Annex C

Detailed Calculations of Operational Noise Levels

Expansion of Heliport Facilities at Macau Ferry Terminal - Operational Phase Noise Monitoring (Day-time)

Date: 3-Jun-11
Time: 15:20 - 16:27
Location: Wayson Commercial Building (roof level)
Weather Condition: Fine

						Measured Façade Noise Level at Wayson Comm. Bldg., dB(A)				Corrected Façade Noise Level After Correction for Shielding Effect at Talon Tower, dB(A) #				Bkg. Level, dB(A)	Distance Attenuat-ion,dB(A) ##	Calculated Nosie Level at Talon Tower, dB(A)
Flight Ref. No.	Flight Model	Flight Direct-ion *	Approx. Time	Flight Event	Duration of Flight Event, s	LAeq	LA10	LA90	LAMax	LAeq	LA10	LA90	LAMax			LAMax @
													(1A)	(2)	(3)	=(1A)-(2)+(3)
1	AW139	W	15:22	Approach	70	74.9	75.3	74.3	79	74.9	75.3	74.3	79.0	73.1	-0.6	77
				Hovering	22	74	74.3	73.5	79.1	74.0	74.3	73.5	79.1	73.1	-0.6	77
				Idling	399	73.3	73.6	72.9	76.7	73.3	73.6	72.9	76.7	73.1	-0.6	74
		E	15:30	Take-off	65	74.2	74.5	73.6	80.4	75.7	76.0	75.1	81.9	73.1	-0.6	81
2	AW139	E	15:51	Approach	66	74.2	74.5	73.7	78.4	75.7	75.9	75.1	82.1	73.1	-0.6	81
				Hovering	19	75.9	76.2	75.2	81.7	75.9	76.2	75.2	81.7	73.1	-0.6	80
				Idling	437	73.9	74.2	73.3	78.8	73.9	74.2	73.3	78.8	73.1	-0.6	77
		W	16:00	Take-off	67	75.1	75.4	74.5	78	75.1	75.4	74.5	78.0	73.1	-0.6	76
3	AW139	W	16:17	Approach	66	75.6	75.9	75	79.1	75.6	75.9	75.0	79.1	73.2	-0.6	77
				Hovering	19	74.3	74.8	73.8	78.8	74.3	74.8	73.8	78.8	73.2	-0.6	77
				Idling	483	73.5	73.8	72.9	80.9	73.5	73.8	72.9	80.9	73.2	-0.6	79
		E	16:26	Take-off	65	73.9	74.2	73.3	77.1	75.6	75.8	75.0	82.1	73.2	-0.6	81
															Highest Lmax, dB(A):	**81**

Remark:

* E - Flight approaches from or departs to the East; W - Flight approaches from or departs to the West.

Corrected noise level after correction for shielding effect (+5dB(A) to the concerned noise data) in accordance with Table 10, Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

Distance correction factor in accordance with Table 9, Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

@ Calculated noise level (without background) with noise correction for shielding effect and distance attenuation in accordance with Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

Expansion of Heliport Facilities at Macau Ferry Terminal - Operational Phase Noise Monitoring (Evening-time)

Date: 03 June 2011
Time: 19:00 - 23:00
Location: Wayson Commercial Building (roof level)
Weather Condition: Fine

						Measured Façade Noise Level at Wayson Comm. Bldg., dB(A)			Corrected Façade Noise Level After Correction for Shielding Effect at Talon Tower, dB(A) #			Bkg. Level, dB(A)	Distance Attenuat-ion, dB(A) ##	Calculated Nosie Level at Talon Tower
Flight Ref. No.	Flight Model	Flight Direct-ion *	Approx. Time	Flight Event	Duration of Flight Event, s	LAeq	LA10	LA90	LAeq	LA10	LA90			LAeq @
									(1B)			(2)	(3)	=(1B)-(2)+(3)
1	AW139	**		Approach	**	**	**	**	**	**	**	**	**	**
				Hovering	**	**	**	**	**	**	**	**	**	**
				Idling	125	71.9	72.2	71.4	71.9	72.2	71.4	71.7	-0.6	58
		E	19:02	Take-off	64	72.8	73.1	72.1	74.5	74.9	73.9	71.7	-0.6	71
2	AW139	W	19:23	Approach	67	74	74.6	73.3	74.0	74.6	73.3	71.4	-0.6	70
				Hovering	20	72.9	74.1	71.8	72.9	74.1	71.8	71.4	-0.6	67
				Idling	430	71.2	71.4	70.7	71.2	71.4	70.7	71.4	-0.6	61
		E	19:31	Take-off	71	71.7	72	71.1	73.0	73.3	72.5	71.4	-0.6	67
3	AW139	W	19:51	Approach	66	73.5	74	72.7	73.5	74.0	72.7	71.2	-0.6	69
				Hovering	18	73.4	73.8	72.9	73.4	73.8	72.9	71.2	-0.6	69
				Idling	566	71.2	71.5	70.7	71.2	71.5	70.7	71.2	-0.6	61
		E	20:01	Take-off	67	71.5	71.9	70.9	73.0	73.4	72.4	71.2	-0.6	68
4	AW139	W	20:17	Approach	69	74.5	75	73.6	74.5	75.0	73.6	70.9	-0.6	71
				Hovering	17	75.3	75.8	74.5	75.3	75.8	74.5	70.9	-0.6	73
				Idling	635	70.9	71.2	70.4	70.9	71.2	70.4	70.9	-0.6	60
		E	20:29	Take-off	65	72.4	72.7	71.7	73.6	74.0	73.0	70.9	-0.6	70
5	AW139	W	20:46	Approach	67	73.7	74.1	73	73.7	74.1	73.0	70.4	-0.6	70
				Hovering	22	75.3	75.9	74.7	75.3	75.9	74.7	70.4	-0.6	73
				Idling	663	71	71.3	70.5	71.0	71.3	70.5	70.4	-0.6	62
		E	20:59	Take-off	67	71.3	71.6	70.8	73.0	73.3	72.5	70.4	-0.6	69
6	AW139	W	21:15	Approach	65	73.1	73.5	72.4	73.1	73.5	72.4	69.9	-0.6	70
				Hovering	19	71.8	72.1	71.2	71.8	72.1	71.2	69.9	-0.6	67
				Idling	928	70.4	70.7	69.9	70.4	70.7	69.9	69.9	-0.6	60
		E	21:32	Take-off	64	72.3	72.7	71.6	73.8	74.1	73.1	69.9	-0.6	71
7	AW139	W	21:46	Approach	64	73.2	74.1	72.1	73.2	74.1	72.1	70.4	-0.6	69
				Hovering	17	73.5	74.1	72.7	73.5	74.1	72.7	70.4	-0.6	70
				Idling	749	70.5	70.8	69.9	70.5	70.8	69.9	70.4	-0.6	53
		E	22:00	Take-off	66	72.5	73.1	71.6	73.8	74.3	73.0	70.4	-0.6	71
8	AW139	W	22:17	Approach	67	75.3	75.8	74.5	75.3	75.8	74.5	70.1	-0.6	73
				Hovering	22	73.9	74.3	73.3	73.9	74.3	73.3	70.1	-0.6	71
				Idling	551	70.3	70.6	69.8	70.3	70.6	69.8	70.1	-0.6	56
		E	22:28	Take-off	69	71.1	71.3	70.6	72.5	72.7	72.0	70.1	-0.6	68
9	AW139	W	22:49	Approach	68	73.7	74.3	72.9	73.7	74.3	72.9	70.3	-0.6	70
				Hovering	22	73.8	74.8	72.8	73.8	74.8	72.8	70.3	-0.6	71
				Idling	345	70.9	71.2	70.2	70.9	71.2	70.2	70.3	-0.6	61
		E	22:56	Take-off	69	70.9	71.2	70.4	72.2	72.4	71.6	70.3	-0.6	67
												Leq(4-hrs), dB(A):		**61**

Remark:

* E - Flight approaches from or departs to the East; W - Flight approaches from or departs to the West.

Corrected noise level after correction for shielding effect (+5dB(A) to the concerned noise data) in accordance with Table 10, Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

Distance correction factor in accordance with Table 9, Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

@ Calculated noise level (without background) with noise correction for shielding effect and distance attenuation in accordance with Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

** Evening-time Noise measurement was commenced at 19:00. Thus, noise data before this time is not available.

Expansion of Heliport Facilities at Macau Ferry Terminal - Operational Phase Noise Monitoring (Day-time)

Date: 3-Jun-11
Time: 13:45 - 15:00
Location: Seaview Commercial Building (roof level)
Weather Condition: Fine

Flight Ref. No.	Flight Model	Flight Direct-ion *	Approx. Time	Flight Event	Duration of Flight Event, s	Measured Façade Noise Level at Seaview Comm. Bldg., dB(A)				Bkg. Level, dB(A)	Distance Attenuat-ion,dB(A) ##	Calculated Nosie Level at Ka On Bldg., dB(A)
						LAeq	LA10	LA90	LAMax			LAMax @
									(1A)	(2)	(3)	=(1A)-(2)+(3)
1	AW139	E	13:45	Approach	73	70.3	70.6	69.7	76.2	70.0	0.9	76
				Hovering	20	70.3	70.9	69.6	77.4	70.0	0.9	77
				Idling	845	71.2	71.5	70.7	80.6	70.0	0.9	81
		W	14:01	Take-off	64	72.2	72.6	71.6	79.4	70.0	0.9	80
2	AW139	E	14:15	Approach	68	71.8	72.1	71.3	74.7	71.9	0.9	72
				Hovering	21	71.8	72.1	71.3	74.5	71.9	0.9	72
				Idling	886	71.2	71.4	70.6	79.5	71.9	0.9	80
		W	14:32	Take-off	68	72.2	72.5	71.7	77.7	71.9	0.9	77
3	AW139	W	14:49	Approach	62	74.7	75.1	74.1	78.9	70.9	0.9	79
				Hovering	26	73.8	74.5	72.9	81.8	70.9	0.9	82
				Idling	465	70.9	71.2	70.4	75.9	70.9	0.9	75
		E	14:58	Take-off	64	72.6	72.9	72.1	76.8	70.9	0.9	76
											Highest Lmax, dB(A):	**82**

Remark:

* E - Flight approaches from or departs to the East; W - Flight approaches from or departs to the West.

Distance correction factor in accordance with Table 9, Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

@ Calculated noise level (without background) with noise correction for shielding effect and distance attenuation in accordance with Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

Expansion of Heliport Facilities at Macau Ferry Terminal - Operational Phase Noise Monitoring (Evening-time)

Date: 03 June 2011
Time: 19:00 - 23:00
Location: Seaview Commercial Building (roof level)
Weather Condition: Fine

Flight Ref. No.	Flight Model	Flight Direct-ion *	Approx. Time	Flight Event	Duration of Flight Event, s	Measured Façade Noise Level at Seaview Comm. Bldg., dB(A) LAeq (1B)	LA10	LA90	Bkg. Level, dB(A) (2)	Distance Attenuat-ion, dB(A) ## (3)	Calculated Nosie Level at Ka On Bldg. LAeq @ =(1B)-(2)+(3)
1	AW139	**		Approach	**	**	**	**	**	**	**
				Hovering	**	**	**	**	**	**	**
				Idling	125	69.9	70.2	69.4	0.0	0.9	71
		E	19:02	Take-off	64	70.9	71.1	70.5	0.0	0.9	72
2	AW139	W	19:23	Approach	67	73.0	73.4	72.1	70.3	0.9	71
				Hovering	20	70.3	70.8	69.6	70.3	0.9	61
				Idling	430	69.8	70.0	69.3	70.3	0.9	61
		E	19:31	Take-off	71	70.4	70.7	69.9	70.3	0.9	55
3	AW139	W	19:51	Approach	66	72.4	72.7	71.7	69.7	0.9	70
				Hovering	18	70.9	71.1	70.5	69.7	0.9	66
				Idling	566	69.8	70.0	69.3	69.7	0.9	54
		E	20:01	Take-off	67	69.8	70.0	69.3	69.7	0.9	54
4	AW139	W	20:17	Approach	69	73.1	73.5	72.4	69.8	0.9	71
				Hovering	17	73.0	73.4	72.2	69.8	0.9	71
				Idling	635	69.6	69.8	69.1	69.8	0.9	61
		E	20:29	Take-off	65	70.3	70.4	69.8	69.8	0.9	62
5	AW139	W	20:46	Approach	67	72.4	72.9	71.6	69.4	0.9	70
				Hovering	22	73.5	74.3	72.0	69.4	0.9	72
				Idling	663	69.7	69.9	69.1	69.4	0.9	59
		E	20:59	Take-off	67	69.6	69.8	69.2	69.4	0.9	57
6	AW139	W	21:15	Approach	65	72.0	72.4	71.3	69.0	0.9	70
				Hovering	19	69.9	70.2	69.4	69.0	0.9	64
				Idling	928	69.0	69.2	68.5	69.0	0.9	60
		E	21:32	Take-off	64	70.2	70.5	69.7	69.0	0.9	65
7	AW139	W	21:46	Approach	64	72.0	72.6	71.2	69.4	0.9	69
				Hovering	17	71.1	71.5	70.4	69.4	0.9	67
				Idling	749	69.2	69.5	68.6	69.4	0.9	60
		E	22:00	Take-off	66	70.7	71.1	70.1	69.4	0.9	66
8	AW139	W	22:17	Approach	67	73.6	73.9	72.9	69.2	0.9	73
				Hovering	22	73.9	74.2	73.2	69.2	0.9	73
				Idling	551	69.0	69.2	68.4	69.2	0.9	60
		E	22:28	Take-off	69	69.6	69.8	69.1	69.2	0.9	60
9	AW139	W	22:49	Approach	68	72.2	72.5	71.3	69.2	0.9	70
				Hovering	22	71.8	72.2	71.1	69.2	0.9	69
				Idling	345	69.0	69.2	68.4	69.2	0.9	60
		E	22:56	Take-off	69	69.2	69.4	68.7	69.2	0.9	60
										Leq(4-hrs), dB(A):	**60**

Remark:

* E - Flight approaches from or departs to the East; W - Flight approaches from or departs to the West.

Distance correction factor in accordance with Table 9, Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

@ Calculated noise level (without background) with noise correction for shielding effect and distance attenuation in accordance with Operational Phase Helicopter Noise Monitoring Methodology (Revision 3).

** Evening-time Noise measurement was commenced at 19:00. Thus, noise data before this time is not available.