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OUR REF: 6658/22 YOUR REF: AMcD DATE: 5th February 2022.

Ms. Adrienne McDonnell,
Kilreesk Lane,
St Margarets,
Co Dublin.

adriennemacaroo@gmail.com

Re: North Runway: Up-to-date acoustic assessment.

Dear Ms McDonnell,

I re-attended at your home (K67 AD79) early on the morning of 25th January 2022. The purpose of my visit was to conduct synchronized indoor and outdoor measurements. In this respect two certified, calibrated and synchronized Brüel & Kjær 2250 instruments were deployed. The first was set up in the centre of the main (upstairs) bedroom. The second was set up at a suitable outdoor location. Both instruments had suitable microphone extension leads and windshields in place. Weather conditions were ideal for such measurement. Although cold it was dry with virtually calm conditions. The app "Flightradar" was used as a useful assist in identifying the flights which took off during the assessment period and which were the main focus of attention.

These flights took off from the existing runway. The McDonnell home is situate - effectively – midway between the existing and North (new) runway. While the results of comparable take offs are likely to be comparable (in the sense of arrival noise level at the given location), the source of such noise emanations will be a *new source* as opposed to a long-established source.

The new source, therefore, must be subject to current restrictions and controls in relation to its infiltration level into existing bedrooms which has been developing and changing over many years. The data gathered, therefore, are to be scrutinized on the basis of their constituting a new source to which existing buildings (family homes including bedrooms with natural ventilation) are to be subjected. The in-room level provoked by the passage of existing flights is being taken as a suitable proxy for the night-time flights from the new runway.

The relevant details metrics noted for each take-off include the time, destination, aircraft type and age (as provided by Flightradar), and the acoustical metrics include **SEL**, $\mathbf{L_{AFmax}}$, $\mathbf{L_{ASmax}}$ and derived metrics including *duration of "event"* and corresponding $\mathbf{L_{Aeq}}$. These latter two metrics were taken from scrutiny/analysis of the logged data recovered from the Analyzer recording in the bedroom (window ajar for fresh air admission) and that recording outdoors.

The *time* was taken as that point on the logged trace where the highest max levels occurred. The *duration* was taken as that from the commencement of the increase above background level until its decay.

The **SEL** data has been downloaded from the source data, itself analyzed via EVALUATOR software. As is good practice, the results have been rounded to the nearest integer. Similar comments apply to the $\mathbf{L_{AFmax}}$ and $\mathbf{L_{ASmax}}$ and indeed the $\mathbf{L_{Aeq}}$ values (the duration of this latter metric being that as indicated above). These metrics are all expressed in A-weighted decibels, denoted dB(A).

A particular take-off has been assigned an “event number” and two separate table have been prepared in this regard. The first table details the acoustical metrics identified by the event number in respect of the in-bedroom level and the outdoor level. The second table deals with (as best possible) the correlation between the noted data and the Flightradar posting.

TABLE 1: Event #, duration, indoor and outdoor metrics.

	INDOORS						OUTDOORS					
Event #	Time	Duration	**SEL**	L_{Aeq}	L_{AFmax}	L_{ASmax}	Time	Duration	**SEL**	L_{Aeq}	L_{AFmax}	L_{ASmax}
1	05:56:00	82 secs	66	47	59	55	05:56:00	86	85	65	75	72
2	06:16:16	93	64	44	56	53	06:16:00	73	83	64	74	72
3	06:17:49	76	67	48	59	56	06:17:51	73	84	66	76	74
4	06:19:30	94	65	45	58	54	06:19:28	87	83	64	74	70
5	06:21:12	94	67	47	58	55	06:21:02	76	85	66	75	73
6	06:23:00	78	64	45	56	53	06:23:00	75	82	63	73	70
7	06:24:31	78	64	45	57	53	06:24:30	80	83	64	76	72
8	06:27:32	80	67	48	58	55	06:27:28	83	84	65	74	71
9	06:29:23	78	65	46	55	53	06:29:21	79	83	64	73	70
10	06:32:53	86	65	46	56	53	06:32:47	86	84	65	75	72
11	06:34:14	78	68	49	59	56	06:34:06	78	85	66	77	73
12	06:35:41	70	66	47	57	55	06:35:27	82	83	64	74	71
13	06:37:10	72	63	45	54	52	06:37:12	83	82	63	74	71
14	06:38:39	83	64	45	53	51	06:38:31	86	83	63	73	69
15	06:40:03	80	63	44	55	51	06:40:03	85	81	62	72	68
16	06:41:26	74	65	46	57	54	06:41:35	78	83	64	74	72
17	06:42:57	88	65	46	59	54	06:42:43	86	83	64	73	71
18	06:44:22	66	65	46	56	54	06:44:19	79	82	63	72	69
19	06:45:46	74	65	46	57	55	06:45:46	76	82	63	73	70
20	06:46:51	76	65	46	59	54	06:46:51	68	83	64	76	73
21	06:56:03	80	64	45	57	54	06:56:03	82	83	63	75	72
22	06:57:27	78	65	46	57	54	06:57:28	90	82	63	73	70
23	06:59:03	77	60	41	54	50	06:59:04	93	78	59	72	68
24	07:00:44	77	64	45	56	53	07:00:35	92	82	62	72	69
25	07:02:41	69	67	49	59	57	07:02:42	82	85	65	75	73
26	07:05:12	74	65	46	58	55	07:05:07	83	82	63	73	70
27	07:06:42	78	63	44	55	52	07:06:39	96	82	62	73	70
28	07:07:59	78	64	45	57	54	07:08:00	81	82	63	74	71
29	07:10:19	89	64	45	56	53	07:10:19	99	83	63	74	71
30	07:13:35	78	65	46	58	55	07:13:37	76	84	65	76	73
31	07:15:10	79	64	45	55	53	07:15:06	82	82	63	73	71
32	07:15:35	89	63	44	54	51	07:17:27	85	82	63	71	69
33	07:17:35	74	60	41	51	48	07:19:58	70	79	61	71	69
34	07:22:29	80	65	46	56	53	07:22:28	83	82	63	73	70
35	07:23:53	73	64	46	56	53	07:23:50	78	82	63	72	70
36	07:25:20	74	64	46	57	54	07:25:21	82	82	63	74	71
37	07:26:42	74	65	45	59	54	07:26:40	95	83	64	74	71
38	07:36:33	85	65	46	58	55	07:36:42	82	83	64	75	72
39	08:11:30	91	64	44	57	54	08:11:30	97	82	62	73	70
40	08:17:24	93	65	45	57	54	08:17:25	90	83	63	75	72
41	08:22:58	74	64	45	56	52	08:22:58	101	83	63	73	70
42	08:33:21	105	64	43	54	51	08:33:21	93	82	63	72	70
43	08:38:36	94	64	44	54	52	08:38:36	86	82	62	71	69

These “events” are flight take-offs. As expected, the lulls between sustained take off periods (such as the lulls in between events 20 and 21, and 38 and 39) a useful insight into the “no flight” conditions. In this respect of outdoor levels, these two periods give levels of 50dB(A) whereas the corresponding in-room levels are 30 – 31 dB(A) for these periods. The max levels for these “no flight” periods (even that after 07:00 hours) are all comfortably below the night-time threshold.

There were some variations between the posted times and the noted events. It has not been possible to fully correlate the earlier flights but reliable notes from events #8 onwards are to hand and tabulate as follows:

TABLE 2; Event #, destination, aircraft type/age and noted take-off time.

Event #	Flight/Carrier.	Destination	Aircraft	Stated age	Time (noted)
8	-	Birmingham	B738	-	06:25
9	FR	-	A320	21	06:29
10	FR	Madrid	B738	13	06:32
11	FR	-	B738	13	06:33
12	EI	Gatwick	A320	17	06:35
13	FR	Edinburgh	B738	15	06:37
14	FR	Gatwick	B738	17	06:38
15	FR	Brussels	B738	13	06:39
16	FR	Manchester	B738	11	06:41
17	EI	Manchester	A320	21	06:42
18	EI	Munich	A320	16	06:43
19	EI	Dusseldorf	A320	14	06:45
20	EI	Heathrow	A321	2	06:46
21	EI	Glasgow	A320	17	06:55
24	EI	Geneva	A320	16	07:00
25	FR	Amsterdam	B737	9	07:02
26	EI	Madrid	A320	13	07:04
27	FR	Glasgow	B737	16	07:06
28	FR	Liverpool	B737	11	07:07
29	EI	Berlin	A320	16	07:10
30	FR	Faro	B737	9	07:13
31	EI	Edinburgh	A320	12	07:14
33	BA	Heathrow	A320	8	07:17
34	EI	Milan	A320	17	07:22
35	EI	Lisbon	A320	10	07:23
36	EI	Barcelona	A320	16	07:24
37	FR	Vilnius	B737	11	07:26
38	FR	Gatwick	B737	17	07:35
39	FR	Stansted	B737	11	08:11
40	SW	Tenerife	B737	10	08:17
41	FR	London	B737	16	08:22
42	FR	Bristol	B737	14	08:33
43	FR	Kerry	B737	16	08:38

Study of the data from Table 1 – particularly the in-room levels – indicates the metric $\mathbf{L_{AFmax}}$ reaches 59 dB(A) on 6 occasions. It does not exceed this level. In a similar fashion the $\mathbf{L_{ASmax}}$ reaches 55 dB(A) on 8 occasions (indeed it attains 56 dB(A) on a further 2 occasions) and this provides an initial target for reduction. Were these metrics to be reduced by some ***15 dB(A)*** the max criteria for a bedroom (*at night with fresh air admission*) will be achieved.

Consider, now, the measured 1-hour in-bedroom level; from the data obtained this yields a 1-hour $\mathbf{L_{AEQ}}$ of 43 dB(A). During this period – from 06:00 to 07:00 – there were 22 take-offs. To attain the appropriate in-bedroom level of 30 dB(A), a reduction, with respect to this metric, of ***13 dB(A)*** is indicated.

The data gathered above applies to your home; similar data will apply to the neighbouring homes of those living close to you – family members.

The data gathered indicates the performance required by the additional attenuation/insulation required to be installed by the DAA. Careful assessment of the bedrooms (the most sensitive rooms) and other rooms (to include study, lounge, reception, dining and halls) will be required in respect of each of the homes. Similar construction may permit similar upgrading.

It is only when such assessment, calculation, design and fit is completed that the night-time operation of the North Runway may occur without serious and objectionable intrusion into your home and that of those immediately proximate to you.

Yours sincerely,

Karl Searson
Chartered Engineer.