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Customer Name:	Civil Aviation Authority	Address:	Gatwick Airport South, West Sussex, RH6 0YR
Contact:	Lisa Darkins		
Date of Analysis:	December 2025 – January 2026		
Engineer & Report Author:	Harry Bulger		

Quality assurance of ANAS* data

*The *Aviation Noise Attitudes Survey 2023-24 (ANAS) is a large-scale social research study examining the relationship between long-term exposure to aviation noise and annoyance in the UK.*

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1. OVERVIEW

The Civil Aviation Authority (CAA) has commissioned significant noise modelling to estimate noise levels at survey postcodes:-

- Over an entire survey area around 10 UK airports
- Results of noise modelling is provided to CAA on a grid that encompasses the survey area
- CAA ANAS team linked the postcode noise dose information to 46,000 survey respondent postcodes using different techniques that could be compared to confirm results

The task commissioned by the CAA and described here was to provide quality checks on the matched data of survey respondents with postcodes from the noise modelling. The matching process was to be repeated independently, and the results compared against the original data. The data supplied is listed in the following tables (data for the London airports LCY (London city airport) and LHR (London Heathrow airport) were provided already combined into one file)s:-

Airport noise-modelled data

BHX_2023_ANAS_Dose_Postcodes	05/11/2025 10:57	Microsoft Excel C...	2,293 KB
EDI_2023_ANAS_Dose_Postcodes	05/11/2025 10:57	Microsoft Excel C...	2,687 KB
EMA_2023_ANAS_Dose_Postcodes	05/01/2026 10:28	Microsoft Excel C...	456 KB
GLA_2023_ANAS_Dose_Postcodes	05/11/2025 10:58	Microsoft Excel C...	3,740 KB
LBA_2023_ANAS_Dose_Postcodes	05/11/2025 10:58	Microsoft Excel C...	2,082 KB
LGW_2023_ANAS_Dose_Postcodes	05/11/2025 10:58	Microsoft Excel C...	2,071 KB
LHR_LCY_2023_ANAS_Dose_Postcodes	05/01/2026 10:39	Microsoft Excel C...	23,557 KB
LTN_2023_ANAS_Dose_Postcodes_NEW	05/01/2026 10:28	Microsoft Excel C...	1,128 KB
MAN_2023_ANAS_Dose_Postcodes	05/11/2025 10:58	Microsoft Excel C...	5,782 KB

Survey data with CAA matching to airport data

Airport-Respondent Joined Noise Dose NEW	07/01/2026 10:42	Microsoft Excel C...	2,201 KB

2. METHOD

A Python script was written to perform the matching task. The files for both the noise modelled data for each airport and the survey responses were provided in the comma separated variable format (.csv), hence, the "pandas" python library (which has numerous built-in methods for handling .csv files) was used to handle the reading and searching of the files.

The data from the survey response file was first loaded using the pandas.read_csv() function. The postcodes from this file were converted into a format that would match the postcodes found in the airport files – as the postcodes in the survey file were provided with the middle space present, whereas this was removed in the airport data files.

The postcodes were stored as a python 'set' structure (as opposed to a list or dictionary) to facilitate fast searches. The data for one airport was then read in chunks using the pandas.read_csv() function, and for each chunk (of 2000 data rows) the search set of all survey postcodes applied to it using the pandas "isin()" function, which returns a list of matches between the searched data (airport data) and the search set (survey postcodes). All airport files were iterated through, until all data rows of all airport files were searched, and all rows in the survey data had been matched.

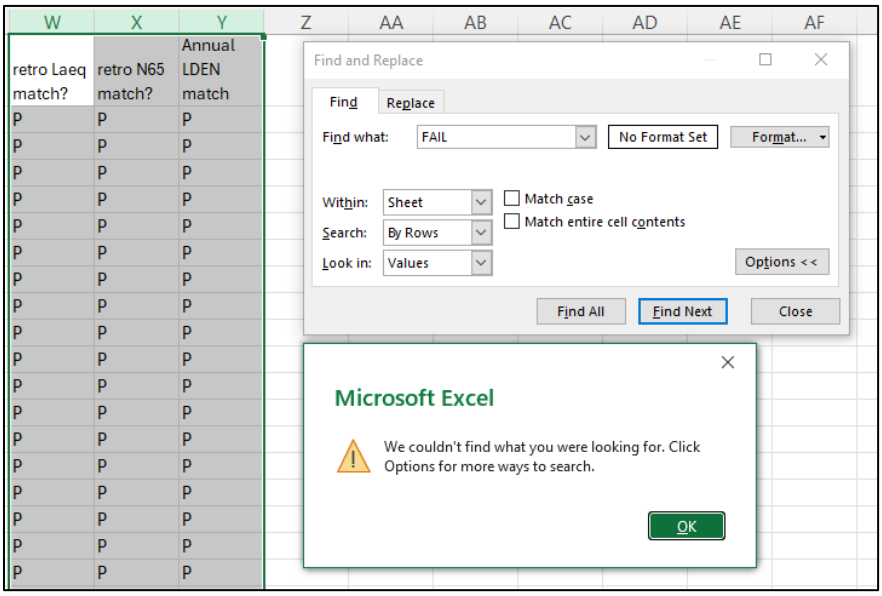
For each matched postcode, the wave ID from the survey response data was then used to determine which acoustic values were to be chosen from the airport data, with "wave 1" rows being matched with the "Summer" N65 and LAEQ16HR values, and "wave 2" rows being matched with the "Winter" N65 and LAEQ16HR values, and the "Annual LDEN" values common to both waves.

The resulting output was an excel file with an equal number of rows to the input survey response file, with each row containing a matched set of acoustic values from the airport dataset.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	Wave	Serial	Mode	tranche	airport_ID	Postcode	retro_LAeq 16h	retro_N65	retro_Lden		start of matching output >	survey_ro	Original survey postcode	Transformed postcode	wave ID	survey data	matched airport file	airport data	retro_LAeq 16h	retro_N65	Annual LDEN	match_status	retro Laeq match?	retro N65 match?	Annual LDEN match
2	1	100000041	1	1	1	B23 5EP	44.122	0.647	46.654			2	B23 5EP	B235EP	1	{'Wave': 1,	BHX_2023	{'Postcode	44.122	0.647	46.654	MATCHED	P	P	P
3	1	100000042	1	1	1	B23 5EP	44.122	0.647	46.654			3	B23 5EP	B235EP	1	{'Wave': 1,	BHX_2023	{'Postcode	44.122	0.647	46.654	MATCHED	P	P	P
4	1	100000121	2	1	1	B23 5EY	46.218	16.67	48.73			4	B23 5EY	B235EY	1	{'Wave': 1,	BHX_2023	{'Postcode	46.218	16.67	48.73	MATCHED	P	P	P
5	1	100000122	2	1	1	B23 5EY	46.218	16.67	48.73			5	B23 5EY	B235EY	1	{'Wave': 1,	BHX_2023	{'Postcode	46.218	16.67	48.73	MATCHED	P	P	P
6	1	100000211	1	1	1	B23 5LR	45.852	11.024	48.346			6	B23 5LR	B235LR	1	{'Wave': 1,	BHX_2023	{'Postcode	45.852	11.024	48.346	MATCHED	P	P	P
7	1	100000212	1	1	1	B23 5LR	45.852	11.024	48.346			7	B23 5LR	B235LR	1	{'Wave': 1,	BHX_2023	{'Postcode	45.852	11.024	48.346	MATCHED	P	P	P
8	1	100000291	1	1	1	B23 5NL	44.939	0.913	47.541			8	B23 5NL	B235NL	1	{'Wave': 1,	BHX_2023	{'Postcode	44.939	0.913	47.541	MATCHED	P	P	P
9	1	100000371	1	1	1	B23 5NX	45.454	7.729	47.991			9	B23 5NX	B235NX	1	{'Wave': 1,	BHX_2023	{'Postcode	45.454	7.729	47.991	MATCHED	P	P	P
10	1	100000401	2	1	1	B23 5RD	44.098	0.404	46.748			10	B23 5RD	B235RD	1	{'Wave': 1,	BHX_2023	{'Postcode	44.098	0.404	46.748	MATCHED	P	P	P
11	1	100000461	1	1	1	B23 5RN	46.154	15.53	48.708			11	B23 5RN	B235RN	1	{'Wave': 1,	BHX_2023	{'Postcode	46.154	15.53	48.708	MATCHED	P	P	P
12	1	100000462	1	1	1	B23 5RN	46.154	15.53	48.708			12	B23 5RN	B235RN	1	{'Wave': 1,	BHX_2023	{'Postcode	46.154	15.53	48.708	MATCHED	P	P	P
13	1	100000511	1	1	1	B23 6DR	45.012	2.442	47.855			13	B23 6DR	B236DR	1	{'Wave': 1,	BHX_2023	{'Postcode	45.012	2.442	47.855	MATCHED	P	P	P
14	1	100000551	2	1	1	B23 6EE	44.297	1.909	47.162			14	B23 6EE	B236EE	1	{'Wave': 1,	BHX_2023	{'Postcode	44.297	1.909	47.162	MATCHED	P	P	P
15	1	100000552	2	1	1	B23 6EE	44.297	1.909	47.162			15	B23 6EE	B236EE	1	{'Wave': 1,	BHX_2023	{'Postcode	44.297	1.909	47.162	MATCHED	P	P	P
16	1	100000561	2	1	1	B23 6HX	44.783	2.142	47.5			16	B23 6HX	B236HX	1	{'Wave': 1,	BHX_2023	{'Postcode	44.783	2.142	47.5	MATCHED	P	P	P
17	1	100000562	2	1	1	B23 6HX	44.783	2.142	47.5			17	B23 6HX	B236HX	1	{'Wave': 1,	BHX_2023	{'Postcode	44.783	2.142	47.5	MATCHED	P	P	P
18	1	100000571	2	1	1	B23 6JR	44.509	1.925	47.227			18	B23 6JR	B236JR	1	{'Wave': 1,	BHX_2023	{'Postcode	44.509	1.925	47.227	MATCHED	P	P	P
19	1	100000572	2	1	1	B23 6JR	44.509	1.925	47.227			19	B23 6JR	B236JR	1	{'Wave': 1,	BHX_2023	{'Postcode	44.509	1.925	47.227	MATCHED	P	P	P
20	1	100000591	2	1	1	B23 6NA	47.085	24.218	49.658			20	B23 6NA	B236NA	1	{'Wave': 1,	BHX_2023	{'Postcode	47.085	24.218	49.658	MATCHED	P	P	P
21	1	100000592	2	1	1	B23 6NA	47.085	24.218	49.658			21	B23 6NA	B236NA	1	{'Wave': 1,	BHX_2023	{'Postcode	47.085	24.218	49.658	MATCHED	P	P	P
22	1	100000701	1	1	1	B23 6NP	44.834	1.199	47.478			22	B23 6NP	B236NP	1	{'Wave': 1,	BHX_2023	{'Postcode	44.834	1.199	47.478	MATCHED	P	P	P
23	1	100000741	1	1	1	B23 6NT	46.597	19.447	49.205			23	B23 6NT	B236NT	1	{'Wave': 1,	BHX_2023	{'Postcode	46.597	19.447	49.205	MATCHED	P	P	P
24	1	100000941	1	1	1	B23 6TX	46.871	20.639	49.516			24	B23 6TX	B236TX	1	{'Wave': 1,	BHX_2023	{'Postcode	46.871	20.639	49.516	MATCHED	P	P	P
25	1	100000981	1	1	1	B23 6UH	45.997	7.65	48.671			25	B23 6UH	B236UH	1	{'Wave': 1,	BHX_2023	{'Postcode	45.997	7.65	48.671	MATCHED	P	P	P
26	1	100000982	1	1	1	B23 6UH	45.997	7.65	48.671			26	B23 6UH	B236UH	1	{'Wave': 1,	BHX_2023	{'Postcode	45.997	7.65	48.671	MATCHED	P	P	P
27	1	100001021	2	1	1	B23 6US	44.112	2.079	47.044			27	B23 6US	B236US	1	{'Wave': 1,	BHX_2023	{'Postcode	44.112	2.079	47.044	MATCHED	P	P	P
28	1	100001041	1	1	1	B24 0BB	46.476	12.45	48.971			28	B24 0BB	B240BB	1	{'Wave': 1,	BHX_2023	{'Postcode	46.476	12.45	48.971	MATCHED	P	P	P
29	1	100001081	1	1	1	B24 0HL	45.934	0.855	48.363			29	B24 0HL	B240HL	1	{'Wave': 1,	BHX_2023	{'Postcode	45.934	0.855	48.363	MATCHED	P	P	P

3. RESULTS

Final checking of the matching task with the original matched data provided by CAA was performed using Excel. As the acoustic data for each metric had already been sorted into a single column based on the wave number for each row, the two matched datasets could easily be compared by checking that values in the “N65”, “LAEQ16HR” and “Annual LDEN” columns were equal, and labelling matches with a “P” (pass) and mismatches with “FAIL”.



0 records in the output matched dataset from the task as performed above were found to have different values to those in the CAA matching dataset provided. This was confirmed by searching the matching columns for “FAIL” values and performing a filter operation on the output data to only display rows which contained the “FAIL” label, both of which returned **no mismatches** in the output data.

```
=LET(
    filtered_data, FILTER('Airport-Respondent Joined Noise'!A1:Y46789,
        ('Airport-Respondent Joined Noise'!W1:W46789="FAIL") +
        ('Airport-Respondent Joined Noise'!X1:X46789="FAIL") + ('Airport-Respondent Joined Noise'!Y1:Y46789="FAIL"),
        ""),
    IF(filtered_data="", "", filtered_data)
)
```

-----END OF REPORT-----