Appendix 5.2.2B
Airstrip Noise Impact Assessment

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

New Gold Inc. (the Proponent) intends to construct an airstrip to facilitate transportation of workforce to and from the proposed Blackwater Gold Project (the Project) by aircraft on a regular basis during the construction period. This would result in noticeable short-term aircraft noise events.

Aircraft noise is noise pollution produced by an aircraft or its components, during various phases of a flight: on the ground while parking and using auxiliary power units, while taxiing, on run-up from propeller and jet exhaust, during takeoff, underneath and lateral to departure and arrival paths, over-flying while en route, or during landing.

Although the Project runway will be built to accommodate a wide range of aircrafts, the assessment of noise has been carried out for Boeing 737, which generates noise at the highest level of all considered aircrafts. This is the worst-case scenario which follows the rule of conservative approach to environmental assessment.

The assessment of noise from the Project airstrip focuses on predicting the loudest expected noise levels during aircraft approach and departure. Each round-trip flight will involve one take-off and one landing during daytime hours only.

The impact of airstrip noise and related perceptions are typically delineated by noise contour lines representing various daytime noise levels that depends upon the type of the plane, the size of the airstrip, prevalent wind directions, topography, and so forth. Noise contours highlight existing or potential areas of significant aircraft noise exposure. The areas within the 65, 70, and 75 dBA noise contours are considered to be the most impacted by aircraft generated noise.

Typically, aviation noise issues are handled at the local level. Local representatives and airport design staff have intimate knowledge of regional matters and are able to address usual concerns of aircraft noise significantly increasing the background noise. Oversight of aviation noise is provided by Transport Canada which verifies that the policies and procedures associated with aircraft noise comply with relevant standards and guidelines[1]. In this area, Transport Canada operates in conjunction with third parties including Health Canada, NAV CANADA and the International Civil Aviation Organization (ICAO).

Transport Canada uses a Noise Exposure Forecast (NEF) system to provide a measurement of the actual and forecasted aircraft noise in the vicinity of airports. This system factors in the subjective reactions of the human ear to specific aircraft noise stimulus: loudness, frequency, duration, time of occurrence, tone, etc. Aircraft noise assessment for the Project follows the Transport Canada computer model NEFCalc Version 206.

[1] Transport Canada web page: www.tc.gc.ca/eng/civilaviation/standards/aerodromeairnav-standards-noise-menu-923.htm

2.0 SOUND EMISSIONS

Acoustic specification of the Boeing 737 aircraft has been generated by the NEFCalc software. A copy of the print screen view window is shown as **Table 1**.

Table 1: Sound Levels in dBA of the Boeing 737 Aircraft

Aircraft Data

Aircraft Name	B737-300/CFM56-3B-1		
Aircraft Code	737300	Manufacturer	BOEING
☐ Equivalency	737300	Engine Type	TFAN

Notes

TakeOff Profile Parameters

Range	0	APPROACH		
Speed	102.6	Knots		
Takeoff Roll	.00	kFt	Tan Climb Angle	.0000
Distance to New Climb Angle	.00	kFt	Tan Climb Angle	.0000
Distance to Power Cutback	.00	kFt	Tan Angle	.0000

Noise Characteristics

	Reference Distance (Ft)							
	200	400	1000	2000	4000	6000	10000	20000
Takeoff	104.1	100.1	94.2	89.2	82.7	78.1	71.7	61.3
Landing	101.7	96.9	89.2	81.8	73.7	68.2	60.4	48.2
Sideline	104.1	100.1	93.8	88.0	78.5	71.5	61.6	45.8
Power Cutback	102.6	98.5	92.2	86.9	80.4	75.7	69.1	58.5

The table shows that the highest noise levels are observed during takeoff. As expected, noise levels decrease with distance due to sound absorption in air.

3.0 SOUND EXPOSURE LEVEL

NEFCalc calculates SEL (Sound Exposure Level) contours for a combination of aircraft, flight path, and range. Airstrip noise assessment in terms of SEL was completed for a single event which refers to one occurrence of an aircraft taking off or approaching, using a specified flight path. The model considered Boeing 737 taking off (the worst case scenario), the aircraft range of 5,000 km, and the airstrip 1,706.9 m long.

The model-generated SEL contours are shown in **Figure 1**.

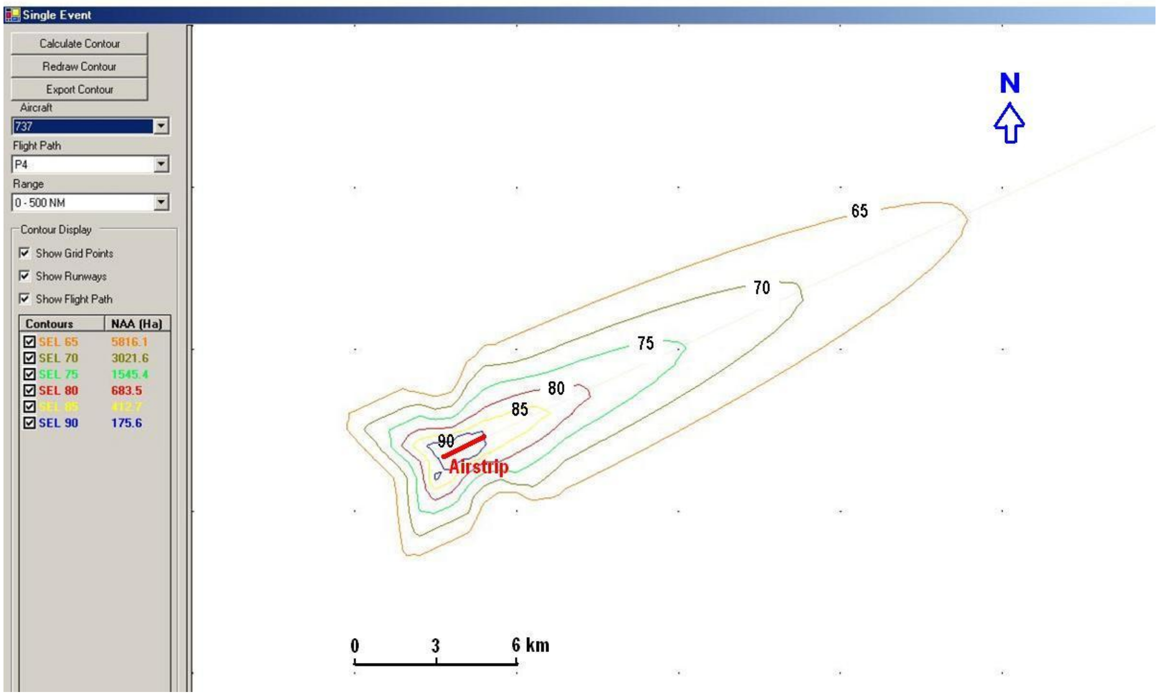

Figure 1: Blackwater Project Airstrip SEL Contours in dBA for Boeing 737

The model revealed the highest noise levels at close proximity to the airstrip when the plane is taking off at full throttle. With the plane moving upward and forward the ground level noise will be decreasing along and across the flight corridor. A significant noise impact, pursuant to daytime permissible sound levels, would occur over noise sensitive land uses within the 75 dBA contour, as discussed in **Section 5**. The noise affected area (NAA) within a particular contour in hectares (ha) is shown on the left site of the graph.

4.0 NOISE EXPOSURE FORECAST

A Noise Exposure Forecast (NEF) measure indicates the average noise energy over some representative 24-hour period. In case of this Project the NEF represents noise exposure during daytime as night time flights are not considered at present. The NEF includes a more sophisticated procedure for weighting the importance of different frequencies of sound. The NEF contours developed for the worst case scenario described above in **Section 3** are shown in **Figure 2** as the NEFCalc model output.

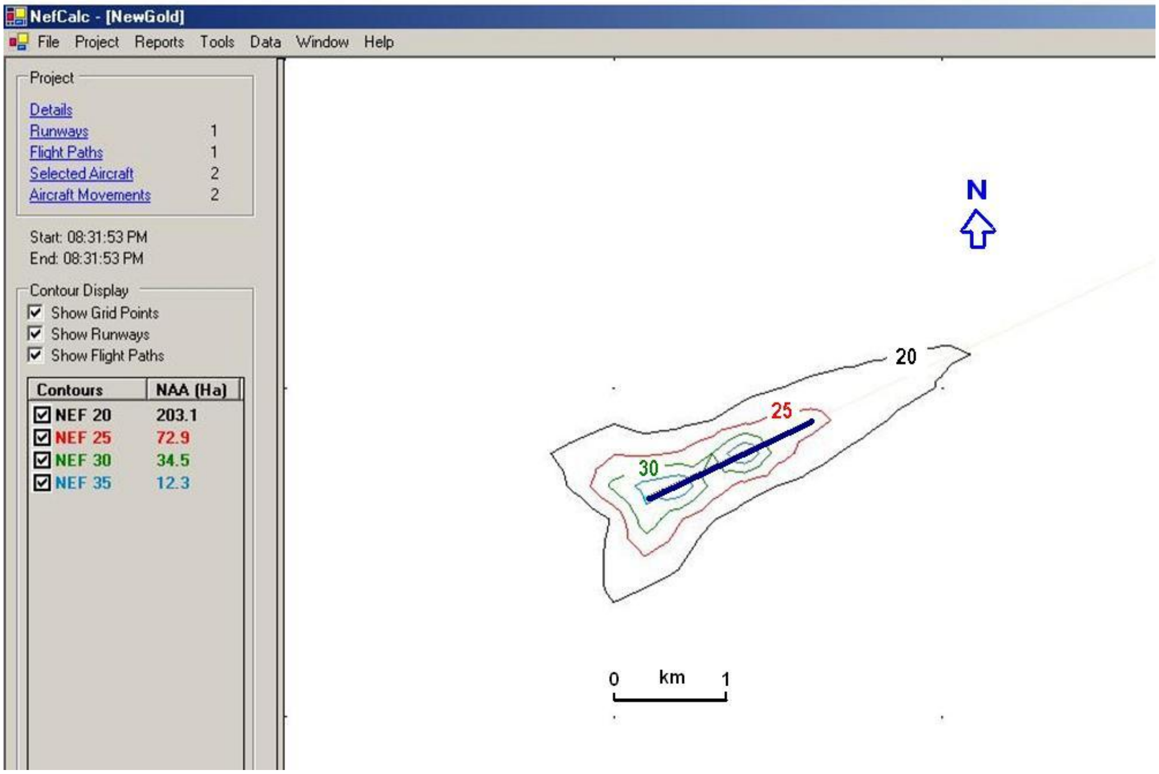

Figure 2: Blackwater Project Airstrip NEF Contours in dBA for Boeing 737

The NEF allows to predict a humans response to aircraft noise. If the NEF level is greater than 35, complaints are likely to be high. Anything above 25 is likely to produce some level of annoyance. Construction of any permanently occupied dwelling such as a hunting lodge or a cabin should not be allowed in vicinity of the airstrip within the 25 dBA NEF contour. The area (in hectares) associated with each NEF contour is also shown in **Figure 2**.

5.0 DISCUSSION AND CONCLUSIONS

The NEFCalc works by defining a network of grid points at ground level around an airstrip. It then selects the shortest distance from each grid point to each flight track and computes the noise exposure generated by each aircraft operation, along each flight track. Corrections are applied for atmospheric acoustical attenuation, acoustical shielding of the aircraft engines by the aircraft itself, and aircraft speed variations. The noise exposure levels for the aircraft are then summed at each grid location. The cumulative noise exposure levels at all grid points are then used to develop noise exposure contours for selected values (e.g., 65, 70 and 75 dBA). Using the results of the grid point analysis, noise contours of equal noise exposure can then be plotted.

The SEL contours shows the elevated noise events during aircraft flyovers at the selected receptors. The events represent one instance per day when the noise will be substantially higher than background noise; however, the duration of each event is expected to be in seconds or no more than a few short minutes, and not in hours. The overall daily cumulative noise level will be much lower than a single event of a high-level noise. For example, when the noise event last 3 minutes during daytime (7:00 to 22:00) and the baseline noise level is 45 dBA, calculated daily cumulative sound level for 75 dBA contour would be only 51 dBA and for 80 dBA contour would be 55 dBA, which is permissible level for daytime in this project.

However, a short-term noise peaks during takeoff, landing and taxiing could be disturbing for people and wildlife when at and above the 80-85 dBA level. At present, there are not dwellings in the higher noise zone but wildlife should be included.

The effect of noise on animals can be similar to the effects observed in humans. Noise can adversely affect wildlife by interfering with communication, masking the sounds of predators and prey, cause "stress" or avoidance reactions and (in the extreme) result in temporary or permanent hearing damage. The animal's initial reaction to a new noise source is fright and avoidance but if other sensory systems are not stimulated (for instance optical or smell), the animal learns quite quickly to ignore the noise source or return to normal existence when noise disappears.