Appendix F

Capacity Analysis Technical Report

John Wayne Airport
Settlement Agreement Amendment
Environmental Impact Report

Capacity Analysis
Technical Report

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SECTION 1
INTRODUCTION

OBJECTIVE

The Aviation Analysis Technical Report presented forecasts of aviation activity at John Wayne Airport for the John Wayne Airport Settlement Agreement Amendment. This included projections of hourly and annual aircraft operations for the Proposed Project and four Alternatives.

This Capacity Analysis Technical Report presents an airfield capacity analysis of the Airport in order to determine if the levels of activity that were forecast for the Proposed Project, Alternatives A, B and C, and the No Project Alternative can be accommodated by the existing facilities. In addition to an assessment of airfield (runway) capacity, this report also assesses the capacity of other airport facilities, namely terminal gates, Remain Over Night "RON" apron, and Federal Inspection Service "FIS" facilities used for the processing of international passengers.

GENERAL APPROACH

This report assesses the following airport elements in terms of capacity.

- **Airfield (Runway) Capacity.** Hourly runway capacity has been estimated using a methodology contained in FAA Advisory Circular 150/5060-5, Airport Capacity and Delay. The estimates of hourly runway capacity were then compared to the hourly projections of aircraft operations for each operational scenario contemplated by the Proposed Project and four Alternatives to approximate if runway capacity issues can be expected. This assessment is presented in Section 2.
- **Gate Capacity.** The capacity of the existing gates was assessed by reviewing existing ramp charts that depict the use of the passenger terminal gates throughout the day. The gates were also evaluated in terms of their utilization, which is measured by the number of annual enplanements per gate and the number of departures per gate. Based on review of this data, it was possible to identify if potential gate issues might result under any of the operational scenarios contemplated by the Proposed Project and four Alternatives. This assessment is presented in Section 3
- **Commercial Fuel Capacity.** The ability of existing fuel system and the fuel system after two large tanks are constructed (currently under design and environmental review) to accommodate the passenger levels of the Proposed Project and four alternatives were analyzed. This assessment is presented in Section 4.
- **Terminal Capacity for International Passengers.** An airport requires certain facilities (Immigrations, Customs) in order to accommodate international passengers. A review of the existing FIS facilities was performed to identify if the projected number of international passengers for any of the operational scenarios contemplated by the Proposed Project and four Alternatives exceeded the existing capacity. This assessment is presented in Section 5.
- **Potential New Aircraft Types.** There are new aircraft types that are in production and new aircraft types that are in development stages. A review of potential new aircraft types was performed in order to determine whether these aircraft could be accommodated by the Airport, since these new aircraft types likely will provide higher seating capacity, increased fuel efficiencies, and lower emissions. This assessment is presented in Section 6.
- **Potential Unconstrained Passenger Demand.** Potential unconstrained passenger demand at the airport was assessed by reviewing forecasts of other regulatory agencies with expertise in

assessing aviation demand, including the Federal Aviation Administration (FAA) and the Southern California Association of Governments (SCAG) with the passenger levels contemplated by the Proposed Project and four Alternatives. This assessment is presented in Section 7.

SECTION 2
AIRFIELD CAPACITY ANALYSIS

INTRODUCTION

As part of the evaluation of the Proposed Project and Alternatives, each operational scenario was analyzed with respect to its ability to accommodate projected operations in the year 2030. This required the identification of the capacity of the existing airfield (runways), which is the subject of this report section. The airfield capacity analysis described herein conforms to the methodologies set out in FAA Advisory Circular 150/5060-5, Airport Capacity and Delay. This involves calculation of the hourly runway capacity during the average day of the peak month (ADPM) of commercial passengers as defined in Section 4 of the Aviation Analysis Technical Report. Base year data for the year 2013, as published in the Quarterly Noise Report for the Airport for the period ending September 30, 2013, was used for identifying aircraft mix and operational characteristics of the runways.

EXISTING AIRFIELD FACILITIES

The Aviation Analysis Technical Report included a brief description of the existing airfield facilities, a portion of which is excerpted herein.

The existing runway system consists of parallel runways oriented in a northeast-southwest configuration. The primary runway, Runway 1L-19R, is 5,701 feet long and 150 feet wide. Runway 19R is equipped for precision instrument approaches and Runway 1L is equipped for non-precision instrument approaches.

The shorter runway, Runway 1R-19L, is 2,887 feet long and 75 feet wide, and is limited to operations by small general aviation aircraft (aircraft less than 12,500 pounds). The runway is lit for night-time operations. The runway is not equipped for instrument approach procedures and there are no published instrument approach procedures for the runway.

The centerlines of the runways are separated by 500 feet. This separation does not allow for operation of simultaneous arrivals and departures. The FAA requires a minimum separation of 700 feet between parallel runways in order to conduct simultaneous operations under Visual Flight Rule “VFR” conditions.

DEFINITION OF TERMS

The major terms used in analyzing airport capacity and discussed in this section are defined below:

Aircraft Mix - is the relative percentage of operations conducted by each of four classes of aircraft according to size (A, B, C and D). Table 2-1 identifies the physical characteristics of the four aircraft size classifications and their relationship to terms used in wake turbulence standards. It should be noted that since the FAA Air Traffic Control Handbook (FAA Order 7110.65) applies wake turbulence procedures to aircraft operating behind heavy jets and B757s, the B757 is considered a heavy aircraft for capacity planning purposes although its maximum certificated takeoff weight is less than 300,000 pounds.

Capacity - (throughput capacity) is a measure of the maximum number of aircraft operations (takeoffs and landings) which can be accommodated on the airport or airport component in an hour. Since the capacity of an airport component is independent of the capacity of other components, it can be calculated separately. This analysis deals with the runway component.

Mix Index - is a mathematical expression. It is the percent of Class C aircraft plus three times the percent of Class D aircraft, and is written % (C+3D).

Table 2-1
AIRCRAFT CLASSIFICATIONS

Aircraft Class	Max. Cert. T.O. Weight (lbs.)	Number of Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small (S)
B	12,500 or less	Multi	Small (S)
C	12,500 – 300,000	Multi	Large (L)
D	Over 300,000	Multi	Heavy (H)/B757

Source: FAA Advisory Circular 150/5060-5, Airport Capacity and Delay.

Percent Arrivals (PA) - is the ratio of arrivals to total operations and is computed as follows:

$$PA = \frac{A + 1/2\,(T\&G)}{A + DA + (T\&G)} \times 100 \text{ where:}$$

A = number of arriving aircraft in the hour
DA = number of departing aircraft in the hour
T&G = number of touch and go's in the hour

Percent Touch and Go's (T&G) - is the ratio of landings with an immediate take-off to total operations and is computed as follows:

$$T\&G = \frac{(T\&G)}{A+DA+(T\&G)} \times 100 \text{ where:}$$

A = number of arriving aircraft in the hour
DA = number of departing aircraft in the hour
T&G = number of touch and go's in the hour

Touch-and-go operations are normally associated with training. The number of these operations usually decreases as the number of air carrier operations increase, as demand approaches runway capacity, or as weather conditions deteriorate. At John Wayne, there is a significant percentage of touch-and-go activity (27 percent of total aircraft operations).

Having established the definitions of terms used in the capacity analysis, the following subsections deal with the calculation of hourly runway capacities. Hourly capacity was calculated for VFR and IFR conditions.

ASSUMPTIONS AND INPUTS FOR RUNWAY CAPACITY ANALYSIS

There were four major assumptions and inputs applied in the runway capacity analysis. These were the runway configuration (layout), weather conditions (VFR or IFR), mix index, and percent touch-and-go operations.

Runway Configuration. Since the separation between the parallel runways is less than 700 feet and does not permit simultaneous arrivals and departures under Visual Flight Rules (VFR or periods of good visibility), for the purpose of this capacity analysis, the runways are considered to function as a single runway. This is a conservative assumption in that the short parallel runway offers operational benefits for smaller aircraft that enhances capacity under VFR conditions. During periods of Instrument Flight Rules “IFR” which can generally be defined as periods of bad weather and/or low visibility, operations at the Airport are basically limited to the main runway on which the airlines operate. Therefore, during IFR the runways are also considered to function as a single runway.

Mix Index. Data for determining mix index was based on year 2013 information published in the Quarterly Noise Report for the period ending September 30, 2013. Based on this data, the average daily use of both JWA runways (representing operations during VFR) operations can generally be described as follows:

- Aircraft with maximum certificated takeoff weights of 12,500 pounds or less account for approximately 62.2 percent of operations. These are categorized as aircraft classes A+B as listed in Table 2-1.

- Aircraft with maximum certificated takeoff weights of 300,000 pounds or more and B757 account for approximately 1.5 percent of operations. These are categorized as aircraft class D.

- Aircraft operating on the runways between 12,500 and 300,000 pounds (excluding the B757) account 36.3 percent of all operations on the runways. These are categorized as aircraft class C as shown in Table 2-1.

Using the definition of mix index shown above, the mix index for VFR conditions is derived as follows:

$$\text{Mix index}_{(VFR)} = \%\ (C+3D)$$
$$\text{Mix index}_{(VFR)} = \%\ (36.3+3(1.5))$$
$$\text{Mix index}_{(VFR)} = 40.8\text{, say } 41$$

During IFR conditions, aircraft operations are primarily performed by the airlines and business aircraft (business jets and turboprops) and GA activity by smaller piston aircraft is less. Since airline aircraft and business aircraft are, for the most part aircraft class C as defined by the FAA Advisory Circular, the mix index for IFR capacity calculations is greater than the VFR mix index shown above (i.e., 41).

Based on the year 2013 data, the average daily use of the main runway (representing operations during IFR) operations can generally be described as follows:

- Aircraft with maximum certificated takeoff weights of 12,500 pounds or less account for approximately 5 percent of operations. These are categorized as aircraft classes A+B as listed in Table 2-1.

- Aircraft with maximum certificated takeoff weights of 300,000 pounds or more and B757 account for approximately 3.2 percent of operations. These are categorized as aircraft class D.

- Aircraft operating on the runways between 12,500 and 300,000 pounds (excluding the B757) account 93.9 percent of all operations on the runways. These are categorized as aircraft class C as shown in Table 2-1.

Calculating the mix index as was done above; the mix index for IFR conditions is estimated as follows:

$$\text{Mix index}_{(IFR)} = \%\ (C+3D)$$
$$\text{Mix index}_{(IFR)} = \%\ (93.9+3(3.2))$$
$$\text{Mix index}_{(IFR)} = 103.5\text{, say } 104$$

A VFR mix index of 41 and IFR mix index of 104 were used as input to identify hourly runway capacities.

Percent Touch-and-Go Operations. Touch-and-go operations are factored into VFR capacity calculations since they will be performed during VFR conditions. Based on base year data for 2013, touch-and-go operations accounted for approximately 27 percent of total operations.

RUNWAY HOURLY CAPACITY

Runway hourly capacity was calculated for VFR and IFR conditions. The hourly capacity estimates were derived in accordance with instructions and capacity curves set forth in Chapter 3 of FAA Advisory Circular “AC” 150/5060-5. The basic steps followed were:

1. From Figure 3-1 of the Advisory Circular, the appropriate graphs for determining VFR and IFR hourly capacity are identified. These were Figures 3-3 and 3-43 of the Advisory Circular, respectively.
2. Apply the applicable Mix Index % (C+3D). (Based on weather condition.)
3. Identify Percent Arrivals – 40, 50, and 60 percent.
4. Identify hourly based capacities from Figure 3-3 and Figure 3-43 of AC 150/5060-5.
5. Determine appropriate exit factors from Figures 3-3 and 3-43 of AC 150/5060-5.
6. Calculate VFR and IFR Capacity.

Capacity Calculations

The hourly capacity is calculated by the formula:

Hourly Capacity = Hourly Capacity Base * Touch & Go factor (T) * Exit factor (E)

Table 2-2 presents the hourly capacity during VFR and IFR conditions for various periods of arrival activity.

Table 2-2
ESTIMATED RUNWAY CAPACITY

Weather Condition	Percent Arrivals	Hourly Capacity Base	Touch & Go Factor (T)	Exit Factor (E)	Hourly Capacity
VFR	40	68	1.20	0.86	70
VFR	50	66	1.20	0.84	66
VFR	60	63	1.20	0.81	61
IFR	40	53	1.00	0.89	47
IFR	50	53	1.00	0.86	45
IFR	60	49	1.00	0.91	44

Source: AECOM analysis, January 2014.

As seen, during VFR, the hourly capacity ranges from 61 to 70 operations depending on the level of arrivals, and it is also seen that capacity is higher when the level of arrivals is lower. During IFR conditions, the hourly capacity ranges from 44 to 47 operations depending on the level of arrivals.

The next section of this chapter compares the hourly demand for the Proposed Project and four Alternatives with the hourly capacity in order to assess if the projected demand for the operational scenarios is constrained by runway capacity. For the purpose of the runway capacity evaluation, an average condition, where the number of arrivals equals the number departures (50 percent arrivals), will be assumed. These are hourly capacities of 66 operations for VFR conditions, and 45 operations for IFR conditions.

HOURLY RUNWAY DEMAND VERSUS CAPACITY

Hourly runway demand versus capacity is graphically depicted for the Proposed Project, three Alternatives, and the No Project Alternative in Figures 2-1 through 2-5, respectively. The horizontal dashed line (green for VFR and red for IFR) represents the hourly runway capacity, and the vertical bars represent the demand, by hour. Demand for both air carrier and general aviation operations are depicted.

It is noted, that on average, a small amount of general aviation operations may occur during nighttime hours as allowed under Orange County Codified Ordinance Section 2-1-30.1 et. seq.

Figure 2-1 presents a comparison of hourly demand (aircraft operations) and runway capacity for the Proposed Project during VFR and IFR conditions. As seen, the runway capacity is sufficient and capable of accommodating the projected demand during each phase of the operational scenarios of the proposed Settlement Agreement Amendment.

Figures 2-2, 2-3 and 2-5 present similar comparisons of hourly demand and capacity for Alternatives A and B, and the No Project Alternative, respectively. There is adequate runway capacity to serve the projected demand under the operational scenarios in each of these alternatives.

Figure 2-4 presents the capacity assessment of Alternative C. As can be seen, the VFR hourly capacity is exceeded in the first two phases of Alternative C. The projected number of operations in Phase 1 of Alternative C exceeds capacity by 7 operations in the 14:00 hour, and the projected operations in Phase 2 exceed capacity by 3 operations in the 11:00 and 14:00 hours. Hourly demand in Phase 3 peaks at 66 operations in the 14:00 hour and does not exceed the estimated VFR capacity. While overall hourly demand exceeds capacity in the hours noted, it is important to note that air carrier operations alone do not exceed capacity. It is the combination of air carrier and general aviation operations that exceed capacity. Therefore, it is reasonable to assume that if these conditions of airfield congestion existed for the peak hours of Alternative C, that general aviation operations would move to non-peak times when there would be less traffic and delays at the Airport.

It should be noted that IFR capacity is not exceeded in any phase of the Proposed Project, three Alternatives, or the No Project Alternative.

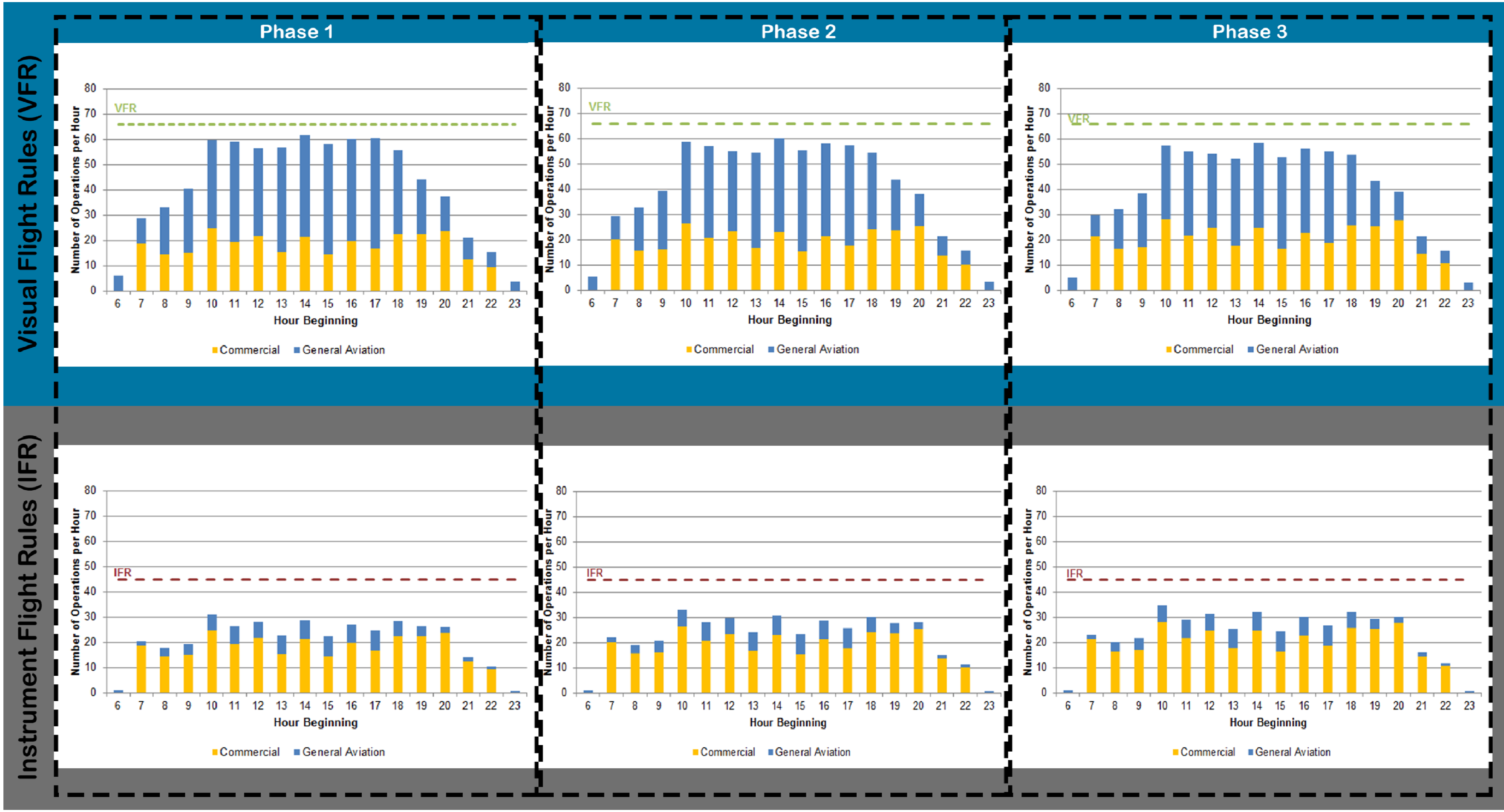

Figure 2-1
Hourly Demand versus Capacity - Proposed Project

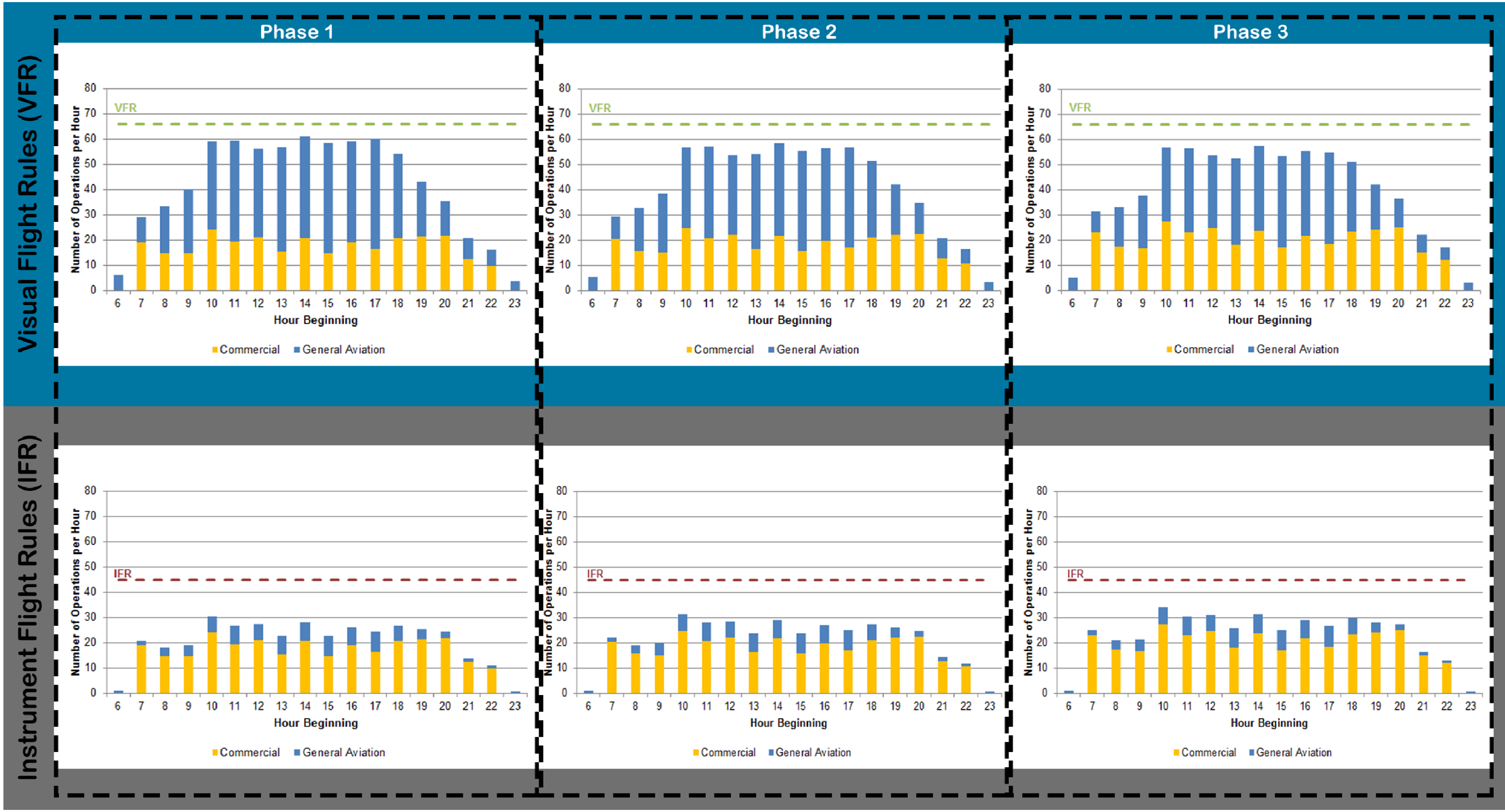

Figure 2-2
Hourly Demand versus Capacity - Alternative A

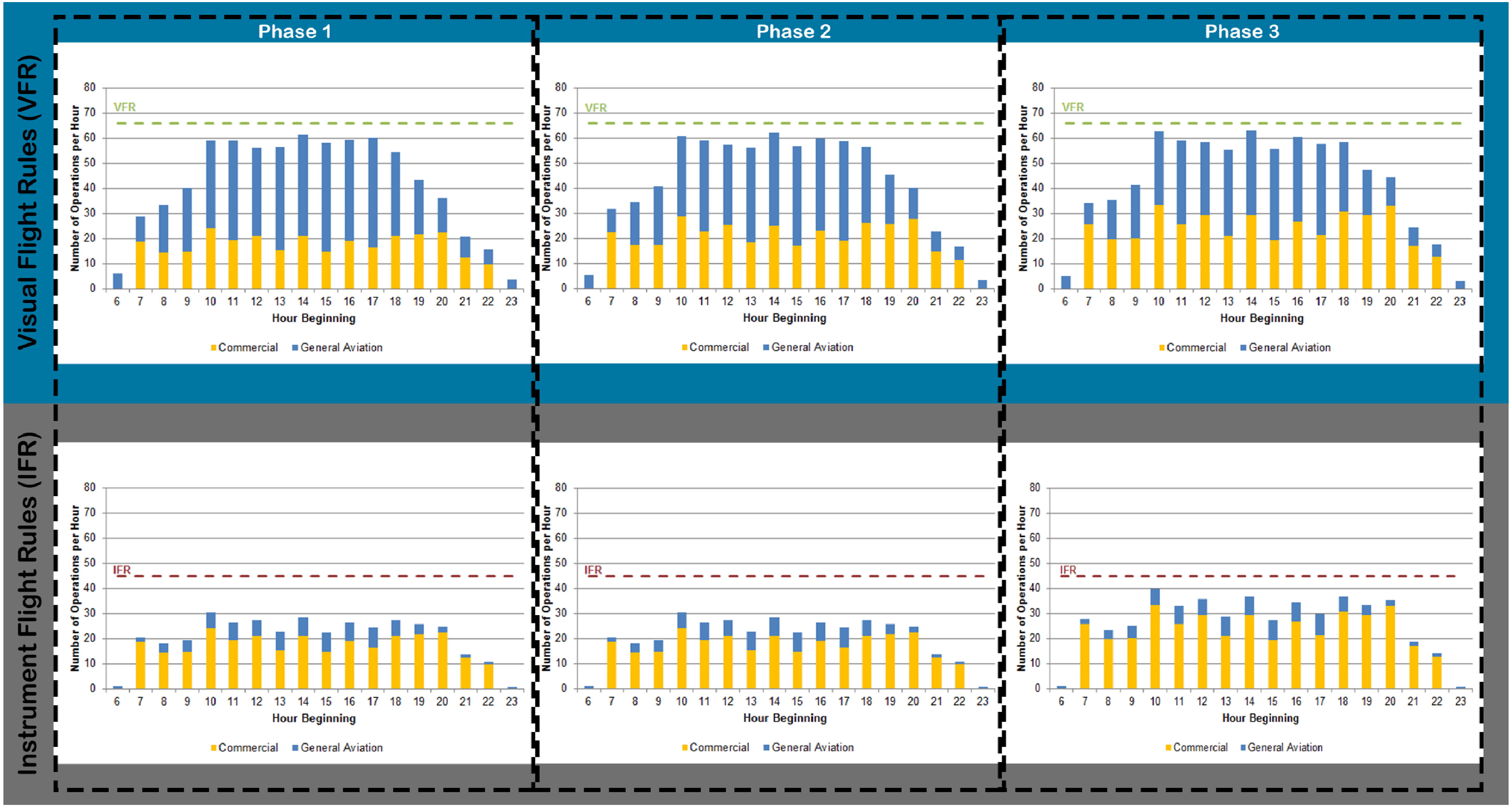

Figure 2-3
Hourly Demand versus Capacity - Alternative B

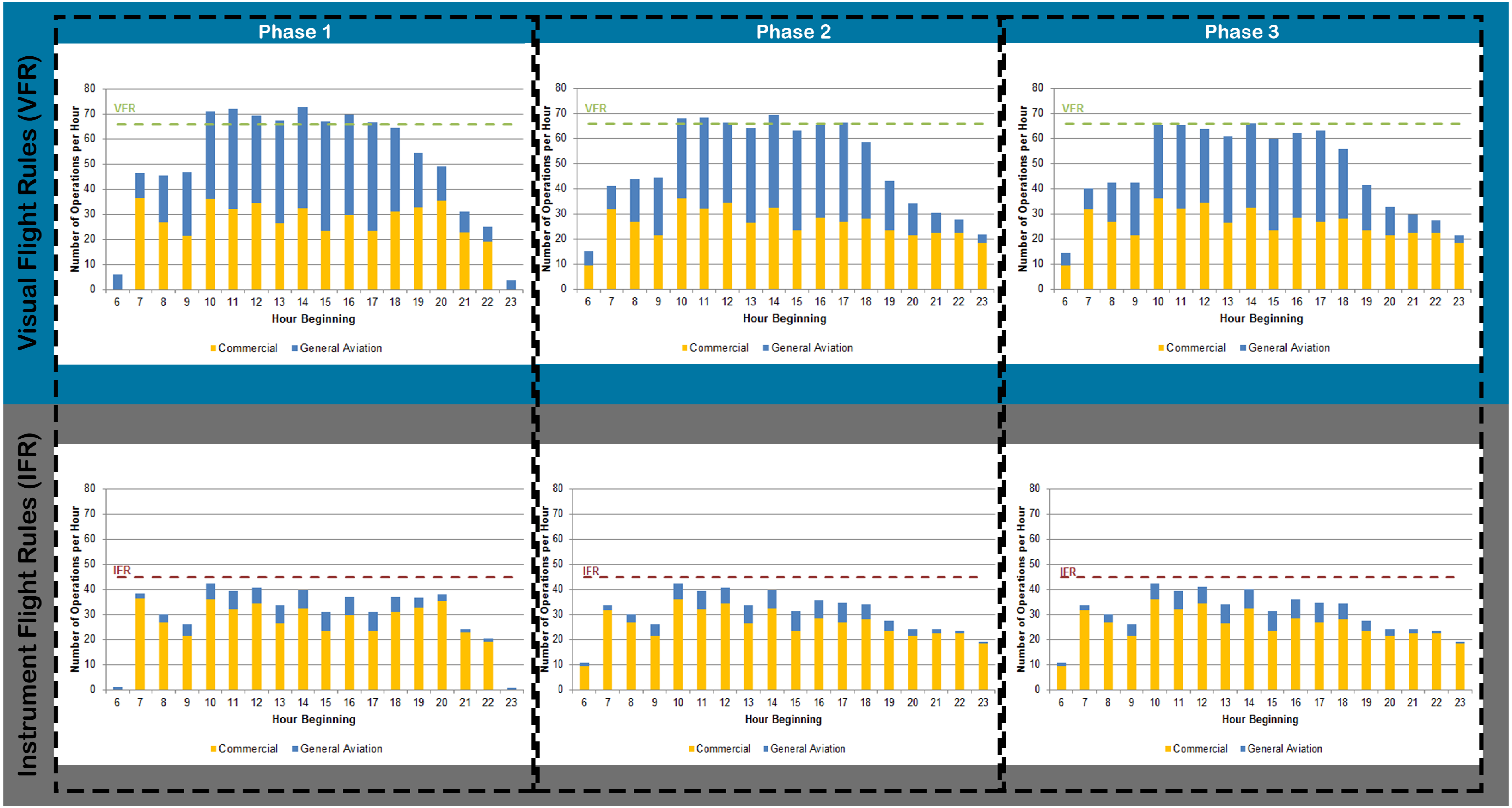

Figure 2-4
Hourly Demand versus Capacity - Alternative C

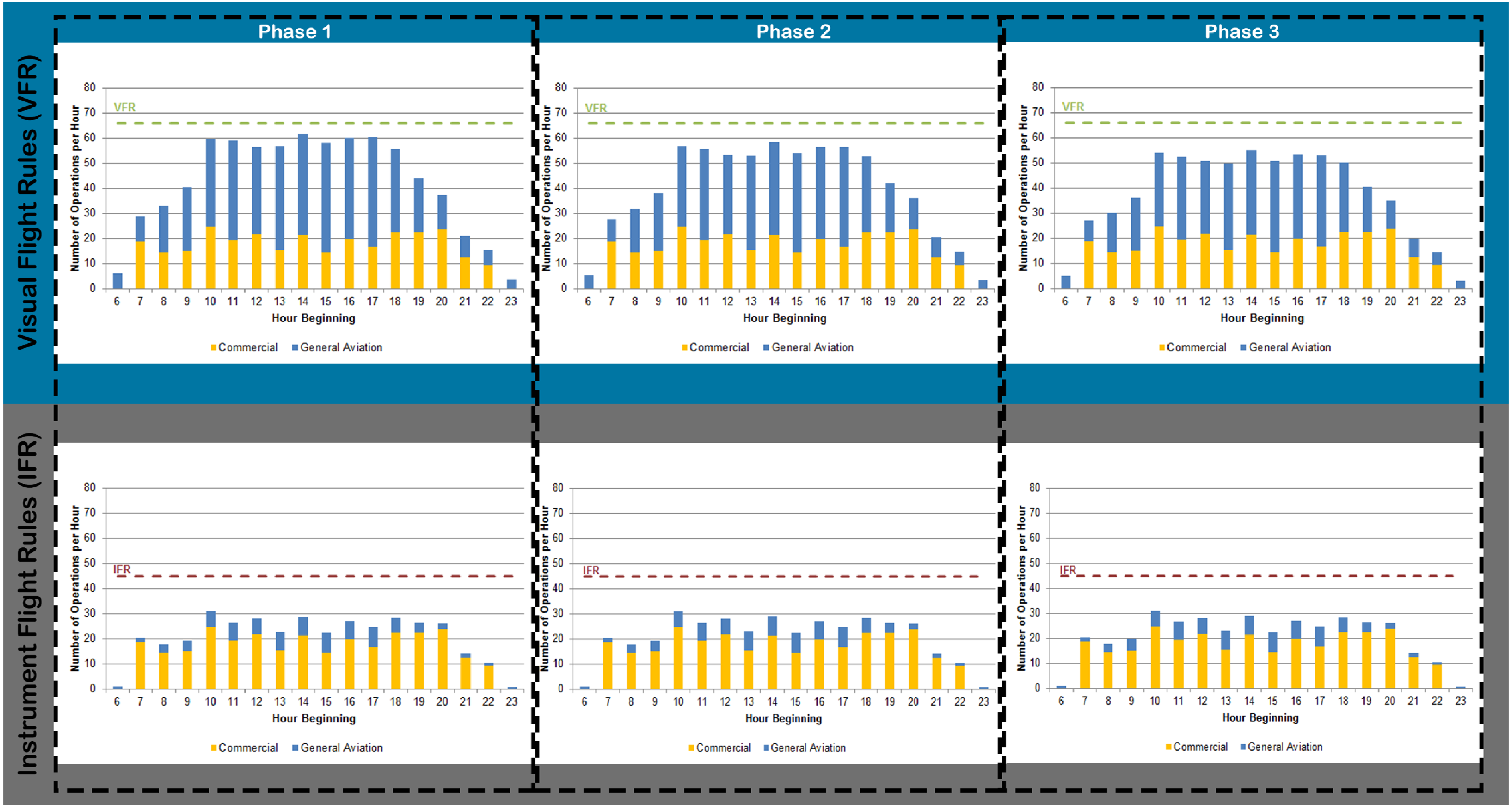

Figure 2-5
Hourly Demand versus Capacity -
No Project Alternative

REMAIN OVERNIGHT CAPACITY

Presently there are ten remain overnight “RON” spaces on the south RON apron and three in the north RON area. South RON spaces are independent of commuter terminal parking. The north RON area is shared with the north commuter terminal, thus if three commuter aircraft are parked at the commuter terminal only one narrow-body RON space is available for a total of eleven spaces. Aircraft will also remain overnight at gates with passenger loading bridges. A total of 20 gates with passenger loading bridges are available. Presently, commuter terminals are underutilized, as are the RON spaces.

Observations in October 2013 indicated a total of 26 aircraft remaining overnight: twenty at gates with passenger loading bridges and three on each RON apron. During the peak passenger month, one additional aircraft is parked on the south apron.

A total of 37 aircraft can remain overnight (20 at gates with passenger loading bridges, 6 at the commuter ground loading gates, 10 on the south RON, and one on the north RON). Parking on the north RON apron can be configured to accommodate additional air carrier aircraft, at the expense of displacing commuter aircraft at Gate 1C. In this configuration, a total of 38 aircraft can remain overnight parked as follows: 20 at gates with passenger loading bridges, 5 at the commuter ground loading gates, 10 on the south RON, and 3 on the north RON. The north RON space adjacent to the north commuter terminal is dependent upon a commuter aircraft vacating Gate 1B before it can be moved.

Due to space constraints of the south RON, dependencies also exist on the apron. These dependencies are with respect to the RON aircraft, not the aircraft parked at the south commuter terminal building. Four RON aircraft are dependent upon movement of other RON aircraft before they can be moved.

For the purpose of this analysis, it is assumed that the departures in the 7:00 a.m. and 8:00 a.m. hours represent the total number of aircraft stored overnight. The exception to this is Alternative C, Phases 2 and 3, in which the curfew is removed. For Phases 2 and 3 of Alternative C, it is assumed that departures in the 6:00 a.m. and 7:00 a.m. hours represent the total number of aircraft stored overnight. It is further assumed that the north RON spaces are maximized for air carrier aircraft (e.g. three air carrier RON spaces and one commuter aircraft each at Gates 1A and 1B). Table 2-3 presents the available RON capacity and requirements for the Proposed Project, three Alternatives, and the No Project Alternative.

During the morning peak, gates with passenger loading bridges are “reloaded” with aircraft from the RON. This refers to moving an aircraft parked on the RON to an open gate with a passenger loading bridge. The RON aircraft is towed by an aircraft tug from the RON parking position to an open gate with a passenger loading bridge, or in other words, the aircraft is not under its own power (using its engines) for this operation.

RON requirements for the Proposed Project (Phase 3) are similar to existing conditions and will not place an undue burden on gates with passenger loading bridges or reloading of the same gates from the RON. Alternatives A and B require 3 to 4 additional RON spaces compared to existing conditions. These additional RONs will likely be located on the south RON where aircraft being towed to gates with passenger loading bridges would likely involve “head-to-head” operations with the main departure taxi flow on Taxiway A. Alternative C RON requirements for all phases exceed capacity. Alternative C would also represent the most operational issues with respect to the reloading of passenger loading bridge gates as all south RON spaces would be filled (greater chance of “head-to-head” operations). The situation is assumed to be similar to what was experienced at the Airport prior to the completion of Terminal C. Phase 1 of Alternative C has a very high RON requirement in comparison to Phases 2 and 3 because the daily schedule is more compressed.

Table 2-3
REMAIN OVERNIGHT "RON" AIRCRAFT PARKING REQUIREMENTS [a]

Type of RON Space	Existing	Proposed Project	Alternative A	Alternative B	Alternative C	No Project
Phase 1						
Commuter						
Available	5	5	5	5	5	5
Required	0	0	0	0	0	0
Shortage	0	0	0	0	0	0
Air Carrier						
Available	33	33	33	33	33	33
Required	27	23	24	23	48	23
Shortage	0	0	0	0	15	0
Phase 2						
Commuter						
Available	5	5	5	5	5	5
Required	0	0	0	0	0	0
Shortage	0	0	0	0	0	0
Air Carrier						
Available	33	33	33	33	33	33
Required	27	24	26	27	37	23
Shortage	0	0	0	0	4	0
Phase 3						
Commuter						
Available	5	5	5	5	5	5
Required	0	0	0	0	0	0
Shortage	0	0	0	0	0	0
Air Carrier						
Available	33	33	33	33	33	33
Required	27	26	30	31	37	23
Shortage	0	0	0	0	4	0

[a] Source: AECOM analysis, 2013.

RON requirements for the No Project Alternative are similar to existing conditions. While MAP levels increase, the peak morning departures, which drives the RON requirements, would be unchanged; additional flights and passengers would be added throughout the day.

SECTION 3
GATE CAPACITY AND UTILIZATION

INTRODUCTION

Similar to the assessment of runway capacity, it is also necessary to evaluate the Proposed Project and four Alternatives in terms of the capacity of available gates (ground loading and passenger loading) at the terminal building. The purpose of this analysis is to determine if gate capacity is exceeded by the Proposed Project, Alternatives A, B and C, or No Project Alternative.

There presently are 20 air carrier gates with passenger loading bridges and 6 commuter gates where ground loading occurs. While the No Project Alternative retains the current limit of 20 passenger loading bridges, the Proposed Project, and Alternatives A and B remove the passenger loading bridge limit on January 1, 2021. Additionally, there is no passenger loading bridge limit included in Alternative C. That being said, the Proposed Project, Alternatives A, B and C, and No Project Alternative do not contemplate a change in the number of passenger loading bridges or the number of commuter gates. Additional gates and passenger loading bridges would be subject to further CEQA and NEPA review.

This analysis assumes a similar mix of airlines as presently operating at the Airport today. This is a key assumption as gate utilizations vary widely by airline and could have a dramatic impact on an airport's capacity. The present mix of airlines serving John Wayne Airport represents a balance between airlines with very efficient ground operations and those with longer aircraft servicing times per flight. Thus, the present mix of airline operations represents a suitable average for gate capacity analysis.

In this technical report, the term "gate" generally refers to aircraft parking positions for the active loading and unloading of passengers. At John Wayne Airport, there are two distinct gate types: those with passenger loading bridges and those without. Gates without passenger loading bridges are referred to as ground loading.

SCHEDULE BASED ANALYSIS

The methodology of this analysis involved a graphic review of current ramp charts (schedules) provided by John Wayne Airport during a week of the peak month (August) in 2013 (see Appendix A for ramp charts). These ramp charts provide a visual indication of gate occupancies (how long an aircraft is parked at a gate). Using this graphic approach and comparing the ramp chart with future schedules projected in the Aviation Forecasts Technical Report, it is possible to identify if potential gate shortages would occur. Table 3-1 documents the results of this analysis. From this analysis it was determined that commuter flights at John Wayne Airport are on the ground for an average of 45 minutes, domestic air carrier flights (utilizing 18 gates) an average of 60 minutes, and international air carrier flights (utilizing 2 gates) an average of 90 minutes.

Key findings of the evaluation are summarized below:

- Commuter gates (ground loading gates) are sufficient to accommodate demand in the Proposed Project, three Alternatives (Alternative C does not forecast any commuter operations), and the No Project Alternative.

- The existing number of gates – with passenger loading bridges – is sufficient for the Proposed Project, Alternative A, and the No Project Alternative.

- The final phase (Phase 3) of Alternative B presents some gate (with passenger loading bridge) capacity issues.

- Alternative C presents more significant gate (with passenger loading bridge) capacity issues.

Table 3-1
GATE SCHEDULE ANALYSIS RESULTS
JOHN WAYNE AIRPORT [a]

Type of Service	Proposed Project	Alternative A	Alternative B	Alternative C	No Project
Commuter (Ground Loading)	Sufficient gates available.	Sufficient gates available.	Sufficient gates available.	No commuter operations.	Sufficient gates available.
Air Carrier (Passenger Loading Bridge)	Sufficient gates available.	Sufficient gates available.	Gate shortages in Phase 3; operations in the 11:00 and 20:00 hours exceed gate availability by 2 and 7 gates, respectively.	Gate shortages in Phase 1 in the 10:00 through 12:00, 14:00, and 18:00 through 20:00 hours. Gate availability is exceeded by as little as 2 (18:00) and as much as 11 (11:00). Gate shortages in Phases 2 and 3 from 10:00 through 12:00 and 14:00. Gate availability is exceeded by as little as 2 (18:00) and as much as 11 (11:00).	Sufficient gates available.

[a] Source: AECOM analysis, December 2013.

TURNS PER GATE

Similar to a schedule based analysis, a review of turns per gate determines the number of turns, or departures per day, per gate. Prior to the opening of Terminal C, John Wayne Airport consistently experienced a high number of turns per gate (Table 3-2). The peak number of daily departures per gate (turns) coincides with the peak year experienced in 2007; at 9.1 turns per gate with passenger loading bridge. For the purpose of this analysis, the 2007 level of activity is used as the maximum number of turns per gate with passenger loading bridge.

As seen in Table 3-3, Alternative C, at 11.2 turns per gate with passenger loading bridge, requires a higher number of turns than historically has occurred at John Wayne Airport. It is projected for Phase 3 of Alternative B that 9.2 turns per gate with passenger loading bridge are required, slightly exceeding the 2007 peak of 9.1. The Proposed Project, Alternative A, and No Project Alternative do not exceed the 9.1 turns per gate with passenger loading bridge historical peak, and based on this measure of gate capacity it is concluded that the number of gates with passenger loading bridges is adequate for these scenarios.

Table 3-2
HISTORICAL TURNS PER GATE WITH PASSENGER LOADING BRIDGE
JOHN WAYNE AIRPORT [a]

Year	Air Carrier Operations [b]	Departures	No. of Gates [c]	Daily Departures/ Gate
1991	64,891	32,446	14	6.3
1992	61,936	30,968	14	6.1
1993	66,192	33,096	14	6.5
1994	70,155	35,078	14	6.9
1995	77,428	38,714	14	7.6
1996	82,107	41,054	14	8.0
1997	81,004	40,502	14	7.9
1998	78,980	39,490	14	7.7
1999	84,234	42,117	14	8.2
2000	85,200	42,600	14	8.3
2001	84,766	42,383	14	8.3
2002	84,597	42,299	14	8.3
2003	84,961	42,481	14	8.3
2004	90,163	45,082	14	8.8
2005	88,088	44,044	14	8.6
2006	89,039	44,520	14	8.7
2007	92,601	46,301	14	9.1
2008	86,999	43,500	14	8.5
2009	90,673	45,337	14	8.9
2010	84,815	42,408	14	8.3
2011	82,425	41,213	14 [d]	8.1
2012	83,528	41,764	20 [e]	5.7
2013	86,000	43,000	20[e]	5.9

[a] Source: AECOM analysis, December 2013.
[b] Source: John Wayne Airport.
[c] Gates with passenger loading bridges.
[d] Terminal C added 6 gates and was opened November 2011.
[e] Only two gates are available for international use; 18 gates are for domestic use. However, if available, (e.g. schedule permitting) the international gates can be used by domestic flights. If passengers require screening at John Wayne Airport, the reverse is not true.

Table 3-3
PROJECTED TURNS PER GATE
JOHN WAYNE AIRPORT [a]

	Existing	Proposed Project	Alternative A	Alternative B	Alternative C	No Project
Phase 1						
Air Carrier Operations	86,000	95,000	92,000	93,000	164,000	95,000
Departures	43,000	47,500	46,000	46,500	82,000	47,500
Gates with passenger loading bridges	20	20	20	20	20	20
Daily Departures/Gate	5.9	6.5	6.3	6.4	**11.2**	6.5
Phase 2						
Air Carrier Operations	86,000	104,000	96,000	114,000	164,000	95,000
Departures	43,000	52,000	48,000	57,000	82,000	47,500
Gates with passenger loading bridges	20	20	20	20	20	20
Daily Departures/Gate	5.9	7.1	6.6	7.8	**11.2**	6.5
Phase 3						
Air Carrier Operations	86,000	111,000	109,000	134,000	164,000	95,000
Departures	43,000	55,500	54,500	67,000	82,000	47,500
Gates with passenger loading bridges	20	20	20	20	20	20
Daily Departures/Gate	5.9	7.6	7.5	**9.2**	**11.2**	6.5

[a] Source: AECOM analysis, December 2013.

PASSENGER THROUGHPUTS

An alternative method of defining gate capacity is in measuring throughputs of passengers at gates, specifically the number of enplanements per gate. Enplanement throughputs can be affected by a number of variables such as airlines, ticketing methods, and terminal configuration.

Table 3-4 presents a history of annual passengers, enplanements, and enplanements per gate with passenger loading bridge at John Wayne Airport. Since 2003, John Wayne Airport has averaged 294,514 enplanements per gate with passenger loading bridge, with a peak reached in 2007 where 340,427 enplanements per gate with passenger loading bridge were processed. Since Terminal C was completed, the number of enplanements per gate with passenger loading bridge has decreased to an average of 248,664 enplanements per gate with loading bridge. The reason for the decrease in throughputs is a result of additional gates (six passenger loading bridges) added as part of the Terminal C project.

Table 3-4
HISTORICAL ENPLANEMENTS PER GATE
JOHN WAYNE AIRPORT [a]

Year	Passengers [b]	Enplanements	No. of Gates [c]	Enplanements/ Gate [c]
2003	8,081,356	4,039,948	14	288,568
2004	8,754,885	4,379,455	14	312,818
2005	9,106,877	4,556,790	14	325,485
2006	9,113,904	4,560,199	14	325,729
2007	9,547,682	4,765,984	14	340,427
2008	8,605,049	4,296,105	14	306,865
2009	8,269,624	4,113,361	14	293,812
2010	8,444,307	4,199,495	14	299,964
2011*	8,423,039	4,194,822	14	299,630
2012	8,705,625	4,343,208	20	217,160
2013	9,168,000	4,584,000	20	229,200

* Terminal C added 6 gates and was opened November 2011.
[a] Source: AECOM analysis, December 2013.
[b] Source: John Wayne Airport.
[c] Gate with passenger loading bridges.

For the purpose of this analysis, it is assumed that when enplanements per gate reach 90 percent of the historical peak throughput per gate with passenger loading bridge (or approximately 306,000), terminal levels of service are impacted. Table 3-5 provides the results of this analysis. As seen in the table, gate throughputs are exceeded in Phase 3 of Alternative A, Phases 2 and 3 of Alternative B, and all phases of Alternative C.

Table 3-5
PROJECTED ENPLANEMENTS PER GATE WITH PASSENGER LOADING BRIDGE (ADJUSTED FOR COMMUTERS)
JOHN WAYNE AIRPORT [A]

	Existing	Proposed Project	Alternative A	Alternative B	Alternative C	No Project
Phase 1						
Passengers [b]	9,168,000	10,300,000	10,300,000	10,300,000	16,900,000	10,300,000
Enplanements	4,584,000	5,150,000	5,150,000	5,150,000	8,450,000	5,150,000
Gates*	20	20	20	20	20 [c]	20
Enplanements/ Gate*	229,200	257,500	257,500	257,500	**422,500**	257,500
Phase 2						
Passengers [b]	9,168,000	11,300,000	10,900,000	12,500,000	16,900,000	10,300,000
Enplanements	4,584,000	5,650,000	5,450,000	6,250,000	8,450,000	5,150,000
Gates*	20	20	20	20	20 [c]	20
Enplanements/ Gate*	229,200	282,500	272,500	**312,500**	**422,500**	257,500
Phase 3						
Passengers [b]	9,168,000	12,000,000	12,300,000	14,500,000	16,900,000	10,300,000
Enplanements	4,584,000	6,000,000	6,150,000	7,250,000	8,450,000	5,150,000
Gates*	20	20	20	20	20 [c]	20
Enplanements/ Gate*	229,200	300,000	**307,500**	**362,500**	**422,500**	257,500

* with passenger loading bridge.
[a] Source: AECOM analysis, December 2013.
[b] Passenger numbers of the Proposed Project, Alternative A, Alternative B, and the No Project alternative are reduced by 500,000; the number of commuter passengers forecasted. Forecasts for Alternative C do not include commuter passengers.
[c] There is no limit to the number of loading bridges for Alternative C; however, additional loading bridges are not proposed under this alternative.

GATE CAPACITY AND UTILIZATION CONCLUSIONS

Results from the methods used to analyze gate capacity and utilization were complimentary. The analysis shows that gate capacity is constrained in Phase 3 of Alternative B and all phases of Alternative C (Figure 3-1).

The analysis presented above considers existing gate conditions; namely, 20 passenger loading bridge gates and 6 ground loaded gates (used for commuters). As previously stated, neither the Proposed Project, three Alternatives, nor the No Project Alternative includes increasing the number of passenger loading bridge or ground loading gates. Any increases in the number of gates (with or without passenger loading bridges) would be subject to further CEQA and NEPA review.

Phase	Proposed Project	Alternative A	Alternative B	Alternative C	No Project
Phase 1	✓	✓	✓	⚠	✓
Phase 2	✓	✓	⚠	⚠	✓
Phase 3	✓	⚠	⚠	⚠	✓

Legend:

No Gate Issues Present ✓

Gate Issues Present ⚠

Figure 3-1
Gate Capacity and Utilization Results

SECTION 4
COMMERCIAL FUEL CAPACITY AT JOHN WAYNE AIRPORT

INTRODUCTION

An important consideration at a commercial service airport is the ability to supply Jet-A fuel throughout the day. Fuel delivery systems at airports can vary greatly in size and complexity. Fuel shipment to the airport can be via truck, rail and/or pipeline delivery. Once the fuel is at the airport, it is typically stored in large, above ground tanks, comprising a fuel farm. The fuel farm also contains a variety of pumps and filters to clean the fuel, transfer fuel from one tank to another, and dispense the fuel. Fuel is dispensed to the aircraft either by trucks or through a hydrant fueling system, with fuel pits located on the apron that connect directly to aircraft via hoses at the gates.

In all fuel systems there is a portion of the fuel that is unusable and referred to as “dead fuel.” This is fuel that is at the bottom of tanks and not able to be pumped out through normal system operation, along with fuel that resides in pipes, pumps, and filters. The dead fuel represents a static and unchanging amount and therefore is not included in the analysis presented below.

This section presents an assessment of the capacity of the existing fuel system of John Wayne Airport. It contains a description of the existing fuel system and translates its capacity into a volume of annual passengers that it supports.

EXISTING CONDITIONS

The existing fuel farm at JWA is comprised of three storage tanks (designated as Tanks 1, 2, and 3 for clarity in this discussion), each with approximately 187,000 gallons capacity or a total capacity of approximately 560,000 gallons. JWA is presently modifying the existing tanks. These modifications will increase fuel storage capacity from 187,000 gallons per tank to 254,000 gallons and a total capacity of approximately 762,000 gallons.

Fuel is delivered to the airport on a nightly basis in 8,000-gallon tanker trucks from nearby refineries to JWA. JWA has 4 truck unloading positions, which can unload trucks simultaneously to the fuel farm facility. In 2013, an average of 28 trucks of fuel was delivered to the airport on a nightly basis. The maximum capability of the existing system is for 32 truck deliveries during the night time hours (between 23:30 and 5:30[1]).

Once fuel is transferred from the truck to the fuel farm the fuel is “settled”. The settling process allows dirt and other contaminants to settle to the bottom of the tank so as not to be fueled into aircraft. A settlement period of 1 hour for every foot of fuel is recommended. This settlement period is recommended not only after offloading from truck deliveries but any time fuel is transferred from one tank to another. Each tanker truck represents approximately ½-foot of fuel in the existing storage tanks.

During any given day, only one tank of fuel is available for use as the supply for commercial aircraft refueling (designated Tank 1 for the purpose of this discussion). Tank 2 is used to store fuel that is settling and will be ready for aircraft refueling the following day. Tank 3 is a “flex” tank, used to transfer fuel and hold fuel that does not pass quality inspection. Therefore, the total daily working capacity of the

[1] Source: SNAFuel, February 2014.

present fuel system is 187,000 gallons (existing) to 254,000 gallons (with tank modifications). In the typical operation of the fuel farm, a tank is not refilled until it is emptied, nor would a tank be partially filled.

Additional improvements are proposed to the fuel farm. These improvements are currently undergoing separate environmental review and include construction of two 1.5 million gallon capacity tanks (exclusive of dead fuel) and connection of these large tanks (designated Tank A and B for the purpose of this discussion) with an underground pipe to a larger pipeline distribution system. The intent of this project is to reduce/remove the need to truck fuel from the refinery to the airport. Tanks A and B will be connected directly to the smaller tanks (Tanks 1 through 3). Fuel cannot be distributed directly from the large tanks to the hydrant fueling system in place; it must first be transferred into one of the smaller tanks and allowed to settle.

For the purpose of this analysis, it is assumed only one large tank will be available for useable fuel. The second tank would be used as a flex tank; transferring fuel and storing fuel that does not pass quality inspections.

A unique operational constraint of the pipeline connection is that JWA would only be able to receive weekly fuel deliveries.

In total, after the two large tanks and pipeline are constructed, and connected to the rest of the fuel farm, two of the smaller tanks would then be available for daily use, increasing the daily working capacity to between 374,000 gallons and 508,000 gallons (existing capacity and with tank modifications, respectively).

FUEL CAPACITY WITH THE EXISTING SYSTEM

As described above, the daily working capacity of the fuel system (assuming tank modifications are completed) is 254,000 gallons. Annual MAP levels supported by this capacity can be estimated by dividing the daily working capacity by the fuel per passenger ratio of 7.4[2] and multiplying by 365.

Daily working capacity of fuel system = 254,000 gallons
Fuel dispensed per passenger = 7.4 gallons
Daily passenger capacity = 34,300
Annual passenger capacity = 12.5 MAP

The fuel dispensed per the passenger ratio can also be used to calculate the number of gallons required to support Average Day Peak Month “ADPM” operations under the Proposed Project and alternative scenarios (Table 4-1). Table 4-1 presents the required fuel capacity, the amount of unused fuel at the end of each day and the number of additional truck deliveries that are needed to support the passenger activity level of each scenario.

As seen in Table 4-1, only the No Project Alternative can be accommodated during ADPM levels. The Proposed Project and Alternatives A through C require additional fuel deliveries during the day. Additional fuel tank deliveries would need to start in the early evening hours for the Proposed Project and early morning hours for Alternative C. For Alternative C, fuel deliveries would be nearly continuous throughout the day and night. The earlier deliveries are required, the greater the potential for disruptions of commercial passenger service.

Day time fuel delivery operations can present several logistical challenges at the airport, at the refinery, and transportation between the two. As noted above, the existing fuel farm has physical limitations, with

[2] The ratio of 7.4 gallons dispensed per passenger was calculated in Section 7 of AECOM’s Aviation Forecasts Technical Report, dated January 2014.

a maximum of four fuel trucks offloading to the fuel farm at any one time. Also, there is limited space adjacent to the facility for tankers to queue. Once the fuel is delivered, it must settle (½ hour per truck) and quality inspections performed. Only then would it be safe for use in aircraft. At the refinery there are also limited positions available to load Jet-A fuel and the refinery serves several customers in addition to John Wayne Airport. Thus, there is the potential that aggressive refueling schedules during the day would conflict with other refinery customers and delivery schedules.

Table 4-1
AVERAGE DAY PEAK MONTH
FUEL CAPACITY AND TRUCKING REQUIREMENTS [A]

Item	Existing	Proposed Project	Alternative A	Alternative B	Alternative C	No Project
Phase 1						
MAP Level	9.17	10.8	10.8	10.8	16.9	10.8
ADPM Passengers [b]	27,451	32,742	32,742	32,742	51,258	32,742
Required Daily Working Capacity	203,000	242,000	242,000	242,000	379,000	242,000
Existing Daily Working Capacity [c]	254,000	254,000	254,000	254,000	254,000	254,000
Remaining Capacity at Days' End	51,000	12,000	12,000	12,000	(125,000)	12,000
Additional Trucks Deliveries Required during the Day	0	0	0	0	16	0
Phase 2						
MAP Level	9.17	11.8	11.4	13.0	16.9	10.8
ADPM Passengers [b]	27,451	35,774	34,581	39,419	51,258	32,742
Required Daily Working Capacity	203,000	265,000	256,000	292,000	379,000	242,000
Existing Daily Working Capacity [c]	254,000	254,000	254,000	254,000	254,000	254,000
Remaining Capacity at Days' End	51,000	(11,000)	(2,000)	(38,000)	(125,000)	12,000
Additional Trucks Deliveries Required during the Day	0	2	1	5	16	0
Phase 3						
MAP Level	9.17	12.5	12.8	15.0	16.9	10.8
ADPM Passengers [b]	27,451	37,903	38,806	45,484	51,258	32,742
Required Daily Working Capacity	203,000	280,000	287,000	337,000	379,000	242,000
Existing Daily Working Capacity [c]	254,000	254,000	254,000	254,000	254,000	254,000
Remaining Capacity at Days' End	51,000	(26,00)	(33,000)	(83,000)	(125,000)	12,000
Additional Trucks Deliveries Required during the Day	0	4	5	11	16	0

[a] Source: AECOM analysis, February 2014.
[b] Source: Technical Report Aviation Forecasts, Table 3-5, AECOM, January 2014.
[c] With tank modifications.

The two closest refineries to John Wayne Airport are 25 and 45 miles and delivery time is approximately 45 minutes from the refinery to the Airport. Given the uncertainty of road conditions, heavy reliance on truck deliveries throughout the day and potentially during peak travel times, runs a high risk of disrupting commercial passenger service.

Fuel Capacity of the Future Facility

This subsection analyzes the ability of the expanded fuel facility to meet demand of the Proposed Project and four alternatives. The future facility analyzed includes the two large tanks and connection to the pipeline distribution. As noted above, pipeline fuel would be delivered once a week to the Airport. Total weekly delivery would be approximately 1.7 million gallons. Assuming no supplemental fuel delivery by truck, the pipeline would limit John Wayne Airport to 12.0 MAP, calculated as follows:

Weekly working capacity of the fuel system = 1,700,000 gallons
Daily working capacity of fuel system = 243,000 gallons
Fuel dispensed per passenger = 7.4 gallons
Daily passenger capacity = 32,800
Annual passenger capacity = 12.0 MAP

Therefore, during the week supplemental fuel would be required, delivered by truck for the Proposed Project and Alternatives A through C. It is assumed that truck deliveries would occur during the night time hours as currently happens, with a maximum of 32 truck deliveries any one night. These deliveries would occur near the end of the week as fuel availability dwindles. Since the large tanks will not be directly connected to the truck unloading positions, the fuel would be offloaded directly to one of the small tanks for settling. Calculations of supplemental fuel truck requirements are presented in Table 4-2.

As seen in Table 4-2, the weekly shortfall of fuel during the peak month ranges from 260,000 gallons for the Proposed Project to 953,000 gallons for Alternative C. This translates into 33 to 120 fuel truck deliveries per week or two to four nights of fuel deliveries, respectively. Even with the pipeline delivery of fuel, Alternative C represents the highest risk of commercial passenger service disruption.

Table 4-2
WEEKLY FUEL CAPACITY AND TRUCKING REQUIREMENTS DURING THE PEAK PASSENGER MONTH WITH IMPROVEMENTS [A]

Item	Proposed Project	Alternative A	Alternative B	Alternative C	No Project
Phase 1					
MAP Level	10.8	10.8	10.8	16.9	10.8
ADPM Passengers [b]	32,742	32,742	32,742	51,258	32,742
Required Daily Working Capacity	242,000	242,000	242,000	379,000	242,000
Days of Capacity [c]	7.0	7.0	7.0	4.5	7.0
Remaining Capacity at Weeks' End	6,000	6,000	6,000	(953,000)	6,000
Additional Trucks Deliveries Required during the Week	0	0	0	120	0
Number of Nights Required to Provide Additional Fuel [d]	0	0	0	4	0
Phase 2					
MAP Level	11.8	11.4	13.0	16.9	10.8
ADPM Passengers [b]	35,774	34,581	39,419	51,258	32,742
Required Daily Working Capacity	265,000	256,000	292,000	379,000	242,000
Days of Capacity [c]	6.4	6.6	5.8	4.5	7.0
Remaining Capacity at Weeks' End	(155,000)	(92,000)	(344,000)	(953,000)	6,000
Additional Trucks Deliveries Required during the Week	20	12	43	120	0
Number of Nights Required to Provide Additional Fuel [d]	1	1	2	4	0
Phase 3					
MAP Level	12.5	12.8	15.0	16.9	10.8
ADPM Passengers [b]	37,903	38,806	45,484	51,258	32,742
Required Daily Working Capacity	280,000	287,000	337,000	379,000	242,000
Days of Capacity [c]	6.1	5.9	5.0	4.5	7.0
Remaining Capacity at Weeks' End	(260,000	(309,000)	(659,000)	(953,000)	6,000
Additional Trucks Deliveries Required during the Week	33	39	83	120	0
Number of Nights Required to Provide Additional Fuel [d]	2	2	3	4	0

[a] Source: AECOM analysis, February 2014.
[b] Source: Technical Report Aviation Forecasts, Table 3-5, AECOM, January 2014.
[c] Assuming weekly delivery of 1.7 million gallons of fuel from the pipeline.
[d] Assumes a maximum of 32 truck deliveries per night.

CONCLUSIONS

This assessment reviewed the capacity of the existing system, inclusive of ongoing tank modifications, and the future fuel system which increases total storage capacity. From this assessment several conclusions are drawn:

- The existing system is unable to accommodate Proposed Project ADPM demand.

- For the Proposed Project and four alternatives additional fuel deliveries are required during the day to supply the existing fuel system. As the number of day-time fuel deliveries are increased risk increases. Risks include inability of the refineries to fill tankers for John Wayne Airport, queuing of fuel trucks on public roads adjacent to the airport, transit time of truck deliveries. At a passenger level of 16.9 MAP (Alternative C), nearly continuous fuel truck delivery is required. This would require a precision delivery schedule that has many variables that are beyond direct control of the supplier or Airport (e.g. road conditions, traffic, weather).
- The proposed larger fuel tanks and pipeline connection would accommodate existing operational levels. However, during the peak month of the Proposed Project, two full nights of truck deliveries per week are required to augment pipeline fuel delivery.
- Pipeline fuel delivery would occur only once per week. If no supplemental fuel truck deliveries are provided, MAP levels accommodated by the pipeline would be 12.0 MAP (less than the proposed project). Therefore, fuel delivery by tanker truck would still be required, up to four consecutive nights during the peak month by the end of the week for Alternative C.

In summary, the existing fuel system with tank modifications is unable to support peak passenger month demand levels of the Proposed Project and four alternatives. Additional fuel tanker deliveries during the day would be required. The proposed expanded fuel farm is also unable to support peak passenger month demand levels of the Proposed Project and four alternatives without supplemental fuel truck deliveries, ranging from two to four nights of fuel deliveries per week. Higher MAP levels such as those found in Alternatives B and C, introduce significant risk of potential commercial passenger service disruptions.

SECTION 5
TERMINAL CAPACITY FOR INTERNATIONAL PASSENGERS

INTRODUCTION

Airports serving international airline operations require dedicated space for the inspection of passengers, crew and baggage by federal inspectors. These are U.S. immigrations, customs, agriculture, and public health officers. In the airport industry, these services and facilities are commonly referred to as federal inspection services "FIS." The purpose of this analysis is to describe the existing facilities that serve international passengers in terms of size, design capacity, and current passenger loads. The facilities addressed in this assessment include FIS facilities and terminal gates used for international operations.

FEDERAL INSPECTION SERVICE "FIS" FACILITIES

FIS facilities are located in the lower (arrivals) level of Terminal C and were constructed as part of the Terminal C project completed in November 2011. Figure 5-1 depicts the location of the FIS facilities in the terminal building.

The FIS facilities comprise approximately 28,400 square feet (SF) which are broken down as noted in Table 5-1. Primary FIS areas are depicted in Figure 5-2 (FIS Officer/Staff and Support areas are not included in the graphic).

Table 5-1
FEDERAL INSPECTION SERVICE FACILITIES AT JOHN WAYNE AIRPORT [A]

Functional Area	Space (SF)
Sterile Corridor	3,747
Primary Processing	13,663
Secondary Processing	3,687
Secondary Operations	270
Exit	3,018
FIS Officer/Staff	1,543
FIS Support	2,450
Total	**28,378**

[a] Source: Construction of Terminal C and Improvements to Terminals A & B Basis of Design Development for John Wayne Airport, Gensler, June 10, 2008.

The space programming for these FIS functional areas was based on a design capacity of 300 international passengers per hour[3].

The Airport is presently served by three airlines that provide international service: Interjet, Airtran Airways, and Westjet. Interjet and Airtran serve Mexico destinations and Westjet serves Canada destinations. The aircraft and passenger seating that these airlines operate at John Wayne Airport are shown in Table 5-2.

[3] Construction of Terminal C and Improvements to Terminals A & B Basis of Design Development for John Wayne Airport, Gensler, June 10, 2008.

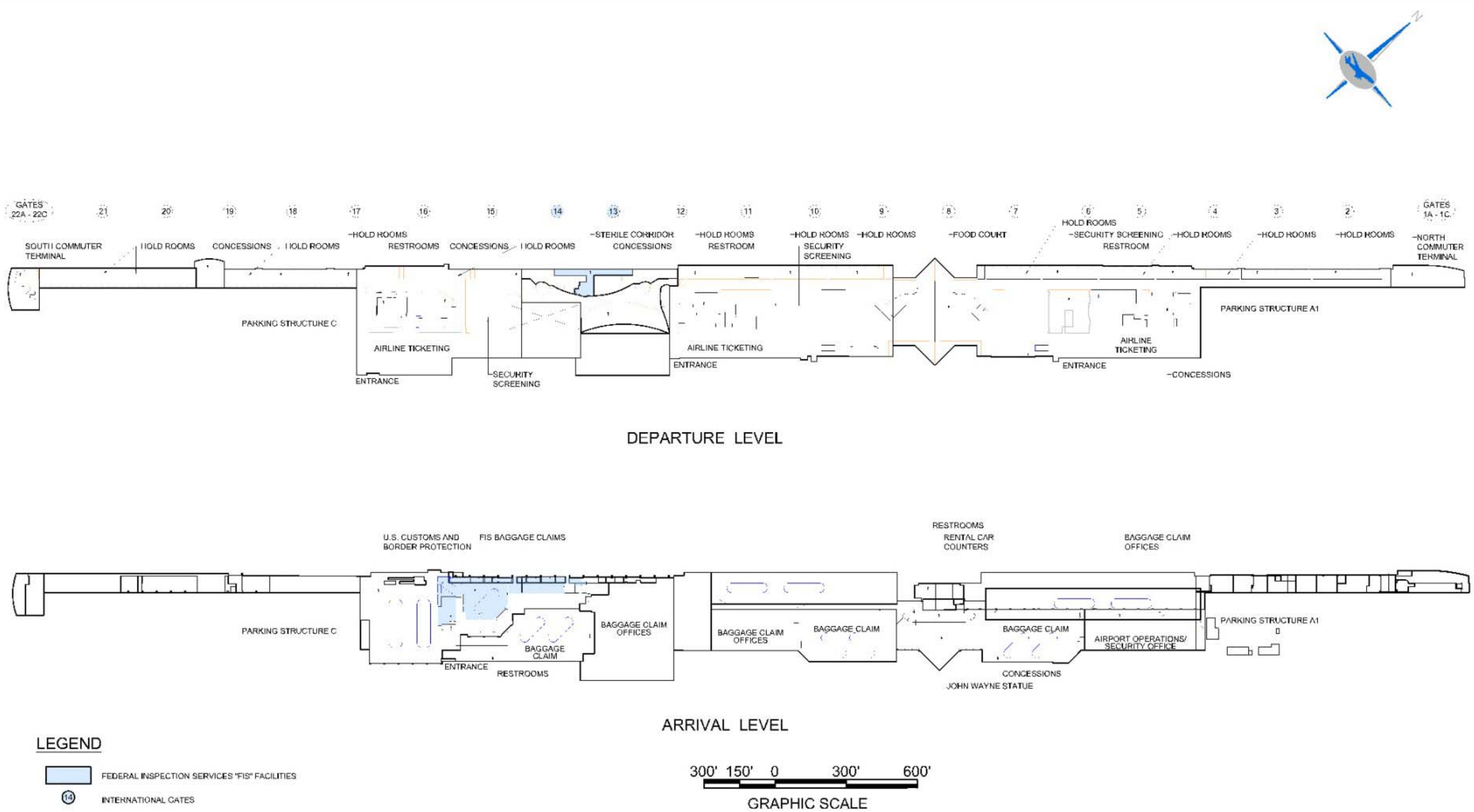

Figure 5-1
Overall Terminal Building Layout

Figure 5-2
FIS Facilities at John Wayne Airport

Table 5-2
AIRLINES AND AIRCRAFT SERVING INTERNATIONAL DESTINATIONS AT JOHN WAYNE AIRPORT

Airline	Aircraft	Passenger Seats
Interjet	Airbus A320	150
Airtran Airways	Boeing 737-700	137
Westjet	Boeing 737-700	136

Source: AECOM analysis, December 2013.

It is noted that presently passengers arriving from Vancouver, Canada are prescreened in Vancouver. Thus, Canadian arrivals do not use the FIS facilities at John Wayne Airport. In order to be conservative in this assessment, it is assumed that future Canadian arrivals will be screened at John Wayne Airport.

John Wayne Airport is a participant in the U.S. Customs and Border Protection Global Entry program. This program allows for expedited clearance for pre-approved, low-risk travelers upon entry into the United States. There is a fee for passengers to enroll in the Global Entry program, along with a background check and an interview process with the U.S. Customs and Border Protection. Interviews are conducted at Enrolment Centers; the closest one being at Los Angeles International Airport. Once a traveler is part of the Global Entry program, he/she may use the Global Entry kiosks at participating airports.

Based on the current operations, there is only one international arrival per hour and, therefore, the maximum number of international arriving passengers is 150 (represented by an arriving Interjet Airbus A320). Comparing current operations to the design capacity of 300 passengers per hour, there is adequate capacity provided by FIS facilities. Theoretically, it appears that the design capacity would be suitable to accommodate two 150-passenger flights per hour; however, based on observations of the FIS area during an international arriving flight, it appears that certain FIS processing elements could be overloaded if arriving traffic exceeds current levels.

As part of this assessment, AECOM observed an international arrival and passengers processing through the FIS facilities at John Wayne Airport. It was noted that the Processing Hall (primary processing area) features five distinct lines: wheelchair passengers, visitors, residents, U.S. citizens, and crew. Two Global Entry kiosks are available in the Processing Hall, located adjacent to the crew line. Of these five lines, the visitor line was observed to be the longest, stretching the length of the hall from the immigration counters to the stairs. In order for additional passengers to be accommodated, queuing areas would need to be reconfigured (presently queuing is in straight lines). Less than six arriving passengers were observed to use the Global Entry kiosks. It is noted that the maximum number of occupants for the processing hall is 547.

After clearing immigrations, passengers claim their bags at the sole international baggage carousel. The carousel is adequately sized to accommodate one arriving flight and the flow of passengers through immigrations is generally at a slow enough rate so as to minimize queuing of passengers in the bag claim area. However, the pace of immigration processing resulted in the baggage carousel being fairly full near the beginning of the arrival process. The baggage claim area has a maximum occupant capacity of 375 people. The observed arrival showed that there is ample space for one arriving flight.

Secondary processing generally was not the critical or choke point of the arrival process. Only those arriving passengers claiming items are required to go through secondary processing, thus not all passengers are required to go through secondary processing. The flow of passengers generally results in no line at the secondary processing area; however, a line of approximately one dozen people was observed but passengers were quickly processed.

In total, it took approximately 45 minutes to process all passengers from the arriving flight.

Two international arrivals in an hour can be accommodated, however, it would be very crowded and levels of service could drop if arrivals are simultaneous. Facilities appear adequate to accommodate two arriving flights in an hour if the flights are not simultaneous, for example, one flight arriving near the top of an hour with the other arriving 30 minutes (or more) later in the hour. This sequencing would allow most passengers of the first flight to have cleared the primary processing as the passengers from the second flight start to arrive. Simultaneous arrivals would potentially overload the primary processing area and baggage claim.

International departures do not utilize the FIS facilities; rather passengers are screened at the gate during the boarding process.

TERMINAL GATES

There are currently two terminal gates that accommodate international operations: Gates 13 and 14, both of which have passenger loading bridges. In the processing of international arriving passengers, it is important that passengers be kept separate from other, domestic passengers, until the international arrivals clear U.S. immigration and customs officers. In order to achieve this separation of international passengers, Gates 13 and 14 are connected to a sterile corridor, leading passengers directly downstairs to the FIS facilities. Progression from the gate to and through FIS is fairly straight forward and a short distance.

As previously stated, departing passengers to international destinations are screened at the gate during the boarding process. There are no secured international hold rooms at the Airport.

As previously seen, the FIS facilities are capable of accommodating two international arriving flights in an hour, and therefore, the two gates match the design capacity of FIS facilities. Furthermore, due to the configuration of the terminal and location of FIS facilities (the sterile corridor), it would be very difficult to connect additional gates with passenger loading bridges directly to the FIS facilities.

AIRLINE TICKET COUNTERS

Four airline ticket counters are located off the exit corridor. These ticket counters are for international passengers connecting to other flights, which is a rare occurrence. Thus, these ticket counters are underutilized.

CONCLUSIONS

The design capacity of existing facilities is sufficient for current operations of one arrival an hour and could accommodate two arrivals in an hour if the arrivals are not simultaneous. It is doubtful that the FIS facilities could accommodate more than two arrivals in an hour, should such activity materialize in the future. Also, operations of international aircraft with greater seating capacity than those presently operating will create additional demand on FIS facilities. This is not necessarily problematic if an arrival of a larger aircraft is the only international operation in an hour.

It is estimated that approximately 16 daily international flights could be accommodated using the present FIS facilities. This assumes that flights are on the ground 1.5 hours for passenger deplaning, aircraft servicing, and passenger enplaning and allows approximately one hour in between arriving international flights. Table 5-3 summarizes the average daily international flights (arrivals) and shows that capacity may be exceeded in Phase 3 of Alternative B and Phases 2 and 3 of Alternative C. However, it is noted that enplanement per gate passenger levels exceed 306,000 in Phase 3 of the Proposed Project and three alternatives, along with Phase 2 of Alternative C (Table 5-4).

Table 5-3
PROJECTED INTERNATIONAL DAILY FLIGHTS
JOHN WAYNE AIRPORT [A]

	Existing	**Proposed Project**	**Alternative A**	**Alternative B**	**Alternative C**	**No Project**
Phase 1						
International Operations	4,900	6,100	6,100	6,100	9,500	6,100
International Arrivals	2,450	3,050	3,050	3,050	4,750	3,050
Daily Arrivals	6.7	8.4	8.4	8.4	13.0	8.4
Phase 2						
International Operations	4,900	8,600	8,300	9,400	12,300	6,100
International Arrivals	2,450	4,300	4,150	4,700	6,150	3,050
Daily Arrivals	6.7	11.8	11.4	12.9	**16.8**	8.4
Phase 3						
International Operations	4,900	10,100	10,300	12,100	13,600	6,100
International Arrivals	2,450	5,050	5,150	6,050	6,800	3,050
Daily Arrivals	6.7	13.8	14.1	**16.6**	**18.6**	8.4

[a] Source: AECOM analysis, December 2013.

Table 5-4
PROJECTED INTERNATIONAL DAILY PASSENGERS PER GATE
JOHN WAYNE AIRPORT [A]

	Proposed Project	**Alternative A**	**Alternative B**	**Alternative C**	**No Project**
Phase 1					
International Passengers	756,000	756,000	756,000	1,183,000	756,000
International Gates	2	2	2	2	2
Enplanements per Gate	189,000	189,000	189,000	295,750	189,000
Phase 2					
International Passengers	1,062,000	1,026,000	1,170,000	1,521,000	756,000
International Gates	2	2	2	2	2
Enplanements per Gate	265,500	256,500	292,500	**380,250**	189,000
Phase 3					
International Passengers	1,250,000	1,280,000	1,500,000	1,690,000	756,000
International Gates	2	2	2	2	2
Enplanements per Gate	**312,500**	**320,000**	**375,000**	**422,500**	189,000

[a] Source: AECOM analysis, March 2014.

SECTION 6
POTENTIAL NEW AIRCRAFT TYPES

INTRODUCTION

The purpose of this task is to identify capacity constraints, if any, associated with potential new aircraft types that might serve John Wayne Airport during the planning period. In the context of this assessment, new aircraft types are classified in the following three categories.

- Aircraft currently in production that could operate at John Wayne Airport but would operate uneconomically due to payload limitations. These are aircraft such as the Boeing 737-800W and 737-900ERW.
- Aircraft currently in production that would require major airfield improvements in order to operate at John Wayne Airport. This category of aircraft is represented by the Boeing 787-8.
- New aircraft that are in development that could replace aircraft currently operating at John Wayne Airport without major airfield improvements. These are aircraft such as Boeing 737 MAX and Airbus neo (new engine option).

New aircraft types are being addressed because they represent potential mitigation options. For example, if existing aircraft with higher seating capacities could be efficiently accommodated this would have the potential to reduce the number of flights as flights would carry more passengers per operation. Also, aircraft currently under development such as the 737 MAX and Airbus neo are expected to offer fuel economies and lower emission engines than the current aircraft models that they will replace.

CURRENT AIRCRAFT THAT CANNOT OPERATE EFFICIENTLY AT JOHN WAYNE AIRPORT

Commercial aircraft operations at the Airport are primarily conducted by Boeing 737-700 and Airbus A319 and A320 aircraft. Typically seating of Boeing 737-700Ws will accommodate approximately 126 passengers and Airbus A319 and A320 seat approximately 124 and 150 passengers, respectively.

There are larger models of the Boeing 737 and Airbus 320 that have higher seating capacities. These aircraft are shown below and include the Boeing 737-800W and 737-900ERW, and Airbus A321. The typical two-class passenger seating configurations shown in Table 6-1 is based on information published by the aircraft manufacturers. However, actual seating configurations (the number of seats) will vary by airline. While it is possible for these larger aircraft models to operate at the Airport, they can experience restrictions on the number of passengers that they can carry because of limitations due to the length of the runway.

Table 6-1
TYPICAL SEAT CONFIGURATIONS

Aircraft Model	Typical Seating
Boeing 737-700W	126
Boeing 737-800W	162
Boeing 737-900ERW	180
Airbus A319	124
Airbus A320	150
Airbus A321	185

Source: The Boeing Company and Airbus.

Based on information provided by Boeing, the current B737 models can fly the following distances with full passenger loads from the existing 5,701-foot long runway. The maximum distance flown is referred to as range and is expressed in nautical miles "nm" (Table 6-2). Also shown in Table 6-2 is the maximum range with full passengers that is possible for the current B737 models assuming there are no runway or other performance limitations. These ranges are much greater than those that are supported by the existing JWA runway. The last column in Table 6-2 presents the number of passengers that could be carried the maximum range possible for the aircraft but with the limitations presented by the existing JWA runway. As seen, the B737-700W would need to limit passengers to 99, versus a full passenger load of 126 passengers. For B737-800W and B737-900ERW the passenger penalties are more severe as the number of passenger would need to be restricted to less than 50 percent of the maximum seating capacity.

Table 6-2
RANGE OF B737 AIRCRAFT
OPERATING AT JOHN WAYNE AIRPORT

Aircraft Model(Engine)	Full Passengers for Aircraft Model	Range with Full Passengers-Existing JWA Runway (nautical miles)	Maximum Range with No Runway or Other Limitations (nautical miles)	Passenger Capacity at Maximum Range for Existing JWA Runway Limitations
B737-700W(CFM56-7B24)	126	2,884 nm	3,445 nm	99
B737-800W(CFM56-7B26)	162	1,469 nm	3,085 nm	79
B737-900ERW(CFM56-7B27)	180	1,107 nm	2,845 nm	85

Source: The Boeing Company, 2014.

General conclusions and observations drawn from the information provided by Boeing for the existing runway are:

- The B737-700W can carry a full load of passengers approximately 2,900 nautical miles. This is sufficient range to reach any destination in the United States, including Alaska and Hawaii. This explains why the B737-700W is the main B737 that operates at the Airport.
- The B737-800W can operate with a full load of passengers up to a distance of approximately 1,470 nautical miles. This range would likely be insufficient for flights to Chicago as flights could incur restrictions on the number of passengers. If the flight is needed to reach a more distant destination, then the number of passengers would need to be reduced even further such that more fuel could be carried for the longer distance. As an alternate, the aircraft could carry a full load of passengers but would need to make a stop for fuel en route.
- The B737-900ERW can operate with a full load of passengers up to a distance of approximately 1,100 nautical miles. This is range is not sufficient to reach Chicago.
- While information was not available from Airbus, similar conclusions can be drawn for Airbus aircraft, namely that the existing runway is suitable for smaller version A320 models, but A320s with higher seating capacity such as the A321 face payload restrictions if the aircraft need to serve longer distance destinations. The A320 presently serves Newark, Chicago, and Mexico

City destinations from JWA. Phoenix (a short-haul market) is the only destination presently served by the A321 from JWA.

The existing runway length is 5,701 feet, which is sufficient for efficient operations by the B737-700W and Airbus 319/320 with full passenger loads. As seen in Table 6-2, the existing runway length creates severe passenger and range restrictions for B737 models with higher seating capacities, and therefore it is uneconomical for airlines to operate the larger B737 as well as larger A320 models. The efficiency of operations of current aircraft with higher seating capacities could be improved if additional runway length (takeoff distance) is available. Since the Proposed Project does not include facility improvements, an analysis of enhanced operating efficiency is beyond this analysis and EIR and would require further study.

Current Aircraft that Would Require Major Improvements to Operate at John Wayne Airport

This category of aircraft includes aircraft models that are much larger in terms of seating capacity and range and is represented by the Boeing 787-8. The B787-8 is a medium-sized, twin-engine aircraft that is expected to serve international destinations on lower density routes. The aircraft has the range for international service for markets that do not require very high passenger seating, such as that provided by the Airbus A380, Boeing 747, and Boeing 777. As with the B737 MAX and Airbus neo, the B787 is a new aircraft that offers increased fuel efficiency, a smaller noise footprint, and lower air quality emissions.

To put in perspective the size of the B787-8 and current aircraft operating at the Airport, a comparison with the B737-700W is presented in Table 6-3.

Table 6-3
Aircraft Characteristics
Boeing 737-700W and 787-8
Operating from Existing 5,701 Runway

Characteristic	B737-700W	B787-8
Length	110.3’	186.1’
Wing Span	117.4’	197.3’
Tail Height	41.7’	56.1’
Maximum Takeoff Weight	154,500 lbs.	502,500 lbs.
Passengers	126	242
Range from JWA (nm)	3,022 nm	3,918 nm

Source: AECOM analysis, December 2013. Range provided by The Boeing Company, 2013, and represents range capability from the existing runway.

As seen, the B787-8 is much larger in terms of length and width, and weight and seating capacity. The size of the B787-8 creates various issues related to Airport infrastructure on the airfield and at the passenger terminal as described below.

Airfield Facilities

The Airport Layout Plan “ALP” for John Wayne Airport indicates that the “design aircraft” is the B767-200. The significance of the design aircraft is that all airfield facilities are designed to meet applicable FAA airport design standards to accommodate safe operation of the aircraft. The B767-200 is categorized by the FAA as Airplane Design Group “ADG” IV which the FAA has defined as aircraft with wingspans of 118 feet up to 171 feet. The B787-8 is larger than the B767-200 and is categorized as Airplane Design Group V which the FAA defines as aircraft with wingspans of 171 feet up to 214 feet. The following table (Table 6-4) compares basic physical characteristics of the B767-200 and B787-8.

Table 6-4
AIRCRAFT CHARACTERISTICS
BOEING 767-200 AND 787-8

Characteristic	B767-200	B787-8
Airplane Design Group	IV	V
Length	159.1’	186.1’
Wing Span	156.2’	197.3’
Tail Height	52.9’	56.1’
Maximum Takeoff Weight	396,000 lbs.	502,500 lbs.
Passengers	224	242

Source: AECOM analysis, December 2013.

Since the B787-8 is larger than the design aircraft and is classified in a larger Airplane Design Group, it is generally subject to more demanding airport design standards. These apply to runway and taxiway geometrics, various safety criteria, and separation from other runways, taxiways, and objects.

The following existing airfield facilities have been identified as meeting design standards for the design aircraft (B767-200), but are not compliant with FAA airport design standards for the B787-8, for the following reasons.

- Paved shoulders of the main runway would need to be widened to accommodate the B787-8.
- The paved blast pads at each end of the main runway would need to be widened and increased in length.
- Runway hold lines (pavement markings on taxiways) would need to be located farther from the main runway centerline. This represents a potentially significant issue as it impacts the ability for aircraft to hold between parallel runways.
- Safety zones associated with taxiways increase in size when used by the B787-8. As a result, vehicle service roads, run up aprons (used by small general aviation aircraft), aircraft parked at the terminal building, navigational aid equipment, and existing fuel farm facilities would be within the expanded safety zones and require mitigation.
- Modifications would be required at taxiway intersections to fillet geometry.
- Airfield pavements would require strengthening to accommodate the B787-8.

Since the Proposed Project does not include runway, taxiway, or other facility improvements, operation of the B787-8 at the Airport are not included in the analysis. Any proposal to operate the B787-8 would require additional study and be subject to a separate CEQA analysis. Improvements to the airfield, as noted above, would also require separate NEPA analysis.

Range Capability

An analysis of the existing 5,700-foot runway performed by Boeing indicated that the B787-8 is capable of carrying a full load of passengers a distance of 3,918 nautical miles. This range includes all destinations in North and Central America and some cities located in the northwest portion of South America. However, this range capability does not allow European destinations to be served. The Boeing analysis included an assessment of increased takeoff distance at John Wayne Airport that concluded that a 500-foot increase in takeoff distance increases the range by 975 nautical miles. This results in a range capability of 4,893 nautical miles which would support non-stop flights from John Wayne Airport to London.

Since the Proposed Project does not propose additional or expanded airport infrastructure, analysis of potential B787-8 operations would require further study in terms of aircraft performance and options for increasing takeoff distance, the latter which could involve construction of runway improvements on the south, north, or both runway ends. As noted above, CEQA and/or NEPA compliance would be required.

Terminal Facilities

Aircraft Parking

While the design aircraft noted on the ALP is a B767-200, there are no airline flights by this aircraft, nor are any of the terminal gates with passenger loading bridges able to accommodate an aircraft of this size. The largest aircraft that parks at the terminal gates with passenger loading bridges is the B757-200W (a B757-200 that is equipped with winglets). Twelve passenger loading bridges and aircraft parking at the gates are designed to accommodate the B757-200W. The other eight passenger loading bridge gates are able to accommodate up to B737-800W aircraft. Most gates (with and without passenger loading bridges) are designed for straight-in aircraft parking, with the aircraft parked perpendicular to the terminal building.

Since the B787-8 is nearly 31 feet longer and 63 wider than a B757-200W, if a B787-8 was to park at the terminal, aircraft parking and gate operations would be impacted. As the B787-8 is larger than the B757-200W, the B787-8 would exceed the parking envelope of the B757-200W. Due to the larger wingspan, the B787-8 would impact adjacent gates, either by reducing the size of the adjacent aircraft or making the gate unavailable while the B787-8 is parked. For planning purposes, a 25-foot wingtip clearance is required between aircraft parked at the terminal.

The length of existing parking positions is just long enough for a B757-200W to remain clear of the vehicle service road. Since the B787-8 is longer than a B757-200W, a B787-8 would need to park at an angle in order for the tail not to extend over the vehicle service road which presents the potential for conflict with ramp service vehicles and equipment. Parking at an angle would cause an adjacent gate to be unavailable and reduces gate capacity.

Ground Service Equipment

Ground Service Equipment “GSE” are the vehicles that operate on the parking apron in the gate area that load, unload, and service the aircraft. GSE for the B757-200W are largely the same as the B787-8; however, additional baggage carts would be required for the B787-8 because of the higher passenger seating capacity. Additionally, the B787-8 has greater cargo capacity and should this be utilized, additional equipment and ramp space would be used to service the aircraft. Since the B787-8 would effectively occupy two to three gates, there should be sufficient room to service the aircraft. New GSE needs are unlikely, as GSE resources for the affected gates could be “pooled” to service the aircraft. Should the B787-8 be used extensively for belly cargo, additional GSE storage may be needed for the larger pallet, container loaders, and carts.

Aircraft Fueling

At John Wayne Airport, air carrier aircraft are refueled through a hydrant fueling system via fuel pits located in the apron. Each gate has a designated fuel pit. For safety reasons, no part of the aircraft can be parked over a fuel pit. If a B787-8 was parked diagonally at the gate, consideration would need to be given not only to the location of pits with respect to fueling, but also with respect to the parked aircraft to ensure no portion of the aircraft is over the fuel pit. There is a high probability that the angled aircraft would overlie existing fuel pits, which poses a safety risk.

Interior Terminal Facilities

The B787-8 seats approximately 32 percent more passengers than the B757-200W, which may affect inside the terminal building.

- Departure Lounges/Holdrooms - Existing departure lounges/holdrooms may need to be enlarged to accommodate the additional passengers. It is noted that the B787-8 would need to occupy two gates and, therefore, two hold rooms would also be used for a B787-8 flight while it is parked at the gate(s). This would be an inefficient situation because the B787 will essentially utilize two holdrooms, whereas it only requires 32 percent additional hold room space.
- Baggage Claim – With the additional passengers existing baggage carousels may also need to be upgraded to accommodate the additional associated baggage.
- FIS Facilities – Should the B787-8 be utilized for international flights, a single full flight of 242 passengers would represent 81 percent of the designed capacity of existing FIS facilities. Based on observations documented in Section 4 above, this would result in crowded facilities and a decrease from existing levels of service.

Conclusions

The B787-8 is currently operated by some airlines but cannot operate at John Wayne Airport unless major airport improvements were to be undertaken. These would include but not be limited to the following.

- Increased takeoff distance. Increasing the takeoff distance by 500 feet would allow non-stop flights from JWA to London on the B787-8. Increasing the takeoff distance by more than 500 feet would provide the potential to serve other European destinations beyond London. This is noteworthy since prior to the introduction of the B787, non-stop flights to Europe would not be possible or considered from John Wayne Airport.
- Widening of runway shoulders
- Increasing size of the runway blast pads
- Relocation of runway hold lines and associated signage
- Removal of objects with in the Taxiway OFA, such as vehicle service roads, aircraft parked at the terminal, portions of run up pads, relocation of the glide slope, and reconfiguration of the fuel farm facility
- Modification of taxiway fillets
- Strengthening of runway and taxiway pavements
- Closure of adjacent gate(s) if a B787-8 is parked at the terminal
- Reconfiguration of hydrant fuel pits
- Modification of departure lounges/holdrooms and baggage claim to maintain existing levels of service
- Should the B787-8 be used for international flights, modifications to FIS facilities to maintain existing levels of service

Since the Proposed Project does not propose additional or expanded airport infrastructure, any potential B787-8 operations would require further study and CEQA analysis. Changes to airport infrastructure would also require further analysis under NEPA.

Aircraft in Development that Will Replace Aircraft Currently Operating at John Wayne Airport

This category of aircraft represents the next models of aircraft that could replace aircraft currently operate at JWA. These next models are the B737 MAX and Airbus neo, which are presently under development and not in production. The overarching goal of these new models is to increase efficiency in terms of reducing operating costs while simultaneously increasing performance.

The B737 MAX are derivative aircraft of the Next Generation B737 family (737-700/800/900ER, respectively). The B737 MAX 8 is scheduled to enter service in the third quarter 2017, while the B737 MAX 9 and B737 MAX 7 are planned to enter into service in 2018 and 2019, respectively.

The B737 MAX aircraft employ several technologies and advancements first found on the B787-8. The largest improvement comes from larger and more efficient engines along with a new winglet design. The Boeing Company indicates that the new B737 MAX will increase efficiencies and reduce operating costs and the environmental footprint of the aircraft. The B737 MAX is predicted to reduce fuel consumption and carbon emissions 13 percent and have a 40 percent smaller community noise footprint than Next Generation B737 (B737-700/800/900ER) aircraft. Additionally, Boeing indicates that NOx levels will be 50 percent below Committee on Aviation Environmental Protection, 2004 testing method limits.[4]

The A320 and A321 neo aircraft also feature larger, more efficient engines and winglets. Airbus claims a 15 percent reduction in fuel consumption. Reductions in engine noise and emissions are also a result of the new engine option, though no specifics have been published by Airbus.[5] Since both the Boeing MAX and Airbus neo aircraft can be equipped with the same engine models, similar reductions in noise and emissions could be anticipated.

The new aircraft models will not represent a change in physical characteristics from existing models which they will ultimately replace other than slightly greater weight (Table 6-5). While the physical characteristics of the derivative aircraft are essentially the same as existing models, they will provide operating efficiencies over existing models with superior environmental performance in terms of noise and air quality emissions. To date, orders for these aircraft have been robust.

Table 6-5
AIRCRAFT CHARACTERISTICS
BOEING 737-700W AND 737 MAX 7 AND AIRBUS 320 AND 320 NEO

Characteristic	B737-700W	B737 MAX 7	A320	A320 neo
Airplane Design Group	III	III	III	III
Length	110.3’	110.3’	123.3’	123.3’
Wing Span	117.4’	117.8’	111.9’	117.4’
Tail Height	41.7’	40.3’	39.6’	38.6’
Maximum Takeoff Weight	154,500 lbs.	159,500 lbs.	170,000 lbs.	172,000 lbs.
Passengers	126	126	150	150

Source: AECOM analysis, 2013.

General conclusions related to these aircraft that are currently under development are:

- Other than slightly greater aircraft weights, there is no significant change in the physical characteristics of aircraft that presently operate at JWA. Therefore, there would be little, if any, issues with airport infrastructure and facilities. In the case of the 737 MAX 7, the aircraft is 5,000 pounds heavier than the existing B737-700W (approximately three percent heavier), and while this represents slightly greater loads on airfield pavements the effects are expected to be negligible.

[4] Source: http://www.newairplane.com/737max/design-highlights/#/max-efficiency/cleaner-quieter, accessed December 2013.
[5] Source: http://www.airbus.com/aircraftfamilies/passengeraircraft/a320family/spotlight-on-a320neo/, accessed December 2013.

- While impacts to existing facilities are not anticipated, the expected transition to the new derivative aircraft like the B737 MAX and Airbus neo will result in an environmentally superior commercial aircraft fleet as the new aircraft are more fuel efficient and cleaner in terms of engine emissions.

SECTION 7
POTENTIAL UNCONSTRAINED PASSENGER DEMAND AT JOHN WAYNE AIRPORT

INTRODUCTION

The previous sections of this report presented capacity assessments of basic airport elements by comparing capacity with passenger demand associated with the Proposed Project and four alternatives. The passenger demand for each scenario represents constrained demand as the number of passengers has been assumed to be restricted. This section presents potential unconstrained passenger demand at JWA and relates it to the previous capacity assessments.

ANALYSIS

In 1985, the County of Orange, the City of Newport Beach and two community groups (the Airport Working Group and Stop Polluting Our Newport) entered into a “Settlement Agreement” that formalized consensus on the nature and extent of facility and operational restrictions and improvements that could be implemented at John Wayne Airport, Orange County (JWA). In 2003, the original four signators approved a series of amendments to the Settlement Agreement that did not impose any restrictions on airport use at JWA beyond those in effect under the 1985 Settlement Agreement, but that allowed for additional facilities and operational capacity while continuing to provide environmental protections for the local communities. The Phase 2 Access Plan and Regulation is the principal mechanism by which the JWA restrictions contained in the Settlement Agreement are administered at the Airport.

In light of the nature of facility and operational restrictions at the Airport, JWA is often referred to as a “constrained” airport in the sense that its operations are subject to a unique set of regulations contained in the Settlement Agreement and administered through the provisions of the Phase 2 Access Plan.

As a result of the Settlement Agreement, the Airport can only respond to market demand for additional aviation services within the applicable capacity restrictions set forth in the Settlement Agreement. Historically, the Airport has only increased capacity over the past 30 years or so as part of a negotiated process, as between the County of Orange, City of Newport Beach, and two community groups. The capacity increases negotiated as part of the Settlement Agreement amendment process do not always line up with the forecasts of other regulatory agencies with expertise in assessing aviation demand, or with the airlines or airline trade organizations.

For example, studies by the Federal Aviation Administration (FAA) and Southern California Association of Governments (SCAG) indicate that commercial passenger demand at John Wayne Airport will exceed the current Settlement Agreement limit of 10.8 Million Annual Passengers (MAP) by 2022 to 2023 and that unmet demand will be served at other airports in the region.

More specifically, the FAA produces unconstrained commercial passenger demand forecasts for 3,335 FAA-towered airports, federal contract-towered airports, nonfederal-towered airports, and non-towered airports as part of its annual *Terminal Area Forecast* (TAF) reports. The TAF projections are the official forecast of aviation activity at FAA facilities, and are prepared to meet the budget and planning needs of FAA and provide information for use by state and local authorities, the aviation industry, and the public. The TAF assumes a demand driven forecast for aviation services based on local and national economic conditions, as well as conditions within the aviation industry. Individual airport unconstrained forecasts within the TAF are developed by the FAA independent of the physical, legal, and economic ability of the airport to furnish the capacity to meet demand. The most recent TAF for John Wayne Airport[6] anticipates unconstrained passenger demand at the Airport reaching 6.4 million enplanements, or 12.8 MAP (enplanements and deplanements) by 2030.[7]

In addition to the FAA's TAF, SCAG also projects commercial passenger activity at airports in the seven-county SCAG region as part of the Regional Transportation Plan (RTP). The most recently adopted 2012 RTP contains an Aviation and Airport Ground Access Appendix[8] that incorporates existing legally-enforceable operational constraints at regional airports, including the John Wayne Airport Settlement Agreement, when forecasting passenger activity at individual airport. However, SCAG's RTP also recognizes that unconstrained demand at John Wayne may exceed the current Settlement Agreement limit of 10.8 MAP in both the Baseline and High Growth scenarios, and that unmet passenger demand at JWA would be served by other regional airports. For example, in recommending the Baseline/Medium Growth Scenario for adoption as the Preferred Regional Air Passenger Demand Forecast for the 2012-2035 RTP, the report notes:

> "The forecast recognizes defined legally-enforceable and physical capacity constraints at the constrained urban airports including … John Wayne. However, it does not recognize the fact that the settlement agreements at both LAX and John Wayne airports expire in the 2015–2020 time period. *Relaxation or elimination of the settlement agreement constraints at these airports could significantly impact forecast allocations of aviation demand at other airports in the regional system*.[9] (emphasis added)

Under the High Growth Scenario, the report similarly states:

> "The airport demand allocations for the High Growth Scenario … are based on an assumption that LAX, Bob Hope, Long Beach, John Wayne, Ontario and March will all reach their capacity constraints by 2035. The residual demand of the 164 MAP forecast (26.6 MAP) was allocated to the remaining airports based on their proportional shares in the Baseline Scenario."[10]

CONCLUSION

In summary then, both FAA and SCAG projections indicate that forecasted passenger demand at JWA exceeds the current Settlement Agreement limits of 10.8 MAP. Additionally, the FAA projections indicate that – in 2030, the horizon year of the Proposed Project – the FAA's 12.8 MAP forecasted passenger demand at JWA will exceed the 12.5 MAP level accommodated by the Proposed Project, with the Proposed Project thereby resulting in unmet demand to be accommodated by other airports in the

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[6] FAA Terminal Area Forecast, Fiscal Years 2012-2040, http://aspm.faa.gov/main/taf.asp, accessed 1/16/14.
[7] As explained in the Environmental Impact Report for the Proposed Project, the 2030 MAP level for Alternative A was identified by reference to the FAA's current TAF report. The Phase II MAP level for Alternative A also corresponds to the FAA's current TAF report for the year 2025. Relatedly, Alternative A is intended to evaluate the environmental impacts associated with the Airport serving the unconstrained demand level identified by the FAA.
[8] Southern California Association of Governments, Aviation and Airport Ground Access Appendix, 2012-2035 RTP, Adopted April 12, 2012, http://rtpscs.scag.ca.gov/Documents/2012/final/SR/2012fRTP_Aviation.pdf, accessed 1/16/14.
[9] Id. at page 4.
[10] Id. at page 3.

Southern California region. Other alternatives considered in the EIR, specifically Alternatives B and C will also satisfy the FAA's projected unconstrained demand at JWA.

With respect to the capacity assessments presented in this report, the FAA's forecast of 12.8 MAP would not present capacity issues for those airport elements that were assessed and documented herein, with the exception of the fuel system. The capacity analysis indicated that gate and international passenger processing facilities would begin to experience capacity issues at passenger levels of approximately 15 MAP (Alternative B Phase 3). Based on the FAA forecast, this would occur in the 2037/2038 timeframe. The capacity analysis also indicated that Alternative C would experience runway and RON capacity issues at passenger levels of 16.9 MAP. Based on the FAA forecast, this would occur sometime after the year 2040. The capacity of the future fuel system (which includes construction of the two large tanks and a pipeline connection), without supplemental fuel truck deliveries is 12.0 MAP, which based on the FAA forecast would occur in 2027. With supplemental fuel truck deliveries 16.9 MAP can be accommodated, which based on the FAA forecast would occur sometime after year 2040.

APPENDIX A

RAMP CHARTS; AUGUST 1, 2013 THROUGH AUGUST 7, 2013

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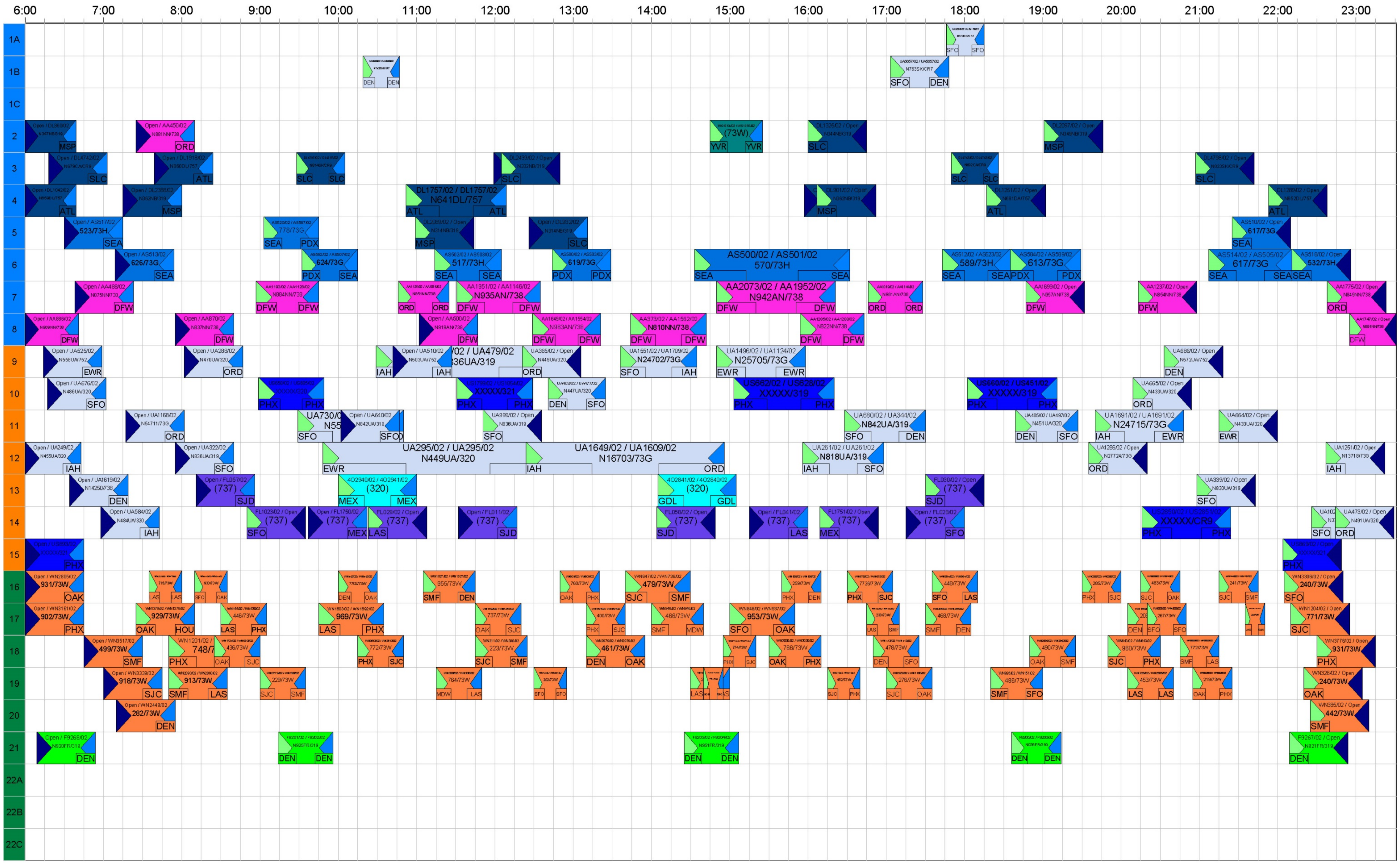
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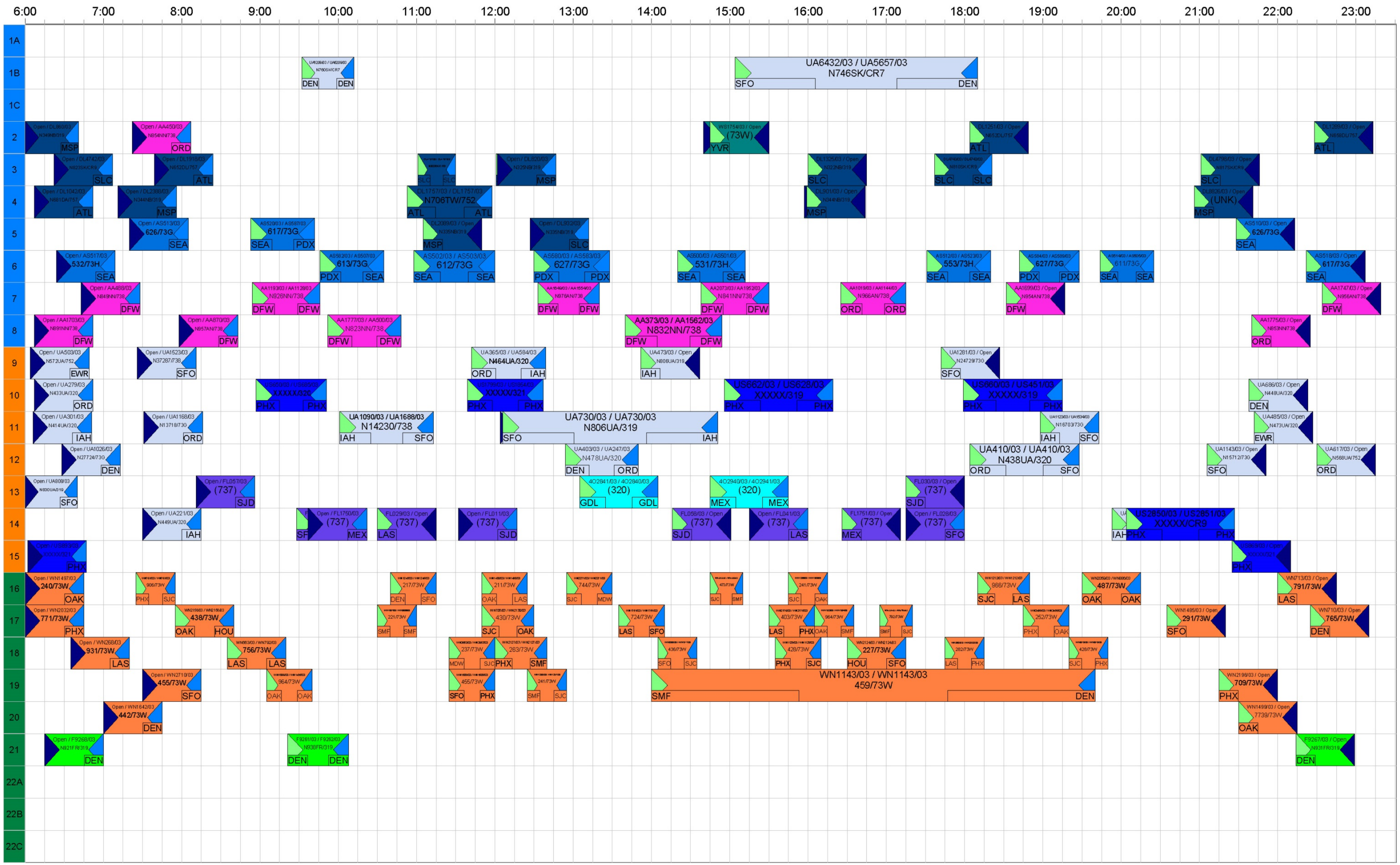

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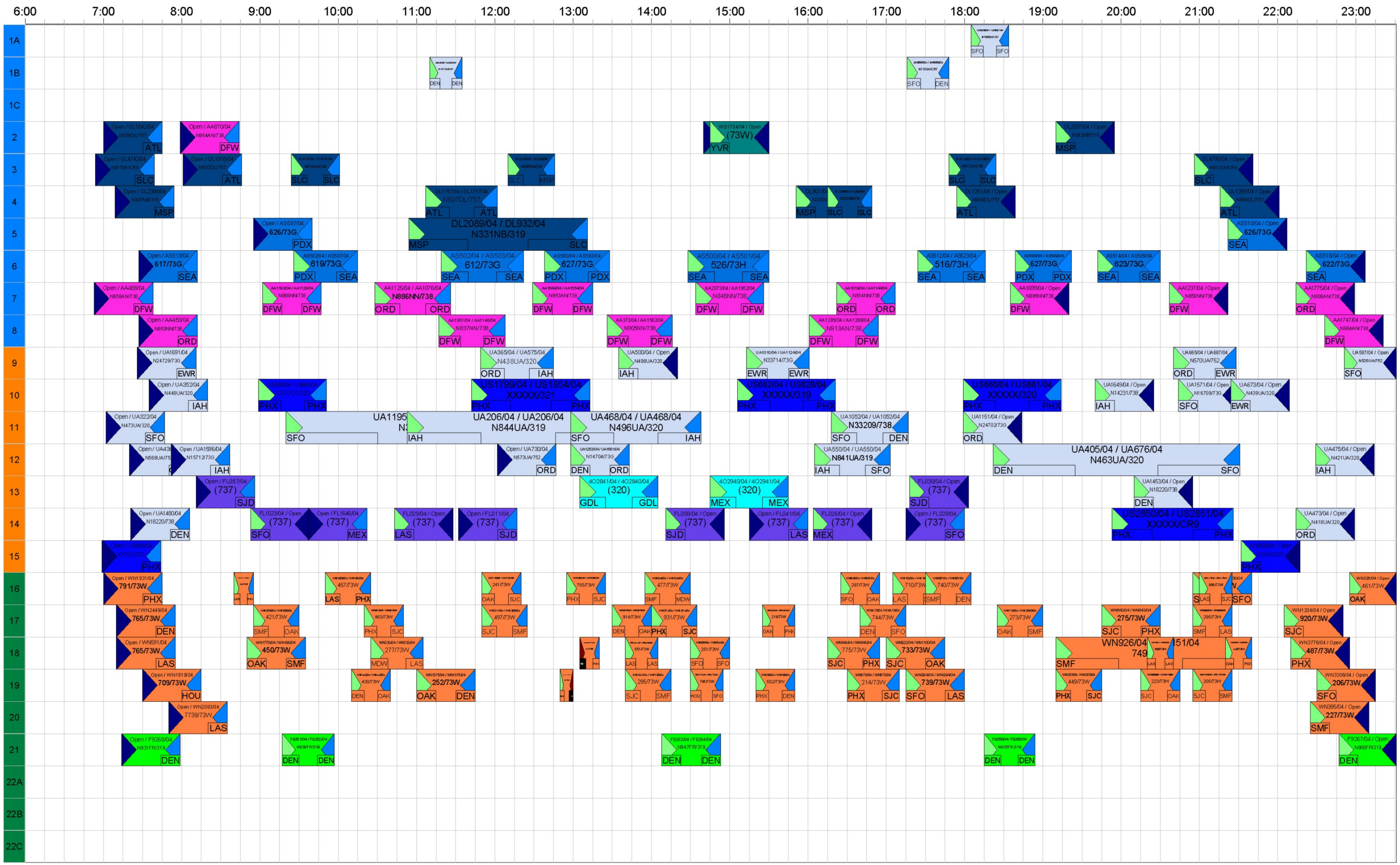
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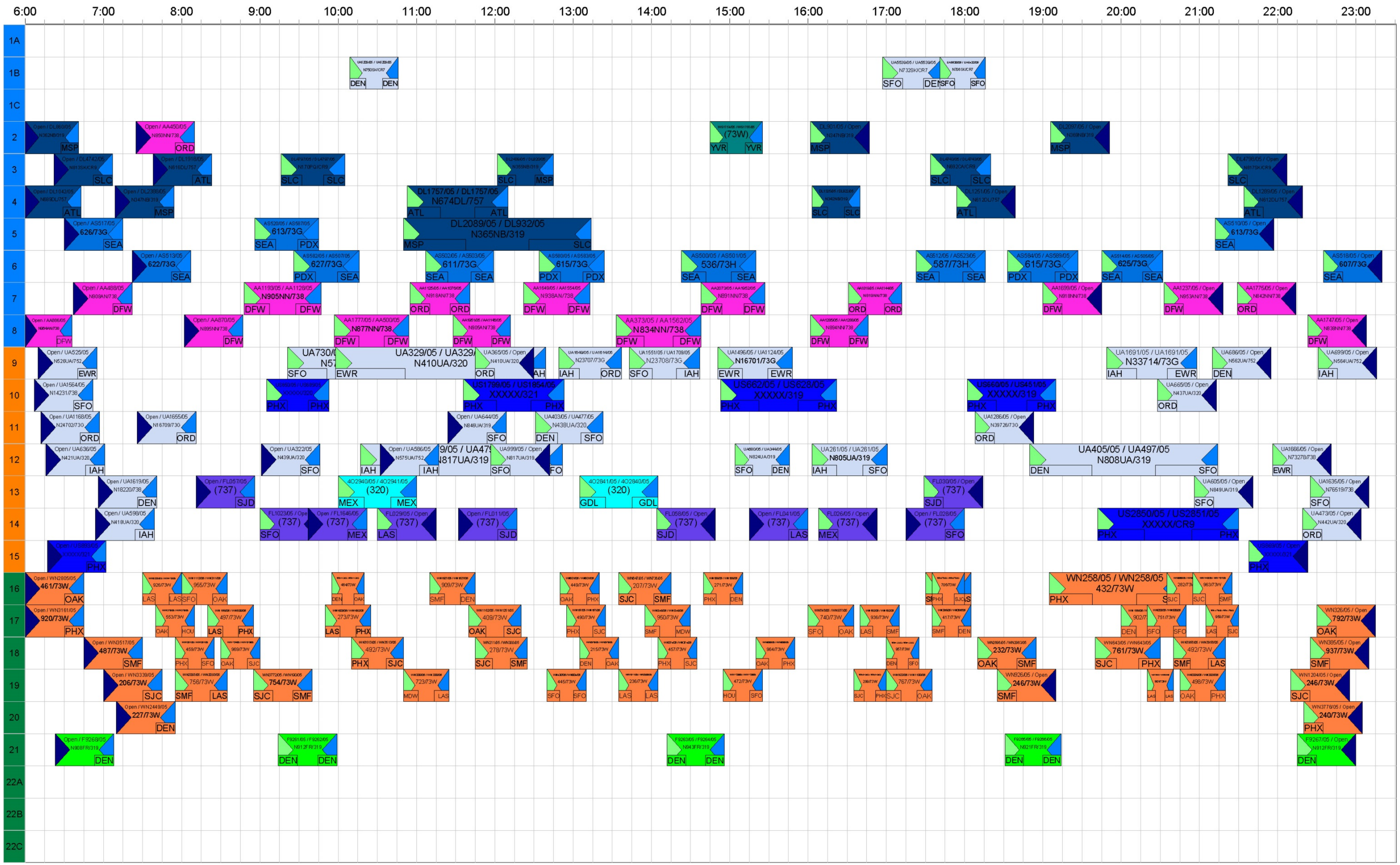

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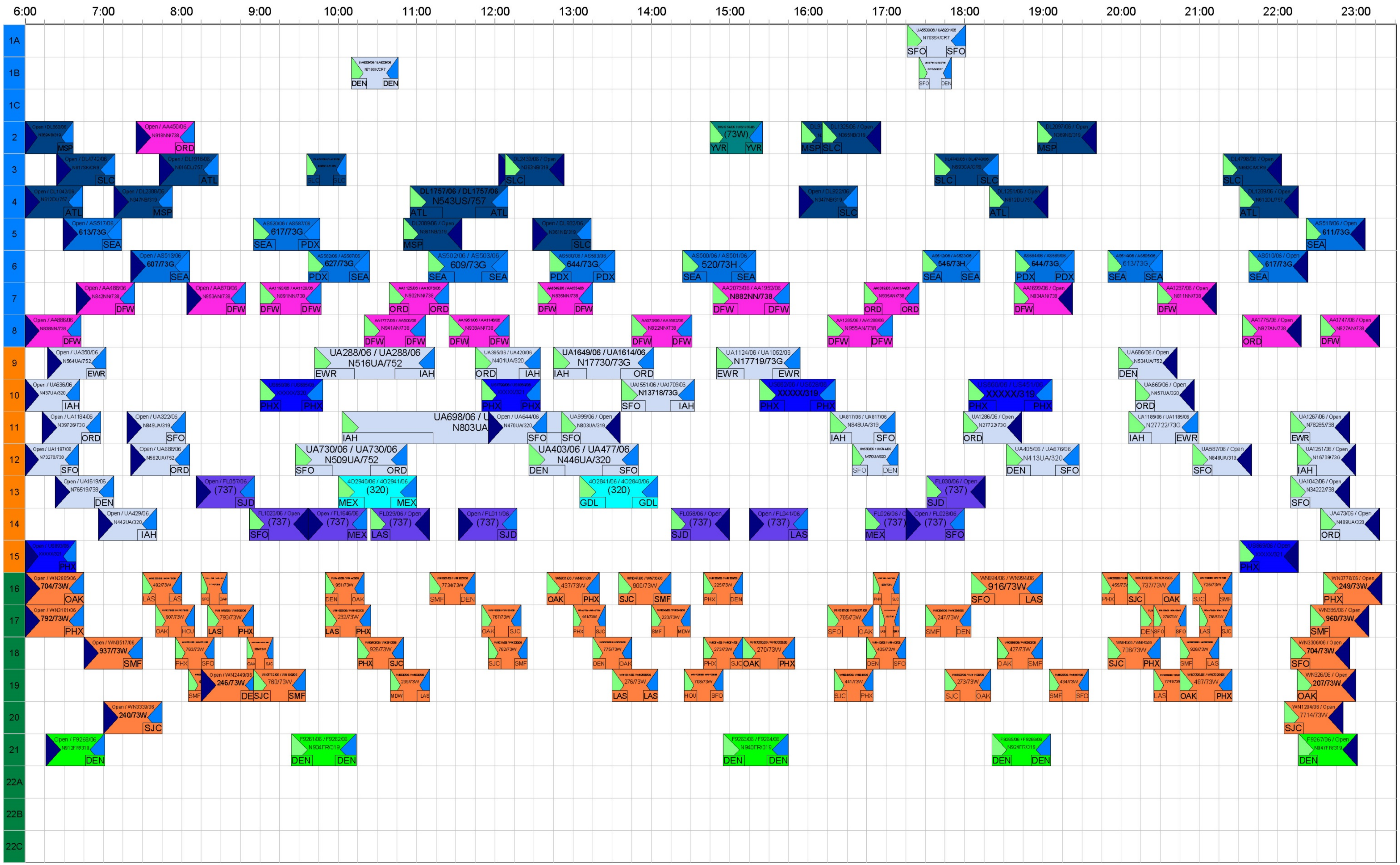
Workstation snauafdu138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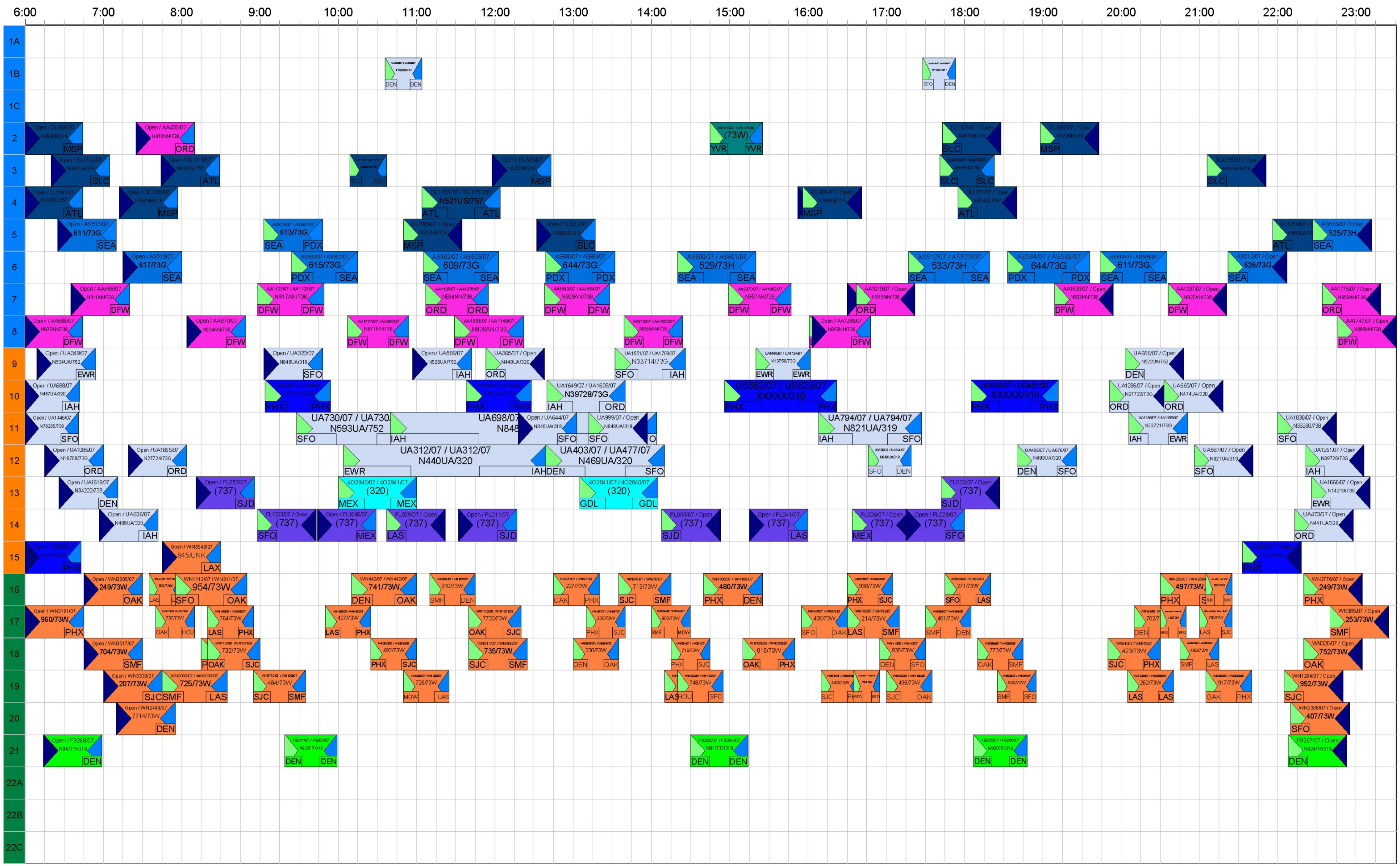
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480/73W
497/73W
952/73W
407/73W
752/73W
253/73W

APPENDIX B
FAA TERMINAL AREA FORECAST FOR JOHN WAYNE AIRPORT

Year	Total Enplanements
2012	4,217,746
2013	4,263,683
2014	4,456,323
2015	4,605,387
2016	4,710,211
2017	4,788,603
2018	4,896,612
2019	5,007,067
2020	5,120,024
2021	5,235,540
2022	5,353,670
2023	5,474,476
2024	5,598,019
2025	5,724,360
2026	5,853,564
2027	5,985,694
2028	6,120,818
2029	6,259,003
2030	6,400,319
2031	6,544,838
2032	6,692,631
2033	6,843,772
2034	6,998,338
2035	7,156,406
2036	7,318,056
2037	7,483,370
2038	7,652,429
2039	7,825,321
2040	8,002,131

Source: FAA Terminal Area Forecast, Fiscal Years 2012-2040, http://aspm.faa.gov/main/taf.asp, accessed January 16, 2014.