



CSBP KWINANA

**ENVIRONMENTAL NOISE
MANAGEMENT PLAN
(2008 – 2011)**

August 2010

PREFACE

The CSBP Kwinana Environmental Noise Management Plan has been reviewed and updated in accordance with Action 3 of the Plan.

The Plan has been updated to include:

- results of an environmental noise assessment for the Proposed Ammonium Nitrate Expansion Phase 2;
- results of directional noise monitoring from Chalk Hill in Medina in July 2010; and
- full review and update of action status

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A. ENVIRONMENTAL NOISE MANAGEMENT PLAN ACTION TABLE

1. **OBJECTIVE**

This Environmental Noise Management Plan describes the way in which CSBP intends achieving the objective of compliance with all aspects of the Environmental Protection (Noise) Regulations 1997 (as amended).

There are two aspects to compliance with environmental noise emissions from CSBP Kwinana.

- a) Compliance with ‘assigned level’ criteria at far residential areas.
- b) Compliance with ‘assigned level’ criteria at adjacent industrial premises.

It is noted that criteria b) will not necessarily have any impact on criteria a), as compliance with the ‘assigned level’ at adjacent industrial premises is principally controlled by the distance from the major noise source to the boundary, with distances of 100-200 m usually adequate to achieve compliance for most industrial plants.

Motivation for the control of noise emissions is driven by good corporate governance and compliance objectives, as well as concern from some residential areas associated with the cumulative noise emission from the Kwinana Industrial Area (KIA) and the Department of Environment and Conservation (DEC) philosophy that compliance of all industries will assist in reducing the cumulative noise emissions.

CSBP Kwinana Industrial Complex noise emissions may exceed Regulation ‘assigned levels’ at adjacent industrial sites. In regards to this, there are proposed Regulation changes to increase the ‘assigned level’ for industrial receivers following a review of the Regulations. Any potential exceedance at adjacent industrial premises may be in compliance following regulation change (subject to the actual gazetted changes).

2. **SCOPE**

This Environmental Noise Management Plan applies to the CSBP Kwinana Industrial Complex from August 2010 to the end of June 2011.

The plan includes consideration of the existing plant and operations at CSBP Kwinana Industrial Complex, including the operations at Australian Gold Reagents (AGR) in a joint venture operated by CSBP.

This plan will not consider occupational exposures to noise or the requirements of Noise Control Planning as required by Worksafe WA and the relevant Code of Practice “Managing Noise at Workplaces.” Those requirements are discussed in separate documentation dealing with occupational health and safety issues.

3. **ENVIRONMENTAL OBJECTIVE**

To protect the amenity of nearby residents from noise impacts resulting from activities associated with CSBP by ensuring that noise levels meet statutory requirements and acceptable standards.

4. PERFORMANCE CRITERIA

Environmental Protection (Noise) Regulations 1997.

5. SUMMARY OF ENVIRONMENTAL NOISE EMISSIONS – AUGUST 2010

5.1 ENVIRONMENTAL REGULATIONS AS APPLICABLE TO CSBP

Environmental noise is governed by the Environmental Protection (Noise) Regulations 1997. These regulations stipulate maximum allowable external noise levels determined by the calculation of an influencing factor that is then added to the base levels shown in Table 1 below. The influencing factor is calculated for the usage of land within the two circles, having a radius 100 m and 450 m from the premises of concern.

TABLE 1 BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _A 10	L _A 1	L _A max
Residential	0700 – 1900 hours Monday to Saturday	45	55	65
	0900 – 1900 hours Sunday and Public Holidays	40	50	65
	1900 – 2200 hours all days	40	50	55
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	35	45	55
Commercial premises	All hours	60	75	80
Industrial and utility premises	All hours	65	80	90

The levels in Table 1 are conditional on no characteristics existing in the noise of concern, such as tonality, modulation or impulsiveness. If such characteristics exist then any measured level is adjusted according to Table 2.

TABLE 2 ADJUSTMENTS TO MEASURED LEVELS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB

5.1.1 Farfield (Residential) Compliance with Regulation Criteria

The 'assigned level' at a residential location is determined as the sum of the base level plus the 'influencing factor'. Locations within 15 m of a building directly associated with a noise sensitive use have a night-time base 'assigned level' of 35 L_A 10. In addition, the influencing factor is made up of factors relating to the proportion of industrial, commercial and 'Area B' land within 100 m and 450 m of the residence, and presence of major (i.e. > 15,000 vehicles per day (vpd)) or minor (< 6000 vpd) roads within these distances. Area B land refers to the Area B of the Kwinana Policy Area as per Schedule 3 of the noise Regulations, and is assessed as being of 'commercial' zoning if not otherwise zoned for industrial use.

In addition, Regulation 7 describes how a noise received at a premises which is made up of emissions from other non-exempt premises, which exceeds the 'assigned level' (by virtue of an exceeding noise level after adjustment for any characteristics such as tonality) shall be assessed under the 'significantly contributing' definition. Where two or more premises contribute to an exceedance of the 'assigned level' at a receiver location, each is responsible to reduce its noise emission contribution to 5 dB(A) less than the 'assigned level'. Therefore, the effective design objective for an industry noise emission at a residence where there is a noise exceedance due to multiple contributors is effectively $30 L_{A 10} +$ 'influencing factor'.

The nearest likely residential area which could be affected by noise emissions from CSBP Kwinana Industrial Complex is Medina/Calista, which is predominantly outside the Area B zone. As the suburbs are predominantly residential, many of the residences are likely to have a zero influencing factor, with design criteria of $30 L_{A 10}$ (night time).

It is noted that noise emissions from sources other than 'premises' are not considered in an assessment of compliance. Therefore wind generated noise, noise from traffic (vehicular on public roads), aircraft, rail, and wildlife are excluded from assessment. Any contribution of noise emissions from the rail activity of the various rail lines and marshalling yard (to the west of Medina) are therefore to be excluded from any assessment.

5.1.2 Nearfield (Industrial) Compliance with Regulation Criteria

At present Industrial receiver 'assigned levels' are $65 L_{A 10}$. An adjustment of +5 to the measured / predicted level is required if the noise is tonal in characteristic. The other statistical noise parameters of $L_{A 1}$ and $L_{A max}$ may also become significant at an industrial premise near to the CSBP Kwinana Industrial Complex and are tabulated for completeness (Tables 1 and 2).

For nearby or adjacent 'industrial premises' surrounding CSBP the design criteria is $65 L_{A 10}$ (non tonal), or if tonal the noise level should be reduced to $60 L_{A 10}$ if the tonal characteristic cannot be removed.

The DEC is in the process of a 'Regulation Review' (refer: Noise Regulations Review: Outcomes of the Working Group Programme, June 2000), and industrial noise 'assigned levels' are one area where a change is likely to occur. A timeframe for regulation drafting and public review is not well defined. This Noise Management Plan considers the scenarios of current 'assigned levels' and will be reviewed if a change in Regulations is enacted.

5.2 PAST ACTIONS

CSBP is active in reducing environmental noise emissions. Significant noise control measures and upgrades (in approximate chronological order) that have occurred to date are included in the following acoustic history summary.

Prior to 2000

- Nitric Acid Ammonium Nitrate (NA AN) Plant 1: Acoustic lagging of exposed compressor intercooler pipe-work and acoustic lining of compressor enclosure to reduce occupational and environmental noise emissions.
- Sodium Cyanide Manufacturing Facility (SCMF): Attenuation of blower room ventilation fan openings. Acoustic lagging of knock-out-pot pipe-work.

September 2000

- Provision of acoustic data as input into the whole of Kwinana “KIC Noise Study”. Overall sound power level of 125 L_{WA} excluded the new AP (which was only under partial operation at the time).
- SCMF: Design and construction of solids plant in the SCMF. Design reviewed for environmental noise compliance prior to construction. Relatively low noise emission plant.

Late 2000

- 2000 Ammonia Plant (AP): Following commissioning, significant noise control applied to steam de-aerator and CO₂ stack. The de-aerator was fitted with a larger orifice plate and discharge attenuator. A 5D un-podded silencer was inserted after the control valve to the CO₂ stack. The stack outlet faces in an easterly direction, and at an elevation of 60m above ground level was a significant contributor to the environmental noise emissions from the site. A reduction in sound power emissions of the order of 10 dB(A) was achieved through these noise control measures.

January 2002

- Update of sound power data for the 2003 KIC review (based on ENM acoustic modelling), overall level of 123 L_{WA} . KIC model not re-calculated and supplied sound power levels not reflected in the reported numbers in the review report. Predicted noise level at Medina residences of 33.7 $L_{A 10}$ under DEC ‘Draft 8’ night conditions using ENM.
- Ammonium Nitrate Production Facility (ANPF): maintenance on compressor discharge stack silencer to replace leached acoustic absorptive material. This was a significant source of tonal 2000 Hz noise from the 40m vertical discharge stack.

Early 2004

- AP: Upgrade to 745tpd (process debottlenecking) resulted in a negligible increase in noise emissions.
- SCMF: Startup Fan (used to ventilate standby plant vessels) switched off when plants 1 and 2 in concurrent operation. The start-up fan is located at the top of the Sodium Cyanide Plant (SCP) structure and being an elevated noise source can make a (small) contribution to the noise emissions to residential areas.

November 2004

- ANPF: Upgrade of site acoustic model for proposed NA AN duplication, including measurement of NA AN discharge stack radiation following attenuator maintenance upgrade (12 dB(A) reduction in radiated noise emission and equivalent attenuation of discharge noise at 40m elevation). Acoustic model converted from ENM to SoundPlan to permit more detailed acoustic modelling close to plant and take advantage of better graphical outputs and reporting capabilities. Sound power of the SCP of 125.1 L_{WA} . Predicted noise level at Medina residences of 30.8 L_{A10} under adverse night wind / inversion conditions.
- ANPF: Acoustic modelling of proposed NA AN duplication, 2008 Prill Plant (PP) and upgrade of SCP 2 (additional compressor inside compressor house). Commitment to provide an acoustic enclosure around existing nitric acid intercoolers (a significant noise emitter) for both existing and duplicate plant, with expected reduction of noise emissions from this section of plant of 10 dB(A). Predicted SCP site sound power of 123.5 L_{WA} . Predicted noise level at Medina residences of 31.0 L_{A10} under adverse night wind / inversion conditions.

2005 to 2007

- ANPF: Noise attenuation measures implemented in various areas of ANPF included installation of acoustic lagging on pipe work and intercoolers, silencers on plant boiler blowdown vents and, lining of the compressor house with acoustic absorbent material. Generally, these attenuation measures were implemented to reduce the area of high intensity noise (>100dBA) within the Facility, and achieve noise levels in occupancy areas within the CSBP industrial complex to less than 85dBA where practicable. The noise control of the compressor and intercooler system at the NA AN1 (a commitment made as part of the expansion) achieved the objective of a 10 dB(A) reduction in emitted sound power.

2008

- ANPF: Herring Storer Acoustics conducted post commissioning acoustic measurements for the expanded ANPF in August 2008 (Ref 9378-1-06051-04). The measured noise levels demonstrated compliance of the ANPF with requirements of the Environmental Protection (Noise) Regulations 1997 at the northern boundary. Noise monitoring demonstrated that the noise control applied to the NA AN 1 and 2 had met the project commitments in accordance with the expansion proposal submission. It was also reasonably concluded that noise emissions from CSBP Kwinana to residential premises at Medina complies with the requirements of the Environmental Protection (Noise) Regulations 1997.
- ANPF: Herring Storer Acoustics also conducted acoustic commissioning measurements for the PP in August 2008 (Ref 9936-1-06051-04). Noise monitoring conducted on the PP identified the final scrubber pump sets as significant noise emitters, however the location of these pumps in comparison to the plant and other buildings meant that significant buffering of this noise occurred in the Medina residential area direction. Noise attenuation here was recommended for occupational reasons.
- AP: Noise control monitoring on the AP (Ref 9937-1-0651) conducted by Herring Storer in August 2008 identified noise at the northern boundary to be greater than the proposed compliance target of 70 L_{A10} . (Pending Environmental Protection (Noise) Regulations 1997 review). Contributions to this measured noise level closest to the boundary are from steam condensate vents, control valves and the auxiliary boiler.

Noise attenuation on these closest sources were recommended before looking into the more distant contributors such as the carbon dioxide discharge stack, primary reformer and compressors.

2009

- Directional Noise Monitoring was conducted at Chalk Hill in Medina by Herring Storer Acoustics in April 2009 (Ref 10554-2-08221). The overall noise level at Chalk Hill has decreased, however CSBP's contribution to the noise present was considered to have increased. Noise coming from the CSBP direction was measured to be 6-8 dB greater than the acoustic model predicted. At this level the CSBP Kwinana Industrial Complex under full operation exceeded the night time assigned level of the Environmental Protection (Noise) Regulations 1997 by up to 8.5 dB after adjustment for tonal characteristic or significantly contributing premises. The additional noise from CSBP was considered to be as a result of increased noise emissions from the SCMF. Follow up actions for the SCMF have been added to the Noise Management Plan as a result.

2010

- SCMF: One of two SCP 1 main blowers was replaced to eliminate harmonic vibration through pipe work.
- SCMF: A temporary acoustic barrier was erected adjacent to the pneumatic hammer on the centrifuge chute to the spin flash dryer in the solid SCP to assess the effectiveness of attenuating far field noise impacts.
- ANPF: Herring Storer Acoustics conducted an environmental noise assessment for the Proposed Ammonium Nitrate Expansion: Phase 2 (Ref 11853-6-09205) to assess the potential impacts of an additional NA AN plant, debottlenecking activities on the two existing and the proposed NA AN plants, and debottlenecking of the 2008 PP. The assessment concluded that the proposal was unlikely to have a significant impact on residential receiver locations, and that noise emissions to the adjacent BP Refinery could be expected to comply with the proposed Regulation Review industrial 'assigned level'.
- Directional Noise Monitoring was conducted at Chalk Hill in Medina by Herring Storer Acoustics in July 2010 (Ref 12207-1-09205-02) to assess the effectiveness of noise attenuation measures in the SCMF. The assessment concluded that noise from CSBP premises were not significant at Medina, the overall noise level complied with the regulation 'assigned level' at night, and that the noise control implemented at the SCMF appeared to have been effective.

5.3 PREDICTED NOISE EMISSIONS - PROPOSED AMMONIUM NITRATE EXPANSION

In May 2010, Herring Storer Acoustics were engaged to upgrade the CSBP acoustic model and review expected noise emissions from the Proposed Ammonium Nitrate Expansion: Phase 2 (Ref11853-6-09205). Noise emissions were modelled to include an additional NA AN plant, debottlenecking activities on the two existing and the proposed NA AN plants, and debottlenecking of the PP. Noise level propagation to the surrounding noise sensitive areas was modelled and assessed against the Environmental Protection (Noise) Regulations 1997.

The sound power levels used in the predictive modelling were based on measurements made around the two existing NA AN plants in 2010, to generate ‘measurement noise contours’ in SoundPlan 7. These contours were used to upgrade and verify the existing acoustic model, prior to using a duplication of the NA AN plant data as a basis for the proposed third plant.

A summary of predicted noise emissions is outlined below to assist in the identification of the actions required to achieve the Environmental Noise Management Plan objective.

5.3.1 Predicted Noise Levels at Residential Premises

Predicted noise levels from the single point calculations are summarised below in Table 3 ‘worst case’ night-time conditions of 3 m/s wind from source to receiver with temperature inversion

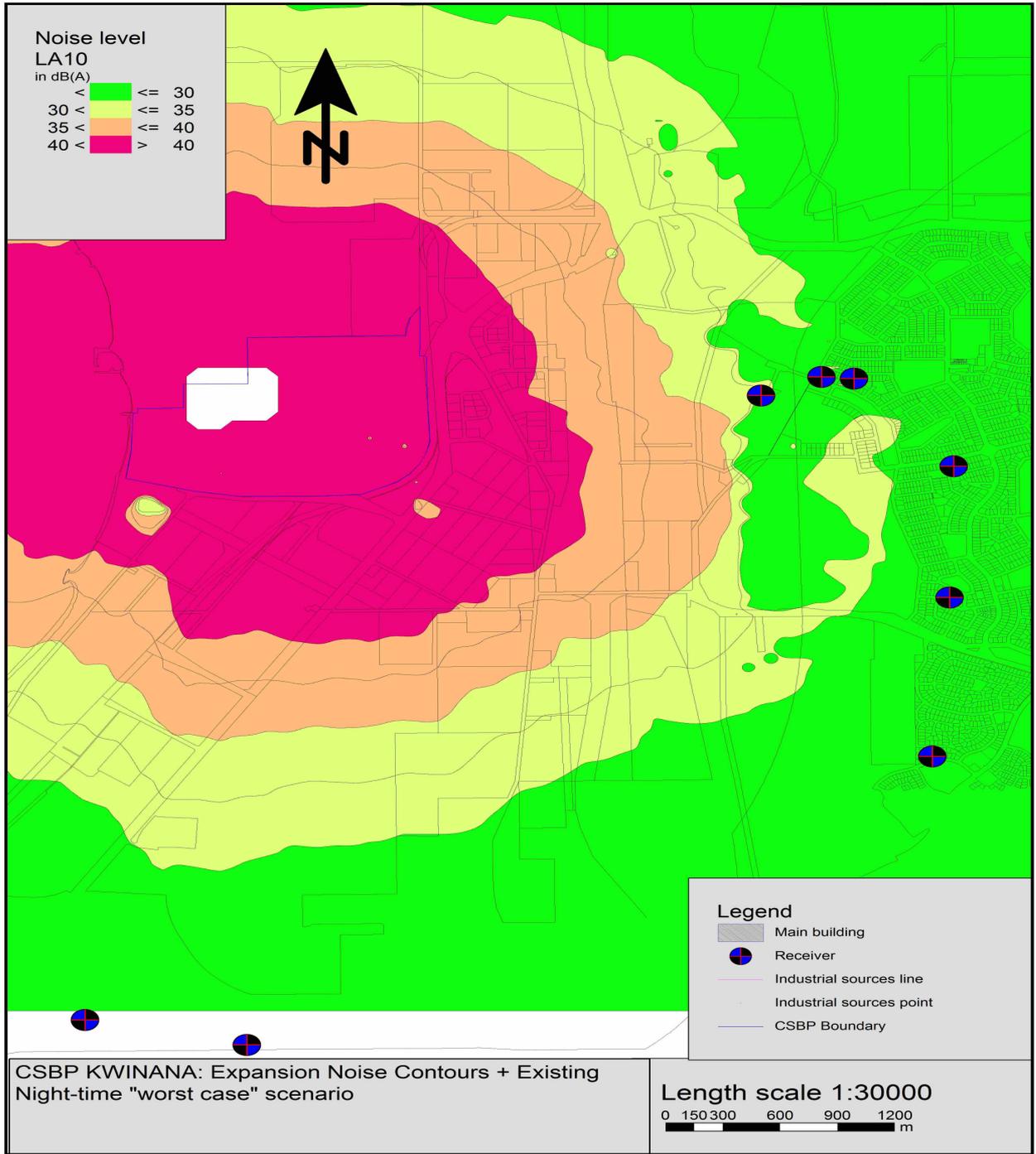
TABLE 3 RESULTS OF SINGLE POINT CALCULATIONS OPERATIONAL NOISE AT RESIDENTIAL PREMISED

Location	Existing Predicted L_{A10}	Additional Nitric Acid Ammonium Nitrate Plant L_{A10}	Proposed Expansion Predicted Combined L_{A10}
Medina Residence	29	22	30
Calista Residence	28	13	28
Leda Residence	26	14	26
Hillman Residence	24	15	25
North Rockingham (near CBH)	25	17	26
East Rockingham (coast)	21	15	22

The predicted noise emissions show that the proposal will not have a significant impact on residential receiver locations. Noise emission contributions of 30 dB(A) or less are not ‘significantly contributing’ and therefore comply with the requirements of the Regulations.

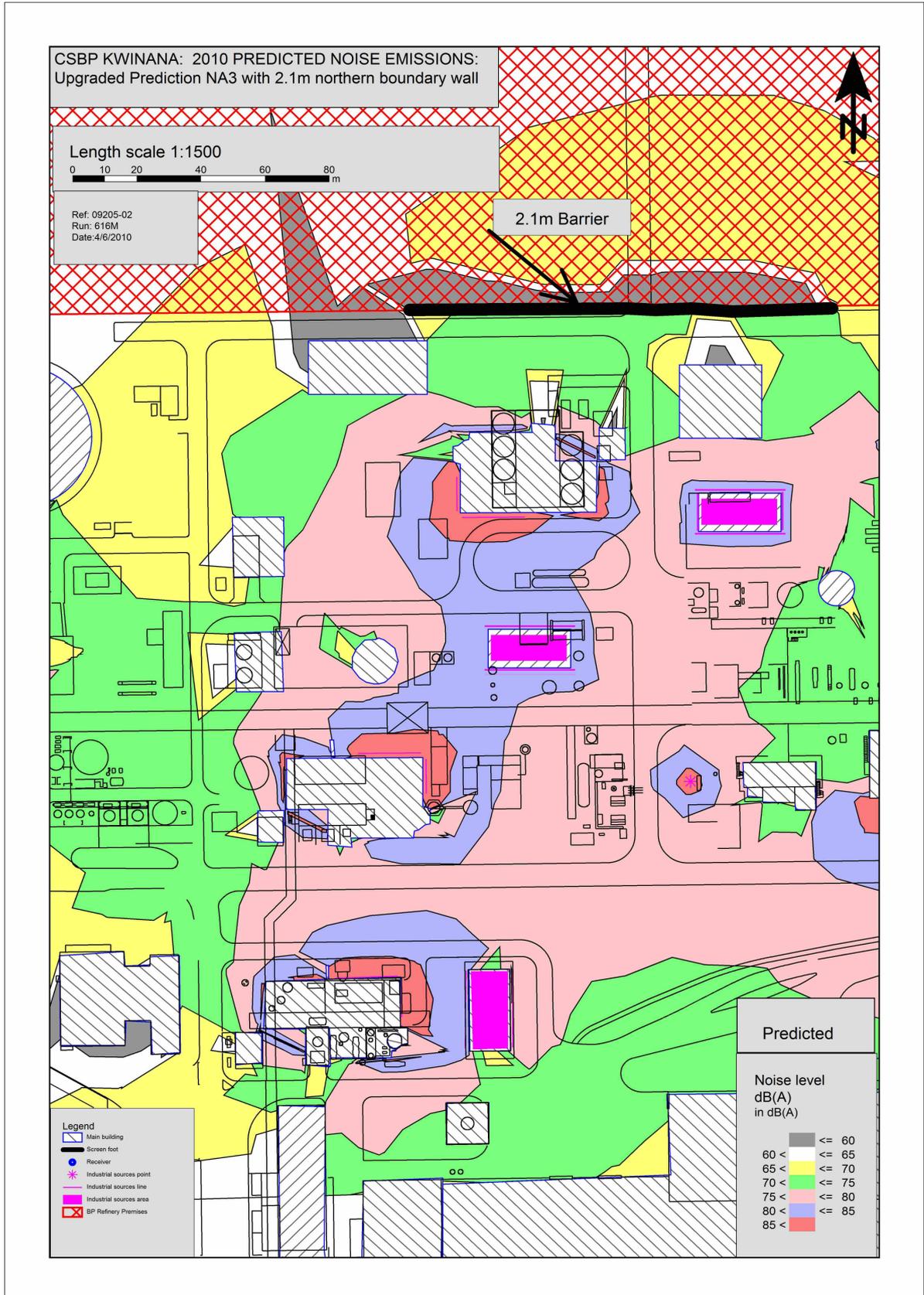
The noise contour plot for ‘worst case’ night wind conditions for the upgraded CSBP Kwinana Industrial Complex plants is shown below.

Figure 1 Night time 'worst case' emissions



5.3.2 Predicted Noise Levels at Industrial Receivers

Figure 2 Predicted Noise Emissions from the Proposed Expansion (northern boundary)



The model has incorporated a 2.1 m high acoustic barrier fence on part of the northern boundary to demonstrate that noise emissions to the adjacent BP Refinery premises can be expected to comply with the proposed Regulation Review industrial 'assigned level'. It is assumed that the northern boundary noise emission will be tonal in characteristic. Alternative noise control options within the site could be applied in lieu of a barrier fence, this would be determined during the detailed design phase.

Although the "Regulation review" recommendations include changing the industrial boundary 'assigned level' by an increase of 10 dB, this has not occurred to date. The predicted Regulation exceedances of noise criteria at the industrial boundaries do not adversely affect the adjacent industries, and have no significant influence on noise levels received at residential areas such as Medina. The exceedances of the industrial boundary 'assigned levels' are mainly due to some plant being located close to boundaries (due to plant layout decisions made in the past when noise regulations were less stringent).

5.4 MONITORED FARFIELD NOISE EMISSIONS – 'BARNOWL'

CSBP commissioned Herring Storer Acoustics to carry out acoustic monitoring of noise emissions received at Chalk Hill, Medina using the directional BarnOwl noise monitoring system in July 2010 (Ref 12207-1-09205-02). The objective of the acoustic monitoring was to determine noise emissions from the CSBP at full operations, and to assess the effectiveness of noise attenuation measures undertaken in the SCMF.

The directional noise monitoring BarnOwl system was used to make measurements of noise received at Chalk Hill Lookout located on the western side of the Medina residential area.

Previous Barnowl monitoring undertaken in April 2009 by Herring Storer Acoustics (Ref 10554-2-08221) indicated that whilst the overall noise level at Chalk Hill appeared to have decreased, CSBP's contribution to the noise present was considered to have increased. Noise coming from the CSBP direction was measured to be 6-8 dB greater than the acoustic model predicted. At this level the CSBP Kwinana Industrial Complex under full operation exceeded the night time assigned level of the Environmental Protection (Noise) Regulations 1997 by up to 8.5 dB after adjustment for tonal characteristic or significantly contributing premises. The additional noise from CSBP was considered to be as a result of increased noise emissions from the SCMF.

BarnOwl directional noise monitoring undertaken in July 2010 concluded that CSBP's contribution to the measured sound pressure level at Chalk Hill was of the order of 23-30 dB(A). Noise control implemented at the SCMF appeared to have been effective in reducing noise at Chalk Hill. Based on the monitoring carried out, the noise emissions from the CSBP Kwinana Industrial Complex under full operation comply with the night time assigned level of the Environmental Protection (Noise) Regulations 1997.

6. ENVIRONMENTAL NOISE MANAGEMENT STRATEGIES

CSBP Kwinana Industrial Complex operates continuously. Noise impacts are minimised through the application of the hierarchy of control methodology. In accordance with this hierarchy, the first efforts are to minimise noise generation. If this is not possible, noise should be reduced at its source by substitution etc. Wherever possible, the steps are as follows:

1. Eliminate the noise source.
2. Change the activity or process to one that is less noisy.
3. Separate people from the noise source by enclosing or physically guarding.
4. Consider other administrative controls (e.g. Operating procedures for particular activities to minimise noise impacts).

6.1 FARFIELD RESIDENTIAL (MEDINA)

- a) Barn Owl monitoring will be undertaken as appropriate to assess changes to CSBP noise impacts on residential areas.

6.2 NEARFIELD NORTHERN BOUNDARY

Options for the purpose of compliance include:

- a) Seek regulation change of 'assigned level' to 70 LA 10 (no characteristic) at boundary.
- b) If the proposed expansion of the ANPF is implemented;
 - i. Noise control for the proposed NA AN plant is to match or exceed that of nitric acid ammonium nitrate plant two
 - ii. Debottlenecking changes be reviewed by an acoustic consultant following detailed design
 - iii. Noise control be implemented at the proposed NA AN plant to ensure compliance with the proposed Regulation Review industrial 'assigned level'. In the event that the proposed Regulation Review does not reduce the assigned level as expected, CSBP will pursue other options for compliance within twenty four months of the Regulation Review process ceasing
 - iv. Include verification measurements in the commissioning process.

6.3 NEARFIELD SCP BOUNDARY

Options for the purpose of compliance include:

- a) Applying an effective seal around blower room penetrations.
- b) Apply acoustic lagging around waste gas pipe work at SCP1 and SCP2.
- c) Investigate and implement appropriate noise attenuation measures on pneumatic hammers including the centrifuge chute to the spin flash dryer.

- d) Seek regulation change of ‘assigned level’ to 70 LA 10 (no characteristic) at boundary.

7. COMPLIANCE VERIFICATION – NOISE MONITORING PROGRAM

7.1 MONITORING FARFIELD NOISE EMISSIONS – ‘BARNOWL’

Acoustic monitoring of noise emissions received at the Medina residential area, using BarnOwl directional noise monitoring will be conducted again following implementation of actions relating to the proposed ammonium nitrate expansion, and the SCP as detailed in Appendix A.

7.2 MONITORING NEARFIELD NOISE EMISSIONS

CSBP will verify that the predicted noise emissions of proposed ammonium nitrate expansion on the northern boundary are similar to that used in modelling, following commissioning of the expansion, currently planned for completion in 2014. Verification of noise inputs used in modelling for the eastern boundary will be conducted following commissioning of the SCMF expansion, currently planned for completion in 2010.

Noise levels significantly higher than base design noise levels (i.e. higher than the design noise levels) will require a review of this management plan and proposed remediation actions developed in consultation with an experienced acoustic consultant.

At milestone dates (such as at time of anticipated Regulation compliance), acoustic monitoring (measurement) of noise levels at receiver locations (e.g. industrial premises boundary or residential areas) are proposed to verify the compliance status predicted by acoustic modelling.

8. COMMUNITY CONSULTATION PROCESS

This environmental noise management plan will be available for stakeholder comment as part of the community consultation process associated with the proposed plant upgrades. The report can be accessed at <http://www.csbp.com.au/Home-Corporate/Sustainability/Environment/Documents-and-reporting.aspx>

Stakeholders include:

- 1) Department of Environment and Conservation
- 2) Town of Kwinana
- 3) City of Rockingham
- 4) Kwinana Noise Reference Group
- 5) Site employee representative group

CSBP presented to the Kwinana Noise Reference Group in August/September 2006 and reported on this Noise Management Plan in the Wesfarmers Social Responsibility Report 2007, 2008, 2009 and will again in 2010. CSBP will continue to participate in the Kwinana Noise Reference Group when relevant and make data available for the KIA noise model.

9. COMPLAINT MANAGEMENT

CSBP has a Community Contact/Complaints Process documented in CSBP procedure *Reporting and Investigating Incidents* (DP-11-050-01). This process ensures complaints, including any regarding environmental noise emissions from the site, are recorded, investigated, and communicated to relevant stakeholders including the Town of Kwinana and the DEC Kwinana (the likely receivers of noise complaints around the Kwinana Industrial Area) as appropriate. This information is recorded on CSBP's SiteSafe incident management database.

Stakeholders, including local residents, local government authorities and regulatory authorities can access information relating to proposed activities likely to result in increased annoyance to residents (such as might occur during commissioning of new plant) utilising the Kwinana Industry Council (KIC) Community Information Line (1300 304 346) and via direct communication. Identified potential significant noise events will be the subject of Job Safety Analyses or Team Based Risk Assessments, with action taken to ensure noise emissions are managed appropriately.

10. AUDITING

The Environmental Noise Management Plan was audited internally by CSBP in November 2008. The status of actions as reported in Appendix A in the action table was verified as correct. Another audit will be conducted within the next 5 years. Auditing will be conducted in accordance with CSBP procedure *Internal Auditing of Management Systems* (DP-02-010-01).

11. REVIEW AND REVISION

The Environmental Noise Management Plan will be reviewed by CSBP annually or following implementation of any significant noise management measures in accordance with CSBP *Guide Manual for Document Management* (GM-04-040-02).

12. REFERENCES

Herring Storer Acoustics (2010), CSBP Limited, Directional Noise Monitoring Chalk Hill (Medina), July 2010, Ref 12207-1-09205-02

Herring Storer Acoustics (2010), CSBP Limited, Proposed Ammonium Nitrate Expansion Phase 2, Kwinana, Environmental Noise Assessment, August 2010, Ref 11853-6-09205

Herring Storer Acoustics (2009), CSBP Limited, Directional Noise Monitoring Chalk Hill (Medina), 23/24 April 2009, Ref 10554-2-08221

Herring Storer Acoustics (2008), CSBP Limited Kwinana, CSBP Kwinana KAP North Noise Control, August 2008, Ref 9937-1-06051

Herring Storer Acoustics (2008), CSBP Limited Kwinana, CSBP Kwinana Prill Plant 2 Acoustic Commissioning, August 2008, Ref 9936-1-06051-04

Herring Storer Acoustics (2008), CSBP Limited Kwinana, CSBP Kwinana Nitric Acid Plant No.2 & Prill Plant No.2 Expansion Acoustic Commissioning Measurements, 21st August 2008, Ref 9378-1-06051-04

Herring Storer Acoustics (2007), CSBP Limited Kwinana, CSBP Expansion Project Kwinana Noise Emission Review – July 2007, Ref 7832-1-06051

Herring Storer Acoustics (2005), CSBP Limited Kwinana, Directional Noise Monitoring at Chalk Hill Lookout – Medina – August 2005, Ref 4965-1-04188-4

Herring Storer Acoustics (2005), CSBP Limited Kwinana, Directional Noise Monitoring at Chalk Hill Lookout – Medina – October 2005, Ref 5666-1-04188-4

Herring Storer Acoustics (2004), CSBP Limited, CSBP Ammonium Nitrate Expansion Project Kwinana Noise Emission Study – November 2004, Ref 3926-4-04188

Herring Storer Acoustics (2004), CSBP Wesfarmers Kwinana, AGR Proposed Upgrade 2004 Noise Emission Study – November 2004, Ref 3921-2-4188

Note: References are available from CSBP on request (contact 9411 8232).

13. GLOSSARY

AGR	Australian Gold Reagents
AN	Ammonium Nitrate
AP	2000 Ammonia Plant
ANPF	Ammonium Nitrate Production Facility
CO ₂	Carbon dioxide
CSBP	CSBP Limited
dB	decibels
dB(A)	decibels (A-weighted)
DEC	Department of Environment and Conservation
ENM	Environmental Noise Model Software
KIA	Kwinana Industrial Area
KIC	Kwinana Industries Council
L _{A1}	A L _{A1} level is an A-weighted noise level, which is exceeded for 1% of the representative assessment period. (An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. As the human ear is not very sensitive in the lower frequencies these frequencies are weighted more than the higher frequencies. An A-weighted sound pressure level is described by the symbol dB(A)).
L _{A10}	A L _{A10} level is an A-weighted noise level, which is exceeded for 10% of the representative assessment period. A L _{A10} level is considered to represent the “intrusive” noise level.
L _{A MAX}	A L _{A max} level is the maximum A-weighted noise level during the representative assessment period.
L _{WA}	A – weighted sound power
NA AN	Nitric Acid Ammonium Nitrate
PER	Public Environmental Review
PP	2008 Prilling Plant
SCP	Sodium Cyanide Plant
SCMF	Sodium Cyanide Manufacturing Facility
Tonal	As per <i>Environmental (Noise) Regulations 1997</i> . Typically a distinctive characteristic of noise.
tpd	tonnes per day
WA	Western Australia

APPENDIX A

ENVIRONMENTAL NOISE MANAGEMENT PLAN ACTION TABLE

Action Code	Subject	Action	Timing	Reporting / Evidence	Status – August 2010
1.	Compliance Monitoring	Acoustic monitoring of noise levels of individual plants	Following commissioning of upgraded plants and following implementation of any noise management measures	Noise monitoring records	<p>Satisfactory to date</p> <ul style="list-style-type: none"> Monitoring of the NAP1 was conducted following noise attenuation work. Refer: Herring Storer Acoustics (2007) CSBP Expansion Project Kwinana – Noise Emission Review - July 2007 Ref 7832-1-06051 Noise emission monitoring conducted for completed ANPF expansion. Herring Storer Acoustics (2008) CSBP Kwinana Nitric Acid Plant 2 and Prill Plant 2 Expansion Acoustic Commissioning measurements – August 2008 Ref 9378-1-06051-04 Noise monitoring of the Ammonia Plant. CSBP Kwinana KAP North Noise Control August 2008 Ref – 9937-1-06051. Noise monitoring following blower replacement and temporary acoustic barrier erection in the SCMF July 2010 Ref 12207-1-09205-02.
2.	Compliance Monitoring	Acoustic monitoring and reporting of noise levels at receiver locations	By 30 December 2008, or 12 months following gazettal of amended Noise Regulations	'Barnowl' Noise monitoring report	<p>Complete</p> <p>Barn Owl monitoring conducted April 2009. Follow up actions as a result. Action code 18 and 19.</p>
3.	Plan Review and Update	Review and update the Environmental Noise Management Plan	Annually, as a minimum, commencing 30 June 2007 or following implementation of any significant noise management measures	Updated noise management plan	<p>Satisfactory to date</p> <p>Noise Management Plan reviewed August 2010.</p>
4.	Audit	Audit (internal) of management plan actions and compliance with performance criteria	By 30 December 2008 and every 5 years following	Audit Report	<p>Satisfactory to date</p> <p>Audit conducted November 2008</p>
5.	Community Consultation	Contribute to Kwinana Noise Reference Group	Ongoing	Completion of actions. Presentations	<p>Satisfactory to date</p> <p>CSBP presented on CSBP Kwinana noise management to the Kwinana Noise Reference Group in August 2006. CSBP will continue to be associated with the KIC and will provide data to the Kwinana Noise reference Group where required.</p>

Action Code	Subject	Action	Timing	Reporting / Evidence	Status – August 2010
6.	Noise Management Review	Prior to the commissioning of NA AN 2, reassess predicted noise emissions and amend Action Table to ensure compliance with regulations	Prior to commissioning of NA AN 2	Noise modelling records and updated noise management plan	Complete Model updated in July 07, Noise Management Plan updated Oct 07. Refer: Herring Storer Acoustics (2007) CSBP Expansion Project Kwinana – Noise Emission Review - July 2007 Ref 7832-1-06051
7.	NA AN 1- Noise Management	Modify noise attenuation around air compressor/expander	Prior to commissioning of NA AN 2	Noise monitoring records	Complete 10 dB(A) reduction in emitted sound power from compressor/intercooler system due to noise attenuation.
8.	NA AN 1- Noise Management	Modify piping supports to reduce structure borne noise	Prior to commissioning of NA AN 2	Noise monitoring records	Complete 10 dB(A) reduction in emitted sound power from compressor/intercooler system due to noise attenuation.
9.	NA AN 2- Noise Management	Install superior quality silencer to NA AN 2 stack	During construction of NA AN 2	As constructed specifications	Complete Constructed as per design.
10.	NA AN 2- Noise Management	Install low noise/high efficiency fans to NA AN 2 Cooling Tower	During construction of NA AN 2	As constructed specifications	Complete Cooling tower constructed. Noise monitoring occurred July 2008.
11.	NA AN 2- Noise Management	Design to incorporate structural isolation and acoustic lagging of compressor system equivalent to NA AN 1	During construction of NA AN 2	As constructed specifications	Complete Constructed as per design.
12.	NA AN 2- Noise Management	Install extra packing in NA AN 2 Cooling Tower to allow slower fan speed	During construction of NA AN 2	As constructed specifications	Complete Cooling tower constructed. Noise monitoring occurred July 2008.
13.	PP – Noise Management	Attenuate external fans to limit noise emissions by means of discharge silencers and acoustic lagging as required	During construction of PP	As constructed specifications	Complete Constructed as per design.
14.	SCP - Noise Management	Apply an effective acoustic seal around blower room penetrations	March 2010 Deferred until assessment of results from next boundary noise survey	Noise monitoring records	Incomplete Still to be completed.
15.	SCP - Noise Management	Acoustically lag SCP blowers (1&2) gas feed pipework to the air intake duct	March 2010 Deferred until assessment of results from next boundary noise survey	Noise monitoring records	Incomplete Still to be completed.
16.	Chlor-Alkali Plant – Noise management	Noise reduction to cooling tower fans	September 2009	Noise monitoring records	Complete Chlor Alkali Plant fully decommissioned January 2009.
17.	AP – Noise Management	Review AP noise sources near CSBP/BP boundary and implement recommendations required to reduce noise at this boundary to below 70 LA10.	December 2008	Noise monitoring records	Complete Ammonia Plant noise review report received in January 2009.

Action Code	Subject	Action	Timing	Reporting / Evidence	Status – August 2010
18.	SCP - Noise Management	Investigate and implement appropriate noise attenuation measures on the pneumatic hammer on the centrifuge chute to the spin flash dryer	June 2010	Noise monitoring records	Satisfactory to date Temporary acoustic barrier installed July 2010 to assess effectiveness and assist planning for permanent structure.
19.	SCP - Noise Management	Replace one of the two SCP 1 main blowers to eliminate harmonic vibration through pipe work	June 2010	Noise monitoring records	Complete Blower replaced in June 2010.
20.	Compliance Monitoring	Acoustic monitoring and reporting of noise levels at receiver locations	Following noise attenuation at SCP by June 2011	'Barnowl' Noise monitoring report	Satisfactory to date Monitoring undertaken in July 2010. Noise attenuation measures deemed effective. CSBP compliant with night time assigned level.
21.	Proposed NA AN3 – Noise Management	Noise control for the proposed NA AN 3 is to match or exceed that of NA AN 2.	During construction of NA AN3	As constructed specifications	Not yet required
22.	NA AN 1, 2 and proposed NA AN3 – Noise Management	Debottlenecking changes be reviewed by an acoustic consultant following detailed design	During design and construction activities on NA AN1, 2 and 3	Acoustic Consultant Review	Not yet required
23.	PP – Noise Management	Debottlenecking changes be reviewed by an acoustic consultant following detailed design	During design and construction activities on PP	Acoustic Consultant Review	Not yet required
24.	Compliance Monitoring	Include verification measurements in the commissioning process for NA AN3	Following commissioning of NA AN3	Noise monitoring records	Not yet required
25.	Compliance Monitoring	Acoustic monitoring and reporting of noise levels at receiver locations	On completion of debottlenecking activities	Noise monitoring records	Not yet required