City of Joondalup

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Helicopter Parking

10/10/2018

1:7500

ATTACHMENT 2

EcoAcoustics

Noise Impact Assessment – Helipad

Joondalup Resort, Joondalup

Environmental Noise Assessment

16 August 2018

Report Number: 18080614-01

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Executive Summary

EcoAcoustics Pty Ltd was commissioned by Rotorvation to conduct an assessment of a helipad located at the Joondalup Resort in Joondalup. The purpose of this assessment is to provide information to assist the City of Joondalup in its consideration for a development application for this land use.

Specifically, this report will provide an understanding as to the location of the helipad, identification of nearby noise sensitive receivers, results of noise monitoring and a management plan detailing specific areas that will minimise the noise impacts. The report has been completed with regard to relevant noise legislation, including the prescribed standards contained in the *Environmental Protection (Noise) Regulations 1997,* however it is important to note that this is not applicable when assessing noise from aircraft.

The results of the noise measurements show that the noise associated with the helicopter take-off and landing will not adversely impact on the amenity of nearby residential premises based on the low frequency of events and the relatively fast noise exposure time. To further mitigate the noise associated with the helicopter, it is recommended that the noise management practices provided in Section 6 of this report be adopted.

1 Introduction

EcoAcoustics Pty Ltd was commissioned by Rotorvation to conduct an assessment of a helipad located at the Joondalup Resort in Joondalup. The purpose of this assessment is to provide information to assist the City of Joondalup in its consideration for a development application for this land use.

Specifically, this report will provide an understanding as to the location of the helipad, identification of nearby noise sensitive receivers, results of noise monitoring and a management plan detailing specific areas that will minimise the noise impacts. The report has been completed with regard to relevant noise legislation, including the prescribed standards contained in the *Environmental Protection (Noise) Regulations 1997,* however it is important to note that this is not applicable when assessing noise from aircraft..

Appendix A contains a description of some of the terminology used throughout this report.

1.1 Site Locality & Surroundings

The helipad site is located within the Joondalup Resort. It utilises their existing tennis courts for the helipad. The site and surroundings are shown in an aerial photo in *Figure 1.1.* The closest residential properties are located to the south of the helipad, at a distance of approximately 220 metres. Other residential premises are located to the north at a distance of approximately 270 metres, east at a distance of 500 metres, and west at approximately 350 metres.

Figure 1.1: Site and Surroundings (Source: Google Earth)

1.2 Site Layout

The helipad utilises the existing tennis courts of Joondalup Resort. *Figure 1.2* shows a close up aerial photo of the helipad.

Figure 1.2: Helipad Location

The helicopter used on the site is generally a Raven R44 four seat aircraft. The helipad operation is generally used as a storage location whereby the helicopter is stored overnight during the summer months to allow for easy access to the Hillary's Marina. Commercial flights out of this location may occur on a very rare occasion; however the primary use for the site is as an overnight storage location.

The aircraft will be used out of the site during the day time only, leaving in the mornings after 9am and returning before 7pm. *Photo 1.1* shows the Raven Helicopter stationery on the helipad. *Photo 1.2* shows the Raven Helicopter during take-off. *Photo 1.3* shows the Raven Helicopter during landing.

Photo 1.1: Raven R44 Helicopter on Helipad (Tennis Court)

Photo 1.2: Raven R44 Helicopter during take off

Photo 1.3: Raven R44 Helicopter during landing

1.3 Historical Helicopter Usage

Log books are required to be kept and maintained under the Civil Aviation Requirements for all aircraft. As such, historical usage data has been logged for this Joondalup Site. *Table 1.1* shows the arrivals and departures from November 2017 until August 2018 and shows predictions for September 2018 to December 2019.

Table 1.1: Historical Usage for Helipad

Month	2017		2018		Projected 2019	
	Departure	Arrival	Departure	Arrival	Departure	Arrival
January			17	17	17	17
February			21	21	21	21
March			19	19	19	19
April			13	13	13	13
May			13	13	13	13
June			10	10	10	10
July			7	7	7	7
August			(Projected) 3	(Projected) 3	3	3
September			(Projected) 4	(Projected) 4	4	4
October			(Projected) 15	(Projected) 15	15	15
November	2	2	(Projected) 21	(Projected) 21	21	21
December	19	19	(Projected) 19	(Projected) 19	19	19
Total	**21**	**21**	**162**	**162**	**162**	**162**
Annual Total	**42**		**324**		**324**	

This volume shows that there is, on average, approximately 27 movements per month. Each departure takes up to approximately three minutes from the initial start and pre-flight checks to where the helicopter is airborne and barely audible. Arrival back to site takes less than 2 minutes from when the aircraft is audible until landing and switched off. Based on these times, the helicopter is audible on average for approximately 135 minutes per month.

2 Criteria

In Western Australia all Environmental noise is regulated by the *Environmental Protection Act 1986* and the *Environmental Protection (Noise) Regulations 1997*. In this case, the Regulation do not consider aircraft noise, however in the absence of any other relevant legislation, reference has been given to the assigned noise levels specified in Regulations 7, 8 and 9.

The standard stipulated in Regulation 7 of the Environmental Protection (Noise) Regulations 1997 states:

7. (1) Noise emitted from any premises or public place when received at other premises –

a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

b) Must be free of –

- *Tonality;*
- *Impulsiveness; and*
- *Modulation.*

A…noise emission is taken to significantly contribute *to a level of noise if the noise emission exceeds a value which is 5dB below the assigned level…*

Regulation 9 defines tonality, impulsiveness and modulation. It is regarded that noise is free of these characteristics if:

a) Tonality, impulsiveness and modulation cannot be equitably removed by means other than decreasing the overall level of noise emission; and

b) Subsequent to any adjustments as displayed in *Table 2.1* noise emissions remain compliant with the required standards when measured at the point of reception.

Table 2.1: Adjustments for Intrusive Characteristics

Tonality	Modulation	Impulsiveness
+ 5dB	+ 5dB	+ 10dB

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown below in *Table 2.2*.

Table 2.2: Baseline Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise Sensitive	0700 to 1900 hours Monday to Saturday **(Day)**	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays **(Sunday)**	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days **(Evening)**	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays **(Night)**	35 + influencing factor	45 + influencing factor	55 + influencing factor
Commercial	**All hours**	**60**	**75**	**80**
Industrial	All hours	65	80	90

Based on the locality of the nearby noise sensitive receivers, the influencing factor has been calculated to be 2. As such, the assigned noise levels in *table 2.3* are applicable.

Table 2.3: Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise Sensitive	0700 to 1900 hours Monday to Saturday **(Day)**	47	57	67
	0900 to 1900 hours Sunday and public holidays **(Sunday)**	42	52	67
	1900 to 2200 hours all days **(Evening)**	42	52	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays **(Night)**	37	47	57

3 Noise Monitoring Methodology

Measurements were completed at four locations near the helipad on 12th August 2018 between 11:30am and 12:30pm.

The first location, shown as ML1 on *Figure 1.2*, was approximately 20 metres from the helicopter and helipad. These measurements were taken using a Norsonic Nor 140 Sound Level Meter (s/n 1405472), set to record 10 second samples. The sound level meter was field calibrated prior to and after the measurements and found to be within ±0.2dB of the reference level.

The other three location, shown on *Figure 1.2* as ML2 to ML4, was chosen to represent the flight path that the helicopter generally takes. These measurements were taken using a Rion NA28 and two Rion NL21 set to record 10 second samples. The meters were field calibrated prior to and after the measurements and found to be within ±0.1dB of the reference level

4 Assessment of Helicopter

To determine the noise impact of the helicopter on the nearby residential premises, measurements were completed during all stages of take-off and landing, including:

- Initial engine start, including rotors;
- Pre-flight checks;
- Engine at full revs prior to take-off
- Take-off
- When overhead at each location; and
- Landing.

These levels have been measured at four locations and the resultant noise levels are presented in *Table 4.1*. Also included is the predicted noise levels to the nearest residential receiver location, shown as RL1 and RL2 on *Figure 1.2*.

Table 4.1: Noise from Helicopter

Location (ref *Figure 1.2*)	Helicopter	Event duration	Measured Noise Level, dB(A)
Measurement Location ML1	Initial Start	5 seconds	74
	Pre-flight checks	1 minutes	81
	Engine at Full Revs	2 minute	82
	Takeoff	10 seconds	92
	Overhead	5 seconds	90
	Landing	15 seconds	93
Measurement Location ML2	Initial Start	5 seconds	62
	Pre-flight checks	1 minutes	65
	Engine at Full Revs	2 minute	67
	Takeoff	10 seconds	67
	Overhead	5 seconds	77
	Landing	15 seconds	64
Measurement Location ML3	Initial Start	5 seconds	53
	Pre-flight checks	1 minutes	55
	Engine at Full Revs	2 minute	55
	Takeoff	10 seconds	63
	Overhead	5 seconds	71
	Landing	15 seconds	62

Location (ref *Figure 1.2*)	Helicopter	Event duration	Measured Noise Level, dB(A)
Measurement Location ML4	Initial Start	5 seconds	55
	Pre-flight checks	1 minutes	57
	Engine at Full Revs	2 minute	57
	Takeoff	10 seconds	65
	Overhead	5 seconds	72
	Landing	15 seconds	67
Receiver Location RL1	Initial Start	5 seconds	53
	Pre-flight checks	1 minutes	55
	Engine at Full Revs	2 minute	55
	Takeoff	10 seconds	63
	Overhead	5 seconds	71
	Landing	15 seconds	62
Prediction to Receiver Location RL2	Initial Start	5 seconds	50
	Pre-flight checks	1 minutes	52
	Engine at Full Revs	2 minute	52
	Takeoff	10 seconds	60
	Overhead	5 seconds	71
	Landing	15 seconds	61

The noise levels presented in *Table 4.1* represent the take-off and landing sequence from the Raven R44 helicopter. The events surrounding both take-off and landing sequences are short duration, and infrequent in nature. As outlined in *Section 1.2*, based on historical data, an average of 13.2 movements occur per month. As such, the loudest noise, being the actual take-off, is likely to be audible for an average of 66 minutes per month.

It is important to note that the helicopter is flying above 1000 feet (305 metres) when it flies over the nearby residential premises (built up areas). This is within the acceptable flying heights over built up areas governed by the Civil Aviation Safety Authority.

5 Noise Management Plan

To minimise the impact of the helicopter using the helipad at Joondalup Resort, the following noise management practices should be considered:

- Flights are to be restricted to the day time only, as per current practice;
- Flight path to follow the golf course fairway, to ensure that low flying at take-off and landing is not over nearby residential premises;
- Whilst flying, sharp manoeuvres should be avoided within the vicinity of the site;
- Routes into and out of the site should be varied. It is understood that these are generally based on the wind direction as it is necessary to take off and land into the wind;
- High take-off and decent profiles should be investigated and utilised where possible;
- Speed should be reduced where possible within the vicinity of the site; and
- Minimise idling whilst on the ground where possible.

The noise management practices discussed above coupled with the infrequent use of the site and the short duration of each noise event will ensure that the helipad will not adversely impact on the amenity of the surrounding residential premises.

6 Conclusion

The results of the noise measurements show that the noise associated with the helicopter take-off and landing will not adversely impact on the amenity of nearby residential premises based on the low frequency of events and the relatively fast noise exposure time. To further mitigate the noise associated with the helicopter, it is recommended that the noise management practices provided in Section 6 of this report be adopted.

It is important to note that the *Environmental Protection (Noise) Regulations* are not applicable when assessing noise from aircraft.

Appendix A

Terminology

Terminology

Ambient Noise

Ambient noise refers to the level of noise from all sources, including background noise as well as the source of interest.

A-Weighting

An A-weighted noise level is a noise level that has been filtered as to represent the way in which the human ear distinguishes sound. This weighting indicates the human ear is more sensitive to higher frequencies than lower frequencies. The A-weighted sound level is described as L_A dB.

Background Noise

Background noise is the noise level from sources other than the source of interest. Background may originate from such things as traffic noise, wind induced noise, industrial noise etc.

Decibel (dB)

The decibel is the unit that characterises the sound power levels and sound pressure of a noise source. It is a logarithmic scale with regard to the threshold of hearing.

Impulsive Noise

An impulsive noise source is a short-term impact noise which may originate from such things as banging, clunking or explosive sound.

Influencing factor

=1/10 (% Type A_{100} + % Type A_{450}) + 1/20(% Type B_{100} + % Type B_{450})

Where:

% Type A_{100} = The percentage of industrial land within a 100m radius of the premises receiving noise

% Type A_{450} = The percentage of industrial land within a 450m radius of the premises receiving noise

% Type B_{100} = The percentage of commercial land within a 100m radius of the premises receiving noise

% Type B_{450} = The percentage of commercial land within a 450m radius of the premises receiving noise

+ Traffic factor (maximum 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 450m

L_{A1}

An L_{A1} level is the A-weighted noise level which is overreached for one percent of a measurement period. It represents the average of the maximum noise levels measured.

L_{A1} assigned level

An assigned L_{A1} level which is not to be exceeded for more than 1% of a delegated assessment period.

L_{A10} assigned level

An assigned L_{A10} level which is not to be exceeded for more than 10% of a delegated assessment period.

L_{A10}

An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{A90}

An L_{A90} level is the A-weighted noise level which is overreached for 90 percent of the measurement period. It is represents the "*background*" noise level.

L_{Aeq}

L_{Aeq} refers to the comparable steady state of an A-weighted sound which, over a specified time period, contains the same acoustic energy as the time-varying level during the specified time period. It represents the "*average*" noise level.

L_{AFast}

The noise level in decibels, obtained using the A frequency weighting and the F time weighting as specified in AS1259.1-1990. L_{AFast} is used when examining the presence of modulation.

L_{Amax}

The L_{AMax} level is the maximum A-weighted noise level throughout a specified measurement.

L_{Amax} assigned level

The L_{Amax} assigned level describes a level which is not to be exceeded at any time.

L_{APeak}

The L_{APeak} level is the maximum reading (measured in decibels) during a measurement period, using the A frequency weighting and P time weighting AS1259.1-1990.

L_{ASlow}

A L_{ASlow} level is the noise level (measured in decibels) obtained using the A frequency weighting and S time weighting as specified in AS1259.1-1990

Major Road

A Major road has an estimated average daily traffic count of more than 15,000 vehicles.

Maximum Design Sound Level

Maximum Design Sound Level is the level of noise beyond hearing range of most people occupying the space start, become dissatisfied with the level of noise.

Modulating Noise

A modulating source is an audible, cyclic and regular source. It is present for at least 10% of a measurement period. The quantitative definition of tonality is:

a fluctuation in the discharge of noise which;

a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;

b) is present for at least 10% of the representative

One-Third-Octave Band

One-Third-Octave-Band are frequencies that span one-third of an octave which have a centre frequency between 25 Hz and 20 000 Hz inclusive.

Representative Assessment Period

Representative Assessment Period describes a period of time not less than 15 minutes, and not surpassing four hours. It is determined by an inspector or authorised person to be suitable for the assessment of noise emissions.

Reverberation Time

Reverberation time refers to an enclosure for a sound of a specified frequency or frequency band as well as the time that would be necessary for the reverberantly decaying sound pressure level in the enclosure to decrease by 60 decibels.

RMS

The root mean square level is used to represent the average level of a wave form such as vibration.

Satisfactory Design Sound Level

Satisfactory Design Sound Level refers to the level of noise that has been found to be acceptable for the environment in question, which is also to be non-intrusive.

Secondary / Minor Road

A Secondary / Minor road has an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Sound Pressure Level (L_p)

Sound Pressure Level refers to a noise source which is dependent upon surroundings, and is influenced by meteorological conditions, topography, ground absorption; distance etc. Sound Pressure Level is what the human ear actually hears. Noise modelling predicts the sound pressure level from the sound power levels whilst taking into account the effect of relevant factors (meteorological conditions, topography, ground absorption; distance etc).

Sound Power Level (L_w)

A sound power level of a noise source cannot be directly measured using a sound level meter. It is calculated based on measured sound pressure levels at recognised distances. Noise modelling includes source sound power levels as part of the input data.

Specific Noise

Specific Noise relates to the component of the ambient noise of interest. It can be specified as the noise of interest or the noise of concern.

Tonal Noise

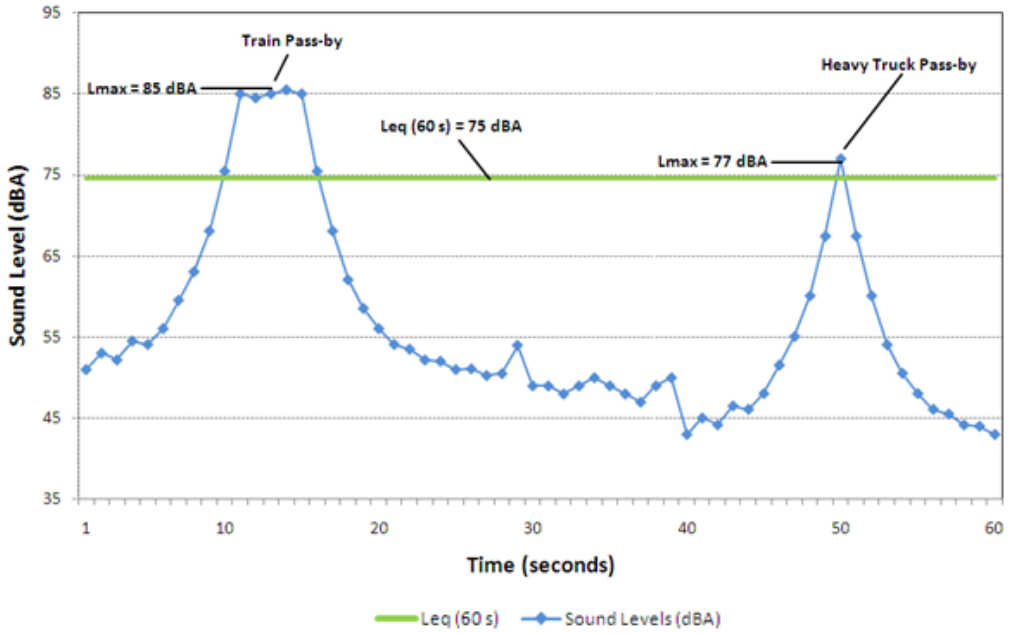
A tonal noise source can be designated as a source that has a specific noise emission over one or several frequencies, such as droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between —

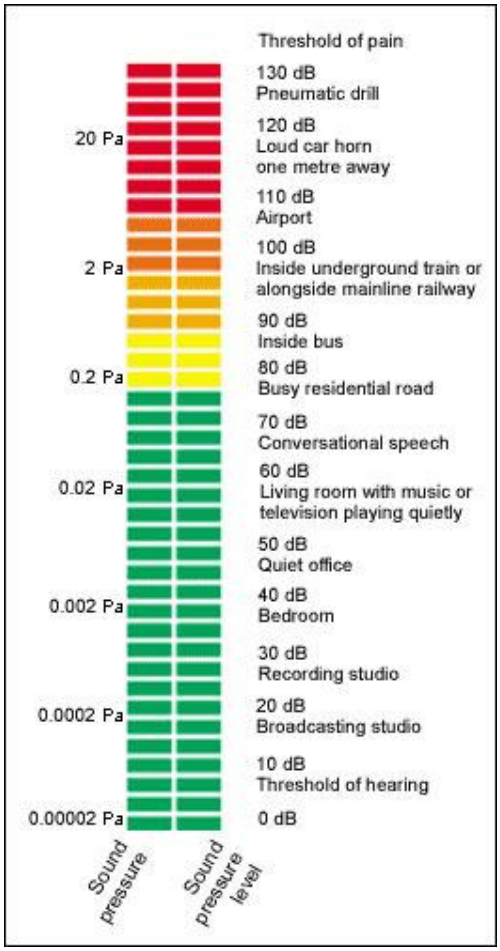
a) the A-weighted sound pressure level in any one-third octave band; and

b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands, is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

Chart of Noise Level Descriptors



Typical Noise Levels



ATTACHMENT 3

Information in support of application by Joondalup Resort for a Helicopter landing site

SUBMITTED BY MIKE WATSON

Mike Watson

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1. Picture of private parking area for pilot vehicles on lawn opposite sheds
2. Diagram of usual route from Joondalup Resort to Hillarys Boat Harbour

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Introduction

Rotorvation Helicopters is a WA family owned business that has operated since 2008 and are the first company in approximately 25 years to be approved by the Department of Transport to operate scenic joy flights from Hillarys Boat Harbour. The application by Joondalup Resort for Rotorvation Helicopters to operate out of their resort is to support these operations by being able to locate a helicopter close to Hillarys Boat Harbour minimising the high cost of transiting to and from our main base at Jandakot Airport.

We are grateful for the support of Joondalup Resort who can see the advantages to local tourism businesses by supporting this venture. It also provides the opportunity for Joondalup Resort patrons to fly from Joondalup to Hillarys Boat Harbour when we relocate the helicopter and the machine is also available for weddings, functions and charter.

Since starting operations at Hillarys Boat Harbour in May 2015, Rotorvation Helicopters' Hillarys scenic flights have been extremely well-received by locals, businesses and visitors. This is evident in the company's 5-star rating on TripAdvisor and collaborative relationship with local operators, such as Rottnest Fast Ferries, the Aquarium of Western Australia (AQWA), and Nautical Adventures. In our 3 years of operation at the harbour we have taken up over 5000 passengers.

Even though we can take 50 or 60 passengers flying in a single day in the summer months from Hillarys Boat Harbour, the location of the Hillarys Helipad on the Southwest Groyne, at the rear of the harbour, ensures all take off and landings occur over water ensuring we do not create a noise nuisance. In fact we have to work hard to inform customers of our location!

Rotorvation Helicopters is an accredited tourism company and operates a range of tours departing from Hillarys that showcase the Sunset Coast, Perth city and Fremantle.

We conduct extensive marketing, both online and offline, to promote our products and the region, including website, Google advertising, social media, brochure distribution, and business partnerships. Rotorvation has been actively involved with the City of Joondalup tourism networking meetings run by Julie Macey and is proud to be able to offer an exciting drawcard for tourists to The City of Joondalup.

Operations from Joondalup Resort

Due to the close proximity of residences to Joondalup Resort we purposely minimise the numbers of take offs and landings from this location. Anyone wishing to do short scenic flights are redirected to our Hillarys Boat Harbour operations. This ensures only a take-off and landing when we relocate the helicopter to Hillarys Boat Harbour for the day's scenic flights. We also do the occasional function or charter for Resort patrons.

On average at Joondalup Resort there is only **one** take off in the morning and **one** landing in the afternoon on weekends and some weekdays when we have bookings, much less in the quieter winter months. See acoustic report for details of numbers of take-offs and landings.

Commitment to Noise Reduction

When the helicopter is at height the noise is minimal and no different to an aircraft flying overhead. The additional noise created by a take-off or landing only lasts for a few minutes and is comparable to the sound of conversational speech. See acoustic report. All take-offs and landings are performed over the greens for safety and to keep noise to a minimum. We already have in place the noise management practices suggested in item 5 of the acoustic report

Neighbour Complaints

We understand there have been some complaints from neighbours in Connolly though we do not have any details of the number or details of the complaints. Sadly, just the mention of helicopters operating in an area can generate complaints but we are confident that our operations do not impact adversely on the local community as demonstrated by the attached acoustic report.

Joondalup to Hillarys Route

It is impossible to detail every possible route we take from Joondalup to Hillarys Boat Harbour as this can be affected by Air Traffic Control requirements or weather. However, the most direct route, as outlined in attachment 2 is used the vast majority of the time. If the approval requires us to use a particular route it would need to be on the condition that it can be varied if required by Air Traffic Control instructions or weather conditions to ensure safe operations.

Safety

Rotorvation Helicopters have a nil accident history for all scenic and charter flights and adhere to strict risk management and environmental standards that exceed those regulated by the Civil Aviation Safety Authority (CASA). We operate with a fleet of 5 aircraft, including 3 low-noise R44 and R66 helicopters which are designed specifically for scenic joy flights. At Joondalup Resort we only use the R44 or R66 Helicopter. Both aircraft are of a similar size with a low noise footprint. The turbine R66 having has a quieter noise level than the R44 which has been used to conduct the acoustic noise survey.

Parking

Only two parking spaces are required for pilots who pick up the helicopter based at Joondalup Resort. The Resort allow us to park on the private lawn area opposite their sheds to ensure we do not impinge on current customer parking availability. See attachment 1

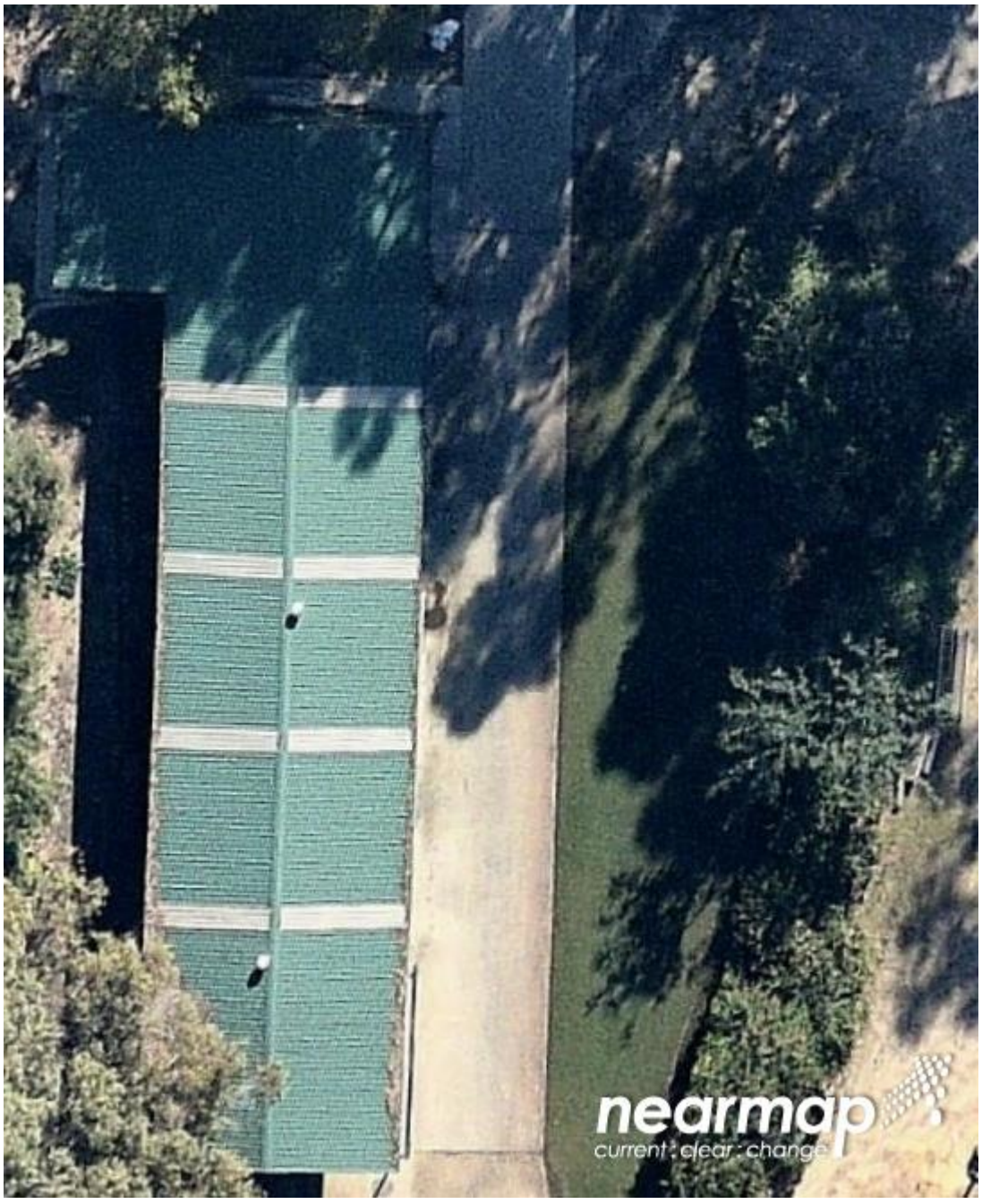
Conclusion

The City of Joondalup has been proactive in supporting tourism in their city. Allowing Rotorvation Helicopters to operate out of Joondalup Resort offers support to a key tourism company which attracts visitors to this region.

As repetitive scenic flights are not operated from the Joondalup location, the impact to residents is minimal. This has been clearly demonstrated in the noise impact report with the close residential locations RL1 and RL2 noise levels ranging from just 50db(A) to 71db(A) with the highest level 71db(A) being equivalent to conversational speech. This noise lasts for just three minutes on take-off and less than two minutes on approach and landing.

Attachments

1. Photo of private grass parking area opposite sheds for pilot vehicles



2. Route from Joondalup Resort to Hillarys Boat Harbour