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Date: December 11, 2019

To: Thomas B. Modica, Acting City Manager

From: Cynthia Guidry, Long Beach Airport Director

For: Mayor and Members of the City Council

Subject: Long Beach Airport Air Carrier Noise Budget and Flight Slot Allocations

Long Beach Municipal Code (LBMC) Chapter 16.43, Airport Noise Compatibility (Noise Ordinance), requires the Long Beach Airport (Airport) to evaluate noise budgets for each user category to ensure compliance with the applicable budget limit and the City's overall goal of minimizing the number of incompatible land uses located within the 65 decibel (dB) Community Noise Equivalent Level (CNEL). Each year, the Airport is required by the Noise Ordinance to determine the status of the Air Carrier noise budget and whether Air Carrier flights should be added or removed to ensure compliance with the noise budgets. Based on the findings of this year's analysis, staff has determined that three supplemental air carrier flight slots are required to be allocated.

The internal noise review and independent analyses conducted by Mestre Greve Associates, a Division of Landrum & Brown, Inc., and Harris, Miller, Miller and Hanson (HMMH) for Noise Year (NY) October 1, 2018 through September 30, 2019 (NY 18-19), indicate the Airport operated below the Air Carrier noise budget at remote monitoring terminal (RMT) 9 and RMT 10 (Attachments A, B). Remote monitoring locations are physical points around the Airport that use calibrated noise monitors to record aircraft noise events. The Airport maintains a total of 18 RMT units as part of the noise monitoring system, however RMT 9 and RMT 10 are specifically used to measure the Airport's noise budget.

As shown in the table below, allowable budgets for the Air Carrier category at RMT 9 and RMT 10 are 70.7 and 84.6, respectively. The actual budget used by Air Carriers was 47.7 at RMT 9, and 69.8 at RMT 10. This indicates 23.0 budget units were unused at RMT 9 and 14.8 budget units were unused at RMT 10.

**Table: Air Carrier Noise Budget Performance
(October 1, 2018 – September 30, 2019)**

Location	Allowable Budget	Budget Used	Percent Used	Budget Remaining	Percent Remaining
RMT 9	70.7	47.7	67.5	23.0	32.5
RMT 10	84.6	69.8	82.5	14.8	17.5

Air Carrier operations remained steady during the current reporting period NY 18-19. The Airport has allocated 50 Air Carrier flight slots – 48 passenger and 2 cargo. These flight slots are comprised of 41 Permanent Air Carrier flight slots and 9 Supplemental Air Carrier flight slots. As a group, the Air Carriers operated an average of 44.1 flights per day throughout the reporting period.

The Air Carriers were well below their allowable budget for the reporting period at RMT 9 and RMT 10. If the average number of Air Carrier flights per day had been closer to the maximum allowed, the respective noise budgets also would have been closer to the maximum allowed, but still below the budget by a sufficient margin to allow additional flight slots beyond the 50 flight slots currently permitted.

LBMC Section 16.43.060(E) states, "In order to achieve applicable noise budgets, users within the Air Carrier category will be encouraged to operate at the lowest average noise level consistent with safety. This encouragement will be provided by permitting increases in the number of allowed Air Carrier Flights if the Air Carrier user group achieves compliance with the CNEL budget established pursuant to this Chapter, as determined on an annual basis." This Section also specifies that if the Air Carrier operations are above the allowable noise budget, and the overall aircraft noise level exceeds the level allowed by LBMC 16.43.050(A), the Airport Director shall revoke such of the supplemental flight slot awards to achieve compliance with LBMC 16.43.050(A).

Landrum & Brown, Inc., was requested to determine the number of additional flight slots above the minimum 41 flight slots and 9 supplemental flight slots that must be allocated. Based on the analysis provided in the attached technical report, and subsequent peer review conducted by Harris, Miller, Miller and Hanson, Landrum & Brown, Inc., recommended that an additional three Supplemental Air Carrier flight slots be added in order to comply with the requirements set forth in the Noise Ordinance.

Based on the dictates of the Noise Ordinance and the relevant noise analyses, the Airport Director has determined that three supplemental flight slots, consistent with the requirements of LBMC Section 16.43.060(E), are required to be made available to Air Carrier operators for possible allocation and that the allocation of these supplemental slots will not lead the Air Carriers as a group to exceed the noise

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levels established by Section 16.43.030(C). Different from other actions, flight slot determinations for the Airport are not a discretionary action by the City Council. This determination by the Airport Director is required to best ensure the Airport's continued grandfathered status under the Airport Noise and Capacity Act of 1990 (ANCA).

Within 30 days the Airport is required to notify each interested Air Carrier of availability and invite them to submit a written request for the flight slot allocations. Supplemental flight slots will be allocated on a first come, first served basis in accordance with the established Supplemental Flight Slot Waiting List. The Air Carriers currently on the waiting list include the following in order:

- 1) Hawaiian Airlines
- 2) Delta Air Lines
- 3) Southwest Airlines

Flight slots required to be awarded pursuant to Section 16.43.060(E) shall be awarded for a period of one year.

If you have any questions or require additional information, please contact me at (562) 570-2605.

ATTACHMENTS:

A - LANDRUM & BROWN NOISE BUDGET ANALYSIS FOR NOISE YEAR OCTOBER 1, 2018, THROUGH SEPTEMBER 30, 2019, DATED OCTOBER 30, 2019

B - HARRIS, MILLER, MILLER AND HANSON PEER REVIEW OF LANDRUM & BROWN NOISE BUDGET ANALYSIS FOR NOISE YEAR OCTOBER 1, 2018, THROUGH SEPTEMBER 30, 2019, DATED NOVEMBER 11, 2019

CC: CHARLES PARKIN, CITY ATTORNEY
LAURA L. DOUD, CITY AUDITOR
DOUGLAS HAUBERT, CITY PROSECUTOR
REBECCA GUZMAN GARNER, ACTING ASSISTANT CITY MANAGER
KEVIN J. JACKSON, DEPUTY CITY MANAGER
TERESA CHANDLER, INTERIM DEPUTY CITY MANAGER
ANDREW VIALPANDO, ACTING ADMINISTRATIVE DEPUTY TO THE CITY MANAGER



October 30, 2019

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, 2018 to September 30, 2019

Dear Mike,

Landrum & Brown, has completed the analysis of the Air Carrier Noise Budget for Noise Year October 1, 2018 through September 30, 2019 (NY '18-19).

As discussed in more detail below, the data indicate that the air carriers operated below the allowed budget at RMT 9 and RMT 10 for the NY '18-19. The number of flights per day averaged well below the allocated flights. Based on these data, noise budget is available in the Air Carrier category for additional flights.

This conclusion is based on a number of factors including, but not limited to, the requirements of Long Beach Municipal Code (LBMC) Section 16.43.060(E), the number of flight slots currently allocated and used, and the noise budget actually used during the NY '18-19. Table 1 compares the allowed budget with the actual budget used:

Table 1

Air Carrier Noise Budget Status For Noise Year 2018/19

Location	Allowed Budget	Actual Budget Used	Budget Available
RMT 9	70.7	47.7	23.0
RMT 10	84.6	69.8	14.8

As shown in Table 1, the air carriers as a category, used 47.7 of 70.7 budget units available at RMT 9 and 69.8 budget units of 84.6 budget units available at RMT 10. This indicates that 23.0 budget units are available at RMT 9 and 14.8 budget units are available at RMT 10.

The airport averaged 44.1 air carrier flights per day. This is below the permitted number of 50 daily air carrier flights (minimum 41 permanent flights plus 9 supplemental flights).



LBMC Section 16.43.060(E) states, "In order to achieve applicable noise budgets, users within the Air Carrier category will be encouraged to operate at the lowest average noise level consistent with safety. This encouragement will be provided by permitting increases in the number of allowed Air Carrier Flights if the Air Carrier user group achieves compliance with the CNEL budget established pursuant to this Chapter, as determined on an annual basis." This Section also specifies that if the air carrier operations are above the allowable noise budget and the overall aircraft noise level exceeds the level allowed by LBMC 16.43.050(A), the Airport Director shall revoke such of the supplemental flight slot awards to achieve compliance with LBMC 16.43.050(A).

If the airlines' average number of flights per day had been closer to the allocated 50 flights, the budget numbers would have been closer to the budget allowed, but still below the budget by sufficient margin to permit additional flights beyond the 50 currently permitted. An additional 3 flights can be added to flight schedule (total 53 daily flights) provided that the aircraft flown are among the quietest in the current fleet (A320, B737, CRJ9, E75) and flights occur with minimal evening arrivals.

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 air carrier 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 2,000 miles carries substantially more fuel than a flight of 250 miles.

More importantly, these data show how much louder an MD80 is on departure than the Airbus A320. Note that the MD80 is no longer a part of the Long Beach fleet and is included here only as an example.

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,
Landrum & Brown

A handwritten signature in black ink, appearing to read 'Vincent Mestre', is written over a horizontal line.

Vincent Mestre, P.E.

HMMH

300 South Harbor Boulevard
Suite 516
Anaheim, California 92805
www.hmmh.com

Attachment B

November 11, 2019

Mr. Ryan McMullan
Noise & Environmental Affairs Officer
Long Beach Airport
4100 E. Donald Douglas Dr.
Long Beach, California 90808
(562) 570-2673 | www.lgb.org

Subject: Long Beach Airport (LGB) Air Carrier Noise Budget Contribution Audit

Reference: HMMH Project Number 311160



Dear Mr. McMullan:

Per your request, HMMH conducted an audit of the Long Beach Airport (LGB) Air Carrier Noise Budget for Noise Year October 1, 2018 through September 30, 2019 (Noise Year '18-19). The purpose of the audit was to verify the accuracy of the input data, calculation methods and results for the Air Carrier aircraft category. These aircraft are defined by the Airport Noise Compatibility Ordinance (Long Beach Municipal Code (LBMC) Chapter 16.43) as follows¹:

““Air Carrier” means a scheduled carrier, certificated under FAR Parts 121, 125, or 135, operating aircraft having a certificated maximum takeoff weight of seventy-five thousand pounds or more, transporting passengers or cargo.”

HMMH understands that LBMC 16.43 reflects consensus, derived through an extensive litigation history between the City of Long Beach, residents, FAA, and various aviation stakeholders on the nature and extent of aircraft operations and noise occurring at LGB. The Airport Noise Compatibility Ordinance is grandfathered under the Airport Noise and Capacity Act of 1990 (ANCA) and for 30 years, the Ordinance has balanced the development of facilities and the growth of operational capacity with the legitimate environmental concerns of the surrounding communities.

ANCA does not allow grandfathered restrictions to become more restrictive without the restriction being agreed to by the airport proprietor and all aircraft operators or has been submitted to and approved by the Secretary of Transportation after an airport or aircraft operator's request for approval. It is imperative that actions by the Airport or the City of Long Beach, not jeopardize the grandfathered status of the Ordinance.

It is the goal of the City, consistent with State of California requirements and federal guidelines, that incompatible property in the vicinity of the Airport not be exposed to noise levels above 65 dB² in terms of the Community Noise Equivalent Level (CNEL). To achieve this goal, LBMC 16.43 establishes noise budgets for five airport user categories. Initial noise budgets were determined based on actual monitored noise levels for the twelve-month period ending October 31, 1990. These budgets are shown in **Table 1: Runway 12-30 Cumulative Noise Budgets**. I understand the noise budgets shown in **Table 1** have not been modified since inception of the Ordinance and there are currently no plans to modify these allocations.

¹ Long Beach Municipal Code, 16.43.010 Definitions, Section A. Air Carrier.

² Note that all noise levels presented in this document are A-weighted unless otherwise specified.

Table 1: Runway 12-30 Cumulative Noise Budgets

Aircraft User Category	RMT 9	RMT 10
Air Carrier	70.7	84.6
Commuter	0.4	3.6
Industrial	8.5	6.6
Charter	0.14	0.09
General Aviation	23.0	26.0
Total	102.74	120.89

Source: Airport Noise Compatibility Ordinance (Long Beach Municipal Code (LBMC) Chapter 16.43, Technical Appendix.



According to the Airport Noise Compatibility Ordinance, the Airport Director is required to evaluate compliance with the budgets on an annual basis. Air Carriers are permitted to operate not less than fifty (50) flights per day (forty-one (41) flights per day was the minimum number of flights specified when the Ordinance was originally adopted and nine (9) flights have been approved as supplemental). The Ordinance defines a flight as one arrival and one departure by an aircraft. The Ordinance provides an incentive to the airlines to operate as quietly as possible. According to the Ordinance³:

“In order to achieve applicable noise budgets, users within the Air Carrier category will be encouraged to operate at the lowest average noise level consistent with safety. This encouragement will be provided by permitting increases in the number of allowed Air Carrier Flights if the Air Carrier user group achieves compliance with the CNEL budget established pursuant to this Chapter, as determined on an annual basis.”

“Additional flights above those permitted [by the Municipal Code] 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...”

The “level established” by the Ordinance is defined as the Noise Contribution Budget (presented in Table 1), which is enforced based on the measured Single Event Noise Exposure Level (SENEL) at remote monitoring terminals (RMT) 9 and 10 of the LGB aircraft noise monitoring system. Since the Ordinance allows for the increase in flights if they will not exceed the “level established”, not increasing the number of flights, if permitted based on the measured noise levels, would result in the Airport being more restrictive and may jeopardize the grandfathered status of the Ordinance.

Measured SENEL values are used to determine the annual Noise Contribution Budget and CNEL at the nearest noise sensitive properties to the respective terminals. Since neither of the RMTs are located at the nearest noise sensitive properties, an offset or correction factor is applied to the noise levels measured at the RMTs to represent the noise levels at the nearest noise sensitive properties. For RMT 9 the SENEL is increased by 1.1 dB and at RMT 10 the SENEL is increased by 0.9 dB to account for the nearest residential properties being closer to LGB than the noise monitors⁴.

The intent of establishing the noise budget was to allow only the number of flights that would result in producing a CNEL of 65 dB at the nearest residence. CNEL is a cumulative 24-hour noise metric that includes all single event noise levels for an entire day and multiplies the measured level by a factor of 3 for noise events measured during evening hours (7 pm to 10 pm) and a factor of 10 during nighttime hours (10 pm to 7 am). Assuming 100 daytime flights, an SENEL of 94.4 dB for each of those flights will generate a CNEL of 65 dB. Since

³ Long Beach Municipal Code, 16.43.060 Compliance with noise budgets, Section E. Air Carrier Flights.

⁴ Long Beach Airport Terminal Improvements, Appendix F Technical Report: Noise Analysis, October 2005, Mestre Greve Associates.

the number of total flights in the noise budget is slightly higher than 100 flights, using 94.4 dB SENEL for the flights allowed in the noise budget, we calculate that the baseline CNEL or the CNEL for which the Municipal Code budget permits at the nearest residences in proximity to RMTs 9 and 10 are 65.1 dB and 65.8 dB, respectively.

The total Noise Contribution Budget is 102.74 at RMT 9 and 120.89 at RMT 10. The air carrier Noise Contribution Budget⁵ is 70.7 (68.8% of 102.74) at RMT 9 and 84.6 (70.0% of 120.89) at RMT 10. Based on the CNEL budgets allowed at the noise sensitive properties nearest the monitoring locations, the air carrier Noise Contribution Budget equates to 63.5 dB (of the 65.1 dB budget) and 64.3 dB (out of the 65.8 dB budget) in terms of CNEL at RMT 9 and 10, respectively.

Using correlated aircraft noise event data from the LGB Airport Noise and Operations Monitoring System (ANOMS™), which included SENEL measured at RMT 9 and RMT 10 along with the flight operation (e.g., airline, aircraft type, destination/origin airport, and date and time of the noise event), HMMH assessed the existing air carrier Noise Contribution Budget for the annual period of October 1, 2018 through September 30, 2019 as summarized in **Table 2: Calculated Air Carrier Noise Budget Contribution (Noise Year '18-19)**.



Table 2: Calculated Air Carrier Noise Budget Contribution (Noise Year '18-19)		
Category	RMT 9	RMT 10
Total Noise Contribution Budget ¹	102.74	120.89
Air Carrier Noise Contribution Budget ¹	70.7	84.6
Air Carrier Noise Contribution Budget ¹ (%)	68.8%	70.0%
Total CNEL Allowed at Nearest Noise Sensitive Property	65.1 dB	65.8 dB
Air Carrier CNEL Allowed at Nearest Noise Sensitive Property	63.5 dB	64.3 dB
Measured Air Carrier CNEL	61.8dB	63.4 dB
Actual Air Carrier Noise Contribution for year ending September 30, 2019	47.7	68.5
Unused Air Carrier Noise Contribution Budget for year ending September 30, 2015	23.0	16.1
Unused Air Carrier Noise Contribution Budget for year ending September 30, 2015 (%)	67.4%	81.0%
<i>Note: (1) Technical Appendix to Chapter 16.43 Airport Noise Compatibility Municipal Code. Total is equal to the budgets from air carriers, commuters, industrial, charter and general aviation. Percent is air carrier budget divided by total budget.</i>		

Our analysis shows that for the most recent full year of operations ending September 30, 2019, the actual air carrier Noise Contribution levels are far below those allowed in the Noise Contribution Budget of the Municipal Code: 47.7 actual vs. 70.7 budgeted at noise sensitive properties close to RMT 9 and 68.5 actual vs 84.6 budgeted at noise sensitive properties close to RMT 10.

⁵ Technical Appendix to Chapter 16.43 Airport Noise Compatibility Municipal Code, Noise Contribution Values for Proposed Long Beach City Ordinance.

The data from the LGB noise monitoring system consisted of 15,767 aircraft operations as measured at RMT 9 and 15,718 at RMT 10, which equates to an annual average of forty-three (43) daily aircraft operations as compared to the currently available "slots" provided to the air carriers for up to fifty (50) daily operations. In order to protect the grandfathered noise budget at LGB, the Airport is interested in determining the additional number of slots that they can provide to air carriers and remain within the air carrier noise budget as shown in Table 1.

Our analysis assumes the following:

1. Air carriers will operate a similar fleet mix with the additional slots as they currently operate
2. Air carriers will operate the same mix of day, evening and night operations as they do currently

As shown in Table 2, air carrier operations accounted for CNEL of 61.8 dB at RMT 9 and 63.4 dB at RMT 10. Had the number of daily operations increased from forty-three (43) to fifty (50) (along with the preceding assumptions), the resulting measured CNEL at RMT 9 and RMT 10 would have been 62.4 dB and 64.0 dB, respectively. This is 1.1 dB and 0.3 dB, respectively, below the allowable CNEL. To increase the CNEL by 0.3 dB, which is the most conservative value, the allowable slots could increase from the minimum of fifty (50) to fifty-three (53). Therefore, HMMH finds it appropriate to increase the minimum slots from fifty (50) to fifty-three (53) (an increase of 3 supplemental slots) based on the air carrier noise budget contribution as measured in Noise Year '18-19.



Sincerely yours,

Harris Miller Miller & Hanson Inc.

A handwritten signature in blue ink that reads "Justin W. Cook". The signature is written in a cursive, slightly slanted style.

Justin W. Cook - INCE, LEED GA
Principal Consultant

cc: Mr. Eugene M. Reindel, Vice President, Director of Aviation Services

Note: Excel Spreadsheet with Noise Contribution Calculations Provided Separately