

## 1) Economic Impact Questions:

- How were the 0.5 to 0.9 minute of delays estimated?
  - Is that delay being applied to all flight operations or flight operations from 7L?

The delay impact is the average delay for all flights at the Airport due to the shift in runway operations needed to avoid weight penalty impacts of departure overflights of the TED site during East Flow conditions.

The delay impact has been reduced to 0.3 to 0.5 minutes, based on the updated crane structure height of 5 to 15 feet.

The delay impacts were based on One-Engine Inoperative (OEI) aircraft payload impact analysis conducted by the airlines and L&B's capacity/delay assessment. The airlines provided flight range and temperature levels where payload would likely be reduced.

L&B analyzed the PHX operations in 2019 to estimate the departure runway usage change based on the payload reduction. 2019 was chosen for the study since it was the last full year of operations before the global pandemic. The total number of commercial flight operations in 2019 are near their historic peak, and the total number of enplaned passengers were at its historic peak, indicating that the airlines are upgaging their fleet to larger aircraft which are more likely to be impacted by any penetration to the OEI surface. The 2019 schedule was extrapolated based on the 2021 FAA Terminal Area Forecast (TAF) report<sup>1</sup> to estimate future demand levels at the Airport.

The analysis did consider the hours of the day that the Airport typically operates in East Flow vs. West Flow as the capacity impacts are anticipated only in East Flow. The Airport typically operates in East Flow in the morning hours until about 11 AM, then shifting to the West Flow through the evening hours, before shifting back to East Flow around 8 PM. Each of the three time periods were assessed separately, with the impact applied only during the East Flow hours.

Based on feedback from airlines and pilots, we assumed that, during East Flow operations, departures that are impacted would request to use Runway 08 over 07L, reducing arrival capacity on Runway 08. The reduced capacity airport was modeled at various future demand levels using a runway queue model to determine the delay impact compared to an airport without reduced demand.

- Shouldn't potential delay to operations be calculated on a monthly basis instead of annual since the construction crane would come down after 3 months?

The numbers were calculated on an annual basis as developments of this size typically take multiple years to complete even though an individual building may only have a crane up for a shorter period of time. The annual numbers can be

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<sup>1</sup> Preliminary FAA Terminal Area Forecast (TAF) Summary Report for PHX, issued May 2021

divided to determine monthly impacts once a construction schedule for the site has been developed.

- If the construction cranes are 3 months in length per structure with a total of ~10 structures, how can the operational delays be stretch over a 10-year period?

The delays would occur in during the time period that the cranes would be impacting operations. The analysis reviewed various years extending up to 2036. Once information on the exact timing (months/years) of when various cranes would be impacting, more detailed impact assessments can be conducted for each year of construction.

- What are the major variables from a delay that lead to an economic impact to an air carrier (\$15-32 MM) and to the regional economy (\$576 MM)?

The air carrier impacts have been reduced to \$13-22 MM and include direct aircraft block costs based on information provided by airlines to the Department of Transportation (Form 41) including fuel, crew, maintenance, and aircraft ownership. The regional economic impacts have been reduced to \$148-264 MM and includes direct and indirect annual visitor spending, annual passenger spending at the Airport, annual airline spending, and airport passenger facility charges.

- Can we get a copy of the L&B analysis and report?

Information is being provided.

Also, FYI. The IDEA Campus next door to the site can have construction cranes up through 2032 per their development agreement. Their Phase I construction crane exceeded OEI by 5-15 feet, and they have at least 4 buildings / construction cranes left to put up. If you are spreading 10 buildings over 10 years for TED (we' re not sure how that can possible given a 3-month duration per crane), then 4 of those years will already be impacted by the IDEA Campus. TED wouldn't adversely impact during those years.

Further analysis is underway.

## 2) More Detailed Questions:

1- What are the current hourly acceptance rates for all arrivals for East flow runway 8? Are there any delays associated with this number currently? What time of day are the delays the highest/lowest?

Questions 1-4 are answered as a group below.

2- What are the current hourly acceptance rates for all arrivals for West flow runways 25L and 25R? Are there any delays associated with this number currently? What time of day are the delays the highest/lowest?

Questions 1-4 are answered as a group below.

3- What are the current hourly departure rates for all departures for East flow runways 7L and 7R? Are there any delays associated with this number currently? What time of day are the delays the highest/lowest?

Questions 1-4 are answered as a group below.

4- What are the current hourly departure rates for all departures for West flow runway 26? Are there any delays associated with this number currently? What time of day are the delays the highest/lowest?

The FAA hourly acceptance rates for PHX are listed below. The FAA provides the rates by flow without breaking down the throughput for each runway.

FAA Runway Rates <sup>2</sup>	Airport Arrival Rate (AAR)	Airport Departure Rate (ADR)
<b>East Flow</b> Runways 07L, 07R, 08	72	60
<b>West Flow</b> Runways 25L, 25R, 26	76	60

The FAA also provides delay statistics for PHX. However, those figures include sources of delay not related to the project at hand. Since the construction cranes will only impact delay associated with runway capacity, the L&B analysis used a runway queue model that isolates the runway delay. Based on an assessment of the flight schedule of an average weekday in March, the peak month in 2019<sup>3</sup>, the runway delay and peaks were estimated and are listed in the table below. The model divides East and West Flow into distinct periods of the day, with the peak delay limited to that flow’s operating hours.

The lowest delay is not listed since the runway delay is low for most of the day, when outside of the periods of high demand.

Runway Delay	Arrival		Departure	
	Daily Average Delay	Peak Delay	Daily Average Delay	Peak Delay
<b>East Flow</b> before 11 AM, after 8 PM	0.5 minutes	2 minutes 9 AM	1.5 minutes	7 minutes 9 AM
<b>West Flow</b> 11 AM – 8PM		3 minutes 6 PM		2 minutes 7 PM

As a reference, the FAA Aviation System Performance Metrics (ASPM) delay figures for PHX in 2019 are shown in the table below. The average arrival gate delay comprises of all delay experienced from the origin airport to gate arrival at PHX, including enroute delay, ground taxi delay and subtracting early departures from the origin airport. The average departure taxi delay comprises of all delay encountered by the aircraft from gate pushback until it reaches the runway, including apron congestion and destination airport ground stop delay.

<sup>2</sup> FAA Operational Information System (OIS) data

<sup>3</sup> FAA Aviation System Performance Metrics (ASPM) Individual Flights Flight Data Report and FAA Air Traffic Activity System (ATADS) data

The ASPM figures for Each Flow cover the entire day instead of having distinct East Flow and West Flow hours. Although the Airport usual operate in West Flow from the late morning to early evening, East Flow operations does happen occasionally during this period. Vice versa for West Flow operations during typical East Flow hours. Therefore, the ASPM delay for a particular flow includes delay observed at any time of day when the Airport was in that flow in 2019, while L&B’s assessed delay is limited to that flow’s typical operating hours.

The daily average, highest, and lowest delays for each flow is shown. Overnight hours are excluded from the lowest delay hours. Note that the departure taxi delay is likely lower in the West Flow than the East Flow since the departure taxi distance is shorter in the West Flow, as the terminals are located much closer to the Runway 25R and 26 departure ends.

FAA ASPM Delay	Average Arrival Gate Delay			Average Departure Taxi Delay		
	Daily Average Delay	Highest Delay	Lowest Delay	Daily Average Delay	Highest Delay	Lowest Delay
<b>East Flow</b> any hour of day when Airport is in East Flow	7 minutes	12 minutes 6-7 PM	5 minutes 7-8 AM	6.5 minutes	9 minutes 9 AM	5 minutes 2 PM
<b>West Flow</b> any hour of day when Airport is in West Flow	8 minutes	10 minutes 6 PM and 10 PM	5 minutes 7-8 AM	4 minutes	7 minutes 9 AM	3 minutes 2-5 PM

L&B’s capacity/delay assessment was conducted using the targeted analysis focused on the runway delay, which is the only source of delay relevant to the TED the development. Other sources of delay covered by the FAA data were excluded from the assessment.

5- What are the Temperature cutoffs that affect these rates? 90? 100? 115?

The AAR and ADR are not affected by temperature. In 2019, when temperature was above 90F, the Airport was able to have an arrival rate in the high 50’s/low 60’s and a departure rate in the mid 50’s. This is a reflection on demand, since only about 50-60 arrivals or departures were scheduled in those hours.

6- Do particular airlines utilize Rwy 8 for departures now? Is this Airline driven as in, they are closer to this runway so less taxi, or is this more route (distance) driven, non-stop long distance routes, aircraft type driven?

In 2019, all the major airlines utilize Runway 08 for some departures. American and Delta used Runway 08 for about 10% of their departures when operating in East Flow. Southwest and United usage were negligible.

7- Do you know if the OEI penetration effects all aircraft departing, or only the long haul, non-stop, or high temp flights, or certain aircraft?

## L&B Responses to Questions Regarding the TED Crane Capacity & Delay Analysis

The impact is primarily on flights longer than 1,750 statute miles during periods of higher temperatures. For example, a CRJ700 to Oklahoma City or an A320 to Seattle are not impacted at any of the temperature examined, while an A321 to Washington DC reaches payload limits around 91F.

8- You state that 13,000 flights could be reduced annually, would this number be influenced by the higher temperature days, vs lower temperature days? What would the temperature need to hit to start causing the cancelations of flights?

The annual flight reduction is now between 3,300 and 5,900 annual operations OR an increase in delay of 0.3 to 0.5 minutes per operation. The reduction in annual operations is a potential airline response to the increased average which can also be an airline response to operational impacts that increase delays. The range is reflective of the lower to higher temperature ranges.