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9173.L4 23 September 2019

The General Manager
Regulatory, Environmental and Stakeholder Engagement Branch
Western Sydney Unit
Department of Infrastructure, Transport, Cities and Regional Development
GPO Box 594, Canberra ACT 2601

Attention: Ms Sarah Leeming

Dear Ms Leeming,

**Re: Meeting on 9 August – Western Sydney Airport**

Further to the meeting in Canberra on 9 August 2019, and correspondence between us generated there from, and in light of discussions with your colleagues following the FOWSA meeting on 15 September 2019, Don Carter and I considered it important to consolidate the information in our report with the detailed issues raised in our Power Point presentation at the meeting in Canberra.

The information below explains why the EIS noise levels predictions are almost three to four times lower (in perceived loudness) than the noise levels recorded in our noise study.

SHORTCOMING A

Use of INM Software

The INM software Users Guide specifically states it was not designed for single-event noise predictions but for estimating long-term average noise levels using average input data. Therefore it cannot predict $L_{Amax}$ noise levels as they can only obtained by single-event noise monitoring. However the EIS purports to be stating $L_{Amax}$ noise levels when in fact they are long-term average effects.

Our noise study and subsequent report was monitoring single-event noise and therefore the noise levels recorded are $L_{Amax}$ as this is what affected residents will hear. The INM User Guide states that any comparison between measured data and INM calculations must considered in this context.

INM 7.0 User Guide Quotes

*"2.1.2 INM is an Average-Value Model*

*INM is designed to estimate long-term average effects using average annual input conditions. Because INM is not a detailed acoustics model, differences between predicted and measured values can and do sometimes occur because important local acoustical variables are not averaged, or because complicated physical phenomena are not explicitly modelled."*

*"2.1.3 Developing an INM Study*

*3. INM is not designed for single-event noise prediction, but rather for estimating long-term average noise levels using average input data. Comparisons between measured data and INM calculations must be considered in this context."*

SHORTCOMING B

Calibration Of The INM Model

The modelling philosophy used in the INM model is robust and based on well established engineering principles. However it relies on the skill of the modeller and the accuracy of the input data. Key assumptions need to be made and these should reflect real-world conditions. This situation requires that the model is calibrate to confirm the reliability of the model both in terms of its accuracy of model and the input data.

In the case of the WSA EIS no calibration of the INM model was carried out. However, in the case of the new parallel runway at Brisbane Airport, calibration of the model was carried out for the full range aircraft types. See Section 4.4 *"Validation of Aircraft Noise Levels"*, Brisbane Airport Corporation (BAC) New Parallel Runway Draft EIS/MDP D4 Volume D " Aircraft Noise Modelling Methodology". Appendix A, Figure 4f , Appendix B Figure 4g and Figure 4.4h, show the calibration results comparing measured and INM predictions.

It will be noted Figures 4.4f, 4.4g and 4.4h in the above document are comparing mean measured maximums with INM predictions that are average noise levels. The noise levels being compared are not $L_{Amax}$. $L_{Amax}$ is what was recorded in our study as single noise events and are what people will hear. If the measured $L_{Amax}$ levels have been recorded in Brisbane they would exceed the mean measured noise levels.

https://www.bne.com.au/sites/default/files/docs/BNR_EIS_MDP_D4_Aircraft_Noise_Modelling.pdf

The fact the INM model for the WSA EIS was not been calibrated makes the noise predictions unreliable. This observation is even more relevant as, in your letter of 30 August 2019, you have advised that "*...elements of the indicative airspace design depicted in the EIS will not be implemented...*"

SHORTCOMING C

No Account Variable Height of Aircraft Departures and Arrivals

The WSA EIS used INM's standard height-v-distance profiles for all departures, and continuous descent approach for all arrivals.

WSA EIS Volume 4 Appendix E1 Page 30, paragraph 5

*"As described in Section 2.3, INM's "standard" height-vs-distance profiles were used for all departures, while a "continuous descent approach" was used for all arrivals"*

This means that one flight profile was used for all departures and one flight profile used for all arrivals. However, reference to Airservices Australia short term monitoring in Sydney and Brisbane shows this assumption are incorrect as there is a large variation in aircraft heights. The variability in the height of aircraft will result in commensurate variations in noise levels.

Appendix C sets out the details of Airservices monitoring at Brisbane and Kingsford Smith Airport (KSA) and the monitoring carried out at Pymble Ladies College and Mays Hill in our report.

The variation of aircraft heights of aircraft and range of noise levels at each monitoring sight are as follows:-

Airservices

Tarragindi, Brisbane 1000 – 4000 ft arrivals, 1000-8000 ft departures. Noise level range 57 – 87 dBA
Coorparoo, Brisbane noise level range 53 – 83 dBA
Wellers Hill, Brisbane noise level range 55 – 88 dBA
Camp Hill, Brisbane noise level range 47 – 86 dBA
Lindfield, Sydney 1500 – 8000 ft arrivals, 1000-5500 ft departures. Noise level range 52 – 85 dBA
North Ryde, Sydney 1300 – 8000 ft arrivals, 1500-9000 ft departures. Noise level range 58 – 89 dBA

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Pymble Ladies College, Sydney 1663 – 6138 arrivals. Noise level range 61- 79 dBA
Mays Hill, Sydney 1639 – 8589 departures. Noise level range 60- 73 dBA

It is obvious from the above that the use of one flight profile for arrivals and one flight profile for departures by INM does reflect the reality and has resulted in noise levels in the WSA EIS being understated.

Appendix D shows the plot of noise levels over Pymble Ladies College from aircraft on the same flight profile used in INM i.e on the constant rate of descent (CRD) 3 degree glide slope.

As previously pointed out the noise levels emitted by aircraft on the glide slope exceed the EIS predictions over Blacktown (greater than 60 dBA ) and Blaxland ( up to 55 dBA). The perceived noise levels are close to 3 times the perceived loudness for Blacktown and close to 4 times louder for Blaxland. This was the finding of our report and on the basis of the above we consider our original findings are correct.

CONCLUSION

On the basis of the above it can be concluded that:

The significant difference in noise levels between the WSA EIS and the noise report is a result of three factors

- Incorrect application of the INM software as it's an average value model and $L_{Amax}$ values cannot be derived from it.
- The EIS noise predictions are unreliable as the INM was not calibrated as was done for the Brisbane parallel runway
- The impact of the variability of the height of aircraft on noise levels was not taken into account as only single flight profiles were used as per the INM software.
- The decision to proceed with WSA was based on aircraft noise predictions that significantly understate the noise levels. In the case of Blacktown and Blaxland, highlighted in the report, the predicted noise levels are nearly 3 to 4 times louder respectively than predicted in the EIS. This fact has serious implications for the quality of life for these locations and other areas of Western Sydney that will impacted by aircraft noise.

Yours faithfully,

P. P

Dr E.J. Ancich
PhD, FIEAust, CPEng, MIABSE
cc Professor Peter Shergold – Chair of FOWSA

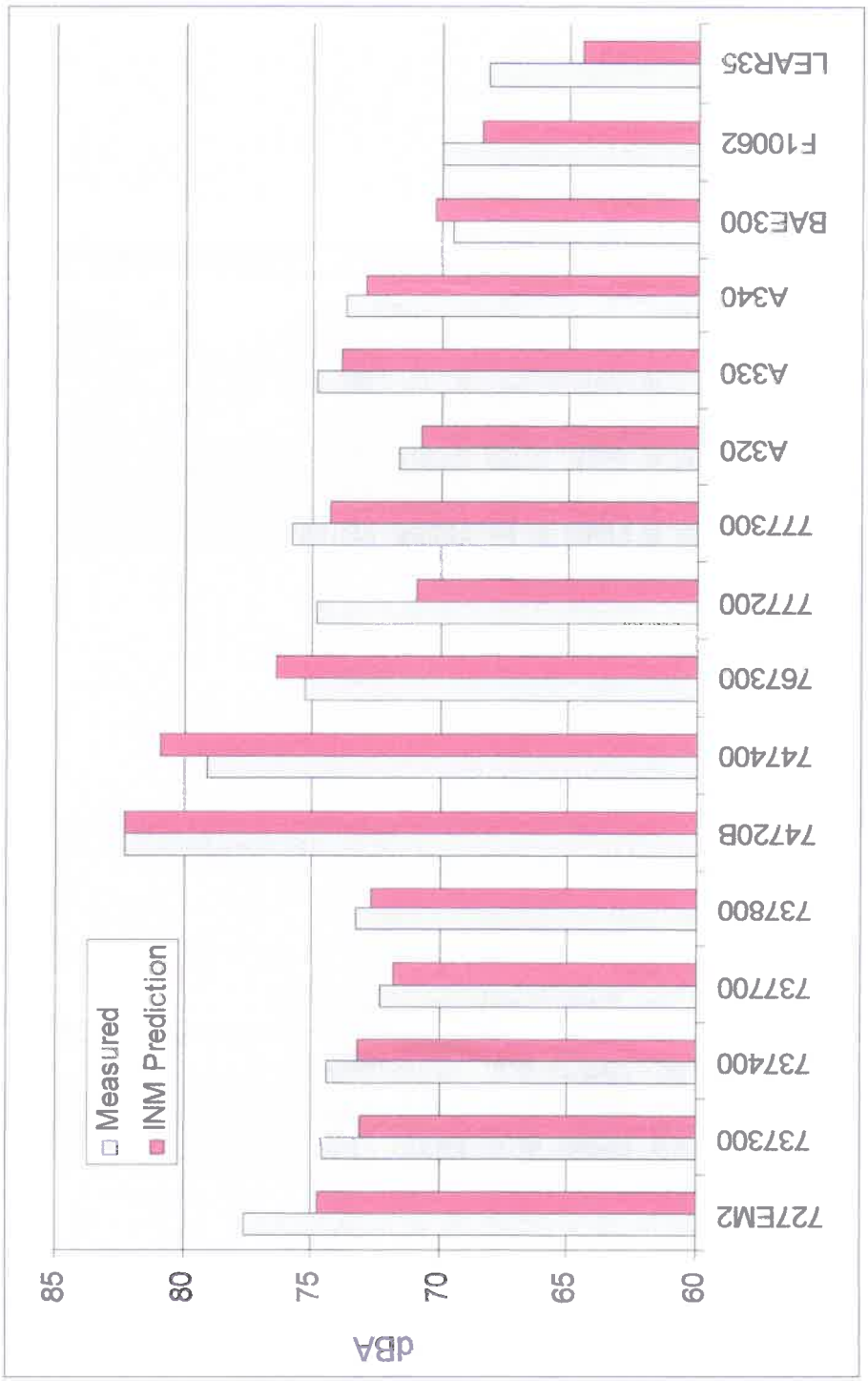


***Figure 4.4f:*** *Aircraft Arrivals, Monitor 1 – Mean Measured Maximum Noise Level, dBA and Predicted Value from INM.*

## APPENDIX C VARIABILITY OF HEIGHT OF AIRCRAFT – BRISBANE, SYDNEY AND ANCICH REPORT

Table 1 Airservices Short Term Monitoring Programs Brisbane

| Tarragindi 2013 16 km from Airport | Arrivals Minimum Ht above Airport Ft | Arrivals Maximum Ht above Airport Ft | Departures Minimum Ht above Airport Ft | Departures Maximum Ht above Airport Ft |
|---|---|---|---|---|
| Figure 4 Movements Capture Zone | 1000 | 4000 | 1000 | 5500 |
| | | | | |
| Tarragindi 2013 16 km from Airport | Minimum Noise Level dBA | Maximum Noise Level dBA | Average Noise Level dBA | |
| Tables 6 Lamax Summary | 56.7 | 87.0 | 66.7 | |
| | | | | |
| Coorparoo 2014 12km from Airport | Minimum Noise Level dBA | Maximum Noise Level dBA | Average Noise Level dBA | |
| Figure 1 Coorparoo Noise Summary | 53 | 83 | NA | |
| | | | | |
| Wellers Hill 2014 15 km from Airport | Minimum Noise Level dBA | Maximum Noise Level dBA | Average Noise Level dBA | |
| Figure 1 Wellers Hill Noise Summary | 55 | 88 | NA | |
| | | | | |
| Camp Hill 2014 9 km from airport | Minimum Noise Level dBA | Maximum Noise Level dBA | Average Noise Level dBA | |
| Figure 1 Camp Hill Noise Summary | 47 | 86 | NA | |

Table 2 Airservices Short Term Monitoring Program Sydney

| Lindfield 2014 18.5 km from Airport | Arrivals Minimum Ht above Airport Ft | Arrivals Maximum Ht above Airport Ft | Departures Minimum Ht above Airport Ft | Departures Maximum Ht above Airport Ft |
|---|---|---|---|---|
| Figure 4 Movements Capture Zone | 1500 | 8000 | 1000 | 8000 |
| | | | | |
| Lindfield 2014 18.5 km from Airport | Minimum Noise Level dBA | Maximum Noise Level dBA | Average Noise Level dBA | |
| Table 6 Lamax Summary | 52.2 | 85.1 | 61.6 | |
| | | | | |
| North Ryde 2013 17 km from Airport | Arrivals Minimum Ht above Airport Ft | Arrivals Maximum Ht above Airport Ft | Departures Minimum Ht above Airport Ft | Departures Maximum Ht above Airport Ft |
| Figure 4 Movements Capture Zone | 1300 | 8000 | 1500 | 9000 |
| | | | | |
| North Ryde 2013 17 km from Airport | Minimum Noise Level dBA | Maximum Noise Level dBA | Average Noise Level dBA | |
| Table 6 Lamax Summary | 57.8 | 88.7 | 70.2 | |

APPENDIX D ANCICH REPORT NOISE LEVELS ON INM FLIGHT PROFILE 3 DEGREE GLIDE SLOPE AT PYMBLE LADIES COLLEGE