

Wednesday, 27 September 2023

Christchurch International Airport Limited



### RE: 2023 CIAL Noise Contour update – Addendum to Final Report

In August 2023 Marshall Day Acoustics discovered a minor error in the model (the Federal Aviation Administrations (FAA's) Aviation Environmental Design Tool (AEDT)) used to generate the 2023 Updated Noise Contours included in CIAL's report '2023 Updated Christchurch International Airport Noise Contours'.

Marshall Day Acoustics have advised Airbiz that the error, which relates to a flight track duplication, was discovered when:

*"we were using one of the flight tracks in the model to calculate current single event noise levels for a resident's query unrelated to the Updated Contours."*

Further:

*"a thorough review has been undertaken by Marshall Day Acoustics to check that all flight track duplications have been identified and amended. The error arose due to a minor bug in AEDT allowing duplicate track names when editing, resulting in the input of duplicate flight tracks which were then not identified with an error message as would have been expected. This has been reported to the FAA by Marshall Day Acoustics."*

CIAL was made aware of the error in early August and the finding was communicated to Environment Canterbury (ECan) on 10<sup>th</sup> August 2023. A meeting was held with ECan and the ECan Expert Review Panel on 17<sup>th</sup> August 2023 to review the finding and agree a correction.

Following this meeting the CIAL Expert Team issued a memorandum (prepared by Marshall Day Acoustics) dated 18<sup>th</sup> August 2023 to ECan describing the issue, impact and proposed correction to the model. On 5<sup>th</sup> September 2023 ECan formally provided documentation to CIAL from the ECan Expert Review Panel (dated 24<sup>th</sup> August 2023) documenting a response, which is an addendum to the ECan Expert Review Panel Report.

CIAL's '2023 Updated Christchurch International Airport Noise Contours' report has been updated to reflect the resulting change. The corrected air noise contour shape files are noted as:

1. Annual Average 50\_55\_65 Aug 2023
2. Annual Average Air Noise Boundary Aug 2023
3. Outer Envelope 50\_55\_65 Aug 2023
4. Outer Envelope Air Noise Boundary Aug 2023

Following this overview letter is the Marshall Day Acoustics memorandum dated 18<sup>th</sup> August 2023 describing the issue and resolution. ECan's Expert Review Panel addendum referenced above can be found on the ECan website.

Your sincerely,

Sebastian Hawken

MEMO – LEGALLY PRIVILEGED

<b>Project:</b>	Christchurch Airport Recontouring	<b>Document No.:</b>	Mm 012
<b>To:</b>	Environment Canterbury	<b>Date:</b>	18 August 2023
<b>Attention:</b>	Jeff Smith	<b>Cross Reference:</b>	
<b>Delivery:</b>		<b>Project No.:</b>	20180806
<b>From:</b>	Laurel Smith	<b>No. Pages:</b>	2
		<b>Attachments:</b>	2
<b>CC:</b>	Darran Humpheson; Sebastian Hawken		
<b>Subject:</b>	Updated Contours Recalculation		

**SUMMARY**

MDA has uncovered an error in the AEDT model used for CIAL’s Updated Noise Contours while using a copy of the model to predict current single event noise levels in response to a query from the public. We found that the points that define the geometry of two flight tracks had been entered twice. This meant that for two departure tracks on Runway 20, each track point existed in the model twice. Instead of this causing an error when the model was run, the model calculated erroneous flight segments for aircraft using these tracks. This resulted in slightly smaller contours under these flight tracks and very slightly larger contours in the vicinity of the runways. We have corrected the error by removing the duplicate flight track points and recalculated the contours.

We recommend the Updated Noise Contour shape files produced by the Peer Review Process are updated with the amended shapefiles. We are sending you the following updated AEDT model and shapefiles:

- AEDT Model: *CIAL-Expert-Panel-v6b-230817.zip*
- Amended Contour Shapefiles: *Annual Average 50\_55\_65 Aug 2023.zip*
- Annual Average Air Noise Boundary Aug 2023.zip*
- Outer Envelope 50\_55\_65 Aug 2023.zip*
- Outer Envelope Air Noise Boundary Aug 2023.zip*

**HOW THE ISSUE OCCURRED**

The track points were imported as a csv file. The csv file included duplicates of points for two departure tracks and their sub-tracks (Note the sub-tracks were entered as individual tracks rather than dispersed tracks). The affected tracks are:

Runway	Backbone Track Name	Affected Sub-tracks
20DEXT	20JDD03_NC_0	20JDD03_NC_2, 20JDD03_NC_3, 20JDD03_NC_4, 20JDD03_NC_5
20IEXT	20JDI03_NC_0	20JDI03_NC_2, 20JDI03_NC_3, 20JDI03_NC_4, 20JDI03_NC_5


Airport Designer

**Edit Point Track: 20JDD03\_NC\_0**

Layout: NZCH Default Layout 0 (16/07/2013-6/06/2079)

\* Name: 20JDD03\_NC\_0

Runway End/Helipad: 20DEXT Operation Type: Departure

Track Type: Point Track Aircraft Type: 

Segment Number	Latitude (deg)	Longitude (deg)	Altitude Control	Control Altitude MSL (ft)
1	-43.472899	172.550679	None	
1	-43.472899	172.550679	None	
2	-43.49801828	172.5217327	None	
2	-43.49801828	172.5217327	None	
3	-43.5024917	172.5158357	None	
3	-43.5024917	172.5158357	None	
4	-43.50601795	172.5114243	None	
4	-43.50601795	172.5114243	None	
5	-43.50787895	172.5089034	None	
5	-43.50787895	172.5089034	None	

90 of 90 item(s) shown. 0 item(s) selected.

Points are duplicated

**HOW IT WAS DISCOVERED**

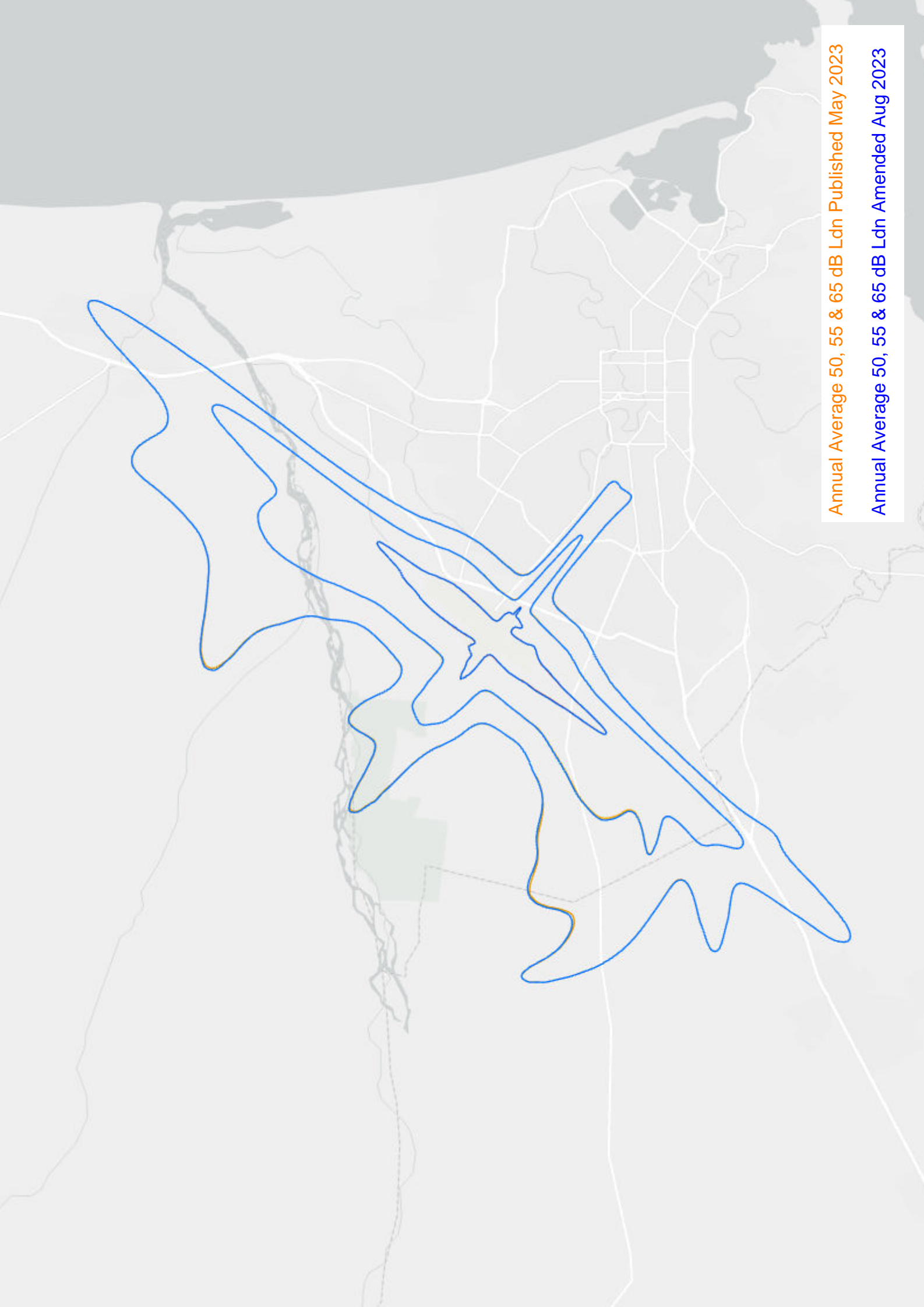
We were using one of the tracks to calculate single event noise levels for a resident’s query unrelated to the Updated Contours. The calculated  $L_{AE}$  did not align with a previous calculation using an older model which raised our initial concerns. Further investigation uncovered the track point duplication and the resulting erroneous calculated flight segments.

Initially we compared the flight performance reports in the metric result output for an aircraft departing on the default straight vector track with one departing on 20JDD03\_NC\_0. This revealed that the calculated flight segments for track 20JDD03\_NC\_0 were incorrect.

**CALCULATION ERROR**

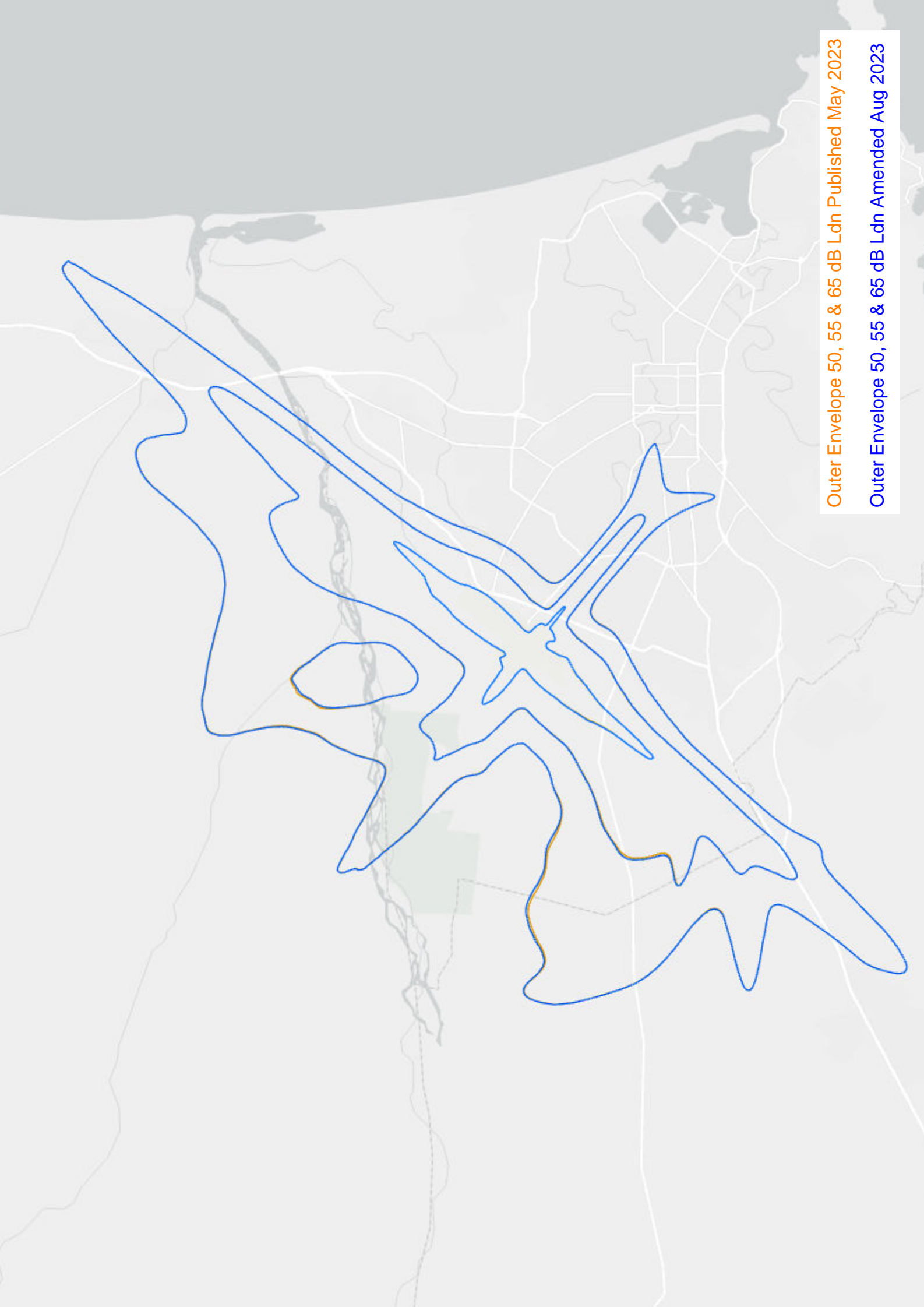
The following pages describe how the track point duplication caused the model to calculate incorrect flight segments. We will report this issue to the FAA through the AEDT feedback forum.

The attached screenshots show the extent of the difference between the May 2023 Updated Contours and the amended ones.



Annual Average 50, 55 & 65 dB Ldn Published May 2023

Annual Average 50, 55 & 65 dB Ldn Amended Aug 2023



Outer Envelope 50, 55 & 65 dB Ldn Published May 2023

Outer Envelope 50, 55 & 65 dB Ldn Amended Aug 2023