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To: San José Mineta International Airport (SJC) Executive Management Team

Date: September 6, 2024

Re: Airport Connector - Summary of SJCP Ridership Study and Project Evaluation

Attached: Technical Review of San José Connection Partners Ridership Study and Project Evaluation

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The attached technical report provides Landrum and Brown's (L&B's) review of the San José Connection Partners (SJCP) Draft Feasibility Study, primarily focusing on the ridership study completed by Steer and an evaluation of impacts to Airport development. L&B was founded in 1949 to support the development commercial air passenger service at airports. L&B has developed industry practices for landside analyses and has evaluated countless airport transit connections since its inception. Most recently, we have been engaged by the San Diego County Regional Airport Authority to assist with the evaluation of proposed transit alternatives developed by the San Diego Association of Governments.

This cover letter provides L&B's overall evaluation of the proposed transit project in which both challenges and potential flaws are identified along with summarizing the findings of our review of the ridership study to San José Mineta International Airport (SJC) staff.

Project Evaluation

SJCP defines the project as either full build, from Diridon Station to the Long-Term Parking Lot, or as the segment from Diridon Station to Terminal B. This implies a preference that the entire project should be constructed at one time, an approach that raises some concerns. The vehicle technology that SJCP is proposing to use is unproven and carries a greater risk of "teething issues" or failure than a conventional automated people mover (APM). If the technology does fail, the guideway that is being constructed will not be designed to support conventional APMs or buses. Additionally, the on-airport service that it would replace provides better access and shorter walking distances to the Long-Term Parking Lot for SJC's customers. The existing bus service also mostly consists of zero-emission battery powered vehicles and is more flexible to future facility changes, as SJC is further developed.

There are currently no funded proposals to further densify the use of Long-Term Parking Lot parcel, beyond the existing parking garage as additional infrastructure would require a new bridge over the Guadalupe River. Any fixed-guideway transit service should be planned in conjunction with future land use changes and integrated into the development to minimize walking distances and maximize the benefits of the investment. For these reasons, **L&B recommends that SJC pause on any extensions of the SJC Connector beyond Terminal B** until its technology is proven and plans for the northeastern quadrant of the airport are funded and those plans integrated with the proposed transit improvements. While L&B believes there is merit in exploring the first segment from Diridon Station to Terminal B, it is recommended that **SJC should proceed with caution**.

Ridership Estimates Review and Evaluation

The lack of City of San Jose transit model documentation, and inability to review the final Steer spreadsheet model, raises questions regarding its overall precision in estimating airport trips. There are limited current data/surveys for SJC, with most of the data over a decade old, resulting in outdated model inputs and assumptions. However, it is L&B's understanding, that many of these concerns will be addressed in future modeling efforts. The model is covered in more detail in the attached study.

Top Line Findings & Recommendations

- Almost all the benchmark cities/airports in the Steer report are of significantly greater size, density and have much higher airport landside volumes than SJC.
    - **Recommendation:** L&B is more confident with a benchmark transit mode share target in a range of 4 to 5%, similar to OAK and PDX, as it is more achievable than Steer's 11% transit share and would still represent a significant increase over the existing 1 to 2% transit share.
- AM Peak matrices are overstating the impact of congestion on auto travel and the attractiveness of transit.
    - **Recommendation:** L&B recommends the development of new matrices or some hybrid of the existing AM Peak and Midday matrices be used instead.
- A 20-minute SJC Connector buffer time discount is too generous, and a half-mile walk shed is too far of a walk for most air passengers with luggage.
    - **Recommendation:** L&B recommends that walk-shed alternatives of a one quarter and one third mile be tested, along with reducing or eliminating the buffer time entirely.
- The future Diridon Station land use and transit improvement assumptions appear aggressive, potentially in scale and timing, both with impact to the ridership estimates.
    - **Recommendation:** Aside from various ridership estimation issues previously identified by L&B, there are also concerns over if/when the proposed transit improvements and land use changes around the 80-acre Diridon Station site will materialize. L&B also recommends that the City of San Jose explore ridership scenarios without California High Speed Rail (CHSR), due to its highly speculative nature.

The following sections summarizes the analyses on which L&B's recommendations are based. Additional details can be found in the attached *Technical Review of San José Connection Partners Ridership Study* (Technical Review).

Benchmarks

The Steer transit share benchmarking included 10 airports, aside from OAK, that were not directly comparable to SJC. The remaining 9 airports are located in much denser metropolitan areas, handle far greater trip volumes on their landside (O/D enplanements), and are more centrally located or directly integrated with their regional transit systems.

To identify more suitable benchmarks, L&B reviewed the full list of 33 medium hub airports in the country and assessed their area population densities and O/D enplanements, in which 4 airports were selected and OAK was added from the Steer analysis based on its similarity to SJC. The complete analysis can be found in the attached Technical Review. The table below (on the next page) presents the transit mode shares for each of the benchmarked airports.

The average transit modal share for the five airports surveyed was 4% - the highest being 5% and the lowest 1%. This is substantially less than the 11% average transit modal share calculated by the SJCP analysis. However, several of the airport's surveyed (PDX, CLE and STL) provide direct one-seat rides

to their region's central business district – providing more direct access for tourist and business travelers than the SJC Connector would.

Transit Shares for Five L&B Benchmark Surveyed Airports

Airport	City	Transit Agency	Transit Type	Transit Mode Share
OAK	City of Oakland	BART	Rail	4%
PDX	Portland	TriMet	Rail	5%
STL	St. Louis	Metrolink	Rail	4%
CLE	Cleveland	RTA	Rail	4%
BUR	Burbank	BUR Airport	Bus/Rail	1%
			Average Transit Mode Share	**4%**

Source: Data collected from the Airports and the various transit Agencies Serving them, Such As: BART, BUR Airport, Port of Portland

Congested Roadways and Higher Transit Frequencies

The higher levels of roadway congestion and more frequent transit services defined in the AM Peak matrices would not be experienced by most air travelers. Airport departure and arrival peaks do not completely align with the commutation periods, as highlighted in Figure 1 of the attached Technical Review. The AM peak period only accounts for 18% of all departing air travelers that are accessing the airport, with the remaining 82% traveling to the airport either before or after the AM peak period. This pattern is similar for SJC's arrival-hours (arriving passengers) as well. It is L&B's assessment that, that the combination of longer auto travel times and higher transit frequencies unduly bias the SJC Connector over auto and for-hire vehicle alternatives.

Land Use and Transit Developments

The Steer model assumed transit improvements that include extension of Bay-Area Rapid Transit (BART) Silicon Valley Berryessa Transit Center to Diridon, along with a stop for CHSR. The Downtown West Mixed-Use Plan, a partnership between the City of San José and Google was also assumed. This would result in up to 7.3 million gross square feet (GSF) of office space; 5,900 units of new housing; up to 500,000 GSF of active uses (retail, cultural, arts, etc.); 100,000 GSF of event space, hotel use (up to 300 rooms), and limited-term corporate accommodations (up to 800); and 15 acres of parks and open space. The half-mile walkshed assumed by SJCP in the model will place much of the development within walking distance of the SJC Connector. All these improvements are assumed in the SJCP ridership model.

The BART extension recently was awarded state and federal funding grants, which makes this project more of a reality even though its timing is still uncertain. The Downtown West redevelopment timing is also unclear since Google has slowed its investment, as it struggles with rightsizing its business post-COVID. Finally, realizing the full intercity benefits of CHSR from San Francisco to Los Angeles is far from certain since the program is not fully funded and there is no official completion date. Plans for an initial operating segment (IOS), from Merced to Bakersfield might open by 2033, but would not include HSR service to Diridon Station. These transportation and land use improvements likely have a substantial impact on the ridership estimates and scenarios should be developed for various transit (similar to CHSR) and development outcomes/timings.

SJC Transit Connector

Technical Review of San José Connector Partners Ridership Study and Project Evaluation

Final – September 2024

PREPARED FOR

San José International Airport

PRESENTED BY

Landrum & Brown, Incorporated

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1 Purpose of Document

Landrum & Brown (L&B) was retained by San José Mineta International Airport (SJC) to review the San José Airport Connector Ridership Forecasts developed by the consulting firm Steer ("Steer Report") for San José Connection Partners (SJCP)[1], released in March of 2024. L&B was founded in 1949 to support the development commercial air passenger service at airports. We are experts on the airside/airfield, terminals, and landside. L&B has developed industry practices for the landside analyses and has evaluated countless airport transit connections since its inception. Most recently, we have been engaged by the San Diego County Regional Airport Authority to assist the evaluation of proposed transit alternatives developed by the San Diego Association of Governments. This document provides a concise critical review of the Steer Report's ridership analysis including the tools/models used, inputs, assumptions made and benchmarks.

2 Summary of Findings & Recommendations

The primary findings from L&B's review of Steer's Ridership Study, completed for San José Connection Partners, are the following:

- The lack of City of San Jose model documentation, and inability to review the final Steer spreadsheet model, raises questions regarding its overall precision in estimating airport trips. It is our understanding, that many of these concerns will be addressed in future modeling efforts.
    - There are limited current data/surveys for San José Mineta International Airport (SJC), with most of the data over a decade old, resulting in inaccurate model inputs and assumptions.
- The project should be constructed in phases – not as the proposed full-build – and initially without the intra-airport segment. The intra-airport segment requires additional planning and coordination with the Airport's overall future development. In addition, the risk associated with the technology should initially be limited to an initial minimal operating segment.
- Almost all the benchmark cities/airports in the Steer report are of significantly greater size, density and have much higher airport landside volumes than SJC. Additionally, the Steer estimated average of 11% transit modal share is more than twice what L&B found at more comparable airports (4%).
- The future Diridon Station land use and transit improvement assumptions appear aggressive in scale and timing, both have the potential to impact the final transit ridership estimates.
- The AM Peak matrices may be overstating the impact of congestion on auto travel and the attractiveness of transit.
- The 20-minute SJC Connector buffer time discount is too generous. A one-half mile walk shed is not a feasible for most air travelers with families and/or luggage.

[1] San Jose Connector Partners is a consortium selected by the City of San Jose in 2023 to develop a transit connection between SJC Airport and the future transit hub at Diridon Station.

3 Steer Report Structure & Project Background

The Steer Report, prepared for the project feasibility study, is organized into eight chapters as followings:

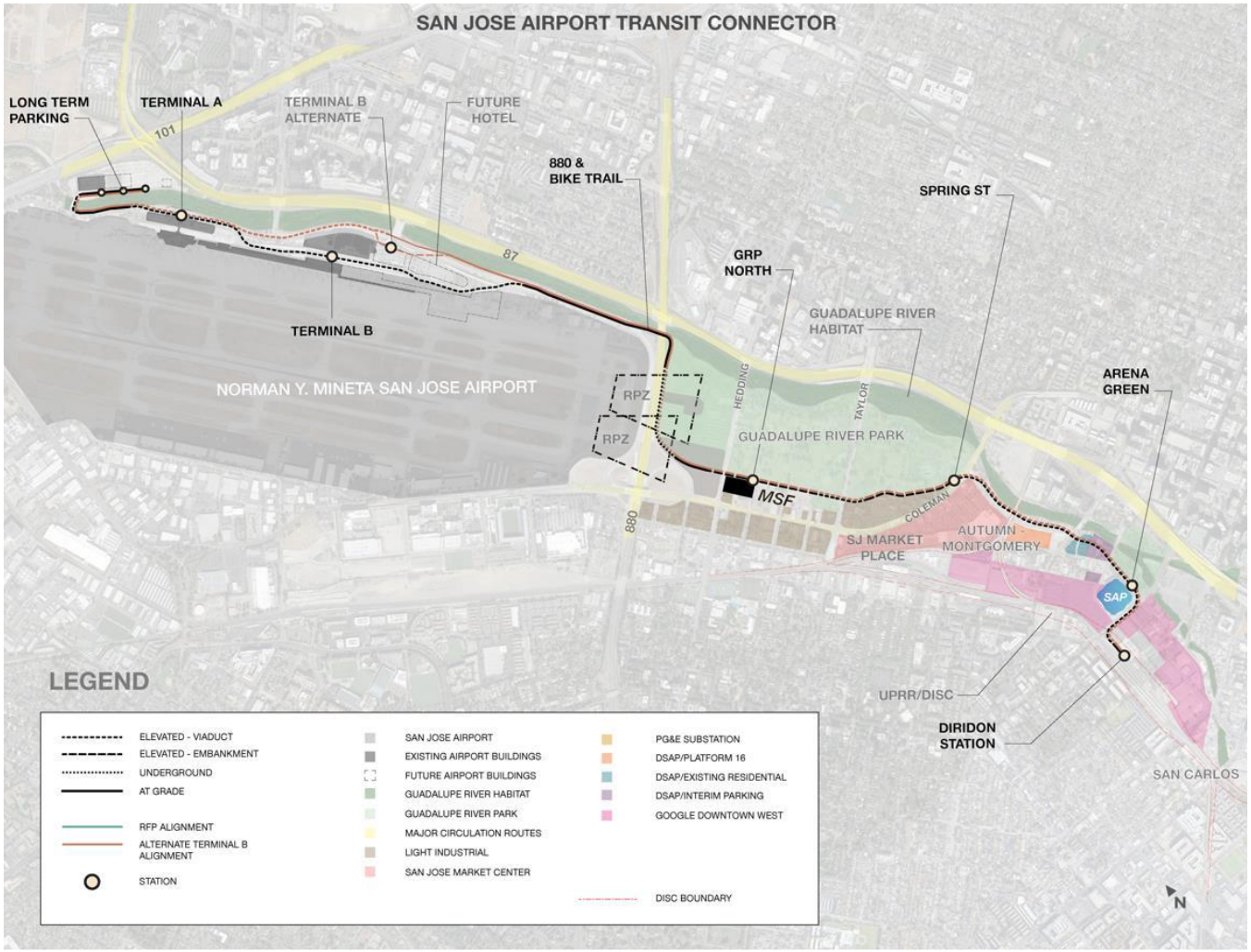
- Chapter 1 providing background information on the project itself.
- Chapters 2 through 4 focus on model inputs, the forecasting tool, and modal choice analysis.
- Chapter 5 overviews the California High-Speed Rail project and its potential impacts.
- Chapter 6 arrays the results of the forecast model.
- Chapter 7 details the benchmarks that were used.
- Chapter 8, the final chapter, discusses next steps that the Steer team will take to further refine the forecasts to a “financial grade” level.

The authors of the Steer Report make it clear from the outset that this a “planning-level” forecast that, “cannot be relied upon as a basis for making financing decisions.” Based on L&B’s review, the L&B team agrees with this statement.

The project evaluated in this ridership study consists of a grade-separated autonomous on-demand personal rapid transit system, which is referred to as an automated transit network (ATN). This system would connect SJC to Diridon Station, an existing transit station offering commuter and intercity rail services along with connections to the City of San José light-rail and bus services. Diridon Station is also the site of a future underground BART station, an extension from Berryessa, and will be a future stop for California’s High-Speed Rail (CHSR). The ATN vehicles, developed by Glydways, would have a maximum capacity of four passengers.

The base system of the project (or SJC Connector) would run from Diridon Station to Terminal B at SJC, mostly along an elevated viaduct, and then return to the surface with an at-grade station at the Airport, either behind a future garage at the Consolidated Rental Car Facility or at the Terminal B Ground Transportation Island. The project also includes an option to extend the SJC Connector to Terminal A at SJC and then to the Long-Term Parking Lot, which would have three stops. Moving forward this will be referred to as the intra-airport option. There could also be several intermediate stations between Diridon Station and SJC Airport, as shown in the following project map.

Project Alignment and Stops with Intermediate Stations



Source: HNTB

4 Review by Section

The following contains our critical review of each of the Steer Report chapters and their respective subsections.

4.1 Chapter 2: SJC Connector Features

This chapter articulated the assumptions used by Steer for the SJC Connector pricing, in-vehicle travel times to and from the airport to Diridon Station and connection walk times between various modes at Diridon Station. L&B also provides feedback on the viability of the on-airport extension of the project, which would replace the existing internal circulator bus service.

4.1.1 Fares

The first table in Chapter 2 of the Steer Report details the various fare offerings for the SJC Connector, including the intermediate stops. For the purposes of this review, we are only focusing on the fare from the Airport, which ranges from $13.00, if a traveler is reserving the entire ATN vehicle, to $6.50, if a traveler is willing to share its occupancy with other riders.

Table 1 arrays the fare from nine benchmark airports with existing transit connections. The four bolded airports are the new benchmarks L&B identified (see **Section 4.6** for more details) and the remaining five are selected airports from the earlier Steer study. The average of these nine fares is $4.77, but this figure is overstated. The fares for Portland International Airport (PDX), St. Louis Lambert International Airport (STL), Cleveland Hopkins International Airport (CLE), and Hollywood Burbank Airport (BUR) are trips from each airport's respective city centers – a distance greater than the approximately three-miles covered by the SJC Connector. If these fares were adjusted to account for this disparity, the average fare would be closer to $4.00. The highest fares are the AirTrain services at Newark Liberty International Airport (EWR) and John F. Kennedy International Airport (JFK), which connect users to a dense and far-reaching transit network, and San Francisco Bay Oakland International Airport (OAK), which is operated by a third-party. The SJC Connector's effective fare collection (per vehicle) would range from $13.00 to $26.00 (assuming the system would try to fill at least two seats in every vehicle when sharing is selected, which is the same as the solo fare). Another issue that requires attention is fare discounts. Most cities offer these for low-income households, seniors or mobility challenged persons, which is currently not discussed in the Steer Report or the other related financial feasibility documents.

Table 1: Fare Comparison of Existing Airport Connecting Transit Services

Airport	Transit	Fares	Without AirTrain
JFK	AirTrain	$ 8.50	-
EWR	AirTrain	$ 8.50	-
DCA	Metro Rail	$ 2.50 *	$ 2.50
ORD	L Train	$ 2.50	$ 2.50
OAK	Airport Connector	$ 7.10	$ 7.10
PDX	TriMet Max Rail	$ 2.80 *	$ 2.80
STL	MetroLink	$ 3.00 *	$ 3.00
CLE	RTA	$ 2.50 *	$ 2.50
BUR	Metro Link	$ 5.50 **	$ 5.50
	Average	**$ 4.77**	**$ 3.70**

*These systems – Ronald Reagan Washington National Airport (DCA), Portland International Airport (PDX), St. Louis Lambert International Airport (STL) and Cleveland Hopkins International Airport (CLE) – do not have airport fare surcharges and reflect the fare from the city center to the Airport.
**The Metro Link system at Burbank has two rates depending on the line used and the destination/ entry gate of the airport. The charge from union station to the Southern terminal of the airport is $ 4 and the fare for the northern terminal is $ 6. Therefore, a midpoint of $5.50 is considered for this comparative study.
Source: Various public transit agencies

4.1.2 Travel Time

We are not in a position to dispute the estimated travel times since we do not have the details of the simulation model used to generate them. However, a quick calculation indicates that for a vehicle to traverse the distance (based on the approximately 3.5-mile alignment) between Diridon Station and SJC in 9 minutes, it would need to operate at an average speed of 23 miles per hour (mph), which appears reasonable.

4.1.3 Diridon Station Transit Transfer/Connection Times

It is difficult to assess the validity of average walking time used between arrival on transit at Diridon Station and then walking to the SJC Connector access point within the multi-modal complex (transfer walk time) without additional details on the station configuration, which are not provided in this study.[2] This transfer time will vary based on proximity of the service (which will again, likely vary since there will be several) and whether it is at the same level or require one or more level changes to access. In addition, the varying degrees of customer mobility needs to be considered and evaluated, accordingly, when developing this assumption. The two minutes used is likely at the low end of the potential range

[2] Vol 1 of the Feasibility Study does contain some initial site plans for the Diridon ATN Station; however, it is not completely clear how the circulation between this station and the rest of the complex will be organized. In addition, the ATN station is located on the northeastern corner of the station at the far end of the platforms, adjacent to the bus bays but further from the Caltrain, Amtrak and LRT services. It is also unclear how the new underground BART station would be connected to the ATN or future CHSR.

and should be evaluated as more details of the station design elements are provided and the desired market surveys completed.

4.1.4 SJC Connector Station Access, Maximum Walking Distance

The maximum walkshed for SJC Connector stations was set at a one-half mile distance. While this is the industry standard for most public transit, Steer should consider the practical reality that most airport users will be carrying/rolling luggage and will be less willing to traverse a distance of this extent. Steer should undertake a sensitivity analysis (or as a part of a future survey) to evaluate one-quarter of a mile and one-third of a mile walksheds.

4.1.5 Intra-Airport Segment of the Transit Connector

When reviewing the plans for the intra-airport option of the transit connector, the L&B team had several concerns beyond the proposed availability payments and SJC's capacity to support them. L&B does not dispute the internal circulation ridership estimates, except for the higher master plan enplanement forecasts used, which we understand is being adjusted and will likely result in overall lower ridership figures. This is a captive market, and it is reasonable to assume that ridership will shift from the existing bus/shuttle circulator service to the intra-airport option of the Connector. We also understand the attractiveness of moving ahead with the base project plus intra-airport segment instead of breaking it into phases, which includes capital cost (construction staging) savings and more attractive financing, due to captive ridership and larger definitive (availability) payments. However, there are several reasons why this might not be the appropriate time for SJC to replace the internal circulator system and why it could result in a degraded level of service (LOS) for long-term parkers.

4.1.5.1 Lack of Alignment Between Land Use and Proposed Transit Service

The Long-Term Parking Lot is an over 10-acre site that has been used for surface parking since the 1990s. In 2020, SJC allocated roughly two acres of property for the construction of a multi-story parking deck. This left approximately 8 acres still allocated for surface parking. While it is considered in the SJC Airport Master Plan, there are no formal redevelopment plans for these remaining acres, as additional infrastructure would require an additional bridge over the Guadalupe River. The proposed intra-airport option plans would result in three transit stops placed in areas that could be suboptimal to support the future redevelopment of the site. There should be an integrated planning process to determine the future "best and highest use" for the site and incorporate the fixed-guideway transit service in way that would complement the redevelopment plan. There are several examples of this in California, which include:

- San Francisco International Airport (SFO)'s new APM service to/from their Central Terminal Area (CTA) that serves a new structured long-term parking deck and consolidated rental car facility, which are both located on airport property.
- Los Angeles International Airport (LAX)'s new APM service connects multiple structured parking facilities, regional transit services and a consolidated rental car facility, most on-airport property.

The above are examples of projects that developed a new transit service to an empty service lot with a clear development plan that would densify its future use. However, if it's ultimately decided that the

long-term lot and garage as currently configured meets the airport's future needs, and there is no additional need to support growth through greater densification of this site, then the extension of the inter-terminal option would be impractical. The costs of constructing, maintaining, and operating the infrastructure would likely be excessive for such a low-density use. Over time, as autonomous vehicles enter the market and mature, these technologies could be applied to replace the current conventionally operated mix-traffic electric shuttle buses to further lower transportation costs to serve this facility.

4.1.5.2 Accessibility Impacted for Long-Term Parking Customers

The current internal circulation shuttle bus serves six stops located within the Long-Term Parking Lot that are spaced out evenly along its perimeter. The SJC Connector will have only three stops on just one side of the lot, parallel to the existing Guadalupe River Bike Trail. SJCP has stated that the increased frequency and greater speed of the Connector will mean that overall travel time is improved. However, this will substantially increase the walking distances for roughly half of the long-term parkers. While this will be a serious impediment for those with impaired mobility, it is also a safety concern for many that will be accessing the lot, especially for arriving passengers later in the evening.

4.1.5.3 Electric Buses Eliminate Environmental Justice (EJ) Concerns

One element that typically makes a fixed-guideway system attractive is their use of electrically powered vehicles, which eliminates the noxious emission of diesel bus services that they have historically replaced. Yet, in this particular case, SJC has already electrified the majority of their bus fleet, eliminating the majority of local green-house-gas (GHG) emissions and operating with reduced noise.

4.2 Chapter 3: Forecasting Tool Development

The CSJ travel demand model appears to have been calibrated using all trips in the region, and therefore does not capture the uniqueness of airport access trips, which differ in many respects, including baggage carrying, group travel, friends and family driving of airport passengers, non-repetitive trips, etc. L&B requests a copy of the travel demand model to review and comment on its applicability to airport access trips.

4.2.1 Modal Shares

The Steer team is clear about the model's imprecision and lack of recent traffic and survey data. We agree that that modal data in table six, on page 13, of the Steer Report is out of date and needs to be updated. The transit share is likely around 1% (assuming a post-pandemic decline, similar to what we have seen in other systems[3]), based on Steer's review of the ridership. However, we do have concerns with arbitrarily tripling of rideshare modal share. No recent survey of air passengers has been

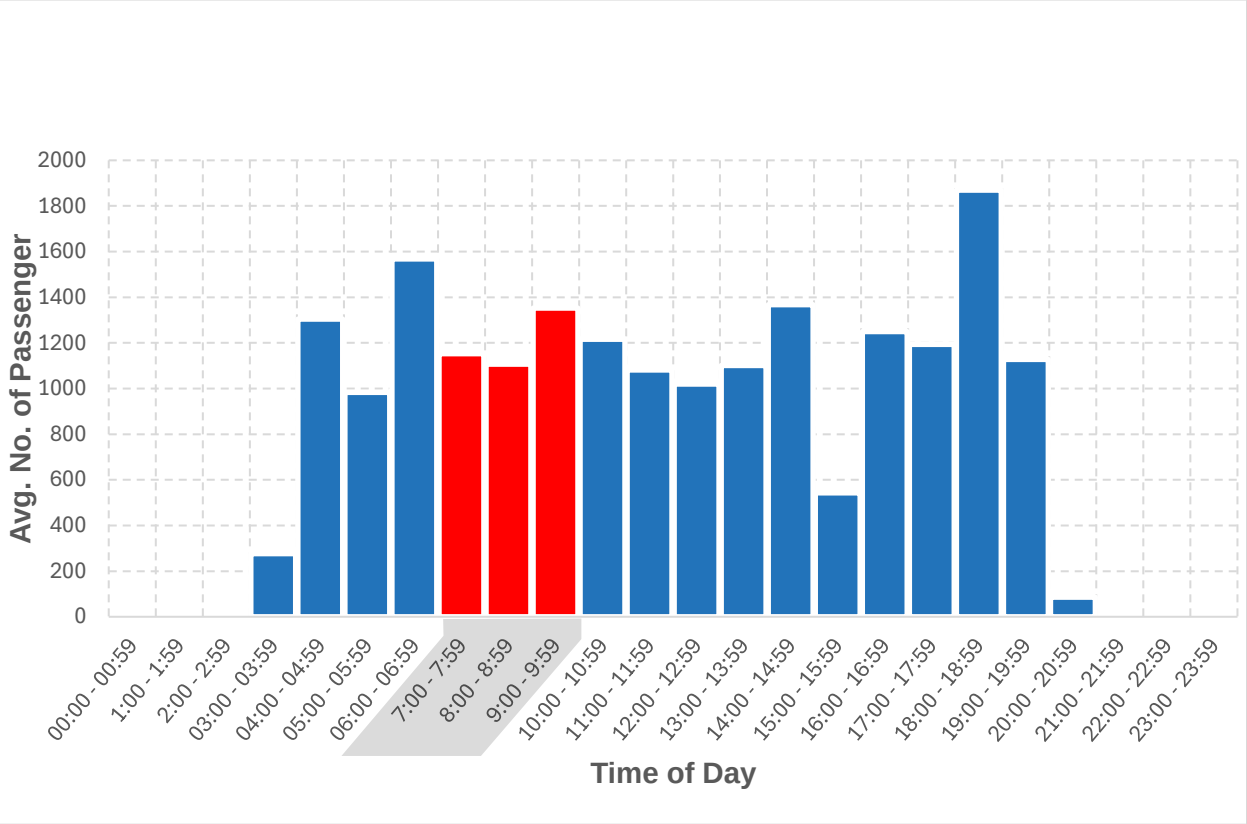
[3] Since COVID-19 transit systems in the United States have struggled to return to ridership levels that existed prior to the pandemic. According to recent report released by the American Public Transportation Association, public transit ridership nationally has rebounded to just 79% of pre-pandemic levels. In the San Francisco Bay Area, the recovery has been far slower, as of June 2024 the BART system's average weekday ridership had only reached 40% of pre-COVID levels. Public transit directly feeds airport transit connections, so when these systems are perceived as less attractive and safe by many users it further depresses the use of transit to airports.

performed, and therefore the report does not have enough data required to estimate the raise of app-based rideshare and other impacts post-pandemic.

4.2.2 Travel Times and Costs

The use of peak period auto travel times, along with peak-transit frequencies, for the entire day is too aggressive. Airport departure and arrival peaks do not completely align with the commutation periods. The extended commuter AM Peak period has traditionally spanned from 7:00am to 10:00am. While the post-pandemic travel behavior changes have blurred the lines – with some commuters shifting further into the shoulders – the majority of those still commuting to an office travel during these times. As shown in **Figure 1** below, SJC's peak departure-hours are 6:00pm to 7:00pm followed by 6:00am to 7:00am – with passengers traveling to SJC to depart to their destinations throughout most of the day, including the AM Peak. The AM peak period only accounts for 18% of all departing air travelers that are accessing SJC, with the remaining 82% traveling to the airport either before or after the AM Peak period.

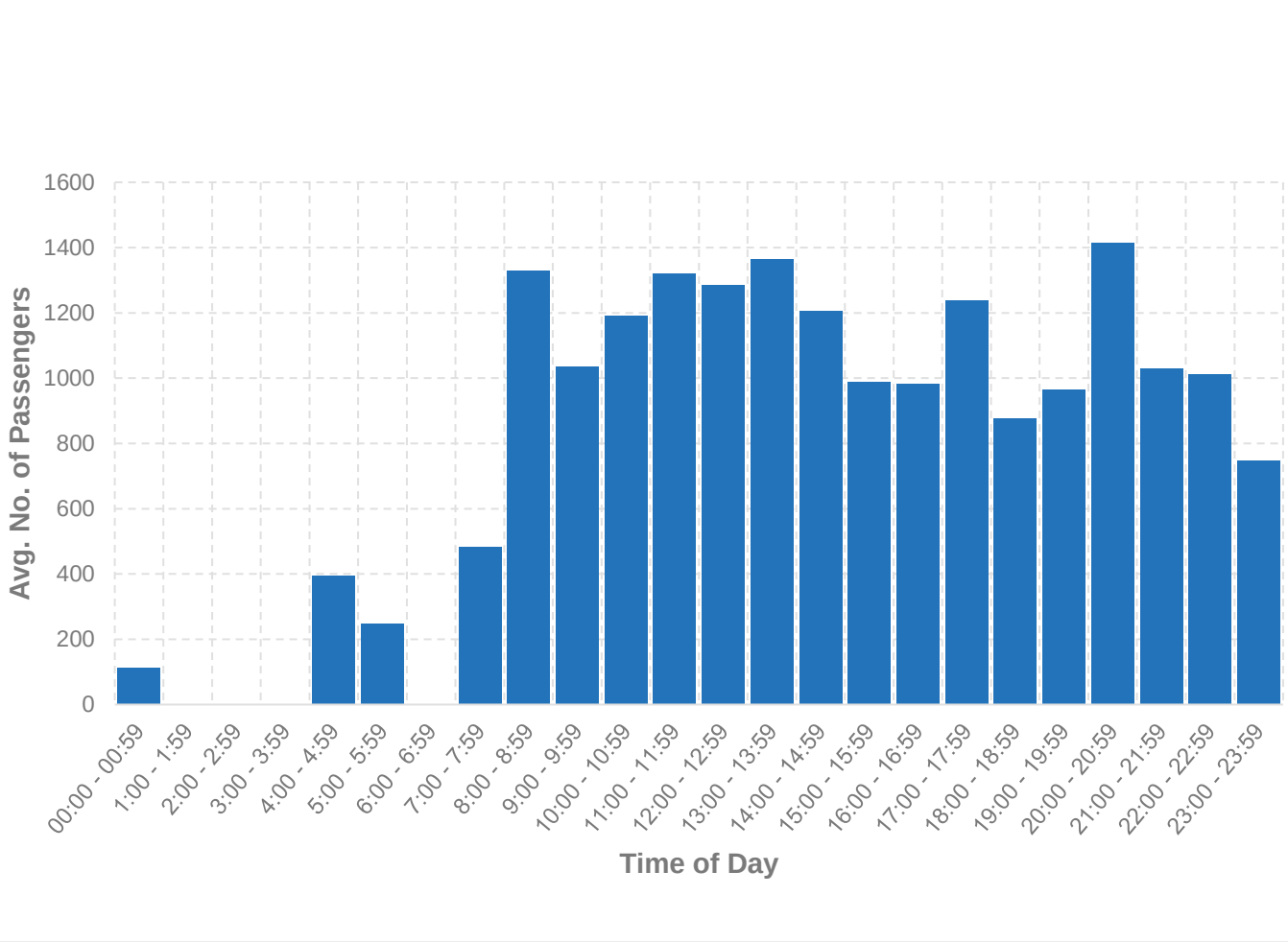
Figure 1: Departing Air Passengers by Hour (Scheduled Peak Day, Summer 2024)



Source: San José Mineta International Airport (SJC)
Notes: Load factor used was 79%, based on the Load Factors of the recent years procured from transtat.bts.gov.

As shown in **Figure 2**, the peak-arrival hour is from 8:00pm-9:00pm, with another busy arrival period occurring during the Midday. The AM Peak period only accounts for 15% of all arriving air travelers that are leaving the airport, with the remaining 85% leaving the airport either before or after the AM Peak period. These data show that level of congestion represented by the AM Peak matrices would not be experienced by most air travelers. In addition, many of these travelers are departing and arriving the airport during times of lower transit frequencies or when transit is not even available. It is our assessment that the combination of the longer auto travel times and higher transit frequencies associated with the applied AM Peak matrices, unduly bias the SJC Connector over auto and for-hire vehicle alternatives.

Figure 2: Arriving Air Passengers by Hour (Scheduled Peak Day, Summer of 2024)



Source: San José Mineta International Airport (SJC)
Notes: Load factor used was 78%, based on the Load Factors of the recent years procured from transtat.bts.gov.

However, we do understand this was the only data available and do agree with Steer that additional surveys are needed. L&B recommends that a sensitivity analysis be conducted to assess the relative impact of the AM Peak and Midday matrices on ridership.

4.2.3 Travel by Airport Staff

This overall analysis is sound based on available information. However, as noted by the Steer team, we are concerned that the span of operation and frequencies of most of the existing and planned connecting transit services at Diridon Station will not align with airport employee shift changes. This has been a problem at airports across the U.S., including SFO.[4] The SJC Connector might run 24 hours a day, 7 days a week, but most of the regional transit services will not. The coverage, span of service, and its frequency are critical factors in an employee's decision to shift modes.

4.2.4 Captive or Unserved Travelers

The methodology and logic applied in this section on captive or unserved SJC Connector travelers raises some questions. Why would a group larger than four (the capacity of the ATN vehicles) not reserve two or more vehicles? For example, couldn't three of the passengers take one vehicle and the remaining two call another? Similar to how larger parties will call two or more for-hire vehicles? While we would accept the 2% reduction to account for parties of 5 or more due to the imprecision of the model, we do not see the applicability under real world circumstances.

Based on our analysis in **Section 4.3.3,** using 5% for unserved passengers, passengers traveling to the airport when there is no meaningful transit, is likely understated. A passenger survey would help determine a more accurate factor for future forecasts.

4.3 Chapter 4: Mode Choice

The mode choice chapter is organized into three sections – group vs. solo travel, travel time and costs and mode choice parameters. Some of what is discussed here we have covered in **Section 4.2** on Chapter 3 but will be included for completeness.

4.3.1 Group vs. Solo Travel

As part of their efforts to account for group and solo travel, Steer references a study conducted by SFO in 2014. As we note in the benchmarking comparison, SFO's landside is not comparable to SJC's. The density of the areas surrounding (and served by) the airport along with the greater volume of trips makes the applicability of the study's findings to SJC questionable. The non-business traveler group size is likely overstated, albeit this would likely have a marginal impact on the ridership estimates.

4.3.2 Travel Time and Costs

As noted in **Section 4.2**, we do not believe that the AM Peak matrices are applicable throughout the day. We learned through a discussion with Steer that they performed a sensitivity analysis using the Midday matrices which, according to them, substantially impacted the ridership estimates (the specific output of this sensitivity analysis was not readily available during our call). It was noted by both parties on the call, that some compromise between the two available matrices (AM Peak and Midday) would

[4] August 12_2024 WDAY Service for Richmond to Millbrae (Red) Line.pdf (bart.gov)

likely be the more accurate way to proceed moving forward. Steer advises that air passengers would be conservative in estimating the time it would take them to arrive at the airport to justify the across-the-board use of the AM Peak matrices, but one could also argue that transit users typically add time to their trips as well, due to lack of reliability and frequency of most transit services in the U.S.

4.3.3 Mode Choice Parameters

The section reviews the mode choice parameters arrayed in table nine (pages 22 and 23) of the Steer Report.

- *Value of time*, no issues with the source used.
- *Weight on access time, wait time, transfer time*, L&B disagrees with applying such a high factor to rideshare trips, the wait time for most of these on-demand services are no longer (1.5x) than the in-vehicle trip time. The factors should be calibrated to the individual modes. The wait time for ridership, existing transit and the SJC connector will likely all vary.
- *Transfer penalty,* L&B agrees that the penalty should be increased for group travel vs. solo travelers. However, we would recommend a sensitivity analysis to evaluate various transfer penalties, even though we do agree that 15 minutes is common industry practice. One question that arises is why is the penalty applied to both transit and transit + connector? The existing transit, bus service, does not require a transfer for all riders – did the ridership analysis consider how many riders did transfer between the VTA Route 60 and other transit services (BART, LRT, other buses, etc.)?
- *Buffer time,* the addition of the buffer time on top of the application of the AM Peak matrices aggressively penalizes auto travel times. In addition, a 20-minute discount has been arbitrarily added to the Transit + Transit Connector travel time, due to the higher frequency/reliability of the SJC Connector. In combination, these actions favor the SJC Connector and further reduces the attractiveness of auto travel mode.
- *Constants and coefficients: L&B has not* reviewed the actual model and cannot assess the role of the modal constants used. As stated in the report “the mode shares have not been validated against recent data.” The study does note the constants and coefficients were referenced from the regional MTC travel model, which does not appear to be calibrated for airports.

4.4 Chapter 5: Impact of California High-Speed Rail (CHSR)

The inclusion of CHSR transfers is highly speculative. The result suggests that the volume of these passengers using the SJC Connector will be relatively high, and the revenue will be a high portion of total revenue, about one-third. This is of particular concern since the revenue estimates may be especially overstated and color any financial analysis if high-speed rail (HSR) does not occur. It is already telling that the CHSR Authority has recently lowered their demand forecasts by 35%, a substantial reduction in daily ridership.

4.4.1 Share of CHSR passengers picking up rental cars at the airport

We agree that it is highly unlikely that a large share of CHSR passengers will use SJC rental car facilities for the same reasons articulated by Steer. If most of this demand is served offsite, it would reduce the CHSR ridership on the SJC connector and associated revenues.

4.4.2 Share of CHSR passengers parking at the airport

The parking demand at SJC is insignificant (18 spaces) relative to other attractors of demand, L&B agrees with the study's review and recommendation.

4.4.3 Central Valley residents using CHSR to reach bay area airports

L&B has the same concerns as Steer and would caution against using these assumptions. We also would recommend sensitivity analyses around the ratio assumption as well. Furthermore, the CHSR is planned to directly stop at the SFO Millbrae station, and we seriously question whether Central Valley users would choose SJC when SFO, with its far greater density of air service offerings, is just one stop (20 to 30 minutes) further along the line.

4.4.4 Reduction in flights and passengers on San José – Los Angeles/Anaheim trips

The diversion of short-haul trips to CHSR will result in freed-up capacity for longer-haul domestic and international service, which in the long-term could be a positive development. However, this is unlikely to materialize for decades, if ever, if the connection to Los Angelos and points further south is never made. We agree with Steer's decision to not include a reduction factor in the model.

4.5 Chapter 6: Forecasts for Model Year 2040

The ridership model developed by Steer is a planning tool that was developed from CSJ Regional Travel Demand model and then modified to more closely reflect airport user travel behavior. However, this model relied on surveys over a decade old and other data that are not localized to SJC. Of note, the mode choice model is based on equations derived in a 1986 academic paper. SJCP does recognize these shortcomings and plans to substantially refine the models in the next phase of the project.

The output of the Draft Feasibility Study arrayed four scenarios, which are detailed in the **Table 2** below. The table reflects the full build estimates, the passenger and staff ridership numbers are lower on the partial build estimates (by 100-200K trips), CHSR impacts remain unchanged.

Table 2: Draft Feasibility Report, SJC Connector Ridership Estimates

Scenario	1	2	3	4
CAGR	**3.7%**	**4.8%**	**~ 3%**	**3.7%**
Summary Description	Baseline Scenario	High Growth	Conservative	Alternate Terminal B/C access point location
Passengers	1,962,000	2,682,000	1,745,000	1,912,000
Staff	294,000	366,000	206,000	288,000
CHSR impacts	894,000	949,000	N/A - No CHSR Phase 1 in scenario 3	949,000
Intra-airport movements	3,307,000	3,968,000	2,927,000	3,415,000
Total with intra-airport connector	6,457,000	7,966,000	4,878,000	6,564,000

Source: SJCP/Steer

It is important to note that the CHSR ridership, using the methodology from the Authority's Business Case, accounts for almost a third of the ridership. L&B's finds this ridership to be extremely speculative (discussed further in technical report) and recommends that it not be included in the estimates.

Out of the four initially presented scenarios, it was scenario #3/Conservative without the intra-airport movements that was the most reasonable of the four. While the elimination of CHSR ridership might be considered extreme, we do feel it is extremely speculative given the financial challenges the program is facing. We also feel the more conservative passenger and employee SJC Connector ridership were more reasonable. Scenario 4 is like the Baseline with some marginal differences and Scenario 2 is far too aggressive but serves its purpose as the high estimate.

After consultation to SJCP and their consultant Steer, we learned that the team had been conducting additional sensitivities to more accurately reflect the concerns of SJC staff and the slower compound annual growth rates (CAGR) that the Airport has experienced post-pandemic. The revised forecasts are shown in the **Table 3** for the full-build estimates.

Table 3: Revised SJC Ridership Estimates (as of 7/24/2024)

Scenario	1	2	3	4	5
CAGR	**3.7%**	**2.7%**	**4.8%**	**2.4%**	**1.25%**
Summary Description	Baseline Scenario	Adjusted Baseline Scenario	High Growth	Reduced Growth	Further Reduced Growth
Passengers	1,962,000	1,609,000	2,682,000	1,531,000	1,264,000
Staff	294,000	242,000	366,000	230,000	190,000
CHSR impacts (riders)	894,000	N/A - no CHSR Phase 1	949,000	N/A - no CHSR Phase 1	N/A - no CHSR Phase 1
Inter-terminal movements	1,722,000	1,456,000	2,066,000	1,385,000	1,143,000
Long term parking	1,318,000	1,115,000	1,582,000	1,061,000	875,000
Total with intra-airport connector	6,190,000	4,423,000	7,645,000	4,207,000	3,472,000

Source: SJCP/Steer

Under the revised estimates, Scenario 1 is unchanged. The high-growth scenario, Scenario 3, is the same as the earlier Scenario 2 from the Draft Feasibility Study. Scenarios 2, 4, and 5 are new and each use lower compound annual growth rates (CAGR) and do not include ridership from CHSR. One noteworthy change is how the results are arrayed compared to the earlier analysis, SJCP split the intra-airport movements into two ridership buckets: inter-terminal movements (between Terminals A and B) and trips to the Long-Term Parking Lot. It is L&B's recommendation that SJC further explore Scenarios 2, 4, and 5 without the inter-terminal and long-term parking options.

Another issue of concern that L&B identified was the land use and transit improvements that were assumed for the 80-acre Diridon Station site. Aside from the already known assumed CHSR and BART Silicon Valley Extension improvement, which are open for scrutiny as to when or if they will occur, we also learned that the full development of the site was also assumed, which includes:

- Up to 7.3 million gross square feet (GSF) of office space;
- 5,900 units of new housing;
- Up to 500,000 GSF of active uses (retail, cultural, arts, etc.);
- 100,000 GSF of event space, hotel use (up to 300 rooms), and limited-term corporate accommodations (up to 800);
    - 15 acres of parks and open space

These transportation and land use improvements will have a substantial impact on the ridership estimates. The half-mile walkshed assumed by SJCP in the model will place much of the development within walking distance of the SJC Connector. Yet, the Downtown West redevelopment timing is unclear since Google has slowed its investment, as it struggles with rightsizing its business post-pandemic.

The BART extension was recently awarded a state grant of $375 million along with a federal grant of $5.1 from the Federal Transit Administration (FTA). However, this still leaves a funding gap of $700 million, making the timing of the project still uncertain.[5] Finally, realizing the full intercity benefits of CHSR from San Francisco to Los Angeles is far from certain since the program is not fully funded and there is no official completion date. Plans for an initial operating segment (IOS), from Merced to Bakersfield might open by 2033, but would not include HSR service to Diridon Station.

Questions:

- The data indicates that 97% of the O/D counties are Santa Clara, San Mateo, and Alameda counties. Is there great geographical detail (more than county level) or the origins/destination of the airport trips?
- It is not explicitly stated, from what we could see, whether the ridership was developed estimating both for boardings and disembarking passengers or doubled? It is a two–way/bidirectional ridership estimate – correct?

4.6 Chapter 7: Benchmarking

Steer's efforts to validate the results by benchmarking included cities/airports that are larger, denser and more transit-oriented than the city of San José and its surrounding environs. As shown in **Table 4**, only OAK has a similar volume of origin/destination (O/D) enplanements and a surrounding population density as SJC. The remaining nine airports benchmarked by Steer are located in more dense areas, have far greater trip volumes on their landside (O/D enplanements) and are more centrally located or directly connected to their regional transit systems.

[5] VTA announces billions of dollars in federal funding for BART to San Jose (transittalent.com)

Table 4: Evaluation of 10 Steer Benchmarks

Airport Code	City	Population Density	% Connecting	O/D Enplanements	Hub	MHI	Transit Type	Dedicated ROW
SJC	**City of San José**	**5,684**	**9.0%**	**5,087,025**	**M**	$136,010	**Bus**	**No**
OAK	City of Oakland	7,878	21.0%	4,349,923	M	$94,389	AirTrain to Regional Transit	Yes
MDW	City of Chicago	12,059	41.8%	5,616,464	L	$71,673	Direct Rail	Yes
IAD	Washington DC	11,280	30.9%	7,094,030	L	$101,722	Direct Rail	Yes
DCA	Washington DC	11,280	19.2%	9,335,511	L	$101,722	Direct Rail	Yes
LGA	New York City	29,303	14.3%	12,312,916	L	$76,607	Bus	Partial
SFO	City of San Francisco	18,629	20.2%	16,288,313	L	$136,689	Direct Rail + Airtrain	Yes
EWR	New York City	29,303/ 12,059	19.8%	17,463,301	L	$76,607	AirTrain to Regional Transit	Yes
ORD	City of Chicago	12,059	37.3%	20,766,537	L	$71,673	Direct Rail + AirTran	Yes
JFK	New York City	29,303	19.6%	21,832,528	L	$76,607	AirTrain to Regional Transit	Yes

Sources: Steer, US Census and FAA T-100, L&B Analysis

In an effort to identify more suitable benchmarks, L&B reviewed the full list of other medium-hub airports in the country and assessed their area population densities and O/D enplanements. Out of the 33 medium hub airports, only five have rail connections with exclusive rights-of-way. The remaining 28 airports or mostly served by buses operating in mixed lanes of traffic, with a handful having buses to adjacent rail services located along the perimeter of the airport, outside of the CTA. **Table 5** shows the results of the survey.

Table 5: Benchmark Identification from 33 Medium Hub Survey

Selected Benchmark	Airport Code	City	Population Density	O/D Enplanements	Transit Type	Dedicated ROW
Yes	PDX	Portland	4,889	6,691,499	Direct Rail	Yes
Yes	STL	St. Louis	4,885	5,038,519	Direct Rail	Yes
Yes	CLE	Cleveland	4,793	4,038,619	Direct Rail	Yes
No	SMF	Sacramento	5,323	5,479,027	Bus	No
No	RDU	Raleigh-Durham	3,178	5,498,685	Bus	No
No	SNA	Santa Ana/John Wayne	4,689	5,303,788	Bus	No
No	RSW	Fort Myers	2,168	4,906,855	Bus	No
No	MCI	Kansas City	1,255	4,412,758	Bus	No
No	SAT	San Antonio	2,875	4,271,697	Bus	No
Yes	BUR	Bob Hope	6,198	2,856,172	Direct Rail	Yes
No	BDL	Bradley International	6,965	2,773,595	Bus	No
No	MKE	General Mitchell International	6,001	2,588,471	Shuttle to Direct Rail	Partial

Sources: Steer, US Census, Various Public Transit Sources and FAA T-100, L&B Analysis

Four airports from the above table were selected for benchmarking – PDX, STL CLE and BUR. OAK, from the Steer analysis, was also added as the fifth airport based on its similarity to SJC. L&B reached out to the airports and their local transit authorities to collect transit ridership data, along with any survey data that would allow us to distinguish between air passengers and employees. The results of the L&B benchmarking survey are shown in the **Table 6**.

Table 6: Five Revised Benchmarked Airports

Airport	City	Transit Agency	Transit Type	Transit Mode Share
OAK	City of Oakland	BART	Rail	4%
PDX	Portland	TriMet	Rail	5%
STL	St. Louis	Metrolink	Rail	4%
CLE	Cleveland	RTA	Rail	4%
BUR	Burbank	BUR Airport	Rail	1%
			Average Transit Mode Share	**4%**

Sources: BART, BUR Airport, Port of Portland, GCRTA.

Similar to the SJCP analysis, the transit mode share was calculated by dividing daily boardings by daily enplanements. Because the daily boardings counts also include employees along with air passengers, the transit modal shares are overstated. An airport station ridership survey provided by CLE indicates that approximately half of the riders taking public transit were airport workers – not air passengers. This would result in an adjusted transit mode share of 2% for CLE. This trip purpose split is in line with information that L&B has collected through its interviews with other transit agencies and airports.

The average transit modal share for the five airports surveyed was 4% - the highest being 5% and the lowest 1%. This is substantially less than the 11% average transit modal share calculated by the SJCP analysis. **L&B believes that a modal share closer to 4-5%, like OAK and PDX, is more achievable which would be a considerable increase over the existing 1-2% transit share.** However, several of the airport's surveyed (PDX, CLE and STL) offer direct one-seat rides to their region's central business district – providing more direct access for tourist and business travelers. If all surveyed airports were adjusted using the CLE trip purpose shares, the **average transit mode share would be closer to 2.3%.**

4.7 Chapter 8: Next Steps

The next steps outlined by Steer are all reasonable and highlight many of the issues we saw throughout our review. Our main takeaways and concerns about the ridership analysis are, in rank order:

- Based on our discussions with Steer, while the CSJ model was initially designed and calibrated for regional travel, it does include an airport zone where the model was adjusted to more accurately estimate airport ground trips. Steer also made some additional adjustments using available surveys to further account for the particularities of airport users. However, the lack of CSJ model documentation, age of the available surveys and inability to review the final Steer model, still raises questions regarding its overall precision in estimating airport trips. It is our understanding, that many of these concerns will be addressed in future modeling efforts.
  - There are limited current data/surveys for SJC, with most of the data over a decade old, resulting in inaccurate model inputs and assumptions.
- Almost all the benchmark cities/airports are of significantly greater size, density and have much higher airport landside volumes than SJC, the Steer estimated an average of 11% transit modal share is more than three-times what L&B found in more comparable airports (3%).

- The future Diridon Station land use and transit improvement assumptions appear ambitious, both in scale and timing, which could impact the ridership estimates.
  - AM Peak matrices are overstating the impact of congestion on auto travel and the attractiveness of transit.
  - The 20-minute buffer time discount for the SJC Connector is too generous, and half-mile walk is too far for most air travelers with luggage.

Apart from variation of the enplanement forecast scenarios and the two SJC Connector configurations (base and intra-terminal), there is no documented sensitivity analysis. As we noted throughout the review, L&B suggests that Steer fully document sensitivity analyses on various modelling assumptions, some of which are noted below:

- AM Peak versus Midday travel time matrices
- Higher transfer penalties (arriving passengers)
- Shorter walksheds including one-quarter mile and one-third of a mile distances
- Lower buffer time discounts such as 10 and 15 minutes