GLADSTONE NICKEL PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT

Updated Noise Report

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URS

Gladstone Pacific Nickel LTD

Gladstone Pacific Nickel

Proposed Nickel Refinery, Gladstone

Response to EIS Submission Queries & Comments

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Prepared for

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1 Introduction

ASK Consulting Engineers was commissioned by URS Pty Ltd on behalf of Gladstone Pacific Nickel Limited (GPNL) to carry out a noise impact assessment for the proposed high-pressure acid leach (HPAL) plant (refinery) to be located in the Yarwun Precinct of the Gladstone State Development Area (GSDA). The findings of the noise assessment were presented in the ASK report 3600R01, dated 19/12/2006, and were included in the Environmental Impact Statement (EIS) submission.

The purpose of this report is to provide additional information on the noise impact of the project, in response to responses and submissions from interested parties, including EPA, QR, Council, Port Authority and others. Some of the submissions request additional noise measurements, modelling, and/or analysis. This report should be read in conjunction with the original ASK report.

2 Project and Locality Information

The following overview of the project and locality has been extracted from ASK's original report.

2.1 Project Overview

The proposed refinery will produce nickel and cobalt metal. The location of the refinery is shown on Figure 2.1.

Stage 1 of the refinery will be built in two phases and will produce approximately 126,000 tonnes per annum of nickel and approximately 10,800 tonnes per annum of cobalt.

It is understood that the refinery will source 1.0 to 2.6 Mt/a of beneficiated ore directly from a proposed nickel and cobalt laterite mine at Marlborough, approximately 180 km north-west of Gladstone, via rail. Additional higher quality nickel laterite ore will be sourced from the South West Pacific via the Wiggins Island Coal Terminal.

The layout of the proposed refinery is shown in Appendix A.

2.2 Area Description

The proposed refinery is located in the Yarwun Precinct of the GSDA. The site is located to the south of Hanson Road, and is bounded by the Calliope River to the east and Reid Road to the west.

The Gladstone State Development Area (GSDA) is located approximately 15 kms to the north west of Gladstone. The Queensland Government established the GSDA in 1993, with the purpose of providing a large area of suitable land with ready access to a deep water port for large scale industrial

development. The GSDA now comprises the Clinton, Yarwun, Aldoga and Targinie precincts in Gladstone City and Calliope Shire and totals approximately 21,000 hectares.

Other industrial sites in the vicinity of the proposed refinery are Cement Australia, Comalco Refinery and Orica, which is located opposite the proposed refinery on the western side of Reid Road.

The site location is shown in **Figure 2.1**. Also shown in **Figure 2.1** are the noise logging locations **S1** to **S9**, and attended monitoring location **L2**, **L3** & **L4**. Note: Location **L1** is the same as location **S2**.

2.3 Sensitive Locations

The nearest sensitive locations are summarised in **Table 2.1** including the approximate distance from the proposed refinery.

Table 2.1: Nearest Sensitive Receivers (Refer Figure 2.1)

Site	Address	Distance from Proposed Refinery (Kilometres)	Direction from Proposed Refinery
S1	2B Linhow Crescent, Clinton	4.3 km	SE
S2	56 Fishermans Drive, Yarwun	3.4 km	NW
S3	748 Calliope River Road, Yarwun	5.0 km	SSW
S4	Mt Miller Road, Yarwun	2.4 km	SSE
S5	65 Stewart Road, Beecher	6.0 km	SSE
S6	68 Flinders Road, Gladstone	6.8 km	ESE
S7	12 Lord Street, Gladstone	7.8 km	E
S8	3 Lindherr Road, Yarwun	4.0 km	W
S9	1063 Calliope River Road, Yarwun	4.0 km	SW

Note: Long term noise monitoring was oringally undertaken by ASK at **S1** – **S4**, and more recently also at **S8** & **S9**. Connell Wagner carried out long term noise monitoring at **S5** – **S8**.

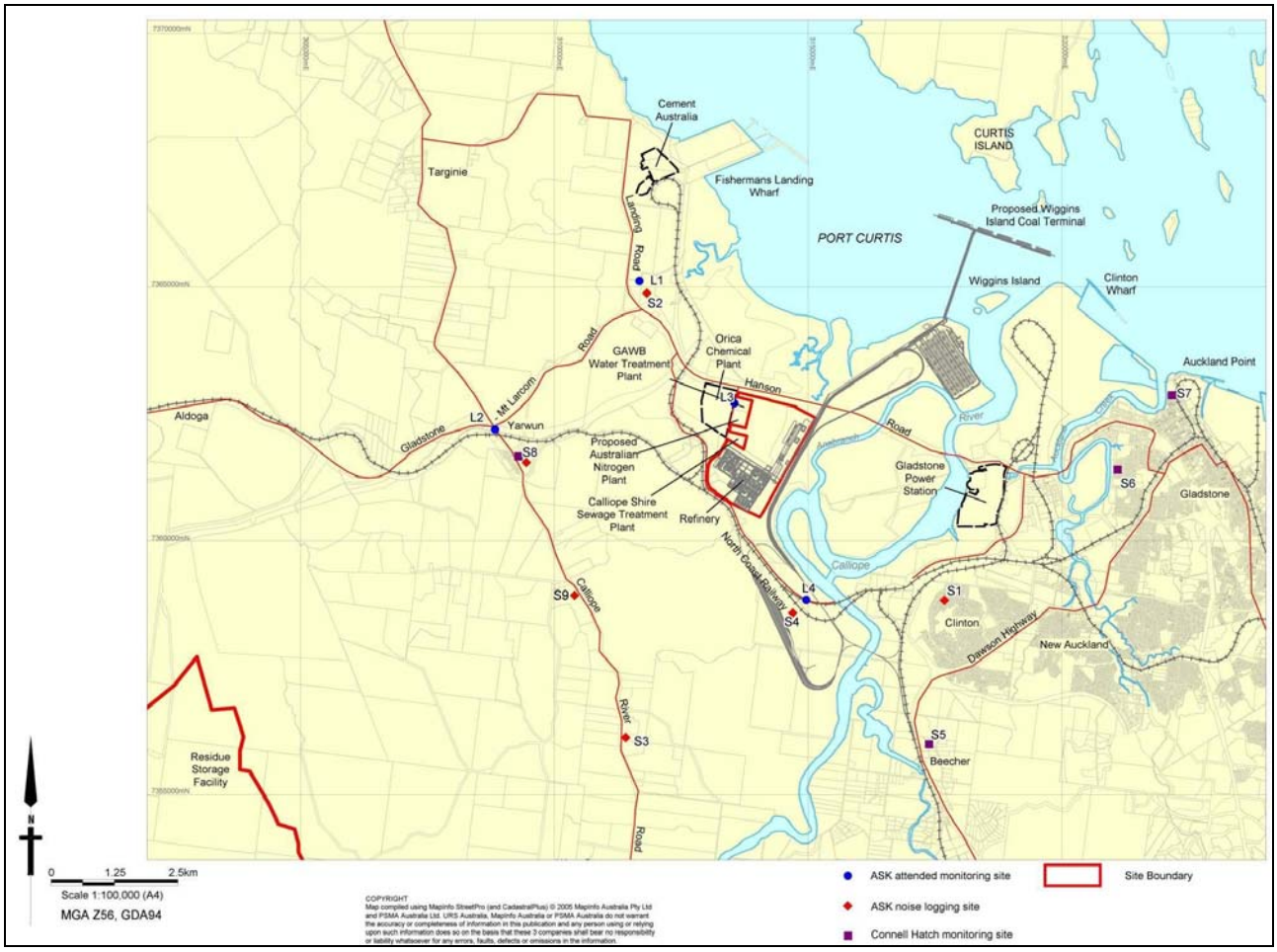

Figure 2.1: Site Locations

2.4 Proposed Refinery Operations

The processing plant will consist of a high pressure acid leach circuit followed by unit operations to neutralise, and precipitate metal values with hydrogen sulphide to produce an intermediate product of mixed nickel and cobalt sulphides. Metal refining will be achieved by re-leaching the mixed sulphides, followed by impurity removal, solvent extraction to separate nickel and cobalt, and recovery of metal by hydrogen reduction to produce metal briquettes.

The nickel and cobalt metal briquettes are exported via containers to a rail siding behind the refinery. Ammonium Sulphate is trucked to the Port of Gladstone by truck.

3 Response to Submissions and Responses

The following queries relating to ASK's report have been noted in the information package provided to ASK on 19/06/07. There may be other relevant queries in the information package but these have not been indicated by URS. Our comments follow.

- EPA p13 of 32, Section 8.8.2.2: Most of the project noise limits have been determined based on the lowest permissible background noise level of 25 dB(A). Thus additional noise monitoring will not change the noise limits at those locations. However, some of the locations are likely to be affected by insects and this was noted in our report. ASK's report recommended additional noise monitoring be conducted, and this is confirmed by the EPA's request. The results of this additional monitoring are included in this report.
- EPA p13 of 32, Section 8.8.4.3: ASK has generally found the PEN computer model (as used in our analysis) to be relatively accurate in the region of Gladstone. This is based on a series of measurements and noise modelling conducted at an industrial site near the subject site. ASK has remodelled the site using the SoundPLAN program which utilises the CONCAWE algorithms. The results of this modelling are included in this report.
- EPA p13 of 32, Section 8.8.5.6: No response required of ASK.
- EPA p32 of 32, Appendix N, Table 4.3: The results in Table 4.3 were not directly used for determining background noise and hence the measurement does not have to be 10 minutes. Shorter measurement periods are used in instances where the field engineer decides that the sample period is sufficient for understanding the noise source of interest. For example, a train passby measurement would not need to occur for 10 minutes.
- QR p4 of 4 plus Calliope Shire Council, pages 9 & 13 of 18: A rail noise analysis is provided in this report.
- CQPA fax page 7 & 8: A noise assessment of port operations is provided in this report.

4 Noise Monitoring

Recent noise monitoring included a combination of long-term (1 week) monitoring and short-term (15 minute) attended measurements.

4.1 Long Term Noise Monitoring Results

ASK Consulting Engineers carried out long term noise monitoring between Monday 23rd July and Monday 30th July 2007 using a calibrated ARL EL215 Type 2 environmental noise logger. The noise logger was configured to obtain statistics over 15 minute periods throughout the monitoring period. The long term noise measurements were carried out in accordance with the Environmental Protection Noise Policy (EPP(Noise)).

Long term noise monitoring was conducted at location S8, as described in Table 4.1 and included in Figure 2.1.

Table 4.1: Recent Noise Monitoring Locations

Location ID	Description	Monitoring Company
S8	Residence, 3 Lindherr Road, Yarwun	ASK

The measured noise levels at S8 are shown in Figure 4.1 and summarised in Table 4.2. The analysis of the long term noise monitoring was only undertaken for complete days of monitoring. The noise levels are expressed in terms of the Leq, L10 and the minL90. The L_{10} and L_{90} are respectively the A-weighted noise levels exceeded 10%, and 90% of the time. The L_{90} is commonly referred to as the background noise level. The L_{eq} is the energy average noise level containing the same acoustic energy as the actual fluctuating noise level.

The L_{eq} and L_{10} noise levels in Table 4.2 are the arithmetic average of all 15 minute periods during the period in question. The minL90 is the median of the daily lowest-10th-percentile value as defined in EPA EcoAccess guideline Planning For Noise Control.

The night-time background noise level is likely to have been limited by the noise floor of the noise logger, as often occurs when undertaking noise logging in rural areas. That is, the background noise levels were most likely lower than 25 dB(A), however, this is approximately the lowest measurable level on this noise logger. Using EcoAccess guidelines, the lowest background noise level to be used for assessment purposes is 25 dB(A), and this is considered appropriate for location S8 at night.

From Figure 4.1 it is evident that the background noise level was noticeably quieter for the last 3 nights, compared with the first 4 nights. The reason for the change is likely due to weather conditions.

Table 4.2: Summary of Measured Noise Levels at S8

Site	Monitoring Period	Noise Levels, dB(A)								
		Day			Evening			Night		
		L_{10}	*minL_{90}*	L_{eq}	L_{10}	*minL_{90}*	L_{eq}	L_{10}	*minL_{90}*	L_{eq}
S8	23/07/07 to 30/07/07	56	36	53	48	29	47	51	25*	49

Note: minL_{90} is the lower 10% of the L_{90} for the period in question as defined in the EPA EcoAccess guideline Planning For Noise Control.

* The measured minL90 was 26 dB(A), but this was likely limited by the instrument noise floor, hence a level of 25 dB(A) is proposed. This being the lowest recommended background noise level in the EcoAccess guidelines.

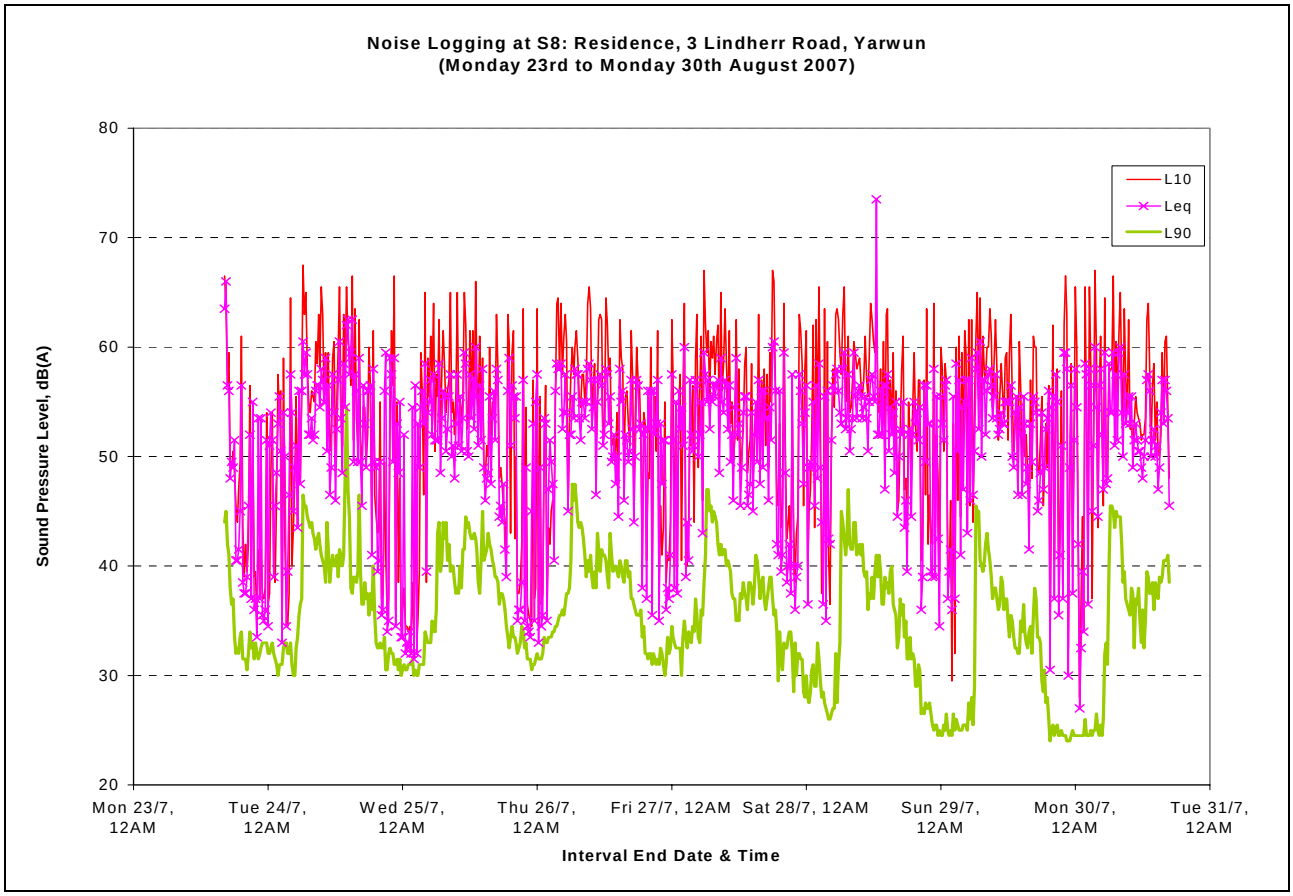

Figure 4.1: Noise Monitoring at Location S8

4.2 Attended Monitoring

Attended monitoring was conducted by ASK on 23rd to 24th July 2007 using a Larson David LD831 Type 1sound level meter, and on 30th July 2007 using a Rion NA27 Type 1 sound Level Meter. A summary of the results is included in **Table 4.3**.

Table 4.3: Summary of Attended Monitoring Results

Loc.	Date & Time	Period (Seconds)	L10, dB(A)	L90, dB(A)	Comments
S8	23/7/07, 4:03pm	11	70	66	Train passby with Lmax 72 dB(A)
S3	23/7/07, 4:56pm	310	41	30	Continuous noise from distant birds (30 to 40 dBA), variable wind blowing in trees, passing cars (41 to 47 dBA Lmax). Industrial noise inaudible.
Near S8	24/7/07, 1:00am	300	36	33	Industrial noise was easily audible, including reverse beepers. Industrial noise dominated the L10 & L90 levels, estimated at 35 dBA.
Between S8 & S9	24/7/07, 1:16am	313	35	29	Industrial noise was audible, but quieter than previous measurement. Industrial noise dominated the L90 levels, estimated at 30 dBA. Insects audible. Very light SE breeze and approximately 30% cloud cover. Train passby with Lmax 37 dBA.
S9	24/7/07, 1:28am	333	30	27	Industrial noise was audible, but quieter than previous measurement. Industrial noise dominated the L90 levels, estimated at 25 to 30 dBA. Insects audible, and noted at 4 kHz frequency band. Light breeze.
S3	24/7/07, 1:41am	169	27	22	Industrial noise was audible, but quieter than previous measurement. Industrial noise estimated at 20 to 25 dBA. Occasional noise from animals. Truck passby (B double) was only truck in 45 minutes. Very light breeze, fine, 100% clear, cool.

Loc.	Date & Time	Period (Seconds)	L10, dB(A)	L90, dB(A)	Comments
Near S3	24/7/07, 1:46am	N/A	N/A	N/A	No measurement, but audibility subjectively equal to previous measurement near S3.
S3	30/7/07, 2:47pm	234	41	29	Noise from birds, 1 truck, resident, and wind in trees. Easterly breeze, 100% clear and fine.
S9	30/7/07, 4:08pm	294	37	29	Noise from road traffic.
S8	30/7/07, 4:35pm	301	52	39	Noise from road traffic, farm animals, dogs and children Breeze, 100% clear and fine.
Between S8 & S9	30/7/07, 9:15pm	606	29	25	Industrial noise audible. Some insect noise
Near S9	30/7/07, 9:42pm	601	27	22	Industrial noise audible. Some insect noise
Near S3	30/7/07, 10:16pm	601	30	25	Industrial noise audible. Some insect noise

4.3 Discussion of Monitoring Results

At the attended noise monitoring sites located west of the mountain range (S3, S8 & S9), the measured noise levels were approximately 20 to 35 dB(A) on 23-24/07/07, whereas on 30/07/07 the noise levels were 22 to 25 dB(A) approximately.

From Figure 4.1 it can be seen that the night-time background noise level at location S8 was around 30 to 35 dB(A) on the first few nights, but reduced to 25 dB(A) on the latter nights. This is similar to the attended measurement results.

The reduction in noise levels is expected to be due to weather conditions, i.e. changes in the atmospheric temperature gradient and wind conditions.

5 Noise Modelling

5.1 SoundPLAN

ASK has conducted modelling of the proposed refinery using the SoundPLAN software, in addition to previous modelling using PEN software.

SoundPLAN is an internationally recognized noise modelling program, that uses 3D modelling techniques and a range of calculation algorithms to predict noise levels. The program is accepted by the EPA and local Councils.

The noise levels have been calculated using the Industrial Noise module of SoundPLAN, utilising the CONCAWE algorithms. The CONCAWE algorithms are regularly used for industrial projects in Queensland, as they are applicable to the calculation of noise level over medium to large distances.

5.2 Input Data

The noise source data for the SoundPLAN model was copied from the PEN model, and thus the same point noise sources and terrain features are in use.

The weather data in the SoundPLAN model is as follows:

- Neutral: Zero wind speed, 25 degreesC air temperature, 50% relative humidity; and
- Inversion: 1 m/s easterly wind, 20 degreesC air temperature, 25% relative humidity.

5.3 Results

The predicted noise level results using both the SoundPLAN and PEN programs is included in Table 5.1.

Table 5.1: SoundPLAN and PEN Noise Modelling Results

Location ID	SoundPLAN Predicted Noise Levels, LAeq,adj		PEN Predicted Noise Levels, LAeq,adj		Difference between SoundPLAN and PEN Predicted Noise Levels, LAeq,adj	
	Neutral	Inversion	Neutral	Inversion	Neutral	Inversion
S1	30	33	28	28	2	5
S2	41	44	31	41	10	3
S3	18	20	3	25*	15	-5
S4	40	44	35	33	5	11
S5	24	28	23	24	1	4
S6	22	24	22	20	0	4
S7	19	22	19	18	0	4
S8	22	22	7	28*	15	-6

Note: * These PEN results were calculated using zero windspeed as outlined in ASK report 3600R01.

From the results in Table 5.1 it is noted that the noise levels are relatively similar (i.e. within 5 dB(A)) at some locations (S1, S5, S6 & S7) but not locations S2 (neutral), S3 (neutral), S4 (inversion) & S8 (neutral & inversion).

At Location S2 (to the north), SoundPLAN is predicting significantly higher noise levels during neutral conditions. At Location S4 (to the south), SoundPLAN is predicting significantly higher noise levels during inversion conditions.

At Locations S5 to S7 the neutral results are very similar for the two modelling programs. The topography between the refinery and Locations S5 to S7 is relatively flat, so any terrain effect algorithm difference between the programs would be of little consequence, hence the similar results.

Locations S3 & S8 are located on the western side of a mountain range. Calculation of the noise path over a mountain range requires complex algorithms and the two programs handle these calculations in different ways. Generally PEN predicts that the mountains will block noise to the west during neutral conditions, as generally experienced in the day, whereas SoundPLAN's CONCAWE algorithms predicts higher noise levels. Conversely during inversions, PEN is predicting higher noise levels as its algorithms predict that noise will curve over the mountains.

5.4 Assessment

Rather than a discussion on the merits and deficiencies of the two noise modelling programs, it is proposed to assess both sets of results against the various noise criteria. The assessment is summarised in Table 5.2.

Table 5.2: Summary of Noise Assessment

Noise Criterion	Assessment of Results from PEN Model (as per ASK report 3600R01)	Assessment of Results from SoundPLAN Model
1. EcoAccess	All receptors acceptable with neutral or inversion conditions.	Exceedance at S1 at night (2 to 5 dBA), and S4 during day (1 dBA) & night (7 dBA).
2. WHO – Continuous	Sleep disturbance criterion is exceeded at S2 with temperature inversion conditions. Annoyance criterion is achieved at all receptors with neutral or inversion conditions.	Sleep disturbance criterion is exceeded at S2 & S4. Annoyance criterion is exceeded at S2 & S4 with inversion conditions.
3. WHO – Intermittent	Not considered relevant.	Not considered relevant.
4. Low Frequency	All receptors considered acceptable.	Not assessed.
5. 'Background Plus'	Exceedance at S2 with inversion conditions, and at S4 with neutral or inversion conditions.	Exceedance at S2 at night with inversion, and S4 during day & night.

From Table 5.2 it can be seen that the increase in noise levels with the SoundPLAN model results in a number of exceedences depending on which criterion is considered.

As before, exceedences are noted at Locations S2 & S4, which are in industrial areas. With SoundPLAN exceedences are now noted at Location S1, in the Gladstone suburb of Clinton.

At Location S1 the exceedance of the EcoAccess criterion is unlikely to cause complaint as the predicted noise levels, 30 to 33 dB(A) $L_{Aeq,adj}$, are well below the existing background noise level of 40 to 42 dB(A) L_{90}. The noise levels at this location are therefore considered acceptable.

It should also be acknowledged that the refinery is located within an approved industrial estate, and under Queensland EPA legislation, the EPP(Noise), the refinery is therefore considered a beneficial asset. This allows Council and the EPA to relax noise limits on the understanding that the industry provides economic benefits to the area.

Based on the predicted noise levels in Table 5.1 and the noise assessment above, the noise impact is considered compliant.

5.5 Discussion

It is not the purpose of this assessment to determine if one model is better than another model. Indeed it is not possible to confirm this without the nickel refinery operating. Both models have been site tested and considered "proven". In the case of SoundPLAN the testing and validation may be considered to have been conducted internationally, and the CONCAWE algorithms are widely accepted. In the case of PEN the testing and validation was conducted locally, and the algorithms are adopted from the widely accepted Bies & Hansen textbook.

The CONCAWE algorithms used in SoundPLAN for this modelling exercise are understood to be relatively simplistic in comparison with the more advanced sound curvature algorithms in PEN. This difference explains the higher noise predictions from PEN for results at locations S3 & S8 under inversion conditions, where PEN calculates the noise will curve over the mountains. The CONCAWE algorithms in SoundPLAN do not predict the same effect.

Based on noise monitoring at locations S3 & S8 that indicates existing industrial noise levels are up to 35 dB(A), it is apparent that industrial noise does diffract over the mountain range to the west. Therefore, it is considered likely that the higher noise level predictions from PEN at these two locations will be more representative than those from SoundPLAN.

6 Rail Noise

6.1 Input Data

Trains will utilise the existing rail network to get to the refinery, and will then utilise a new rail segment and unloading station on the south-east side of the site.

Information provided to ASK indicates that 3 trains per day are expected on this route.

The potential noise issues are as follows:

- Increased rail traffic on existing track; and
- Noise from rail unloading station.

6.2 Analysis of Rail Traffic

Data was obtained from QR with the number of train movements at Mt Miller, between Gladstone and Yarwun. The data was for the week 8 to 14th October 2007. On the weekdays, the typical number of daily train movements was 80, whereas on weekends the daily train movements was halved to approximately 40. The trains use the railway line 24 hours/day, 7 days/week.

The Client has indicated that the projected increase due to the project is 3 trains per day.

Given that the proposed trains will be similar to the existing trains, the increase of 3 trains per day, equates to a 4% increase on weekdays and 2% increase on weekends. These increases are minimal and it is not expected that residents near to the rail track would notice the difference. Therefore, on the basis of this data, the rail noise impact is considered acceptable.

6.3 Analysis of Rail Unloading Station

Based on ASK's noise data library, the typical sound power level of a rail unloading station is 118 dB(A).

The rail unloading station with sound power level of 118 dB(A), has been added to ASK's PEN noise model of the site, to determine the noise levels at existing residents. The station location is over 3.5km from the nearest residence.

The predicted noise levels with adverse meteorological conditions (i.e. night inversion) at receptor locations is detailed in Table 6.1.

Table 6.1: Predicted Noise Level from Rail Unloading Station

Receptor	Predicted Noise Level (Inversion Conditions), L_{eq}, dB(A)
S1	27
S2	25
S3	20
S4	30
S5	22
S6	23
S7	21

Receptor	Predicted Noise Level (Inversion Conditions), L_{eq}, dB(A)
S8	23

From Table 6.1 it can be seen that the predicted noise level is up to 30 dB(A) at Location S4. Location S4 is subject to existing background noise levels of 37 dB(A) to 42 dB(A), and therefore short periods of noise levels of up to 30 dB(A) would not normally be intrusive.

Noise levels at other locations are 20 dB(A) to 27 dB(A), which would not be expected to be intrusive given the existing noise environment.

Noise levels have not been modelled using the SoundPLAN model, but even allowing for typical model-to-model variations the noise levels are expected to be similar to those in Table 6.1.

Overall, noise from the rail unloading station is considered to be compliant.

7 Noise from Port Activities

7.1 Overview

The potential noise issues associated with the Port are as follows:

- The proposed ore and sulphur conveyors from the Wiggins Island Terminal; and
- Unloading operations at the Wiggins Island Terminal.

The two noise issues are addressed separately as follows.

7.2 Conveyors from Wiggins Island Coal Terminal to Site Stockpiles

The conveyors from the Wiggins Island Coal Terminal to Site Stockpiles have been modelled as enclosed conveyors using the PEN model. The predicted noise levels with adverse meteorological conditions (i.e. night inversion) at receptor locations are detailed in Table 7.1.

Table 7.1: Predicted Noise Level from Conveyors

Receptor	Predicted Noise Level (Inversion Conditions), L_{eq}, dB(A)
S1	26
S2	25
S3	14
S4	25
S5	17
S6	26
S7	25
S8	18

From Table 7.1 it can be seen that the predicted noise level is up to 26 dB(A) at Location S1. Noise levels of 14 dB(A) to 26 dB(A), which would not be expected to be intrusive given the existing noise environment.

Noise levels have not been modelled using the SoundPLAN model, but even allowing for typical model-to-model variations the noise levels are expected to be similar to those in Table 7.1.

Overall, noise from the two enclosed conveyors between the nickel refinery stockpiles and the terminal are considered to be compliant.

7.3 Unloading Operations at Terminal

ASK has been provided with a copy of the Wiggins Island Coal Terminal Environmental Impact Statement (WICT EIS) Noise and Vibration report. That report addressed potential noise and vibration issues associated with the construction and operation of the WICT with respect to its use as a coal terminal. At the time of preparation of that report, the intention was to stockpile the coal near the terminal, but we understand that this concept has since changed, and coal will be stockpiled to the south and conveyed to the terminal. Thus the noise impact of the WICT is likely to be lower than identified in the WICT EIS Noise and Vibration Report, as the new stockpile site is located further from residential areas.

The main process difference between the coal & nickel refinery use of the terminal would be that the coal component of the terminal involves loading material into ships, whereas the nickel refinery component of the terminal involves unloading material from ships. This process difference is likely to result in similar noise levels as the same types of equipment is involved in each process (i.e. conveyors, transfer stations, material handling noise etc). Thus for this assessment it is proposed to assume that the nickel refinery unloading operations will produce equal noise levels to the coal terminal operations addressed in the WICT EIS, and thus the conclusions of that report are applicable here.

In terms of operational noise aspects, the conclusions of the WICT EIS Noise and Vibration Report are summarised as follows:

- Dominant noise sources were stockyard conveyors and outloading conveyors;
- At all mainland receptors, predicted noise levels were acceptable under neutral meteorological conditions, and with only minimal exceedences (2 dB(A)) under adverse meteorological conditions;
- No noise controls are proposed for mainland receptors; and
- At the Tide Island receptor, the noise levels were considered to warrant further detailed investigation, including baseline noise monitoring.

ASK does not have specific details on the differences between the proposed coal terminal equipment, as assessed in the EIS, and the proposed nickel refinery terminal equipment. If the WICT EIS conclusions are adopted for the nickel refinery operations, then the only potential issue is the noise impact on the Tide Island receptor. That receptor should be considered in further detail, as proposed in the WICT EIS.

8 Noise from Truck Routes

8.1 Route 1 - Calliope River Road

It is proposed to use Calliope River Road for vehicle movements to and from the refinery. This road will be used 24 hours/day.

The traffic data provided to ASK is included in Table 8.1.

Table 8.1: Traffic Data for Calliope River Road

Year	AM + PM (vehicles/ hour)	Estimated vehicles/12 hour (6am to 6pm)	% HV	Notes
2003	141	638	11.03	DMR 12 hour intersection turning count
2006	150	681	13.33	Estimate from Traffic Engineers
2009	572	2597	30.59	Estimate from Traffic Engineers
2016	306	1390	9.80	Estimate from Traffic Engineers

Further traffic data is required to provide further assessment of this issue, including night-time vehicle movements with and without the nickel refinery vehicle contribution.

Based on ASK's time undertaking noise measurements on Calliope River Road, there is little night-time traffic, and particularly low numbers of trucks at night. We understand the project will introduce night time truck movements on this road, and thus would adversely effect the noise environment at residences beside Calliope River Road. Trucks movements on this road will have the potential to result in noise levels that cause sleep disturbance, and this may not currently occur if existing night-time truck movements are very low. However, we are advised that this road was upgraded in the past to cope with regular truck movements of this type, and thus the planning decision to accommodate heavy vehicle movements would seem to have been already made.

8.2 Route 2 – Refinery to Barney Point via Hanson Road

It is proposed to use Hanson Road and the Gladstone Port Access Road for vehicle movements to and from the refinery. This road will be used 24 hours/day.

The traffic data provided to ASK (6/9/07) is included in Table 8.2.

Table 8.2: Traffic Data for Hanson Road/Glenlyon Road, North of Gladstone Port Access Road

Year	AADT (vehicles/ 24 hours)	Estimated vehicles/12 hour (7am to 7pm)	% HV	% Truck or Bus	% Articulated Vehicles	% Road Train	Notes
2004	11708	9366	8.84	5.62	1.92	1.30	DMR Count, 200m north of Lord Street
2009	14635	11708	8.84	5.62	1.92	1.30	Estimate from Traffic Engineers
2016	18733	14986	8.84	5.62	1.92	1.30	Estimate from Traffic Engineers

The Client indicated that approximately 15 (Stage 1, 2010) to 31 (Stage 2, 2016) B doubles would use this route to Barney Point. The truck movements would occur between 7am & 7pm, Monday to Friday.

Using the 12 hour count and % road train data in Table 8.2, the number of road trains is 121, 152 & 194 for Years 2004, 2009 & 2016 respectively.

The contribution of the GPN refinery is 15 to 31 vehicles from 2010 to 2016, or approximately 10% to 16% of the 12-hour road train volume.

It is considered that a 10% to 16% contribution is not high enough to cause a noticeable noise impact. In terms of daily noise levels, the increase due to the refinery B-Doubles would be less than 0.5 dB(A) L_{10}(18hour).

Trucks using Hanson Road and the Gladstone Port Access Road are not expected to cause an adverse noise impact.

9 Conclusions

The following conclusions are drawn in this report:

- Noise monitoring has found that noise from existing industries is audible at residents located west of the site (S3, S8 & S9). Thus when modelling indicates that noise from the proposed nickel refinery will be audible to the west, it is likely that background noise levels will already be elevated due to noise from other existing industries;
- Noise monitoring indicates that background noise levels can be very low, to the west of the site, hence the use of the minimum 25 dB(A) background noise level at receptors S3 & S8 in ASK's original report;
- Noise modelling using SoundPLAN results in similar conclusions to that determined using the PEN model results. The predictions vary between the two models, as expected, as they model meteorological effects differently and thus represent noise levels for difference meteorological conditions;
- The minimal additional rail traffic on the main railway line is expected to have negligible effect on receptors near to the railway line as daily traffic volume increases are less than 4%;
- The noise emissions from the rail unloading station are predicted to be acceptable;
- The assessment of port activities proposes the adoption of report conclusions from the Wiggins Island Coal Terminal EIS Noise and Vibration report. That is, the noise impact is minimal with the exception of the receptor at Tide Island, for which additional monitoring and assessment may be warranted;
- The noise emissions from the two conveyors between the nickel refinery stockpiles and the terminal are predicted to be acceptable;
- Night-time truck movements on Calliope River Road are expected to cause an adverse noise impact on residents beside the road. However, additional traffic data is required to provide further assessment of this issue; and
- Trucks using Hanson Road and the Gladstone Port Access Road are not expected to cause an adverse noise impact.

If you have any queries regarding this report, please do not hesitate to contact the undersigned.

Yours faithfully

ASK Consulting Engineers

Stephen Pugh

Associate