



MEMORANDUM

April 23, 2009

To: Bill Dolan - Snohomish County Airport
Ryk Dunkelberg, Mark McFarland - Barnard Dunkelberg

From: Joel Hirsh

Re: Estimates of Traffic Impacts and Terminal Capacity - Revised Final

As requested, Hirsh Associates (HA) has evaluated the forecast schedules and passengers provided by Horizon and Allegiant for new service to Paine Field (PAE). HA has developed automobile traffic estimates based on this and other assumptions, as well as estimates of terminal capacity which may be used in the environmental assessment for the airport.

Airline forecasts and data for 1, 3 and 5 year planning periods were based on the following letters to William Dolan:

Horizon Air - March 16, 2009
Allegiant Airlines - March 9, 2009 and follow up phone calls

HA also spoke with the Airport's traffic consultant, Edward Koltonowski, on April 9 to discuss assumptions and impacts for the vehicular traffic analysis.

Table 1 (attached) summarizes the airline data, assumptions made by HA, and calculations of the various forecasts.

A. Airline-Furnished Forecasts

Horizon has forecast initial service at 6 departures per day, increasing to 10 per day after 5 years. All flights would use 76 seats Q400 aircraft which is the main aircraft in Horizon's fleet. On an average basis, Horizon is forecasting a local boarding load factor of 61-63%. This is less than Horizon's typical 2006-2008 system-wide load factor of approximately 73-74%.

Allegiant provided forecasts on a weekly basis beginning at 2 departures/week, increasing to 10 weekly departures after five years. All flights would use 150 seat aircraft, although Allegiant does have some smaller aircraft. On an average basis, Allegiant is forecasting a load factor of 90% in all years. Allegiant's system-wide load factor has grown from 81% in 2006 to almost 90% in 2008.

On an annual basis, Horizon's average daily boardings were multiplied by 350 days. This takes into account adjustments for flight cancellations and typically reduced schedules on weekends. Allegiant's weekly boardings were assumed to have a full 52 week's activity. This results in an annual enplanement forecast of 112,000 in Year 1 growing to 238,200 by Year 5.

B. Peak Hour Forecasts

Terminal facilities are typically sized for a peak hour of an average day during the peak month (design hour). The peak hour reflects a rolling 60 minute period and may not correspond to a clock hour (i.e. 7:00-7:59). This design hour may be modified to reflect a weekday (in the case of a predominantly business market) or a specific day of the week (in the case of a seasonal leisure destination). Where there is no existing service (or a major change in service is anticipated), the design hour should reflect the anticipated air service at realistic maximum load factors. For PAE, it is likely that both airlines would have flights during the peak hour, and the terminal has been sized for this assumption. Although the airlines have projected average boarding load factors in the range of 61-90%, during a peak hour it is reasonable to assume a 90% load factor for both carriers given industry trends.

The peak hour is based on the gate/terminal capacity and it is anticipated that no additional gates would be provided within the 5 year planning period. Thus the peak hour would be unchanged at 205 enplaned or deplaned passengers.

C. Likely Peak Hour Traffic Impacts

It is understood that peak hour traffic estimates are needed for the environmental analysis.

As noted above, the peak hour activity at PAE would likely consist of one arrival and departure by each airline. Ground time for these airlines is typically 40-50 minutes, so the gates would “turn” within an hour. Exact schedules are not known at this time (and would also likely change many times over the forecast period), but it is reasonable to assume that while the flights would occur within an hour, they would not be simultaneous departures or arrivals.

Departing (enplaning) domestic passengers typically arrive at the terminal following a distribution which ranges from as early as 2 hours to as little as 30 minutes before scheduled time of departure (STD). Leisure passengers with checked baggage tend to arrive earlier, while business passengers with no checked baggage tend to arrive closer to STD. For the purpose of estimating maximum traffic impacts, it is reasonable to assume that all passengers arrive at the terminal within a 60 minute period, and that passengers from both flights would arrive during that same 60 minute period.

Arriving (deplaning) passengers will leave the terminal as soon as they can claim their bags, arrange for ground transportation, and/or pay for parking. This will typically occur within 30-40 minutes of arrival time. Thus, it is also reasonable to assume that both flights’ passengers would leave the terminal within a 60 minute period.

Peak hour passengers are typically converted to vehicle trips based on average vehicle occupancies (passengers/car). At an airport like PAE with adequate parking, it is anticipated that passengers would either park at the airport (originating passengers) or use a rental car (destination passengers). Thus, each traveling party would generate one vehicle trip when departing and one when arriving. Very few passengers would be expected to be picked up or dropped off by others which would generate two trips per traveling party.

Alliant estimates that the vehicle occupancy would initially be 2.0 passengers/car, increasing to 2.4. This is based on their internal data on traveling party size for different markets which are anticipated to be served from PAE. Horizon estimated an occupancy ratio of 2.5, but HA believes this is high given the primarily business markets anticipated to be served. A more conservative occupancy ratio

of 1.5 passengers/car is recommended to be used for traffic analysis. This results in estimated peak hour directional trips of 114 in Year 2, decreasing to 102 directional trips in Years 3 and 5. The reason for the decrease in trip generation is due to the increased vehicle occupancy ratio for Allegiant.

The enplaning and deplaning ground traffic would occur in separate hours, but possibly as sequential time periods. It is not known at this time, at what time of day these peaks would occur, and thus the direct impact on existing traffic volumes.

After discussions with the Airport's traffic consultant, it was determined that the likely traffic pattern in a peak hour would be for passengers of both airlines' flights to be either arriving or departing and thus generate the maximum peak number of trips either to or from the airport (102 in Years 3 and 5). When Horizon is operating 10 departures/day by Year 5, it is also likely that passengers from a previous or following flight would also be leaving or entering the terminal during that same peak hour (46 trips). Thus, the combined peak hour traffic would be 148 trips.

D. Typical Daily Traffic Impacts

It is also understood that daily traffic volumes are needed. For PAE, an "average day" must consider both Horizon flights which are scheduled on a daily basis and days when Allegiant operates.

For Horizon, the airline's estimate of average daily originating passengers provides a reasonable basis for typical day directional traffic. This was divided by the 1.5 passenger/car ratio used for peak hour traffic estimates.

For Allegiant, in Year 1 there would only be activity on 2 days per week. In Year 3, the 6 weekly trips would also not likely result in more than 1 flight per day. In Year 5, the 10 weekly trips would mean that most days would have a second flight. In each of the planning years, the airline's estimate of average originating passengers per flight in each year was used and divided by the 2.0-2.4 passenger/car ratio to estimate daily directional trips.

This results in 255 to 433 directional vehicle trips for a typical day in Years 1 and 5 respectively. Total traffic generation (passengers only) are estimated at 510 to 866 daily vehicle trips.

E. Terminal Capacity Estimates

As noted in Section B, terminal facilities are sized to accommodate a design hour level of activity. Most people, however, want to know the "capacity" of a terminal, typically in terms of annual passengers. The conversion from design hour volumes to annual passengers requires a number of assumptions including the number of times gates are used during an average day; and load factors (annual and/or peak hour).

Two approaches are outlined in Table 1.

Maximum Capacity -

This is based on the capacity of the terminal's gates and a range of departures per gate. For PAE, the gates have a design capacity of one 75 seat regional aircraft plus one 150 seat mainline aircraft for a total of 225 seats. A typical spoke (non-hubbing) airport will average 4-6 departures per gate per day. So PAE could have a daily capacity of 900-1,350 departing seats per day if both gates were used for the largest aircraft they are sized for.

A high average daily load factor would be for PAE to generate originating passengers at the airlines' system-wide load factors. An average of Horizon and Allegiant's system load factors is approximately 81%. Thus, a load factor range of 80-85% would be very generous. No airport operates at the same level of activity every day of the year. As noted in Section A, 350 day "year" is typically used to account for cancelled flights and reduced weekend schedules. This results in a capacity of approximately 720-1,150 daily enplanements, and an annual capacity range of 252,000 to 401,600 enplanements.

Daily directional trips would be based on an average of the Horizon and Allegiant long term vehicle occupancy factors since equal operations are assumed. This would result in approximately 370-590 daily directional trips based on an average occupancy of 2.0 passengers/car. Total traffic generation (passengers only) are estimated at 740 to 1,180 daily vehicle trips.

Realistic Capacity -

A more realistic capacity considers the mix of aircraft which might actually serve the airport. For PAE, a combination of 10 daily regional departures and 2 mainline departures would be realistic giving a total of 6 departures per gate, and reflecting the proposed airlines' anticipated service. This results in 1,050 daily departing seats.

For an average load factor, a weighted average of the system-wide load factors was used for the 12 departures. This is approximately 76%. As before, a range using this as a base (75-80%) would provide a generous estimate of approximately 790-840 daily enplanements. Applying the 350 day annualization factor results in an annual capacity of 275,000-294,000 enplanements.

Daily directional trips would be based on a weighted average of the Horizon and Allegiant long term vehicle occupancy factors since most operations are assumed to be by Horizon. This would result in approximately 480-510 daily directional trips based on an average occupancy of 1.7 passengers/car. Total traffic generation (passengers only) are estimated at 950 to 1,020 daily vehicle trips.

**Snohomish County Airport, Paine Field
Estimates of Terminal Capacity and Expected Passenger Activity**

Table 1

Final

A. Airline Furnished Forecasts:	Year 1	Year 3	Year 5
Horizon			
Daily Departures	6	8	10
Average Originating Passengers (daily)	280	380	480
Aircraft size (seats)	76	76	76
Average Boarding Load Factor	61%	63%	63%
Allegiant			
Weekly Departures	2	6	10
Average Originating Passengers (weekly)	270	810	1,350
Aircraft size (seats)	150	150	150
Average Boarding Load Factor	90%	90%	90%
Combined Forecasts:			
Horizon			
Assume 350 days (based on some reduction in weekend service)	98,000	133,000	168,000
Allegiant			
Assume full 52 week schedule	14,000	42,100	70,200
Airport Total Annual Enplanements:	112,000	175,100	238,200
B. Peak Hour Forecasts:			
Year 1			
Year 3			
Year 5			
Peak hour includes 1 arrival and 1 departure by each airline			
Horizon - seats	76	76	76
Allegiant - seats	150	150	150
Total seats	226	226	226
Peak Hr Boarding Load Factor	90%	90%	90%
Peak Hour Enplaning Passengers	205	205	205
Peak Hour Deplaning Passengers	205	205	205

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Final

Table 1

C. Likely Peak Hour Traffic Impacts	Year 1	Year 3	Year 5
Assumes -			
Each aircraft turns within an hour			
All enplaning passengers arrive at the terminal within an hour before departure (compressed arrival time distribution)			
All deplaning passengers depart the terminal within an hour after arrival			
Enplaning and deplaning traffic occur in separate hours			
Estimated average vehicle occupancies (passengers/car)			
Horizon	1.5	1.5	1.5
Allegiant	2.0	2.4	2.4
Estimated peak hour 1-way trips			
Horizon	46	46	46
Allegiant	68	56	56
Total	114	102	102 1-way trips
Estimated peak hour total trips			
Maximum in one direction (both airlines)	114	102	102
Maximum in opposite direction (Horizon only)	46	46	46
Combined peak hour trips	160	148	148 trips
D. Typical Daily Traffic Impacts			
Assumes -			
Horizon daily forecast @ avg originating loads	280	380	480 enplaned
= daily trips	187	253	320 1-way trips
Allegiant: 1/day years 1 & 3; 2/day year 5			
@ avg originating loads	135	135	270 enplaned
= daily trips	68	56	113 1-way trips
Total average daily 1-way trips	255	309	433 1-way trips
Total average daily total trips	510	618	866 total trips

**Snohomish County Airport, Paine Field
Estimates of Terminal Capacity and Expected Passenger Activity**

Final **Table 1**

<u>E. Terminal Capacity Estimates</u>	<u>Low</u>	<u>High</u>
Maximum Capacity (directional) -		
Peak Hour capacity based on gates:		
1 @ 75 seats + 1 @ 150 seats	225 seats	
4-6 departures/gate/day	900	1,350 daily departing seats
Average daily load factor 80-85% (high range)	720	1,148 daily enplanements
350 day year - range	252,000	401,600 annual enplanements
Average daily trips:		
Weighted average passengers/car	2.0	
Average daily 1-way trips	369	588 1-way trips
Average daily total trips	738	1,176 total trips
Realistic Capacity (directional) -		
Daily departures by regional aircraft (75 seats)	10	
Daily departures by mainline aircraft (150 seats)	2	
= daily departing seats	1,050	daily departing seats
Average daily load factor 75-80% (high range)	788	840 daily enplanements
350 day year - range	275,600	294,000 annual enplanements
Average daily trips:		
Weighted average passengers/car	1.7	
Average daily 1-way trips	477	509 1-way trips
Average daily total trips	954	1,018 total trips