

# **Noise and Vibration Management Plan**

**Crawfords Freightlines Sandgate Site**

## Document Control

Version	Date	Amendment Details	Amended By	Next Review Date
V1	August 2013	First issue as part of facility Operational Environmental Management Plan	ERM	-
V2	February 2023	Prepared as a standalone plan during the update to the Operational Environment Management Plan and reviewed following 2022 Independent Environmental Audit	Chris Bonomini (Umwelt)	February 2026
V3	October 2023	Revision to address DPE and SafeWork NSW comments on V2	Tim Procter (Umwelt)	February 2026

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# 1 Introduction

## 1.1 Background

Crawfords Freightlines Pty Ltd (Crawfords) has operated a storage and distribution facility (the Facility) for ammonium nitrate (AN) at the site since 2009. The development is located in Sandgate, NSW and involves the storage of up to 9000 tonnes (t) of AN in warehouses (Sheds A and B) (refer to **Figure 1.1**). The Facility is now completely leased by Crawfords with no other companies onsite, and also consists of areas for storage of shipping containers and aluminium ingots, general mixed freight, a workshop, a wash bay with an integrated water treatment system, a rail siding (refer to **Figure 1.2**).

An environmental impact statement (EIS) was prepared to accompany a state significant development application (SSD-5119) seeking approval to store and distribute 13,500 t of AN at the Facility in Sheds A, B and C. Development consent, subject to conditions (the Consent), was granted on 13 June 2013. On 18 July 2013, the EPA issued EPL 20295. Although the Consent allowed for the storage of up to 13,500 t of AN, the SafeWork NSW has withdrawn approval to store AN in, and outside of, Shed C due to its proximity to the neighbouring aged care facility (St Josephs) north of the Facility and the current AN storage limit is 9,000 t.

## 1.2 Facility Overview

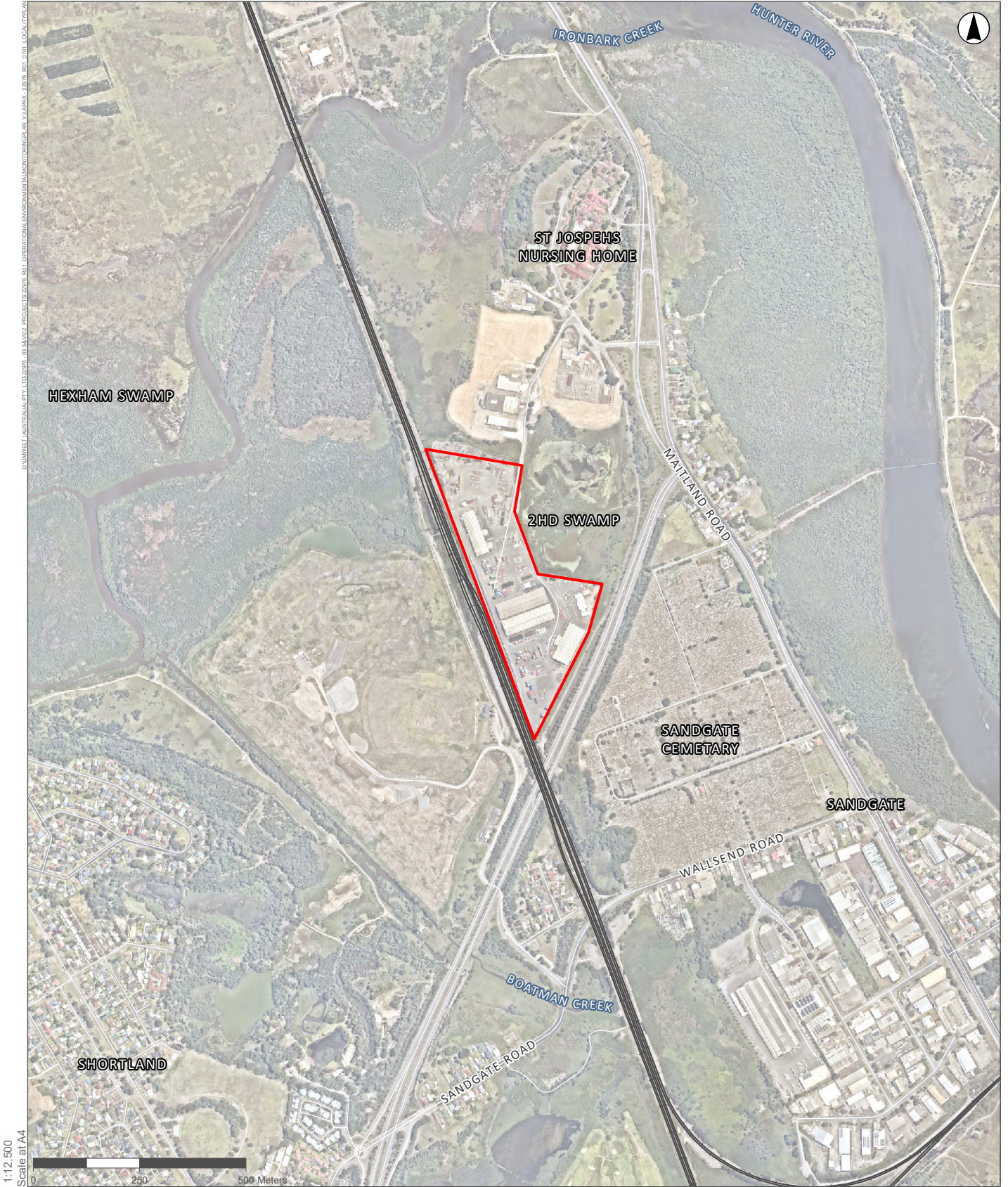
The site is located at Lot 12 DP 625053 Old Maitland Road, Sandgate, New South Wales (NSW) and has an area of 8.77 hectares (ha). The site is situated approximately 10 kilometres (km) to the north-west of Newcastle Central Business District and approximately 6.7 km west-north-west of industrial operations on Kooragang Island, NSW, within the local government area of Newcastle. A site locality plan is presented in **Figure 1.1**. Access to the site is via Old Maitland Road, off the Pacific Highway. **Figure 1.2** shows the site layout.

Crawfords manages and operates a rail siding at the site adjacent to the Main Northern Railway Line which runs along the western Facility boundary. The siding is used exclusively for trains servicing Crawfords Port Botany container transport operation. Crawfords have exclusive use of the siding. Trains operating to and from and accessing the siding are operating under the direction of Crawfords. Crawfords have engaged '3801 Limited' to operate trains servicing the siding. 3801 Limited hold current accreditation as a train operator on the track network.

The operational boundary for entering the Crawfords siding is M106.8 (202) signal on the up main line located at 171.957 km (from Sydney). The operational boundary for departing the Crawfords siding is SS106.7 (235) signal within the Crawfords siding located at 171.685 km.

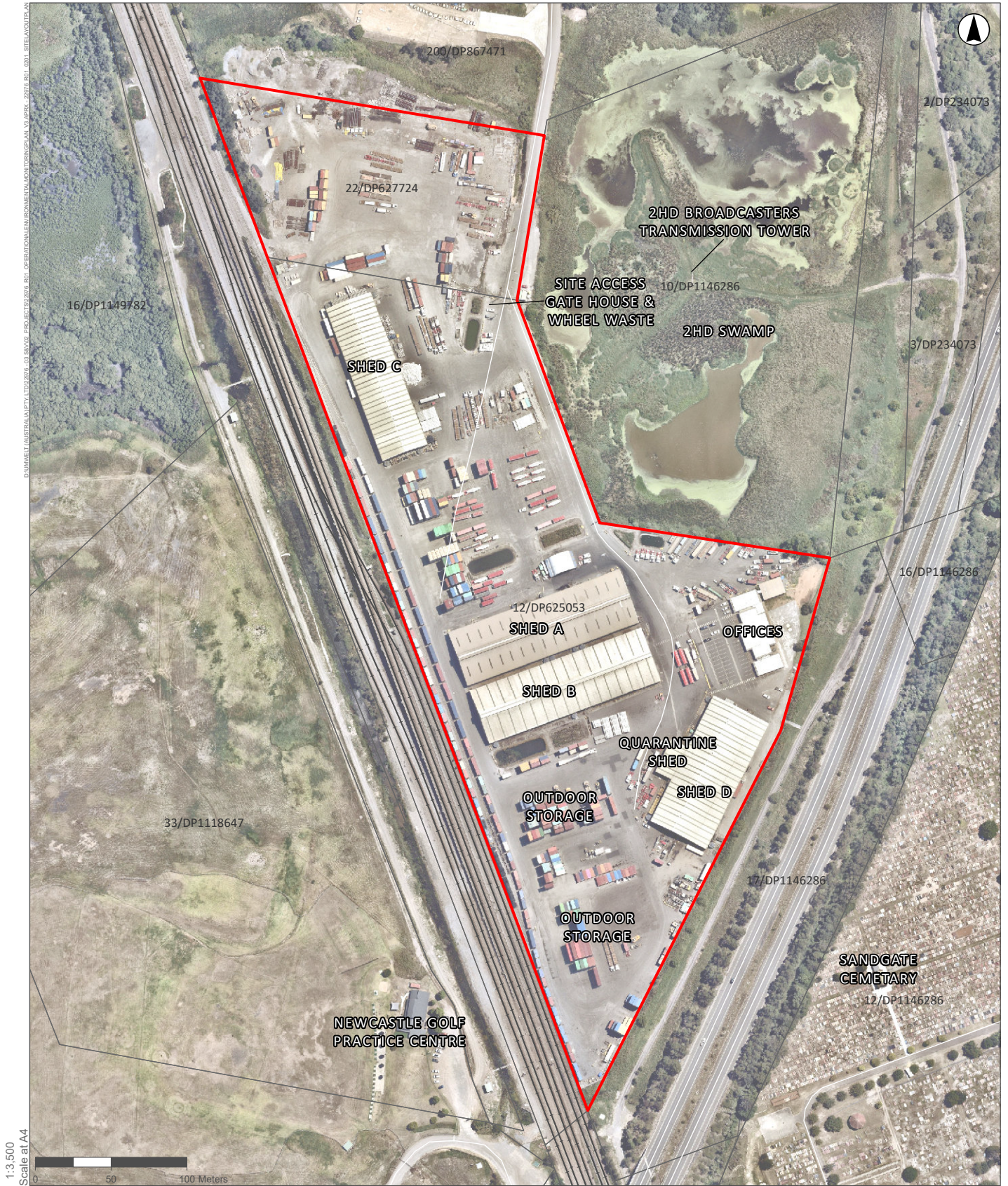
The track maintenance boundary is aligned with signal SS106.7 (235) at the operational boundary at 171.685 km.

Crawfords is responsible for the management of maintenance over its managed track beyond this point away from the Australian Rail Track Corporation's (ARTC's) main line. Crawfords is also responsible for inspection of the walkway adjacent to the up main line.



- Legend
- Railway
  - Project Site

**FIGURE 1.1**  
Locality Plan



1:3,500  
Scale at A4

GDA2020 MGA Zone 56

- Legend**
- Railway
  - Lot Boundary
  - Project Site

**FIGURE 2.1**  
Site Layout Plan



## 1.3 Purpose and Scope

This Noise and Vibration Management Plan (NVMP) has been prepared to address the requirements of applicable legislation and approval conditions of the development. The purpose of the NVMP is to present the project-specific operational noise control mitigation, management measures and monitoring program that will be implemented at the site during operations. The purpose of these mitigation measures and monitoring program are to minimise noise disturbance of surrounding residents from operations at the site.

The NVMP forms part of the broader Operational Environmental Management Plan (OEMP) for the Facility and should be read in conjunction with the OEMP.

## 1.4 Statutory Context

The NVMP has been prepared in accordance with the following legislation and guidelines. ERM's Noise and Vibration Impact Assessment – *Crawfords Freightlines Ammonium Nitrate Storage Facility – Lot 12 Old Maitland Road, Sandgate (NSW)*, dated July 2012 (ERM, 2012c), has also been referred to.

### 1.4.1 Legislation, Policies and Guidelines

The NVMP has been prepared with consideration of the following legislation and guidelines:

- Protection of the Environment Operation Act 1997 (POEO Act)
- Industrial Noise Policy (INP) (NSW, EPA, 2000)
- Noise Policy for Industry (NPfI) (NSW EPA, 2017)
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (AS 1055:2018)
- Assessing Vibration – A Technical Guideline (the Vibration Guideline) (DEC, 2006).

### 1.4.2 ERM's Noise and Vibration Impact Assessment (2012)

ERM's Noise and Vibration Impact Assessment (ERM, 2012c) assessed operational noise and vibration at the identified nearest surrounding sensitive receivers. Specifically, the assessment considered potential acoustic impacts generated by uses at storage Shed A, Shed B, Shed C, Shed D and the outdoor compound.

The findings of the operational site noise impact assessment indicated that:

- Unmitigated site noise levels were predicted to be at or below the daytime (7.00 am to 6.00 pm) noise criteria at all sensitive receiver locations.
- During the evening (6.00 pm to 10.00 pm) and morning shoulder (6.00 am to 7.00 am) periods, predictions determined that noise mitigation was required to achieve the noise criteria at Receiver R8.
- Following the implementation of the recommended mitigation measures, the assessment showed that negligible impacts (less than 1 dB(A) exceedance) were predicted during evening and morning shoulder period at Receiver R8.

- The potential risk of road traffic noise or any vibration impacts is limited and the magnitude of any impacts was determined to be insignificant. Additional road traffic noise or any vibration control mitigation and/or management measures (or monitoring) to those already implemented on site following normal good operational practices, were not recommended.
- Site operations were not determined to generate perceptible levels of vibration at any receivers. However, Crawford’s will continue to manage site vibration following good operational practices. In the unlikely event that vibration generating sources are introduced to the site these will be mitigated to achieve site vibration levels at or below the noise criteria, if necessary.

### 1.4.3 Development Consent

Table 1.1 presents the conditions of the Consent that are relevant to this Noise and Vibration Management Plan.

**Table 1.1 Relevant OEMP Development Consent Conditions (SSD 5119)**

Condition	Requirement	Section(s) Addressed																																												
<b>SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITION</b>																																														
<b>NOISE AND VIBRATION</b>																																														
<b>Noise Limits</b>																																														
24	<p>The Applicant shall ensure that the noise generated by the operations on-site does not exceed the limits in Table 1 at any private residential receiver.</p> <p><i>Table 1: Noise impact assessment criteria dB(A)</i></p> <table border="1"> <thead> <tr> <th rowspan="2">Location</th> <th>Day</th> <th>Evening</th> <th colspan="2">Night</th> </tr> <tr> <th>L<sub>Aeq</sub>(15 minute)</th> <th>L<sub>Aeq</sub>(15 minute)</th> <th>L<sub>Aeq</sub>(15 minute)</th> <th>L<sub>A1</sub> (1 minute)</th> </tr> </thead> <tbody> <tr> <td><b>R1</b> Residence on Blanch Street</td> <td>39</td> <td>39</td> <td>39</td> <td>54</td> </tr> <tr> <td><b>R3</b> Residence on Astra Street</td> <td>42</td> <td>42</td> <td>42</td> <td>54</td> </tr> <tr> <td><b>R4</b> Residence on Wallsend Road</td> <td>42</td> <td>42</td> <td>42</td> <td>55</td> </tr> <tr> <td><b>R5</b> Residence on Wallsend Road</td> <td>42</td> <td>42</td> <td>42</td> <td>54</td> </tr> <tr> <td><b>R6</b> Residence on eastern side of Pacific Highway</td> <td>60</td> <td>57</td> <td>54</td> <td>54</td> </tr> <tr> <td><b>R7</b> Residence on western side of Pacific Highway</td> <td>60</td> <td>57</td> <td>54</td> <td>54</td> </tr> <tr> <td><b>R8</b> St Joseph’s Aged Care Complex</td> <td>43</td> <td>40</td> <td>39</td> <td>54</td> </tr> </tbody> </table> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>• To identify a residential receiver location, refer to Appendix C of this consent and Appendix I of the EIS;</li> <li>• Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy; and</li> <li>• To avoid doubt, the responsibility for noise generated by trains off-site in the corridor of the Main Northern Railway Line lies with the owner and/or lessee of that corridor.</li> </ul>	Location	Day	Evening	Night		L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)	<b>R1</b> Residence on Blanch Street	39	39	39	54	<b>R3</b> Residence on Astra Street	42	42	42	54	<b>R4</b> Residence on Wallsend Road	42	42	42	55	<b>R5</b> Residence on Wallsend Road	42	42	42	54	<b>R6</b> Residence on eastern side of Pacific Highway	60	57	54	54	<b>R7</b> Residence on western side of Pacific Highway	60	57	54	54	<b>R8</b> St Joseph’s Aged Care Complex	43	40	39	54	<b>Section 2.2 and Section 3</b>
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<b>NOISE AND VIBRATION</b>																	
<b>Operating Hours</b>																	
25	<p>The Applicant shall comply with the operating hours in Table 2 for the site, unless otherwise agreed in writing by the Director-General.</p> <p><i>Table 2: Operating Hours</i></p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Day</th> <th>Hours</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Construction</td> <td>Monday - Friday</td> <td>7.00am – 6.00pm</td> </tr> <tr> <td>Saturdays</td> <td>8.00am – 1.00pm</td> </tr> <tr> <td>Sundays and Public Holidays</td> <td>Nil</td> </tr> <tr> <td rowspan="2">Operations</td> <td>Monday - Sunday</td> <td>6.00 am to 10.00 pm</td> </tr> <tr> <td>Public Holidays</td> <td>Nil</td> </tr> </tbody> </table>	Activity	Day	Hours	Construction	Monday - Friday	7.00am – 6.00pm	Saturdays	8.00am – 1.00pm	Sundays and Public Holidays	Nil	Operations	Monday - Sunday	6.00 am to 10.00 pm	Public Holidays	Nil	<b>Section 2.3</b>
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Operations	Monday - Sunday	6.00 am to 10.00 pm															
	Public Holidays	Nil															
<b>Operating Conditions</b>																	
26	The Applicant shall:	<b>Section 3.1</b>															
	(a) implement best management practice, including all reasonable and feasible measures to prevent and minimise noise and vibration during construction and operation of the development (including low frequency noise and traffic noise);																
	(b) minimise the noise impacts of the development during adverse meteorological conditions when noise criteria do not apply;	<b>Section 3.1 and Section 3.2.1</b>															
	(c) maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not used operationally until fully repaired; and	<b>Section 3.1</b>															
	(d) regularly assess noise monitoring data and relocate, modify and/or stop operations to ensure compliance with the relevant conditions of this consent.	<b>Section 3.1 and Section 3.3</b>															
<b>Noise Management</b>																	
27	The Applicant shall prepare and implement a Noise and Vibration Management Plan for the development in consultation with the EPA and to the satisfaction of the Director-General. The plan must:																
	(a) be prepared and implemented by a suitably qualified and experienced expert;																
	(b) be approved by the Director-General prior to the commencement of operations;	Refer to OEMP and Appendix A															
	(c) describe the measures that will be implemented to minimise noise and vibration from the operation of the development and ensure: <ul style="list-style-type: none"> <li>▪ best management practice is being employed on site;</li> <li>▪ traffic noise is effectively managed;</li> </ul>	<b>Section 3</b>															

Condition	Requirement	Section(s) Addressed
<b>SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITION</b>		
<b>NOISE AND VIBRATION</b>		
	<ul style="list-style-type: none"> <li>▪ the noise impacts of the development are minimised during any meteorological conditions when the noise criteria in this consent do not apply; and</li> <li>▪ compliance with the relevant conditions of this consent.</li> </ul>	
	(d) describe the noise management system;	<b>Section 3</b>
	(e) includes a noise monitoring program that: <ul style="list-style-type: none"> <li>▪ is capable of evaluating the performance of the development;</li> <li>▪ includes a protocol for determining exceedances of the relevant conditions of this consent and responding to complaints;</li> <li>▪ adequately supports the noise management system;</li> <li>▪ evaluates and reports on the effectiveness of the noise management system; and</li> <li>▪ includes a protocol for the implementation of further mitigation in consultation with the EPA in the event that the development is found not to be complying the conditions of this consent.</li> </ul>	<b>Section 3.3</b>
<b>Noise Validation</b>		
28	Within 2 months of the commencement of operations, the Applicant shall undertake Noise Compliance Monitoring. <p>(a) be undertaken by a suitably qualified and experienced expert in consultation with the EPA;</p> <p>(b) be submitted as a report to the EPA and the Department within 2 weeks of its completion;</p> <p>(c) be undertaken to present worst-case noise operations during a period of combined truck and rail operations as described in Annexure I of the EIS;</p> <p>(d) include noise monitoring undertaken at day, evening and night (including shoulder periods), as defined in the EPA’s Industrial Noise Policy, over 3 consecutive operating days for a minimum of:</p> <ul style="list-style-type: none"> <li>▪ 1.5 hours during the day;</li> <li>▪ 30 minutes during the evening; and</li> <li>▪ 1 hour at night.</li> </ul> <p>(e) compare the noise monitoring results against the noise modelling predictions (including that for shoulder periods) in the EIS;</p>	Noise validation monitoring completed. Summary of findings included within <b>Section 3.3.1</b> and report within <b>Appendix B.</b>

Condition	Requirement	Section(s) Addressed
<b>SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITION</b>		
<b>NOISE AND VIBRATION</b>		
	(f) identify whether the project is complying with the development noise limits specified in Condition 24 of this Schedule; and	
	(g) outline the mitigation measures to be implemented if exceedences of the development noise limits (Condition 24) or the noise modelling predictions in the EIS are identified, to the satisfaction of the Director-General.	

#### 1.4.4 EIS Recommendations / Commitments

Table 1.2 presents the management and mitigation measures relevant to this NVMP, recommended as part of the EIS (ERM, 2012c).

**Table 1.2 Recommended Management and Mitigation Measures**

Item	Management and/or Mitigation Measure	Section(s) Addressed
<b>Operational Noise – Evening and morning shoulder period</b>		
1	Heavy vehicle drivers should be instructed to quietly enter and exit the site and should be instructed to limit extended periods of vehicle idling time. Where vehicle idling is unavoidable ERM recommends that Crawford’s utilise on site structures (e.g. buildings or shipping containers etc) to obstruct noise sources from the nearest sensitive receptor location, where practical.	<b>Section 3.2.1</b>
2	The use of mobile plant motion alarms should be limited. Plant and equipment usage on site should be optimised during these periods to maximise forward motion, which will reduce motion alarms that typically sound in reverse. Where this is not achievable ERM recommends that Crawfords investigate visible alarms (i.e. flashing lights instead of audible alarms) or installs “squashed duck” type alarms which are known to be less intrusive than standard alarms fitted to most plant and equipment, although use of such alarms should still be satisfactory to achieve occupational health and safety requirements.	<b>Section 3.2.1</b>
3	The use of large forklifts (i.e. 36T) should be limited. Furthermore, where large forklift usage is required, the operators should be instructed to quietly operate the equipment following normal good operational practices.	<b>Section 3.2.1</b>
4	Continue to manage potential high noise level generating events, which cause potential sleep disturbance, to occur after the morning shoulder period (i.e. after 7am) to assist in minimising the risk of potential noise impacts.	<b>Section 3.2.1</b>

Item	Management and/or Mitigation Measure	Section(s) Addressed
<b>Operational Noise Monitoring</b>		
4	Within three months of the recommencement of operations, operator attended noise measurements be undertaken by a qualified and suitable experienced acoustician to verify actual site noise level contributions at a representative number of the closest and/or potentially most affected noise sensitive receptors in near proximity to the site. These measurements should be undertaken during rail and truck combined operations, where practical and completed with due regard to and in accordance with the requirements specified in AS 1055 and the INP.	Noise validation monitoring completed. Summary of findings included within <b>Section 3.3.1</b> and report within <b>Appendix B.</b>
5	The results of these measurements should be compared to the applicable daytime, evening and morning shoulder period PSNL presented in this report to determine INP compliance.	
6	The findings of this INP compliance assessment should be used to verify the effect of noise management measures implemented on site and to identify any additional measures that should be considered by Crawfords to assist in reducing operational noise levels and the risk of potential impacts for sensitive receptors located in the vicinity of the site.	
7	Where measured operational noise levels are determined to comply with the INP criteria, no further actions are required to those already taken to reduce noise at the time of the operator attended noise measurements.	

### 1.4.5 Environment Protection Licence

The Facility operates under Environmental Protection Licence (EPL) 20295 issued under the Protection of the Environment Operations Act 1997 (NSW Government). EPL 20295 includes the following conditions relating to noise:

#### L3 Noise Limits

- L3.1 Where a noise limit has not been prescribed, all operations and activities occurring on the premises must be conducted in a manner that will not cause offensive noise.
- L3.2 Noise generated at the premises must not exceed the noise limits presented in the table below. The noise limits in the table below represent the noise contribution from the premises. The locations referred to in the table are identified as shown in Figure 5.21 of the "Ammonium Nitrate Storage and Distribution Facility EIS for Crawfords Freightlines" prepared by ERM dated December 2012.

### Noise Limits dB(A)

Location	Day LAeq (15 minute)	Evening LAeq (15 minute)	Night LAeq (15 minute)	Night LA1 (1 minute)
R1 - Residence at 49 Blanch Street, Shortland	39	39	39	54
R3 - Residence at 24 Astra Street, Shortland	42	42	42	54
R4 - Residence on Wallsend Road, Sandgate	42	42	42	54
R5 - Residence on Wallsend Road, Sandgate	42	42	42	54
R6 - Residence on eastern side of Pacific Highway, Sandgate	60	57	54	54
R7 - Residence on western side of Pacific Highway, Sandgate	60	57	54	54
R8 - St Joseph's Aged Care Facility, Sandgate	43	40	39	54

Note: For the purpose of the condition above:

- a) Day is defined as the period from 7:00 am to 6:00 pm Monday to Saturday and 8:00 am to 6:00 pm Sunday and Public Holidays.
- b) Evening is defined as the period 6:00 pm to 10:00 pm.
- c) Night is defined as the period from 10:00 pm to 7:00 am Monday to Saturday and 10:00 pm to 8:00 am Sunday and Public Holidays.

L3.3 The noise limits set out in the Noise Limits table above apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- c) Stability category G temperature inversion conditions.

For the purposes of this condition:

- d) Data recorded by a representative meteorological station must be used to determine meteorological conditions; and
- e) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L3.4 Noise from the premises is to be measured or computed at the most noise-affected point at the receptors listed in the Noise Limits table above.

a) with the Leq(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located:

- i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
- ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
- iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.

b) with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located within 1 metre of a dwelling façade.

c) with the noise limits in the Noise Limits table, the noise measurement equipment must be located:

- i) at the most affected point at a location where there is no dwelling at the location; or
- ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

For the purpose of noise measurement required for this condition, the LAeq noise level must be measured or computed for the required period (i.e. 15 minutes or full day, evening or night) using "FAST" response on the sound level meter.

Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternate means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).

Note: A non-compliance of the Noise Limits table will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- i) at a location other than an area prescribed in part (a) and part (b); and/or
- ii) at a point other than the most affected point at a location.

L3.5 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L3.6 Definitions:

- NSW Industrial Noise Policy – the document entitled "New South Wales Industrial Noise Policy" published by the Environment Protection Authority in January 2000.
- Noise – sound pressure levels for the purposes of condition L3.1 to L3.5.



## **R1 Annual return documents**

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance – Licence Conditions,
4. a Statement of Compliance – Load based Fee,
5. a Statement of Compliance – Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance – Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance – Environmental Management Systems and Practices.

## **M4 Recording of pollution complaints**

M4.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies. M4.2 The record must include details of the following:

- a) the date and time of the complaint;
- b) the method by which the complaint was made;
- c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- d) the nature of the complaint;
- e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
- f) if no action was taken by the licensee, the reasons why no action was taken.

M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

## **M5 Telephone complaints line**

M5.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M5.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M5.3 The preceding two conditions do not apply until 1 month the date of the issue of this licence.

## 1.5 Roles and Responsibilities

Environmental management at the Facility is the responsibility of all employees with the Health, Safety, Security, Environment (HSSE) & Compliance Manager having overall responsibility for environmental management of the operations. Roles and responsibilities for implementation of this NVMP for key personnel at the Facility are outlined in **Table 1.3**.

**Table 1.3 Noise Sensitive Residential Receiver Locations**

Role	Responsibility
Director	Provide sufficient resources to enable full implementation of this plan
HSSE & Compliance Manager	<ul style="list-style-type: none"> <li>• Oversee the implementation of this plan.</li> <li>• Have working knowledge of this plan.</li> <li>• Coordinate the implementation of noise management measures and strategies in accordance with this plan.</li> <li>• Coordinate the review of this plan.</li> <li>• Ensure all noise management measures and monitoring are undertaken in accordance with the requirements of this plan.</li> <li>• Be aware of the environmental legislative requirements associated with the Facility and take measures to ensure compliance.</li> <li>• Ensure employees are competent through training and awareness programs.</li> </ul>
HSSE Officer/Coordinator	<ul style="list-style-type: none"> <li>• Coordinate the noise management measures and monitoring described in this plan.</li> <li>• Evaluate and report monitoring results as required by the Consent and Environment Protection Licence (EPL).</li> <li>• Coordinate noise management measures and reporting as required by legislation.</li> <li>• Initiate investigations of complaints as received from the public or government agency.</li> <li>• Provide primary contact for complaints and supply follow-up information to any complainant.</li> <li>• Prepare a report to government agencies following non-compliances.</li> </ul>
Site Manager	<ul style="list-style-type: none"> <li>• Monitor and manage noise emission from the Facility and liaise with any approved contractors (as relevant) to minimise noise emissions and disturbance.</li> </ul>
Employees and Contractors	<ul style="list-style-type: none"> <li>• Comply with all requirements in this plan.</li> <li>• Report all potential environmental incidents to the HSSE Officer immediately.</li> <li>• Operate in a manner that minimises the risk of noise complaints and noise emission to themselves, fellow workers or the surrounding environment.</li> </ul>

## 1.6 Consultation

This NVMP has been submitted to the EPA. Records of consultation are provided in **Appendix A**.

## 2 RECEIVERS, NOISE LIMITS AND OPERATIONAL HOURS

### 2.1 Noise Sensitive Receivers

ERM's Noise and Vibration Impact Assessment (ERM, 2012c) presented the project-specific noise sensitive residential receiver locations for operational assessments. These locations are described in **Table 2.1** and shown in **Figure 2.1**. Noise emissions from the site will be managed and assessed at these locations during operations, where relevant.

**Table 2.1 Noise Sensitive Residential Receiver Locations**

ID	Description	GPS Coordinates (56h)		Direction from site	Distance from site (m)	Elevation (m)
		Easting	Northing			
R1	Residence on Blanch Street	377728	6362297	Southwest	907	2.4
R2	Newcastle Golf Practice Centre	378565	6362177	Southwest	213	4.6
R3	Residence on Astra Street	378807	6362092	South	574	5.8
R4	Residence on Wallsend Road	379159	6362222	South	726	7.7
R5	Residence on Wallsend Road	378906	6362965	Southeast	842	10.3
R6	Residence on eastern side of Pacific Highway	378970	6363002	East	523	12.2
R7	Residence on western side of Pacific Highway	378622	6363491	East	448	13.5
R8	St Joseph's Aged Care Complex	378411	6362560	North	431	4.5
R9	Industrial receptor located within the same industrial area and south of Old Maitland Road	378498	6363182	North	749	5.5

### 2.2 Noise Limits

The project specific noise limits as presented in Condition 24 of SSD-5119 and Condition L3 of EPL 20295 and are reproduced in **Table 2.2**. Residential receiver locations where noise limits apply are shown in **Figure 2.1**.

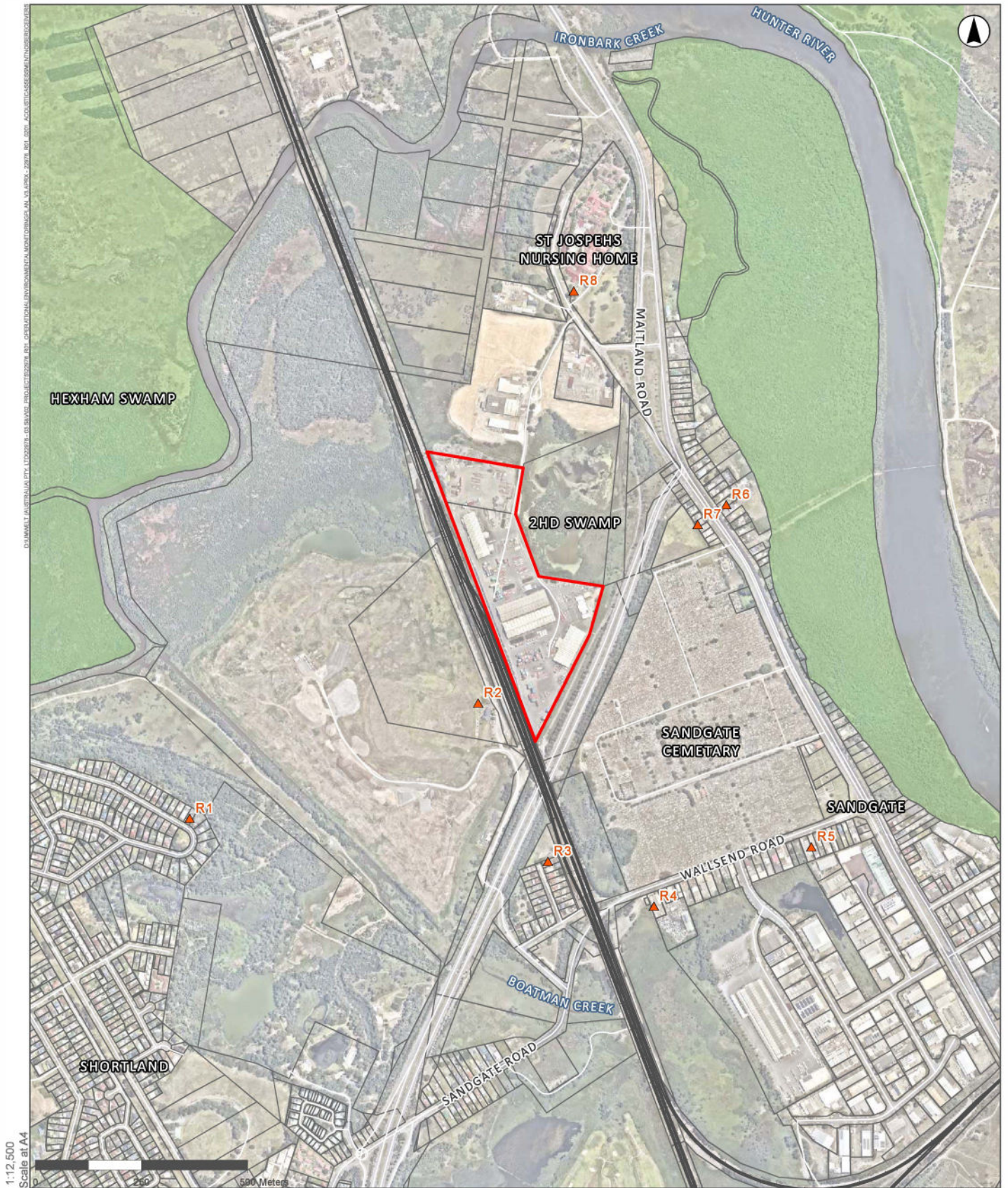
Crawfords will ensure that the noise generated by the operations on site do not exceed the limits at any private residential receiver.

**Table 2.2 Noise Limits**

Description	Day	Evening	Night	
	LAeq(15 Minute)	LAeq(15 Minute)	LAeq(15 Minute)	LA1(1 Minute)
R1 Residence on Blanch Street	39	39	39	54
R3 Residence on Astra Street	42	42	42	54
R4 Residence on Wallsend Road	42	42	42	55
R5 Residence on Wallsend Road	42	42	42	54
R6 Residence on eastern side of Pacific Highway	60	57	54	54
R7 Residence on western side of Pacific Highway	60	57	54	54
R8 St Joseph's Aged Care Complex	43	40	39	54

**Notes**

1. to identify a residential receiver location, refer to Figure 2.1 of this NVMP, Appendix C of consent SSD-5119 this consent and/or Annexure I of the EIS;
2. noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy; and
3. to avoid doubt, the responsibility for noise generated by trains off-site in the corridor of the Main Northern Railway line lies with the owner and/or lessee of that corridor.



1:12,500  
Scale at A4

GDA2020 MGA Zone 56

- Legend**
- ▲ Noise Sensitive Receiver and Monitoring Location
  - Railway
  - Lot Boundary
  - Project Site
  - NPWS Reserve

**FIGURE 2.1**  
**Noise Monitoring Locations**

## 2.3 Hours of Operation

In accordance with Condition 25 of SSD-5119, operations will be restricted to the approved operating hours detailed in **Table 2.3**. No out of hours works will be undertaken unless otherwise agreed in writing by the EPA.

**Table 2.3 Hours of Operation**

Activity	Day	Hours
Operations	Monday–Sunday	6:00 am–10:00 pm
	Public Holidays	Nil

## 3 NOISE MANAGEMENT SYSTEM

This section presents the overview strategy, the noise mitigation and management measures and the noise monitoring program developed to meet the requirements of Condition 26, Condition 27 and Condition 28 Schedule 3 of SSD-5119.

### 3.1 Overview Strategy

In accordance with Condition 26 Schedule 3 of SSD-5119, Crawfords will:

- Implement best management practice, including all reasonable and feasible measures to prevent and minimise noise and vibration during operation of the development (including low frequency noise and traffic noise).
- Minimise the noise impacts of the development during adverse meteorological conditions when noise criteria do not apply.
- Maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not used operationally until fully repaired.
- Regularly assess noise monitoring data and relocate, modify and/or stop operations to ensure compliance with the relevant conditions of this consent.

## 3.2 Mitigation and Management Measures

### 3.2.1 Specific Noise Measures

The following noise mitigation and management measures will be adopted during the evening and morning shoulder period operations:

- Instruct heavy vehicle drivers to quietly enter and exit the site and to limit extended periods of vehicle idling time. Where vehicle idling is unavoidable during these periods Crawfords will, if deemed appropriate, utilise on site structures to shield heavy vehicles from the nearest sensitive receptor location, where practical.
- Limit the use of mobile plant motion alarms. Plant and equipment usage on site will be optimised during these periods to maximise forward movement, which will reduce motion alarms that typically sound in reverse. Where this is not achievable Crawfords will:
  - Investigate visible alarms (i.e. flashing lights instead of audible alarms) or install broadband type alarms which are known to be less intrusive than standard tonal beeper alarms.
  - Investigate “smart” alarms which limit the acoustic range to the immediate danger area.
  - Use of such alarms will still be satisfactory to achieve occupational health and safety requirements.
- Limit the use of large forklifts (i.e. 36T). The use of large forklifts will be limited during these periods to moving full containers only. Where large forklift usage is required, the operators will be instructed to quietly operate the equipment following normal good operational practices.
- Continue to manage potential high noise level generating events, which cause potential sleep disturbance, to occur after the morning shoulder period (i.e. after 7:00 am) to assist in minimising the risk of potential noise impacts.
- Noise enhancing conditions are often associated with cooler early morning periods. Therefore, from May through to September noise generating activities during the morning shoulder period will be minimised, or, where possible, delayed until the day period.

### 3.2.2 General Noise and Vibration Measures

The following general noise management measures will be implemented on site:

- Schedule the use high noise level generating equipment to occur during the least sensitive times of day, where possible. Based on noise logging data presented in ERM 2012c this is between 7:00 am and 9:00 am and then between 4:00 pm and 6:00 pm on weekdays where ambient noise levels are at their highest, and most likely to mask site noise contributions.
- Utilise on site structures (e.g. buildings or shipping containers etc) to obstruct high noise level generating equipment from the nearest sensitive receptor location, where practical. Furthermore, work tasks will be designed to maximise the distance from the critical noise source to the receiver, where possible.

- Ensure that all permanent staff will be aware and cognisant of the project- specific noise limits and the need to employ “quiet” operational practices wherever possible. Non-permanent staff (e.g. sub-contractors on site for limited periods) will be advised of the project-specific noise limits on a case by case base, for example during their visitor induction, and actions taken to reduce noise levels associate with their work, if necessary.
- Ensure that any existing equipment is maintained to be in good working order and ensure defective plant is not used operationally until fully repaired. Noise emission levels of any new plant will be considered during procurement to ensure the quietest equipment is used on site, where feasible and reasonable.
- Consider the use of enclosures and silencing exhausts (muffler design and barrier systems) for any high noise level generating plant and equipment.
- Perceptible levels of vibration (and any vibration impacts) are unlikely to be generated at the closest and/or potentially most affected receiver locations in the vicinity of the site. Therefore, the potential risk of vibration impacts is limited, and the magnitude of any impacts will be insignificant. Nevertheless, existing equipment will be maintained to be in good working order. Also, any new equipment that generates vibration which is perceptible by Crawford's staff onsite, will be investigated to check if the vibration is perceptible off site. If required, the services of a suitably qualified and experienced acoustician will be obtained.

### **3.3 Noise Monitoring Program**

#### **3.3.1 Noise Validation**

Noise validation monitoring was undertaken by Environmental Resources Management Australia Pty Ltd (ERM) on behalf of Crawfords in May 2015. The monitoring was undertaken to address Condition 28 Schedule 3 of SSD-5119 and EIS recommendations and commitments. The noise validation monitoring report is included in Appendix B.

The findings of the noise validation monitoring, presented within Section D of the report, are reiterated below:

- Site noise events and associated emissions were inaudible for the majority of the time. Site emissions were audible and barely detectable during 14 of the 23 measurements. The duration of observed noise events varied between 5 and 40 seconds (total duration for each applicable measurement) and typically associated with the infrequent use of motion alarms and metal-on-metal contact from activities on site. Whilst audible these site noise events did not dominate the acoustics environment at any of the identified sensitive receptors (R1, and R3 to R8), where extraneous noise emissions (mostly road traffic noise) prevailed as the most significant noise in the area.
- Meteorological conditions included temperatures between approximately 10°C and 20°C, average wind speeds of between 0.5 m/s and 4 m/s (generally from a westerly or north-westerly direction) and cloud coverage of 0/8 octas (clear skies).



- The results, presented in Table 4 of Appendix B, identify that worst-case noise emissions associated with site operations comply with the applicable LA<sub>eq,15</sub> minute noise limits contained in EPL 20295 and SSD-5119, at all assessed receptor locations.
- The results, presented in Table 5 of Appendix B, identify that worst-case noise emissions associated with site operations comply with the applicable LA<sub>1,1</sub> minute noise limits contained in EPL 20295 and SSD-5119, at all assessed receptor locations.

A comparison of the measured noise levels to the predicted values presented in the impact assessment indicates that actual site noise level contributions are lower than those predicted.

The impact considered both calm and adverse weather conditions. Allowing for a potential increase (< 1dB) in noise levels associated with prevailing noise enhancing winds and temperature inversions site noise level contributions may increase to be closer to the predicted values but would still be expected to remain below the applicable ELP 20295 and SSD-5119 noise limits.

### **3.3.2 Noise Compliance Monitoring**

Annual compliance noise monitoring is to be undertaken to address Condition 26 (d) and Condition 27 (e) Schedule 3 of SSD-5119. Crawfords will engage a suitably qualified and experienced acoustician to undertake one round of noise monitoring per year to determine compliance and assist in ensuring that the noise generated by the operations on-site does not exceed the limits.

Noise compliance monitoring will be completed at a representative number of the closest and/or potentially most affected residential receivers in proximity to the site. The locations are to be confirmed by the engaged acoustician but at a minimum should include three (3) receiver locations with one of them being Receiver R8.

Monitoring will be undertaken during the day (7:00 am to 6:00 pm), evening (6:00 pm to 10:00 pm) and night (10:00 pm to 7:00 am), including morning shoulder (5:00 am to 7:00 am) assessment periods, at each location for a minimum of:

- 30 minutes during the day and evening
- 15 minutes at night.

Note in accordance with Condition L3.4 of the EPL, where it is demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternate means of determining compliance. Chapter 11 of the INP details that where existing noise levels are high, it may difficult to separate out the source noise level and quantify site noise, as existing noise levels are higher than noise levels from the source. When this happens, it may not be feasible to measure compliance at the specified location, and other methods will be needed. In these cases, measurements may be taken closer to the source and then calculated back to the specified location.

### 3.3.3 Additional Noise Compliance Monitoring

The importance of monitoring noise as a tool for managing site emissions and minimising complaints (as well as investigating complaints) is recognised by Crawfords. Following noise validation, additional noise monitoring will be undertaken if:

- Changes to site operations are made that would potentially increase noise levels (or increase impacts to residential receivers) to those measured during validation; or
  - In this situation, a suitably qualified and experienced acoustician will be engaged to determine the risk of potential noise increase, prior to the purchase / rental / adoption of the equipment / alternative operations.
- Noise complaints are received, and noise monitoring will assist to investigate the complaint.

The noise monitoring methodology will be determined by a suitably qualified and experienced acoustician and with due regard to the monitoring requirements described above, where relevant.

Note in accordance with Condition L3.4 of the EPL, where it is demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternate means of determining compliance. Chapter 11 of the INP details that where existing noise levels are high, it may be difficult to separate out the source noise level and quantify site noise, as existing noise levels are higher than noise levels from the source. When this happens, it may not be feasible to measure compliance at the specified location, and other methods will be needed. In these cases, measurements may be taken closer to the source and then calculated back to the specified location.

## 3.4 Determining Compliance

Exceedances will be determined by comparing the measured site noise level contribution to the noise limits presented in **Table 2.2** of this NVMP. Where site noise levels are below the noise limits the site will be determined to comply. Where the site noise levels are above the noise limits an exceedance will be identified.

Crawfords maintain ultimate control of the site's noise emissions, however, it is the responsibility of the qualified and suitably experienced acoustician to determine compliance and to inform Crawfords immediately. Any actions which result are the responsibility of the Site Manager or in their absence from site, a nominated authority.

## 3.5 Additional Measures

The findings of the validation / compliance monitoring described above will be used to verify the effect of noise management measures implemented on site and to identify any additional measures that will be considered by Crawfords to reduce operational noise levels to compliant levels, and the risk of potential impacts for sensitive receptors located in the vicinity of the site.

Where measured operational noise levels are determined to comply with the noise limits (i.e. no exceedances are identified), no further mitigation will be implemented to that already provided to reduce noise at the time of the operator attended noise measurements.

Where measured operational noise levels are not determined to comply with the noise limits (i.e. an exceedance is identified), further mitigation will be implemented and additional noise monitoring undertaken to quantify the effect of the additional measures, and to identify compliance.

In addition to the above, the Site Manager will periodically check the site and nearby residences and other sensitive land uses (refer **Table 2.1**), where access is possible, for noise problems so that solutions can be quickly applied.

In the highly unlikely event that that facility experiences on-going issues complying with the noise limits, Crawford's will consider and implement further noise mitigation and management measures in consultation with the EPA and DPE.

## **3.6 Reporting**

### **3.6.1 Validation Monitoring**

The findings of the validation noise monitoring described above will be submitted as a report to the EPA and the Department within two weeks of its completion. The report will be prepared by the acoustics expert engaged to undertake the monitoring works.

The report will also summarise any additional (to those already provided to reduce noise at the time of noise monitoring) noise control mitigation and/or management measures implemented on site, if any.

The report will present the findings and recommendations of any additional noise monitoring undertaken following implementation of additional noise control mitigation and/or management measures.

### **3.6.2 EPL Annual Return**

Under condition R1 of EPL 20295 (refer to Section 1.4.5), Crawfords are required to submit an Annual Return to the EPA at the end of each reporting period. The annual reporting period for EPL 20295 is 18 July to 17 July. At the end of each reporting period, the EPA will provide Crawfords with a notification indicating that the Annual Return is due.

The Annual Return is required to include the following information in relation to noise:

- The number of complaints in relation to noise received by Crawfords during the reporting period.
- Results of any additional noise monitoring (validation, compliance or otherwise) undertaken over the reporting period.

### 3.7 Managing Complaints

During operational hours, Crawfords operate a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence. So that the public is notified, the complaints telephone line is detailed on the front gate of the site and can be located on Crawfords website.

Noise complaints arising from operations will be treated sensitively and in a manner that recognises the potential for site operations to cause environmental impacts.

Noise complaints will be immediately investigated to determine likely causes, including noise generated by the Facility and from off-site sources outside of Crawfords control. Should the generation of noise associated with the complaint be found to be associated Facility operations, Crawfords will act swiftly to:

- mitigate any ongoing excessive noise generation (e.g. relocate or cease the noise generating activity)
- identify any ongoing additional noise mitigation measures to minimise the potential of similar noise levels to occur in the future
- provide prompt feedback to the complainant as to the cause of the excessive noise as far as can be practically determined and what is being done to mitigate noise generation.

Should the generation of excessive noise associated with the complaint be found to be associated with activities off-site that are not within Crawfords control, Crawfords will:

- where possible, notify the party responsible for the noise generating activity, of the issue and request mitigation measures be implemented
- notify the complainant that the excessive noise emission is considered to be outside of Crawfords operation control and provide any details of the suspected cause of the excessive noise that is/was the subject of the complaint.

Recording of noise complaints will be undertaken in accordance with condition M4 of EPL 21295 (refer to **Section 1.4.4**).

## 4 REFERENCES

*Ammonium Nitrate Storage and Distribution Facility Environmental Impact Statement—Final*, ERM, 2012.

*Ammonium Nitrate Storage and Distribution Facility Noise and Vibration Impact Assessment*, ERM, 2012.

*Protection of the Environment Operation Act 1997*.

*Industrial Noise Policy*, NSW Environment Protection Authority, 2000.

*Noise Policy for Industry*, NSW Environment Protection Authority, (2017).

*Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise*.

*Assessing Vibration – A Technical Guideline*, Department of Environment and Conservation, 2006.

## APPENDIX A – AGENCY CONSULTATION

## APPENDIX B – NOISE VALIDATION MONITORING

## Noise Validation Monitoring (Technical Report)

<b>Project Number:</b>	0286425	<b>Date:</b>	29 May 2015
<b>Project Name:</b>	Crawfords Freightlines - Ammonium Nitrate Storage Facility	<b>Subject:</b>	Crawfords Noise Validation Monitoring
<b>Prepared by:</b>	Nathan Lynch	<b>Reference:</b>	0286425RP01_F01 - Crawfords Noise Validation Monitoring.docx
<b>Authorised for Release:</b>	Steve O'Connor		

### 1. OVERVIEW

This document has been prepared by Environmental Resources Management Australia Pty Ltd (ERM) on behalf of Crawfords Freightlines Pty Ltd (Crawfords) to assess environmental noise (via monitoring) associated with the ammonium nitrate storage facility located at Lot 12 Old Maitland Road, Sandgate in New South Wales (NSW).

This noise validation monitoring has been undertaken to validate the predicted noise levels presented in the *Crawfords Freightlines - Ammonium Nitrate Storage Facility - Lot 12 Old Maitland Road, Sandgate (NSW) - Noise and Vibration Impact Assessment* prepared by ERM and dated July 2012 (the impact assessment). The impact assessment recommended, amongst other things, that operator attended noise measurements be undertaken by a qualified and suitable experienced acoustician to verify actual site noise level contributions at a representative number of the closest and/or potentially most affected noise sensitive receptors in near proximity to the site.

Furthermore this noise validation monitoring was completed to address the noise conditions presented in the NSW Government – Department of Planning and Infrastructure (DoPI) - *Development Consent - SSD-5119 Final Consent (SSD-5119)*, dated 13 June 2013; and the NSW Government – EPA – *Environment Protection Licence 20295 and Revocation of Prevention Notice (EPL 20295)*, dated 18 July 2013 as far as practical.

### 2. SITE DESCRIPTION

The site is located on Old Maitland Road, Sandgate (NSW) approximately 9.8 kilometres (km) north-west of the Newcastle Central Business District and 6.7 km west-north-west of industrial operations on Kooragang Island. The depot is situated within a small light industrial area.

The site is bound by the main Northern Railway (Newcastle-Maitland (Hunter) railway line) to the west and south, where rail container deliveries are made; the Newcastle Inner City Bypass (Shortland to Sandgate); Sandgate Cemetery and the Pacific Highway to the east and Old Maitland Road to the north; the Hunter River is situated approximately 820 metres (m) to the east between Sandgate and Kooragang Island.

ERM notes that at the time the impact assessment was undertaken the Newcastle Inner City Bypass (Shortland to Sandgate) was under construction. During the validation monitoring construction of the bypass was complete and operational. Extraneous noise events (not associated with the site) attributable to the bypass, and other road traffic noise sources, were the dominant noise of the area.





a. SURROUNDING LAND USES

Land uses and activities directly surrounding the site are generally limited to minor industrial and commercial uses, and residential areas. To the west of the Northern Railway line (beyond the Hunter Wetlands area) is a residential area with receptors located on Blanch Street. The rears of these properties are approximately 800 metres from the site.

Directly adjacent and west of the site is the Newcastle Golf Range and Practice Centre; to the south of the site is a residential area with receptors located on Astra Street. Sandgate Cemetery and mixed industrial and residential areas are located to the south east of the site. Further to the east is the Pacific Highway which has a strip of residential receptors and a commercial development directly fronting the highway.

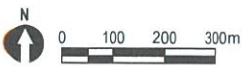
These land uses are exposed to significant existing road traffic noise from the highway. To the north of the site are other industrial premises situated within the same industrial area as the Crawfords site and the St Joseph's Home (residential aged care) and St Joseph's Village (independent living), which are on the northern side of Old Maitland Road.

*Site Layout and Locality*

The Crawfords ammonium nitrate storage facility, surrounding land uses and other items relevant to this noise validation assessment are visually represented in *Figure 1* and *Figure 2*. *Figure 3* presents all potentially sensitive receptors considered in the impact assessment. In accordance with EPL 20295 and SSD-5119 noise validation monitoring was only completed at sensitive receptors R1, and R3 to R8.



**Legend**  
 Site Boundary  
 Cadastre



**Source:**  
 - nearmap imagery  
 date 8 May 2015  
 - DCDB 2015

Client:	Crawfords Freightlines
Drawing No:	0286425s_NVM_G001_R0.mxd
Date:	29/05/2015
Drawn By:	GC
	Reviewed By: NL

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

**Figure 1 - Locality Map**

Noise Validation Monitoring  
 Old Maitland Road, Sandgate, NSW  
 Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch,  
 Melbourne, Newcastle, Perth, Port Macquarie, Sydney

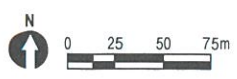




**Legend**

- Site Boundary
- Cadastre

**Source:**  
 - nearmap imagery  
 date 8 May 2015  
 - DCDB 2015



Client:	Crawfords Freightlines
Drawing No:	0286425s_NVM_G002_R0.mxd
Date:	29/05/2015
Drawn By:	GC
Drawing Size:	A4
Reviewed By:	NL

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

**Figure 2 - Site Layout Plan**

Noise Validation Monitoring  
 Old Maitland Road, Sandgate, NSW  
 Environmental Resources Management ANZ  
 Auckland, Brisbane, Canberra, Christchurch,  
 Melbourne, Newcastle, Perth, Port Macquarie, Sydney





**Legend**

- Site Boundary
- Cadastre
- ▲ Noise Validation Monitoring (Receptor) Locations

**Source:**  
 - nearmap imagery date 8 May 2015  
 - DCDB 2015

**Scale:**  
 0 100 200 300m


<b>Client:</b>	Crawfords Freightlines
<b>Drawing No:</b>	0286425s_NVM_G003_R0.mxd
<b>Date:</b>	29/05/2015
<b>Drawn By:</b>	GC
<b>Drawing Size:</b>	A4
<b>Reviewed By:</b>	NL

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

**Figure 3 - Acoustic Assessment Map**

Noise Validation Monitoring  
 Old Maitland Road, Sandgate, NSW

Environmental Resources Management ANZ  
 Auckland, Brisbane, Canberra, Christchurch,  
 Melbourne, Newcastle, Perth, Port Macquarie, Sydney



### 3. VALIDATION MONITORING METHODOLOGY

The methodology adopted to measure site noise level contributions for the purposes of this noise validation monitoring assessment are outlined below:

- Noise validation monitoring was completed with due regard to the documents, policy, standards and guidelines listed in the reference section of this report.
- Noise validation monitoring occurred during the daytime (7am to 6pm), evening (6pm to 10pm) and night time (10pm to 7am) assessment periods over two consecutive days. Night time monitoring occurred directly before and during the morning shoulder (5am to 7am) assessment period where combined rail and truck operations were expected (and then observed) to occur.
- ERM visited the site on Thursday, 7 May and Friday, 8 May 2015 and completed short-term (15 minute) operator attended noise compliance and validation measurements at sensitive receptors R1, and R3 to R8. These locations are shown in Figure 3 and described in Section 3a.
- A total of 23 operator 15 minute attended noise measurements were completed. A total of 2.25 hours of data was captured during the daytime, 1.75 hours during the evening and 1.75 hours during the night time.
- Prior to the monitoring ERM completed a site walkover to confirm that the site was operating under normal conditions during the two day monitoring period and to identify that the key noise generating plant, equipment and machinery listed in the impact assessment were in use.
- The site was operating normally and the key noise emitting sources were observed to include forklifts, light vehicles, motion alarms, train transfer and loading activity (morning shoulder period only), heavy vehicles/trucks and the infrequent use of a mobile conveyor. Other equipment was in use however the contribution to the overall noise from the site was considered insignificant.
- All measurements were conducted by trained ERM personnel; with due regard to, and in accordance with, the relevant standards for environmental noise monitoring listed in the reference section of this report. The measurement instrumentation used to complete the assessment complied with the requirements of AS 61672.1 and AS/IEC 60942 with current NATA calibration certificates, with certification at intervals not exceeding two years at the time of use.
- The equipment used for this assessment included one Brüel & Kjær 2250 Investigator (Type 1) Sound Analyser and one Brüel & Kjær 4231 (Type 1) Sound Level Calibrator.
- Instrument calibration was checked prior to monitoring and again at the conclusion with no difference noted between the two measurements. All data handling and analysis has been completed by a member of the Australian Acoustical Society.
- All noise level values presented in this document are expressed in dB(A) re:  $2 \times 10^{-5}$  Pa.



a. POTENTIALLY SENSITIVE RECEPTORS

The potentially sensitive receptors where noise validation monitoring was completed are presented in *Table 1* and identified in *Figure 3*.

*Table 1 – Noise Validation Monitoring (Receptor) Locations*

ID	Description	MGA (Zone 56) Coordinates		Direction and Distance from Site Centre	
		Easting	Northing	Compass point	~Distance, m
R1	Residential receptor located on Blanch Street	377728	6362297	South-west	910
R3	Residential receptor located on Astra Street	378565	6362177	South	575
R4	Residential receptor located on Wallsend Road	378807	6362092	South	725
R5	Residential receptor located on Wallsend Road	379159	6362222	South-east	840
R6	Residential receptor located on the eastern side of the Pacific Highway	378970	6363002	East	525
R7	Residential receptor located on the western side of the Pacific Highway	378906	6362965	East	450
R8	St Joseph's aged care and independent living	378622	6363491	North	700

b. NOISE LIMITS

The noise limits that apply at each of the potentially sensitive receptors where noise validation monitoring was completed are presented in *Table 2*.

*Table 2 – Noise Limits (R1, and R3 to R8)*

ID	Daytime	Evening	Night time	
	LAeq, 15minute	LAeq, 15minute	LAeq, 15minute	LA1, 1minute
R1	39	39	39	54
R3	42	42	42	54
R4	42	42	42	54
R5	42	42	42	54
R6	60	57	54	54
R7	60	57	54	54
R8	43	40	39	54

1. Daytime: 7am to 6pm - Monday to Saturday or 8am to 6pm on Sundays and Public Holidays;  
 2. Evening: 6pm to 10pm; and  
 3. Night time: all remaining periods.

c. EPL 20295 AND SSD-5119 NOISE CONDITIONS

EPL 20295 and SSD-5119 are broadly similar regarding their requirements for noise monitoring however SSD-5119 specifies that monitoring should be completed over three consecutive operating days. This requirement is not specified in EPL 20295. ERM has undertaken the noise validation monitoring to meet the requirements of EPL 20295 and SSD-5119 as far as practical however monitoring occurred over two consecutive days. This is considered adequate for the site as:

- Daily works are regular and repeatable in nature and noise monitoring was planned to coincide with worst-case combined truck and rail operations;
- The overall noise environment of the area is dominated by road traffic noise not associated with the site that masks site noise events so that they are generally inaudible at nearby receptors; and
- Compliance with EPL 20295 can be achieved adopting this marginally reduced scope method, as the three consecutive day's requirement is not part of the EPL.

d. DETERMINING COMPLIANCE

Site noise level contributions have been determined in the absence of any influential extraneous noise emission sources not associated with the site.

Due to the influence of extraneous noise emissions (not associated with the site) site noise emissions could not be directly measured during all measurements. For the majority of the time the site was inaudible (masked by extraneous emissions) and was not detectable with a sound level meter. On other occasions, site noise emissions were infrequently audible despite the influence of extraneous emissions. To determine site noise level contributions and to demonstrate compliance, site noise values have been calculated based on operator noise event observations (level and duration) made during each measurement and review of audio files.

To account for the inaudible content, ERM has logarithmically added an estimated site background noise level contribution to any observed LAeq, 15minute and LA1, 1 minute site contributions. The inaudible content was estimated by deducting 20 dB from the measured overall LA90 value for each measurement.

These additional steps were undertaken to ensure that site noise emissions are conservatively and comprehensively assessed for compliance despite being inaudible for the majority of the time. Where site noise level contributions remained inaudible for the duration of the measurement the site contribution was estimated by again deducting 20 dB from the measured overall LA90.

In all cases the reported values for inaudible or infrequently audible site noise emissions considered all applicable INP modifying (penalty) factors e.g. for tonality or low frequency content. To determine compliance, the site noise level contributions (LAeq, 15minute and LA1, 1 minute) are compared to the noise limits previously presented in *Table 2*.

#### 4. RESULTANT NOISE LEVELS

This section presents the measured overall (site plus all other emissions in the area) noise levels for the noise validation monitoring conducted in Thursday, 7 May and Friday, 8 May 2015 and a comparison of site noise emissions to the applicable LAeq, 15 minute and LA1, 1 minute noise limits.



a. OVERALL NOISE LEVELS

The measured overall ambient and background noise levels are presented in *Table 3* including all relevant statistical and acoustical parameters i.e.  $L_{max}$ ,  $L_{min}$ ,  $L_{eq}$ ,  $L_1$ ,  $L_{10}$  and  $L_{90}$ .

*Table 3 – Measured Overall Noise Levels – 7 May and 8 May 2015*

Receiver ID	Assessment Period	Date	Start Time (24 Hour)	Measured Overall Noise Levels					
				$L_{max}$	$L_{min}$	$L_{eq}$	$L_1$	$L_{10}$	$L_{90}$
8	Daytime	07/05/15	10:30	80	50	58	66	60	53
6			11:00	93	57	76	85	79	63
5			11:21	91	51	71	81	75	56
4			11:43	87	49	71	81	74	58
3			12:06	76	47	65	73	70	52
1			12:32	72	41	49	57	51	44
7			12:59	81	52	62	68	64	56
7	Evening		18:02	74	51	61	67	64	56
8			18:21	75	48	58	67	64	51
6			18:44	87	54	72	83	77	60
5			19:05	83	45	68	78	72	50
4			19:24	95	46	69	80	71	51
3			19:45	74	40	60	70	64	48
1			20:09	64	33	42	52	41	35
5	Night time	08/05/15	04:35	87	49	67	78	71	52
4			04:53	84	49	66	77	69	52
7			05:13	82	52	68	78	73	57
8			05:36	78	49	60	72	63	52
6			05:55	89	55	75	85	79	61
3			06:17	81	49	65	73	70	53
1			06:39	69	41	52	62	55	44
3	Daytime		07:25	84	49	63	71	68	52
8			07:46	80	51	62	74	63	54

1. Daytime: 7am to 6pm - Monday to Saturday or 8am to 6pm on Sundays and Public Holidays;  
 2. Evening: 6pm to 10pm; and  
 3. Night time: all remaining periods.

b. COMPARISON TO LAeq, 15 MINUTE LIMITS

A comparison of resultant site noise level contributions to the applicable  $L_{Aeq, 15 \text{ minute}}$  noise limits is presented in *Table 4*. These site noise level contributions have been determined from each measurement as previously described in *Section 3*, in the absence of any influential extraneous noise emission sources not associated with the site.



Table 4 – Comparison to LAeq, 15 minute Noise Limits

Receiver ID	Assessment Period	Start Time (24 Hour)	Noise Compliance Assessment (LAeq, 15 minute)		
			Noise Limit	Site Noise Level Contribution	Comply with Limit?
8	Daytime	10:30	43	≤33	Yes
6		11:00	60	≤43	Yes
5		11:21	42	≤36	Yes
4		11:43	42	≤38	Yes
3		12:06	42	≤32	Yes
1		12:32	39	<30	Yes
7		12:59	60	≤38	Yes
7	Evening	18:02	57	≤38	Yes
8		18:21	40	≤34	Yes
6		18:44	57	≤40	Yes
5		19:05	42	≤30	Yes
4		19:24	42	≤31	Yes
3		19:45	42	<30	Yes
1		20:09	39	<30	Yes
5	Night time	04:35	42	≤34	Yes
4		04:53	42	≤32	Yes
7		05:13	54	≤37	Yes
8		05:36	39	≤32	Yes
6		05:55	54	≤41	Yes
3		06:17	42	≤35	Yes
1		06:39	39	<30	Yes
3	Daytime	07:25	42	≤34	Yes
8		07:46	43	≤36	Yes

1. Daytime: 7am to 6pm - Monday to Saturday or 8am to 6pm on Sundays and Public Holidays;  
 2. Evening: 6pm to 10pm; and  
 3. Night time: all remaining periods.

c. COMPARISON TO LA1, 1 MINUTE NOISE LIMITS

A comparison of resultant site noise level contributions (for each night time measurement) to the applicable LA1, 1 minute noise limits is presented in Table 5. These site noise level contributions have been determined from each measurement as previously described in Section 3, in the absence of any influential extraneous noise emission sources not associated with the site.

Table 5 – Comparison to LA1, 1 minute Noise Limits

Receiver ID	Assessment Period	Start Time (24 Hour)	Noise Compliance Assessment (LA1, 1 minute)		
			Noise Limit	Site Noise Level Contribution	Comply with Limit?
5	Night time	04:35	54	≤41	Yes
4		04:53	54	≤35	Yes
7		05:13	54	≤38	Yes
8		05:36	54	≤38	Yes
6		05:55	54	≤42	Yes
3		06:17	54	≤41	Yes
1		06:39	54	<30	Yes
1. Daytime: 7am to 6pm - Monday to Saturday or 8am to 6pm on Sundays and Public Holidays; 2. Evening: 6pm to 10pm; and 3. Night time: all remaining periods.					

d. DISCUSSION

The findings of the noise validation monitoring are summarised below:

- Site noise events and associated emissions were inaudible for the majority of the time. Site emissions were audible and barely detectable during 14 of the 23 measurements. The duration of observed noise events varied between 5 and 40 seconds (total duration for each applicable measurement) and typically associated with the infrequent use of motion alarms and metal-on-metal contact from activities on site. Whilst audible these site noise events did not dominate the acoustics environment at any of the identified sensitive receptors (R1, and R3 to R8), where extraneous noise emissions (mostly road traffic noise) prevailed as the most significant noise in the area;
- Meteorological conditions included temperatures between approximately 10° and 20°C, average wind speeds of between 0.5m/s and 4 m/s (generally from a westerly or north-westerly direction) and cloud coverage of 0/8 octas (clear skies).
- The results presented in Table 4 identify that worst-case noise emissions associated with site operations comply with the applicable LAeq, 15 minute noise limits contained in EPL 20295 and SSD-5119, at all assessed receptor locations;
- The results presented in Table 5 identify that worst-case noise emissions associated with site operations comply with the applicable LA1, 1 minute noise limits contained in EPL 20295 and SSD-5119, at all assessed receptor locations; and
- A comparison of the measured noise levels to the predicted values presented in the impact assessment indicates that actual site noise level contributions are lower than those predicted. The impact considered both calm and adverse weather conditions. Allowing for a potential increase (<1 dB) in noise levels associated with prevailing noise enhancing winds and temperature inversions site noise level contributions may increase to be closer to the predicted values but would still be expected to remain below the applicable EPL 20295 and SSD-5119 noise limits.



## 5. RECOMMENDATIONS

As stated in the impact assessment, where measured noise levels are determined to comply with criteria, no further actions are required to those already taken to reduce noise at the time of the monitoring. Furthermore, site noise levels were measured to comply with the noise limits presented in EPL 20295 and SSD-5119.

ERM makes no additional recommendations for noise mitigation, management measures or monitoring options but notes that Crawfords continues to manage noise generated by site plant, equipment and machinery, and operates within the noise conditions of their approval.

## 6. CONTACTS

ERM trust this noise validation monitoring and assessment meets Crawford's requirements. Any questions or queries regarding the findings presented in this document please do not hesitate to contact Nathan Lynch on (02) 8584 8888 or via email at [nathan.lynch@erm.com](mailto:nathan.lynch@erm.com).

For Environmental Resources Management Australia Pty Ltd

A handwritten signature in black ink, appearing to read 'Nathan Lynch'.

Nathan Lynch  
Project Manager

A handwritten signature in black ink, appearing to read 'S. O'Connor'.

Steve O'Connor  
Technical Director

## REFERENCES

**Crawfords Freightlines - Ammonium Nitrate Storage Facility - Lot 12 Old Maitland Road, Sandgate (NSW) - Noise and Vibration Impact Assessment (0143175RP01\_Final)**, dated July 2012

NSW Government – Department of Planning and Infrastructure (DoPI) - **Development Consent - SSD-5119 Final Consent (SSD-5119)**, dated 13 June 2013

**Ammonium Nitrate Storage Facility – Operational Environmental Management Plan (0143175\_OEMP)**, dated 7 August 2013. Specifically, the Noise and Vibration Management Plan (NVMP) presented in Section 5.3 of the overall OEMP

NSW Government – EPA – **Environment Protection Licence 20295 and Revocation of Prevention Notice (EPL 20295)**, dated 18 July 2013

NSW Government – DoPI document titled: **Crawfords Ammonium Nitrate Storage and Distribution Facility (SSD-5119) - Extension of Time for Noise Validation** (reference: 12/0230), dated 1 August 2013

NSW Environment Protection Authority – **NSW Environmental Noise Management – Industrial Noise Policy (INP)**, January 2000 and relevant application notes

Standards Australia AS1055–1997™ (AS1055) – **Description and Measurement of Environmental Noise**, Parts 1, 2 and 3

Standards Australia AS IEC 61672.1–2004™ (AS61672) – **Electro Acoustics - Sound Level Meters Specifications Monitoring**

Standards Australia AS/IEC 60942:2004/IEC 60942:2003 (IEC60942) – **Australian Standard™ – Electroacoustics – Sound Calibrators**

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