| Peer Review Comment (from *Busselton Margaret River Airport – Peer Review of Noise Modelling,* dated March 2016) | | | City of Busselton Comment | To70 Response | Peer Review Close Out Comments |
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| **Section** | **Description** | **Comment** | | | |
| 3.1.1 | INM study and airport details | The coordinates in the INM study for ARP and runways match that listed in the Report with the exception for the coordinates for Rwy 03, which differs by 0.000001 degrees.<br><br>The coordinates for Rwy 03 need to be checked and corrected in either the Report or the INM study. A check of runway length used in the model closely match that listed in the Report.<br><br>The Report does not detail where the coordinates for the helipad were obtained from and should be referenced. | To be actioned by To70.<br><br>City of Busselton provided the helipad coordinates based on actual location. | Normal INM-induced rounding error. Difference of less than 15 cm (beneath the resolution of the contours). Will be amended. | No further action required after report is amended. |
| 3.2.1 | Ports of origin and destinations | In the past aircraft operating to and from an airport usually track to/from their destination airport direct if within a short distance or via a navigation aid if tracking to/from a distant airport. However, due to change in aircraft navigation capabilities there have been and will be changes in the future to the flight paths followed, particularly for long range flights with aircraft tracking direct to/from the port of origin/destination, unless directed by air traffic control.<br><br>The presentation shown in Figure 6 for origin/destination for RPT and FIFO flights should be presented prior to the section detailing "tracks" to provide clarity as to the alignment of some of the flight tracks used. | Can be requested in noise modelling report. | To70 to rearrange report as recommended. | No further action required after report is amended. |
| 3.3.1 | Flight tracks | The reference to the existing model does not provide any indication as to when it was prepared and whether it has been checked for technical accuracy in regards to flight tracks followed and if there has been any variation in these tracks to that currently flown and has been incorporated into this model. | To70 to provide reference to "existing model" in noise modelling report (2014) and comment on no variation to flight tracks.<br><br>Note: Original report was not peer reviewed. | These tracks were discussed with local expert in 2014. Report will be updated to reflect this. | No further action required after report is amended. |
| | | The Report also provides information of ports of origin/destination for RPT and FIFO aircraft but does not provide any details of how the alignment of the flight tracks modelled have been determined, i.e. if they have been modelled to fit in with current aircraft flight paths or existing navigation aids. It also does not provide any information as to how the alignment of flight paths used were determined and source of information used when preparing the tracks. | To70 to provide comment. | The requirement for ANEF studies is that the tracks be operationally suitable. (They will certainly require a detailed design if they are to be used for the RPT/Charters described in the forecast, but not for this study.) | No further action required. |
| | | The review noted that departures from Rwy 03 to the east are modelled conducting a left turn of approximately 270 degrees and track over the airfield to begin their track to their destination airport. Is this appropriate or do they turn right at track to their destination, which is the usual practice for departures at airports located in rural areas. | To70 to provide comment. | See above | To70 to include reference to the study completed in 2014 in the report, including assumptions/limitations made regarding RPT operations flight tracks (such as conducting a 270 degree turn to track to the east on departure). |
| | | This review also noted there is no differentiation between flight tracks used by the high performance aircraft (mainly jet aircraft) and low performance aircraft (GA and other slower aircraft) which does not usually occur due to an air traffic control requirement of lateral separation between these aircraft categories. This is particularly apparent for arrivals to Rwy 03 from the south and to Rwy 21 from the north as the only approach path for GA and similar aircraft types is for a straight in approach where these aircraft types normally join the circuit for a circling approach to the selected runway as modelled for arrivals from the north to Rwy 03 and from the south for Rwy 21. | To70 to provide comment. | See above | Comment has been based on separation requirements usually used between RPT and GA aircraft types. There are also separation requirements flown by jet and non-jet RPT aircraft dur to performance characteristics and the ability of smaller aircraft to conduct a smaller radius turn. Such requirements and assumptions/limitations used during modelling to be stated in the report. |
| | | The review has noted the majority of the flight tracks used in the modelling are point tracks with a maximum spread of up to 0.5 nautical miles (default INM setting). The spread of these tracks reducing the closer to the airport the aircraft are and are acceptable for the majority of all the departure flight tracks and some of the approach flight tracks.<br><br>However, the review noted the modelled GNSS RNAV approach tracks also include a spread of approximately 0.3 nautical miles up till they pass the initial point, after which the spread reducing to zero for the touchdown. These approach procedures require aircraft to be able to use a GPS navigation system as part of their flight management system. It has been found the spread of the aircraft using these approach procedures is minimal and it is suggested the spread of these flight tracks be amended to a maximum of 0.1 nautical miles for all the sections prior to passing the initial point. | To70 to action. | We can narrow the GNSS RNAV approach track spread to 0.1 NM, however the future RNAV track performance is not as certain as described in the comment. | No further action required after model is updated to narrow the GNSS RNAV approach track spread to 0.1 NM.<br><br>Note that aircraft conducting an RNAV approach usually follow a very confined approach path when compared to what is followed by aircraft conducting a visual approach. Assumptions/limitations on approach paths used to be stated in the report. |
| | | The review noted the circuit tracks modelled for higher performance aircraft use the same radius of turn as used for GA aircraft. In the majority of cases higher performance aircraft conduct circuit training at a higher speed, requiring a greater radius during their turns. To model these flights the turns modelled for the MED circuit tracks should be increased by approximately 50% (0.6945 km) whilst retaining the same separation distance between the downwind leg and the runway. | Circuit training is not permitted at the BMRA for larger aircraft and hence need to clarify if this is still relevant. | Only light aircraft (Evektor SportStar) do training, so the MED tracks will be removed. | No further action required after MED tracks are removed from the model. |
| | | Helicopter operations have been modelled with one straight approach track and one straight departure track with all arrivals from the north and all departures to the south. These flight tracks are aligned parallel with Rwy 03/21, which is not consistent with the areas listed in Appendix A for helicopter destinations. Helicopter operations usually take into account current wind direction and usually arrive and depart into the wind. Confirmation of approach and departure flight paths should be sought from helicopter pilots and airport management and amended in the INM model to reflect these. This may | CoB confirm that helicopter operators always use the parallel approach and departure track to a minimum of the airport boundary then set course no matter of wind direction. This is considered normal flight procedures and also due to airport building and | We can remodel this based on these discussions if required. | Helicopter operations should be amended to reflect the comments provided by the City of Busselton. |

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| | | also require changing helicopter movements to reflect the revised tracks and the flight paths noted in Appendix A. | power line locations. | | |
| 3.4.1 | Runway usage | Although the Report indicates the City provided the 40%/60% of runway usage, analysis of wind speed and direction data obtained from BoM indicates runway usage may be different to this based on the percentage of the time for wind direction. The reviewer has not undertaken a review of BoM data and therefore recommends To70 undertake such a review to confirm the 40%/60% split provided by the City is appropriate. Also taken into consideration are calm periods or wind speed is not considered to be a factor in determining the runway used, enabling aircraft approaching the airport to select the most appropriate runway instead of having to track a greater distance to land on from the other end. The confirmed runway usage split then should be applied to fixed wing aircraft and helicopter operations for each study.<br><br>A review of aircraft movements for ANEC 2038-39, ANEC 40-50 year forecast and NA contours for 2018-19, 2022-23, 2028-29 and 2038-39 indicated the 40%/60% runway usage was applied to each case. | To70 to provide comment on 40%:60% split. | This split was provided by BMRA based on current use. BMRA advises that aircraft regularly land and take off with the wind. | No further action required. |
| 3.5.1 | INM aircraft selection | Appendix A of the Report includes details of forecast aircraft types and the number of movements they conduct. However, for locally based aircraft, it is not stated where they operate to/from other than stating 'various' for the destination.<br><br>The selection of aircraft used in each forecast period has not taken into account changes in aircraft that will be operating at this airport due to the age of the current aircraft that are operating and that new aircraft will in most cases be quieter than those that current operate there, particularly larger aircraft which are required under ICAO regulations to be quieter than earlier models of the same aircraft type, i.e. Dash 8-100 when compared to Dash 8-300 and 400 series aircraft. | Can be provided and traffic projections based on the SWDC/City business case submitted to the State Government. | Will amend if required. | CoB to confirm traffic projections are best available for modelling purposes. If improved projections are available, peer review recommends modelling is updated. Any assumptions/limitations with regard to traffic projections to be stated in the report.<br><br>Note: The use of older aircraft types to that which currently operate at an airport my result in Airservices requesting a change to the modelled aircraft, thereby causing concern in the reliability of the resultant ANEF contours. |
| | | The Report also lists the B737-800NG aircraft type that has been used to model some RPT operations. However, this aircraft type is not included in the INM database and details of how it was created and the differences between it and the standard INM 737800 aircraft type are not included in the Report, including if there are any differences in noise data. This aircraft types was not included in the data provided by the City and details why it was used have not been included in the Report. | To70 to provide comment. | This surrogate methodology is acknowledged and accepted by Airservices Australia. Where existing aircraft that are not yet incorporated into the INM database, a surrogate is created and adjusted with reference to a similar to aircraft in INM.<br><br>http://www.acoustics.asn.au/conference_proceedings/INTERNOISE2014/papers/p607.pdf | The report should include comments on the modelling of this aircraft and the assumptions made when determining the reduction in the EPNL noise data used and what these assumptions were based on. |
| | | The Bombardier Dash 8 aircraft has been modelled using the INM DHC8 which represents the Dash 8-100 series aircraft. A check of 2014 Australian Aircraft registration indicates there are less than 10 models of this aircraft type flying and more than 50 Dash-8 300 and Dash-8 400 model aircraft flying, indicating this aircraft type should be modelled using the INM DHC830 aircraft type. | To70 to provide comment. | Airport can advise which is more common in Busselton. Summary of registrations is overstated, especially for WA (see table in comment). | CoB to confirm which aircraft type is more common/representative of BMRA for modelling purposes. Peer review recommends if aircraft type numbers differ significantly from existing model, model should be updated using the appropriate INM aircraft types. |
| | | The list of forecast aircraft types includes some that require the use of an INM substitute aircraft type but does not include a statement to indicate this has been done. It lists some of these aircraft in the INM ACFT ID column in Table 6 using its aircraft code, not the code for the INM aircraft used. These aircraft types are:<br>• PC12 should be shown as being modelled using the CNA208 INM aircraft.<br>• LEAR45 should be shown as being modelled using the LEAR35 INM aircraft.<br><br>It also lists the Cessna 180, 182, 172 and 210 as being modelled using the INM CNA172 aircraft type. However, only the Cessna 172 should be modelled using this INM aircraft type. The others should be modelled using the following:<br>• Cessna 182 modelled using the INM CNA182.<br>• Cessna 210 modelled using the INM substitute CNA206.<br>• Cessna 180 does not have an INM substitute but research indicates it has the same engine as the Cessna 182 which is a derivative of the Cessna 180 model, therefor it is suggested the INM CNA182 aircraft type is suggested as the substitute aircraft type. | To70 to action/ provide comment. | These are standard INM substitutions. No comment is necessary, but a comment can be added to the report if needed.<br><br>Cessna 172 is chosen as the representative single piston engine aircraft. It is common and sensible to use a representative aircraft for a group of similar aircraft, as this reduces rounding error. If specific forecasts for each aircraft type are provided, these can be modelled individually. | The report should be amended to note the INM suggested substitution aircraft.<br><br>No further action required. |
| | | The Report also lists the INM CNA750 as the aircraft to model Cessna Citation aircraft but does not provide any details of the actual model it represents, given that there are approximately ten different Citation models that have been sold by Cessna and they have been constructed by Cessna since 1969 and the Citation 750 has only been built since 1996. A review of the Citation aircraft that currently operate at this airport is suggested and the INM model changed or comments added to the Report justifying the use of this | To70 to action / provide comment. | Airport to advise which model the forecasts intend. If this is the CNA750 Cessna Citation X or similar, no change required. | CoB to confirm which aircraft type is more common/representative of BMRA for modelling purposes. Peer review recommends if aircraft type numbers differ significantly from existing model, model should be updated using the appropriate INM aircraft types. |

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| | | INM aircraft type.<br><br>The Report does not provide any information on why Evektor Sportstar – LSA used the INM GASEPF aircraft, Airvan GA8 using the CNA206 and the PC9 used the JPATS aircraft to model their operations.<br><br>The Report also lists five helicopter types that either currently operate or are forecast to operate at the Busselton-Margaret River Airport but does not provide any supporting information as to why the INM helicopter type was selected to model the identified helicopter type, i.e. some helicopter noise data does not include the required effective perceived noise data (EPNL) that is required to prepare and ANEC set of noise contours, thereby limiting the helicopter types that can be used to model their operations. | To70 to provide comment.<br><br>To70 to provide comment. | PC9 used JPATS because this is the military version of the PC9. Others are representative aircraft. It is sufficient to state which aircraft were used.<br><br>This comment points out the limitations of INM and noise modelling in general. The comment does not relate to the modelling of the contour, which is correct as it stands. | Report to state INM aircraft types that have been used in the modelling and the aircraft types they represent, including any assumption/limitations on aircraft model selection.<br><br>No further action required, however assumptions/limitations as to why helicopter types have been selected, usually to model helicopters with one or two engines and those available with EPNL noise data. |
| 3.6.1 | Source of movement data | The Report does not provide any details of the actual source of the aircraft types used and their movements, except that they were based on historical and forecast data provided the City. Due to the complexity of forecast aircraft operations particularly that of RPT and charter operations this data is usually prepared by a company specialising in forecasting. If the services of such a company was involved will provide these forecasts then its details should be included in the Report, especially if preparing a report for having an ANEF endorsed for technical accuracy by Airservices Australia.<br><br>It was noted several of the aircraft types modelled did not have any changes in the number of movements forecast for the different studies modelled, i.e. there were no changes in number of movements for emergency services, recreational, general, military and helicopters for the 2028/29 and 2038/39 forecast periods. | Can be provided and traffic projections based on the SWDC/City business case submitted to the State Government.<br><br>As above. | Will amend if required. | CoB to confirm traffic projections are best available for modelling purposes. If improved projections are available, peer review recommends modelling is updated. Any assumptions/limitations with regard to traffic projections to be stated in the report. |
| 3.7.1 | Circuit operations | The modelling of only one circuit training flight per week does not appear to represent the noise impact of these flights that usually occur at smaller airports and the City should seek more information from the airport as to how many circuits are flown during the week | Flight training is restricted at the BMRA and managed by the City. Only one operator using ultra-light aircraft is approved to conduct flight training. | No action required | No further action required. |
| 3.8.1 | Day/night operations | The Report does not provide any details as to how aircraft movements during the day and night periods were determined, a requirement for when having an INM study checked for endorsement by Airservices Australia. | Can be provided and traffic projections based on the SWDC/City business case submitted to the State Government.<br><br>The City is not intending to submit the noise modelling report for Airservices Australia endorsement at this time. | Will amend if required.<br><br>COB to draft text on aircraft movements and day/night split. | CoB to confirm traffic projections are best available for modelling purposes. If improved projections are available, peer review recommends modelling is updated. Any assumptions/limitations with regard to traffic projections to be stated in the report. |
| 3.9 | Airport capacity study | Review of the Report indicates that a capacity study was not undertaken for this airport. | Traffic projections based on the SWDC/City business case submitted to the State Government – passenger demand was based on KPMG study completed in 2014.<br><br>The City is not intending to submit the noise modelling report for Airservices Australia endorsement at this time. | This is required for endorsement with Airservices Australia only. | No further action required. |
| 3.10.1 | Stage lengths used for departures | The Report does not provide any details of the stage lengths modelled but a review of the movements used for each forecast period modelled indicates the 737800, 737MAX INM aircraft were modelled using Stage 3 and 4 departure profiles and the F10065 INM aircraft was modelled using Stage 1 and 2 departure profiles. These stage lengths appear to be appropriate for destination airports but details of the stage lengths used and why they were used should be included in the Report. | Stage lengths can be provided.<br><br>Stage lengths to be included in the report | We will amend report to include description of stage lengths. | No further action required after report is amended. |
| 3.11.1 | Aircraft track assignments | Figure 6 shows the flight track for aircraft arriving from Perth, Boolgeeda, West Angeles, Jandakot and Karara as a straight line that will align them with a straight in approach to Rwy 21. However, Table 8 lists the arrivals track to Rwy 21 is track GNNSG which requires these aircraft to make a right turn to initially join the track then a left turn when passing the initial waypoint. Although away from the airport and outside of the calculated noise contours, track GNSSA should be used for these arrivals. This should especially be taken into consideration if one of these studies is to be assessed for endorsed as an ANEF and details of this approach path possibly being made public.<br><br>The forecast movement data list of different ports of origin/destination for some aircraft types but does not provide an estimate of the percentage of their movements that will operate to the identified airport. Based on this information the following assessment of flight track assignments was made:<br><br>- Where there are more than one port of origin/destination listed for an aircraft, percentage of movements to each port should be provided as in some cases these listed ports require approach/departure from a different direction, requiring the use of a different approach and departure track.<br><br>- With the exception of RPT aircraft types and jet aircraft, the majority of arrivals to | To70 to provide comment.<br><br>To70 to provide comment.<br><br>To70 to provide comment. | Figure 6 does not show flight tracks, it is simply a schematic route map.<br><br>This refers to GA aircraft which are assigned evenly to all available tracks, so it will not impact on modelling and is not required by Airservices.<br><br>Input cleared with airport. Split traffic evenly among available tracks as is commonly | No further action required after report is amended to state the map is for illustrative purposes only (is only a schematic route map, rather than providing flight track information).<br><br>No further action required.<br><br>No further action required. |

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| | | Rwy 03 would join for a circling approach using track WEST and only use a GNSS approach when weather conditions require the pilot to conduct does not Instrument Flight Rules (IFR) approach to this runway, which would be considerably less than the 50% indicated in Table 9 for day arrivals and less than 50% for night arrivals. | | accepted when no further information is available. | |
| | | J The majority of arrivals to Rwy 21 would also join for a circling approach using the east approach instead of the GNSS approach as noted above for arrivals to Rwy 03 during the day and night. | To70 to provide comment / action. | Input cleared with airport. Not raised by expert consulted with in formation of tracks or SVT Acoustic report. | No further action required. |
| | | J Track assignments for GA and similar aircraft types listed in Table 9 indicate one third of all arrivals to Rwy 21 are modelled arriving from the west. This does not appear to be consistent with the extent of the areas to the west, south-west and south of the airport, unless these areas are being used for training purposes. This is not consistent with the approach paths used for arrivals to Rwy 03 and it does not seem practicable that all of these aircraft types arrive using this approach path. | To70 to provide comment / action. | With GA, no specific forecast as to their O/D exists. It is common practice to assign them equally to the available tracks. | No further action required. |
| | | J Similar to that noted above for arrivals by GA and similar aircraft to Rwy 03 and Rwy 21 it is assumed the majority of military arrivals to this runway will join the circuit and conduct a circling approach to this runway and should be modelled with a greater percentage using track WEST for arrivals to Rwy 03 and track EAST for arrivals to Rwy 21. | To70 to provide comment. | Input cleared with airport. Not raised by expert consulted with in formation of tracks or SVT Acoustic report. | No further action required. |
| | | J Helicopter operations have been noted as a straight approach and departure that parallel Rwy 03/21 with all arrivals and departures in the same direction. These flight tracks are not consistent with the areas indicated in Appendix A for their destination as helicopters normally operate direct to/from these locations after their initial take-off/approach flight path which will usually parallel the airports runway. Helicopters are known to operate into the wind when landing or departing a helipad. | CoB confirm that helicopter operators always use the parallel approach and departure track to a minimum of the airport boundary then set course no matter of wind direction. This is considered normal flight procedures and also due to airport building and power line locations. | Airport to advise whether current modelling is representative of current conditions. | No further action required. |
| | | J Table 9 lists for military arrivals and departures on Rwy 03 and Rwy 21 should read 100% for each entry instead of the 50% for arrivals to Rwy 03 and 33% departures from this runway and for arrivals and departures on Rwy 21.<br><br>Aircraft movements on each runway and on each approach and departure track for each of the studies were checked and found to match the percentage listed in Table 9 for the different aircraft categories, with the exception for military arrivals and departures which have been modelled correctly with 100% of all arrivals and departures being assigned to the listed track instead of the percentages noted in this Table 9. | To70 to provide comment. | We will correct the table. | No further action required after report is amended. |
| 4.2.1 | Airport meteorological parameter | Further details of how the settings for temperature, pressure and relative humidity need to be detailed in the Report or amended to averages based on met records for the 1997 to 2010 or 2016 period. | To70 to provide comment / action. | The data that was prepared at the start of this work in 2015 is sufficiently recent for Airservices Australia endorsement. | The report should include a comment about how met data was determined. |
| 4.3.1 | User defined aircraft | The Report does not provide any details as to why this aircraft type was created and why the noise data for it is 3 dB lower than that of the INM 737800 aircraft. This needs to be justified in the Report, including supporting information as to why there is a difference in the noise levels.<br><br>Due to INM not being able to generate flight profile graphs for the 737MAX aircraft it is possible that when undertaking the calculation of the noise contours an error may occur, which INM may not report. If this occurs this may result in the INM not calculating the full impact of these aircrafts operations. It is suggested these profiles be amended so that the word STANDARD is changed to USER and the movements file be amended for this aircraft to reflect this change if this aircraft type continues to be used in these studies. | To70 to provide comment / action.<br><br>To70 to action | This surrogate method is accepted by Airservices, as described in 3.5.1.<br><br>Reviewer is correct. We will amend the model. | See comments at 3.5.1.<br><br>No further action required after model and report is amended. |
| 4.5.1 | INM run settings | Based on the above findings it is suggested the use angle of bank box be deselected in accordance with the recommendation in the INM User's Guide and the warning messages that are generated with it selected.<br><br>It is suggested the refinement setting be increased to at least 12 to 14 which will increase the accuracy when calculating noise contours. | To70 to action | Reviewer is correct. We will amend the model.<br><br>We will check with Airservices. | No further action required after model and report is amended.<br><br>No further action required after model and report is amended (if required by Airservices). |

9 May 2016

Jennifer May
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City of Busselton
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Our ref: 61/33115
156257
Your ref:

Dear Jenny

**Busselton-Margaret River Regional Airport**
**Peer Review of Noise Modelling**

GHD Pty Ltd (GHD) has completed a peer review of noise modelling contours (ANECs, N65, N70, N75, N80 and LAmax contours) recently prepared for the proposed Busselton-Margaret River Regional Airport development and reported in *Noise Modelling Report – Busselton Margaret River Airport*, completed by To70 Aviation (Australia) Pty Ltd (To70), dated December 2015.

## 1 Scope of work

The scope of works completed by GHD was as follows:

- Reviewed and assessed the data sources and attribution for aircraft movement forecasts, aircraft type selection and flight paths/tracks, track maps with labels and track assignment assumptions, details of circuit operations, stage lengths for departures and forecast horizons.
- Reviewed and assessed airport setup, runway description, temperature, headwind and humidity assumptions, calculations of airport capacity runway usage assumptions, day/night split assumptions and sources used as input for the INM model.
- INM model setup including version, aircraft type selection, details of terrain files (if used), base map coordinate systems etc.
- Documentation of inputs and outputs.

GHD completed a desktop peer review of To70 generated outputs; including:

- ANECs (standard) for the Busselton Regional Airport Master Plan 2015 aerodrome infrastructure / operations projected for twenty (20) years.
- N65, N70, N75, N80s for the following scenarios:
  - Master Plan (2015) aerodrome infrastructure / operations 2017/2018
  - Master Plan (2015) aerodrome infrastructure / operations 2022/2023
  - Master Plan (2015) aerodrome infrastructure / operations 2027/2028
  - Master Plan (2015) aerodrome infrastructure / operations 2037/2038
- ANEC (standard) for a 40-50 year projection (doubling of the 20 yr traffic forecast)

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- N65 and N70 for a 40-50 year projection (doubling of the 20 yr traffic forecast)
- LAmax contours using the Master Plan (2015) infrastructure for the following design aircraft:
  - Fokker100 (approach & departure for 03 and 21)
  - A320 (approach & departure for 03 and 21)
  - B737-800 (approach & departure for 03 and 21)

## 2 Peer review report and close out comments

GHD has issued the report *Busselton-Margaret River Regional Airport - Peer Review of Noise Modelling*, dated March 2016.

Comments from the peer review report have been collated into a comments table, which incorporates a response to the peer review comments from To70 and a close out comment from GHD as peer reviewer. The close out comments table is attached to this letter.

## 3 Noise modelling to inform environmental approvals

City of Busselton has requested GHD to comment, as an additional scope item, following completion of the peer review, on the suitability of the noise modelling for informing environmental approvals.

The use of Australian Noise Exposure Concept (ANEC) (Australian Noise Exposure Forecast (ANEF)) and Nxx (number above) contours is considered the conventional approach to providing information on aircraft noise in Australia for both land use planning and assessing aircraft noise impacts at Australian airports as referenced by the Federal Government Department of Infrastructure and Regional Development.

The resultant Nxx (N65, N70, N75 and N80) noise modelling contours do not extend to any populous areas for modelled scenarios for 2018/19, 2022/23 and 2028/29. The noise modelling demonstrates that noise impacts from forecast aircraft movements are not predicted to impact on residential areas.

The noise modelling has been completed based on forecast air traffic levels provided by City of Busselton. The future forecasts have been based on a number of assumptions and may change. Indications from City of Busselton are that air traffic forecasts are conservative and the forecast activity levels may never be realised in practice. As such, noise modelling contours produced can be considered as worst case (as is a typical requirement for noise modelling studies to inform environmental approvals).

In addition, peer review has found on several occasions older model aircraft have been used as representative of newer models of aircraft. Old model aircraft are typically louder than new models, resulting in higher predicted noise levels.

Based on the peer review undertaken, GHD concludes that the noise modelling completed is suitable for informing environmental approvals and presents a representative prediction of noise levels from the proposed development of Busselton-Margaret River Regional Airport.

## 4 Closing

Thank you for engaging GHD to undertake the peer review of noise modelling for the proposed Busselton-Margaret River Regional Airport development.

Please contact the undersigned should you require further information or assistance in relation to this peer review.

Kind regards

**James Forrest**
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Service Line Leader – Air & Noise (Australia, Asia Pacific, United Kingdom & Middle East)
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