3.0 DEMAND/CAPACITY ANALYSIS

The process of determining Fox Airfield’s capacity requires the use of FAA planning standards. For purposes of this evaluation, capacity refers to the ability for the runway and associated taxiways to accommodate the anticipated level of aircraft activity throughout the 20-year planning period. It should be noted that the projected demand does not drive the development of facilities at the Fox Airfield. Instead, it will be the actual demand that determines when new facilities are required. Should aircraft activity increase faster than forecasted, then facility improvements should be accelerated. Likewise, should aircraft activity lag, facility improvements may be deferred or even removed from planned improvements. The use of the forecast of aviation activity indentified in Chapter 2.0 does not commit the County of Los Angeles to build facilities associated with demand, but it does provide the County of Los Angeles with a schedule of proposed development projects for planning purposes.

This chapter is organized in five sections, including:

- Airfield Capacity Requirements
- Hourly and Annual Capacity
- Annual Service Volume
- Demand vs. Capacity

3.1 Airfield Capacity Requirements

Airfield capacity is a measure of the maximum number of aircraft operations that can be accommodated on the airport or airport component within one hour. Capacity of other airport components could be calculated separately; however, for purposes of the Fox Airfield Master Plan Update, the existing airfield configuration will be used to determine the airfield capacity. Hourly airfield capacity is used to evaluate the need and timing of airport development projects. Airfield capacity is typically measured using the throughput capacity method. Throughput capacity is derived from computer models used by the FAA to analyze airport capacity and aircraft delay (for larger commercial airports).

To calculate both Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) capacity for the Fox Airfield, the FAA’s Airport Design for Microcomputers Software (version 4.2D) was used. This program is particularly useful for airports the size and configuration of Fox Airfield. Airports having a complex airfield often require simulation to determine the actual VFR and IFR capacities for each runway configuration. Table 3.1 provides a breakdown of the FAA’s aircraft classifications for airport capacity and delay. Aircraft class is separated into four categories, A through D to represent the level of wake turbulence generated for each category.
Table 3.1: Aircraft Classifications

<table>
<thead>
<tr>
<th>Aircraft Class</th>
<th>Maximum Certified Takeoff Weight (lbs.)</th>
<th>No. Engines</th>
<th>Wake Turbulence Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>12,500 or less</td>
<td>Single</td>
<td>Small (S)</td>
</tr>
<tr>
<td>C</td>
<td>12,500 – 300,000</td>
<td>Multi</td>
<td>Large (L)</td>
</tr>
<tr>
<td>D</td>
<td>Over 300,000</td>
<td>Multi</td>
<td>Heavy (H)</td>
</tr>
</tbody>
</table>

Source: FAA AC 150/5060-5, Airport Capacity and Delay

Aircraft fleet mix estimates must included VFR and IFR conditions to adjust for the decrease in demand during IFR conditions. To develop peak hour fleet mix estimates for VFR and IFR, the following assumptions were made:

- All Class C aircraft were assumed to have instrument capability; therefore, IFR and VFR demands are the same for Class C aircraft, resulting in an increased fleet mix percentage during IFR conditions.
- The effect of weather on small general aviation aircraft traffic is assumed to vary for the different aircraft classifications. Seventy-five percent of Class A and 50 percent of Class B operations are expected to drop out during IFR conditions.

3.2 Hourly and Annual Capacity

Hourly capacity is calculated for each operating condition at Fox Airfield. Fox Airfield is a single runway airport with a supporting parallel taxiway and multiple taxiway exits. Since the Fox Airfield has only one runway, operations occur on either Runway 6 or Runway 24 and capacity is the same for each. Fox Airfield can operate under two conditions: VFR and IFR. A third condition would include airport closure or impact of weather on landing minimums. Using the FAA’s model, the calculated hourly capacity for the Fox Airfield is 74 operations for VFR conditions and 57 operations for IFR conditions. The input data includes the percentage of aircraft weighing between 12,500 pounds and 300,000 pounds, the annual demand for the forecast year, and that general aviation dominates the number of annual operations.

3.3 Annual Service Volume

Annual Service Volume (ASV) is defined as the number of annual aircraft operations that may be accommodated by the runway system at an airport. ASV is often used as a reference in long-range airport capacity and delay planning. The results of an airport’s ASV include variations in runway use, aircraft fleet mix, and weather conditions over a one-year period. ASV may be calculated using two methods, a determination of weighted-hourly capacity for each runway configuration or the use of the FAA’s Airport Design for Microcomputers program version 4.2D. The FAA’s Airport Design for Microcomputers program was used to determine the ASV for the Fox Airfield. Inputs and outputs for the computer program are summarized below.
INPUT

C = Percent of airplanes over 12,500 lbs but not over 300,000 lbs 30%
D = Percent of airplanes over 300,000 lbs 0%
Mix Index (C+3D) 30%
Runway Use Configuration (Sketch No.)1
Annual demand (2029 Forecasted Operations) 87,000
General aviation operations dominate

OUTPUT

Capacity VFR Operations per hour 74
IFR Operations per hour 57
Annual Service Volume (ASV) 195,000 Operations
Ration of Annual Demand to ASV 0.45
Average Delay per Aircraft Minutes (Low) 0.2
Minutes (High) 0.4
Minutes of Annual Delay (All operations) Low 17
High 35

As identified above, the ASV for the Fox Airfield is 195,000. As compared to the ASV identified in the 1996 Fox Airfield Master Plan Update (230,000), this estimate reflects a lower and more conservative estimate. The difference in ASV is a result of a change in the mix index as well as the reduction in the number of forecasted annual operations. The 1996 plan determined the ASV for the Fox Airfield by using the instructions identified in the FAA AC 150/5060-5 entitled Airport Capacity and Delay which was last updated in 1983 and required the use of antiquated charts to identify specific inputs necessary to determine the weighted-hourly runway capacity and ASV. Using the AC 150/5060-5 to determine weighted-hourly capacity can often result in inconsistencies as human interpretation plays a large role in these results. Given the potential flaws associated with using the AC 150/5060-5, the FAA’s Airport Design for Microcomputers program version 4.2D was used. As a result, an ASV of 195,000 operations will be used as the recommended annual capacity. It is important to note that airport capacity is not constant and will likely change over time depending airfield and airspace geometry, ATC procedures, weather, fleet mix, and airport improvements.

3.4 Demand vs. Capacity

When ASV and hourly capacities are compared to the forecast annual and peak hour demand, a more clear understanding of demand and capacity can be made. Table 3.2 displays the comparisons of demand versus capacity as well as the anticipated percentage of capacity utilized.
According to the analysis, capacity at Fox Airfield is considered adequate throughout the 20-year planning period. However, should airport activity reach 60 percent of the Airport’s runway capacity, planning for a new runway should be initiated or demand management strategies should be analyzed to provide additional runway capacity. If airport activity reaches 80 percent of runway capacity, a new runway should be constructed or demand management strategies should be in place. As shown in Table 3-5, the forecasted demand does not exceed the aforementioned 60 percent threshold; therefore, no capacity-enhancing improvements are planned at this time. Hourly capacity is forecasted to utilize less than 20 percent throughout the 20-year planning period. For purposes of comparison, annual capacity is used more predominately than hourly capacity, primarily because hourly capacity incorporates the use of peaking factors. Based on the forecasted demand/capacity for the Fox Airfield over the 20-year planning period, no airfield improvements are needed at this time to achieve additional runway capacity.