Refer to CBAG Submission Section 1 Introduction for context and related content

24 October 2019

Director – Transport Assessments
Planning and Assessment
Department of Planning, Industry and Environment
GPO BOX 39 SYDNEY NSW 2001

Dear Sir / Madam

Re: Coffs Harbour bypass; SSI_7666 Review of Operational Noise Assessment

This submission is purely about operational traffic noise as presented in the EIS, in particular about noise in the night period and potential impacts on surrounding residential receivers.

I recognise that this project is of significant benefit to the national, state, and local community and acknowledge the huge improvement of what is now being presented compared to the 'cuttings' concept design that was presented in September, 2018.

Noise Level Summary

Total Façades Above WHO 2018 Guideline of sub 45 dB(A)

Bypass Area	Façade Total	Mitigated	Unmitigatd	Total Exceed WHO 2018	% Exceed WHO 2018
Boambee	3,030	414	547	961	32%
West Coffs	5,547	621	1,409	2,030	37%
Korora	8,380	385	5,737	6,122	73%
Total	**16,957**	**1,420**	**7,693**	**9,113**	**54%**

[1]

The figures in the table above are taken from the Operational Noise Results table (reference G1 of Appendix G in Volume 4B of the Coffs Harbour Bypass Environmental Impact Statement (The EIS). The noise level used for analysing the data is the final Predicted Noise Level in 2034 after applying low noise pavement and noise barriers (i.e. the 'at source' remediation). It shows that there is a significant number of residences that exceed the latest World Health Organisation Traffic Noise Guidelines (2018) for night time noise exposure. The WHO recommendation is to remain below **45 dBA Lnight**. Note the number of residences left in noisy situations with no 'at residence' remediation compared to those that are entitled to remediation. This is all as a result of the Predicted Noise Level being within tolerance of the Noise Mitigation Guideline (NMG) which is heavily based on existing baseline noise levels. **In order for residents to receive an equitable outcome, and in order**

[1] For a more granular view see Appendix D in the attachments where actual noise levels and NCAs are shown

for optimal decisions to be made on the type of remediation to be performed, it is critical that the baseline noise levels are accurate.

Average Noise Targets (Part A) - Summary of Findings

All of the following summarised findings are supported with details within this submission and detailed data shown in an attached set of appendices. Through-out all of the following I have broken the official night period into 10 – midnight, midnight – 5 am, and 5 – 7 am.

- Finding 1: The noise profile of the Pacific Highway at night is quite constant across all 3 night time periods. I.e. the average traffic noise level, as measured by Leq(A), in the 5 – 7 am period is not much different from that for the preceding 7 hours.
    - Example: 30 Birugan Close, Valla Beach; there are numerous other examples.
- Finding 2: There is a significant problem across a large percentage of The Bypass area with non-traffic noise, mainly bird-noise, contaminating the 5 – 7 am time period.
    - Examples: 15 & 21 Safrano Place, CH; 16 Brennan Court CH; 3 Breakers Way, Korora.
- Finding 3: The impact of the contamination is significant. The increase from the first 7 hours of the night is consistently in the range of 10 to 12 dB(A).
    - Same examples as above.
- Finding 4: In the noise transitional zone around Coramba Road the traffic is heavily skewed towards the 5 – 7 am period. See argument to apply a different definition of the night time period to obtain a more equitable result.
    - Example: 15 Safrano Place, CH; 21 Safrano Place, CH.
- Finding 5: There are issues where modelling of residences with almost identical noise properties today are coming up with completely different results within the Operational Noise Results table (G1 of Appendix G in Volume 4B). I.e. the model appears internally inconsistent across many sites in NCA13, with predicted baseline measurements that vary by around 12 dBA for sites with almost identical proximity to the current main source of traffic noise, Coramba Road. In addition there are a number of properties where the modelled baseline night time noise levels are 10+ dBA greater than our measurements (performed at the façade)
    - Example: 12 Tamara Close, CH versus 15 Safrano Place, CH.
    - Example 21 Safrano Place, CH.

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Average Noise Targets (Part A) - Conclusion

I note that within the NSW Road Noise Policy (2011) in Section 2.5.5 the very situation with which we are dealing in Findings 2 to 4 above, is anticipated:

2.5.5 Dealing with 'shoulder periods'

At times, it may be reasonable to vary the standard time periods applied to the day and night. For example, the noise levels in an area may begin to rise sharply earlier than 7 a.m. (the standard time day begins) due to normal early morning activity from the community. In these situations, it is reasonable to consider varying the standard day-time and night-time periods.

Appropriate noise level targets where night-time noise levels rise quickly to day-time noise levels (often termed 'shoulder periods') may be negotiated with the determining or regulatory authority on a case-by-case basis.

The above deals with the small number of areas within the EIS where there are residences right next to (within say 50 metres) of the few existing busy road corridors (the transitional zones in the EIS). It is particularly appropriate for the noise areas around Coramba Road.

In general though the main problem is that in the 5 – 7 am time period there is such extensive non-traffic noise that the overall night time measurement is contaminated. And the problem exists right across the measurement area. The problem with this period is that it is **so difficult to remove the non-traffic noise from the measurement**. I reference the following from Section 3.4.1 of the NSW Road Noise Policy.

> In cases where non-traffic noise constitutes an important part of the ambient noise in an area, monitoring needs to be supplemented by calculation of the traffic noise component, as described in **Appendix B1**.

Appendix B doesn't really come up with any systemic approaches to remove non-traffic noise other than to state multiple times that it should be removed.

B3 Noise monitoring procedures

This section describes the procedures used to gather the noise information needed to apply this RNP. This section is not intended to describe in detail the procedures required to undertake a comprehensive noise-monitoring program. These procedures are documented elsewhere, and are a part of general acoustic practice.

To measure the range of noise levels specified in this document, any noise monitoring program must be carefully designed. Select sites to cover the range of traffic noise conditions encountered in the area of interest. Avoid locations with significant sources of noise other than road traffic. If this is not possible, document these other sources and estimate their contribution to the measured noise level. Remember that in applying this RNP, only levels of road traffic noise are important.

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I also note in Volume 4A Appendix G Section 3.1.2 titled Noise Mitigation Guideline the following guideline that states the overriding principle of reasonable and equitable outcomes takes precedence over blindly following the Noise Mitigation Guideline.

3.1.2 Noise Mitigation Guideline

A consistent approach to assessing whether a receiver should be considered for additional mitigation measures as a result of the traffic noise impacts from a road development is provided by Roads and Maritime in the Noise Mitigation Guideline (NMG).

The following principles take precedence over the procedure outlined in the NMG:

- Communities should receive reasonable and equitable outcomes

For a substantial proportion of sites the NMG is being adversely impacted by the inclusion of significant, difficult to measure, non-traffic noise resulting in inflated NMG levels leading to unreasonable and inequitable outcomes for many residents. If it is difficult to take out the non-traffic noise then I would suggest that section 2.5.5 should be used to remove the period altogether and focus on achieving a more accurate measure of the period that will be most impacted by the new highway corridor (i.e. 10 pm until 5 am).

The advantages of such an approach:

- It would better focus on the difference that is being brought to many of the target noise receivers as a result of the project; i.e. a relative constant stream of truck noise across the whole night time period.
- It would make the measurement process easier to repeat in the pre and post operational noise assessments in a fair and consistent manner. It is acknowledged that infrequent loud **non-traffic** noise events, e.g. the overnight trains, would still need to be filtered out of the measurement process, but these are easier to identify and remove.
    - *It should be noted that including such loud non-traffic events in both pre and post operational measurements is not an acceptable solution because they distort the overall average reading in cases where they are well above the ambient noise level.*

Average Noise Targets - Recommendations

- I recommend that there should be an independent audit conducted by a suitably qualified, experienced and independent team of experts that reports into NSW Planning, Infrastructure, and Environment to:
    - Assess the current inputs and processes that have led to the output produced by the Operational Noise Results table, paying particular attention to the noise collection areas around Coramba Road.

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- Determine a representative sample of receivers that covers the different noise profiles across the Bypass corridor (e.g. Boambee transitional, Boambee north, Coramba Road, northern end of Pearce Drive, Korora).
- Measure those receivers at the façade, take associated audio, and then properly examine that audio to identify significant amounts of non-traffic noise.
- Analyse this data to come up with a recommendation as to the relative merits of using Section 2.5.5 of the NSW Road Noise Policy to amend the definition of the night time period to be 10 pm until 5 am or any other such recommendations as appropriate.
- Make recommendations as to the need for additional measurements and/or changes that impact the operation of the noise model being used.

I am aware that the Department of Planning has it own in house noise specialist and, given the significance of this project, request that this submission and the accompanying appendices be reviewed for comment and direction prior to referral to the RMS. This will ensure that the issues raised here are adequately addressed to meet the Planning's SEARs.

I am a member of the Coffs Bypass Action Group steering committee and have relied on measurements that I, along with others, collected as part of my role as the noise specialist within that group.

I trust this information is of assistance. Please contact me if you have any further queries. If you really want to understand the issues with the noise assessment to date, I implore you to read the first 2 tabs in the excel attachment.

Yours faithfully

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Average Noise Targets: Detail

More details of all the data presented in this detail section is included in an attachment to this submission. The attachment also shows graphical representations from sound software of snapshots of the noise profile. These allow bird noise and traffic noise to be more easily distinguished. I also have available full sound recordings of every measurement shown in this submission. I.e. I am happy to be fully transparent with these findings; they speak for themselves.

The profile of the Highway

T2: Classic Sample Site along already upgraded highway

Time Interval	Avg Ambient (LA90)	Avg Leq	Avg Lmax	Diff Max to Amb	Diff Max to Eq	Diff Eq to Amb
30 Birugan Close, Valla Beach; town 2 acre block 370 metres from highway						
Average 9-10	38.4	46.4	58.4	20.1	12.1	8.0
Average 10-12	37.4	47.9	57.9	20.6	10.0	10.5
Average 12 - 5	36.9	48.2	56.9	20.1	8.7	11.3
Average 5 - 7	42.5	49.1	59.8	17.4	10.7	6.6
Avg Night 9 hr	**38.9**	**48.3**	**57.8**			

- This site is 370 metres from the highway on a section of the highway with 110 km/h speed limit.
- Note the lack of variability in Avg Leq through the time periods.
- RMS traffic data will confirm that the truck volumes are relatively constant across the time periods.
- I have an audio recording of the whole night that confirms this.
- A certified Accoustic Engineer has results from a 10 day continuous measurement that shows exactly the same pattern.
- Sites very close to this residence were measured and tabled in the Nambucca Heads to Urunga Pacific Highway Upgrade Post Operational Noise Report of July, 2017.
- The point is, the above profile (The Highway Night Truck profile) is well known and there should be no dispute.

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Problems Filtering Out Non-Traffic Noise in 5 – 7 am period: NCA13 (Coramba Rd)

Time Interval	Avg Ambient (LA90)	Avg Leq	Avg Lmax	Diff Max to Amb	Diff Max to Eq	Diff Eq to Amb Row 835
15 Safrano Place (sth face)	**Coffs Harbour (Leq0030, 0056) - NCA13**					
Average 9-10	25.8	52.2	68.5	42.6	16.2	26.4
Average 10-12	22.4	46.3	62.0	39.6	15.6	24.0
Average 12 - 5	26.2	44.2	53.4	27.2	9.2	18.1
Average 5 - 7	37.2	55.6	69.8	32.6	14.2	18.4
Avg Night 9 hr				EIS model Leq **60,64** sth		
S1	**31.6**	**50.2**	**58.9**	façade		

- A façade on the southern side of the residence backing onto Coramba Road. Measured 18 and 20 metres from Coramba Road:
- Focus on the highlighted cells, **the 5 – 7 am period is characterised by a significant ramp up in local traffic, plus bird noise**.
    - Leq readings for **10 pm until 5 am** of **45** dBA and **5 - 7 am** of **55.6**. **Shows the skewed nature of the traffic on Coramba Road**.
    - A jump of > 10 dB(A) between the first 7 hours and the last 2.
- In this instance, properties right on Coramba Road, the skewed nature of the early morning period (in this case dominated by local traffic) should be taken out because it skews the whole night time period. It will be used to justify bringing a higher target for the Highway Night Truck profile which will impact more dramatically the first 7 hours. This is inequitable.

From Appendix B in my attachment: A typical 10 minute period in the 5 – 7 am time period

The Leq's are 56.2 for each 5 minute period. Traffic events are circled in blue, birds in red, and often both, red and blue at 2 hours 29 min.

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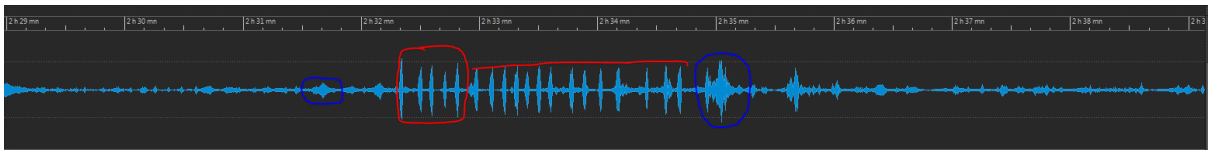
						Row
21 Safrano Place. Coffs Harbour (Leq0029) - NCA13						1224
Average 9-10	27.8	44.6	56.8	29.1	12.2	16.9
Average 10-12	23.5	38.7	54.4	31.0	15.7	15.3
Average 12 - 5	22.3	35.7	48.5	26.2	12.8	13.4
Average 5 - 7	38.1	49.1	62.9	24.8	13.7	11.0
Avg Night 9 hr	**32.0**	**43.4**	**53.0**	EIS model Leq **53,54** west façade		

- A façade on the western side of the residence 80 metres from Coramba Road.
- Focus on the highlighted cells. This time **the 5 – 7 am period is dominated by bird noise.**
    - Leq readings for **10 pm until 5 am of 36.8** dBA and **5 - 7 am** of **49.1**.
    - A jump of > 12 dB(A) between the first 7 hours and the last 2.
- In this instance, properties 80 metres or more from Coramba Road, the skewed nature of the early morning period (in this case dominated by bird noise) should be taken out because it skews the whole night time period. It will be used to justify bringing a higher target for the Highway Night Truck profile which will impact more dramatically the first 7 hours. This is inequitable as summarised in Finding 4.
- Note also the average for the official night time period in our measurement of 43.4 dBA versus the baseline estimate from the model of 53 to 54 dBA. There is a problem with the model in NCA13.

Appendix B in my attachment: A typical 10 minute period in the 5 – 7 am time period



The Leq's are 54.5 & 53.5 for the 5 minute periods. Traffic events are circled in blue, birds in red. This is mostly bird noise.

Given the logarithmic nature of the decibel scale any acoustic engineer will verify that the frequent loud events will dominate the period average.

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Problems Filtering Out Non-Traffic Noise in 5 – 7 am period: NCA16 (nth of Pearce Drive)

Time Interval	Avg Ambient (LA90)	Avg Leq	Avg Lmax	Diff Max to Amb	Diff Max to Eq	Diff Eq to Amb Row 3558
26 Brennan Court, Coffs Harbour (Leq0031, 2nd Leq0039) - NCA16						
Average 9-10	26.1	36.3	49.2	23.4	16.0	7.4
Average 10-12	24.0	33.1	46.8	23.2	16.4	6.8
Average 12 - 5	26.8	37.0	50.9	24.4	18.0	6.5
Average 5 - 7	30.8	43.0	55.6	26.2	17.0	9.2
Avg Night 9 hr S1	**27.7**	**38.9**	**51.0**	EIS model Leq **36** sthwest façade		

- A façade on the south-western side of the residence facing onto Brennan Court. The train is on the northern side, distorting the overnight figures
    - Measured Leq readings for 10 pm until 5 am drop from **35.7** dBA to **30.4** dBA by excluding the periods (again measured in 5 minute intervals) impacted by the train.
- If we now compare the first 7 hours with the 5 – 7 am period we move from 30.4 dBA to 43.0 dBA. This is predominantly bird noise.
- A jump of > 12 dBA.

Problems Filtering Out Non-Traffic Noise in 5 – 7 am period: NCA24 (Korora)

Time Interval	Avg Ambient (LN90)	Avg Leq	Avg Lmax	Diff Max to Amb	Diff Max to Eq	Diff Eq to Amb Row 1666
1b Breakers Way, Korora (Leq0052) - NCA24						
Average 9-10	35.4	40.7	51.1	15.6	10.3	5.3
Average 10-12	36.7	42.8	50.8	14.0	8.0	6.0
Average 12 - 5	34.9	40.2	47.6	12.7	7.5	5.3
Average 5 - 7	47.0	50.1	58.6	11.5	8.5	3.0
Avg Night 9 hr	**41.5**	**45.1**	**50.8**	EIS model Leq **50-52** GF west:		

- A façade on the western side of a residence **410 metres from the existing highway (speed limit 80 km/h)**. Note also that this property is elevated from the highway and the highway at this point travels in a wide arc around the residence.
- Measured Leq readings for 10 pm until 5 am of **41.1 dBA** versus **50.1 dBA** in the 5-7 am time period, giving **45.1 dBA over the 9 hours**. A jump of 10 dBA
- However the 5-7 am time period is dominated by bird noise to the extent that the highway noise is just a hum in the background.

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Finding 4: Receiving Reasonable and Equitable Outcomes: NCA13 near Coramba Road

- The below relates to Volume 4 Appendix G: Subsection 3.1.2. Noise Mitigation Guidelines. There are a few guidelines that need to be quoted because they have not been consistently followed:
    - "Communities should receive reasonable and equitable outcomes".
    - "Incidental benefits from the noise mitigation designed for qualifying receivers should be recognised at all receivers within a community where noise levels exceed WHO guidelines (Façade noise levels of 50 dB(A) during day and 45 dB(A) during night-time)". In NCA13 which has been classified as a 'Transitional Zone' the community is not receiving "reasonable and equitable" outcomes.
- There are a few problems in the treatment of this noise area which have been pointed out above for 15 and 21 Safrano Place.
- Please go back and look again at the first table for Birugan Close showing a typical profile for the Pacific Highway.
    - Look at the Leq column across the 4 displayed time periods. The noise is elevated all night and the Lmax value is > L90 value (ambient noise) by around 20 dB all night. This is what these residents are going to get.
    - Table 4A shows 2 properties near Coramba Road. Note again the Leq column but this time focus on the last two time periods:
        - 15 Safrano Place measures 44.2 dBA from 12-5am but 55.6 dBA 5-7am
        - 21 Safrano Place measures 35.7 dBA from 12-5am but 49.1 dBA 5-7am

Finding 5: Inconsistency within the Operational Noise Results Table

- See Attachment A for details.
- A façade on the southern side of **12 Tamara Close**, a residence backing onto Coramba Road. Measured in the EIS (Logger 4) in the field right next to the road at 52 dBA and assigned an Unmitigated Night No Build figure of 52 dBA at the southern façade of the residence. Given the growth in traffic to 2024 and the extra distance of the façade from the main source of the noise this appears reasonable.
- What cannot be correct is that this façade is modelled at baseline **52 dBA** whereas the same position 160 metres further down the road at **15 Safrano Place** is modelled at **60** and **64 dBA**. A difference of around 12 dB!
- What also cannot be true is that the same façade at 12 Tamara Close, which is 160 metres closer to the new Bypass and interchange, will have a final mitigated noise level of **52 dBA** when 15 Safrano is modelled to finish up at **61 and 65 dBA**. Again, a difference of around 12 dB!

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Measurement Methodology

- Equipment used:
    - Sound Level Meter: RION NL-42. This is exactly the same equipment used by ACOM when they monitored noise around the Valla Beach section of the highway.
        - The equipment was sent to Melbourne and a Calibration Certificate obtained from Zenith Sales and Calibrations Pty Ltd; dated 10th April, 2019.
    - Recording Equipment: Used a Zoom H2N Handy Recorder. This utilises a general omni-directional mike.
- Due to a limitation of resources, measurements were taken only during what would generally be considered 'the usual hours of sleep for most of the population'; i.e. from 9 pm until 7 am.
- Checking of results for consistency:
    - Overnight measurements were performed at Birugan Close, Valla Beach. This is a site that has been measured multiple times by the RMS. In addition a professional 10-day measurement was performed by an acoustic engineer from Wilkinson Murray the week prior to our measurement. Our values over the night period were right in the middle of a fairly tight range of LAeq, (9 hour) measurements recorded by that study.
    - We measured 2 of the sites measured and tabled in the Nambucca Heads to Urunga Pacific Highway Upgrade Post Operational Noise Report of July, 2017 and were within 2 dBA each time of the Leq(A), night measurements so tabled.
    - Our results are also consistent with results taken at Noise Loggers 4 and 16 within the EIS, being the only two sites where we measured from the exact same residence; noting that we measured from the façade rather than in the open. Our equipment was placed within 5 metres of that in the EIS in each occasion.
- For each of our measurements performed using the Noise Pressure Monitor we have a full audio recording of the entire night. Hence, we can look at summarised results in 5 minute periods and go to the actual recordings to verify the noise source. This makes our results quite transparent. It also allows us to speak with certainty to the topic of non-traffic noise.
- Prior to commencing our recordings we studied applicable sections of Traffic Noise Policy (March, 2011), particularly section 2.5.4 which deals with measurement guidelines.
- Throughout the measurement process we were in contact and took guidance from a senior executive of one of the most respected noise measurement companies in Australia.