October 29, 2015

Mr. Mike Mais
Assistant City Attorney
Long Beach Airport
4100 Donald Douglas Drive
Long Beach, CA 90808

Subject: Long Beach Airport Noise Budget Analysis For Noise Year October 1, 2014 to September 30, 2015

Dear Mike,

Mestre Greve Associates, a Division of Landrum & Brown, has completed the analysis of the Airline Noise Budget for Noise Year October 1, 2014 through September 30, 2015 (NY '14-15).

The data show that the air carriers operated well below the allowed budget at RMT 9 and well below budget at RMT 10. Table 1 compares the allowed budget with the actual budget used:

Table 1

Noise Budget Status For Noise Year 2014/15

Location	Allowed Budget	Actual Budget Used
RMT 9	70.7	41.9
RMT 10	84.6	50.3

The reason the budget numbers are well below the permitted levels is due to the reduction in the number of noisier aircraft types and the fact that the airport operated well below the permitted minimum number of daily air carrier flights. While the permitted minimum number of air carrier flights is 41, the airlines and cargo carriers actually averaged 30.4 flights per day.

Section 16.43.060E states that if the air carrier operations are below the allowable noise budget then additional flights "shall be awarded only to the extent the Airport Manager determines that initiation of service utilizing those flights will not lead the Air Carriers, as a group, to exceed the level established pursuant to section 16.43.050 C."

Because the budget results are well below the budget limit (as was the case in NY '13-14), there is room to allocate flights above the 41 flights provided that such additional allocations do not result in exceeding the allowed budget. The number of additional flights is highly dependent on the type of aircraft used, the aircraft weight, and the time of the operation as some aircraft are noisier than others, departure noise increases with aircraft weight, and the noise budget methodology is very sensitive to the time of day of the flight.

Noise Budget Methodology

The noise budget status was computed from individual flight data collected from the Long Beach Airport's permanent airport noise monitoring system (ANOMS). Individual data was provided for each of the commercial airline flights arriving and departing from Long Beach Airport during the budget year. The following paragraphs describe the computation methodology.

An example of 5 flights recorded at RMT 9 are as follows:

Max Date Time	Aircraft Type	Airline	A/D/O	Runway	RMT	SEL
10/1/02 7:06	MD80	AAL	D	30	9	99.7
10/1/02 7:09	A320	JBU	D	30	9	89.8
10/1/02 7:11	A320	AWE	D	30	9	88.2
10/1/02 7:17	A320	JBU	D	30	9	94.7
10/1/02 8:02	A320	JBU	D	30	9	90

The first column lists the date and time of the flight. The time used for noise budget calculations is the time that the noise event was recorded at the monitoring site, not the scheduled flight time. Subsequent data includes the aircraft type, airline, departure/arrival/overflight, runway utilized, noise monitor measurement site, and the Sound Exposure Level (SEL), in decibels, as measured at the RMT (remote monitoring terminal).

It is interesting to note that 4 of the 5 aircraft in the above example are Airbus A-320's and there is a substantial range in the measured noise level. There are many factors that contribute to this range, but the most significant is aircraft weight. Aircraft weight is a function of the number of passengers and the distance to the destination. A flight of 2000 miles carries substantially more fuel that a flight of 250 miles.

More importantly, these data show how much louder an MD80 is on departure than the Airbus A320.

Noise Budget Calculations and Analysis

The conversion of the measured SEL at RMT 9 and RMT 10, is done according to the budget definitions and as prescribed in the City's Noise Compatibility Ordinance (LBMC 16.43).

The first step in analyzing the data is to convert the noise measurements made at RMT 9 and RMT 10 to the noise level at the nearest residences to Runway 12/30. For RMT 9 the noise level is increased by 1.1 dB and at RMT 10 the noise level is increased by 0.9 dB to account for the fact that the nearest homes are closer to the runway than the actual monitoring stations.

The next step is to convert the noise level at the nearest home to an equivalent number of daytime flights of the 'standard' aircraft that is built into the budget. This equivalent number of daytime flights is termed "budget units." The 'standard' aircraft noise level is the SEL that 100 daytime flights would have to have to produce a CNEL of 65 dB at the nearest residence.

The resulting numbers of equivalent budget units are then compared to the budget allocations of 70.7 budget units at RMT 9, and 84.6 at RMT 10. The budget allocations were based on the 1989/90 baseline actual noise level and industrial aircraft forecast as prescribed in the federal court approved and federal code-grandfathered Long Beach Airport Noise Compatibility Ordinance (LBMC 16.43).

If you have any questions please do not hesitate to call.

Yours very truly,
Mestre Greve Associates Division of Landrum & Brown

Vincent Mestre, P.E.