

Norman Y. Mineta San Jose International Airport

Evaluation of SJC Future Demand Accommodation with Existing Facilities

April 2019



1.0 Introduction

The City of San Jose Airport Department is proceeding with a proposed amendment to the Norman Y. Mineta San Jose International Airport (SJC) Master Plan to extend the horizon year and demand forecasts from 2027 to 2037, incorporate the airfield reconfiguration improvements recommended in the Runway Incursion Mitigation/Design Standards Analysis Study (“RIM Study”), and modify other elements of the facility development program to accommodate the updated demand. As part of the CEQA analysis for the Master Plan amendment, a “No Project” alternative, which assumes no further airport facility development beyond existing improvements (including those currently under or pending construction), must be analyzed for comparative purposes. To assist in that analysis, the aviation planning/engineering services of HNTB has been procured to independently evaluate the extent to which the “No Project” alternative could reasonably accommodate the projected 2037 long range demand levels.

This evaluation focuses on “landside” facilities serving airline passenger, air cargo, and general aviation activity. The capacity of existing “airfield” facilities (runways, taxiways, and other aircraft movement areas) was previously evaluated in SJC’s RIM Study and determined capable of accommodating the 2037 demand of 237,710 total aircraft operations. That analysis applied FAA capacity metrics, including annual service volume (ASV), hourly runway capacity, and average aircraft delay, to the existing airfield layout at the 2037 operations demand levels, with and without re-opening of the west side general aviation runway, as summarized in **Table 1** below.

Table 1: SJC Airfield Capacity Analysis Summary

	Current	2037
Annual Service Volume (Operations)	240,363	241,700
Hourly Capacity (Operations)	74	73
Average Aircraft Delay (Minutes)	0.50	2.25

Source: SJC RIM Updated Capacity and Facility Requirement Analysis, 2017

As indicated, the ASV for the existing airfield in 2037 is higher than the projected demand (237,710 operations), hourly capacity is essentially retained, and the projected average aircraft delay remains within the acceptable range (delay is typically not a concern until the average exceeds 4-6 minutes). The RIM Study additionally conducted an airfield simulation modeling of 2037 demand which confirmed the finding that the existing airfield has sufficient capacity to accommodate the projected demand.

2.0 Passenger Terminal Facilities

Passenger Terminal Aircraft Gates

The existing passenger terminal facilities at SJC consist of Terminals A and B, providing a total of 30 boarding gates, and encompass a total area of approximately 1,050,000 square feet. An interim terminal expansion is currently under construction at the south side of Terminal B to add six additional boarding gates. **Table 2** presents the annual enplanements, number of boarding gates available, and the average number of enplanements served by each gate at SJC for 2018 and 2037.

Table 2: 2018 Actual & 2037 Projected Numbers of Passengers at SJC

	2018 Actual	Projected 2037
Annual Enplanements (in million)	7.14	11.27*
Air Carrier Gates	30	36
Average Annual Enplanements per Gate	238,021	312,944

Source: FAA CY 2017 Passenger Boarding Data, SJC Master Plan 2018, and HNTB analysis

*Note: Annual enplanements for projected 2037 demand is assumed to be one-half of the total number of annual passengers (22,532,000).

To accommodate the increased passenger demand in 2037 with the current construction of six additional gates, each boarding gate would serve an average of almost 313,000 passengers annually. While this is a relatively high number that would likely result in undesirable congestion at the boarding gate hold rooms and other terminal processing facilities (ticket counters, security checkpoints, baggage claim areas, etc.) during peak hours, this is still a feasible operational scenario considering that this situation occurs at other airports across the U.S. **Table 3** presents the annual enplanements for 2017, number of gates available, and the average number of annual enplanements per gate at a cross section of U.S. airports that served more than an average of 200,000 passengers per gate.

Table 3: Average Number of Annual Enplanements per Aircraft Gate at Selected U.S. Airports

Airport	Total Annual Enplanements (in million)	Number of Gates	Average Annual Enplanements per Gate
Dallas Love Field (DAL)	7.86	20	393,090
San Diego International (SAN) – Terminal 1 Southwest Airlines	4.28	11	388,885
Los Angeles International (LAX)	41.23	128	322,128
Seattle-Tacoma International (SEA)	22.64	80	282,989
William P. Hobby (HOU)	6.54	25	261,600
Ronald Reagan Washington National (DCA)	11.51	45	255,696
McCarran International (LAS)	23.36	92	253,961
Chicago Midway International (MDW)	10.91	43	253,769
San Francisco International (SFO)	26.90	115	233,913
John Wayne Airport (SNA)	5.08	22	231,033
Oakland International (OAK)	6.41	29	221,034
San Diego International (SAN)	11.14	51	218,430
Chicago O'Hare International (ORD)	38.59	191	202,058

Source: FAA CY 2017 Passenger Boarding Data for U.S. Airports, and HNTB analysis

San Diego International Airport (SAN) serves as a noteworthy example of growing demand being accommodated in constrained facilities. SAN is a west coast airport serving primarily origin & destination traffic that has continued to increase in recent years, with Southwest Airlines as its largest carrier, all characteristics similar to SJC. While SAN averaged 218,430 enplaned passengers per gate in 2017, the terminal which serves Southwest Airlines averaged almost 389,000 enplaned passengers per gate.

From an aircraft operations perspective, the number of passenger airline operations at SJC is projected at 183,920 operations in 2037. With the 30 existing boarding gates plus six new gates under construction, a gate utilization average of 14 operations per day would result. While this again is a relatively high gate utilization rate, this situation occurs at other airports across the U.S. **Table 4** presents the annual airline passenger operations for 2017, number of gates available, and the average number of daily aircraft operations per gate at a cross section of U.S. airports, or terminals where Southwest Airlines is the predominant user, that had a gate utilization average of more than 10 daily operations. As indicated, an average of 14 daily operations per gate is a feasible activity level with as many as 18 possible in constrained situations.

Table 4: Average Number of Airline Operations per Aircraft Gate at Selected U.S. Airports

Airport	Total Annual Airline Operations	Number of Gates	Average Number of Daily Airline Operations per Gate
Dallas Love Field (DAL) – Southwest Airlines	121,170	18	18
San Diego International (SAN) – Terminal 1 Southwest Airlines	73,811	11	18
Los Angeles International (LAX) – Terminal 1 Southwest Airlines	87,083	13	18
Oakland International (OAK) – Terminal 2 Southwest Airlines	79,216	13	17
McCarran International (LAS) – Terminals B, C Southwest Airlines	141,702	24	16
William P. Hobby (HOU) – Southwest Airlines	104,979	18	16
Seattle-Tacoma International (SEA)	405,049	80	14
Los Angeles International (LAX)	645,405	128	14
William P. Hobby (HOU)	119,430	25	13
Chicago Midway International (MDW)	186,227	43	12
McCarran International (LAS)	362,898	92	11
John Wayne Airport (SNA)	90,250	22	11
Oakland International (OAK)	112,222	29	11
San Diego International (SAN)	194,155	51	11

Source: CY 2017 Air Traffic Report for Multiple U.S. Airports, and HNTB analysis

Public Parking, Rental Car Parking, and Roadway Facilities

SJC currently has approximately 6,600 public parking spaces spread around six separate parking lots and garages, a total that has recently decreased due to construction of the interim terminal expansion which has displaced some vehicle parking in Lots 5 and 6. Experience of other airports indicates that limited public parking does not constrain passenger growth. Instead, a combination of behavioral and economic adjustments is typically seen, such as an increase in curbside passenger drop-offs or pick-ups by privately-owned vehicles, Transportation Network Companies (e.g., Uber or Lyft), or taxis or other commercial vehicles, increased use of commercial off-airport parking facilities that provide shuttle bus or van service to and from the terminals, and increased use of available transit alternatives. San Diego International Airport (SAN) is again a good example of an airport similar to SJC that historically has had a significant shortage of public parking, yet passenger activity has continued to increase (even during the two-year period between mid-2016 and mid-2018 when 1,200 spaces were closed in one of the surface lots for new construction).

SJC's existing consolidated Rental Car Garage was completed in 2010 to accommodate a long-range demand of 2,000 ready/return spaces, so is not proposed for any capacity increase in the amended Airport Master Plan. Notwithstanding, a shortage of rental car ready-return spaces at an airport has not been shown to impact passenger activity. Oftentimes, as has been done at SJC in the past prior to construction of the consolidated rental car garage, rental car companies will lease lots off-airport and shuttle passengers or vehicles to the more remote locations to better serve the ready/return demand.

Expansion of the airport roadway system at SJC is not proposed in the amended Master Plan other than relatively minor modifications as part of the expanded terminal and parking garage projects. However, deficient roadway capacity has not been seen to constrain passenger growth at airports. As with public parking shortfalls, roadway congestion can impact how passengers choose to access or egress the terminal, including allotting additional time as needed to navigate the roadways during anticipated periods of congested traffic. There are numerous airports in the U.S. that regularly experience severe congestion on their roadways, yet such conditions have not inhibited passenger growth (Los Angeles International and San Francisco International airports being two prime examples).

3.0 Air Cargo Facilities

Cargo activity at most airports typically occurs at separate sets of facilities utilized by all-cargo airlines and the passenger airlines carrying belly-cargo. The all-cargo airlines need airside and landside space for aircraft parking, loading/unloading operation, and surface vehicle parking/movement areas, while the passenger airlines need building space to process belly-cargo that is loaded and unloaded at the aircraft gate positions at the terminals. SJC has 6.9 acres of all-cargo airline space split between two sites on the northeast and southeast sides of the airport (one used predominantly by FedEx and the other by UPS), and a 2.0-acre belly-cargo facility just south of the passenger terminal area and is shared by multiple airlines.

Based on the cargo demand at SJC in 2037, a total of 10.7 acres of facilities for the all-cargo airlines, and 2.7 acres of facilities for the passenger airlines, will be needed. However, experience at SJC and many other airports indicates that the existing facilities would likely accommodate the 2037 demand. Air cargo operators often manage increased demand by re-distributing the functions within its existing space and cross-utilizing areas for multiple functions. At non-cargo hub airports such as SJC, airlines often prefer utilizing existing facilities that may not meet the industry guidelines for space usage rather than investing in construction or leasing of newer or larger facilities.

At SJC, the areas designated for cargo activity have remained relatively unchanged for many years despite annual cargo volumes that have fluctuated considerably. In SJC's peak cargo activity year of 2000, for example, the cargo airlines handled more than 134,000 tons of cargo and almost 6,000 aircraft operations, volumes that are significantly higher than projected for the year 2037.

4.0 General Aviation Facilities

General aviation facilities are comprised of aircraft storage and parking ranging from open tiedown spaces to large private or multi-aircraft hangars, and supporting functions such as fuel storage/dispensing, aircraft maintenance/repair, and fixed-base operator (FBO) offices and terminals. For 2037 demand at SJC, a total land area of 88 acres would be required to sufficiently accommodate the projected demand. The west side of the Airport currently consists of 79 acres of general aviation use, with available undeveloped space to provide the needed additional acreage to serve long-range general aviation demand.

Space constraints for general aviation activity do not necessarily result in limiting the demand for general aircraft operations. FBOs typically have a lot of flexibility in managing their hangar and ramp space, and will park, stage, or move aircraft as needed to accommodate demand on a daily basis. Las Vegas McCarran International Airport (LAS) is a notable example of an airport with constrained general aviation facilities, yet has accommodated annual increases in general aviation operations through such FBO leasehold management practices, including during special events that often generate a short-term surge in general aviation demand. Additionally, at airports serving a lot of corporate aviation activity, such as SJC, some aircraft operators also have been known to base their aircraft elsewhere and ferry them in as transient operations to serve their local demand.

5.0 Conclusion

The experience of airports across the U.S., including SJC, has demonstrated that aviation activity levels are not constrained by shortfalls in facility design capacity. As long as airlines and other aircraft operators identify a demand to be served at an airport, those air service providers and their customers have shown a willingness to tolerate and adjust to delays, congestion, and other inconveniences resulting from constrained facilities (much the same way as vehicle traffic on a freeway can regularly, and at times significantly, exceed the roadway's design capacity). While airport master plans set forth a physical layout and program for facility improvements intended to sufficiently accommodate projected demand, actual implementation of specific improvements typically occurs in a "catch up" manner after activity growth has already exceeded existing facility design capacity. For SJC's Master Plan amendment "No Project" scenario, this evaluation therefore concludes that no expansion of existing facilities will not deter the activity demand projected for the year 2037 from materializing, and instead would generate undesirable service levels and impacts that the facility improvements proposed in the Airport Master Plan amendment are intended to address.