APPENDIX U

Sensitivity Analysis to Compare 15-Hour Daytime and 24-Hour Day Sound Levels at Zion National Park

The National Park Service (NPS) and other commenters requested information regarding noise levels occasioned by project-related and cumulative aircraft activity during 15-hour daytime periods. Some 15-hour data and analyses were performed and presented in the Draft Environmental Impact Statement (EIS). To supplement this information, the FAA conducted a sensitivity analysis to compare 15-hour daytime and 24-hour day sound levels at Zion National Park (Zion) for other noise descriptors not evaluated on this basis in the Draft EIS. The analysis was performed using data from the year 2020 because it presents the highest number of operations anticipated within the study area. The 15-hour daytime traffic constitutes approximately 90 to 95 percent of the 24-hour traffic, a relationship that was reflected in the comparative results for several elements of the analysis. Noise effects therefore are more concentrated within the 15-hour daytime period and less concentrated during nighttime hours than the 24-hour averages.

Equivalent Noise Levels

Information in **Table B.38 through Table B.41** of the Draft EIS disclosed the daytime and 24-hour Equivalent Noise Levels (Leq) for Zion, while **Table B.22 and Table B.23** provides similar information for all other 4f/303(c) locations within the initial area of investigation. These data indicate that, on average, 15-hour daytime noise levels will be 1.9 decibels (dB) of Leq greater than the 24-hour Leq level. The range of differences at individual points is 1.8 to 2.0 dB. The actual Leq values approximate 35 dBA.

Number of Operations Above 35 Decibels

The sensitivity analysis showed that 85 to 99 percent of the overflights exceeding 35 dBA[1] at the Zion grid points from the St. George Airport (existing or replacement) occur during the 15-hour period between 7:00 a.m. and 10:00 p.m. No site is exposed to more than 0.7 flights per hour during the 24-day or more than 1.1 flight per hour during the 15-hour daytime period. Cumulative noise exposure patterns are similar, with a range of events proportionately greater, reflecting the greater numbers of operations from non-project airports and en route traffic. **Table A** provides average hourly overflights at Zion grid points for 2020 that exceed 35 dBA.

[1] The Grand Canyon Trust requested Number of Event information above 35 dBA in its comments on the Draft EIS. Consequently that level was selected for this sensitivity analysis.

Table A
AVERAGE HOURLY OVERFLIGHTS AT ZION NATIONAL PARK GRID POINTS

	24-hour Day Period		15-hour Daytime Period	
Case	Hourly Average	Hourly Range	Hourly Average	Hourly Range
Existing Airport	0.1	0 to 0.7	0.1	0 to 1.1
Replacement Airport	0.1	0 to 0.7	0.1	0 to 1.1
Cumulative Addition	5.7	2.7 to 7.2	8.9	4.2 to 10.9

A comparison of hourly average data would not be particularly instructive, because the flow of operations is not constant throughout the data. However, the concentration of most of the 24 hour's worth of data into the 15-hour daytime period results in a higher hourly average during the 15-hour daytime period. This concentration of events in the daytime hours results in less than one percent of the total daily traffic occurring during each nighttime hour. In addition, scheduled operations data are not available for general aviation and much of the fleet that operates at the airport. Enroute flight information would be difficult and expensive to obtain and analyze; radar data would need to be collected and processed on an hourly basis, resulting in an increase in noise modeling time and cost of approximately 23 times those of the current evaluation.

Time Above Natural Ambient

The results for Time Above (in minutes) per 15-hour day and 24-hour day are based on the same flight activity information distributed over different durations. As might be expected, the relationships between 15-hour daytime and 24-hour average day overflights are similarly maintained in the assessment of Time Above Natural Ambient noise levels. Because there is a greater percentage of operations per hour in the 15-hour daytime than over the 24-hour day, hourly Time Above estimates are slightly higher for the 15-hour period. In general, the findings show a range of 0 to 1 minute per hour for the existing and replacement airport only, and from 0 to 34 minutes per hour for the cumulative condition. **Table B** provides information for the year 2020 regarding the times above the natural ambient noise levels at grid points within Zion National Park.

Table B
AVERAGE HOURLY MINUTES ABOVE NATURAL AMBIENT AT ZION NATIONAL PARK GRID POINTS

	24-hour Day Period		15-hour Daytime Period	
Case	Hourly Average	Hourly Range	Hourly Average	Hourly Range
Existing Airport	0.1	0 to 0.7	0.2	0 to 1.1
Replacement Airport	0.2	0.0 to 0.8	0.3	0 to 1.2
Cumulative Addition	9.6	0.1 to 22.1	14.7	0.1 to 33.5

Audibility

The Time Audible results indicate that the replacement airport would generate slightly less time above audible levels than the existing airport, owing largely to the difference between commuter air carrier fleet mix and operations numbers forecast for the two facilities. The audibility computations indicated that for both the existing and replacement airport, cumulative noise would produce levels of audibility in excess of 100 percent during both the 15-hour and 24-hour periods. Consequently, further analysis would yield no additional benefit of meaningful information or improved understanding of potential noise impacts.

The availability of both 24-hour and 15-hour audibility information allows one to infer percent audibility information about the nine-hour nighttime period. At most locations within Zion, the inferred nighttime time audible ranges from 85 to 160 minutes among the grid points in Zion.