNG. It is acknowledged that predicted noise level contributions may increase or decrease as a result of plant and equipment selections associated with the revised site configuration and operational parameters, however the facility design should ensure that the PSNG are not exceeded.

A preliminary acoustic review of the proposed amendments to Mulgrave Substrate Plant was undertaken in December 2014. The design of the facility has progressed allowing further acoustic review and noise modelling to be conducted. Albeit final plant and equipment have not been finalised.

2.0 Proposal

Following from ongoing development and review of best available technologies including odour control, Elf Farm Supplies propose to modify the approved development at Mulgrave in order to improve efficiencies in site operations and odour control. The approved and amended site layouts are presented in *Appendix 1*.

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 current best 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 Traymaster Blender, previously identified and ranked as a significant noise source to overall site noise emissions to be de-commissioned. An addition front end loader may be required within the working hall of the new pre-wet tunnel processing area.

The existing bio-scrubber system and approved second bio-scrubber would be replaced with a new emissions control plant including ammonia scrubbers and bio-filter. Additional ancillary components of the development include enclosure of the existing bale wetting area, a bale breaking line, an enclosed conveyer systems and

ducted ventilation systems. Up to twenty-eight (28) fans are proposed for the new tunnel based processing, with the majority of those fans located within purpose designed and built plantrooms located on the northern and southern ends of the building in a 'closed' ventilation system for processing the substrate. Air no longer required for the processing or substrate or captured from processing halls is discharged at low velocity through an extensive network of discharge spigots throughout the biofilter. Eight (8) fans would be located externally or draw / discharge to the atmosphere.

Twenty-five (25) fans are proposed for the approved Phase 2/3 building on the northern portion of the site to service the substrate tunnels. These fans are located within the building structure in a centralised 'fan room plenum' oriented north / south along the building. It is proposed to draw air in through penetrations within the northern and southern elevations. These intake grille penetrations would incorporate air filters and subject to further acoustic review, attenuation measures would be implemented.

A new refrigeration system for the total site is proposed with cooling tower pumps located remotely in a central plant corridor between the existing pre-wet shed and new processing tunnels, whilst the associated cooling towers are proposed adjacent the eastern side of the new Phase 2/3 tunnels approved on the northern portion of the site. The location of the cooling towers was selected to maximise acoustic shielding for residential receivers to the south and west of the facility.

The annual tonnage output and consequent truck movements to/from the site will continue to be limited as specified in the project approval. Accordingly the proposed modifications are principally associated with replacing the existing pre-wet process with a tunnel processing facility and improved odour management utilising a bio-filter system and the new refrigeration plant (cooling towers)

3.0 Noise Modelling

The principle plant and equipment associated with the proposed amendments are fans (x20) and pumps that would be installed in purpose built plantrooms to the south (tunnels 1-6) and north (tunnels 7-10), hydraulic pumps and other ancillary plant in the plantroom adjacent the eastern side of tunnel 6, roof / externally mounted fans (x8) and evaporative cooling towers (x6). Mobile plant is consistent with the existing approved operations, with potential for an additional front end loader (FEL). The proposed amendments to the site will result in typical operation of mobile plant during the night within buildings and with the enclosure of the existing materials storage area and formalised link from pre-wet to conveyor building, external activities of site mobile plant will be limited. External operation of mobile plant is typically limited to day hours and principally involves use of Komatsu WA320 within the bale storage area or transporting straw bale to the materials storage shed.

The movement or volume of trucks on the site will not alter from the approved operations, with trucks accessing the site during day, evening and night hours.

Noise modelling for the current design documentation and equipment selections for the five (5) reference receiver locations has considered all plant and equipment operating simultaneously. A summary of the operation scenario is presented below:

All fixed plant *(fans, pumps, cooling towers, conveyors, drives, bale breaking line)*

2 x trucks *4 movements (base Lw101dB(A) adjusted for total 3min duration on access road and 3min duration for entry/exit paths to building)*

Existing Phase 2/3 Building (exit & entry points)

Access Road

3 x FEL (Komatsu WA320, Volvo L90E and 2 x Volvo L150E)

1 x Bale Storage Area - Komatsu WA320 *included but use unlikely at night*

1 x Materials Storage Area - Volvo L90E

1 x Pre Wet (Pre Wet and Conveyor Building) - Volvo L150E

1 x New Working Hall - Volvo L150E

Noise modelling (ENM) for calm and adverse meteorological scenarios (NNE, SW, SSW and NE wind directions) referenced in *'Operation and Construction. Noise Impact Assessment. Mushroom Substrate Plant. Mulgrave'* Report No. 40.6411.R1:CFCD4 Rev03 dated June 2010 confirmed the following range of noise levels for the reference receiver locations:

Receiver	PSNG (Night) $L_{Aeq,15min}$	Predicted Noise Contribution $L_{Aeq,15min}$
R1 – 46 Mulgrave Road, Mulgrave	43dB(A)	37-43dB(A)
R2 – Mulgrave Industrial Area	65-70dB(A)	38-40dB(A)
R3 – 2 Railway Road, Mulgrave	42dB(A)	35-37dB(A)
R4 – 126 Mulgrave Road, Mulgrave	42dB(A)	37-41dB(A)
R5 – Chisholm Place, South Windsor	44dB(A)	39-42dB(A)

The results of the modelling demonstrate that the predicted noise level contributions referenced to the sensitive receivers can achieve the PSNG under calm and adverse meteorological conditions.

The following assumptions were considered in the noise modelling:

- Plant and equipment selected on acoustic performance
- Building walls (Materials Storage Shed and Bale Breaking Area) concrete to a min. height of two (2) metres above FFL followed by galvanised steel frame and galvanised wall / roof sheeting nominally 0.6mm BMT and a minimum Rw22. Final details subject to acoustic review prior to final specification;

- Fan plantrooms for new Stage 1 processing tunnels to south (Tunnels 1-6) and north (Tunnels 7-10) constructed with concrete walls (min. Rw50) and composite roof/ceiling OR insitu concrete (min. Rw40);
- Penetrations of fan rooms to be review by acoustic consultant and appropriately detailed to avoid de-rating the structure;
- New processing tunnels to be of concrete construction;
- Construction materials of working hall between processing tunnels (1-6 and 7-10) typically concrete wall construction nominal installed noise reduction in the order of 40dB (min. Rw46) and composite roof/ceiling nominal installed noise reduction in the order of 25dB (Rw31). Final details subject to acoustic review.
- Proposed external fans identified on current design drawings (No. 41, 42, 43, 44, 52, 53, 6667 and 68) to incorporate inlet / discharge attenuators. Details subject to acoustic review;
- Fan room intake for new Phase 2/3 building (Fan No. 110 - 134 inclusive x 25 fans subject to acoustic review;
- Internal walls and roof of tunnels within Phase 2/3 building precast or cast insitu concrete and/or Hebel panels/blocks;
- Building wall cladding (Phase 2/3 building insulated colorbond sandwich panels consistent with existing Phase 2/3 building providing a nominal installed noise reduction in the order of 23dB (Rw28 or greater). Final details subject to review prior to final specification;
- Building roof cladding sheet metal (min. 0.42BMT) over fibreglass building blanket and medium duty thermofoil or similar and insulated colorbond sandwich panel (ceiling) consistent with existing Phase 2/3 building providing a nominal installed noise reduction in the order of 28dB (Rw34 or greater). Final details subject to review prior to final specification;
- The final design / tender documentation to be reviewed by Acoustic Consultant

4.0 Conclusion

Noise modelling undertaken to address design changes for the purpose of adopting best available technology and improving odour control at the Mulgrave Substrate Plant has shown that the predicted noise levels marginally increase from the 2010 noise assessment and exceed the noise assessment criteria outlined in Condition 19 of the DoP Approval (Application No. 08_0255) dated 11 January 2012.

The acoustic review and noise modelling has demonstrated that the predicted noise level contributions can achieve the project specific noise goals (PSNG) at the reference receiver locations.

As part of the design development, plant and equipment selections, building designs and noise attenuation requirements will be reviewed to address the PSNG and any pending noise criteria proposed as part of the Conditions of Consent.

Please do not hesitate to contact our office if further information or clarification is required.

Yours sincerely,
ATKINS ACOUSTICS & ASSOCIATES PTY LTD.

Carl Fokkema