

NOISE IMPACT ASSESSMENT  
REVISED B9 PROJECT  
AMCOR PAPER PTY LIMITED  
BOTANY ROAD, MATRAVILLE SITE

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## EXECUTIVE SUMMARY

The B9 Project has been revised to take benefit of the operational and environmental improvements in the site layout that have been recognised by the Project Design Team. Following submission of the Noise Impact Assessment (NIA) dated 19 January 2010, there has been ongoing discussion and consideration of the findings of the NIA.

The revised B9 Project affected many changes to the original project. These changes have affected the location of the stock preparation plant, the waste paper yard operations, and the location of the exhaust fans and blowers that ventilate the process and the building, in addition a significant change to the operation and design of the finished product store has been devised. These changes to the layout of the B9 Project have many environmental benefits but as a consequence of the revised layout and operational changes, the predicted noise levels for the project have varied from those predicted for the original project.

The B9 Project would replace the existing older paper mills and finished product storage activities. The noise impact assessment has been prepared on the basis of the B7 and B8 paper machine buildings being demolished by a future owner of this land. The premise of retaining these buildings is no longer applicable and limited truck traffic at night is considered necessary for the operational efficiencies required of the revised B9 Project. The finished product (reel) store servicing these mills would be retained and in the future be developed into a 24/7 operated Materials Recycling Facility (MRF) to service local government and the CBD of Sydney.

The noise impact assessment has found that the Project Specific Noise Limits approved in the original development are no longer technically achievable, and will prevent the AMCOR site from being able to expand. The growth of the site will be sterilised and prevent sustainability projects from being added to the paper recycling processes in the future. A balance is needed between a number of factors as otherwise this would be a significant disadvantage to the B9 Project. In arriving at what is a reasonable balance several essential factors were chosen as the objectives of the redesign of the noise emissions from the site.

- Protect the acoustic amenity of the residents from noises with annoying characteristic, i.e. no tones, impacts, undulating or distinctive noise levels. Lessons have been learnt from other major industrial projects where an engineered noise environment is designed that uses steady state noise to mask undulating noise sources so that the residents' amenity is not disturbed.
- Ensure there are adequate safeguards to protect against sleep disturbance occurring.
- Focus the acoustic design of the project on meeting reasonable night time noise levels.
- Allow the economic development of the site.
- Apply technical and feasible means to provide the community with reasonable noise levels.
- Demonstrate that this means have been applied.
- Consider the comments of our Regulatory Bodies in revising the Noise Impact Assessment.
- Adjust the final PSNL's after discussion with the DECCW on adding further technically feasible controls where this is possible.
- Maintain the operational noise levels of the revised project at least at the recommended urban area  $L_{Aeq}$  (5 minute) night time noise limit.



- Achieve a 7 dB(A) reduction on the B7 and B8 Environment Protection Licence noise limit of  $L_{A90}$  of 50 dB(A).
- Enable night time operations to include road transport of waste paper onto site and delivery of finished product, both being required to aid operational efficiencies given the density of truck traffic during day light hours.

The current industrial noise levels at the nearest residences are a steady state noise from the AMCOR site and as a result of achieving these objectives will be able to be maintained between the amenity criteria for an urban area at 45dB(A) and well below the urban/industrial interface amenity level of 50dB(A) during night time.

Night time is the critical period that has influenced the design of the B9 Project. A revised noise management plan will be required for the site to ensure the objectives are satisfied.

The noise modelling with the new site layout – with the removal of the B7 and B8 paper machine buildings – will fail the previous Revised Project Specific Noise Limits set for residences to the immediate north and east of the site.

This mainly is a result of the loss of the high acoustic shielding provided by these buildings. The acoustic shielding would be partially restored by the inclusion of high acoustic walls around the new perimeter of the site. These walls have been placed to ensure carpark noise and truck movements do not exceed the design objectives. The perimeter acoustic wall would provide a marginal degree of noise reduction to road traffic noise from Botany Road.

Very high acoustic walls would be erected at the waste yard. The B9 Project would provide other groups of residents with useful acoustic shielding from the Port of Botany operations and traffic along Botany Road. The noise issues are therefore complex and a degree of interpretation of what is achievable and is reasonable is required as a result. This is the approach being adopted for the benefits of both the immediate community and the wider community who will benefit from the B9 Project.

The detailed noise modelling of the revised project has found that the existing steady state noise levels generated by the existing AMCOR site would not be significantly exceeded. The noise modelling has shown that INP based Revised Project Specific Noise Limits (PSNL) using an urban land use would be exceeded for evening and night time periods only if the combined contribution from the Port activities were included. As noted previously, the AMCOR contributions would remain at or below the urban land use night time noise limit. This situation has been further evaluated and AMCOR contributions would now be below the urban land use night time noise limit.

As discussed, careful and detailed design has been able to generate a noise environment that will use the steady state nature of the processes to mask the intermittent noise levels generated by truck and mobile equipment movements. Detailed consideration is also being given to ensuring there is an absence of irritating characteristics such as undulating noise levels, impacts and tones.

A set of noise controls have been designed into the revised B9 Project and in summary include the following:

- High 5 m noise barriers along the boundary shared with the adjoining new development precincts (i.e. subdivided land);
- Retention of the existing B7 Reel Store so that this building would be used in the future as a Material Recovery Facility and be redesigned to provide acoustic shielding;
- Very high noise barriers of concrete and "Colorbond" around the waste storage yard;



- Placement of the ventilation system fans on decks located on the south side of the mill building;
- Engineering controls on specific fans and blowers to achieve 85dB(A) at 1m from the outlets.;
- The ground floor level wall facing residential areas would be of concrete and a double clad metal system;
- The machine level floor cladding facing residential areas would be a double steel cladding system;
- The internal roadway system and therefore the traffic flow has been designed to prevent the sleep disturbance criteria from being exceeded and this will be satisfied; and
- The finished goods store has been redesigned so that trucks will be loaded inside the building and exit the site at a location removed from the nearest residences.

There have been numerous other decisions made in engineering noise controls into specific areas of the plant and equipment. With air movement equipment i.e. fans, blowers, heat extraction units, ducts and associated openings in walls, detailed consideration of losses in energy efficiencies versus noise emission levels have needed to be considered. It is in this area of the project where there are additional technically feasible means available to reduce the contributions from this group of sources and achieve a PNL of 43 dB(A) at R1, R2 and R3 during night time.

The B9 Project has a large number of individual noise sources that for ease of presentation were combined into several groups of sources. The cumulative level that results from combining all these sources means that reducing the overall level becomes technically very limited to the reduction that can be achieved. These aspects are discussed in the body of the report in Section 3.

The premise on which the original B9 Project Revised Project Specific Noise Limits were set is no longer applicable. Detailed noise modelling has shown that the original predicted noise levels will not be able to be met at all residential locations. A set of Project Specific Noise Limits have been finalised after consultation with DECCW and provide a reasonable balance between the technical and feasible limits that can be achieved and maintaining the AMCOR contribution below the current contribution from their site or at the urban land use noise limit for night time.

The management of AMCOR are unable to restrict the preservation of the buildings that currently house paper mill plants B7 and B8. As this land is divested it is assumed that future owners would demolish these buildings and the perimeter brick wall. The revised design of the B9 Project has included a 5 metre high acoustic wall and this is considered to be the limit on the height of the wall that is able to be provided.

The revised B9 Project would provide operational noise levels from the re-consolidated site that would be less than the current EPL limits and would not exceed the night time limit for urban land use, a reasonable acoustic environment would result. This is considered to be a beneficial outcome.

R T Benbow  
Principal Consultant

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## 1. INTRODUCTION

This report provides the findings of a noise impact assessment for the revised site layout of the B9 Project at the AMCOR Matraville site. The noise impact assessment was released to the Department of Planning towards the end of January 2010. Ongoing discussions with officers of the Department of Planning and the DECCW have led to the release of a revised Noise Impact Assessment that provides additional technical clarification of noise control measures designed into the revised site layout of the B9 Project.

Benbow Environmental was commissioned by AMCOR to undertake the noise impact assessment following changes to the site layout. In undertaking the noise impact assessment Benbow Environmental has adopted the Revised Project Specific Noise Limits recommended by SKM in their noise impact studies prepared for the Environmental Assessment (EA).

The EA was approved by the Department of Planning in July 2007. The B9 Project is a Major Project under the Major Projects SEPP. The Revised Project Specific Noise Limits recommended by SKM in the original EA were not adopted by DECCW and DoP. Primarily it is understood the predicted noise levels were chosen as the approved limits. The predicted levels were based on buildings being retained onsite and a different site layout to what is now proposed.

The Revised B9 Project is unable to satisfy the Revised Project Specific Noise Limits applied by DECCW and DoP due to the technical limitations on the predicted noise levels that are achievable. The revised B9 Project is able to achieve a reduction in the existing AMCOR site's current contributions to the ambient acoustic environment and the site on its own is able to meet the 45 dB(A) urban land use criteria for night time. Day and evening noise limits are readily satisfied.

Separate discussions have been held with DECCW and DoP to clarify the basis of the limitations in being able to satisfy the original conditions of consent relating to noise for the Revised B9 Project. The noise assessment report establishes a reasonable set of Project Specific Noise Limits that will be technically achievable and for most residences be lower than the existing contribution from the AMCOR site.

The issue of noise allocation to AMCOR is complex as growth in the Port of Botany and associated truck traffic has utilised the historical environment protection licence limit of an  $L_{A90}$  50dB(A) allocated to AMCOR. The height and shape of the revised B9 Project building is expected to lower the noise contribution for certain near groups of residences. A 5m high perimeter wall around the revised AMCOR site will provide marginal reduction to traffic noise along Botany Road. The overall effect will be no increase in the residential noise contribution from AMCOR above the 45 dB(A) urban land use recommended  $L_{Aeq}$  noise levels (for night time).

The INP derived night time Project Specific Noise Limits applied by DECCW to the original B9 Project are unable to be satisfied due to technical and feasible limitations. These limitations have been examined in detail and arise because of many factors which are discussed in detail in Section 3 of the Noise Impact Assessment to assist the Department of Planning and DECCW in considering the justification for revised noise limits.



The matter of what is technically feasible to achieve is complex. The revised noise assessment therefore has focussed on predicting operational noise levels and the report concludes with recommending acceptance of the predicted noise levels as the Project Specific Noise Limits for the Revised B9 Project.

Benbow Environmental requested AMCOR engage the services of the acoustic consultant who has a very long history of monitoring noise emissions from their site and requesting their opinion on the existing noise contributions from AMCOR and noise limits for the revised B9 Project. The findings of The Acoustic Group's assessment are presented in Section 1.3.

## 1.1 SCOPE OF THE NOISE ASSESSMENT

The noise impact assessment has followed the following scope.

- Predict operational noise levels for day, evening and night time for noise sources from the activities of the revised B9 Project;
- Establish the project specific noise limits;
- Recommend noise controls that would be needed to satisfy project specific noise limits;
- Examine technical and feasible limits of noise controls in further reducing the contribution from the revised B9 Project to the residential noise levels;
- Outline the need for a noise management plan; and
- Compile this report.

## 1.2 BACKGROUND TO THE NOISE ASSESSMENT

Detailed noise studies had previously been completed by SKM as part of the EA development approval process.

The SKM study derived a set of Revised Project Specific Noise Limits. These were presented in the SKM Report titled AMCOR Botany Mill Upgrade Noise Assessment Rev 1 dated 2 April 2007.

The SKM report recommended the following Revised Project Specific Noise Limits:

Day	46dB(A)
Evening	39dB(A)
Night	38dB(A)

The predicted noise levels were modelled by SKM on the basis of the noise reduction provided by B7 and B8 mill buildings being available. The management of AMCOR have indicated that this is unable to be the basis of the predicted noise levels as it is not feasible for the reconsolidation of the site to proceed on this basis and be viable.



The conditions of consent for the revised B9 Project were based on a combination of the revised INP derived Project Specific Noise Limits and the predicted noise levels. The INP has established that where predicted noise levels are less than the Project Specific Noise Limits then the predicted levels are used as the recommended limits for the consent.

A site location map presented below shows the location of the site and the surrounding residential streets (See Figure 1-1).

A set of six residential reference locations have been chosen in keeping with the original noise assessment. The residential reference locations are show on Figure 3-1.

- R1      Corner Australia Avenue and McCauley Street.
- R2      Australia Avenue due north of the approximate centre of the B9 Mill building.
- R3      Western end of Murrabin Avenue – nearest residences to the site (in this avenue).
- R4      Western end of Partanna Avenue – nearest residences to the site (in this avenue).
- R5      Junction of Moorina Avenue and Partanna Avenue.
- R6      Midway along Moorina Avenue at residences opposite the approximate centre of the B7 and B8 Mill buildings.

Figure 1-1: Site Location



These same street locations have been used in the detailed noise modelling undertaken for the revised site layout. In addition the facades of the first row of residences facing the site have been included in the model. Noise contours show the effects of this inclusion.

The noise modelling presented in Section 3 of the report also uses these six reference locations R1 to R6. Their relationship to the street locations and the derivation of noise limits is shown in the following Table 1-1.

Table 1-1: Derivation of Revised Project Specific Noise Limits – Neutral Meteorological Conditions				
Location	Condition	Daytime	Evening	Night
Australia Avenue Residential Reference Locations R1 and R2.	B'G L <sub>A90</sub>			43, 45
	Mill on			39-45
	Predicted SKM			
	Neutral	45-47	45	39
	Revised SKM	46	39	38
	PSL's			
	<b>Consent</b>	47	40	40
Murrabin Avenue Residential Reference Location R3.	B'G L <sub>A90</sub>			43, 45
	Mill on			44-48
	Predicted SKM			
	Neutral	45	45	40
	Revised SKM	46	39	38
	PSL's			
	<b>Consent</b>	45	39	38
Partanna Avenue Residential Reference Locations R4 and R5.	B'G L <sub>A90</sub>			39, 41
	Mill on			53-55
	Predicted SKM			
	Neutral	44	44	36
	Revised SKM	46	39	38
	PSL's			
	<b>Consent</b>	44	39	36
Moorina Avenue Residential Reference Location R6.	B'G L <sub>A90</sub>			40, 43
	Mill on			36-45
	Predicted SKM			
	Neutral	31	31	30
	Revised SKM	46	39	38
	PSL's			
	<b>Consent</b>	35	35	35

**Note:** <sup>1</sup> R1 is at the corner of McCauley St and Australia Ave. The consent values are 46, 39 and 39 for Day, evening and night respectively.



The revised SKM PSL's were derived on the basis that the existing noise levels from industry would not be reduced in the future. The noise limits adopted in the consent are generally either the revised PSL's or the predicted noise levels, whichever is the lower.

## Discussion

Recent operational noise monitoring undertaken by the Acoustic Group have found similar operational noise levels to those referred to in the SKM Noise Assessment from April 2007.

The results from the 2009 Acoustic Group monitoring are summarised below.

The  $L_{A90}$  levels are presented as the industrial noise levels are expected to have minor changes from  $L_{A90}$  and  $L_{Aeq}$  – typically expected to be <1-2 dB(A).





Table 1-2: Results of Noise Monitoring – Night time		
Location	L <sub>A90</sub> Noise Levels dB(A)	
Date: 21 January 2009		
Australia Avenue	44.5	AMCOR and Port
Murrabin Avenue	46.5	AMCOR, Port and traffic
Partanna Avenue	49	AMCOR
Moorina Avenue	40.5	Substation and traffic
Date: 9 April 2009		
Australia Avenue	48.5	Port
Murrabin Avenue	46.5	Port
Partanna Avenue	54	AMCOR
Moorina Avenue	43	AMCOR
Date: 7 June 2009		
Australia Avenue	47	Port
Murrabin Avenue	46	Port
Partanna Avenue	52	AMCOR
Moorina Avenue	45	Port
Date: 10 July 2009		
Australia Avenue	46	Port
Murrabin Avenue	47.5	Port
Partanna Avenue	52.5	AMCOR
Moorina Avenue	41.5	AMCOR and Port
Date: 1 September 2009		
Australia Avenue	51.5	Port
Murrabin Avenue	50	Port
Partanna Avenue	51.5	AMCOR and Port
Moorina Avenue	46.5	AMCOR and Port
Date: 15 October 2009		
Australia Avenue	46	Port
Murrabin Avenue	48.5	Port
Partanna Avenue	52.5	AMCOR and Port
Moorina Avenue	46.5	Port

A further assessment of the AMCOR contribution to the residential noise levels was undertaken by The Acoustic Group and reported in their correspondence dated 2<sup>nd</sup> April, 2010. This correspondence is included in Attachment 5 and is summarised in the following table and discussion.



Table 1-3: Comparison of residential noise levels and improvements dB(A) night time

Residential Location	AMCOR Contribution SKM Pre 2008	AMCOR Contribution The Acoustic Group 2010	Port Botany Contribution The Acoustic Group 2010	NIA Recommended Project Specific Noise Limits	Recommended Noise Limits from The Acoustic Group	Improvement Over Existing Noise Levels
Australia Avenue R1 R2	39 - 45	39 - 42	42 - 48	45 44.5	46	Slight increase but satisfies 45dB(A) criteria and AMCOR will reduce traffic noise so an overall improvement expected.
Murrabin Avenue R3	44 - 48	42 - 45	44 - 48	45	46	No change, satisfies criteria and no AMCOR increase
Partanna Avenue R4 R5	53 - 55	48 - 50	44 - 47	41 39	47	Improvement of 7 - 9 9 - 11
Moorina Avenue R6	36 - 45	Not nominated	42 - 47	39	44	Improvement of 3 - 8

Notes 1: Residential locations used in the Noise Impact Assessment for the Modification Proposal i.e. R1 – R6

2: This is the industry  $L_{Aeq}$  contribution for an urban area.

A comparison between the recommended noise limits in the NIA for the modification proposal when compared to the current contribution show the following:

#### Australia Avenue R1 and R2

Marginal increase could be expected but for certain groups of residences the new AMCOR buildings would reduce traffic noise, truck movement noise at the Port of Botany and partially reduce noise from activities at the Port. The Port remains the dominant noise source.

The noise levels requested in the Modification Proposal are a 5 dB(A) decrease on the existing licence limit and are at the lower end of the contribution from industry permitted under the NSW Industrial Noise Policy (INP).



There are a large number of noise sources that are preventing noise reduction being achieved.

Original consent – 40 dB(A). Requested change to consent - 44.5 – 45 dB(A). Any other improvement that is possible should be kept as a safeguard.

**Murrabin Avenue**  
R3

No change and no increase in the AMCOR noise contribution.  
Original consent 38 dB(A). Requested change to consent 45 dB(A).

**Partanna Avenue**  
R4  
R5

7 – 9 dB(A) improvement.  
9 – 11 dB(A) improvement.  
Original consent 36 dB(A). Requested change to consent 39 – 41 dB(A).

**Moorina Avenue**  
R6

3 – 8 dB(A) improvement.  
Original consent 35 dB(A). Requested change to consent 39 dB(A).

The noise environment is currently being shared between the Port and AMCOR.

Inspections of the residential area have found in our opinion that the noise emissions from the existing AMCOR operations have a quality free of intrusive characteristics.

### 1.3 REVIEW OF COMPLAINT HISTORY

A review of complaint history over the past two years has been made.

There were four complaints, three from the same residential location, one complaint related to night time noise:

- |                      |         |  |
|----------------------|---------|--|
| • 27 September 2007* | 3.50pm  | Steam noise – cause fixed immediately.               |
| • 25 October 2007*   | 6.00pm  | Hissing noise – cause located and fixed immediately. |
| • 31 May 2008        | 6.00pm  | Bulk tanker operating.                               |
| • 14 February 2008*  | 12.15am | Emergency alarm sounded for 15-20 minutes.           |

This same philosophy in engineering a steady state noise emission that masks fluctuating noise emissions has been adopted for the revised B9 Project. To achieve this objective, it has been necessary to propose an extensive system of high and very high noise barriers, a detailed process in the design of the equipment and processes to ensure there is control over annoying characteristic and achieve the set of design objectives listed in the Executive Summary and presented in Section 1.4.1.

\* - Same residential location



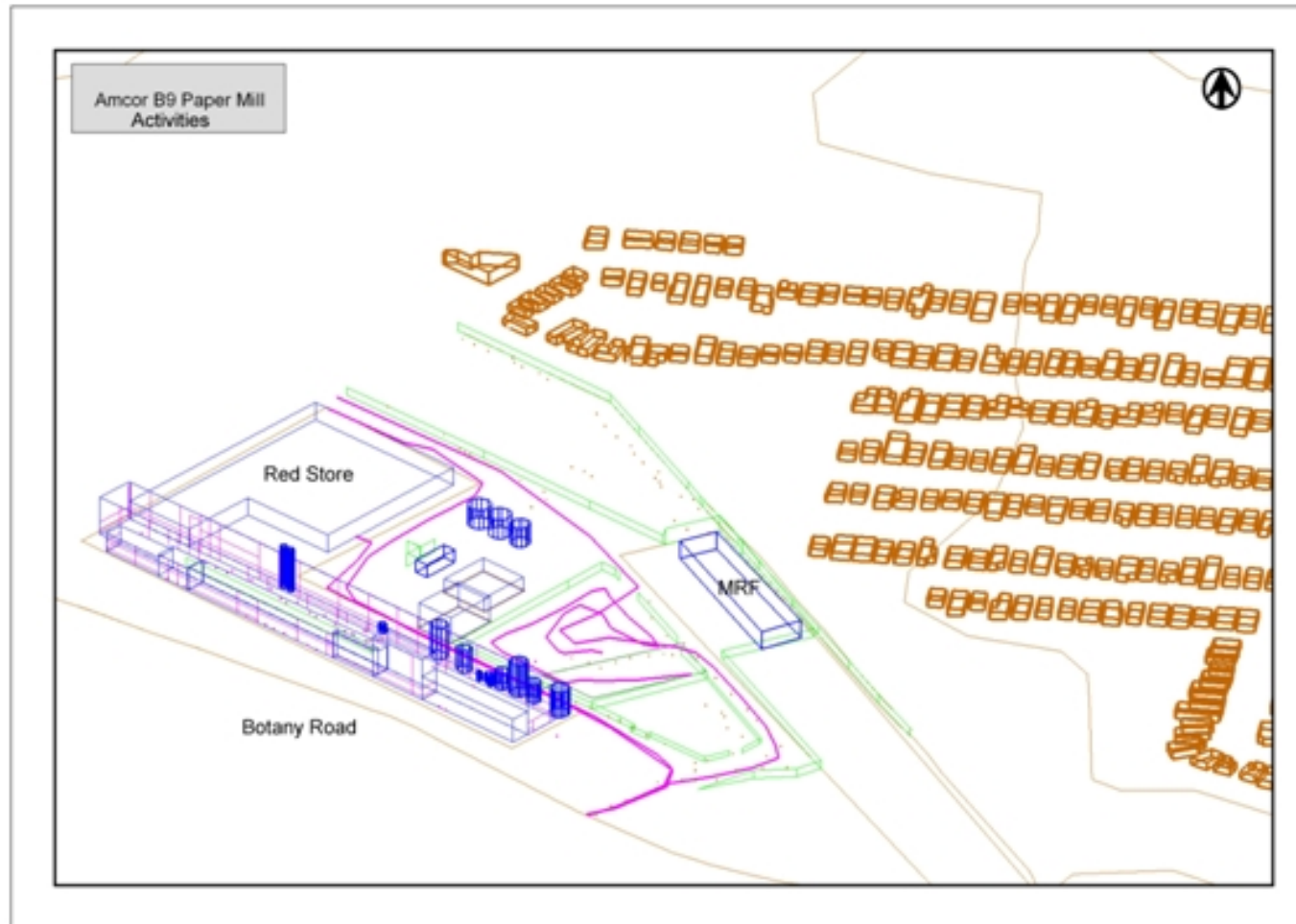


## 1.4 B9 PROJECT CHANGES

As the result of a recent review of the project, the proposed site layout has been significantly improved with environmental management advantages to AMCOR and the residential community.

Reference is made to a three-dimensioned view of the proposed layout, which is shown as Figure 1-2.

Figure 1-2: Three Dimensional View of the Proposed Layout





Shown in a green outline is the extent of the site that would be retained by AMCOR after the sale of excess land. To recap from previous reports, the land to the north that is now vacant of buildings and structures would be sold.

The land to the east currently occupied by the B7 and B8 paper mills would also be sold. Shown along this eastern boundary is the outline of the proposed Material Recovery Facility (MRF). The MRF would either utilise the existing No.7 Reel Store building or occupy a new building replacing the reel store. In either case, the building would have different openings (facing south and north-west). The MRF would be subject to a separate noise assessment and derivation of PSNL (noise limits).

The B9 mill building is shown along the southern end of the site fronting Botany Road. This part of the site layout has been changed in two main respects.

- The stock preparation building has been relocated to the eastern end of the B9 mill building. This reduces the capital cost, and reduces the number of openings and external pipe bridges. It also relocates the rejects area. The rejects area needs clearing by the Payloader (large front end loader) at least once per night shift and there is limited opportunity for placement of effective noise barriers. As a consequence night time noise levels of 35dB(A) will be exceeded.
- The exhaust fans, blowers and vacuum pump air outlets provide a large number of noise sources external to the building. A series of decks on the southern side of the mill building are proposed which will enable the building facade to provide very effective noise reduction for the residential areas.

In addition, the ventilation fan outlets will be tilted by 20° to the south to provide a useful degree of noise reduction due to diffraction.

The Finished Product Store has been redesigned. This is the large area of building in the north-west portion of the site. Loading of trucks will be able to occur within the building. This is a significant environmental improvement.

Figure 1-3 shows an aerial impression of the revised site layout. Also shown on this figure are the residential reference points R1 – R6 used in the point to point noise modelling.

For the purposes of noise modelling it has been assumed that the areas proposed for subdivision have no structures, buildings or fences i.e. bare ground. While the future owners of the land will obviously erect some buildings or other structures no allowance, in terms of noise mitigation for future development, has been made.

Figure 1-3: Site Layout – Aerial View





#### 1.4.1 Acoustic Design Objectives

The objectives of the redesign of the noise emissions from the site are as follows:

- Protect the acoustic amenity of the residents from noises with annoying characteristic, i.e. no tones, impacts, undulating or distinctive noise levels. Lessons have been learnt from other major industrial projects where an engineered noise environment is designed that uses steady state noise to mask undulating noise sources so that the residents' amenity is not disturbed.
- Ensure there are adequate safeguards to protect against sleep disturbance occurring.
- Focus the acoustic design of the project on meeting reasonable night time noise levels.
- Allow the economic development of the site.
- Apply technical and feasible means to provide the community with reasonable noise levels. Demonstrate that these means have been applied.
- Consider the comments of our Regulatory Bodies in revising the Noise Impact Assessment.
- Maintain the operational noise levels of the revised project at least at the recommended urban area  $L_{Aeq}$  (5 minute) night time noise limit.
- Achieve a 5 dB(A) reduction on the B7 and B8 Environment Protection Licence noise limit of  $L_{A90}$  of 50 dB(A).
- Enable night time operations to include road transport of waste paper onto site and delivery of finished product, both be acquired to aid operational efficiencies given the density of truck traffic during day light hours.



## 2. OPERATIONS

This section of the report provides operational details and discusses the noise sources included in the modelling. The noise prediction model SoundPLAN (Version 6.5) was then used to determine the noise levels for the large number of noise sources that exist at a paper recycling plant.

The details of the noise modelling are presented in the Section 3 of the report. The operations of a paper recycling plant essentially involve the following unit operations:

- Waste paper yard;
  - Stock preparation;
  - Paper machine;
  - Winder;
  - Finished product store;
  - Rejects handling area; and
  - Associated facilities:
- Certain of these are currently existing – wastewater treatment plant and boiler house. New transformers have been included as a noise source.

The noise sources were grouped into five separate groups for the purpose of designing noise controls. These are presented in the model runs as:

- B9 building – the two floor level paper machine operations including stock preparation, the paper machine and the winder, the mezzanine which includes noise emitted from the wall and roof of the structures along the south side of the main Paper Machine building.
- Loaders – mobile equipment as it operates at the waste paper yard and at the Rejects Area. Sleep disturbance is also assessed as this mobile equipment will operate at night time.
- Trucks – the movement of trucks on site is required to be included in the assessment of the continuous noise emissions and in addition for night time the assessment of sleep disturbance.
- Fans – there are a large number of fans and a smaller number of blowers. The fans have been placed on mezzanine levels located on the southern side of the stock preparation and paper machine building described as B9 in the text of this report. The noise emission from the fans and blowers and their duct outlets. These are located above the mezzanine levels and the exhaust outlets have been pointed to the south by tilting the ends of the ducts by 20° off vertical to take advantage of diffraction effects. To achieve the final set of PSNL additional engineering controls will be applied to specific fans and blowers. This would be determined during the detailed design/construct phase.
- Transformers.

The trucks will be present at several areas. These areas are shown on Figure 2-3 and will be discussed in detail.



## 2.1 STEADY STATE NOISE SOURCES

The steady state noise sources are located in two areas:

### Area 1

Fans and fan and blower discharge vents are positioned on the mezzanine levels on the south side of the B9 mill building.

Figure 2-1 shows the location of the fans, discharge vents and transformers and these can be seen as circles with dots on this plan – along the southern side of the paper machine building. The transformers are at ground level within the building and are exposed to the south.

Figure 2-2 then shows an elevation and plan with the fan and blower locations shown again as circles with dots. A number of fans are located on mezzanine levels. Blowers are mainly on the operating floor within the building. The process/storage tanks are the structures shown as columns in blue.

This design approach prevents the fans and blowers causing vibration of the roof structure and significantly reduces the propagation of noise from fan and blower bodies contributing significantly to the residential noise.

Noise reduction provided by diffraction is utilised by directing the stack outlets towards the south.

To achieve the noise contribution needed from the fans and blowers, certain fans and blowers will be provided with additional noise control to achieve a duct outlet noise level of 85 dB(A) at 1 metre.

The details of these controls would be developed into a Noise Management Plan to assist the Project Design Team in the construction of the B9 Project.

Fan sound power data was either obtained from the supplier or predicted using algorithms provided in Woods reference text on noise.

The algorithms in Woods use the operating conditions of the fans to be able to determine the sound power. Corrections are provided for impeller type to enable the one-one octave band data to be calculated. A typical spectrum is provided in Figure 2-4.



## Area 2

The processing equipment in buildings.

The processing equipment that converts the waste board and paper into finished paper is located in the B9 building and Figure 2-1 shows the process areas described as:

- Stock preparation; and
- Paper machine.

The stock preparation receives the waste cardboard and paper from a floor mounted conveyor that starts in the covered area of the waste yard and raises these materials to feed these into a large cylindrical tank that breaks these materials down using hot water and mechanical agitation (a pulper).

This process continues using various screening and cleaning steps again using hot water and mechanical processes to convert the board and paper into high quality pulp – the fibre that is placed onto the forming section at the start of the paper machine to commence the conversion of the fibre into paper.

Stock preparation equipment noise levels were sourced from the equipment suppliers.

The stock preparation equipment will be located within a building that uses concrete precast panels at ground for a height that will typically be 2m-2.2m. Above this and to the underside of the roof the building will be clad in a double metal cladding system.

This will consist of steel formed sections with 0.47mm base metal thickness on the inside of the walls and 0.7mm base metal thickness on the outside. An air gap provided by the structure of the wall will aid noise reduction. Acoustic infill is not required. Internal treatment of reverberation is also not required.

The paper machine will extend over two levels:

- The basement; and
- The machine floor level.

From previous experiences in this industry, the basement will be where the highest noise levels are located. This is supported by data provided by the paper machine suppliers.

One third octave band spectra were used. The noise emission data is a text file from SoundPLAN and is presented in Attachment 1. Any further clarification required can be provided.

The basement will have walls constructed from precast concrete to a height of 2m – 2.2m and then the double steel cladding system adopted for the stock preparation area. This wall construction will be provided along the east and north facing walls. Elsewhere, the construction materials will be concrete for the first 2m-2.2m and then single steel cladding.





The vacuum blowers are located on the operating floor level in a separate room with concrete masonry walls.

The roof of the basement level is the concrete floor of the machine floor level. The basement is therefore highly reverberant and this increases the overall noise levels.

This has been allowed for in the measured levels being from similar noise environments.

The noise from the paper machine is directed through from the floor above adding to the noise levels in the basement – and included in the sound power levels that are used in the model.

As noted above, the machine floor level will have a reinforced concrete floor. The paper machine has an environmental enclosure to maintain the humidity and temperature conditions to facilitate the speed of the machine in being able to make paper at a high speed. The machine floor noise levels are reduced as a result.

The ventilation system of the stock preparation and the paper making processes, require large volumes of air to be circulated and exhausted. Heat is recovered from the air removed from the paper machine enclosure.

Steam for the paper machine will be supplied by the existing boiler house. This has been included in the modelled noise levels.

The western end of the paper machine building houses the winder. The winder splits the large paper rolls produced by the paper machine into several smaller reels of paper (i.e. Finished Product). These reels are then transferred through an opening into the Finished Product store (also called a reel store). Large forklifts with reel grabs are used to transport the finished product by placing it into storage stacks and subsequent loading onto trucks for delivery to customers.

Figure 2-1: Site Plan

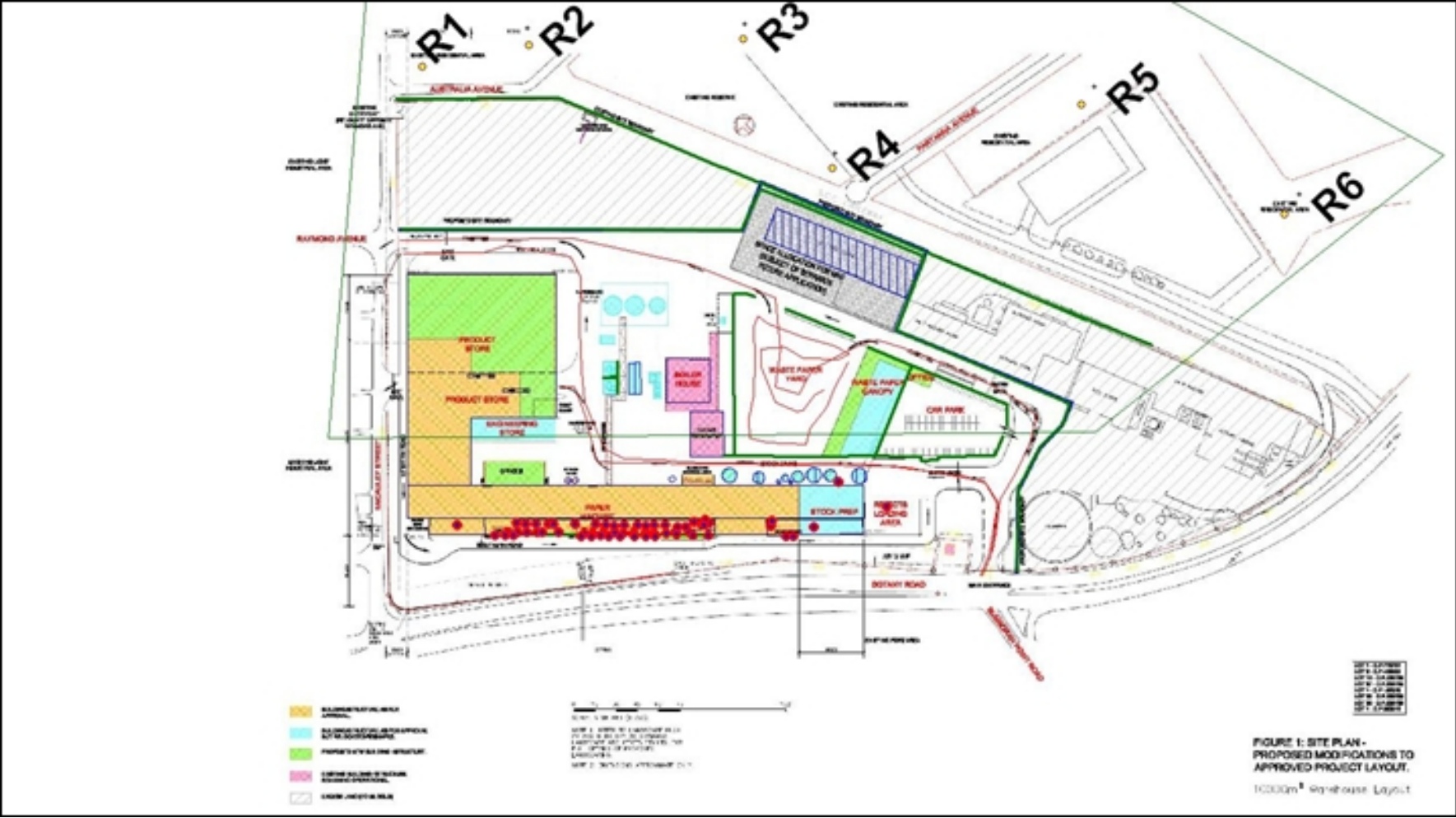
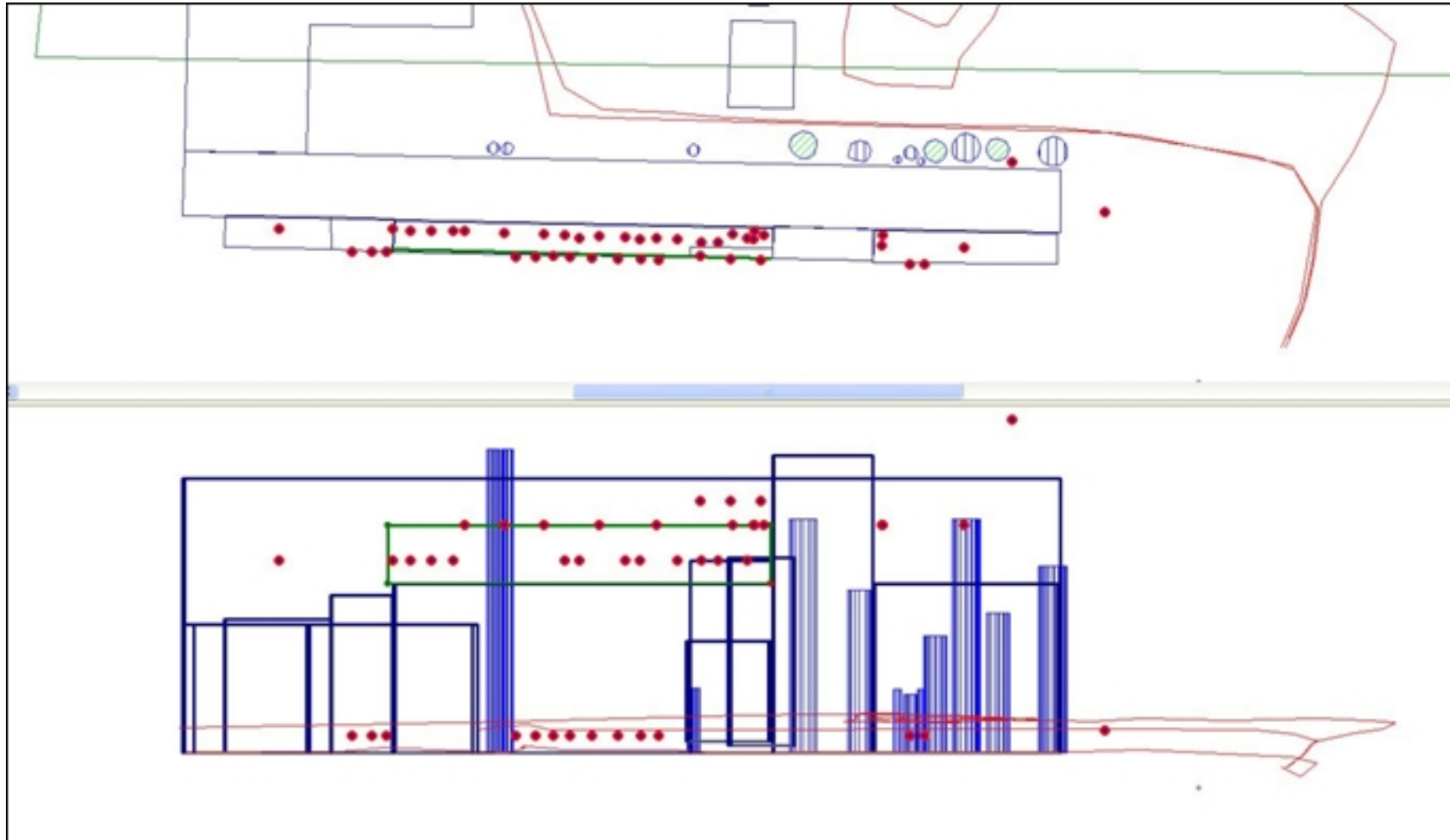


Figure 2-2: Elevations and Fans



## 2.2 INTERMITTENT AND IMPULSIVE NOISE SOURCES

There are two groups of noise sources in this group.

These are trucks and mobile equipment. Trucks are discussed first; refer to Figure 2-3.

### 2.2.1 Trucks

There are three types of truck movements and these will use different routes on site.

- Trucks delivering waste cardboard and paper to the waste yard;
- General deliveries for chemicals and the engineering stores/workshop; and
- Finished product semi trailers and B-doubles.

#### 2.2.1.1 Waste Trucks

The waste trucks will operate 24/7 with a reduced number of trucks during night time. Night time access is critical. These activities occur at night time due to traffic congestion at other times. The waste trucks will either bring the cardboard and paper in bales or compacted. Some trucks with compacted loads need to reverse and brake to dislodge their loads. These truck movements would also be associated with a future MRF at the existing finished product (reel) store of B7.

All trucks regardless of type will enter the site through one entry only – off Botany Road.

The waste trucks travel around the outside of the car park where on Figure 2-3 an internal roadway is shown. Shown in a heavy blue line is the boundary perimeter of the site and along this line a 5m high noise barrier will be needed, constructed of a suitable material as outlined below.

The materials of construction would achieve the level of noise reduction needed to achieve the noise budget (i.e. contribution) from mobile equipment and on site truck movements.

This would mean that the wall could be constructed from a range of combination of materials to achieve the surface density desired by the Department of Planning to prevent noise transmission through the surface of the wall compromising the noise reduction that is needed. We consider that this detail would be determined at the construction certificate stage however suitable materials of construction would be concrete ponds, Hebel panels, timber, heavy Colorbond with concrete protective ponds at ground level or a combination of these materials meeting several parameters.

- Adequate strength for wind loading;
- Adequate protection from mechanical impact;
- Visually satisfying within the context of the separation distances to residences and the appearance of the industrial developments in this area; and
- Acoustic performance.



The waste trucks continue along this roadway at a forced minimum speed. The roadway needs to be free of sharp speed bumps. Any speed control devices need to have gradual slopes to prevent impacts occurring. Surveillance cameras with one focussed on licence plates are needed so that 'drive neighbourly' habits can be forced onto the truck drivers. These details would be provided in a Noise Management Plan for the site prior to operations commencing.

These trucks enter the waste paper yard through openings in a wall on the north east side of the waste paper yard. The trucks empty their load, board and paper absorbs impacts so this part of the activity of the waste paper yard is relatively free of impacts.

The arrows on Figure 2-3 show how these trucks then travel around the inside of the northern perimeter acoustic wall – 5m in height.

These trucks exit the site at the north-west corner into McCauley Street.

#### **2.2.1.2 General Deliveries Trucks**

Trucks with general deliveries travel along the south side of the car park and along the immediate northern side of the paper machine building. Chemical deliveries are made at tanks shown or for the engineering store, an unloading area is provided in the area between the store and the offices – in this general area. These deliveries are usually day time only.

These trucks then exit the site by travelling to the north along the eastern side of the product store and exit at the north west corner into McCauley Street.

#### **2.2.1.3 Trucks Delivering Finished Products**

Trucks to deliver finished product travel along the same internal route but would go past the engineering store and enter into a wide opening that enables the trucks to park within the product store. Figure 2-3 shows two trucks within the product store where these would be loaded by the grab forklifts.

This provides an under cover loading bay that would be able to load out finished products 24/7.

### **2.2.2 Mobile Equipment**

Mobile equipment operates in three areas:

- The waste paper yard;
- The waste paper canopy; and
- Rejects loading area at the eastern end of the stock preparation part of the paper machine building.



The mobile equipment operates in the waste paper yard during day time and evening with limited movements at night time.

The waste paper canopy is a roofed area with acoustically designed walls extending to the roof along the north east and east side, as this area is continuously operated to feed material into the stock preparation building. There is a technical limit on the noise reduction achievable because the north-west wall is open to allow paper to be placed inside the canopy.

These restrictions on the building cause limitations to the noise levels that can be achieved.

It will be shown in the next section of the report that the mobile equipment at location R5 and R6 when combined with the other B9 Project noise level is unable to be reduced below 39dB(A).

Calculations during the development of the noise control scenarios showed that the mobile equipment alone at R6 would generate 36dB(A), whereas the current consent for the project limits the allowable noise to 35dB(A). This would essentially cause the project to be abandoned as the plant would not be able to operate. Hence, the need to maintain a balance between using the existing operational noise levels and predicted noise levels with departure from INP Acceptable Noise Levels as the new conditions of consent.

The rejects area is an open area where material that is unable to be converted into paper is discharged from the stock preparation equipment into bunkers.

The bunkers fill with reject material and need to be cleared at night to enable the processes to continue.

Due to the rejects area being open to allow semi trailers to enter during day time (to remove the material off site), noise barriers are unable to be located in this area.

The Payloader that is used is a state of the art machine and has available noise controls installed, however there are further technical limitations on this machine being able to emit less noise because of its diesel engine.

**LEGEND**

- BUILDING EXTENSION - EXISTING APPROVAL
- BUILDING EXTENSION - EXISTING APPROVAL, BUT NOT YET CONSTRUCTED
- PROPOSED NEW BUILDING STRUCTURE
- EXISTING BUILDING STRUCTURE
- EXISTING LANDSCAPE AREA

**SCALE** 0 10 20 30 40 50 60 70 80 90 100 METERS

**NOTE 1:** REFER TO LANDSCAPE PLAN FOR DETAILS OF LANDSCAPE IMPROVEMENTS AND LANDSCAPE AREA TO BE MAINTAINED OR ENHANCED.

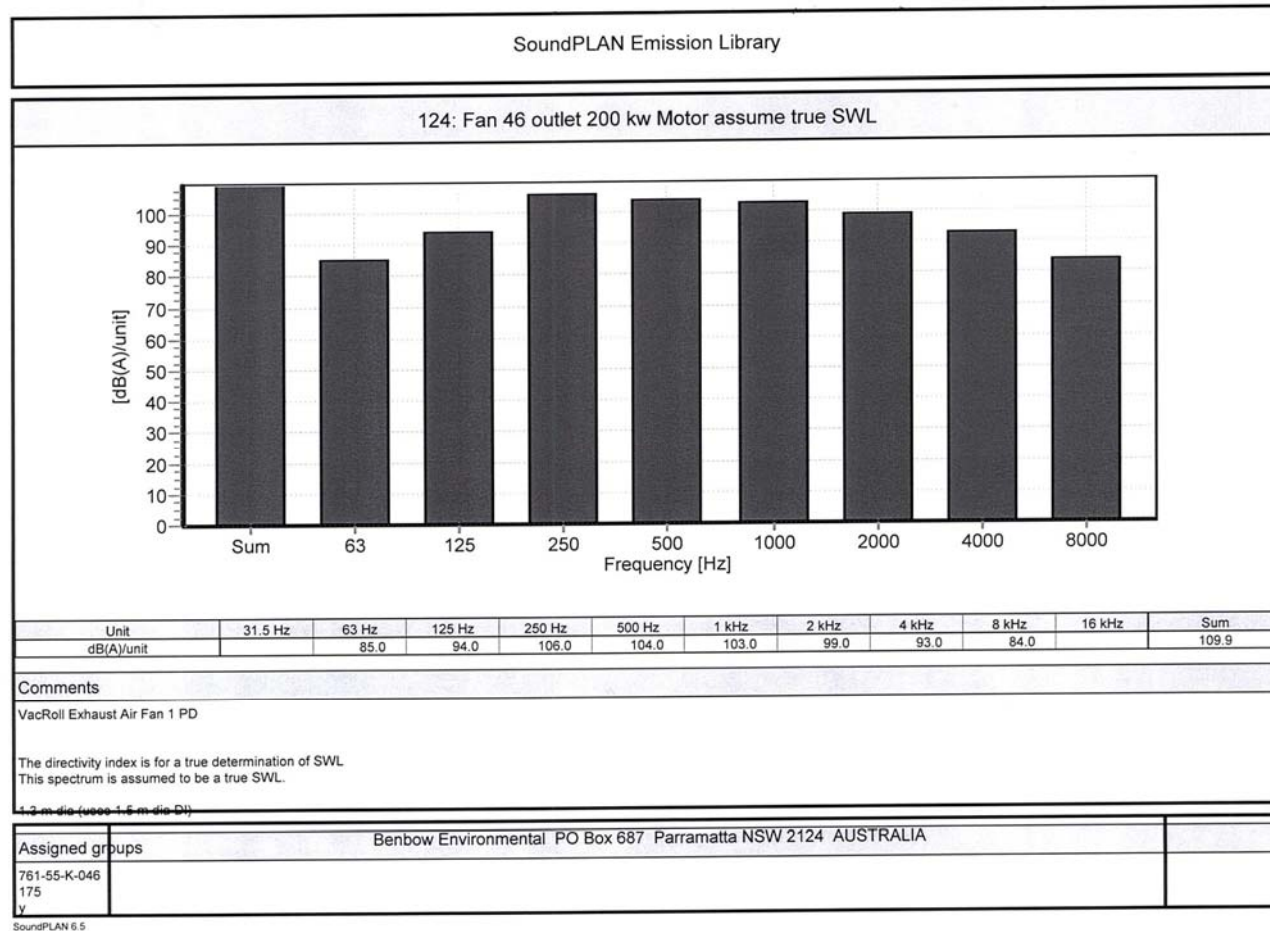
**NOTE 2:** EXISTING APPROXIMATE SCALE.

**FIGURE 1: SITE PLAN - PROPOSED MODIFICATIONS TO APPROVED PROJECT LAYOUT.**

1000m<sup>2</sup> Warehouse Layout

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### 3. RESULTS OF NOISE MODELLING

SoundPLAN was used to predict noise levels from the revised B9 Project.

Numerous model runs were conducted to select the set of noise controls that have been recommended.

The main limitations in being able to meet the consent conditions for the original B9 Project were initially truck and mobile equipment movements.

The next limiting noise sources were the fans with fan bodies, fan outlets and the length of the outlet ducts being the individual sources of noise. Fan drives and bodies were relocated to service platforms located on the side of the mill building facing Botany Road. This design change enables the wall of the mill building to serve as an acoustic shield and avoids additional use of resources to otherwise acoustically enclose fan bodies.

The discharge outlets of the fans would be directed to the south to use naturally occurring diffraction effects and reduce the need to install acoustic silencers in the outlets of many fans; certain fans will still require silencers. The extent of the back pressure required for these silencers will be reduced by the benefits afforded with the relocation of the fans and the outlets.

This in turn benefits the control of energy consumption as larger electric motors are not needed to provide the air volume flow rates at higher back pressures. The fans when combined become the main limiting noise source. Fans would be selected and the installation designed to avoid undulating noise levels and tonal characteristic. Vibration isolation would be detailed to avoid structural borne noise becoming an unwanted noise source.

The next limiting noise source is the mill building and this has been designed to provide the steady state background noise "hum" that will be used to mask mobile equipment, trucks and steam releases.

A balance has therefore been achieved between the groups of noise sources so that the acoustic design objectives will be met. Night time is the critical period that has been the focus of the Noise Impact Assessment. An example of the influence of the several noise groups for night time is provided below for residential reference location R1 showing the influence of the noise groups – buildings, fans, loaders and trucks.

This set of noise levels was further evaluated after discussions with DECCW.

• Building noise contribution	37 dB(A)
• Fan/blower noise contribution	43.2 dB(A)
• Loaders noise contribution	36 dB(A)
• Trucks noise contribution	34.4 dB(A)
Combined noise levels	45 dB(A)

To aid in appreciating why the predicted noise levels for the revised project are unable to be reduced significantly, an example – theoretical – is presented to demonstrate the limitations that exist.

If the highest contributing noise source is considered and a theoretical reduction of 3.2 dB(A) were able to be engineered then the overall site reduction that results is 1.7 dB(A). Extending this theoretical reduction further to say 4.2 dB(A) increases the overall reduction by a further 0.5 dB(A) and a 5.2 dB(A) reduction in the fan/blower noise increases the overall reduction by 2.6 dB(A). However the fans/blowers have already been re designed to achieve substantial noise control and even a 3.2 dB(A) further reduction from Scenario 1 to Scenario 2 is technically difficult to achieve.

A number of reductions to the fans/blowers were then made to influence the gradual change that occurs as a result of the extensive number of noise sources that exist on a large project. The fan/blower noise contribution is reduced as shown:

Table 3-1: Reduction of Fan/blower Noise Contribution				
	Scenario 1 – As designed	Scenario 2	Scenario 3	Scenario 4
Building	37 dB(A)	37 dB(A)	37 dB(A)	37 dB(A)
Fans/blowers	43.2 dB(A)	40 dB(A)	39 dB(A)	38 dB(A)
Loaders	36 dB(A)	36 dB(A)	35.5 dB(A)	35.5 dB(A)
Trucks	34.4 dB(A)	34.4 dB(A)	34.4 dB(A)	34.4 dB(A)
Combined Level	45 dB(A)	43.3 dB(A)	42.8 dB(A)	42.4 dB(A)
Reduction Achieved	N/A	1.7 dB(A)	2.2 dB(A)	2.6 dB(A)

The 3.2 dB(A) reduction from Scenario 1 to Scenario 2 in the fans/blowers has been accepted as being feasible and reasonable to achieve.

For Scenario 4, further reduction is then limited by the mill building and the numerous noise sources that are associated with the activities of the mill. Further reductions to below 42.4 dB(A) would require changes that would then be limited by all four noise groups and this is not technically feasible. Instead a set of acoustic objectives, as set out elsewhere in this revised NIA, have been chosen that will ensure the noise contribution from the revised B9 Project provides an acceptable acoustic environment for residents.

The noise modelling chose 6 reference locations, R1 to R6. These are shown on Figure 2-1, Figure 3-1 and Figure 3-2.

Figure 3-1 shows the noise contours with controls in place and with consideration of the residential dwellings included to show the effect of the noise shielding provided by the first row of dwellings. This shows that the number of residences that will be exposed to the revised noise levels is very limited. Figure 3-2 shows the same contours with a broader resolution of 5dB(A) to better show the range of noise levels.



An analysis of weather data from the Bureau of Meteorology was undertaken following INP Guidelines. A wind rose for a year's data is provided in Attachment 4.

The analysis found there to be no inversion conditions present for 30% of the time and this was expected given the location of the site near the coast. The analysis found there were no predominant wind directions that required adverse meteorological conditions to be considered.

Regardless of these facts, control of low frequency noise sources to prevent uncontrolled emissions of low frequencies was a major aspect included in the design of the revised B9 Project.

Every attempt has been made to achieve compliance with the original project specific noise limits. The limiting factors causing these limits to be unachievable are trucks and mobile equipment.

Both trucks and mobile equipment movements at night time are essential for a paper recycling mill. All mills require these activities 24/7.

Shown in Table 3-2 are the modelling results for the mobile equipment at the six reference locations for night time.  $L_{Amax}$  results satisfy the sleep disturbance criteria with the acoustic walls in place. These results are presented as an illustration. Further evaluation of means of reducing the noise levels from these sources was undertaken and reductions were found to be achievable. These reductions were included in the noise levels that were discussed in Table 3-1.

Table 3-2: Mobile Equipment and Truck Night Time Noise Levels				
Residential Reference Locations consent noise levels at night time	Paper Yard Loader 7m high noise barriers dB(A)	Trucks 5 m high noise barriers dB(A)	Combined Noise, Noise Barriers 5m and 7m high dB(A)	Satisfies original consent conditions Y- Yes N- No
R1 39dB(A)	36.5	41.5	43	N
R2 40dB(A)	38	41	43	N
R3 38dB(A)	40.5	39	43	N
R4 36dB(A)	35.5	38.5	40	N
R5 36dB(A)	32	27	33	Y
R6 35dB(A)	35	27.5	36	N

The noise levels were then predicted for several scenarios and two scenarios are provided in Attachments 2 and 3 to illustrate the technical limitations on the predicted levels of noise that are realistic.

Attachment 2 All plant, no walls  
Attachment 3 All plant, certain fans with silencers, acoustic walls in place, no existing walls remaining in place

The results from Attachment 3 – all plant, certain fans with silencers, acoustic walls in place, no existing walls remaining in place – are discussed below.  $L_{Amax}$  noise levels at night are satisfied with the acoustic walls in place. The modelling is for neutral meteorological conditions.

After additional discussions with DECCW, it was agreed that a further 2 dB(A) noise reduction was feasible for residential receivers R1, R2 and R3. These revised noise levels are presented in brackets in the table below

Table 3-3: Night time Combined B9 Project Predicted Noise Levels			
Residential Reference Locations consent noise levels at night time	Night time Predicted Noise Level dB(A)	Satisfies original consent conditions Y- Yes N- No	Exceedances dB(A)
R1 39dB(A)	45 (43)	N	6 (4)
R2 40dB(A)	44.5 (43)	N	4.5 (2.5)
R3 38dB(A)	45 (43)	N	7 (5)
R4 36dB(A)	41	N	5
R5 36dB(A)	39	N	3
R6 35dB(A)	39	N	4

#### Comment

The exceedances of the original consent conditions are apparent. Further options for noise reduction are limited. There were no other technically feasible means available to reduce these exceedances. The predicted noise levels are less than the existing range of noise levels contributed by the site and therefore a reasonable noise environment would be maintained.



Day and evening combined noise levels are shown in the following tables.

Table 3-4: Daytime Combined B9 Project Predicted Noise Levels			
Residential Reference Locations Consent Noise Levels at Daytime	Combined Noise Level	Satisfies Original Consent Conditions	Exceedances dB(A)
R1 46dB(A)	46	Y	Nil
R2 47dB(A)	45	Y	Nil
R3 45dB(A)	45.5	N	0.5
R4 44dB(A)	42	Y	Nil
R5 44dB(A)	42	Y	Nil
R6 35dB(A)	43	N	8

#### Comments

There is only the one exceedance of the original consent and this is a result of the previously predicted noise levels at R6 being adopted as the noise limit. The basis of the predicted noise levels has altered with the revised B9 Project.

For evening time the results are summarised below.



Table 3-5: Evening time Combined B9 Project Predicted Noise Levels

Residential Reference Locations Consent Noise Levels at Evening Time	Combined Noise Level	Satisfies Original Consent Conditions	Exceedances dB(A)
R1 39dB(A)	45	N	6
R2 40dB(A)	45	N	5
R3 39dB(A)	45	N	6
R4 39dB(A)	41	N	2
R5 39dB(A)	42	N	3
R6 35dB(A)	42.5	N	7.5

#### Comments

The exceedances of the original consent conditions are apparent. The predicted noise levels are within the range of the existing noise contributions from the site.

The initial recommended Project Specific Noise Limits are the following:

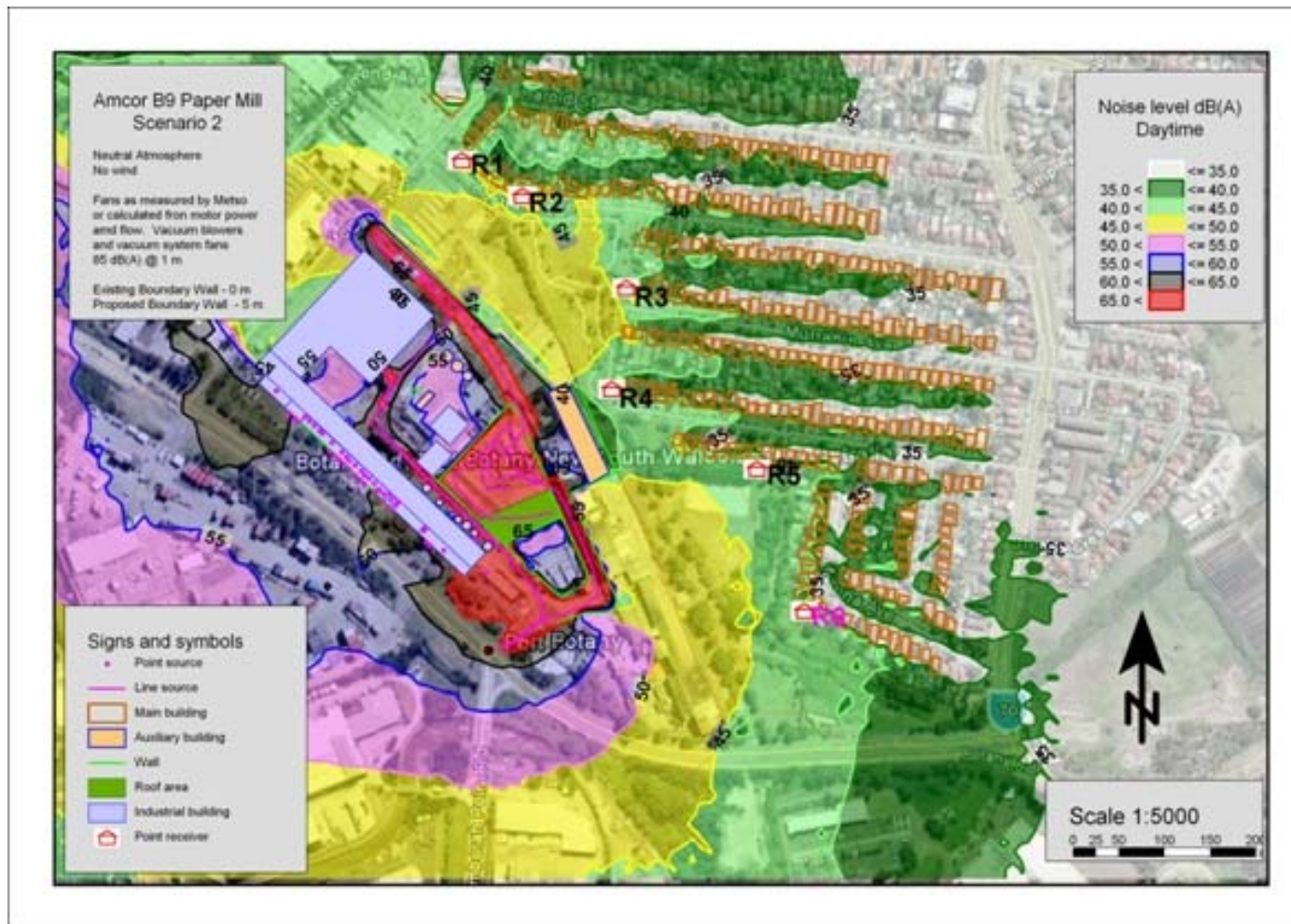
Table 3-6: Recommended Project Specific Noise Limits

Residential Location	Day Time dB(A)	Evening dB(A)	Night Time dB(A)
R1	46	45	43
R2	45	45	43
R3	45.5	45	43
R4	42	41	41
R5	42	42	39
R6	43	42.5	39





Figure 3-2: Low Resolution Noise Contours







### 3.1 TECHNICAL AND FEASIBLE SOLUTIONS

The revised Noise Impact Assessment has considered whether further technical and feasible solutions exist to lower operational noise levels:

- without affecting the viability of the revised B9 Project ; and
- without compromising the acoustic environment currently experienced by the residential community.

The method of construction of the high perimeter acoustic wall has been considered and alternatives would be evaluated to prevent the long term structural strength and durability of this barrier being compromised.

The recommended noise limits provide a balance between the available noise controls, reasonable silencing of air moving equipment (fans and blowers) and using a variety of noise control strategies that ensure the viability of the project is not compromised. Equally important has been the need to provide an overall improvement in the acoustic amenity for the residents. This is a complex issue for this site with the growth of Port Botany, the 24/7 operations and the heavy density of truck movements.

AMCOR is able to reduce it's operational noise limits by 7 dB(A) from the current EPL limits and will be able to meet a 43 dB(A) night time limit for urban land use as it's upper limit requested for approval of the revised B9 Project. It prefers to maintain the predicted limits as the revised conditions of consent and if during commissioning lower limits are able to be achieved, revising the limits placed on the EPL could be considered.

## 4. NOISE MANAGEMENT PLAN

A noise management plan is proposed that would provide the guidance during construction and operation to ensure the Project Specific Noise Limits are achieved – on the assumption that the limits requested are approved. There is also a clear need to consider the long term protection of the residential amenity as the site divestment takes place.

Interim Construction Noise Guidelines have recently been released by DECCW. The document is dated July 2009. The Guidelines recommend the following hours of operation as standard hours of construction:

Monday – Friday	7.00am – 6.00pm
Saturday	8.00am – 1.00pm
Sundays or public holidays	No work

The noise level at residential areas is to satisfy a noise limit derived from the Rating Background Level (i.e.  $L_{A90}$ ) +10dB(A). For hours of construction outside of the recommended hours the noise limit is to meet the Rating Background Level +5dB(A).

A construction noise management plan needs to include the following as a minimum:

- Identify nearby residences and sensitive land uses that may be affected;
- Approved hours of construction - work to be undertaken during those hours throughout the various stages of the development. The fitting out of buildings that can readily achieve compliance with the rating background level +5dB(A) would mean that evening and night time work would be permitted;
- Work practices to be applied to minimise noise;
- Community notification, and this is especially important where loud noise generating activities may be needed for short periods of time e.g. pile driving, rock breaking; and
- Community response procedure.

The noise management plan becomes a daily management tool to ensure the critical aspects of work practices that may affect noise emissions are being adhered to.

The noise management plan would contain procedures either adopted from existing procedures or be redeveloped so that noise nuisances can be avoided.

An operational noise management plan provides the following details:

- Predict construction noise once the schedule of construction is known;
- Noise reduction measures detailed to ensure the reduction needed will be achieved. This detail will finalise the materials of construction, the method of construction and the necessary inspections required by the project team;
- Noise monitoring during commissioning and operations. Noise monitoring would be undertaken at each source to compare these to the levels used in the modelling; and
- Update the noise complaints procedure and other work practice procedures that would be identified.



## 5. CONCLUDING REMARKS

The revisions to the B9 Project have identified that a reasonable noise environment can be shared with the residential community providing an environment similar to the existing environment but with further improvements.

The revisions to the B9 Project have identified the need for an extensive set of noise controls which would protect the amenity of the residential area.

Importantly with the removal of the B7 and B8 buildings, certain residential areas will become more exposed to truck and traffic noise along Botany Road. The erection of high noise barriers around the perimeter of the revised AMCOR site and the height of the buildings associated with this project will ameliorate this change to a useful degree.

A set of project specific noise limits have been developed which are feasible and reasonable to achieve.

R T Benbow  
Principal Consultant

Peter Eisenhuth  
Senior Technical Officer

Anita Joh  
Acoustical Engineer

Brandon Burrell  
Acoustical Engineer



## 6. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

This report has been prepared solely for the use by AMCOR PAPER PTY LTD, as per our agreement for providing environmental assessment services. Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that required by law) in relation to the information contained within this document.

AMCOR PAPER PTY LTD is entitled to rely upon the findings in the report within the scope of work described in this report. No responsibility is accepted for the use of any part of the report in any other context or for any other purpose.

Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

## ATTACHMENTS

Attachment 1: Sound Pressure Levels

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SPLs

No. 2	Element 4	name 8	Unit 16	emis.txt					1
				31.5 Sum Hz	63 Hz	125 Hz	250 Hz	500 kHz	
kHz	kHz	kHz							kHz
124	Fan 46	outlet	200 kw Motor	assume true SWL			dB(A)/unit		
85.0	94.0	106.0	104.0	103.0	99.0	93.0	84.0		109.9
125	Fan 46	casing	200 kw Motor		dB(A)/unit			72.0	84.0
98.0	97.0	98.0	95.0	89.0	81.0		103.4		
126	Fan 34	casing	75 kw motor		dB(A)/unit			68.0	79.0
93.0	92.0	92.0	89.0	84.0	75.0		98.0		
127	Fan 32	casing	160 kw motor		dB(A)/unit			73.0	86.0
94.0	104.0	101.0	99.0	94.0	86.0		107.1		
128	Axial-flow fan					37.8	55.4	64.4	63.8
62.0	63.2	60.5	56.9		70.3				
129	Fan 38	casing	132 kw motor		dB(A)/unit			73.0	85.0
93.0	101.0	100.0	97.0	92.0	84.0		105.0		
130	Fan 68	outlet	132 hw motor	assume true SWL			dB(A)/unit		
78.0	91.0	96.0	102.0	105.0	102.0	99.0	91.0		108.9
131	Fan 24	casing	22 kw motor		dB(A)/unit			64.0	76.0
84.0	92.0	91.0	89.0	84.0	76.0		96.3		
132	Transformer < 4 MW	(GUESSED)			dB(A)/unit		12.2	31.4	43.5
46.0	51.4	48.6	44.8	39.6	30.5		55.0		
133	Blower Room Internal				dB(A)/meter	78.0	86.0	100.0	100.0
101.0	106.0	106.0	99.0	95.0		110.9			
134	PV14/PSP01 Pulper Exhaust Fan				dB(A)/unit		65.6	76.8	82.9
83.4	83.8	86.0	84.2	81.0	73.9		91.8		
135	Fan 44	Casing	110 kw motor		dB(A)/unit			69.0	81.0
88.0	103.0	94.0	91.0	86.0	78.0		104.0		
90	B9 Paper Roll Storage Ground North					dB(A)/level		1.4	49.3
63.2	73.2	75.2	79.5	80.5	82.4	71.9	53.9	90.7	
90			1.4	56.4	68.2	75.7	76.7	78.7	79.5
75.8	65.6								
90			1.4	62.4	67.8	74.5	81.5	81.1	80.0
73.8	64.1								
91	B9 Reeler Ground North				dB(A)/level	0.2	48.1	62.0	72.0
74.0	78.3	79.3	81.2	70.7	52.7	89.5			
91			0.2	55.2	67.0	74.5	75.5	77.5	78.3
74.6	64.4								
91			0.2	61.2	66.6	73.3	80.3	79.9	78.8
72.6	62.9								
92	B9 Size Press Ground North				dB(A)/level		8.8	56.1	68.4
70.4	74.7	82.9	82.3	81.8	71.9	57.3	92.5		
92			8.8	61.7	72.0	75.9	80.3	81.5	80.8
80.2	67.3								
92			56.1	69.0	71.7	76.9	81.5	83.6	81.6
77.2	69.5								
93	B9 Pre Dryer End Ground North				dB(A)/level		9.3	56.6	68.9
70.9	75.2	83.4	82.8	82.3	72.4	57.8	93.0		
93			9.3	62.2	72.5	76.4	80.8	82.0	81.3
80.7	67.8								
93			56.6	69.5	72.2	77.4	82.0	84.1	82.1
77.7	70.0								
94	B9 Pre Dryer Mid Ground North				dB(A)/level		9.6	56.9	69.2
71.2	75.5	83.7	83.1	82.6	72.7	58.1	93.3		
94			9.6	62.5	72.8	76.7	81.1	82.3	81.6
81.0	68.1								
94			56.9	69.8	72.5	77.7	82.3	84.4	82.4
78.0	70.3								
95	B9 Press Ground North				dB(A)/level	11.2	60.4	69.1	73.6
77.3	81.9	83.6	84.4	73.8	59.2	94.0			
95			11.2	64.2	71.7	81.4	81.8	83.1	82.5
82.1	69.3								
95			58.7	69.0	73.3	77.3	81.3	85.7	83.3
79.1	72.9								
96	B9 Paper Roll Storage Level 1 North				dB(A)/level		9.1		64.0
73.1	78.5	81.7	82.3	82.4	80.5	76.9	65.7	93.7	
96			54.6	69.3	75.4	77.7	82.7	84.4	82.2
79.9	73.2								



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96			69.3	67.6	78.5	78.2	82.2	83.3	81.5
78.4	69.5								
97	B9 Reeler Level	1 North	dB(A)/level			7.1	62.0	71.1	76.5
79.7	80.3	80.4	78.5	74.9	63.7	91.7			
97			52.6	67.3	73.4	75.7	80.7	82.4	80.2
77.9	71.2								
97			67.3	65.6	76.5	76.2	80.2	81.3	79.5
76.4	67.5								
98	B9 Size Press Level	1 North	dB(A)/level			-12.0	43.3	48.4	
56.0	64.5	68.9	79.9	83.2	78.4	64.3	90.1		
98			34.3	42.3	52.5	65.8	67.3	69.0	78.6
82.8	73.8								
98			40.8	43.5	55.8	63.0	65.1	70.8	82.6
80.8	68.8								
99	B9 Pre Dryer End Level	1 North	dB(A)/level			-12.0	43.3	48.4	
56.0	64.5	68.9	79.9	83.2	78.4	64.3	90.1		
99			34.3	42.3	52.5	65.8	67.3	69.0	78.6
82.8	73.8								
99			40.8	43.5	55.8	63.0	65.1	70.8	82.6
80.8	68.8								
100	B9 Pre Dryer Mid Level	1 North	dB(A)/level			-11.1	44.2	49.3	
56.9	65.4	69.8	80.8	84.1	79.3	65.2	91.0		
100			35.2	43.2	53.4	66.7	68.2	69.9	79.5
83.7	74.7								
100			41.7	44.4	56.7	63.9	66.0	71.7	83.5
81.7	69.7								
101	B9 Pre Dryer Start Level	1 North	dB(A)/level			-8.5	46.8		
51.9	59.5	68.0	72.4	83.4	86.7	81.9	67.8	93.6	
101			37.8	45.8	56.0	69.3	70.8	72.5	82.1
86.3	77.3								
101			44.3	47.0	59.3	66.5	68.6	74.3	86.1
84.3	72.3								
136	Fan 42 Casing	75 kw motor	dB(A)/unit				69.0	82.0	
90.0	98.0	97.0	94.0	90.0	81.0	102.1			
137	Fan 64 Casing	90 kw motor	dB(A)/unit				68.0	80.0	
87.0	102.0	93.0	90.0	85.0	77.0	103.0			
138	Fan 74 Outlet	75 kw motor assume true SWL	dB(A)/unit						
85.0	94.0	100.0	113.0	103.0	99.0	93.0	85.0	113.8	
139	Fan 74 casing	75 hw motor	dB(A)/unit				74.0	84.0	
96.0	98.0	101.0	99.0	95.0	87.0	105.4			
140	Exhaust Fan BV01-05		dB(A)/unit			72.1	83.3	89.4	89.9
90.3	92.5	90.7	87.5	80.4	98.3				
141	Fan 52 Outlet	200 kw motor assume true SWL	dB(A)/unit						
85.0	94.0	106.0	104.0	103.0	99.0	93.0	84.0	109.9	
142	Fan 52 casing	200 kw motor	dB(A)/unit				72.0	84.0	
98.0	97.0	98.0	95.0	89.0	81.0	103.4			
143	Vacuum Blower Exhaust		dB(A)/unit			66.1	73.4	80.7	82.2
86.8	79.1	87.6	73.5	55.2	91.7				
144	Fan 007 PV01/PM09 Optiformer	1	dB(A)/unit			79.5	90.7	96.8	
97.3	97.7	99.9	98.1	94.9	87.8	105.7			
145	Exhaust Fan Optiformer Fans	7,11	dB(A)/unit				79.5	90.7	
96.8	97.3	97.7	99.9	98.1	94.9	87.8	105.7		
146	Exhaust Fan Mist Collector Fan	15	dB(A)/unit				82.5	93.7	
99.8	100.3	100.7	102.9	101.1	97.9	90.8	108.7		
147	Vacuum System Fan No	1	dB/unit			111.7	111.8	114.8	120.1
122.2	135.4	127.2	116.9	136.4					
102	B9 Former Level	1 North	dB(A)/level			2.5	57.8	68.6	77.6
81.6	84.2	83.4	82.0	83.2	74.4	95.0			
102			2.5	55.5	76.2	77.5	82.4	83.2	81.0
84.6	82.2								
102			53.1	61.9	72.5	79.0	83.5	82.4	83.0
84.4	78.7								
103	B9 Paper Roll Storage	Ground South	dB(A)/level			1.4	49.3		
63.2	73.2	75.2	79.5	80.5	82.4	71.9	53.9	90.7	
103			1.4	56.4	68.2	75.7	76.7	78.7	79.5
75.8	65.6								
103			1.4	62.4	67.8	74.5	81.5	81.1	80.0
73.8	64.1								

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104	B9 Paper Roll Storage Level 1 South				dB(A)/level	9.3	64.2		
73.3	78.7	81.9	82.5	82.6	80.7	77.1	65.9	94.0	
104			54.8	69.5	75.6	77.9	82.9	84.6	82.4
80.1	73.4								
104			69.5	67.8	78.7	78.4	82.4	83.5	81.7
78.6	69.7								
105	B9 Size Press Ground South				dB(A)/level	8.6	55.9	68.2	
70.2	74.5	82.7	82.1	81.6	71.7	57.1	92.2		
105			8.6	61.5	71.8	75.7	80.1	81.3	80.6
80.0	67.1								
105			55.9	68.8	71.5	76.7	81.3	83.4	81.4
77.0	69.3								
106	B9 Reeler Ground South				dB(A)/level	0.2	48.1	62.0	72.0
74.0	78.3	79.3	81.2	70.7	52.7	89.5			
106			0.2	55.2	67.0	74.5	75.5	77.5	78.3
74.6	64.4								
106			0.2	61.2	66.6	73.3	80.3	79.9	78.8
72.6	62.9								
107	B9 Pre Dryer End Ground South				dB(A)/level	9.2	56.5	68.8	
70.8	75.1	83.3	82.7	82.2	72.3	57.7	92.9		
107			9.2	62.1	72.4	76.3	80.7	81.9	81.2
80.6	67.7								
107			56.5	69.4	72.1	77.3	81.9	84.0	82.0
77.6	69.9								
108	B9 Pre Dryer Mid Ground South				dB(A)/level	9.6	56.9	69.2	
71.2	75.5	83.7	83.1	82.6	72.7	58.1	93.3		
108			9.6	62.5	72.8	76.7	81.1	82.3	81.6
81.0	68.1								
108			56.9	69.8	72.5	77.7	82.3	84.4	82.4
78.0	70.3								
109	B9 Pre Dryer Start Ground South				dB(A)/level	9.6	56.9	69.2	
71.2	75.5	83.7	83.1	82.6	72.7	58.1	93.3		
109			9.6	62.5	72.8	76.7	81.1	82.3	81.6
81.0	68.1								
109			56.9	69.8	72.5	77.7	82.3	84.4	82.4
78.0	70.3								
110	B9 Former Ground South				dB(A)/level	10.2	59.4	68.1	72.6
76.3	80.9	82.6	83.4	72.8	58.2	93.0			
110			10.2	63.2	70.7	80.4	80.8	82.1	81.5
81.1	68.3								
110			57.7	68.0	72.3	76.3	80.3	84.7	82.3
78.1	71.9								
122	Fan 68 casing 132 kw motor				dB(A)/unit			72.0	85.0
90.0	96.0	99.0	95.0	93.0	85.0		102.7		
123	Fan 60 casing 160 kw motor				dB(A)/unit			73.0	85.0
93.0	101.0	100.0	97.0	92.0	84.0		105.0		
49	No noise				dB(A)/level	-19.0	-19.0	-19.0	-19.0
-19.0	-19.0	-19.0	-19.0	-19.0	-9.0				
121	Truck Manouvering (from 15130 Ingal)				dB(A)/unit			39.2	69.8
77.5	82.1	87.2	90.1	94.4	89.8	82.7	-4.3	102.5	
121			50.4	67.2	74.9	85.9	86.8	92.9	93.1
86.7	80.4	-6.6							
121			64.8	76.4	77.7	86.6	89.9	95.0	91.7
84.8	77.0	-9.3							
68	B9 Stock Prep Ground				dB(A)/level	2.0	61.3	64.4	74.9
78.7	80.4	81.6	81.3	72.3	60.2	92.0			
68			2.0	53.8	71.1	79.6	80.1	80.1	80.0
77.9	68.6								
68			55.7	61.6	70.8	77.7	81.9	82.9	80.6
75.4	72.6								
52	B9 winder Ground North				dB(A)/level	3.0	50.9	64.8	74.8
76.8	81.1	82.1	84.0	73.5	55.5	92.3			
52			3.0	58.0	69.8	77.3	78.3	80.3	81.1
77.4	67.2								
52			3.0	64.0	69.4	76.1	83.1	82.7	81.6
75.4	65.7								
53	B9 After Dryer Ground North				dB(A)/level	0.6	59.9	63.0	
73.5	77.3	79.0	80.2	79.9	70.9	58.8	90.6		

53				emis.txt				
76.5	67.2		0.6	52.4	69.7	78.2	78.7	78.6
53			54.3	60.2	69.4	76.3	80.5	81.5
74.0	71.2							79.2
54	B9 Pre Dryer Start Ground North				dB(A)/level		9.9	57.2
71.5	75.8	84.0	83.4	82.9	73.0	58.4	93.6	69.5
54			9.9	62.8	73.1	77.0	81.4	82.6
81.3	68.4							81.9
54			57.2	70.1	72.8	78.0	82.6	84.7
78.3	70.6							82.7
55	B9 Former Ground North				dB(A)/level		10.2	59.4
76.3	80.9	82.6	83.4	72.8	58.2	93.0		68.1
55			10.2	63.2	70.7	80.4	80.8	82.1
81.1	68.3							81.5
55			57.7	68.0	72.3	76.3	80.3	84.7
78.1	71.9							82.3
56	B9 Winder Ground South				dB(A)/level		3.0	50.9
76.8	81.1	82.1	84.0	73.5	55.5	92.3		64.8
56			3.0	58.0	69.8	77.3	78.3	80.3
77.4	67.2							81.1
56			3.0	64.0	69.4	76.1	83.1	82.7
75.4	65.7							81.6
57	B9 After Dryer Ground South				dB(A)/level		-0.7	58.6
72.2	76.0	77.7	78.9	78.6	69.6	57.5	89.3	61.7
57			-0.7	51.1	68.4	76.9	77.4	77.4
75.2	65.9							77.3
57			53.0	58.9	68.1	75.0	79.2	80.2
72.7	69.9							77.9
58	B9 Pre Dryer Ground South				dB(A)/level		0.0	47.3
61.6	65.9	74.1	73.5	73.0	63.1	48.5	83.7	59.6
58			0.0	52.9	63.2	67.1	71.5	72.7
71.4	58.5							72.0
58			47.3	60.2	62.9	68.1	72.7	74.8
68.4	60.7							72.8
59	B9 Press Ground South				dB(A)/level		11.2	60.4
77.3	81.9	83.6	84.4	73.8	59.2	94.0		69.1
59			11.2	64.2	71.7	81.4	81.8	83.1
82.1	69.3							82.5
59			58.7	69.0	73.3	77.3	81.3	85.7
79.1	72.9							83.3
60	B9 Winder Level 1 North				dB(A)/level		11.6	66.5
84.2	84.8	84.9	83.0	79.4	68.2	96.2		75.6
60			57.1	71.8	77.9	80.2	85.2	86.9
82.4	75.7							84.7
60			71.8	70.1	81.0	80.7	84.7	85.8
80.9	72.0							84.0
61	B9 Winder Level 1 South				dB(A)/level		11.6	66.5
84.2	84.8	84.9	83.0	79.4	68.2	96.2		75.6
61			57.1	71.8	77.9	80.2	85.2	86.9
82.4	75.7							84.7
61			71.8	70.1	81.0	80.7	84.7	85.8
80.9	72.0							84.0
62	B9 After Dryer Level 1 North				dB(A)/level		-11.8	43.5
56.2	64.7	69.1	80.1	83.4	78.6	64.5	90.2	48.6
62			34.5	42.5	52.7	66.0	67.5	69.2
83.0	74.0							78.8
62			41.0	43.7	56.0	63.2	65.3	71.0
81.0	69.0							82.8
63	B9 After Dryer Level 1 South				dB(A)/level		-10.1	45.2
57.9	66.4	70.8	81.8	85.1	80.3	66.2	91.9	50.3
63			36.2	44.2	54.4	67.7	69.2	70.9
84.7	75.7							80.5
63			42.7	45.4	57.7	64.9	67.0	72.7
82.7	70.7							84.5
64	B9 Pre Dryer Level 1 North				dB(A)/level		-11.1	44.2
56.9	65.4	69.8	80.8	84.1	79.3	65.2	91.0	49.3
64			35.2	43.2	53.4	66.7	68.2	69.9
83.7	74.7							79.5

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64			41.7	44.4	56.7	63.9	66.0	71.7	83.5
81.7	69.7								
65	B9 Pre Dryer Start Level	1 South				dB(A)/level		-7.1	48.2
53.3	60.9	69.4	73.8	84.8	88.1	83.3	69.2	95.0	
65			39.2	47.2	57.4	70.7	72.2	73.9	83.5
87.7	78.7								
65			45.7	48.4	60.7	67.9	70.0	75.7	87.5
85.7	73.7								
66	B9 Press Level	1 North				dB(A)/level	4.5	59.8	70.6
83.6	86.2	85.4	84.0	85.2	76.4	97.0			
66			4.5	57.5	78.2	79.5	84.4	85.2	83.0
86.6	84.2								
66			55.1	63.9	74.5	81.0	85.5	84.4	85.0
86.4	80.7								
67	B9 Press Level	1 South				dB(A)/level	7.5	62.8	73.6
86.6	89.2	88.4	87.0	88.2	79.4	100.0			
67			7.5	60.5	81.2	82.5	87.4	88.2	86.0
89.6	87.2								
67			58.1	66.9	77.5	84.0	88.5	87.4	88.0
89.4	83.7								
69	B9 Stock Prep Operating					dB(A)/level	-2.5	52.8	63.6
76.6	79.2	78.4	77.0	78.2	69.4	90.0			
69			-2.5	50.5	71.2	72.5	77.4	78.2	76.0
79.6	77.2								
69			48.1	56.9	67.5	74.0	78.5	77.4	78.0
79.4	73.7								
70	Null source (eg covered by another building)					dB(A)/level			-39.4
-99.0	-99.0	-99.0	-99.0	-99.0	-97.8	-98.0	-99.0	-99.0	-39.4
120	B9 Approach Ground south					dB(A)/unit	0.0	55.3	66.1
75.1	79.1	81.7	80.9	79.5	80.7	71.9	92.5		
120			0.0	53.0	73.7	75.0	79.9	80.7	78.5
82.1	79.7								
120			50.6	59.4	70.0	76.5	81.0	79.9	80.5
81.9	76.2								
111	B9 Reeler Level	1 South				dB(A)/level	8.1	63.0	72.1
80.7	81.3	81.4	79.5	75.9	64.7	92.7			
111			53.6	68.3	74.4	76.7	81.7	83.4	81.2
78.9	72.2								
111			68.3	66.6	77.5	77.2	81.2	82.3	80.5
77.4	68.5								
112	B9 Size Press Level	1 South				dB(A)/level	-9.1	46.2	51.3
58.9	67.4	71.8	82.8	86.1	81.3	67.2	93.0		
112			37.2	45.2	55.4	68.7	70.2	71.9	81.5
85.7	76.7								
112			43.7	46.4	58.7	65.9	68.0	73.7	85.5
83.7	71.7								
113	B9 Pre Dryer End Level	1 South				dB(A)/level	-10.1	45.2	50.3
57.9	66.4	70.8	81.8	85.1	80.3	66.2	92.0		
113			36.2	44.2	54.4	67.7	69.2	70.9	80.5
84.7	75.7								
113			42.7	45.4	57.7	64.9	67.0	72.7	84.5
82.7	70.7								
114	B9 Pre Dryer Mid Level	1 South				dB(A)/level	-8.1	47.2	52.3
59.9	68.4	72.8	83.8	87.1	82.3	68.2	94.0		
114			38.2	46.2	56.4	69.7	71.2	72.9	82.5
86.7	77.7								
114			44.7	47.4	59.7	66.9	69.0	74.7	86.5
84.7	72.7								
115	B9 Former Level	1 South				dB(A)/level	5.5	60.8	71.6
84.6	87.2	86.4	85.0	86.2	77.4	98.0			
115			5.5	58.5	79.2	80.5	85.4	86.2	84.0
87.6	85.2								
115			56.1	64.9	75.5	82.0	86.5	85.4	86.0
87.4	81.7								
116	B9 Approach Ground North					dB(A)/level	9.7	58.9	67.6
72.1	75.8	80.4	82.1	82.9	72.3	57.7	92.5		
116			9.7	62.7	70.2	79.9	80.3	81.6	81.0
80.6	67.8								

116			57.2	67.5	emis.txt	71.8	75.8	79.8	84.2	81.8
77.6	71.4									
117	B9 Approach Level 1 North				dB(A)/level			0.6	55.9	66.7
75.7	79.7	82.3	81.5	80.1	81.3	72.5	93.2			
117			0.6	53.6	74.3	75.6	80.5	81.3	79.1	
82.7	80.3									
117			51.2	60.0	70.6	77.1	81.6	80.5	81.1	
82.5	76.8									
118	B9 Approach Level 1 South				dB(A)/level			3.1	58.4	69.2
78.2	82.2	84.8	84.0	82.6	83.8	75.0	95.6			
118			3.1	56.1	76.8	78.1	83.0	83.8	81.6	
85.2	82.8									
118			53.7	62.5	73.1	79.6	84.1	83.0	83.6	
85.0	79.3									
119	Blower room internal level				dB(A)/level			79.3	84.5	90.8
92.5	92.5	96.2	97.1	90.5	85.8		102.0			
148	Vacuum System Fan No 2				dB(A)/unit	72.0	85.3	98.4	105.9	
116.6		121.9	136.3	127.9	115.5	137.1				
149	Fan 92 casing 55 kw motor				dB(A)/unit			67.0	79.0	
88.0	100.0	94.0	92.0	87.0	79.0		101.9			
150	Cat 972G Front End Loader Revving				dB(A)/unit			40.1	62.2	
82.3	97.7	87.9	93.9	97.6	90.8	88.9	80.1	105.5		
150			51.3	65.1	78.3	85.1	94.8	94.3	92.5	
89.6	87.4	71.8								
150			52.6	69.2	92.6	86.7	92.4	95.0	91.5	
88.0	84.2	60.5								
151	Fan 58 / PV10 / PM 18 Vav Roll Exhaust 3				dB(A)/unit			79.1		
90.3	96.4	91.9	96.3	96.0	6.2	94.5	87.4		102.7	
152	Fan 80 Press Pulper Exhaust				dB(A)/unit		70.9	82.1	88.2	
88.7	89.1	91.3	89.5	86.3	79.2		97.1			
153	Fan 83 Sizer Pulper Exhaust				dB(A)/unit		71.1	82.3	88.4	
88.9	89.3	91.5	89.7	86.5	79.4		97.3			
154	Fan 86 Reeler Pulper Exhaust				dB(A)/unit		72.0	83.2	89.3	
89.8	90.2	92.4	90.6	87.4	80.3		98.2			
155	Fan 89 Winder Pulper Exhaust				dB(A)/unit		71.8	83.0	89.1	
89.6	90.0	92.2	90.4	87.2	80.1		98.0			

Attachment 2: Predicted Noise Levels from All Plant – No Acoustic Walls

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Attachment 3: Predicted Noise Levels from All Plant – Certain fans with silencers, acoustic wall in place, no  
existing walls remaining in place

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## WIND ROSE PLOTS

Figure 1: Wind Rose Plots of Day Time Period for the Referenced Meteorological Station - Bureau of Meteorology - Sydney Airport (2008)

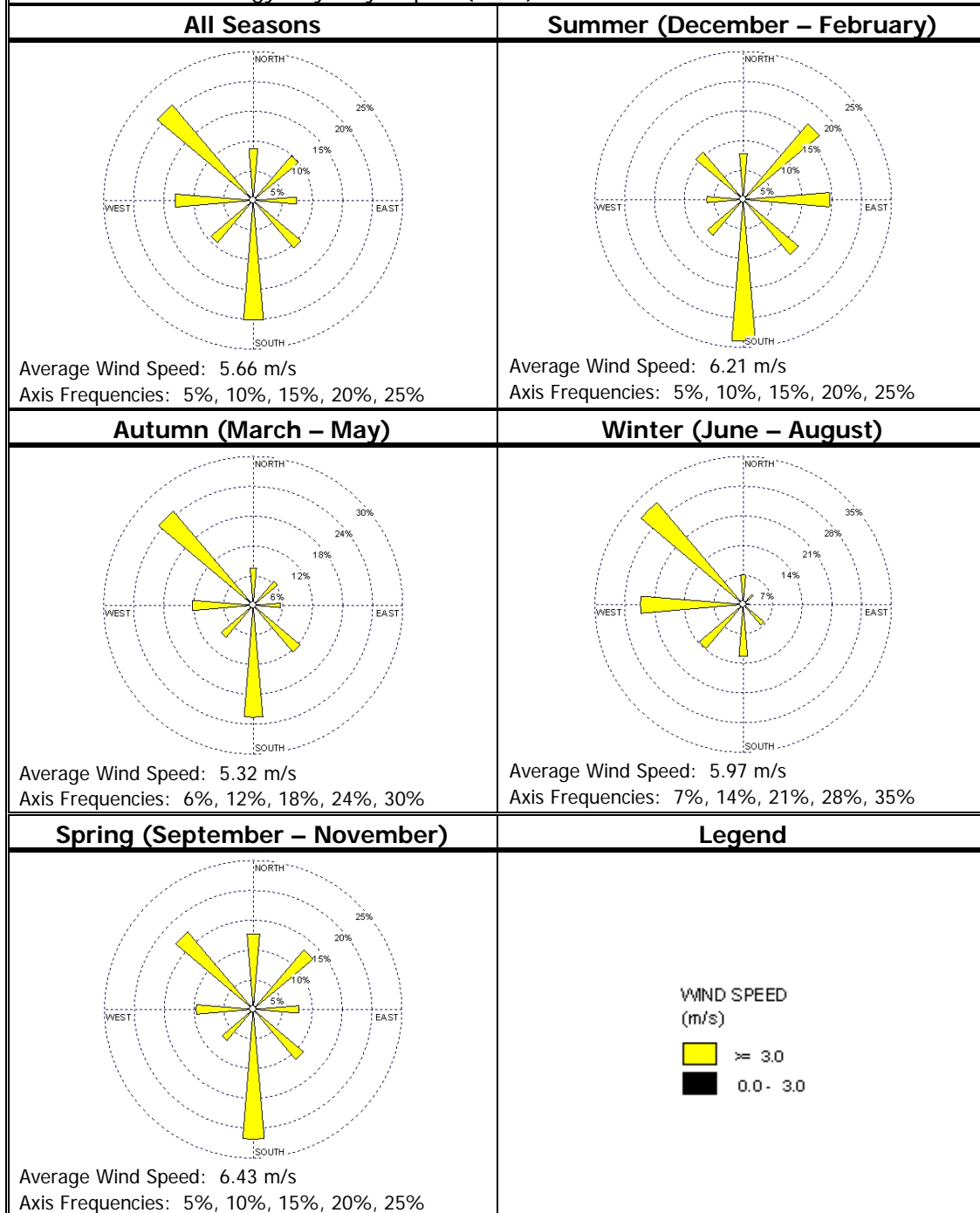




Figure 2: Wind Rose Plots of Evening Time Period for the Referenced Meteorological Station - Bureau of Meteorology - Sydney Airport (2008)

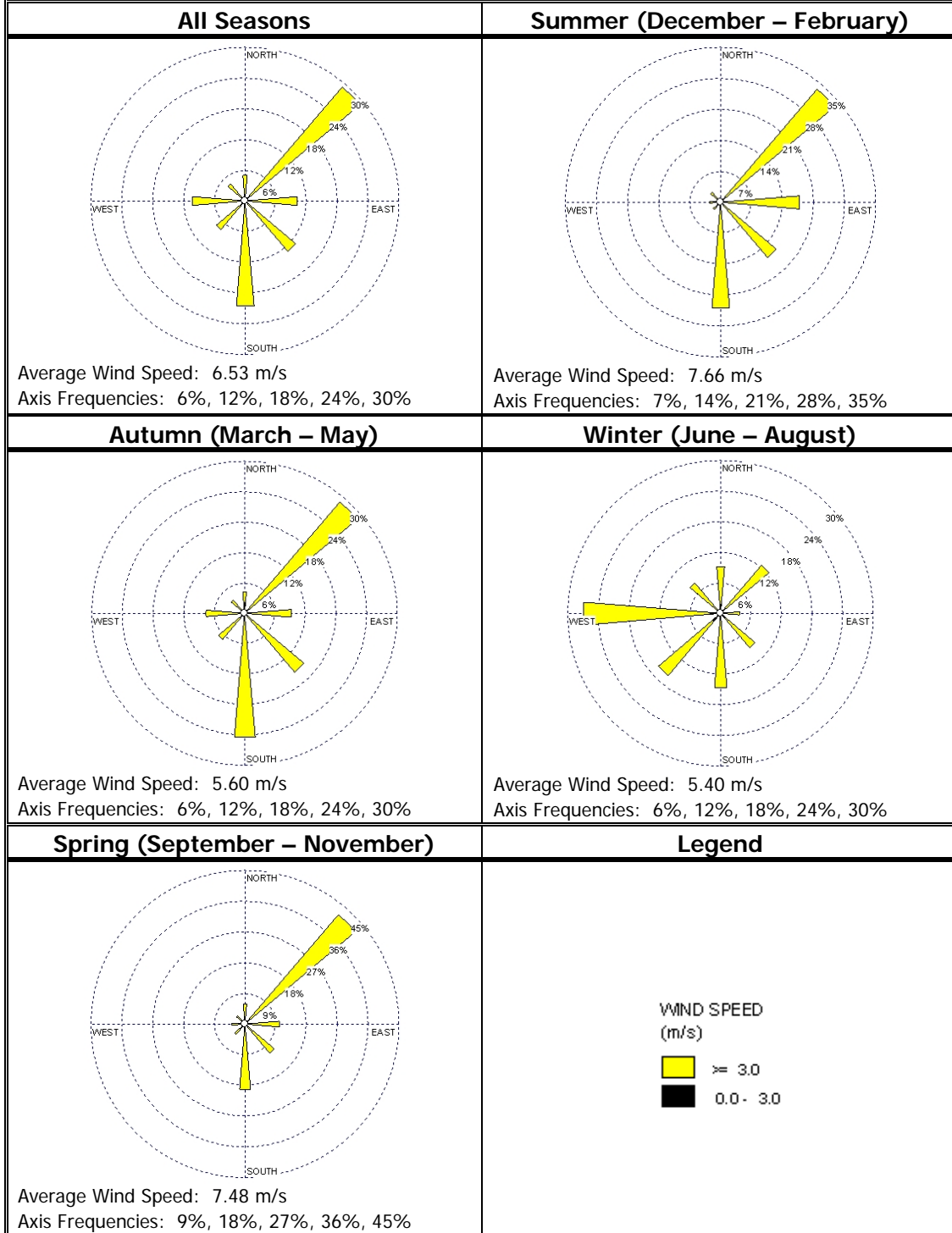
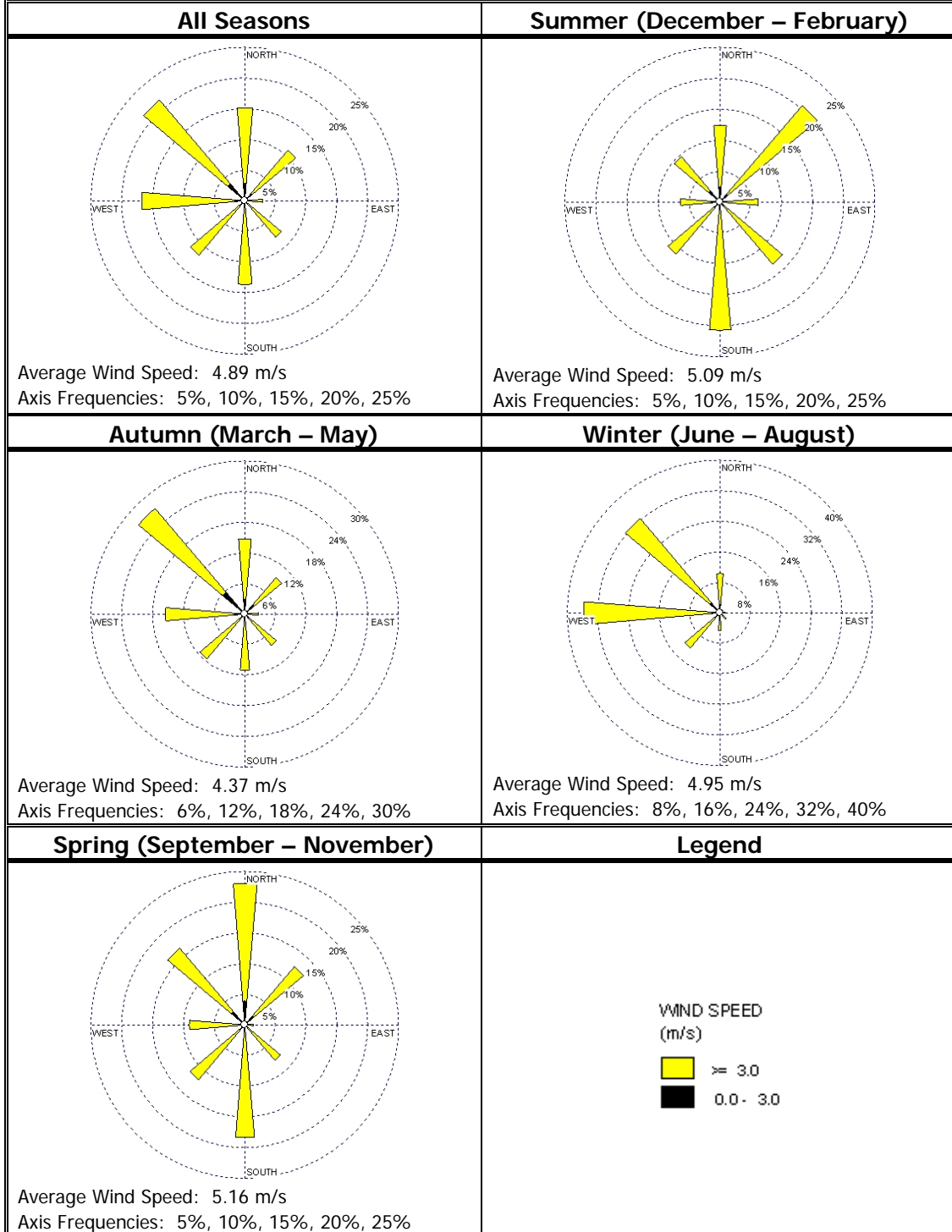




Figure 3: Wind Rose Plots of Night Time Period for the Referenced Meteorological Station - Bureau of Meteorology - Sydney Airport (2008)





40.3306.L140.ZSC

2<sup>nd</sup> April 2010

Amcor Paper Australia  
PO Box 95  
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**Attention:** Mr B. Batchelor

**AMCOR BOTANY MILL - NOISE EMISSION LIMITS**

I refer to discussions with Mr Benbow seeking clarification of noise emission criteria applied to the Botany Mill site and the relevance of such noise limits to the proposed No 9 Mill.

I have been involved in noise monitoring of the Botany Mill since 1977 and involved (with the SPCC) in the development of noise criteria that in turn led me to be responsible for the preparation of the site's Noise Reduction Program. Accordingly I have access to noise documentation and monitoring results in relation to the Mill from the 1960s to the present time, that are contained in files from James A Madden Associates, James Madden Cooper Atkins, Steven Cooper Acoustics and The Acoustic Group.

Prior to the formation of the State Pollution Control Commission the responsibility of noise lay with the NSW Department of Health. Noise controls were introduced to reduce the noise impact to nearby residential areas. The No 8 Machine was specifically orientated to reduce noise, whilst the No 7 and No 5 Machines and the Power House were the subject of noise controls for the purpose of obtaining a 55 dB(A) night time limit at residential boundaries.

In 1978 following the approval of the Polypropylene plant on the ICI Botany site the SPCC introduced a 50 dB(A) night time target at residential boundaries for ICI, Kellogs and APM.

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**THE ACOUSTIC GROUP**

The SPCC limit was lower than that that had been used for previous works at the Mill and resulted in additional expenditure and re-design of various projects.

The SPCC approach was to require before a Section 27 Approval was issued for an extension of the Scheduled Premise that there was a commitment to reduce the total noise emission from the subject premise. That commitment for the site required the modification of the previous noise targets for the site, and development of a new Noise Reduction Program to achieve the new target, as the SPCC introduced a lower noise limit than that required by the Department of Health.

Extensive works have been carried out on the site to address the Noise Reduction Program, where the majority of the works related to the No 7 Machine, although significant works were carried out on the Power House and the Waste Paper Plant.

From time to time site noise surveys had been carried out as part of the Noise Reduction Program to establish the extent and magnitude of noise emission into the nearby residential area with large scale noise contour maps in dB(A) and octave bands prepared to identify the progress of the reduction works.

Following the preparation of the Draft Stationary Noise Policy document industry representatives met with the EPA to address noise issues for existing industrial premises. As a result of those meetings the industrial/urban interface category was included in the amenity noise table and the Noise Reduction Program (used by the Mill) became the draft version of Chapter 10 of the INP.

In terms of the operation of the Botany Site the noise target at residential properties in proximity to the Mill was set in 1978 to be 50 dB(A) at night. Attaining compliance with that target involved significant expense and a number of years to achieve. This limit accords with the INP urban/industrial interface amenity limit.

To ensure compliance with the Noise Reduction Program/EPA noise targets for the site, night time monitoring has been carried out on a random basis (approximately every 6 weeks) since 1977 in the residential area adjacent to the Mill.





Standard reference locations representing the most affect residential boundaries to the Mill are shown in the attached map. What is not shown in the map is the extent of the Port Botany operations, which over the years has become a significant noise source in the residential area, and as such has negated some of the benefits of the reductions achieved by the Mill.

The results of the night time monitoring identify that the No 7 Machine is the major noise emission source impacting upon the residential area at the end of Partanna Avenue.

The No 7 Machine and the Waste Paper Plant influence Murrabin Avenue and to a lesser extent Australia Street.

Since the demolition of the buildings at the McCauley Street end of the Mill site the previous benefit of acoustic shielding by those buildings (with respect to Port Botany) has become obvious during the night time monitoring as at times the Mill is inaudible in Australia Street and Murrabin Avenue.

In Moorina Avenue there is little noise from the Mill in that the physical presence of the No 8 Machine building provides significant acoustic shielding of the Mill and Port Botany.

### **Noise Targets for new Plants**

In accordance with the INP and the Noise Reduction Program to maintain the 50 dB(A) night noise target at residential receivers near the Mill with the No 7 Machine, No 8 Machine, Waste Paper Plant and the Power House in operation any new plant installed on the premises was required to have a contribution less than 35 dB(A).

Such a level ensures there would be no exceedance of the noise limit. If the No9 Mill was to be built and the existing operations were to remain then in accordance with the INP and the Botany Mill Noise Reduction Program the design target for the new mill would be 35 dB(A).



However if the No 7 and No 8 Mill were to cease operations then under previous EPA/DEC/DECC policies (and the INP) the replacement mill would be designed to ensure noise emission was no greater than the existing Mill emissions.

Under the INP if the No 9 Machine is to replace the No 7 and No 8 Machines then a “nominal” noise emission limit of 50 dB(A) would apply, and not the 35 dB(A) contribution that would apply if both the No 7 and No 8 Machines were to continue operating.

The “nominal” noise target now relates to cumulative industrial noise at night. As the Port has continued to generate more noise its contribution needs to be taken into account.

It is necessary to identify that at the Partanna Avenue end of Moorina Avenue the “nominal” noise target would be different in that the acoustic environment for that end of Moorina Avenue is noticeably lower than at the other sites. At the opposite end of Moorina Avenue the acoustic environment is dominated by the Port activities and leads to background levels some 3 – 5 dB(A) higher than the reference location in Moorina Avenue.

Due to the prevailing weather conditions the Mill’s noise contribution at the Partanna Avenue, Murrabin Avenue and Australia Street areas varies significantly – as does the contribution from the Port.

On the basis of the night time noise monitoring I consider that for Partanna Avenue the Mill contribution is 48 – 50 dB(A) and the Port 44 – 47 dB(A).

On the basis of the night time noise monitoring I consider that for Murrabin Avenue the Mill contribution is 42 – 45 dB(A) and the Port 44 – 48 dB(A).

On the basis of the night time noise monitoring I consider that for Australia Street the Mill contribution is 39 – 42 dB(A) and the Port 42 – 48 dB(A).



If the No 8 Machine and the No 7 Machine buildings are to be demolished then the ambient background level in Moorina Avenue will increase. On the basis of the Partanna Avenue location I suggest that at the reference location in Moorina Avenue a Port contribution of 42 – 47 dB(A) could be expected.

In my view the above Port contributions are noticeably higher than nominated in the various EIS documents and one could very well question the degree of acoustic compliance testing that has been undertaken by the Port.

Taking into account the INP requirements, the assumption the DECCW takes no action as to Port Botany noise emissions and that the No 7 and No 8 Machines are to demolished, then the appropriate noise design contributions for the No 9 Mill are:

Australia Street - 46 dB(A)

Murrabin Avenue - 46 dB(A)

Partanna Avenue - 47dB(A)

Moorina Avenue (Partanna Avenue end) - 44 dB(A)

I trust the above satisfies your immediate requirements.

Yours faithfully,

**THE ACOUSTIC GROUP PTY LTD**



**STEVEN E. COOPER**



