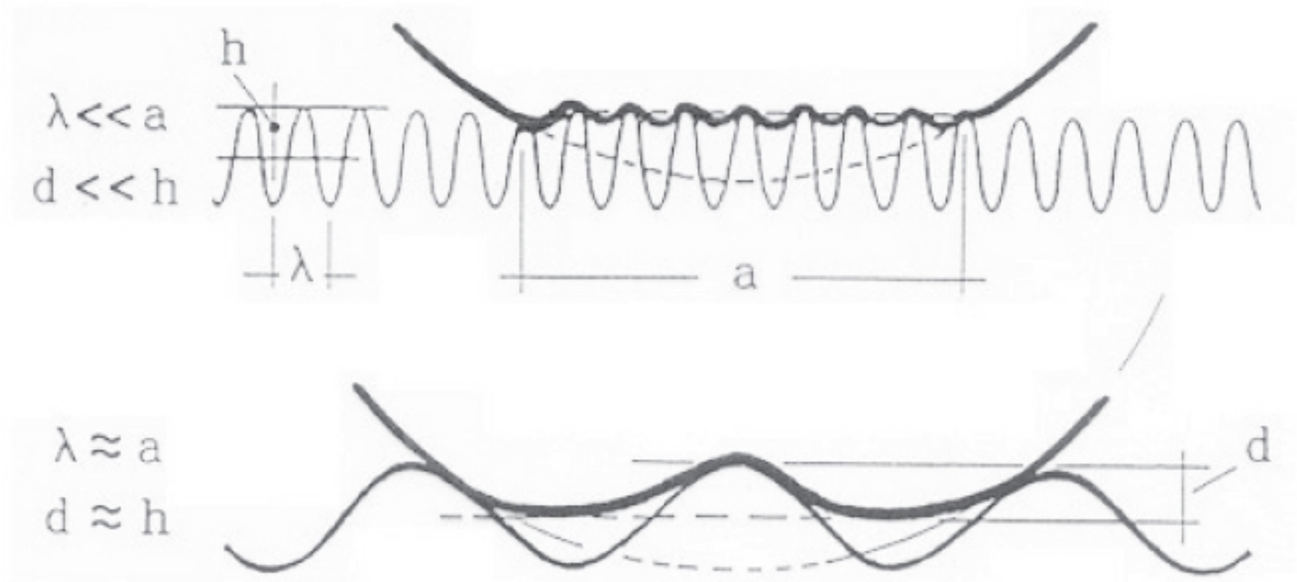

Malcolm Hunt Associates

Noise and Environmental Consultants

www.noise.co.nz - email mha@noise.co.nz

first floor, arco house, 47 cuba st, PO box 11-294, wellington, telephone 04 472 5689, fax 04 473 0456,

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Assessment of Environmental Noise Effects

Helicopter Landing Area and Ground Noise Impact Report

State Highway 6 - Fox Glacier

Prepared BY:

MalcolmHuntAssociates

noise and environmental consultants

First floor, Arco House, 47 Cuba Street, PO Box 11-294, Wellington
Telephone 04 472 5689 Fax 04 473 0456
mha@noise.co.nz www.noise.co.nz

Prepared For [Applicant]:

Hokitika AIRPORT

Hokitika Airport Limited

In Assocation With [Planning Consultant]:

Titan Solutions

MHA Report Reference: 2017-86-201/V2

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Assessment of Environmental Noise Effects

Helicopter Landing Area

State Highway 6 | Fox Glacier

MalcolmHuntAssociates
noise and environmental consultants

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Document Prepared by	**Malcolm Hunt** Principal Acoustic Engineer Professional Qualifications B.Sc. M.E.[Mechanical] [Acoustics] Dip Pub. Health. RSH Dip. Noise Control. MASNZ MNZIEH. **Lindsay Hannah** Senior Acoustic Engineer Professional Qualifications Bachelor of Building Science BBSc. PGDipSc [Acoustics [dist]]MPhil [Sc] [Acoustics] [Hons]] MASNZ MNZEIH.

The information contained in this document [HELICOPTER NOISE IMPACT REPORT] by Malcolm Hunt Associates is solely for use of our Client for the singular purpose for which it has been prepared [AEE: Noise Report for Helipad Resource Consent]. The results in this report are site and activity specific as they take account of site specific details within the assessment under the New Zealand Standards. The methodology and results therefore should not be applied to any other site or activity. This document may only be reproduced in full. MHA© Copyright **2017**. It is recommended that you print this report in COLOUR. Drawings in this report are not to scale and schematic only – do not scale from the drawings or graphics in this report. Refer to Resource Consent Application for full drawing sets. North symbols in diagrams are approx only.

Assessment of Environmental Noise Effects

Helicopter Landing Area

State Highway 6 | Fox Glacier

Glossary of Acoustic Terms

dB	Decibel. A measurement of sound expressed as a logarithmic ratio of sound pressure level P to a reference pressure level, P= 20µPa
dB[A]	A weighted Decibel. A measurement of sound which has its frequency characteristics modified by a filter [A-weighted] so as to more closely approximate the frequency bias of the human ear.
Ldn or L_{dn}	Day-Night Level is a parameter used in New Zealand Standard NZS 6804:1992 and 6807:1994 for measurement of aircraft noise, and related to general annoyance. It is defined in NZS 6805:1992 as the time-average [i.e. energy-average] sound level over a 24-hour period from midnight to midnight, with the addition of 10 dB to night-time levels, to take account of increased annoyance caused by noise at night. This means that one aircraft flight movement at night-time is equivalent to ten of the same movements during the day.
Lmax or L_{max}	The single highest sampled level of sound. Used in night time emission limits as a means of ensuring sleep protection.
Leq or L_{eq}	The time-averaged sound level [or equivalent sound level] that has the same mean square sound pressure level as the time-varying sound level under consideration. Commonly referred to as an “energy average” measure of sound exposure.
L90 or L_{90}	The level of sound exceeded for 90% of the monitoring period. This level of sound equates to an average background sound level, and is influenced by constant sources. Noise emission limits are not generally specified in terms of an L_{90} level, but it is used as a guide to the general background sound level.
NZS 6801	NZ Standard ‘Measurement of Environmental Noise’
NZS 6802	NZ Standard ‘Assessment of Environmental Noise’
SACs	SACs is an acronym for Special Audible Characteristics which are qualities of environmental sound which make the sound additionally annoying. Sound that has special audible characteristics, such as tonality or impulsiveness, is likely to cause adverse community response at lower sound levels, than sound without such characteristics.
Sound Power	Sound Power Level. The ‘energy’ created by a sound is defined as its sound power. The ear cannot hear sound power nor can it be measured directly. Sound power is not dependent upon its surrounding environment.
Sound Pressure	Sound Pressure Level is defined as varying pressure fluctuations caused by sound waves. The ear converts these fluctuations into what we call audible sound, which is the sensation [as detected by the ear] of very small rapid changes in the air pressure above and below a static value. This "static" value is atmospheric pressure.

Assessment of Environmental Noise Effects

Helicopter Landing Area

State Highway 6 | Fox Glacier

Glossary of Aviation Terms

Aircraft	A machine or device, such as an airplane, helicopter, glider, or dirigible, that is capable of atmospheric flight.
Airfield	The network of runways and taxiways at an airport.
Airport	The broader environs of an aerodrome and its associated non-aviation commercial and industrial activities.
Airside	The movement area of an aerodrome, adjacent terrain and buildings or portions thereof, access to which is controlled.
Approach and Departure	A defined area over which the final phase of a helicopter approach manoeuvre to land is completed and from which the departure manoeuvre is commenced. N.B One Arrival = 1 movement. One Departure = 1 movement
Helicopter	An aircraft whose lift is generated by the action of a rotary wing.
New Zealand Civil Aviation Authority [NZCAA]	The New Zealand Civil Aviation Authority is responsible for the administration of Civil Aviation Regulations promulgated under the Civil Aviation Act 1990.
Landing Area or Helipad	A defined area prepared for the landing and takeoff of aircraft. For a helicopter this refers to an area on which a helicopter lands or departs from.
Flight Track or Flight Path	A intended and defined path or track for a aircraft intended to provide a link between one helicopter landing area and another.
TALO	Touchdown and lift off area located at a heliport.

Assessment of Environmental Noise Effects

Helicopter Landing Area

State Highway 6 | Fox Glacier

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Assessment of Environmental Noise Effects

Helicopter Landing Area

State Highway 6 | Fox Glacier

MalcolmHuntAssociates
noise and environmental consultants

1 Background

Malcolm Hunt Associates [MHA] have been commissioned by **Hokitikia Airport Limited** [the Applicant] to assess potential noise effects associated with a proposed helicopter landing area to be located at a rural location off State Highway 6 [SH6] Fox Glacier.

This acoustic assessment describes, in accordance with the Fourth Schedule of the Resource Management Act 1991 [RMA], the potential noise effects arising from the proposed operation as may potentially affect the surrounding environment, together with identifying mitigation measures that will minimise noise effects on the environment.

This acoustic assessment contains:

- *An outline of the noise-related aspects of the activity and site under this Resource Consent Application;*
- *A description of the Westland District Plan [WDC] noise emission rules and objectives including a discussion on of the Westland District Plan noise emission rules applicable to helicopter landing areas;*
- *A discussion on New Zealand Standard NZS 6807:1994 "Noise Management and Land Use Planning for Helicopter Landing Areas";*
- *An assessment of cumulative, worst case noise from the proposed helicopter activities as received in the surrounding environment;*
- *An assessment of cumulative worst case noise levels from the proposed auxiliary activities as received in the surrounding environment; and*
- *A description of the noise mitigation measures in line with s.16 of the RMA.*

This report has been prepared in accordance with the requirements of Section 88 and the Fourth Schedule of the Resource Management Act 1991, and it is intended to provide the information necessary to fully understand noise aspects of the proposal and assess any actual or potential noise effects that the proposed activity may have on the environment. Our assessment is based on the methodology of NZS 6807:1994 *Noise Management and Land Use Planning for Helicopter Landing Areas* with site and activity information provided by the Applicant and Project Planner [Titan Solutions]. We have also relied on information set out in the Resource Consent Application.

Malcolm Hunt Associates report authors are considered suitably qualified and experienced to conduct this assessment having been involved with numerous helicopter landing areas and operations throughout both the North and South Island of New Zealand including helicopter operations in Queenstown, Wanaka, Kaikoura, Wellington, Auckland, Wairarapa, North Canterbury, Hanmer Springs, Auckland and Milford Sound to name but a few. The authors have also conducted works regarding helicopter operations for New Zealand Defence Force [NZDF] in respect to their activities at Ohakea and Whenuapa Airbases.

2 Site and Activity

The proposed helicopter landing area [Helipad] is proposed to be located at a rural site accessed via State Highway 6 located around 1 kilometre from the Fox Township. The application site is DOC administered land. Currently a concession is being processed by the Department of Conservation [DOC] for the use of the site by Hokitika Airport Limited [HAL] as a proposed heliport. The appellation of the land under application is known as Crown Land Survey Office Plan 2474. The land statute is Stewardship land [DOC Control]. Most of the site is covered in regenerated indigenous vegetation. It is proposed to construct four [4] separate helipads on the site which would each formed as a separate gravel base pad. This area with the four helipads would be the operational area which is where the helicopters would land and take-off. For safety purposes this area would be fenced off from the car parking/vehicle turning area. There are currently no buildings or structures on the site, nor in the immediate area.

Figure 1 below shows the location of proposed helicopter landing area and the closest dwelling to the landing site at **34 Pekanga Drive.**

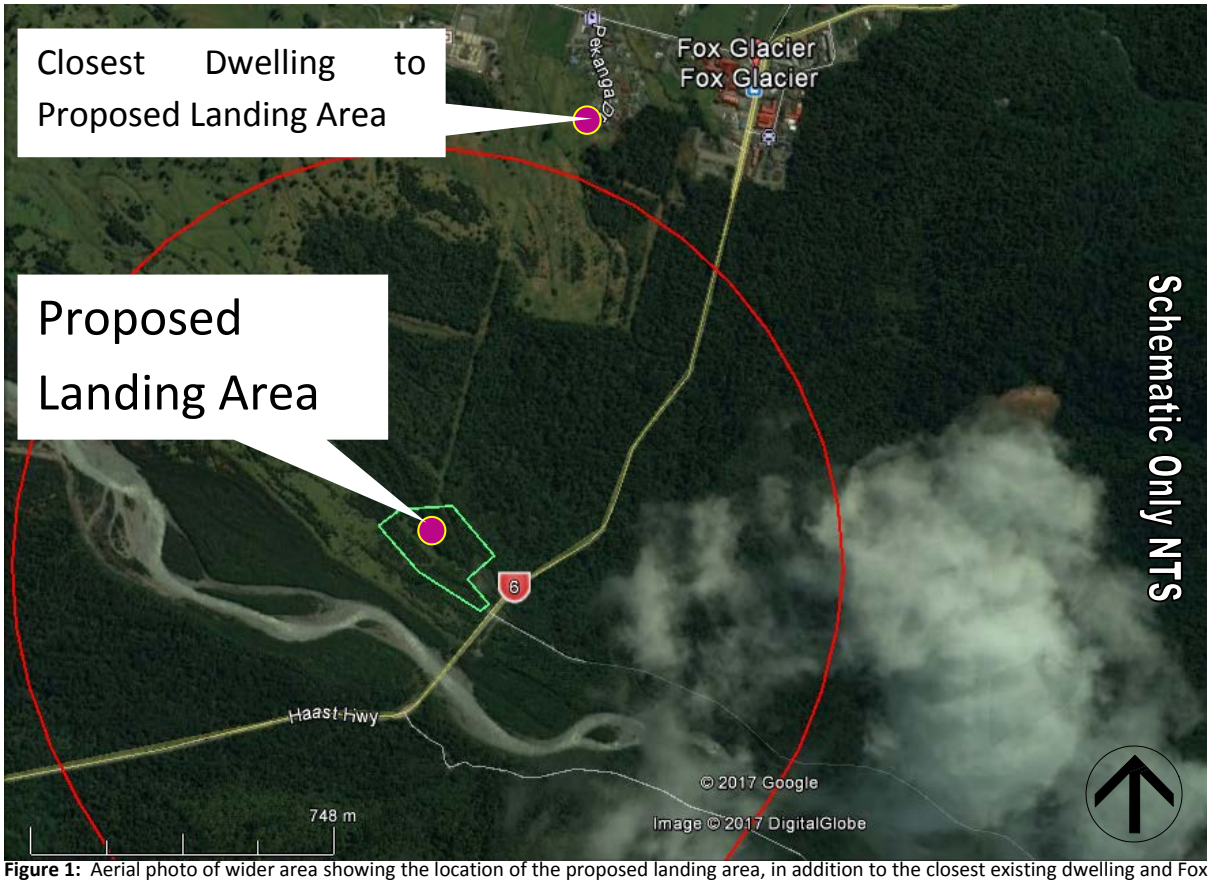


Figure 1: Aerial photo of wider area showing the location of the proposed landing area, in addition to the closest existing dwelling and Fox Glacier Township. The red circle has a diameter of approximately 900 metres.

Figure 2 below indicates the location of the proposed landing area with respect to closest neighbouring dwellings and activities along Cook Flat Road. The red circle represents a distance of approx 500 metres from the proposed landing site.

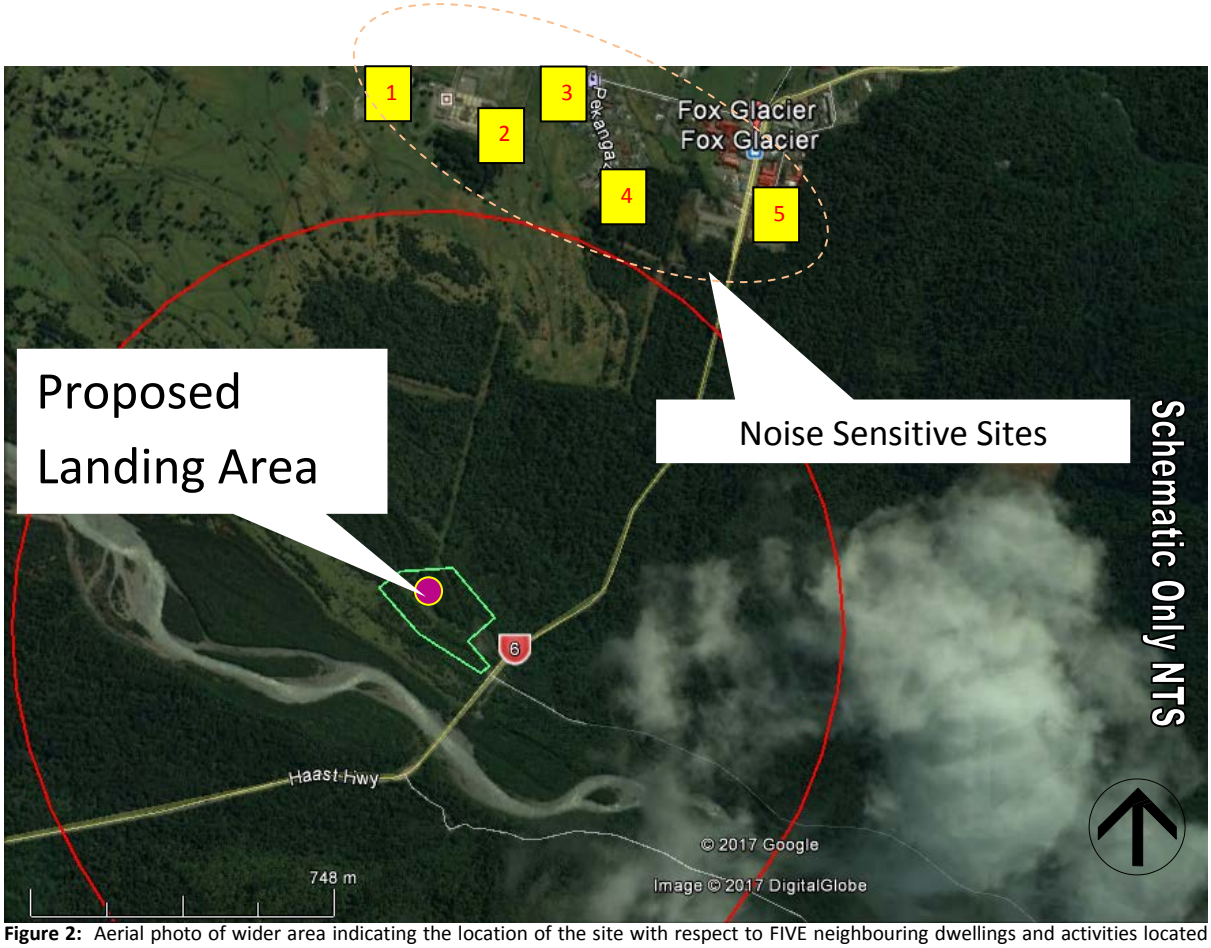


Figure 2: Aerial photo of wider area indicating the location of the site with respect to FIVE neighbouring dwellings and activities located near to the Fox Glacier Township at which helicopter noise levels have been assessed.

A review of the nearby area has revealed the closest FIVE [5] 'noise sensitive' sites as follows in **Table A;**

Site ID	Noise Sensitive Sites	Address	Distance [metres]
1	Fox Glacier [Weheka] School	Crn Kerr Road and Cook Flat Rd	1,175m
2	Fox Glacier TOP 10 Holiday Park & Motels - RV Park	Kerr Road	970m
3	Lake Matheson Motel	Cnr Cook Flat Rd & Pekanga Dr	1,050m
4	Closest dwelling in Residential Zone	34 Pekanga Drive	850m
5	Bella Vista Motel	55 Main Road [SH6]	870m

Table A: Name and location of the closest sensitive receiver sites at which potential helicopter noise effects have been assessed.
Note: Distance [metres] represents approx distance to the closest portion of the flight tracks.

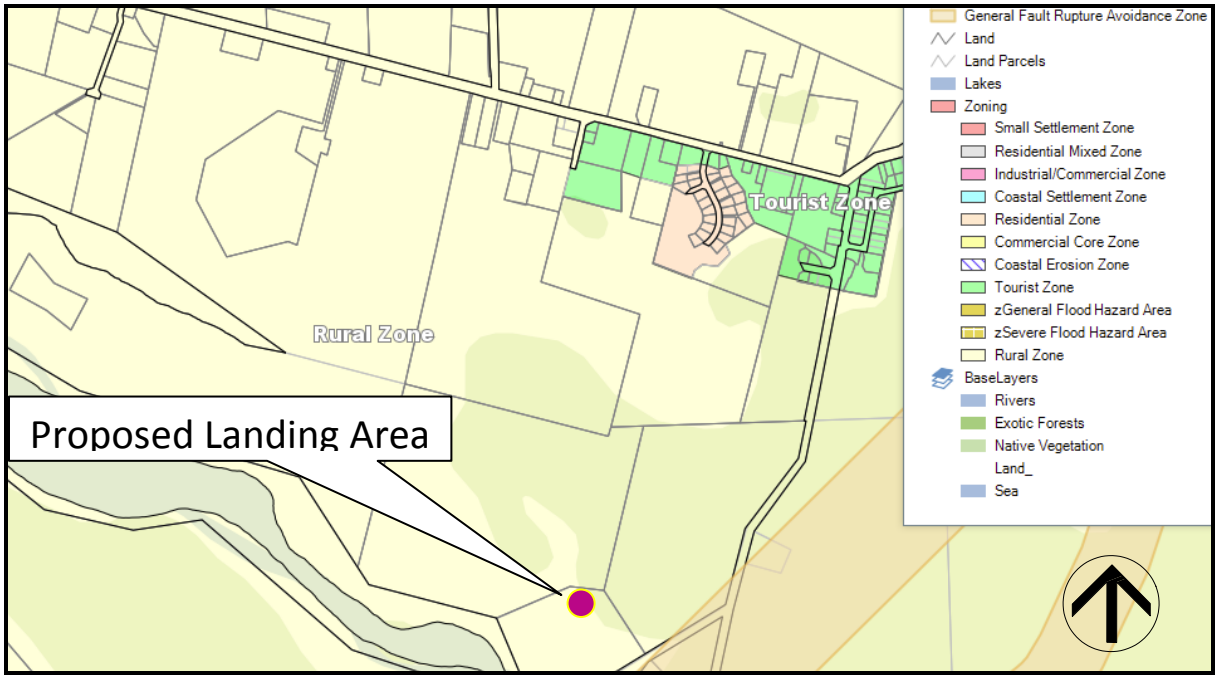
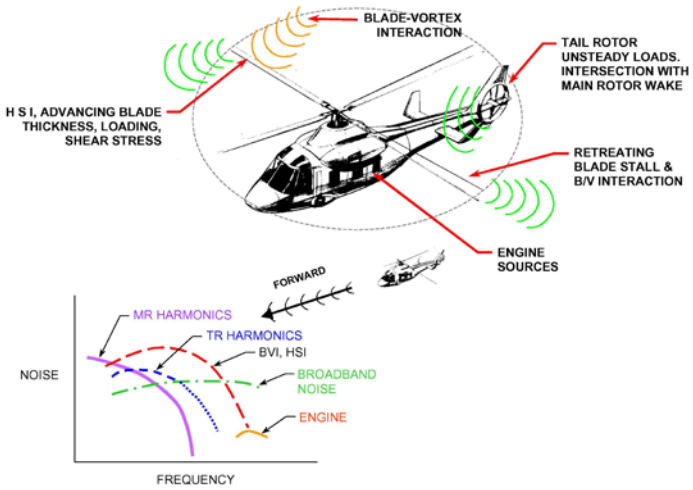


Figure 3: Extract from Westland District Plan – planning maps confirming the 'Rural' zoning of the site and much of the surrounding area.

3 Helicopter Noise

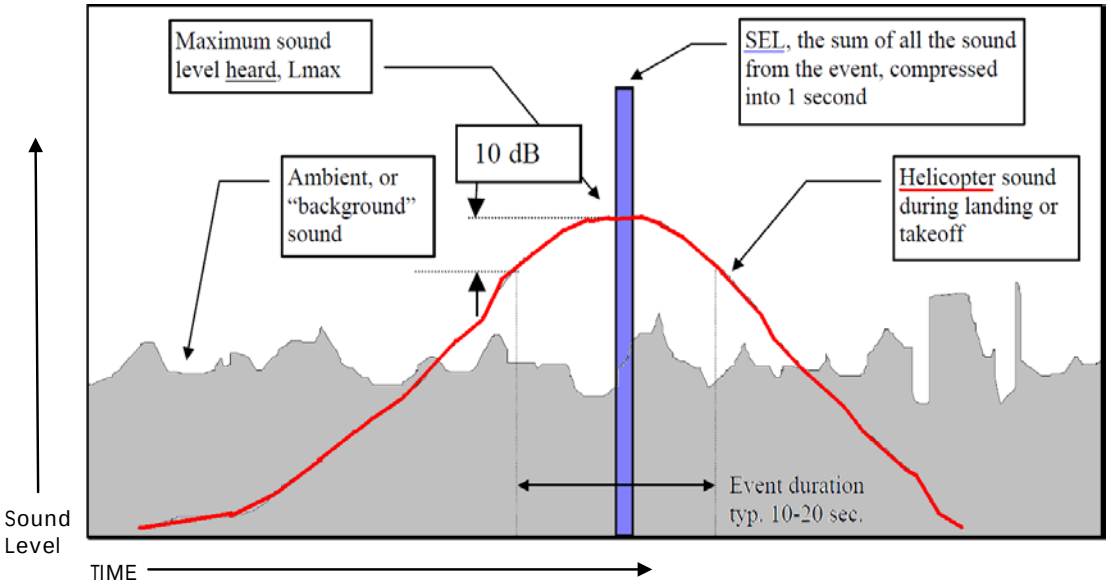
We are advised that the 'loudest' helicopter to be used at the proposed landing area is AS 350 model commonly known in New Zealand as a Squirrel. The Squirrel Helicopter is manufactured by Airbus Helicopters [formerly Eurocopter]. Rotating blades are the main noise sources however other noise sources are also present. **Graphic A** shows numerous noise sources and generating mechanisms present in a helicopter and their spectral contents.



Graphic A: Noise sources associated with helicopters.

The sounds of each helicopter movement is typified by an increase in sound as the helicopter approaches. The maximum level occurs when is at its closest point to the receiver, before the sound levels drop away again as the distance to the machine increases.

In the case of sound experienced near the landing pad, the distant sound of the helicopter will increase gradually as the machine approaches the site; will reach its maximum as the separation distance diminishes to the minimum distance, with the sound level reducing until the skids are firmly on land when a low level idle sound occurs. The idle sound is reduced to zero once the engine switched off after a suitable cool down period.



Graphic B: The derivation of the L_{Amax} and SEL sound level for a typical helicopter noise event. Sound levels [red line] increase and decrease as the helicopter approaches and /or departs the area. A similar pattern [but with a more rapid drop-off] occurs when a helicopter lands or departs the landing pad.

As shown in **Graphic B** above, all sound from a helicopter "event" is captured within the Sound Exposure Level [SEL] value for the helicopter landing or take-off 'event'. The SEL of an event is the sound level that would have occurred if the entire event took place in one second rather than spreading out the total sound energy over many seconds [a typical helicopter approach or departure "event" lasts about 20 to 30 seconds].

The SEL value is a value used for calculating overall noise exposure. One does not actually 'hear' an SEL value. Rather SEL's are a mathematical construct used to quantify the sound event. The maximum sound level one can experience during a helicopter take-off or landings can be heard or experienced. This is a much lower decibel level than the SEL - for a typical helicopter landing or take-off the measured L_{AFmax} measures in the order of 7 to 10 dBA below the measured SEL.

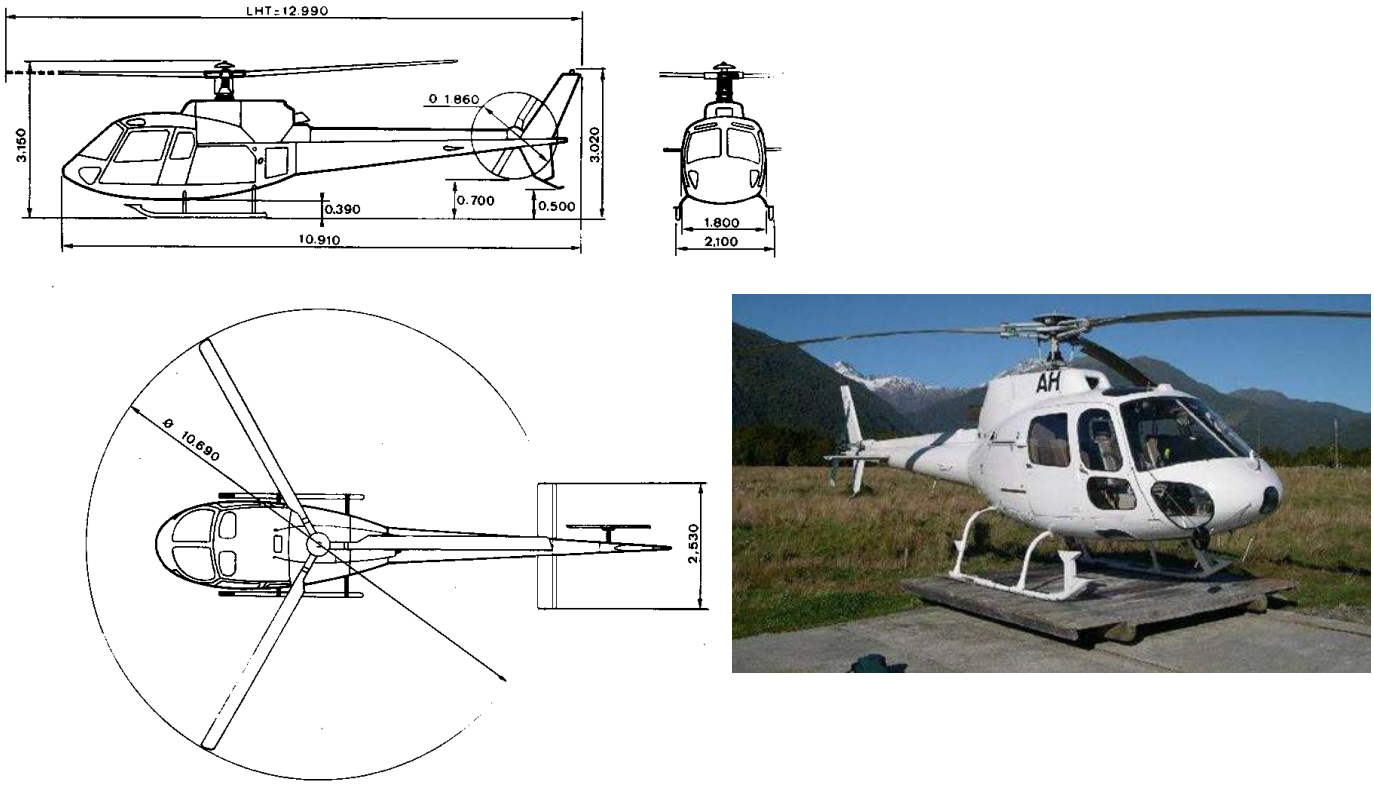
4 Helicopter Models

4.1 Model - Squirrel AS 350

The helicopters proposed to be frequently used at this site under this Application is a Squirrel AS 350 or AS 355 ["Squirrel"] which comes from a family of light helicopters originally manufactured by Airbus. The AS350 is the single-engine version.

The single engine AS 350 is renowned for its high performance, safety and relatively low-noise operation[1]. This helicopter is described in the following *generic* drawing and photograph set in **Graphic C.**

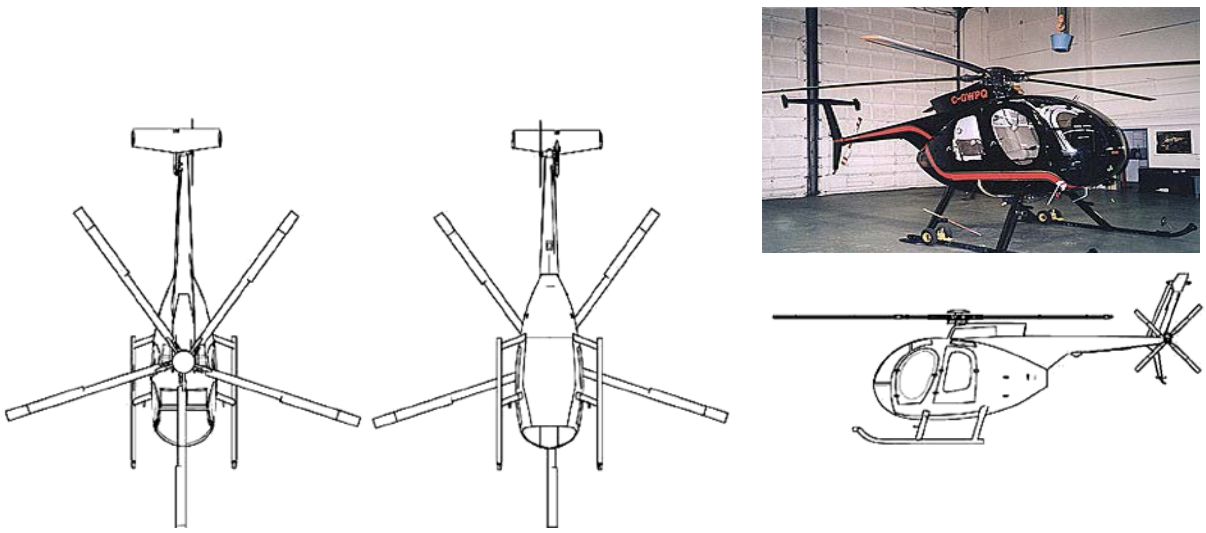
[1] Ref: http://www.eurocopter.com/



Graphic C: Generic photo and schematic of a Squirrel AS 350.

4.2 Hughes 500D [4-Bladed Tail Rotor]

The MD 500 series is an American family of light utility civilian and military helicopters. The MD 500 was developed from the Hughes 500, a civilian version of the US Army's OH-6A Cayuse/Loach. The Hughes 500 series is the world's most popular light turbine helicopter. The Hughes Aircraft Corporation was taken over in 1984: Hughes 500s became MD500s in August 1985 the Hughes 500D has a four bladed tail rotor and has a rugged construction. Good operational performance and reliability. Crisp handling and manoeuvrability combine to make it a popular model and 500D helicopters are a common sight around New Zealand.



Graphic D: Generic photo and schematic of a Hughes MD500D.

5 Helicopter Flight Tracks

Helicopter flights over the alpine glaciers have become a popular tourist activity. In 2011 there were about 14,000 sightseeing helicopter trips per year to see the glaciers, this has grown to around 70,000 flights a year, and is expected to double in the next 10 years.

Flights departing Fox Glacier will arrive using the flight track set out in **Figure 4** below. The Applicant is seeking consent to takeoff [departure] and land [approach] helicopter subject based on the flight tracks shown in **Figure 4** which illustrates the indicative arrival and departure tracks based on existing sightseeing flight paths.

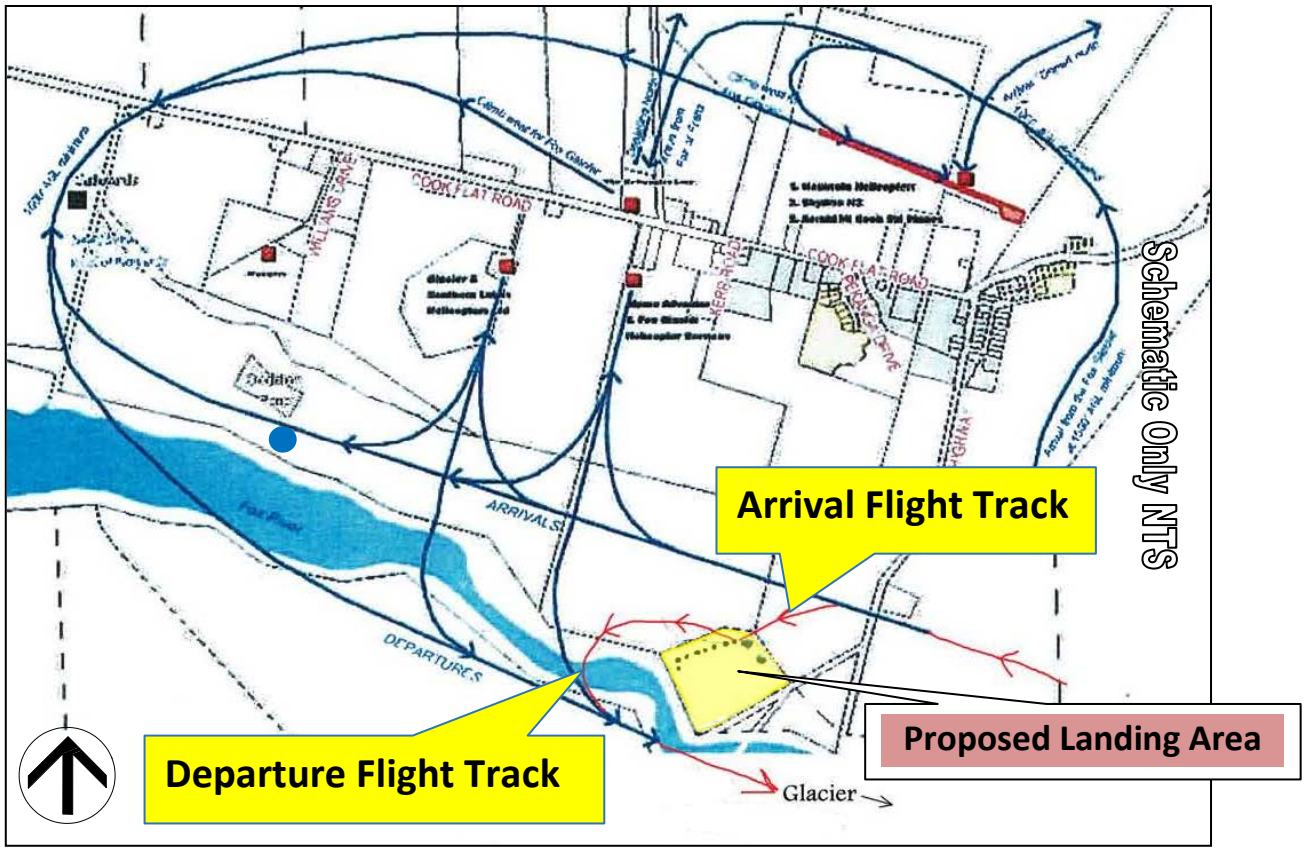


Figure 4: Diagram of Aerial helipad with indicative arrival and departure tracks [Flight Path] Ref: Applicant. NTS.

Noise arising due to the proposed use of the landing area have been predicted based on the stated number of helicopter movements arriving and departing the site along the red curved lines within **Figure 4**. These proposed flights paths would allow ease of integration with the existing flight paths coming from and going to the Fox Glacier.

6 Helicopter Noise Levels

NZS6807 assesses helicopter noise in terms of units L_{dn}[2]. The L_{dn} descriptor of daily noise emission that depends upon the noise level associated with each helicopter movement and the number of movements. Technically the L_{dn} metric represents a 24 hour measure of noise exposure based on the contribution throughout the day from each individual aircraft movement with a 10 dB weighting applied to noise from night time movements [10.00pm to 7.00am] to account for added sensitivity at residential sites to night time noise events.

[2] See Glossary attached.

Each landing or take-off creates a noise "event" which has an associated maximum noise level [L_{max}] and a "sound exposure level" [SEL]. L_{max} levels are assessed directly against L_{max} criteria set out within NZS6807:1994 [particularly where night time movements are involved], whereas SEL values are energy-summed over the whole day to provide an L_{dn} value for that day.

Measurements of the SEL from typical landing and take-off noise from an AS 350 and Hughes 500D helicopters were undertaken in the Wairarapa at a flat, rural site under fine conditions on 11th June 2010 using Bruel + Kjaer 2260 Investigator complying with IEC 651 Type 1 specifications for precision grade sound level meters. Field calibrations were checked prior to and after measurements. The settings during the measurements were as follows:

- Measurements taken in general accordance with NZS6801:1991;
- 'A' weighting, fast response, range 30 to 100 dBA;
- Measurements were performed at 130 metres from the landing site;
- Flat open site;
- Flight track at oblique angle, min slant distance = ~300 metres;
- Measurements results reported as SEL and L_{max} results.

Two landings and two take-offs were measured, for each of the two helicopter types. The results are shown in **Table B and Table C** as follows;

Take Off -

	Take-off 1	Take-off 2	Average
SEL [dBA]	88.3 dBA	86.7 dBA	**87.50** dBA
L_{eq} [dBA]	74.7 dBA	75.6 dBA	**75.12** dBA
L_{max} [dBA]	78.4 dBA	78.9 dBA	**78.65** dBA

Landing

	Landing 1	Landing 2	Average
SEL [dBA]	87.9 dBA	87.0 dBA	**87.45** dBA
L_{eq} [dBA]	75.6 dBA	77.5 dBA	**76.53** dBA
L_{max} [dBA]	79.2 dBA	79.8 dBA	**79.50** dBA

Table B: Summary Sound Exposure Level (SEL) and L_{max} levels for 2 landings and 2 take-offs of the **AS350 helicopter** @ 300 metres.

Take Off

	Take-off 1	Take-off 2	Average
SEL [dBA]	81.3 dBA	80.5 dBA	**80.90** dBA
L_{eq} [dBA]	67.7 dBA	69.4 dBA	**68.52** dBA
L_{max} [dBA]	72.3 dBA	71.3 dBA	**71.80** dBA

Landing

	Landing 1	Landing 2	Average
SEL [dBA]	81.2 dBA	83.5 dBA	**82.35** dBA
L_{eq} [dBA]	70.4 dBA	74.0 dBA	**72.18** dBA
L_{max} [dBA]	72.3 dBA	71.5 dBA	**71.90** dBA

Table C: Summary Sound Exposure Level (SEL) and L_{max} levels for 2 landings and 2 take-offs of the **Hughes 500D helicopter** with 4 bladed tail rotor @ 300 metres.

It is clear the AS350 model is noisier than the MD 350D with the 4 bladed tail rotor, for both arrival and departure. To simplify the assessment of noise effects, all helicopter noise emission calculations are based on the use of the AS350 helicopter only [even though, in practice, some of the flights will be undertaken using the quieter MD350D helicopter with 4 bladed tail rotor].

Rather than rely on our 2010 field readings, the 'certified noise level' [SEL] for the AS350 helicopter has been used in the calculations. ***Appendix B*** contains a copy the European Union certificates setting out noise levels for the AS350 model indicating compliance with ICAO Annex 16 Chapter 8 [Helicopter] noise limits of 90 dB [takeoff/departure], 91 dB over flight and 93 dB [landing/approach], all as measured at ~152 metres from the aircraft. These quoted SEL levels have been adopted within the noise calculations based on the number of movements set out below.

7 Number of Helicopter Movements

For the purposes of this assessment a helicopter flight comprises a take-off [departure] or landing [approach] from the helipad thus one flight equates to two movements. Proposed number of flights from the site is 160 per day or, on average 40 flights for each of the four helipads. The 160 flights per day is proposed as a maximum only likely to occur during peak season where a mixture of fine weather, very high tourist numbers and full proposed working hours are available - which would likely be in summer. It is unlikely that this level of custom would occur regularly, however it forms a 'worse case' basis for estimating maximum noise levels. The Applicant is applying for a total movements set out in **Table D.**

Maximum Flights		Flight Movements	
Night-time	Day time	ARRIVALS PER DAY MAXIMUM NUMBER	DEPARTURES PERDAY MAXIMUM NUMBER
0	160	160	160

Table D: Maximum number of daily helicopter movements sought for which noise predictions have been based on.

The proposed hours of operation for the site would be 7:30am-8.00pm in the summer [September- May] and 8.00am-6.00pm in the winter [June-August].

8 Prediction Method

The approach of New Zealand Standard NZS6807:1994 is to assess helicopter noise on a 24 hour basis with helicopter sound levels quantified using the L_{dn} unit ["level Day Night"]. The L_{dn} level of helicopter noise emission for a given landing site depends upon the noise level contributed by each helicopter movement, the number of movements, the time of day that movements occur. The actual calculated L_{dn} level of helicopter noise received is determined by the noise output from the helicopter and the distance from the craft.

As stated above the time-of-day factor is not relevant in this case since there will be no night-time movements from the proposed helicopter landing area. The L_{dn} has been calculated in accordance with NZS6807:1994 by considering the contribution throughout the day from individual aircraft movements. In effect, for each relevant assessment points, each aircraft event has an associated noise event [SEL, sound exposure level] which are energy-summed for a whole day to provide an L_{dn} value for that day using the following equation:

$$L_{Adn} = 10 \times [AA \times [10^{[SEL/10]}] - 49.4 \text{ [dB]} \qquad \textit{[Equation 1]}$$

Where:
AA = number of helicopter movements per day
SEL = Measured sound exposure level of representative helicopter event [refer to above].

The SEL value adopted for this assessment are those set out in ***Appendix B***, which are the published "type testing" sound levels for the AS350 helicopter. Predictions have been conducted based on the minimum distance [as the crow flies] from the helipad to the closest dwellings or sensitive sites.

9 Prediction Results

Table E summarises the results of predicted L_{dn} noise levels for the five [5] closest sensitive sites, based on 160 sightseeing trips per day [160 landings & 160 departures, averaged over 7 days].

These calculated worse case L_{dn} values have been compared to the limits of acceptability set out in NZS6807. These predictions assume traffic on the flight tracks described above in **Figure 5**, and the numbers of movements of the AS350 set out in **Table 2.**

Site ID	Noise Sensitive Sites	L_{dn} dBA Calculated as per NZS6807 (dBA)	L_{AFMax} dBA Calculated as per NZS6807 (dBA)
1	Fox Glacier [Weheka] School	42 dBA	59 dBA
2	Fox Glacier TOP 10 Holiday Park & Motels - RV Park	43 dBA	60 dBA
3	Lake Matheson Motel	41 dBA	59 dBA
4	Closest dwelling in Residential Zone	44 dBA	61 dBA
5	Bella Vista Motel	42 dBA	59 dBA

Table E: Predicted L_{dn} levels calculated for the closest existing dwelling and sensitive land uses. Assessment based on maximum number of daily helicopter movements to ensure the L_{dn} 50 dBA limit of acceptability of NZS 6807:1994 is not exceeded any of the identified receiver sites.

L_{Max} levels have been predicted even though no night time movements proposed between 10.00pm and 7.00 am. ***Appendix A*** contains a predicted L_{dn} helicopter noise contour calculated as per NZS6807.

10 Noise Criteria

10.1 Resource Management Act

The environmental effects of land use activities are controlled through the provisions of the Resource Management Act 1991 [the RMA], which embraces the sustainable management of natural, and physical resources, focusing on the effects that land use activities have on the receiving environment. The environment involves people and communities and their ability to provide for their social and cultural wellbeing as well as for their health and safety.

Section 16 of the RMA places a general duty on all occupiers to adopt the best practicable option [BPO] to ensure noise emitted from any site does not exceed a reasonable level. What constitutes a "reasonable level" is not prescribed by the Act. Noise limits prescribed in the District Plan are used to determine limits of acceptability. Further to Section 16 it is important to note Section 17 of the Act. Section 17 states that every person has the general duty to avoid, remedy or mitigate potential adverse effects, including noise. Further comments on noise mitigation under this Application are set out below.

10.2 Westland District Plan

The site and all surrounding sites are zoned "*Rural Zone*" under the Westland District Council noise criteria. The District Plan noise rule for the site under the District Plan is reproduced as follows.

Table 5.7: Standards for Permitted, Controlled and Discretionary Activities

		Rural Zone	
		Permitted and Controlled Activities	Discretionary Activities
(d)	**Noise** (all activities except forestry, and agricultural activities)		
	▪ 0700 - 2100 hrs Mon - Fri ▪ 0700 - 1800 hrs Saturday	55dBA L_{10} at any point within the notional boundary of a residential activity	55dBA L_{10} at any point within the notional boundary of a residential activity
	▪ all other times including public holidays	45dBA L_{10} at any point within the notional boundary of a residential activity	45dBA L_{10} at any point within the notional boundary of a residential activity

As noted above, only limited daytime hours of operation are proposed. All movements take place within the definition of daytime under the District Plan as well as daytime within the definition of '***NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas*** [NZS6807].

The normally applied District Plan noise limits applying to activities in the Rural Zone rely on the implementation of New Zealand Standard NZS6802:1991. However, this Standard does not cover noise from transportation sources such as noise from public roads, airports, ports and heliports. NZS6802:1991 recommends that where the sound under investigation is covered by a specific NZ Standard, then noise effects should be assessed under that specific Standard.

11 Helicopter Noise NZS 6807: 1994

The New Zealand Standard for assessing helicopter noise '***NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas***' was specifically developed to provide guidelines for controlling helicopter landing area noise in the context of the [then] newly enacted Resource Management Act.

Clause 1.1 of NZS 6807:1994 states it is appropriate to apply this Standard to the assessment of noise from helicopter landing sites used for 10 or more flight movements per month or where the L_{max} sound level will exceed 90 dBA during daytime or 70 dBA during night time. In this case, no night flights are proposed but there will be 10 or more flight movements per month. Clause 4.1.2 of NZS6807:1994 states:

> *"This standard has been prepared taking into account the distinctive character of helicopter noise, and the nature of operations from helicopter landings areas. NZS6802 Assessment of environmental sound and NZS 6805 Airport noise management and land use planning are inappropriate for the assess of noise from helicopter lands areas".*

NZS6807:1994 is therefore technically the most appropriate Standard for assessment of noise associated with the use of helicopter landing areas and is adopted in many District Plans throughout New Zealand.

The approach of NZS 6807:1994 is to assess helicopter noise using L_{dn} with a separate consideration of the maximum levels due to any night time operations [using L_{AFmax}].

Table 1 of NZS 6807:1994 *Noise Management and Land Use Planning for Helicopter Landing Areas* includes guidelines for the recommended upper limit of noise from helicopter landing areas received at or within the notional boundary of rural dwelling. **Table 1** of NZS6807:1994 is reproduced as follows in **Table F:**

Affected land use	L_{dn} day-night average sound level dBA	L_{max} night-time maximum sound level dBA
[i] Industrial	75	n/a
[ii] Commercial	65	n/a
[iii] Residential	50	70
[iv] Rural [at notional boundary]	50	70* [Not Applicable]
[v] Residential [internal]	40	55

Table F: Limits of acceptability, NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing.

The applicable NZS6807 limit under this application is therefore L_{dn} 50 dBA to be complied with at the 20 metre notional boundary to the closest affected rural residential.

***The L_{max} limit does not apply as no movements are proposed for night time.**

12 Civil Aviation Authority [CAA]

The RMA does not empower Councils to control noise from overflying aircraft, that is when aircraft are *en route* to a destination and not in the vicinity of the landing area as this aircraft noise is under jurisdiction of Civil Aviation Act *Section 29A* of the Civil Aviation Act 1990 which empowers Civil Aviation Authority [CAA] to control noise from overflying aircraft.

It is important to note that by the time the helicopter leaves the subject site, it may have already obtained a height of 500ft or more. Once the helicopter is above 500ft the noise of flight is realistically beyond the powers of the Westland District Plan. **Civil Aviation Authority** [CAA] law requires that unless landing or taking-off, aircraft must operate not lower than *500ft [approximately 150m]* above ground level in an open area [such as the areas under this Application] and 1000 ft [approximately 300m] above built up areas [other than during take offs and landings]. At these altitudes noise effects of the helicopter associated with the site would not be any more noticeable than noise from any other aircraft that would be overflying.

The Environment Court case *Dome Valley District Residents' Society Incorporated* and *Skywork Helicopters Limited versus Rodney District Council*, Decision A099/2007[3] Dated 14th December 2007 considered this when determining whether the adverse effects of over-flying by helicopters could be taken into account on a resource consent application for a helicopter landing area. At Paragraph 69 the Court said:

> *"So, reading Section 104[1] in its context, we infer that the scope of effects of allowing a helicopter base activity to which consent authorities are to have regard includes the noise of helicopters in the course of landing at the base, on the ground, and in the course of departing from the base; but is not intended to extend to effects generated by helicopters [or other aircraft] while airborne or in flight. That is our understanding of how Section 104[1] applies to Skywork's Application."*

The decision was upheld in the High Court, once in relation to an appeal against the Environment Court decision and again when leave was refused to Appeal the High Court decision to the Court of Appeal.

[3] Dome Valley District Residents Society Inc. versus Rodney District Council [2008] 3 NZLR 821; [2008] 14 ELRNZ 237; [2008] NZRMA 534 [HC] and, Dome Valley District Residents Society Inc. versus Rodney District Council 8/12/08, Priestley J, HC Auckland CIV-2008-404-587.

13 Assessment

A helicopter operating from a landing area may create intermittent noise in the local area, clearly an 'effect' requiring assessment under the Resource Management Act 1991 [RMA] procedures. An individual's reaction to noise can vary widely due to differing individual sensitivity to noise. Many factors affect sensitivity to noise including time of day, state of mind, and the activity being carried out when noise is experienced. Of importance is the "intrusiveness" of nuisance noise, often defined as the degree by which the normally occurring background sound level is exceeded.

As explained above the Westland District Plan noise rules for permitted activities in the Rural Zone do not apply to transportation sources and are not appropriate for assessing noise effects of the current application. The L_{10} noise descriptor defined in the Plan is the level of sound equalled or exceeded for 10% of the monitoring period with the L_{10} level of sound.

As discussed above *NZS* 6807:1994 *Noise Management and Land Use Planning for Helicopter Landing Area* is the appropriate stated as this bases its calculations on Single Event Level [SEL] used to quantify the time-varying sound level of individual events [e.g. helicopter landing and take-off]. It should be noted that community noise exposure varies significantly between day, evening and night-time periods it is therefore often desirable to set criteria for acceptable noise exposure to use the Day-Night Average Sound Level [L_{dn}] is used widely internationally and nationally for this purpose [[4]]. The use of L_{dn} within NZS6807:1994 for assessing noise from helicopter landing areas is considered best practice in New Zealand for assessing other types of noise from other transportation sources such as ports and airports.

The predictions carried out, based on the flight tracks provided and the number of movements nominated by the applicant, all existing dwelling locations fully comply with the daily maximum of L_{dn} 50 dBA recommended in the Standard as a limit on helicopter noise for rural residential sites. In regards to L_{Amax}, NZS 6807 does not require L_{Amax} assessment as no night-time helicopter movements. In regards to ground based noise this is also predicted to fully comply with the requirements of the District Plan refer to Section 16 below.

13.1 Noise Effects on Animals

We have been asked to provide comment on helicopter noise effects on livestock. We note that the Resource Management Act defines "environment" as including people and it is people dwellings and immediate surrounding that are protected by the District Plan and the guidelines provided within NZS6807. This is the approach taken in assessing potential adverse noise effects from the proposed activity.

None the less we provide the following comment. We note that compared to noise studies on humans, noise effects studies on animals is limited. Although some research has been carried in this area, the research has been mainly focussed on sensitive creatures such as marine mammals, birds and reptiles. In addition, studies appear to have focused on noise effects in natural areas as opposed to farming or land used for pastoral grazing. Based on experience and our own observations of helicopter activity, our view is that noise from ground based activities and helicopter arrivals or departures sounds would not be expected to adversely affect livestock. In real terms the sound will not be inconsistent with the temporary sounds from a passing truck or other significant sounds found in rural areas such as tractors and other equipment.

We would not expect cattle grazing to react or be "spooked" by sounds from a helicopter activities. This is not likely to occur for passing heavy vehicles travelling at speed and is similarly not an expected reaction to a helicopter movement. A helicopter arriving and departing as per the Flight tracks will suitably mitigate the effect in our view.

[4] Berglund, B., & Lindvall, T. [Eds.]. Community Noise. Archives of the Center for Sensory Research, 1995, 2[1], 1-195 for comment on L_{dn}, L_{eq} and SEL.

13.2 Impact On Fox Township & In Wilderness Areas

There are currently many different helicopter operators [and therefore helicopter landing areas] utilised for what is a popular tourist activity at Fox Glacier. Because of the increasing frequency of sightseeing flights, noise associated with helicopter these activities is almost omni-present around the town during the hours of daylight. While it is evident that flight paths to and from the various landing areas and destinations have been selected to minimise overflight of noise-sensitive locations [such as dwellings and accommodation facilities] there is always a need to consider better and more efficient methods for concentrating this noise into areas away from sensitive sites, to ensure at least a basic level of rural amenity is preserved in the local area.

A 2007 study of helicopter noise in South Westland[5] investigated whether utilisation of helicopter landing areas near the Fox township are presenting a risk to public health because of their proximity to residential and commercial areas. The findings were that although serious annoyance was expressed at times, the measurements and observations of helicopter noise found that sound exposure levels in parts of Franz Josef are higher than desirable but are moderated by attitudinal factors because of the co-dependence of air and ground-side tourism. Sound exposure to helicopter noise in the Fox Glacier township environs was found to be at lower levels than those measured around Franz Josef.

There are some current efforts already in place to manage noise from helicopters in flight. The Mount Cook and Westland National Parks Resident Air User Group has, in conjunction with Civil Aviation Authority (CAA) developed protocols for good aviation practice when flying in the environs of these glaciers and near to towns in the area, however dispersal of helicopter noise among the plethora of landing sites employed in and around locations where people live and work is considered an inefficient method for managing the noise effect.

We note that researchers have studied the effect of vehicle and equipment noise on visitor recreational experiences at a variety of DoC managed locations including on the West Coast. Studies carried out in New Zealand by DoC and others regarding the effects of aircraft and helicopter noise on recreational visitors have all been in relation to aircraft in flight.

A 2013 survey of visitor experiences[6] found that there is wide variation in visitors' expectations and tolerance of aircraft noise, possibly related to their country of origin. Of the international visitors surveyed, for example, visitors from the USA had less tolerance for any aircraft activity in a national park because they are not used to this in their own country. In contrast, many European visitors commented that they were used to busy airspace over Europe and, as a consequence, aircraft activity did not particularly bother them. Overall, re-locating 160 sightseeing trips to the proposed site will reduce over flying in the township and thus help reduce helicopter noise experienced in the town.

14 Ground Based Noise Sources

NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas [NZS6807:1994] only applies to noise resulting from helicopter activity including in the course of landing at the helipad and while starting up or shutting down on the ground, and in the course of departing from the heli-base. We understand that there will be no helicopter maintenance on site. Thus there are no noise effects from these types of activities to consider.

The proposal does include ground based activities such as car parking, a waiting area and fuelling facilities. Assessment of noise emissions from these on-site activities falls within the ambit of the District Plan permitted activity noise standards and are to be measured in accordance with NZS 6801 NZ Standard 'Measurement of Environmental Noise' and assessed in accordance with NZS 6802 'Assessment of Environmental Noise'.

[5] South Westland aviation noise issues and public health VC Goodwin, ENAAS Ministry Of Health 3 Dec 2008.
[6] Monitoring The Effects Of Aircraft Over-Flights On Visitors To The Glaciers, Westland Tai Poutini National Park, New Zealand - A Report Presenting Results From The 2013 Visitor Survey. Prepared For Department Of Conservation, West Coast Tai Poutini Conservancy By Dr Stephen Espiner & Dr Jude Wilson Espiner Consulting (Ltd) May 29 2013

In regards to the car park and office area these sound sources such as noise from movements of vehicles moving on and off site are unlikely to be noticeable within the wider area. In terms of people sound, this will likely to be a genuine low sound level type of activity and will be fully compliant with the District Plan noise limits.

Overall our predictions show cumulative noise from all proposed ground based activity will be less than L_{A10} 40 dB when assessed at the any point within the notional boundary of the closest rural dwelling. Ground based activities can comply at all times with the District Plan permitted activity noise standards.

15 Temporary Construction Noise

Some significant construction works will be required to establish the landing area. The works include;

- ≠ Upgrade the existing access to the required New Zealand Transport Agency standard;
- ≠ Establish a road from the access to a proposed turn/parking area;
- ≠ Establish a safe intersection for turn-off to the Green Waste area;
- ≠ Establish a turn/park area for vehicles and two shelters for waiting passengers';
- ≠ Establish a fuel storage area and dispending facility (e.g. underground pipes);
- ≠ Construct an area for four (4) helipads to operate simultaneously; and
- ≠ Clear up to 1.5 ha of regenerated indigenous vegetation,

The District Plan does not appear to have any noise performance standards relating to construction noise. Regardless national standard for construction noise ***NZS6803:1999 Acoustics Construction Noise*** provides suitable guidance to assess effects of noise during the construction of the shelters and pad.

We are of the view that due to the distances involved and type of construction work involved, construction noise emissions will be able to comply with the applicable limits set out in ***NZS6803:1999 Acoustics Construction Noise.*** This is a reasonable expectation given the proposed plans for the site and the distances to any sensitive receiver site.

16 Noise Mitigation Methods

The provisions of Sections 16 and 17 of the Resource Management Act require that activities adopt methods to avoid, remedy or mitigate potential adverse noise effects. s.16 in particular is explicit in requiring the adoption of the "best practical option" to avoid unreasonable noise.

s.17 requirements must also be adopted whether or not an activity complies with the District Plan, which includes compliance with the District Plan noise limits.

"...the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to

a) The nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and

b) The financial implications, and the effects on the environment, of that option when compared with other options; and

c) The current state of technical knowledge and the likelihood that the option can be successfully applied."

The following mitigation measures are recommended to be implemented as part of the best practical option for the site:

16.1 Flight Tracks

The main method for avoiding overflying noise disturbance is to avoid over-flight of noise sensitive areas i.e. the isolated or noise sensitive dwelling locations. This is the method recommended to be adopted by the Applicant. Pilots must fly aircraft to comply with certain minimum safe heights at all times. These heights are prescribed in CAA's "Legal Information Bulletin Number 1, Interpretation of CAR 91.311[c]" which states that, subject to some exemptions, pilots in command must not fly below 1,000 feet over built up urban areas and 500 feet in rural areas. Apart from the flight tracks avoiding overflying residential locations, noise effects are controlled by using prescribed rates of descent / ascent when operating to / from the landing area. Steep turns and sharp manoeuvres should also be avoided in the vicinity of the landing area. **Figure 5** below describes how ground noise is minimised during landing by careful control of the rate of descent close to the landing area [by comparing the sizes of the landing noise footprint]. Approaching the site on a long glide slope will result in unnecessary noise on the ground in the vicinity of the landing area and is recommended to be avoided.

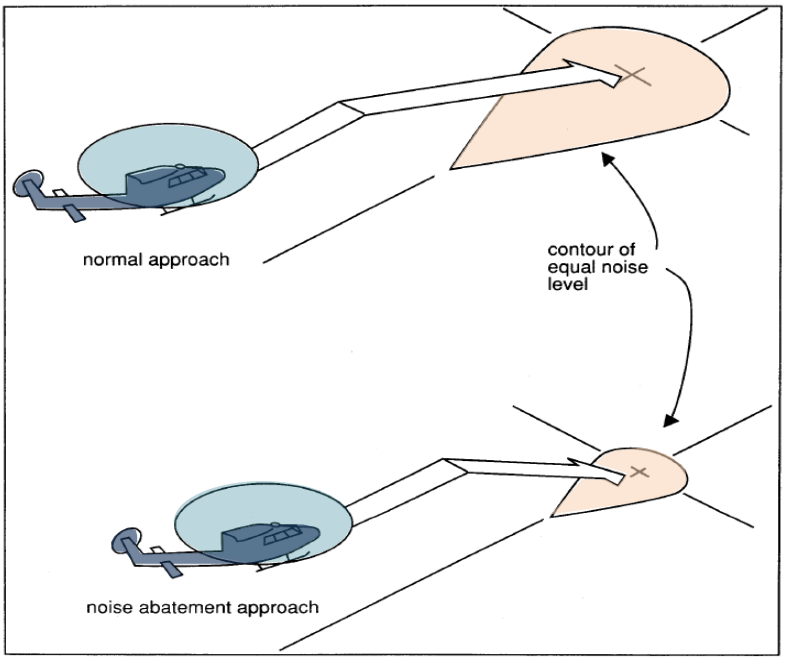


Figure 5: Helicopter landing noise comparison. Compared to a traditional glide slope landing trajectory [upper profile], a higher trajectory with a more rapid drop onto the landing area is [lower profile] is a technique that minimises noise on the ground.

The technique shown in **Figure 5** will assist in reducing the potential for blade slap and minimise noise on the ground during landing. A similar technique is available regarding take-off. A relatively steep take-off with a shallower trajectory once 100 to 200 feet above ground level will assist in reducing helicopter noise on the ground during take-off.

16.2 Maximum Noise Output

Only helicopters with a certified noise emission level no greater than the AS350 will use the site. Any aircraft that produces a noise higher than the elected AS350 helicopter are not authorised by the consent sought here.

16.3 Noise Aware Flying

The proposed users of the site have not been confirmed however the applicant plans to operate the site in a similar way to its Franz Josef operational heliport site. For this proposed site there would be a Helicopter Management Manual (HMM) similar to the existing Franz Josef operation. Please see the existing HMM for the Franz Josef site set out in Appendix 13 of the Application document. No overflying of any dwelling is likely to occur given the prescribed flight tracks to and from the site.

16.4 Log Book

A log book of all movements of helicopters is to be maintained. This will provide a mechanism to ensure the number of helicopter movements are limited to those specified within the consent.

16.5 Movement Restrictions

Movements should be restricted to avoid noise sensitive times of the day. The proposal is to only use the landing area for daytime movements, as set out in this report. The site is proposed to be utilised only for normal arrivals and departures. No extended hovering etc is proposed to be undertaken at the site. Further to the above, it is understood all CAA procedures will be followed to ensure safe flying of the aircraft.

17 Summary and Recommendations

Malcolm Hunt Associates have conducted an assessment of potential noise effects associated with a helicopter landing area proposed for a site located on DOC Land approximately 1 km south of the Fox Glacier Township. The site is well separated from noise sensitive sites which are all located over 1,000 metres from the landing site.

Based on the results of predictions carried out, the upper guideline limits for daily helicopter noise of 50 dB L_{dn} set out by NZS6807:1994 applying at the notional boundary of any existing dwelling or building housing a noise sensitive activity is assessed be able to be fully complied with at all times. Ground based activies are assessed as being able to fully comply at all times with the District Plan permitted noise rules. Temporary construction based activities have been assessed as able to fully comply with the national construction noise standard *NZS6803:1999 Acoustics Construction Noise*

We see no noise-related reasons for Council to withhold consent on noise grounds, subject to the following recommended noise-related conditions;

1. ***The consent holder shall ensure use of the landing area to which this consent applies shall be limited to no more than 160 departures and 160 arrivals per day, averaged over 7 days as per NZS6807:1994.***

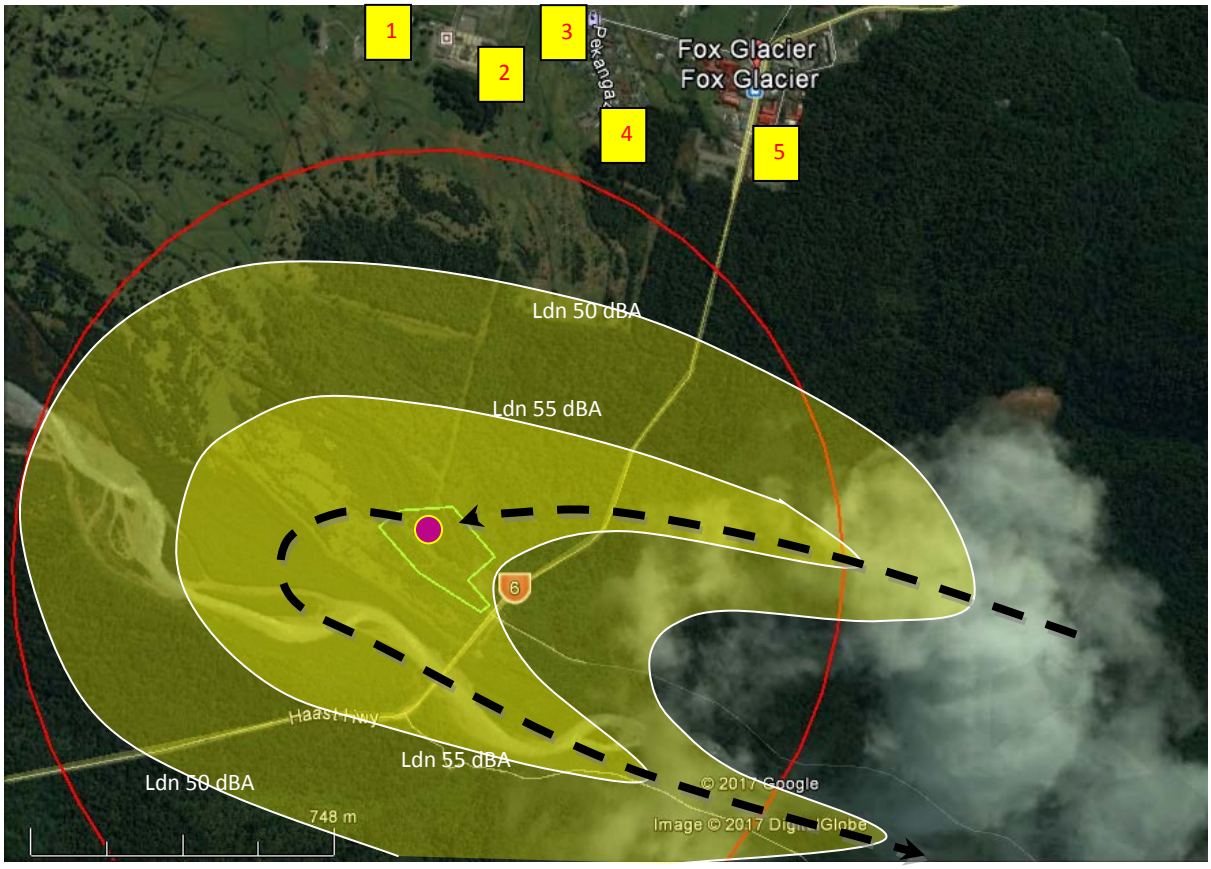
2. ***The consent holder shall ensure access to the landing area is controlled so that helicopter movements only take place between the hours 7:30am-8.00pm during summer months (September- May) and 8.00am-6.00pm during winter months [June-August].***

3. ***The consent holder shall ensure that the activity is limited to use of a AS350 helicopter or such other models of helicopter which generate no more noise than a AS350 helicopter.***

4. ***The consent holder shall ensure, other than in the event of emergencies, pilots using the site only use the flight paths set out in Figure 4 of this report.***

Malcolm Hunt Associates
16 June 2017

Appendix A – Helicopter Noise L_{dn} 50 dBA Contour



Appendix B – Helicopter Certification

European Aviation Safety Agency
TYPE-CERTIFICATE DATA SHEET FOR NOISE
Airbus Helicopters AS350

European Aviation Safety Agency

EASA

TYPE-CERTIFICATE DATA SHEET FOR NOISE

No. EASA.R.008

for

AS350B

Type Certificate Holder:
Eurocopter

Aéroport International Marseille – Provence
13725 Marignane cedex
France

For models: AS350B
AS350B1
AS350B2
AS350B3
EC130T2
AS350BA
AS350BB
AS350D
EC130B4

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Type Certificate Holder **Eurocopter**

Aircraft Type Designation **AS350B**

Engine Manufacturer **Turbomeca**

Engine Type Designation **Arriel 1B**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment

Chapter **8**

EASA Record No.	Maximum Mass		Take-Off EPNL		Overflight EPNL		Approach EPNL		See Note
	Take-off (kg)	Landing (kg)	Level	Limit	Level	Limit	Level	Limit	
D196	**1,950**	**1,950**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Type Certificate Holder[1] **Eurocopter**

Aircraft Type Designation[1] **AS350B1**

Engine Manufacturer[1] **Turbomeca**

Engine Type Designation[1] **Arriel 1D**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **1 Edition / Amendment 2** Chapter[1] **8 (8.4.1)**

EASA Record No.	Maximum Mass		Take-Off EPNL		Overflight EPNL		Approach EPNL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	Level [1]	Limit	Level [1]	Limit	
D70	**2,200**	**2,200**	**89.7**	**93.4**	**87.3**	**92.4**	**91.3**	**94.4**	**-**

[1] See Note 1.

Type Certificate Holder[1] **Eurocopter**

Aircraft Type Designation[1] **AS350B2**

Engine Manufacturer[1] **Turbomeca**

Engine Type Designation[1] **Arriel 1D1**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **1 Edition / Amendment 3** Chapter[1] **8 (8.4.1)**

EASA Record No.	Maximum Mass		Take-Off EPNL		Overflight EPNL		Approach EPNL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	Level [1]	Limit	Level [1]	Limit	
D71	**2,250**	**2,250**	**89.8**	**93.5**	**87.6**	**92.5**	**91.4**	**94.5**	**-**

[1] See Note 1.

Type Certificate Holder **Eurocopter**

Aircraft Type Designation[1] **AS350B3**

Engine Manufacturer[1] **Turbomeca**

Engine Type Designation[1] **Arriel 2B**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **3 Edition / Amendment 5** Chapter[1] **11 (11.4.1)**

EASA Record No.	Maximum Mass		Overflight SEL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	
D73	**2,250**	**2,250**	**84.6**	**86.5**	**3**

Type Certificate Holder[1] **Eurocopter** Aircraft Type Designation[1] **AS350B3**

Engine Manufacturer[1] **Turbomeca** Engine Type Designation[1] **Arriel 2B**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **2 Edition / Amendment 4** Chapter[1] **8 (8.4.1)**

EASA Record No.	Maximum Mass		Take-Off EPNL		Overflight EPNL		Approach EPNL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	Level [1]	Limit	Level [1]	Limit	
D72	**2,250**	**2,250**	**89.7**	**93.5**	**87.3**	**92.5**	**91.3**	**94.5**	**-**

[1] See Note 1.

Type Certificate Holder **Eurocopter**

Aircraft Type Designation[1] **AS350B3**

Engine Manufacturer[1] **Turbomeca**

Engine Type Designation[1] **Arriel 2B1**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **3 Edition / Amendment 5** Chapter[1] **11 (11.4.1)**

EASA Record No.	Maximum Mass		Overflight SEL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	
D64	**2,370**	**2,370**	**84.1**	**86.8**	**-**
D128	**2,250**	**2,250**	**84.6**	**86.5**	**3**

Type Certificate Holder[1] **Eurocopter** Aircraft Type Designation[1] **AS350B3**

Engine Manufacturer[1] **Turbomeca** Engine Type Designation[1] **Arriel 2D**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **5 Edition / Amendment 9** Chapter[1] **11 (11.4.1)**

EASA Record No.	Maximum Mass		Overflight SEL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	
D337	**2,370**	**2,370**	**84.2**	**86.8**	**-**
D338	**2,250**	**2,250**	**84.4**	**86.5**	**-**

[1] See Note 1.

Type Certificate Holder[1] **Eurocopter**

Aircraft Type Designation[1] **AS350BA**

Engine Manufacturer[1] **Turbomeca**

Engine Type Designation[1] **Arriel 1B**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **1 Edition / Amendment 3** Chapter[1] **8 (8.4.1)**

EASA Record No.	Maximum Mass		Take-Off EPNL		Overflight EPNL		Approach EPNL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	Level [1]	Limit	Level [1]	Limit	
D75	**2,100**	**2,100**	**91.1**	**93.2**	**87.3**	**92.2**	**91.3**	**94.2**	**-**

[1] See Note 1.

Type Certificate Holder[1] **Eurocopter** Aircraft Type Designation[1] **AS350BB**

Engine Manufacturer[1] **Turbomeca** Engine Type Designation[1] **Arriel 1D1**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **1 Edition / Amendment 3** Chapter[1] **8 (8.4.1)**

EASA Record No.	Maximum Mass		Take-Off EPNL		Overflight EPNL		Approach EPNL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	Level [1]	Limit	Level [1]	Limit	
D76	**2,100**	**2,100**	**93.2**	**93.2**	**92.2**	**92.2**	**94.2**	**94.2**	**-**

[1] See Note 1.

Type Certificate Holder **Eurocopter**

Aircraft Type Designation **AS350D**

Engine Manufacturer **Lycoming**

Engine Type Designation **LTS101-600A-2**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment

Chapter **8**

EASA Record No.	Maximum Mass		Take-Off EPNL		Overflight EPNL		Approach EPNL		See Note
	Take-off (kg)	Landing (kg)	Level	Limit	Level	Limit	Level	Limit	
D315	**1,950**	**1,950**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Type Certificate Holder[1] **Eurocopter**

Aircraft Type Designation[1] **EC130B4**

Engine Manufacturer[1] **Turbomeca**

Engine Type Designation[1] **Arriel 2B1**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **3 Edition / Amendment 5** Chapter[1] **8 (8.4.1)**

EASA Record No.	Maximum Mass		Take-Off EPNL		Overflight EPNL		Approach EPNL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	Level [1]	Limit	Level [1]	Limit	
D129	**2,427**	**2,427**	**85.5**	**93.9**	**84.2**	**92.9**	**90.5**	**94.9**	**-**
D74	**2,400**	**2,400**	**85.5**	**93.8**	**84.2**	**92.8**	**90.5**	**94.8**	**-**

[1] See Note 1.

Type Certificate Holder[1] **Eurocopter**

Aircraft Type Designation[1] **EC130T2**

Engine Manufacturer[1] **Turbomeca**

Engine Type Designation[1] **Arriel 2D**

Additional modifications essential to meet the requirements or needed to attain the certificated noise levels[1] **None**

Noise Certification Basis **ICAO Annex 16, Volume I** Edition / Amendment **5 Edition / Amendment 9** Chapter[1] **11 (11.4.1)**

EASA Record No.	Maximum Mass		Overflight SEL		See Note
	Take-off [1] (kg)	Landing (kg)	Level [1]	Limit	
D357	**2,500**	**2,500**	**81.1**	**87.0**	**-**

[1] See Note 1.

TCDSN EASA.R.008 Notes

1. Items so marked shall be included on EASA Form 45.
2. This aircraft type conforms with the provisions of Article 6.1 of Regulation 216/2008 without the need to comply with the Standards of ICAO Annex 16, Volume I, by virtue of the date of type certification.
3. Extended MCP

TCDSN

Change Record

Issue	Date	Changes
Issue 1	22 March 2007	Initial Issue
Issue 2	27 November 2009	Page 4: Add record D196 Page 13: Add record D315
Issue 3	06 January 2010	Update of the footnote for blank records
Issue 4	17 June 2011	Records D337 and D338 added.
Issue 5	20 July 2011	Records D337 and D338 added.
Issue 6	25 May 2012	Records D357 added : EC130T2

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