steer davies gleave

High Desert Corridor: Investment Grade Ridership & Revenue Forecasts

Final Report
March 2017

High Desert Corridor Joint Powers Authority

Our ref: 22876601

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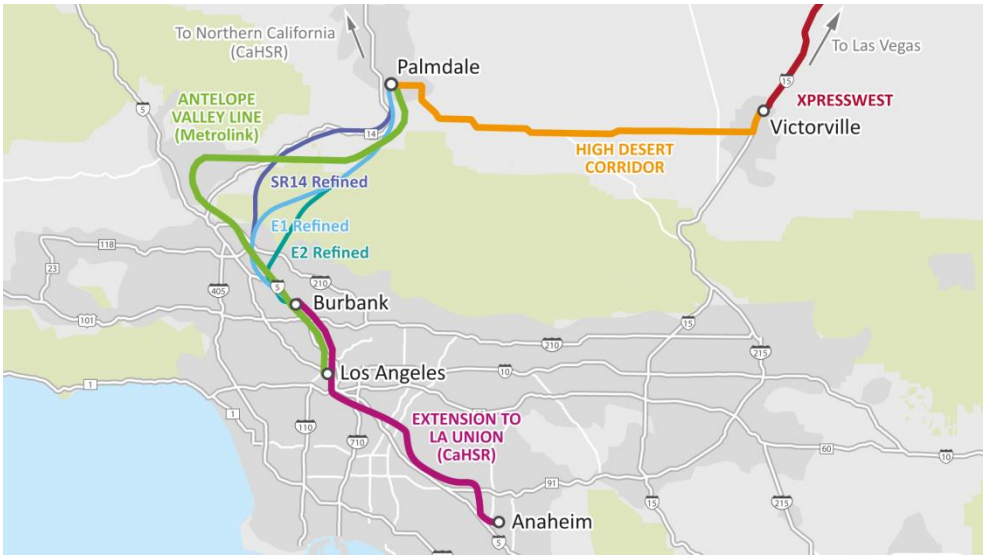
Synopsis

The High Desert Corridor (HDC) will provide new high speed rail (HSR) infrastructure facilitating services linking Victorville in San Bernardino County, CA with Palmdale in Los Angeles County, CA, providing a connection between the proposed California High Speed Rail (CaHSR) network and XpressWest's planned line to Las Vegas. Prior to completion of the CaHSR segment from Palmdale to Burbank, the service will link to Metrolink's Antelope Valley Line. This will enable direct services between Southern California and Las Vegas, with travelers from Northern California using CaHSR services able to transfer at Palmdale to travel to and from Las Vegas.

Figure S.1: Map of High Desert Corridor and proposed connections to Las Vegas and Southern California[1]

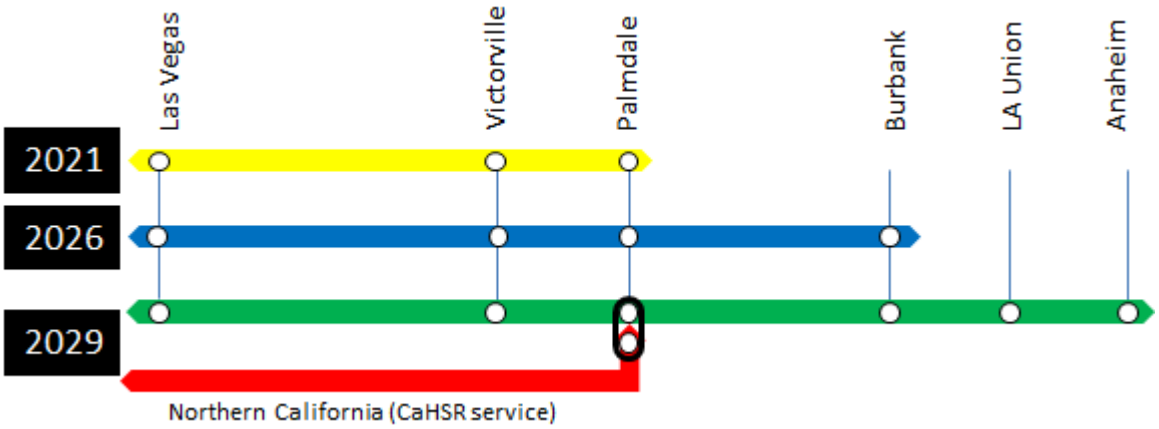


HSR services are projected to be introduced incrementally, starting with Las Vegas to Victorville and Palmdale in 2021, before reaching Burbank as early as 2026. They will then be extended on to Los Angeles and Anaheim by 2029, in line with the CaHSR business plan[2].

[1] There are currently multiple potential alignments being considered by the CaHSRA; each of these options are highlighted within the figure (labeled "SR14 Refined", "E1 Refined" and "E2 Refined").

[2] The Base Case scenario in this report assumes that high-speed rail service will begin operations between Palmdale and Burbank in 2026. The CaHSRA's 2016 Business Plan does not contemplate opening this section until completion of the full Phase 1 system in 2029. Further discussion is provided in section 4 of this report.

Figure S.2: Assumed roll-out of HSR infrastructure



The High Desert Corridor Joint Powers Authority (HDC JPA) commissioned Steer Davies Gleave (SDG) to produce Investment Grade Ridership & Revenue Forecasts for HSR rail services using the proposed HDC line. Our forecasting approach focused on identifying or estimating:

- The current and future size of the "in-scope" market – subset of trips made between Las Vegas and California by travelers for whom the proposed HSR service is a viable travel option;
- How much of this market HSR can capture at a given fare; and
- How much additional travel will be "induced" by the presence of the HSR service itself.

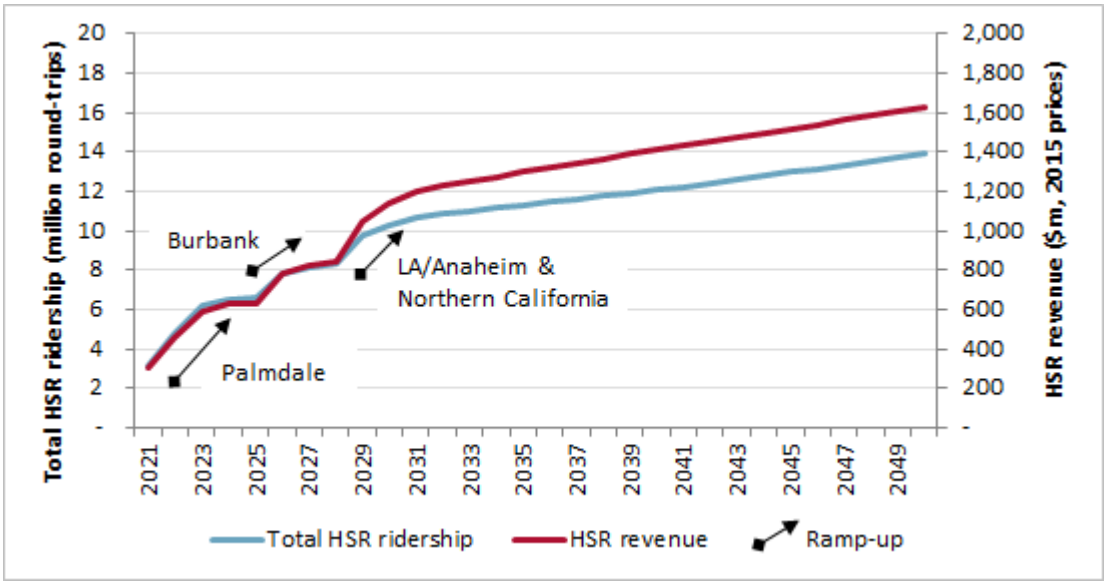
The main market for HSR service along the HDC comprises traffic to and from Las Vegas. California residents accounted for 29% of all visitors to Las Vegas in 2015. In addition, many international visitors travel to Las Vegas via Southern California, and there is also a substantial reverse flow of Las Vegas/Clark County residents to California. The total "in-scope" market for HSR is estimated at 26.3 million round trips in 2015, most of whom currently drive to/from Las Vegas along the I-15.

To quantify the magnitude of potential capture of this market by HSR we conducted a behavioral travel survey of over 4,000 current travelers, seeking information on their origins / destinations, travel purposes and potential response to alternative HSR service options. This was combined with demographic projections by age and ethnicity which influence the propensity to visit Las Vegas.

Our survey results demonstrate that HSR would provide a viable and attractive alternative to the existing air and auto modes, with almost 90% of respondents indicating they would be willing to try the new service. Extending the HSR service from Palmdale to Burbank, Los Angeles and Anaheim would add to the appeal of the proposed HSR service: 76% of respondents willing to try the HSR service would prefer to use one of these three stations over Palmdale or Victorville. Extending to these stations also provides benefits to the wider community through relieving congestion on key highway sections across Southern California.

Our Base Case ridership and revenue forecasts are summarized below.

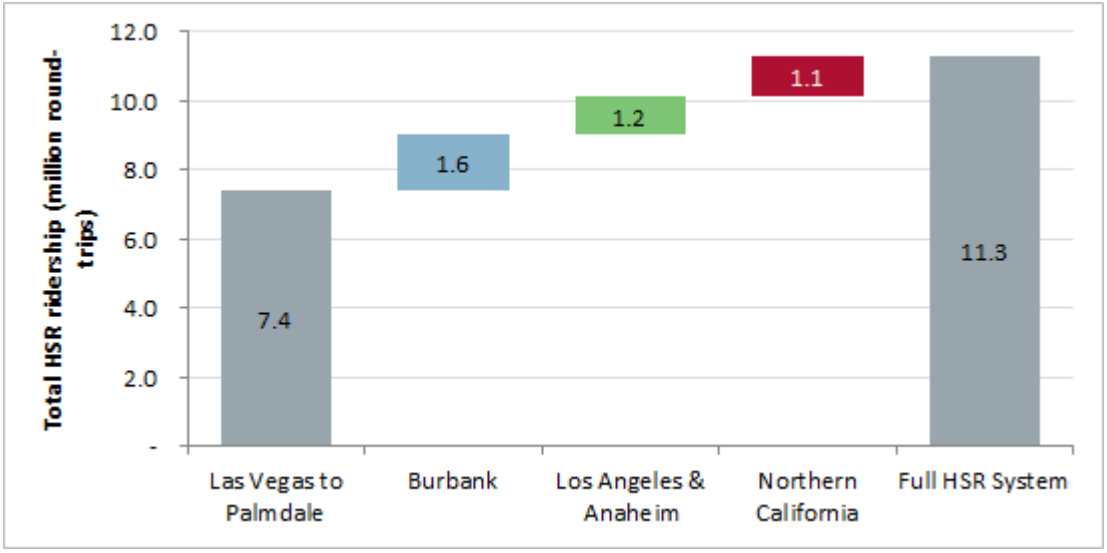
Figure S.3: Build-up of ridership and revenue including assumed roll-out of HSR infrastructure



By 2035 all HSR infrastructure is assumed to be in place and ramp-up of demand complete. At this stage we forecast the potential "in-scope" market for HSR will be 37.9 million round trips. At an average round trip fare of $115 (2015 dollars), HSR is expected to capture 27% of the "in-scope" market, equivalent to 10.2 million round trips, and induce a further 1.1 million round trips. In total this results in 11.3 million round trips generating $1,297 million in revenues.

The potential of each phase of infrastructure development to generate incremental ridership is shown below. It should be noted that the absolute forecast usage of Burbank, Los Angeles and Anaheim is higher than the increment shown as some riders shift from using Victorville or Palmdale to one of these three stations.

Figure S.4: Forecast of incremental ridership by infrastructure phase, 2035



Serving Burbank improves access for people in northern and western LA County. Further extending the line onto Los Angeles and Anaheim would help increase the attractiveness of the service, in particular to non-resident tourists. In total, 90% of riders are forecast to be going to or from Southern California with the remaining 10% from Northern California[3].

We subjected our forecasts to a range of sensitivity tests, which demonstrate the resilience of the forecasts across a number of key areas of uncertainty.

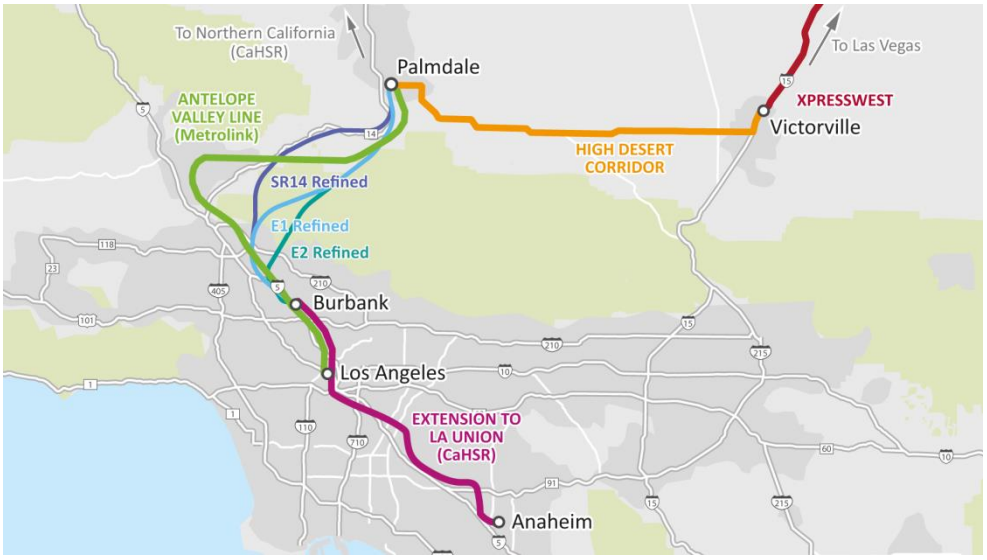
[3] For the purposes of this study, the reference made to Northern California also includes the Central Valley and Central Coast.

Executive summary

Overview

In January 2016, the High Desert Corridor Joint Powers Authority (HDC JPA) commissioned Steer Davies Gleave (SDG) to produce Investment Grade[4] Ridership & Revenue Forecasts for a proposed high-speed rail (HSR) line across the High Desert Corridor (HDC) between Victorville and Palmdale. The HDC will provide a critical link in creating a HSR corridor between California and Nevada.

Figure E.1: Map of High Desert Corridor and proposed connections to Las Vegas and Southern California[5]



Source: Steer Davies Gleave

The focus of this study is on forecasting the potential ridership and revenue for HSR through the corridor, generated by direct services between Las Vegas and Burbank/Los Angeles/Anaheim, and serving destinations in Northern California via a connection with California High Speed Rail (CaHSR) trains at Palmdale.

In this report we explore the characteristics of the existing travel patterns between California and Las Vegas and the various markets which will be in-scope[6] to use the HDC. We then analyze how

[4] There are no formal rules that define Investment Grade forecasts: they are characterized by their outputs rather than a specific methodology. "Investment Grade" in the context of this study means we present forecasts of revenue that explain and quantify uncertainties, and that we stand by these forecasts as providing a sound basis for investors to rely on to make an investment decision. To this end we ensure full transparency of all assumptions, forecasting methodology and processes and the final outputs; use recently observed data for all key components; and, as far as practicable, base our analysis on parameters specific to the project, rather than imported from other studies.

[5] There are currently multiple potential alignments being considered by the CaHSRA; each of these options are highlighted within the figure (labeled "SR14 Refined", "E1 Refined" and "E2 Refined").

[6] For definition see section entitled "the in-scope market" on page 10/11 of this Executive Summary.

this demand might change in the future following the introduction of HSR and present our forecasts of ridership and revenue for each phase of infrastructure development reflecting the anticipated phased roll out of the HSR infrastructure over the period from 2021 to 2050.

The market for HSR

The High Desert Corridor infrastructure will link Victorville with Palmdale, enabling trains running over XpressWest lines between Las Vegas and Victorville to access CaHSR infrastructure and run on to Burbank, Los Angeles and Anaheim.

Las Vegas presents a unique combination of gaming, entertainment, leisure activities and world–class convention and business facilities. Its scale makes it a worldwide brand and destination of choice for much of the US population as well as international visitors. 2015 was a record-breaking year with total visitors to Las Vegas exceeding 42.3 million. In the last five years (2010 to 2015) visitor volume has increased at a compound annual growth rate of 2.6%. The majority of visitors are tourists, but there is an important convention and business visitor market, and a number are also visiting friends and relatives.

Californian residents accounted for 29% of all visitors to Las Vegas in 2015, of which 80-85% reside in the Counties of Southern California[7]. The Las Vegas visitor market from Southern California is the key determinant of the future use of the HDC. However, there will also be potential to attract a share of the non-resident visitor market traveling via California. Travel by Las Vegas and wider Clark County residents to California provides an additional in-scope market for the HDC.

A further 16% of visitors to Las Vegas are international travelers, almost three-quarters of whom do not fly direct to Las Vegas, but arrive via other US gateways including Los Angeles and San Francisco. A proportion of US domestic visitors also combine their trip to Las Vegas with a visit to California. Taken together, these statistics indicate a substantial market segment accessing Las Vegas via California, also potentially in-scope for HSR.

Existing travel options

Visitors arriving in Las Vegas by road[8] accounted for 57% of the total market in 2015, with this proportion rising to over 90% for residents of Southern California.

Uncongested drive times between Southern California and Las Vegas range from under four hours from San Bernardino to approximately six hours from parts of Santa Barbara and Imperial Counties. From Northern California, for example San Francisco, the uncongested drive time can be as much as nine hours.

Almost all drivers from California to Las Vegas travel on the I-15, which they typically join south of the Cajon Pass, or along SR-18 from Palmdale, before passing Victorville in San Bernardino County and then crossing the Mojave Desert. Highway traffic peaks on Thursdays and Fridays northbound

[7] Defined by the Las Vegas Convention and Visitors Authority (LVCVA) as the eight counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara and Ventura.

[8] All modes including car, RV and bus.

to Las Vegas, when many travelers depart, and on Sunday in the southbound direction from Las Vegas for the return leg. Nearly one quarter of car trips throughout a typical week are made in one or both directions during these peak times, when journey times can be extended by congestion and unpredictable delays.

Las Vegas McCarran International Airport (LAS) is served by flights from six major airports in Southern California[9] and another five in Northern California[10] which in combination offer over 170 daily flights in each direction. Air travel, like car travel, peaks on Thursdays and Fridays to Las Vegas and Sundays from Las Vegas. Round-trip air fares vary from $40 to over $450 depending on the carrier, dates and times of travel.

A number of commercial bus operators also run services between California and Las Vegas but journey times are longer than auto and air, at between five and eight hours depending on the number of stops en-route.

There are no existing rail passenger services between California and Las Vegas[11].

The High Desert Corridor project

The HDC project is a proposed link between State Route (SR)-14 in Los Angeles County and SR-18 in San Bernardino County. This project would connect some of the fastest growing residential, commercial and industrial areas in Southern California, including the cities of Palmdale, Lancaster, Adelanto, Victorville and the Town of Apple Valley. The HDC is expected to be multi-modal and includes a freeway/tollway and "Green Corridor" alongside a dedicated HSR line.

The HSR line is a proposed 54-mile section of new grade-separated dedicated railway track between Pamdale, Los Angeles County, CA and Victorville, San Bernardino County, CA, which will enable high-speed trains to travel between Palmdale and Victorville in under 30 minutes. The line will provide an important link between the California High Speed Rail (CaHSR) network and Las Vegas via Victorville using XpressWest infrastructure. Specifically, it will provide rail service to:

- Southern California initially via connection with Metrolink's Antelope Valley Line, then by through services using CaHSR track; and
- Northern California via a connection with CaHSR services.

There are four primary infrastructure Phases which have been considered, building on the initial line planned by XpressWest between Las Vegas and Victorville. The subsequent phasing reflects the anticipated roll out of the CaHSR infrastructure:

[9] Los Angeles International (LAX); San Diego International (SAN); Burbank – Glendale – Pasadena (BUR); John Wayne (SNA); Ontario (ONT); Long Beach (LGB).

[10] Fresno Yosemite International (FAT); Oakland International (OAK); San Francisco International (SFO); San Jose International (SJC); Sacramento International (SMF).

[11] Although Amtrak does offer a Thruway bus service from Los Angeles and Bakersfield.

1. One-seat high-speed ride linking Las Vegas-Victorville-Palmdale, with transfers to the existing Metrolink services on the Antelope Valley Line, feeder bus services or auto access with parking facilities at Palmdale & Victorville;
2. One-seat high-speed ride between Las Vegas and Burbank, using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville and Palmdale);
3. One-seat high-speed ride between Las Vegas and Los Angeles Union Station / Anaheim Station using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville, Palmdale and Burbank)[12]; and
4. One-seat high-speed ride between Las Vegas and Los Angeles Union Station / Anaheim Station, with an advertized connection at Palmdale for transfer (typically within 15 minutes) to/from CaHSR trains serving Northern California. Specific CaHSR services will have varying stopping patterns, but will include combinations of stops at: Bakersfield; Kings/Tulare; Fresno; Merced; Gilroy; San Jose; Millbrae; and San Francisco.

Some of the system parameters specified in this report for the CaHSR system, developed by SDG in consultation with the HDC JPA, vary from those set forth in the CaHSRA's 2016 Business Plan adopted by the Authority's Board of Directors in April 2016. These assumptions are SDG's planning assumptions and do not reflect any change in the Authority's plans at this time. In addition, parameters regarding how proposed services will operate on future infrastructure between Palmdale and Anaheim (including train frequencies, span of service and passenger fares) are not reflected in the plans or assumptions made by the Authority. HSR services to/from Las Vegas are assumed to operate entirely independently of any future service offer by CaHSR south of Palmdale, and are thus expected to have no impact on CaHSR operations. The HSR services via the HDC are assumed not to carry passengers between any station pair south of Palmdale, so there is no impact on the level of demand or passenger revenues expected to accrue to CaHSR services over these lines.

Figure E.2 shows the planned extent of the HSR network in California/Nevada and the critical role that the HDC rail link will play within that network.

[12] There is a potential for a further station at either Norwalk/Santa Fe Springs or Fullerton. At this stage however these remains as options within the CaHSR 2016 Business Plan.

Figure E.2: Map of proposed HSR service

Source: Steer Davies Gleave

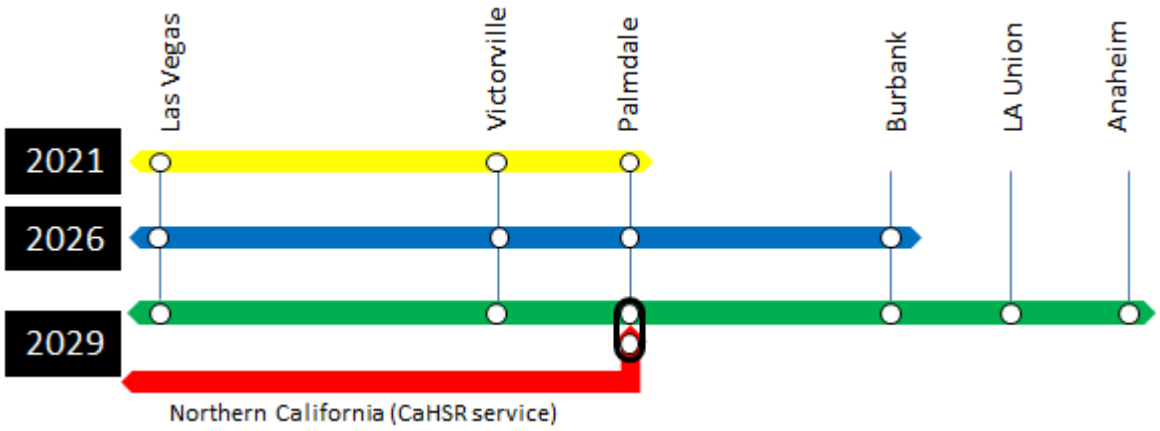
The timing of each phase of infrastructure has been developed based upon a combination of the 2016 CaHSR Business Plan[13] and agreed assumptions with the HDC JPA and wider stakeholders:

- 2021: Phase 0: Las Vegas-Victorville (base line position);
- 2021: Phase 1: Las Vegas-Palmdale;
- 2026: Phase 2: Las Vegas-Burbank;
- 2029: Phase 3: Las Vegas-Anaheim; and
- 2029: Phase 4: CaHSR to Central Valley and Northern California.

[13] http://www.hsr.ca.gov/docs/about/business_plans/2016_BusinessPlan.pdf.

This assumed timing is set out in Figure E.3.

Figure E.3: Assumed roll-out of HSR infrastructure



Source: Steer Davies Gleave

Our forecasting approach

Our forecasting approach focused on identifying or estimating:

- The size of the "in-scope" market for travel which HSR can serve;
- The future growth in this market;
- How much of this market HSR can capture at a given fare; and
- How much additional travel will be "induced" by the presence of the HSR service itself.

The principal inputs we required to construct our demand forecasting model were existing trips, by origins and destinations, for a model base year of 2015 and forecasts of trips in future years; times and costs of travel by car, bus, air and HSR; and behavioral parameters which represent how travelers respond to choices between travel options.

In addition to the collation and review of documentation and data from a wide range of existing sources, we carried out a program of primary research including:

- Focus groups and stated preference surveys to provide both a qualitative overview of traveler priorities and preferences and a quantitative measure of the weights they attach to time and costs of travel options;
- Analysis of cell phone and GPS data to provide information on patterns of traveler origins and destinations;
- Analysis of "real time" journey time data to support congestion and journey time variability assumptions; and
- Commissioning of market growth analysis to understand how the Las Vegas visitor market is expected to evolve in future.

The in-scope market

The "in-scope" market represents current demand for travel between Las Vegas and California from travelers who might consider traveling by HSR in future[14]. We estimate that the in-scope market includes approximately 26 million round-trips in 2015, with a split by origin and current mode as summarized in Table E.1 below.

Table E.1: 2015 in-scope traveling market, millions of round-trips

Market	Auto	Air	Bus	Total
Southern CA to Las Vegas	12.4	1.9	1.3	**15.6**
Northern CA to Las Vegas	0.9	1.4	0.2	**2.6**
Las Vegas/Clark County to CA	3.6	0.7	0.0	**4.3**
Other locations to Las Vegas via CA	2.2[15]	0.7	0.1	**3.0**
Southern CA to Victorville	0.8	0.0	0.0	**0.8**
Total	**20.0**	**4.8**	**1.6**	**26.3**

Source: Steer Davies Gleave

The total size of the in-scope market has been estimated using three primary sources of data:

- The 2015 Las Vegas Visitor and Convention Authority visitor statistics and surveys[16];
- Visit California statistics on state visitors and their origins from 2014[17]; and
- Population estimates for Clark County[18].

Each of the 4,000 plus respondents to the behavioral survey provided information on their origin and destination, travel purpose, group size and composition, day of travel, and most recent trip cost. This and other information[19] was used to subdivide the total in-scope car, air and bus markets into segments based on traveler origin and destination, journey purpose, current mode, time of travel and group size.

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[14] The "out-of-scope" market includes all other trips currently made that would not consider traveling by HSR in future; for example through-trips on the I-15 traveling beyond Las Vegas, or trips made by commercial vehicles.

[15] Including trips arriving into CA by air, but continuing in rental car.

[16] www.lvcva.com.

[17] http://industry.visitcalifornia.com/find-research/california-statistics-trends/.

[18] http://www.clarkcountynv.gov/comprehensive-planning/demographics/Documents/2015_Population_Forecasts.pdf.

[19] Including Airsage cell phone demand data, StreetLight GPS demand data, LVCVA 2015 Visitor Profile survey, Visit California data and T-100 data on air passengers published by the USDOT.

Market growth

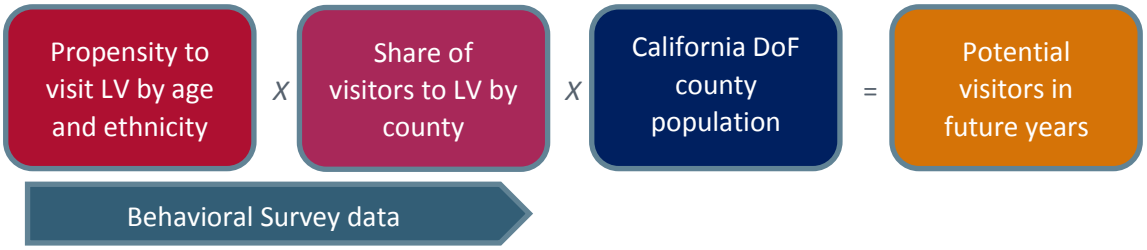
Our Base Case projections of growth rates are summarized in Table E.2.

Table E.2: Growth rates (CAGR) by market segment – Base Case

Market segment	2015-2022	2022-2030	2030-2040	2040-2050
Southern California Tourists	1.35%	1.15%	1.30%	1.11%
Northern California Tourists	2.40%	1.97%	1.70%	1.49%
Convention Attendees+	3.41%	0.95%	0.74%	0.74%
Other US visitors via CA+	1.15%	0.80%	0.63%	0.63%
Foreign visitors via CA	4.39%	3.03%	2.12%	2.00%
Las Vegas/Clark County residents	3.88%	2.97%	2.45%	2.30%

Source: Steer Davies Gleave; +Applied Analysis Base Case

Forecasts of future year in-scope market size among residents of California are based on expected changes in behaviors in response to factors such as population growth in the primary catchment areas of California, taking into account age and ethnicity, and the relative attractiveness of the Las Vegas experience to the particular market segments based on recent visitor profiles and propensity to visit Las Vegas.



Higher propensity to visit among young Hispanics have a particularly strong impact on SoCal tourist market growth in future years, counteracting an absolute decline in the ageing White Non-Hispanic population. Further details on growth assumptions are provided in section 8 of this report.

Market share

We constructed two demand forecasting models to estimate HSR's potential to capture market share: one for car travelers and one for air travelers. The models contain, for each market segment:

- The number of in-scope travelers in 2015 and future years based on the values presented in Tables E.1 and E.2;
- The times and costs of travel by existing mode and by HSR;
- The generalized cost of each mode, which combines the individual times and costs for each element of the entire trip; and
- The mode choice "logit" function, which allocates future travelers between the two modes – existing mode and HSR - according to the differences in their generalized costs.

The principal elements of time and costs incorporated in the generalized costs are as follows:

- For auto travelers:
  - Journey time to Las Vegas;
  - Costs of fuel reflecting current and forecast fuel consumption and gas prices for autos;
  - Costs of other items, including depreciation, maintenance and tires.
- For air and HSR travelers:
  - Access journey time to their local airport if they fly, or to their preferred HSR station if they use HSR;
  - Cost of driving to airport/station or taxi/public transportation fare as appropriate;
  - Cost of parking at airport/station as appropriate;
  - Time on the plane or the train, at departure and arrival airport or station, and accessing downtown Las Vegas by taxi or shuttle bus; and
  - Costs of the air fare or HSR fare.

Each respondent who took part in our behavioral survey was presented with eight scenarios for which they were asked to make a choice between using their current mode and HSR. Their responses on which mode they would choose were used to infer the weight they attached to time and cost. These weightings were applied to the times and costs for each mode and market segment to calculate a total generalized cost.

The mode choice model or "logit" function is an established choice modeling technique which we have used on a large number of transportation projects and is embedded in our demand forecasting model. If the generalized costs of two alternative modes are equal, the model allocates half the travelers to each mode. If they differ, it allocates more travelers to the mode with the lower generalized cost. The greater the difference between the costs, the more it allocates to the "cheaper" mode. It is through this method that we calculate key sensitivities within the model; for example the sensitivity to changes in future gas prices.

Other forecasting assumptions

The ridership and revenue forecasts produced by our demand forecasting model were adjusted for "ramp-up" and "induced" demand.

"Ramp-up" is typically seen when a new mode is introduced, as it takes time for travelers to become aware of and adapt to it. From our experience of other new rail projects, such as Eurostar services in Europe, we assumed that the initial HDC service to Palmdale would achieve 50% of its potential market share in 2021, 75% in 2022, 95% in 2023 and achieve its full potential market share thereafter. Ramp-up is also applied to each incremental addition to the HSR service as the line is extended to Burbank, Los Angeles Union and Anaheim, although at a faster rate, reflecting greater awareness of the service and the fact that a proportion of the demand will be switching stations. In the case of the connection with CaHSR for points north of Palmdale, the more conservative ramp-up assumption was applied.

We estimated the scope for additional travel "induced" by HSR itself. These estimates were based on the proportion of survey respondents who indicated they would make more trips if HSR was available. In total we estimated these effects would increase HSR ridership by 7% to 11%, depending on the level of infrastructure in place, and increase revenue by 6% to 9%.

A summary of the other key assumptions adopted within the development of the forecasts is provided below:

- **HSR journey times**: A selection of key journey times by HSR are provided below:
  - Victorville-Las Vegas: 1 hour 20 minutes;
  - Palmdale-Las Vegas: 1 hour 50 minutes;
  - Burbank-Las Vegas: 2 hours 19 minutes;
  - Los Angeles-Las Vegas: 2 hours 28 minutes;
  - Anaheim-Las Vegas: 3 hours 6 minutes; and
  - San Francisco-Las Vegas: 5 hours 19 minutes, including 15 minute transfer at Palmdale.
- **HSR service frequency**: Every 20-30 minutes throughout the day;
- **Average HSR fares**: Between $91 and $206 round-trip, based on the stations used; all fares will be set according to market demand using yield management to optimize net revenues;
- **Parking at HSR stations**: Free at Las Vegas, Victorville and Palmdale; market rates (up to $20 per day) elsewhere;
- **Future auto drive times**: Developed based on forecasts from the Southern California Association of Governments (SCAG) model; lower growth assumed along the I-15 to Las Vegas reflecting that a portion of traffic on the highway is anticipated to be captured by HSR;
- **Future gas prices**: Developed based on long-term forecasts from the Energy Information Administration (EIA);
- **Future air service:** Assumed to be maintained at current levels; this compares to experience in Europe which suggests that airlines do not seek to compete aggressively for flows where there is direct competition between HSR and air - typically flight frequencies are reduced.

Further details on all assumptions are provided in section 9 and appendix A of this report.

Base Case forecasts

Our Base Case ridership and revenue forecasts are summarized in Table E.3 below.

Table E.3: Summary of Base Case annual ridership forecasts

Forecast element	2021	2024	2026	2029	2035	2040	2050
Operational Phases	Phases 0-1	Phases 0-1	Phases 0-2	Phases 0-4	Phases 0-4	Phases 0-4	Phases 0-4
In-scope market (million round-trips)	27.5	29.0	29.9	34.5	37.9	40.8	47.0
HSR capture rate (%)	11%	21%	24%	25%	27%	27%	27%
Captured HSR ridership (million round-trips)	2.9	6.1	7.1	8.8	10.2	10.8	12.6
Induced HSR ridership (million round-trips)	0.2	0.4	0.6	1.0	1.1	1.2	1.4
Total HSR ridership (million round-trips)	3.1	6.5	7.8	9.7	11.3	12.1	14.0
Average HSR round-trip fare ($, 2015 prices)	96	96	100	108	115	117	117
HSR revenue ($m, 2015 prices)	300	626	781	1,049	1,297	1,412	1,632
Net ramp-up assumed (%)[20]	50%	100%	96%	93%	100%	100%	100%

Source: Steer Davies Gleave

The initial phase of the HSR line connecting Las Vegas, Victorville and Palmdale is assumed to open in 2021. In the first year of operation, 11% of the in-scope market is forecast to be captured at an average round-trip fare of $96. With the addition of induced trips, this results in forecast annual ridership of just over 3 million round-trips and forecast annual revenue of just over $300m.

The level of captured demand increases significantly over the first few years as a result of our ramp-up assumptions which impact forecasts from 2021 through 2023. By 2024, 21% of the in-scope market is forecast to be captured, resulting in forecast annual ridership of approximately 6.5 million round-trips and annual revenue of approximately $630m.

The second phase of the line to Burbank is forecast to open in 2026. In this year, 24% of the in-scope market is forecast to be captured at an average round-trip fare of $100. The average fare value assumes application of yield management; the underlying fares paid by individual passengers will vary depending on their time of travel. This results in forecast annual ridership of just less than 8 million round-trips and annual revenue of approximately $780m.

By 2029, the HSR line is assumed to be extended south to Los Angeles Union and Anaheim, and a connection with CaHSR services north of Palmdale is assumed to be available. Approximately 25% of the in-scope market is forecast to be captured at an average round-trip fare of $108. With the addition of induced trips, this results in forecast annual ridership of just less than 10 million round-trips and forecast annual revenue of approximately $1,050m.

[20] The net ramp-up assumed shows the impact on total HSR ridership of the ramp-up assumptions. Unless otherwise stated, all forecasts are shown including ramp-up. For example, forecast ridership in 2026 is 7.8 million with ramp-up of 96%. Excluding ramp-up, forecast ridership would be 7.8 / 96% = 8.2 million.

Following additional ramp-up to 2031, the level of forecast capture is broadly maintained at around 27% throughout the remainder of the model forecast period up to 2050. By 2050 we forecast annual ridership of approximately 14.0 million round-trips and annual revenue of just over $1,630m.

Yield management

The forecasts provided in Table E.3 assume application of yield management principles widely applied by airlines and increasingly applied in the intercity rail market. Evidence from the intercity rail market indicates that use of yield management can increase average yields, and accordingly revenue, by around 6%. This impact is included within our forecasts by assuming fares vary according to the time of travel, group size and anticipated level of demand for services at any given time. The spread of fares which underpins this yield is similar to the spread of fares which around 90% of focus group participants indicated that they would be willing to pay.

The specific characteristics of the Las Vegas visitor market, and the detailed customer data collected on repeat visitors, could provide scope for more targeted offers. If the experience of casino resorts proved directly transferrable to HSR, this could raise the potential revenue gain from yield management by 15%. Table E.4 summarizes the impact this could have on HSR revenue.

Table E.4: Illustrative impact of enhanced yield management results based on casino resort experience

Forecast element	2021	2024	2026	2029	2035	2040	2050
Operational Phases	Phases 0-1	Phases 0-1	Phases 0-2	Phases 0-4	Phases 0-4	Phases 0-4	Phases 0-4
HSR revenue with enhanced yield management ($m, 2015 prices)	327	682	851	1,143	1,413	1,539	1,778

Source: Steer Davies Gleave

Sensitivity tests

We subjected our forecasts to a range of sensitivity tests.

In addition to our Base Case we developed a series of internally consistent scenarios based on distinct combinations of circumstances. The appropriate range of input variables and their potential interactions and associated implications has been carefully considered to develop a range of plausible scenarios for HSR ridership.

We examined possible changes to the competitive environment, including the elimination or worsening of highway delays on the I-15, changes in gas price trends, and higher or lower round-trip air fares. We also investigated the effects of changing a number of the HSR service characteristics including average fares, journey times, service frequency, station parking charges and operating hours. These sensitivity tests demonstrate the resilience of the forecasts across a range of areas of uncertainty.

Finally we developed a series of internally consistent scenarios based on distinct combinations of circumstances to produce a range of plausible scenarios for HSR ridership. Table E.4 provides summary results for the following scenarios:

- High economic growth coupled with high gas price growth:
  - GDP per capita grows on average 1% per annum faster each year;
  - Real incomes grow on average 0.6% per annum faster each year;
  - Demand for business/convention trips to Las Vegas grows in line with the high case forecasts produced by Applied Analysis; and
  - Gas prices grow in line with the EIA's "high oil" scenario.
- Low economic growth coupled with low gas price growth:
  - GDP per capita grows on average 1% per annum slower each year;
  - Real incomes grow on average 0.6% per annum slower each year;
  - Demand for business/convention trips to Las Vegas grows in line with the low case forecasts produced by Applied Analysis; and
  - Gas prices grow in line with the EIA's "low oil" scenario.
- Operation of HSR between Palmdale and Burbank by 2029:
  - The line between Palmdale and Burbank opens in 2029, at the same time as the section to Los Angeles and Anaheim, compared to 2026 in the Base Case.
- Early completion of HSR between Palmdale and Anaheim:
  - The line to Anaheim (including stops at Burbank and Los Angeles) is fully open in 2024, compared to being open between 2026 and 2029 in the Base Case.
- No change in trip propensity by ethnic group:
  - Trends in visitation rates among younger age ethnic groups to Las Vegas do not continue in future years.
- Potential upside from Las Vegas-specific experience:
  - High-speed rail is able to achieve faster ramp-up and enhanced yield management results reflecting the potential ability to capitalise on the distinct characteristics of the Las Vegas visitor market and aligned with evidence on the uplift achieved by casino resorts using their detailed customer database.

Table E.5: Summary of scenario revenue forecasts relative to the Base Case forecasts

% change in revenue relative to Base Case	2021	2026	2029	2035	2040	2050
High economic and gas price growth	16%	19%	20%	19%	19%	22%
Low economic and gas price growth	-9%	-12%	-13%	-14%	-16%	-18%
Line to Burbank open in 2029	-	-18%	-4%	-	-	-
Early completion of HSR to Anaheim	-	21%	3%	-	-	-
No change in trip propensity by ethnic group	-2%	-4%	-4%	-6%	-8%	-11%
Potential upside from Las Vegas experience	111%	14%	21%	9%	9%	9%

Source: Steer Davies Gleave

Further details of all sensitivity analyses are provided in section 12 of this report.

1 Introduction

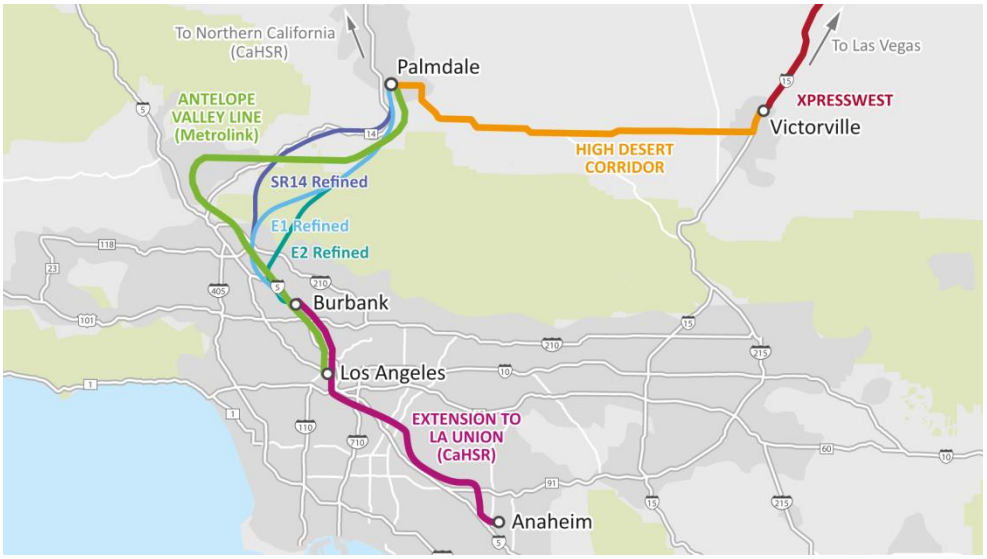
In January 2016, the High Desert Corridor Joint Powers Authority (HDC JPA) commissioned Steer Davies Gleave (SDG) to produce Investment Grade[21] Ridership & Revenue Forecasts for a proposed high-speed rail (HSR) line across the High Desert Corridor (HDC).

The HDC HSR project is an approximately 54-mile link between Victorville and Palmdale which forms a critical link in creating a HSR corridor between California and Nevada. The full HDC project is expected to be a multi-modal link including freeway/tollway alongside the potential HSR line, linking State Route (SR)-14 in Los Angeles County and SR-18 in San Bernardino County. This project would connect some of the fastest growing residential, commercial and industrial areas in Southern California, including the cities of Palmdale, Lancaster, Adelanto, Victorville and the Town of Apple Valley.

The focus of this study is on the potential for HSR in the corridor, with connections to Las Vegas via XpressWest (XW) and to Burbank/Los Angeles/Anaheim using either existing Metrolink infrastructure, or California High Speed Rail (CaHSR) infrastructure in future. The location of the HDC rail link is shown in Figure 1.1.

[21] There are no formal rules that define Investment Grade forecasts: they are characterized by their outputs rather than a specific methodology. “Investment Grade” in the context of this study means we present forecasts of revenue that explain and quantify uncertainties, and that we stand by these forecasts as providing a sound basis for investors to rely on to make an investment decision. To this end we ensure full transparency of all assumptions, forecasting methodology and processes and the final outputs; use recently observed data for all key components; and, as far as practicable, base our analysis on parameters specific to the project, rather than imported from other studies.

Figure 1.1: Map of High Desert Corridor and proposed connections to Las Vegas and Southern California[22, 23]



Source: Steer Davies Gleave

Further, the HDC rail line provides an opportunity to connect with CaHSR services heading north from Palmdale in future as shown in Figure 1.2.

[22] There is a potential for a further station at either Norwalk/Santa Fe Springs or Fullerton. At this stage however these remain as options within the CaHSR Draft 2016 Business Plan.

[23] There are currently multiple potential alignments being considered by the CaHSRA; each of these options are highlighted within the figure (labeled “SR14 Refined”, “E1 Refined” and “E2 Refined”).

Figure 1.2: Map of proposed connection with CaHSR Phase 1

Source: Steer Davies Gleave

2 The market

Because HDC will link the XpressWest to/from Las Vegas to Palmdale providing connections to Los Angeles/Anaheim and CaHSR services, the Las Vegas visitor market is a key determinant of the future use of the HDC. Travel by Las Vegas and Clark County residents to California provides an additional, albeit, smaller in-scope market for the HDC. The characteristics of these markets - in terms of why people travel to Las Vegas and from where - and observed recent trends are described below.

2.1 Overview of Las Vegas visitor market

Las Vegas presents a unique combination of gaming, entertainment, leisure activities and world–class convention and business facilities. Its scale makes it a worldwide brand, and destination of choice for much of the US population and as well as international visitors.

2015 was a record-breaking year with total visitors to Las Vegas exceeding 42.3 million. In the last five years (2010 to 2015) visitor volume has increased at a compound annual growth rate of 2.6%. This rate matches the 2.6% annual increase observed during the ten-year pre-recession period of 1997 to 2007.

The recent trend marks a rebound from the declines in 2008 and 2009. Annual growth over the last 10 years (2006 to 2015) has averaged at only 0.9% per year, significantly lower than in the preceding decades. A similarly moderated growth trend is expected to continue in future years[24].

The Las Vegas visitor market has three core components:

- Tourists and leisure visitors;
- Convention delegates/corporate meeting attendees; and
- Other business travelers.

2.1.1 Tourists and leisure visitors

The tourist market has consistently been the bedrock of Las Vegas demand, accounting for 77% of total visitors in 2015, 32 million annual trips. The proportion of visitors arriving as tourists peaked at 82% in 2014. Tourists are considered to include both visitors on vacation, coming primarily to attend special events and weddings, and people visiting friends and relatives in Las Vegas. The

[24] Las Vegas Convention and Visitors Authority (2016), Las Vegas Convention Center District Financial Planning Document.

proportion of tourists coming from Southern California was 78% in 2015 and has remained stable in recent years.

2.1.2 Convention delegates/corporate meeting attendees

Las Vegas hosts many of the ten largest conventions/trade shows in the United States, with the competitive position of Las Vegas as a venue reinforced by the presence of three of the country's largest convention centers: Sands Expo and Convention Center (attached to The Venetian); Mandalay Bay Convention Center; and the Las Vegas Convention Center (LVCC). Together they provide the capacity to accommodate the largest shows across multiple venues, and hotels provide hotel room capacity to accommodate hundreds of thousands of attendees.

The number of convention attendees has been growing strongly in recent years, rising from 4.47 million in 2010 to 5.89 million in 2015 (source: LVCVA counts), equivalent to a compound annual growth rate of 5.7%. In 2015, 14% of all visitors to Las Vegas were attending conventions or corporate meetings. 2015 saw 9.9% annual growth, and in the first 4 months of 2016 this accelerated to 14.6% (with 11.2% more meetings/conventions held). Convention attendees fell by close to 30% during the Great Recession (2006-2009)[25], contrasting starkly with a fall of only 2% among non-convention visitors.

The convention visitor market includes a high proportion of repeat visitors with 89% of visitors making a repeat trip in 2015, typically returning on an annual basis according to LVCVA Visitor Profile surveys. This market is a particularly important factor in supporting midweek hotel occupancy.

2.1.3 Other business visitors

Between 2010 and 2015, the numbers of other (non-convention) business visitors has been reasonably consistent at between 6% and 7% of the total (source: LVCVA Visitor Profiles).

2.2 Origins of visitors

Visitors traveling to Las Vegas for tourism, conventions/corporate meetings and for business purposes predominantly originate in the Western United States which accounts for over half of visitor volume to Las Vegas (53% in 2015).

2.2.1 California residents

Californian residents accounted for 29% of all visitors to Las Vegas in 2015[26]. Of this proportion, 80-85% reside in the Counties of Southern California (SoCal) and are the subject of specific market profiling by LVCVA. There is no equivalent profiling carried out for the smaller proportion of visitors from Northern California.

Southern California accounted for 23% of convention visitors in 2015, and this share has been reasonably consistent over time. However, the proportion of attendees coming from Northern

[25] http://www.lvcva.com/includes/content/images/media/docs/Historical-1970-to-2015.pdf.

[26] Source: Las Vegas Visitor Profile Surveys Visitor Demographics 2000 to 2015.

California appears to be more volatile, ranging from 9% in 2014 down to 2% in 2015, as reported by LVCVA Visitor Profile surveys.

2.2.2 International visitors

International visitors accounted for 16% of all visitors to Las Vegas in 2015. There were an estimated 6.77 million foreign visitors to Las Vegas in 2015. The number is a substantial increase on ten years earlier when 4.6 million were recorded. Since 2010, there has been little growth of annual visitors although there has been some intermediate volatility with annual volumes ranging between 6.2-7.9 million in the intervening years.

Just over 25% of these international visitors fly direct to Las Vegas, with McCarran International Airport recording 1.7 million international arrivals in 2015[27], with just over half of these coming from Canada. International arrivals at McCarran International Airport have increased by 54% since 2010.

Almost three-quarters of international visitors therefore travel to Las Vegas via other points of entry to the United States, with 2.32 million flying from other airports and 2.71 million arriving by road according to LVCVA survey responses. With Los Angeles and San Francisco being major points of entry to the US, many foreign visitors to Las Vegas combine their trip with a visit to California. 'Visit California' estimates that 29% of overseas visitors to California also visit Las Vegas on their trip.

A proportion of US domestic visitors also combine their trip to Las Vegas with a visit to California. Taken together, these data indicate that there is a substantial fly-drive market segment accessing Las Vegas via California which is potentially in-scope for HSR.

2.3 Las Vegas/Clark County residents

A substantial number of Las Vegas and Clark County residents visit California each year. Data from the Los Angeles Tourism and Convention Board indicates that in 2014 there were over 785,000 overnight visitors to Los Angeles originating in Las Vegas[28], and this is likely to substantially underestimate the total as many unrecorded visitors will be staying with friends or family, and a substantial number of day trips are made for business purposes.

Around 23.6% of air trips by Las Vegas residents are to California, representing approximately 560,000 journeys in 2014/2015[29]. Of these 39% (218,000) had a destination in the LA Metro Area and 38% (214,000) in the San Francisco Bay Area.

Surveys on the I-15 undertaken by SDG in 2010 indicated that 20% of traffic was originating in Las Vegas and traveling to or through Southern California. At an average occupancy of 1.85 adults per vehicle this implies just over 6 million person trips by auto, based on 2015 traffic volumes.

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[27] McCarran International Airport website.

[28] Source: http://www.discoverlosangeles.com/tourism/research.

[29] Source: www.deanrunyan.com/CAAirTraffic/AirTraffic.html.

This evidence suggests that there is a potential in-scope, reverse-flow market segment for HDC, originating in Las Vegas with destinations in both Southern and Northern California.

3 Existing and planned travel options

We discuss the principle modes of travel between California and Las Vegas by auto, bus and air. This section concludes with a discussion of transport improvements which are planned for the future.

3.1 Auto travel

In this section we focus on auto travel, excluding motorcycles, Recreational Vehicles (RV) and public transport such as bus. Visitors arriving in Las Vegas by road[30] accounted for 57% of the total market in 2015[31], and this proportion has been reasonably consistent (56-58%) over the last five years.

The decision to travel by road takes into account conditions on the highway network shown in Figure 3.1, particularly the principal north-south highway, the I-15 linking both Southern and Northern California (via SR-58 at Barstow) to Las Vegas.

3.1.1 Southern California

The total distance from Las Vegas to San Diego on the I-15 is just over 300 miles, predominantly through California. Posted speeds on I-15 are 70 miles per hour (mph) between Corona and Escondido and from San Bernardino to the Nevada border, and 65 mph elsewhere[32].

The characteristics of the I-15 are displayed in Figure 3.2. The section immediately south of Las Vegas is four lanes in each direction, but this falls to three lanes outside of the city limits and to two at Primm, the California Nevada state line. Across the Mojave Desert between Primm and Barstow there are typically two lanes each way, although a third climbing lane is available in some sections, where the highway rises to above 4,000 feet above sea level.

South of Victorville the I-15 runs through the Cajon Pass between the Angeles National Forest and the San Bernardino National Forest. At this point it is the only major highway for 25 miles in either direction, between the I-5 and SR-14 in the west and SR-62 ad SR-247 in the east. The I-5, the other main north-south highway is 60 miles away.

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[30] All modes including RV and bus.

[31] Source : LVCVA Las Vegas Visitor Profile.

[32] Source: http://www.dot.ca.gov/hq/roadinfo/70mph.htm.

Figure 3.1: Principal highways between California and Las Vegas

Source: Steer Davies Gleave

Between Las Vegas and San Diego, the I-15 has interchanges with a number of major highways listed in Table 3.1.

Table 3.1: I-15 major connecting highways

Highway	Location and County	Role
I-8	San Diego	Runs through Imperial County to Arizona
SR-78	Escondido, San Diego County	Runs from Oceanside to I-10 at the Arizona state line
I-215	Murrieta, Riverside County	Provides an alternative to the I-15
SR-91	Corona, Riverside County	Runs west through Los Angeles
SR-60	Eastvale, Riverside County	Runs west through Los Angeles
I-10	Ontario, Riverside County	Runs west through Los Angeles and east towards Palm Springs
I-210	Pasadena, Los Angeles County	Runs west through Los Angeles and just north of Burbank
I-215	San Bernardino	Serves Murrieta, Riverside and San Bernardino
SR-18	Victorville, San Bernardino County	From San Bernardino
SR-58	Barstow, San Bernardino County	Links Northern CA to I-15 via Bakersfield

Source: Steer Davies Gleave

Figure 3.2: Characteristics of I-15

Source: Steer Davies Gleave

Other key highways in the Southern California region are illustrated in Figure 3.3 and include:

- SR-14/Antelope Valley Freeway linking I-5 at the north of the San Fernando Valley with Palmdale
- I-5 south of Santa Clarita, specifically the section between the intersection with SR-170 and SR-134 which provides a link to Burbank CaHSR station and Bob Hope Airport
- US-101 in LA County, which serves LA Union Station close to the intersection with I-5 and I-10
- SR-57 close to the intersection with I-5 which links to Anaheim Regional Transportation Intermodal Center

Drive times

Table 3.2 shows the average total drive times between Las Vegas, Victorville and HSR station locations in Southern California.

Table 3.2: Average drive times: Las Vegas to Southern California station locations

From	To	Drive time (hh:mm)
Anaheim	Las Vegas	04:12
Downtown Los Angeles	Las Vegas	04:23
Burbank	Las Vegas	04:23
Palmdale	Las Vegas	03:48
Victorville	Las Vegas	02:50
Palmdale	Victorville	01:09

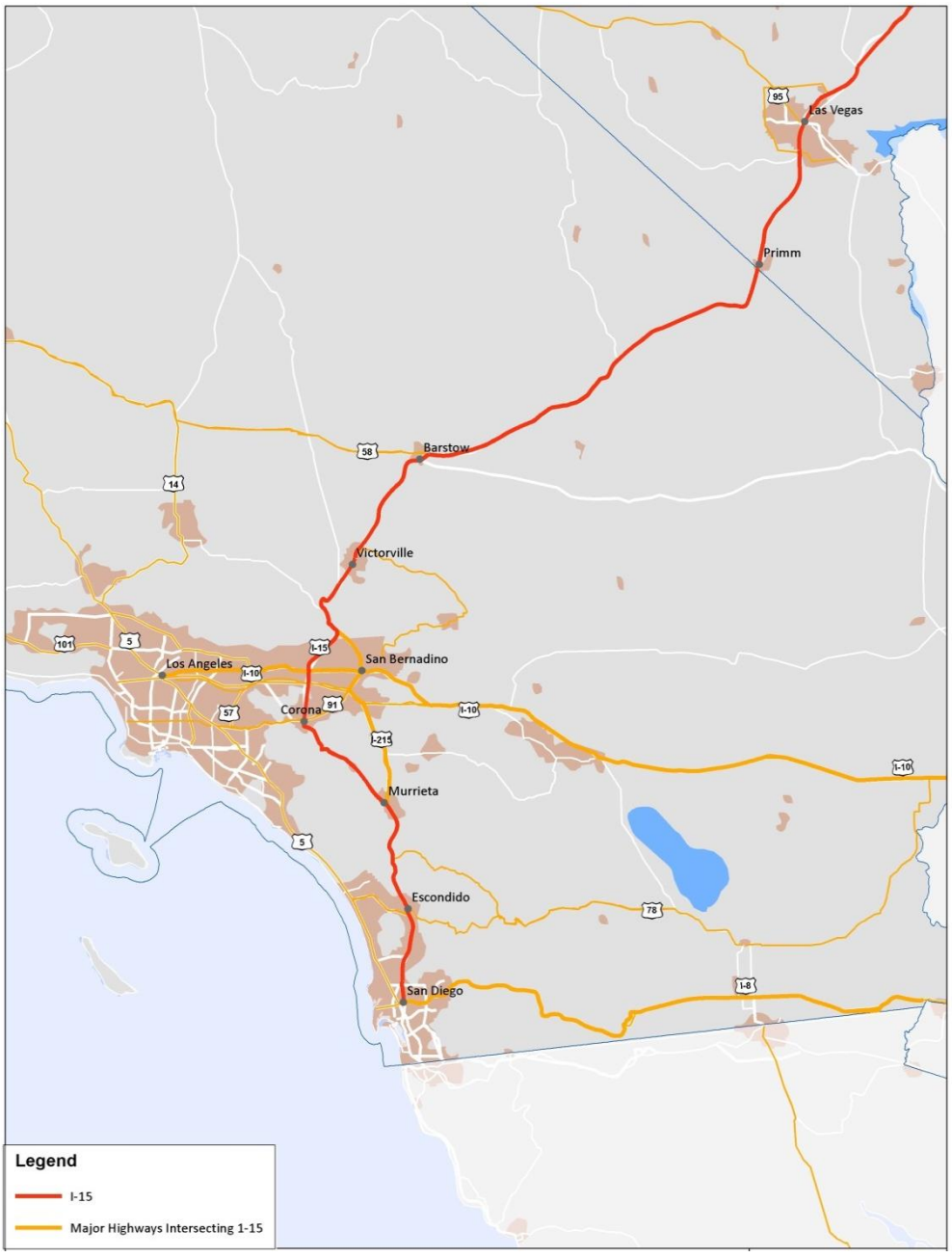
Source: Steer Davies Gleave

Severe congestion occurs on Southern California highways, particularly in the LA Basin. Specific locations by direction and time period include:

- I-15 near the California/Nevada border: Friday evenings northbound and Sunday afternoons southbound;
- I-15 near Temecula: northbound weekday afternoons, southbound weekday mornings;
- Majority of highway network in LA Basin (I-5, I-10, I-405, I-710, CA-91, I-605, CA-110, I-210, CA-60, I-105, US-101): weekday daytime;
- San Bernardino Valley highways (I-10, CA-210): weekday mornings westbound, weekday afternoon eastbound; and
- San Diego highway network (I-5, I-8, I-805, I-15): weekday mornings and afternoons.

We provide more information on how journeys are affected by congestion in Appendix E.

Figure 3.3: Key Southern California highways



Source: Steer Davies Gleave

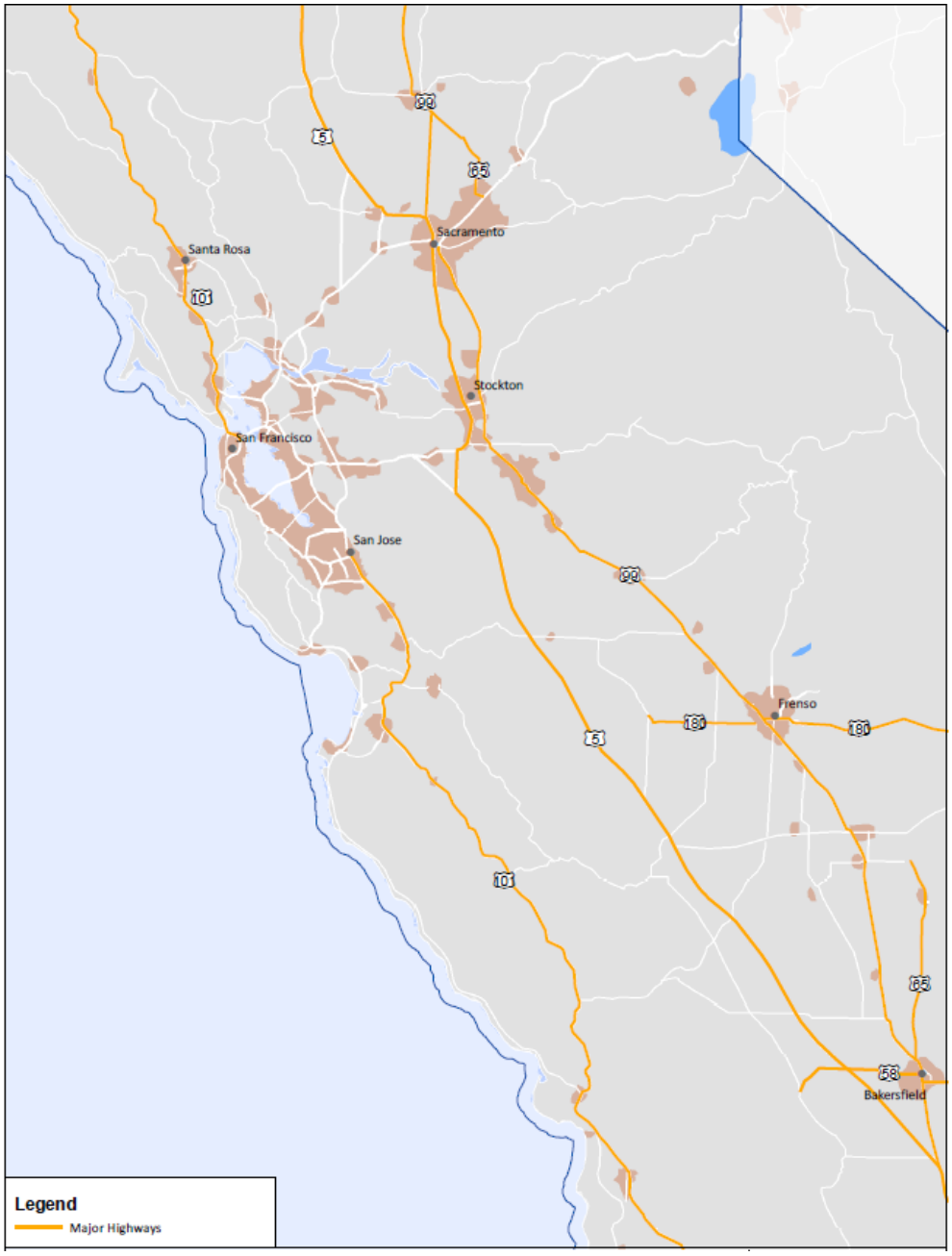
3.1.2 Northern California

Figure 3.4 displays the key relevant highways in Northern California for travel to/from Las Vegas. Distances between Northern California and Las Vegas vary between 570 miles (San Francisco) and 285 miles (Bakersfield). There are two principal north south routes: I-5 and SR-99.

Bakersfield is a key gateway to Southern California and the I-15. The SR-99 and SR-65 converge here and the I-5 passes on the west, connecting via SR-58. From Bakersfield the main route across to I-15 is again via SR-58 to Barstow.

For those living in the northern areas of the state, for example in Trinity or Butte County US-95 is a reasonable alternative via I-80 to Reno and down the eastern side of Death Valley.

Figure 3.4: Key Northern California highways

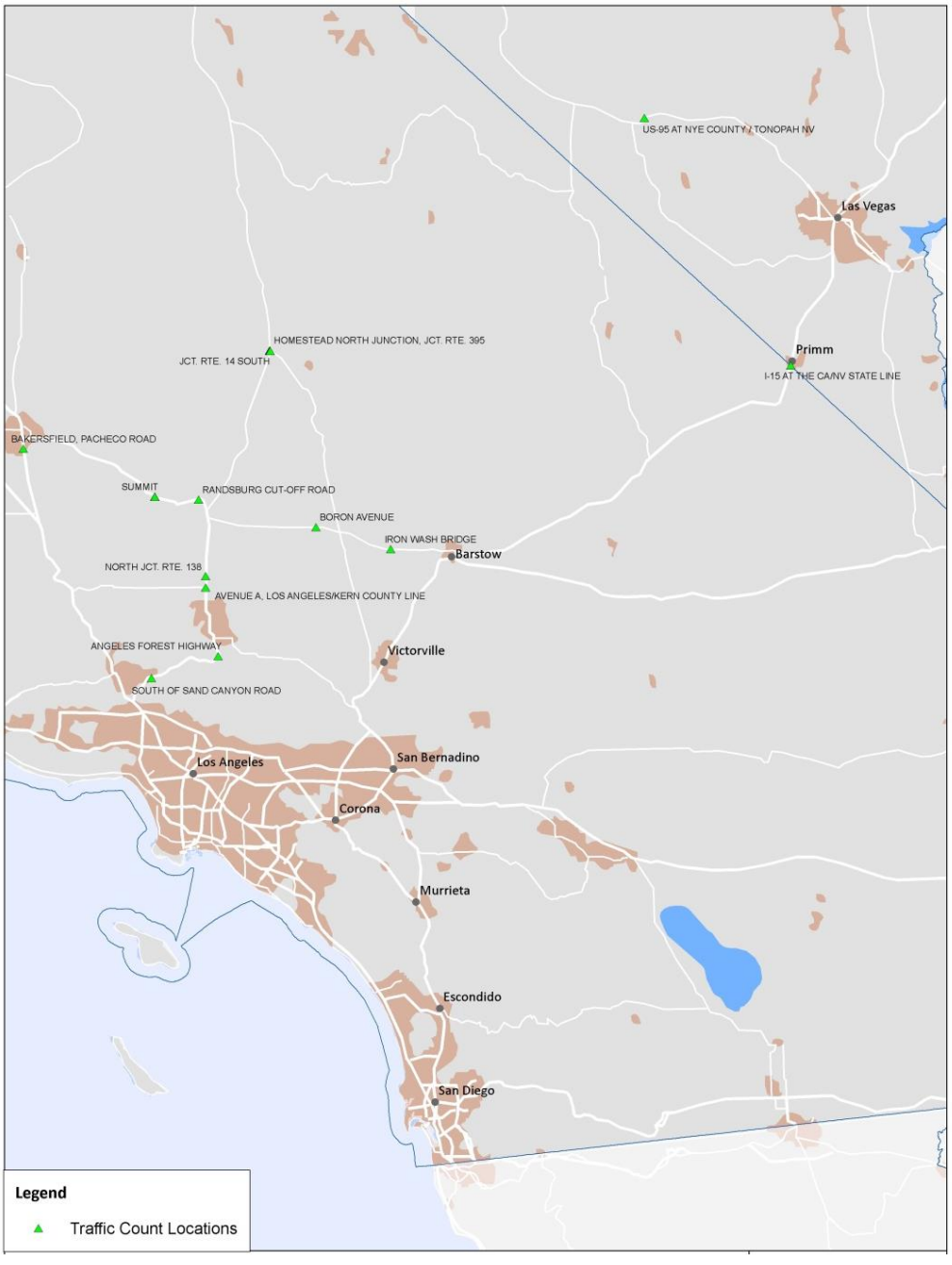


Source: Steer Davies Gleave

3.1.3 Auto travel: traffic and delays

We obtained hourly and average daily traffic count data from Nevada (NDOT) and California (Caltrans) Department of Transportation for key roads in California and Nevada as shown in Figure 3.5.

Figure 3.5: Traffic count sites

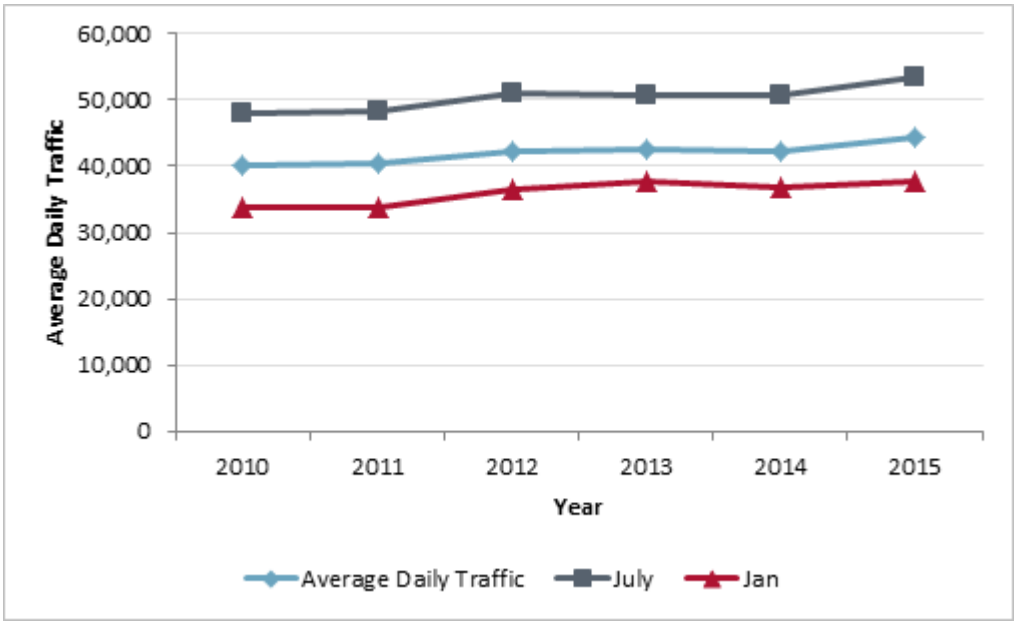


Source: Steer Davies Gleave

Traffic on I-15

Traffic volumes on the I-15 at the California Nevada state line vary considerably by season and at holiday times, such as Thanksgiving. Average Daily Traffic (ADT) in 2015 ranged from 53,496 in July, the busiest month, to 37,691 in January, the lowest month. Figure 3.6 shows average daily traffic volumes at the state line between 2010 and 2015 for the entire year, the highest and the lowest months. Since 2010, average annual traffic has grown 10.5%, with a 12% increase in both the low and high months.

Figure 3.6: Trend in Average Daily Traffic

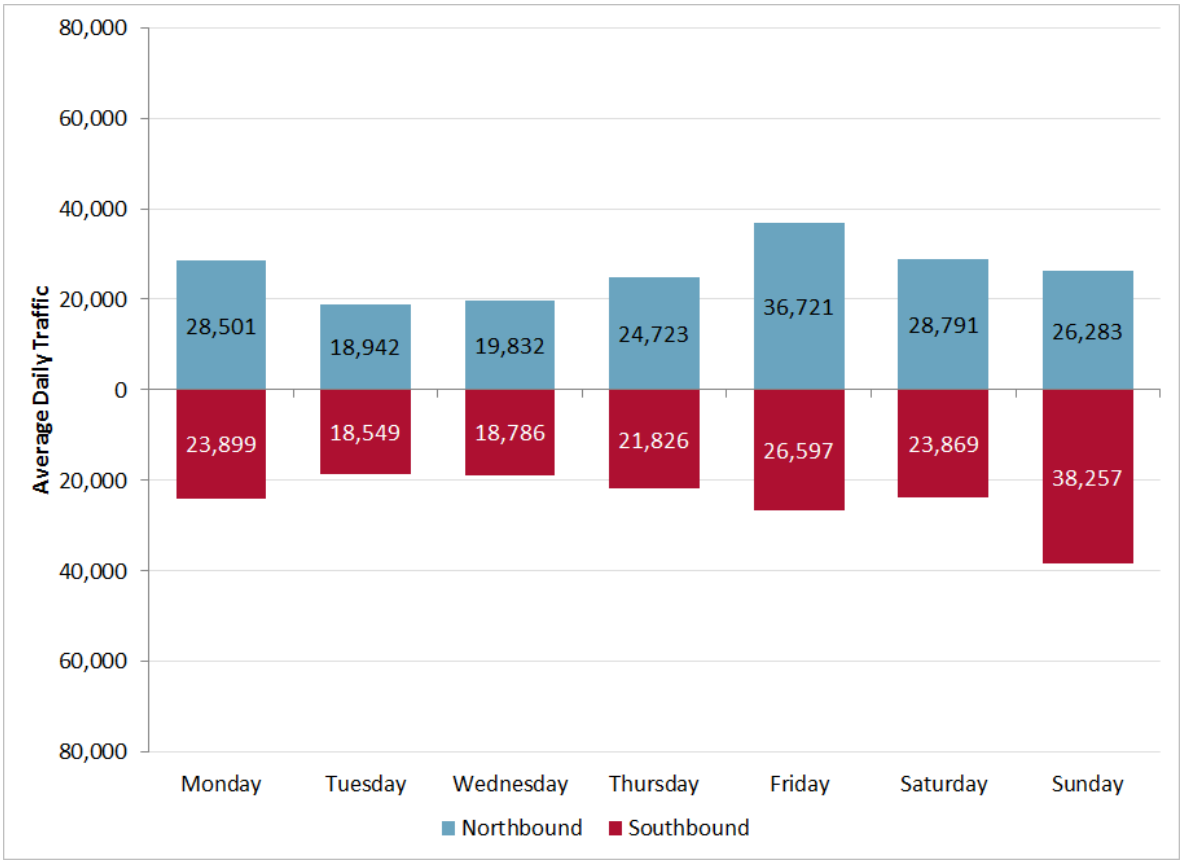


Source: Steer Davies Gleave, NDOT

As Figure 3.7 illustrates, the highest volume of traffic northbound on I-15 occurs on Fridays during the evening peak, which coincides with the end of the working week. Southbound peaks are from midday on Sunday as visitors check out of their hotels or motels and make the drive home.

Given the high proportion of SoCal visitors who arrive by road, there is a strong relationship with I-15 traffic levels, but it is important to bear in mind that the I-15 also carries a significant amount of through traffic and demand generated by the resident population of Las Vegas and Southern Nevada.

Figure 3.7: I-15 Average Daily Traffic (ADT) at the state line, by day of week and direction

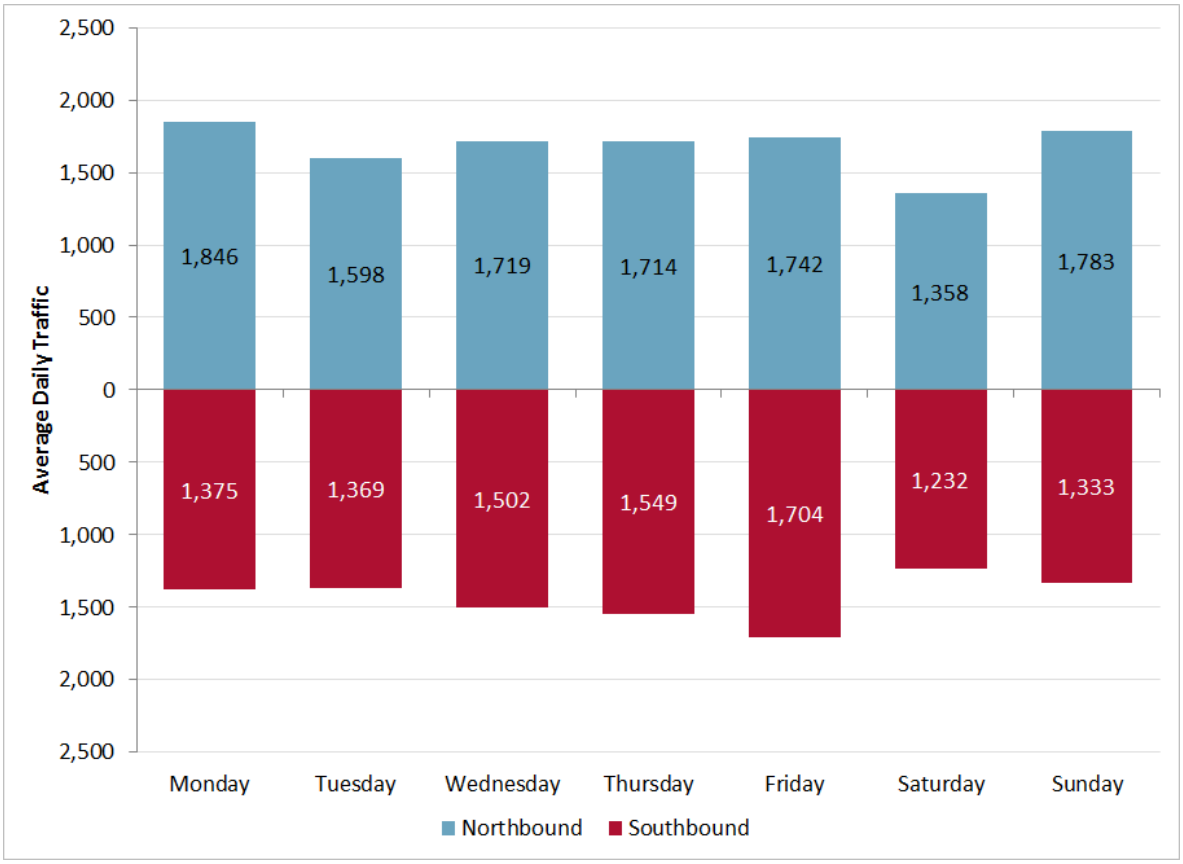


Source: Steer Davies Gleave, NDOT, month of April 2015

Traffic on US-95

Volumes on US-95, to the north of Las Vegas at Nye County, are far lower than on I-15 which approaches from the south. Figure 3.8 shows that the average daily traffic peaks in the southbound direction on a Friday where it is 18% above the average for the week. The peak in the northbound direction is on a Monday when volumes are 10% above the weekly average.

Figure 3.8: US-95 Annual Daily Traffic at Nye County, by day of week and direction



Source: Nevada Department of Transportation, Nye County, April 30 2015 to May 06 2015

Our behavioral research, described in Appendix C, showed that the majority of round-trips by geographical market began on a Friday and/or returned on a Sunday as shown in Table 3.3.

Table 3.3: Start and end day of trip by market

Market	Began Friday[33]	Returned Sunday
Southern California	28%	24%
Northern and Central CA	27%	27%
Clark County	27%	34%

Source: Steer Davies Gleave behavioral survey 2016

[33] Percentage of all trips from each market starting on a Friday.

3.2 Air travel

Las Vegas McCarran airport (LAS) is served by six major airports in Southern California and another six in Northern California as shown in Figure 3.9. In 2015, 43% of all visitors to Las Vegas arrived by air through McCarran Airport[34].

In the past five years the volume of trips by air to Las Vegas has shown continual growth. The compound annual growth rate (CAGR) between 2010 and 2015[35] has been 3.8% and 3.7% for Southern California and Northern Californian airports respectively.

Figure 3.9: Principal airports in California

Source: Steer Davies Gleave

3.2.1 Scheduled flights

Scheduled weekly air services between these airports and Las Vegas are summarized in Table 3.4 and Table 3.5.

[34] Source: LVCVA Las Vegas Visitor Profile Surveys 2015.

[35] Data for 2015 was only available for 11 months of the year at the time of writing. Total for whole year has been estimated using rate of growth between 2014 and 2015. Source: Analysis of BTS T-100 market database.

Table 3.4: Weekly scheduled air services between Southern California and Las Vegas

Airport	Los Angeles International	San Diego International	Burbank – Glendale – Pasadena	John Wayne	Ontario	Long Beach	Total flights
Code	LAX	SAN	BUR	SNA	ONT	LGB	n/a
Average gate to gate time (minutes)	75	70	70	65	55	70	n/a
Southwest Airlines	117	115	103	78	46	0	459
Delta Airlines	108	0	0	0	0	0	108
United Airlines	50	0	0	0	0	0	50
American Airlines	84	0	0	0	0	0	84
JetBlue Airways	0	0	0	0	0	40	40
Total weekly flights	360	115	103	78	46	40	741

Source: Steer Davies Gleave, Official Airline Guide and Airline websites, correct June 2016

Table 3.5: Weekly scheduled air services between Northern California and Las Vegas

Airport	Fresno Yosemite International	Oakland International	San Francisco International	San Jose International	Sacramento International	Total flights
Code	FAT	OAK	SFO	SJC	SMF	n/a
Average gate to gate time (minutes)		85	90	80	85	n/a
Southwest	0	94	66	94	85	339
United Airlines	0	0	121	0	0	121
Total weekly flights	0	94	187	94	85	460

Source: Steer Davies Gleave, Official Airline Guide and Airline websites, correct June 2016

The choice to travel by air is influenced by the distance between the origin and Las Vegas. A relatively small proportion of Southern Californians arrive by air compared with 56%[36] reported from other US origins and 60% of international visitors[37].

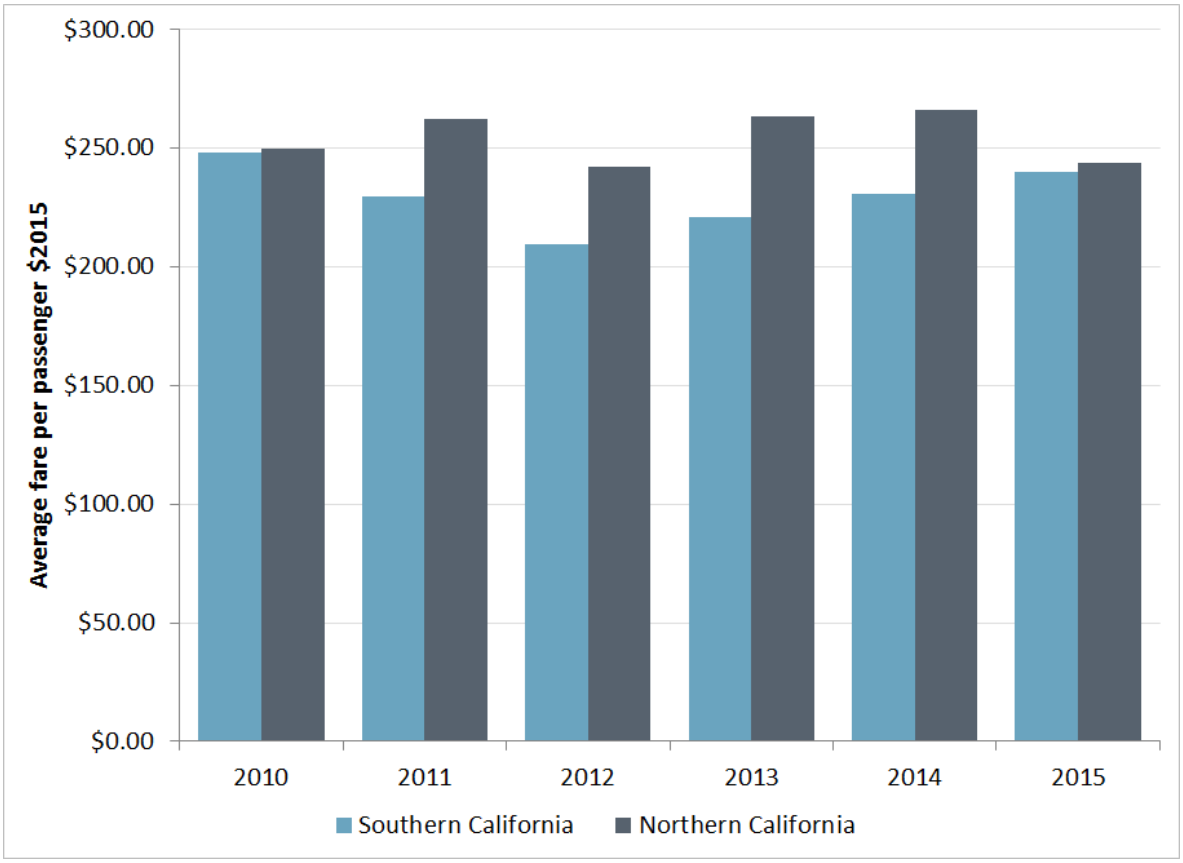
[36] Source: LVCVA Visitor Profile Surveys 2015.

[37] Although only 43% of this group arrived on direct flights, with the remainder making an intermediate stop in the US. Source: LVCVA Visitor Profiles and McCarran Airport statistics.

3.2.2 Air fares

We examined air fares using the Bureau of Transportation DB1B database, a 10% sample of air fares from reporting carriers. Figure 3.10 summarizes the results for Southern California and Northern California airports for flights to Las Vegas. Fares have been converted to 2015 dollars using the Consumer Price Index (CPI) published by U.S Bureau of Labor Statistics.

Figure 3.10: Average round-trip air fares, $2015[38]



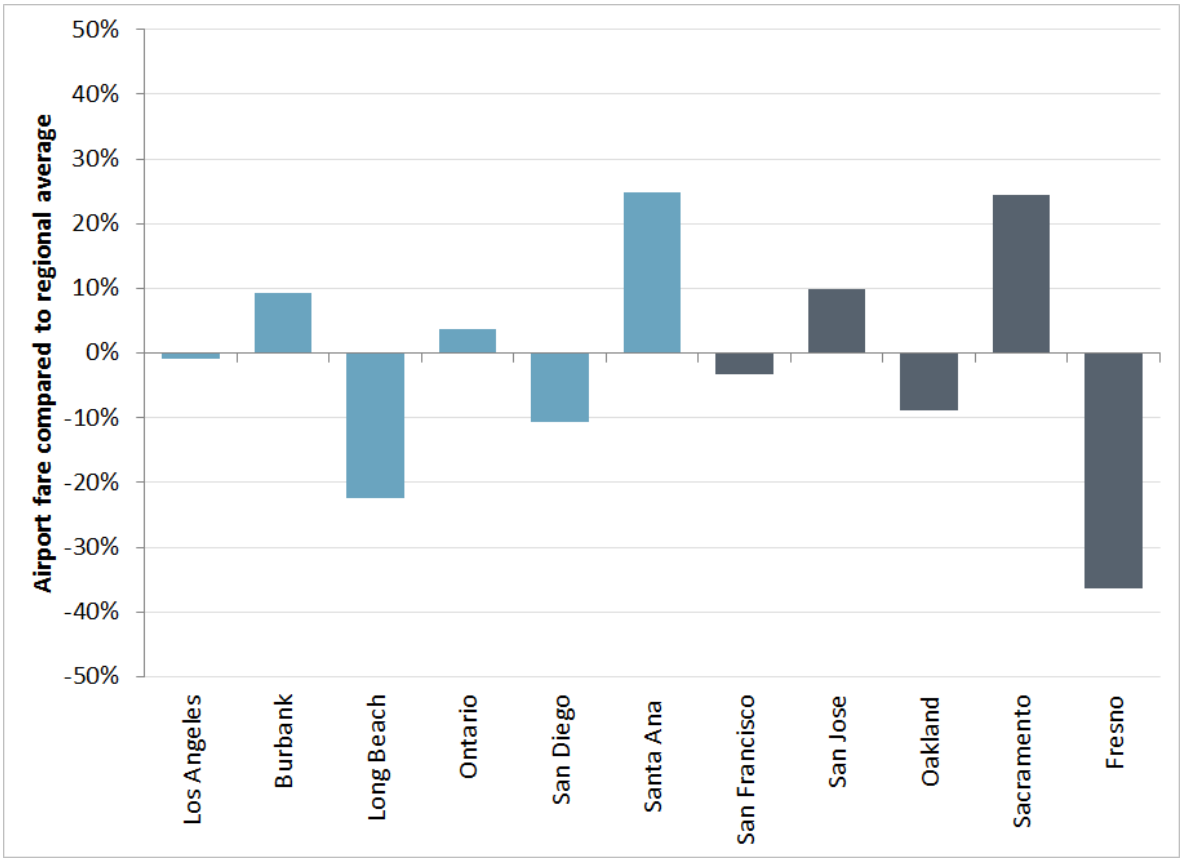
Source: DB1B Market Data, BTS

Advertised or "headline" airfares are highly variable as airlines apply yield management techniques to maximize their revenues. Current round-trip air fares vary from $40 to over $450 in both Southern California and Northern California depending on the dates and times of travel.

Fares also vary significantly by airport as shown in Figure 3.11. Fresno and Long Beach airports tend to have the lowest regional fares whereas Santa Ana and Sacramento have the highest.

[38] Data for 2015 is for first 6 months only.

Figure 3.11: Individual airport fares compared with regional average, 2015



Source: DB1B Market Data, BTS

3.3 Bus travel

In 2015, buses accounted for 0.8% of total traffic along the I-15[39]. A number of commercial bus operators run services between California and Las Vegas as shown in Table 3.6: five serving Southern California and four serving Northern California.

[39] Nevada Department of Transportation classified traffic counts April 2015.

Table 3.6: Bus service operators to Las Vegas and main cities served in California

Region	Operators	Main cities served
Southern California[40]	Greyhound	Los Angeles, San Diego
	Megabus	Los Angeles, Burbank, Anaheim, Santa Ana, Oceanside, San Diego
	Lux Bus America	Los Angeles, Burbank, Anaheim, Santa Ana,
	Bolt Bus	Los Angeles, Burbank, Anaheim, Oceanside, San Diego
	Tufesa International	Los Angeles, Burbank, Anaheim, Oceanside, San Diego
	Amtrak Thruway bus	Los Angeles
Northern California	Greyhound	San Francisco, San Jose
	Megabus	San Francisco, San Jose
	Bolt Bus	San Francisco, San Jose, Bakersfield, Fresno, Merced
	Tufesa International	San Francisco, San Jose, Bakersfield, Fresno, Merced
	Amtrak Thruway bus	Bakersfield

Source: Steer Davies Gleave, correct June 2016

Round-trip bus fares from the Los Angeles area are around $40 to $60 per person and journey times are between five and eight hours depending on the number of stops en-route. We estimate that there are around 31 direct buses per day on average throughout the week.

Travel by bus from Northern California is both more expensive and slower due to the large distances covered. From Fresno, the average round-trip fare is around $110 per person (2016 prices) with a journey times of around ten and a half hours. From San Francisco the round-trip fare is around $160 (2016 prices) with journey times of around 14 hours.

3.4 Future plans for the corridor

There are a number of transportation agencies in Southern California and Nevada tasked with developing transportation policies and plans which may affect future travel to Las Vegas, as shown in Figure 3.12.

[40] https://www.wanderu.com/; http://www.gotobus.com/.

Figure 3.12: Transportation agencies in Southern California

Source: California Department of Transportation

Outlined below is a brief summary of the known future plans across these agencies and the potential implications for forecast levels of ridership for the HDC HSR line.

Auto

Auto is the predominant mode used for travel to/from Las Vegas. It is also the predominant mode used for trips throughout California and Nevada. While concerted efforts are being made to encourage and facilitate mode shift, particularly in urban areas, auto is likely to remain the dominant mode of travel.

We provide below a summary of some key planned highway investments in the region[41]:

- Planned improvements in next ten years (by 2025):
  - I-5: Add 1 HOV lane in each direction from Weldon Canyon Rd to SR-14 (2017);

[41] Sources: Regional Transportation Plan 2013-2035, The Regional Transportation Commission of Southern Nevada; Southern California Association of Governments Regional Transportation Plan 2016-2040; San Bernardino Countywide Transportation Plan, 2015.

- I-10: Express Lane widening from San Antonio Ave to I-10/I-15 IC (2022); 2 express lanes in each direction from I-10/I-15 Interchange to California St and 1 express lane in each direction from California St to Ford St in Redlands (2024);
- I-15: Widen lanes from Sloan Rd to Blue Diamond Rd, Craig Road to Speedway Blvd and Speedway Blvd to Apex Interchange (2020); Express lanes from Cantu Galleano Rd to SR-210 and from SR-210 to Duncan Canyon Rd (2022);
- SR-55: Add 1 mixed-flow lane in each direction and fix chokepoints from I-405 to I-5 and add 1 auxiliary lane in each direction between select on/off ramps (2020);
- I-405 - Add 1 mixed-flow lane in each direction from I-5 to SR-55 (2023);
- SR-91 - Add 1 mixed-flow lane on SR-91 eastbound from SR-57 to SR-55 and improve interchange at SR-91/SR-55 (2025); and
- SR-210: Add 1 Mixed Flow lane in each direction from Highland Ave to San Bernardino Ave (2021).

- Planned improvements beyond next ten years (from 2026 onwards):
  - I-5: Add 1 mixed-flow lane in each direction from SR-57 to SR-91 and add 1 HOV lane in each direction from Pico to SD County Line (2040);
  - I-10: Add 1 HOV lane in each direction from Ford to RV County Line (2030);
  - I-15: Add 1 HOT lane in each direction from Cajalco Rd to SR-74 (2029); Add 1 HOV lane in each direction from SR-74 to I-15/I-215 interchange (2039); Express lanes from SR-210 to I-15/I-215 Interchange (2026), in segment 4 (2030) and from US-395 to High Desert Corridor (2034);
  - I-210: Add 1 HOV lane in each direction from I-215 to I-10 (2040); Add 2 HOT lanes in each direction from US-395 to I-15/I-215 and widen lanes from Blue Diamond to Tropicana Ave (2030); and
  - SR-14 - Add 1 HOV lane in each direction from Ave P-8 to Ave L (2027).

These plans have the potential to improve the flow of traffic in parts of California, but we are not aware of any plans to provide a wholly new route between Southern California and Las Vegas, or any plans which would materially affect journey times on the I-15 between Southern California and Las Vegas. Indeed forecasts from SANBAG and SCAG both envisage steady reductions in average highway speeds in the area. The competitive position of auto relative to HSR is therefore not anticipated to shift significantly in future.

Autonomous vehicles and car ownership trends

Technical innovation, with connected cars and driverless cars, should help to mitigate the potential increase in congestion related delays as traffic volumes increase, but will require a substantial proportion of the auto fleet to be fitted in order to be effective. At this stage it appears unlikely that such developments will contribute to increasing auto speeds.

In the major urban areas a move towards a shared ownership model, potentially encouraged by the roll out of autonomous vehicles, would mean that fewer people would have their own car. This would not preclude car rentals or ride sharing for long distance trips, but it is likely to increase the consideration of a rail alternative. However, this factor has not been incorporated in the analysis given the uncertainty about the pace of transition.

Air

Las Vegas McCarran Airport was the ninth busiest in North America in 2015, and the second busiest when measured in terms of passengers' origin or final destination. With the opening of Terminal 3 in 2012, the airport now has capacity to accept up to 55 million passengers per year, but this is reported to be a hard limit due to local air traffic restrictions from Los Angeles, and Department of Defense activity through Nellis Air Force base.

Base Case projections by Applied Analysis suggested that McCarran will reach the cap at some point between 2034 and 2040, but this could be pulled forward to 2030 with faster market growth. Alternative growth projections by the FAA suggest this total could be breached as early as 2025.

An option that has been considered in the past to accommodate future visitor growth is the development of a new airport in the Ivanpah Valley, located south of Las Vegas. However, this project has been on hold since 2010 and the timeline to fully develop the site is put at 12-15 years.

Whether this site is developed or not, it would appear unlikely that capacity constraints at McCarran Airport will pose a significant threat to the long term growth of the Las Vegas visitor market. HSR has the potential to transfer a proportion of passengers from the busiest air corridor to/from Southern California. An associated reduction in flights to/from Southern California will facilitate the redeployment of airport slot capacity to cater for growth in flights serving longer distance markets. HSR services could therefore be seen as complementary to air, enabling further growth in total visitation to Las Vegas.

Rail

There are currently no rail passenger services between Southern California and Las Vegas[42].

The CaHSRA is implementing the California high-speed rail system, which will run from Los Angeles and Anaheim to the San Francisco Bay Area by 2029 at speeds of over 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling about 800 miles with up to 24 stations. The CaHSRA's Business Plan highlights that the California high-speed rail will connect the mega-regions of the state, contribute to economic development and a cleaner environment, create jobs, and preserve agricultural and protected lands. A connection between the California high-speed rail system and the High Desert Corridor HSR line is planned at the Palmdale station.

In addition to the plans of CaHSR, XpressWest and the HDC JPA discussed in this report, plans by Xtrain for a service between Fullerton and Las Vegas remain an ambition. Specific details of the service are limited, but were a service to be available over the existing rail infrastructure, both the journey time and frequency would be significantly less attractive than that offered by the proposed HSR service over the HDC.

Once a HSR service between Las Vegas and Palmdale is in place, passengers will have the opportunity to travel to Las Vegas entirely by rail, initially using Metrolink services along the Antelope Valley line. Future service plans for the Antelope Valley line are set out within the 10-

[42] Although Amtrak does offer a Thruway bus service from Los Angeles and Bakersfield.

year strategic plan 2015-2015, Southern California Regional Rail Authority, Sep 2015. This sets out potential future service enhancements, with the potential for up to 88 weekly services[43]. Any enhancements to the Antelope Valley line services would benefit HSR using the HDC by offering greater connectivity to the Metrolink system.

Bus

Investment is anticipated by the Antelope Valley Transit Authority, helping them create a BRT line between Lancaster and Palmdale[44]. In addition some commuter bus services are anticipated to be expanded, including the 785 linking Palmdale with downtown Los Angeles and the 787 linking Palmdale to the West San Fernando Valley.

The impact on HSR ridership of such improvements is anticipated to be small, given the peak commuter focus of this initiative. However, any such investments could likely benefit HSR along the HDC by providing enhanced connection options for local communities.

[43] Further details are provided within Appendix A.

[44] http://www.avta.com/index.aspx?page=473.

4 The High Desert Corridor project

In this section we explain the proposed High Desert Corridor Project, the railway project and its specification in terms of the location of stations, ticketing and fare arrangements. The results of our behavioral research investigating traveler attitudes to the service proposition and preferred station locations are also presented.

4.1 The High Desert Corridor project

The High Desert Corridor (HDC) project is a proposed link between State Route (SR)-14 in Los Angeles County and SR-18 in San Bernardino County. This project would connect some of the fastest growing residential, commercial and industrial areas in Southern California, including the cities of Palmdale, Lancaster, Adelanto, Victorville and the Town of Apple Valley. The HDC is expected to be multi-modal and includes a freeway/tollway alongside a dedicated HSR line.

The HSR line will provide an important link between the California High Speed Rail (CaHSR) network and Las Vegas via Victorville. Specifically, it will connect:

- Southern California via the Antelope Valley, upgraded to new high CaHSR track; and
- Northern California via new CaHSR Phase 1 services.

4.2 The rail project

The HDC railway line is a 54-mile section of new dedicated railway track between Palmdale, Los Angeles County, CA, and Victorville, San Bernardino County, CA. Its construction will enable new, high-speed Electrical Multiple Units (EMUs) trains to run; compatible with the plans for CaHSR and the planned HSR between Las Vegas and Victorville. Trains will be able to travel at speeds of 150 miles per hour between Las Vegas, Victorville and Palmdale.

There are four primary infrastructure Phases which have been considered, building on the initial line planned by XpressWest between Las Vegas and Victorville. The subsequent phasing reflects the anticipated phased roll out of the CaHSR infrastructure:

1. One-seat high-speed ride linking Las Vegas-Victorville-Palmdale, with transfer to the existing Metrolink services on the Antelope Valley Line or auto access with parking facilities at Palmdale & Victorville;
2. One-seat high-speed ride between Las Vegas and Burbank, using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville and Palmdale);

3. One-seat high-speed ride between Las Vegas and Los Angeles Union Station / Anaheim Station using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville, Palmdale and Burbank)[45]; and
4. High-speed ride between Las Vegas and Palmdale with a timed connection at Palmdale for CaHSR Phase 1 services to/from Northern California[46]. Specific CaHSR services will have varying stopping patterns, but will include combinations of stops at:
    - Bakersfield;
    - Kings/Tulare;
    - Fresno;
    - Merced;
    - Gilroy;
    - San Jose;
    - Millbrae; and
    - San Francisco.

Figure 4.1 shows the planned extent of the HSR network in California/Nevada and the critical role that the HDC rail link will play within that network.

Figure 4.1: Map of proposed HSR service

Source: Steer Davies Gleave

[45] There is a potential for a further station at either Norwalk/Santa Fe Springs or Fullerton. At this stage however these remains as options within the CaHSR Draft 2016 Business Plan.

[46] For definition of Northern vs. Southern California used within our modeling, see Appendix A.

In our Base Case forecasts we assume a high-speed ride between Las Vegas and Anaheim with a timed connection at Palmdale for CaHSR Phase 1 services to/from Northern California will be available by 2029.

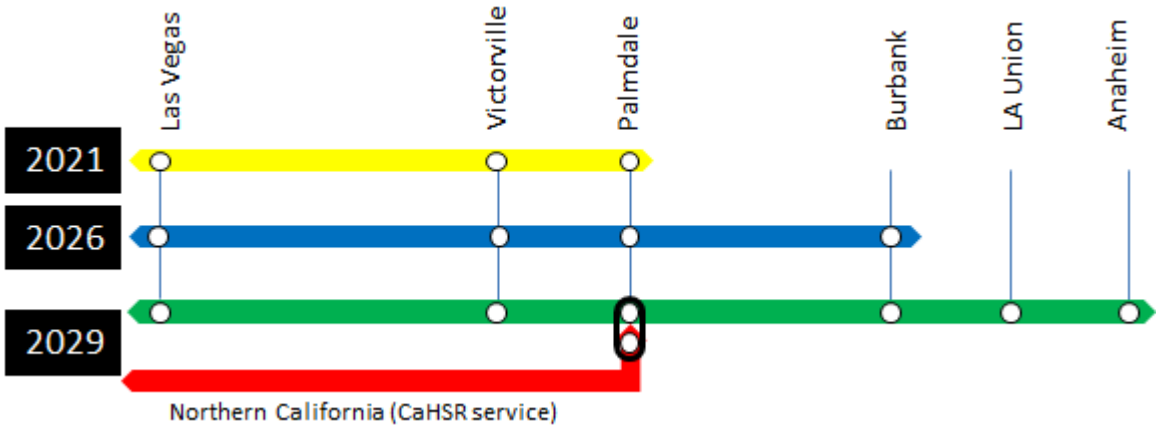
This full service is assumed to be developed in stages. The timing of each stage of infrastructure has been developed based upon advice from XpressWest on the opening of the section between Las Vegas and Victorville, and the latest CaHSR business plan[47] with an amended opening date to Burbank based on agreed assumptions with the HDC JPA:

- 2021: Phase 0: Las Vegas-Victorville (base line position);
- 2021: Phase 1: Las Vegas-Palmdale;
- 2026: Phase 2: Las Vegas-Burbank;
- 2029: Phase 3: Las Vegas-Anaheim; and
- 2029: Phase 4: CaHSR to NorCal.

It is noted that the 2016 CaHSR business plan assumes the full service through to Los Angeles and Anaheim will not begin until 2029; however, there may be an opportunity to operate over the infrastrucure between Palmdale and Burbank if constructed earlier, even if CaHSR trains are not yet operational on this section. Our Base Case assumes operations over this section of line by 2026; an alternative scenario assuming operations only commence in 2029 (in line with CaHSR service proposals) is presented in section 12.

This assumed timing is set out in Figure 4.2.

Figure 4.2: Assumed roll-out of HSR infrastructure



Source: Steer Davies Gleave

HSR services to/from Las Vegas are assumed to operate entirely independently of any future service offer by CaHSR south of Palmdale, and are expected to have no impact on CaHSR operations. The HSR services via the HDC is assumed not to carry passengers whose journeys are made entirely between any two stations on the CaHSR line between Anaheim and Palmdale, so

[47] http://www.hsr.ca.gov/docs/about/business_plans/2016_BusinessPlan.pdf.

there is no potential abstraction of the demand or passenger revenues expected to accrue to CaHSR services as a result of adding the service through to Las Vegas.

4.3 Rail service specification

Relative to existing modes, travel by HSR will be fast, relaxing, convenient, reliable and priced at an attractive level. The proposed HDC rail service specification is described below.

4.3.1 Journey times and frequencies

Trains will run between Las Vegas and Palmdale on average every 20-30 minutes throughout the day. Assumed frequencies have been set in order to align with the peak periods of demand to/from Las Vegas.

Table 4.1: HSR assumed frequencies

Time period	Trains per hour	Average time between trains (mins)
Sunday peak	5	12
Friday/Saturday/Monday peak	4	15
Thursday peak	3	20
Off-peak	2	30

These anticipated frequencies, and how they align with forecast demand, are shown in section "10.11.1 Base case train loadings".

Services from Northern and Central California will require a 'timed' connection at Palmdale. 'One seat' rides from Southern California will be possible.

Table 4.2 shows the proposed journey times from stations in California to Las Vegas[48].

[48] The CaHSRA's 2016 Business Plan includes trains with different stopping patterns on the line north of Palmdale. Several limited stop trains provide the option of faster travel times to/from stations north of Palmdale at certain times. However, there are significant benefits to HDC of being able to advertise frequent connections with services to Las Vegas, so the assumptions adopted within this report represent averaged journey times across the full range of anticipated CaHSR services, and also an allowance for additional transfer time at Palmdale station. Accordingly the travel times provided in this report do not reflect the fastest journey times reported in connection with the ridership studies for the Authority's 2016 Business Plan.

Table 4.2: HSR proposed journey times

	From	To	Total travel time (hh:mm)
Southern CA	Anaheim	Las Vegas	03:06
	Los Angeles	Las Vegas	02:28
	Burbank	Las Vegas	02:19
	Palmdale	Las Vegas	01:50
	Victorville	Las Vegas	01:20
Northern and Central CA	San Francisco	Las Vegas	05:19
	Millbrae	Las Vegas	05:03
	San Jose	Las Vegas	04:31
	Gilroy	Las Vegas	04:13
	Merced	Las Vegas	03:54
	Fresno	Las Vegas	03:29
	Kings/Tulare	Las Vegas	03:13
	Bakersfield	Las Vegas	02:42

Source: CaHSR Business Plan 2016, XpressWest and SDG assumptions

All journey times between Northern California and Las Vegas are stated inclusive of an assumed 15 minute transfer time at Palmdale.

4.3.2 HDC Stations

The existing Palmdale Transportation Center at Clock Tower Plaza Drive in the city of Palmdale is assumed to be re-located south to between Avenue Q and Palmdale Blvd. The new station would include bus facilities as well as Metrolink and HSR platforms.

The new station at Victorville is assumed to be located off I-15 at exit 161, Dale Evans Parkway.

The Las Vegas station is assumed to be located within the resort corridor close to the Strip, providing good onward connections to the major hotels and resorts.

All other stations are assumed to be co-located with existing facilities in accordance with the latest CaHSR Business Plan.

4.3.3 Ticketing and facilities

Ticket reservations will be possible via the internet, over the phone and through travel and tour operators. There will be the option to buy "walk-up" tickets at the station on the day of travel.

A wide range of refreshments, dining options, retail, entertainment, Wi-Fi and charging station facilities would be provided both on the train and at the stations. All luggage could be taken directly on board, or, in the case of trips to Las Vegas, sent straight through to the hotel.

4.4 Traveler attitudes

In our behavioral research we introduced travelers to the HSR concept and proposed HDC rail line. Respondents were asked to:

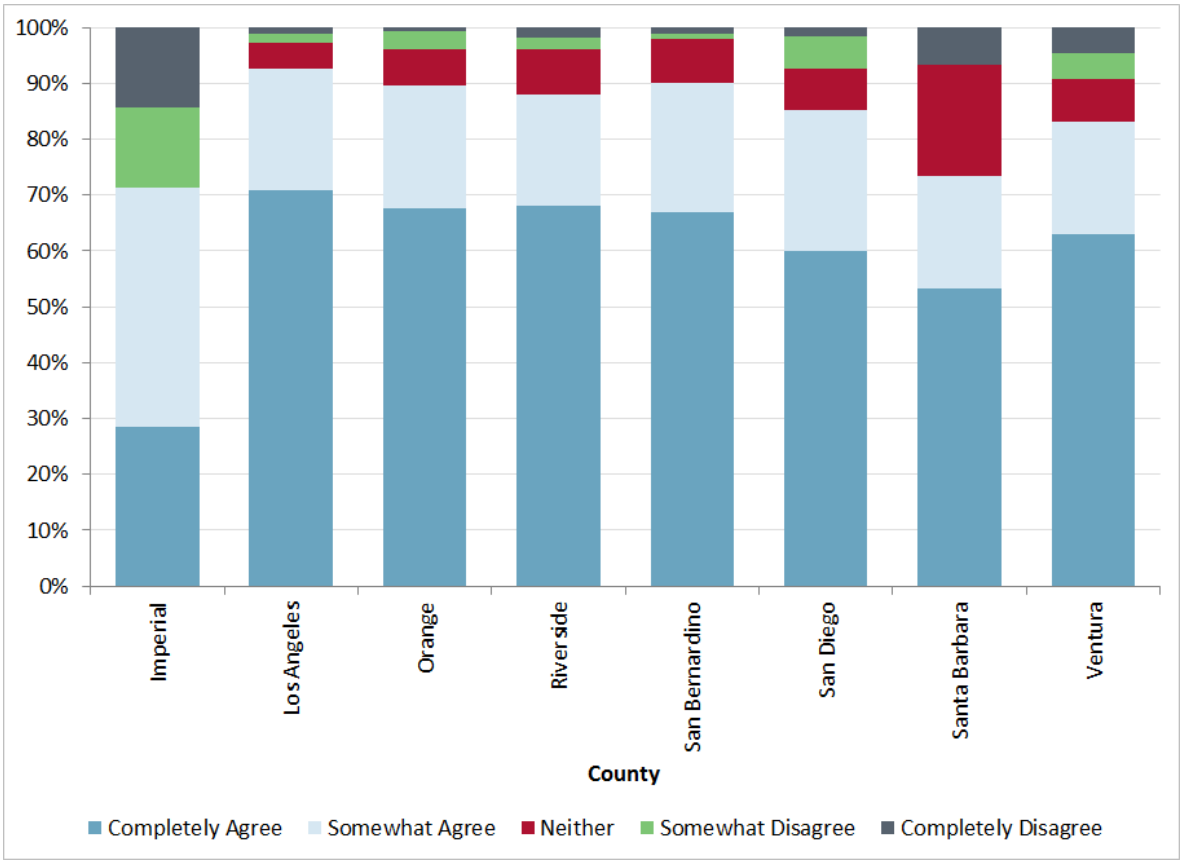
- Provide their reaction to the proposal;
- Suggest features they would like the service to have; and
- Express the likelihood of using the service in the future.

Full details of the focus groups and behavioral surveys that were undertaken specifically for this assignment are provided in Appendix B and Appendix C. The key findings of our research are provided below.

4.4.1 Auto travelers

Figure 4.3 shows that overall, auto travelers from Southern California responded positively to HSR. Over 70% of those from Los Angeles responded strongly when asked if they were willing to try the new service. Those from Orange, San Bernardino and Riverside were all just below 70%.

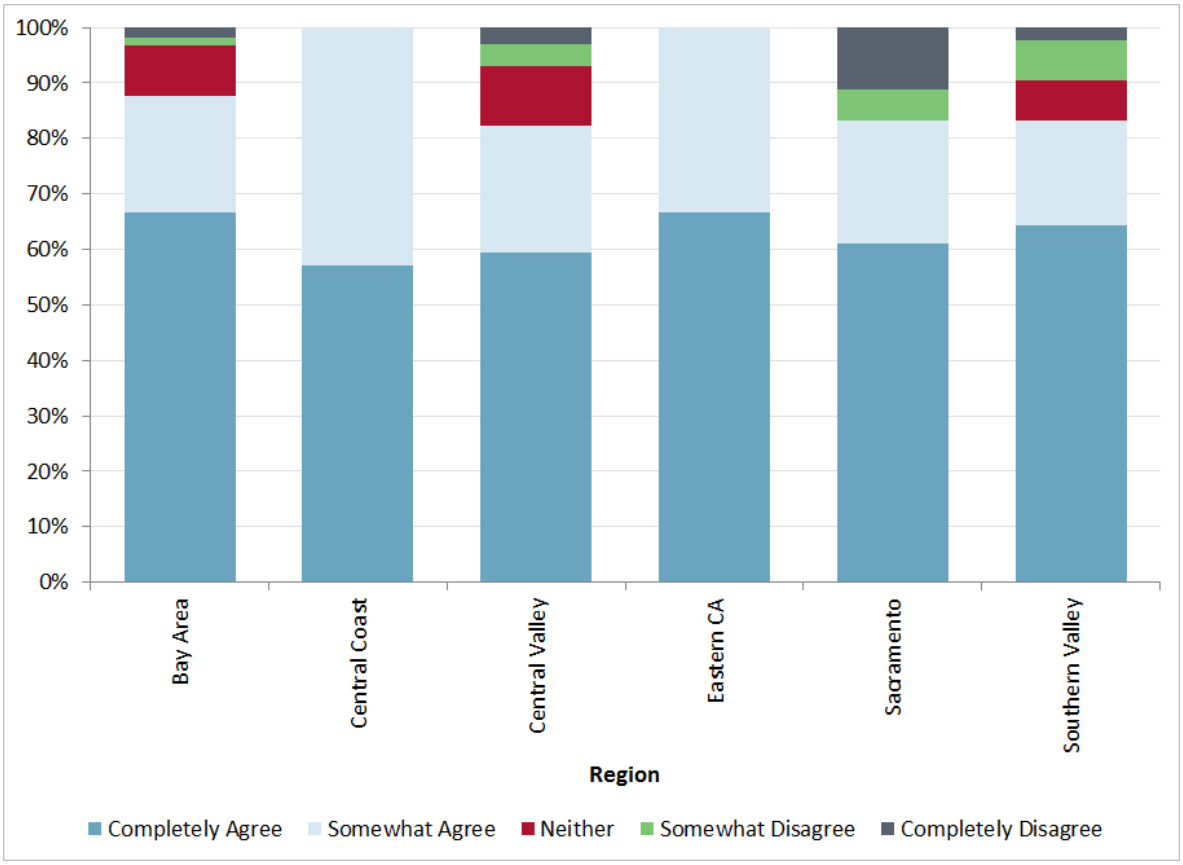
Figure 4.3: "I would definitely try HSR", Southern Californians, Auto



Source: Steer Davies Gleave behavioral surveys 2016

Figure 4.4 shows that Northern Californians were slightly less positive, with an average of 63% responding strongly when asked about trying the service. Northern California residents of the Bay Area were most positive at 66%[49].

Figure 4.4: "I would definitely try HSR", Northern Californians, Auto



Source: Steer Davies Gleave behavioral surveys 2016

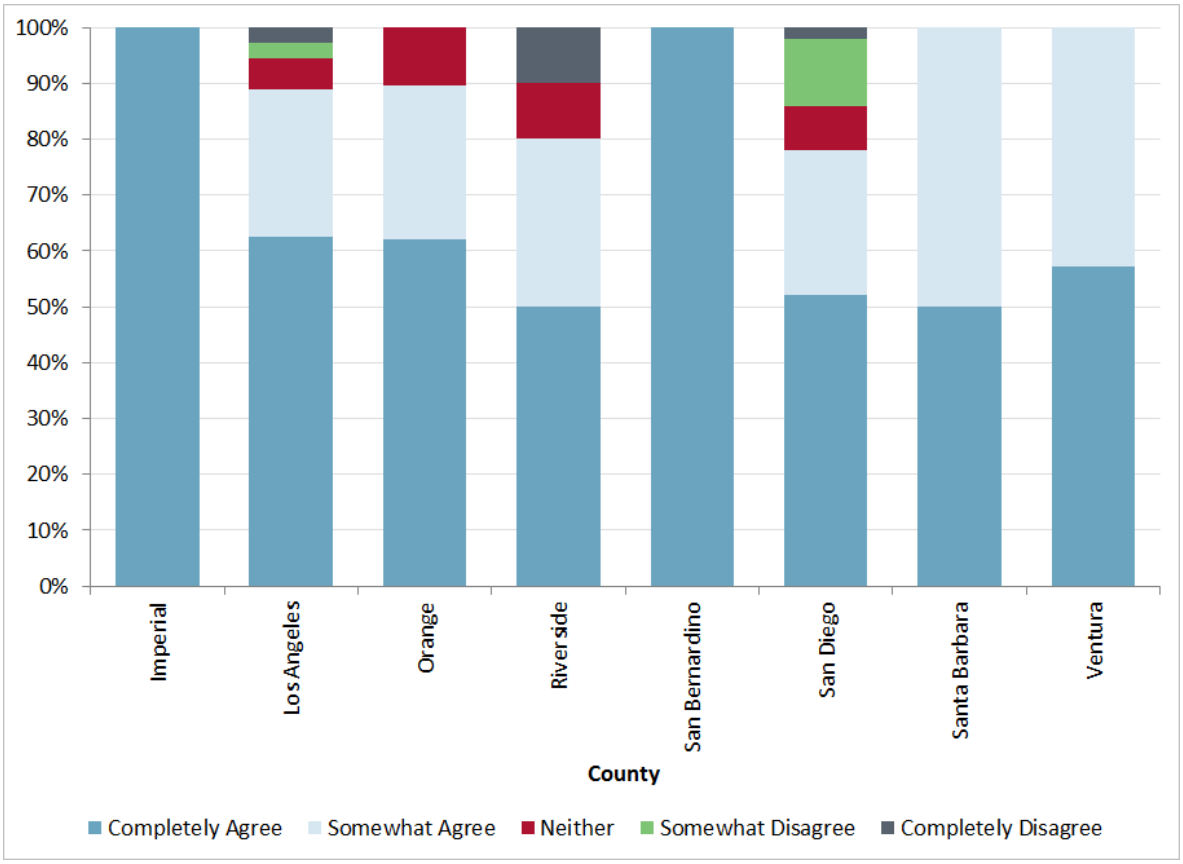
4.4.2 Air travelers

Of those traveling by air, travelers from Los Angeles County were the largest group in our behavioral research (64% of air sample). As Figure 4.5 shows. This group was also most positive about HSR with 63% completely agreeing that they would definitely try HSR[50].

[49] Sample from Eastern Counties based on 3 respondents only.

[50] Sample rates for other locations except San Diego were below 30.

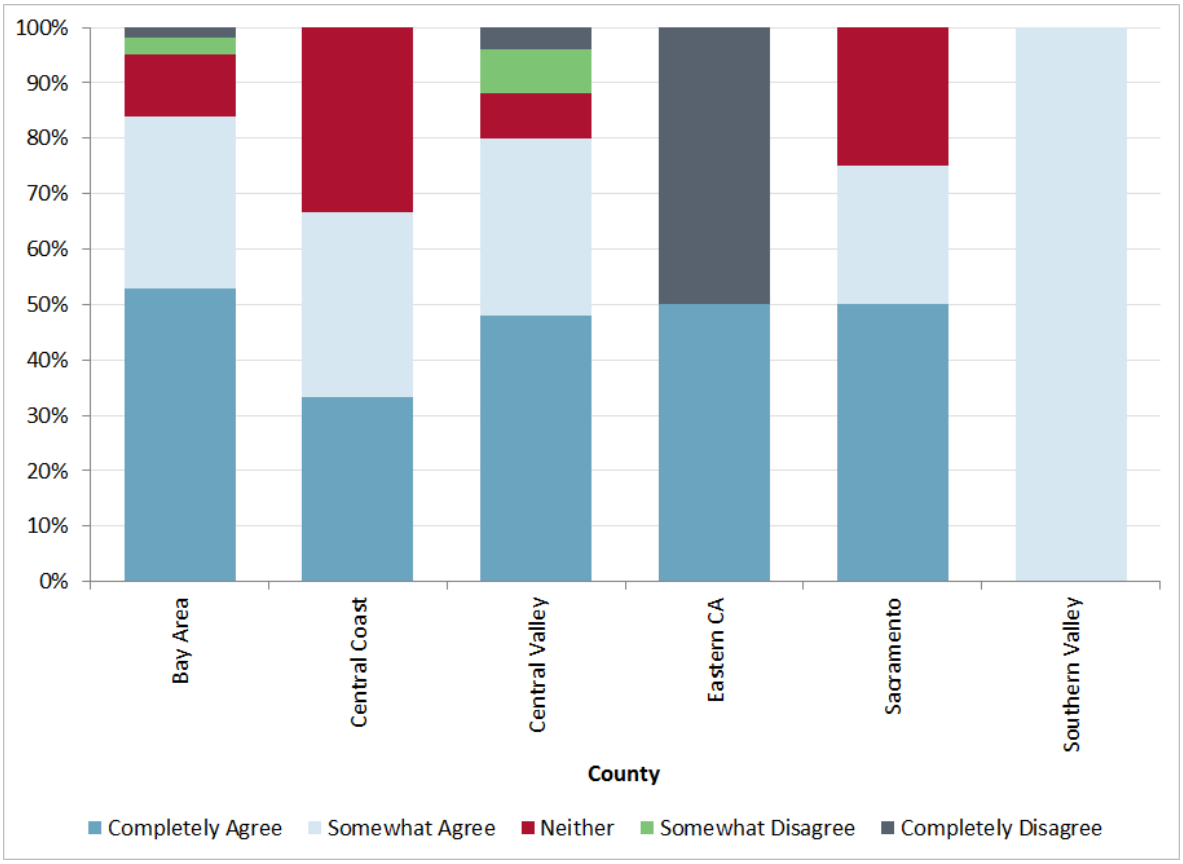
Figure 4.5: "I would definitely try HSR", Southern Californians, Air



Source: Steer Davies Gleave behavioral surveys 2016

Figure 4.6 shows that overall existing air travelers to Las Vegas from Northern California were less positive about HSR. Those from the Bay Area were the biggest group in our sample (86%), of these 53% were most positive about the proposed HSR service.

Figure 4.6: "I would definitely try HSR", Northern Californians, Air



Source: Steer Davies Gleave behavioral surveys 2016

4.4.3 Preferred station

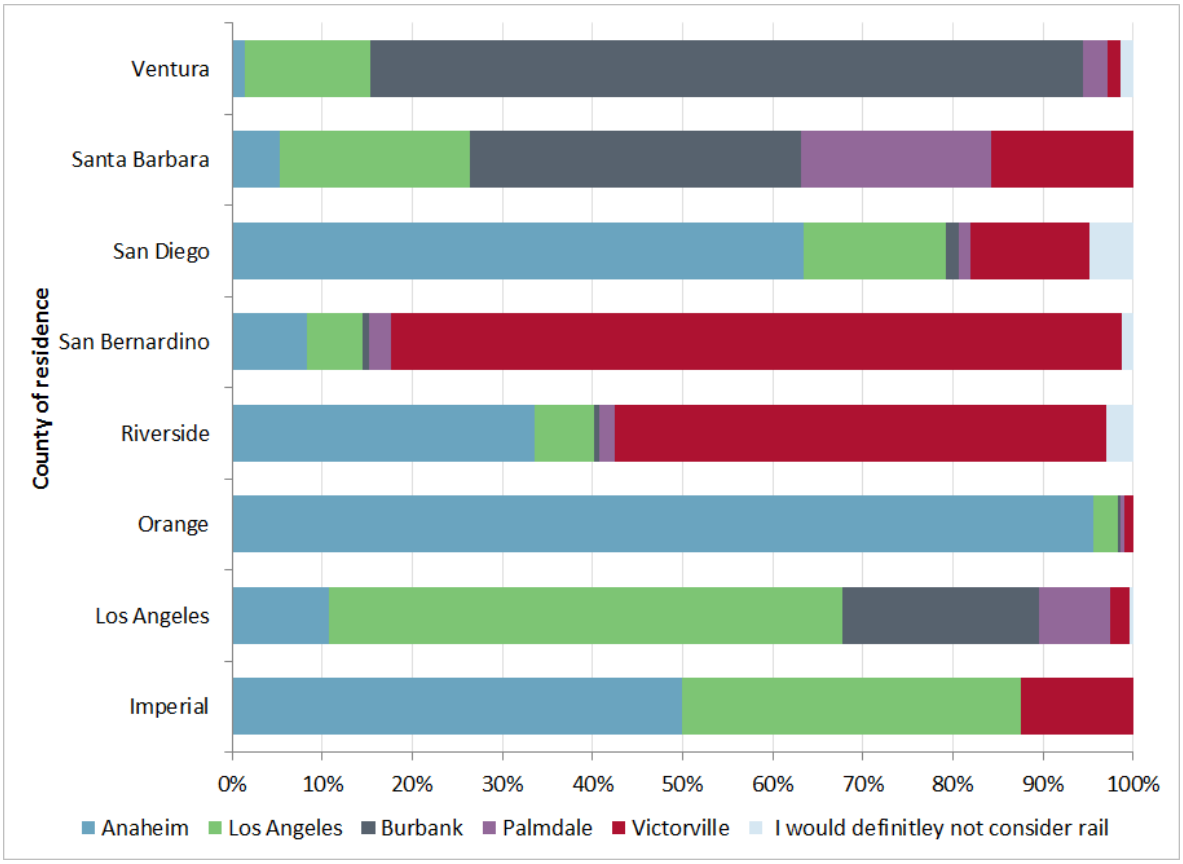
All respondents were asked which station they would prefer to use if they were traveling by HSR from California, and assuming that HSR was fully built out to Anaheim.

Preferences for Southern California are shown in Figure 4.7 and reflect the most convenient station location:

- Anaheim was the most popular choice for those living in: Orange, San Diego and Imperial Counties;
- Los Angeles Union was the most popular for: Los Angeles County residents;
- Burbank was most popular for: Ventura County and Santa Barbara; and
- Victorville was the most popular for: San Bernardino and Riverside Counties.

Palmdale was not the most popular station choice in any group, but would attract riders from a number of counties, including in particular parts of Los Angeles, Santa Barbara and Ventura County.

Figure 4.7: Station preference, Southern California



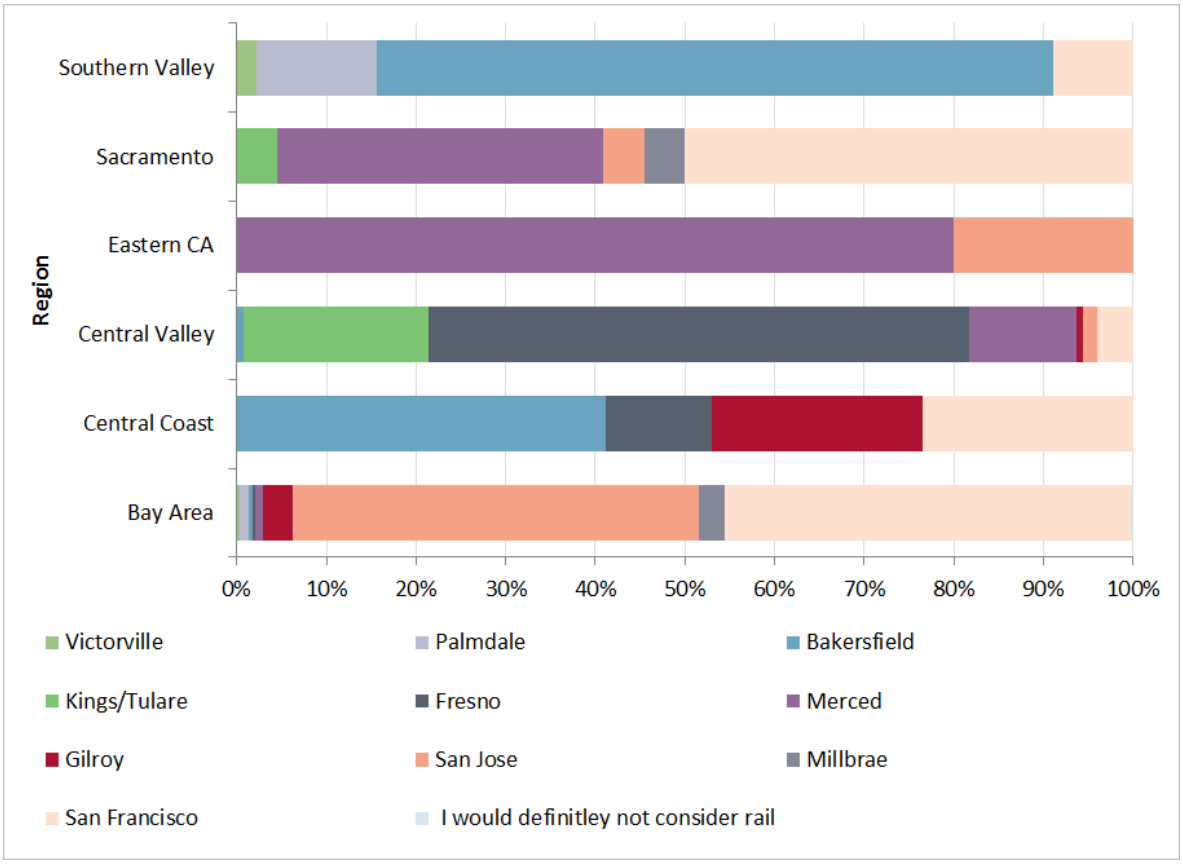
Source: Steer Davies Gleave behavioral surveys 2016

Overall, 32% of people indicated that Anaheim was their preferred station; 30% prefer Los Angeles; 18% prefer Victorville; 14% prefer Burbank and 5% prefer Palmdale.

In Northern California, sample sizes were lower (597 respondents) and Figure 4.8 shows that responses were more varied due to the much larger area covered by HSR. For the three largest sample groups:

- Bay area residents preferred San Jose and San Francisco stations equally (45%);
- Fresno was the preferred station for Central Valley residents (60%); and
- Bakersfield was preferred by Southern Valley residents (76%).

Figure 4.8: Station preference, Northern California



Source: Steer Davies Gleave behavioral surveys 2016

4.5 Summary

Overall respondents to the behavioral survey reacted very positively towards the HDC proposals. Almost 90% either “completely agreed” or “somewhat agreed” when asked if they were willing to try the new service while only 4% disagreed. Similarly when asked for their station preference, only 1% of respondents indicated that they would not be willing to consider travelling by rail.

5 Forecasting approach

While the HDC principally serves the unique Las Vegas market, demand forecasting methodologies are relatively standard across the rail and transportation industry. Our forecasting approach builds upon a framework widely accepted throughout the transportation industry and commonly used to estimate potential demand for toll roads, urban transit systems and rail networks.

Our forecasting approach uses "logit" models to estimate mode choice. Logit models work on the basis of "generalized costs" - a representation of all aspects of time and cost for traveling by a given mode. If the generalized costs of two alternative modes are equal, the model allocates half the travelers to each mode. If they differ, it allocates more travelers to the mode with the lower generalized cost. The greater the cost difference, the more it allocates to the "cheaper" mode. This is a more realistic approach than assuming "all or nothing" transfers, as it better reflects the range of individual circumstances, perceptions and preferences.

Logit models are the predominant approach used to predict mode shares in transportation studies in the US and around the world. Application of logit models in transportation began with the work of Daniel McFadden in the mid-1960s (work for which he received the Nobel Prize in economics in 2000). Standard texts used in graduate and professional transportation curriculum deal extensively or exclusively with logit models[51]. Logit models are used for mode choice prediction in virtually all major US metropolitan transportation forecasting models, and are strongly recommended by the US Federal Transit Administration for mode choice forecasts prepared as part of large fixed guide-way capital grant applications.

Binary choice logit models, the type of model used for this project, are the application of logit models to two-mode situations (e.g. car and rail) to predict the ridership captured by one mode (e.g. rail) from users of another (e.g. car). Steer Davies Gleave has used this methodology on most major transportation studies we have performed. This includes our reviews of High Speed Rail corridors in California, other US states and internationally.

[51] Modeling Transport, Ortuzar and Willumsen; Transportation Systems Analysis, Cascetta; Discrete Choice Analysis, Ben-Akiva and Lerman; A Self-Instructing Course in Mode Choice Modeling: Multinomial and Nested Logit Models, prepared for USDOT by Koppelman and Bhat; and many others.

This modeling approach has also been widely used by other specialist demand forecasting firms for HSR forecasting. A peer-reviewed description of the approach was published in 1992 in a journal edited by the US Transportation Research Board[52].

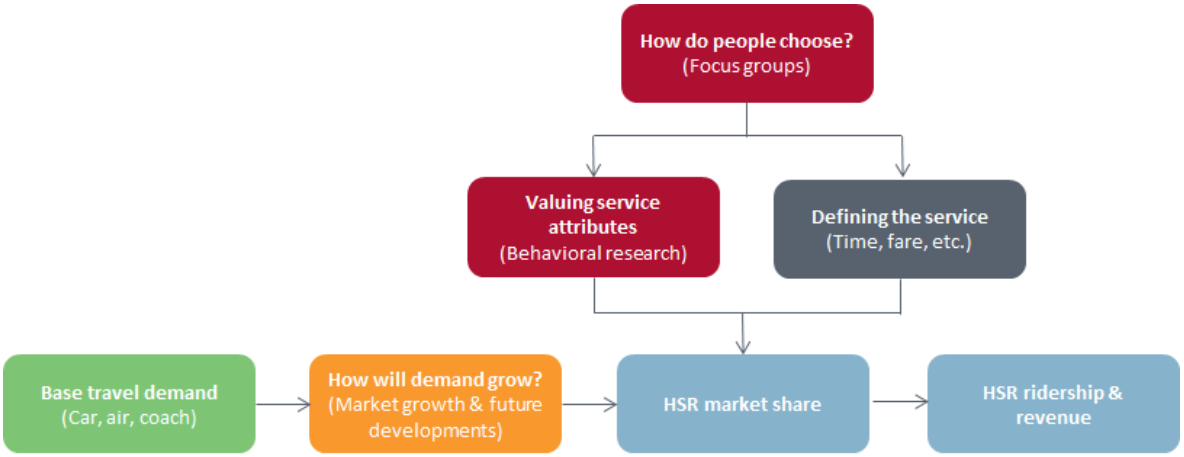
To enable us to develop ridership and revenue estimates we have:

- Obtained recently observed data for all key forecasting components, especially the size of the in-scope market;
- Derived a set of behavioral parameters specific to the project that do not rely on other studies;
- Avoided reliance on third party traffic assignment models; and
- Identified and explained key risks and quantified their potential impact.

5.1 Our forecasting approach

Our demand forecasting approach is outlined in Figure 5.1.

Figure 5.1: High Desert Corridor HSR forecasting approach



Source: Steer Davies Gleave

1.1 For each primary option, and for each travel market, we:

- Establish the base travel demand;
- Forecast how this demand is anticipated to grow without the proposed HSR service;
- Establish anticipated service attributes for each of the existing modes as well as the proposed HSR service;
- Develop a detailed understanding of how people choose between modes through significant primary research efforts;
- Forecast the HSR market share using each of the elements outlined above;
- Forecast the potential for additional induced traffic as a result of the proposed HSR service; and

[52] Forecasting High-Speed Rail Ridership", Brand, Parody, Hsu and Tierney, Transportation Research Record 1341.

- Produce overall forecasts of ridership and revenue.

5.2 Theoretical basis

Binary choice models are used to estimate the likely allocation of different types of traffic to competing modes by:

- Analyzing generalized cost of different travel choices offered; and
- Incorporating behavioral values determined from the analysis outlined in Figure 5.1.

Once a generalized cost has been calculated for each mode, the probabilities of choosing each mode are expressed as:

$$P_i = \frac{exp(\beta G_i)}{exp(\beta G_i) + exp(\beta G_j)} \; and \; P_j = \frac{exp(\beta G_j)}{exp(\beta G_i) + exp(\beta G_j)}$$

Where:

- P_i and P_j are the probabilities of choosing to travel by modes i and j;
- G_i and G_j are the generalized costs of travel by modes i and j;
- β is a scaling parameter; and
- ***exp*** is the exponential function.

5.3 Model inputs

The forecasting models use three main types of inputs for each current mode of travel (auto and air), summarized below.

5.3.1 Trip tables

Trip tables represent in-scope market size, or demand, for model base year and for future horizon years. We segment demand for each individual origin and destination pair by journey purpose, current mode, time of travel and group size.

5.3.2 Time and cost tables

Time and cost tables list elements of generalized cost for each mode, the key components of which are:

- Time in-vehicle traveling by main mode of travel;
- Time to access and egress main mode from initial origin to final destination;
- Headway: The time between services on the main mode; and
- Cost: The monetary costs of the journey, such as fares or fuel.

5.3.4 Behavioral parameters

We use behavioral parameters, based on our research, to weight time and cost inputs to convert them into a generalized cost for each mode.

Section 6 describes our research program to collect additional data for the modeling program.

Sections 7 to 9 describe in greater detail our assumptions regarding:

- In-scope market, in section 7;
- Growth, in section 8; and
- Forecasting assumptions in section 9.

6 Research program

To support our demand forecasting for the HDC rail line, we have undertaken an extensive program of primary data collection. This data was collected to provide an accurate representation of the existing in-scope market for the project, to provide an in-depth understanding of travelers' preferences, to define the cost of competing modes and to populate the demand forecasting model.

The origins of the data, components of data collected, the objectives of the collection of data from each source and the location of detailed documentation associated with each survey type are summarized in Table 6.1.

Table 6.1: New data collection and analysis

Program	Component	Objectives	Further documentation
Market growth	Applied Analysis research	Develop understanding of the evolution of the Las Vegas visitor market. Support analysis of historical trends	Section 8, Appendix D
Cell phone data	Origins and destinations of trips	Provide patterns of trips between California and Las Vegas	Later in this report section
GPS data	Origins and destinations of trips	Validation of patterns of trips between California and Las Vegas.	Later in this report section
Google travel times	Current journey times	Collation of "real time" journey times to support congestion and journey time variability assumptions included in demand forecasting model	Section 3, Appendix E
Behavioral research	Focus groups	Qualitative overview of traveler priorities and preferences	Appendix B
	Stated Preference	Quantitative weightings for mode choice modeling and demand segmentations	Appendix C

Source: Steer Davies Gleave

We provide further details of the Applied Analysis research in section 8 and Appendix D.

This section summarizes in turn:

- Cell phone data;
- GPS data;
- Google travel times; and
- Behavioral research.

6.1 Cell phone data

Cell phone tracking data has been used to develop origin-destination matrices of in-scope travel patterns along the study corridors. An entire month of cell phone data for April 2015 has been extracted on the basis of our zoning system, described in Figure 7.3 and Figure 7.4. The data represents different times of the day and days of week. The dataset contains records of 9,164,075 auto trips and 1,419,777 air trips that travelled between California and the area surrounding Las Vegas.

This data is collected via Sprint and Verizon network cell phone signals using Wireless Signal Extraction (WiSE) technology. This allows recording of the date, time and location of the device while ensuring anonymity of the individual user. A signal is recorded whenever the phone performs one of the following tasks:

- A phone call is made/received;
- An SMS or e-mail is sent/received; or
- The phone makes contact with the network in order to receive updates.

The location and timings of these signals can then be used to show where phones spend most of their time (location) and how they move (spatially) through time. The two operator networks interrogated for this exercise account for approximately 47% of subscribers to the total US cell phone network in 2015[53].

Separate extractions have been made for auto and air travel, and each validated to ensure the distribution of trips and population trip rates are representative.

6.2 GPS data

GPS data is used to validate cell phone origin-destination information and to establish relative volumes of trips on different parts of the highway network.

[53] Source: Strategy Analytics, Jun 30 2015, US Wireless Market to Add 100 Million Subscribers by 2020.

www.strategyanalytics.com/strategy-analytics/news/strategy-analytics-press-releases/strategy-analytics-press-release/2015/06/30.

GPS data is focused on auto travel and collected in three ways:

- From signals received via the satellite navigation system in the vehicle (connected cars[54]);
- From GPS location systems in some smart phone devices; and
- In the case of commercial vehicles, from fleet management systems.

For this study we have focused on personal vehicles, of which connected cars constitute the greater part of the sample. Data has been extracted for the 12-month period January to December 2015.

Trip chains are built up by tracking individual devices and matched to the road network to understand trip patterns and route choices. The data is available for different times of the day and days of week. All data is anonymous and indexed on a study-by-study basis. The sample size typically covers fewer than 5% of Average Annual Daily Traffic (AADT). Although GPS data represents a lower volume of data than typically generated by cell phone datasets, it is a highly accurate way of tracking movement. Devices send signals more frequently than smartphones (every few seconds) and are accurate to around five meters.

6.3 Google travel times

Advances in technology now permit 'real time' journey time information that Google Maps generates to be 'mined' and stored for specified sections of the highway network.

We have used this data to establish a profile of journey time variability on key Californian highways. Since Google Maps is commonly used by drivers seeking travel information, this data gives a good indication of how drivers plan their trips. Using an SDG-developed tool for querying the Google Maps dataset, journey times on key links of the California and Nevada highway networks were collected every half hour from the beginning of March to the middle of April 2016. Google collects its data from cell phones, including Android users, users of the Google Maps app on other mobile devices, as well as from highway sensor data provided by local highway authorities.

Figure 6.1 shows the highway segments for which data was gathered. Figure 6.2 then shows a close-up of the highway segments in the Los Angeles area.

[54] A connected car is a car that is equipped with internet access, and usually also with a wireless local area network. This allows the car to share internet access with other devices both inside as well as outside the vehicle. It includes all vehicles with navigation, real-time traffic and infotainment services (including web/internet and mobile links), vehicles with autonomous and safety features, etc., as well as large numbers of vehicles with hands-free wireless and subscription radio.

Figure 6.1: Google journey time highway segments

Source: Steer Davies Gleave

Figure 6.2: Google journey time highway segments: Los Angeles area

Source: Steer Davies Gleave

As these segments do not connect to all the study zone connectors in our demand forecasting model, additional free flow access and egress times to the study zones were also collected. The journey times for each segment, which varied by time period, were strung together with a static origin-to-highway and highway-to-destination journey time to produce zone-to-zone journey times. The data was aggregated into the following two peak periods, with the off peak periods accounting for the remainder of the 7-day week:

- To Las Vegas Peak: Fridays 12:00pm to 8:00pm; and
- From Las Vegas Peak: Sundays 10:00am to 6:00pm.

Further information is provided in Appendix E.

6.4 Behavioral research focus groups

Focus groups take the form of a discussion between eight to twelve participants, typically lasting 1½-2 hours. Each focus group session consists of a structured conversation between all participants, led and guided by an experienced moderator using a pre-determined guide.

Focus groups can provide a rich source of information on a wide range of topics. Respondents are encouraged to discuss their opinions and experiences in detail. They are a key component of our behavioral research survey design process because they help to determine what factors to include and quantify in the Stated Preference research and how to focus the questions. Focus groups are used to investigate the real-life trip making choices of travelers. They often highlight the complexity of route/mode choice decisions, the level of knowledge of decision makers and provide a critical insight into local issues which can otherwise be difficult to identify such as the location of particular traffic 'hot spots' or particular attractions on a chosen route.

We facilitated ten groups across three distinct markets: Southern California, Northern California and Clark County (NV) as shown in Table 6.2.

Table 6.2: Focus groups dates and locations, 2016

Date	Group	Market	Location	Respondents
February 1	1 & 2	Southern CA	Anaheim	Anaheim residents
February 2	3 & 4	Southern CA	Los Angeles	Los Angeles residents
February 3	5 & 6	Northern CA	Fresno	Fresno residents
February 4	7 & 8	Northern CA	San Francisco	San Francisco residents
February 5	9 & 10	Clark County (NV)	Las Vegas	Las Vegas residents

Source: Steer Davies Gleave, Crescent Research Inc.

We recruited respondents by telephone. It is normal practice in recruiting respondents for focus group research to specify a set of screening criteria to ensure that the respondents are representative of the general population traveling between California and Las Vegas. The screening criteria and justification for each criterion are described in Table 6.3.

Table 6.3: Focus group screening criteria

ID	Screening criteria	Reason
1	Traveled between California and Las Vegas in either direction at least once in past two years, or plan to do so in next 12 months	Ensure only those making a relevant trip were recruited.
2	Had influenced the decision on choice of mode or route	Only those with an active choice in travel decisions were recruited. Passive respondents may have no active choice in whether to travel by HSR in the future.
3	Aged between 25 and 64 years old	To encourage active participation by all respondents in each group. In our experience respondents over the age of 65 tend to be less vocal in a mixed age group. Those aged 21-25 can dominate[55].
4	Household income of at least $25,000	To minimize the attendance of professional focus group participants. Those with household incomes of less than $25k represent a small proportion of Las Vegas visitors[56].
5	Do not travel by Recreational Vehicle (RV)	Ensure only those making a relevant trip were recruited. We assume that those traveling by RV would continue to do so in the future.

Source: Steer Davies Gleave, Crescent Research Inc.

Each group typically included both auto and air travelers. A summary of the respondent demographics is shown in Table 6.4.

Table 6.4: Focus group respondent average demographics

	Number in focus groups	Age Range (Average)	Income Range (Average)	Trips/year	Business %	Leisure %	Business & Leisure %
Anaheim	20	30-60 (43)	$25k-100k+ ($88k)	1.98	0%	50%	50%
Los Angeles	18	30-64 (44)	$25k-100k+ ($86k)	3.00	22%	33%	44%
Fresno	18	32-64 (46)	$25k-100k+ ($73k)	No info	6%	78%	17%
San Francisco	24	25-62 (43)	$35k-100k+ ($91k)	2.77	13%	42%	46%
Las Vegas	18	26-63 (44)	$25k-100k+ ($70k)	2.33	17%	44%	39%

Source: Steer Davies Gleave, Crescent Research Inc.

[55] Recommendation of Crescent Research Inc.

[56] In 2015 LVCVA reported 2% of all visitors to Las Vegas with a household income of below $20k. For the Southern California market this was 1%, with the rest of the US at 2%. Source Las Vegas Visitor Profile Survey and by origin (Southern California and International edition).

Table 6.5 summarizes the discussion topics. A full report providing details of each of the focus groups is provided in Appendix B.

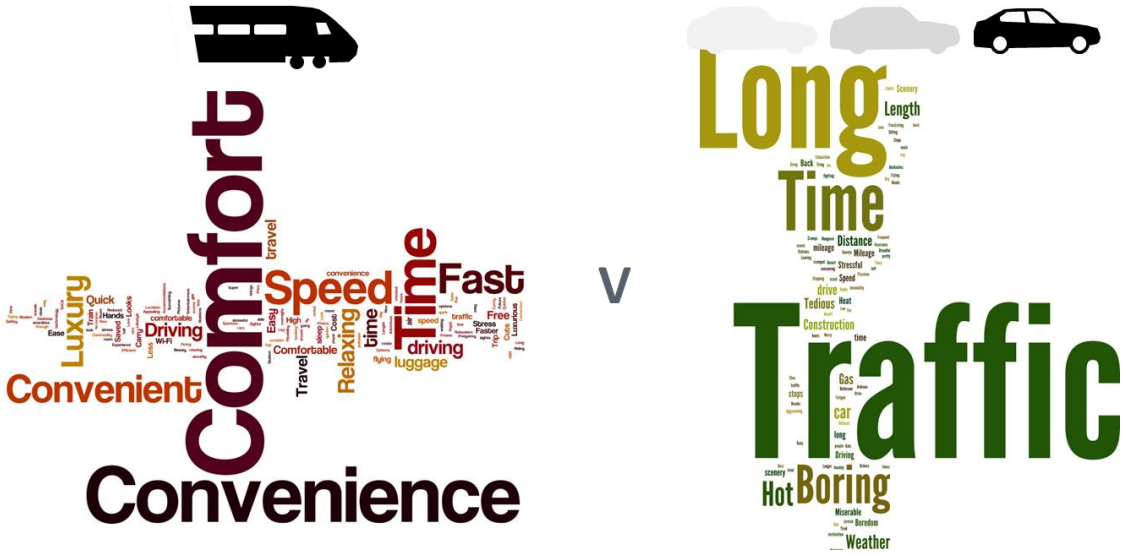
Table 6.5: Focus group discussion topics

Topic	Issues included
General experience of travel	How often Time since last trip Journey purpose
Specific experience of travel	Which modes used and why Traveling alone or size and nature of group Number of days spent away Day of week and time of travel Any access or egress modes used Whether recent changes to oil prices have affected travel decisions
Auto travel	Reasons for choosing to drive Attitudes to the drive Drive time Cost Worst part of the drive Experience of unexpected delays Routes used, whether travel through Antelope Valley
Air travel	Reasons for choosing to fly How far in advance flight was booked Typical choice of airport Time allowed between origin and flight departure Typical air fare
Train travel	General perceptions Previous experience
General introduction to HSR	Initial reactions to HSR
Detailed discussion on HSR	How much it should cost Service frequency Hours of operation Facilities expected at parking, station, on train Station access Station egress Preferred station under different infrastructure phases Ticketing options
Summing up and conclusions	

Source: Steer Davies Gleave, Crescent Research Inc.

The diagram below summarizes the feedback received on what respondents most liked about the concept of HSR, in comparison with their negative perceptions of driving.

Figure 6.3: Contrasting perceptions of positive attributes of HSR versus negative perceptions of driving to Las Vegas



Source: Crescent Research

Further details of the outcomes from the focus groups are provided in Appendix B.

6.5 Behavioral research Stated Preference surveys

Following the qualitative focus groups, we used a different type of behavioral survey to gather quantitative information from a much larger group of in-scope travelers. This survey used Stated Preference (SP) techniques and was designed to collect a wide range of information on respondents' travel patterns, their attitudes and preferences, and the likelihood that they would choose HSR in the future rather than their current mode.

We describe below:

- The role of Stated Preference surveys;
- The structure of the survey used in the research;
- The testing and recruitment program; and
- Response rates targeted and achieved.

6.5.1 Stated Preference surveys

Stated Preference, or SP, is a survey technique designed to aid the understanding of people's preferences and how they use those preferences to make choices. As part of SP research respondents are presented with choices between hypothetical, but realistic, alternatives. Each alternative is described in terms of its characteristics or attributes. In this context we presented respondents with choices between travel by their current mode (auto or air travel) or by HSR.

The relative importance that respondents attach to each attribute is measured by varying these attributes in a controlled and systematic manner using experimental designs. Further details of the design process are provided in Appendix C.

Insight from the focus groups was used to develop this survey which was carried out online using panel datasets between January and April of 2016[57] supplemented by recruitment postcards.

6.5.2 Survey structure

We developed an SP survey comprising six main sections which are summarized in Table 6.6. Different variations of the SP questionnaire were shown depending on the origin of the respondent (Southern CA, Northern CA or Clark County) and between which areas they were traveling. This was to ensure that the relevant HSR service was tailored to the respondent's particular trip.

Table 6.6: Online SP survey structure

Section	Focus of questions
Screening	Ensure a trip made between CA and Las Vegas (either direction) in past two years Aged 21 years or more
Basic trip information	Time since most recent trip Most recent trip mode of travel Most recent trip day of the week Most recent trip journey time Most recent trip group size and composition Most recent trip cost Most recent trip purpose
Introduction to HSR	Interest in using it Most desired features Reasonable price levels Preferred station
Up to eight SP choice scenarios between current mode and HSR	Outbound journey travel Return journey time Round-trip cost per person
Follow up questions	Reasons for having chosen current mode or HSR Information about stay in Las Vegas (if applicable)
Segmentation and socio-demographic/economic information	Household income Employment status Experience of using HSR

Source: Steer Davies Gleave behavioral research 2016

6.5.3 Survey testing and launch

Before launching the SP survey we undertook a rigorous testing program to ensure the design was operating without errors or bias. This involved:

[57] Lists of names and contact details for people willing to participate in market research are held by specialist companies; these are referred to as panel datasets. Datasets typically include thousands (and sometimes millions) of potential respondents. Specific recruitment criteria are used to target certain types of respondents as datasets include limited socio-demographic information. In this case we targeted people according to where they live.

- A full internal testing program prior to the pilot launch; and
- A simulated set of responses created to ensure questions were being properly populated and 'trading' between choice options was taking place

The SP survey was then launched in three waves:

- An internal test survey which was open to the HDC JPA and wider stakeholders for review;
- A soft launch pilot survey for a limited number of public respondents; and
- A full survey launch.

6.5.4 Survey recruitment

We aimed to ensure that Clark County and the various areas of California were represented in sufficient numbers to enable us to develop robust demand forecasting models of mode choice. We therefore set a target of 4,000 responses:

- 2,000 from online panels recruited through email invitations; and
- 2,000 from postcard recruitment at 12 locations in Las Vegas and at Yermo near Barstow, CA.

Table 6.7 shows how the 2,000 online panel respondents were targeted across the residential markets.

Table 6.7: Online panel recruitment criteria

Market	Sample size	Criteria
Southern CA	1,000	In line with population distribution across the ten Southern CA counties[58]
Northern CA	500	In line with population distribution across a limited set of Northern CA counties[59], selected as being close to the proposed HSR route
Clark County NV	500	

Source: Steer Davies Gleave behavioral research 2016

In addition postcards were printed for distribution across three channels:

- MGM properties in Las Vegas;
- At the Las Vegas Convention Center; and
- At the Yermo Agricultural Inspection station.

Each postcard was pre-printed with a unique code allowing respondents to access and complete the survey once. Figure 6.4 shows the postcard front page format which was designed to be eye-catching and to encourage completion of the postcards by visitors to Las Vegas.

[58] Southern CA counties: Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura, Kern, Imperial.

[59] Limited Northern CA counties: San Francisco, San Mateo, Santa Cruz, Monterey, San Senito, Santa Clara, Alameda, San Jose, Fresno, Bakersfield, Merced, Fresno, Kings, Tulare.

Figure 6.4: Example of SP survey recruitment postcard front page

Source: Steer Davies Gleave behavioral research 2016

MGM Properties

Approximately 19,000 postcards were distributed across eleven MGM properties: MGM Grand, Circus Circus, Mirage, Bellagio, Aria, Vdara, New York New York, Excalibur, Luxor, Mandalay Bay and Delano at Mandalay Bay. Postcards were handed out at check-in, and entirely based on the cooperation of the MGM resorts.

Las Vegas Convention Center

Approximately 1,000 postcards were distributed at the Las Vegas Convention Center – specifically at the ATA Taekwondo convention on March 30 and April 2 2016[60].

Yermo Agricultural Inspection Station

The Agricultural Inspection station is located at Yermo, near Barstow, between exits 196 and 198 of I-15. It is operated by the California Department of Food and Agriculture. All vehicles traveling southbound into California are obliged to slow and pass through the inspection gates. There are five lanes in total with one used exclusively for trucks.

Postcards were distributed to all private vehicles passing through the station during the week commencing April 23 2016. Approximately 51,000 postcards were distributed.

6.5.5 Response rates

Table 6.8 summarizes the response rates from each recruitment channel.

[60] Additional conventions had been targeted but arrangements were not able to be finalized.

Table 6.8: Behavioral survey response rate

Number of contacts	Online panel	Yermo	Las Vegas locations	Total
Contacted	n/a	51,000	19,590	>70,000
Responded	4,042	2,094	266	6,402
Passed screening and in-scope	2,154	1,799	119	4,072
Existing auto traveler	1,472	1,799	85	3,356
Existing air traveler	682	-	34	716

Source: Steer Davies Gleave behavioral research 2016

Across all recruitment channels, just over 4,000 respondents passed the initial survey screening and were therefore in-scope for our analysis. Of these approximately half came from the online panel and approximately half came from postcard distribution. This is in line with the target identified at the survey recruitment stage.

7 Assumptions: In-scope market

This section describes how we have identified the in-scope market for each travel mode between California and Las Vegas for the base year of 2015. The base year was selected because it represents the last full year of complete data.

7.1 Key findings

Table 7.1 sets out our estimates of the in-scope market in 2015. The market is segmented into five geographies and three modes of travel. The in-scope market is defined in terms of person round-trips.

Table 7.1: 2015 in-scope traveling market, millions of person round-trips

Market	Auto	Air	Bus	Total
Southern CA to Las Vegas	12.4	1.9	1.3	**15.6**
Northern CA to Las Vegas	0.9	1.4	0.2	**2.6**
Las Vegas/Clark County to CA	3.6	0.7	0.0	**4.3**
Other locations to Las Vegas via CA	2.2	0.7	0.1	**3.0**
CA to/from Victorville	0.8	0.0	0.0	**0.8**
Total	**20.0**	**4.8**	**1.6**	**26.3**

Source: Steer Davies Gleave

We estimate 15.6 million round-trips were made to Las Vegas by Southern Californian residents and 2.6 million round-trips by Northern Californians. This is more than LVCVA estimates (approximately 11 million and 2 million respectively[61]). LVCVA do not include travelers under 21, or those who stay with friends or relatives, in timeshares or rental properties. LVCVA data also under-represents day trips due to the sampling methodology used. Our forecasts have therefore been adjusted to account for these factors.

7.2 In-scope market: trips to or from Las Vegas

The total size of the in-scope market has been estimated using three key sources of data:

[61] 2015 LVCVA visitor statistics, http://www.lvcva.com/includes/content/images/media/docs/ES-YTD-2015.pdf**,** and LVCVA Visitors by Market Segment 2015, Southern California and International Visitors Version, http://www.lvcva.com/includes/content/images/media/docs/2015-LV-VPS-SoCal-Intl.pdf.

- The 2015 Las Vegas Visitor and Convention Authority visitor statistics and surveys;
- Visit California statistics on state visitors and their origins from 2014; and
- Population estimates for Clark County.

7.2.1 Las Vegas Visitor and Convention Authority

We rely on two sets of statistics produced annually by LVCVA:

- Monthly and annual visitor statistics (all visitors to Las Vegas) with separate breakout of convention attendees; and
- Visitor surveys undertaken with around 3,600 visitors on and around The Strip, reported for various markets including Southern California and International visitors.

The visitor surveys provide a rich source of information on: residency of visitor, mode of travel, main purpose of trip, average size of traveling group and whether they stayed on The Strip or elsewhere. All of this information is used in the segmentation of the in-scope market.

7.2.2 Visit California

Visit California produce numerous summary statistics describing visitors to the state. In particular, we have used estimates of:

- The number of travelers visiting California from Nevada, which areas in California (Northern and Southern) were visited by mode of travel; and
- The number of foreign visitors to California also visiting Las Vegas by travel mode and the areas of California visited (North or South).

7.2.3 Clark County population estimates

The Center for Business and Economic Research (CBER) based out of the University of Las Vegas produce population forecasts[62] for Clark County. We use these as the basis for the potential market traveling between Las Vegas and California. At the time of writing the 2015 update is the most current set of forecasts.

7.3 Key assumptions: California to Las Vegas markets

The LVCVA estimates that were 42.3 million visitors to Las Vegas in 2015. Of these, approximately 26%[63] were Southern California residents, and approximately 5%[64] were Northern California residents.

We uplift the LVCVA visitor numbers to include:

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[62] http://www.clarkcountynv.gov/comprehensive-planning/demographics/Documents/2015_Population_Forecasts.pdf.

[63] The LVCVA estimates 25% for 2015. However to mitigate issues of sampling error we have used an average across the last two years which gives 26%.

[64] The LVCVA estimates 4% for 2015. However to mitigate issues of sampling error we have used an average across the last two years which gives 5%.

- Under 21s (excluded from the LVCVA survey sampling methodology);
- Those staying in non-hotel or motel accommodation (also excluded from the LVCVA sample); and
- Day trips (under-estimated by LVCVA).

7.3.1 Under 21s: 10% increase SoCal, 11% increase NorCal

Travelers under 21 are added to our in-scope market by comparing the average car occupancy in each market with the adult car occupancy. This gives an increase for each market. We use the reported car occupancy rates from our behavioral survey for this purpose and assumed that they apply equally to air travelers.

7.3.2 Non-hotels and motels: 17% increase SoCal, 15% increase NorCal

Those staying with friends or relatives, in timeshares or other non-hotel or motel accommodation are added. We use the proportion of travelers from our behavioral surveys who report staying in these types of properties.

7.3.3 Day trips: 6% increase SoCal, 5% increase NorCal

An increase for those making day trips is made. This is taken directly from our behavioral survey and is applied to each geographical segment rather than the market as a whole.

7.3.4 Summary

The impact of these adjustments for the California market results in the overall market size of 15.6 and 2.6 million round-trips for Southern and Northern California respectively.

7.4 Key assumptions: Clark County residents to California

The size of the Nevada resident market traveling to California is based on population estimates for Clark County. This is uplifted to a number of trips assuming a long distance trip rate per capita, and an assumption about the share of those trips which have destinations in California.

7.4.1 Long distance trip rates

The long distance trip rate is taken from the Transport Statistics Annual Report 1998[65] produced by the Bureau of Transport Statistics (BTS). The BTS trip rate has been adjusted to reflect the Clark County population demographics and uplifted in-line to establish a 2015 equivalent using Nevada's real growth in GDP. This implies just under 3.5 long distance trips per capita, or 10.8 million trips per year.

[65] Source http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/transportation_statistics_annual_report/1998/index.html.

7.4.2 Trips to California

Dean Runyan analysis of air passenger data suggests that 23.8% of Las Vegas Metro originating air passenger movements are to California. The share of the larger auto trip market is considerably higher.

Fieldwork by SDG in 2010 indicated that 20% of auto traffic on the I-15 was originating in Las Vegas/Clark County and traveling to or through California. With average occupancy of 1.85 persons, this was equivalent to 5.4 million trips.

Data from Visit California surveys in 2015 indicate that 2.0% of the 246.3 million domestic visitors to California originated in Las Vegas, which would imply around 4.9 million trips[66] (the share of trips was slightly down on the 2.2% reported in 2014.) This represents a 45% share of the expected long distance movements.

The proportion of the Clark County long distance trips made to California will be driven not only by relative proximity but also the effect of links to family and friends. The population of Clark County has expanded rapidly, having grown by 56% between 2000 and 2015, largely as a result of domestic migration. The Internal Revenue Service (IRS) SOI County-to-County Migration data[67] shows that the share of migrants to Clark County originating in CA was 35% between 2004/05 and 2006/07. Although both absolute numbers and the proportion originating in California fell during the recession to 29% both indicators are now again on a rising trend, reaching 35% of migrants in 2013/14. We would therefore expect the links between Clark County residents and California to remain strong into the future.

We have taken a relatively conservative approach, assuming that 40% of future long distance trips by Clark County residents will continue to be made to California. The split between trips going to Northern or Southern California is taken from Visit California statistics for Nevada residents[68].

7.4.3 Summary

These assumptions result in an estimate of 4.3 million round-trips a year in 2015 to California from Clark County residents.

7.5 Key assumptions: travelers from other locations

Travelers from elsewhere includes two categories, both of which are assumed to travel to Las Vegas via California: foreign travelers; and, other US residents.

7.5.1 Foreign travelers

LVCVA produces estimates of the proportion of foreign visitors[69] and whether they access Las Vegas via road or air. We have used this information to estimate the overall foreign market visiting Las Vegas.

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[66] http://industry.visitcalifornia.com/find-research/california-statistics-trends/

[67] Source: https://www.irs.gov/uac/soi-tax-stats-county-to-county-migration-data-files

[68] http://www.visitcalifornia.com/

The number of foreign visitors traveling to Las Vegas via California has been extracted from Visit California statistics. This figure is uplifted to account for under 18's that are not included in the LVCVA estimates.

7.5.2 Other US residents

Given the variety of attractions in California, a sizeable proportion of out of state US residents visit Las Vegas as part of a multi-stage fly-drive trip[70]. We establish the size this market from estimates by mode. Further details of this analysis are presented in section 7.7.

LVCVA produces estimates of the size of the US domestic market by region. Because we have focused on visitors from California separately, CA has been removed from the estimates of the US domestic market, leaving the total amount from other markets described by the data. These figures are then used as an upper bound of domestic visitors to Las Vegas in order to validate the non-California US fly-drive market.

7.5.3 Summary

We estimate a total of 3.0 million annual trips are made to Las Vegas from non-Californian residents (non-US and domestic US citizens), via California.

7.6 Key assumptions: trips between California and Victorville

In addition to the core market to/from Las Vegas, the High Desert Corridor would offer the opportunity to travel via rail between Victorville and various locations throughout California.

The HSR services via the HDC is assumed not to carry passengers whose journeys are entirely between any station pair south of Palmdale, so there is no impact on the level of demand or passenger revenues expected to accrue to CaHSR services over these lines.

We use a combination of data from the Census Transportation Planning Product (CTPP) Journey to Work Data, which is based on the American Community Survey, and the California State Travel Demand Model (CSTDM), to provide an estimate of the total number of trips between Victorville and areas surrounding each of the proposed HSR stations.

7.6.1 Summary

Using the sources outlined above we estimate that there were approximately 0.8 million in-scope round-trips a year in 2015 between California and Victorville.

7.7 In-scope market size: by mode

Three existing travel modes are in-scope for transfer to HSR: air, bus and auto. These are discussed individually below.

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[69] LVCVA Visitor profile survey.

[70] Data from Visit California suggests that approximately 25% of visitors to California also visit Las Vegas as part of their trip.

7.7.1 In-scope market size: Air

This market has been estimated using the T-100 data bank of air passengers between selected airport pairs. The T-100 data bank is published by USDOT. There are two key datasets:

- Segment data: passengers defined by origin and destination airport. These passengers might fly onto another airport without deplaning; and
- Market data: passengers defined as those enplaning and deplaning at origin and destination airports.

We used these datasets to estimate the maximum number of passengers who are traveling between California and Las Vegas[71]. For the purpose of this analysis we include the following airports either to or from Las Vegas McCarran (LAS).

Table 7.2: Study area airports

Region	Code	Airport name
Southern California	BUR	Burbank
Southern California	LAX	Los Angeles International Apt
Southern California	LGB	Long Beach Apt
Southern California	ONT	Ontario LA /Ontario International Apt
Southern California	SAN	San Diego International
Southern California	SNA	Santa Ana John Wayne Apt
Northern California	FAT	Fresno Yosemite International Airport
Northern California	OAK	Oakland International Apt
Northern California	SFO	San Francisco International Apt
Northern California	SJC	San Jose Norman Y. Mineta International
Northern California	SMF	Sacramento International Apt

Source: Steer Davies Gleave

It was necessary to make an assumption about the number of passengers transferring onto another flight at McCarran airport. This was done using a combination of judgment and the BTS DB1B market dataset which is based on flight bookings and is a 10% sample. We assumed that the proportion of transferring passengers is relatively low. McCarran was the ninth busiest airport in North America in 2015, but is the second busiest when measured in terms of passengers' origin or final destination[72]. Thus it should have a higher proportion of terminating passengers than elsewhere and the DB1B database alone does not reflect this.

[71] At the time of writing the T-100 data for 2015 was incomplete. We estimated the 2015 total by uplifting by one month using the same rate of increase observed in the rest of the year.

[72] Source: Federal Aviation Authority, www.faa.gov/nextgen/snapshots/airport/?locationId=35.

The estimated total visitors traveling by air, 4.8 million round-trips, was then disaggregated across the different geographic markets using Visit California, T-100 and Dean Runyan[73] estimates by originating visitor market.

7.7.2 In-scope market size: Bus travel

The total size of the bus market has been based on the number of buses observed using I-15 at the state border[74] and assumed bus occupancy rates. We have used an assumed occupancy rate from our earlier 2010 work (64%). Bus movements to/from Primm are removed as out-of-scope.

Bus travel is split across the different geographic markets using assumptions about the proportion of trips from each region. The bus market share for Clark County residents and foreign visitors is taken from Visit California information.

The bus share of the 'Other US resident' market is assumed to be relatively low, at 25%[75] of the bus share of foreign visitors. The remaining bus market has then been apportioned between trips by Northern and Southern Californians. This split is assumed to be the same as the proportions derived for the auto visitor market.

7.7.3 In-scope market size: Auto travel

The total size of the auto market for each geographical segment is based on:

- The total in-scope round-trips;
- Less the modal estimates for air and bus travelers.

The resulting estimates were then reconciled back to the traffic counts on I-15 at the state border using an assumed proportion of in-scope vehicle movements and vehicle occupancies. These assumptions come from our postcard behavioral surveys and NDOT classified traffic counts.

We further reconciled the size of each market to the implied share of ground transportation modes for trips to Las Vegas. Ground transportation modes in this context are auto and bus travel and the assumption is based on the estimate provided by LVCVA in their Visitor Profile surveys.

Foreign visitor estimates (via California) are taken from Visit California. Trips from other US residents via California are controlled to the proportion observed in our behavioral survey (postcard recruitment only), at 3.1% of the overall traffic at the state border.

7.8 Segmentation

We divided the in-scope market into geographic segments and then sub-divided these into zones. These zones reflect origins of travel and the different options that travelers have at their disposal. For example, their accessibility to stations or airports and levels of congestion that affect different locations on the highway network.

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[73] Source: http://www.deanrunyan.com/CAAirTraffic/AirTraffic.html.

[74] From Nevada Department of Transport traffic counts.

[75] SDG assumption.

As well as the geographic segments we have used other market segments including mode of travel, group size, time of travel and journey purpose.

Table 7.3 summarizes all the in-scope market segments used in the demand forecasting model. These sub-segments are described in more detail below.

Table 7.3: In-scope market segments

Segmentation	Sub-segments	Number	Rationale for segmentation
Origin of travel	Southern California	76	Identify origin and destination Mode choices available
	Northern California	59	
	Las Vegas/ Clark County	15	
Current mode	auto, air, bus	3	Mode choice
Journey purpose	tourism, business/convention	2	Behavior
Time of travel	Peak or off-peak	2	Drive times, highway delay, fares
Group size	1, 2, 3 or more	3	Behavior and travel costs

Source: Steer Davies Gleave

We derive the origin and demographic segments from: the 2016 Steer Davies Gleave behavioral survey, Airsage cell phone demand data, StreetLight GPS demand data, LVCVA 2015 Visitor Profile survey and Visit California data.

7.8.1 Segmentation: Origin and destination

We developed a zoning system using clusters of ZIP codes to segment demand by trip origin and destination. There are 150 in-scope zones in our demand forecasting model.

We reviewed other model zoning systems as part of the zone development process:

- The Steer Davies Gleave XpressWest zoning system developed in 2010 focused on Southern California;
- The California High Speed Rail Model[76];
- The California Statewide Travel Demand Model (CSTDM)[77]; and
- SCAG travel demand model.

Further detail on the zoning system is provided in Appendix A.

Due to the large number of counties and broad geographic spread of Northern California we have developed zones on the basis of seven broader regions as shown in Figure 7.1. Individual zones are necessarily bigger than in Southern California: on average 1,952 square meters (313 in the Bay area) compared with 570 square meters in Southern California (110 in LA and Orange County).

[76] Source: Cambridge Systematics.

[77] Source: Parsons Brinkerhoff.

Figure 7.1: Study area counties and regions

Source: Steer Davies Gleave

Table 7.4 summarizes the number of zones in each county or region and Figure 7.2 illustrates geographical location of the zones.

Table 7.4: Model zoning system

State	County / Region[78]	Number of zones
Southern California	Los Angeles	39
	Orange	12
	Riverside	6
	San Bernardino	11
	San Diego	9
	Santa Barbara and Ventura	4
	Imperial	1
Northern California	Bay Area	28
	Central Coast	4
	Central Valley	13
	Eastern CA	6
	Far North	1
	Sacramento	8
	Southern Valley	4
Nevada	Clark County, including Las Vegas	28

Source: Steer Davies Gleave

[78] Correspondence of Northern CA counties to the regions used here is provided in Appendix A.

Figure 7.2: Zones in California and Clark County

Source: Steer Davies Gleave

The primary source for segmenting the in-scope market across these zones is the Airsage cell phone data. This was extracted using our zoning system described in Appendix A.

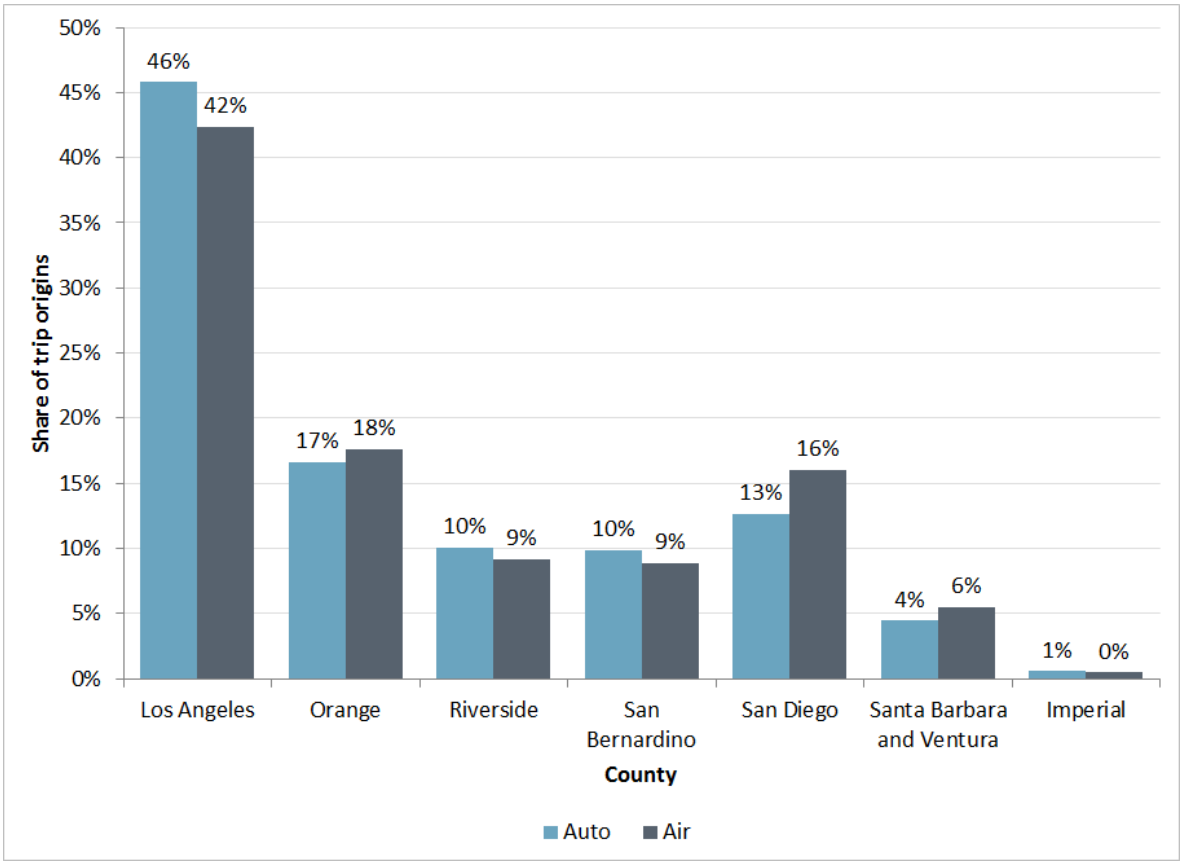
We validated the distribution of trips against GPS data provided by StreetLight, responses from our 2016 behavioral survey, specifically the I-15 postcard respondents, and LVCVA visitor profile surveys. We also reviewed the trip rate per head of population by county and zone. Based on this validation we made the following conclusions and subsequent adjustments:

- Las Vegas: given the small size of zones in Las Vegas, the distribution of trips coming into Las Vegas as estimated by Airsage data was adjusted to ensure the proportion ending on the Strip versus non-Strip destinations matched proportions reported by LVCVA.
- Southern California: the San Bernardino market traveling to Las Vegas was disproportionate compared to other areas and its population.
    - Analysis of trips from each San Bernardino zone per head of population demonstrated that zone 12, which is a large zone on the north eastern edge of San Bernardino encompassing Valley Wells services and Baker, was disproportionate. The trip rate for this zone has been adjusted to be the same as the average for the rest of the county by removing and redistributing trips.
    - Further analysis of San Bernardino using StreetLight GPS data suggests that there are a high number of trip breaks in the county, which is effectively the gateway to Las Vegas. Trip breaks in this context mean stops for fuel, comfort or food and refreshments. We have made a second adjustment to account for this effect to all zones with the exception

of zone 12 (to avoid double counting). Trips have been removed from San Bernardino and redistributed to other areas in Southern California.

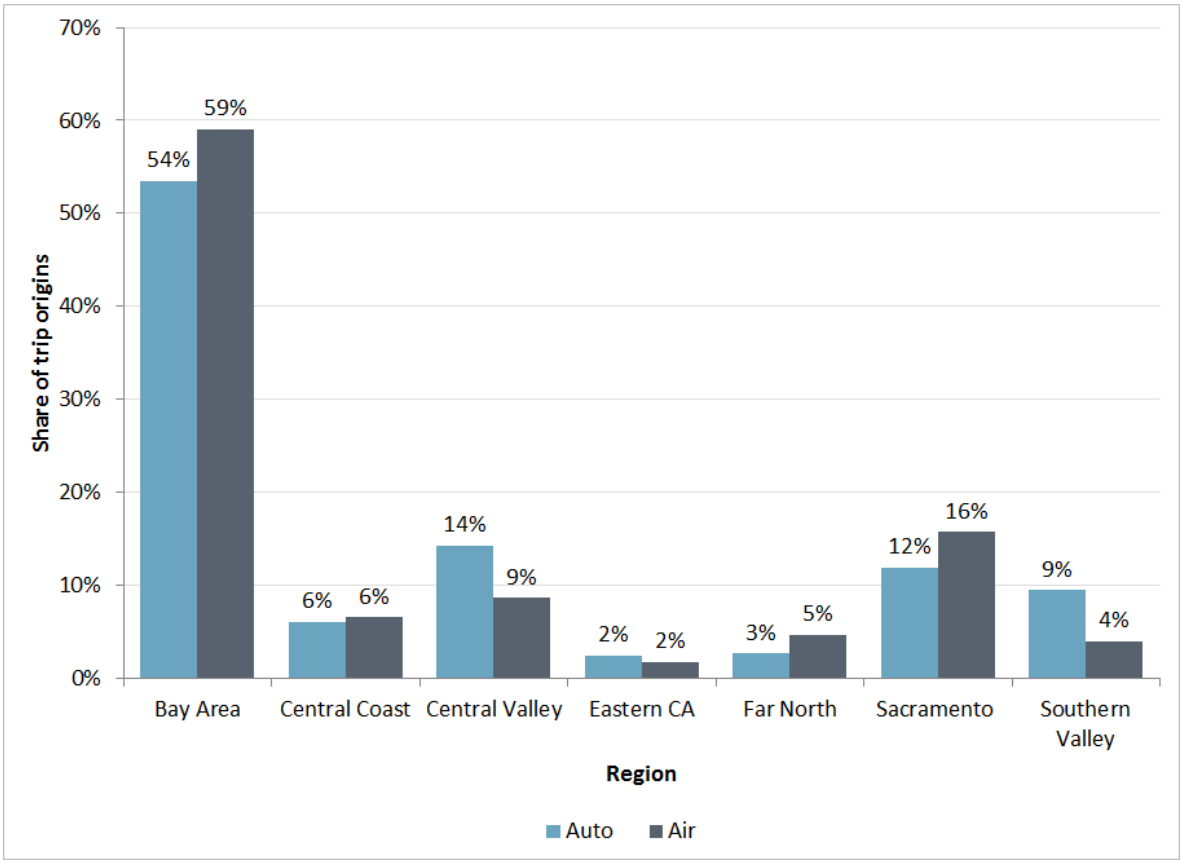
Figure 7.3 and Figure 7.4 show the final distribution of trips across Southern and Northern California origins for auto and air travel.

Figure 7.3: Distribution of trips by origin, Southern California



Source: Steer Davies Gleave

Figure 7.4: Distribution of trips by origin, Northern California



Source: Steer Davies Gleave

7.8.2 Segmentation: Current mode and journey purpose

As explained previously, three existing modes have been included in the in-scope market: auto, air and bus. Trips by these modes are further segmented by two journey purposes:

- Business and conventions; and
- Other (all tourist related).

We have used the I-15 postcard survey to segment the market by purpose, as well as the LVCVA convention attendee figures.

Table 7.5: 2015 in-scope traveling market, millions of annual round-trips by journey purpose

Market	Auto	Air	Bus	Total
Southern CA to Las Vegas: business / conventions	1.1	0.9	0.0	**2.0**
Southern CA to Las Vegas: other	11.3	1.0	1.3	**13.6**
Northern CA to Las Vegas: business / conventions	0.1	0.4	0.0	**0.4**
Northern CA to Las Vegas: other	0.9	1.0	0.2	**2.1**
Las Vegas/Clark County to CA	3.6	0.7	0.0	**4.3**
Other locations to Las Vegas via CA	2.2	0.7	0.1	**3.0**
Southern CA to Victorville	0.8	0.0	0.0	**0.8**
Total	**20.0**	**4.8**	**1.6**	**26.3**

Source: Steer Davies Gleave

7.8.3 Segmentation: Time of travel

To accurately reflect different types of visitors and traveling conditions (particularly on the highway network), we segmented the in-scope market by time of day, day of week and direction of travel.

Trips by auto

For trips by auto we adopted the distribution of traffic derived from analysis of NDOT traffic count data.

Using information from the I-15 postcard survey and LVCVA statistics on the distribution of stay length and the distribution of arrival day in Las Vegas, we created separate distributions for traffic originating in:

- Southern California, with peak travel northbound Friday and southbound Sunday;
- Northern California with peak travel northbound (on I-15) Friday and southbound Sunday; and
- Las Vegas with peak travel southbound on Sundays and northbound Fridays.

Peak periods on the highways were defined as:

- Passing Victorville northbound on Friday between 10am and 6pm; and
- Leaving Las Vegas southbound on Sunday between 10am and 6pm.

Overall we estimate that approximately one quarter of car trips between Las Vegas and California experience congestion on the I-15 either outbound, inbound or in both directions.

Trips by air

We adopted Official Airline Guide (OAG) flight schedule data to reflect demand and supply across different times of the day, days of the week, and directions of travel.

7.8.5 Segmentation: Group size

Three group size segments are included: traveling alone, with one other person, in a group of three or more. These segments are taken from our behavioral surveys (postcard and panel recruitment). The segments are used to reflect the different costs that will be incurred by parties of different sizes which will affect visitors' propensity to choose HSR in the future.

Table 7.6: Group size assumptions

	One person	Two people	Three or more
Auto	15.5%	51.0%	33.5%
Air	21.9%	44.1%	34.1%

Source: Steer Davies Gleave

8 Market growth

8.1 Approach

There are both supply side and demand side aspects to the dynamics of the future growth of in-scope demand for HDC. As a first step to estimating potential future growth, it is critical that the existing interactions between the market attractors and drivers are clearly understood. These are defined as follows:

- **Attractors** are the offerings available in Las Vegas that draw visitors to the market.
- **Drivers** are the demographics and psychographics of the potential Las Vegas customers, with particular focus on visitors originating in or traveling via California, and the growth of population in Clark County.

Relevant data for Attractors and Drivers has been collected, compared and analyzed to provide a basis for the prediction of future Las Vegas market growth. In conducting our market growth analysis, we have focused primarily on annual data since 2010, i.e. covering the period of recovery from the Great Recession. This period avoids the boom/bust cycle of 2005-2009. Taking a multi-year view also avoids potential distortions of seasonal and one-off factors and helps to ensure that longer term "big picture" trends are identified.

Steer Davies Gleave predictions for the growth of the Las Vegas visitor market have been benchmarked against an independent study commissioned by Applied Analysis specifically for this study as outlined below.

8.2 Independent visitor forecasts

Understanding the trends in the Las Vegas visitor market is important for future planning and investment. There are a number of respected market analysts who, from their differing perspectives, regularly produce estimates of future visitor volumes for Las Vegas over the short and longer term.

Union Gaming has produced estimates on an annual basis through to 2018[79].

Applied Analysis (AA) has made longer term projections, notably on behalf of the Southern Nevada Tourism Infrastructure Committee (SNTIC), with the results published in 2015 giving estimates of visitor numbers through to 2060 at 10 year intervals[80].

[79] www.uniongaming.com/wp-content/uploads/2016/01/UG-NA-Jan-5-2016-LV-2016-Outlook.pdf.

In order to draw on their insight into long term trends, Steer Davies Gleave commissioned AA to provide their assessment of the future development of the Las Vegas market segmented by leisure and convention visitors. AA were asked to develop a range of alternative scenarios around their Base Case visitor projection through 2040 to reflect the interplay of projected demand and customer mix, and the potential impact of room inventory levels on demand. AA's Base Case reflects assumptions with a 60% probability of being met or exceeded. Thei r Conservative scenario was based on assumptions with an 80% probability and their Aggressive scenario was considered to have a 20% probability, to indicate the plausible range of outcomes. The outputs quoted in this report reflect their findings and analysis based on actual data up to July 2016.

The forecasts produced by AA for Steer Davies Gleave are lower than those published in connection with their work for SNTIC in 2015. The overall visitor growth rate over the period to 2020 has been revised down from 2% per annum to 1.23% in the Base Case, and between 2020 and 2030 from 1.25% per annum to 0.83%. Thereafter the growth rates are similar.

Applied Analysis have based their projections for SDG on more recent data and reported that feedback from SNTIC and LVCVA suggest a "softer landing" to the projections is now appropriate. Within the AA forecasts, the rate of growth for convention visitors is expected to outpace that of the leisure market, as set out in Table 8.1.

Table 8.1: Applied Analysis forecasts of visitor growth – Compound Annual Growth Rates

	2015-2022	2022-2025	2025-2030	2030-2040
AA Base Case				
All Visitors	1.15%	0.85%	0.77%	0.63%
Tourist/Leisure segment	0.77%	0.82%	0.74%	0.60%
Convention segment	3.41%	1.01%	0.92%	0.74%
AA Aggressive Case				
All Visitors	1.65%	1.35%	1.17%	1.03%
Tourist/Leisure segment	1.23%	1.31%	1.12%	1.00%
Convention segment	4.12%	1.54%	1.43%	1.16%

Source: Applied Analysis

The Center for Business and Economic Research at UNLV also produces long term visitor forecasts for Las Vegas. These proprietary forecasts, not currently in the public domain, are based on estimates from a series of Autoregressive Moving Average (ARMA) models with additional explanatory variables. The results of recent work are understood to suggest a higher rate of growth in the initial period, continuing the bounceback from recession, and indicate a gradual

[80] Southern Nevada Tourism Infrastructure Committee (2015), Southern Nevada's Economic Growth and the Importance of Tourism Infrastructure http://sntic.org/meeting/01/economy/aguero/SNTIC_Aguero_07%2014%202015_FINAL%20v2.pdf.

slowdown over the longer term, consistent with the trend in the Applied Analysis report, although CEBR's expectations are somewhat higher.

Monthly visitor statistics from January to September 2016 have shown a mixed trend versus 2015, but the overall year to date growth comes in at 1.8%, supported by a strong growth in convention attendance, up over 12.1%. These results are in line with the Applied Analysis Aggressive Case, although they do reflect a slowing from the level of growth seen in 2015.

8.3 Market attractors

8.3.1 Historic room supply

According to LVCVA, some 96% of overnight visitors to Las Vegas stayed in a hotel or motel room in 2015[81]. Notwithstanding the fact that the LVCVA statistics are likely to under-represent the number of visitors staying with family and friends, the availability of hotel rooms has a dominant influence on levels of visitation.

There are around 149,000 rooms in the Las Vegas Metropolitan area, with an estimated 97,885 located on the main resort corridor of Las Vegas Strip[82]. Figure 8.1 shows that historically, until the Great Recession of 2008-2009, room inventory development was strongly correlated with visitor volume growth. Inevitably there is a symbiotic relationship between hotel rooms which resorts price to fill, and levels of demand at a price level which supports the investment in new capacity.

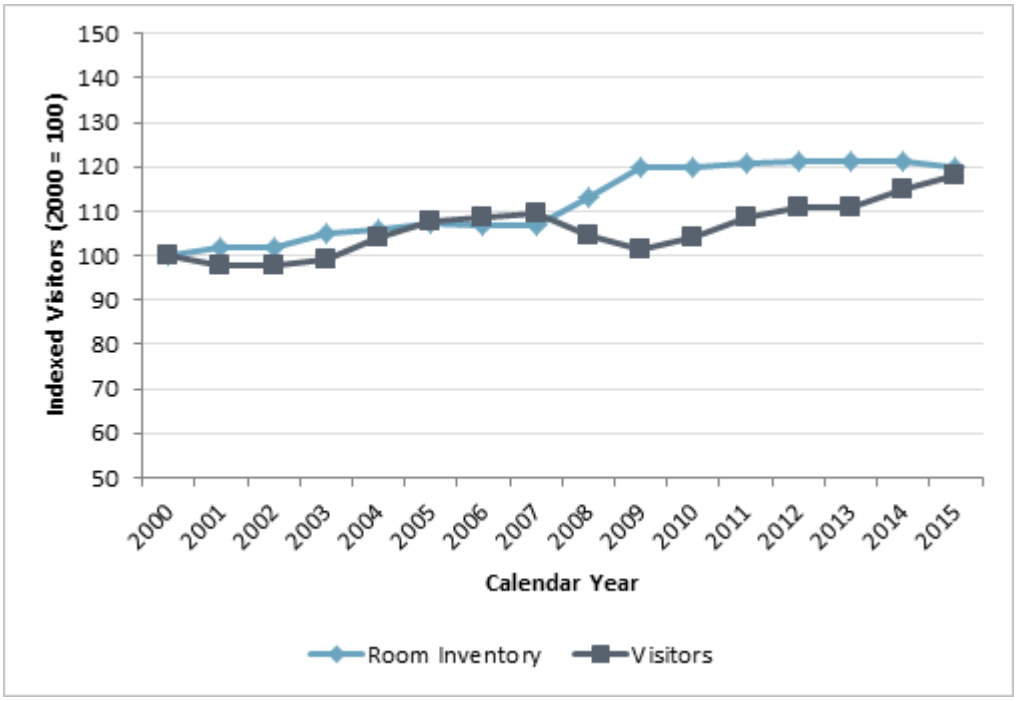
However, this relationship became disconnected during the Great Recession, with room inventory increasing significantly, just as visitor volumes declined. Much of the room supply growth related to major Strip openings including: Palazzo (Dec 2007 – 3,015 rooms); Wynn Encore (Dec 2008 - 2,034 rooms); CityCenter (Dec 2009 - 5,742 rooms); and Cosmopolitan (Dec 2010 - 2,969 rooms). Since 2010, the inventory has remained broadly static overall despite the addition of the 668-room Octavius Tower at Caesars Palace in 2012 and the SLS Las Vegas opening in 2014 with 1,622 rooms.

As Figure 8.1 shows, visitor growth resumed from 2010 and by 2015 was once again in line with room inventory.

[81] LVCVA 2015 Las Vegas Visitor Profile.

[82] Union Gaming (Jan 2016), Global Gaming Operators Industry Update p.9 http://www.uniongaming.com/wp-content/uploads/2016/01/UG-NA-Jan-5-2016-LV-2016-Outlook.pdf.

Figure 8.1: Comparison of Room Inventory versus Visitor Volumes (Indexed)



Sources: Historical LVCVA Visitor Statistics 1990 to 2015, Steer Davies Gleave

8.3.2 Future room supply

Announcements of near term development plans indicate that only modest inventory growth is anticipated in the short term (LVCVA, Las Vegas Tourism Construction Bulletin, June 22, 2016). Although a resurgence of megaresort construction cannot be ruled out at some future date, there is currently no evidence for any supporting investment plans.

Nevertheless, Las Vegas properties are investing in renovations and additional amenities/ attractions to support market diversification, such as the MGM/AEG Arena opening in 2016.

There is also an expansion of convention facilities with the Mandalay Bay Convention Center, and plans for an upgrade and expansion of the LVCC. May 2015 saw the closure of the Riviera, removing 2,075 rooms, in order to make way for the LVCC project.

According to LVCVA, 2016 will add only 351 rooms, with 167 expected in 2017. 2018 is expected to see more rapid expansion, with a total of 1,838, most notably Alon Las Vegas with 1,100 rooms. Another 5,087 rooms are projected for 2019 and beyond. Significant developments included in this latter estimate include Resorts World Las Vegas (a revival of the former Echelon project by Genting), which accounts for 3,500 rooms in 2019, and Wynn Paradise Park expected to add 1,000 rooms by 2020.

When construction resumes on Fontainebleau Las Vegas this could add 3,889 rooms, although the timing is currently uncertain. Plans have also been mooted for a St Regis Tower. By 2020 at least 6,000 and potentially more than 10,000 rooms may have been added to the current total.

There have been no public announcements of firm plans for further large scale developments, but a rising market with high occupancy levels is likely to encourage new investment. Although a significant length of The Strip is now built-out, there remain a significant number of large underdeveloped areas both on and near to The Strip. These plots are held by the casino resort operators in Las Vegas, so a lack of available land should not act as a constraint to future expansion[83]. As part of their forecasting report for SDG, AA identified around 597 acres of developable property across 14 sites within the resort corridor. In addition, there has been a history of demolitions of existing properties on the Las Vegas Strip to make way for new, typically larger capacity resorts.

New development can be expected to focus on mid- to top-end properties. However, given the level of investment costs, as a new product enters the market at this level, the competing older properties will effectively be downgraded which will help to maintain an effective spread of accommodation to suit all levels in the market.

8.3.3 Future hospitality sector employment

Long term population forecasts for Clark County are developed using a general-equilibrium demographic and economic model developed by Regional Economic Models Inc. (REMI), specifically for Clark County[84]. Population growth was 2.1% in 2015, with a total of 2.15 million residents living in the County. This growth rate is projected to decline gradually over time to 1.7% in 2018, 1.1% by 2030 and 0.8% by 2035, falling towards the national average growth rate as the local economy matures. The population is forecast to be 2.51 million in 2025 and to reach 3.00 million by 2045.

Long term population and employment forecasts by sector are developed using a general-equilibrium demographic and economic model developed by Regional Economic Models Inc. (REMI), specifically for Clark County[85]. Accommodation and Food Services represents the largest individual component, running at just under 25 percent of private non-farm employment. The ratio of leisure and hospitality sector employees per room fell sharply between 2007 and 2009, from 2.10 to 1.69, but since then has stabilized and is now rising again, reaching 1.89 in 2015[86].

This employment ratio typically depends on the standard of service offered. Given that the range of accommodation grades in Las Vegas is expected to remain broadly spread (to attract the widest

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[83] Union Gaming (Jan 2016), Global Gaming Operators Industry Update p.17 http://www.uniongaming.com/wp-content/uploads/2016/01/UG-NA-Jan-5-2016-LV-2016-Outlook.pdf.

[84] Constant I. Tra, (June 2015), Population Forecasts: Long-Term Projections for Clark County, Nevada 2015-2050, Center for Business and Economic Research UNLV http://www.clarkcountynv.gov/comprehensive-planning/demographics/Documents/2015_Population_Forecasts.pdf.

[85] Constant I. Tra, (June 2015), Population Forecasts: Long-Term Projections for Clark County, Nevada 2015-2050, Center for Business and Economic Research UNLV http://www.clarkcountynv.gov/comprehensive-planning/demographics/Documents/2015_Population_Forecasts.pdf.

[86] Sources: Federal Reserve Bank of St Louis - https://research.stlouisfed.org/fred2/series/LASV832LEIH#; SDG analysis.

market), and that resort owners continue to invest in remodeling to maintain quality and encourage repeat visits, a substantial shift in standards is unlikely to be a driver of change. The forecasts of sector employment can therefore be considered to provide a proxy indicator for future hotel room inventory.

At a constant level of 1.85 employees per room, there can be expected to be 155,500 rooms by 2018, rising to 160,200 by 2020, 167,700 by 2030, 169,500 by 2040 and 170,800 by 2050. These numbers are 2.5% above the AA Base Case in 2020, similar in 2030 but 4.7% lower by 2040. It is notable that the REMI model is suggesting a gradual reduction in the proportion of Clark County residents employed in the sector over time.

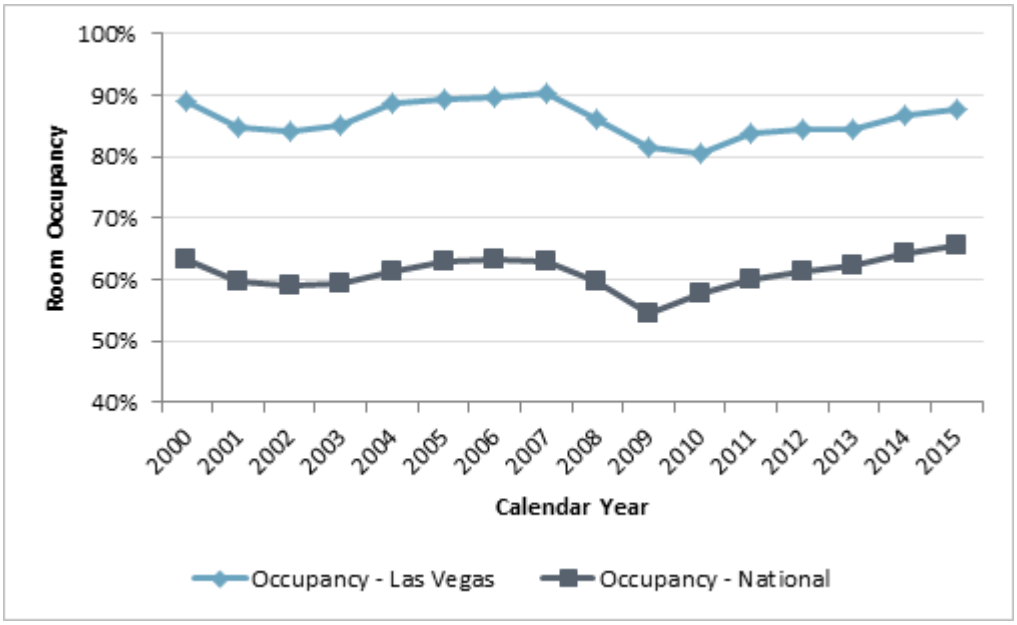
Introduction of new technology could reduce staffing ratios in the future, although these trends do not appear to have been allowed for in the current employment projections. In addition to 'app-based' check-in and ordering services, some traditional staff roles may also be automated. There are already examples of robots acting as receptionist, concierge and porter. Room service deliveries and certain cleaning activities can also be automated or robot assisted. Automated valet parking is also becoming a reality, and security monitoring systems require less human interaction. There will remain certain customer facing activities which are less amenable to automation, but the practical ratio of rooms/guests per employee is likely to rise.

8.3.4 Historic room occupancy and duration of stay

Hotels continuously adjust their room rates in order to manage occupancy and maximize their Average Daily Rate (ADR) per room. This means the room rates can be highly volatile, with marked declines in low season and during economic downturns.

Occupancy rates have risen from 80.4% in 2010 to 87.7% in 2015, still slightly below the peak of 90.4% in 2007. However, given the seasonal patterns of demand, there is clearly a limit to how far occupancy can rise. Las Vegas occupancy is already substantially higher than in the rest of the United States, although as shown in Figure 8.2, the gap is narrowing, from an average of 26% between 2000 and 2010 to 22% in 2015.

Figure 8.2: Comparison of Las Vegas and national hotel occupancy



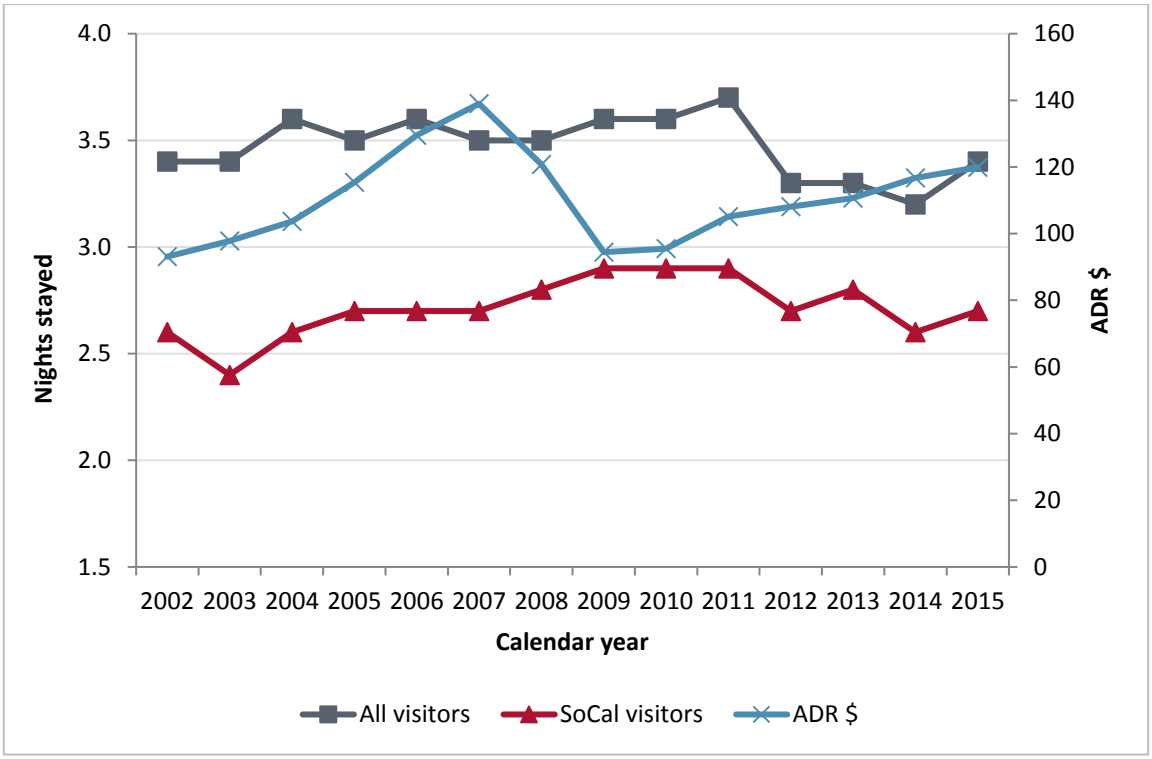
Sources: LVCVA and PwC US based on Smith Travel Research (STR) data

Each hotel room is hosting more visitors. Average duration of stay in Las Vegas across all visitors averaged 3.6 nights between 2004 and 2011, but since 2012 has declined to an average of 3.3 nights, as shown in Figure 8.4. SoCal visitors have the shortest average stay: this rose from 2.6 in 2004 to 2.9 in 2011, but fell back to an average of 2.7 over the last four years.

Average daily room rates (ADR) appear likely to have influenced the SoCal trend in particular. Stays grew longer when rates fell during the recession but have fallen back as ADRs rose again, from an average of $95 in 2010 to $120 by 2015.

A combination of rising occupancy and rising ADR will help to stimulate investment in new/expanded properties.

Figure 8.3: Trends in duration of stay



Source: SDG analysis of LVCVA visitor statistics

8.3.5 Implications for visitor numbers

It is possible to imply future visitor volumes from the projections of available rooms and visitor churn.

- Assuming that there was no change in the duration of stay and group size the number of visitors would increase to 45.7m by 2020 and 48.3m by 2040.
- However, a further decline in average duration of stay would imply that future visitor numbers could be higher (although this would not affect total visitor nights). If the average duration of stay continues to decline by 0.667% per year to 2020, then by 0.333% per year to 2030 and then by 0.167% per year, the average duration of stay would fall from 3.4 nights in 2015 to 3.29 in 2020 and 3.13 by 2040.
- A change in average duration of stay could also be driven by a change in visitor mix as well as overall market dynamics; proportionately more visitors from SoCal than the rest of the US would translate into a fall in the average duration of stay.

The results of this hypothetical exercise, presented in Table 8.2, indicate that there is potential for visitor volumes to grow substantially in the short-medium term, despite limited increase in room inventory. On the basis of these assumptions, the number of visitors would exceed the AA Base Case estimates in every year, and would be above the AA Aggressive Case up to 2025.

Table 8.2: Illustrative visitor forecasts based on room inventory and falling duration of stay

	2015 Actual	2020	2025	2030	2040
Implied Rooms (000s)	149.2	160.2	166.2	167.7	169.5
Nights stayed on declining trend	3.4	3.29	3.23	3.18	3.13
Room-based Visitor estimate (million)	42.3	45.7	47.4	47.8	48.3
Adjusted for shorter stay (million)	42.3	47.2	49.8	51.1	52.5
AA Visitor estimate (m) Base Case		45.0	47.0	48.9	52.0
AA Visitor estimate (m) Aggressive Case		46.1	49.4	52.4	58.0

Sources: SDG analysis based on Clark County population and employment forecasts to estimate room inventory, and assumed trend in duration of stay; Applied Analysis forecasts commissioned by SDG (version Sep 13 2016)

8.4 Market drivers

8.4.1 Californian resident profiles

Californian residents are a key driver of visitor numbers in Las Vegas. In 2015 they accounted for 29% of all visitors to Las Vegas, although this was down on the 33% recorded between 2012 and 2014. Of this total, the majority reside in the Counties of Southern California (SoCal) and are the subject of specific market profiling by LVCVA. There is no equivalent profiling carried out for the smaller number of visitors from Northern California (NorCal).

In comparison with other market segments, the profile of visitors from Southern California is more ethnically diverse, and more strongly features younger age groups than from the rest of the USA. However, the current income profile is broadly similar.

Frequency of visits

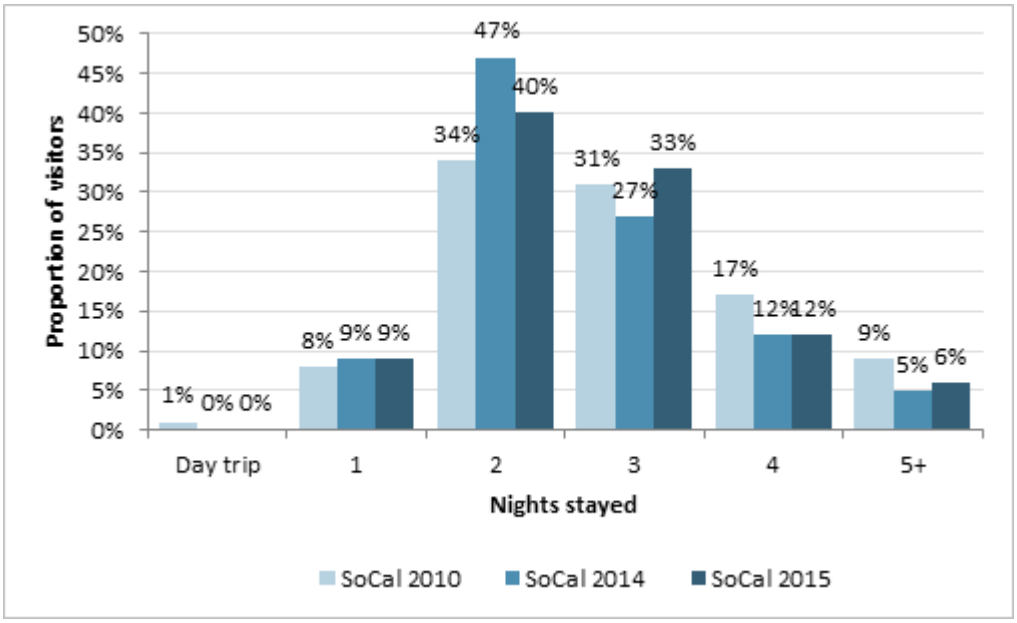
SoCal residents visiting Las Vegas are very likely to be repeat visitors (98% in 2015) and these visitors make frequent trips, averaging 2.5 within 12 months according to LVCVA visitor profiles. Respondents to the SDG behavioral survey reported an average of 9.0 visits in the past five years.

To some extent the SoCal visitor market and visitation rate appears to be disconnected from the wider economic cycle. By virtue of its geographic proximity, acceptable drive times and relatively lower travel costs compared to more distant markets, the SoCal market is more responsive to discounts and complimentary offers by resort operators seeking to fill low occupancy periods.

Duration of stay

SoCal visitors have the shortest average stay of any visitor segment, at 2.7 nights in 2015 (source: LVCVA visitor profile surveys). As Figure 8.4 shows, the typical duration of stay has fallen: 40% stayed for two nights in 2015, compared with 34% in 2010, and there has been a marked reduction in the numbers staying for four or more nights, down from 26% in 2010 to 18% in 2015. Shorter stays mean that there is likely to be greater importance attached to maximizing the available time at the resort, which should be positive for HSR demand.

Figure 8.4: SoCal visitors' duration of stay



Source: LVCVA Las Vegas Visitor Profiles: Southern California and International Visitors Version

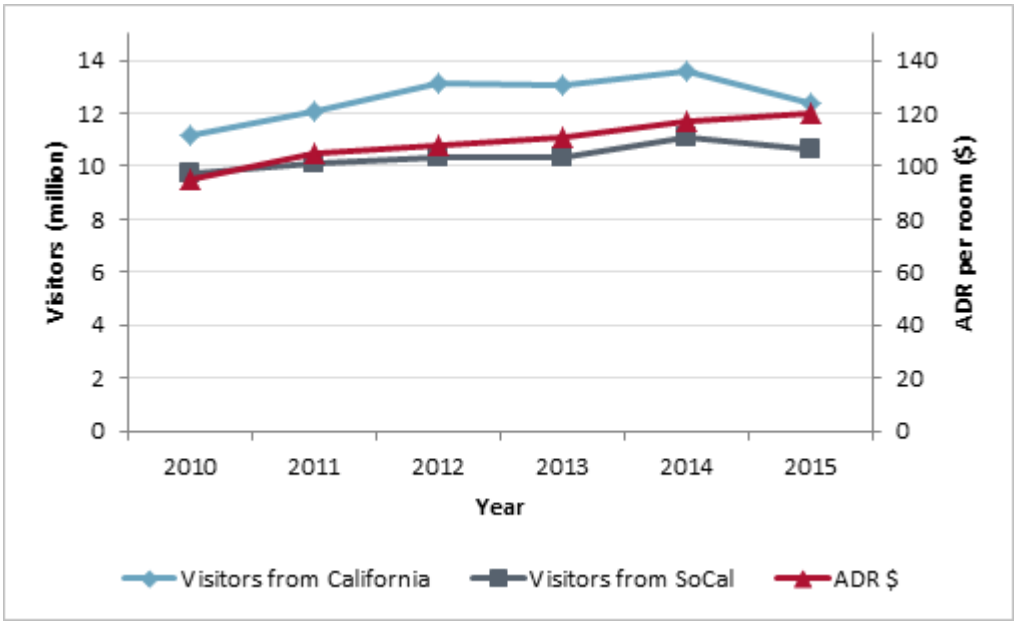
Income and trip costs

Income distribution is widely used as an explanatory variable in travel demand modeling and appears to be an equally important factor in determining visitor propensity to visit Las Vegas for leisure purposes.

With economic recovery, incomes are likely to increase in real terms. However, recent trends suggest that the cost of a trip to Las Vegas will increase significantly faster than incomes. Over the past five years (2010-2015) room rates have increased three times faster than inflation, with casino resort operators seeking to maximize revenues from stronger demand generated from the economic recovery. Indications from recent trends in duration of stay suggests that this may be resulting in shorter trips rather than a net reduction in visitor demand.

Figure 8.5 shows that up until 2015 demand from California continued to grow even as the ADR per room increased, with the impact on trip budgets apparently compensated by a shorter duration of stay.

Figure 8.5: Trends in visitor numbers and room rates



Source: SDG analysis of LVCVA visitor statistics

How the population of SoCal changes over time in terms of proportional ethnicity, age profile and propensity to gamble, will influence the in-scope Las Vegas visitor market.

Ethnicity

Ethnicity is generally a strong proxy for income, and income relativities have been broadly stable over time. During the Great Recession, median family incomes among Non-Hispanic Whites in California fell 8.3% from $94.5k in 2008 to $86.6k in 2010 and by 8.1% among Hispanics from $44.1k in 2008 to $40.5k in 2010[87].

There is a distinct difference between the ethnicity of Las Vegas visitors from SoCal and that of the SoCal resident adult population. Whilst 78% of SoCal visitors were categorized as Non-Hispanic White in the LVCVA Visitor Profile Surveys in 2015, this ethnic group represents only 39% of the population of SoCal over 20 years of age. Conversely the adult population in SoCal is 39% Hispanic but only 14% of SoCal visitors were categorized in this way. These findings show that Non-Hispanic White visitors from SoCal are presently overrepresented in the Las Vegas visitor market whilst Hispanic visitors from SoCal are underrepresented.

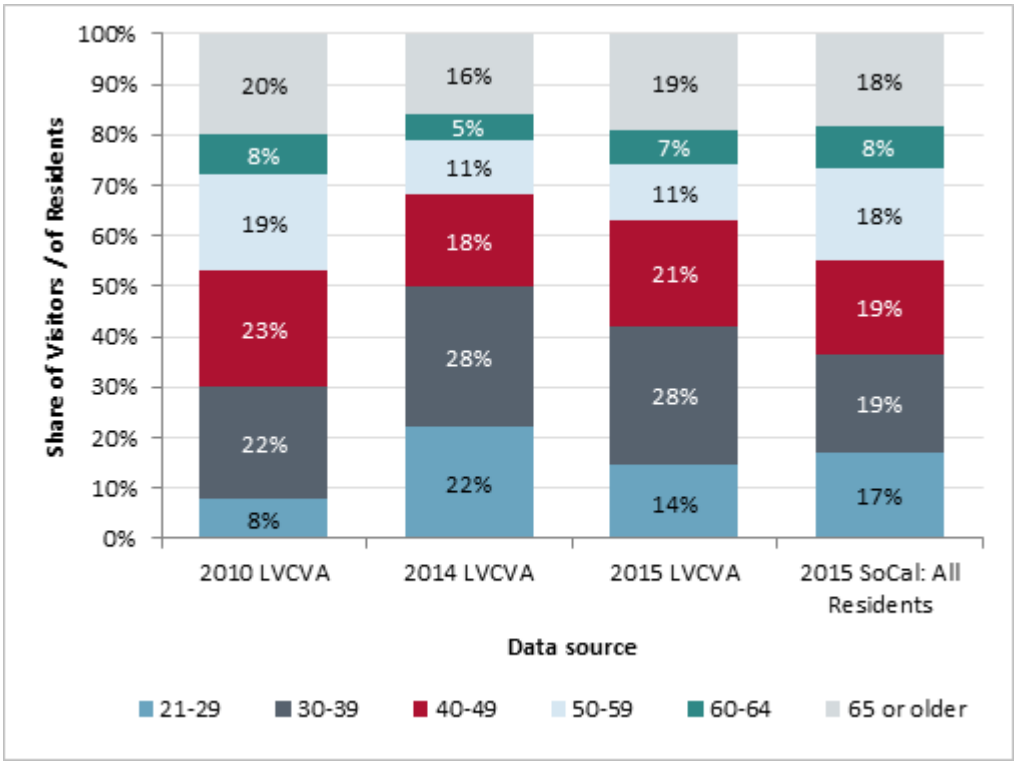
Age

The age profile of Southern Californian visitors to Las Vegas appears to have changed quite markedly in recent years, with 2012 as a key break point. In 2010, 47% of visitors from SoCal were

[87] Sarah Bohn and Eric Schiff (Dec 2011), The Great Recession and Distribution of Income in California, Public Policy Institute of California.

50 years of age or older and just 30% under 40. By 2014, the pattern had almost flipped with 32% in the older age groups and 50% below 40 years. 2015 saw a partial reversal of the trend, with 37% in the older age groups and 42% under 40. Figure 8.6 shows the extent of apparent volatility in the LVCVA results. The chart also provides a comparison with the age profile of the SoCal population.

Figure 8.6: Comparison of age profiles among SoCal visitors and adult residents



Source: LVCVA Visitor Profiles, SDG analysis, California DoF

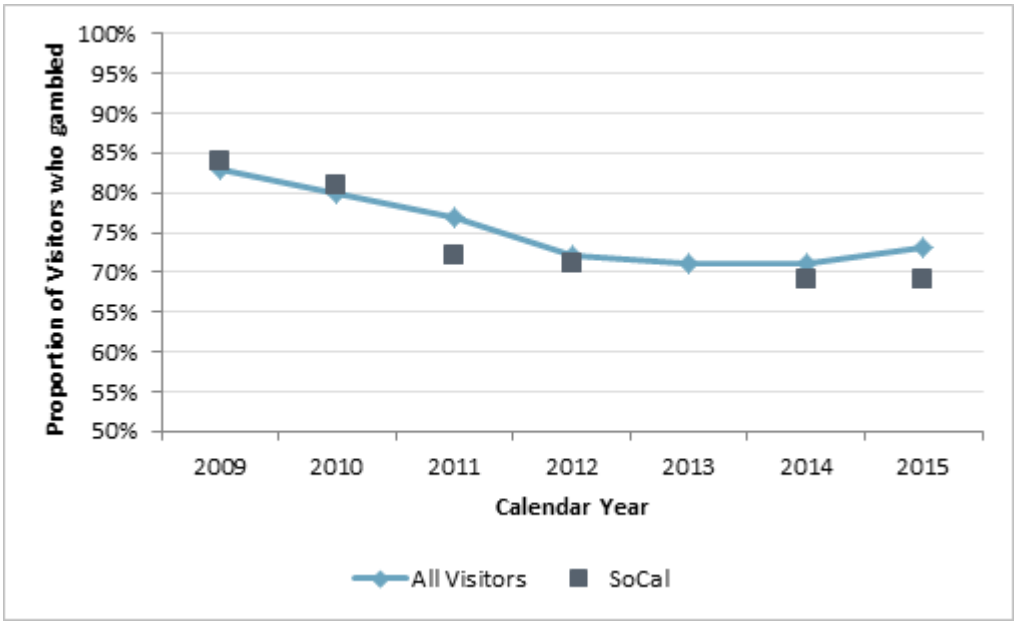
With an ageing population, the participation rates will depend on the social security and retirement benefits enjoyed by this important segment of the visitor market. For the purposes of these forecasts it is assumed that the future incomes of retirees will be maintained. Less generous pension provision could negatively impact on visitation in this demographic.

Propensity to gamble in Las Vegas

Gaming was traditionally the key attraction of Las Vegas, but this has been diminishing as opportunities for legal gaming have proliferated elsewhere. This decline in the proportion of visitors gaming has been evident across all visitors to Las Vegas as shown in Figure 8.7, with SoCal visitors showing the largest decline, from 84% in 2009 to 69% in 2015.

There is a marked generational divide in gaming behavior, with 87% of the oldest ("Silent Generation") gaming, falling to 78% among "Boomers", 68% for "Gen X" and 63% among "Millennials". Nevertheless, gaming remains a significant attraction.

Figure 8.7: Gaming participation in Las Vegas



Source: LVCVA Visitor Profiles

Research into gambling propensity in California[88] confirms that there are also marked differences in overall gambling participation associated with age, ethnicity and cultural background. The research showed that 32% of Non-Hispanic Whites had participated in casino gaming in the previous year, compared to 23% of Hispanics. These factors are likely to influence the profile of visitors and help explain the contrast with the overall population profile.

Las Vegas resort operators are investing in new attractions to appeal to the changing demographic, and responding to associated changes in patterns of visitor spend. Investment in a diversified range of non-gaming attractions is helping to maintain the attraction of Las Vegas as a destination and reduce the historic dependency on gaming revenues.

8.4.2 California demographic trends

California is home to an adult[89] population of 30.9 million in 2015, of which over 50%, 17.8 million reside in the eight counties of Southern California. The region is divided between Metropolitan Planning Organizations (MPO). The largest and most heavily populated is the Southern California Association of Governments (SCAG), which is made up of the six counties of Los Angeles, Orange, Ventura, Riverside, San Bernardino and Imperial.

[88] Source: Volberg, Nysse-Carris and Gerstein, 2006 California Problem Gambling Prevalence Survey.

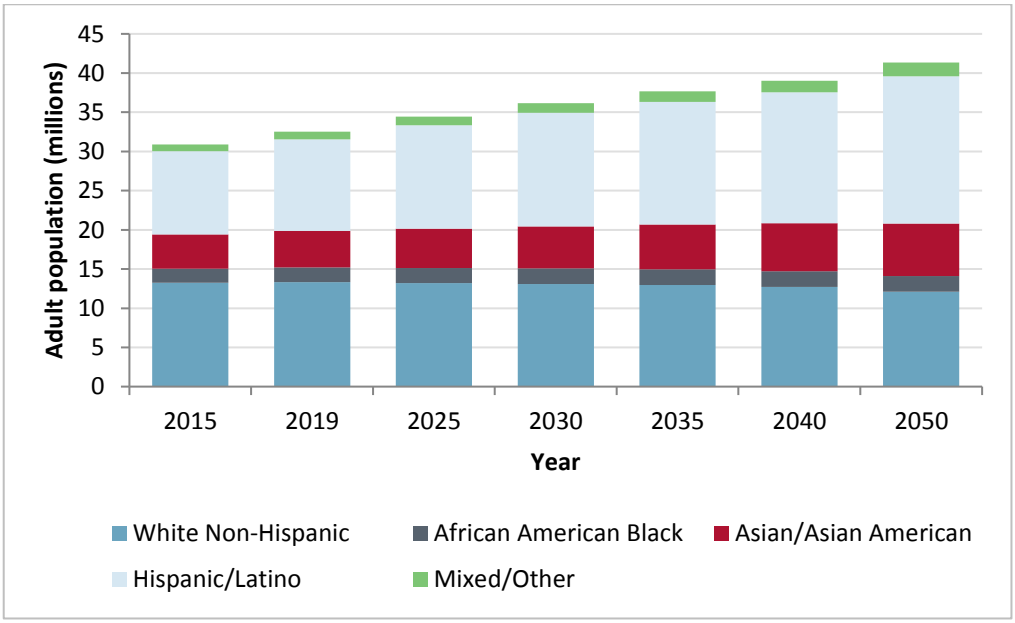
[89] Adult defined as 20 years of age or older.

The California Department of Finance (DoF) publishes 50 year projections of future population by ethnicity and age group at County level[90]. The starting point for the forecasts are assumptions about future fertility, mortality and net migration. Counties have different population growth rates depending on whether they are mature or developing areas.

Across the last decade, natural increase has been the primary driver of California's population growth, tempered by net out migration. However, during the Great Recession, there was a marked slowdown in levels of net foreign and domestic migration, reducing the net out migration and helping to offset a decline in the birth rate.

The overall growth in the adult population in California is presented in Figure 8.8. It is notable that the proportion of Hispanics in the California population is increasing over time, while the traditional core market of Las Vegas visitors, dominated by the Non-Hispanic White ethnic group, is forecast to decline in both relative and absolute terms. By 2030, the number of adult Non-Hispanic Whites will have declined by 1%, while Hispanic ethnic adults will have increased by 37%. By 2050 the number of Non-Hispanic White adults will be down 8% on 2015, and Hispanics up 77%.

Figure 8.8: Growth in adult population of California by ethnic group



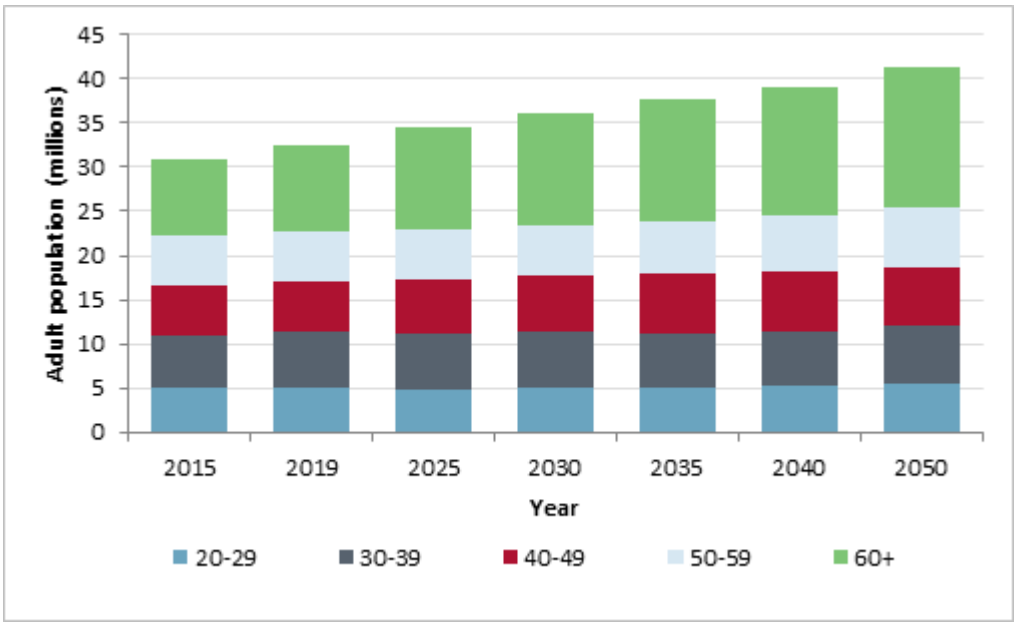
Source: California DoF projections

The differential growth patterns between ethnic groups, which have different propensities to visit Las Vegas, will impact upon the future in-scope market for HSR.

[90] California Department of Finance (Dec 2014), Modelling Methodology for the State and County Population Projections.

Figure 8.9 shows that the predicted demographic profile is also ageing. Those aged 60 and over show the most rapid rise, increasing from 28% of the adult population in 2015 to 35% by 2030 and 39% by 2050.

Figure 8.9: Growth in adult population of California by age group



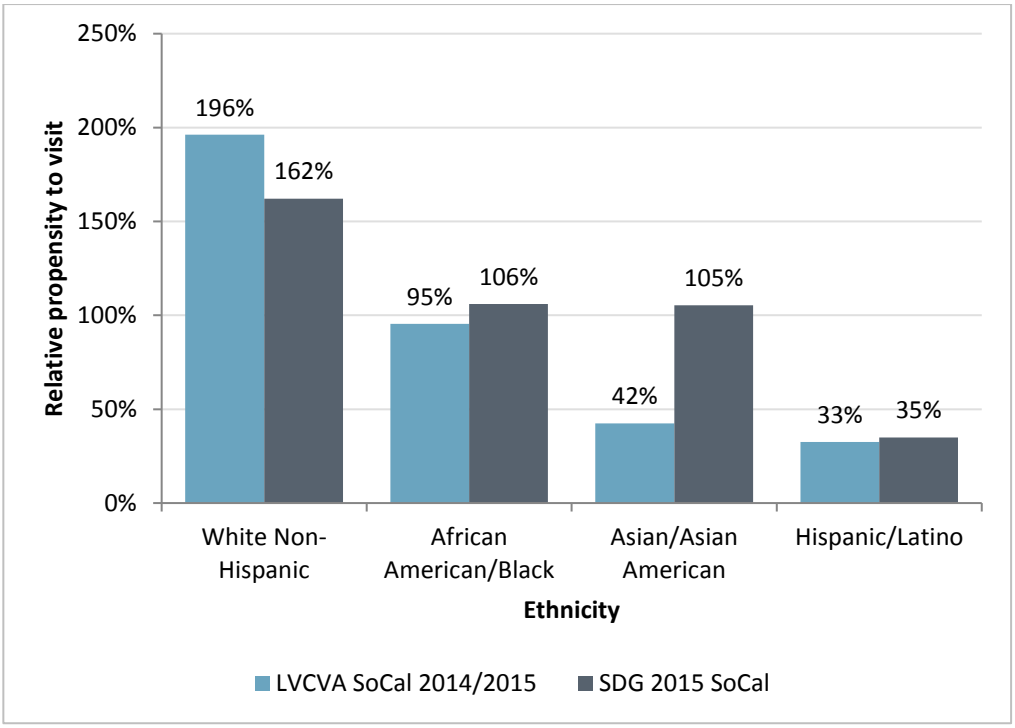
Source: California DoF projections

8.4.3 Implications for California visitor numbers

In order to assess potential growth of the California visitor market, it is necessary to combine the current distribution of visitors with the predicted growth rate of each County. Changes in the demographic mix in addition to general population growth will have a disproportionate impact on the potential visitation market, given the marked differences in propensity to visit among different segments of the population.

Figure 8.10 shows a comparison of the relative propensity of visitors by ethnic group observed in the LVCVA Visitor Profiles and respondents to SDG's behavioral survey, compared with the average rate for SoCal adults.

Figure 8.10: Propensity to visit by ethnic group in Southern California vs average adult

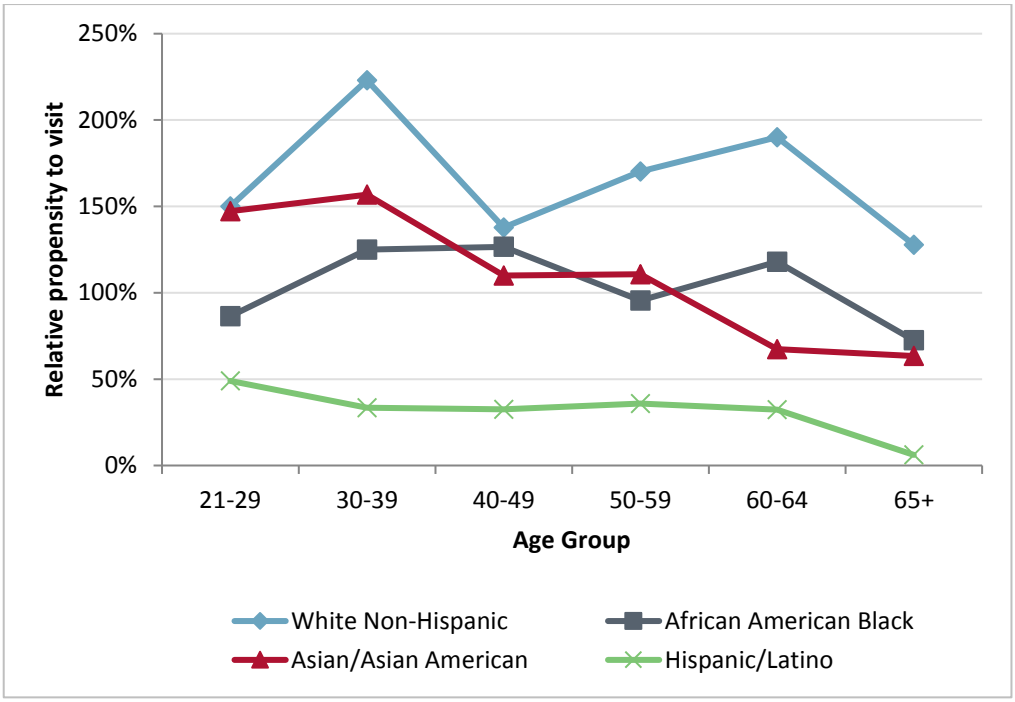


Source: SDG analysis based on 2014/2015 LVCVA, responses to SDG behavioral survey and California DoF data

The relative propensities reported by LVCVA and SDG are of a similar order of magnitude for White Non-Hispanics, African American/Blacks and Hispanics, but notably higher in SDG survey for Asian/Asian Americans (this pattern was also found in comparable research undertaken by SDG in 2010). The LVCVA and SDG surveys use different data collection techniques – face-to-face interviews and web-based respectively - which is likely to account for some differences in the sample. The SDG results are based on a larger sample of SoCal respondents and have the additional benefit of being able to be split by age group. This means that the SDG analysis can provide a measure of the influence of changes in the population age profile across the various ethnic groups.

White Non-Hispanics, who make up the majority of visitors, make more frequent visits to Las Vegas than other ethnic groups across the entire age range, although differences are less pronounced among the younger age groups. Among Hispanics and Asians, younger people are much more likely to visit than older generations, as illustrated in Figure 8.11.

Figure 8.11: Visitation rates by age and ethnicity



Source: SDG analysis based on responses to SDG behavioral survey and California DoF population data

Future trends in participation rates also need to be taken into account. There are grounds for assuming that participation, and visitation to Las Vegas, among Non-White ethnic groups is likely to increase over the longer term due to the process of acculturation, leading to modified attitudes and adapted behaviors in successive generations. The process can be observed in the differences between the relative visitation rates of various age groups.

In the 2016 SDG behavioral survey, Hispanics under 30 were found to be only a third as likely to visit as the equivalent White Non-Hispanic person, but this is over six times more than for those over 65. The propensity overall has increased from 32% in the equivalent 2010 survey to 35% in 2016, but the increase has been most marked in the youngest age group (21-29) rising from 34% to 49% over the same period. Conversely, the relative propensity among Non-Hispanic Whites has declined slightly from 170% to 162%, which in part will reflect the effects of population ageing.

In order to model changes in the propensity to visit Las Vegas over time, we have:

- Assumed that the relative visitation rates for Non-Hispanic Whites remain constant for each age group; and
- Over time, successive age cohorts of the Hispanic, Black and Asian population will visit at the higher of their prior frequency or the equivalent prior cohort (whichever is higher).

In the case of the youngest age group (21-29) additional growth among the Hispanic population is assumed:

- Doubling between 2015 and 2025;
- Growing by a further 50% to 2035; and

- Growing by 25% every 10 years thereafter.

The rate is capped by the equivalent rate for White Non-Hispanics. This scale of growth reflects the rate of growth seen since 2010.

Among the Black/African American ethnic group a rise in propensity of over three times in five years was observed. Given the increase which has already occurred, a lower rate of increase for the youngest age group is expected going forward:

- Increase of 25% to 2025;
- Slowing to 12.5% over the following decade.

For Asian/Asian Americans, the propensity among young people is already close to that of Non-Hispanic Whites, so no further uplift was assumed.

The propensity to visit Las Vegas rates have been applied separately for counties in Southern California and Northern California as described below.

8.4.4 California geographic distribution

Analysis of visitor origins shows that geographic location affects the propensity for trip making across California. Whilst relative incomes in the different areas will have some influence, it also reflects levels of accessibility, journey times and costs.

The base year distribution of visitor demand is derived from analysis of cell phone data by Airsage and equivalent analysis of GPS tracking data by Streetlight. This helps identify the trips to Las Vegas originating in each County.

We have combined this information about the geographical distribution of trips in California with forecast population growth and trends in the propensity to visit Las Vegas to derived the growth rates described in Table 8.3.

Table 8.3: California resident visitation growth based on population growth and trends in trip propensity

	2015-22	2022-30	2030-40	2040-50
SoCal CAGR	1.35%	1.15%	1.30%	1.11%
NorCal CAGR	2.40%	1.97%	1.70%	1.49%

Source: SDG analysis

8.4.5 Convention attendees from California

Southern California accounted for 23.2% of convention visitors in 2015, and this share has been reasonably consistent over time. While overall convention attendance fell sharply during the Great Recession, the convention market from California proved more resilient, not least because of the relative proximity of Las Vegas as a destination. The proportion of convention attendees coming from Northern California is more volatile, ranging from 4% in 2010 up to 9% in 2014, before falling back to 2% in 2015 (source: LVCVA Visitor Profile surveys).

There are proposals for renovation and expansion of the Las Vegas Convention Center. LVCC has indicated that it is approaching a sellout of the available exhibit space. It is also facing increased

competition from venues in other cities. Lack of available dates was the most frequently cited reason preventing respondents from hosting conferences in Las Vegas. Organizers that would be likely or very likely to bring their events to Las Vegas if space was available represent 183,000 attendees per annum with an average stay of close to two nights (a 3% points increase in convention visitors).

Applied Analysis forecasts commissioned for the purposes of this study indicate that growth is expected to continue at a faster rate than in the leisure market, but the rate of growth is expected to decline over the coming years, as shown in Table 8.4.

Table 8.4: Applied Analysis convention visitor compound annual growth rates (CAGR)

	2015-22	2022-25	2025-30	2030-40
AA Base Case CAGR	3.41%	1.01%	0.92%	0.74%
AA Aggressive Case CAGR	4.12%	1.54%	1.43%	1.16%

On the basis of recent trends, and evidence of support for adding convention and meeting facilities in connection with new or remodeled properties, we believe that there will be the necessary investment in infrastructure to support continued growth. It seems reasonable to expect that the growth in convention visitors from California will mirror that of the broader conventions market, using the AA Base Case growth rates.

8.4.6 Other US visitors

Around 44% of non-SoCal visitors are reported to arrive in Las Vegas by auto, RV or bus. Of the total by all modes, 7% come from Northern California and 15% from Arizona. Again, this implies that there is a large fly-drive market accessing Las Vegas via Southern California and potentially in-scope for HSR.

Given the scale of the domestic US visitor market, and the mature nature of the domestic air network, the trend in volumes coming through California is likely to reflect that of the overall Las Vegas visitor market. It is assumed that this will grow in line with Applied Analysis Base Case forecasts as shown in Table 8.5.

Table 8.5: Growth rates (CAGR) by market segment – Other US visitors

	2015-22	2022-30	2030-40	2040-50
Other US visitors via CA	1.15%	0.80%	0.63%	0.63%

Source: Applied Analysis assumptions for overall visitor market growth

8.4.7 International visitors

Visit California data highlights the strong linkage between visits to California and Las Vegas, with 29% of overseas visitors (i.e. international excluding Canada and Mexico) visiting both locations on

their trip[91]. The proportions vary by origin, ranging from over 40% of visitors from Australia, Italy and France, 37% for Germany and 27% for the UK. 25% of Chinese visitors to California also visit Las Vegas. 45% of overseas visitors to California enter the US via Los Angeles and only 2% via Las Vegas. These statistics mean that there is potential to attract additional ridership between California and Las Vegas (and vice versa) among international visitors.

Visit California estimates that overseas visitor numbers will increase at 4.75% CAGR between 2015 and 2020[92]. Whilst this appears strong growth relative to the broader Las Vegas market, it represents a slowdown on the average 6.5% per annum growth from 2010 to 2015. Whilst longer term independent forecasts are not currently available, it seems probable that the sector will continue to experience relatively rapid growth, with a gradual leveling off, in part driven by an increase in direct international flights to Las Vegas. The assumed growth of foreign visitors traveling to Las Vegas from California is shown in Table 8.6.

Table 8.6: Assumed growth in foreign visitors via California

	2015-20	2020-25	2025-30	2030-35	2035-40	2040-50
CAGR	4.75%	3.50%	2.75%	2.25%	2.00%	2.00%

Source: Visit California (2015-20), SDG assumptions 2020-2050

It is assumed that the rate will decline 1% every five years, leveling out after 2035. It should be noted that this market can be sensitive to global economic and security factors (although there can be compensating adjustments in local tourism to offset any decline).

[91] Tourism Economics for Visit California, California Travel & Tourism Outlook, Feb 2016, quoting original sources Tourism Economics; DKSA, TNS Global (domestic); CIC Research; OTTI (international).

[92] Source: Tourism Economics for Visit California, California Travel & Tourism Outlook, Feb 2016, quoting as original sources: Tourism Economics; DKSA, TNS Global (domestic); CIC Research; OTTI (international).

8.5 Las Vegas/Clark County residents

Long term population forecasts for Clark County are developed using the REMI model[93]. This shows population rising from its current level of 2.15 million to 2.33 million by 2020 at the equivalent of 1.7% per annum and 2.65 million by 2030. The rate of population growth is expected to fall over time as shown in Table 8.7.

Table 8.7: Clark County population forecasts

	2015 Actual	2015-20	2020-25	2025-30	2030-35	2035-40	2040-50
Clark County Population (000s)	2,146	2,335	2,507	2,654	2,776	2,887	3,109
CAGR		1.70%	1.43%	1.15%	0.90%	0.80%	0.75%

Source: Center for Business and Economic Research, UNLV, June 2015

Long distance trip making is assumed to rise in line with real Gross Domestic Product, or at a more local level Gross Regional Product (GRP), with an elasticity of 1.0. Clark County Real GRP rose just 3% between 2010 and 2014, but there was a marked difference between the falls of -0.4% in 2011 and 2012, relative to the 2.0% growth seen in 2013 and 2014. As shown in Table 8.8, the Center for Business and Economic Research (CEBR) Annual Long-Term Economic Forecast predicts continued strong growth in GRP for Clark County, somewhat faster than personal income per capita which may be a better guide to leisure related trip volumes[94].

Table 8.8: Clark County real GRP and personal income growth forecasts

	2015-20	2020-25	2025-30	2030-35	2035-40	2040-45	2045-50
Real GRP	3.75%	2.75%	2.76%	2.46%	2.43%	2.41%	2.40%
Per Capita Personal Income (Real)	2.45%	1.67%	1.75%	1.56%	1.57%	1.54%	1.47%

Source: Center for Business and Economic Research, UNLV

The combination of population growth and real personal income growth supports expectations of significant growth in trip making, with California likely to remain the dominant destination for trips given its relative proximity and prevalence of ties to friends and family in the area. Our forecasts for the growth of future trip making between Clark County and California are provided in Table 8.9.

[93] Constant I. Tra, (June 2015), Population Forecasts: Long-Term Projections for Clark County, Nevada 2015-2050, Center for Business and Economic Research UNLV http://www.clarkcountynv.gov/comprehensive-planning/demographics/Documents/2015_Population_Forecasts.pdf.

[94] http://cber.unlv.edu/publications/SoNevada-LongTerm.pdf.

Table 8.9: Clark County trip growth

	2015-20	2020-25	2025-30	2030-35	2035-40	2040-50
Clark County Resident trip growth CAGR	4.2%	3.1%	2.9%	2.5%	2.4%	2.3%

Source: Steer Davies Gleave

8.6 Summary of growth rates by market segment

Based on the analysis presented above, Table 8.10 below summarizes the expected Base Case growth rates in each market segment for each of the modeled periods.

Table 8.10: Growth rates (CAGR) by market segment – Base Case

Market segment	2015-22	2022-30	2030-40	2040-50
Southern California Tourists	1.35%	1.15%	1.30%	1.11%
Northern California Tourists	2.40%	1.97%	1.70%	1.49%
Convention Attendees[+]	3.41%	0.95%	0.74%	0.74%
Other US visitors via CA[+]	1.15%	0.80%	0.63%	0.63%
Foreign visitors via CA	4.39%	3.03%	2.12%	2.00%
Las Vegas/Clark County residents	3.88%	2.97%	2.45%	2.30%

Source: Steer Davies Gleave; [+]Applied Analysis Base Case

9 Forecasting assumptions

This section describes the core forecasting assumptions which have been adopted in the Base Case ridership and revenue forecasts. A comprehensive list of all assumptions is provided in Appendix A. Key forecasting assumptions include:

- Journey times by auto, air and HSR;
- Auto costs including fuel and other operating costs;
- Air fares and HSR fares;
- Parking costs for all modes;
- HSR service patterns;
- Ramp-up;
- Busy period premium; and
- Induced demand.

Our forecasting assumptions for each driver of demand for HSR are described below. At the outset we have presented an overview of the treatment of journey times and costs in the demand forecasting model.

9.1 Journey times and costs

Table 9.1 summarizes the journey time and cost elements taken into account in the calculation of the generalized journey costs used in the demand forecasting model (discussed in section 5). This description assumes travel from California to Las Vegas, but the same components are used in both directions.

Table 9.1: Components of journey time and cost

Element	Car	Air	HSR
Time			
Access from origin		Journey time to airport/station, including any wait time (if accessing by public transit), stopping time and delay due to congestion	
At departure airport/station		Check-in, security, boarding and wait time	Time from arriving at station to train departing
Main mode	Drive time by car to Las Vegas	Gate-to-gate flight time	HSR journey time
At arrival airport/station		Deplaning, baggage claim and walking to egress mode	Time from train arriving to egress mode
Egress to destination		Time by egress mode (taxi, shuttle, car or public transit) to final destination	
Cost			
Access from origin		Dependent on mode used: - Car: Gas, tolls & other operating costs - Taxi (incl. Uber/Lyft): Fare + tip (where applicable) - Public transit: Fare	
At departure airport/station		Car parking (where applicable)	
Main mode	Gas, tolls & other operating costs	Airfare	HSR fare
Egress to destination		Dependent on mode used: - Car/Taxi/PT: Same components as access from origin - Shuttles: Free	

Source: Steer Davies Gleave

Further details of the assumptions underlying each of these elements are provided within the remainder of this section or in Appendix A.

9.2 Drive times

We have estimated drive times from Google Maps and checked them against drive times obtained through the online behavioral survey and San Bernardino Associated Governments' monitoring tool for the regional transportation system.

Data from Google Maps' trip planning tool provides average vehicles speeds on road sections in real time traffic conditions. We have used automated software which allows us to extract highway speeds from this software on an hourly basis over a 2-month period. Speeds have been collected for all major highways in the study area.

Drive time outputs for key trip movements made in uncongested traffic conditions are provided in Table 3.2.

9.2.1 Drive times: Highway delays

Figure 9.1 provides an extract of the Google data on I-15 between Las Vegas and Barstow.

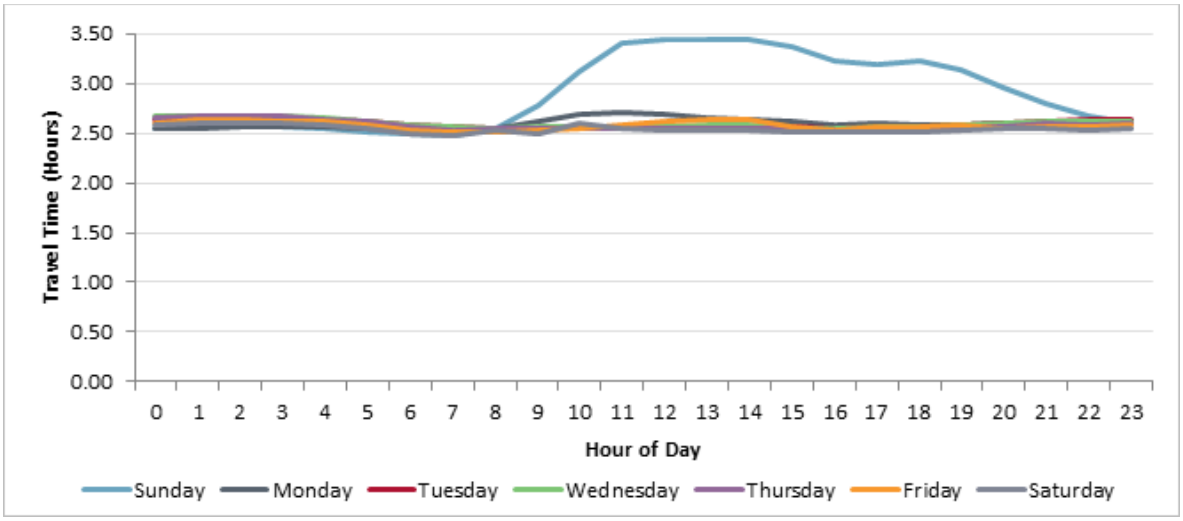
While the trip takes 2.5 hours most days, it takes on average up to an hour longer on Sunday afternoons. This finding corresponds with known traffic patterns in the area, and in particular delays experienced around the agricultural inspection station at Yermo.

Using this data, average delays along the whole I-15 section between Las Vegas and Victorville are forecast to increase journey times as follows:

- Northbound peak (Friday afternoon): 4%; and
- Southbound peak (Sunday afternoon): 21%.

Drive time data has been used to develop journey times for: origin-destination zone pairs; origins to airports; and, origins to HSR station.

Figure 9.1: Las Vegas to Barstow journey times



Source: Google maps and SDG analysis

9.2.2 Drive times: Future

We have used the Southern California Association of Governments (SCAG) model[95] to estimate how drive times and delays will change in future.

Table 9.2 provides a summary of the projected average change in highway speeds assumed within the SCAG model:

[95] SCAG is the Metropolitan Planning Organization (MPO) covering six counties: Los Angeles, Orange, Ventura, Santa Barbara, Riverside and San Bernardino. The SCAG model is used to inform regional transportation plans and covers a 25-year planning horizon to 2040.

Table 9.2: SCAG model assumed changes in highway speeds

SCAG model time period	Total difference 2012-2040	Average annual difference
AM peak	-13.5%	-0.5%
Middle of day	-4.7%	-0.2%
PM peak	-20.0%	-0.8%
Evening	-2.2%	-0.1%
Night	-0.2%	0.0%

Source: SCAG

Our demand forecasting model works on the basis of different time periods to the SCAG model, reflecting the different peak periods for travel to/from Las Vegas compared to overall highway travel patterns. We have therefore translated this data into our modeled time periods using profiles of demand by hour throughout an average week. Table 9.3 provides a summary of the average annual change in highway speeds assumed within our demand forecasting model, representing all trips between California and Las Vegas:

Table 9.3: Demand forecasting model assumed changes in highway speeds

SDG model time period	Total difference 2015-2040[96]	Average annual difference
Peak	-7.7%	-0.32%
Off-peak	-6.5%	-0.27%

Source: SCAG and SDG analysis

For the I-15 section between Victorville and Las Vegas only, we have assumed that peak journey times increase at half the annual rate shown in Table 9.3, reflecting the fact that a portion of traffic on the highway is anticipated to be captured by HSR (see section "10.12 Highway traffic displacement" for further details).

We use the SCAG model results directly up to 2040. Between 2040 and 2050 we conservatively assume the rate of decrease in speeds is half that between 2012 and 2040.

9.3 Journey times by air and HSR

Journey times by air from each California airport are provided in Table 3.4 and Table 3.5

Assumed journey times by HSR are provided in Table 4.2.

In addition to the main mode journey time, additional time is added for both travel by air and HSR to account for:

- The time between arriving at the departure airport/station and the chosen mode departing; and

[96] Noting that our model base year is 2015, not 2012.

- The time between the chosen mode arriving at the destination airport/station and a person leaving the airport/station complex.

For air this additional time is based upon our 2016 behavioral survey results and is based on the time that respondents reported arriving at the airport prior to the planned departure time. These times are provided in Table 9.4.

Table 9.4: Time between arrival and the plane departing by airport

Airport	Average time between arriving and plane departing (mins)
McCarran International	64
Los Angeles International	64
San Diego International	67
Burbank – Glendale – Pasadena	61
John Wayne	58
Ontario	60
Long Beach	67
Fresno Yosemite International	59
Oakland International	66
San Francisco International	66
San Jose International	61
Sacramento International	75

Source: SDG behavioral survey

On average respondents reported arriving just over an hour before departure across all airports.

We assume the time between arrival and departing the airport complex is half of the time stated above for each airport (so on average approximately 30 minutes).

For HSR we assume the following times:

- 15 minutes between entering the station complex and arriving at the platform ready to depart (for an individual's origin station);
- Wait time of between 6 and 15 minutes for the next HSR departure, based on half the headway assumed for HSR; and
- 15 minutes between arriving at the platform and exiting the station complex (for an individual's destination station).

In total this results in additional assumed time of between 36 and 45 minutes.

9.4 Auto fuel cost

9.4.1 Base year

In the demand forecasting model base year of 2015, fuel prices are assumed to be $3.22 per gallon – the average gas price reported by the Energy Information Administration (EIA) for California.

Average fleet fuel efficiency is assumed to be 21.7 miles per gallon – the "combined on-the-road" estimate for all cars and light trucks as reported by the EIA.

This results in an overall fuel cost of $0.15 per mile.

9.4.2 Future years

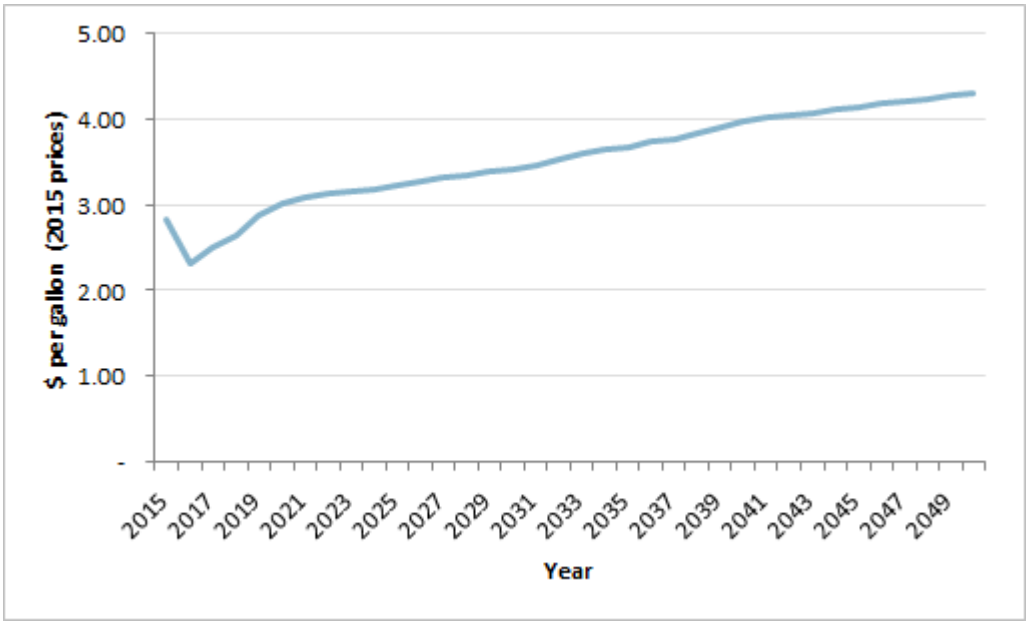
The EIA publishes a long-term energy outlook annually. The latest long-term energy outlook was published in July 2016 and provides forecasts up to 2040.

Our assumptions regarding future gas prices are based on the reference case forecasts from this publication:

- The EIA long term forecasts are used between up until 2040; and
- Growth between 2040 and 2050 is assumed to be at half the average rate between 2030 and 2040 (based on judgment).

Figure 9.2 shows the output gas price forecast on this basis:

Figure 9.2: Assumed future gas price

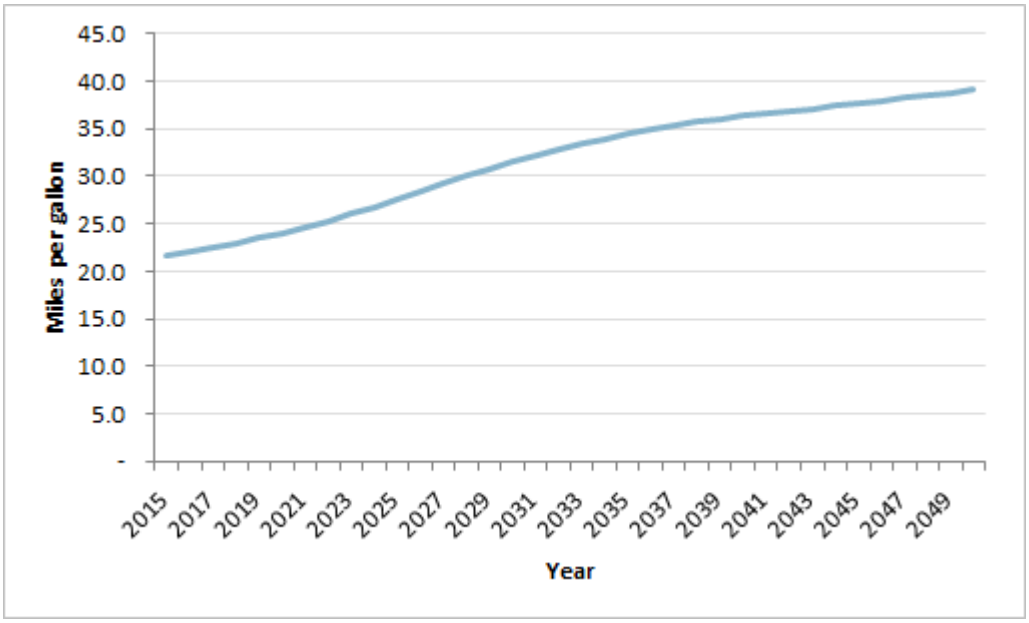


Source: EIA and SDG analysis

Future fleet fuel efficiency between 2015 and 2040 is also taken directly from the EIA long-term energy outlook forecasts. Between 2040 and 2050 growth in fuel efficiency is assumed to be at half the average rate between 2030 and 2040.

Figure 9.3 shows the fuel efficiency assumed on this basis over the forecasting period:

Figure 9.3: Assumed future fleet fuel efficiency



Source: EIA and SDG analysis

Overall, this results in the following average annual changes in the cost of driving between the demand forecasting model forecast years:

- -1.1% p.a. between 2015 and 2022;
- -1.9% p.a. between 2022 and 2030;
- -0.1% p.a. between 2030 and 2040; and
- -0.1% p.a. between 2040 and 2050.

9.5 Other mileage-related auto operating costs

We have included the cost of maintenance, tires and a proportion of depreciation costs in the forecasting model based on the values reported by the American Automobile Association (AAA), as shown in Table 9.5.

Table 9.5: Components of auto operating costs

Cost element	$ per mile
Maintenance	0.05
Tires	0.01
Mileage based depreciation	0.05
Total	**0.11**

Source: AAA

These costs are assumed to remain constant in real terms in all future years.

9.6 Air fares

Average air fares by airport have been based on those reported within the Airline Origin and Destination Survey (DB1B) as shown in Figure 3.10.

These have been varied by journey purpose (business/convention and leisure) based on the fares reported within the Steer Davies Gleave 2016 behavioral survey. On this basis, average fares for business/convention travelers are assumed to be approximately 10% higher than those for leisure travelers.

Future growth in air fares has been developed as follows:

- The proportion of air fares attributable to fuel costs – assumed to be 1/3rd of the total cost – will vary through time in line with our fuel price forecast (as outlined above);
- The remaining elements of the air fare are assumed to remain constant in real terms.

Experience in Europe following the introduction of high speed rail suggests that airlines do not seek to compete aggressively on price for flows where there is direct competition between rail and air. For the most part flight frequencies are reduced, retaining a limited service which caters primarily for feeder traffic transferring to longer distance flights.

9.7 HSR fares with yield management

HSR fares will be set according to market demand using yield management to optimize net revenues. Yield management is designed to maximize revenue at times when demand exceeds capacity, by giving priority to customers who contribute the greatest net revenue, and persuading more price sensitive customers to travel at other times.

Yield management techniques were originally developed in the airline industry and have subsequently been applied to hotel, car rental and other service industries where capacity is limited and perishable, and fixed costs are high. In the intercity rail market, Amtrak uses a yield management system for services in the Northeast Corridor. In Europe yield management is widely applied to HSR services in the UK, France, Germany, Italy and Spain.

The effective application of yield management requires detailed knowledge of the characteristics of the market and significant but predictable variation in the distribution of demand. The combination of yield management with a detailed customer database can make a substantial contribution. There is already comprehensive data on traffic flows on the I-15, by day and hour of the day, which will provide a valuable starting point for any yield management system. In addition, once services start, there will be accurate loading data on every single departure through the ticketing/ reservation system, which can be combined with data on traveler characteristics provided during the booking process. These data can also be used to create a customer database for marketing offers, leveraging the propensity of Californians to make frequent repeat visits to Las Vegas.

In the airline industry the revenue uplift through application of yield management has been estimated at between 4% and 6%[97].

In the intercity rail sector, the principal suppliers of yield management systems advise that an automated yield management system can bring revenue improvements of between 2% and 5%, depending on the sophistication of the revenue tools and techniques that are deployed. To maximize the benefit it is essential that the pricing points are set at an appropriate level. Once this is achieved, dynamic, real time price optimization strategies can be overlaid to generate an additional 1-3% revenue gain, although this uplift typically takes a number of years to deliver. We have assumed benefits of the order of 6% from application of these techniques, with the time to build up necessary experience reflected in the revenue ramp-up assumptions. Further details of the principles and potential application of yield management to this project can be found in Appendix G.

HSR services compete directly with airlines for at least part of their market, so the benefit of a yield management strategy also depends to an extent on the response of competing airlines. Experience in Europe suggests that, for HSR journey times of less than three hours, application of yield management by the HSR operator has potential to capture the vast majority of the pre-existing air market: HSR becomes the price setter in these markets.

Given the specific characteristics of the Las Vegas visitor market there may be potential upside for HSR revenues. The experience of the casino industry in applying yield management has generated substantially higher benefits. In the case of Harrah's the introduction of the system in conjunction with database marketing was reported to have increased revenue per room across the hotel chain by 15%[98]. The gambling industry requires different pricing and customer-segmentation approaches which reflect the significant differences in customers' willingness to-pay in comparison with other industries, with the highest paying customers willing to pay 20-50 times more than the lowest paying customers[99]. By contrast the difference between the highest and lowest fares which airline coach class passengers are willing to pay is typically only 3-5 times.

Experience in the European intercity rail sector, indicates the ratio between the full walk-up fare and advance purchase average yield for coach passengers in the range 4.0-5.6 times, rising to 6.4-7.7 times for first class.

The focus groups undertaken as part of this study suggested a similar spread in the maximum fares which potential users were willing to pay. Just 3% were willing to pay under $80 in coach, with 73% between $80 and $230 for a round trip, and 24% more than $230. For premium class 47% were willing to pay more than $230, and 8% more than $430. There wasn't a material difference between the price that was expected and the price they indicated they would be willing

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[97] University of Texas: www.utdallas.edu/~metin/FuJen/Folios/scpricing_s.pdf

[98] Underwood, R. 2003. In the hot seat—Who: Gary Loveman. Fast Company 67 (February)

[99] Richard Metters, Carrie Queenan, Mark Ferguson, Laura Harrison, Jon Higbie, Stan Ward, Bruce Barfield, Tammy Farley, H. Ahmet Kuyumcu, Amar Duggasani, (2008) The "Killer Application" of Revenue Management: Harrah's Cherokee Casino & Hotel. Interfaces 38(3):161-175

to pay. Around 90% of the potential users would therefore be willing to pay fares between $80 and $430, a range of 5.4 times.

There may be additional scope to enhance HSR revenues by establishing commercial relationships with the casino resort operators, interfacing with their customer loyalty programs and making bundled offers as part of a coordinated yield management strategy. The revenue benefits to the HSR operator from this marketing strategy will critically depend on the terms of any commercial agreement; i.e. how the share of revenue uplift is allocated between the parties.

Table 9.6 provides a summary of the average HSR fare yields assumed for each station. These fares represent the revenue-optimizing[100] fares for travel from each station, assuming standard yield management.

Table 9.6: Average fare in 2015, 2015 prices

	Average round-trip fare in 2015
Victorville	$91
Palmdale	$100
Burbank	$110
Los Angeles	$110
Anaheim	$110
Bakersfield	$161
Kings/Tulare	$180
Fresno	$188
Merced	$202
Gilroy	$206
San Jose	$206
Millbrae	$206
San Francisco	$206

Source: SDG analysis

In addition to differentiating the fare by origin station, different fares may be charged according to:

- Time of travel: peak or off peak; and
- Group size: 1, 2, 3 persons or more.

We have also allowed a degree of fare differential by journey purpose. While this is not something which could be directly applied to passengers, the modeled fares reflect, to some degree, the different behaviors of each market which can be targeted. For example, choice of ticket class and degree of advanced booking will be influenced by travelers' trip purpose. Given the larger

[100] Revenue optimizing fares are the forecast level of fares which maximize fare-box revenues, taking into account both changes in demand and yield that arise from different fare levels.

proportion of business travelers currently flying between California and Las Vegas, rather than using auto, a higher average fare could apply to the market captured from air.

Across each of these different market segments, the maximum differential in fares assumed is $65. For example, someone traveling between Los Angeles and Las Vegas during an off-peak time period and in a party of three or more is assumed to pay $105, whereas someone making the same trip during a peak time and traveling alone is assumed to pay $165, $60 less which is within the maximum differential of $65.

In the context of the Las Vegas market environment, a commercially driven yield managed approach could potentially apply a wider range of fares, using carefully targeted customer offers.

9.8 Parking charges

Parking charges have been included in the demand forecasting model at airports, HSR stations and at selected properties in Las Vegas who have recently started charging for guest parking. The parking costs assumed at airports, at stations on the California High-Speed Rail system and in Las Vegas have been based on an assessment of typical market rates in the local areas at the time of this study.

Table 9.7 provides assumed parking rates at airports throughout California:

Table 9.7: Average daily parking charges at California airports

Airport	Average daily parking cost
McCarran International	$10
Los Angeles International	$12
San Diego International	$13
Burbank – Glendale – Pasadena	$10
John Wayne	$18
Ontario	$9
Long Beach	$19
Fresno Yosemite International	$8
Oakland International	$10
San Francisco International	$18
San Jose International	$10
Sacramento International	$12

Source: Typical prices from www.bestparking.com for May 2016

Table 9.8 provides assumed parking rates at HSR stations[101]:

Table 9.8: Average daily parking charges at HSR stations

	Average daily parking cost
Desert stations (Victorville; Palmdale) & Las Vegas	$0
Key urban center stations (Los Angeles; San Francisco)	$20
Wider LA area stations (Burbank; Anaheim)	$10
Southern/Central Valley stations (Bakersfield; Kings/Tulare; Fresno)	$5
Northern California stations (Merced; Gilroy; San Jose; Millbrae)	$10

Source: SDG modeling assumption

Parking charges are assumed to apply only to Las Vegas properties which currently charge for parking (those owned by MGM). The cost of parking per day is assumed to be $10, although a proportion of guests are exempt due to their loyalty card status.

All parking charges are assumed to remain constant in real terms in future years. In addition, they are only applied to the proportion of people who park – people being dropped off, traveling by taxi, resort shuttle or public transit are not assumed to pay anything for parking.

9.9 HSR service offer

The HSR service to Las Vegas has been modeled considering a phased roll-out of infrastructure in phases as described in section 10:

- 2021: Phase 0 - Las Vegas to Victorville;
- 2021: Phase 1 - Las Vegas to Victorville and Palmdale;
- 2026: Phase 2 - Including use of CaHSR infrastructure south to Burbank;
- 2029: Phase 3 - Including use of CaHSR infrastructure south to Los Angeles/Anaheim; and
- 2029: Phase 4 - connection with CaHSR services north from Palmdale serving stations as far as San Francisco.

Assumed journey times between each station within these Phases are provided in Table 4.2.

9.10 Ramp-up

We estimated rates of “ramp-up” of HSR ridership and revenue to its full potential in the early years of operation for each phase of infrastructure development. Ramp-up reflects the period when not all potential travelers are aware of, or choose to try, a new product. Our assumptions, based on experience of other HSR services, are shown in Table 9.9.

[101] The parking costs provided for stations on the California High-Speed Rail system are different from the assumptions in the Authority’s ridership studies.

Table 9.9: Assumed demand ramp-up rates

	Infrastructure Phase 0, 1 and 4 for NorCal connection	Infrastructure Phases 2 and 3
First year of operation	50%	75%
Second year of operation	75%	95%
Third year of operation	95%	100%
Thereafter	100%	100%

Source: Steer Davies Gleave

For the opening of the initial line to Victorville and Palmdale, and also the connection north with CaHSR, we assume a ramp-up over three years. For the incremental additions of the line to Burbank and then to Anaheim, we assume a slightly faster ramp-up over two years reflecting the fact that many of these passengers will simply be switching access station as opposed to trying HSR for the first time.

HSR services are most commonly introduced as an upgrade to existing rail. New HSR services, where none previously existed are rare, although one example is the opening on November 14, 1994 of Eurostar[102] services through the Channel Tunnel between London and Paris and Brussels. The only previous "rail" service involved two trains linked by a ferry. We provide below the estimated ramp-up rate observed on Eurostar:

- First year of operation: 40-55%;
- Second year of operation: 70-90%;
- Third year of operation: 85-100%; and
- Thereafter: 100%.

Estimating ramp-up can be subject to significant uncertainty. In the case of Eurostar, this estimate is complicated by a number of factors:

- Identifying the size of the existing market from which Eurostar captured passengers. This is often taken to be previous air travel market only;
- The simultaneous opening of Eurotunnel's car shuttle services, which provided a new and faster but expensive option of travel with a car (rather than traditional ferries);
- In November 1996, a fire in the Channel Tunnel leading to closure for several months; and
- Progressive cutbacks to air services, as Eurostar captured 60-70% of the air market.

Where HSR is introduced on an existing rail served route, the period of ramp-up can be considerably accelerated, as has been observed in Spain with 80% of final demand realized in Year 1 and 95% by Year 2. This is the basis for the Phase 2 and 3 assumptions, when the service enhancements build on the established HSR operations from Palmdale and Victorville to Las Vegas.

[102] http://www.eurostar.com.

9.11 Busy period premium

Our assumed HSR frequencies are based upon the operating assumptions of XpressWest and CaHSR. XpressWest has based capacity provision on the two busiest summer months of July and August. Higher demand peaks exist around holiday periods, particularly on Independence Day and Thanksgiving. During these periods, resorts achieve significantly higher than average daily room rates, and airlines sell fares at a premium. Our ridership and revenue forecasts assume HSR fares will also rise during these busy periods, whilst maintaining ridership within capacity, and will result in additional revenue. This results in an overall uplift in revenue of approximately 1%.

9.12 Induced demand

As part of our 2016 behavioral research, respondents were asked whether they would make more trips as a result of HSR being available as a travel option. We used this as a basis for calculation of potential induced demand. An induced trip is a trip which is not currently being made today (by any existing mode), but which is forecast to be made in future as a result of the HSR infrastructure being in place.

Table 9.10 displays the percentage of respondents who claimed they would "definitely make more trips" as a result of HSR opening and those who claimed they would "probably make more trips" as a result of HSR opening. In each case we also show the average number of additional trips respondents claimed they would make each year.

Table 9.10: Additional trips claimed to be made as a result of HSR opening

	% who would "definitely make more trips"	Number of additional trips each year	% who would "probably make more trips"	Number of additional trips each year
Southern California	21%	3.2	34%	2.0
Northern California	20%	2.8	35%	1.7
Las Vegas	23%	3.9	30%	2.5

Source: SDG behavioral survey

The survey responses indicate a high propensity to make additional trips as a result of the introduction of the HSR service. However, since no specific fare was shown to respondents as they were making these statements and since we assume revenue optimizing fares within our Base Case, which tend to be higher than the fare people indicated they would want to pay, we have assumed lower levels of induced demand within our forecasts:

- For those who said they would "definitely make more trips", we have assumed they would make half the number of trips stated in Table 9.10 at the full average fare rate included within the demand forecasting model;
- For those who said they would "probably make more trips", we have assumed they would make one quarter of the trips stated in Table 9.10 at a discounted fare of half the average fare included within the forecasting model.

The values above relate to the full infrastructure being in place. Accordingly, we have reduced the forecast level of induced demand during the operation of infrastructure Phases 1 through 3 proportionally according to the forecast level of capture in each Phase.

Overall, this results in the following assumed level of induced ridership and revenue:

- Additional trips by Southern California residents:
  - Primary Phase 1: 10% increase in trips; 8% increase in revenue
  - Primary Phase 2: 13% increase in trips; 10% increase in revenue
  - Primary Phases 3&4: 16% increase in trips; 13% increase in revenue
- Additional trips by Las Vegas residents:
  - Primary Phase 1: 2% increase in trips; 2% increase in revenue
  - Primary Phase 2: 8% increase in trips; 7% increase in revenue
  - Primary Phases 3&4: 13% increase in trips; 11% increase in revenue
- Additional trips by Northern California residents:
  - Primary Phases 1-3: 0%
  - Primary Phase 4: 12% increase in trips; 10% increase in revenue
- Other US and international residents: 0%

10 Base Case ridership and revenue forecasts

This section presents our Base Case ridership and revenue forecasts. Our Base Case is considered to be the 'most likely' outcome and is based on the forecasting assumptions described in section 9. All ridership figures refer to round-trips and all monetary values are in 2015 prices unless otherwise stated.

10.1 Summary

The Base Case assumes a high-speed ride between Las Vegas and Anaheim with a timed connection at Palmdale for CaHSR Phase 1 services to/from Central Valley / Northern California by 2029.

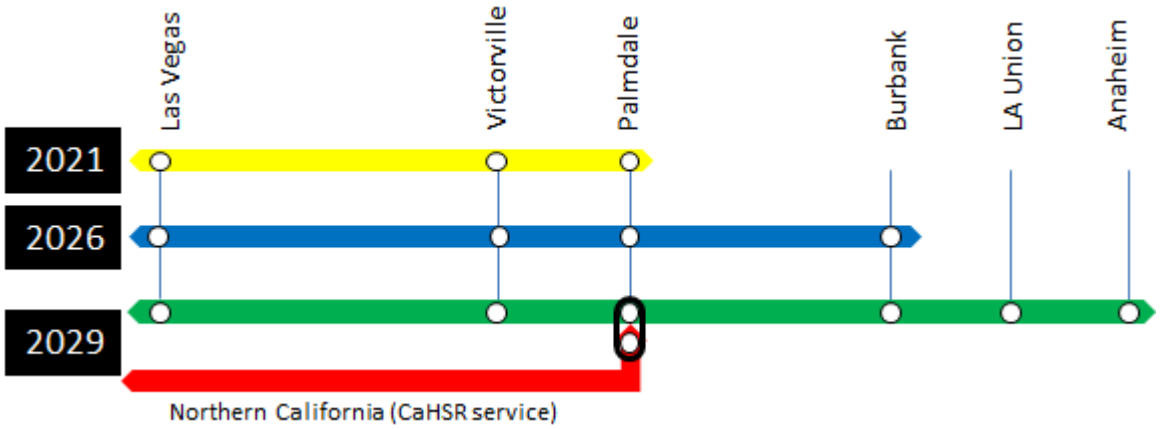
The project is assumed to be developed in stages. The timing of each stage of infrastructure has been estimated based upon the latest CaHSR business plan[103], XpressWest operational assumptions and agreed assumptions with the HDC JPA and wider stakeholders:

- 2021: Phase 0: Las Vegas-Victorville (base line position);
- 2021: Phase 1: Las Vegas-Palmdale;
- 2026: Phase 2: Las Vegas-Burbank;
- 2029: Phase 3: Las Vegas-Anaheim; and
- 2029: Phase 4: CaHSR to Central Valley / Northern California.

This assumed timing is set out in Figure 10.1.

[103] http://www.hsr.ca.gov/docs/about/business_plans/2016_BusinessPlan.pdf.

Figure 10.1: Assumed roll-out of HSR infrastructure



Source: Steer Davies Gleave

Table 10.1 provides a summary of the Base Case ridership forecasts. Figure 10.2 then provides forecasts for all years, including highlighting the impact of each element of HSR infrastructure.

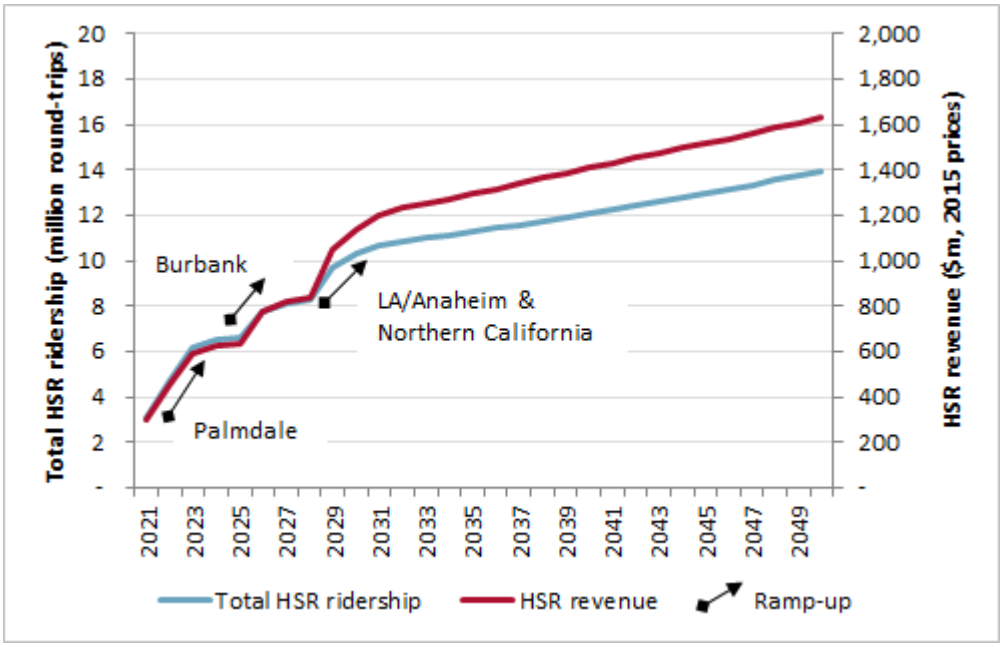
Table 10.1: Summary of Base Case annual ridership forecasts (including ramp-up)

Forecast element	2021	2024	2026	2029	2035	2040	2050
Operational Phases	Phases 0-1	Phases 0-1	Phases 0-2	Phases 0-4	Phases 0-4	Phases 0-4	Phases 0-4
In-scope market (million round-trips)	27.5	29.0	29.9	34.5	37.9	40.8	47.0
HSR capture rate (%)	11%	21%	24%	25%	27%	27%	27%
Captured HSR ridership (million round-trips)	2.9	6.1	7.1	8.8	10.2	10.8	12.6
Induced HSR ridership (million round-trips)	0.2	0.4	0.6	1.0	1.1	1.2	1.4
Total HSR ridership (million round-trips)	3.1	6.5	7.8	9.7	11.3	12.1	14.0
Average HSR round-trip fare ($, 2015 prices)	96	96	100	108	115	117	117
HSR revenue ($m, 2015 prices)	300	626	781	1,049	1,297	1,412	1,632
Net ramp-up assumed (%)[104]	50%	100%	96%	93%	100%	100%	100%

Source: Steer Davies Gleave

[104] The net ramp-up assumed shows the impact on total HSR ridership of the ramp-up assumptions in each year. Unless otherwise stated, all forecasts are shown including ramp-up. As an example, forecast ridership in 2026 is 7.8 million and net assumed ramp-up is 96%. Accordingly if all ramp-up assumptions were removed, forecast ridership would be 7.8 / 96% = 8.2 million.

Figure 10.2: Build-up of ridership and revenue including assumed roll-out of HSR infrastructure



Source: Steer Davies Gleave

The initial phase of the HSR line between Las Vegas, Victorville and Palmdale is assumed to open in 2021. In the first year of operation, 11% of the in-scope market is forecast to be captured at an average round-trip fare of $96. With the addition of induced trips, this results in forecast annual ridership of just over 3 million round-trips and forecast annual revenue of just over $300m.

The level of captured demand increases significantly over the first few years as a result of our ramp-up assumptions which impact forecasts from 2021 through 2023. By 2024, 21% of the in-scope market is forecast to be captured, resulting in forecast annual ridership of approximately 6.5 million round-trips and annual revenue of approximately $630m.

The second phase of the line to Burbank is forecast to open in 2026. In this year, 24% of the in-scope market is forecast to be captured at an average round-trip fare of $100. This results in forecast annual ridership of just less than 8 million round-trips and annual revenue of approximately $780m.

In 2029, the HSR line is assumed to be extended south to Los Angeles Union Station and Anaheim, and a connection with CaHSR services north of Palmdale is assumed to be available. Approximately 25% of the in-scope market is forecast to be captured at an average round-trip fare of $108. With the addition of induced trips, this results in forecast annual ridership of just less than 10 million round-trips and forecast annual revenue of approximately $1,050m.

Following additional ramp-up to 2031, the level of forecast capture is broadly maintained at around 27% throughout the remainder of the model forecast period up to 2050. By 2050 we forecast annual ridership of approximately 14.0 million round-trips and annual revenue of just over $1,630m.

Forecasts are provided separately for each infrastructure Phase within Section 11 of this report

10.2 The in-scope market

The "in-scope" market represents current demand for travel between Las Vegas and California from those who might consider traveling by HSR in future. Table 10.2 recaps the size of the estimated in-scope market for a number of key segments across each forecast horizon year.

Table 10.2: Summary of annual in-scope market by key segments

Million round-trips	2021	2024	2026	2029	2035	2040	2050
By originating market							
Southern California	17.2	17.9	18.3	19.0	20.5	21.8	24.3
Northern California	-	-	-	3.5	3.8	4.1	4.7
Las Vegas	4.7	5.2	5.5	6.8	7.8	8.8	10.8
Other	5.5	5.9	6.1	5.3	5.8	6.2	7.1
By current mode							
Auto	22.6	23.9	24.6	26.0	28.5	30.7	35.3
Air	3.1	3.3	3.4	6.6	7.2	7.8	9.0
Bus	1.8	1.9	1.9	2.0	2.2	2.3	2.7
Total	**27.5**	**29.0**	**29.9**	**34.5**	**37.9**	**40.8**	**47.0**

Source: Steer Davies Gleave

In the first year of operation of 2021 we forecast the size of the in-scope market to be 27.5 million round-trips, 63% of which are from Southern California residents. By 2050 we forecast the in-scope market to be 47.0 million annual round-trips.

In 2021, 82% of the in-scope market is forecast to currently travel by auto. By 2050, this reduces to 75% with the air market increasing accordingly. This shift is due to the inclusion of Northern California as in-scope from 2029 where the air market share is greater, as opposed to a forecast shift in the mode choice of people from Southern California. The Northern California market is only considered as in-scope following the opening of the connection with CaHSR north from Palmdale in 2029.

"Other" includes residents of US States excluding California and Nevada, international visitors as well as local trips being made to/from Victorville (so not continuing to Las Vegas). In addition, prior to 2029 it includes residents of Northern California who drive to Las Vegas via the I-15. Upon opening of the connection with the CaHSR north from Palmdale, we include residents of Northern California as a separate category, including those who travel by air, and accordingly reclassify those driving via the I-15 as being part of the Northern California in-scope market. For this reason, the "Other" market appears to decrease between 2026 and 2029, but in reality a portion has simply shifted to be allocated as Northern California.

Full details of the in-scope market by year are provided in Appendix F.

10.3 Ridership captured and induced

Base Case market share and ridership forecasts by trip origins are summarized in Table 10.3 and Table 10.4.

Table 10.3: Base Case market share by origin

%	2021	2024	2026	2029	2035	2040	2050
Market share (excluding induced travel)							
Southern California	14%	27%	30%	30%	30%	30%	30%
Northern California	-	-	-	9%	17%	17%	17%
Las Vegas	7%	14%	19%	26%	29%	28%	29%
Other	4%	9%	11%	17%	20%	20%	20%
Total	**11%**	**21%**	**24%**	**25%**	**27%**	**27%**	**27%**

Source: Steer Davies Gleave

Table 10.4: Base Case annual ridership by origin

Million round-trips	2021	2024	2026	2029	2035	2040	2050
Ridership (including induced travel)							
Southern California	2.6	5.3	6.0	6.5	6.9	7.3	8.2
Northern California	-	-	-	0.3	0.7	0.8	0.9
Las Vegas	0.3	0.7	1.1	2.0	2.5	2.8	3.5
Other	0.2	0.5	0.6	0.9	1.1	1.2	1.4
Total	**3.1**	**6.5**	**7.8**	**9.7**	**11.3**	**12.1**	**14.0**

Source: Steer Davies Gleave

In 2021, the first year of operation, we forecast HSR ridership of 3.1 million round-trips with 81% of trips originating in Southern California.

By 2050, we forecast 14.0 million riders for the HSR line with 8.2 million trips (59%) forecast to be made by residents of Southern California, 0.9 million trips (6%) from residents of Northern California, 3.5 million (25%) from residents of Las Vegas with the remaining 1.4 million (10%) from residents of other areas in the US or internationally as well as from local trips.

The growth in forecasts market share between 2024 and 2050 is significiantly higher in the Las Vegas market than the Southern California market. The principle reason for this is onward travel; in 2024 the line is assumed to be open to Victorville and Palmdale only. In this case, a large number of Las Vegas residents would need to rent a car in order to reach their final destinations, or make other onward travel arrangements. The proportion needing to do so once the full infrastructure is in place is significantly less, hence the uplift between the scenarios is significantly greater. Note that similar onward travel arrangements are not such a significant issue for passengers going to Las Vegas since the geographical spread of destinations is much more focused (in particular along the Strip).

If the effects of ramp-up are excluded, the underlying growth in ridership, including induced travel, is forecast to be:

- 5.2% per annum from 2021 to 2026 – 1.3% per annum from 2021 to 2025 and an increase of 22.4% in 2026 when the line to Burbank opens;
- 8.9% per annum from 2026 to 2029 – 1.2% per annum from 2026 to 2028 and an increase of 26.1% in 2029 when the line to Anaheim and north from Palmdale opens;
- 1.3% per annum from 2029 to 2035;
- 1.3% per annum from 2035 to 2040; and
- 1.5% per annum from 2040 to 2050.

Detailed results tables for every year from 2015 to 2050 are provided in Appendix F.

10.4 Ridership by mode

Table 10.5 and Table 10.6 provide details of the how the Base Case ridership is either:

- Captured from auto, air and bus; or
- Is induced by the HSR system.

Table 10.5: Base Case market share by existing mode

%	2021	2024	2026	2029	2035	2040	2050
Market share (excluding induced travel)							
Auto	10%	20%	22%	24%	24%	24%	24%
Air	21%	42%	50%	37%	44%	44%	44%
Bus	2%	4%	4%	4%	4%	4%	4%
Total	**11%**	**21%**	**24%**	**25%**	**27%**	**27%**	**27%**

Source: Steer Davies Gleave

Table 10.6: Base Case annual ridership by existing mode

Million round-trips	2021	2024	2026	2029	2035	2040	2050
Ridership (including induced travel)							
Auto	2.3	4.7	5.4	6.2	6.9	7.3	8.5
Air	0.6	1.4	1.7	2.4	3.2	3.4	4.0
Bus	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Induced	0.2	0.4	0.6	1.0	1.1	1.2	1.4
Total	**3.1**	**6.5**	**7.8**	**9.7**	**11.3**	**12.1**	**14.0**

Source: Steer Davies Gleave

The highest forecast capture rate is from air at 21% in opening year, rising to 44% by 2035 once all future infrastructure elements are forecast to be in place.

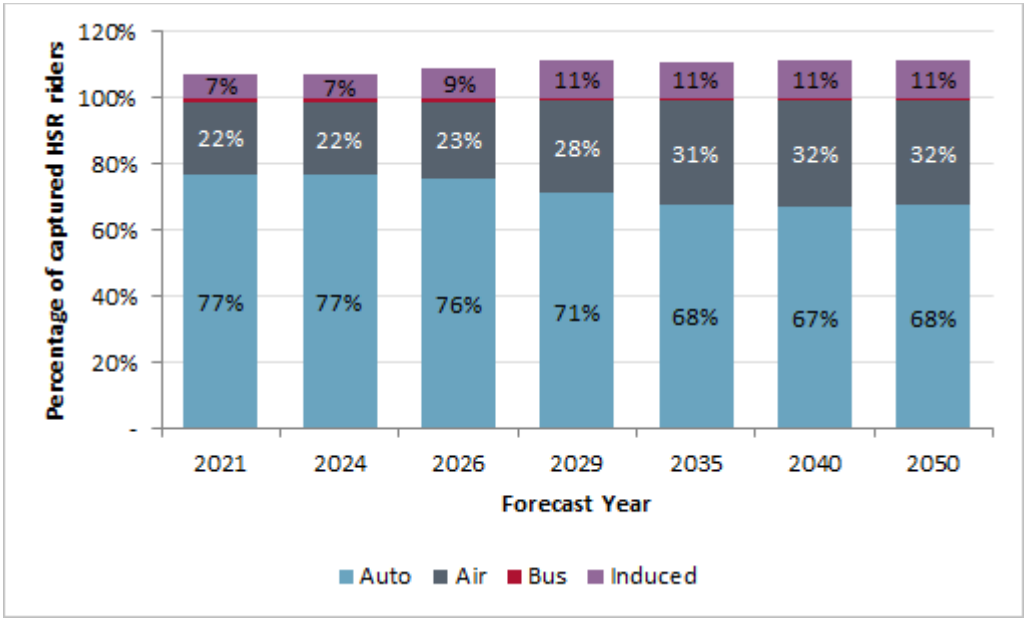
The capture rate from auto is lower, at 10% initially rising to 24% by 2035. The lowest capture is forecast from the bus market at just 4%. This is because the mode choice of those currently

traveling by bus is considered to be determined largely by cost. Given the assumed HSR fare is significantly higher than available bus fares we only forecast very low capture from this market.

As shown in Figure 10.3, we forecast throughout the forecasting period that the existing modes of HSR passengers will be approximately:

- 77% captured from auto in 2021, declining to 68% by 2050;
- 22% captured from air in 2021, increasing to 32% by 2050;
- 1% captured from bus in all years; and
- An additional 7% induced by the HSR service in 2021, increasing to 11% by 2050.

Figure 10.3: HSR ridership by current mode of travel[105]



Source: Steer Davies Gleave

The forecast shift in capture between auto and air is consistent with the forecast reduction in the in-scope auto market as a percentage of the entire in-scope market. In both cases this shift is due to the inclusion of Northern California as in-scope from 2029, where the air market share is greater, as opposed to a forecast shift in the mode choice of people from Southern California.

Appendix F includes more detailed forecasts and a summary of all forecasts for each year between 2015 and 2050.

10.5 Ridership by group size

Table 10.7 shows the predicted revenue-optimized fare and average market shares by group size for 2035.

[105] Bus accounts for 1% of forecast ridership in all years – the values are omitted from the chart to avoid overlapping text.

Table 10.7: Base Case fares and capture rates in 2035

	1 person	2 people	3+ people
Average fare per traveler ($)	125	113	111
Average market share (%)	31%	27%	24%

Source: Steer Davies Gleave

Party size directly affects the cost per traveler of travel by auto; therefore we forecast the highest capture rates for those traveling alone. However, by offering reduced fares for groups of three or more people, it will be possible to retain a higher capture rate for larger parties, but at a lower average fare.

10.6 Ridership by geography

Figure 10.4 recaps the counties/geographic regions of Southern California, Northern California and Clark County, Nevada, used in our demand forecasting model.

Figure 10.4: Southern California, Northern California and Las Vegas

Source: Steer Davies Gleave

Table 10.8 displays the predicted HSR capture of travel from each county/geographic region.

Table 10.8: Base Case market share by county/geographic region of origin

%	2021	2024	2026	2029	2035	2040	2050
Southern California							
Inland Empire[106]	11%	21%	21%	22%	22%	22%	22%
LA area[107]	13%	25%	29%	32%	32%	32%	32%
San Diego area[108]	13%	26%	26%	27%	26%	26%	26%
Northern California							
Southern Valley	-	-	-	17%	34%	34%	34%
Central Valley/Coast[109]	-	-	-	13%	26%	26%	27%
Bay Area	-	-	-	7%	14%	14%	14%
Eastern/Northern counties[110]	-	-	-	6%	11%	11%	11%
Nevada							
Clark County	6%	12%	16%	24%	27%	27%	27%
Total	**11%**	**21%**	**24%**	**25%**	**27%**	**27%**	**27%**

Source: Steer Davies Gleave

HSR is forecast to be most competitive in the Los Angeles area, in particular from 2029 onwards once the full line to Anaheim is expected to be open. It is also forecast to be competitive in the Southern and Central Valley, despite the need to transfer trains in Palmdale.

HSR is forecast to be least competitive initially in Las Vegas, Clark County, primarily because of the need for travelers originating in Las Vegas to arrange onward transportation from the Victorville or Palmdale stations into Southern California. Once the full line is assumed to be open however, the service is forecast to become much more attractive to Las Vegas residents.

Accordingly, from 2029 onwards, the HSR service is forecast to be least competitive in the Bay area and Eastern/Northern counties of Northern California. This is due to a combination of higher fares from Northern California, longer journey times and a strong competitive position offered by air.

[106] Includes San Bernardino and Riverside.

[107] Includes Los Angeles, Orange, Santa Barbara and Ventura.

[108] Includes San Diego and Imperial.

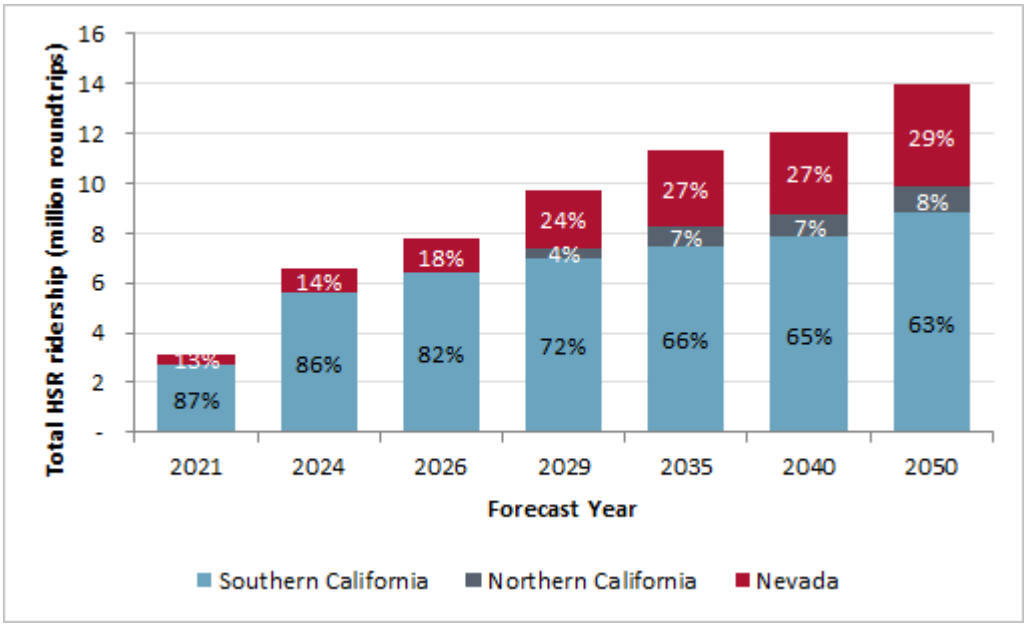
[109] Includes Central Valley and Central Coast.

[110] Includes Eastern CA, Sacramento and Far North.

The following figures show the ridership composition of HSR by geography:

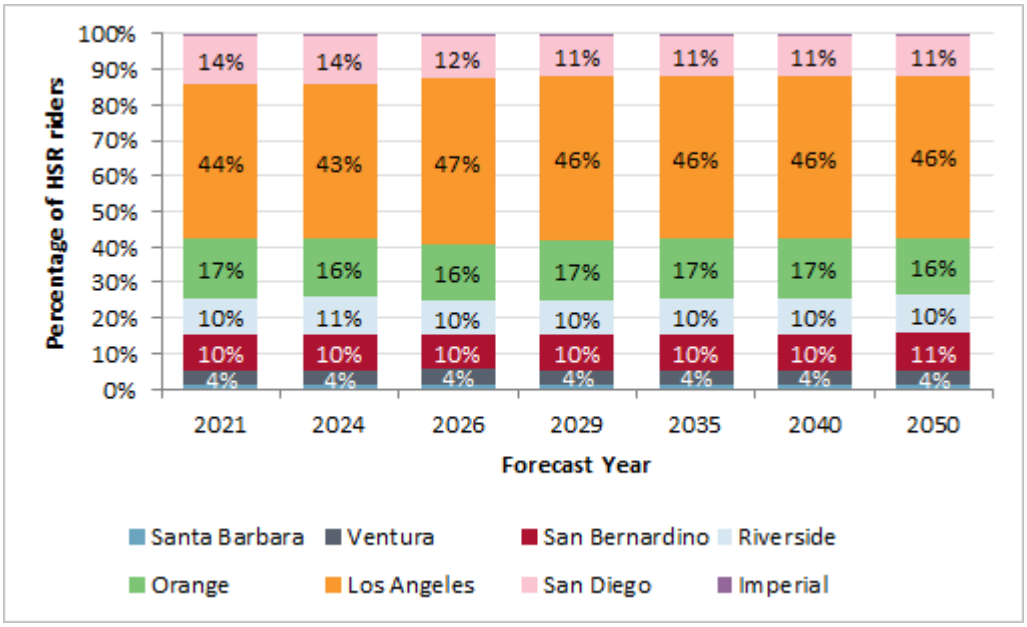
- Figure 10.5 shows ridership split by the three core geographic areas: Southern California, Northern California and Nevada, indexed such that opening year demand is equal to 100;
- Figure 10.6 shows ridership split by geography within Southern California; and
- Figure 10.7 shows ridership split by geography within Northern California.

Figure 10.5: HSR ridership by core geographic areas



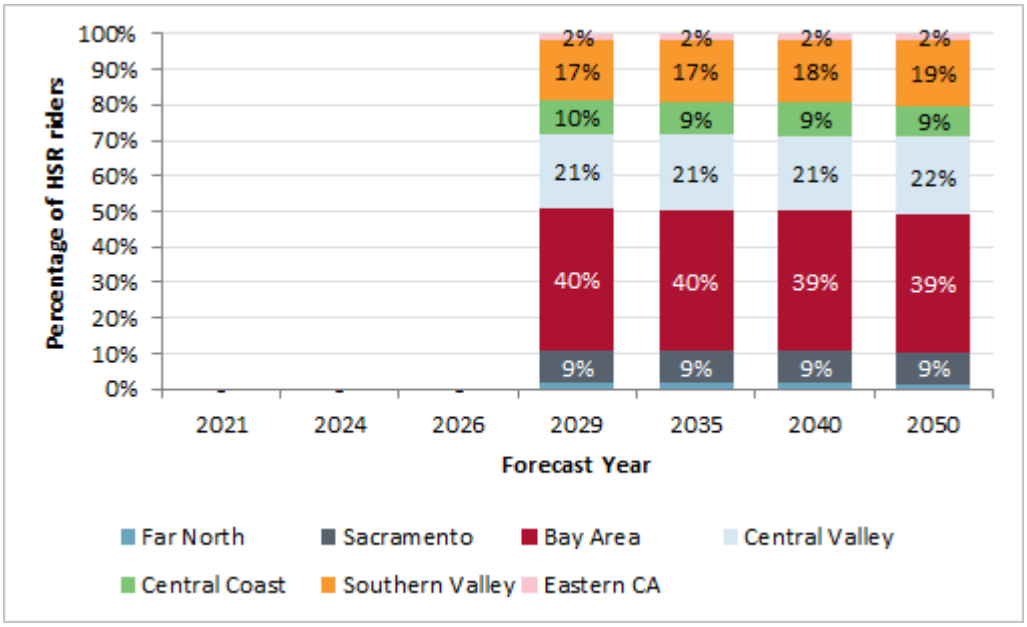
Source: Steer Davies Gleave

Figure 10.6: HSR ridership by geography within Southern California[111]



Source: Steer Davies Gleave

Figure 10.7: HSR ridership by geography within Northern California[112]



[111] Both Santa Barbara and Imperial account for approximately 1% of forecast ridership in all years – the values are omitted from the chart to avoid overlapping text.

[112] Far North accounts for approximately 1% of forecast ridership in all years – the values are omitted from the chart to avoid overlapping text.

Source: Steer Davies Gleave

In each year, the majority of ridership is forecast to come from Southern California, although this proportion decreases over time as CaHSR comes online making trips via HSR more attractive from Northern California and Clark County.

Within Southern California, almost half the forecast ridership originates in Los Angeles County, which reflects the size of the overall population living in Los Angeles relative to other locations. Despite forecast population growth in Los Angeles being slower than in other parts of California, the proportion of riders from LA remains high as the HSR offer becomes more attractive to LA residents with the additional of each part of the infrastructure.

Within Northern Calfiornia, the Central and Southern Valley are the areas where HSR is forecast to be most competitive and together account for just less than 40% of the forecast riders. Despite the lower level of attractiveness, the Bay Area also accounts for approximately 40% of the riders from Northern California, reflecting the overall population size relative to other locations.

10.7 Revenue

We assume yield management techniques will be used on the HSR service and that different average fares may be charged according to:

- Originating station;
- Time of travel: peak or off peak; and
- Group size: 1, 2, 3 or more.

We have also allowed a degree of fare differential by journey purpose. While this is not something which could be directly applied, the modeled fares reflect, to some degree, the different behaviors of each market which can be targeted. For example, choice of ticket class and degree of advanced booking will be influenced by travelers' trip purpose. Given the larger proportion of business travelers currently flying between California and Las Vegas, rather than using auto, in theory a higher average fare could be charged to those captured from air.

We calculated revenue-optimizing fares for each year, and these rise slowly over time as the assumed relative competitive position of HSR changes. This process takes into account the effects of:

- Higher oil prices resulting in higher gas prices for auto users and fares for air users; and
- Higher levels of congestion on the I-15 and other highways and the impact this has on auto drive times.

Table 10.9 shows the Base Case forecast average fares and Table 10.10 shows the Base Case annual fare revenue forecasts. All revenues are based on the headline fare advertised to the customer expressed in 2015 dollars.

Table 10.9: Base Case average fares

2015 dollars	2021	2024	2026	2029	2035	2040	2050
Average HSR round-trip fare							
Southern California	97	97	103	107	110	112	112
Northern California	-	-	-	198	200	202	201
Las Vegas	82	82	87	94	101	103	103
Other	96	96	101	112	123	126	127
Total	**96**	**96**	**100**	**108**	**115**	**117**	**117**

Source: Steer Davies Gleave

Table 10.10: Base Case annual revenue

2015 dollars	2021	2024	2026	2029	2035	2040	2050
HSR revenue							
Southern California	249	515	616	698	763	818	912
Northern California	-	-	-	64	143	156	181
Las Vegas	28	60	100	186	253	286	358
Other	24	51	65	101	138	152	180
Total	**300**	**626**	**781**	**1,049**	**1,297**	**1,412**	**1,632**

Source: Steer Davies Gleave

In 2021, the first year of operation, we forecast average fares will be $96 per ticket, generating annual revenue of just over $300 million. Average fares are forecast to increase over time as the line is extended and a larger proportion of people travel greater distances on the HSR line. By 2050 we forecast average fares will be $117 and annual revenues of just over $1,630 million.

10.9 Fares mix

In Table 10.11 we show the forecast mix of round-trip fares paid in 2035, in 2015 dollars.

Table 10.11: Base Case fares mix

	2035
Percentage of trips (%)	
$80 or lower	3%
$80 to $100	28%
$100 to $120	42%
$120 to $140	11%
$140 to $160	5%
$160 to $180	4%
$180 to $200	2%
$200 to $220	3%
$220 or higher	2%
Fares (2015 dollars)	
Average	115
Minimum	75
Maximum	270

Source: Steer Davies Gleave

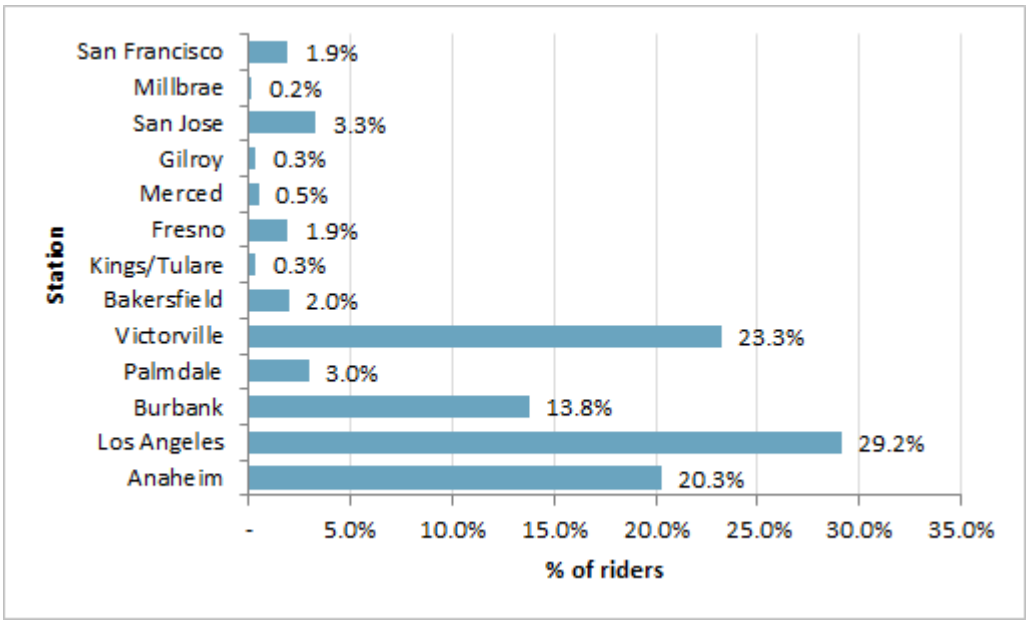
In 2035, we forecast an average yield of $115 per passenger with over 80% of all passengers paying between $80 and $140, in 2015 dollars.

We assume yield management will result in higher average fares paid by less price-sensitive travelers such as convention visitors and other business travelers who currently travel by air at peak times. The lowest fares are expected to be paid by passengers originating in Las Vegas and traveling during off peak periods.

10.11 Ridership by station

The following figure shows the forecast percentage of riders in 2035 forecast at each station in California.

Figure 10.8: Base Case riders by California station



Source: Steer Davies Gleave

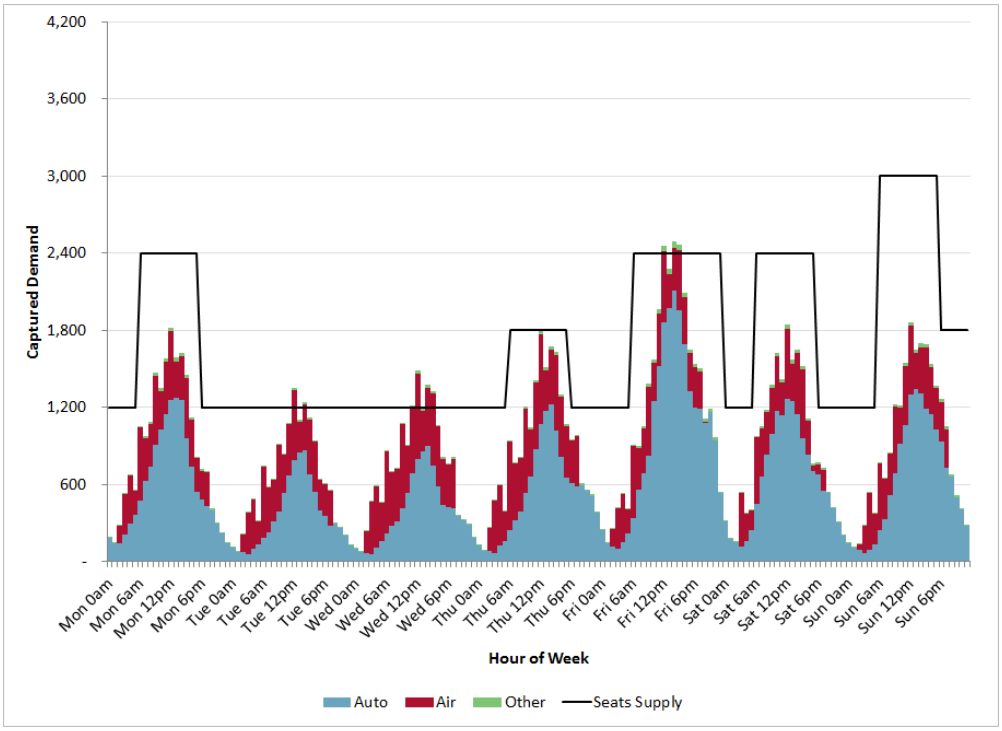
Almost one third of passengers are forecast to use the Los Angeles station. Within Southern California, Victorville is forecast to be the second most used station, followed by Anaheim, Burbank and then Palmdale. Stations in Southern California are forecast to be used by 90% of the total riders.

Anyone traveling to/from Northern California would be required to transfer trains at Palmdale. In the figure above these trips are assigned to the station they use in Northern California. If we include this transfer market using Palmdale station then the percentage for Palmdale would increase to 13%.

10.11.1 Base case train loadings

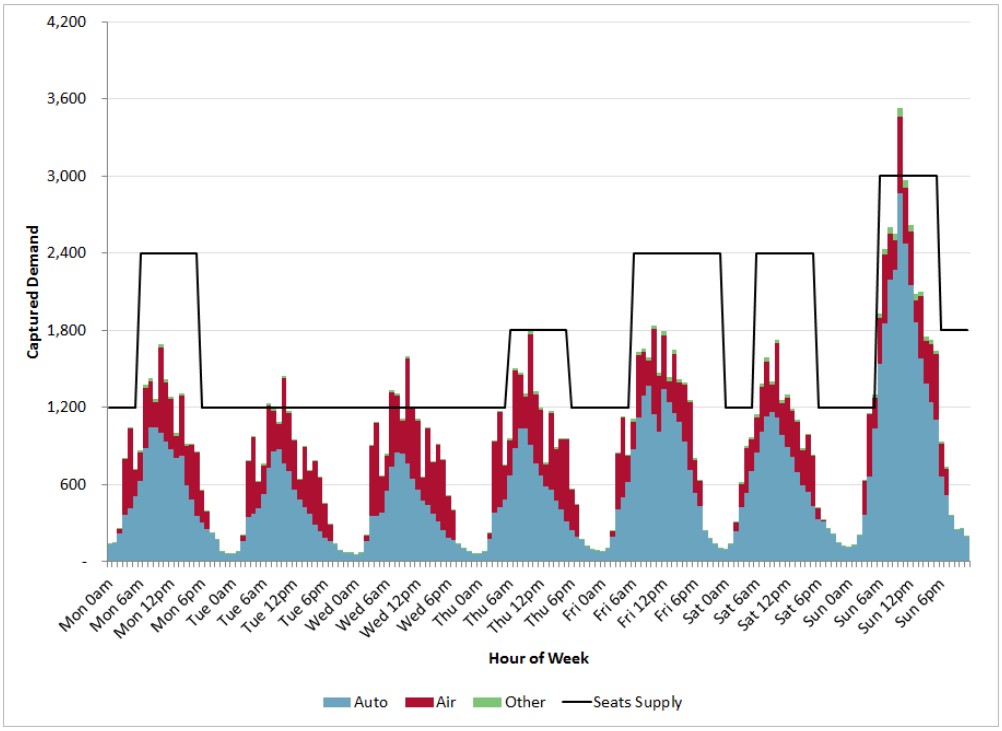
The following figures show the forecast hour-by-hour unconstrained ridership forecasts for an average week in 2035. The figures show loadings across the High Desert Corridor between Palmdale and Victorville and the current modes where demand is forecast to be capture from.

Figure 10.9: Northbound hourly ridership, average week 2035



Source: Steer Davies Gleave

Figure 10.10: Southbound hourly ridership, average week 2035



Source: Steer Davies Gleave

We forecast a maximum hourly ridership of approximately 3,500 riders on Sundays around midday. The assumed capacity is lower than the unconstrained forecasts at certain peak times, however there is available capacity outside these core periods, and a degree of peak spreading could remove the need to run any additional services.

Significant spare capacity remains outside the peak period. This suggests:

- The HSR system will also be able to absorb high peak ridership through a degree of peak-spreading; and
- There may be scope for savings by running fewer trains in less busy periods.

10.12 Highway traffic displacement

Table 10.12 shows the estimated saving in highway vehicle miles traveled across all California and Nevada highways as a result of demand captured by HSR.

Table 10.12: Base Case highway miles removed

	2021	2024	2026	2029	2035	2040	2050
Captured ridership from auto (round-trip)	2.3	4.7	5.4	6.2	6.9	7.3	8.5
Total vehicle miles removed (millions)	371	769	892	1,043	1,168	1,240	1,438
Miles removed per captured rider from auto	164	164	165	167	170	170	170

Source: Steer Davies Gleave

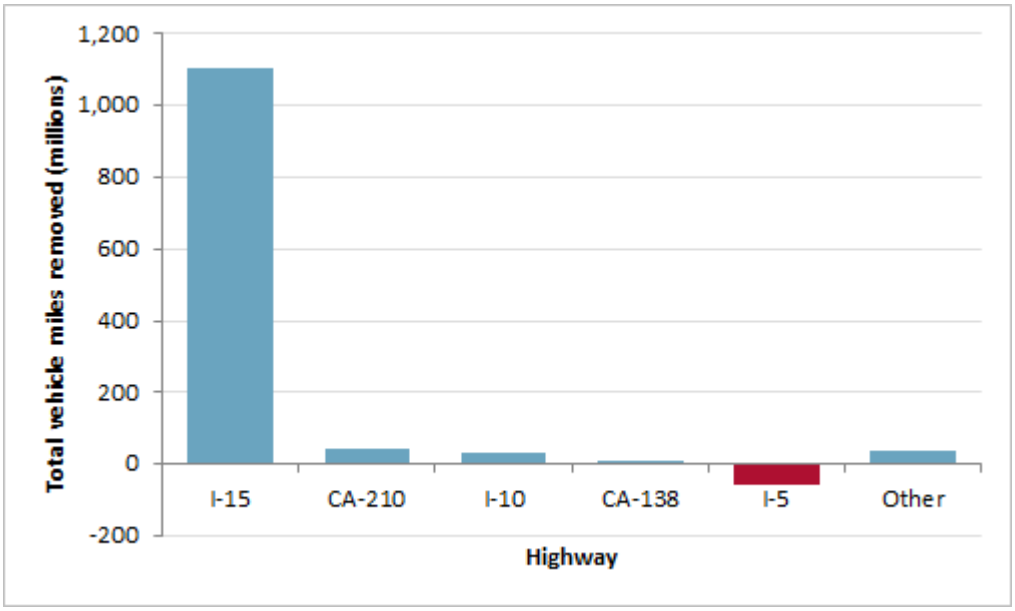
On average just under 170 highway vehicle miles are forecast to be removed for each rider captured that is currently traveling to/from Las Vegas by auto.

This value is significantly lower than the round-trip distance between California and Las Vegas (for example the distance from Los Angeles to Las Vegas is approximately 540 miles). There are three principal causes of this:

- On average there are approximately 2.5 people in each auto;
- The full distance is not saved, as most people are assumed to access the HSR stations by auto; and
- Some additional trips are induced by HSR meaning that some vehicle trips are made that wouldn't previously have been made.

Figure 10.11 shows how the reduction in vehicle miles traveled is forecast to be distributed among key highways in California and Nevada.

Figure 10.11: Base Case miles removed by highway, 2035



Source: Steer Davies Gleave

Approximately 95% of the vehicle miles saved are forecast to be on the I-15. By 2035, once the full HSR infrastructure is in place, this represents approximately 12% of the total traffic on the I-15 between Victorville and Las Vegas[113].

The I-5 is forecast to see a modest volume of additional traffic as a result of HSR, since it provides a key route across Los Angeles County in close proximity to each of Burbank, Los Angeles and Anaheim stations.

Table 10.13 shows the estimated reduction in CO_2 emissions as a result of the reduction in vehicle miles traveled.

Table 10.13: Base Case reduction in CO_2 emissions

	2021	2024	2026	2029	2035	2040	2050
Total vehicle miles removed (millions)	371	769	892	1,043	1,168	1,240	1,438
Grams of CO_2 per vehicle mile	325	288	264	245	220	209	196
Metric tons of CO_2 saved	120,346	221,053	235,377	255,329	257,254	259,463	281,237

Source: Steer Davies Gleave

CO2 emissions are calculated based upon estimated emissions per gallon of gasoline from the Environmental Protection Agency (EPA)[114], future improvements in auto emissions from the US

[113] Assuming that the proportion of traffic on the I-15 going to/from Las Vegas remains constant in future years.

Department of Transportation (US DoT)[115] and improvements in fleet fuel efficiency from the Energy Information Administration (EIA)[116] consistent with assumptions used throughout our forecasts.

As a result of these forecast improvements, the equivalent grams of CO_2 emitted per vehicle mile reduces from 325 in 2021 to 196 by 2050.

Note that the reductions in CO_2 emissions provided only consider changes in vehicle miles traveled. The HSR system is anticipated to be electric powered with no emissions at the point of use.

[114] https://www.epa.gov/sites/production/files/2016-02/documents/420f14040a.pdf.

[115] https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/NewStartsPolicyGuidance.pdf.

[116] https://www.eia.gov/forecasts/aeo/.

11 Forecasts by phase of infrastructure development

Forecasts have been developed for four infrastructure phases, reflecting the potential stages in the roll out of the California High Speed Rail (CaHSR) infrastructure. The phases are defined as follows:

0. Base line with direct services between Las Vegas and Victorville only;
1. One-seat high-speed ride linking Las Vegas-Victorville-Palmdale, with transfer to the existing Metrolink services on the Antelope Valley Line, feeder bus services or auto access with parking facilities at Palmdale & Victorville;
2. One-seat high-speed ride between Las Vegas and Burbank, using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville and Palmdale);
3. One-seat high-speed ride between Las Vegas and Los Angeles Union Station / Anaheim Station using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville, Palmdale and Burbank) ; and
4. High-speed ride between Las Vegas and Palmdale with a timed connection at Palmdale for CaHSR Phase 1 services to/from Northern California[117]. Specific CaHSR services will have varying stopping patterns, but will include combinations of stops at:
    - Bakersfield;
    - Kings/Tulare;
    - Fresno;
    - Merced;
    - Gilroy;
    - San Jose;
    - Millbrae; and
    - San Francisco.

[117] There is a potential for a further station at either Norwalk/Santa Fe Springs or Fullerton. At this stage however these remains as options within the CaHSR 2016 Business Plan.

Figure 11.1: Map of proposed HSR service phases

Source: Steer Davies Gleave

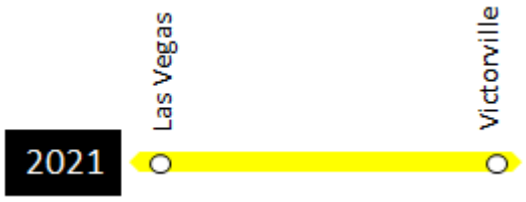
Forecasts for each of these phases are presented below.

11.1.1 Phase 0: Base Line - Las Vegas-Victorville

The base line situation envisages construction of a high speed line between Las Vegas and Victorville based on XpressWest proposals, and provision of dedicated parking facilities at the stations at either end of the line.

Figure 11.2 provides a summary of the assumed roll-out of HSR infrastructure for Phase 0:

Figure 11.2: Assumed roll-out of HSR infrastructure for Phase 0



Source: Steer Davies Gleave

Forecasts for infrastructure Phase 0 are presented in Table 11.1.

Table 11.1: Summary of annual forecasts for infrastructure Phase 0

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	26.7	28.2	29.1	30.5	33.4	36.1	41.4
HSR capture rate (%)	11%	21%	21%	21%	20%	20%	20%
Captured HSR ridership (million round-trips)	2.8	5.9	6.1	6.3	6.7	7.1	8.1
Induced HSR ridership (million round-trips)	0.2	0.4	0.4	0.4	0.5	0.5	0.6
Total HSR ridership (million round-trips)	3.0	6.4	6.5	6.7	7.2	7.6	8.7
Average HSR round-trip fare ($, 2015 prices)	96	96	96	96	98	100	100
HSR revenue ($m, 2015 prices)	292	609	623	644	705	762	867
Net ramp-up assumed (%)	50%	100%	100%	100%	100%	100%	100%
HSR revenue with enhanced yield management ($m, 2015 prices) [118]	318	664	679	702	768	831	945

Source: Steer Davies Gleave

The HSR line between Las Vegas and Victorville is assumed to open at the start of 2021. In this initial year of operation, 11% of the in-scope market is forecast to be captured at an average round-trip fare of $96. With the addition of induced trips, this results in forecast annual ridership of just over 3 million round-trips and forecast annual revenue of approximately $290m.

The level of captured demand increases significantly over the first few years of ramp-up which impact forecasts from 2021 through 2023. By 2024, 21% of the in-scope market is forecast to be captured. This level of capture is forecast to reduce slightly in subsequent years while the average round-trip fare is forecast to increase slightly. By 2050 we forecast annual ridership of approximately 8.7 million round-trips and annual revenue of approximately $867m.

As operator of the line and owner of the infrastructure, XpressWest will have full control over the range of station facilities and services which will be available to all passengers in this Phase. This provides the opportunity to segment the market according to preference for a range of fare inclusive options such as valet parking and lounge facilities, in addition to varying fares according to time of travel and group size. As a result the potential net fare yield is assumed to be greater than for other Phases, where the operator of the HSR service will be dependent on agreement with the provider of infrastructure services at each station for the range of customer facilities which can be offered. The estimated impact of this greater control over the product offer and associated pricing is approximately 3% in each year; this is reflected in the results presented in Table 11.1.

11.1.2 Phase 1: Las Vegas-Palmdale

Figure 11.3 provides a summary of the assumed roll-out of HSR infrastructure for Phase 1:

[118] Discussion of the yield management assumptions adopted and the potential for enhanced revenue from the Las Vegas visitor market is provided in Section 9.7 of this report.

- Construction of high speed line in the High Desert Corridor, offering one-seat ride linking Las Vegas-Victorville-Palmdale. Access/onward travel options include transfer to the existing Metrolink services on the Antelope Valley Line, feeder bus services or auto access with parking facilities at Palmdale.

Figure 11.3: Assumed roll-out of HSR infrastructure for Phase 1

Source: Steer Davies Gleave

Forecasts for infrastructure Phase 1 are presented in Table 11.2.

Table 11.2: Summary of annual forecasts for infrastructure Phase 1

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.5	29.0	29.9	31.4	34.3	37.0	42.4
HSR capture rate (%)	11%	21%	21%	21%	20%	20%	20%
Captured HSR ridership (million round-trips)	2.9	6.1	6.3	6.5	6.9	7.3	8.4
Induced HSR ridership (million round-trips)	0.2	0.4	0.4	0.4	0.5	0.5	0.6
Total HSR ridership (million round-trips)	3.1	6.5	6.7	6.9	7.4	7.8	8.9
Average HSR round-trip fare ($, 2015 prices)	96	96	96	95	98	100	100
HSR revenue ($m, 2015 prices)	300	626	639	661	722	780	888
Net ramp-up assumed (%)	50%	100%	100%	100%	100%	100%	100%

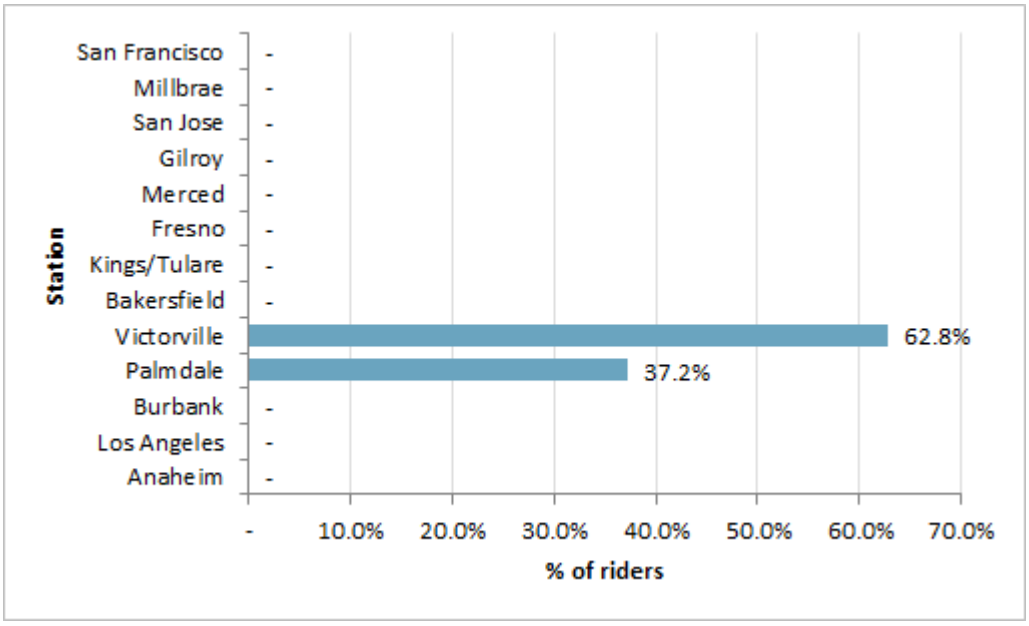
Source: Steer Davies Gleave

The HSR line between Las Vegas and Palmdale is assumed to open at the start of 2021. In this initial year of operation, 11% of the in-scope market is forecast to be captured at an average round-trip fare of $96. With the addition of induced trips, this results in forecast annual ridership of just over 3 million round-trips and forecast annual revenue of just over $300m.

As with Phase 0, the level of captured demand increases significantly over the first few years as a result of our ramp-up assumptions which impact forecasts from 2021 through 2023. By 2024, 21% of the in-scope market is forecast to be captured. This level of capture is broadly maintained throughout the model forecast period up to 2050. By 2050 we forecast annual ridership of approximately 8.9 million round-trips and annual revenue of approximately $890m.

The following figure shows the percentage of riders in 2035 forecast at each station in California within Phase 1.

Figure 11.4: Phase 1: Riders by California station



Source: Steer Davies Gleave

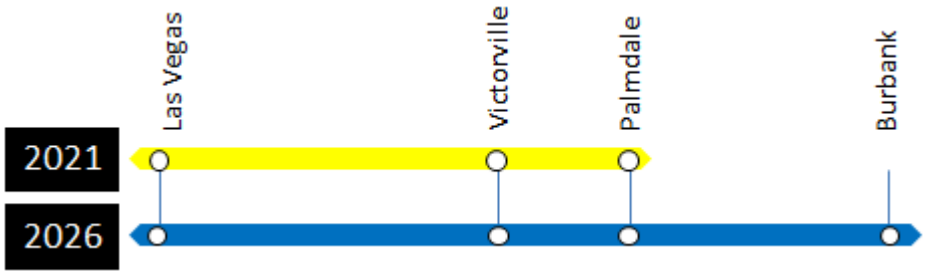
Slightly under 40% of riders are forecast to use the Palmdale station, with the remaining riders choosing the station at Victorville.

11.1.3 Phase 2: Las Vegas-Burbank

Figure 11.5 provides a summary of the assumed roll-out of HSR infrastructure for Phase 2:

- One-seat high-speed ride between Las Vegas and Burbank, using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville and Palmdale).

Figure 11.5: Assumed roll-out of HSR infrastructure for Phase 2



Source: Steer Davies Gleave

Forecasts for infrastructure Phase 2 are presented in Table 11.3.

Table 11.3: Summary of annual forecasts for infrastructure Phase 2

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.5	29.0	29.9	31.4	34.3	37.0	42.4
HSR capture rate (%)	11%	21%	24%	25%	24%	24%	24%
Captured HSR ridership (million round-trips)	2.9	6.1	7.1	7.7	8.3	8.8	10.1
Induced HSR ridership (million round-trips)	0.2	0.4	0.6	0.7	0.7	0.8	0.9
Total HSR ridership (million round-trips)	3.1	6.5	7.8	8.4	9.0	9.5	11.0
Average HSR round-trip fare ($, 2015 prices)	96	96	100	102	104	106	106
HSR revenue ($m, 2015 prices)	300	626	781	853	934	1,012	1,157
Net ramp-up assumed (%)	50%	100%	96%	100%	100%	100%	100%

Source: Steer Davies Gleave

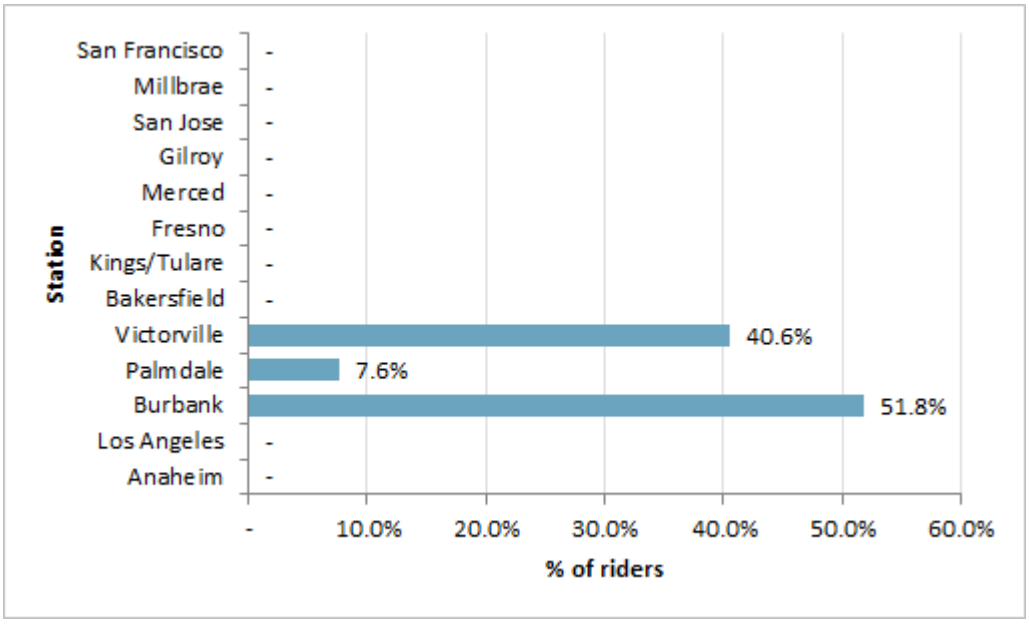
The HSR line is assumed to be extended to Burbank in 2026. In this initial year of the extended operation, 24% of the in-scope market is forecast to be captured at an average round-trip fare of $100. Relative to infrastructure Phase 1, this results in additional forecast annual ridership of just over 1 million round-trips and additional forecast annual revenue of just under $150m.

Ramp-up for the incremental ridership and revenue is applied between 2026 and 2028. By 2029 we forecast incremental annual ridership of approximately 1.5 million round-trips and incremental annual revenue of just over $190m.

By 2050, absolute ridership under infrastructure Phase 2 is forecast to be approximately 11.0 million round-trips and absolute revenue is forecast to be approximately $1,160m.

The following figure shows the percentage of riders in 2035 forecast at each station in California within Phase 2.

Figure 11.6: Phase 2: Riders by California station



Source: Steer Davies Gleave

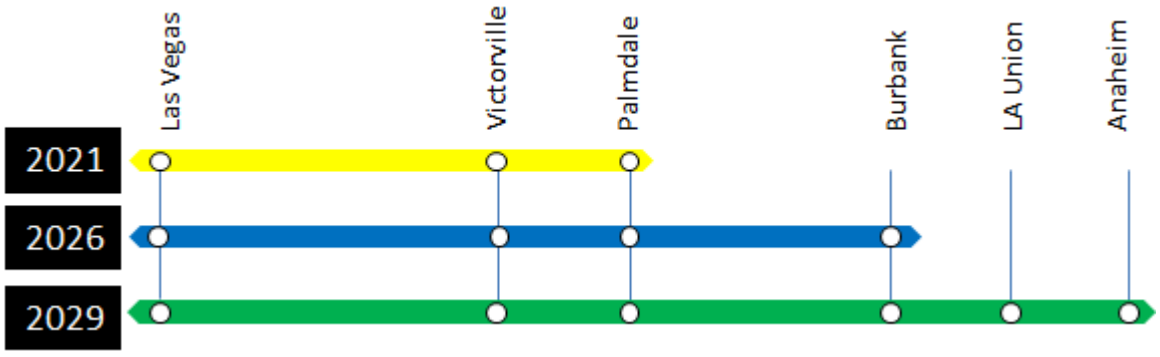
With the addition of a station at Burbank, usage at Victorville and Palmdale is forecast to decrease quite significantly as riders shift to the Burbank station. Overall just over half of all riders are forecast to use the station at Burbank.

11.1.4 Phase 3: Las Vegas-Anaheim

Figure 11.7 provides a summary of the assumed roll-out of HSR infrastructure for Phase 3:

- One-seat high-speed ride between Las Vegas and Los Angeles Union Station / Anaheim Station using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville, Palmdale and Burbank).

Figure 11.7: Assumed roll-out of HSR infrastructure for Phase 3



Source: Steer Davies Gleave

Forecasts for infrastructure Phase 3 are presented in Table 11.4.

Table 11.4: Summary of annual forecasts for infrastructure Phase 3

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.5	29.0	29.9	31.4	34.3	37.0	42.4
HSR capture rate (%)	11%	21%	24%	26%	27%	26%	26%
Captured HSR ridership (million round-trips)	2.9	6.1	7.1	8.3	9.1	9.7	11.2
Induced HSR ridership (million round-trips)	0.2	0.4	0.6	1.0	1.0	1.1	1.3
Total HSR ridership (million round-trips)	3.1	6.5	7.8	9.2	10.2	10.8	12.5
Average HSR round-trip fare ($, 2015 prices)	96	96	100	103	106	108	107
HSR revenue ($m, 2015 prices)	300	626	781	949	1,071	1,163	1,337
Net ramp-up assumed (%)	50%	100%	96%	98%	100%	100%	100%

Source: Steer Davies Gleave

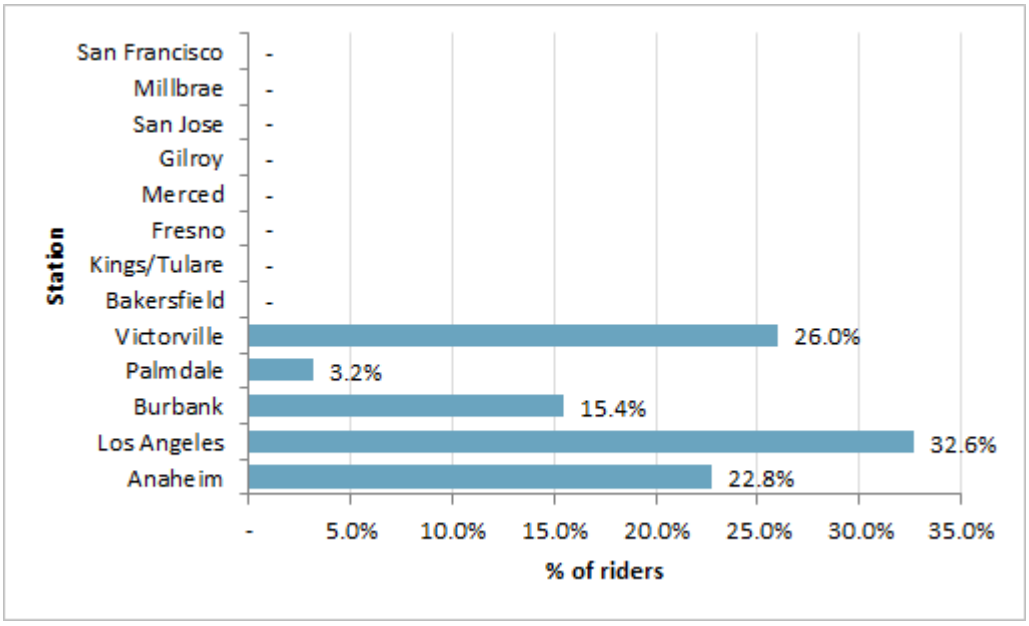
The HSR line is assumed to be extended to Anaheim, including a stop in Los Angeles in 2029. During this initial year of the extended operation, 26% of the in-scope market is forecast to be captured at an average round-trip fare of $103. Relative to infrastructure Phase 2, this results in additional forecast annual ridership of approximately 0.8 million round-trips and additional forecast annual revenue of approximately $100m.

Ramp-up for the incremental ridership and revenue is applied between 2029 and 2031. By 2035 we forecast incremental ridership of approximately 1.2 million round-trips and incremental annual revenue of approximately $140m.

By 2050, absolute annual ridership under infrastructure Phase 3 is forecast to be approximately 12.5 million round-trips and absolute annual revenue is forecast to be approximately $1,340m.

The following figure shows the percentage of riders in 2035 forecast at each station in California within Phase 3.

Figure 11.8: Phase 3: Riders by California station



Source: Steer Davies Gleave

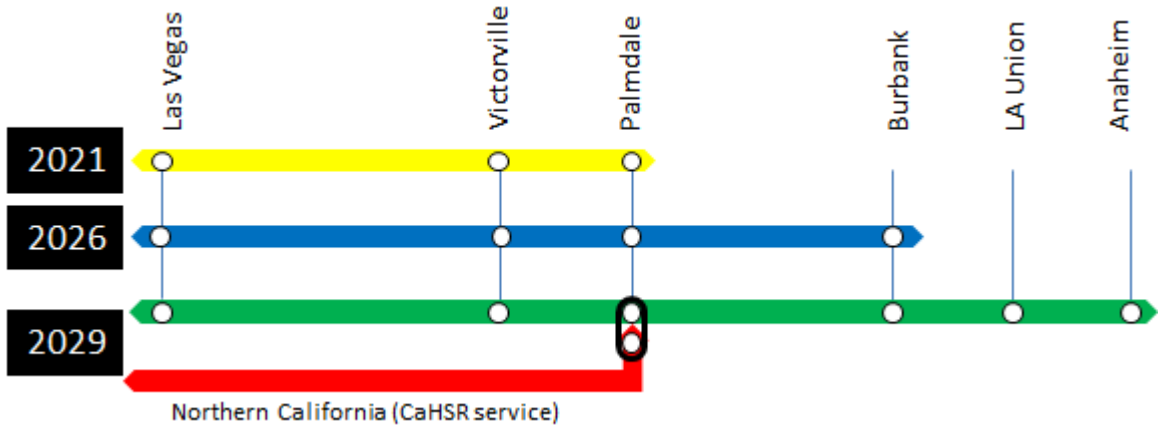
The Los Angeles station is forecast to be the most used stations in Southern California. Within this Phase, Victorville is now forecast to surpass Burbank in terms of ridership, in particular since those using Burbank under Phase 2 are more likely to prefer to access via Los Angeles or Anaheim than those accessing via Victorville.

11.1.5 Phase 4: CaHSR to NorCal

Figure 11.9 provides a summary of the assumed roll-out of HSR infrastructure for Phase 4 (the Base Case forecasts):

- As Phase 3, with a timed connection at Palmdale for transfer to/from CaHSR trains serving Northern California.

Figure 11.9: Assumed roll-out of HSR infrastructure for Phase 4



Source: Steer Davies Gleave

Forecasts for infrastructure Phase 4 are presented in Table 11.5.

Table 11.5: Summary of annual forecasts for infrastructure Phase 4

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.5	29.0	29.9	34.5	37.9	40.8	47.0
HSR capture rate (%)	11%	21%	24%	25%	27%	27%	27%
Captured HSR ridership (million round-trips)	2.9	6.1	7.1	8.8	10.2	10.8	12.6
Induced HSR ridership (million round-trips)	0.2	0.4	0.6	1.0	1.1	1.2	1.4
Total HSR ridership (million round-trips)	3.1	6.5	7.8	9.7	11.3	12.1	14.0
Average HSR round-trip fare ($, 2015 prices)	96	96	100	108	115	117	117
HSR revenue ($m, 2015 prices)	300	626	781	1,049	1,297	1,412	1,632
Net ramp-up assumed (%)	50%	100%	96%	93%	100%	100%	100%

Source: Steer Davies Gleave

The connection of the HSR line with the California High-Speed Rail (CaHSR) system heading north from Palmdale is also assumed to be in place in 2029. In this initial year of the connection, the capture rate is forecast to be lower than for Phase 3 (26%) though at an average round-trip fare of $108. This reduction in capture rate is a result of the increase in the in-scope market size brought about by this additional connection with CaHSR, as well as the lower forecast capture rate for people from Northern California compared with Southern California[119].

Whilst the capture rate compared to Phase 3 decreases, the overall forecast annual ridership and revenue increases. Relative to infrastructure Phase 3, we forecast additional annual ridership of approximately 0.5 million round-trips and additional annual revenue of just under $100m.

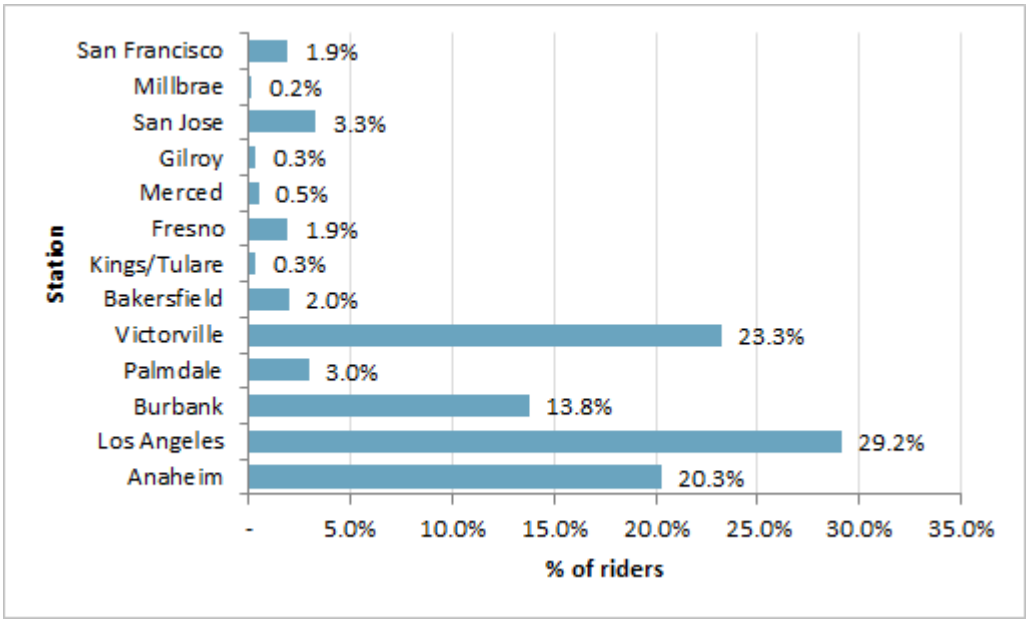
Ramp-up for the incremental ridership and revenue is applied between 2029 and 2031. By 2035, 27% of the in-scope market is forecast to be captured, resulting in incremental annual ridership of approximately 1.1 million round-trips and incremental annual revenue of approximately $230m.

By 2050, absolute annual ridership under infrastructure Phase 4 is forecast to be approximately 14.0 million round-trips and absolute annual revenue is forecast to be just over $1,630m.

The following figure shows the forecast percentage of riders in 2035 forecast at each station in California within Phase 4 (the Base Case forecasts).

[119] Further details are provided in section 10.

Figure 11.10: Phase 4: Riders by California station



Source: Steer Davies Gleave

Overall almost one third of passengers are forecast to use the Los Angeles station. Within Southern California, Victorville is forecast to be the second most used station, followed by Anaheim, Burbank and then Palmdale. Stations in Southern California are forecast to be used by 90% of the total riders.

Note anyone traveling to/from Northern California would be required to transfer trains at Palmdale. In the figure above these people are assigned to the station they use in Northern California. If we include these people as using Palmdale station then the percentage for Palmdale would increase to 13%.

11.1.6 Yield management

The forecasts provided in Table 11.2, Table 11.3, Table 11.4 and Table 11.5 assume application of yield management principles widely applied by airlines and increasingly applied in the intercity rail market. Evidence from the intercity rail market indicates that use of yield management can increase average yields, and accordingly revenue, by around 6%. This impact is included within our forecasts by assuming fares vary according to the time of travel, group size and anticipated level of demand for services at any given time. The spread of fares which underpins this yield is similar to the spread of fares which around 90% of focus group participants indicated that they would be willing to pay.

The specific characteristics of the Las Vegas visitor market, and the detailed customer data collected on repeat visitors, could provide scope for more targeted offers. If the experience of casino resorts proved directly transferrable to HSR, this could raise the potential revenue gain from yield management by 15%. Table 11.6 summarizes the impact this could have on HSR revenue separately for each infrastructure phase.

Table 11.6: Illustrative impact of enhanced yield management results based on casino resort experience

Forecast element Operational Phases	2021 Phases 0-1	2024 Phases 0-1	2026 Phases 0-2	2029 Phases 0-4	2035 Phases 0-4	2040 Phases 0-4	2050 Phases 0-4
HSR revenue with enhanced yield management ($m, 2015 prices)							
Phase 1	327	682	697	720	787	851	968
Phase 2	327	682	851	930	1,018	1,103	1,261
Phase 3	327	682	851	1,035	1,168	1,268	1,457
Phase 4	327	682	851	1,143	1,413	1,539	1,778

Source: Steer Davies Gleave

Further details on the yield management assumptions adopted and the potential for enhanced revenue from the Las Vegas visitor market is provided in Section 9.7 of this report.

12 Sensitivity tests

The sensitivity of the forecasts to incremental changes in each of the key input variables needs to be established to highlight the relative importance of individual forecasting assumptions and to demonstrate the robustness of the results to a range of uncertainties and forecasting parameters. However, from a business case perspective, what is critical are potential combinations of conditions.

Two alternative approaches are commonly applied to risk analysis to identify the range of potential outcomes:

- A frequently used option is a probabilistic approach, known as Monte Carlo simulation, which requires the definition of a distribution profile of potential values for each variable, with a base/most likely value and a minimum to maximum range. In this method the simulation is run many times, sampling across combinations of the risk variables and, as output, produces a distribution of potential outcomes, with a median value and probabilities of obtaining different results.
- The alternative approach is to develop a series of internally consistent scenarios based on distinct combinations of circumstances. The appropriate range of input variables and their potential interactions and associated implications must be carefully considered, but this option also allows the impact of potential mitigation actions to be taken into account.

Each approach has particular merits for a given type of problem and potential audience. Using the Monte Carlo approach means defining probability distributions for event outomes, and identifying potential correlations. In some situations historic data and test results can provide clear guidance on the appropriate distribution to use. However, the technique is less useful when dealing with uncertainty of outcomes, such as future economic conditions and gas price movements.

A scenario based approach was considered more appropriate for the High Desert Corridor situation, as it offers the high degree of transparency required to support investment decisions. It is particularly important to be able to take into account the potential abilities of relevant actors to respond to any given set of economic conditions, by adjustments to pricing to influence demand. For example, during the Great Recession the number of visitors from SoCal rose between 2008 and 2010, even as demand from the rest of the US fell sharply; casino resorts provided attractive offers to increase the frequency of visits from their nearest market. The Las Vegas resort owners, train operator and infrastructure investors have a common interest in maintaining visitor volumes, and promoting frequent repeat visits, which may mitigate adverse economic pressures.

To reflect this, first, we present the sensitivity of the ridership forecasts to individual forecasting assumptions. We then present a number of alternative scenarios, demonstrating the sensitivity of the forecasts in each case.

12.1 Sensitivity tests: Individual forecasting assumptions

Potential demand and revenues will depend on a combination of variables. Exogenous factors affecting the potential scale of the market include:

- The future development of Las Vegas in terms of the room supply and range of attractions offered;
- Changes in the Nevada and California population mix and the propensity of different ethnic and age groups to visit Las Vegas;
- Changes in the population of Southern Nevada; and
- Levels of international tourism and visits to California/Las Vegas.

A number of factors may also impact the attractiveness of using alternative modes including:

- Program for delivery of HSR infrastructure (by line segment);
- Future gas prices and air fares (which tend to move in parallel); and
- Levels of road congestion and consequently journey times impacted by the difference between traffic growth and infrastructure improvements.

The characteristics of the HSR service offer will also influence its competitive advantage and hence demand. Journey times will be determined by the characteristics of the infrastructure and rolling stock. However, the service frequency and fares are largely within the control of the HSR operator, and will be set at a level which is ultimately profit maximizing based on potential yield and operating costs.

The sensitivity of forecasts to each of these factors is outlined below.

12.1.1 Exogenous factors

Scenarios incorporating changes to key exogenous factors are including in the section entitled Sensitivity tests: Alternative scenarios.

12.1.2 Competing mode characteristics

Table 12.1 summarizes the effect on 2021 and 2035 revenue of a range of sensitivity tests related to competing mode characteristics. The most significant competing mode characteristic is the future gas price.

Table 12.1: Sensitivity tests: Competing mode characteristics

% change in revenue relative to Base Case	2021	2035
Gas prices – 25% higher by 2021	7.1%	6.8%
Gas prices – 25% lower by 2021	-6.7%	-6.5%
Gas prices – Using EIA high oil forecasts	14.5%	13.2%
Gas prices – Using mid-point between EIA reference and high oil forecasts	7.1%	6.5%
Other auto operating costs – 10% higher	2.5%	2.2%
Other auto operating costs – 10% lower	-2.5%	-2.2%
Air fares – 10% higher by 2021	0.6%	1.0%
Air fares – 10% lower by 2021	-0.6%	-1.0%
Journey times – No delays on I-15	-1.0%	-0.8%
Journey times – Delays doubled on I-15	1.2%	1.0%
Expansion of Las Vegas parking charges	4.5%	3.0%

Source: Steer Davies Gleave

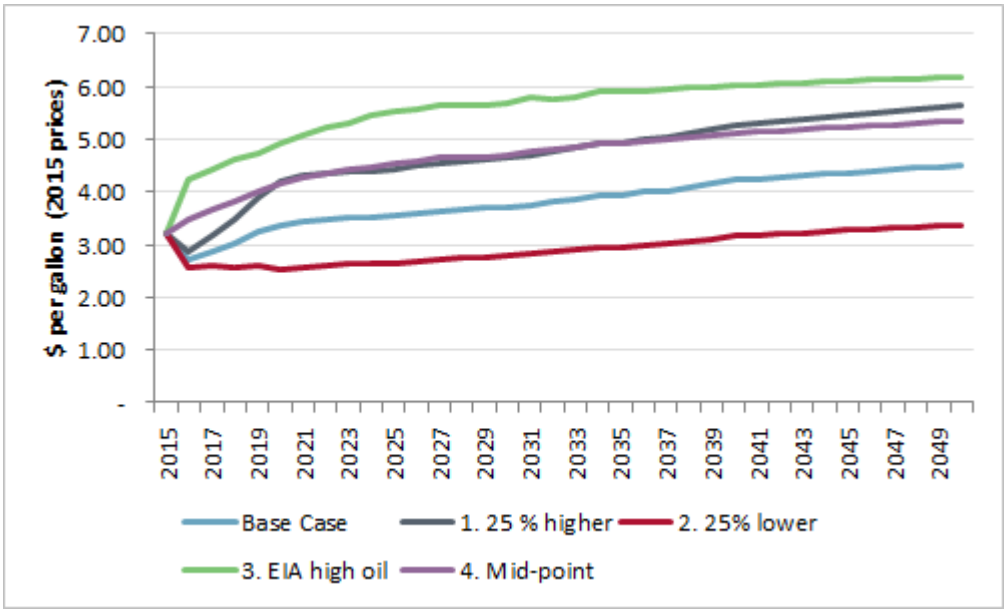
Gas prices

We tested four alternative gas price sensitivity tests:

1. Gas prices increased relative to the Base Case forecasts by 25% by 2021 – prices are assumed to grow in line with the Base Case forecasts thereafter;
2. Gas prices decreased relative to the Base Case forecasts by 25% by 2021 – prices are assumed to grow in line with the Base Case forecasts thereafter;
3. Gas prices assumed to grow in line with the EIA “high oil” scenario; and
4. Gas prices assumed to grow in line with the mid-point between the EIA “reference” and “high oil” scenarios.

Figure 12.1 provides the output assumed gas price for each of these sensitivity tests.

Figure 12.1: Range of gas price sensitivities



Source: EIA and SDG analysis

A 25% change in oil prices is forecast to impact revenue by approximately 7%, implying a gas price elasticity of just less than 0.3.

By 2035 there is a 50% difference in gas prices between the EIA high oil scenario and the EIA reference scenario (used in the Base Case). This is forecast to translate to a difference in HSR revenue of approximately 13%, implying a slightly higher elasticity for this larger gas price change of just over 0.3.

We provide below a summary of some wider evidence of gas price elasticities.

- UK Passenger Demand Forecasting Handbook (PDFH): This is the guidance for rail demand forecasting provided by the UK Department for Transport, and draws upon a large number of studies from across the UK and Europe. Recommended values range between 0.19 and 0.5. The most recent guidance (PDFH v5.1) recommends elasticities of 0.5 across all types of flow.
- American Public Transportation Association (APTA): APTA published a research paper in May 2012[120] which provides elasticities to gas prices from a number of US studies. These range between 0.05 and 0.4 with an average of approximately 0.2. The studies also indicate higher elasticities for larger changes in gas prices.

The sensitivity to gas price within our model is therefore consistent with the range obtained in other research.

These tests highlight the importance of gas price assumptions and the large potential impact future prices can have on projected revenues.

[120] http://www.apta.com/resources/reportsandpublications/Documents/Gas-Price-Impact-May-2012.pdf

These tests do not take into account any long-term behavioral adjustments that might occur under each scenario, such as changes in the vehicle composition.

Other auto operating costs

The Base Case forecast assumes other operating costs of $0.11 per mile. While there is broad acceptance that these costs exist, the scale of these costs as well as the proportion of people who perceive these costs and therefore take them into consideration when making their travel choices is subject to debate.

We forecast that a 10% increase in these costs would increase revenue by between 2% and 2.5%. The impact of reducing these costs by 10% is forecast to be of a similar magnitude.

Relative to gas prices, the future volatility in these costs is considered to be subject to significantly less variation.

Air fares

We tested two alternative scenarios where average air fares are either increased or decreased by 10%, as shown in Table 12.2.

Table 12.2: Sensitivity tests: Changes in air fare

Modeled average air fare, 2015 prices[121]	Lower by 10%	Base Case	Higher by 10%
Tourists	$152	$169	$186
Business/convention travelers	$176	$195	$215

Source: Steer Davies Gleave behavioral survey 2016

The effect of a 10% change in air fares is approximately 1% change in HSR annual revenue, with higher air fares increasing ridership.

The impact on forecasts of future changes in air fares is therefore estimated to be relatively small.

Journey times

Delays on the I-15 vary considerably depending on the month of the year and whether the day coincides with a particularly busy period. In the development of our Base Case forecasts we assumed an average delay across the entire year for peak days and direction of travel. Along the whole I-15 section between Las Vegas and Victorville, delays are forecast to increase journey times as follows:

- Northbound peak (Friday afternoon): 4% - equivalent to approximately 6 minutes; and
- Southbound peak (Sunday afternoon): 21% - equivalent to approximately 32 minutes.

As a sensitivity to this assumption we tested two different delay scenarios:

- No delays on the I-15 implying peak times are the same as off peak times; and

[121] Represents average air fare to/from airports in Southern California.

- Doubling of delays on the I-15 during peak periods.

The forecasts are relatively insensitive to changes in the assumed levels of delay. The impact on ridership is at most 1.2% in 2021.

The tests undertaken incorporate very large changes in the input assumptions but have a relatively small impact on results, indicating that this is not a critical assumption within the forecasts.

Expansion of Las Vegas parking charges

In our Base Case, the extent of future parking charges in Las Vegas is assumed to remain consistent with current levels. It is certainly possible that other resorts also decide to charge for parking in the future.

In this test we assume that 100% of resorts on the Strip charge for parking, and that the charging regime is equivalent to the current policy of MGM resorts.

In 2021 the impact of additional parking charges is forecast to be 4.5%. This reduces to 3.0% by 2035 due to changes in the in-scope market and increases in people's willingness to pay for services.

12.1.3 HSR service characteristics

Table 12.3 summarizes the effect on 2021 and 2035 revenue of a range of sensitivity tests related to HSR service characteristics. The most significant service characteristic is HSR journey times.

Table 12.3: Sensitivity tests: HSR service characteristics

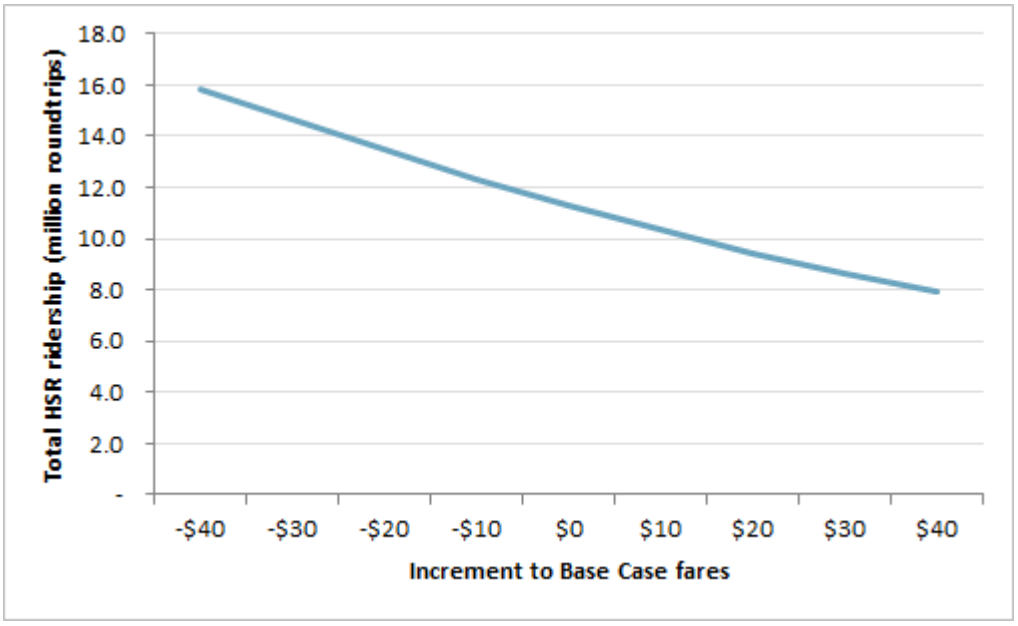
% change in revenue relative to Base Case	2021	2035
Fares - $40 higher for all return fares	-6.4%	-3.9%
Fares - $30 higher for all return fares	-3.7%	-2.2%
Fares - $20 higher for all return fares	-1.6%	-0.8%
Fares - $10 higher for all return fares	-0.3%	-0.1%
Fares - $10 lower for all return fares	-1.1%	-0.9%
Fares - $20 lower for all return fares	-3.8%	-3.0%
Fares - $30 lower for all return fares	-8.6%	-6.4%
Fares - $40 lower for all return fares	-15.5%	-11.4%
Journey times – 25% slower	-8.4%	-14.7%
Journey times – 25% faster	9.0%	14.8%
Service frequency – Frequency doubled	1.8%	1.3%
Service frequency – Frequency halved	-3.5%	-2.6%
Hours of operation – Service stopped overnight	-4.4%	-4.4%
Station parking charges – No parking charges at HSR stations	-	4.5%
Station parking charges – Parking charges doubled at HSR stations	-	-4.2%
HSR infrastructure program – Limited through service to Northern California	-	0.8%

Source: Steer Davies Gleave

Fares

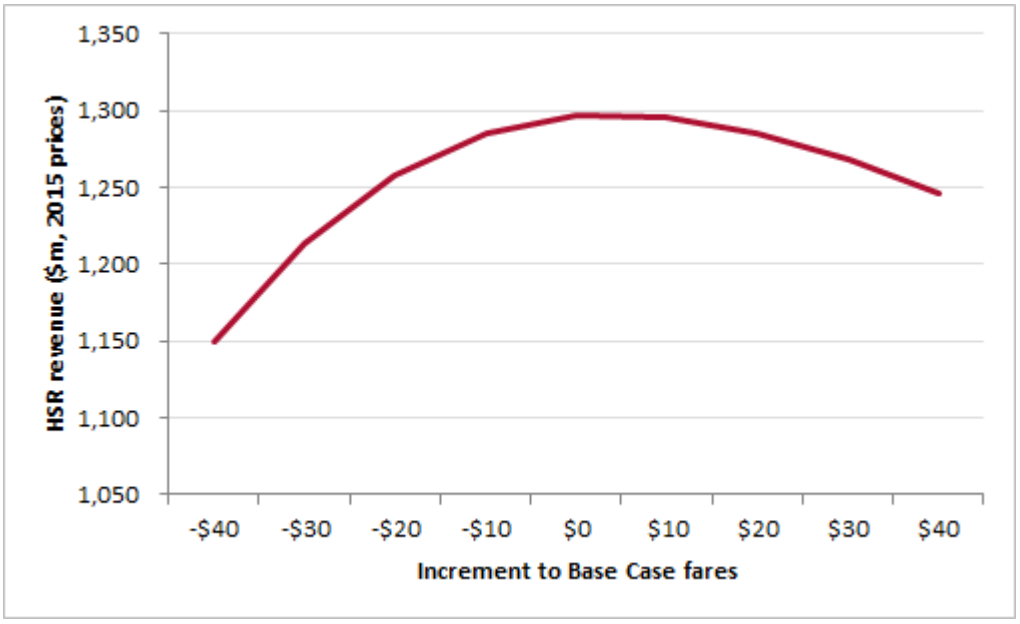
HSR fares within the Base Case forecasts have been set in order to maximize overall revenue. We tested increments to these fares of $10, up to a maximum difference of $40. The impact on revenue and ridership of each of these tests is outlined Figure 12.2 and Figure 12.3.

Figure 12.2: 2035 forecast ridership by average fare increments to Base Case



Source: Steer Davies Gleave

Figure 12.3: 2035 forecast revenue by average fare increments to Base Case



Source: Steer Davies Gleave

Note that the increments to the Base Case fares represent the input assumptions for each sensitivity test, not the output impact on average fares. The output can be marginally different as a result of separate markets responding differently to changes in fares. For example, a $10 increase in average input fares is forecast to result in a $10.72 increase in output average fare, as those paying lower fares tend to have a slightly higher sensitivity to fare increases.

The results demonstrate that the assumed Base Case fares result in the highest output revenue forecast.

Journey times

The Base Case forecast assumes a journey time by HSR between Los Angeles and Las Vegas station of 2 hours 28 minutes. We forecast increasing journey times by 25%, resulting in a journey time between Los Angeles and Las Vegas of 3 hours 5 minutes, would reduce ridership by around 8% in 2021, rising to just less than 15% by 2035. The impact of reducing journey times by 25% is forecast to be of a similar magnitude.

The impact of these tests is quite large on the forecasts. However, a 25% increase or decrease in HSR journey times is considered to be quite an extreme test.

Service frequency

If service frequencies are increased above those we assume in the Base Case, there is forecast to be a minor effect on ridership and revenue of approximately 1.5%. This is because HSR frequencies in the Base Case are sufficiently high to offer a “Turn up and go” service. Accordingly, further frequency enhancements do not materially reduce average waiting times.

If service frequencies are reduced by half, ridership and revenue is forecast to drop by approximately 3% in 2025.

Note that all forecasts are presented as unconstrained – this impact therefore could be larger in the reduced frequency case given potential capacity constraints, although this would be partially offset by yield management.

Hours of operation

Base Case forecasts are presented on an unconstrained basis, and we assume that HSR services will operate 24 hours a day for 365 days a year.

There will be a need for occasional track closures to allow for maintenance, but given that demand will be primarily in one direction, closing only one track at a time for maintenance and operating using sections of single track (as opposed to the double track normally in operation) is a potential option. Accordingly we have not constrained demand in our Base Case to allow for the potential need to suspend operations for maintenance.

CaHSR have advised that night time operation will likely not be possible over their tracks; it is currently anticipated that there will be no direct service south of Palmdale for a 5 hour period each night, coinciding with the lowest levels of forecast demand (between 10pm and 3am).

In this test we instead assume operations are stopped across the entire line between Las Vegas and Anaheim between 10pm and 3am. This is forecast to reduce ridership by up to 4.4%.

Station parking charges

We tested two alternative scenarios where all HSR parking is free or all HSR parking is doubled, as shown in Table 12.4.

Table 12.4: Sensitivity tests: Changes in HSR parking charges

Parking charges per day, 2015 prices	Free parking	Base Case	Charges doubled
Desert stations (Victorville; Palmdale)	$0	$0	$0
Key urban center stations (Los Angeles; San Francisco)	$0	$20	$40
Wider LA area stations (Burbank; Anaheim)	$0	$10	$20
Southern/Central Valley stations (Bakersfield; Kings/Tulare; Fresno)	$0	$5	$10
Northern California stations (Merced; Gilroy; San Jose; Millbrae)	$0	$10	$20

Source: Steer Davies Gleave

In 2021 there is no impact on forecasts, since parking at both Victorville and Palmdale is assumed to be free in all cases.

In 2035, the effect of making all parking free is approximately 4.5% increase in revenue. Conversely the effect of doubling all parking charges is approximately 4.2% reduction in revenue.

These tests do not take into account any behavioral adjustments that might occur under each scenario, such as changes in the way people choose to access each station.

HSR infrastructure program

Our Base Case assumes that there will be no direct services run between Las Vegas and Northern California – all residents of Northern California would be required to transfer trains at Palmdale.

If we assume all services are direct instead, we forecast this would result in an overall revenue increase of 2.4%, and an increase of approximately 16% specifically for the market from Northern California.

From an operational perspective, it is unlikely that all services between Northern California and Las Vegas would be direct; much more likely is a limited through service offered at intervals throughout the day. Accordingly, we assume the impact would be reduced by approximately two-thirds of that noted above. This implies a potential increase of 0.8% in overall revenue and an increase of approximately 5% specifically for the market from Northern California.

A limited through service to Northern California is likely to be attractive to a segment of the market, even without any direct journey time benefit.

12.1.4 Model parameters

Table 12.5 summarizes the effect on 2021 and 2035 revenue of a range of sensitivity tests related to model parameters within our forecasting model. The most significant parameters is the value of time.

Table 12.5: Sensitivity tests: Model parameters

% change in revenue relative to Base Case	2021	2035
Value of time – 10% higher	4.8%	5.1%
Value of time – 10% lower	-5.4%	-5.7%
Mode constants – 10% higher	-3.0%	0.1%
Mode constants – 10% lower	3.0%	-0.1%
Mode constants – 10% less favorable for HSR	-3.0%	-1.4%

Source: Steer Davies Gleave

Value of time

The Base Case value of time within the model is estimated based upon statistical analysis of the stated preference survey results; the value of time for existing auto travelers is estimated to be $10.70 per hour while for existing air users it is estimated to be $43.20 per hour.

If the value of time is assumed to be 10% higher than in the Base Case this is estimated to result in an increase in revenue of approximately 5%. Similarly a 5% reduction in value of time is estimated to result in a decrease in revenue of approximately 5%.

The US Department of Transportation (US DOT) provides guidance on expected values of times for different types of movements which it uses in the assessment of transportation benefits analysis. These represent 'typical' values based upon travel markets across the US. They are useful therefore as a point of reference to check the broad scale of estimated parameters, however there can often be local factors which can result in values of time for specific flows being somewhat different.

Based on this guidance, the expected typical range of value of time is $14-$27 per hour for auto travelers and $29-65 per hour for air travelers. Our Base Case value of time for air travelers falls within this typical range whereas our value of time for auto travelers is slightly below the typical range.

Mode constants

The Base Case incorporates mode constants estimated based upon statistical analysis of the stated preference survey results; these are equivalent to:

- Existing auto, accessing Victorville or Palmdale: A negative valued constant of 143 minutes against rail;
- Existing air, accessing Victorville or Palmdale: A negative valued constant of 169 minutes against rail;
- Existing air, accessing any other station: A positive valued constant of 279 minutes in favor of rail;
- Otherwise zero.

If the mode constants are assumed to be 10% higher than in the Base Case this is estimated to result in a decrease in revenue of approximately 3% in 2021, but a broadly neutral effect in 2035.

This different impact by year is as a result of the subsequent infrastructure phases opening and therefore shifting station access patterns.

Similarly a 10% reduction in mode constants is estimated to result in an increase in revenue of approximately 3% in 2021, but a broadly neutral effect in 2035.

Finally if all constants are shifted by 10% against rail, this is estimated to result in a 3% decrease in revenue in 2021 and a 1.4% decrease in revenue in 2035.

12.2 Sensitivity tests: Alternative scenarios

We have developed a series of internally consistent scenarios based on distinct combinations of circumstances. The appropriate range of input variables and their potential interactions and associated implications has been carefully considered to develop a range of plausible scenarios for HSR ridership.

The following alternative scenarios are presented:

- High economic growth coupled with high gas price growth;
- Low economic growth coupled with low gas price growth;
- Operation of HSR between Palmdale and Burbank beginning in 2029;
- Early completion of HSR between Palmdale and Anaheim;
- No change in trip propensity by ethnic group; and
- Potential upside from Las Vegas-specific experience.

12.2.1 High economic growth coupled with high gas price growth

This scenario assumes that the economy grows materially faster over a sustained period, resulting in higher levels of disposable income and higher levels of business activity. Coupled with this, we assume higher growth in gas prices.

We adopt the following assumptions within this scenario:

- GDP per capita grows on average 1% per annum faster throughout the model forecast period to 2050. This impacts forecast growth in trips of Las Vegas residents:
  - 2015-2022: 4.9% pa compared to 3.9% pa in the Base Case;
  - 2022-2030: 4.0% pa compared to 3.0% pa in the Base Case;
  - 2030-2040: 3.4% pa compared to 2.4% pa in the Base Case; and
  - 2040-2050: 3.3% pa compared to 2.3% pa in the Base Case.
- Real incomes grow on average 0.6% per annum faster throughout the same period;
- Demand for business/convention trips to Las Vegas increases – we adopt the high case forecasts produced by Applied Analysis as opposed to the central case forecasts adopted within our Base Case:
  - 2015-2022: 4.1% pa compared to 3.4% pa in the Base Case;
  - 2022-2030: 1.5% pa compared to 1.0% pa in the Base Case;
  - 2030-2040: 1.2% pa compared to 0.7% pa in the Base Case; and
  - 2040-2050: 1.2% pa compared to 0.7% pa in the Base Case.
- Gas prices grow in line with the EIA's "high oil" scenario as opposed to their "reference" scenario adopted within our Base Case:
  - 2015-2022: 7.1% pa compared to 1.7% pa in the Base Case;

- 2022-2030: 1.5% pa compared to 1.0% pa in the Base Case;
- 2030-2040: 1.9% pa compared to 1.5% pa in the Base Case; and
- 2040-2050: 1.0% pa compared to 0.7% pa in the Base Case.

Forecasts for this scenario are presented in Table 12.6.

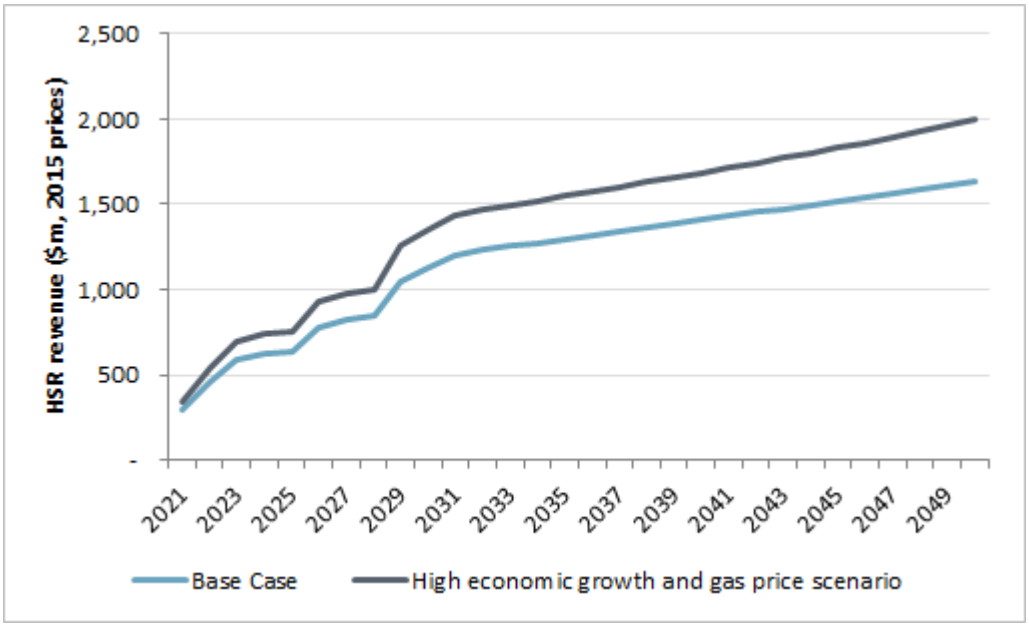
Table 12.6: Summary of annual forecasts for high economic growth and gas price scenario

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.8	29.6	30.7	35.7	39.8	43.6	51.9
HSR capture rate (%)	12%	24%	28%	29%	31%	30%	30%
Captured HSR ridership (million round-trips)	3.4	7.2	8.5	10.5	12.2	13.0	15.5
Induced HSR ridership (million round-trips)	0.2	0.5	0.8	1.2	1.3	1.4	1.7
Total HSR ridership (million round-trips)	3.6	7.7	9.2	11.7	13.5	14.5	17.2
Average HSR round-trip fare ($, 2015 prices)	96	96	100	107	114	117	116
HSR revenue ($m, 2015 prices)	348	743	927	1,254	1,547	1,687	1,994
Net ramp-up assumed (%)	50%	100%	96%	93%	100%	100%	100%

Source: Steer Davies Gleave

Figure 12.4 compares the forecast revenue for this scenario with the Base Case forecasts.

Figure 12.4: Comparison of high economic growth and gas price scenario and Base Case annual revenue forecasts, 2021 to 2050



Source: Steer Davies Gleave

In the opening year, revenue is forecast to be 16% higher than in the Base Case, equivalent to just over $45m. This is driven largely through additional capture from auto given the much higher assumed gas prices and the higher value of time arising from assumed real income growth.

This increment is forecast to increase in future years, rising to 20% by 2030, 19% by 2040 and 22% by 2050. In the final forecast year this is forecast to result in just over 3.2 million additional riders and just over $360m in additional annual revenue.

12.2.2 Low economic growth coupled with low gas price growth

This scenario assumes that the economy grows materially slower over a sustained period, resulting in lower levels of disposable income and lower levels of business activity. Coupled with this, we assume lower growth in gas prices.

We adopt the following assumptions within this scenario:

- GDP per capita grows on average 1% per annum slower throughout the model forecast period to 2050. This impacts forecast growth in trips of Las Vegas residents:
  - 2015-2022: 2.9% pa compared to 3.9% pa in the Base Case;
  - 2022-2030: 2.0% pa compared to 3.0% pa in the Base Case;
  - 2030-2040: 1.4% pa compared to 2.4% pa in the Base Case; and
  - 2040-2050: 1.3% pa compared to 2.3% pa in the Base Case.
- Real incomes grow on average 0.6% per annum slower throughout the same period;
- Demand for business/convention trips to Las Vegas decreases – we adopt the low case forecasts produced by Applied Analysis as opposed to the central case forecasts adopted within our Base Case:
  - 2015-2022: 2.4% pa compared to 3.4% pa in the Base Case;
  - 2022-2030: 0.4% pa compared to 1.0% pa in the Base Case;
  - 2030-2040: 0.2% pa compared to 0.7% pa in the Base Case; and
  - 2040-2050: 0.2% pa compared to 0.7% pa in the Base Case.
- Gas prices grow in line with the EIA's "low oil" scenario as opposed to their "reference" scenario adopted within our Base Case:
  - 2015-2022: -0.3% pa compared to 1.7% pa in the Base Case;
  - 2022-2030: 0.0% pa compared to 1.0% pa in the Base Case;
  - 2030-2040: 0.1% pa compared to 1.5% pa in the Base Case; and
  - 2040-2050: 0.1% pa compared to 0.7% pa in the Base Case.

Forecasts for this scenario are presented in Table 12.7.

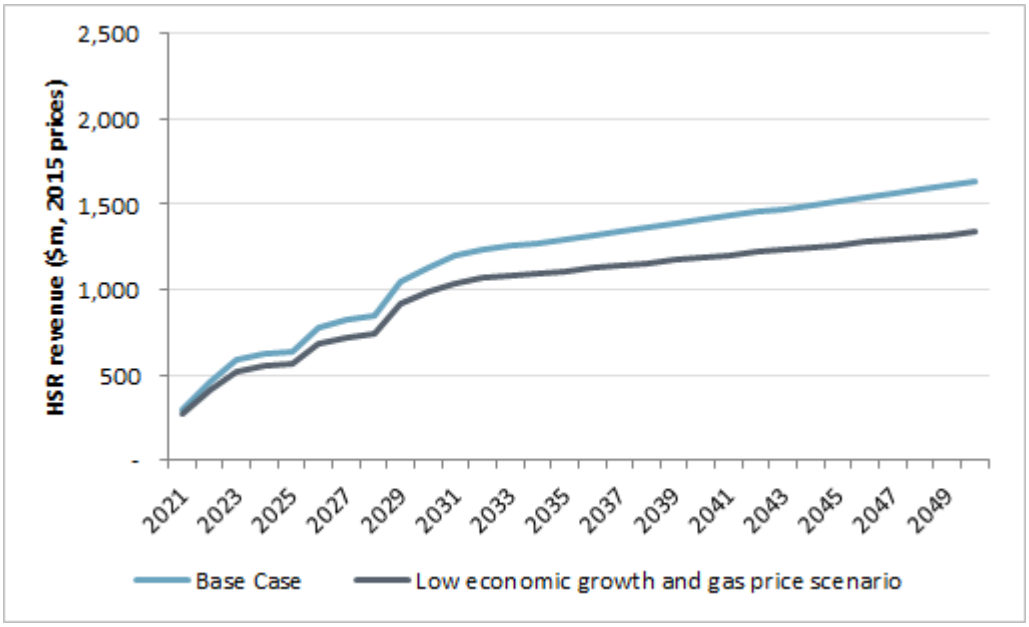
Table 12.7: Summary of annual forecasts for low economic growth and gas price scenario

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.1	28.4	29.1	33.3	36.1	38.4	43.1
HSR capture rate (%)	10%	19%	22%	23%	24%	24%	24%
Captured HSR ridership (million round-trips)	2.7	5.5	6.3	7.6	8.7	9.1	10.2
Induced HSR ridership (million round-trips)	0.2	0.4	0.6	0.9	1.0	1.0	1.2
Total HSR ridership (million round-trips)	2.9	5.8	6.9	8.5	9.7	10.1	11.4
Average HSR round-trip fare ($, 2015 prices)	95	95	100	108	115	118	117
HSR revenue ($m, 2015 prices)	273	556	688	913	1,111	1,192	1,339
Net ramp-up assumed (%)	50%	100%	96%	93%	100%	100%	100%

Source: Steer Davies Gleave

Figure 12.5 compares the forecast revenue for this scenario with the Base Case forecasts.

Figure 12.5: Comparison of low economic growth and gas price scenario and Base Case annual revenue forecasts, 2021 to 2050



Source: Steer Davies Gleave

In the opening year, revenue is forecast to be 9% lower than in the Base Case, equivalent to just less than $30m. This is driven largely through less capture from auto given the lower assumed gas prices and the lower value of time arising from lower assumed real income growth.

This increment is forecast to steadily increase in future years, rising to 13% by 2030, 16% by 2040 and 18% by 2050. In the final forecast year this is forecast to result in approximately 2.6 million fewer riders and annual revenue which is approximately $290m lower than the Base Case.

12.2.3 Operation of HSR between Palmdale and Burbank beginning in 2029

Within the Base Case forecasts, the line to Burbank is assumed to be open in 2026 whereas the 2016 CaHSR Business Plan assumes services on this section of the line will only begin in 2029.

This scenario test assumes that the line between Palmdale and Burbank opens in 2029, at the same time as the section to Los Angeles and Anaheim. The connection with CaHSR north from Palmdale is also assumed to open in 2029.

Forecasts for this scenario are presented in Table 12.8.

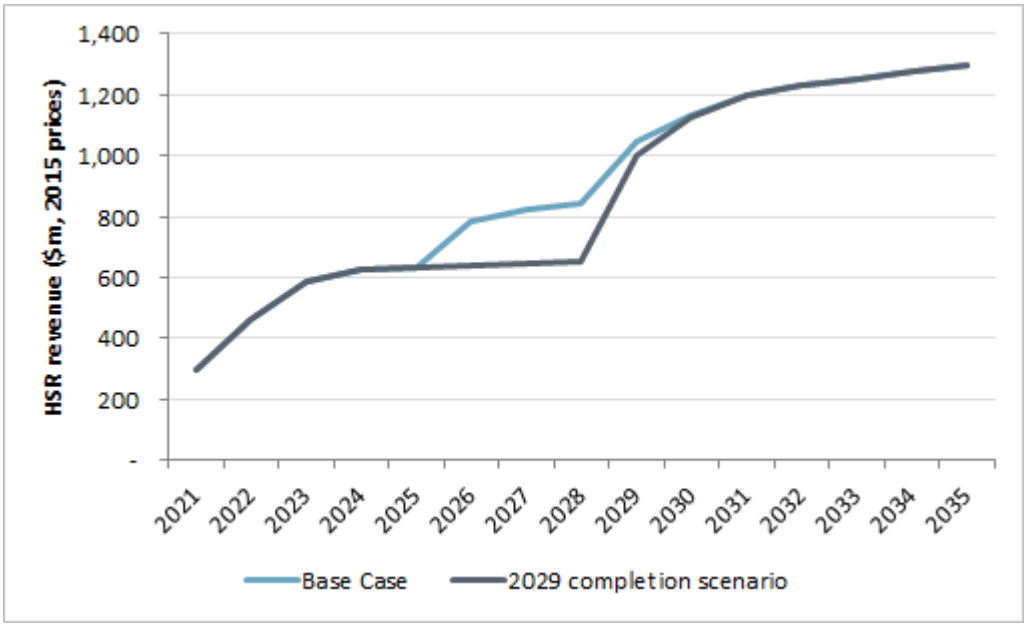
Table 12.8: Summary of annual forecasts for 2029 completion scenario

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.5	29.0	29.9	34.5	37.9	40.8	47.0
HSR capture rate (%)	11%	21%	21%	24%	27%	27%	27%
Captured HSR ridership (million round-trips)	2.9	6.1	6.3	8.4	10.2	10.8	12.6
Induced HSR ridership (million round-trips)	0.2	0.4	0.4	1.0	1.1	1.2	1.4
Total HSR ridership (million round-trips)	3.1	6.5	6.7	9.4	11.3	12.1	14.0
Average HSR round-trip fare ($, 2015 prices)	96	96	96	107	115	117	117
HSR revenue ($m, 2015 prices)	300	626	639	1,003	1,297	1,412	1,632
Net ramp-up assumed (%)	50%	100%	100%	90%	100%	100%	100%

Source: Steer Davies Gleave

Figure 12.6 compares the forecast revenue for this scenario with the Base Case forecasts.

Figure 12.6: Comparison of 2029 completion scenario and Base Case annual revenue forecasts, 2021 to 2035



Source: Steer Davies Gleave

Prior to 2026, the forecasts are consistent.

As a result of the line to Burbank not yet being open in 2026, annual revenue is forecast to be 18% lower than the Base Case, equivalent to just over $140m.

In 2029, when the line to Anaheim (including Burbank) and the connection with CaHSR north from Palmdale are assumed to open, this reduces to just 4% lower, equivalent to approximately $45m.

By 2031, when all ramp-up is assumed to have been completed, the forecasts are again consistent.

Over the entire period between 2024 and 2031, revenue is forecast to be approximately $570m lower under this scenario.

12.2.4 Early completion of HSR between Palmdale and Anaheim

Within the Base Case forecasts, the line to Burbank is assumed to be open in 2026 while the line to Anaheim, as well as the connection with CaHSR north from Palmdale, is assumed to open in 2029.

This scenario assumes that the line to Anaheim (including stops at Burbank and Los Angeles) is fully open in 2024. The connection with CaHSR north from Palmdale is assumed still to be open in 2029.

Forecasts for this scenario are presented in Table 12.9.

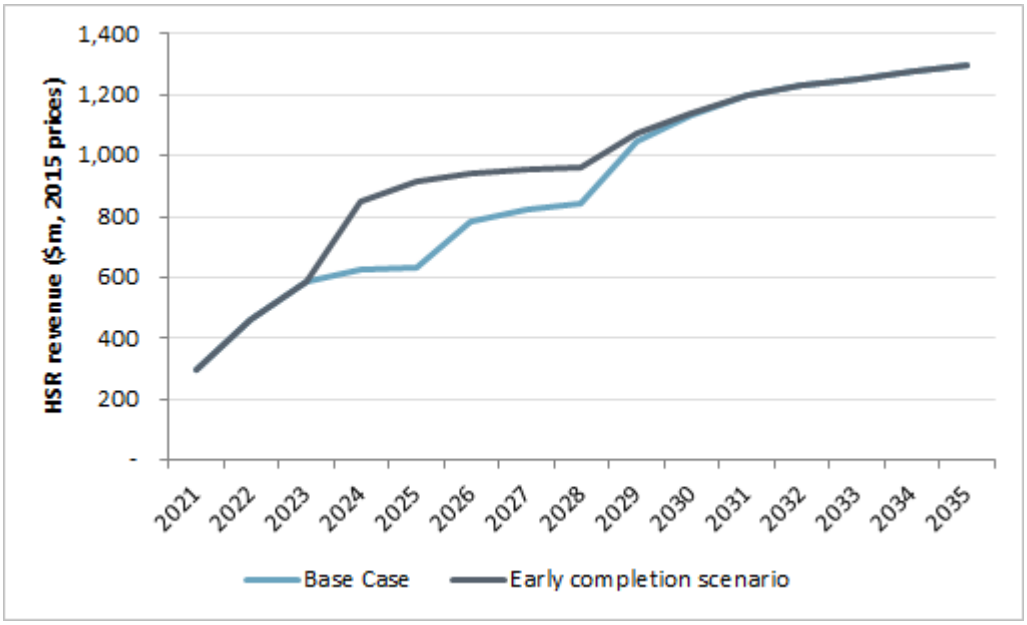
Table 12.9: Summary of annual forecasts for early completion scenario

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.5	29.0	29.9	34.5	37.9	40.8	47.0
HSR capture rate (%)	11%	26%	27%	26%	27%	27%	27%
Captured HSR ridership (million round-trips)	2.9	7.5	8.2	8.9	10.2	10.8	12.6
Induced HSR ridership (million round-trips)	0.2	0.9	0.9	1.0	1.1	1.2	1.4
Total HSR ridership (million round-trips)	3.1	8.4	9.1	9.9	11.3	12.1	14.0
Average HSR round-trip fare ($, 2015 prices)	96	102	104	108	115	117	117
HSR revenue ($m, 2015 prices)	300	852	942	1,076	1,297	1,412	1,632
Net ramp-up assumed (%)	50%	94%	100%	95%	100%	100%	100%

Source: Steer Davies Gleave

Figure 12.7 compares the forecast revenue for this scenario with the Base Case forecasts.

Figure 12.7: Comparison of early completion scenario and Base Case annual revenue forecasts, 2021 to 2035



Source: Steer Davies Gleave

Prior to 2024, the forecasts are consistent.

Upon opening of the HSR section between Palmdale and Anaheim in 2024, annual revenue is forecast to be 36% higher than the Base Case, equivalent to just over $225m.

In 2026, when the line to Burbank is assumed to open in the Base Case, this difference reduces to 21%, equivalent to just over $160m.

In 2029, when the line to Anaheim along with the connection with CaHSR north from Palmdale are assumed to open in the Base Case, this reduces to just 3%, equivalent to approximately $30m.

By 2031, when all ramp-up is assumed to have been completed, the forecasts are again consistent.

Over the entire period between 2024 and 2031, approximately $950m in additional revenue is forecast under this scenario, generated by an additional 7.7 million round-trips.

12.2.5 No change in trip propensity by ethnic group

Within the Base Case forecasts, future trends in participation rates by ethnic groups have been adjusted in future years to reflect the process of acculturation, leading to modified attitudes and adapted behaviors in successive generations. The process can be observed in the differences between the relative visitation rates of various age groups.

In this scenario we test an alternative hypothesis whereby these observed trends do not continue in future years, and therefore the propensity of different groups to visit Las Vegas remains constant.

Forecasts for this scenario are presented in Table 12.10.

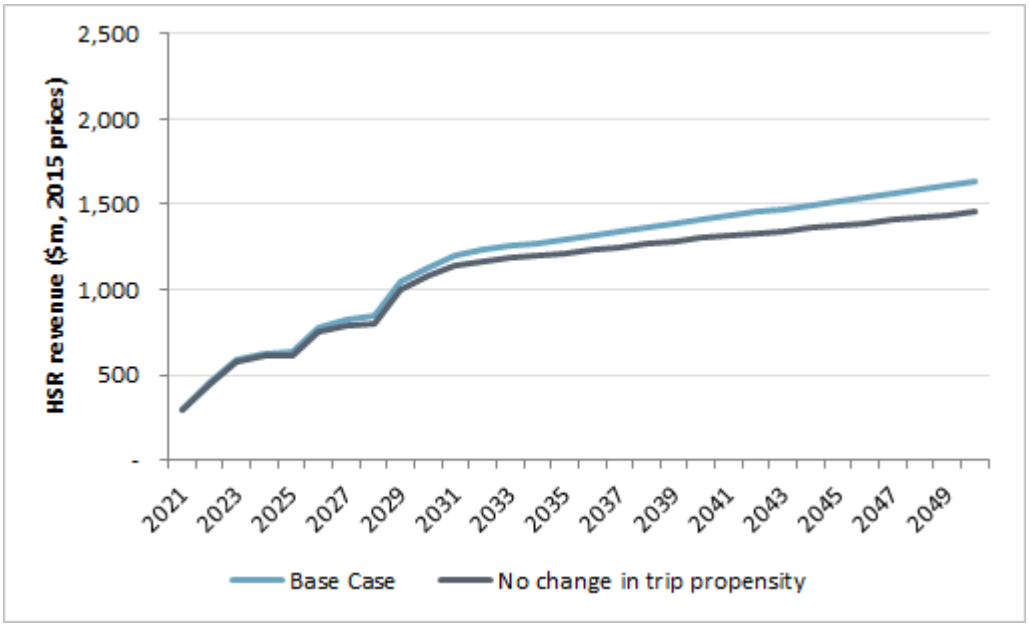
Table 12.10: Summary of annual forecasts for no change in trip propensity scenario

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.1	28.3	29.0	33.1	35.5	37.6	41.9
HSR capture rate (%)	11%	21%	24%	25%	27%	27%	27%
Captured HSR ridership (million round-trips)	2.9	5.9	6.9	8.4	9.5	10.0	11.2
Induced HSR ridership (million round-trips)	0.2	0.4	0.6	0.9	1.0	1.1	1.2
Total HSR ridership (million round-trips)	3.1	6.4	7.5	9.3	10.5	11.0	12.4
Average HSR round-trip fare ($, 2015 prices)	96	96	100	108	115	118	118
HSR revenue ($m, 2015 prices)	295	608	753	1,003	1,215	1,300	1,455
Net ramp-up assumed (%)	50%	100%	96%	93%	100%	100%	100%

Source: Steer Davies Gleave

Figure 12.8 compares the forecast revenue for this scenario with the Base Case forecasts.

Figure 12.8: Comparison of no change in trip propensity scenario and Base Case annual revenue forecasts, 2021 to 2050



Source: Steer Davies Gleave

In the opening year, revenue is forecast to be 2% lower than in the Base Case, equivalent to just over $5m. This increment is forecast to steadily increase in future years, rising to 5% by 2030, 8% by 2040 and 11% by 2050. In the final forecast year this is forecast to result in approximately 1.6 million fewer riders and annual revenue which is approximately $180m lower than the Base Case.

12.2.6 Potential upside from Las Vegas-specific experience

The Base Case forecasts have been developed using best-practice transportation planning techniques applied to the analysis of high-speed rail projects around the world. However, there are certain aspects of this project which do set it apart from its comparators – and which could potentially enhance ridership and revenue:

- **Ramp-up**: Our Base Case adopts ramp-up assumptions that are comparable to those observed internationally, in particular on the London-Paris Eurostar service. The XpressWest Business Plan will incorporate dynamic marketing approaches similar to those expected for opening a new hotel casino in Las Vegas. There is evidence from room occupancies in Las Vegas that ramp-up rates for new resorts is considerably faster than would be expected on HSR services[122]. With the potential for offering rail bookings linked with resort bookings, this may offer an opportunity for an accelerated ramp-up of the initial line.
- **Impact of Las Vegas resort loyalty programs**: All major Las Vegas casinos routinely carry out sophisticated market analysis using data collected from their loyalty programs. Through use of personalized resort cards, the casinos have access not only to standard personal data, such as name, address and contact details, but also the spending habits of each customer on gaming activities, food, drink, retail and entertainment. These databases allow casinos to produce highly targeted marketing material specifically tailored to the needs of their customers. There is evidence that these programs generate substantially greater revenue uplifts than would be expected on HSR services when applying yield management techniques, with up to 15% quoted for Caesars casinos[123].

This scenario assumes that the high-speed rail is able to achieve faster ramp-up and enhanced yield management results than would be typically expected based on international HSR evidence, and instead is aligned with evidence from casino resorts:

- Ramp-up:
  - Year 1: 97% compared to 50% in the Base Case;
  - Year 2: 98% compared to 75% in the Base Case;
  - Year 3: 100% compared to 95% in the Base Case; and
  - Thereafter: 100% in scenario and Base Case.
- Yield management uplift of 15% in line with experience of casino resorts.

Forecasts for this scenario are presented in Table 12.11.

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[122] Following the opening of the Wynn Resort in 2005, high room occupancy rates were immediately achieved (source: Source: Wynn Resorts Form 10K annual filing with SEC). In comparison with occupancy rates achieved at similarly priced rooms at the Bellagio, the rates seen at Wynn were as follows: 97% in 2005; 98% in 2006; 100% in 2007.

[123] CEO of Caesars Entertainment, Gary Loveman said in an interview in 2003: "*The sophistication of concepts that were developed in other industries had never been applied in gaming. … By introducing that system, we've increased our gaming win per room by 15%.*" (Source: In the hot seat, Ryan Underwood, January 2003).

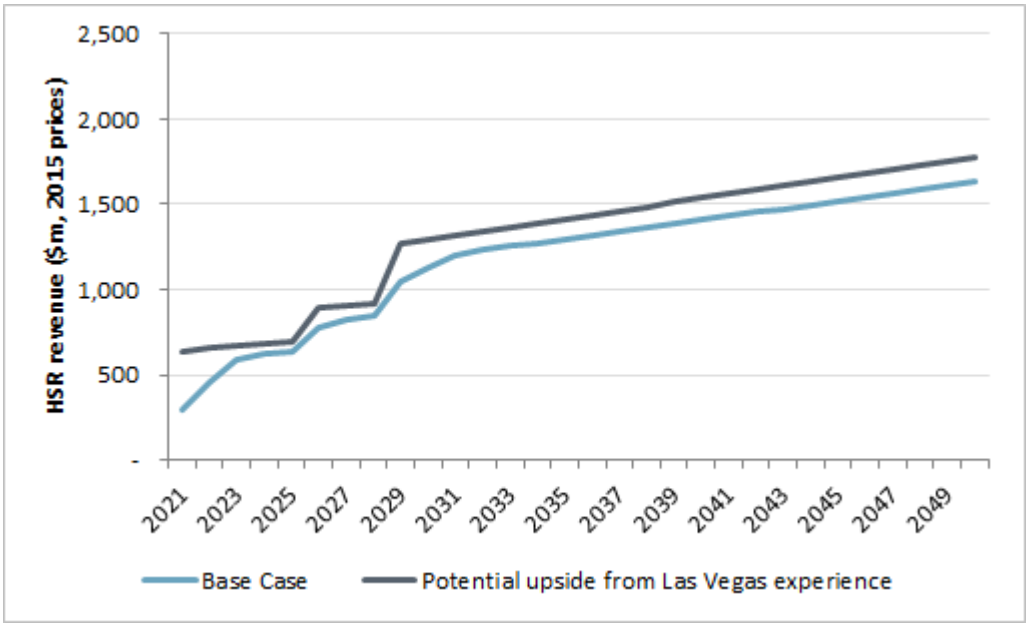
Table 12.11: Summary of annual forecasts for potential upside from Las Vegas experience scenario

Forecast element	2021	2024	2026	2029	2035	2040	2050
In-scope market (million round-trips)	27.5	29.0	29.9	34.5	37.9	40.8	47.0
HSR capture rate (%)	21%	21%	25%	27%	27%	27%	27%
Captured HSR ridership (million round-trips)	5.7	6.1	7.4	9.4	10.2	10.8	12.6
Induced HSR ridership (million round-trips)	0.4	0.4	0.7	1.0	1.1	1.2	1.4
Total HSR ridership (million round-trips)	6.1	6.5	8.1	10.4	11.3	12.1	14.0
Average HSR round-trip fare ($, 2015 prices)	104	104	111	122	125	128	127
HSR revenue ($m, 2015 prices)	635	682	893	1,271	1,413	1,539	1,778
Net ramp-up assumed (%)	97%	100%	100%	99%	100%	100%	100%

Source: Steer Davies Gleave

Figure 12.9 compares the forecast revenue for this scenario with the Base Case forecasts.

Figure 12.9: Comparison of potential upside from Las Vegas experience scenario and Base Case annual revenue forecasts, 2021 to 2050



Source: Steer Davies Gleave

In the opening year, revenue is forecast to be 111% higher than in the Base Case, equivalent to just over $330m. This significant uplift is driven primarily by the ramp-up assumptions. This increment is forecast to fluctuate in each year due to each Phase of the infrastructure opening and the different ramp-up assumptions assumed.

Over the entire period between 2021 and 2031, revenue is forecast to be approximately a cumulative $1,496m higher under this scenario.

In the final forecast year (2050), this scenario is forecast to result in annual revenue which is approximately $170m higher than the Base Case.

12.3 Summary

Many of the tests undertaken have a limited impact on forecasts and therefore demonstrate the resilience of the forecasts across a range of areas of uncertainty. There are a number of key risk areas, including in particular the underlying growth of the Las Vegas market itself and the potential for prolonged stagnation of gas prices. In each case however there is also the potential for upside should the Las Vegas market conditions develop more favorably or the price of gas return to previously observed trends.

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Appendices

A Forecasting assumptions

This appendix provides details of the baseline assumptions for the four primary Phases as well as a comprehensive list of the core modeling assumptions adopted for our Base Case forecasts. We also provide maps of the zoning system adopted within the forecasting model.

A1 Baseline assumptions for primary phases

Outlined below are the service assumptions adopted for each of the four primary phases for evaluation (details of which are provided within section 10).

A1.1 Phase 1: Las Vegas-Palmdale

Outlined below are the baseline assumptions for the following Phase:

1. One-seat high-speed ride linking Las Vegas-Victorville-Palmdale, with transfer to the existing Metrolink services on the Antelope Valley Line or auto access with parking facilities at Palmdale & Victorville.

Table A.1: Phase 1: Baseline HSR service assumptions

Origin station	Total travel time to Las Vegas (peak/off-peak) (mins)	Headway (peak/off-peak) (mins)	Notes
Victorville	80	20/30	-
Palmdale	110		-

Source: CaHSR Business Plan 2016, XpressWest and SDG assumptions

Table A.2: Phase 1: Baseline Antelope Valley Line service assumptions[124]

Origin station	Total travel time to Palmdale (peak/off-peak) (mins)	Headway (peak/off-peak) (mins)	Notes
Burbank	89	60/129	Includes intermediate stops as today
LA Union	108/110		Includes intermediate stops as today

Source: Southern California Regional Rail Authority, 10-Year Strategic Plan and SDG assumptions

Service frequencies for the Antelope Valley line are based upon Scenario 1 as set out in the SCRRA strategic plan[125]:

- Scenario 1: Enhancement of Existing Network: A managed growth scenario based on feedback from Member Agencies of service assumptions they believe could be realistic to fund over the next 10 years:
  - 40 weekday services; 16 weekend services[126].

Wider access to stations:

- High capacity secure car park within short walk of station building – no additional charge at Victorville or Palmdale; parking charges anticipated at all other stations (see detailed assumptions log);
- Rental car agent with bases in Southern California.

A1.2 Phase 2: Las Vegas-Burbank

Outlined below are the baseline assumptions for the following Phase:

2. One-seat high-speed ride between Las Vegas and Burbank, using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville and Palmdale).

[124] Journey times and headways based upon average across Mon-Sun using "no service growth" scenario set out within the SCRRA 10-year strategic plan. Peak is defined as arriving at Palmdale between 11:30-19:30 on Friday heading northbound, and departing from Palmdale between 12:00-20:00 heading southbound, and off-peak defined as all other time periods.

[125] 10-year strategic plan 2015-2025, Southern California Regional Rail Authority, adopted in January 2016.

[126] Currently there are 30 weekday services and 12 weekend services

Table A.3: Phase 2: Baseline HSR service assumptions

Origin station	Total travel time to Las Vegas (peak/off-peak) (mins)	Headway (peak/off-peak) (mins)	Notes
Victorville	80	20/30	-
Palmdale	110		-
Burbank	139		-

Source: CaHSR Business Plan 2016, XpressWest and SDG assumptions

Table A.4: Phase 2: Baseline Antelope Valley Line service assumptions[127]

Origin station	Total travel time to Palmdale (peak/off-peak) (mins)	Headway (peak/off-peak) (mins)	Notes
LA Union	108/110	38/82	Includes intermediate stops as today

Source: Southern California Regional Rail Authority, 10-Year Strategic Plan and SDG assumptions

Service frequencies for the Antelope Valley line are based upon Scenario 3 as set out in the SCRRA strategic plan:

- Scenario 3: HSR Service Integration: A scenario aimed at maximizing the potential of the Metrolink network to feed and distribute trips to and from the California High-Speed Rail (CaHSR) line upon its completion from the Central Valley and Bay Area to its interim terminus in the San Fernando Valley at Burbank:
  - 62 weekday services; 26 weekend services.

Wider access to stations:

- High capacity secure car park within short walk of station building – no additional charge at Victorville or Palmdale; parking charges anticipated at all other stations (see detailed assumptions log);
- Rental car agent with bases in Southern California.

A1.3 Phase 3: Las Vegas to Anaheim

Outlined below are the baseline assumptions for the following Phase:

[127] Journey times and headways based upon average across Mon-Sun with existing service patterns, and assuming peak to be defined as arriving at Palmdale between 11:30-19:30 on Friday heading northbound, and departing from Palmdale between 12:00-20:00 heading southbound, and off-peak defined as all other time periods.

3. One-seat high-speed ride between Las Vegas and Los Angeles Union Station / Anaheim Station using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville, Palmdale and Burbank).

Table A.5: Phase 3: Baseline HSR service assumptions

Origin station	Total travel time to Las Vegas (peak/off-peak) (mins)	Headway (peak/off-peak) (mins)	Notes
Victorville	80	20/30	-
Palmdale	110		-
Burbank	139		-
Los Angeles	148		-
Anaheim	186		-

Source: CaHSR Business Plan 2016, XpressWest and SDG assumptions

Wider access to stations:

- High capacity secure car park within short walk of station building – no additional charge at Victorville or Palmdale; parking charges anticipated at all other stations (see detailed assumptions log);
- Rental car agent with bases in Southern California.

A1.4 Phase 4: CaHSR to NorCal

Outlined below are the initial baseline assumptions for the following Phase:

4. One-seat high-speed ride between Las Vegas and Los Angeles Union Station / Anaheim Station using new CaHSR infrastructure from Palmdale (with intermediate stops at Victorville, Palmdale and Burbank), with an additional connection (requiring a transfer) with CaHSR Phase 1 services into Northern California, with various combinations of stops at:
    - Bakersfield;
    - Kings/Tulare;
    - Fresno;
    - Merced;
    - Gilroy;
    - San Jose;
    - Millbrae; and
    - San Francisco.

Table A.6: Phase 4: Baseline HSR service assumptions

Origin station	Total travel time to Las Vegas (peak/off-peak) (mins)	Headway (peak/off-peak) (mins)	Notes
Victorville	80	20/30	-
Palmdale	110		-
Burbank	139		-
Los Angeles	148		-
Anaheim	186		-
Bakersfield	162	CaHSR from NorCal: 30 HSR from Palmdale: 20/30	Includes transfer at Palmdale, assuming total transfer time of 15 minutes
Kings/Tulare	193		Includes transfer at Palmdale, assuming total transfer time of 15 minutes
Fresno	209		Includes transfer at Palmdale, assuming total transfer time of 15 minutes
Merced	234		Includes transfer at Palmdale, assuming total transfer time of 15 minutes
Gilroy	253		Includes transfer at Palmdale, assuming total transfer time of 15 minutes
San Jose	271		Includes transfer at Palmdale, assuming total transfer time of 15 minutes
Millbrae	303		Includes transfer at Palmdale, assuming total transfer time of 15 minutes
San Francisco	319		Includes transfer at Palmdale, assuming total transfer time of 15 minutes

Source: CaHSR Business Plan 2016, XpressWest and SDG assumptions

Wider access to stations:

- High capacity secure car park within short walk of station building – no additional charge at Victorville or Palmdale; parking charges anticipated at all other stations (see detailed assumptions log);
- Rental car agent with bases in Southern California.

A2 Assumptions log

The following tables outline the core modeling assumptions and sources used within the forecasting framework.

Table A.7: Assumption log: General forecasting assumptions

Item	Description	Source(s)
Forecast base year	2015	SDG modeling assumption
Price base	2015 - all fares, revenues and costs in 2015 prices, net of tax (unless otherwise specified)	SDG modeling assumption
Future forecast years	2022, 2030, 2040 and 2050 Forecasts post 2050 are based upon high-level growth assumptions and are not formally run through the demand forecasting model: • 0.75% growth pa for each the in-scope market, HSR ridership and HSR revenue	SDG modeling assumption
Tax	No specific assumptions on tax	SDG modeling assumption
Ramp-up	Ramp-up is applied in the first few years for each phase of infrastructure development. For the opening of the initial line to Palmdale, and also the connection north with CaHSR, the following ramp-up profile is assumed: • First year of Operation – 50% • Second year of Operation – 75% • Third year of Operation 95% • Thereafter – 100% For the incremental additions of the line to Burbank and then to Anaheim, the following ramp-up profile is assumed: • First year of Operation – 75% • Second year of Operation – 95% • Thereafter – 100%	SDG modeling assumption

Source: As noted for each individual item

Table A.8: Assumption log: Base travel demand

Item	Description	Source(s)
HSR in-scope market	For primary Phases 1 through 3, the core in-scope markets are: • Residents of Southern California going to Victorville/Las Vegas; • Residents of Las Vegas/Victorville going to Southern California; • Non-resident tourists going from Southern California to Las Vegas; and • Non-resident tourists going from Las Vegas to Southern California For primary Phase 4, the following are additional in-scope markets: • Residents of Northern California going to Victorville/Las Vegas; • Residents of Las Vegas/Victorville going to Northern California; • Non-resident tourists going from Northern California to Las Vegas; and • Non-resident tourists going from Las Vegas to Northern California Southern California and Northern California as defined in the section entitled Zone maps Note: Reference above to "Las Vegas" covers the whole of Clark County	The in-scope market has been developed using a large number of sources, including: • NDOT/Caltrans traffic counts on I-15 • Official Airline Guide Flight (OAG) schedule • US DOT T-100 database of air passenger numbers • Steer Davies Gleave Behavioral Survey • OD information generated from Airsage and Streetlight demand data • LVCVA Visitor Profiles For full details see section 7
Market segmentation: Current mode	Auto, air, scheduled bus	SDG modeling assumption
Market segmentation: Origins and destinations	Zoning system includes: • 15 zones to represent Las Vegas • 76 zones to represent Southern California • 59 zones to represent Northern California For details see section entitled Zone maps	SDG modeling assumption
Market segmentation: Journey purpose	• Business and conventions: including corporate events, other business • Tourism: leisure, visiting friends/relatives, vacation	• Steer Davies Gleave Behavioral Survey • LVCVA Visitor Profiles
Market segmentation: Residency	For primary Phases 1 through 3: • Primary: Las Vegas residents, Southern California residents • Secondary: Other (travel to/from Las Vegas via Southern California; commuters from Victorville to Southern California; commuters from Southern California to Victorville) In addition, for primary Phase 4: • Primary: Northern California residents • Secondary: Other (travel to/from Las Vegas via Northern California)	SDG modeling assumption

Item	Description	Source(s)
Market segmentation: Time of travel	• Outbound trip in peak/off-peak • Return trip in peak/off-peak Peak defined as: • Friday northbound: arriving at Victorville station between 12pm and 8pm • Sunday southbound: arriving at Las Vegas station between 10am and 6pm Off-peak defined as: • All other times	• Steer Davies Gleave Behavioral Survey • LVCVA Visitor Profiles
Market segmentation: Group size	1 person 2 people 3+ people	• Steer Davies Gleave Behavioral Survey • LVCVA Visitor Profiles
Market segmentation: Ethnicity	White, non-Hispanic Hispanic African American Asian Other	• California Department of Finance forecasts • Steer Davies Gleave Behavioral Survey
Traffic seasonality	Distribution of traffic by month, day of week and time of day	Auto: • Nevada Department of Transportation (NDOT) day of week and month of year traffic profiles Air: • Official Airline Guide (OAG) published flight schedules for time of day profiles for an average month
Allocation of zones to airports	Initial allocations by county/geographic region from SDG Behavioral Survey Individual zone allocations adjusted so that an airport is not chosen if it is more than one hour further from zone than another airport with flights to/from Las Vegas	• Steer Davies Gleave Behavioral Survey • Google travel times
Bus market	Bus passengers estimated based on volume of scheduled services to/from Las Vegas and an assumed average bus occupancy of 32 people	• Nevada Department of Transportation (NDOT) classified counts • Average bus occupancy estimates from 2010 Steer Davies Gleave Vehicle Occupancy Survey

Item	Description	Source(s)
'Fly-Drive' market	Size of market and mode of travel for foreign visitors based on Visit California statistics Domestic visitors estimated from LVCVA statistics and SDG Behavioral Survey For further details see section 7	• Nevada Department of Transportation (NDOT) classified counts • LVCVA Visitor Profiles • Visit California surveys of foreign and domestic visitors • Steer Davies Gleave Behavioral Survey

Source: As noted for each individual item

Table A.9: Assumption log: Future demand growth

Item	Description	Source(s)
Population forecasts	By county up to 2050, split by: • Age • Gender • Ethnicity	California Department of Finance
Visitation propensity by ethnic group	Forecast of trip rates per capita based on changes in population by age group For further details see section 8	• California Department of Finance population forecasts by ethnicity and age group • Steer Davies Gleave Behavioral Survey
GDP/GRP forecasts	• 2015-20: 3.75% • 2020-25: 2.75% • 2025-30: 2.76% • 2030-35: 2.46% • 2035-40: 2.43% • 2040-45: 2.41% • 2045-50: 2.40%	Center for Business and Economic Research
Las Vegas market growth forecasts	• 2015-20: 4.2% • 2020-25: 3.1% • 2025-30: 2.9% • 2030-35: 2.5% • 2035-40: 2.4% • 2040-50: 2.3%	SDG analysis, based on data from Center for Business and Economic Research

Item	Description	Source(s)
Induced demand	Additional trips by Southern California residents: • Primary Phase 1: 10% uplift in trips; 8% uplift in revenue • Primary Phase 2: 13% uplift in trips; 10% uplift in revenue • Primary Phases 3&4: 16% uplift in trips; 13% uplift in revenue Additional trips by Las Vegas residents: • Primary Phase 1: 2% uplift in trips; 2% uplift in revenue • Primary Phase 2: 8% uplift in trips; 7% uplift in revenue • Primary Phases 3&4: 13% uplift in trips; 11% uplift in revenue Additional trips by Northern California residents: • Primary Phases 1-3: 0% • Primary Phase 4: 12% uplift in trips; 10% uplift in revenue Other US and international residents: 0%	Steer Davies Gleave Behavioral Survey
Busy period premium	Revenue uplift resulting from higher fares in busy periods: 1%	SDG analysis of Las Vegas room rate uplifts for particular special events throughout the year
'Fly-Drive' market	Assumed to grow in line with estimates of overall Las Vegas visitor growth For further details see section 8	Applied Analysis and SDG assumptions

Source: As noted for each individual item

Table A.10: Assumption log: Defining the service

Item	Description	Source(s)
Current costs of driving: Highway journey times	Segmented by peak and off-peak time periods to reflect peak hour congestion Additional time due to fuel/rest stops sourced from 2010 Steer Davies Gleave Behavioral Survey	Primary sources: • Google travel times by time of day • Steer Davies Gleave Behavioral Survey Secondary sources: • SANBAG journey time monitoring tool • Southern California Associated Government (SCAG) Regional Model outputs
Current costs of driving: Gas prices	Average California gas prices as published by EIA for model base year	Energy Information Administration (EIA)
Current costs of driving: Fuel consumption	Average fleet fuel efficiency as published by EIA for model base year	Energy Information Administration (EIA)

Item	Description	Source(s)

Current costs of driving: Highway tolls	Tolls and fast lane charges on: CA-91, CA-133, CA-241, CA-261, I-15 (San Diego)
	• Average toll paid per trip in one direction (2015 prices):
	  • Orange County: Between $0.00 and $5.66/car depending on zone pair
	  • San Diego: Between $0.00 and $0.50/car depending on zone pair
	  • All other locations: no charge
		• www.thetollroads.com
		• www.91expresslanes.com

Current costs of driving: Other Costs	Auto driving costs: • Maintenance and tires based on California fleet VMT (6.3c/mile in 2015) • Mileage based depreciation (5.0c/mile in 2010) Rental car costs: • Applied as increments to Las Vegas residents only – proportion requiring a rental car for onward travel to final destination based on SDG Behavioral Survey • Average cost per day of $42 (2015 prices) Parking charges: • Parking charges assumed to apply only to Las Vegas properties which currently charge for parking (those owned by MGM) • Parking assumed to cost $10 per day (2015 prices) • Average stay length assumed to be 3.8 days • Applied to 26% of the market based on the share of hotel rooms accounted for by MGM properties • Two thirds (67%) of people at these properties assumed to pay for parking (M-Life Pearl members and above qualify for free parking) • Overall this results in an average parking cost for the entire stay of $8.65 (2015 prices)	• http://www.aaa.com/ • http://www.kbb.com/ • http://www.mgmresorts.com/parking/ • Steer Davies Gleave Behavioral Survey • Online rental car quotes from May 2016

Item	Description	Source(s)
Future costs of driving: Highway journey times	Journey times increased over time based on factors from the SCAG Regional Model up to 2040, and SDG assumptions thereafter. Increases applied to peak and off-peak times (as defined above) separately based on differential growth in SCAG model time periods: Peak: • Times increased by 0.32% p.a. between 2015 and 2040 • Times increased by 0.16% p.a. between 2040 and 2050 Off-peak: • Times increased by 0.27% p.a. between 2015 and 2040 • Times increased by 0.14% p.a. between 2040 and 2050 For the I-15 section between Victorville and Las Vegas only, we have assumed that peak journey times increase at half the annual rate shown above, reflecting the fact that a portion of traffic on the highway is anticipated to be captured by HSR	• Southern California Associated Government (SCAG) Regional Model
Future costs of driving: Gas prices	Fuel price growth based on the latest EIA long-term gas price forecasts	Energy Information Administration (EIA) • Annual Energy Outlook 2016
Future costs of driving: Fuel consumption	Changes in average fleet fuel efficiency as forecast by EIA	Energy Information Administration (EIA)
Future costs of driving: Highway tolls	Tolls assumed to remain fixed in real terms	SDG modeling assumption

Item	Description	Source(s)

Current costs by air: Access/Egress	Access/Egress costs:
	• By airport used and segmented by journey purpose, using mode splits Steer Davies Gleave Behavioral Survey
	• Cost of driving same as used for auto
	• Cost of taxis, including services such as Uber/Lyft based on online search including:
	  ◦ Fixed fees
	  ◦ Cost per mile
	  ◦ Cost per minute (if applicable)
	  ◦ Assumed average tip of 15%
	  ◦ Excise tax (3% in Las Vegas only)
	  ◦ Airport surcharge
	• Cost of public transit based on estimated fare by OD from Google
	Access/Egress time:
	• For auto/taxis, including services such as Uber/Lyft - Same methodology as for auto
	• Times by public transit based on estimated times by OD from Google (including journey time and wait time)
	  ◦ Where times are not available for a given OD, assumed to be double the time by auto, plus the average wait time for services to the same destination (up to a maximum of 1.5 hours)
		Primary sources:
		• Google travel times by time of day
		• Steer Davies Gleave Behavioral Survey
		• Online taxi prices from May 2016
		  ◦ http://www.taxicabsla.org/
		  ◦ http://taxi.nv.gov/Rider-Info/
		  ◦ http://www.sandiego.org/articles/transportation/san-diego-taxi-rates.aspx
		  ◦ http://yellowcabsf.com/service/cab-fares/
		  ◦ http://uberestimate.com/prices/
		Secondary sources:
		• SANBAG journey time monitoring tool
		• Southern California Associated Government (SCAG) Regional Model outputs

Current costs by air: Wait time at airport	By airport based on Steer Davies Gleave Behavioral Survey	Steer Davies Gleave Behavioral Survey
Current costs by air: Time from plane to egress mode:	By airport based on Steer Davies Gleave Behavioral Survey	Steer Davies Gleave Behavioral Survey
Current costs by air: Flight time & flights per day	Based on published schedule from OAG	Official Airline Guide (OAG)
Current costs by air: Air fares	Average fares by airport based on the Airline Origin and Destination Survey (DB1B): • Varied by journey purpose based on Steer Davies Gleave Behavioral Survey	• Bureau of Transportation Statistics • Steer Davies Gleave Behavioral Survey
HSR service offer: Opening dates by line segment	2021: Las Vegas to Victorville and Victorville to Palmdale 2026: Including CaHSR infrastructure south to Burbank 2029: Including CaHSR south to LA/Anaheim and north to San Francisco	• XpressWest operating plan • HDC JPA target completion date • CaHSR operating plan • SDG modeling assumption

Item	Description	Source(s)
HSR service offer: Operating times (both directions)	24 hours every day: provision for maintenance will be required necessitating at least part closure during some hours, the impact of which has not been accounted for within the forecasts	SDG modeling assumption
HSR service offer: Operating days (both directions)	365 days per year	SDG modeling assumption
HSR service offer: Fares	• Revenue optimizing fares • Yield management • Net of tax, excluding ancillary revenues	SDG modeling assumption
HSR service offer: Frequency	See section above entitled Baseline assumptions for primary phases	SDG modeling assumption
HSR service offer: Journey times	See section above entitled Baseline assumptions for primary phases	SDG modeling assumption
HSR service offer: Other service assumptions	Reliability: very high, negligible service cancellations and delays Fare evasion: Negligible – no downward adjustment made Classes of travel: • First and coach Rolling stock: • Capacity of 450-600 passengers per train (seated) • High quality, air conditioned, electric multiple units, • Dedicated space for luggage, Wi-Fi, seat guaranteed, at seat entertainment • On-train refreshments via trolley for coach and dedicated lounge/hostesses for first class	SDG modeling assumption
HSR service offer: Station locations	• Victorville Station West of I-15 at exit 161, Dale Evans Parkway • Las Vegas Station west of I-15 on South Valley View Blvd, south of Flamingo Rd • Other stations will be collocated with existing facilities.	• XpressWest operating plan • CaHSR operating plan

Item	Description	Source(s)

HSR service offer: Access/Egress at HSR stations	• Access/egress mode same as for air: combination of auto, taxi & public transit
	• Well signed from highways
	• High capacity secure car park within short walk of station building; no constraint on demand; parking charges apply:
	  • Las Vegas; Victorville; Palmdale: Free
	  • Bakersfield; Kings/Tulare; Fresno: $5 per day
	  • Burbank; Anaheim; Merced; Gilroy; San Jose; Millbrae: $10 per day
	  • Los Angeles, San Francisco: $20 per day
	• Optional valet parking available
	• Transit available from car park to station area where necessary – no additional charge
	• Rental car agent with bases in Southern California to allow for one way rentals
	• Transfer Time: 15 minutes from highway to platform in each direction of travel (including baggage security check)
	
	Las Vegas only:
	• Egress mode: high frequency dedicated shuttle bus serving central Las Vegas locations - no additional charge to any location along The Strip or Downtown
		SDG modeling assumption

HSR service offer: Platforms / station waiting areas	• Easy to find, well sign-posted (e.g. from car parks) • Covered and air-conditioned • Visible staff /customer agents presence • Easy to use ticket machines or ability to buy ticket on board at no extra cost • Secure platforms (access controls) • Retail and refreshments	SDG modeling assumption
Future costs by air: Wait time at airport	Constant in real terms	SDG modeling assumption
Future costs by air: Time from plane to egress mode:	No change from base year	SDG modeling assumption
Future costs by air: Flight time & flights per day	No change from base year	SDG modeling assumption

Item	Description	Source(s)
Future costs by air: Air fares	Proportion of air fares attributable to fuel – assumed to be 1/3rd of total cost - assumed to vary through time in line with fuel price forecast Remaining elements of fare to remain constant in real terms	Energy Information Administration (EIA)

Source: As noted for each individual item

Table A.11: Assumption log: Behavioral assumptions

Item	Description	Source(s)
Auto behavioral assumptions	Values of Time ($/minute): segmented by journey purpose and county of trip origin Value of Time growth: Directly linked in behavioral formulation to average incomes. Incomes assumed to increase in line with forecasts of California Department of Transportation	• Steer Davies Gleave Behavioral Survey • California Department of Transportation – California County-Level Economic Forecast 2015-2040
Air behavioral assumptions	Values of Time ($/minute): segmented by journey purpose and county of trip origin Value of Time growth: Directly linked in behavioral formulation to average incomes. Incomes assumed to increase in line with forecasts of California Department of Transportation	• Steer Davies Gleave Behavioral Survey • California Department of Transportation – California County-Level Economic Forecast 2015-2040

Source: As noted for each individual item

A3 Zone maps

The following data sources were used to establish zones:

- Existing zone systems available from SDG's work for XpressWest, the Southern California Association of Governments (SCAG) model, California Statewide Travel Demand Model (CSTDM) and California High-Speed Rail (CaHSR) model.
- Origin-Destination Demand Data: information about long distance travel in California taken from the CSTDM and compared with other confidential sources.
- American Community Survey Population Data: census tract-level data to determine areas of high population densities, used in placing zone boundaries.
- HSR system, Highway Networks, Airport Locations: other transportation networks referred to as to ensure that most people traveling to or from a zone would use the same route.

The zone system is summarized in Table B.12. Figures B.1 to B.4 display the full zone system, as well as close ups of particular geographic areas.

Table A.12: Summary of zoning system

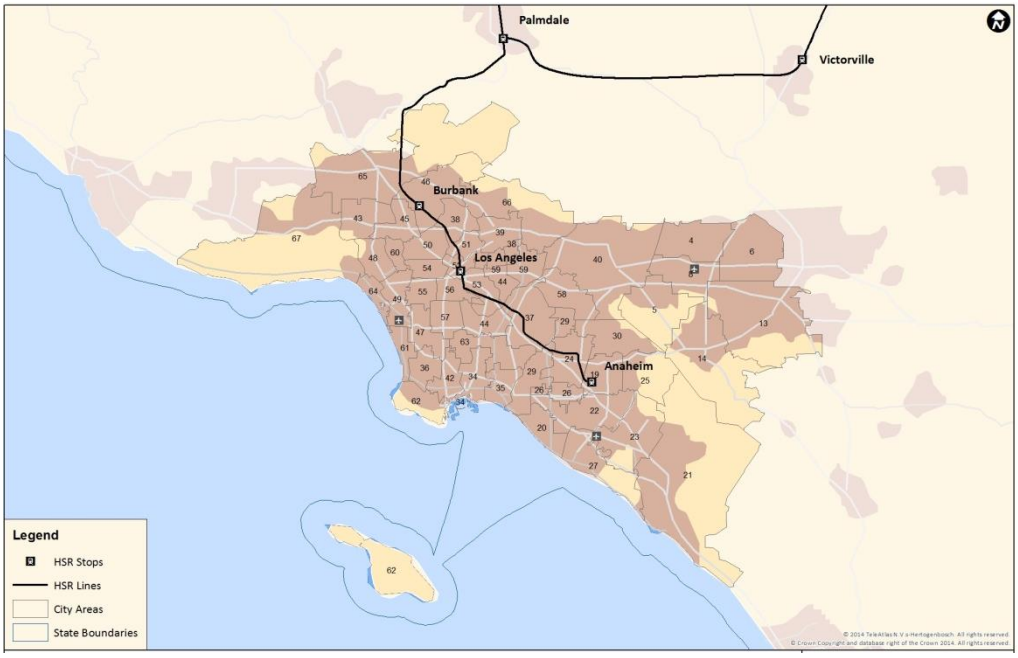
Region	Number of Zones	Avg. Area (sq. mi.)
Southern California	76	1952 (313 Bay Area only)
Northern California	59	570 (110 LA/Orange County only)
Nevada	15	2642 (205 LV metro only)

Source: Steer Davies Gleave

Figure A.1: Full Zoning System

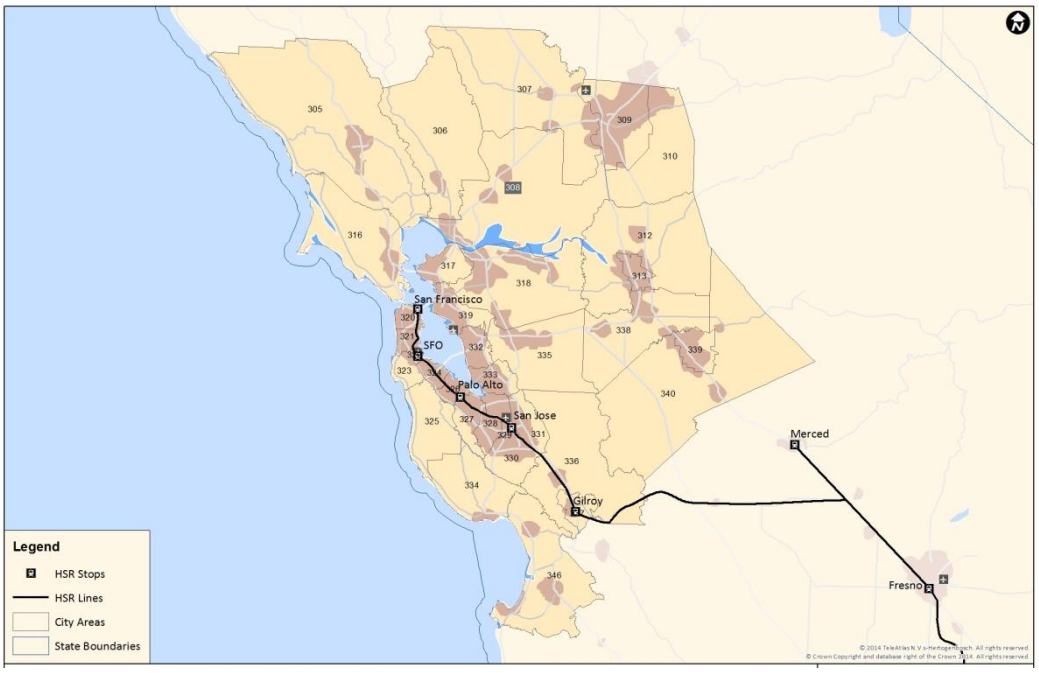
Source: Steer Davies Gleave

Figure A.2: Los Angeles Zones



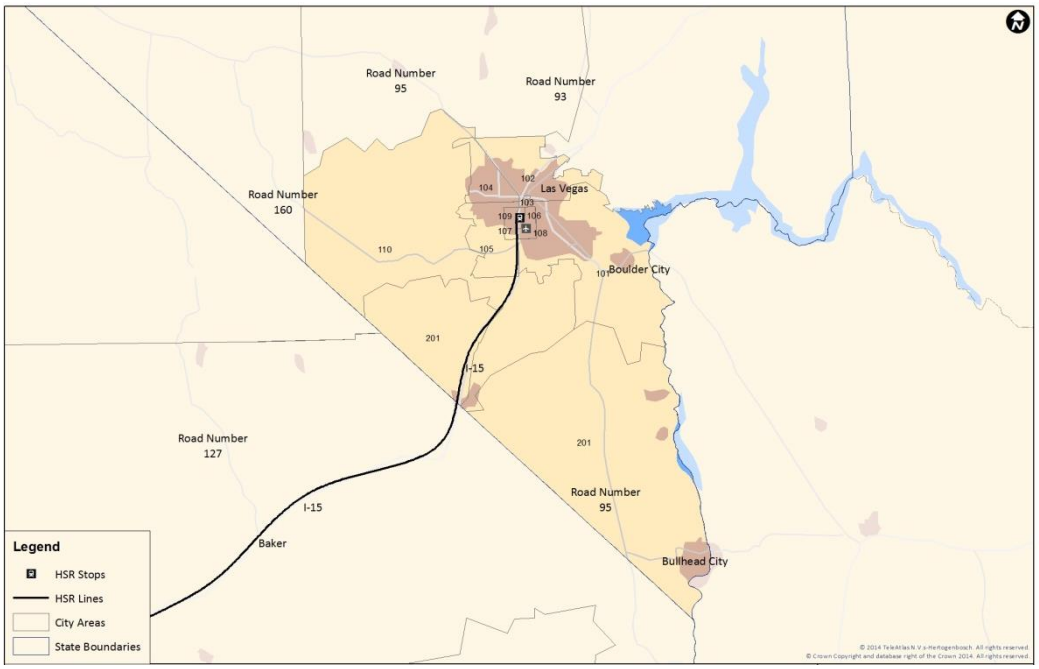
Source: Steer Davies Gleave

Figure A.3: Bay Area Zones



Source: Steer Davies Gleave

Figure A.4: Las Vegas Zones



Source: Steer Davies Gleave

A3.1 Correspondence for Northern California zones

The outputs for Northern presented in this report are grouped into broad geographic regions as opposed to being presented at County level. The following table provides a correspondence list between these.

Geographic region	Counties
Bay Area	Alameda; Contra Costa; Marin; Napa; San Francisco; San Mateo; Santa Clara; Santa Cruz; Solano; Sonoma
Central Coast	Monterey; San Benito; San Luis Obispo
Central Valley	Fresno; Kings; Madera; Merced; Stanislaus; Tulare
Eastern CA	Alpine; Amador; Calaveras; El Dorado; Inyo; Mariposa; Mono; Nevada; Sierra; Tuolumne
Far North	Butte; Del Norte; Glenn; Humboldt; Lassen; Mendocino; Modoc; Plumas; Shasta; Siskiyou; Tehama; Trinity
Sacramento	Colusa; Lake; Placer; Sacramento; San Joaquin; Sutter; Yolo; Yuba
Southern Valley	Kern

Source: Steer Davies Gleave

B Focus groups

This appendix provides the focus groups report developed by Crescent Research Inc.

HIGH DESERT CORRIDOR

QUALITATIVE RESEARCH – 2016 CONCEPT TESTING
ANALYSES AND CONCLUSIONS

PRESENTED BY
CRESCENT RESEARCH, INC.

ON BEHALF OF:
STEER DAVIES GLEAVE

Report Date: March 16, 2016
Data Collection Dates: February 1 – 5, 2016

CRESCENT RESEARCH, INC.

steer davies gleave

TABLE OF CONTENTS

BACKGROUND

Crescent Research, Inc. has been engaged by Steer Davies Gleave (SDG) to conduct qualitative research regarding the High Desert Corridor (HDC), a proposed high speed rail between Palmdale and Victorville. The proposed HDC would facilitate the operation of high-speed trains between Anaheim, CA, and Las Vegas, NV, with stops in Los Angeles and Burbank, as well as Palmdale and Victorville. The proposed rail will also connect to the California High Speed Rail System in Palmdale, with proposed stops in Bakersfield, Kings/Tulare, Fresno, Merced, Gilroy, San Jose, and San Francisco. The purpose of the research is to provide SDG with decision support data and information regarding the attitudes, perceptions, behaviors, motivations and intention of residents in Las Vegas, Southern California, and Northern California regarding the proposed rail service; and particularly in using the High Desert Corridor line between Southern California and Las Vegas.

CONTEXT

This research project is being conducted as one element of an overall research and consulting project to assess consumer perceptions of and potential utilization of High Desert Corridor (HDC). The objective of the overall research project is to give insight into the attractiveness of the HDC service, identify key decision drivers and thereby provide one framework for the project development and future market research studies.

METHODOLOGY

For the qualitative component of the research project, 10 focus groups were held according to the following schedule.

	DATE	TIME	LOCATION	PARTICIPANTS
Group 1	Monday, February 1	6:00 PM	Anaheim	Anaheim residents
Group 2		8:00 PM		Anaheim residents
Group 3	Tuesday, February 2	6:00 PM	Los Angeles	Los Angeles residents
Group 4		8:00 PM		Los Angeles residents
Group 5	Wednesday, February 3	6:00 PM	Fresno	Fresno residents
Group 6		8:00 PM		Fresno residents
Group 7	Thursday, February 4	6:00 PM	San Francisco	San Francisco residents
Group 8		8:00 PM		San Francisco residents
Group 9	Friday, February 5	6:00 PM	Las Vegas	Las Vegas residents
Group 10		8:00 PM		Las Vegas residents

Focus group participants were recruited based on the following qualifications:

1. All had traveled between Southern California/Northern California and Las Vegas at least once in the past 2 years and planned to travel between Southern California/Northern California and Las Vegas at least once in the coming 12 months.
2. They were divided between infrequent (<4 times) and frequent (4+ times) travelers in a 12-month period.
3. They were almost equally divided between those who traveled primarily by car or plane, and for business or leisure.
4. They were represented by diversity in gender, age (25 – 65 years), and household income ($25K - $100K+).

There were 10 participants in each group.

- They state an almost equal preference for car or plane travel
- Most travel with friends and family, although a few travel alone for business purposes only

It should be noted that this report is based on the results of ten focus groups. Accordingly, the results from this research cannot and should not be generalized to the three research universes, Southern California, Northern California and Las Vegas. Terms are used in this analysis that reflect general proportions of respondents, but for individual groups or cities, extrapolating the results in terms of actual percentages to the individual markets is not appropriate.

Some analyses present percentages for all 100 participants. This sample size produces results which can be considered statistically directional, but not valid of the total population.

Verbatim comments are used extensively in this report to reinforce the observations and conclusions and to provide a voice of the customer. For the most part, comments are pulled directly from the transcriptions. There are instances where slight modifications have been made to improve readability. Situations where a single concept has been inserted to reflect the intention and response of the participants are indicated by placing the concept in [brackets.]

EXECUTIVE SUMMARY

This summary combines observations from all focus groups and compiles the information into key strategic issues that are considered paramount to High Desert Corridor.

Strategic Issue #1

TRAVELERS SAY THE PRIMARY BENEFITS OF HIGH SPEED RAIL TRAVEL INCLUDE ITS COMFORT, CONVENIENCE, AND SPEED. THESE ATTRIBUTES TRANSLATE INTO AN OVERARCHING BENEFIT OF GREATER CONTROL OF HOW ONE ENJOYS SPENDING TIME WHILE TRAVELING.

Discussion

Initial responses to the High Desert Corridor concept focus on time elements related to the speed of the train and reduced overall travel time. They quickly consider the comfort and convenience of the experience and how it adds to their overall Las Vegas experience.

Implication

Many perceive High Desert Corridor as an extension of their Las Vegas experience. Vegas begins when the train pulls away from the station. They are free to drink, enjoy the camaraderie of friends, or they can take a nap and be ready to party when they get to Vegas. On the way home, they can avoid traffic, relax, and remember the good time they had. This differs from their current Vegas experience, and is a welcomed option for many.

And for those traveling from Las Vegas to Southern California, they can release any responsibilities associated with driving and enjoy the family from beginning to end. The train serves to extend the vacation.

On the train, the journey can be just as rewarding as the destination.

Strategic Issue #2

TRAVELING VIA HIGH DESERT RAILWAY BETWEEN SOUTHERN CALIFORNIA AND LAS VEGAS IS RECEIVED POSITIVELY DUE TO THE EXPANDED ROUTES FROM VICTORVILLE TO ANAHEIM. THE CONCEPT IS MOST ATTRACTIVE TO CONSUMERS WHO CURRENTLY TRAVEL BY CAR; ESPECIALLY SOUTHERN CALIFORNIA RESIDENTS WHO MAKE THE ONEROUS WEEKEND DRIVE BETWEEN HOME AND LAS VEGAS.

Discussion

With proposed stops in Victorville, as well as in Palmdale, Burbank, Los Angeles, and Anaheim, consumers are very enthusiastic about the idea of traveling to and from Las Vegas via high speed rail. Similarly, Las Vegas residents can envision traveling to Los Angeles and on to Anaheim to visit the beaches and various theme parks. Several wish the train to go to Palm Springs and San Diego as well

However, only a few Californians relate to the idea of, or imagine a time when they might board the train in Victorville. They think it is too far and as some point out, almost halfway to Las Vegas. Several also express safety concerns with Palmdale, saying they will hesitate to leave a car parked there.

Implication

Few are motivated to drive to Victorville to ride the High Desert Corridor at the beginning – most are perfectly happy to wait until the train comes to their market area. Early marketing strategies must motivate drivers to travel to the station and give the train a try – free, safe parking; discounts for the first "x" riders, party buses leaving from the LA area, creative ways to generate trial and usage among first responders and more adventurous souls who want a new experience.

Strategic Issue #3

CONSUMERS WHO TRAVEL BETWEEN NORTHERN CALIFORNIA AND LAS VEGAS VIA SOUTHERN CALIFORNIA ARE LESS POSITIVE ABOUT HIGH SPEED RAIL TRAVEL – NOT BECAUSE THEY ARE OPPOSED TO CHANGING TRAINS IN PALMDALE, BUT BECAUSE MOST DOUBT THE CALIFORNIA HIGH DESERT RAIL CONNECTING NORTHERN TO SOUTHERN CALIFORNIA WILL EVER BE BUILT.

Discussion

Should the California High Desert Rail exist, many think that travel between Northern California and Las Vegas could be a viable option, at least on a trial basis. However, the Northern Californians are not as concerned with the High Desert Corridor portion of the trip as they are skeptical with the California High Desert Rail portion. Many are aware of the political conversations and issues surrounding the train and they simply doubt it will be built in their lifetime.

When they take time to contemplate and discuss High Desert Rail relative to their travels between Northern California and Las Vegas, many conclude that the actual travel benefits may not offset the convenience of flying. Those driving (and there were many) saw advantages of train travel, but only if they could take the train all the way. There is no real advantage to driving all the way to Victorville just to have a train experience.

Implication

In addition to Las Vegas travel, there is some opportunity to market a travel package up and down the California coastline; however, most consumers would prefer to travel farther than Palmdale. They would want to go to Los Angeles or Anaheim and change trains in Palmdale to get there.

Strategic Issue #4

WITH LITTLE FRAME OF REFERENCE, THOSE WHO TRAVEL BY PLANE AND CAR BOTH ARE APPREHENSIVE ABOUT THE COST OF HIGH DESERT CORRIDOR BECAUSE THE CONCEPT APPEARS SO LUXURIOUS. EVEN IF A SPLURGE, BOTH TYPES OF TRAVELERS SAY THEY WOULD AT LEAST TRY THE TRAIN FOR THE EXPERIENCE.

Discussion

The concept of travel by train is intriguing to many participants. It appears to be fun, exciting, and quite luxurious – so well-appointed, in fact, that many participants worry it may be unaffordable. Consumers must be assured of the affordability of traveling by High Speed Rail. However, they will not make travel decisions on costs alone. Most are willing to splurge on a train for a try, but ongoing usage will depend on a winning combination of cost, convenient logistics, and a unique travel experience – one that surpasses the benefits of their current travel modality.

Implication

Competing on cost alone will not be effective. Consumers are interested in hearing about the time they save, but the High Desert Corridor experience must also excel on flexibility, convenience, amenities, and the overall travel experience. And, they should be rewarded for being loyal High Desert Corridor Customers.

Strategic Issue #5

CONSUMERS WANT ASSURANCE THAT THE TRAIN WILL TRAVEL LATE AT NIGHT AND EARLY IN THE MORNING AND WILL BE ON TIME. HOWEVER, MOST DO NOT THINK THAT EVERY 30 MINUTES IS NECESSARY – 4 OR 5 TIMES A DAY MAY BE SUFFICIENT

Discussion

Consumers find it difficult to imagine traffic will require a train every half hour, however they would be delighted if that were the case. The total travel time between destinations presented were acceptable to all except for busy business-only travelers looking for the fastest route. Consumers are more concerned that regardless the schedule, trains will travel on time. The number of stops and potential delays that could be involved is a concern. Even in Northern California, consumers will accept a train change in Palmdale if it runs on time.

Implication

The High Desert Corridor experience must meet expectations for timeliness and convenience. Competing on time savings, consistency and experience must differentiate the overall High Desert Corridor experience from car or plane travel.

Strategic Issue #6

MORE LENIENT BAGGAGE REQUIREMENTS THAN WITH AIRPLANE TRAVEL IS A POSITIVE, AND THE ABILITY TO CARRY MORE BAGGAGE AND ITEMS THAT DON'T FIT ON A PLANE IS A PLUS. THEY ARE DELIGHTED WITH THE IDEA OF REDUCED SECURITY OVER AIRPLANE TRAVEL, BUT NEED TO BE REASSURED THAT SECURITY IS SUFFICIENT TO OFFSET POTENTIAL DANGEROUS SITUATIONS.

Discussion

One of the reasons participants drive to and from Las Vegas is they want to pack as much as they like. Business people are carrying samples, equipment, or supplies. Individuals carry golf bags, gifts, strollers or other items. They want to know if they will be able carry some of the more awkwardly shaped items on the train. They also want to know how their bags will be stowed: will they have to check them, or can they perhaps put them on a rack similar to when they are taking transit to a rental car at the airport? Their preference is not to be required to check bags, and to have them close by if possible.

Implication

Baggage service is another opportunity to delight customers and differentiate the train from airplane or car travel. With relaxed baggage requirements, consumers say they will consider train travel over plane travel, and in some instances, car travel. And for many, the check-through service is wonderful.

Strategic Issue #7

PARKING IS A CONCERN FOR MANY WHO ARE FAMILIAR WITH TRAIN STATIONS IN THE AREA CURRENTLY. SEVERAL EXPRESSED CONCERNS WITH THE COST OF PARKING AT LA UNION STATION AND SAN FRANCISCO. SEVERAL EXPRESSED CONCERNS WITH THE SAFETY OF THEIR CARS PARKED IN PALMDALE – IN FACT, SEVERAL SAID THEY WOULD ONLY GO TO BURBANK. THEY EXPECT MASS TRANSPORTATION AND RENTAL CARS TO BE AVAILABLE ONSITE.

Discussion

Consumers would like parking to be well-lighted with opportunities to choose covered parking if they want. It will be even better if some parking is enclosed. They want some parking to be free, but at the very least less expensive than parking at the airport – more similar to long-term airport parking, only closer to the station. Several say they hope it will be possible for them to avoid parking altogether with good mass transit to and from the station. In Las Vegas, the monorail should come to the station.

They assume rental cars will be available and conveniently located in both cities. However, they also hope High Desert Corridor will partner with mass transportation companies to provide travel to and from events and popular locations so they do not have to rent a car unless they want to.

Implication

Providing safe, convenient and affordable parking will address important safety and convenience criteria held by consumers. They expect to be able to get a rental car if they want one. However, making it possible for consumers to access the station as well as popular destinations without having to park or rent a car will add even more value to the proposition.

Strategic Issue #8

CONSUMERS ANTICIPATE A NUMBER OF AMENITIES, INCLUDING FREE WI-FI, CHARGING STATIONS, AND QUALITY FOOD AND BEVERAGES FOR PURCHASE. THEY ALSO WANT SEATING TO BE SEGREGATED SO ADULT CUSTOMERS ARE NOT SEATED IN THE SAME CAR AS FAMILIES, BUSINESS TRAVELERS ARE NOT SEATED WITH PARTIERS, ETC.

Discussion

Participants generated a number of ideas and concepts regarding services and amenities that they would like to see offered on the train and at the station:

- Wi-Fi/Internet (preferably free)
- Nice quality, healthy drinks and food for purchase
- Alcoholic beverages
- Purpose built/designed cars
  - Car dedicated for children and families
  - Car dedicated for business travelers
  - Car dedicated for adults
  - Seating to accommodate groups other than families
  - Quiet zones
- Different classes of travel (e.g., first class, business class)
- While they like the ability to access their cell phones, they hope there will be designated areas for carrying on phone conversations. They do not want to have to sit and listen to other people talking or playing music and games.

Implication

The desire for various levels of service and amenities is based not only accommodating travelers' own personal traveling style, but also avoiding the travel style of other travelers. The concept of having different cars configured for different travel styles is another way to differentiate train travel from plane travel and will help motivate certain groups, such as families, to give the train a try.

DETAILED FINDINGS

PARTICIPANT TRAVEL PROFILE

In the present study, half the participants were recruited stating a preference for car travel and half a preference for air travel. It is important to point out, however, that most use both modes of travel. The following table presents the travel profile of respondents.

	Southern California		Northern California				Las Vegas		Overall Total	
Trips in past 12 months	**Anaheim**	**Los Angeles**	**Fresno**	**San Francisco**	**Total**	**Percent**	**Total**	**Percent**	**Total**	**Percent**
Car # of Trips	41	60	28	19	**148**	**46%**	77	**62%**	**225**	**50%**
Air # of Trips	40	34	22	74	**170**	**53%**	47	**38%**	**217**	**49%**
Bus # of Trips	3	0	0	1	**4**	**1%**	1	**1%**	**5**	**1%**
TTL # of Trips	**84**	**94**	**50**	**94**	**322**	**100%**	**125**	**100%**	**447**	**100%**

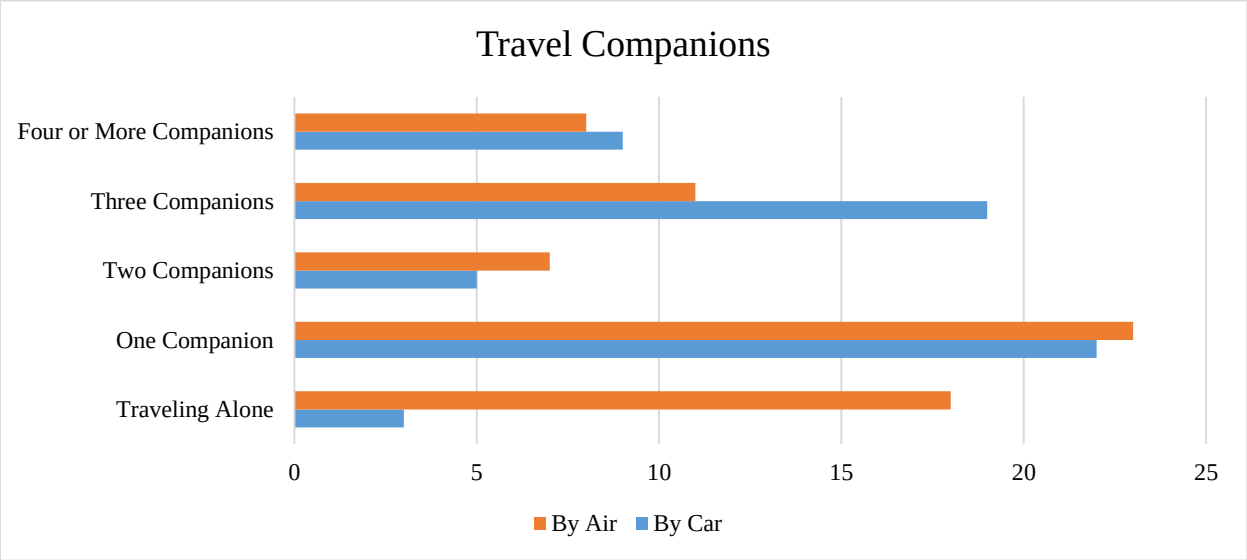
Participants in California traveled almost equally by car and plane last year, while Las Vegas residents traveled to Southern California by car twice as often as by plane.

	Average Trips in the Last 12 Months			
	Car	**Air**	**Bus**	**Total**
Anaheim Average	2.1	2.0	0.2	4.4
Los Angeles Average	3.0	1.7	0.0	4.7
Fresno Average	1.4	1.1	0.0	2.5
San Francisco Average	1.0	3.7	0.1	4.7
California Average	**1.9**	**2.1**	**0.1**	**4.1**
Las Vegas Average	3.9	2.4	0.1	6.3

California participants made an average of 4.1 trips to Vegas last year, about half by air and half by car. The average was lowest in Fresno, with 2.5 trips. Not surprising due to proximity, Los Angeles was more likely to travel by car and San Francisco by plane. Las Vegas residents made an average of 6.3 trips to Southern California, most often by car.

	Average People per Trip		
	Car	**Air**	**Bus**
Anaheim Average	3.3	3.4	2.0
Los Angeles Average	3.1	3.0	-
Fresno Average	3.0	2.9	-
San Francisco Average	3.4	3.4	18.0
Las Vegas Average	3.2	1.7	4.0
Grand Average	**3.2**	**2.9**	**8.0**

Overall, most travel is conducted with two additional people, whether traveling by car or plane. However, air travel is most likely to be conducted alone, most like a function of sole business travelers. The very few who traveled by bus took a charter or party bus with more people. This is an important consideration for High Desert Corridor because travel is a shared experience, and the element of camaraderie is important whatever the travel mode.



Travel by Car

People travel by car for a wide variety of reasons. Four items surface as being most important to consumers.

Cost

Many participants try to save as much money as possible for the Vegas travel experience. They typically travel with other people and share the cost. Many who visit Vegas for family vacations think driving is critical to their staying on budget.

"Well, the thing is you don't share the airfare – you do share your car and gas costs." – Fresno

Shared Experience

The trip is a shared experience with family and friends. Participants who drive say they enjoy listening to music, visiting with one another, and making plans for what to do in Vegas. Naturally, this experience is much more fun on the travel to Vegas than on the return trip home, when traffic can be at a standstill, people are tired and perhaps in a bad mood if they lost money. For Southern Californians, the drive home on Highway 15 is so onerous that some rent a car and drive to Vegas, and then fly home.

"I get to listen to music and I get to visit [with] my beautiful wife." – Anaheim

Flexibility

Many who prefer car travel because it maximizes trip flexibility. They can stop when they want, travel late at night or early in the morning, and enjoy more of Vegas than the strip. Some report that Vegas is a destination where they like to dress up and change clothes often, so they don't want to be restricted by the number of bags they pack and pay for. These car travelers simply adjust their travel times to avoid Sunday afternoon/evening traffic, leaving either very early Sunday morning or Monday.

"Having the car there - that flexibility. I've been able to stay in a resort the whole weekend, see a show, and other times drive around and see different sites, and take the kids up and down the Strip, so you could go to Caesars and the Mandalay and have the whole day." – Anaheim

Personal car in Las Vegas

Many who drive to Las Vegas report that they like having a car when they are there:

- They enjoy activities off the strip, such as golf, hiking and water sports in the surrounding areas.
- They stay off the strip in a timeshare or less expensive hotel.
- They visit family and friends while there and to be able to get around.
- They just like having their own car.

"I can leave whenever I want. I can do whatever." – Fresno

"And if it's going to be a longer trip, I probably will want to take my car because I'm going to want to take my golf clubs." – Anaheim

"With our car or, you know, we go downtown. We go to Fremont Street, and then the hotels and shows and everything along the strip. And of course, if you have your own car, we go to our relatives, or the lake." – Anaheim

However, when asked if the car is a necessity or convenience, they admit it is not a necessity. In fact, some point out that having a car on the strip can be an inconvenience at times. And, when presented with the idea that some hotels may now charge for parking, most agree this could

change their driving behavior in the future. For example, they might look for lodging off the strip with free parking, or they would drive less up and down the strip and use more public transportation.

Travel by Plane

About half the people we spoke with prefer air travel over a car. In Southern California, there are many airlines that offer attractive fares and fly out of airports other than LAX, including Burbank, Long Beach, and Orange County. In Northern California, geography plus low airfares influences the decision to fly rather than drive. Although about half the Las Vegas residents prefer to fly to Southern California, in reality they fly on about 1/3 of the trips they make to Southern California. They rent a car when they get there.

Travel by plane is driven by the following primary reasons.

Speed

Air travelers claim air travel takes less time: the concept of "door-to-door" is not as prevalent as it is among those who decide to drive. While most do not take the entire time associated with air travel into consideration when discussing the speed of flying, several mention that airport security has such a hassle to make them question the time savings.

"I've driven it in the summer and been out there when it's 118 and you're stuck in traffic, and I've driven it through Tehachapi when it's been snowing. My time's too valuable to be just sitting there on the road." – Anaheim

"I try to fly as much as possible, just because I can't deal with the drive. The traffic and it's just that one road. If there's one problem, then you're screwed for hours." – Los Angeles

Cost

Many claim they can fly for less than the cost of driving the car if they plan in advance. Airlines like Allegiant and Spirit have fares lower than $100 if booked in advance, and Southwest regularly offers discounted fares. However, participants in both Anaheim and Fresno point out that the flights are almost always full, and low fares can be hard to get.

"I don't like driving there, right, so whenever I get a very inexpensive trip, you know, flying, I'll just book it just to go on vacation. Just to go there . . . because they used to have good flights, which would be like $60 round trip. – Los Angeles

Fun

People who fly tend to start their vacation when they arrive at the airport. They claim the drive is too boring, and there is no scenery of interest – when flying they can start having fun more quickly. Some parents say that driving in a car full of children is no fun at all. They claim that flying provides just enough distraction to make traveling with children tolerable.

If you're someone who likes to party, you could travel with a group of people and have more fun at the airport. - Anaheim

Business

Those participants who conduct business in and out of Las Vegas fly almost exclusively. The company reimburses for travel, and they want to get in and out as quickly as possible.

"If you're going there for business, you want to be away from the people partying." – Anaheim

"I fly for business. You have to fly; you can't just drive." – Los Angeles

"When I do travel for business, I always fly. – Fresno

Other Travel Logistics

Travel Day/Times

In Southern California, most people traveling by car leave on Thursday evening or Friday morning and return early Sunday morning or on Monday to avoid the traffic. If traveling by plane, the trip is most often a weekend trip. In Northern California they typically go for the weekend if they fly and stay longer if they drive since the drive itself takes most of a day. Travel times from Las Vegas to Southern and Northern California vary widely – just as the reasons for traveling vary. Very few have taken a day trip to Vegas, even for business.

The majority of respondents stay on the Strip. A few report they enjoy outings in the surrounding areas, but for the more frequent travelers are going to gamble, eat, see shows, and have fun on the strip.

Getting Around in Las Vegas

To get around on the strip, most walk or take taxis. Many say they are using Uber and Lyft more often than in the past. Some say they ride the Deuce and Ace buses, or take advantage of free shuttles. Most participants are aware of the monorail and some have ridden it once or twice, but most do not use it regularly. Even those who drive to the city say they do not use their cars on the Strip because traffic is too bad.

"I've taken the monorail, and it was fun."- Fresno

"Walking. We do lots and lots of walking." – San Francisco

CAR TRAVEL TO AND FROM LAS VEGAS

Participants were asked to write the two words that described the best part, and two words that described the worst part of car travel. The attributes associated with the best part of the drive are presented below. The size of the word corresponds with the frequency of mention.

Participants speak even more positively about the company with whom they travel than they do about convenience, cost or control. High Desert Corridor has an opportunity to leverage the concept of train travel as a shared experience; one that is hands-free.

"It is interesting and fun. Interesting because of the scenery and we're usually road-tripping or caravanning."- Los Angeles

"And I like the funky truck stops and the rocky – there are places where there's rocky landscape. That's the best for me. And the worst is driving back and, when you do need a pee break, looking for a place to pull over." – Los Angeles

Conversely, the attributes associated with the worst part of the drive are listed below. Virtually all major negative attributes can be mitigated with the train. The fact that High Desert Corridor avoids the congestion on I-15 addresses the importance of travel flexibility, convenience, reduced stress as much as it does avoidance of actual travel conditions and time savings. And, it makes the end of the trip far more pleasant than when driving.

Congestion and Timing

Participants say congestion is worst in and around the major cities, at the state line where Highway 15 becomes a two-lane road, and from thereafter it could be anywhere there is a stalled car, wreck, or anything else that slows traffic. Once anything goes wrong – including simply leaving at the wrong time – Highway 15 becomes a parking lot.

Long, boring, especially on the way home. All the traffic. You're never going to get there" – Fresno

"It can take thirteen or fourteen hours if you hit traffic, a wreck, or weather." – Fresno

HIGH DESERT CORRIDOR CONCEPT TEST

Existing Train Travel Perceptions

Prior to presenting the High Desert Corridor concept, initial thoughts and perceptions concerning train travel were obtained. Most people are aware of Amtrak trains and the Metro systems. Many have used them to travel up and down the West Coast and in the Northeast, but few use them regularly. A surprising number – at least one or two people in every group – had experienced high-speed train travel in Europe or Asia. In these groups, participants were able to relate their experiences and help set expectations for the other group members.

High Desert Corridor Concept Statement

Respondents were read the following concept statement describing the High Desert Corridor. They were also presented with maps and table illustrating routes and expected travel times. These materials are included in the appendix of this report.

> *Southern California*
> A proposed High Desert Train service is being considered that would link Las Vegas with Southern California. This train will travel at about 150 to 220 miles an hour on dedicated fully electric tracks. There would be no need to change trains – it would go directly from Southern California to Las Vegas. The train will start in Anaheim with stops at Los Angeles Union Station and Burbank. The train line will then route through Palmdale and Victorville and end in Las Vegas close to the Strip.
>
> Trains will depart frequently every day of the week from early in the morning till late at night. Rental cars would be available at all high speed rail stations. In addition, parking will be available at each station with a range of prices from free (e.g. in Victorville) to market rate (e.g. in downtown Los Angeles).
>
> You will be able to purchase your ticket in advance on the internet, over the phone, and through travel and tour operators. There will also be the option of booking at the station on the day of travel.
>
> A wide range of refreshment, retail and entertainment/Wi-Fi facilities would be provided both on the train and at the stations.
>
> All luggage could be taken directly on board – no need to check-in bags. There would be an option to check bags through to your hotel if desired.

Northern California

A proposed High Speed Train service is being considered that would link Las Vegas with Northern California, via a connection in Palmdale. This train will travel at about 150 to 220 miles an hour on dedicated fully electric tracks.

The train will start in Palmdale with a stop in Victorville and end in Las Vegas close to the Strip. Passengers from Northern California would be able to access the High Speed Train directly at Palmdale, or via the proposed California High Desert Rail service (changing trains at Palmdale), which will include proposed stops at: San Francisco, San Jose, Gilroy, Merced, Fresno, Kings/Tulare, and Bakersfield.

Las Vegas

A proposed High Speed Train service is being considered that would link Las Vegas with Southern California. This train will travel at about 150 to 220 miles an hour on dedicated fully electric tracks. There would be no need to change trains – it would go directly from Las Vegas to Southern California. The train will start in Las Vegas close to the Strip with stops at Victorville, Palmdale, Burbank, Los Angeles Union Station and Anaheim. (Note: The Northern California routes were introduced later in the session).

Initial Reaction to High Desert Corridor

Traveling via a high speed railway between Southern California and Las Vegas is received positively. The concept is most attractive to consumers who currently travel by car; especially Southern California residents who make the onerous weekend drive home from Las Vegas.

Consumers who travel between Northern California and Las Vegas via Southern California are less positive about high speed rail travel – not because they are opposed to changing trains in Palmdale, but because most do not think the California High Desert Rail that connects Northern to Southern California will ever be built. And in fact, many are not convinced it should be built. Some express concerns for the state to spend so much money when it has bigger issues like providing enough water, and others are apprehensive about potential risks for the environment.

Las Vegas residents, who make more trips per year to Southern California than vice versa, are quite positive about train travel – primarily if it is affordable. Most residents who fly expect to rent a car to get around anyway, and they can do that just as easily from a train station.

Across all groups, the prominent concern about the train service is potential cost. The pictures they saw show a luxurious experience. And while Vegas itself is viewed as a bit of a splurge, consumers have trained themselves to conserve on travel so they can spend more when they arrive.

Concerns about cost were mitigated when participants were asked to calculate the total cost of travel and talk about it before they completed the pricing exercise. That, plus input from participants who have paid for high speed rail in Europe and Asia resulted in pricing expectations more in line with actual prices.

High Desert Corridor should consider positioning train travel within the context of the total Vegas experience – *you deserve this*. There may also be an education process that prompts consumers to think about what they actually spend versus what they get in return.

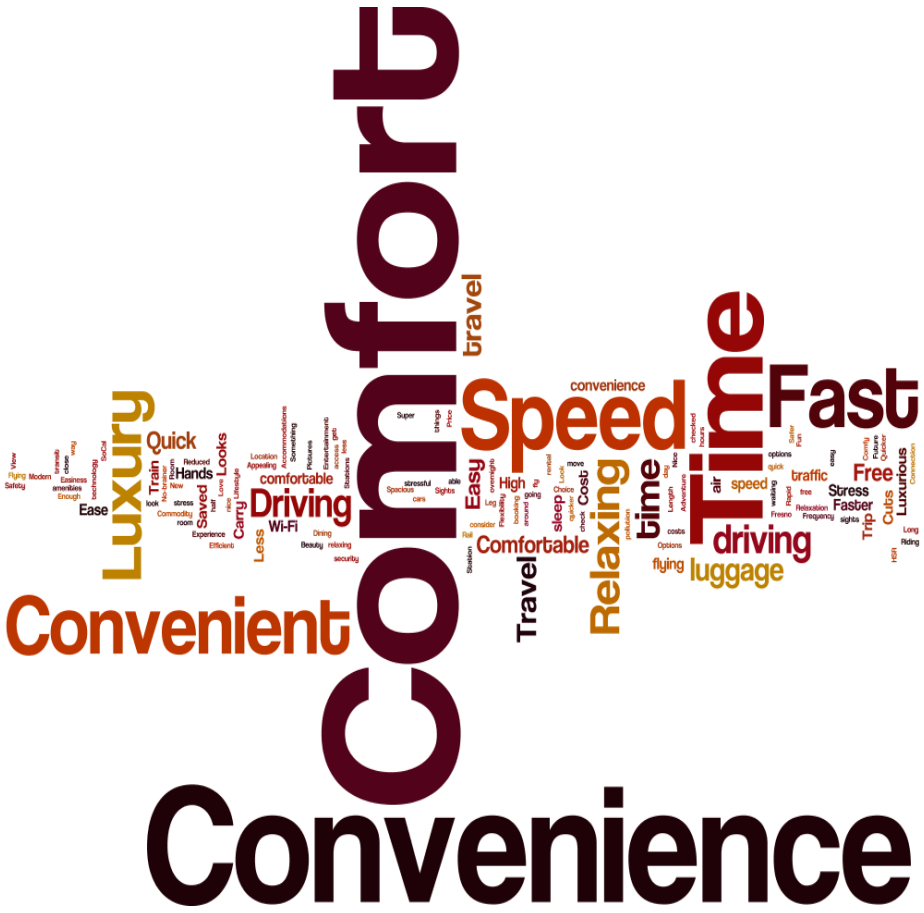
"It's a no-brainer. It's like what I would probably prefer. You have the speed of getting there quicker, but also not having to deal with driving, or going through airport security possibly, or any of the other hassles. I'm assuming it was cheaper than a flight - airplane flight, so that's like the middle option" – Anaheim

"I wouldn't be worried about delays, at all. You could literally go for a weekend, which is just great"- Fresno

"Well, I see the convenience, and I also see it very relaxing. It looks comfortable." – Fresno

Initial Positive Reactions

Participants were asked to write words reflecting what they like about High Desert Corridor. The following graphic presents a visual representation of the results. Word size corresponds with frequency of mention.



Travelers say the primary benefits of high speed rail focus on comfort, convenience, and speed. These translate into an overarching benefit of greater control of how one enjoys spending time while traveling. Most think the train has been a long time coming, and is the answer to their travel needs – if they can afford it.

"Well, I also agree with convenience and the hands-free aspect, and I like to read instead of drive, because I usually get to be the driver." – San Francisco

"I was going to kind of say convenience, too, but in a different way. I get bored, and so I will call my kid and be like hey, we are going to leave tonight. Who do you wants to come with? We are going to go down there. So I like that every half-hour thing. That is awesome to me. I can just go jump on instead of driving five hours - let them do it and rent the car right there. Hey, why not." – Las Vegas

Initial Negative Reactions

Participants were also asked to note words that reflect what they do not like about the High Desert Corridor concept. As before, the following graphic represents the results.

Most notable is that there is a much more diverse array of attributes that consumers mention for their negative reaction than they do for their positive reaction. Consumers are concerned primarily with potential costs, followed by convenience. As they ponder the offering, they are conflicted – some positives become negatives. They want the train to stop at locations close by, yet they worry about too many stops. They welcome the idea of not having to deal with the TSA, but worry if the train will be safe. Car travelers worry they don't have a car once they arrive at their location.

"It is compact with close quarters. And, if you wanted to take it from San Francisco, that's a lot of stops in between." – San Francisco

"I think it depends upon the cost, because it looks like it might be expensive." – Las Vegas

Enticements to High Desert Corridor Trial

Only a minority of participants make spontaneous trips to Vegas. Most people plan their travel at least 2 weeks to a few months in advance to take advantage of "deals" on airfare, hotels, and entertainment. Most say they decide if they are going to drive or fly based on airfares. They typically look for the best deal on a hotel at the same time. They are divided on whether they book dinner and show reservations in advance or just see what is available when they get there.

They would like to be more spontaneous because that adds fun to the Vegas experience, but cheap airfares are hard to come by in the smaller markets and if they have to drive it adds at least one extra day to the trip

High Desert Corridor offers the ability to be more spontaneous in planning a trip to Vegas – and that element alone makes the idea of train travel extremely attractive. For that reason, consumers hope there will be "red-eye" trains so they can take off after work, have a nice nap and be ready to have fun when they arrive in the city. Similarly, if they are having fun on Sunday and want to stay a few more hours, they would have the flexibility to do that, catch a later train, and sleep a little before they get home. This allows late Sunday travel which they now avoid by car due to the congestion.

"This – I could do this in two, three days and say, "You know what? Let's go to Vegas." I don't need a week or pushing the vacation down the road. I – we could – I could be very spontaneous." - Fresno

Wait and See

Few imagine a time when they might be motivated to get on a train that does not travel the full route to Anaheim. They don't envision driving to get on the train in Victorville, even to be part of a new experience. They think it is too far and as some point out, almost halfway to Las Vegas. They are not much more excited about getting on at Palmdale. Several express safety concerns with Palmdale, saying they will hesitate to leave a car parked there. However, from Burbank on they will drive and park to have the experience.

Implication

Few are motivated to drive to Victorville to ride the High Desert Corridor at the beginning – most are perfectly happy to wait until the train comes to them. Early marketing strategies will need to motivate drivers to come to Victorville and give the train a try – free, safe parking; discounts for the first "x" riders, party buses leaving from the LA area to Victorville, creative ways to generate trial and usage among first responders and more adventurous souls who want a new experience.

When asked to think of a time and motivation to spontaneously stop, park, and join the train ride in Victorville, consumers had a few thoughts:

If congestion became worse as they approached I-15 and they began to see billboards – better yet, dynamic billboards that change/update messages – for the train, they might get off the highway, park and ride. The messages would be something about:

- You could be in Vegas in "x" minutes
- How much time one would save
- A low cost fare and free, safe parking
- Time the next train leaves
- Before and after pictures on billboards (Why sit in bumper to bumper traffic when you could relax and have a drink on the train)

"I would drive to Victorville once. Maybe once. For the experience." – Los Angeles

Traveler Security

At first, consumers thought it would be great if they never dealt with TSA security at the airport again. That alone represented an early reason to travel on the train. However with a little discussion, the topic was raised of just how safe the train stations would be:

- Will the parking lots be well lighted and cordoned off from public access?
- Will someone be monitoring unruly passengers who have had too much to drink?
- Will there be some way to be sure people don't bring weapons (knives, guns) on the train?
- Will security guards be on every train "just in case?"

There were mixed opinions of what the level of security should be. Consumers want to be sure the train experience remains upscale, well lighted, clean and safe, and not run the risk of looking like current Amtrak or bus stations. But they want more leniency than they experience in airports.

Regarding the level of screening at the terminal, participants are mixed in just how stringent this procedure should be. Some believe that the screening process should equal that found in airports while others mention that this travel modality does not require this rigorous level of screening because train travel is and should be a more relaxed, casual form of travel.

For some, screening at airports conjures images of waiting and lines which directly conflict with one of the key benefits of taking the train - saving time.

"Usually with trains, you can roll up right to the train ten minutes before and get on and go. And not go through security. Yeah, and you don't have all the TSA." – San Francisco

"Surely there will be something. You don't want someone getting on the train and blowing everything up and all." – San Francisco

Parking

Participants express considerable concern over the parking facilities and associated security that will be present at the train stations. They are apprehensive about their cars being left at a location not knowing what measures exist to protect their vehicle while they are in Vegas. They point out that they would be reluctant to park in any of the train stations that exist currently; especially Palmdale.

Respondents have the following expectations for the Victorville parking facilities. They are concerned that parking at LA's Union Station or the San Francisco Station downtown will be prohibitively expensive. They agree the following features should be present for every station:

- Well lighted
- Guards patrolling the parking lots
- Gated and secure
- Security cameras should be present
- Covered parking should be available
- A shuttle to assist with moving bags to the terminal is desired
- Valet parking as an option

If they charge for parking, I'd probably Uber it or something. – Los Angeles

I would just drive to the Anaheim station and park my car. – Anaheim

Services and Amenities Offered

When the illustrations of what High Desert Corridor might look like is introduced to participants, they describe it as "luxurious" and begin to worry about the cost. They want it to be nice, clean and safe, but in a range that is affordable to the general public. Other that affordable, they are interested in knowing the train service will have the following amenities:

- Wi-Fi/Internet (preferably free) both in the station and on the train
- Charging stations where they can plug in phones and laptops
- Nice quality, healthy drinks and food for purchase. Most do not see the need for restaurant service, but sandwiches, salads, and snacks they can take back to their seats
- Plenty of nice, clean, spacious restrooms – some with changing stations.
- Alcoholic beverages for purchase
- Purpose built/designed cars
  - An area dedicated for children and families
  - A quiet area where business travelers can work and others can sleep
  - Adult-only areas away from noisy children

- Seating to accommodate groups of people who travel together
- A bar car to contain the partiers

♦ Different classes of travel (e.g., first class, business class). They assume these areas will be more like airplanes, where food and drink is available at no additional charge and passengers are served

♦ While they like the ability to access their cell phones, they hope there will be designated areas for carrying on phone conversations. They do not want to have to sit and listen to other people talking or playing music and games

♦ Is clearly differentiated from airline travel in terms of service and experience

Participants mention that they are interested in benefits that relate not only to their experience on the train, but their experience in Las Vegas as well. For example, several really liked the idea of being able to check their bags straight through to the hotel.

The concept of having different cars configured for different travel styles arose in virtually all group discussions. Participants recognize that there are many different travelers with corresponding different travel styles. Ideally, they would like to see High Desert Corridor accommodate those styles with different cars or compartments. The desire for this flexibility is based not only on accommodating their own personal traveling style, but also avoiding the travel style of other travelers.

"We're in California, vegetarian choices of food for sure." – San Francisco

"Wi-Fi needs to be available. And charging stations." – Los Angeles

Luggage Management

The issue of how their personal bags are managed on High Desert Corridor is very important to respondents because of:

♦ Logistical issues
- How many bags they can carry
- Where it will be stored
- How it will be stored
- Safety/security

♦ Timing issues
- Potentially compromises time saving benefit of train travel

Participants travel with all sizes of luggage. Several mentioned that the reason they drive now is because Vegas is a place where they like to bring their best clothes and change often. They do not like being restricted to two bags, or having to pay extra for them.

Many want to store their bags close by where they can see them and know they are safe. However, a dedicated baggage car, if it were to operate similar to a valet service, is also plausible if they can be reassured the bags are locked away where others can't get to them.

Numerous individuals loved the idea of checking their bags all the way through to/from the hotel, if it works. Some are skeptical if their bags will actually get to the hotel, but if they do it's a great service.

"I want plenty of room, at the very least, to put my luggage or at the very least carry on. I can't stand on a plane how you bring your one thing and there's not even room for that. It's so stressful." – Las Vegas

"I could bring a big bag – as much as I want – right on the train with me." – Anaheim

Departure Frequency

Participants were asked how often they felt the train should depart. Most agreed there should be one early in the morning and one late at night, then two or three others throughout the day, perhaps every two or three hours.

When informed that current plans call for High Desert Corridor to depart every 30 minutes, participants express surprise and a little doubt if they could possibly fill that many trains with passengers. If High Desert Corridor could fill the trains, however, the whole experiences would change for the better in consumers' minds: Vegas becomes a much more spontaneous opportunity, which is fun. Participants thought they would take more trips, trips of shorter duration, and more spontaneous trips – maybe even day trips.

"If I know there's one like every, let's say, two hours. Be conservative. Then that opens up a lot of options for me to leave." – Fresno

"They have them leaving a half hour apart? That sounds nuts to me. Good for them." – Las Vegas

High Desert Corridor Cost

Initial reaction to High Desert Corridor focused on cost. In fact, until cost was discussed specifically in the groups, participants had trouble reviewing the concepts itself. They did not want to like it if they could not afford it. They wanted to establish some idea of cost in order to assess the viability and appropriateness of the High Desert Corridor service for them.

Participants were asked to provide three different perspectives on the cost of traveling on the High Desert Corridor.

- How much they would expect a ticket to cost.
- How much they would want a ticket to cost.
- What would be the most they would consider before they decide it is too expensive.

The results are summarized in the following tables.

	High Desert Corridor Coach Ticket Price Expectations					
	Expected Price		Desired Price		Highest Price	
Cost	Count	Percent	Count	Percent	Count	Percent
< $80	7	7%	36	36%	3	3%
$80 - $129	27	27%	40	40%	31	31%
$130 - $179	25	25%	11	11%	24	24%
$180 - $229	19	19%	13	13%	18	18%
$230 +	22	22%	0	0%	24	24%
Total	**100**	**100%**	**100**	**100%**	**100**	**100%**
Average	**$177**		**$103**		**$181**	

	HDC Business / Premium Ticket Price Expectations					
	Expected Price		Desired Price		Highest Price	
Cost	Count	Percent	Count	Percent	Count	Percent
< $80	1	1%	8	8%	1	1%
$80 - $129	11	11%	25	26%	7	7%
$130 - $179	7	7%	17	17%	19	19%
$180 - $229	20	20%	23	23%	24	24%
$230 - $279	12	12%	4	4%	14	14%
$280 - $329	14	14%	13	13%	13	13%
$330 - $379	7	7%	4	4%	4	4%
$380 - $429	8	8%	2	2%	8	8%
$430+	19	19%	2	2%	8	8%
Total	**99**	**100%**	**98**	**100%**	**98**	**100%**
Average	**$311**		**$189**		**$256**	

Additionally, we asked participants to estimate how much they typically spend for the travel portion only of their trip – whether they fly or drive. We asked them to be as inclusive as possible: gas, parking, tolls, tickets, stops, etc.

	How Much do You Usually Spend?					
	Car		Air		Bus	
Cost	Count	Percent	Count	Precent	Count	Percent
< $80	6	7%	0	0%	0	0%
$80 - $129	17	20%	3	4%	2	67%
$130 - $179	21	25%	8	10%	1	33%
$180 - $229	19	23%	19	25%	0	0%
$230+	21	25%	47	61%	0	0%
Total	**84**	**100%**	**77**	**100%**	**3**	**100%**
Average	**$186**		**$303**		**$123**	

Pricing Observations:

- In Coach, the highest price a participant would pay is 2% more than the expected price
- In Business / Premium, the highest price a participant would pay is 18% less than the expected price
- Participants expect to pay 76% more for a Business / Premium fare
- The average highest price a participant will pay is $181 for Coach, and $256 for Business / Premium
    - 86% already pay this for air travel
    - 48% already pay this for car travel
- The average expectation is for the train to cost about the same as car travel and less than air travel

A number of group participants mention that their travel plans to Las Vegas involve perks and benefits. These benefits are typically associated with their hotel stay. Repeat Vegas visitors may be members of one or more loyalty programs associated with hotels and casinos.

Some take this experience and generalize it to the High Desert Corridor experience. They mention different pricing programs and potential packages that could be coordinated with the train service.

- Package deal with hotels
- Package deals with rental cars
- Frequent user discount
- Lower cost for off-peak travel
- Group discounts
    - Families, party groups

Participants are mixed regarding whether they would purchase tickets in advance or the same day. Many report that the train would represent a novel method of travel for them, so it would be a spontaneous decision to try it and would therefore purchase their ticket the day of travel.

Las Vegas Terminal Location

Participants expect the terminal to be somewhere near the Strip, and they would welcome the opportunity to bypass McCarran Airport. They could see this being an opportunity to build a monorail to the station and motivate more people to use it. They expect a full range of mass transportation at the station: taxis, hotel shuttles, buses, and rental cars. They envision it working similarly to airport travel.

Those traveling from Las Vegas to Southern California definitely expect rental cars at all the train stations. This is the way they travel around Southern California when they fly currently.

Service Increments

Consumers were presented with the idea of the train opening in increments. First they were asked about the train opening at the Burbank station, with Amtrak and Metro available from Anaheim and LA Union station. Most in Anaheim and LA were amenable to driving to Burbank. They said they would probably just drive to Burbank because it isn't far away. Traveling from Burbank was acceptable to motivate most to still take the train.

However, we then asked about the train starting at Palmdale with a stop at Victorville. Both of the stations met with far greater resistance. Several participants were not familiar where Palmdale is located and assumed it to be much further away than it is in reality. Others were familiar with Palmdale and said it was not an area where they would be comfortable parking and leaving their car.

Almost no one would drive to Victorville to catch the train. Most pointed out they were halfway to Vegas already – so why bother parking the car at that point?

"Would we need to factor in the cost of another ticket to get from LA to the train in Palmdale? Because all that matters as well. Then it's definitely not a great deal." – Los Angeles

"It's like a mental bubble that people in L.A. have when things are far out [as Palmdale]. They're like, it's not worth it. And Burbank, it's still worth it to me, for some reason." – Los Angeles

Potential Future Technology

Finally, participants were asked their opinions of self-driving vehicles and if they would take a ride in one. About a third of participants would definitely ride in them as soon as they become available. Another third plan to wait and see how safe they are, but do not rule out the possibility of riding in one at some point. The remainder do not plan on getting in one at any point because they fear they are not safe.

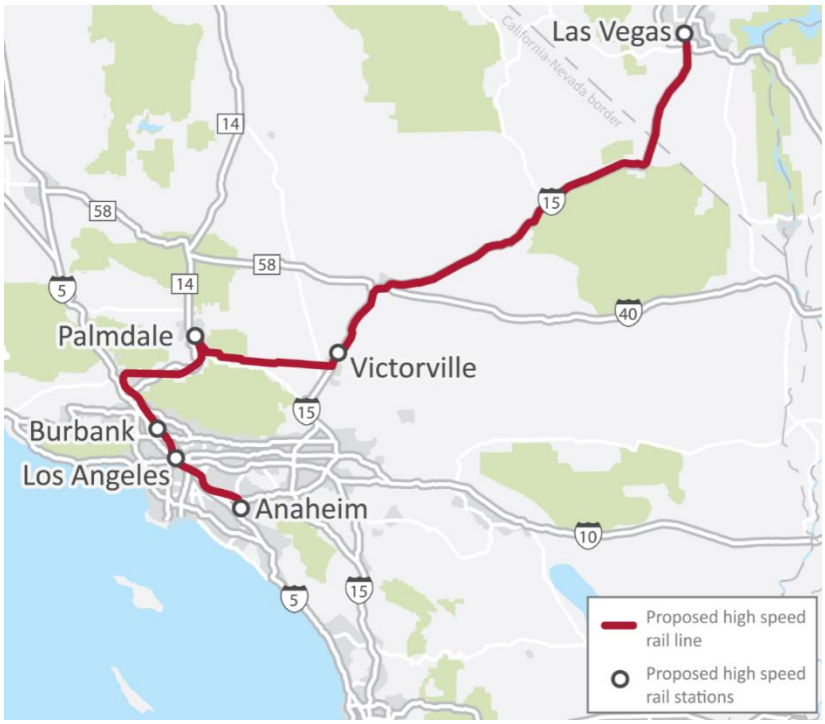
"I don't – that thing is completely out of your control. You're putting your whole life in jeopardy." – Las Vegas

"I would but I suspect it would be very expensive because you're not having the stress of driving. You're being driven to and back so I would think that it would be out of my budget." – Las Vegas

APPENDIX

Images

Maps and Travel Times



From	To	Total Travel Time (h:mm)
Anaheim	Las Vegas	2:45
Los Angeles	Las Vegas	2:20
Burbank	Las Vegas	2:10
Palmdale	Las Vegas	1:45
Victorville	Las Vegas	1:20

From	To	Total Travel Time (h:mm)
Las Vegas	Victorville	1:20
Las Vegas	Palmdale	1:45
Las Vegas	Burbank	2:10
Las Vegas	Los Angeles	2:20
Las Vegas	Anaheim	2:45
Las Vegas	Bakersfield	2:35*
Las Vegas	Kings/Tulare	3:10*
Las Vegas	Fresno	3:25*
Las Vegas	Merced	3:50*
Las Vegas	Gilroy	4:10*
Las Vegas	San Jose	4:25*
Las Vegas	San Francisco	5:10*

*Includes a 15 minute transfer time at Palmdale

From	To	Total Travel Time (h:mm)
San Francisco	Las Vegas	5:10*
San Jose	Las Vegas	4:25*
Gilroy	Las Vegas	4:10*
Merced	Las Vegas	3:50*
Fresno	Las Vegas	3:25*
Kings/Tulare	Las Vegas	3:10*
Bakersfield	Las Vegas	2:35*
Palmdale	Las Vegas	1:45
Victorville	Las Vegas	1:20

*Includes a 15 minute transfer time at Palmdale

From	To	Total Travel Time (h:mm)
Fresno	Las Vegas	3:25*
Kings/Tulare	Las Vegas	3:10*
Bakersfield	Las Vegas	2:35*
Palmdale	Las Vegas	1:45
Victorville	Las Vegas	1:20

*Includes a 15 minute transfer time at Palmdale

Discussion Guide – Southern California only

1. Introduction 00:00

A. Introduce purpose of discussion
   i. Work for independent marketing research company.
B. This discussion is for market research only.
C. We are recording our discussion this evening.
D. There are no right or wrong answers. We need your complete honesty and candor.
E. Purpose of discussion is to talk about travel to and from Nevada, specifically to and from Las Vegas.

2. Respondent background 00:05

I want to spend a few moments to understand a little more about you.

A. Your name
B. Where do you live and how long you have lived there?

3. General travel experience 00:10

A. Generally speaking, how many times a year do you travel to Las Vegas?
B. Have the number of visits you make increased or decreased in recent years?
   i. If so, why?
C. When was the last time you traveled to Las Vegas?
D. Why do you go to Las Vegas?
   i. Gaming, shows, clubs, restaurants, spas, weddings, etc.?
E. Have you traveled to the Victorville area in the past? [show map]
   i. If so, why?
   ii. How often?
   iii.

4. Specific travel discussion 00:15

Planning your trip and mode choice

A. How far in advance do you decide how you are going to travel to Las Vegas?
   i. Do you book your accommodation/shows/other activities at this time also?
B. How much flexibility do you have when you can leave?
   i. Both traveling to and from Las Vegas
C. In the **past year**, how many times have you traveled to Las Vegas by Car? Plane? Bus? Other?
   i. [PARTICIPANTS RECORD ON WORKSHEET BY **#1 A. – D**.]
D. Which is your preferred method of travel to Las Vegas?
   i. What are the most important attributes that factor into your decision?
E. Are there any reasons why you do not choose other modes of travel?
   i. For example, if you drive, why do you not fly?
      - PROBE: Faster, less expensive, negative airport experience
F. Who do you typically travel with?

i. Alone, group, spouse, family, children

G. Do you use different modes depending on who you travel with? Or without?
   i. Family, friends, colleagues?
H. Do you use different modes if you travel at different times of year?
   i. If so, why? (heat in summer, traffic volumes during special events, etc.)

In Las Vegas

I. Once you arrive in Las Vegas, where do you typically stay? [Strip, Downtown, family, friends, other]
J. How long do you usually stay in Las Vegas?
   i. Are you staying for more or less nights than you have done in the past (last few years)?
K. In general, once you arrive at your destination, hotel or resort, how do you get around Las Vegas?
   i. Monorail, walk, Deuce, ace, taxi, Uber/Lyft, rental car, personal car, free shuttles, other, or don't leave resort
L. Have you ever made day trips to Las Vegas?
   i. What was the reason for the day trip?

5. Car travel to/from Las Vegas 00:30

A. Why do you like to drive to Las Vegas?
   i. Why do you choose it over flying or other modes of travel?
B. Do you own or lease your car? [show of hands]
C. Do you ever rent a car for your trip instead of using your own/leased car? [show of hands]
   i. If so, why?
D. How many people are usually in your car? Write down in **BOX #1 A.** on the sheet.
E. Do you normally use your car during your stay once you have arrived in Las Vegas?
   i. IF YES: Why do you need your car in Las Vegas? What do you use it for in Las Vegas?
      - PROBE: travel to casinos/ restaurants/shows, shopping malls, grocery stores, touring etc.
      - Do you consider your car in Las Vegas a necessity or a convenience?
   ii. Would it be a problem or not if you did not have a car in Las Vegas?
      - Why?
      - What would you rely upon if you did not have a car in Las Vegas?
   iii. If Las Vegas resorts/properties started charging for parking (say approx. $10/night), would this change your decision to travel by car?

Travel time and congestion

F. What day of the week do you usually start your trip to Las Vegas?
   i. What time of day?
   ii. Do you plan to leave at a certain time to avoid congestion?

G. What day of the week do you usually start your return trip home from Las Vegas?
    i. What time of day?
    ii. Do you plan to leave at a certain time to avoid congestion?
H. How would you classify the drive?
    i. Write down four words you would use to describe the drive.
        - Two words that describe the **best** part of the drive in **BOX #2 A.** and two that describe the **worst** part of the drive in **BOX #2 B.**.
I. How long does the drive usually take?
J. How often do you experience congestion on the drive?
    i. How much does it vary throughout the trip?
    ii. Where is congestion usually worse? [prompt for route numbers]. Write next to **#3**.
    iii. What's the longest drive, either to or from Las Vegas that you have experienced?
    iv. Assume the drive time could be reduced by one hour. What would you do with this extra hour? Does it matter?
K. How would you rate the condition of the highways you use to drive to Las Vegas?
    i. Are there areas that are worse than others?
    ii. Which roads are good and bad and why?
L. What part of the drive do you consider to be the worst?
    i. Is it the same in both directions of travel?
M. What part of the drive do you consider to be the best?
    i. Is it the same in both directions?
N. Do you build in extra drive time for delays? Accidents? Congestion?
    i. Do you plan on extra time in both directions? How much?
    ii.

Routes

I want to know a little more about the route you take to Las Vegas.

O. What route do you usually take to get out of Southern California?
    i. Do you plan the route and figure out timings or just jump in the car?
    ii. Do you typically use the same route or follow best route suggested by a routing map (e.g. Google maps, IPhone maps, Waze, etc.)?
    iii. Rely on sat-nav?
P. At what point do you typically intersect with I-15?
Q. Do you ever stop along the way anywhere?
        - If so, why? For how long?
R. Do you ever take Highway 14/Antelope Valley Freeway to cut across to I-15?
    i. If so, how much time do you expect to save going this way versus an alternate route?
    ii. If not, if the drive on Highway 14 were faster in the future, would you consider taking it?

Costs

S. When you travel to Las Vegas, do you have a set budget in mind?
   i. Do you consider the cost of travel part of your budget?
T. How much do you usually spend on the trip for travel only? Write next to **#4**.
   i. Who pays: split between the group, one person, employer?
U. Has the reduction in gas prices changed how often you drive to Vegas?
   i. Has it changed how you choose to travel [car v air or bus]?
   ii. How would changes in gas prices impact your decision to drive in the future?
   iii. PROBE: If gas prices doubled what would you do?
V. For those of you who have never driven to Las Vegas, why not? PROBE: Specific reasons.

6. Air travel 0:45

A. Why do you choose to fly to Las Vegas?
   i. Why do you prefer to fly rather than drive or some other mode of travel?
B. What is the most important factor when booking your flight?
   i. PROBE: Price, airline, departure time, arrival time.
C. What airport do you typically depart from?
   i. Why do you choose this airport? (nearest, further but cheaper flight, etc.)
D. How far in advance do you normally book your ticket?
   i. What time of the day do you normally like to depart?
   ii. Do you have problems finding a flight at an acceptable price for the time when you want to travel or do you typically have to adjust your schedule?
E. How often do you book a last minute flight to Las Vegas with little or no advance planning?
F. What day of the week do you usually start your trip to Las Vegas?
   i. What time of day? And why?
G. What day of the week do you usually start your return trip home to California?
   i. What time of day? And why?
H. How much is the typical round trip airfare to Las Vegas?
   i. Who typically pays for your travel? You? Employer?
I. We talked before about your Las Vegas budget. How does airfare factor into this?
J. How many people are typically in your immediate travel party? Write down in **BOX # 1. B.**.

Getting to and from the airport

K. How do you usually get to the airport in Southern California?
   i. PROBE: Drive and park, dropped off, shared shuttle, transit (what), taxi, limo.
L. How long does it take for you to get to the airport in Southern California?
   i. Do you encounter traffic congestion?
M. Do you keep track of how much it costs you to drive to and park at the airport in Southern California?

i. If you parked at airport: how much do you pay per day for parking?

N. How much time before your flight do you arrive at the airport in Southern California?

O. Once you land, how do you get from McCarran Airport to your final destination?
   i. PROBE: Rental car, picked up, transit (what), taxi, Uber/Lyft, limo, hotel shuttle, other?

P. How long does it take for you to get from McCarran Airport to your final destination?
   i. Do you encounter traffic congestion?

Q. For those of you who have never flown to Las Vegas, why not?
   i. PROBE: Specific reasons.

7. Bus travel 0:55

A. Why do you choose to take the bus to Las Vegas?
   i. Why do you prefer to take the bus rather than drive or fly?

B. What is the most important factor when booking your bus trip?
   i. PROBE: Price, bus company, departure time, arrival time, frequency of departure.

C. Which company do you typically use?
   i. Why do you choose this company? (nearest, cheapest, most reliable, etc.)

D. What day of the week do you usually start your trip to Las Vegas?
   i. What time of day?
   ii. Do you plan to leave at a certain time to avoid congestion?

E. How long does it take for you to get to the bus station in California?
   i. Do you encounter traffic congestion?

F. How long does it take for you to get from the Las Vegas bus stop to your final destination?
   i. Do you encounter traffic congestion?

G. How do you travel from the Las Vegas bus stop to your destination?

H. What day of the week do you usually start your return trip home to California?
   i. What time of day and why?
   ii. Do you plan to leave at a certain time to avoid congestion?

I. How many people are typically in your immediate travel party? Write down in **BOX #1. C**.

J. For those who have never taken a bus to Las Vegas, why not?
   i. PROBE: Specific reasons.

8. Familiarity with High Speed Train 1:00

A. Have you ever been on a true High-Speed Rail train such as in Europe or in Asia? (TGV, Shinkansen, etc)
   i) Where?
   ii) For what purpose? How long was trip?

9. Introduction to High Speed Train services 1:05

A proposed High Speed Train service is being considered that would link Las Vegas with Southern California. This train will travel at about 150 to 220 miles an hour on dedicated tracks. There would be no need to change trains – it would go directly from Southern California to Las Vegas. The train will start in Anaheim with stops at Los Angeles Union Station and Burbank. The train line will then route through Palmdale and Victorville and end in Las Vegas close to the Strip.

[Show map of full HSR route from Las Vegas to Anaheim]
[Map to show indicative times from each station to LV]

Trains will depart frequently every day of the week from early in the morning till late at night. Rental cars would be available at all high speed rail stations. In addition, parking will be available at each station with a range of prices from free (e.g. in Victorville) to market rate (e.g. in downtown Los Angeles).

You will be able to purchase your ticket in advance via the internet, over the phone, and through travel and tour operators. There will also be the option of booking at the station on the day of travel.

A wide range of refreshment, retail and entertainment/Wi-Fi facilities would be provided both on the train and at the stations.

All luggage could be taken directly on board – no need to check-in bags.

A. Overall, what are your thoughts about this concept?
B. What are the top two things that you like about this?
    i. Please write these down on the paper in front of you in **BOX #5. A**.
C. What are the top two things that you do not like about this?
    i. Please write these down on the paper in front of you net to **BOX #5. B**
D. How likely are you to use this high speed train to travel to Las Vegas?
E. What are the most compelling reasons why you would use this train service?
    i. These may or may not be the things that you like about the train service.
F. What do you consider to be the biggest reasons why you would not use this train service?
    i. These may or may not be the things that you do not like about the train service.
G. How does the concept compare to driving all the way? And compared to flying?
    i. Under what situation would you use this?
        - PROBE: short duration trips, cost, starting your holiday/trip sooner, staying longer/return later?
    ii. For what types of trips would you use the train? All? Some? With whom?

10. Specific views about the High Speed Train service 1:10

A. If you were to use this train service, which station would you likely use and why?
   i. Write down preferred station next to **#6**.
   ii. Note how many would do the following:
      - Joining at [X] station (closest to train origin) and take the train from there
      - Travel to intermediate [Y] station (to intercept line) and take the train from there
      - Would not use train

B. If you were to use this train service, how would you prefer to get **from your origin to the station in California**?
   i. PROBE: personal car, rental car, get a lift, resort shuttle service, taxi, Uber/Lyft,

C. If you were to use this train service, how would you prefer to get **from the Las Vegas station to your destination**?
   i. PROBE: rental car, get a lift, resort shuttle service, taxi, Uber/Lyft, monorail

D. Many of you drive to Las Vegas. During the drive, what would make you stop and take the train rather than just keep going to Las Vegas?
   i. PROBE: congestion levels on drive there
   ii. Consider that you were driving to Las Vegas and you were approaching one of the stations and you started seeing billboards for the train. What message would make you consider stopping and taking the train?
   iii. How likely are you to stop?
   iv. If you don't stop, why do you keep going?

E. For those who currently travel to Victorville area
   i. Would you consider using the train to travel to Victorville? **[We are not interested in travel to Palmdale, make sure respondent understand this is to Victorville]**

About the service and your trip

F. Thinking about the train itself, what amenities or services would you like to see provided on the train? What amenities or services would make you more likely to take the train?
   i. PROBE: first/business class, quiet zones, Wi-Fi, streamed entertainment, restaurant car, full bar, etc.?
   ii. Which ones are most important?
   iii. Which are least important?

G. How frequently should the train service run?
   i. Would this frequency have any influence on whether or not you took the train?

H. What hours should the train operate (how early or late)?

I. What do you think about the journey times [table of station to Las Vegas times]?
   i. How do you compare this to the time involved with flying?

- PROBE: Take into account travel time to/from airport, parking, airport security, etc.

ii. How do you compare this to the time involved with driving?
iii. How do you compare this to the time involved with taking a bus?

J. Would taking the train make you alter your departure times to and from Las Vegas compared to what you do now? By how much?
K. How much should a regular coach round trip ticket cost per person for this train service?
   i. Write down two prices:
      - What you expect: in BOX # 7. A. What you want: **in BOX # 7. B**
   ii. What would be the most you would consider before you decided it was too expensive? in **BOX # 7. C**
L. Assume that, like air travel, there is business/premium and coach. How much should a business/premium round trip ticket cost per person for this train service?
   i. Write down two prices:
      - What you expect: **BOX # 8. A**. What you want: **BOX # 8. B**
   ii. What would be the most you would consider before you decided it was too expensive in **BOX # 8. C**
M. What types of discounted ticket options would you expect to see?
   i. (PROBE if necessary: group fare, advance bookings, mid-week, seniors)
N. If you were to use the train, would you prefer to book your ticket in advance or buy a ticket when you arrived at the station?
O. Which would you prefer: tickets that offer flexible travel times, or tickets that are for a specific certain departure time?
   i. PROBE: A flexible ticket would be subject to availability and may mean waiting if trains are full
   ii. Would you pay extra for a ticket that provides limited flexibility in travel time but a guaranteed seat? For example, a 4 pm departure, but you can leave plus or minus one hour.

Train/station facilities

P. Thinking about the station, what specific facilities or services could be provided that would make you more likely to take the train?
   i. PROBE: valet parking, hotel check-in, Wi-Fi, food, bar, etc.
Q. What types of facilities or other services would you like to see available at the stations?
   i. Facilities: shops, refreshments, entertainment, hotel accommodations, etc.
   ii. Feeder services: buses, monorail, taxis, Uber/Lyft, hotel shuttles

TRAVEL BEHAVIOR

R. Would the availability of the high speed train make you travel to Las Vegas more than you do now?
   i. Would you make more short duration trips?
   ii. Would you be any more likely to make day trips?

S. Would you alter your travel times to and from Las Vegas compared to what you do now? How?
T. On balance / all in all could this work for you? How does the concept compare to driving all the way or flying? Now that we have been talking about this, in what situation would you use this?

11. Service Increments 1:30

The new high speed rail service may open in stages.

Service Increments - Part 1

A. If the high speed rail service was to start from Burbank, 12 miles north of Los Angeles (so conventional rail service (Amtrak/Metrolink) would still be available at stops in Los Angeles or Anaheim) how would this change how you would travel to Las Vegas? Note that all stations would offer the same level of service and similar amenities as introduced earlier in Section 8.
    i. Note how many would now:
        - Use the same station as before (not LA Union or Anaheim)
        - Travel to Burbank station and take the train from there
        - Travel to Palmdale station and take the train from there
        - Travel to Victorville station and take the train from there
        - Would not use train

    ii. For those who would change to using Burbank station – how would you get there? [Probe mode]
B. How does the concept compare to driving all the way? To flying ? To taking the bus?
    i. Under what situation would you use this?
        - PROBE: time saving, cost, starting your holiday/trip sooner?
    ii. For what types of trips would you use the train? All? Some? With whom?

Service Increments - Part 2

C. If the high speed rail service to Las Vegas was to start from Palmdale with a stop in Victorville, (so conventional rail service (Amtrak/Metrolink) would still be available from Anaheim, Los Angeles and Burbank) would this change how you would travel to Las Vegas? Note that all stations would offer the same level of service and similar amenities as introduced earlier in Section 8.
    i. Note how many would now:
        - Use the same station as before (not Burbank, LA Union or Anaheim)
        - Travel to Victorville station and take the train from there
        - Travel to Palmdale station and take the train from there
        - Would not use train
D. How does the option compare to driving all the way? To flying ? To taking the bus?

i. Under what situation would you use this?
   - PROBE: time saving, cost, starting your holiday/trip sooner?

ii. For what types of trips would you use the train? All? Some? With whom?

POTENTIAL FUTURE TECHNOLOGY

E. Imagine that fully self-driving vehicles become available in the market and other people were using it, how likely will you be to take a ride in it (e.g. as a drive to work, taxi or rental car)?
   i. Probe: Definitely, very likely, somewhat likely, not likely, definitely not, indifferent/hard to say/neutral
   ii. Do you think this would be more or less attractive than existing cars for a long distance trip to Las Vegas?

12. Conclusion 1:45

A. Are they any other final comments or questions you have about this proposed High Speed Train service?
   i. Good points?
   ii. Bad points?

B. Thank the participants for their time.

C Behavioral research

This appendix summarizes the behavioral research undertaken.

Contents

Figures

Tables

1 Introduction

1.1 This document forms Appendix C to the High Desert Corridor Investment Grade Ridership and Revenue Forecasts report.

1.2 In January through April 2016, Steer Davies Gleave undertook a program of behavioral research. This included:

- Focus groups; and
- On-line behavioral surveys

1.3 An important stage in producing ridership forecasts is developing an understanding of how people behave. In the context of the High Desert Corridor (HDC), this applies principally to those traveling between California and Las Vegas. Understanding how people behave allows us to establish what is important to people when they make choices, particularly with respect to making travel decisions.

Focus groups

1.4 Focus groups are in-depth discussions with eight to twelve participants, lasting between one and a half and two hours. Each group is a structured conversation between all participants using a pre-determined discussion guide. The discussion is led by an experienced moderator who guides the conversation.

1.5 Focus groups provide a rich source of information on a wide range of topics. Respondents are encouraged to discuss their experiences and opinions in detail. Focus groups are a key component in the process of survey design for any follow-up surveys. They provide information on how to focus the questionnaires in terms of what is important, what questions to ask and in the case of technical or complex topics, what language to use.

On-line behavioral surveys

1.6 Behavioral surveys are used to elicit quantitative information from larger groups of people (compared to those who participate in focus groups). Surveys are designed to collect a wide range of contextual, attitudinal and choice data. Choice data refers to the likelihood that a person might elect to use high-speed rail (HSR) in the future over the mode of travel they are currently using for a similar trip. Choice information can be collected using a combination of Stated Intention and Stated Preference (SP) techniques.

1.7 Additional contextual and attitudinal information allows us to establish demand and behavioral segmentations in the potential market. Choice data is a mechanism for deriving a set of behavioral

parameters which then form an input to the forecasting model. These behavioral parameters include sensitivity to the transportation aspects of the service such as perceived time and cost, as well as the more experiential aspects which are estimated through an alternative specific or mode constant.

About stated preference

1.8 Stated Preference is a survey technique concerned with understanding people's preferences, and how they use those preferences to make choices. Stated Preference techniques have been developed over the last 30 years by academics and practitioners and are a growing social-science, used to model behavior in many different markets.

1.9 In Stated Preference, research respondents are presented with choices between hypothetical but realistic alternatives, with each alternative being described in terms of their characteristics or "attributes". Alternatives are realistic as they are based around a real life experience, the Stated Preference frame. This ensures that the attributes are based on respondent's actual perceptions. By varying the values of these attributes in a carefully controlled way, we can learn about how much importance people attach to them on the basis of the choices they make.

1.10 Research shows that if respondents are asked about one attribute at a time, they tend to overstate its relative importance, because it is hard for respondents not to feel that everything is important. The Stated Preference approach resolves this problem by measuring the value of each attribute relative to the others. It does this by asking respondents to assess whole service descriptions, then decomposing those assessments to infer the relative values of the attributes.

1.11 We measure the relative importance respondents attach to each attribute by varying these attributes in a controlled and systematic manner using experimental designs. These designs are chosen so we can be sure to be able to measure the relative importance of each attribute. They are tested prior to the full survey using computer simulation and pilot surveys.

This document

1.12 The remainder of this document is structured as follows:

- Chapter 2: The methodology used in our research;
- Chapter 3: Description of the behavioral survey sample profile;
- Chapter 4: Specific discussion of the characteristics of the auto market;
- Chapter 5: Specific discussion of the characteristics of the air market;
- Chapter 6: Opinions expressed with regards to the HDC project; and
- Chapter 7: Our resultant choice modeling used to forecast HDC ridership.

2 Methodology

2.1 The behavioral research has been undertaken in two stages: focus groups and an on-line behavioral survey. In this section we describe the methodology for each in turn.

Focus groups

2.2 Ten focus groups were carried out in locations in Northern California, Southern California and Las Vegas. The dates and locations of the groups are summarized in Table 2.1. Groups were organized across five different locations in order to understand differences in travel experiences and perceptions as well as potential propensity to use HDC.

2.3 Discussion guides were developed jointly between Crescent Research Inc. and Steer Davies Gleave for different geographies: Northern California, Southern California and Las Vegas.

Focus group recruitment and locations

2.4 Respondents were recruited by telephone using panel datasets held by each focus group facility. Respondents were asked a number of screening questions. To qualify for participation, respondents were required:

- To have traveled between California and Las Vegas at least once in the past two years and/or planned to travel between California and Las Vegas at least once in the coming 12 months; and
- To be between 25 and 65 years old with a household income of $25,000 or higher.

2.5 Participants were categorized as infrequent (<4 times) and frequent (>4 times) travelers in a 12 month period. They were also categorized as typically traveling by auto or air and for business or leisure travel purposes. These criteria were set to ensure that participants were representative of the range of travelers between Las Vegas and California.

2.6 Two groups with local residents were undertaken on each date at each facility. 98 participants were involved in total.

Table 2.1: Focus groups dates and locations

ID	Date	Market	Location	Participants
1	February 1, 2016	Southern CA	Anaheim	20
2	February 2, 2016	Southern CA	Los Angeles	18
3	February 3, 2016	Northern CA	Fresno	18
4	February 4, 2016	Northern CA	San Francisco	24
5	February 5, 2016	Las Vegas/Clark County	Las Vegas	18

Source: Steer Davies Gleave / Crescent Research Inc. 2016

Focus group format

2.7 The discussion covered the following broad topic areas.

Table 2.2: Focus group discussion areas

Topic	Issues included
General experience of travel	How often Time since last trip Journey purpose
Specific experience of travel	Which modes used and why Traveling alone or size and nature of group Number of days spent away Day of week and time of travel Any access or egress modes used Whether recent changes to oil prices have affected travel decisions
Auto travel	Reasons for choosing to drive Attitudes to the drive Drive time Cost Worst part of the drive Experience of unexpected delays Routes used, whether travel through Antelope Valley
Air travel	Reasons for choosing to fly How far in advance flight was booked Typical choice of airport Time allowed between origin and flight departure Typical air fare
Train travel	General perceptions Previous experience
General introduction to HSR	Initial reactions to HSR

Topic	Issues included
Detailed discussion on HSR	How much it should cost Service frequency Hours of operation Facilities expected at parking, station, on train Station access Station egress Preferred station under different infrastructure options Ticketing options
Summing up and conclusions	

Source: Steer Davies Gleave / Crescent Research Inc. 2016

2.8 A standalone report on the focus group findings has been prepared by Crescent Research Inc. and is provided in Appendix B.

On-line behavioral survey

2.9 On-line behavioral surveys were carried out between March and May 2016. Surveys were developed for travelers between California and Las Vegas with different variants for the three main markets:

- Southern California to Las Vegas;
- Northern California to Las Vegas; and
- Las Vegas / Clark County residents to California (distinguishing between trips to Northern and Southern California areas).

Survey structure

2.10 The survey was designed to capture more quantitative information, building on what had been learned in the focus groups. The broad structure of the survey is shown below.

Table 2.3: On-line behavioral survey structure

Section	Focus of questions
Screening	Ensure a trip made between CA and Las Vegas (either direction) in past two years Aged 21 years or more
Basic trip information	Time since most recent trip Most recent trip mode of travel Most recent trip day of the week Most recent trip journey time Most recent trip group size and composition Most recent trip cost Most recent trip purpose
Introduction to HSR	Interest in using it Most desired features Reasonable price levels Preferred station
Up to eight SP choice scenarios between current mode and HSR	Outbound journey travel Return journey time Round-trip cost per person

Follow up questions	Reasons for having chosen current mode or HSR Information about stay in Las Vegas (if applicable)
Segmentation and socio-demographic/economic information	Household income Employment status Experience of using HSR

Source: Steer Davies Gleave

Recruitment

2.11 Respondents were recruited for the surveys via two channels: commercial panels and postcard distribution.

2.12 To qualify for the survey, respondents needed to be aged 21 years old or more, and have made a trip between California and Las Vegas in either direction in the past two years, at least once by auto or plane.

The online panel survey

2.13 The panel survey was launched in two waves:

- A soft-launch with 182 respondents between Friday March 25 and Monday, March 28, 2016.
- The main survey between Wednesday, March 30 and Tuesday, April 12, 2016 with 2,000 respondents.

2.14 The objective of the soft-launch survey was to: ensure there were no programming “bugs”, test the functionality of the questionnaire, check the response rate and to undertake a thorough analysis of the Stated Preference responses. No significant changes were made following the soft-launch; with changes limited to small text amendments.

Postcard distribution

2.15 100,000 postcards were printed and distributed inviting respondents to take part in the survey between March and May 2016.

2.16 Postcards had a unique six digit numerical password on the reverse side, which could only be used to access the survey once. Respondents accessed the same survey as those being recruited via the online panel. An incentive was provided to encourage people to complete the survey.

Figure 2.1: Final Postcard Front

Source: Steer Davies Gleave

MGM Properties

2.17 Approximately 19,000 postcards were distributed across eleven MGM properties: MGM Grand, Circus Circus, Mirage, Bellagio, Aria, Vdara, New York New York, Excalibur, Luxor, Mandalay Bay and Delano at Mandalay Bay. Postcards were handed out at check-in, and entirely based on the cooperation of the MGM resorts.

Las Vegas Convention Center

2.18 Approximately 1,000 postcards were distributed at the Las Vegas Convention Center – specifically at the ATA Taekwondo convention on March 30 and April 2 2016[1].

Yermo Agricultural Inspection Station

2.19 The Agricultural Inspection station is located at Yermo, near Barstow, between exits 196 and 198 of I-15. It is operated by the California Department of Food and Agriculture. All vehicles traveling southbound into California are obliged to slow and pass through the inspection gates. There are five lanes in total with one used exclusively for trucks.

2.20 Postcards were distributed to all private vehicles passing through the station during the week commencing April 23 2016. Approximately 51,000 postcards were distributed.

Response rates

2.21 Over 4,000 responses were achieved from 3,356 auto and 716 air travelers. Overall the response rate from the postcard distribution was 3.3%

[1] Additional conventions had been targeted but arrangements were not able to be finalized

Table 2.4: Behavioral survey response rates, all recruitment channels

Number of contacts	Online panel	Yermo	Las Vegas locations	Total
Contacted	n/a	51,000	19,590	>70,000
Responded	4,042	2,094	266	6,402
Passed screening and in-scope	**2,154**	**1,799**	**119**	**4,072**
Existing auto traveler	1,472	1,799	85	3,356
Existing air traveler	682	-	34	716

Source: Steer Davies Gleave

3 Behavioral survey sample profile

3.1 Over 4,000[2] on-line surveys were carried out between March and May of 2016: approximately 80% with auto travelers and 20% with air travelers.

3.2 Respondents were sampled from Southern California (54%), Northern and Central California (17%), Clark County NV (24%) with the remainder coming from elsewhere traveling via California (5%). This chapter describes the socio-economic and demographic characteristics of these respondents as well as their general travel behavior.

3.3 Information from Southern California is presented at a county level whereas information from Northern and Central California is aggregated into six regions: Bay area, Central Coast, Central Valley, Eastern CA, Sacramento and Southern Valley.

Main mode of travel

3.4 Table 3.1 shows the composition of main mode of travel by area of residence.

[2] Note however that not all questions were answered by all participants, or in some cases results were screened out due to inconsistencies in responses. Accordingly a smaller sample of approximately 3,400 is used for most of the results presented in this section.

Table 3.1: Composition of the sample by main mode of travel

County/Area	Air	Auto	Total
Los Angeles	5.2%	19.3%	24.5%
Orange	0.8%	7.5%	8.4%
Riverside	0.3%	4.5%	4.8%
San Bernardino	0.1%	6.9%	7.0%
San Diego	1.4%	5.1%	6.5%
Imperial	0.0%	0.2%	0.2%
Santa Barbara	0.1%	0.4%	0.5%
Ventura	0.2%	1.9%	2.1%
Total Southern CA	**8.2%**	**45.8%**	**54.0%**
Bay Area	6.6%	4.4%	11.0%
Central Coast	0.1%	0.4%	0.5%
Central Valley	0.7%	2.9%	3.6%
Eastern CA	0.1%	0.1%	0.1%
Sacramento	0.1%	0.5%	0.6%
Southern Valley	0.1%	1.2%	1.3%
Total Northern & Central CA	**7.6%**	**9.5%**	**17.1%**
Las Vegas	2.4%	21.9%	24.2%
Other (International)	0.2%	1.2%	1.4%
Other (U.S.)	0.4%	2.8%	3.2%
Total Non-California	**3.0%**	**25.8%**	**28.8%**
TOTAL	**18.8%**	**81.2%**	**100.0%**

Source: Steer Davies Gleave 2016

3.5 In Northern California the sample was split fairly evenly between air (45%) and auto (55%) travelers, while in Southern California 85% of the sample travelled by auto. For those traveling from Las Vegas auto was also preferred (90%).

3.6 By area or county, the largest proportion of respondents in Southern California came from Los Angeles (25%). In Northern California the Bay area accounted for the highest proportion of the sample (11%).

General trip characteristics

3.7 Respondents were asked some questions about their most recent trip to Las Vegas or California. This included: when their last trip was; who they were traveling with; and for what purpose. Respondents were also asked a number of questions about the journey in both directions. In this section we provide details on:

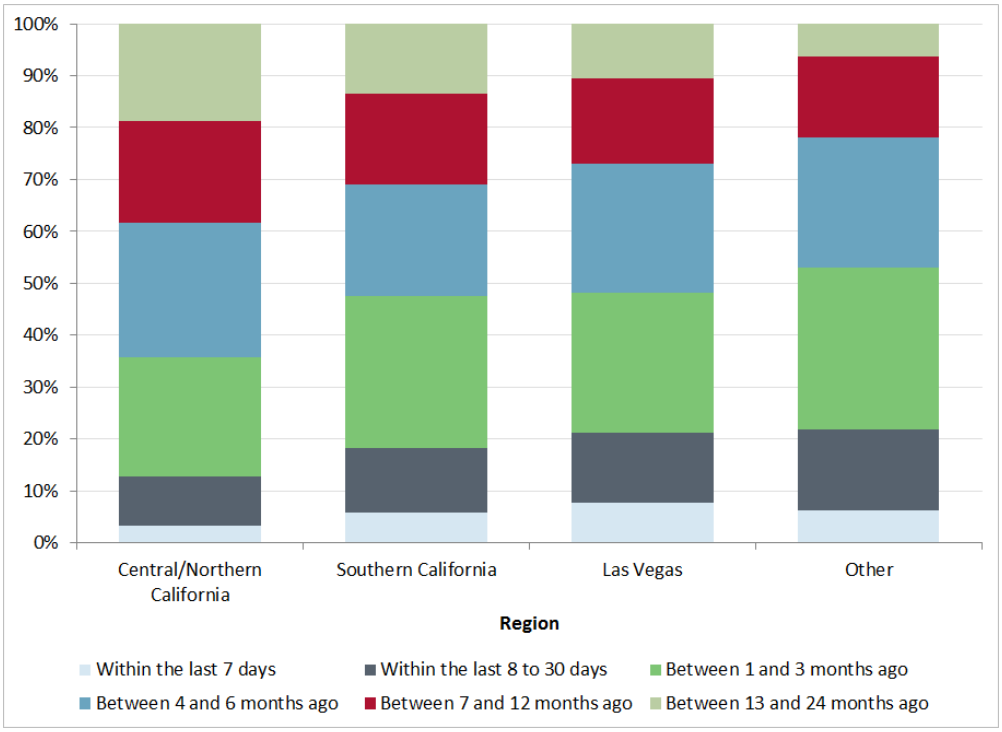
- When the most recent trip occurred;
- The composition of the traveling group;
- The purpose of this most recent trip; and

- The frequency of making trips between California and Las Vegas over the past two years.

Most recent trip

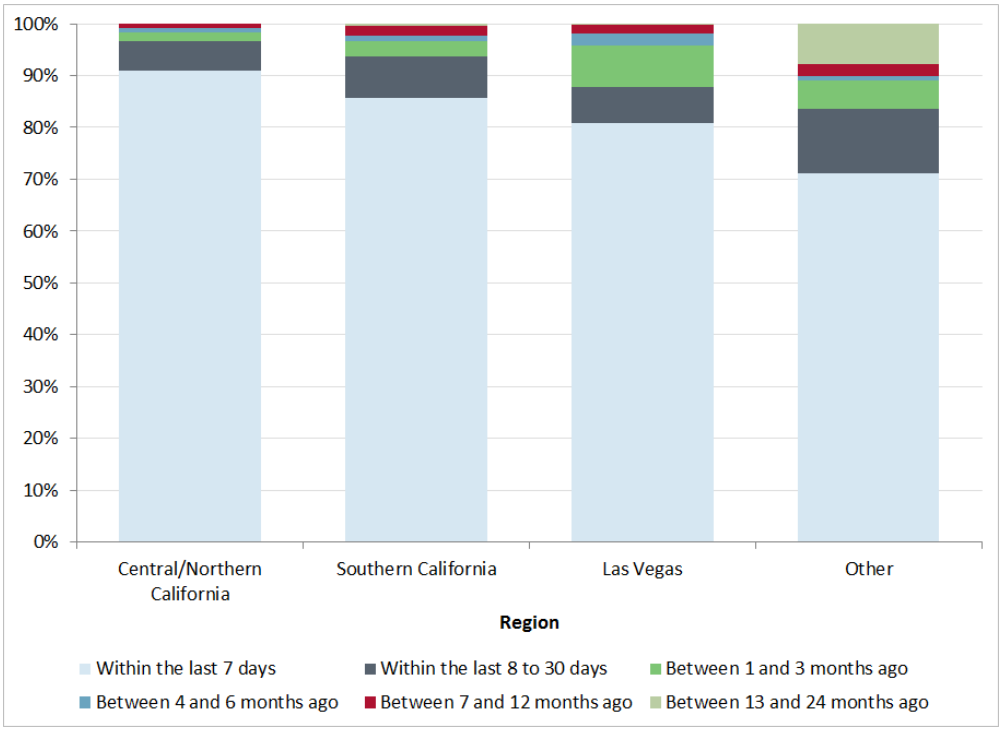
3.8 All respondents were asked for the broad date of their last trip to either California (Northern or Southern) or to Las Vegas. The last trip could have been at most two years ago to qualify for the survey. Respondents recruited via the on-line panel tended to have made a more historic trip with just over 50% reporting a trip made in the last one to six months, the period September 2015 to February/March 2016. Those recruited via postcards had made more recent trips with 84% of the sample reporting a trip in the past seven days (during March and April 2016).

Figure 3.1: Date of last trip, panel survey



Source: Steer Davies Gleave 2016

Figure 3.2: Date of last trip, postcard survey

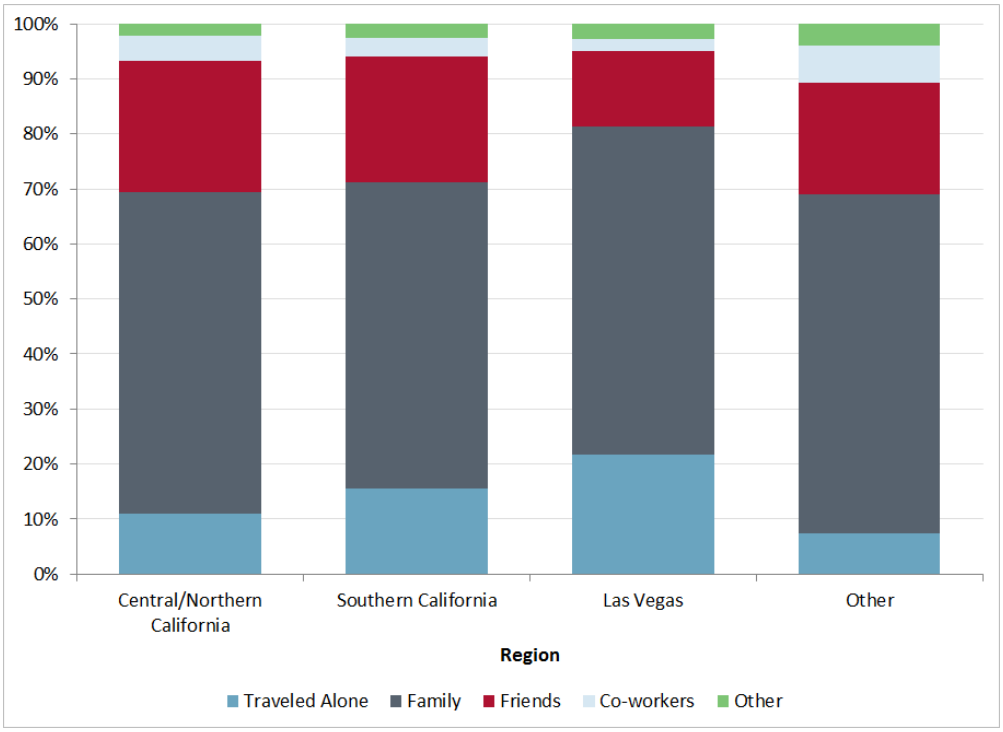


Source: Steer Davies Gleave 2016

Composition and size of traveling parties

3.9 Close to 60% of respondents were traveling with family, with a further 21% traveling with friends and 16% traveling alone. Those traveling from Las Vegas to California were most likely to be alone (22%) with those from Northern and Central California least likely (11%).

Figure 3.3: Composition of traveling parties, auto and air



Source: Steer Davies Gleave 2016

3.10 Table 3.2 shows the average group size of the immediate traveling party by geographic region.

Table 3.2: Average group size by region/area

Area / Region	Average group size
Southern CA	2.5
Los Angeles	2.5
Orange	2.3
San Bernardino	2.5
Riverside	2.5
San Diego	2.7
Northern & Central CA	2.7
Bay area	2.8
Central Valley	2.5
Las Vegas / Clark	2.4
Other	2.7
Overall	**2.5**

Source: Steer Davies Gleave 2016

3.11 The average group size by area varies by region with the largest groups traveling from Northern and Central California (2.7 people per group) and the smallest from Las Vegas/Clark County at 2.4[3].

Composition and size of traveling parties: by mode of travel

3.12 This section provides information on the composition of traveling parties by air and auto separately.

Table 3.3: Average group size by region/area, by mode

Area/region	Air	Auto
Southern CA	2.5	2.5
Los Angeles	2.5	2.6
Orange	2.3	2.3
San Bernardino	2.0	2.5
Riverside	2.2	2.6
San Diego	2.5	2.8
Northern & Central CA	2.5	2.8
Bay area	2.6	3.0
Central Valley	1.9	2.7
Las Vegas / Clark	1.9	2.4
Other	2.4	2.7
Overall	**2.4**	**2.5**

Source: Steer Davies Gleave 2016

3.13 Overall the average group size traveling by auto (2.5) is slightly larger than by air (2.4).

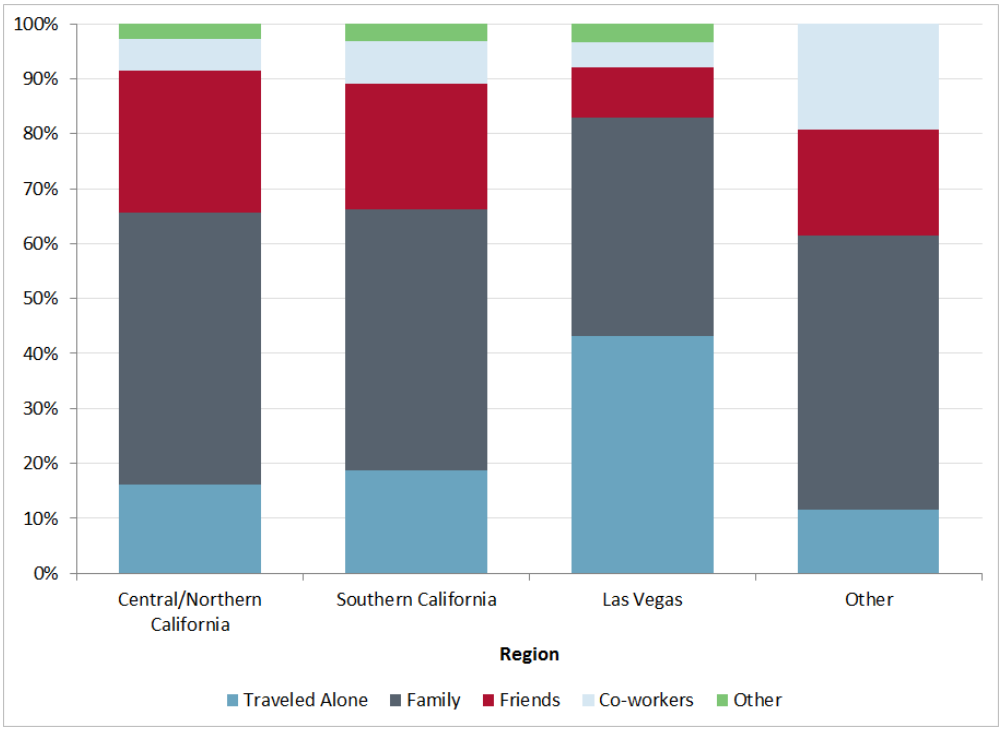
3.14 There is some variation between areas and regions, in particular for the air market, but on the whole sample sizes restrict the ability to make strong conclusions.

Travel by air

3.15 Figure 3.4 shows the composition of traveling parties for the air market.

[3] Note, areas with a sample size of less than 100 have been omitted from this table (Imperial, Ventura and Santa Barbara).

Figure 3.4: Composition and size of traveling parties, air users



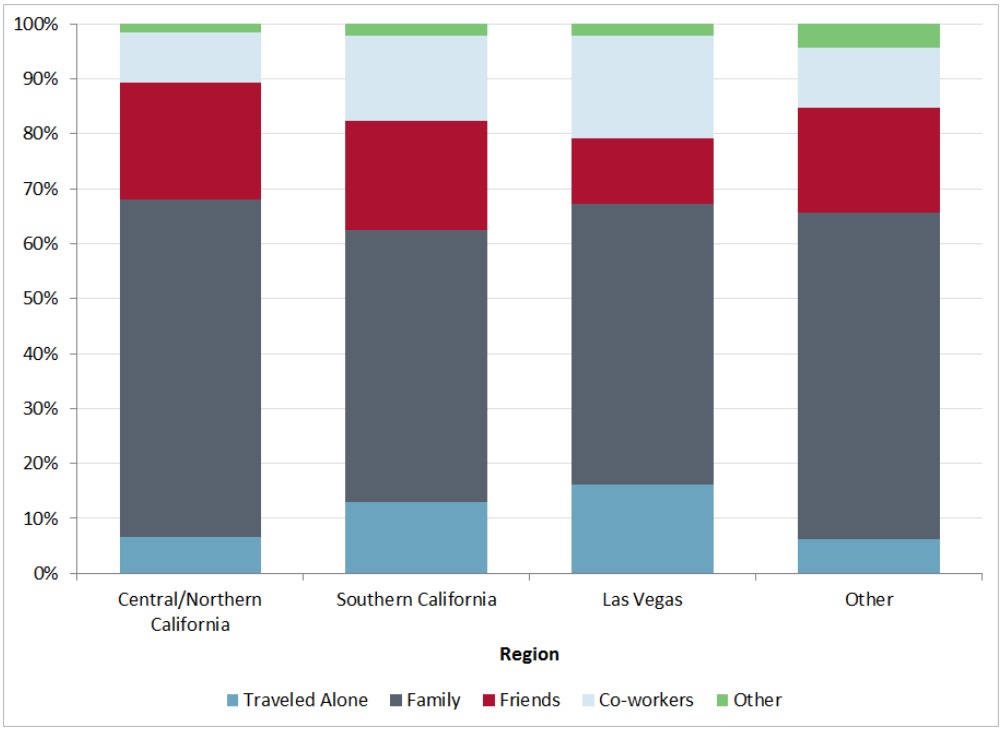
Source: Steer Davies Gleave 2016

20% of those traveling by air were traveling alone. This proportion was far higher in Las Vegas at 43%.

Travel by auto

3.16 Traveling with family was the most prevalent way to travel amongst those who drove (52% overall). Those from Northern and Central California and those traveling via California from elsewhere were most likely to be with family (61% and 60% respectively). Those traveling from Las Vegas or Clark County had the highest proportion traveling alone (16%). Those traveling alone were lowest from Northern and Central California (7%) likely due to the long distances associated with the drive.

Figure 3.5: Composition and size of traveling parties, auto users



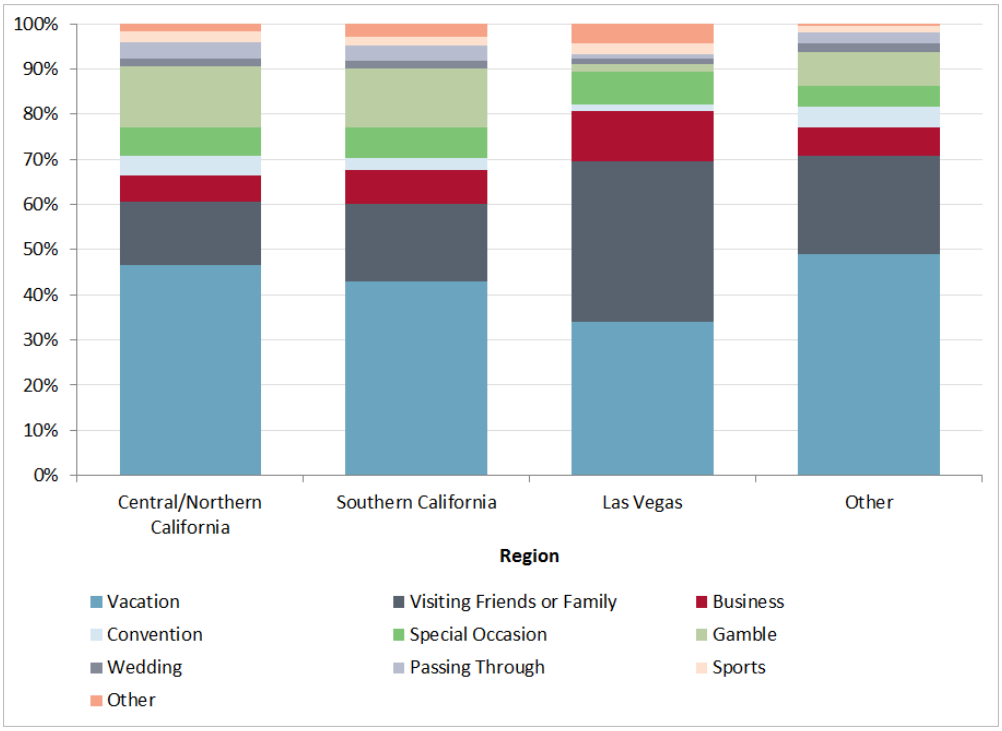
Source: Steer Davies Gleave 2016

Journey purpose of the most recent trip

3.17 The majority of respondents were traveling for a vacation – 43% for Southern California and 47% for Central/Northern California. Those traveling for business or convention purposes represented between 10% and 13% of the total sample.

3.18 Visiting friends and relatives was on average 21% of the sample with those traveling from Las Vegas or Clark County having the highest propensity to travel for this purpose (36% of those sampled), illustrating the connection between California and residents of this area of Nevada.

Figure 3.6: Journey purpose for most recent trip, auto and air



Source: Steer Davies Gleave 2016

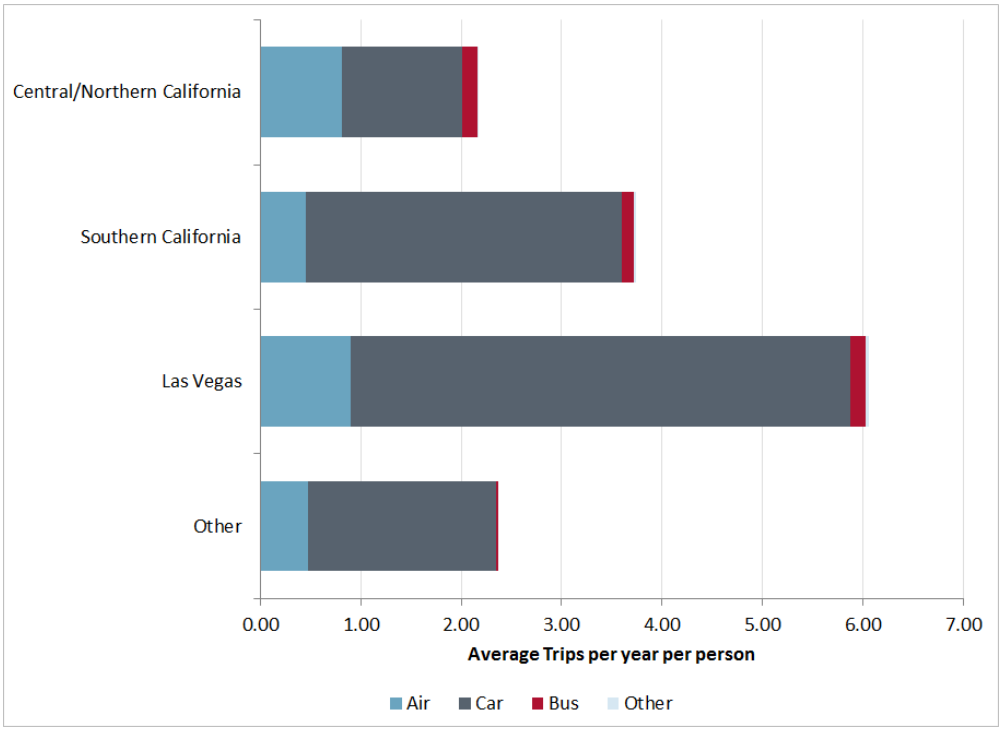
Frequency of travel between Las Vegas and California

3.19 Average trip rates were calculated for respondents from each area. Las Vegas residents made an average of six trips per year, with five of these being made by auto. Trips for Southern Californians were the next highest at 3.7 a year, 3.1 of which were by auto.

3.20 Air trips were high amongst Northern and Central Californians, due to the larger distances being covered, at 0.8 a year. Air trips from Las Vegas residents were higher still at 0.9 trips a year.

3.21 Bus trips were low across all geographies with California and Las Vegas residents making between 0.1 and 0.15 trips per year by this mode.

Figure 3.7: Average trip rates per person per year for different areas



Source: Steer Davies Gleave 2016

Socio-economic and demographic characteristics

3.22 In this section we summarize the socio-economic and demographic characteristics of the sample.

Respondent ages

3.23 Table 3.4 gives the average age of respondents in the sample by market area/region.

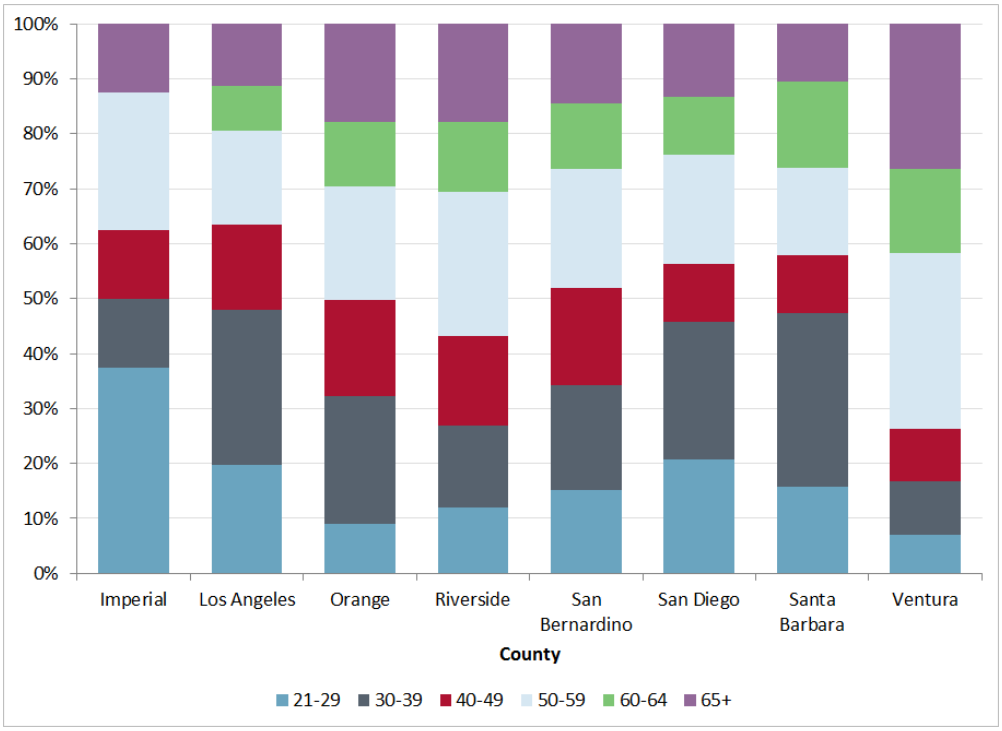
Table 3.4: Average respondent ages by area

	Central & Northern CA	Southern CA	Las Vegas / Clark	Other
Average age	44 years old	47 years old	48 years old	46 years old

Source: Steer Davies Gleave 2016

3.24 The following figure shows age characteristics by each Southern California County. In general those traveling from Los Angeles (average 44 years old) were slightly younger than those from Orange, San Bernardino or Riverside. San Diego residents were the next youngest group with an average age of 45.

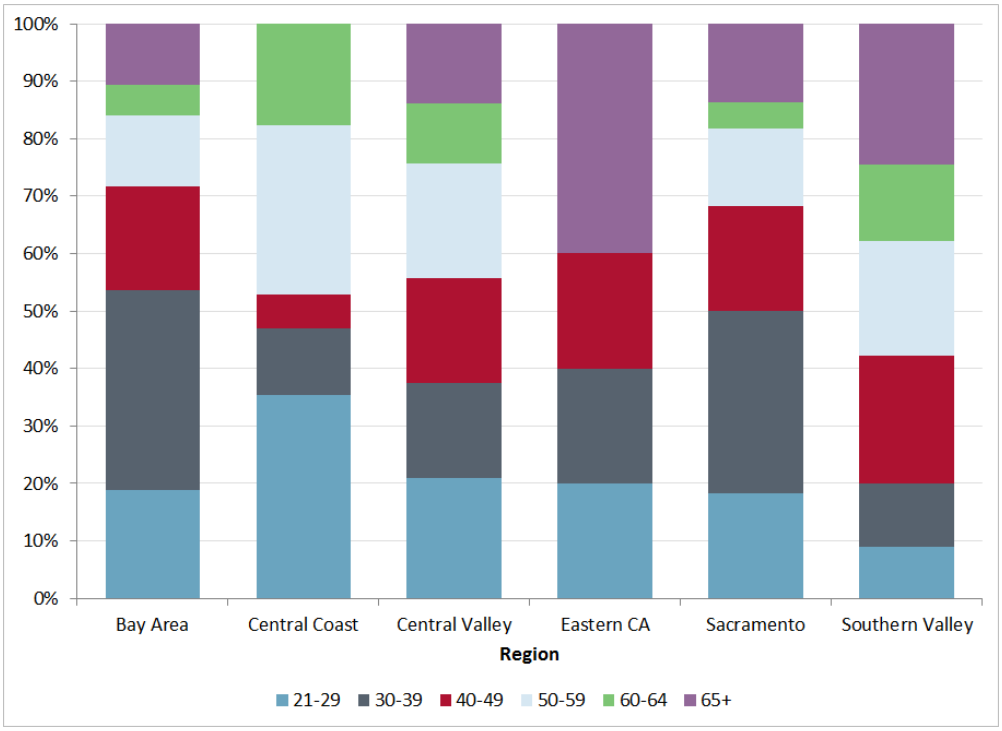
Figure 3.8: Southern California respondent ages, auto and air



Source: Steer Davies Gleave 2016

3.25 In Northern and Central California the average respondent age was a little younger at 44 years old. This is influenced by the respondents from the Bay area who were the largest group in the sample with an average age of 43 years old. Respondents from elsewhere in the region had an average age of 47.

Figure 3.9: Northern California respondent ages, auto and air

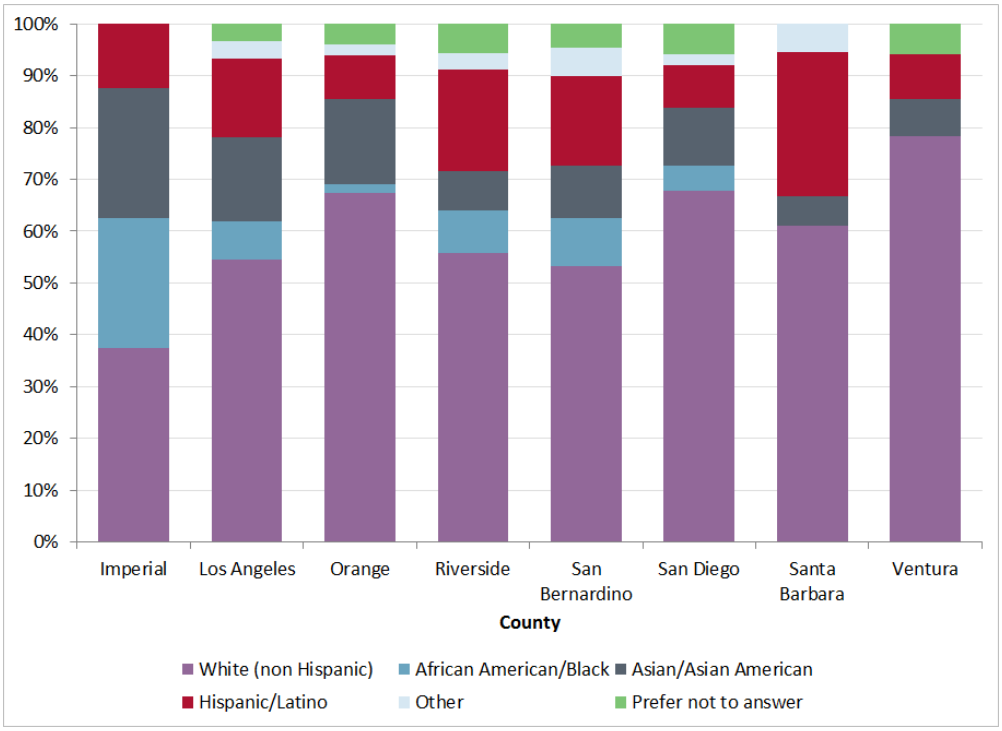


Source: Steer Davies Gleave 2016

Respondent ethnicity

3.26 The sample in Southern California was largely composed of respondents from a white, non-Hispanic background (59% overall). Hispanics and Asian Americans were the next largest groups at 14% of the sample each.

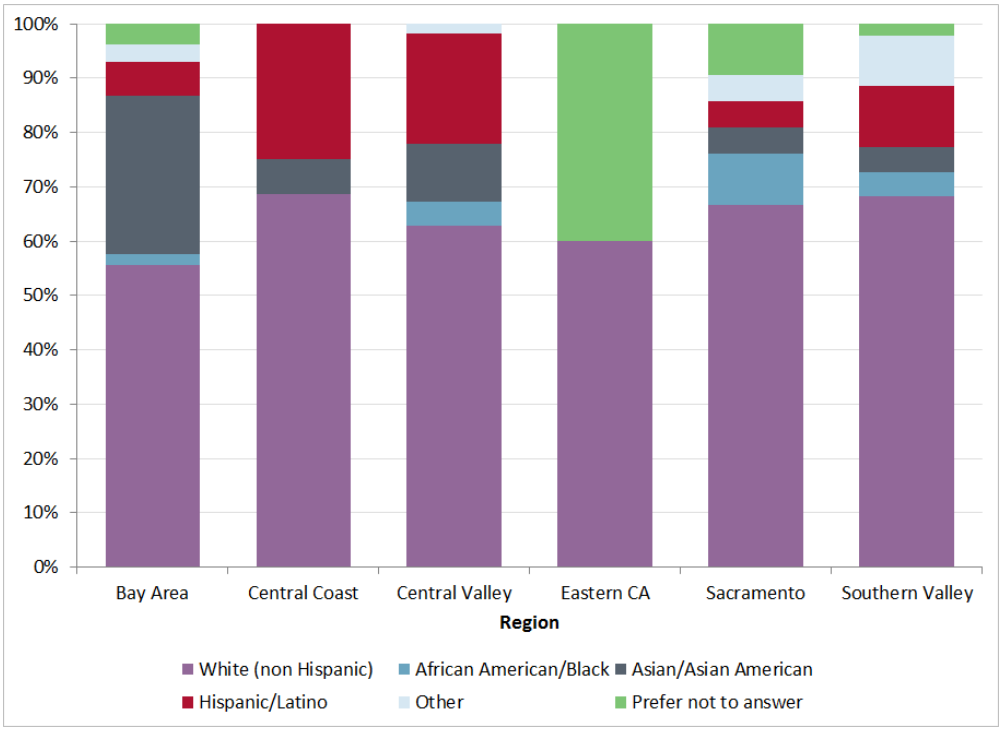
Figure 3.10: Respondent ethnicity by Southern Californian County, auto and air



Source: Steer Davies Gleave 2016

3.27 The respondents from Central and Northern California had a similar breakdown of ethnicities, though with a slightly larger proportion from Asian American backgrounds at 22%.

Figure 3.11: Respondent ethnicity by Northern Californian region, auto and air



Source: Steer Davies Gleave 2016

Annual household income levels

3.28 10% of respondents preferred not to disclose their household income. Amongst those who did reveal their income group: Northern and Central California household incomes were higher than Southern California at just under $99k on average. Incomes from Las Vegas and Clark county were lower than from anywhere else (with a sampler rate of above 50) at an average of $79.5k.

Table 3.5: Average annual household income, $ 2016

		Average HH income, $ 2016
Central/Northern CA		$98,928
	Bay Area	$111,143
	Central Coast	$73,367
	Central Valley	$83,236
	Eastern CA	$74,375
	Sacramento	$77,639
	Southern Valley	$77,788
Southern CA		$91,695
	Imperial	$60,438
	Los Angeles	$90,134
	Orange	$107,189

	Riverside	$85,170
	San Bernardino	$84,689
	San Diego	$95,310
	Santa Barbara	$65,844
	Ventura	$87,560
Las Vegas / Clark		$79,584
Other		$90,683

Source: Steer Davies Gleave 2016

Household car ownership

3.29 Car ownership levels are fairly similar across all regions at between 1.8 and 2.0 cars per household. At a County level, respondents in Los Angeles and San Diego had lower numbers of cars than in Orange, San Bernardino or Riverside Counties. Within Northern and Central California, the Bay area reported the lowest levels of car ownership at 1.65.

Table 3.6: Average cars per household, auto and air

		Cars/household
Central/Northern CA		1.80
	Bay Area	1.65
	Central Coast	1.88
	Central Valley	2.07
	Eastern CA	2.20
	Sacramento	2.38
	Southern Valley	1.89
Southern CA		2.00
	Imperial	2.25
	Los Angeles	1.89
	Orange	2.14
	Riverside	2.16
	San Bernardino	2.40
	San Diego	1.89
	Santa Barbara	2.00
	Ventura	2.17
Las Vegas / Clark		1.84
Other		2.03

Source: Steer Davies Gleave 2016

4 Auto user characteristics

Introduction

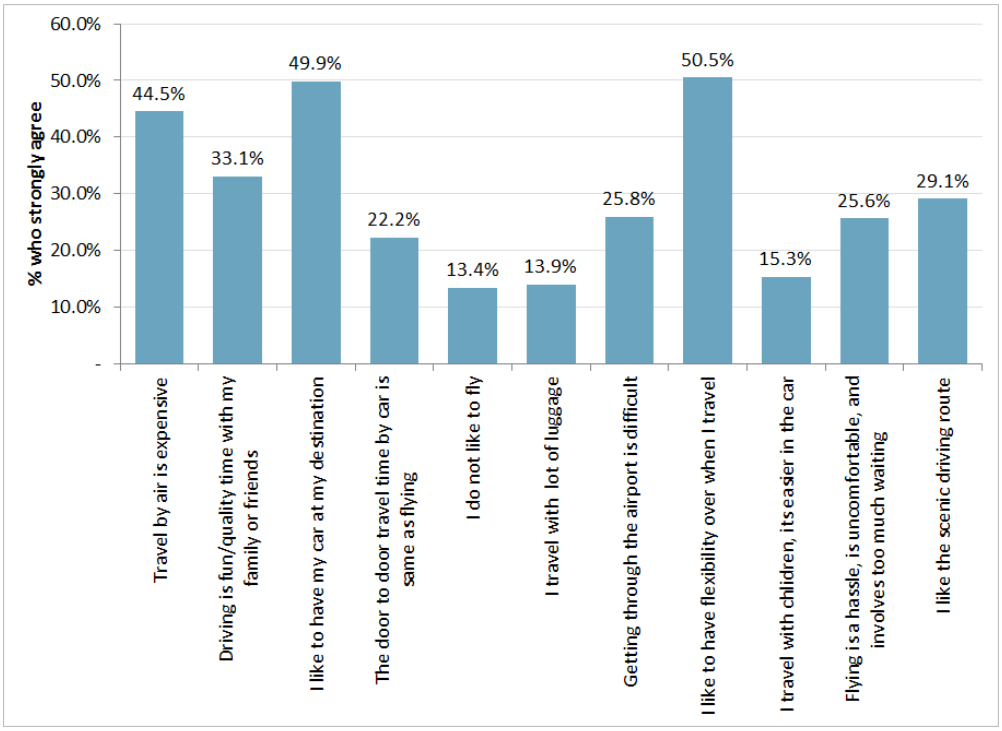
4.1 Depending on geography, the propensity to travel by auto or air can vary. Respondents from Southern California showed a preference for auto travel to Las Vegas with 85% using this mode for their most recent trip. Respondents from Northern California showed a different preference with 45% reaching Las Vegas by air and 55% by auto. 90% of respondents traveling from Las Vegas to California and back used auto. This chapter details the characteristics of the auto respondents, including:

- Why they choose to use auto; and
- The level of delay experienced.

Why do people drive

4.2 Questions were included in the questionnaire in order to provide insight into the perceptions of travelers. Respondents were shown a number of attitudinal questions and asked to indicate their level of agreement with the statement made. Figure 5.1 provides each of these questions along with the proportion of auto respondents who indicated that they “completely agreed” with the statement.

Figure 4.1: Qualitative statement agreement



Source: Steer Davies Gleave 2016

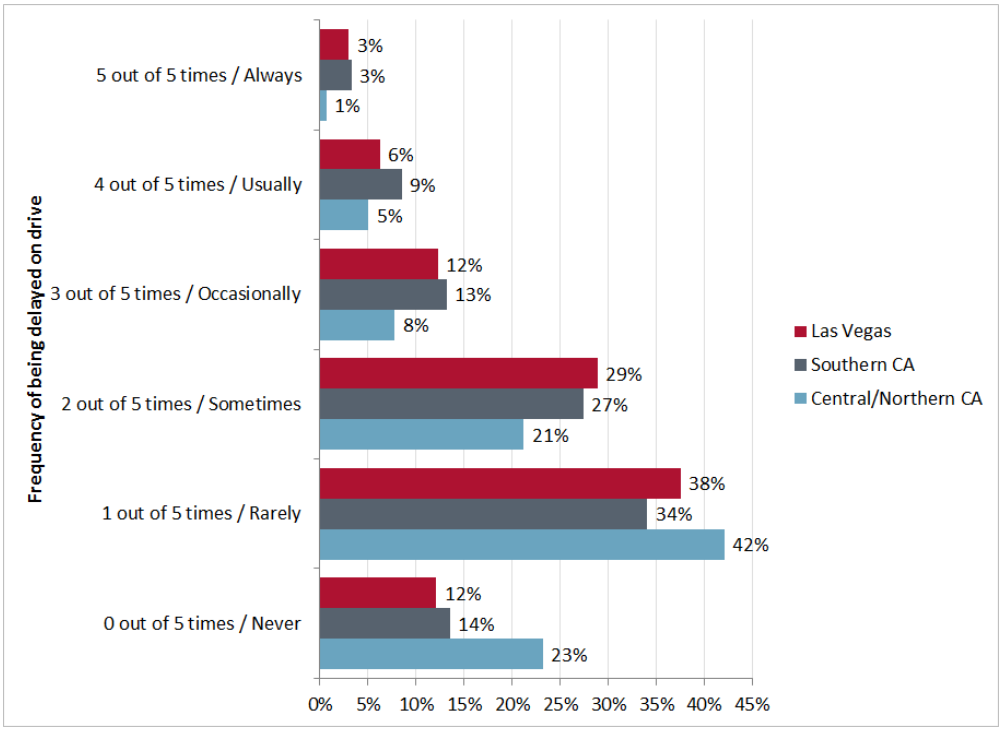
4.3 Most people preferred the flexibility of travel by auto (51%) and the fact they could have a vehicle at their destination (50%). 45% said travel by air was too expensive and 13% of respondents simply did not like to fly.

Auto levels of delay

4.4 To understand how congestion affects drivers between California and Las Vegas and vice versa, respondents were asked how frequently they experienced delay on their journey in either direction.

4.5 25% of Southern California respondents indicated that they experienced delay at least three in every five trips (60% of the time or more). This proportion was similar for Las Vegas residents (21%). Northern and Central Californian residents reported less delays with 13% experiencing some degree of delay in 60% of trips or more.

Figure 4.2: Level of delay for auto journeys



Source: Steer Davies Gleave 2016

5 Air user characteristics

Introduction

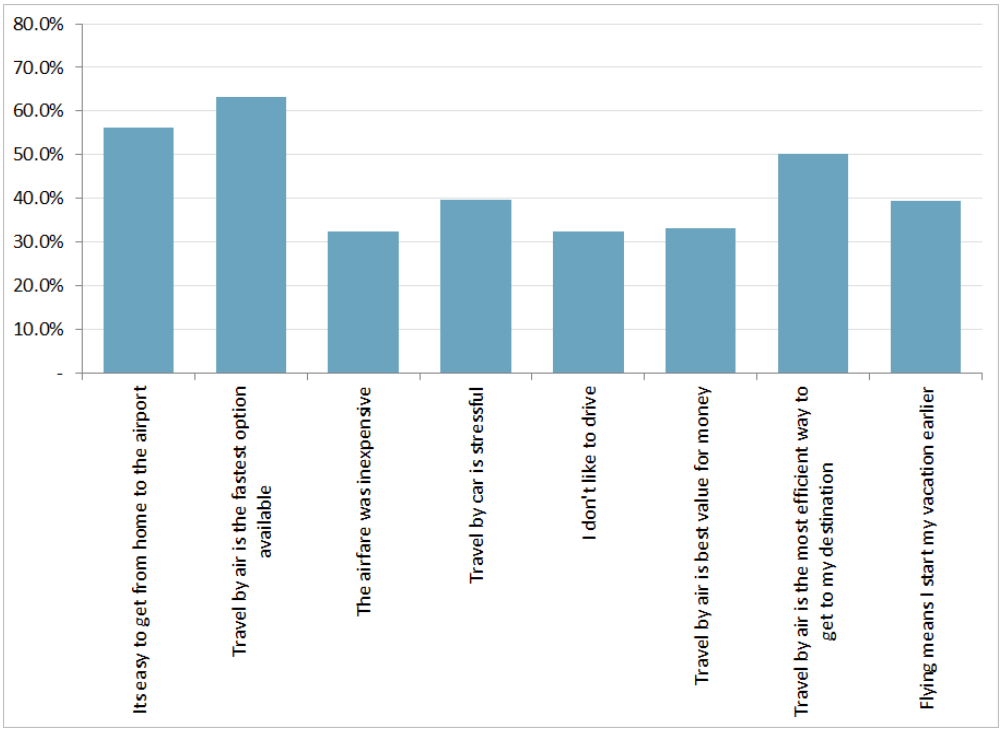
5.1 This chapter details the important characteristics of respondents who traveled by air, including:

- Why they choose to fly; and
- Time to access the airport.

Why do people fly

5.2 Respondents were asked a series of qualitative statements to explore their motivations for choosing to fly between California and Las Vegas or vice versa. The results are summarized in Figure 6.1 for those who completely agreed with each statement.

Figure 5.1: Qualitative statements agreement



Source: Steer Davies Gleave 2016

5.3 Statements with the strongest agreement related to speed and convenience:

- 63% strongly agreed that travel by air is the fastest option available;
- 56% agreed that it was easy to travel from home to the airport; and
- 50% agreed that air travel was the most efficient way to travel.

Airport used

5.4 Table 5.1 shows the airports used by respondents in the sample. In Southern California the Los Angeles International was the most used airport (48%) whereas in Northern and Central California the most used airport was San Francisco (55%).

Table 5.1: Airport used by region

Airport	% of sample
Burbank - Bob Hope Airport (BUR)	12%
Long Beach Airport (LGB)	13%
Los Angeles International Airport (LAX)	48%
Ontario International Airport (ONT)	2%
Orange County - John Wayne Airport (SNA	6%
San Diego International Airport (SAN)	16%
Other	2%
Southern CA	**100%**
Fresno Yosemite International Airport (FAT)	9%
Oakland International Airport (OAK)	2%
Sacramento International Airport (SMF)	1%
San Francisco International Airport (SFO)	55%
San Jose International Airport (SJC)	32%
Other	1%
Northern & Central CA	**100%**

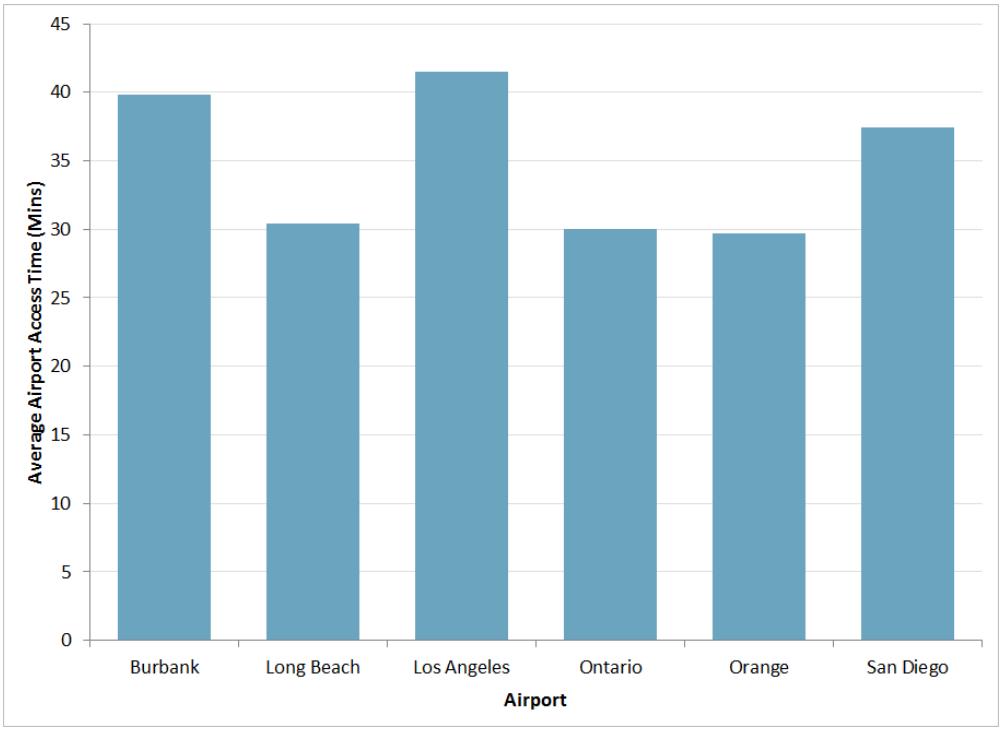
Source: Steer Davies Gleave 2016

Airport access times

5.5 Respondents were asked about access times to the airport they traveled to or from on the journey to or from Las Vegas or California.

5.6 In Southern California, respondents who travelled through Los Angeles Airport had the longest access times (more than 40 minutes). Access times to Orange County Airport were the lowest, just less than 30 minutes.

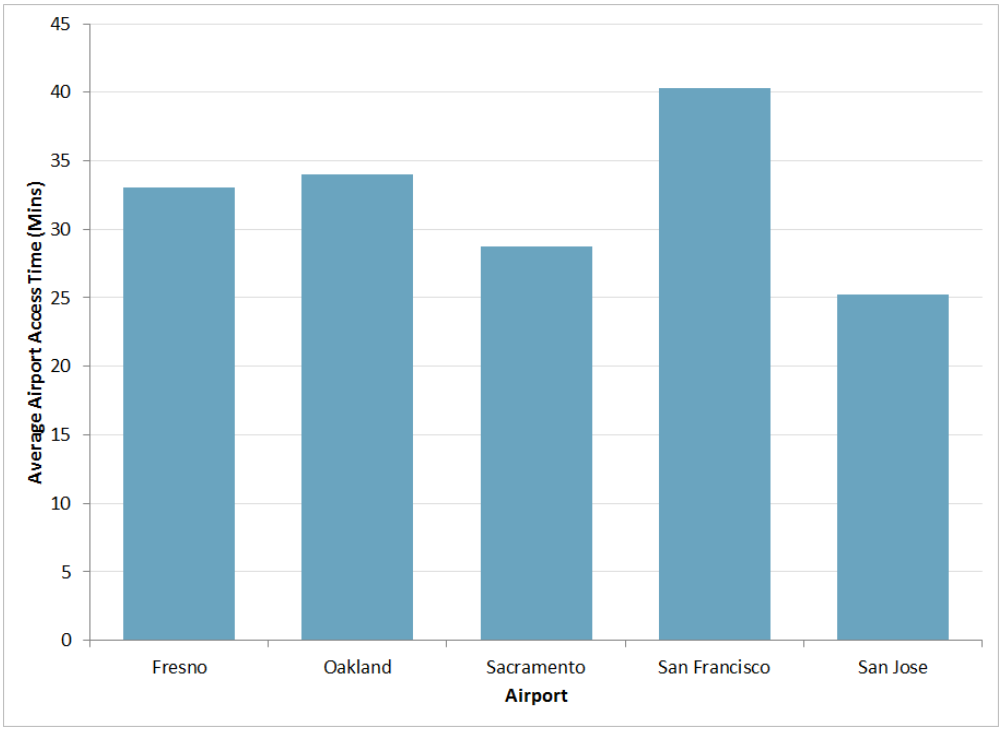
Figure 5.2: Airport access times Southern California



Source: Steer Davies Gleave 2016

5.7 In Northern California, access to San Francisco was reported as taking the longest at just over 40 minutes. The average amongst airports other than San Francisco was 27 minutes.

Figure 5.3: Airport access times Northern California



Source: Steer Davies Gleave 2016

6 High Desert Corridor opinions

6.1 As part of the Behavioral survey, respondents were introduced to the High Desert Corridor (HDC) and the proposed HSR service linking California and Las Vegas. They were then asked to give their reaction to the proposal, their preferred access station, their thoughts on pricing and if they think the proposed project would impact the frequency of trips they make.

Description of HDC

6.2 The text used to describe the HDC project to respondents is shown below. Different descriptions were used for Southern California and Northern or Central California; Las Vegas residents were shown the same information as other respondents depending on whether they were traveling to Southern or Northern/Central California.

Table 6.1: Southern California HDC description

A proposed high-speed train service is being considered that would link Las Vegas with Southern California. This fully electric high-speed train will travel at about 150 to 220 miles an hour on dedicated steel rail tracks. There would be no need to change trains - it would go directly from Las Vegas to multiple stations in Southern California. The train will start in Las Vegas close to the Strip. High-speed rail stations in Southern California will include: Anaheim, Los Angeles Union Station, Burbank, Palmdale and Victorville. Trains would depart frequently (every 20-30 minutes).

The proposed travel times (hh:mm) between Southern California stations and Las Vegas are:

Anaheim to Las Vegas:	03:00
Los Angeles to Las Vegas:	02:20
Burbank to Las Vegas:	02:10
Palmdale to Las Vegas:	01:40
Victorville to Las Vegas:	01:20

Trains will depart every day of the week from early in the morning until late at night. Rental cars would be available at all high-speed train stations. In addition, parking will be available at each station with a range of prices from free (e.g. in Victorville) to market rate (e.g. in downtown Los Angeles). You will be able to purchase your ticket in advance via the internet, over the phone, and through travel and tour operators. There will be the option to buy "walk-up" tickets at the station on the day of travel. A wide range of refreshments, dining options, retail, entertainment, Wi-Fi and charging station facilities would be provided both on the train and at the stations.

All luggage could be taken directly on board – there would be no need to check in bags. However, there would be an option to check bags through to your hotel if desired.

Source: Steer Davies Gleave 2016

Table 6.2: Northern & Central California HDC description

A proposed high-speed train service is being considered that would link Central and Northern California and Las Vegas. This fully electric high-speed train will travel at about 150 to 220 miles an hour on dedicated steel rail tracks. Trains would depart frequently (every 20-30 minutes).

Passengers from Central and Northern California would be able to access the high-speed train service at any of the following stations:

- San Francisco
- San Jose
- Gilroy
- Merced
- Fresno
- Kings County/Tulare and
- Bakersfield

Passengers from Central and Northern California going to Las Vegas would have a timed transfer of 15 minutes in Palmdale.

San Francisco to Las Vegas:	05:10
Millbrae to Las Vegas:	04:55
San Jose to Las Vegas:	04:20
Gilroy to Las Vegas:	04:05
Merced to Las Vegas:	03:45
Fresno to Las Vegas:	03:20
Kings County/Tulare to Las Vegas	03:05
Bakersfield to Las Vegas:	02:30
Palmdale to Las Vegas:	01:40
Victorville to Las Vegas:	01:20

Trains will depart every day of the week from early in the morning until late at night. Rental cars would be available at all high-speed train stations. In addition, parking will be available at each station with a range of prices from free (e.g. in Victorville) to market rate. You will be able to purchase your ticket in advance via the internet, over the phone, and through travel and tour operators. There will be the option to buy "walk-up" tickets at the station on the day of travel. A wide range of refreshments, dining options, retail, entertainment, Wi-Fi and charging station facilities would be provided both on the train and at the stations.

All luggage could be taken directly on board – there would be no need to check in bags. However, there would be an option to check bags through to your hotel if desired.

Source: Steer Davies Gleave 2016

Initial reactions: auto users

6.3 Figure 7.1 shows the responses from current auto users to the question of how likely they were to try the HSR service.

Figure 6.1: Likelihood of use by region, auto users

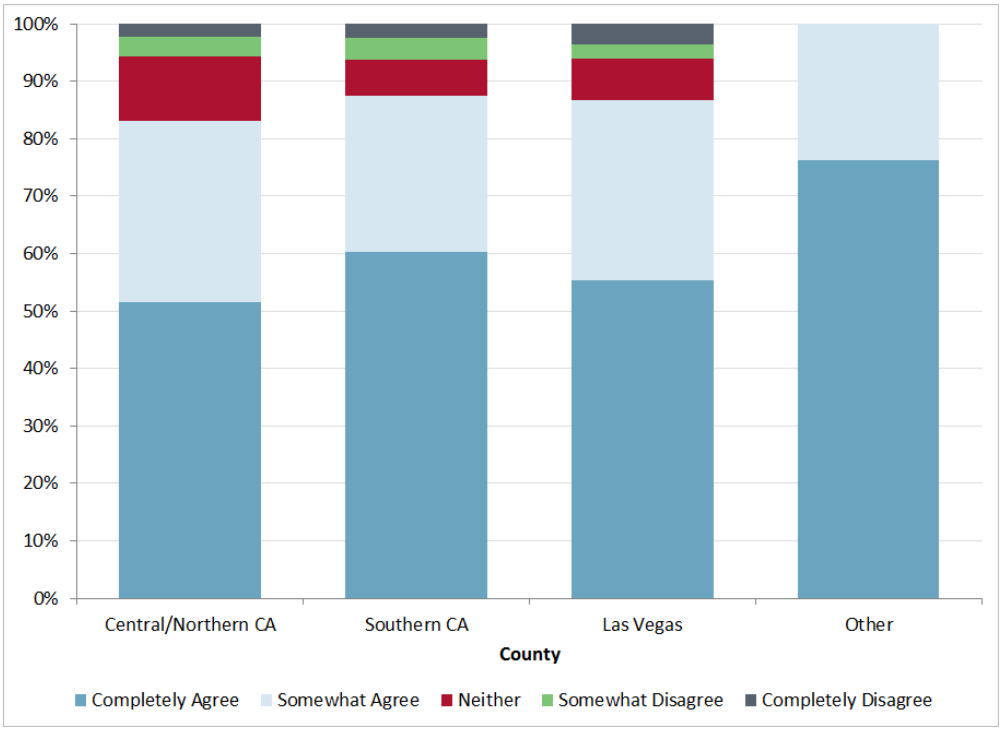
Source: Steer Davies Gleave 2016

6.4 Overall Las Vegas respondents were most positive about use of HSR (72%). 68% of Southern Californians were highly positive whereas those from Northern and Central California were the least positive about the proposed project.

Initial reactions: air travelers

6.5 Figure 7.6 shows the results from air travelers to the question of how likely respondents were to try the HSR service.

Figure 6.2: Likelihood of use by region, air travelers



Source: Steer Davies Gleave 2016

6.6 "Other" respondents (those from other US States and International visitors) were most positive about the service, followed by Southern Californians. As with auto travelers, those from Northern and Central California were the least positive with regards to the proposed service.

Influencing future trip making

6.7 Respondents were asked if having the option of HSR would change how often they would travel to Las Vegas or California.

Auto users

6.8 Overall, 20% of auto users said that the HSR option would result in them definitely making more trips. Across the different regions this percentage was highest for Las Vegas residents (22%).

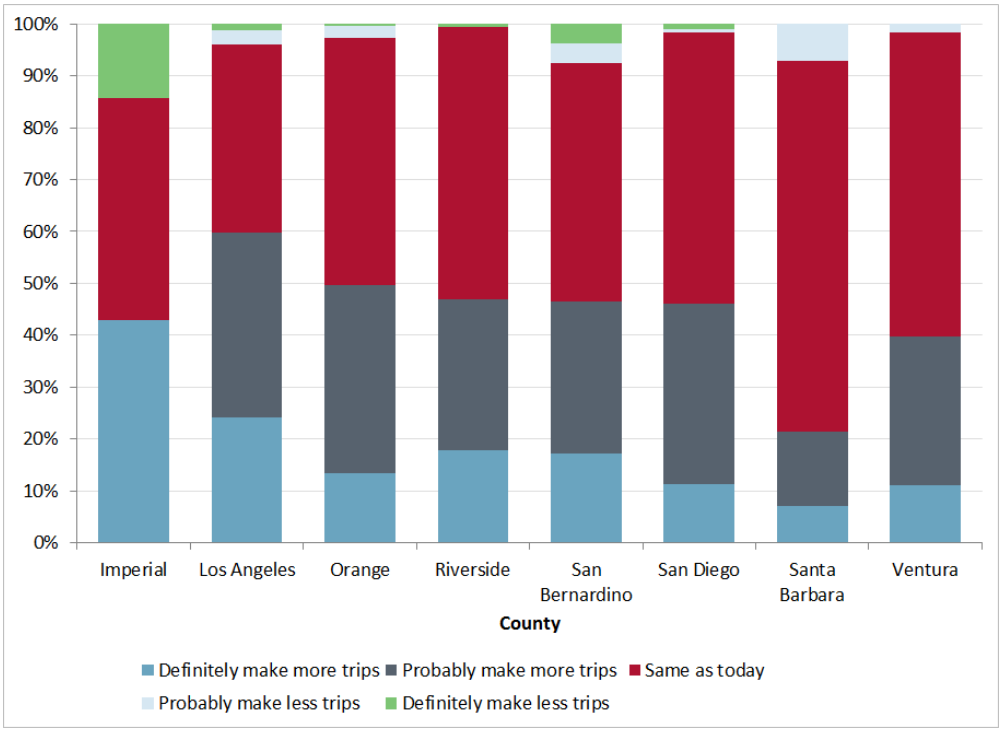
Table 6.3: HDC impact on future trips (would you make more?), auto users

	Definitely more trips	Probably more trips	Same as today	Probably less trips	Definitely less trips
Central/Northern CA	19%	34%	42%	2%	3%
Southern CA	19%	33%	44%	2%	1%
Las Vegas	22%	29%	46%	2%	1%
Other	17%	35%	41%	2%	5%

Source: Steer Davies Gleave 2016

6.9 Across the Southern California counties (excluding those with small samples[4]) those from Los Angeles were most likely to indicate that they would definitely make more trips (24%).

Figure 6.3: HDC impact on future trips (would you make more?), Southern CA, auto users



Source: Steer Davies Gleave 2016

Air travelers

6.10 Overall, 27% of air travelers said they would definitely make more trips if HSR was in operation.

Table 6.4: HDC impact on future trips (would you make more?), air users

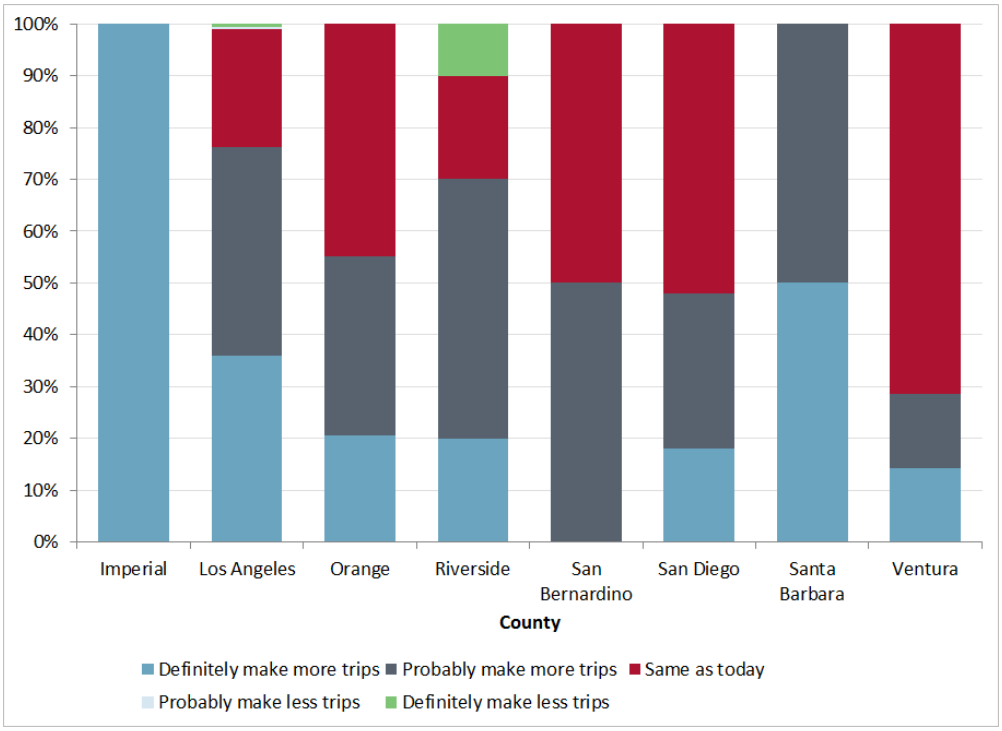
	Definitely more trips	Probably more trips	Same as today	Probably less trips	Definitely less trips
Central/Northern CA	22%	36%	38%	2%	2%
Southern CA	30%	38%	31%	0%	1%
Las Vegas	28%	34%	35%	1%	1%
Other	50%	22%	28%	0%	0%

Source: Steer Davies Gleave 2016, note small sample sizes in "other" category

6.11 Of the overall Southern California residents who currently fly, 64% were Los Angeles. Of these, 36% said they would definitely make more trips as a result of HSR.

[4] Note sample rates for two counties were fairly low: Imperial = 7, Santa Barbara = 14

Figure 6.4: Trip making responses for Southern California, air users



Source: Steer Davies Gleave 2016

Station Choice

6.12 Respondents were asked which station they were most likely to use on the HSR route. Southern Californian respondents could choose from Anaheim, Los Angeles Union, Burbank, Palmdale or Victorville. Those from Central and Northern California could choose from any of the stops shown in Figure 6.5.

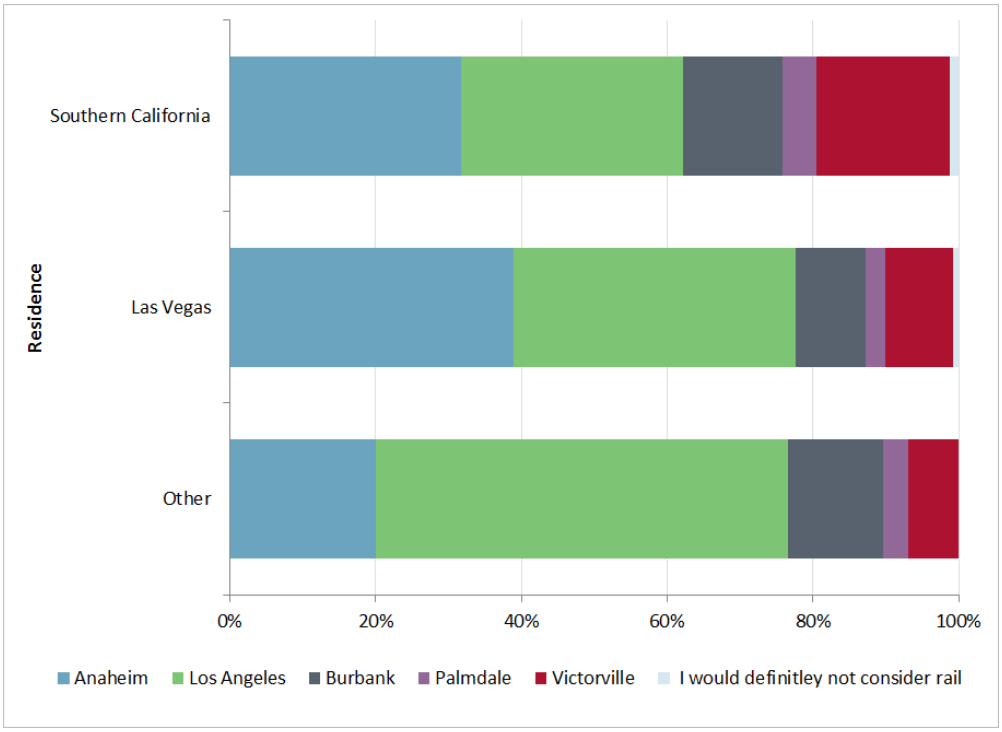
Figure 6.5: HSR station options

Source: Steer Davies Gleave

Southern California stations, all respondents

6.13 Overall Los Angeles Union was the preferred station for those traveling to Southern California (34%), followed by Anaheim (33%). Victorville and Burbank were chosen by 15% and 13% respectively with Palmdale the least preferred station at 4%.

Figure 6.6: Preferred station in Southern CA, all users by residence



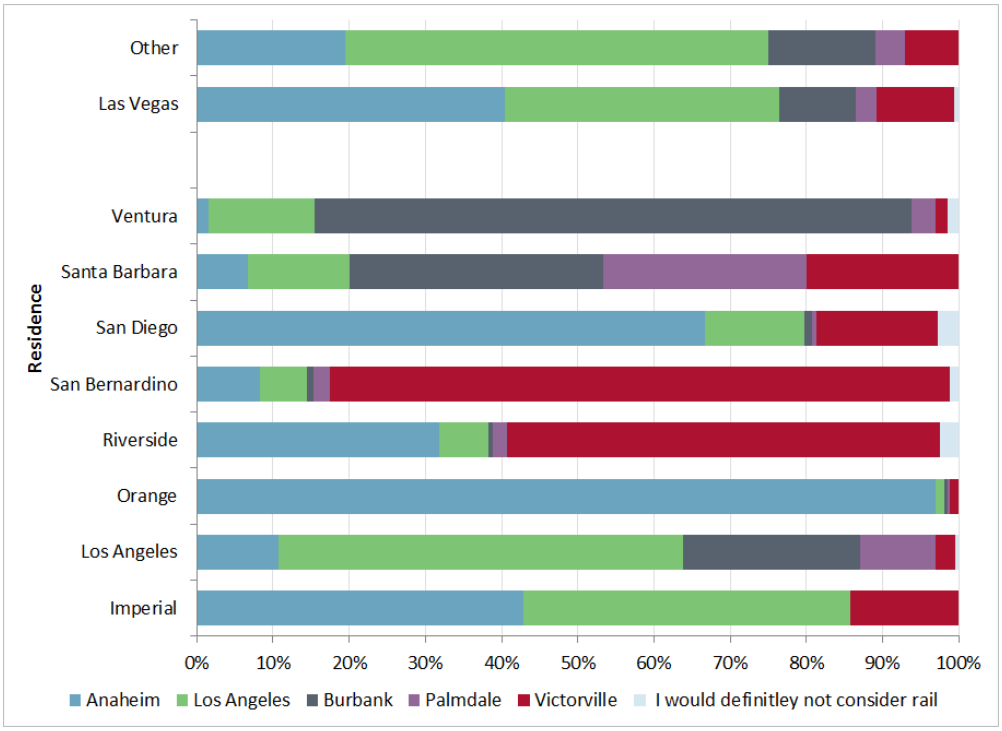
Source: Steer Davies Gleave, 2016

Southern California stations, auto users

6.14 Amongst auto travelers the preferences for Southern California stations were fairly intuitive with most choosing the one that would be easiest to access.

- Anaheim station was preferred by residents of Orange (97%) and San Diego (67%)
- Los Angeles Union was preferred by Los Angeles residents (53%)
- Burbank was preferred by residents of Ventura (78%) and Santa Barbara (33%)
- Victorville was preferred by San Bernardino (81%) and Riverside (57%) residents
- Palmdale was not the highest chosen station in any County, although 27% of those in Santa Barbara and 10% of those in Los Angeles indicated Palmdale as their preferred station

Figure 6.7: Preferred station in Southern CA, auto users by residence and county



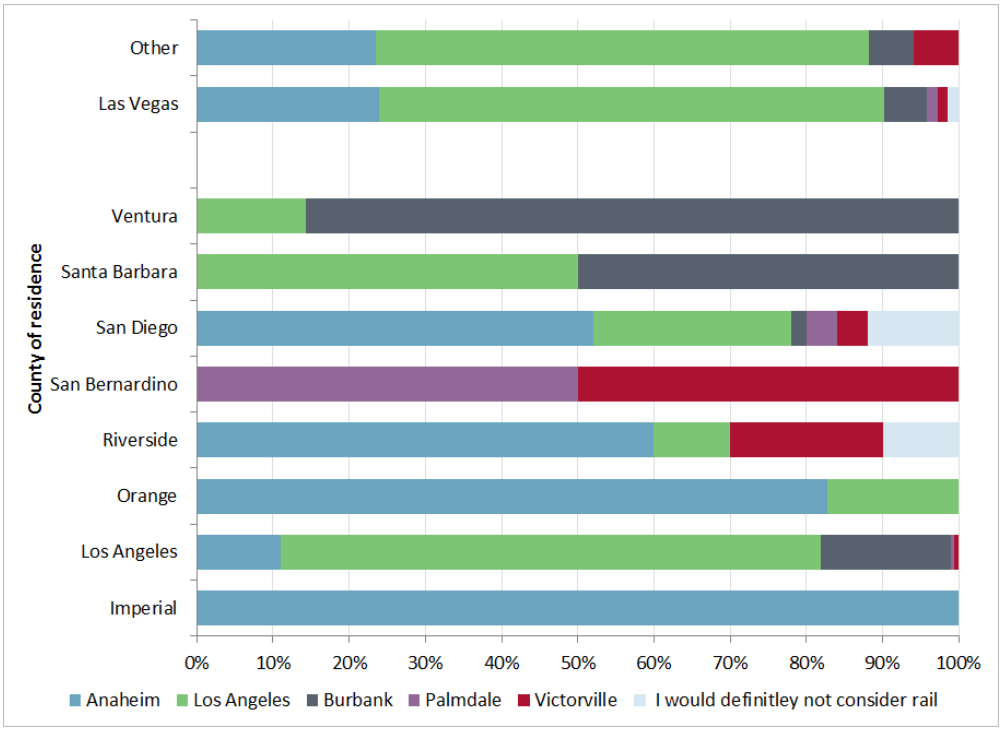
Source: Steer Davies Gleave, 2016

Southern California stations, air users

6.15 Station choice in Southern California for those currently flying was dominated by two groups: those from Los Angeles and those from Las Vegas. All other areas had a sample of 50 or below.

- Los Angeles Union was preferred by those from Los Angeles (71%) and those from Las Vegas (66%). In both cases this was a greater majority than amongst auto travelers (53% and 36% respectively)
- Anaheim station was preferred by Southern California residents from areas other than Los Angeles (55%) however the sample is dominated by those from San Diego (49% of sample).

Figure 6.8: Preferred station in Southern CA, air users by residence and county

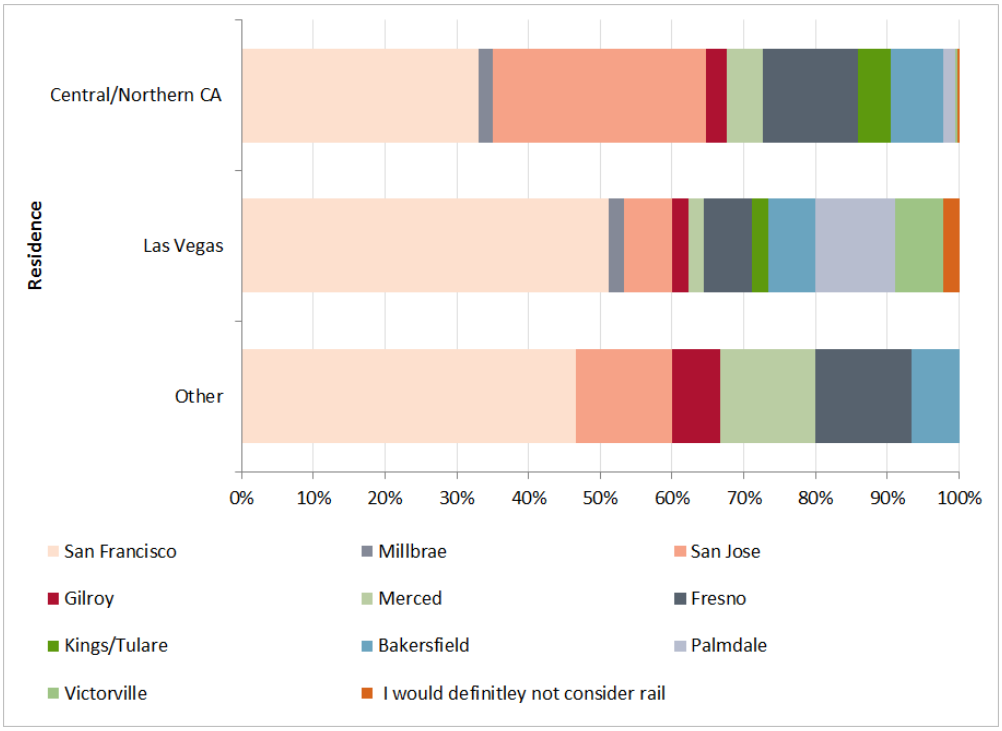


Source: Steer Davies Gleave 2016, note small sample sizes

Northern and Central California stations, all respondents

6.16 The most popular Northern or Central Californian stations were San Francisco (35%) and San Jose (28%).

Figure 6.9: Preferred station in Northern/Central CA, all users by residence



Source: Steer Davies Gleave 2016

Attitudes to pricing

6.17 Respondents were asked a series of questions about what fare they might expect for the service. In each case respondents were asked to state the round trip fare per person in relation to the following:

- Fare you expect to be charged
- Fare you would like to pay
- Maximum fare that you would be willing to consider before it was too expensive

6.18 These questions were asked separately for coach/standard and business/premium classes of service. The business or premium service was described as follows.

Table 6.5: Description of business/premium level service

Assume, like air travel, there is a business/premium service with the following additional features: • Priority valet parking; • VIP lounge in the station and on the train; • Business/premium class seating with wider seats and more legroom; • Flexible seating including separate compartments; • Onboard concierge; • Hostesses serving complementary refreshments; • Priority access to the free hotel shuttles, and • Luggage service: door to door service to and from your hotel.

Source: Steer Davies Gleave 2016

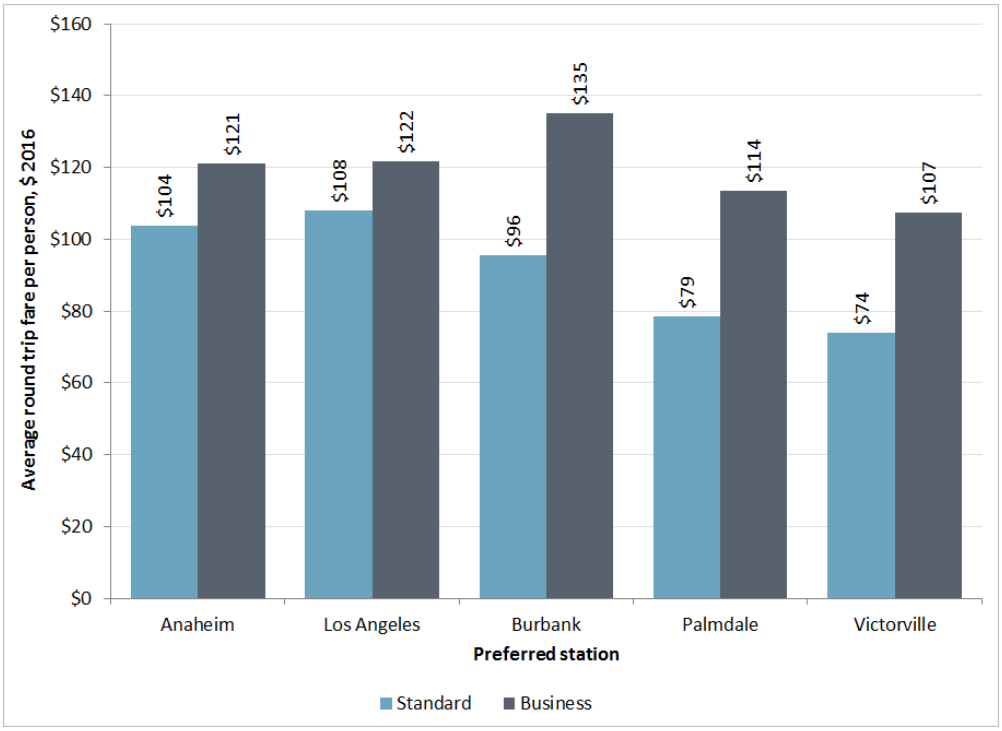
Fare you expect to be charged

6.19 Expected fares at Southern California stations were typically lower than Northern and Central California. In general in Southern California, stations in the LA area (Anaheim, Los Angeles and Burbank) had higher expected fares than desert stations by a factor of approximately 40% for standard class and 15% for business/premium.

6.20 Average fares by area were:

- LA area stations: $105 standard / $124 business
- Desert stations: $75 standard / $108 business

Figure 6.10: Expected fare, Southern CA stations

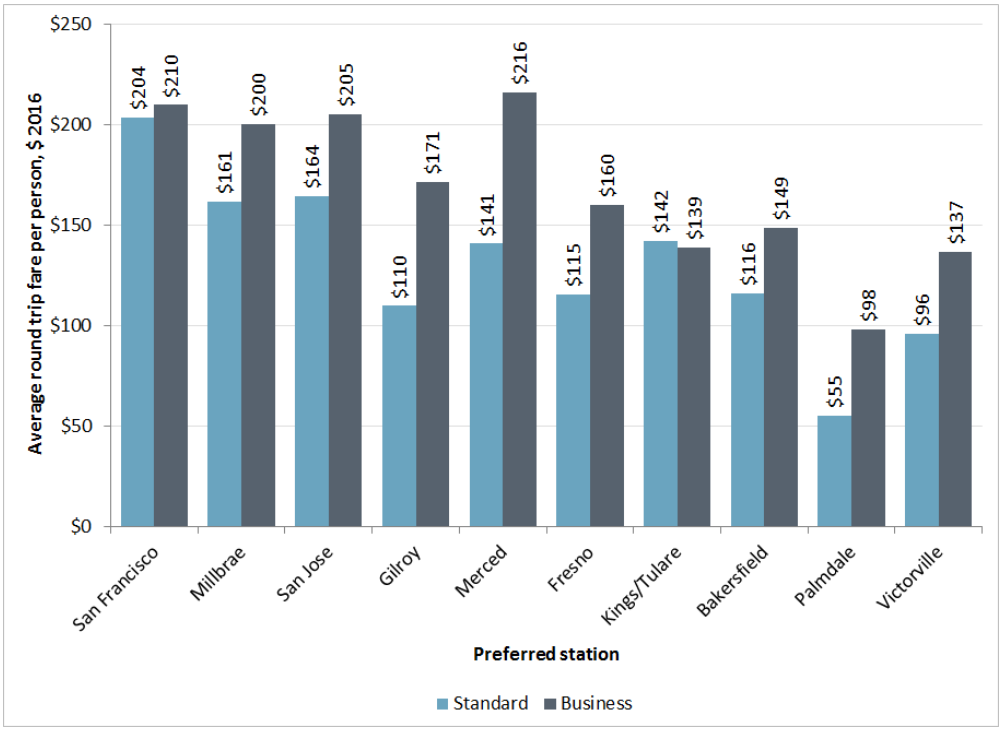


Source: Steer Davies Gleave

6.21 Grouping the Northern and Central California stations there were three general price points with fares decreasing with proximity to Las Vegas:

- San Francisco, Millbrae, San Jose: $185 standard / $207 business
- Gilroy, Merced, Fresno, Kings/Tulare, Bakersfield: $122 standard / $164 business
- Palmdale and Victorville: $88 standard / $130 business

Figure 6.11: Expected fare, Northern & Central CA stations

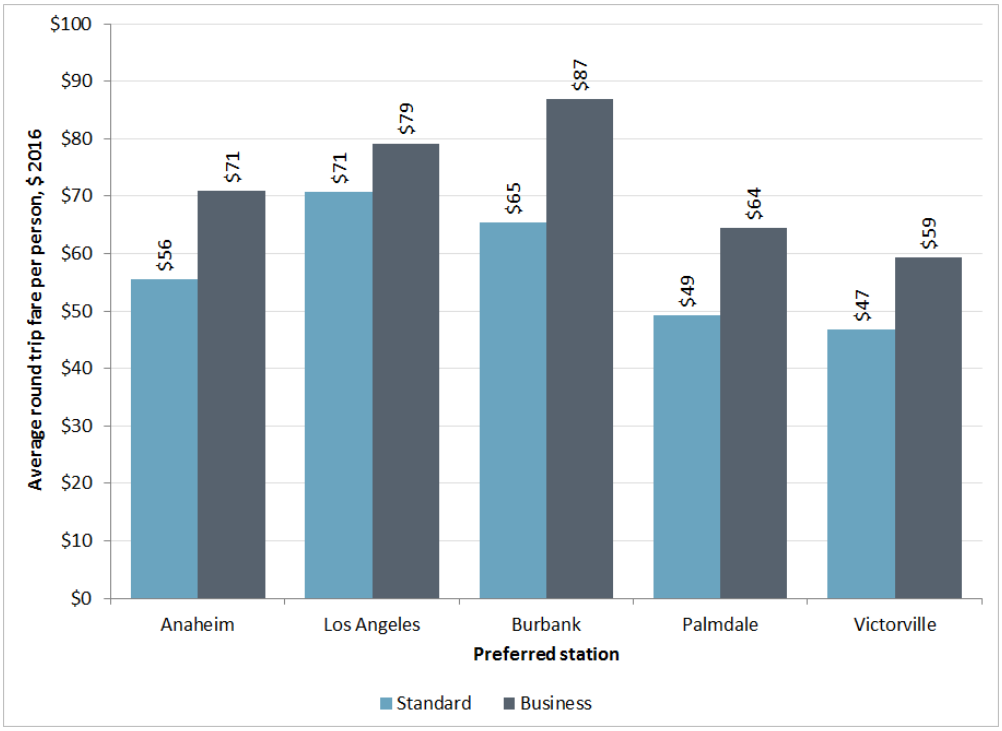


Source: Steer Davies Gleave, note small sample sizes other than San Francisco and San Jose

Fare you would like to pay

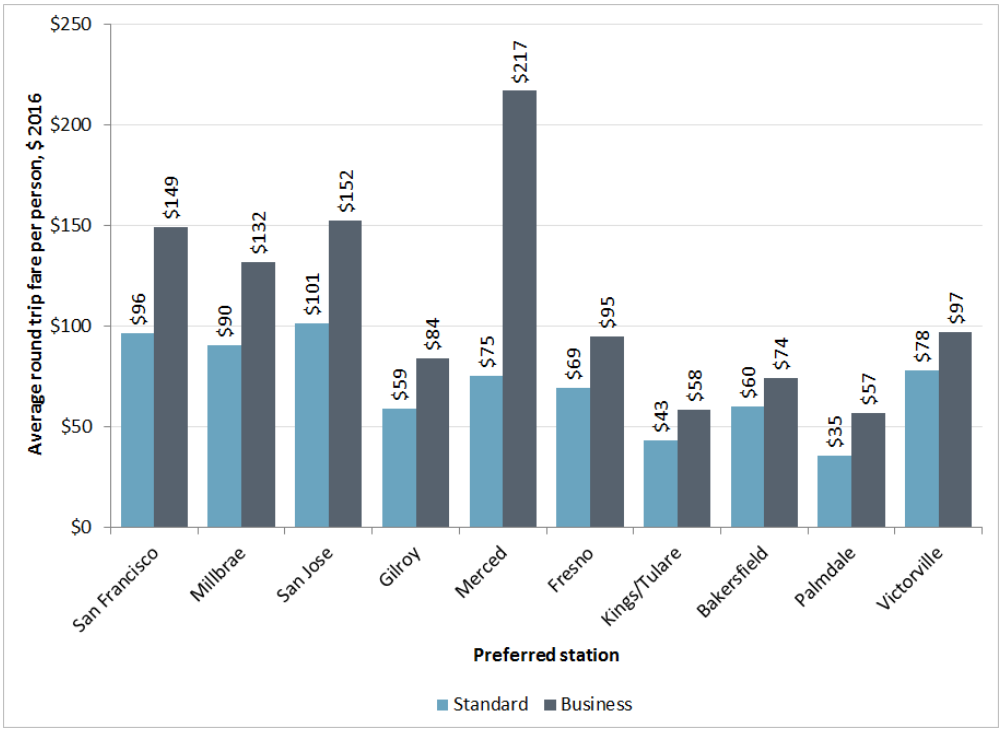
6.22 As is expected, fares people would like to pay were lower than the expected fares. In general across all stations they were approximately 35-40% lower across both standard and business class.

Figure 6.12: Desired fare, Southern CA stations



Source: Steer Davies Gleave 2016

Figure 6.13: Desired fare, Northern & Central CA stations



Source: Steer Davies Gleave 2016, note small sample sizes other than San Francisco and San Jose

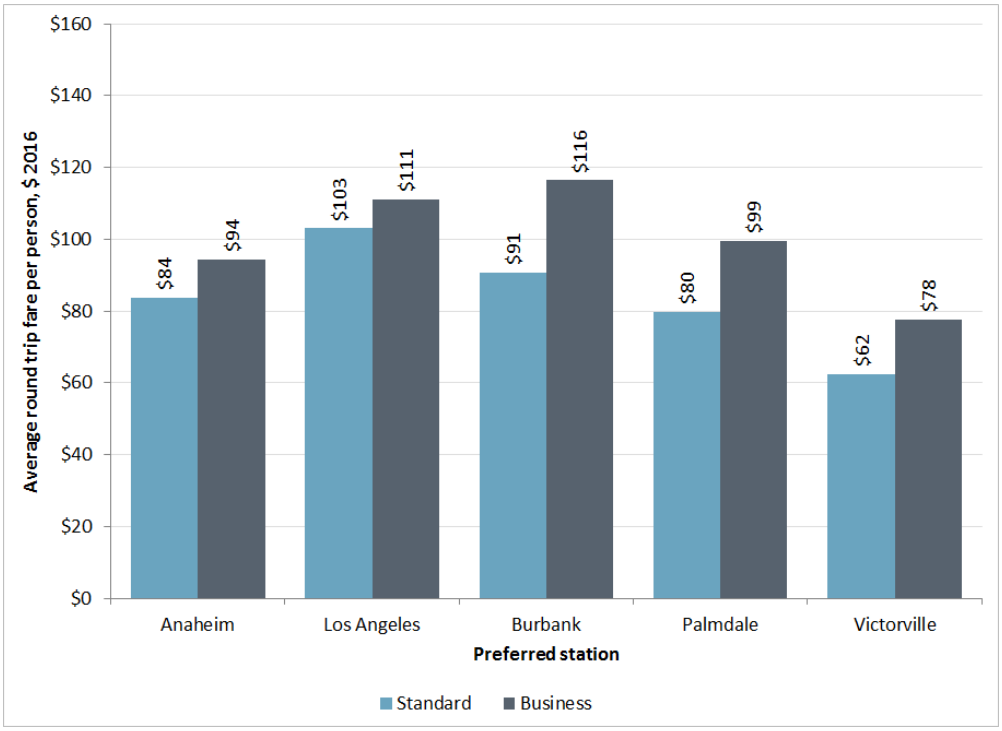
Maximum fares

6.23 The maximum fare levels that people were willing to consider paying are shown below. In summary these were:

- LA area: $93 standard / $105 business
- Desert stations (Southern Californians): $66 standard / $81 business
- San Francisco, Millbrae, San Jose: $151 standard / $204 business
- Gilroy, Merced, Fresno, Kings/Tulare, Bakersfield: $96 standard / $137 business
- Desert stations (Northern and Central CA): $76 standard / $124 business

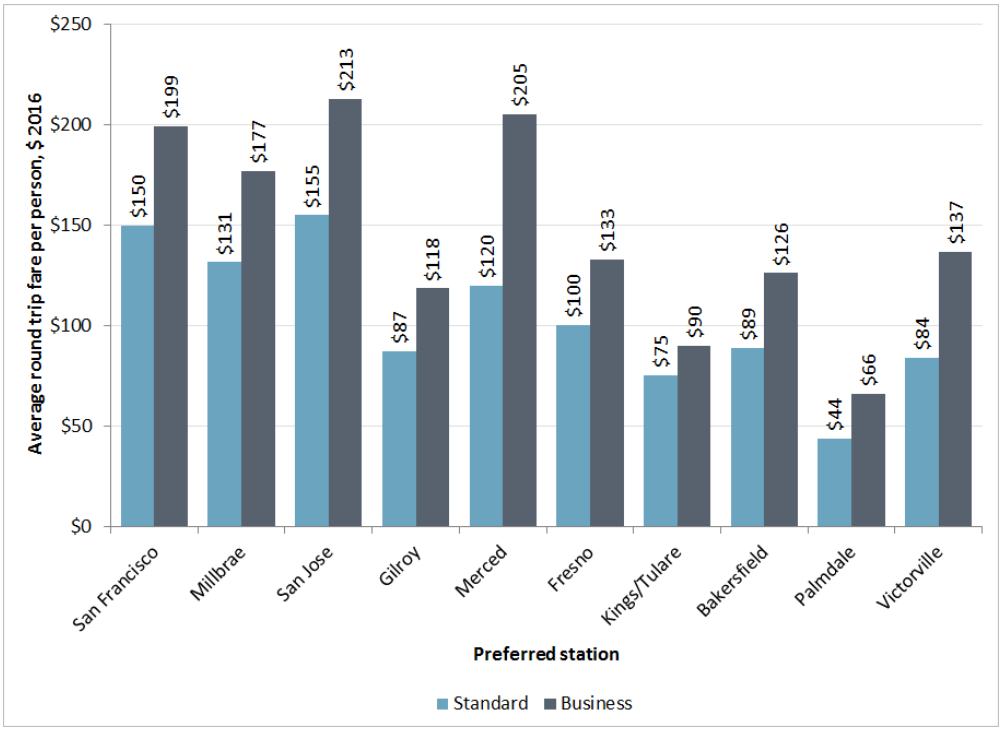
6.24 Overall these fares are approximately 13% lower than the expected fares that people indicated.

Figure 6.14: Maximum fare willing to pay, Southern CA stations



Source: Steer Davies Gleave 2016

Figure 6.15: Maximum fare willing to pay, Northern & Central CA stations



Source: Steer Davies Gleave 2016, note small sample sizes other than San Francisco and San Jose

Fare summary

6.25 The average fare levels that people reported are shown in Table 6.6.

Table 6.6: Average fare levels, all categories, $ 2016

	Standard			Business		
	Desired	Expected	Max	Desired	Expected	Max
LA area	$64	$104	$93	$77	$124	$105
Desert stations (SoCal)	$47	$75	$66	$60	$108	$81
San Francisco – San Jose	$97	$185	$151	$147	$207	$204
Gilroy - Bakersfield	$64	$122	$96	$103	$164	$137
Desert stations (Cen & NorCal)	$69	$88	$76	$89	$130	$124

Source: Steer Davies Gleave 2016

7 High Desert Corridor Choice Modeling

Overview

7.1 To estimate the levels of ridership HDC would be expected to capture from each of the existing modes, a forecasting model has been developed. This is based on binary choices between HDC and existing modes of transport: air and auto.

7.2 The model works with market segments defined in terms of combinations of origin and destination, existing mode, journey purpose, and other key variables.

7.3 The model calculates the total journey time and cost for each market segment. The total times and costs for each mode, traveler segment and geographical area are then compared and the forecast ridership for HDC estimated.

7.4 This chapter sets out the theory of choice modeling, and then describes the outputs from the behavioral research which allow us to establish the different sensitivities to times and costs (the demand parameters).

Theoretical overview

7.5 The total journey time for each segment is expressed as a 'generalized time'. In generalized times all the individual elements of the journey (such as in-vehicle time, fare, access time, egress time, etc.) are combined using consistent units. Each element in the generalized time expression is expressed in terms of equivalent in-vehicle time minutes.

7.6 The generalized times are converted into 'utilities' and the market share of each alternative mode forecast. The market shares are estimated using a logit model, the general form of which is shown below.

$$P_{ni} = \frac{e^{V_{ni}}}{\sum_{\forall A_j \in A(n)} e^{V_{nj}}}$$

Where:

- ni is the probability of individual n choosing alternative i from a set of alternatives A(n)
- Vni is the deterministic utility of alternative i to individual n

7.7 The deterministic component of utility (Vni) is made up of the sum product (or vector product) of a vector of parameters and a vector of time and cost variables, where β is the vector of parameters and x is the vector of variables:

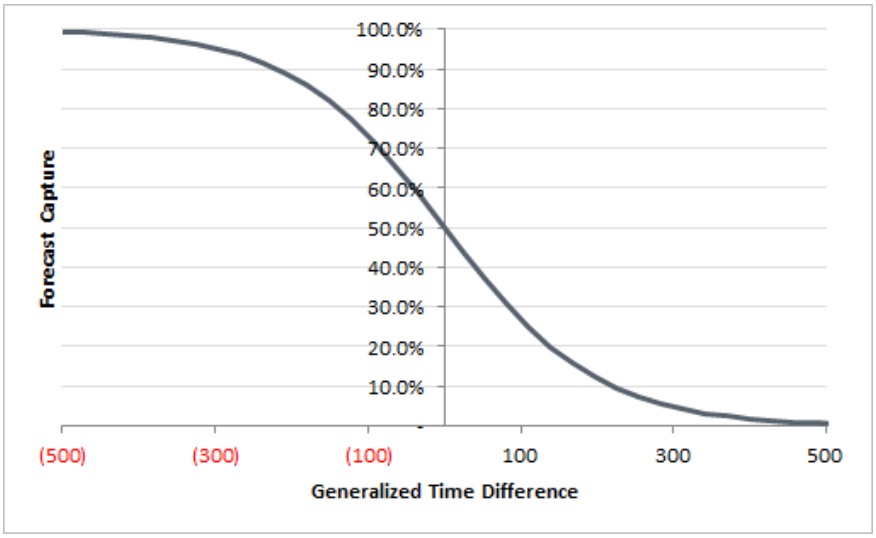
$$V_{ni} = \beta' x_{ni}$$

The Logit Curve

7.8 The 'assignment' of people to one mode or another in the forecasting process is based on the difference in their generalized times and on the probability given by the logit shaped distribution. Thus in simple terms the greater the generalized time advantage of HSR compared with a competing mode, the greater the ridership.

7.9 An example of a logit curve is shown in Figure 7.1. The forecast market share (vertical axis) is plotted against the difference in generalized time (horizontal axis), where a negative value means that HSR is faster in terms of generalized minutes than the alternative. The curve shows that when the HSR has a generalized time advantage it will capture a higher proportion of the market.

Figure 7.1: Example of Logit Curve



Source: Steer Davies Gleave

7.10 In order to obtain the demand parameters (the β) that define the logit curves, a survey or data with actual travel information of the population is required. This can be based on:

- Revealed Preference data (RP), which is information of actual travel behavior and choices;
- Stated Preference data (Stated Preference), which is information about hypothetical travel behavior; or
- A mix of the two types of data.

7.11 The demand parameters that we have estimated and subsequently report in this chapter are based on Stated Preference responses from a sample consisting of people who are in-scope to use HSR.

Stated Preference

General overview

7.12 Stated Preference surveys have been widely used in transportation appraisal projects to estimate the demand of new modes of transport for over 30 years.

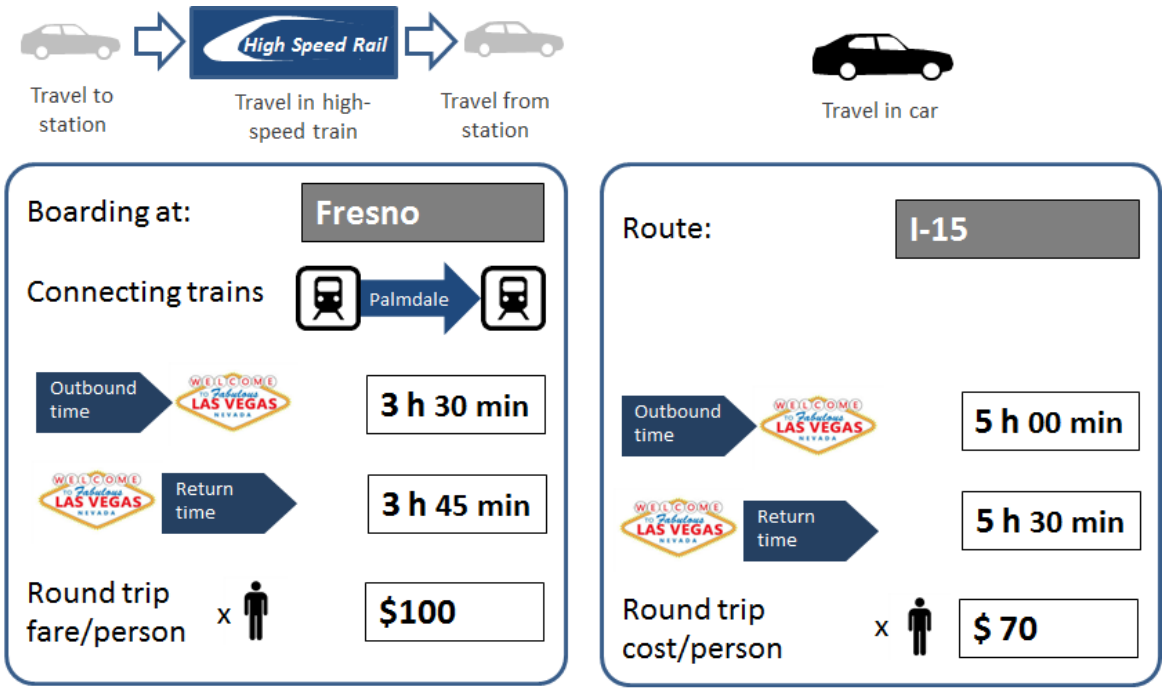
7.13 Stated Preference surveys consist of a series of hypothetical choice scenarios, in which every respondent has to make a decision among different alternatives described in terms of their most relevant attributes. In this context, attributes are what describe the alternative, and can be:

- Quantitative such as times and costs; or
- Qualitative such as comfort, safety and reliability.

7.14 The focus groups that were carried out indicated that travel cost and time were the variables that people considered most in their travel decisions, thus the Stated Preference choice scenarios have been constructed using cost and time by each alternative mode of travel as the core attributes.

7.15 Underlying the set of hypothetical choices is an experimental design. This design controls the number of different choice scenarios that each respondent is shown and also how the attributes are varied. For the purpose of this study, each respondent was shown nine hypothetical choice situations. Figure 8.2 shows an example of a hypothetical choice scenario or Stated Preference card for an auto user.

Figure 7.2: Example choice scenario – auto vs. HSR



7.16 We refer to the dataset containing information about each Stated Preference card (in terms of its alternatives and attributes) and the choices each respondent made as the 'choice data'. Analysis of this data allows the competitive position of HDC relative to the current modes of travel to be quantified through the implicit trade-offs made among the attributes of the alternatives.

Choice modeling and analysis

Value of time ranges

7.17 Respondents were presented with eight cards with a wide range of values of time. The table below shows the value of time distribution of the cards shown to respondents. The values of time shown to a given respondent varied to enable his or her value of time to be uncovered

Table 7.1: SP VoT ($/hr) shown to respondents

Percentile	Auto	Air
10%	$3.4	$6.4
25%	$8.4	$11.4
50%	$18.2	$21.7
75%	$34.0	$44.8
90%	$54.4	$83.3

7.18 Overall, over 70% of the respondents 'traded' during the SP exercise, that is they chose their current mode at least once and they chose the HSR service at least once.

Trading	Auto	Air
Traders	72.0%	70.0%
Always current mode	20.8%	11.8%
Always HSR	7.2%	18.2%

Variables tested

7.19 As part of the analysis undertaken, a large number of different models were tested in order to understand the influence of various market segmentations and utility equation forms on the output results. These tests included:

- Income;
- Ethnicity;
- Age group;
- Journey purpose – business/convention and other;
- Group size of immediate traveling party;
- Access distance to HSR station;
- Origin of trip by geography; and
- Access station.

7.20 The final models selected represent those which demonstrated the best fit with the data while also providing output parameters which made sense from an economic theory perspective.

Auto choice model

Utility function

7.21 The specification of the auto model included the following groups of variables:

- Round trip travel time;

- Round trip cost per person; and
- Mode constant.

7.22 In addition it included the following market segmentations:

- Income; and
- Location of access station (desert or non-desert).

7.23 The round trip cost per person was interacted with income. This meant a different willingness to pay to save travel time could be estimated depending on the income level of the traveler.

7.24 Additionally we defined a variable identifying whether the access station was a "desert" station (Victorville or Palmdale) or whether it was a non-desert station (any other station). This provided us with a differential mode constant by these station groupings.

7.25 The final model is described by the following utility equation:

$$U(Auto) = \beta_{time} \times Round\ trip\ auto\ travel\ time + \beta_{cost} \times Round\ trip\ auto\ cost\ per\ person \div log(income)$$

$$U(HSR) = \beta_{time} \times Round\ trip\ HSR\ travel\ time + \beta_{cost} \times Round\ trip\ HSR\ cost\ per\ person \div log(income) + \beta_{desert} \times desert$$

Where:

Desert = 1 if station is Victorville or Palmdale, else 0

Income is measured in thousands of dollars per annum

All cost and income terms are in USD 2016.

Response filtering

7.26 Data collected from online surveys such as this need careful interrogation to ensure that respondents have provided thoughtful responses and that tasks have been well understood. A careful balance must be struck between obtaining statistically valid results while not being heavy handed over screening out respondents.

7.27 Some degree of response inconsistency can be expected: by the very nature of the survey choice cards and typical human responses. However significantly inconsistent responses indicate that a respondent may not have been providing thoughtful answers and this can skew the output results from the behavioral analysis.

7.28 Accordingly the model specified was applied to a subset of the overall responses received from the behavioral survey in order to filter out any respondents who demonstrated significant inconsistencies in their responses. In particular the following filter was used:

- **Value of time based:** A total of 8 choice cards were presented to each individual survey respondent. An implicit value of time was calculated for each choice card. If the minimum value of time implied across the set of cards the set was more than 10 times higher than the maximum value of time, then the respondent was removed from the choice model.

Example: A respondent is presented with a choice card which is one hour faster by HSR but would cost $50 more, and the respondent chooses the rail option. This implies the respondent has a value of time of at least $50/hour. Subsequently the respondent is presented with a choice card which is 2 hours faster by HSR but would cost $5 more by HSR, and the respondent chooses the auto option. This implies that the respondent has a value of time of at most $2.50/hour. This level of discrepancy is greater than 10 (50/2.5 = 20) therefore the respondent would be excluded from the choice model.

7.29 On this basis, 4% of respondents were excluded from the choice models.

Model outputs

7.30 Table 7.2 provides a summary of the model in terms of parameters estimated and implied average value of time and constants.

7.31 All estimated parameters were highly significant at the 95% level (Z value of greater than 1.96 (absolute)).

Table 7.2: Auto model summary

Parameter	Description	Units	Value	Z	P>|Z|
β time	Round trip travel time	Utils / min	-0.003	-8.96	0
β cost	Round trip cost per person	Utils / USD	-0.081	-19.18	0
β desert	Mode constant applied to desert stations	Utils	-0.467	-9.54	0
VoT	Value of time	USD / hour	$10.70		
HSR constant	Mode constant if desert station	Mins	-143		
	Mode constant if non-desert station	Mins	-		
Observations	Number of individual observations	-	36,960		

Source: Steer Davies Gleave behavioral research

7.32 Desert stations include a negative valued constant which is equivalent to approximately 143 minutes. This means that there is a perceived disbenefit when traveling via a desert station (Palmdale or Victorville) above and beyond any direct implications in terms of actual time and cost. There is no constant applied when traveling via a non-desert station.

Air choice models

Utility function

7.33 The specification of the air model included the following groups of variables:

- Round trip travel time;
- Round trip cost per person; and
- Mode constant.

7.34 In addition it included the following market segmentations:

- Income; and
- Location of access station (desert or non-desert).

7.35 The round trip cost per person was interacted with income. Accordingly we are able to estimate a different willingness to pay to save travel time depending on the income level of the traveler.

7.36 As with the auto model we defined a variable identifying whether the access station was a "desert" station (Victorville or Palmdale) or whether it was a non-desert station (any other station). This again provided us with a differential mode constant by these station groups.

7.37 The final model is described by the following utility equation:

$$U(Air) = \beta_{time} \times Round\ trip\ air\ travel\ time + \beta_{cost} \times Round\ trip\ air\ cost\ per\ person \div log(income)$$

$$U(HSR) = \beta_{time} \times Round\ trip\ HSR\ travel\ time + \beta_{cost} \times Round\ trip\ HSR\ cost\ per\ person \div log(income) + \beta_{desert} \times desert + constant$$

Where

Desert = 1 if station is Victorville or Palmdale, else 0

Income is measured in thousands of dollars per annum

All cost and income terms are in USD 2016.

Response filtering

7.38 As with the auto model some responses were excluded. The following filters were used:

- **Value of time based**: A total of 8 choice cards were presented to each individual survey respondent. An implicit value of time was calculated for each choice card. If the minimum value of time implied across the set of cards was more than 10 times higher than the maximum value of time, then the respondent was removed from the choice model.

  Example: A respondent is presented with a choice card which is 2 hours slower by HSR but would cost $5 less, and the respondent chooses the rail option. This implies the respondent has a value of time of at most $2.50/hour. Subsequently the respondent is presented with a choice card which is 1 hour slower by HSR but would cost $50 less by HSR, and the respondent chooses the air option. This implies that the respondent has a value of time of at least $50/hour. This level of discrepancy is greater than 10 (50/2.5 = 20) therefore the respondent would be excluded from the choice model.

- **'Policy' bias:** All respondents were presented with attitudinal questions gauging their views on HSR. In reality however some of these only applied to auto users (for example, whether people agree that using the HSR rail would allow them to avoid traffic issues along I-15).

Respondents who were extremely positive to HSR in all cases, even when the question wasn't really applicable to them[5], were excluded as having a HSR bias.

Example: An existing air respondent indicated they "completely agree" with every attitudinal statement in favor of HSR, therefore the respondent would be excluded from the choice model.

7.39 On this basis, 18% of respondents were excluded from the choice models.

Model outputs

7.40 Table 7.3 provides a summary of the model. All parameters were significant at the 95% level.

Table 7.3: Air mode summary

Parameter	Description	Units	Value	Z	P>|Z|
β time	Round trip travel time	Utils / min	-0.002	-5.19	0
β cost	Round trip cost per person	Utils / USD	-0.015	-4.03	0
β desert	Mode constant applied to desert stations	Utils	-1.020	-8.10	0
HSR constant	Mode constant applied to HSR	Utils	0.635	4.47	0
VoT	Value of time	USD / hour		$43.20	
HSR constant	Mode constant if desert station	Mins		-169	
	Mode constant if non-desert station	Mins		279	
Observations	Number of individual observations	-		7,968	

Source: Steer Davies Gleave behavioral research

7.41 The overall HSR constant is positive, implying an underlying perceived benefit of HSR over travel by air. Desert stations however include a negative valued constant which is larger in absolute scale than the positive HSR constant. This means that there is a perceived disbenefit when traveling via a desert station (Palmdale or Victorville) above and beyond any direct implications in terms of actual time and cost.

Benchmarking of VoTs

7.42 The US Department of Transportation (US DOT) provides guidance on expected values of times for different types of movements which it uses in the assessment of transportation benefits analysis. These represent 'typical' values based upon travel markets across the US. They are useful therefore as a point of reference to check the broad scale of estimated parameters, however there can often be local factors which can result in values of time for specific flows being somewhat different.

7.43 Based upon the median household incomes in California and Nevada[6], median hourly wages from the Bureau of Labor Statistics[7] and guidance provided by the US DOT[8], the expected typical range of VoT is:

[5] Note in all cases respondents had the option of selecting "not applicable".

- Intercity travel by auto:
  - Non-business: $15 - $27;
  - Business: $14 - $25.
- Intercity travel by air:
  - Non-business: $29 – $51;
  - Business: $37 - $65.

7.44 From our behavioral models, the output VoT for existing auto travelers is $10.70 while for existing air users is $43.20.

7.45 The output VoT for existing air users therefore falls in the range advised by the US DOT. The output VoT for existing auto users however falls slightly below the range advised by the US DOT. A lower VoT implies that people are less willing to pay a premium for a faster mode.

[6] **https://www.census.gov/quickfacts/table/INC110214/**

[7] **http://www.bls.gov/oes/current/oes_29820.htm**

[8] **https://www.transportation.gov/office-policy/transportation-policy/guidance-value-time**

D Applied Analysis report

This appendix provides the market growth report developed by Applied Analysis.

Southern Nevada Tourism Industry

A Demand Projection Analysis

Prepared for:

steer davies gleave

May 20, 2016

APPLIED ANALYSIS

TABLE OF CONTENTS

FINDINGS IN SUMMARY

Applied Analysis ("AA") was retained by Steer Davies Gleave ("SDG" or "the Company") to develop a range of projection scenarios for southern Nevada's tourism industry to assist the Company in evaluating the market potential of a high-speed rail service between Las Vegas and southern California. This analysis is based on the best available information at the time this analysis was conducted.

Beyond current conditions, forward-looking research and analysis contains various assumptions about general economic conditions and changes in supply and demand dynamics in generating forecasts through 2040.[1] It is worth noting that long-run projections can be impacted by any number of factors, including global, national and regional market conditions. More details about these projections are contained in the paragraphs that follow and within the body of this summary report.

BROAD MARKET EXPECTATIONS AND IMPACT ON PROJECTION ANALYSIS

As a foundational element of the projection analysis, it is important to consider the long-run trends experienced in the southern Nevada tourism industry. During the past 10 years, southern Nevada visitor volume expanded at a compound annual growth rate ("CAGR") of 0.9 percent, while maintaining average hotel occupancies of approximately 89 percent. This period includes the significant impacts created by the global recession and subsequent economic downturn. It is also worth noting the 20-year CAGR in visitor volume was 1.9 percent. Since the initial 2010 analysis was prepared, visitor volume has increased at a compound annual growth rate of 2.6 percent (2010 to 2015), which matches the 2.6 percent rate during the pre-recession period of 1997 through 2007. In 2015 Las Vegas visitor volume surpassed 42.3 million, the highest level recorded.

Throughout the ups and downs of some of the most unique economic times in southern Nevada's history, hotel and gaming operators managed to respond to external market forces and shifts in consumer demands and demographics. This analysis assumes their ability to respond to future opportunities and challenges will continue. Additionally, projection estimates include forecasts of convention-related travel as well as non-convention, or leisure, travel.

Convention-related demand softened considerably amid the recession, declining by 29 percent between 2006 and 2009 as global economic conditions impacted demand for business travel. However, Las Vegas maintained its position among the leading trade show destinations during that period, and convention activity and related visitation have expanded as economic conditions improved in the United States and around the globe. In the five years since 2010, convention attendance has increased by a compound annual growth rate of 4.8 percent, which is generally in line with the 5.8-percent CAGR in the decade before the recession began. The convention component remains an important element in the demand profile, supporting mid-week hotel occupancies and pricing. Meanwhile, following a decline in 2008, leisure traveler volume returned to a long-term upward growth trend. The compound annual growth rate since 2010 was 2.3 percent, slightly higher than the 2.0-percent CAGR between 1997 and 2007.

Southern California remains the primary visitor market of origin, supplying 25 percent of all visitors in 2015[2], and is expected to continue to evolve in terms of demographics and competitive gaming supply. Demand sourced to southern California visitors is a function of their relative value, the volume of potential consumers and the frequency of their visits. In 2015, 98 percent of visitors from southern California were on repeat visits, compared to 86 percent for other domestic visitors and 56 percent for international travelers. Southern Californians also visit more frequently, with 65 percent reporting two or more trips to Las Vegas within the past year. This compares to 33 percent for other domestic visitors and 13 percent of international

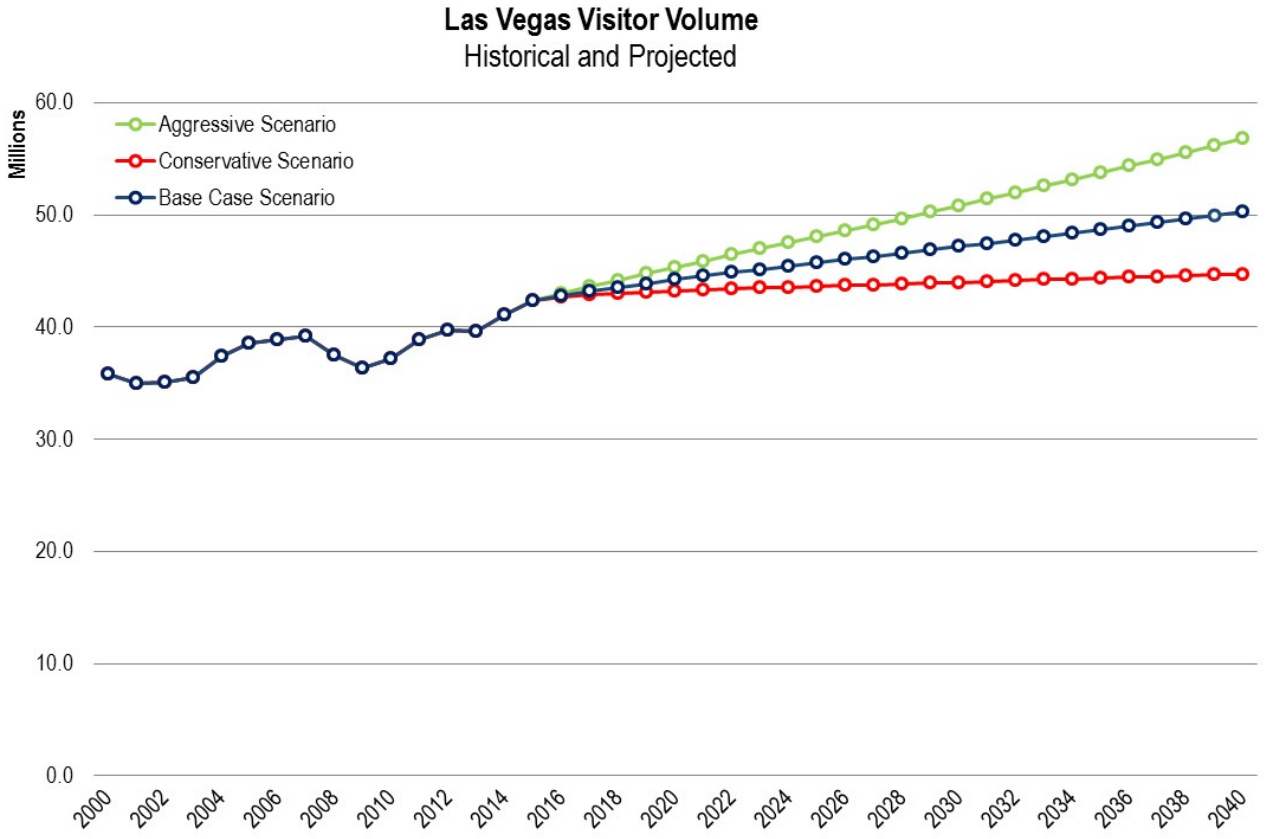
[1] See Exhibit A for trending of selected historical industry performance measures considered as part of this analysis.
[2] Las Vegas Convention and Visitors Authority, 2015 *Las Vegas Visitor Profile Survey*.

visitors. Additionally, the vast majority of visitors from southern California (97 percent) reporting arriving via ground transportation such as a personal vehicle or bus. Future demand will be sourced to repeat visitors, additional market penetration and overall growth in population in the region. With more than 10 million annual visitors from southern California, this segment of the market will continue to an integral component going forward and a key contributor to the industry.

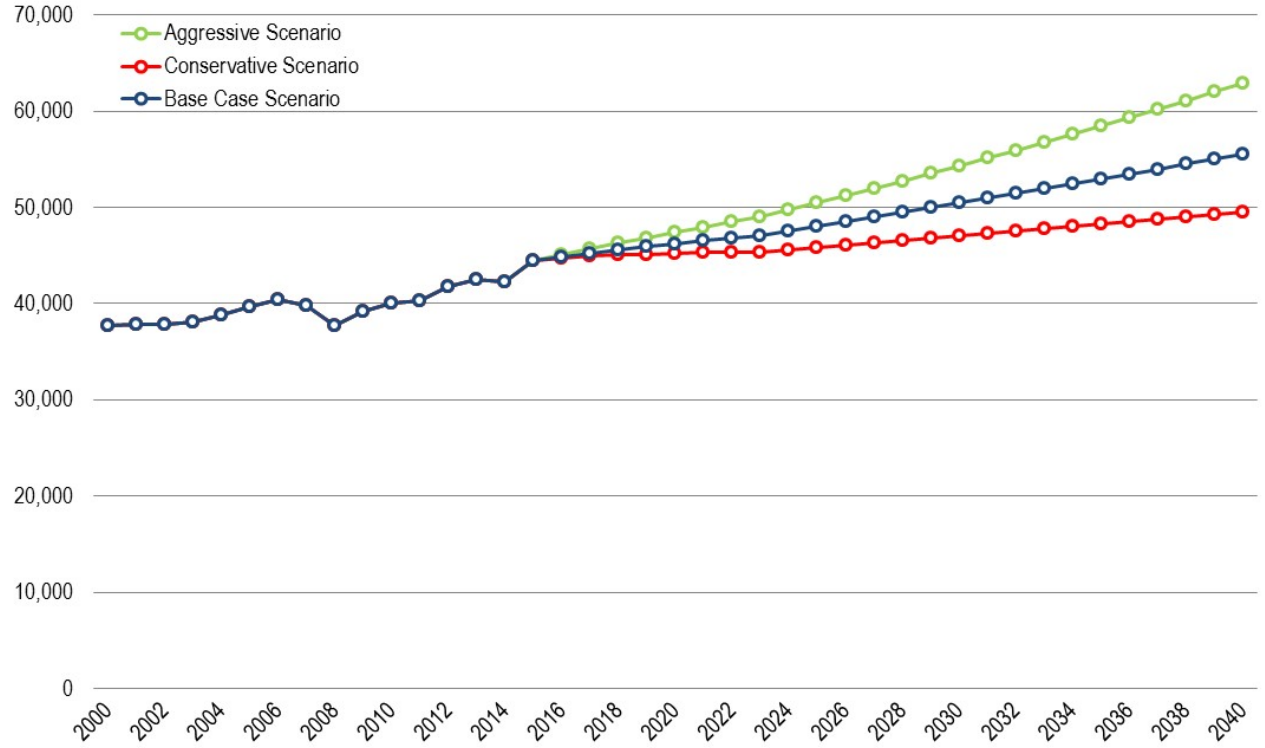
The normal rhythms of the business cycle will undoubtedly affect the tourism industry during the projection period. That said, attempting to forecast future businesses cycles is a Sisyphean task. As such, the analysis utilizes longer-run historical averages for metrics such as growth in domestic gross product, manufacturing demand, retail sales activity, consumer confidence levels and other measures of economic health.

Modeled Scenarios

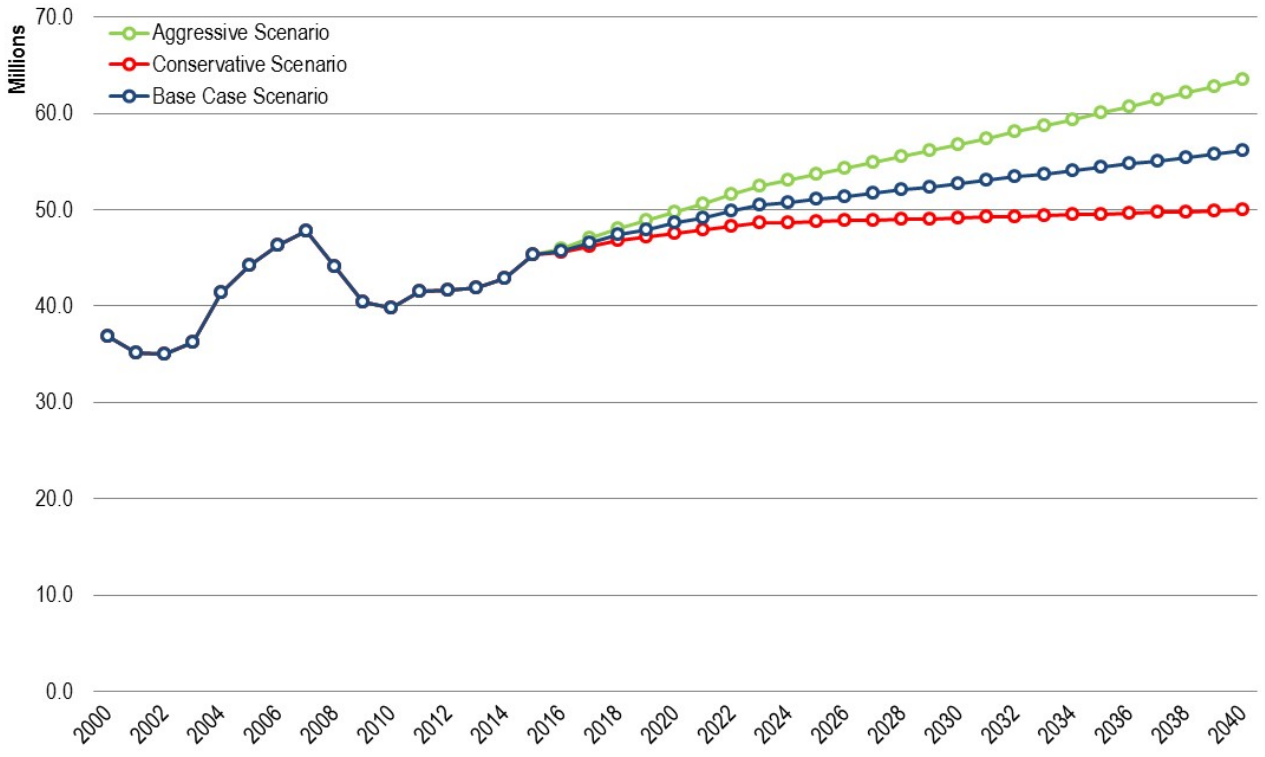
Also noteworthy is that while the output from this analysis is intended to provide demand estimates into the future, visitors' modes of transportation and supply considerations were also analyzed. With regard to modes of transportation, these estimates are relevant for SDG's purposes, but are not the primary focus of the analysis. The alternative scenarios were developed to understand the interplay of projected demand and the potential customer mix. With regard to supply, it was necessary to also model inventory levels to evaluate capacity constraints and their potential impact on the demand side of the equation. That said, at your direction, a range of scenarios were considered; the following graphically depicts the results of the analyses and the scenarios modeled.



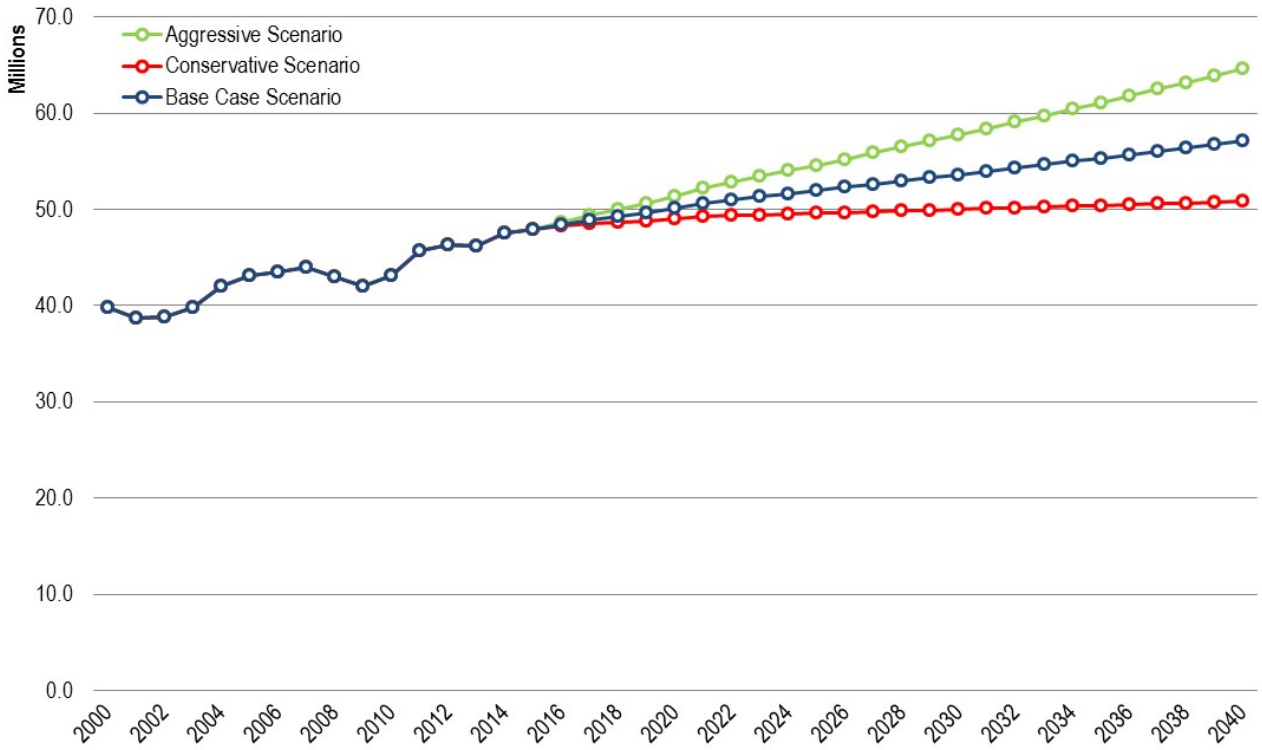
Traffic Counts at Interstate 15 (CA/NV Border)
Historical and Projected



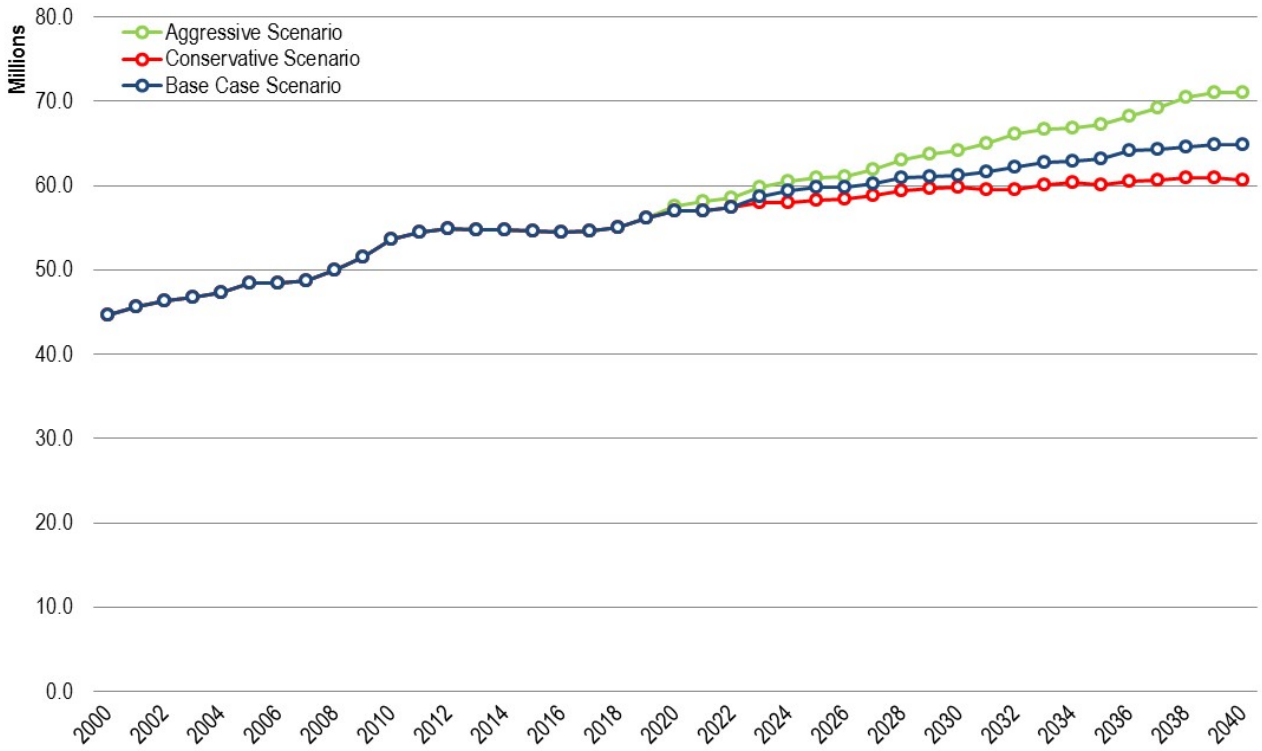
McCarran Passenger Counts
Historical and Projected



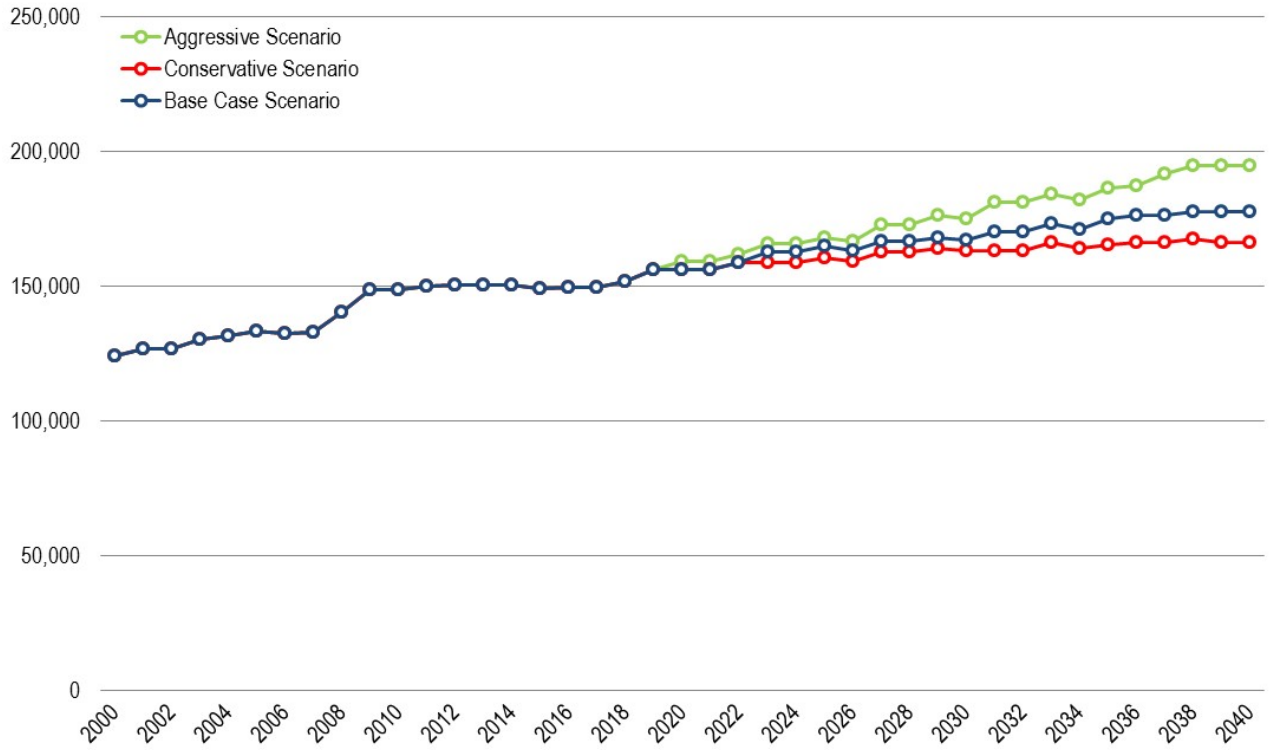
Hotel Room Nights Occupied
Historical and Projected



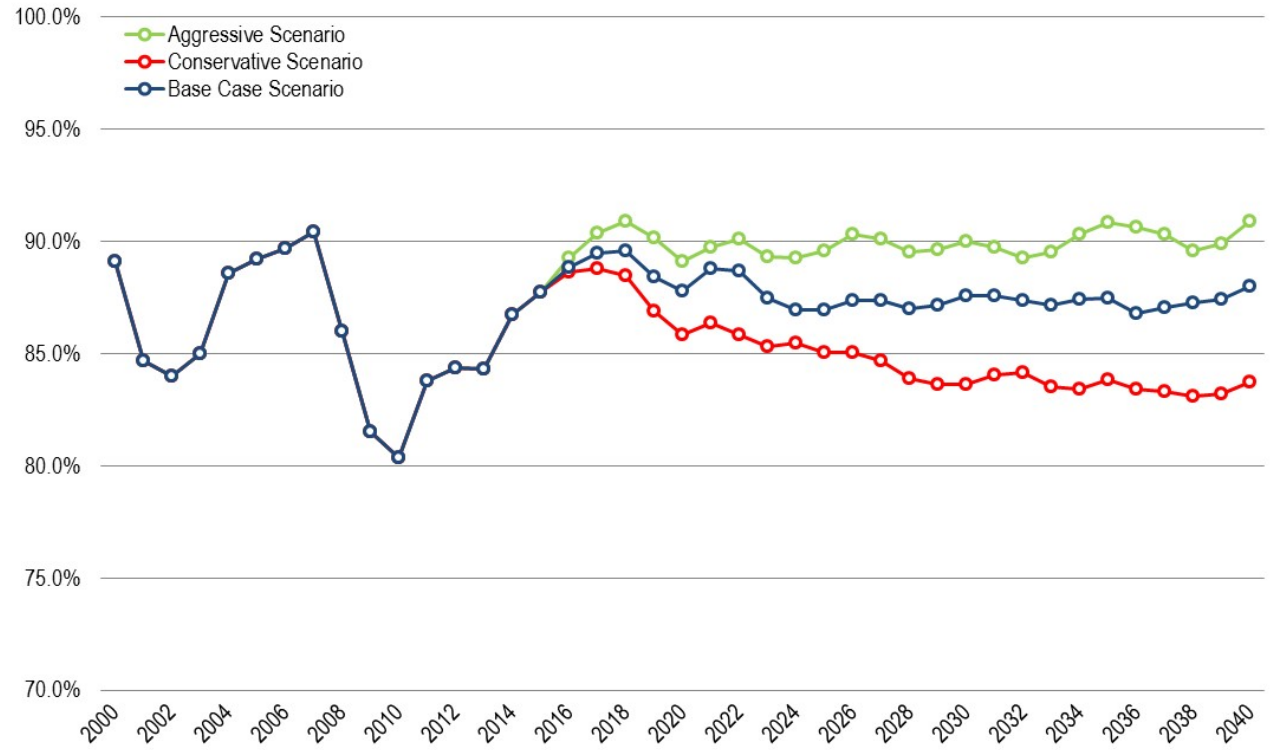
Hotel Room Nights Available
Historical and Projected



Hotel Room Inventory
Historical and Projected



Hotel/Motel Occupancy Rates
Historical and Projected



Specific Questions Presented

The following questions presented by the Company have been included at their request with corresponding references to underlying research and analysis included for ease of reference.

Question Presented by SDG	Reference
We would like your view on how the supply base is likely to evolve post 2020, over 5-year terms to 2040.	See *Results of Projection Analysis* section and Exhibits B-1 through B-3.
What are the key factors and assumptions as it relates to new supply entering the market?	See the general discussion in the *Findings in Summary* section and *Market Risks, Uncertainties and Special Assumptions* for key factors and assumptions.
What types of property (high-, mid-, and low-end) and in what volumes are likely to be developed in the future?	See discussion in *Hotel Development and Room Mix Considerations* section.
More specifically, how much of the additional capacity is likely to be taken up by visitors from Southern California? Will the rooms be needed just to satisfy growing demand from the rest of the US?	See the projection scenarios modeled in Exhibits B-1 through B-3 for the interplay between the various visitor segments and future supply additions.
Is the potential Southern California market effectively saturated and only likely to be driven by population changes?	See the general discussion in the *Findings in Summary* section and the projection scenarios modeled in Exhibits B-1 through B-3 for southern California's visitor component.
Will Native American gaming resorts make more in-roads into this market (as a lower cost alternative as prices rise in Vegas)?	See *Market Risks, Uncertainties and Special Assumptions* for further discussion.

RESULTS OF PROJECTION ANALYSIS

The detailed results of each scenario are contained in Exhibits B-1, B-2 and B-3 for further review, along with a consolidated data table of relevant components of each model in Exhibit C. The following provides summary results in five-year increments as requested.

Selected Demand and Supply Projections by Scenario

	2015	2020	2025	2030	2035	2040
Visitor Volume						
Conservative Scenario	42,312,216	43,246,053	43,642,851	43,996,589	44,353,194	44,712,689
5-Year CAGR	2.6%	0.4%	0.2%	0.2%	0.2%	0.2%
Base Case Scenario	42,312,216	44,223,911	45,724,493	47,179,569	48,680,950	50,230,108
5-Year CAGR	2.6%	0.9%	0.7%	0.6%	0.6%	0.6%
Aggressive Scenario	42,312,216	45,330,698	48,044,381	50,817,174	53,749,993	56,852,074
5-Year CAGR	2.6%	1.4%	1.2%	1.1%	1.1%	1.1%
Traffic Counts at I-15 NV/CA Border						
Conservative Scenario	44,419	45,223	45,839	47,032	48,242	49,468
Base Case Scenario	44,419	46,245	48,025	50,435	52,949	55,572
Aggressive Scenario	44,419	47,402	50,462	54,323	58,462	62,898
McCarran International Airport Passengers						
Conservative Scenario	45,389,074	47,515,812	48,754,628	49,151,504	49,550,442	49,952,148
Base Case Scenario	45,389,074	48,590,088	51,080,085	52,707,387	54,385,264	56,116,041
Aggressive Scenario	45,389,074	49,805,790	53,671,479	56,770,932	60,047,988	63,513,646
Hotel Room Nights Occupied						
Conservative Scenario	47,896,317	48,953,396	49,594,149	49,996,124	50,401,357	50,809,874
Base Case Scenario	47,896,317	50,060,306	51,959,651	53,613,147	55,319,261	57,079,668
Aggressive Scenario	47,896,317	51,313,159	54,595,888	57,746,788	61,079,537	64,604,630
Hotel Room Inventory						
Conservative Scenario	149,213	156,245	160,745	163,245	165,245	166,245
Base Case Scenario	149,213	156,245	164,745	167,245	175,245	177,745
Aggressive Scenario	149,213	159,245	168,245	175,245	186,245	194,745
Hotel Room Occupancy Rates						
Conservative Scenario	87.7%	85.8%	85.1%	83.7%	83.8%	83.7%
Base Case Scenario	87.7%	87.8%	86.9%	87.6%	87.5%	88.0%
Aggressive Scenario	87.7%	89.1%	89.6%	90.0%	90.8%	90.9%

SUPPLY CONSTRAINTS CONSIDERED

While demand-side projections are the primary objective of the analysis, such an analysis requires an evaluation of capacity and potential capacity constraints.

HOTEL INVENTORY AND DEVELOPABLE LAND AVAILABILITY

From a hotel inventory perspective, the analysis contained herein models reasonable supply movements given market demands. Southern Nevada's hotel-casino and tourism industry was negatively impacted by the downturn in the broader economy as discretionary spending contracted and convention and meeting demand waned. As a result, room inventory has remained relatively steady since the addition of more than 8,500 rooms in 2009 and 2010. That period welcomed the development of several new products: the nearly $1.0 billion M Resort (390 hotel rooms); a two-phased expansion of the Hard Rock Hotel and Casino (865 hotel rooms); a $150 million expansion of downtown's Golden Nugget (500 hotel rooms); the unveiling of the $8.5 billion CityCenter developed by MGM Resorts International and Dubai World (4,396 hotel rooms and 1,495 hotel-condo units); the Planet Hollywood Tower by Westgate Resorts (240 timeshare units and 961 hotel rooms); and the $3.9 billion Cosmopolitan (2,995 rooms). The rise in room supply in combination with the economic downturn suppressed hotel occupancy rates by more than 10 points, from a peak of 94.0 percent in 2007 to a low of 83.6 percent in 2010. The hotel occupancy rate has risen since then to 89.8 percent, which remains below peak levels but is higher than the 10-year average of 87.5 percent from 1998 through 2007.

During the period of supply-demand imbalance in the hotel sector, a number of planned or proposed projects were postponed or stalled, including Boyd Gaming's Echelon (4,910 hotel rooms) and the 3,815-unit Fontainebleau, which entered bankruptcy and was subsequently auctioned off and remains idle. Now that visitor volume and occupancy rates are on the rise, so is the number of new properties under construction. Genting's $4 billion Resorts World Las Vegas (3,500 rooms) is under construction on the previous Echelon site; preliminary plans have been announced for the 1,100-room Alon Las Vegas at the former Frontier location; and Wynn Las Vegas has unveiled plans for a $1.5-billion expansion that would include 1,000 rooms, convention space and a 38-acre lagoon. Additionally, the Fontainebleau property was listed for sale in November 2015 with an asking price of $650 million.

Despite these ongoing projects, the availability of developable property within the resort corridor remains abundant, with a number of properties suitable for large-scale resort development over the course of the next 20 years. Please see the map of the resort corridor on the following page, with a legend describing each of the potential development sites. Currently, approximately 597 acres of identifiable developable property exists (14 sites) within the resort corridor. With project sizes ranging from 10 to 50 acres, sufficient property exists for even the most aggressive scenario modeled herein. It is also worth noting that historically, a number of demolitions have taken place on the Las Vegas Strip to make way for new properties. This analysis assumes some of this activity.

Resort Corridor
Developable Properties Suitable for Large-Scale Resorts

Source: Applied Analysis

Resort Corridor
Legend: Developable Properties Suitable for Large-Scale Resorts

Site	Approximate Location	Approximate Acreage	Informational Notes
1	2500 Las Vegas Boulevard South (SWC Las Vegas Boulevard and Sahara Avenue)	+/- 40 Acres	Owned/Controlled by MGM Resorts International (currently operating as an outdoor concert and event venue with limited improvements on-site)
2	2784 Las Vegas Boulevard South (South of Sahara; North of Circus Circus Drive)	+/- 38 Acres	Owned/Controlled by MGM Resorts International
3	2601 Las Vegas Boulevard South (South of Sahara; North of Riviera Boulevard)	+/- 27 Acres	Proposed for the "All Net Resort and Arena" but has yet to move forward with any development activity
4	2777 Las Vegas Boulevard South (NEC Las Vegas Boulevard and Riviera Boulevard)	+/- 23 Acres	Owned/Controlled by Carl Icahn (stalled Fontainebleau project)
5	3000 S. Rancho Drive (Rancho Drive west of Interstate 15 Between Sahara Avenue and Desert Inn)	+/- 55 Acres	Previously owned/controlled by Station Casinos and Fisher Brothers; same ownership assumed at present.
6	West of Koval Lane; North of Flamingo Road; South of Sands Ave.	+/- 30 Acres	Owned/Controlled by Caesars Entertainment (proposed for arena development)
7	East of Koval Lane; North of Flamingo Road; South of Sands Ave.	+/- 20 Acres	Owned/Controlled by Caesars Entertainment
8	NWC of Harmon Avenue and Paradise Road (behind Hard Rock Hotel and Casino)	+/- 15 Acres	Owned/Controlled by Aqua Blue Estates, LLC (undeveloped property adjacent to existing Hard Rock Hotel and Casino)
9	NEC of Harmon Avenue and Koval Lane	+/- 60 Acres	Formerly proposed as a W Hotel and other condominium and resort developments (acquired in 2015)
10	3725 Las Vegas Boulevard South (SEC Las Vegas Boulevard and Harmon Avenue)	+/- 20 Acres	Formerly proposed as Elvis-themed hotel-casino development
11	SWC Flamingo Road and Dean Martin Drive	+/- 40 Acres	Previously assembled for potential large-scale mixed-use development.
12	3330 W. Tropicana Avenue (NWC Tropicana Avenue and Dean Martin Drive)	+/- 100 Acres	Previously proposed redevelopment project of Wild Wild West Casino)
13	NWC Russell Road and Interstate 15	+/- 60 Acres	Formerly proposed as a hotel-casino development
14	4613 Las Vegas Boulevard South (North of Russell Road)	+/- 69 Acres	Various parcels adjacent to McCarran International Airport
	Total	+/- 597 Acres	

HOTEL DEVELOPMENT AND ROOM MIX CONSIDERATIONS

While supply projections contained in Exhibits B-1 through B-3 provide raw numbers in terms of room inventory, AA analyzed the present mix of product and how it might evolve over time. The following summarizes current inventory levels.[3]

Number of Hotel Rooms - 2015
By Location and Class Type

	Downtown	Resort Corridor	Suburban	Grand Total
Room Counts				
Low Tier	7,739	23,947	7,429	39,115
Mid Tier	2,419	36,415	4,872	43,706
Top Tier	-	41,383	1,201	42,584
Total with 200 or More Rooms	10,158	101,745	13,502	125,405
Total with Less than 200 Rooms				23,808
Total Hotel Room Inventory				149,213
Room Distributions				
Low Tier	5.2%	16.0%	5.0%	26.2%
Mid Tier	1.6%	24.4%	3.3%	29.3%
Top Tier	0.0%	27.7%	0.8%	28.5%
Total with 200 or More Rooms	6.8%	68.1%	9.1%	84.0%
Total with Less than 200 Rooms				16.0%
Total Hotel Room Inventory				100.0%

With regard to future room inventory, mid- to top-tier properties will likely be constructed given development costs. However, it is important to note that as new product enters the market at the mid-to-higher segments, aging properties will be downgraded as they are unable to necessarily compete with the latest product offerings. As such, a well-distributed room mix, similar to existing levels, will likely prevail.

MCCARRAN INTERNATIONAL AIRPORT CAPACITY

Another constraining capacity consideration reviewed was McCarran International Airport. According to airport authorities, the maximum practical capacity for McCarran is 55.0 million enplaning and deplaning passengers annually given present conditions, including air space restrictions. McCarran officials are currently conducting a review of maximum capacity, which could potentially increase the current capacity limitation.

Airport capacity is not a constraining factor in the conservative scenario modeled, but it does potentially impact visitor volumes by 2037 in the base case scenario. The 55.0 million threshold is projected in 2028 under the aggressive scenario. Models included in this analysis have not been adjusted for this condition and assumes an alternative solution is made available in advance of achieving these thresholds. Airport officials also indicated that the Ivanpah Airport, a potential airport facility located south of the urban Las Vegas valley, could be developed once demand dictates its necessity. Planning, studying and building the new airport would require 12 to 15 years to complete at an estimated cost of $10 billion. In 2015, the number of

[3] Classifications of properties are subjective based on market perceptions, pricing and other qualitative attributes.

passengers traveling through McCarran reached 45.4 million, the largest number since 2007 and the third-highest total in airport history.

National Economic Conditions Considered

Any localized market analysis and outlook must consider the broader national economic climate, particularly as it relates to a tourism-dependent economy such as the one under consideration.

In most respects, the national economic climate has improved considerably over the past five years. The seasonally adjusted unemployment rate, which was reported at 9.3 percent in December 2010, has steadily declined to 5.0 percent in April 2016 (latest period available). During the latest seven-month period, the rate has bounced between 4.9 percent and 5.0 percent, which is considered by many economists to be near the nation's full employment level. Initial unemployment claims have declined as well, reaching their lowest level in four decades.

The United States' gross domestic product (GDP), or total economic output, for the first quarter of 2016 (advance estimate) increased by 1.9 percent from the prior year. That figure was the lowest year-over-year growth since the first quarter of 2014. Quarter-to-quarter GDP growth registered at 0.5 percent, down from the 1.4 percent growth in the fourth quarter of 2015. Overall, the national economy, as measured by GDP, has grown on a year-over-year basis for 25 consecutive quarters, yet growth levels have not returned to those seen in the pre-recession period.

Consumer spending, which accounts for roughly two-thirds of the nation's economic activity, has followed a similar trend. On an annual basis, consumer spending climbed 3.5 percent in March 2016, a modest increase but one that falls below the 4.2 percent growth rate reported a year earlier. Recent annual spending growth also remains well below the levels reported in early 2006, which were in the range of 6.5 percent. Conversely, Americans are saving more today than a decade ago. The annual average personal savings rate rose slightly to 5.1 percent in March 2016. In the mid-2000s, the savings rate dipped to a low of 2.6 percent as consumer spending rates climbed. These figures indicate that Americans are more cautious about spending following their experiences during the recession.

According to the Conference Board, three key gauges of national consumer confidence levels reveal mixed feelings about the economy. The Consumer Confidence Index (CCI) dipped slightly in April 2016 to 94.2, down from the 96.1 the previous month. The Present Situation Index (PSI), a measure of people's sense about present day conditions, rose from 114.9 to 116.4, the second-highest level since late 2007. Consumers are expressing reduced optimism about the future, however, as the Conference Board's Expectations Index (EI) fell to a two-year low of 79.3 in April.

The equities markets are reflecting a similar outlook. Following a period of significant annual growth from late-2012 through mid-2015, the major stock markets have begun 2016 on a downward trajectory with negative growth in each month of the year. In April 2016, the Dow Jones Industrial Average dropped 0.7 percent, Standard & Poor's 500 Index dipped 0.9 percent and the NASDAQ Composite Index fell 1.9 percent over the past 12 months.

These trends are being monitored closely by the Federal Reserve Bank. During the recession and prolonged recovery, the central bank relied on an extended period of historically low interest rates and the implementation of quantitative easing tactics in an effort to stimulate the economy. Quantitative easing is a way for the Fed to credit itself money and then use it to purchase long-term assets such as US Treasury bonds. The hope is that purchasing these bonds would lower long-term interest rates on the open market, which in turn would spur economic activity through cheaper credit. This program has ended, as the Fed is no longer purchasing additional securities. However, it still owns $4.5 trillion in holdings that it plans to gradually divest from in concert with interest rate increases. In December 2015, the Fed raised the federal funds rate by 0.25 percent, the first rate increase since mid-2006. The Fed has indicated another rate increase could be forthcoming in the near future.

MARKET RISKS, UNCERTAINTIES AND SPECIAL ASSUMPTIONS

In addition to conditions discussed within this analysis, there are a number of other factors that should be considered when evaluating the various demand projection scenarios.

1. Internet Gaming. Internet gaming is generally prohibited in the United States, but a handful of states have authorized selected online gaming activities (e.g., poker). Should online gaming laws change and/or expansions occur, it is unclear how such changes would impact demand for bricks-and-mortar casinos, positively or negatively. That said, forecasts contained herein have considered a broader approval of online poker; approval of broader-based online gaming activities is not contemplated during the projection period.

2. Native American Gaming in California. Casinos located on Native American land in California is not uncommon. The competitive environment within California has continued to increase as new properties have opened (e.g., Graton Resort & Casino). From a modeling perspective, it is assumed the current regulatory structure will remain consistent through the study period.

3. Aging of America. Generally, the US population continues to age as the baby boomer demographic moves through their life cycle. The modeled scenarios consider the aggregate size and value of this market. According to the US Census Bureau, the number of Americans aged 65 and older is projected to be 79.7 million by 2040, or 84.8 percent higher than the estimated 43.1 million in 2012.[4] Social security and other retirement benefits of this key demographic group are assumed to continue uninterrupted.

4. Maintenance Capital Expenditures. Historically, major casino operators spend millions of dollars in normal, recurring capital expenditures to maintain the quality of their facilities and product offerings. It is assumed that these types of investments continue to occur into the future, including product and branding changes in response to evolving consumer demands.

5. Local, State and Federal Public Policies. While impractical to forecast public policy decisions at the local, state or federal levels, material shifts in tax policies are not contemplated, particularly as it relates to taxation at the various levels of government.

6. Electric and Hybrid Vehicles. With the advent of green technologies in cars and other vehicles, electric and hybrid vehicles are expected to capture an increasing larger share of automobile utilization. Many of these newer technologies have yet to resolve travel distance challenges caused by the need for "recharging". While markets like Los Angeles and other densely-populated metropolitan areas may shift toward these types of technologies, traveling long distances may be infeasible for some period of time. Evolution in these types of vehicles has not been estimated in the overall projections.

7. Labor-related Considerations. The leisure and hospitality industry in southern Nevada currently employs approximately 280,000 workers, with a large share of them represented by union organizations. This analysis assumes no work stoppages and that contract renewals between employers and union labor are not cost prohibitive to continuing operations at an efficient level. The analysis similarly does not contemplate union- or labor-related issues with airline employee groups.

[4] US Census Bureau, *An Aging Nation: The Older Population in the United States*, 2014.

8. Development Costs. Supply-side forecasts assume development activity will meet market demands. This assumption does not contemplate the potential impact of overall development costs, including land, labor and raw materials. It also assumes that design, development and permitting standards remain reasonable and achievable allowing for future development under historical processes.

9. Economic Conditions of Primary Market of Visitor Origin. With about one quarter of visitation originating from southern California, economic conditions in the region play a significant role in the overall performance of the southern Nevada tourism industry. While AA considered general market conditions, extreme volatility associated with public policy adjustments (e.g., tax initiatives or immigration laws) or other factors have not been considered.

10. Life Safety Codes and Standards. While issues are not anticipated, the projection scenarios assume that existing and future structures are designed and developed to meet regulatory life safety codes and standards. This analysis assumes suitability of these factors in existing and future properties.

11. Southwest Airlines. With approximately four in 10 air travelers to McCarran International Airport arriving via Southwest Airlines, the analysis does not contemplate a material shift in airline mix or shutdown of the discount air carrier.

12. Water Shortage. At present, southern Nevada is highly dependent on the Colorado River for its water supply, and extended drought has dropped Lake Mead (the primary source of extraction) to historically low levels. The Southern Nevada Water Authority (SNWA) has taken numerous steps to promote conservation and to secure reserve sources of water; a new, deeper water pipeline intake was recently constructed; and an in-state water development plan has been drafted. This analysis assumes that water resources remain sufficient to meet the community's needs through 2040, which is consistent with the SNWA's current water resource plan.

13. Unforeseen Intervening Activities. The modeled scenarios in this analysis did not attempt to forecast events that could have a devastating effect on the market and/or the tourism industry as a whole. While difficult to provide examples of such potential activities, the tragic events of September 11, 2001 suggest external, unforeseen forces can materially impact the market's overall performance. Other examples might include unforeseen natural disasters (e.g., earthquakes).

General Assumptions and Data Limitations

While the objective of this analysis was to develop a broad economic outlook for the southern Nevada tourism industry and provide projection scenarios or potential market demand, the scope of this study required certain market analyses techniques to test forecasted demand scenarios for reasonableness. The results of such tests are included in the modeled output scenarios and presented in the *Summary of Findings* section.

Analysis Overview and General Process

A market analysis is used as an economic decision-making tool. Economics is concerned with choices made in a competitive environment under the constraint of limited resources. In a real estate context, market analysis examines the productive attributes of a property vis-à-vis the relationship of supply and demand, delineating the market in which the property competes.

Our analysis began by collecting data, which included background economic, gaming, travel and demographic information covering southern Nevada's tourism industry. Other relevant market and industry information were also collected, analyzed and considered. Subsequently, we performed a demand analysis based on historical market performance and consumer demand trends. This includes the identification of appropriate demand factors, analyzing historical (pre-recession) trends, the current environment and considering several other key elements.

Based on these considerations, demand projections for the tourism market were prepared. Demand projections also considered key factors relevant for the Company, including modes of transportation. Certain assumptions were utilized in forming the forward-looking distributions of modes of travel. While not the specific focus of our arrangement with the Company, traffic and air travel estimates were included to provide basis for SDG's other purposes.

Following the demand analysis, we independently performed a supply analysis by reviewing the quantity and quality of existing and proposed development in the area. Near-term supply projections were based on current market knowledge about projects in the development pipeline, third-party reports and other sources. Beyond the next five years, assumptions with regard to the timing and scope of projections were considered. While specific sites and/or projects were not identified, a number of developable sites exist within the Las Vegas resort corridor.

The supply-side assessment was followed by an equilibrium analysis in which we used an economic modeling approach to assess the appropriateness of the balance between supply and demand. It is from the combination of these analyses, quantitative and qualitative, that our ultimate conclusions were derived.

Data and Analysis Limitations

The information used in, and arising from, this analysis is based upon assumptions that are subject to uncertainty and variation. As a result, the estimates do not represent results that will be achieved in the future. There will usually be differences between projected and actual results as events and circumstances frequently do not occur as expected; the differences may be material. This report, the findings of this report, and the analysis underlying the findings have been prepared to demonstrate the possible effect of future hypothetical occurrences showing the potential demand for the southern Nevada tourism industry.

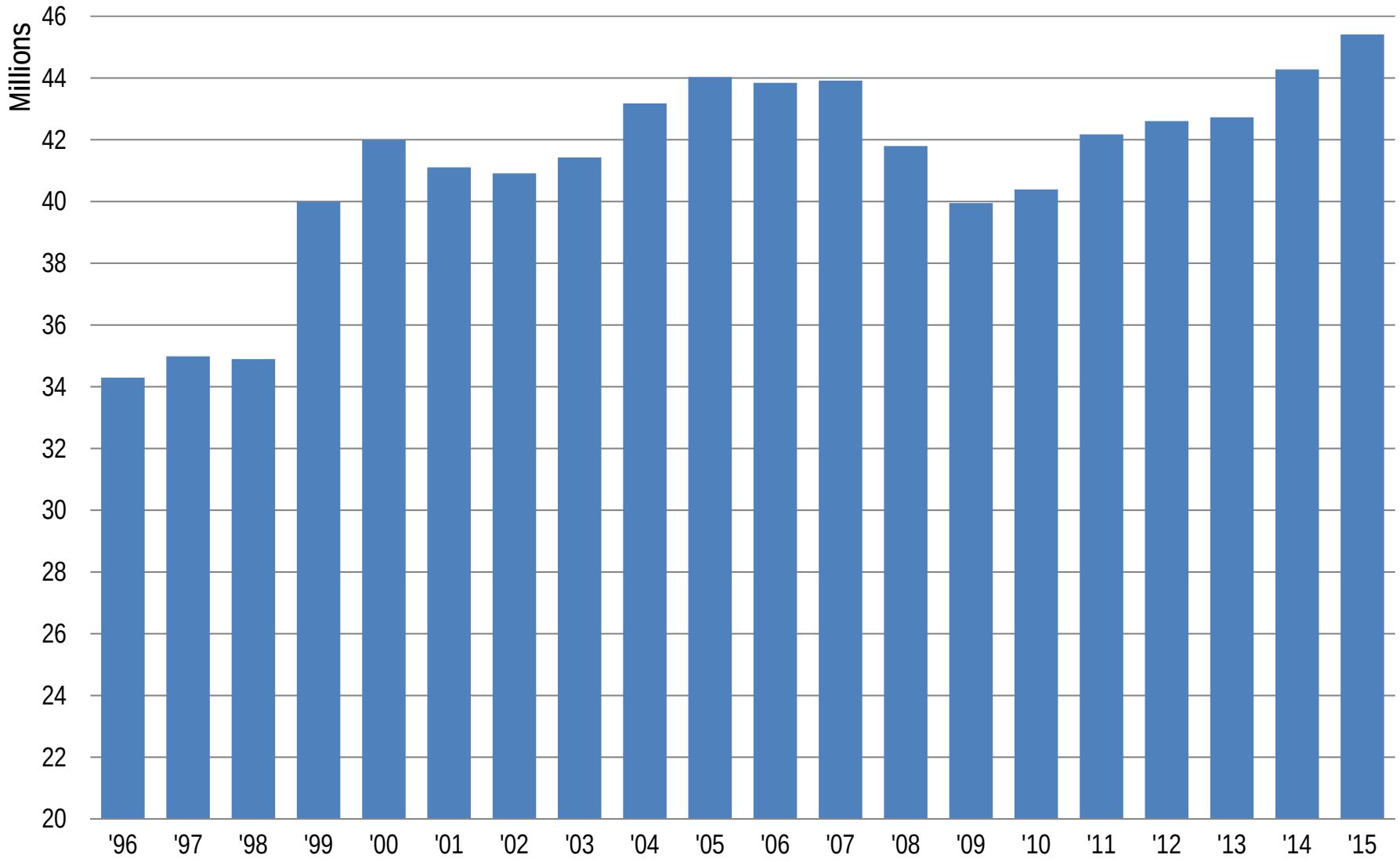
As part of this analysis, a number of data sources and providers were utilized. Much of the tourism- and visitor-specific performance measures were derived from data produced by the Las Vegas Convention and Visitors Authority (LVCVA),

including the Visitor Profile Study series conducted by GLS Research. Other indicators regarding air travel and ground transportation are sourced to McCarran International Airport and the Nevada Department of Transportation. Other performance measures were obtained from the Nevada Gaming Control Board, various third-party sources and Applied Analysis internal datasets.

Market and economic information furnished to us and contained in this submission or utilized in the formation of the findings were obtained from sources considered reliable and believed to be true and correct. However, we did not perform any audit or other assurance procedures on the data; and as such, no representation, liability or warranty for the accuracy of such items is assumed by or imposed on AA, and all submissions are subject to corrections, errors, omissions, and withdrawal without notice.

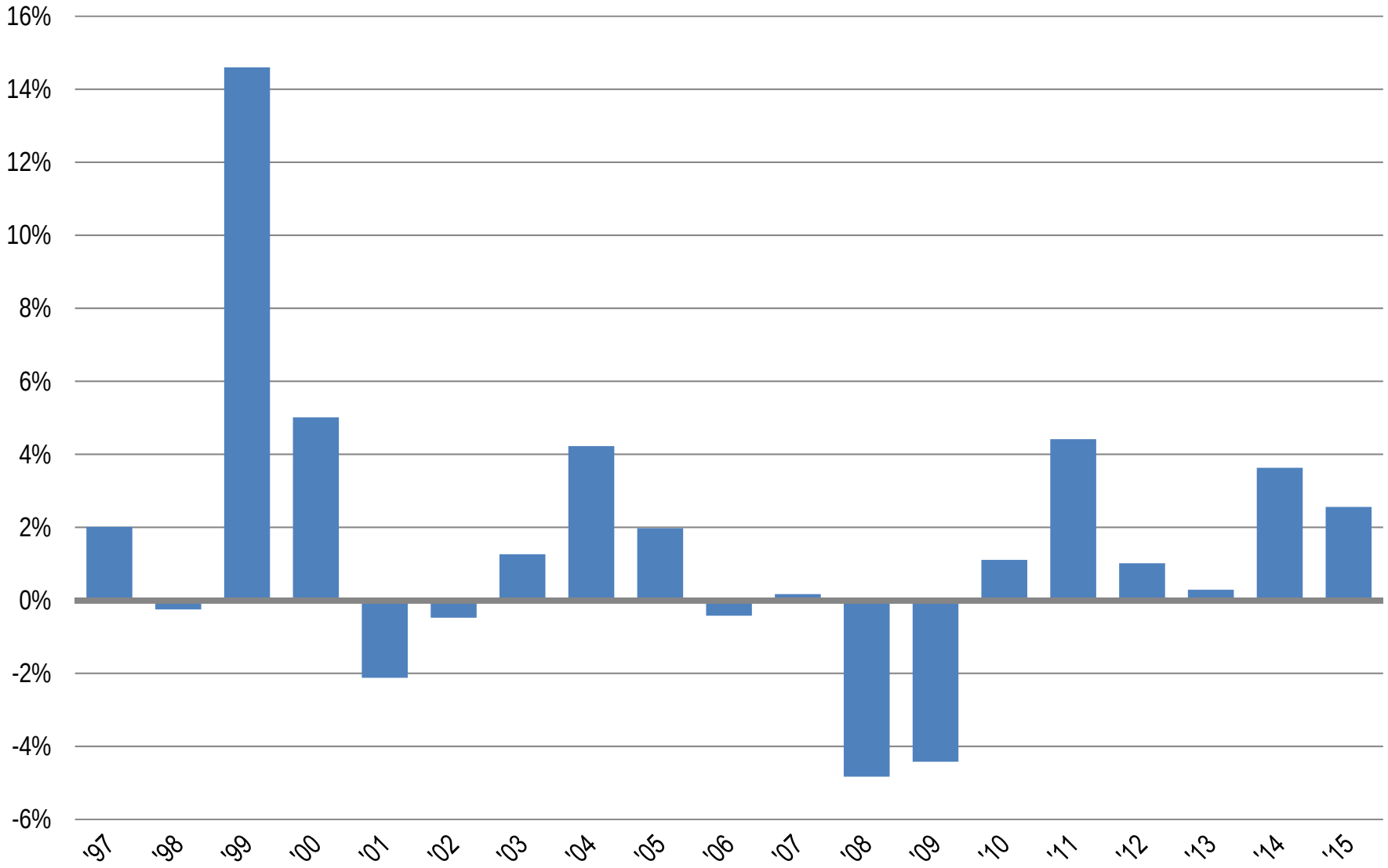
EXHIBITS

Clark County Visitor Volume
Annual Series



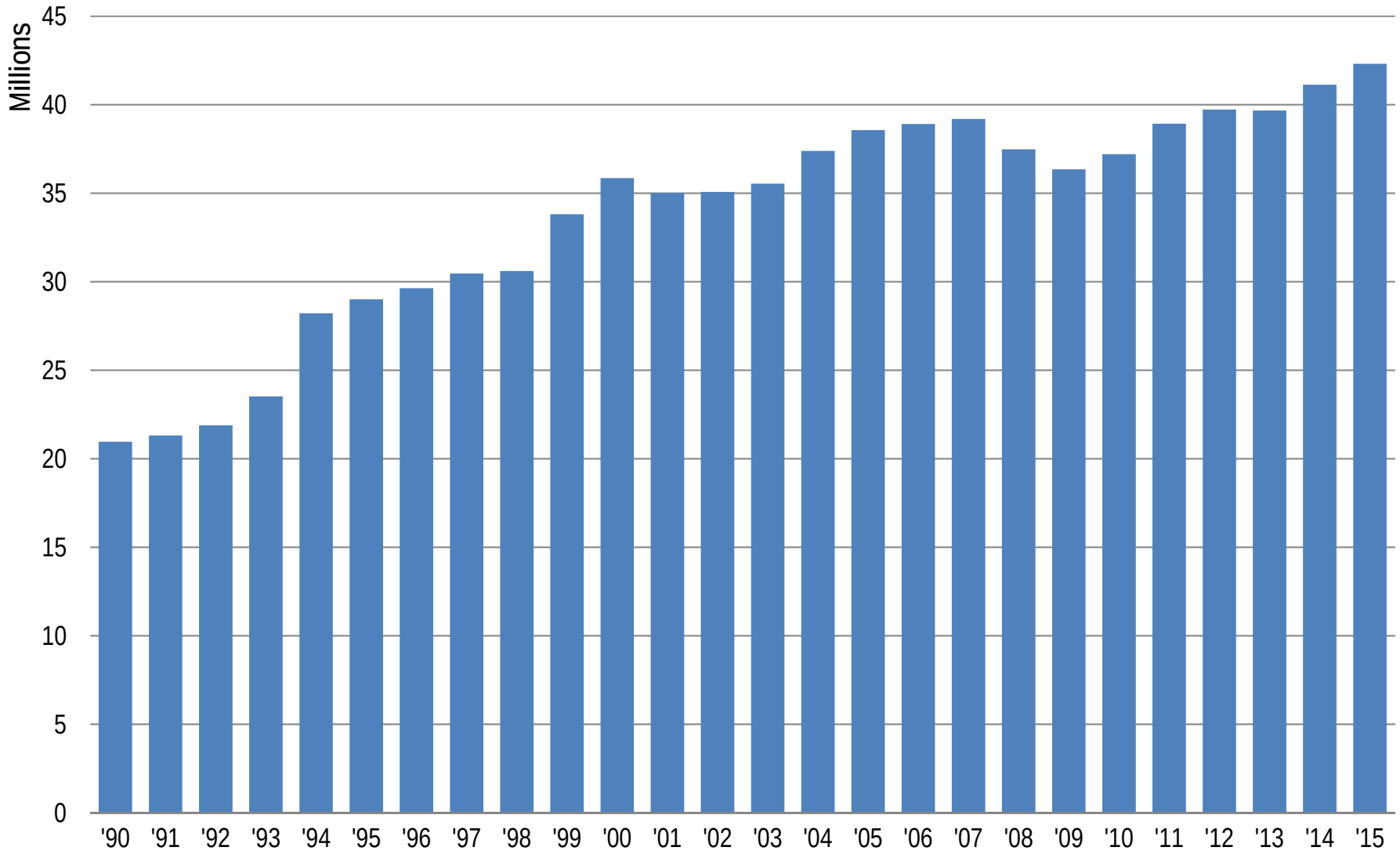
APPLIED ANALYSIS

Clark County Visitor Volume
Annual Growth Rates



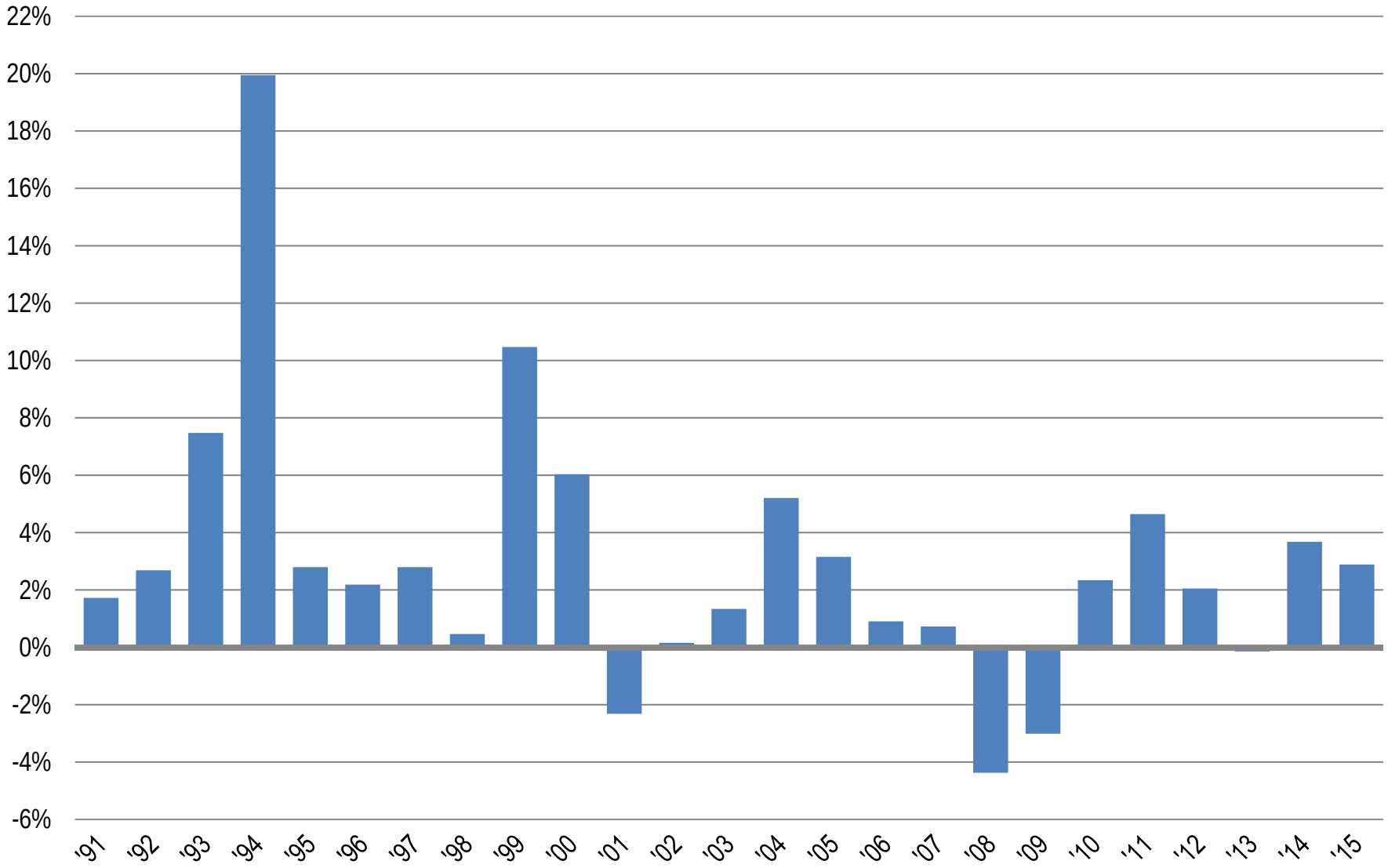
APPLIED ANALYSIS

Las Vegas Visitor Volume
Annual Series



APPLIED ANALYSIS

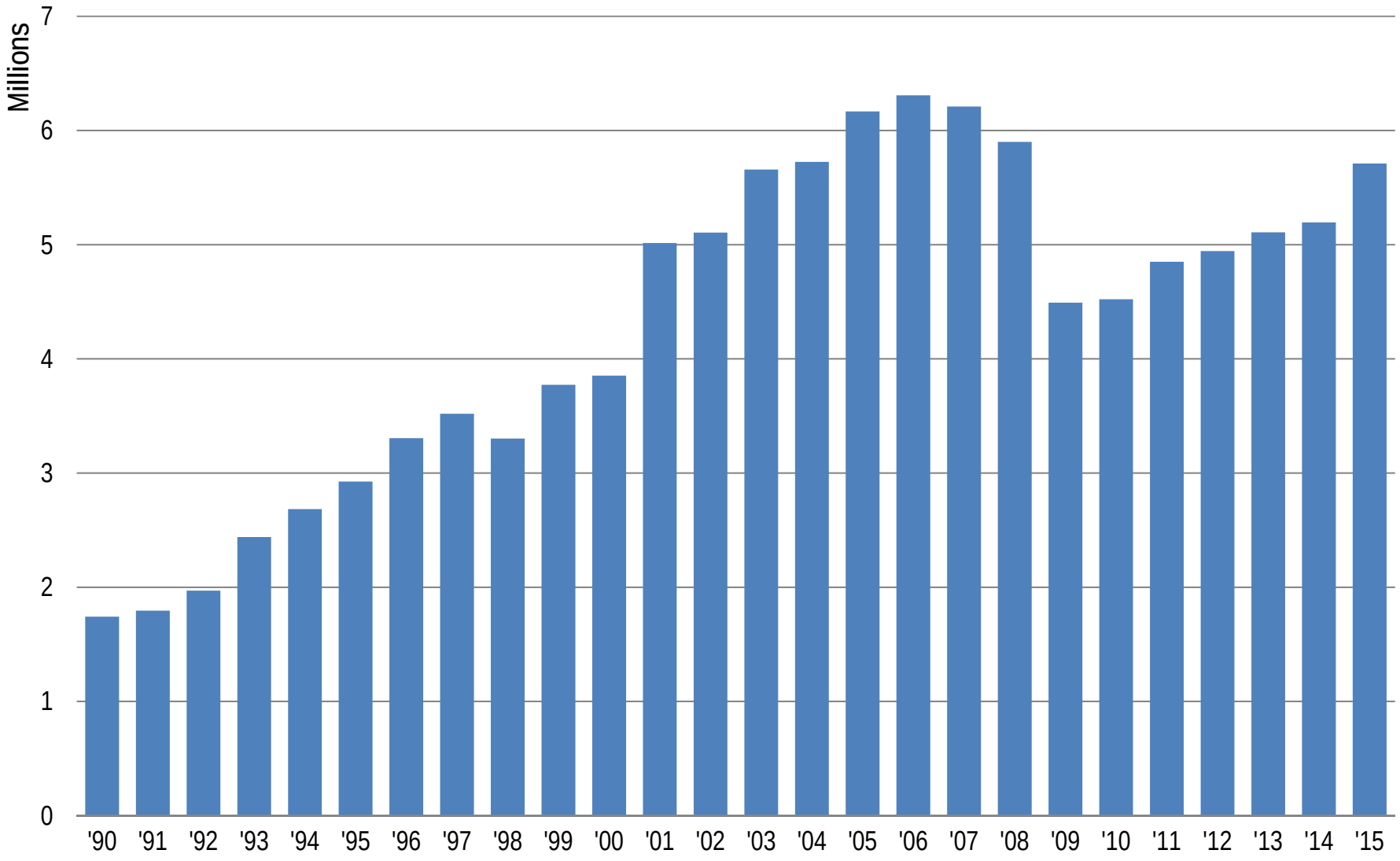
Las Vegas Visitor Volume
Annual Growth Rates



APPLIED ANALYSIS

Las Vegas Convention Attendance

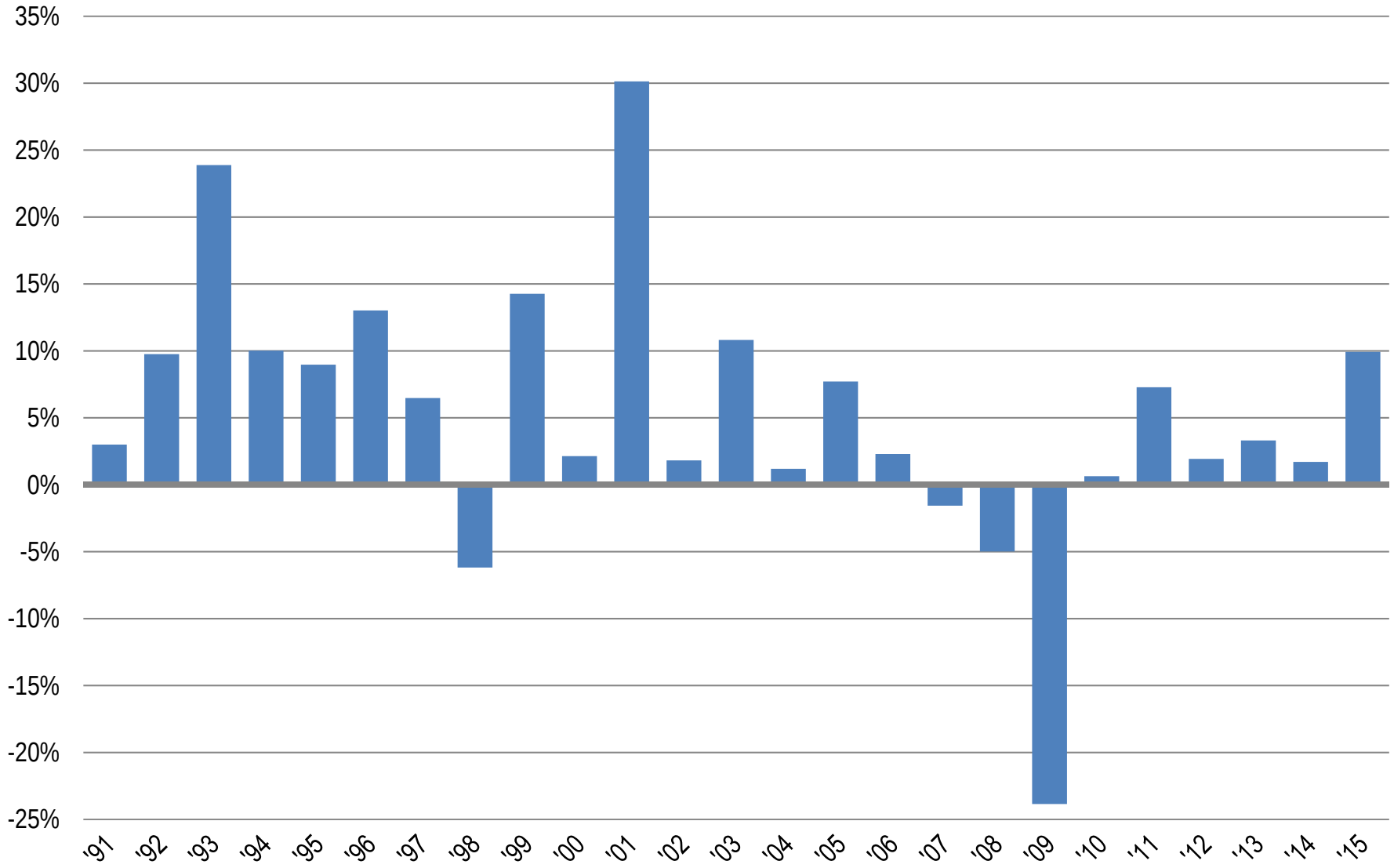
Annual Series



APPLIED ANALYSIS

Las Vegas Convention Attendance

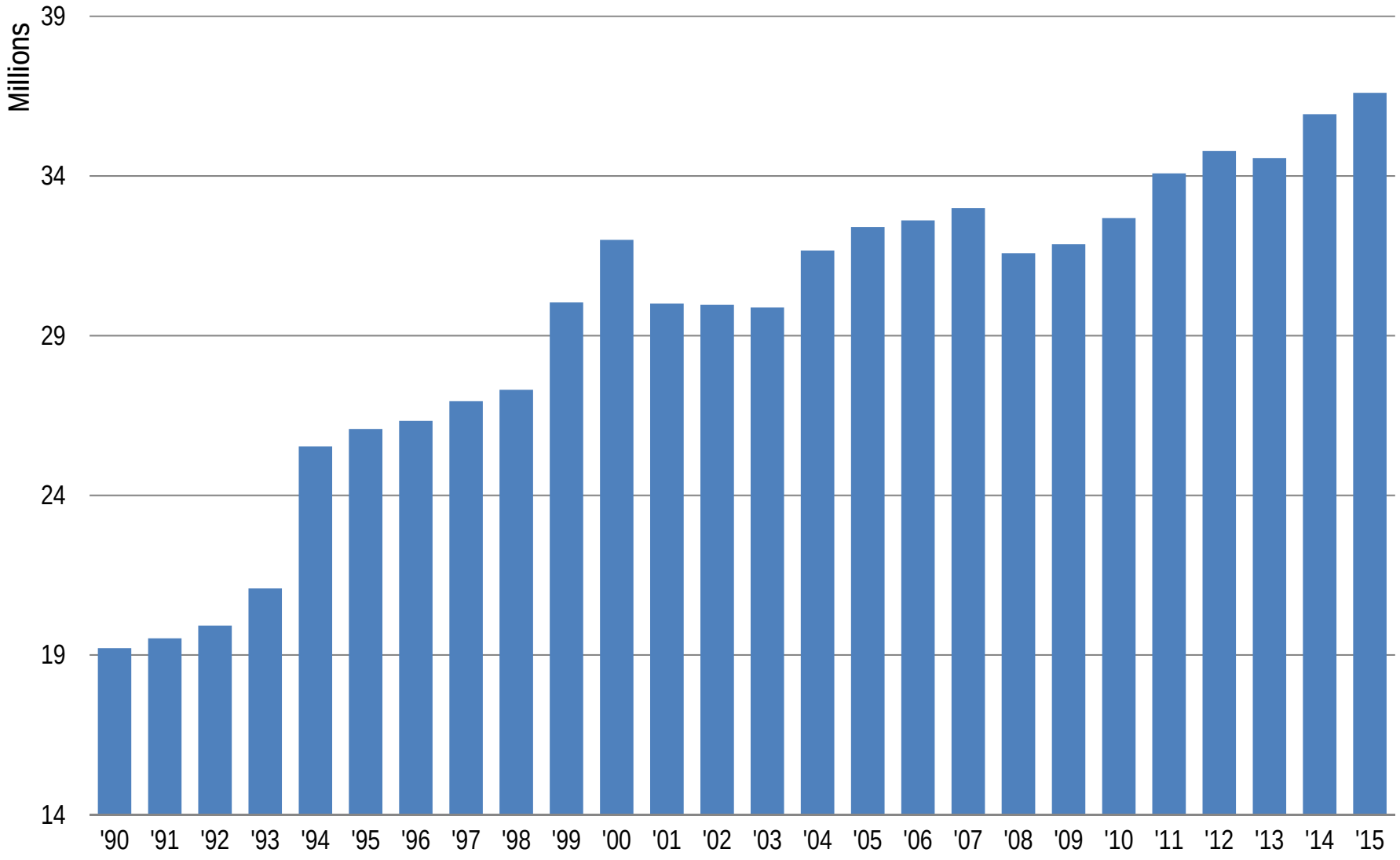
Annual Growth Rates



APPLIED ANALYSIS

Las Vegas Non-Convention Attendance

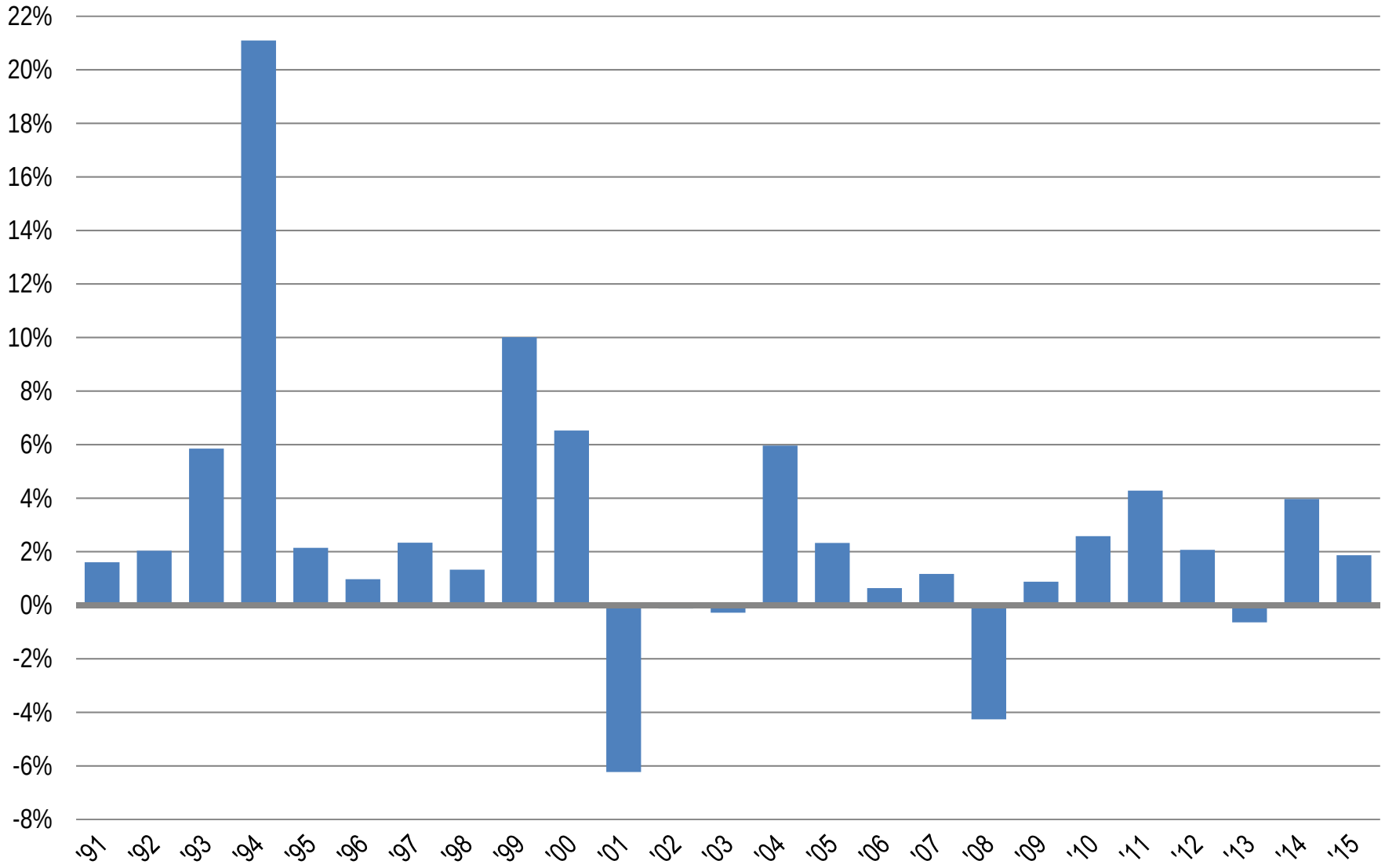
Annual Series



APPLIED ANALYSIS

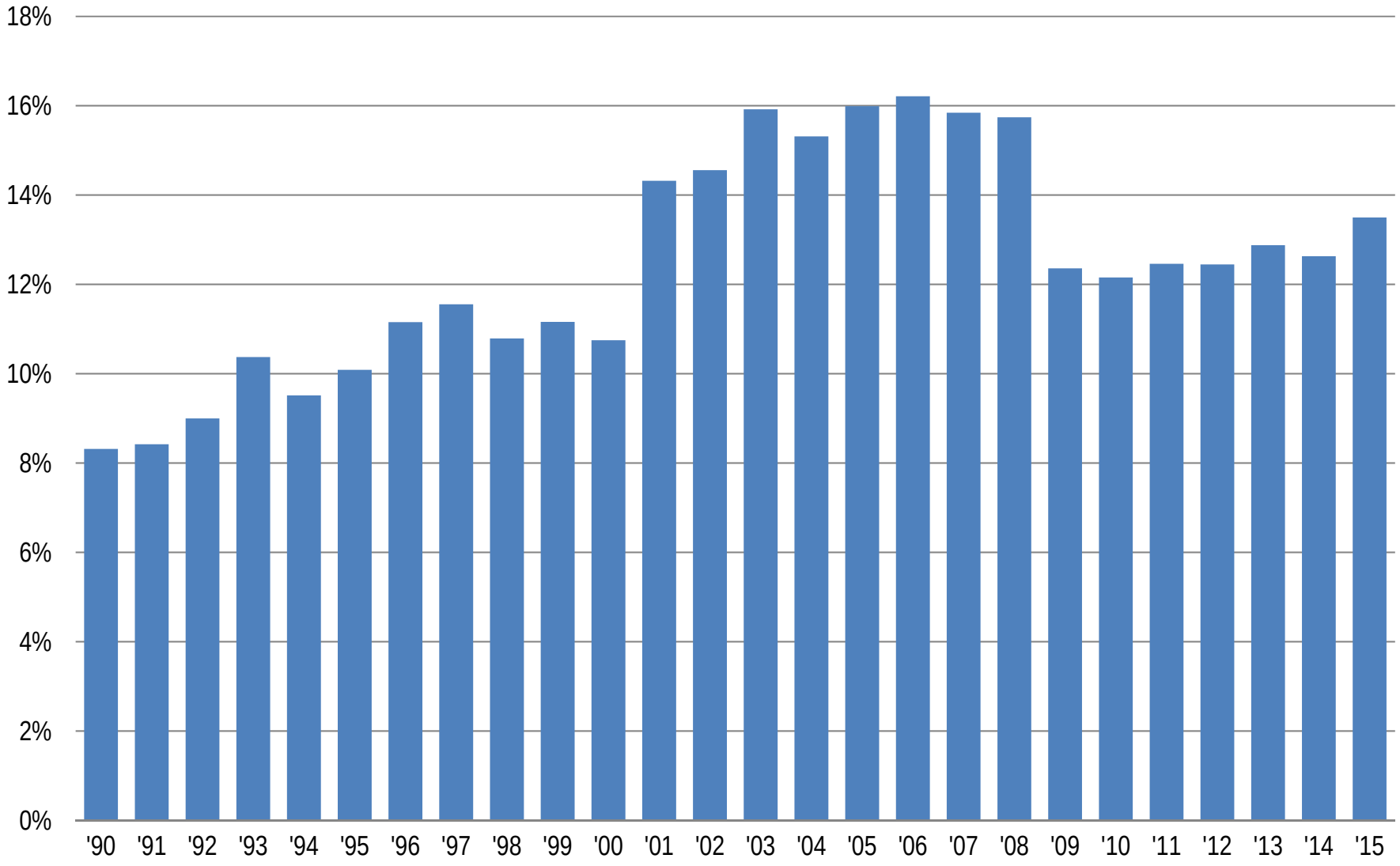
Las Vegas Non-Convention Attendance

Annual Growth Rates



APPLIED ANALYSIS

Convention Attendance
As a Percentage of Total Visitor Volume



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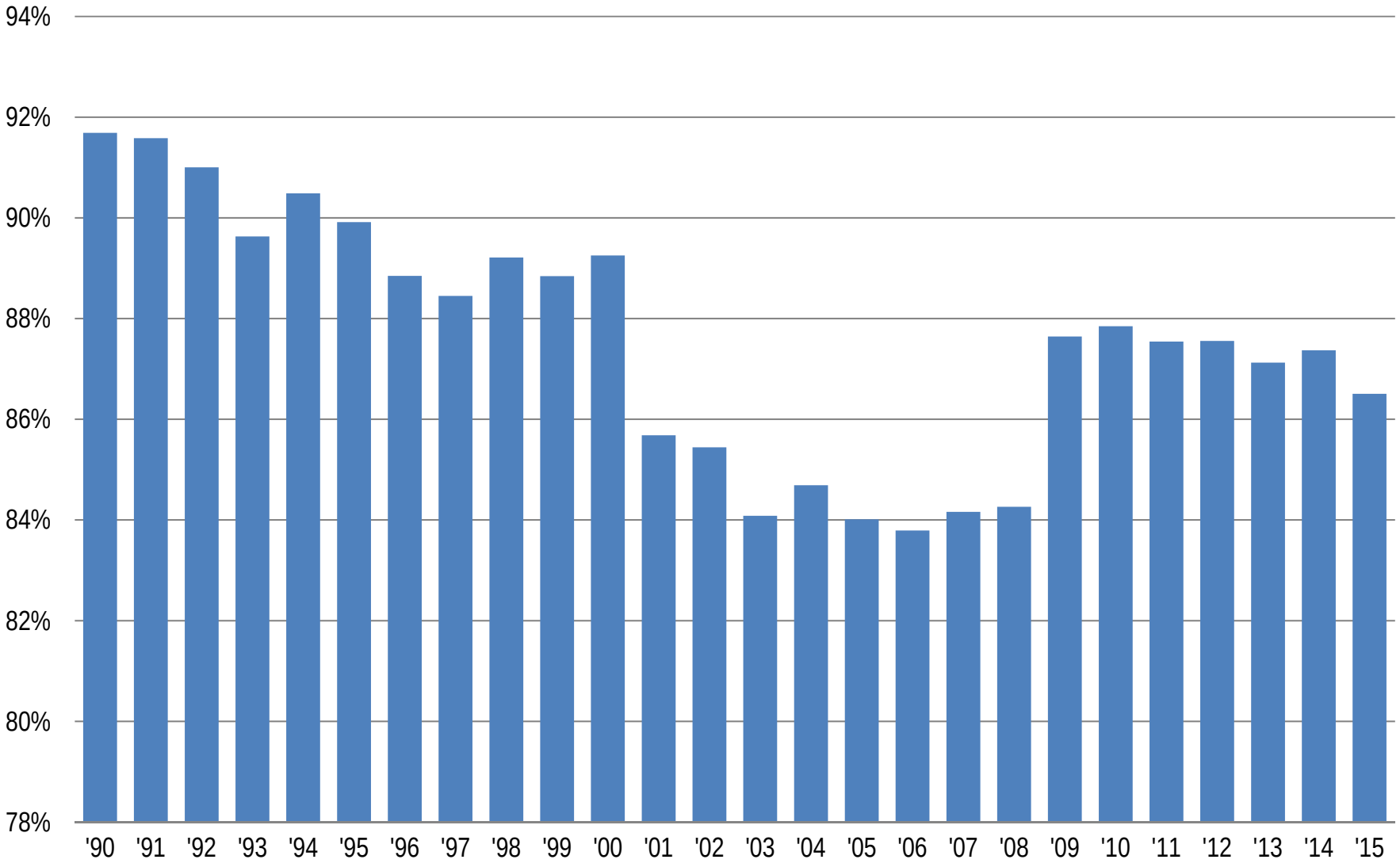
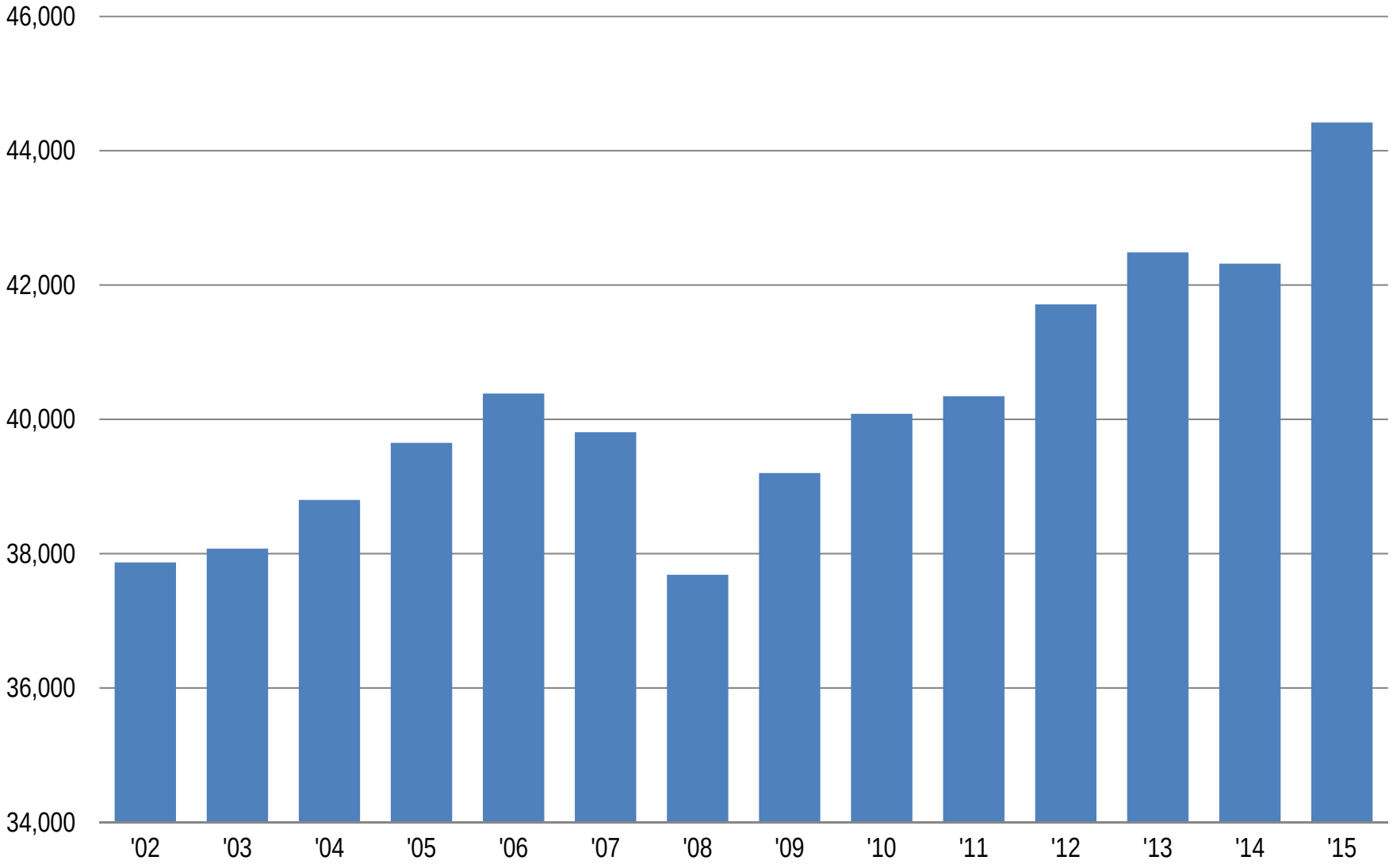
Non-Convention Attendance
As a Percentage of Total Visitor Volume



APPLIED ANALYSIS

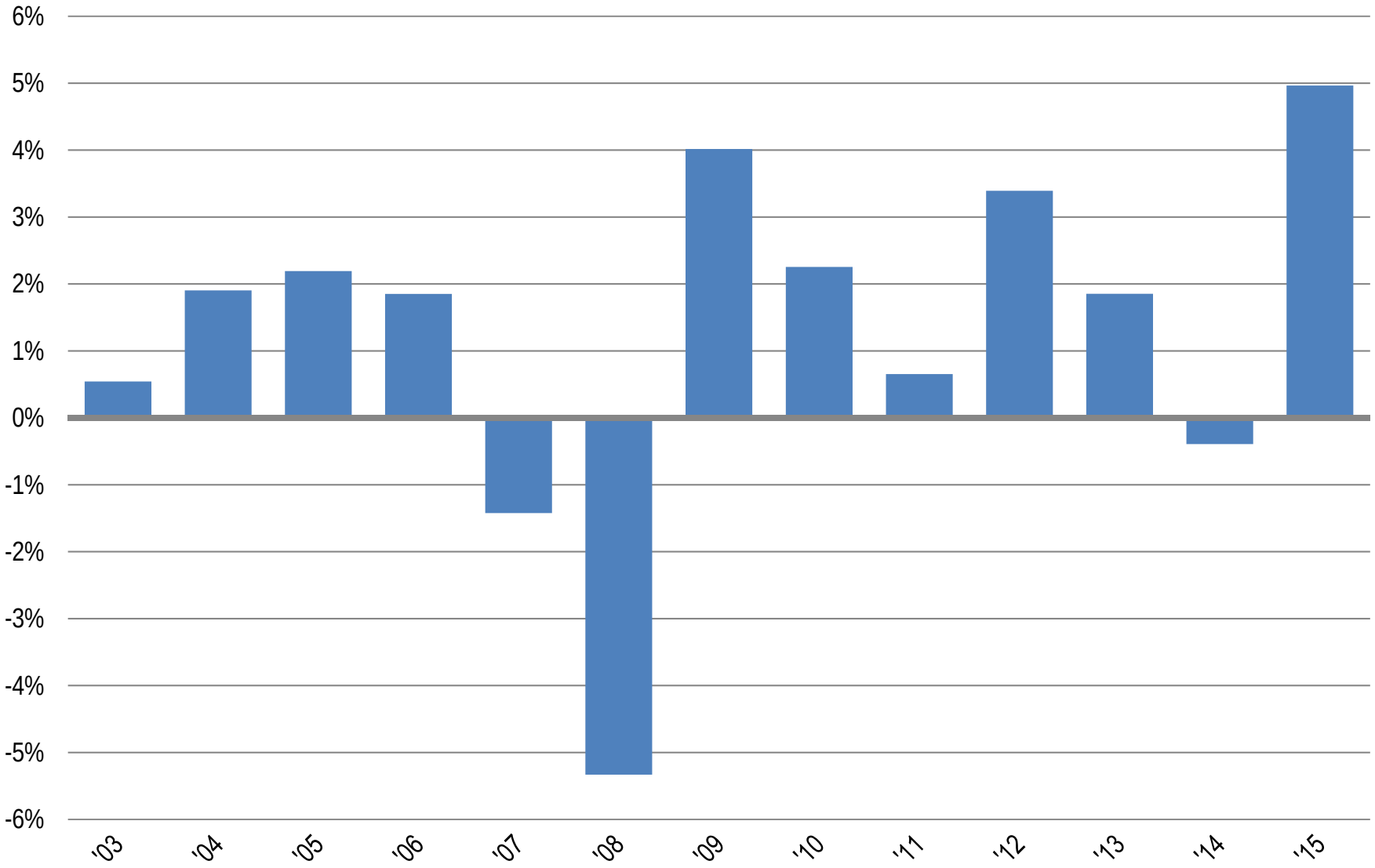
Average Daily Traffic Counts
Interstate 15 at the NV/CA Border



APPLIED ANALYSIS

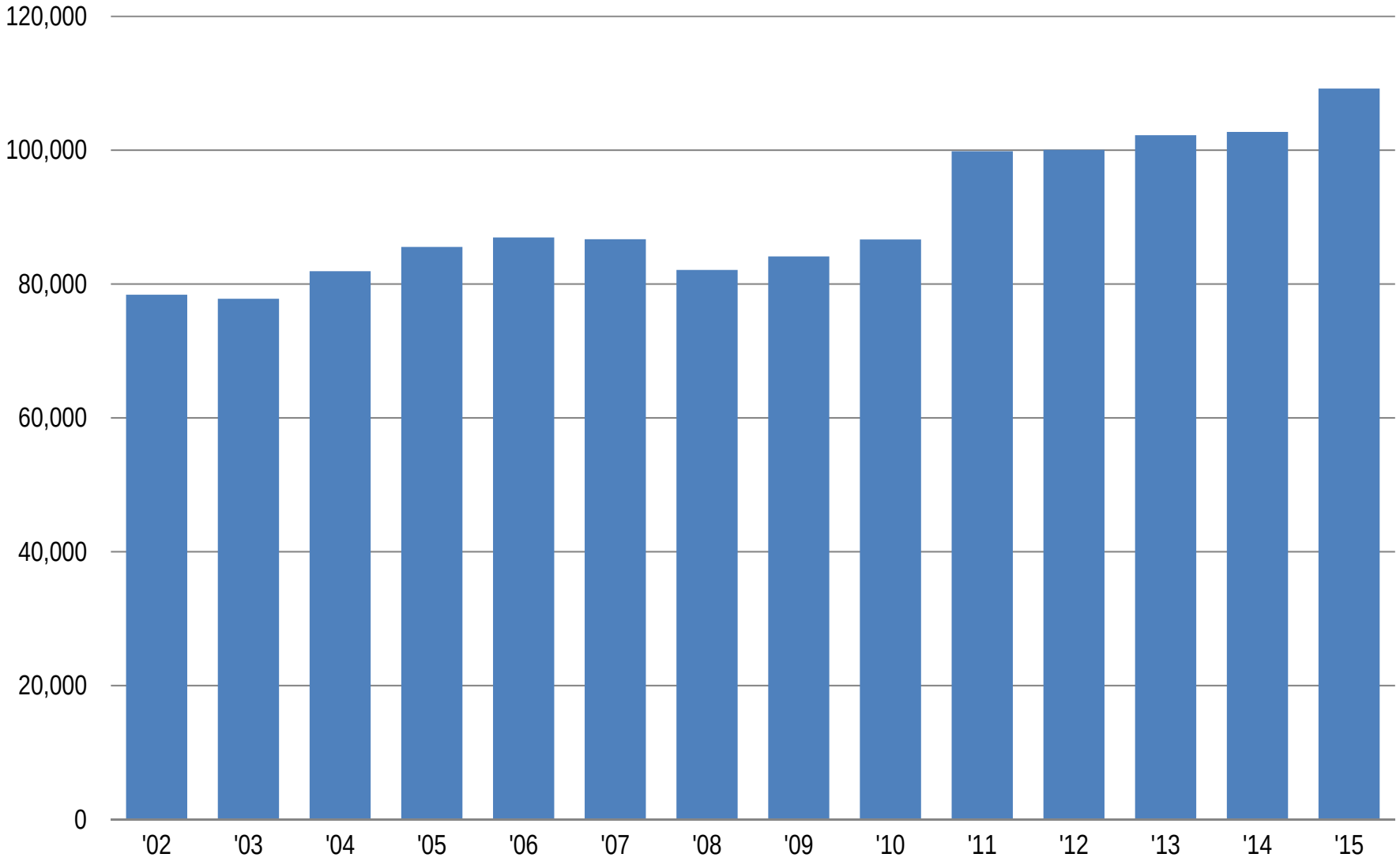
Average Daily Traffic Counts

Interstate 15 at the NV/CA Border | Annual Growth Rates



APPLIED ANALYSIS

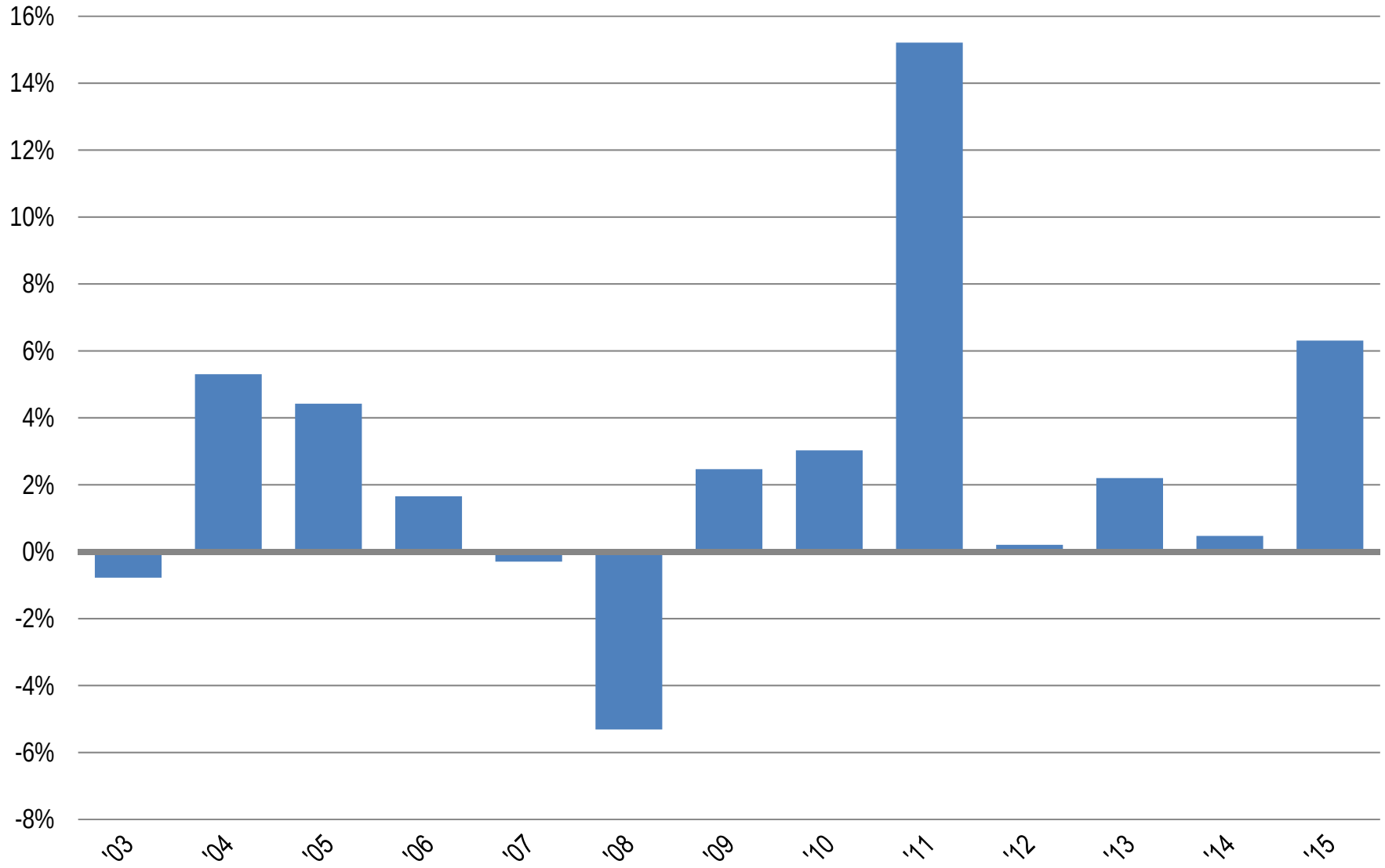
Average Daily Traffic Counts
All Major Highways



APPLIED ANALYSIS

Average Daily Traffic Counts

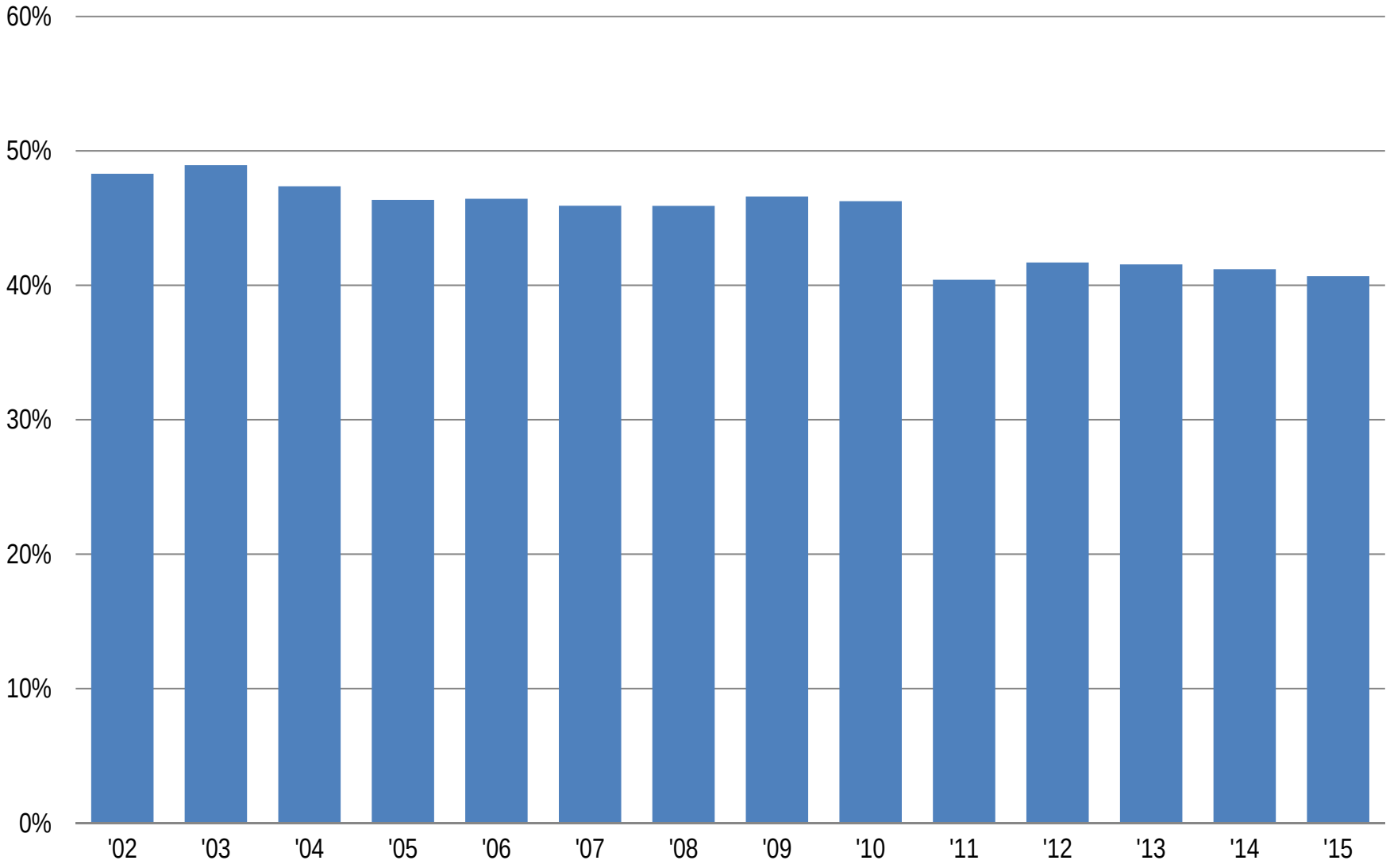
All Major Highways | Annual Growth Rates



APPLIED ANALYSIS

Average Daily Traffic Counts

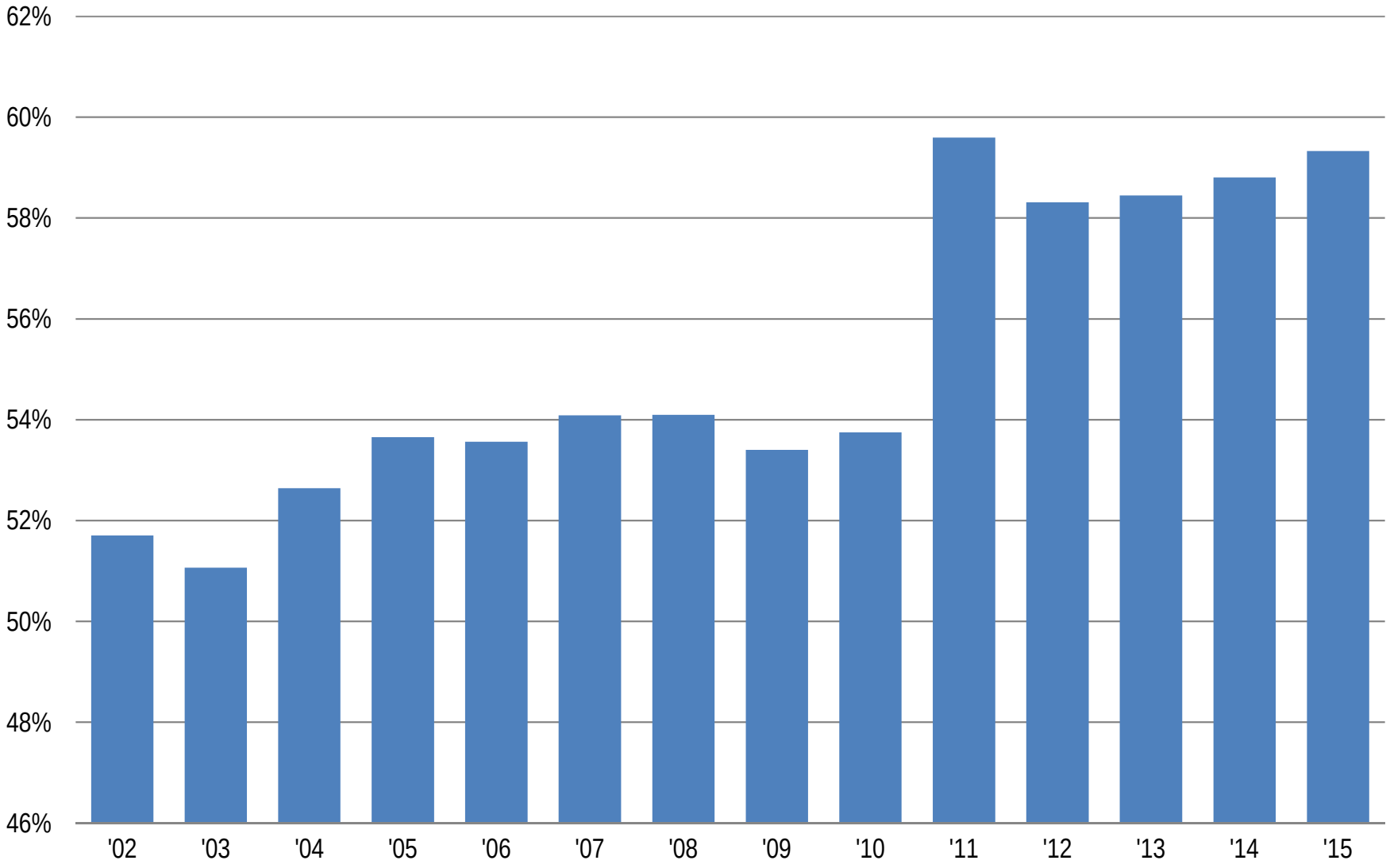
Interstate 15 at the NV/CA Border as a % of Total Traffic Volume



APPLIED ANALYSIS

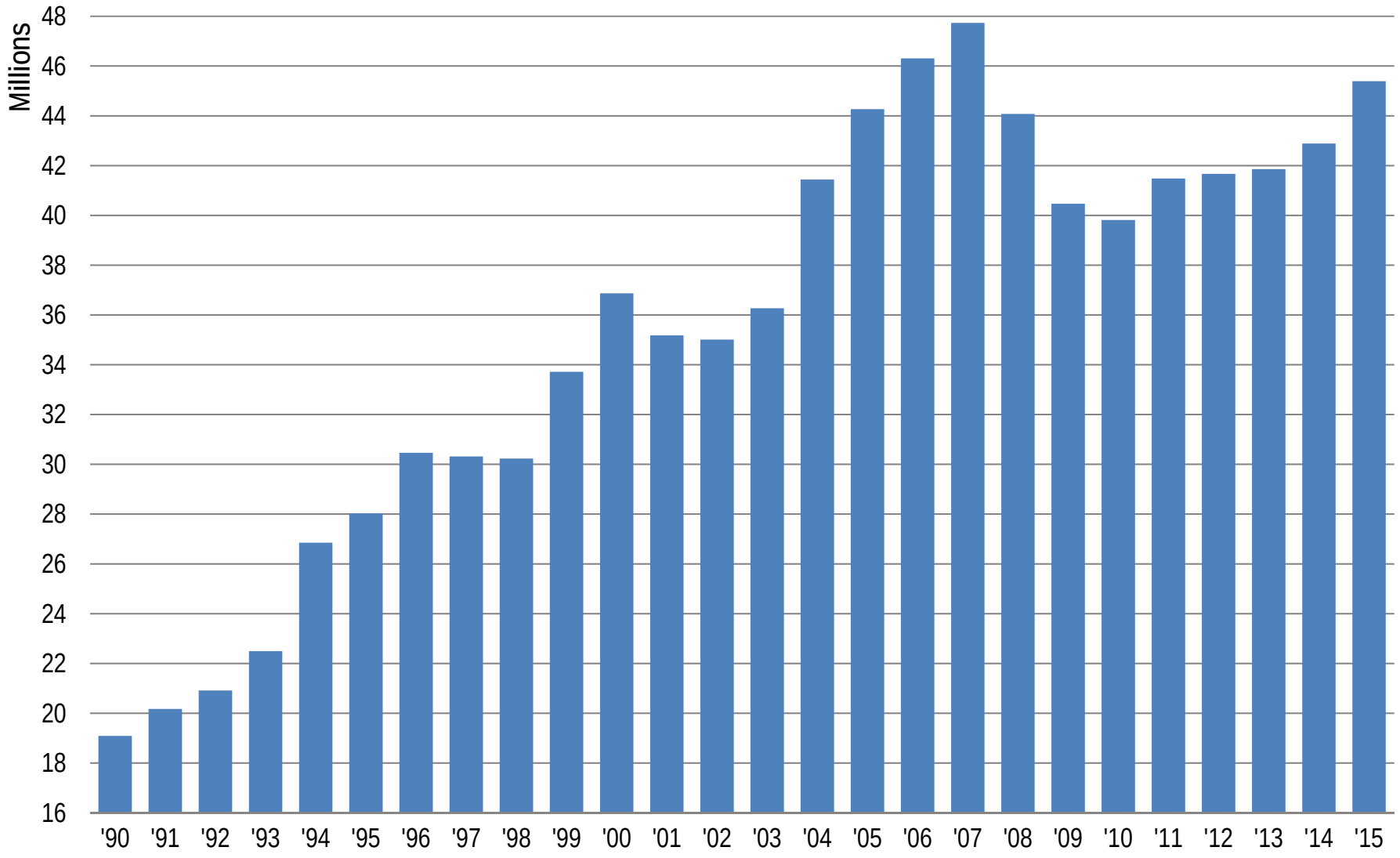
Average Daily Traffic Counts

All Other Major Highways as a % of Total Traffic Volume



APPLIED ANALYSIS

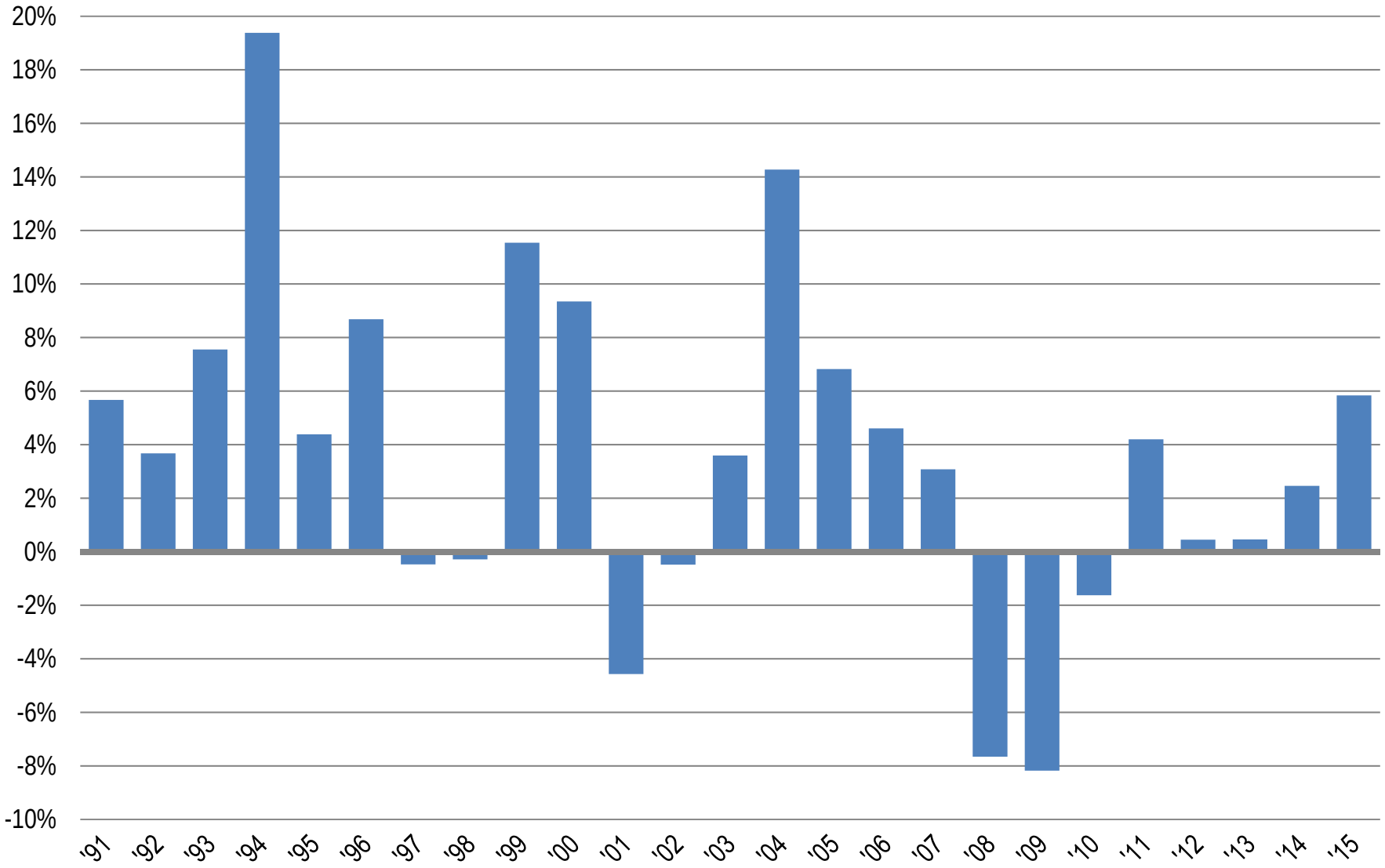
McCarran International Airport
Enplaned and Deplaned Passengers



APPLIED ANALYSIS

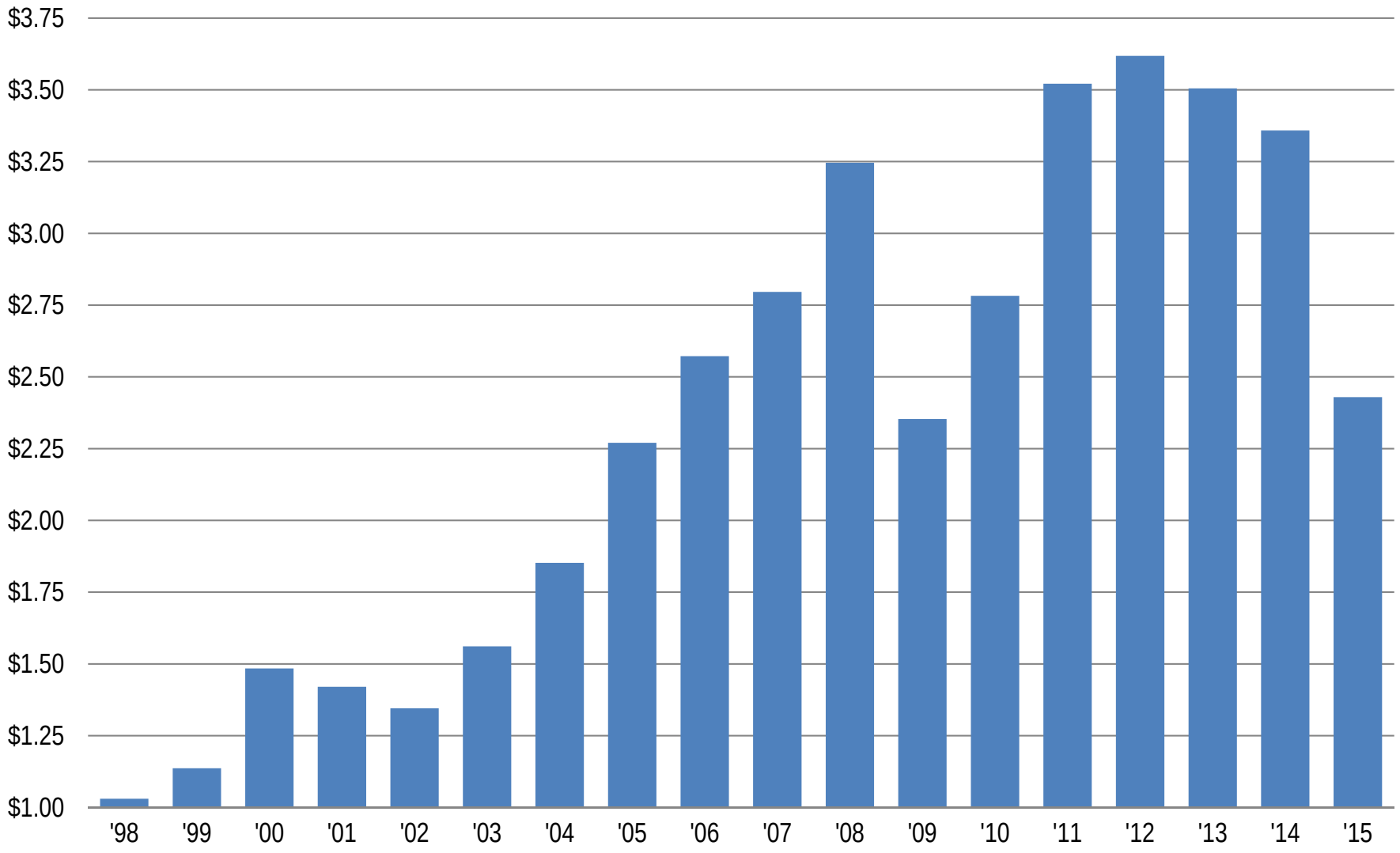
McCarran International Airport

Enplaned and Deplaned Passengers | Annual Growth Rates



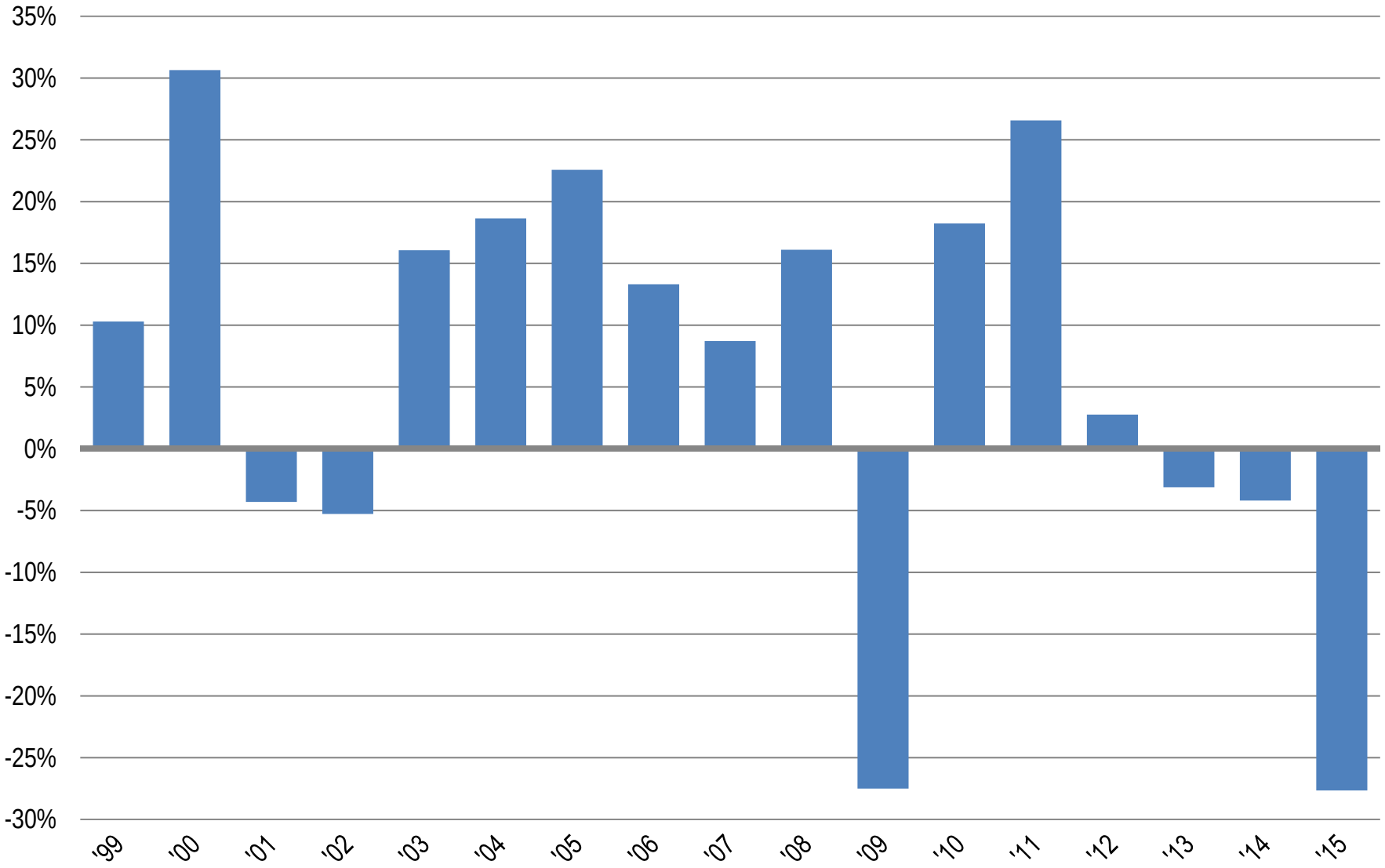
APPLIED ANALYSIS

United States Gasoline Prices
Annual Averages



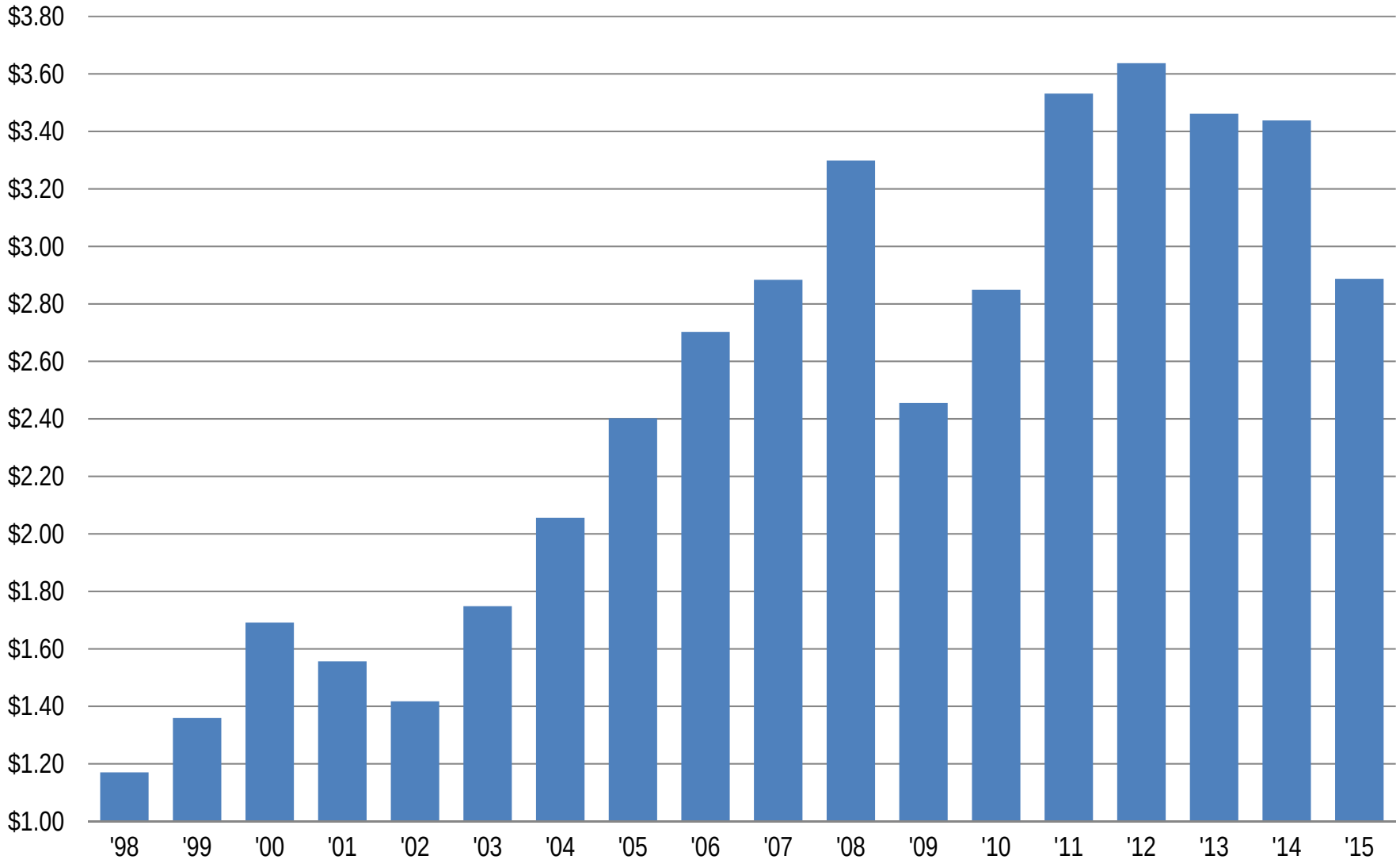
APPLIED ANALYSIS

United States Gasoline Prices
Annual Growth Rates



APPLIED ANALYSIS

Las Vegas Gasoline Prices
Annual Averages



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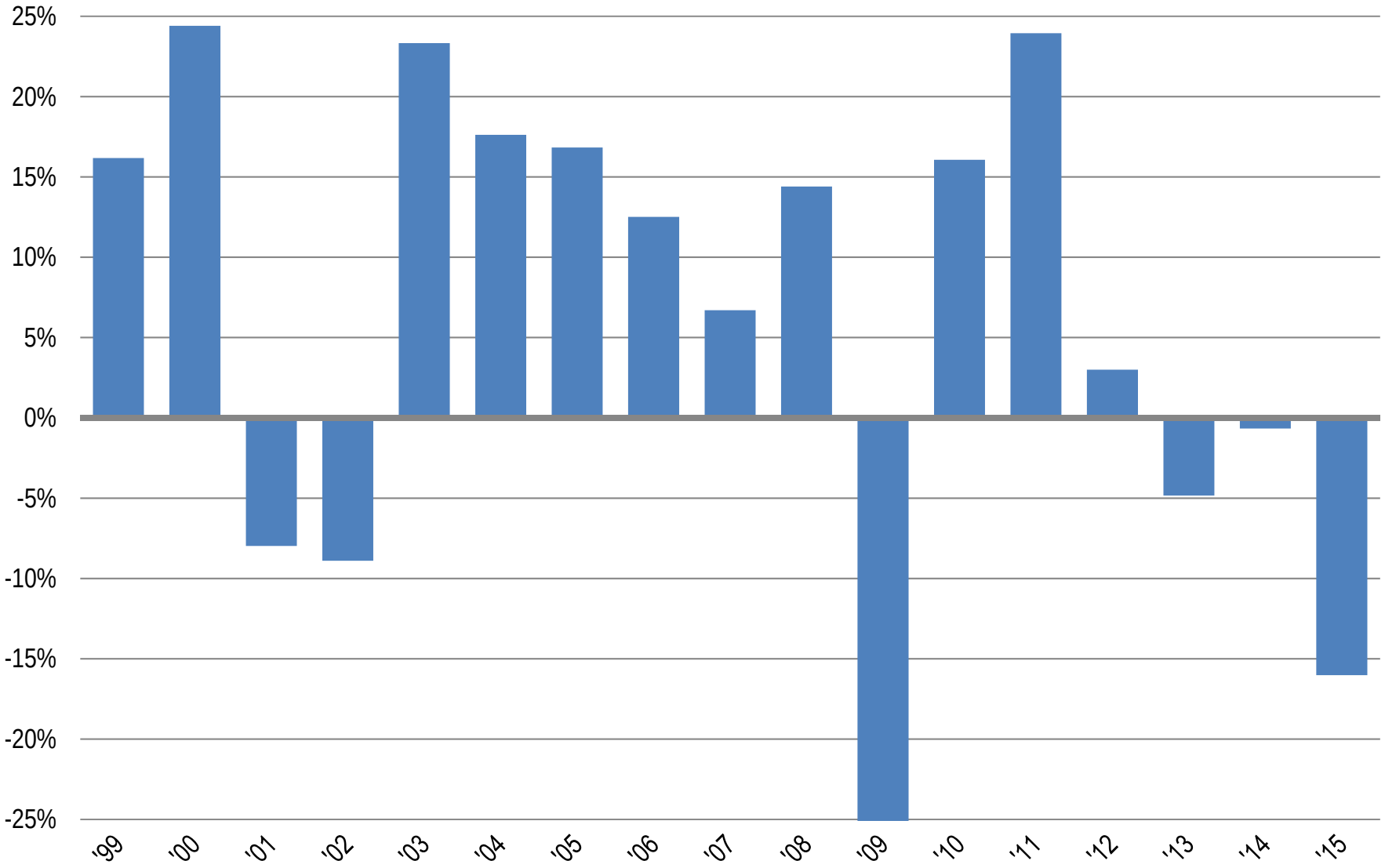
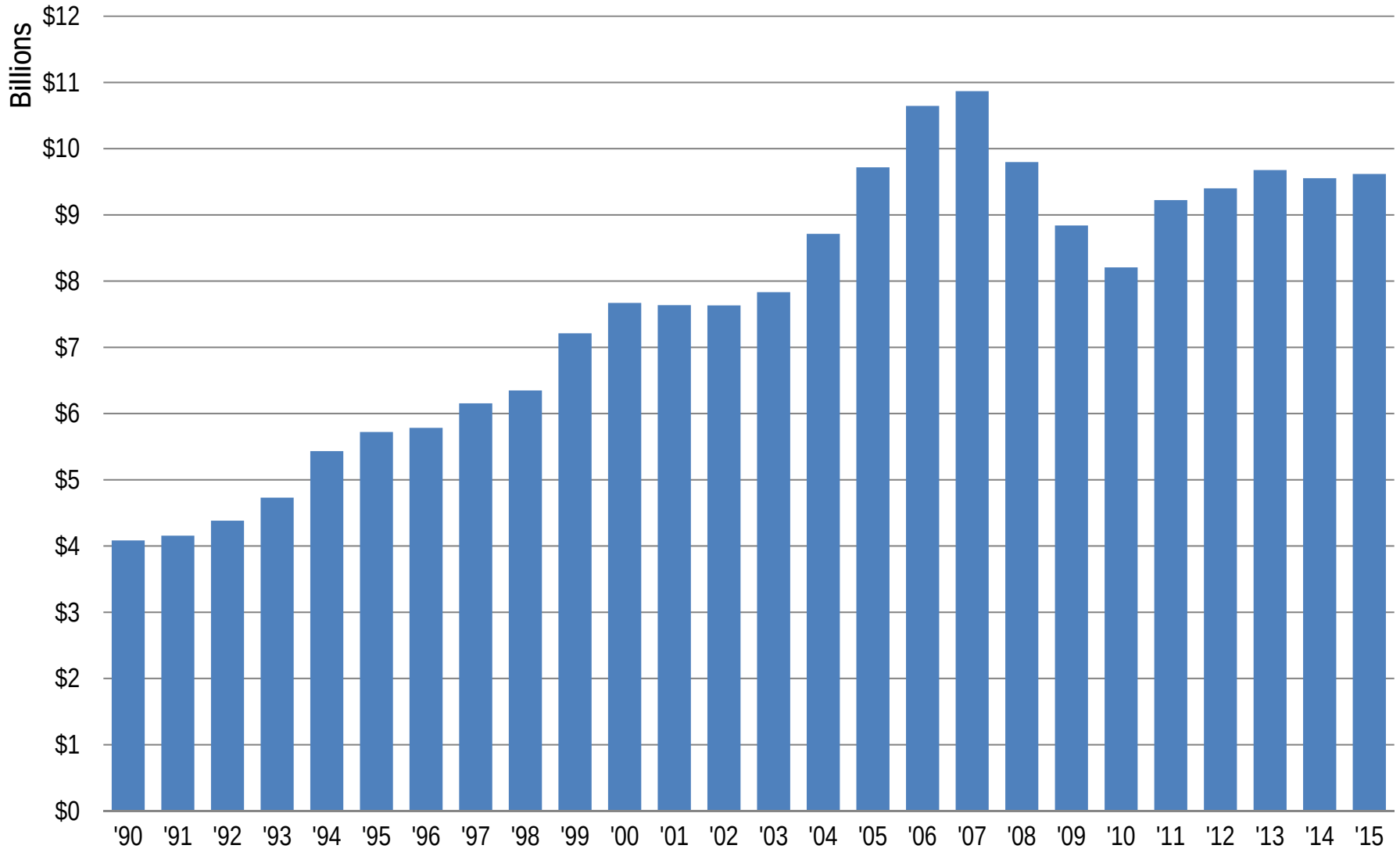
Las Vegas Gasoline Prices
Annual Growth Rates



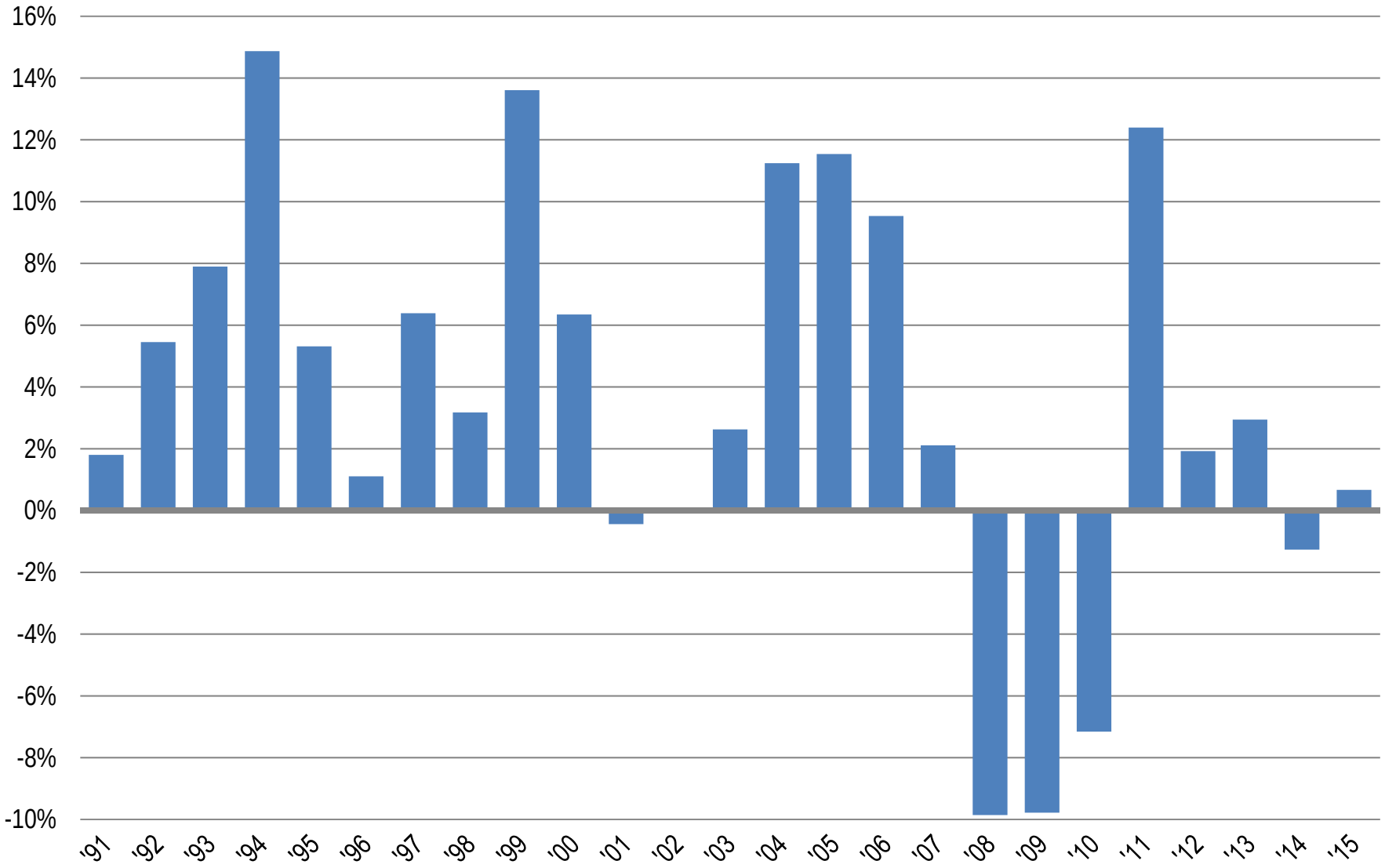
APPLIED ANALYSIS

Clark County Gross Gaming Revenues
Annual Series



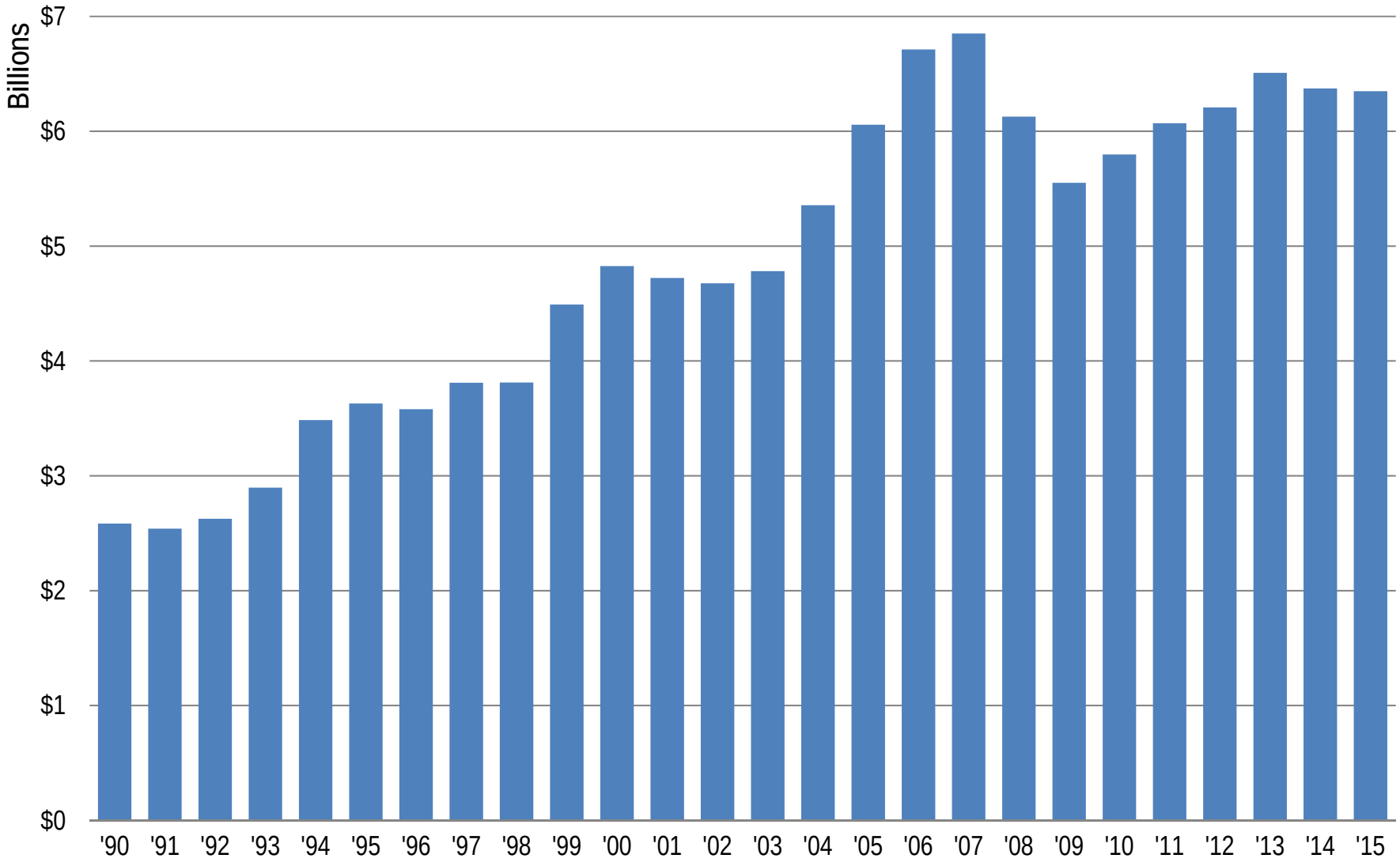
APPLIED ANALYSIS

Clark County Gross Gaming Revenues
Annual Growth Rates



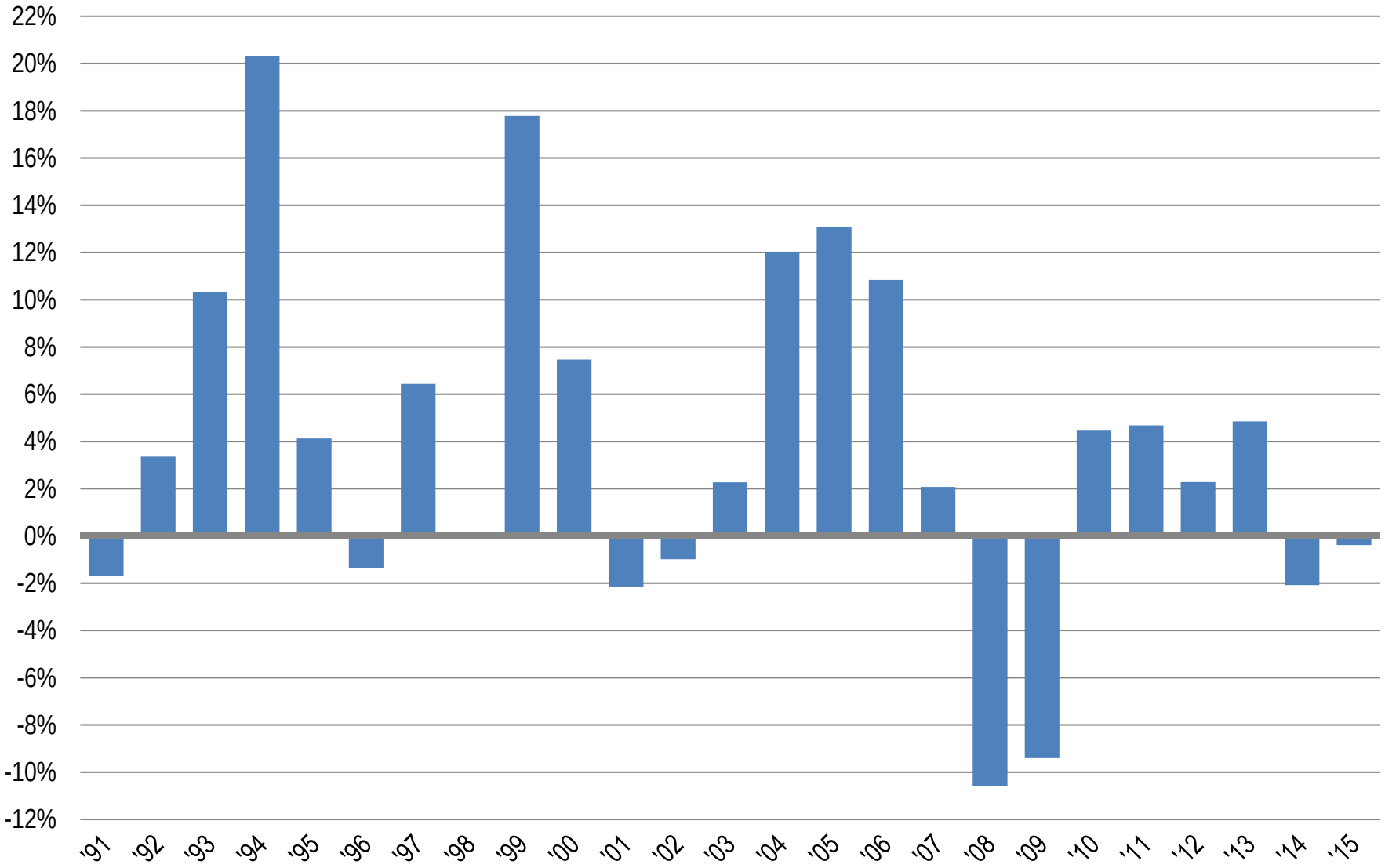
APPLIED ANALYSIS

Las Vegas Strip Gross Gaming Revenues
Annual Series



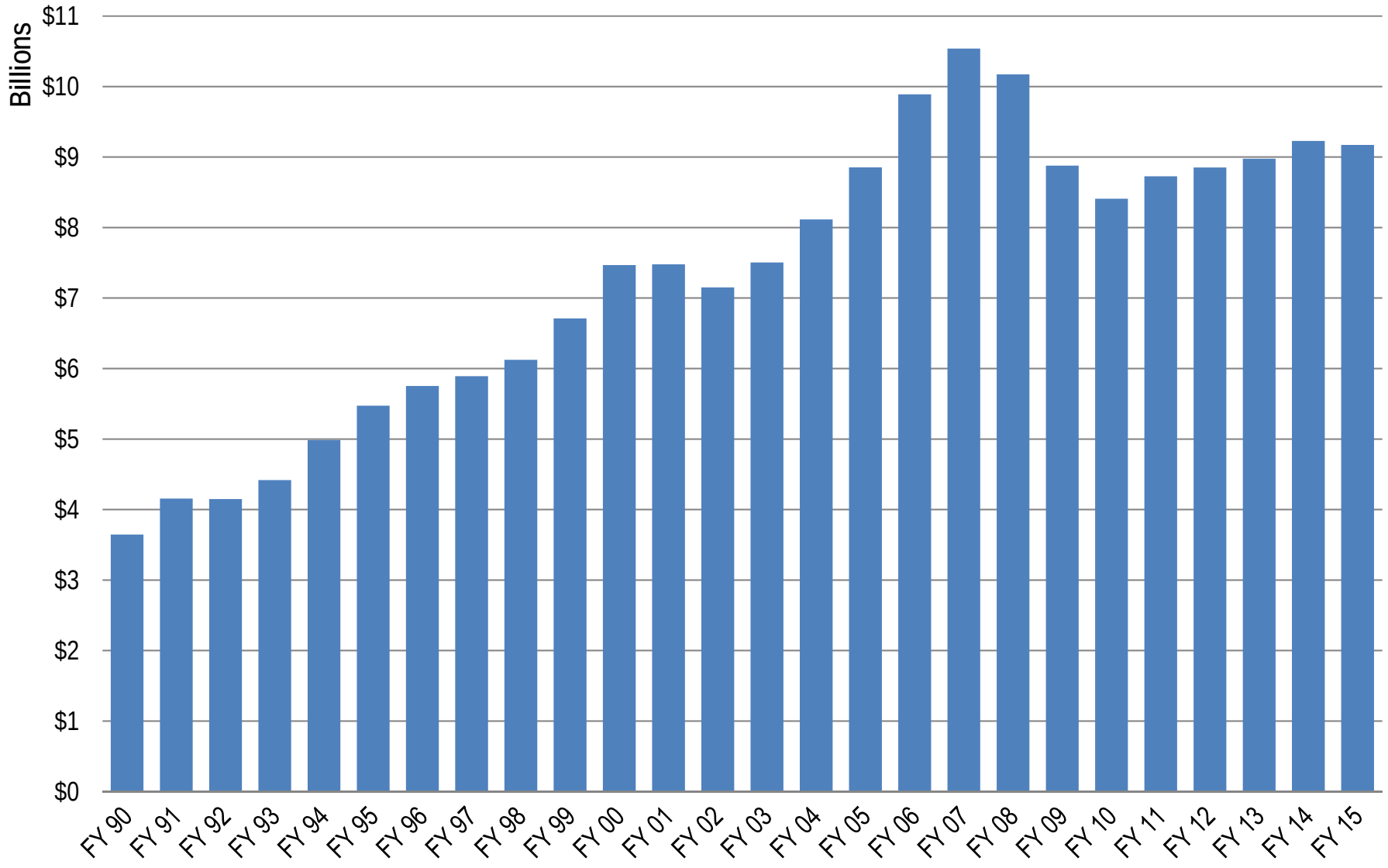
APPLIED ANALYSIS

Las Vegas Strip Gross Gaming Revenues
Annual Growth Rates



APPLIED ANALYSIS

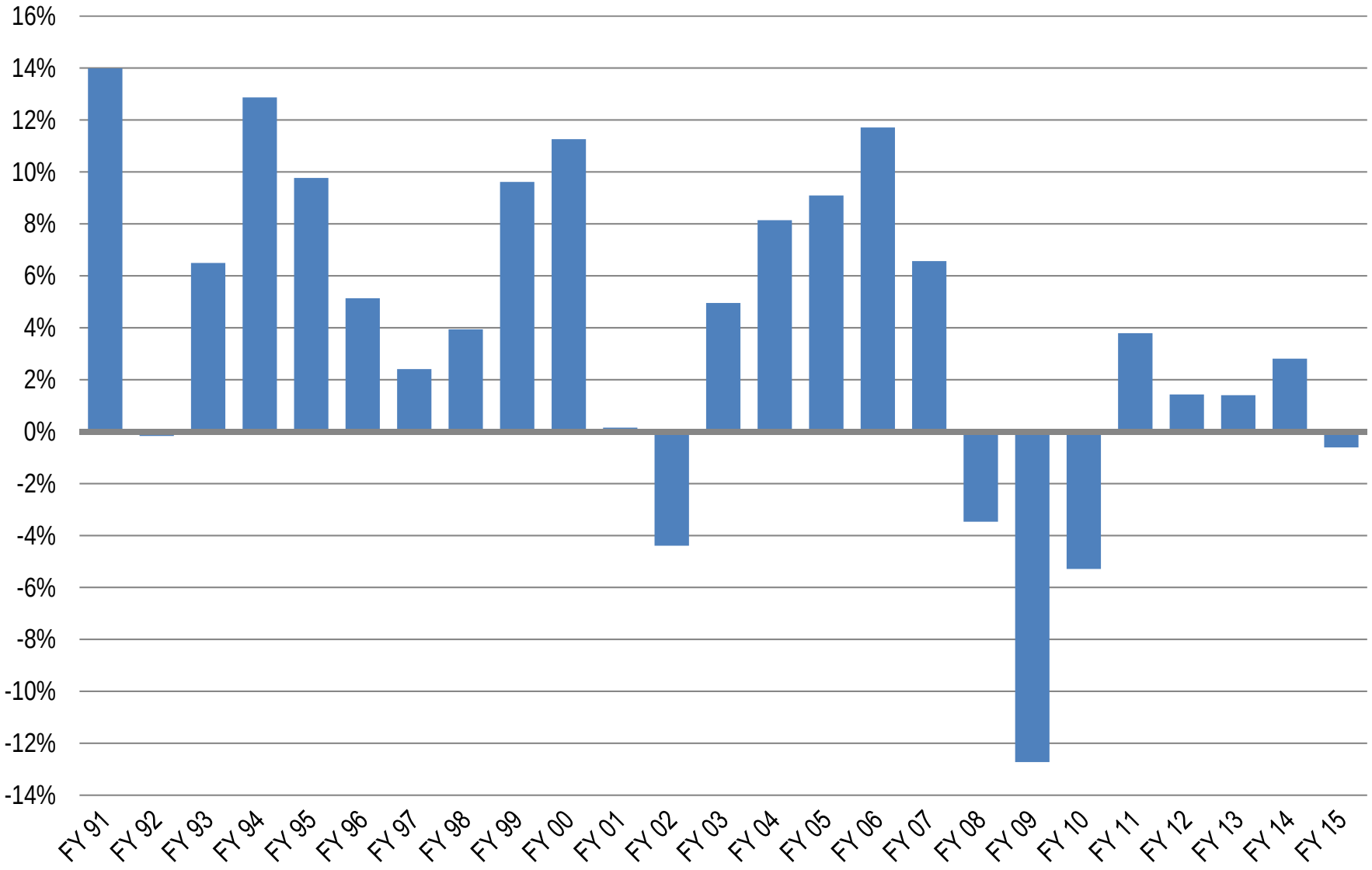
Clark County Gaming Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

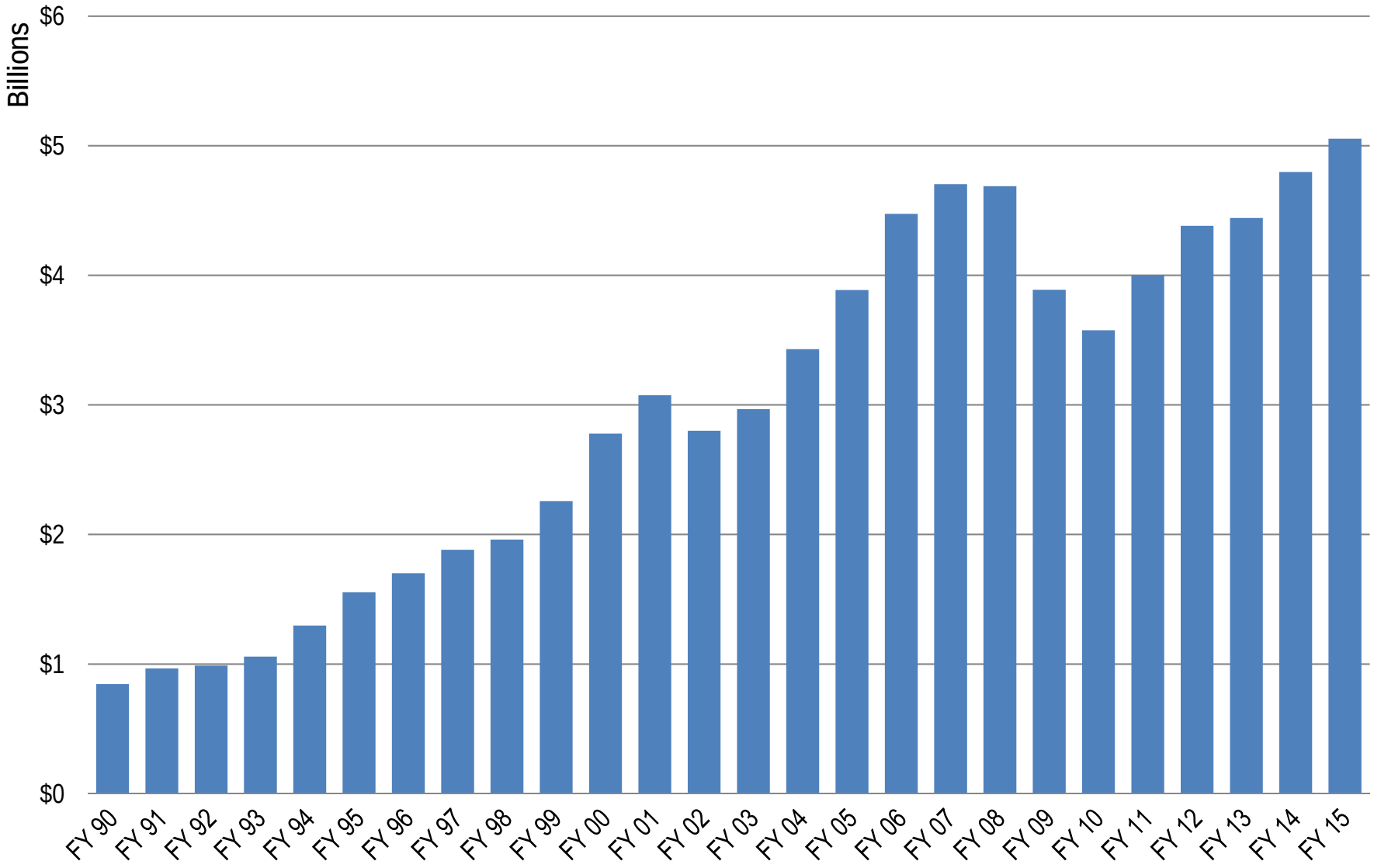
Clark County Gaming Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

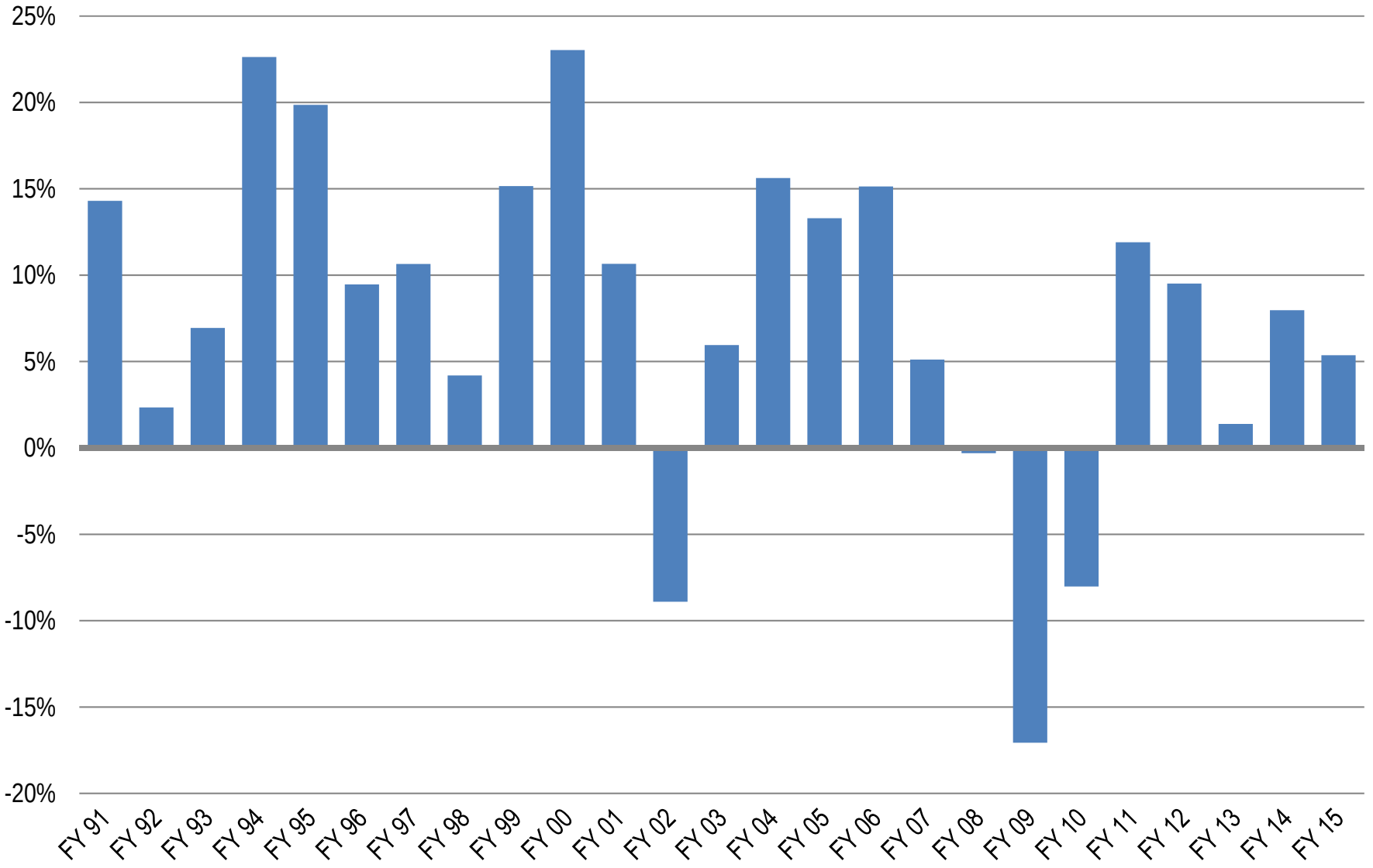
Clark County Room Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

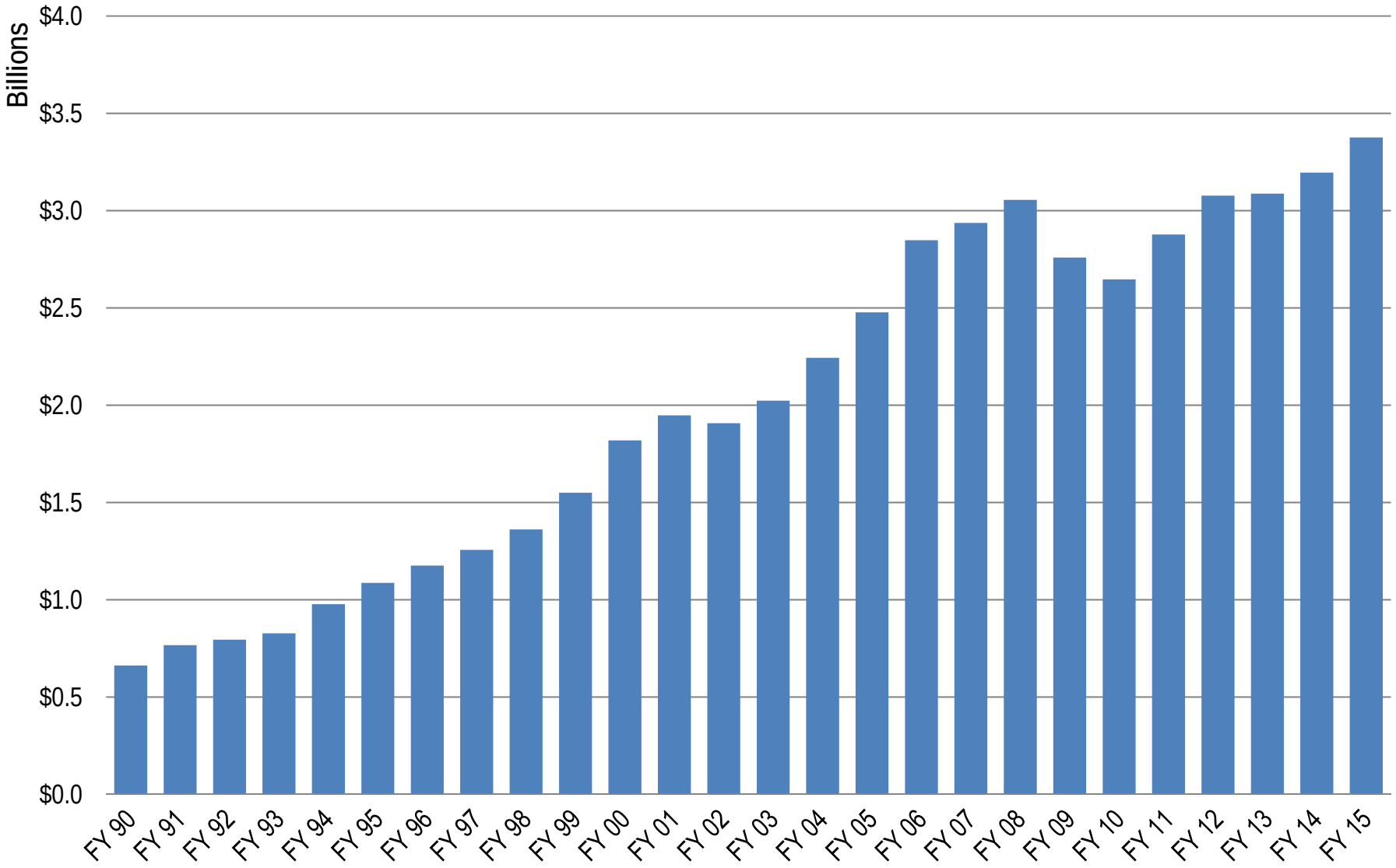
Clark County Room Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

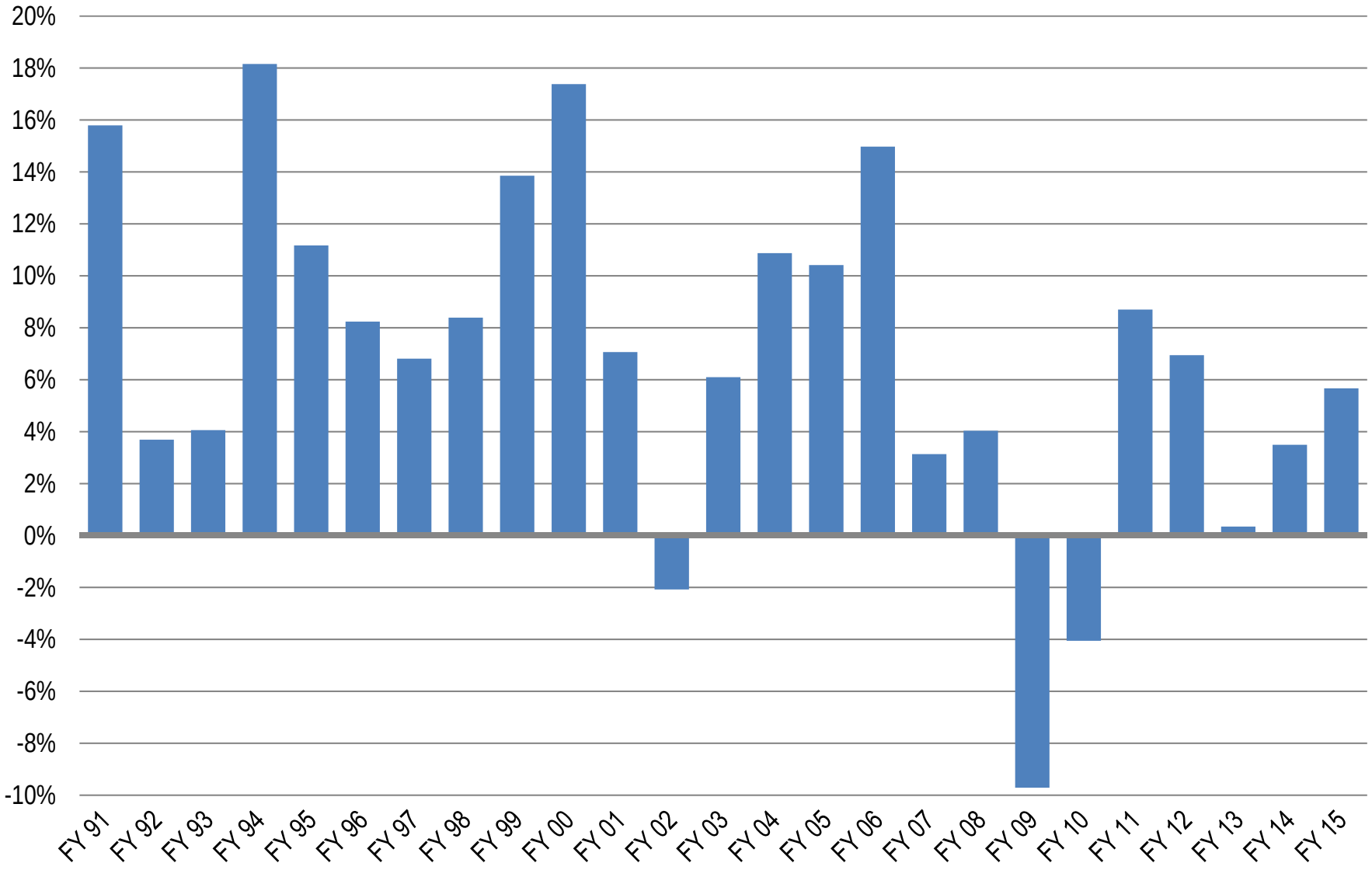
Clark County Food Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

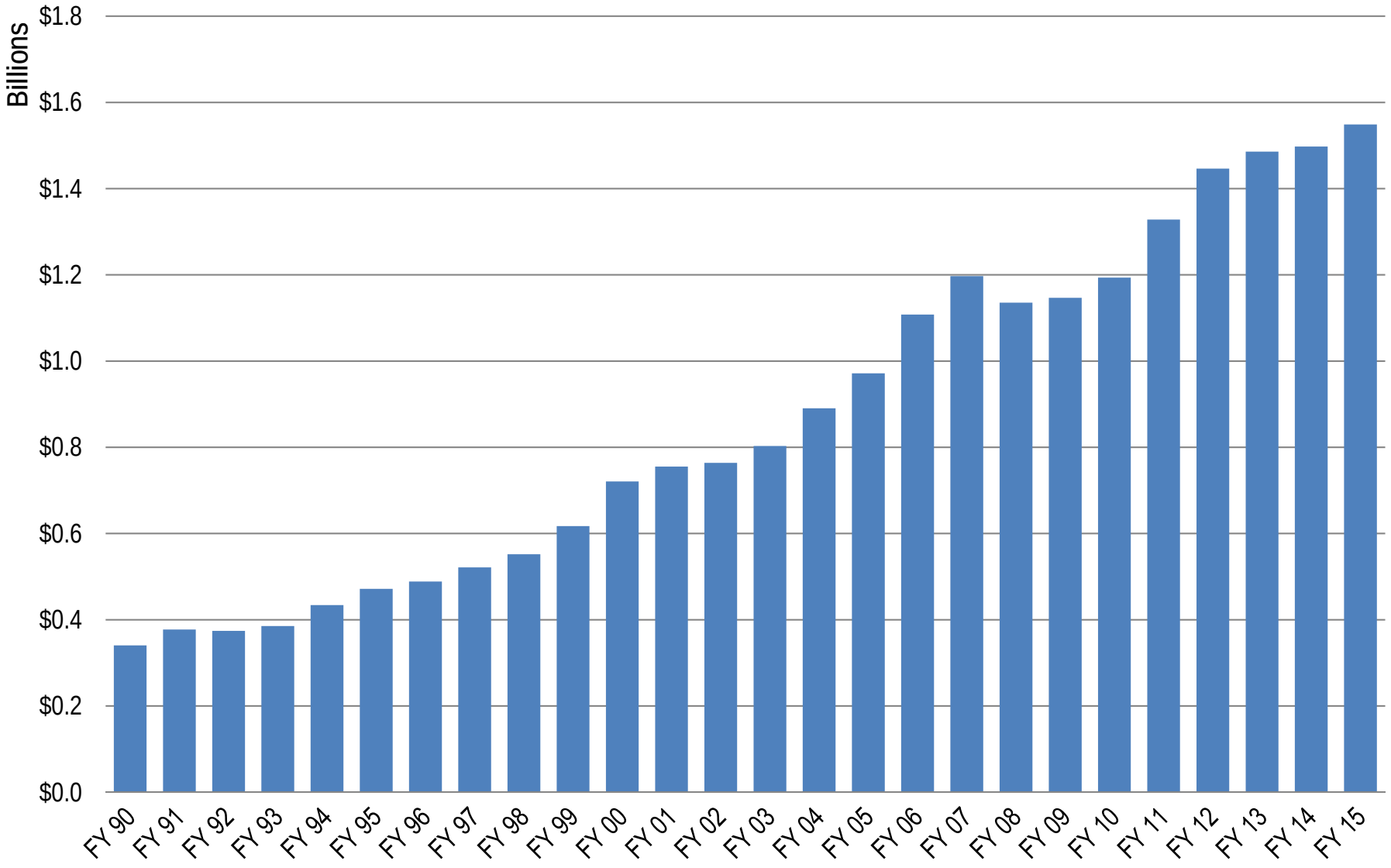
Clark County Food Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

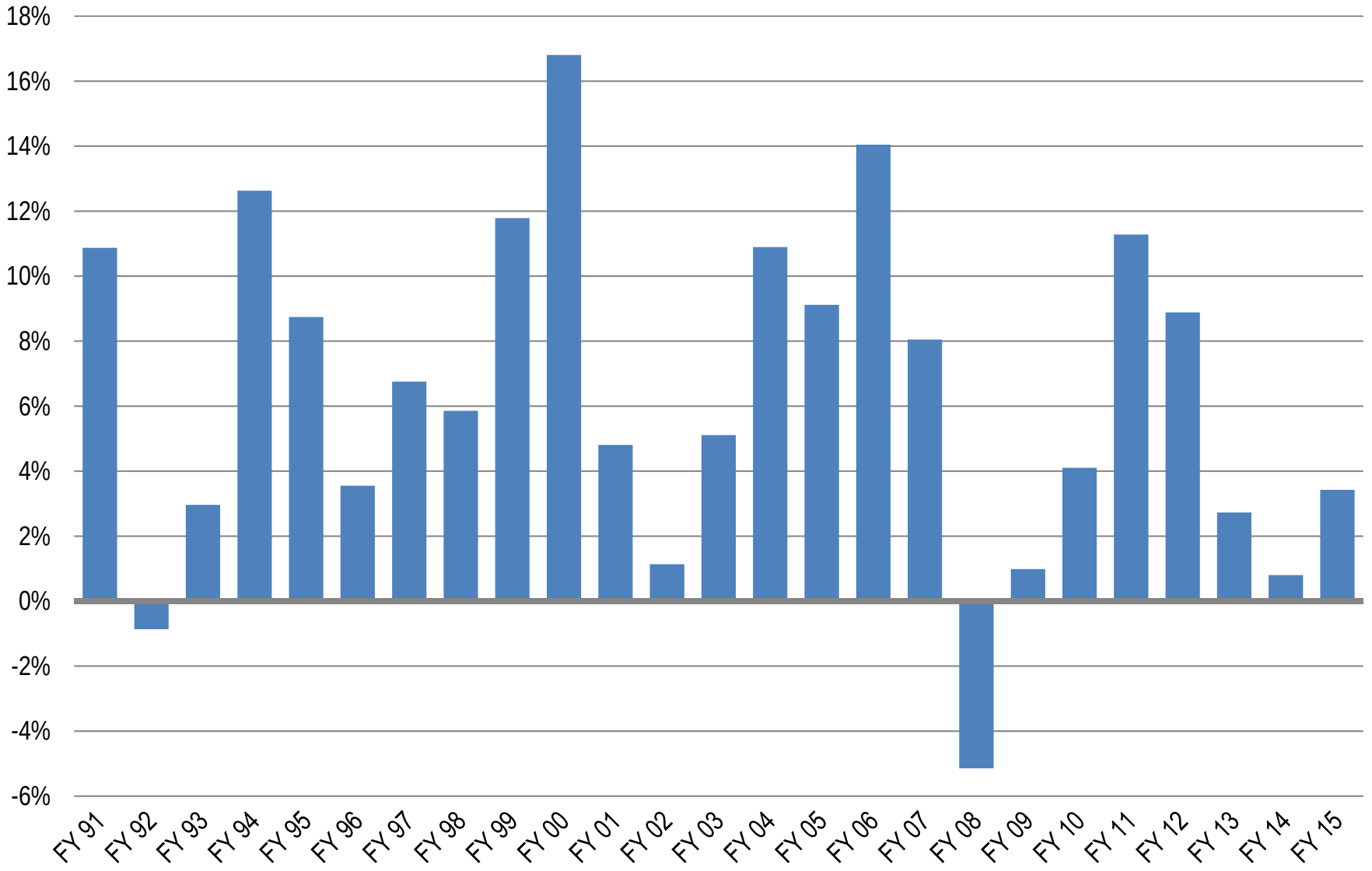
Clark County Beverage Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

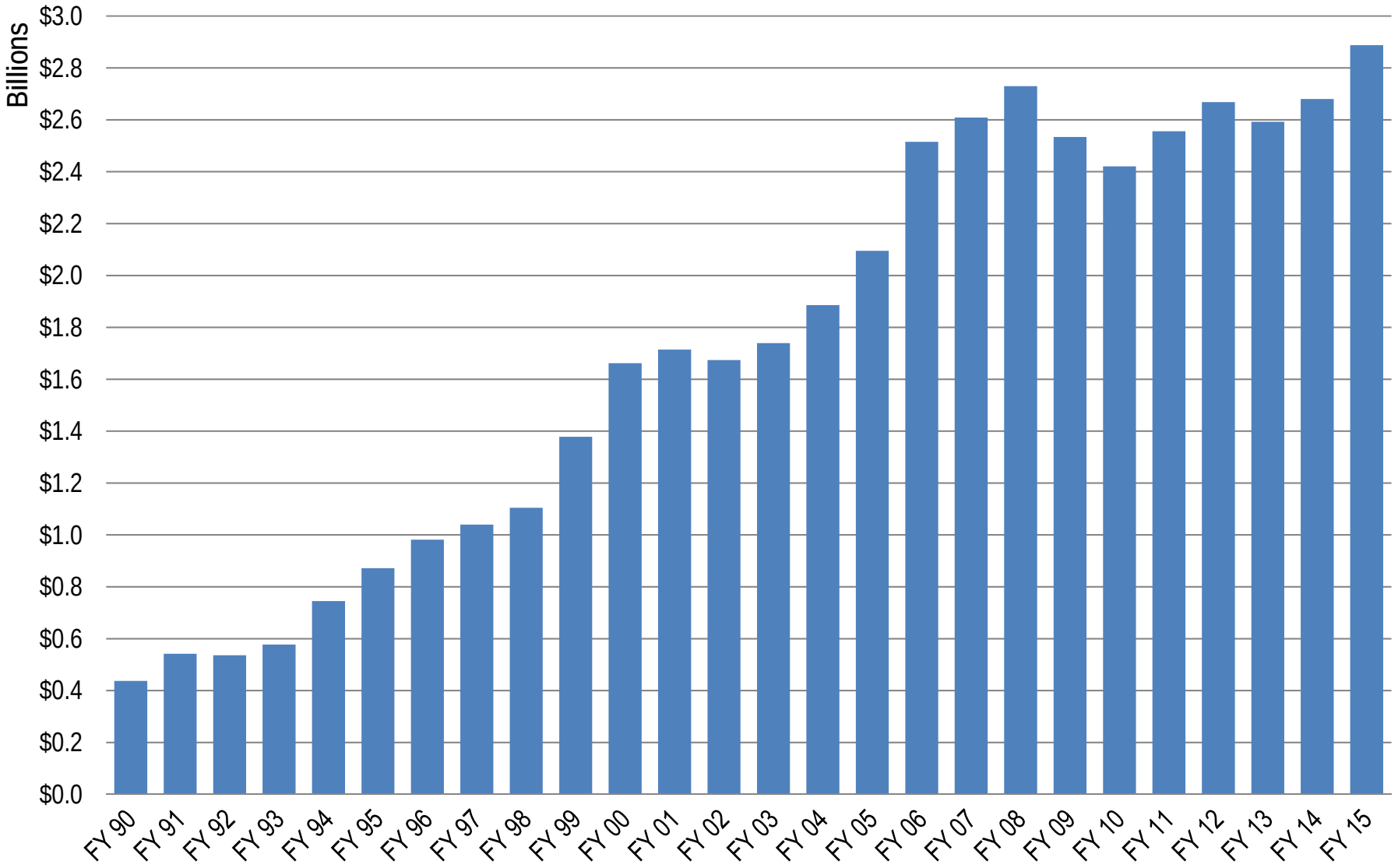
Clark County Beverage Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

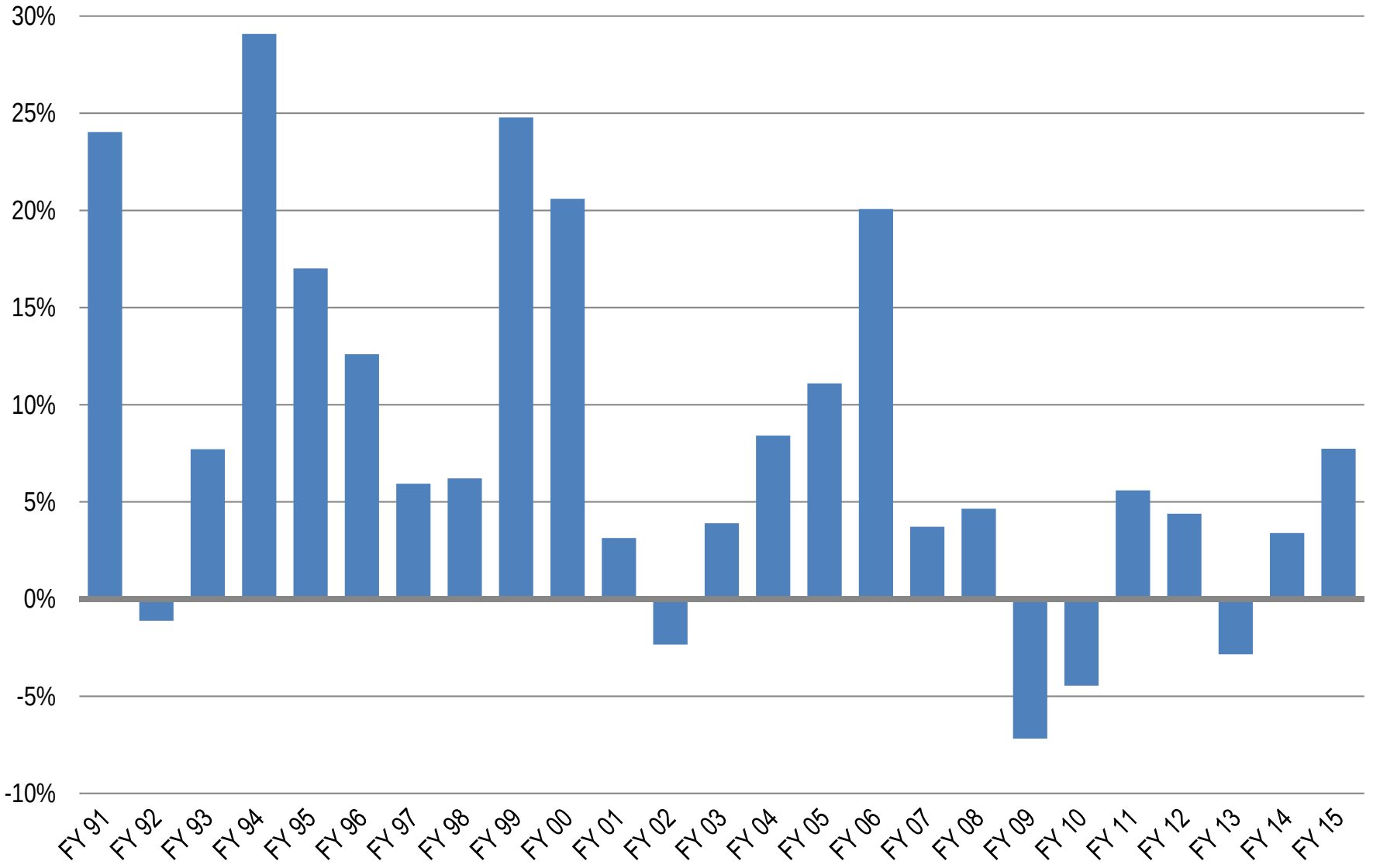
Clark County Other Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

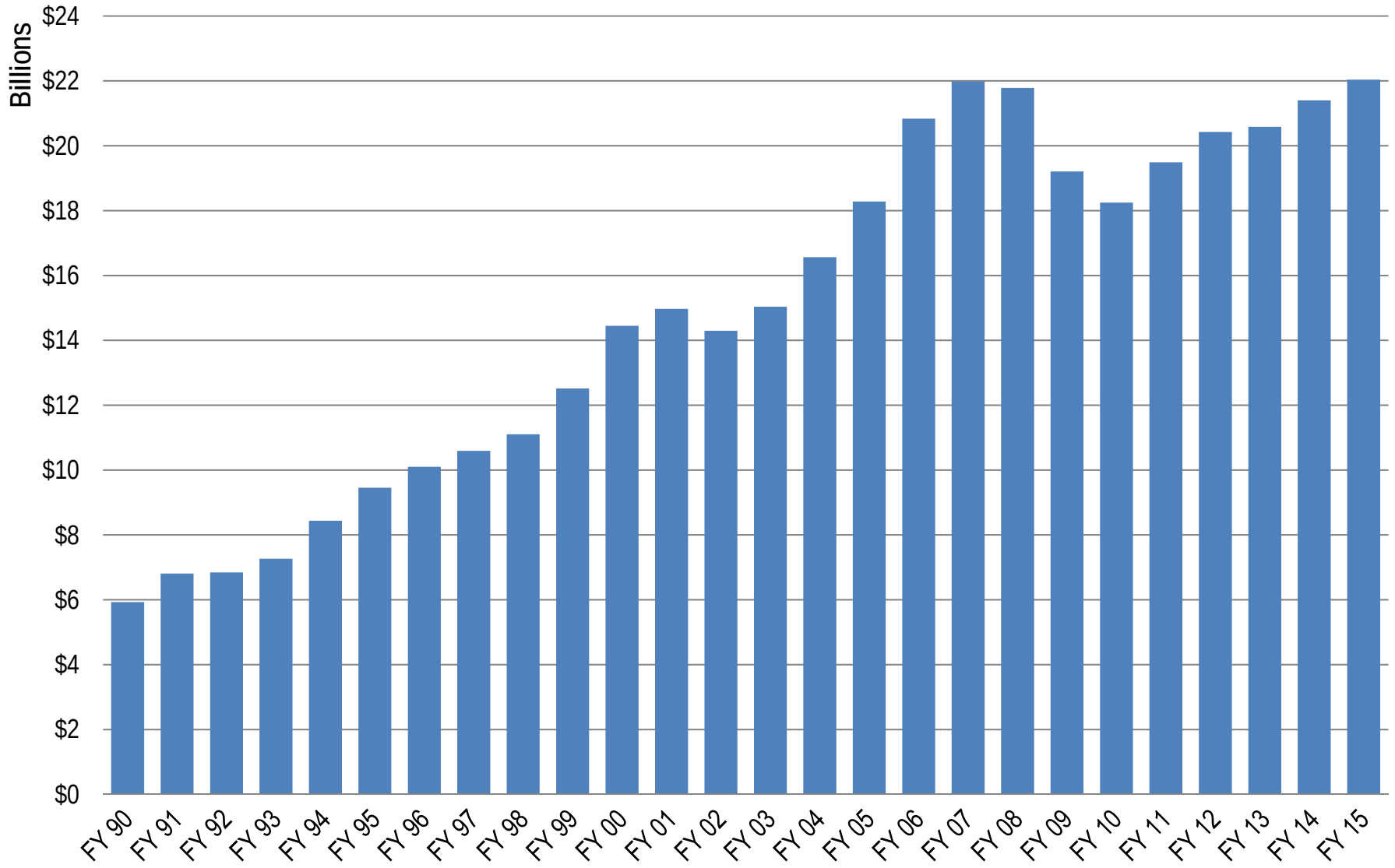
Clark County Other Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

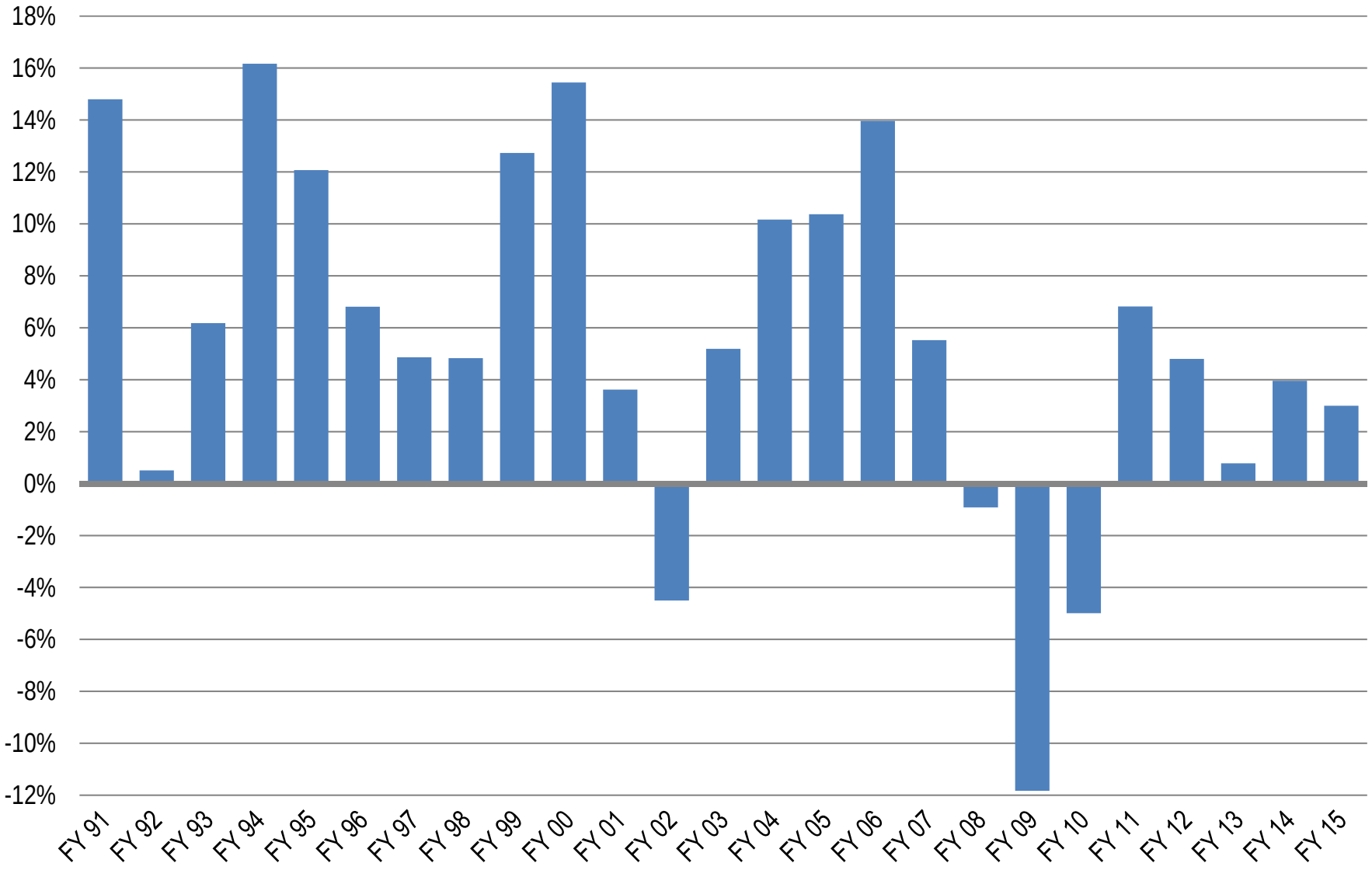
Clark County Total Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

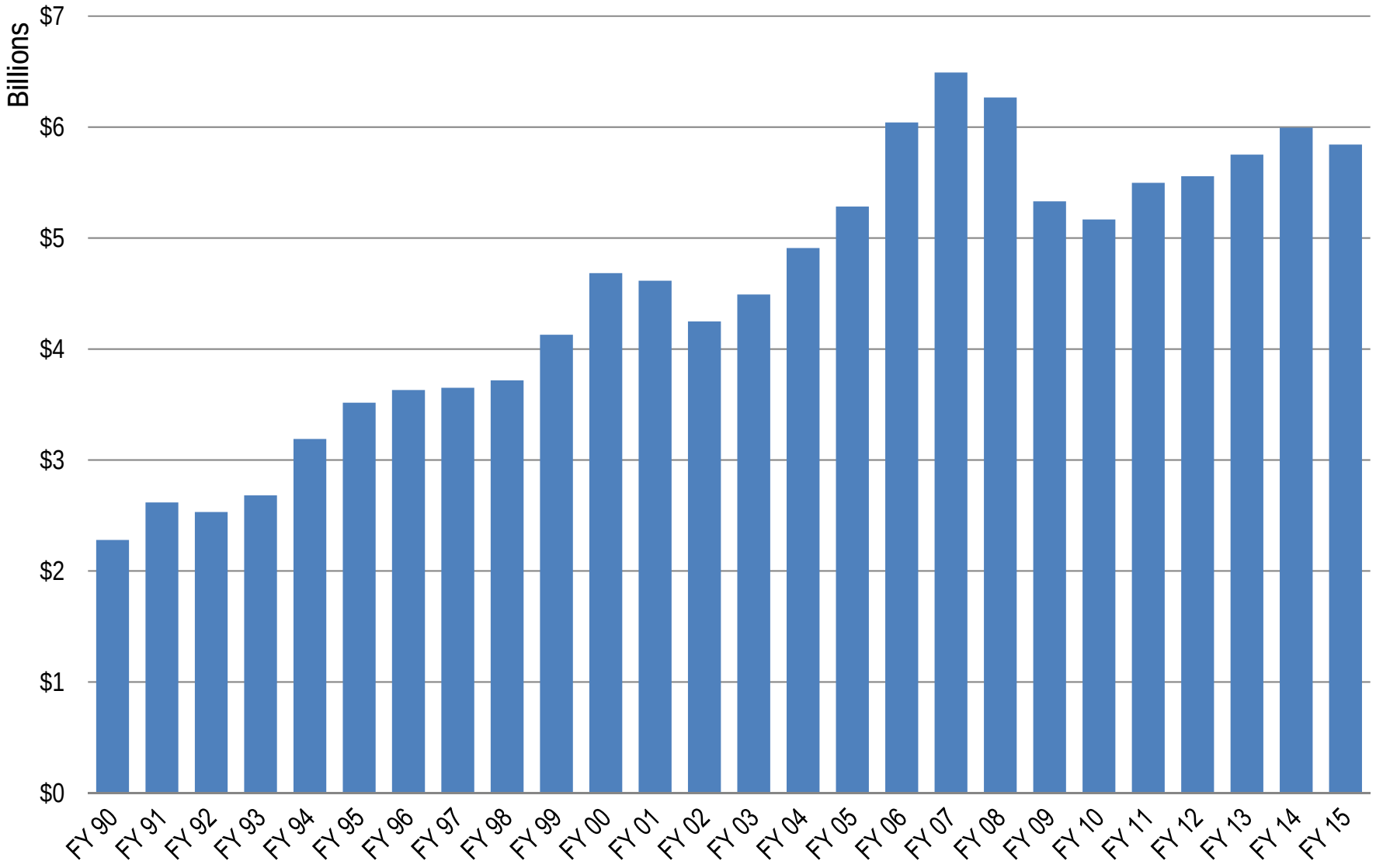
Clark County Total Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

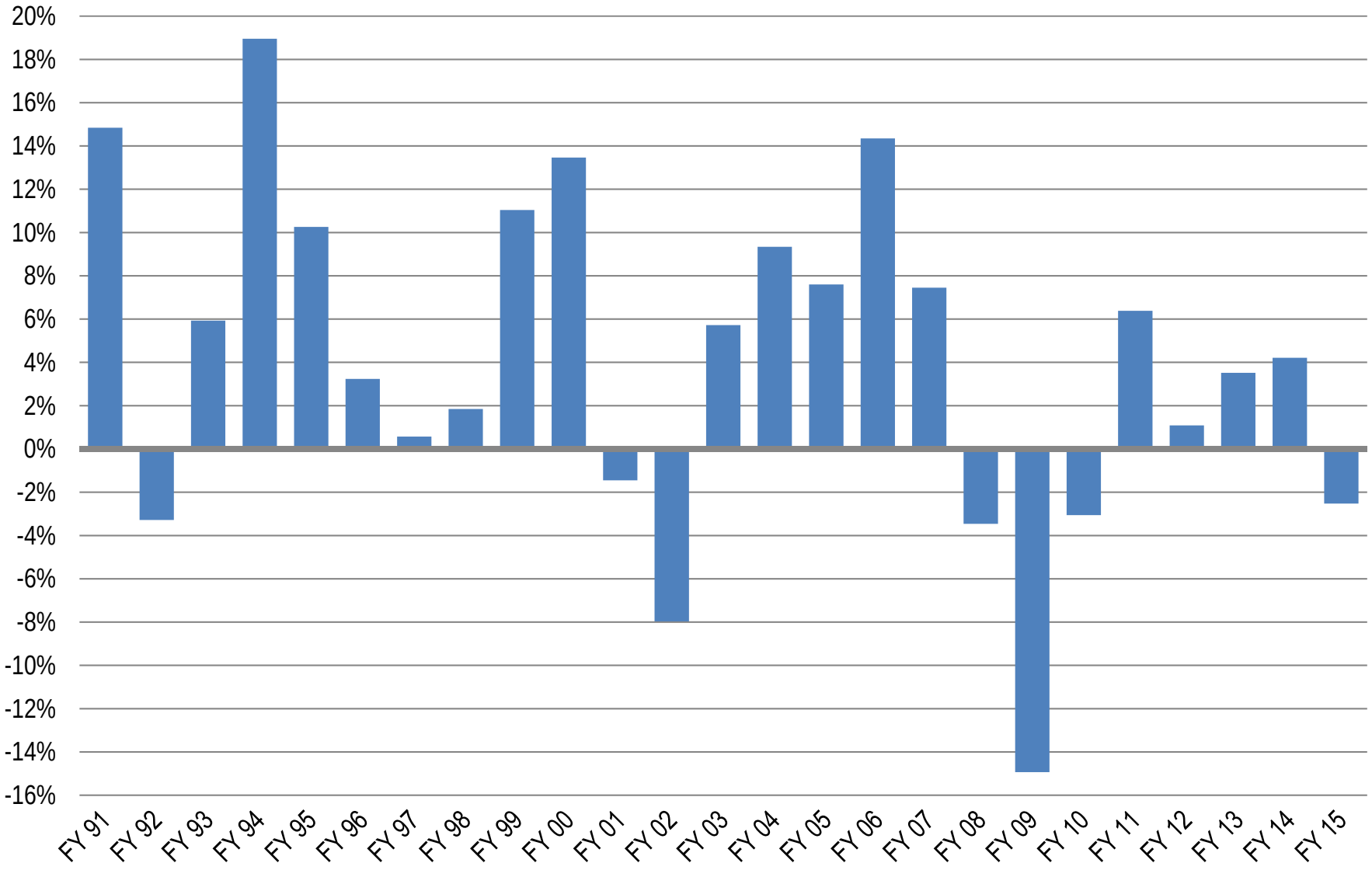
Las Vegas Strip Gaming Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

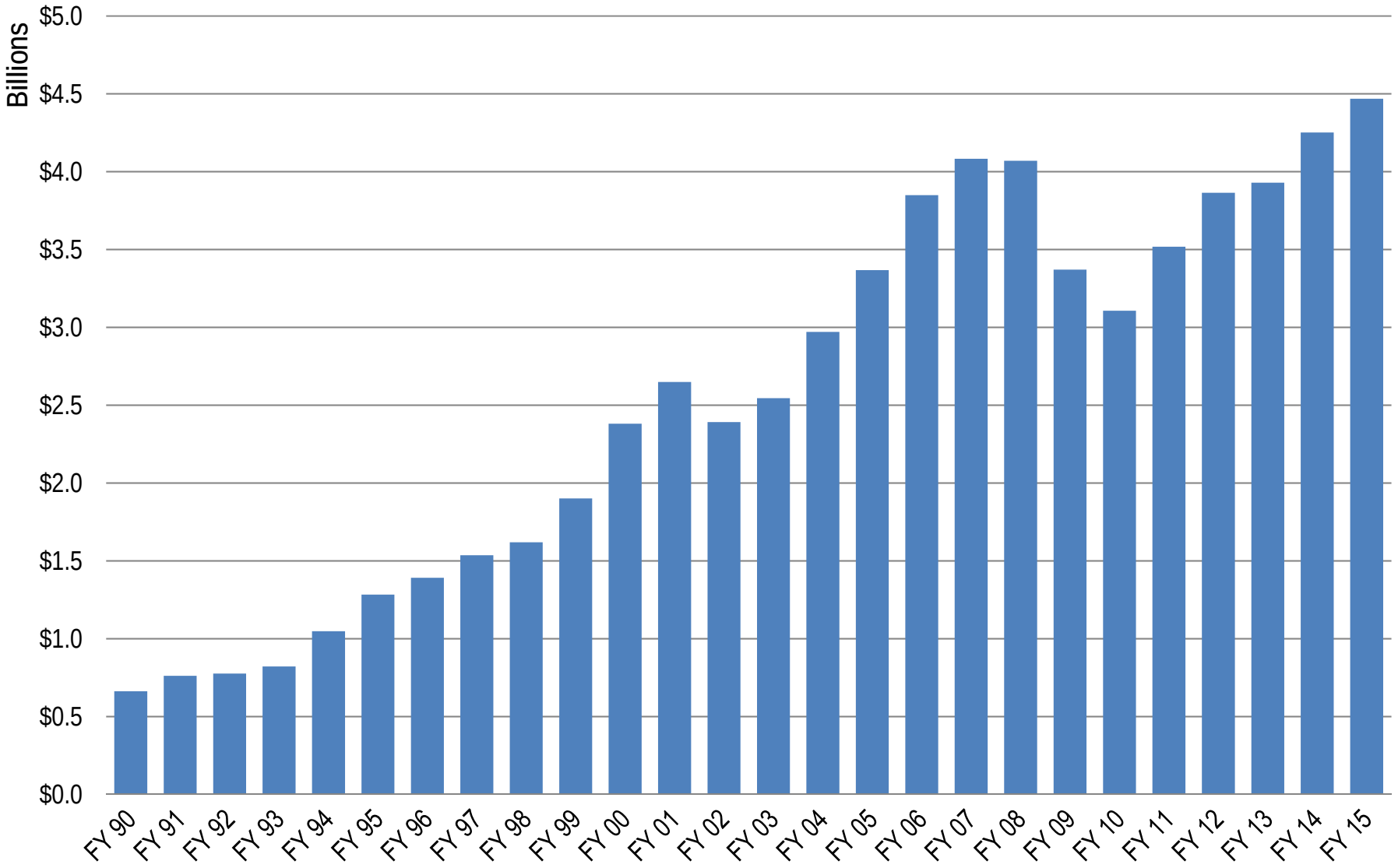
Las Vegas Strip Gaming Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

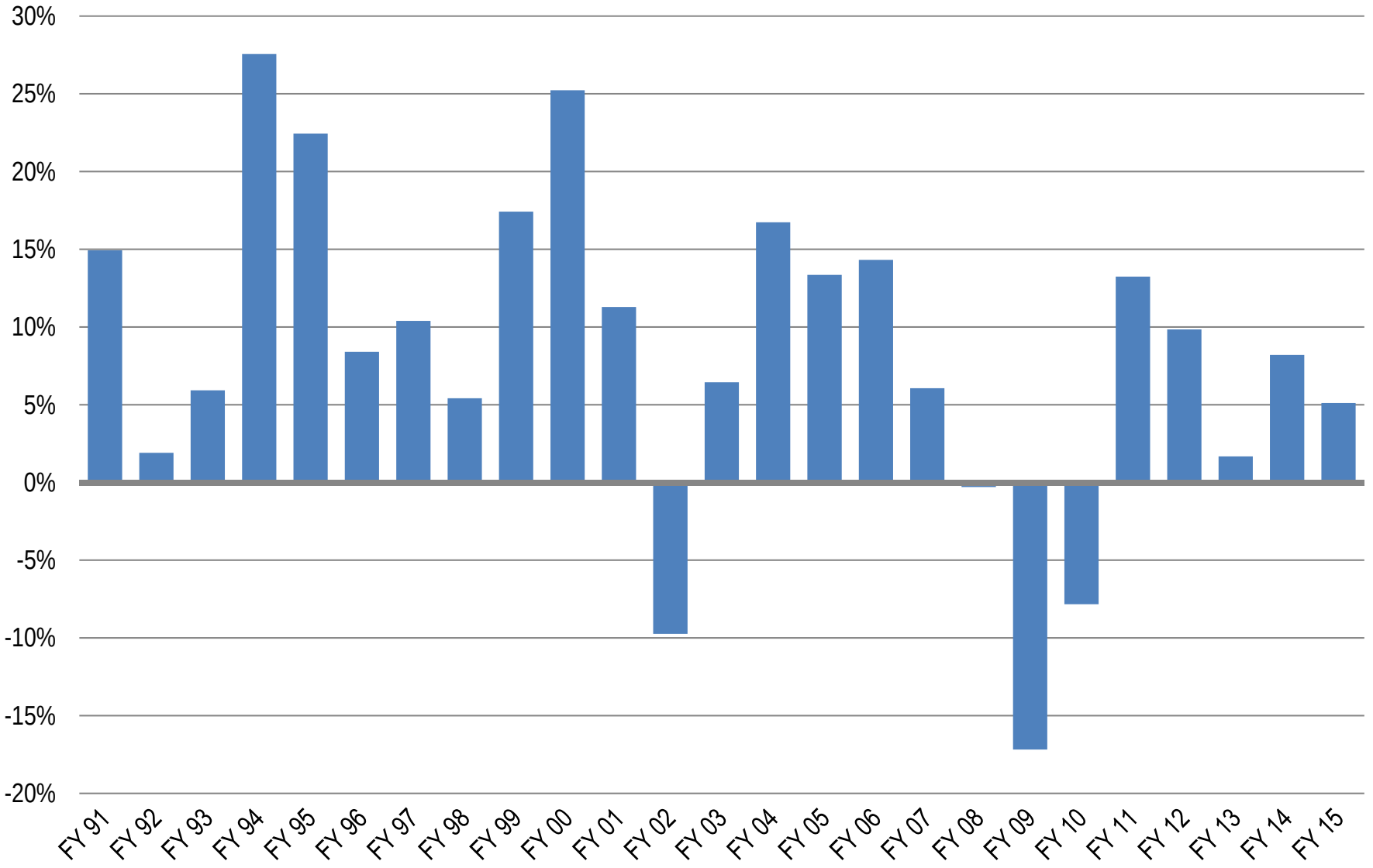
Las Vegas Strip Room Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

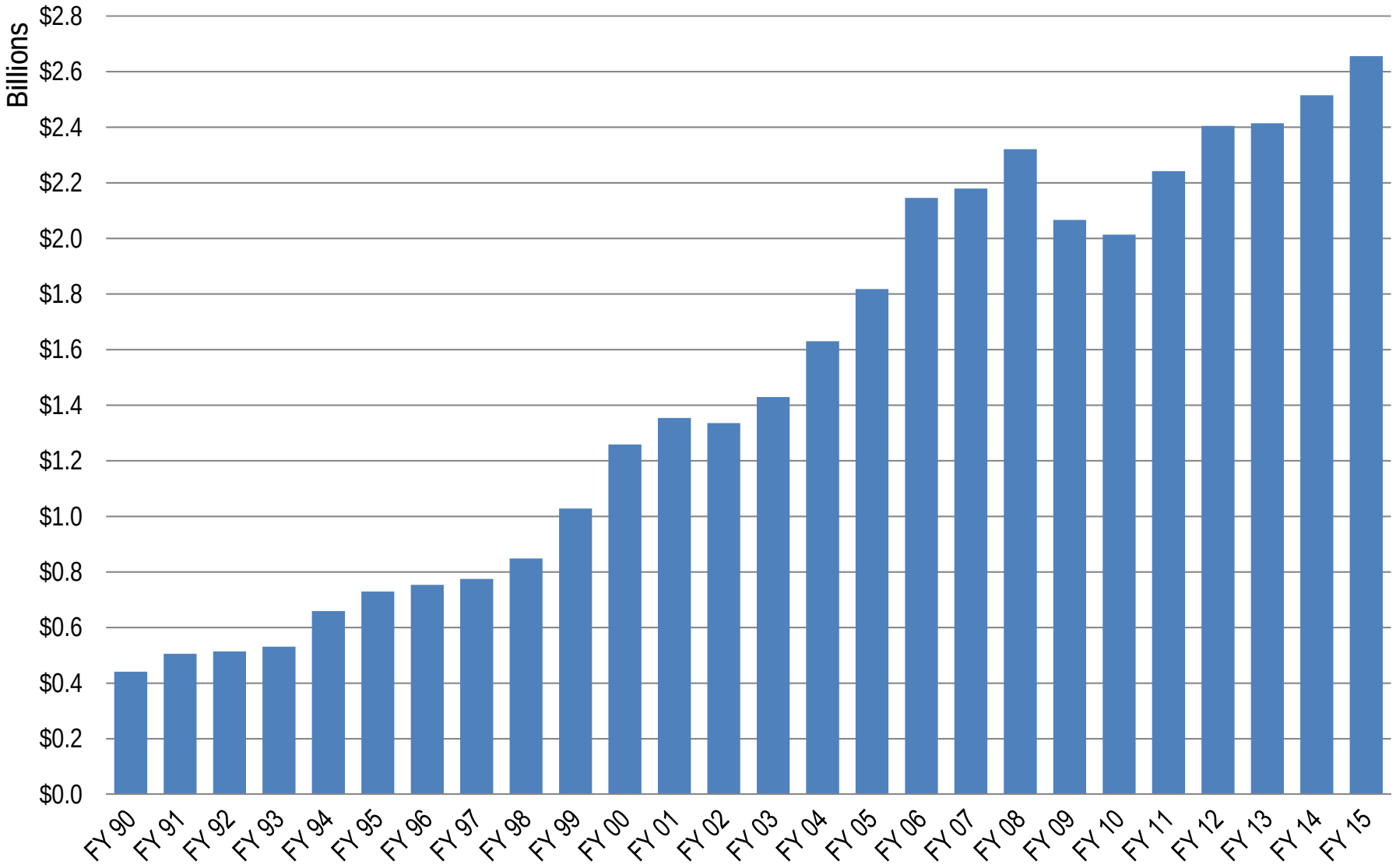
Las Vegas Strip Room Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

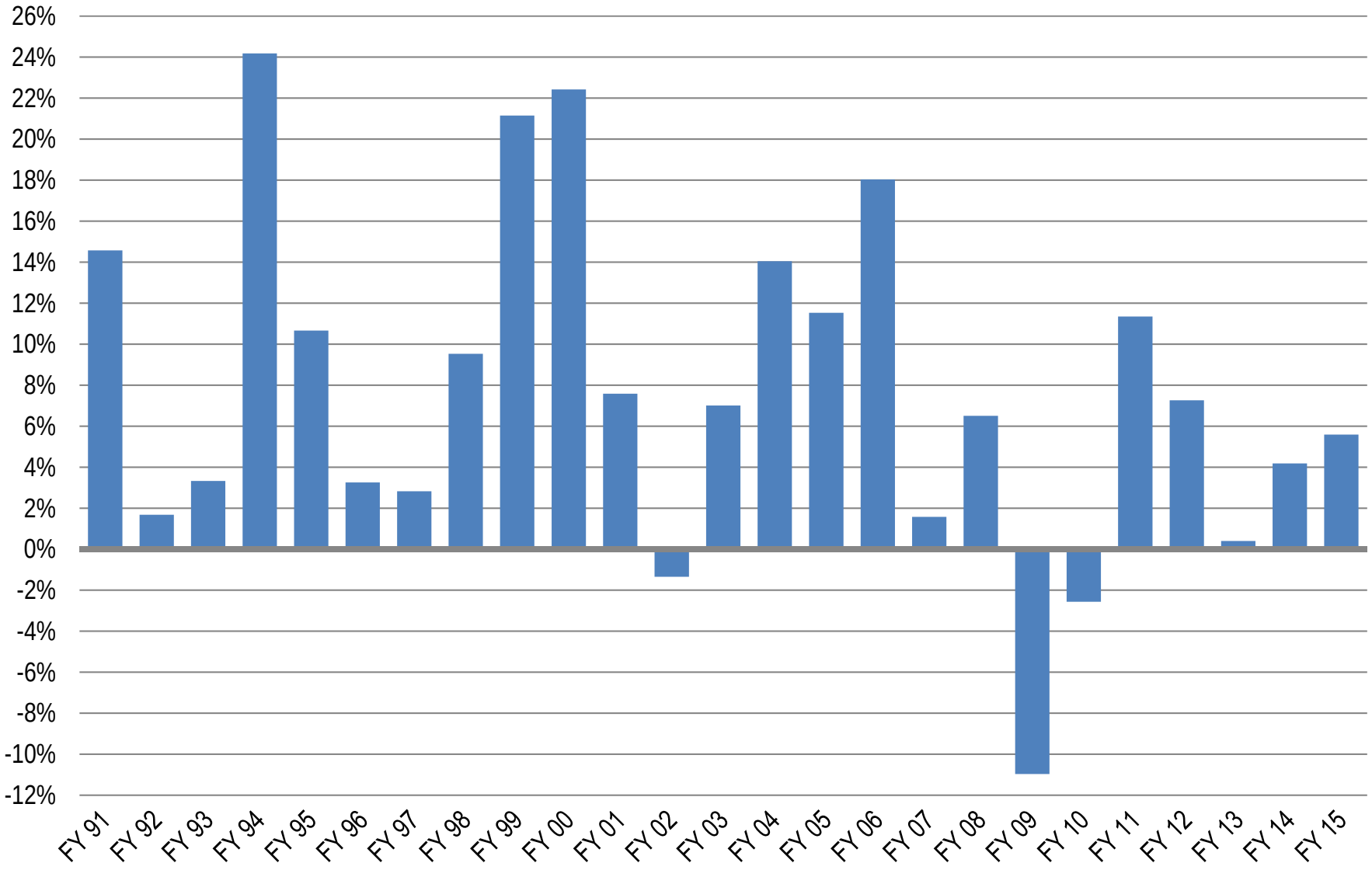
Las Vegas Strip Food Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

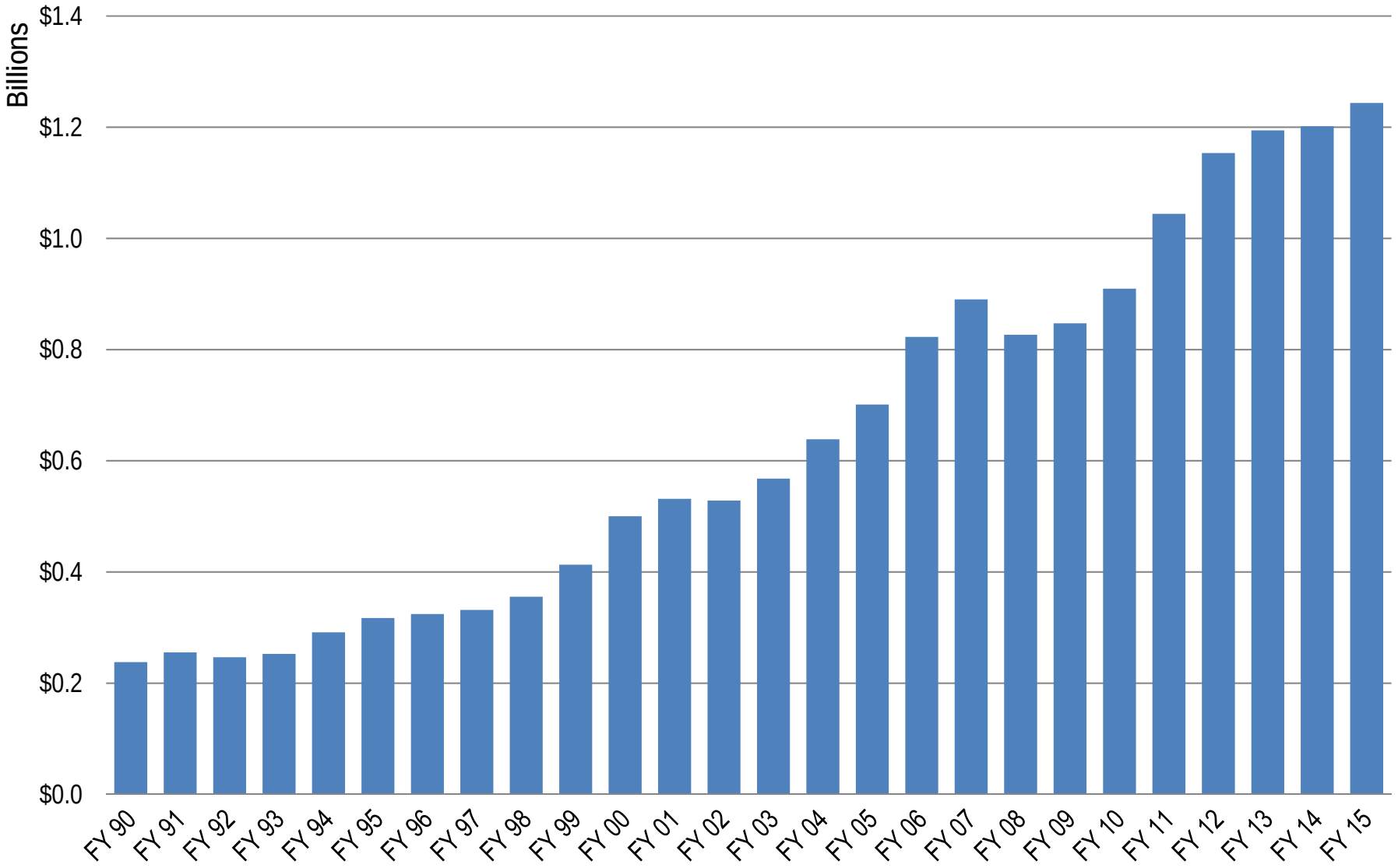
Las Vegas Strip Food Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

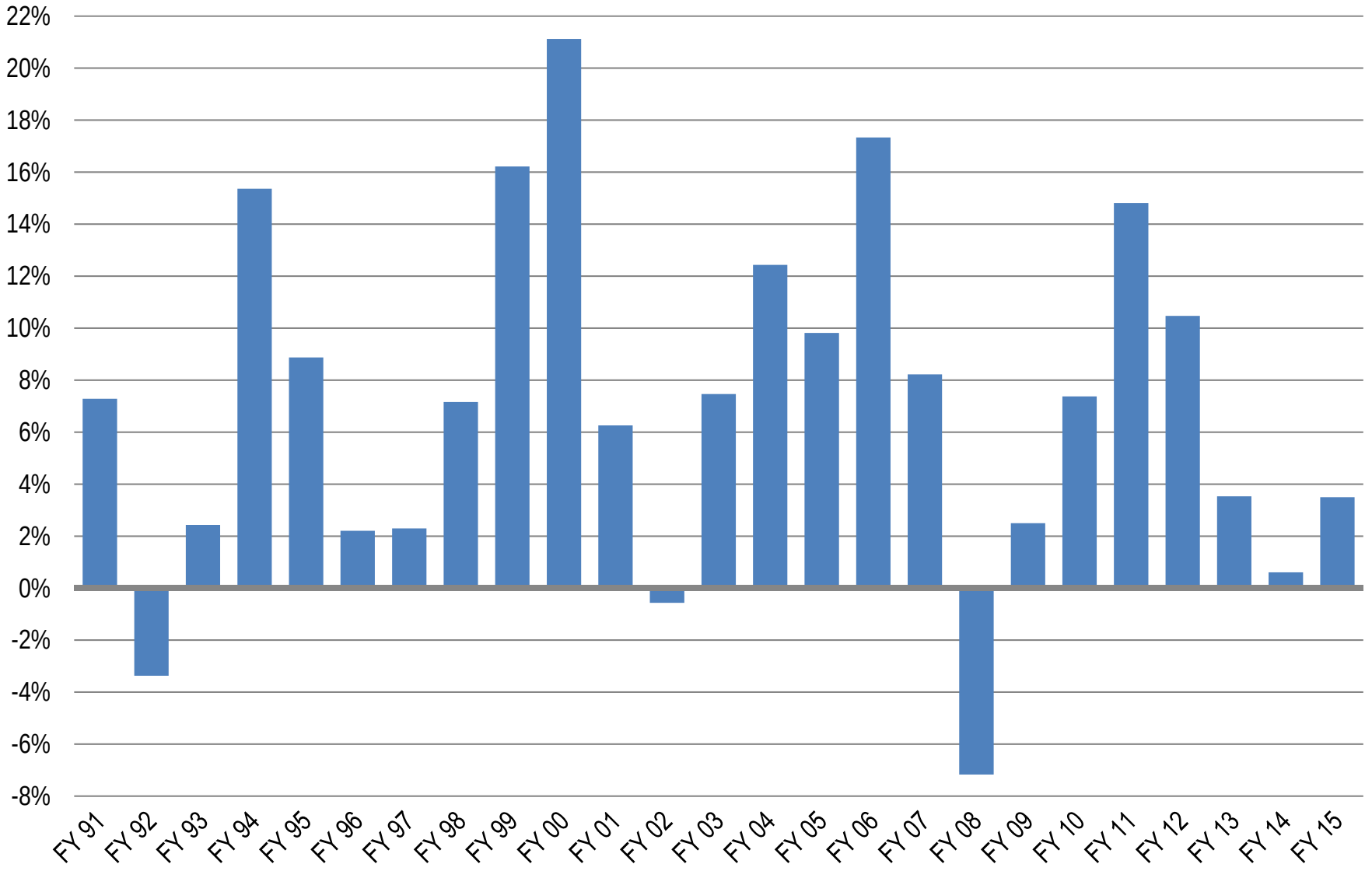
Las Vegas Strip Beverage Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

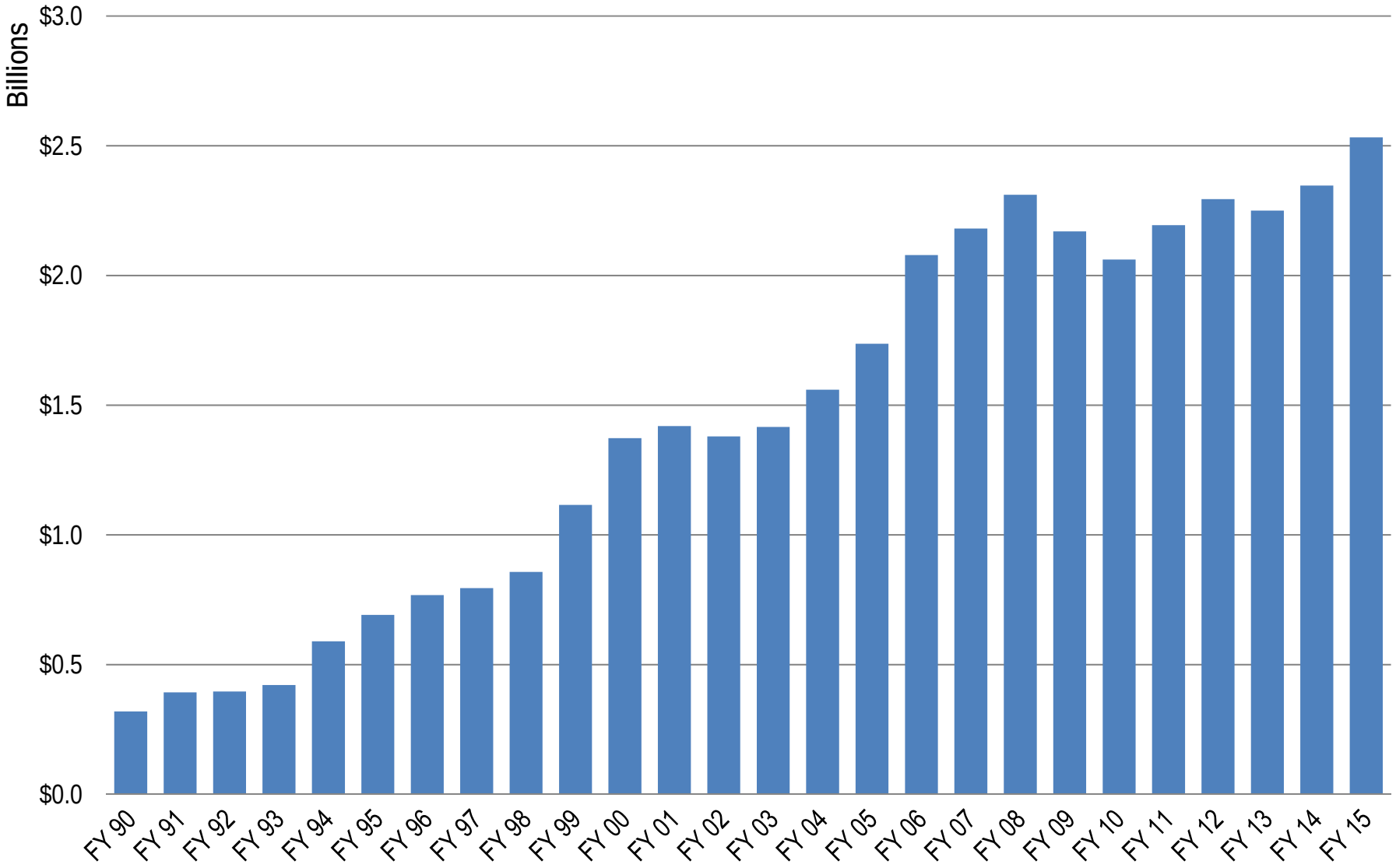
Las Vegas Strip Beverage Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

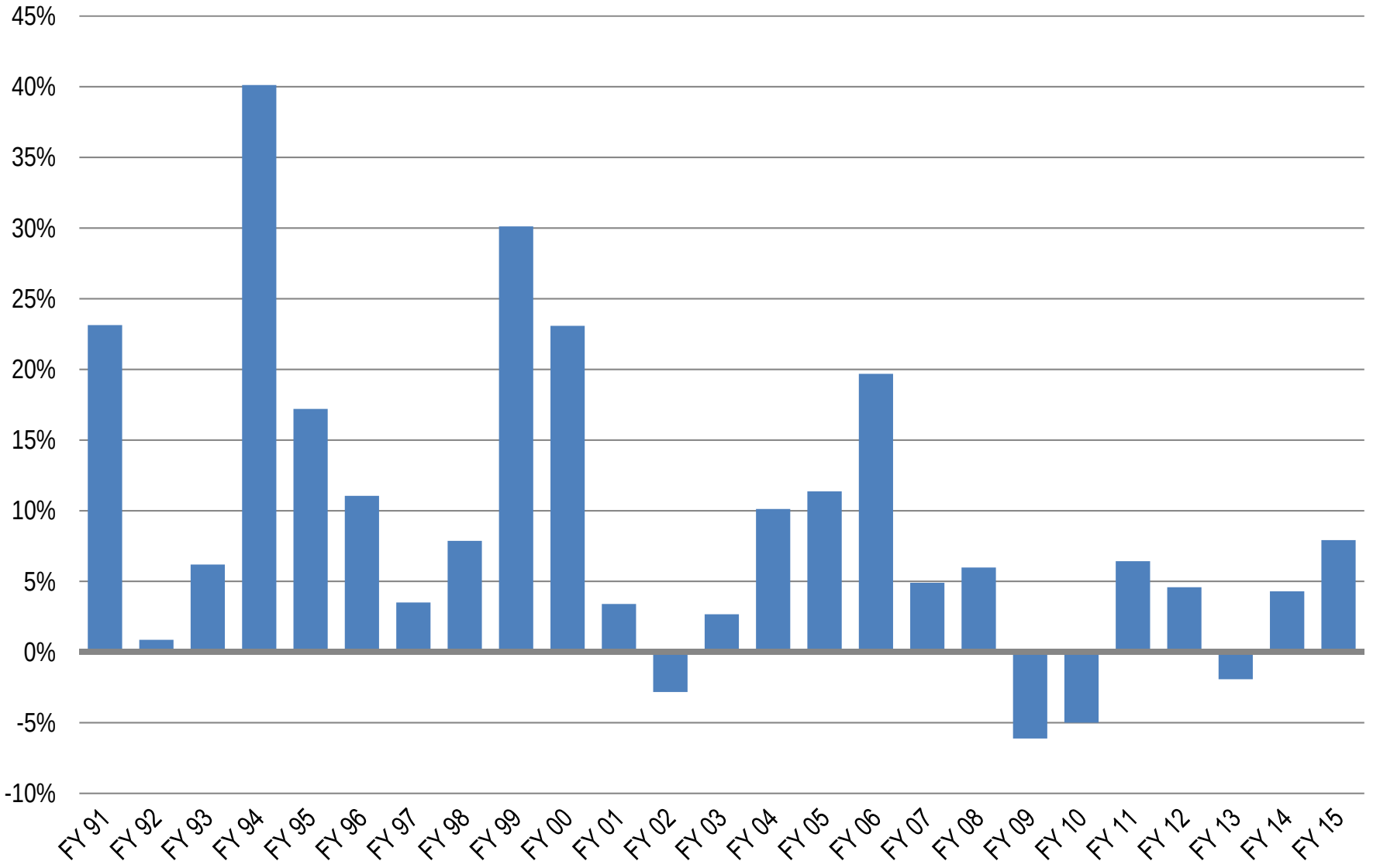
Las Vegas Strip Other Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

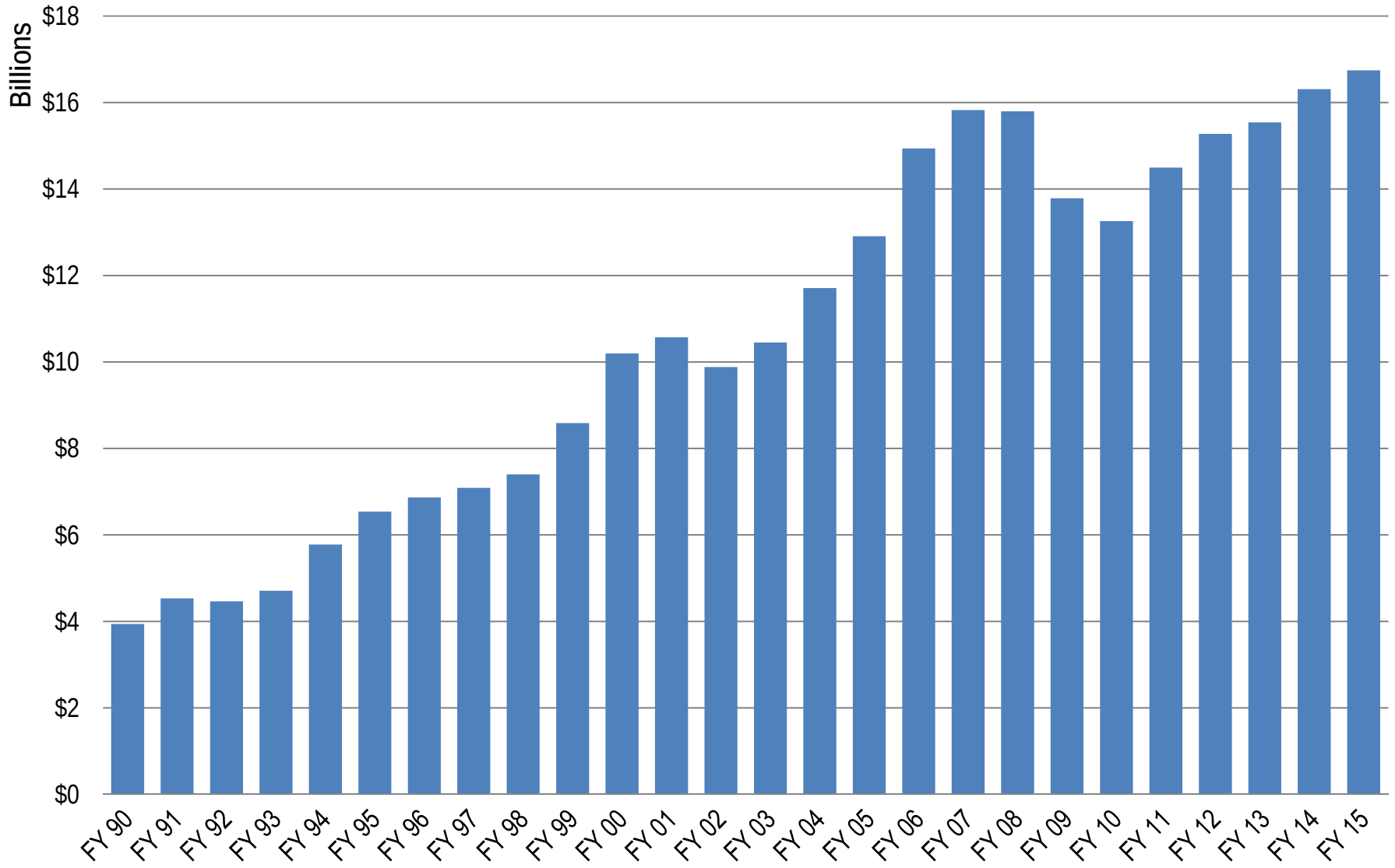
Las Vegas Strip Other Revenues

Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

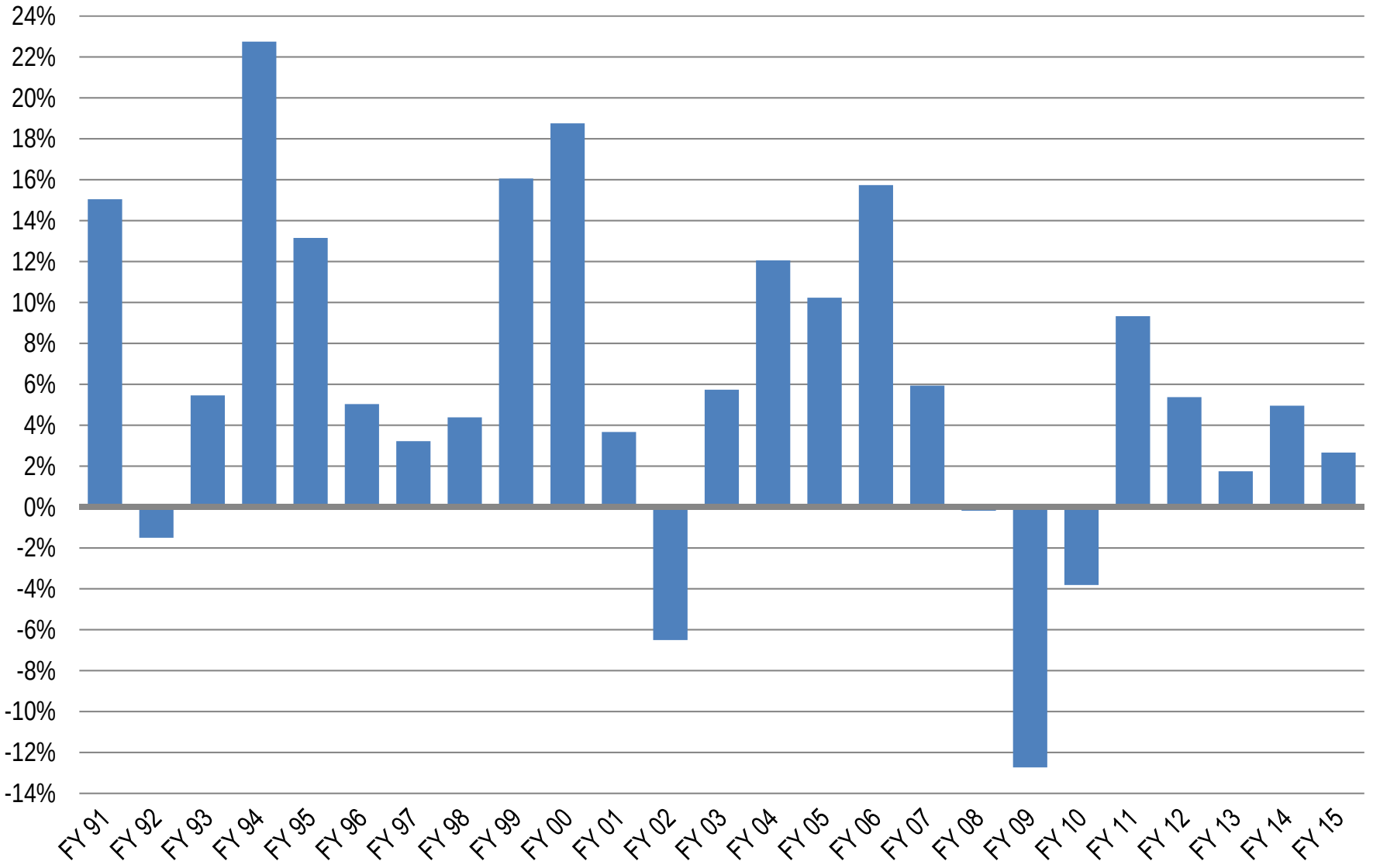
Las Vegas Strip Total Revenues
Reported in the Nevada GCB Abstract Reports



APPLIED ANALYSIS

Las Vegas Strip Total Revenues

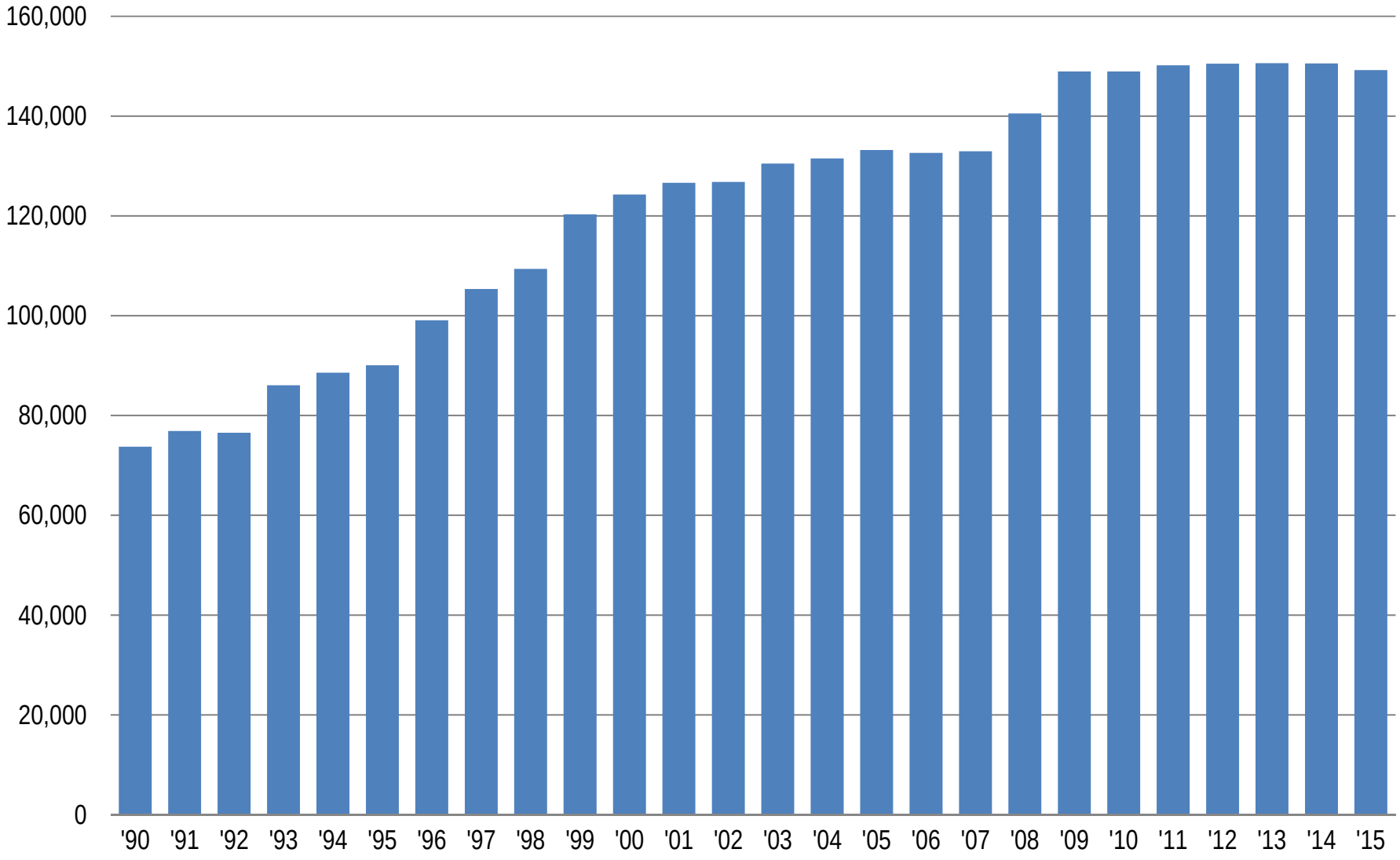
Reported in the Nevada GCB Abstract Reports | Annual Growth Rates



APPLIED ANALYSIS

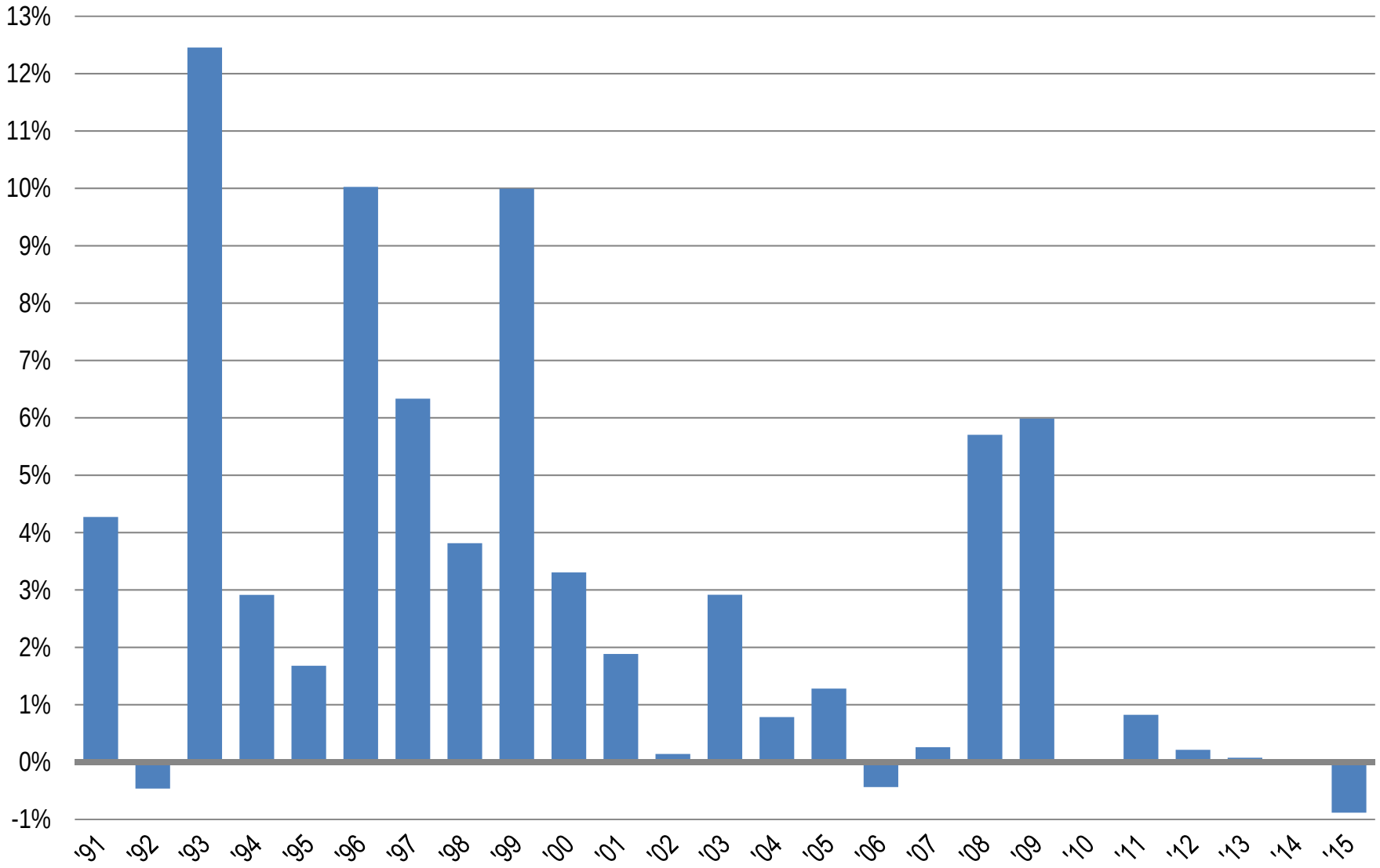
Las Vegas Hotel/Motel Room Inventory

Annual Series



APPLIED ANALYSIS

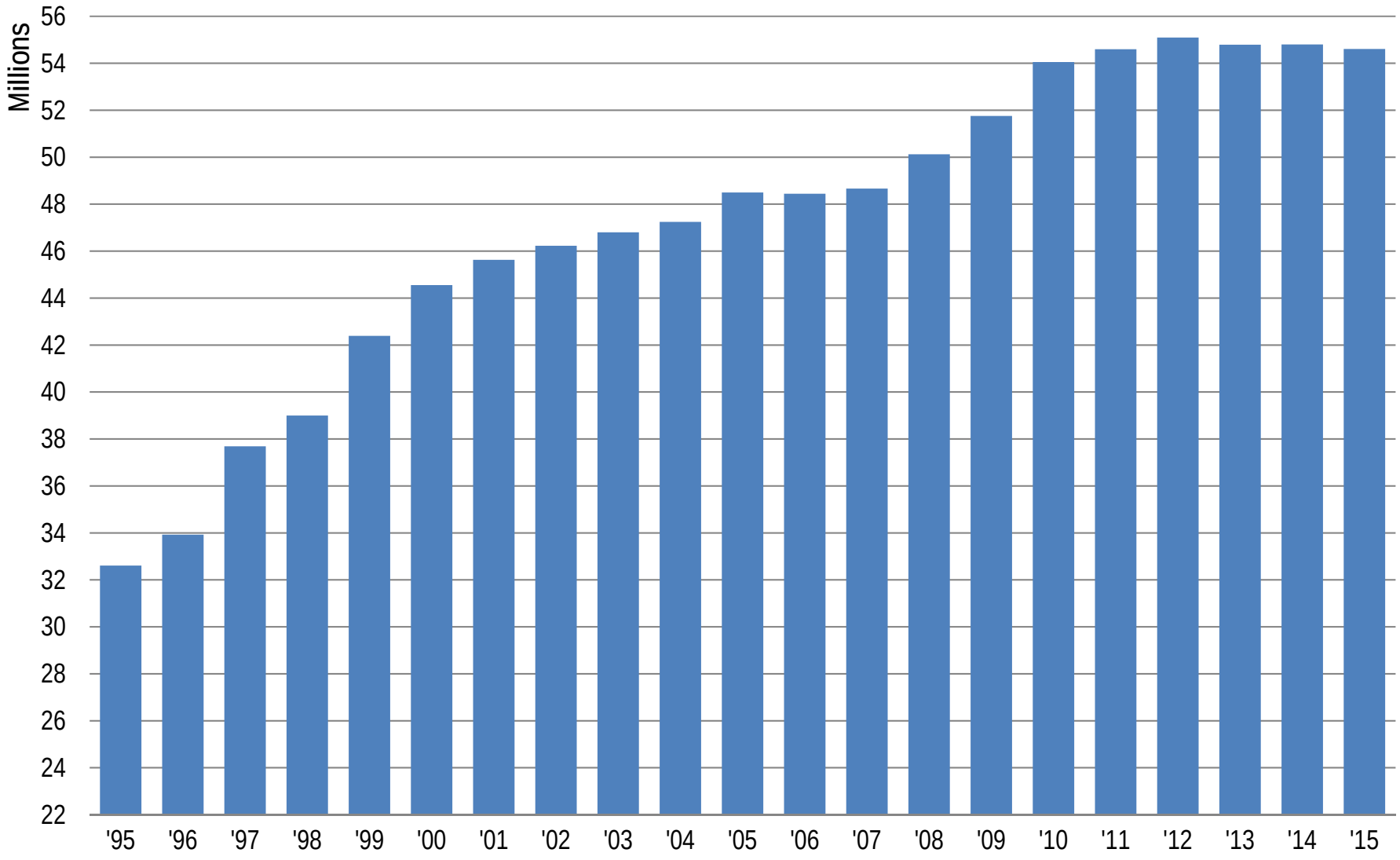
Las Vegas Hotel/Motel Inventory
Annual Growth Rates



APPLIED ANALYSIS

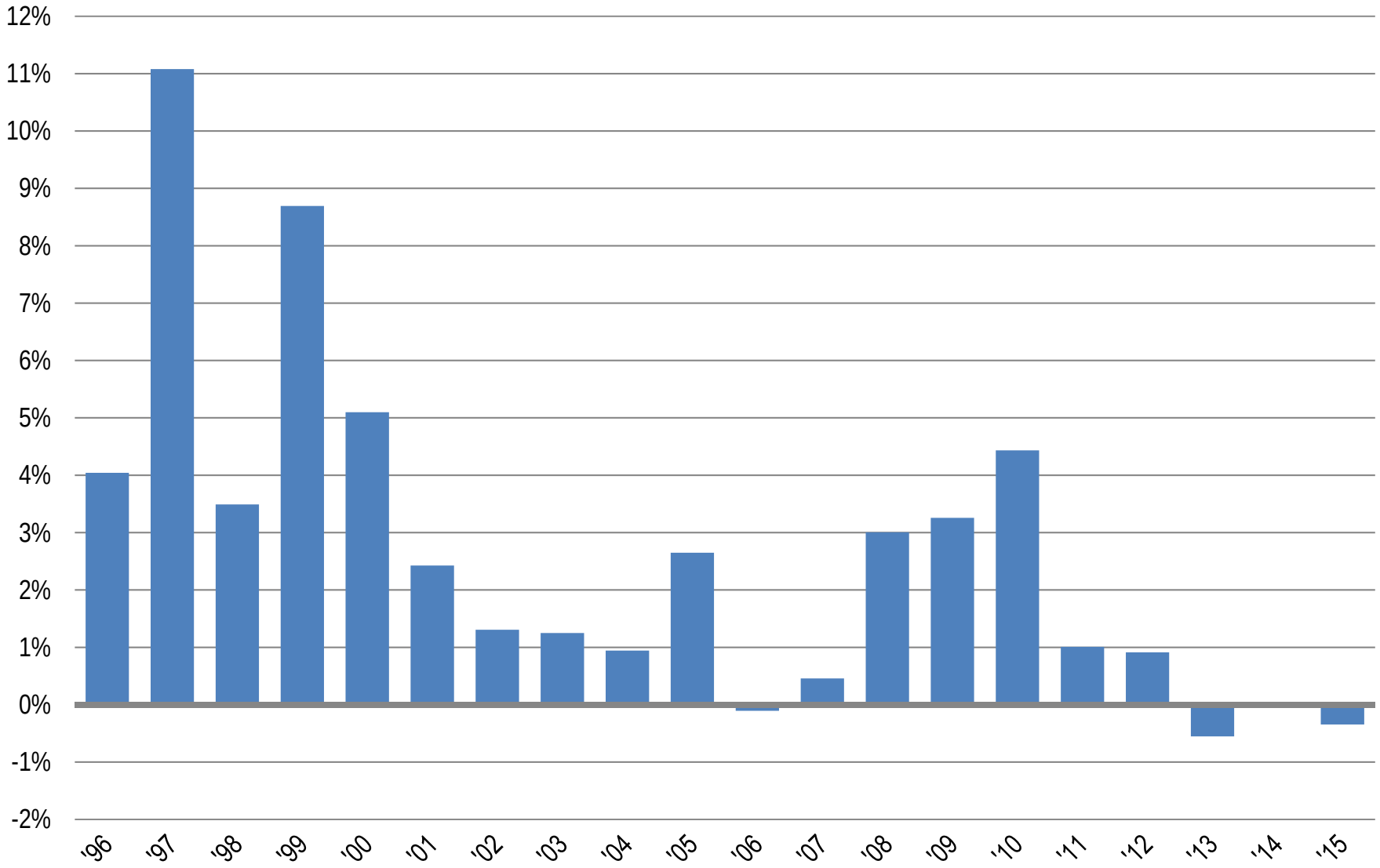
Las Vegas Room Nights Available

Annual Series



APPLIED ANALYSIS

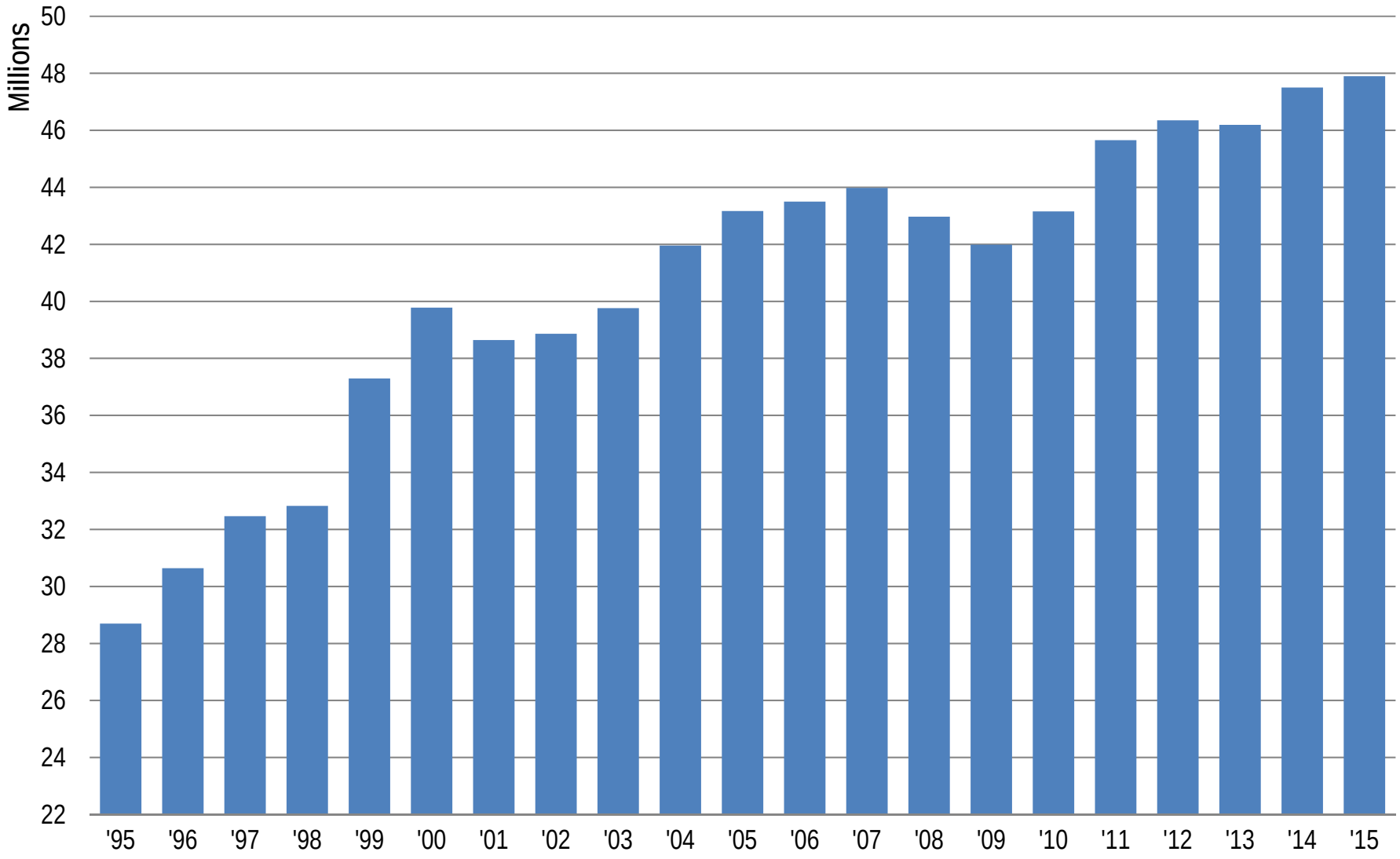
Las Vegas Room Nights Available
Annual Growth Rates



APPLIED ANALYSIS

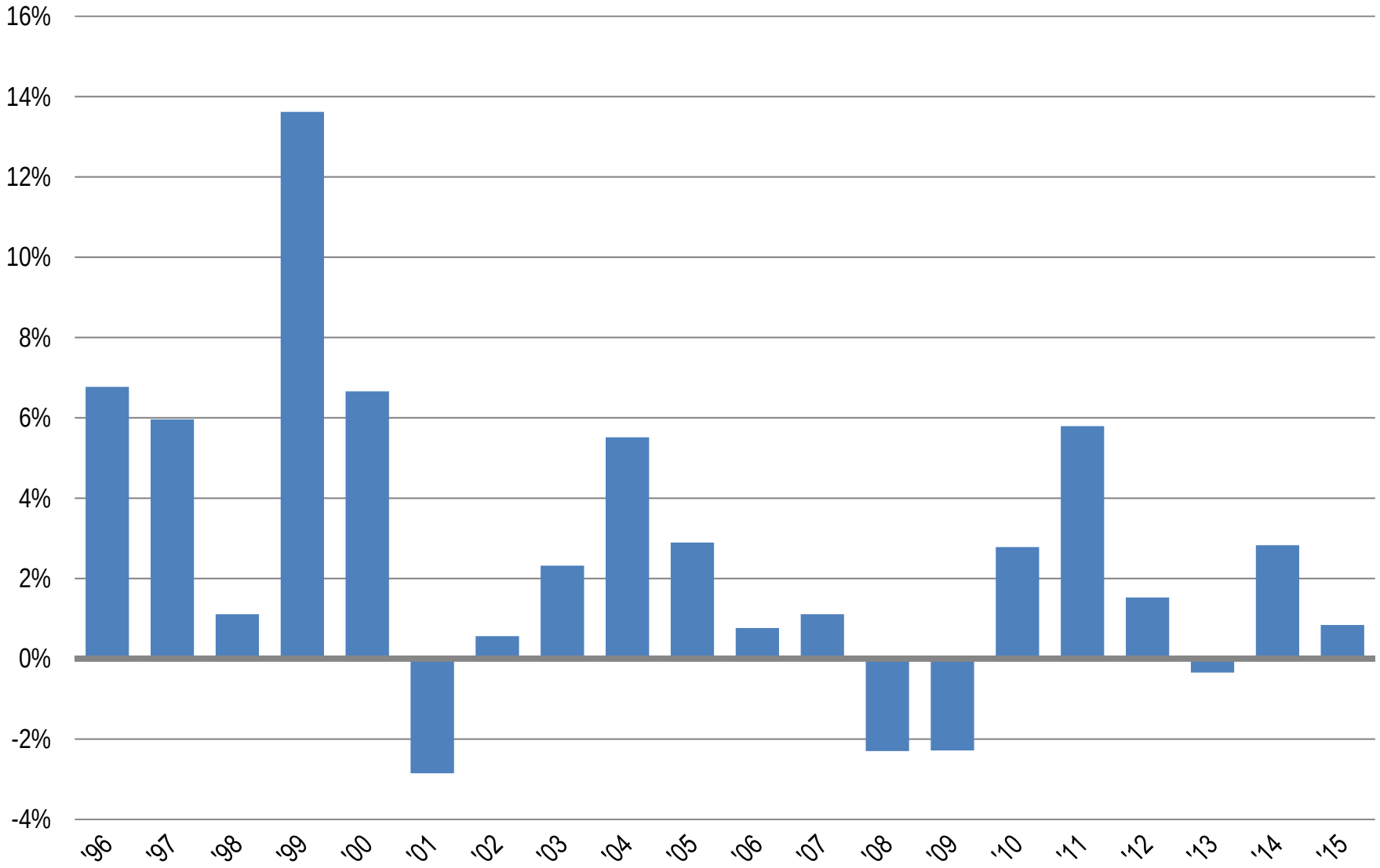
Las Vegas Room Nights Occupied

Annual Series



APPLIED ANALYSIS

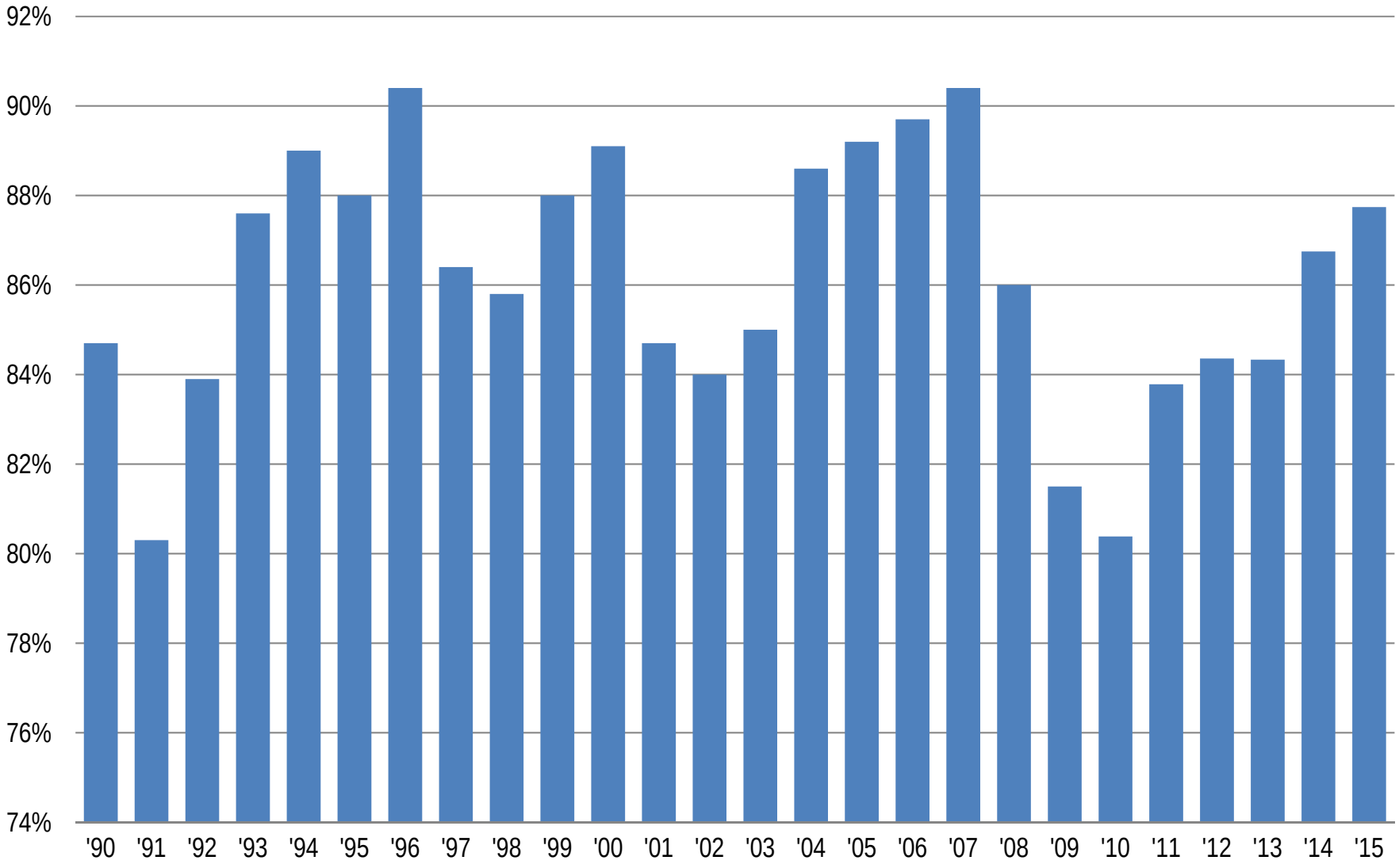
Las Vegas Room Nights Occupied
Annual Growth Rates



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Citywide

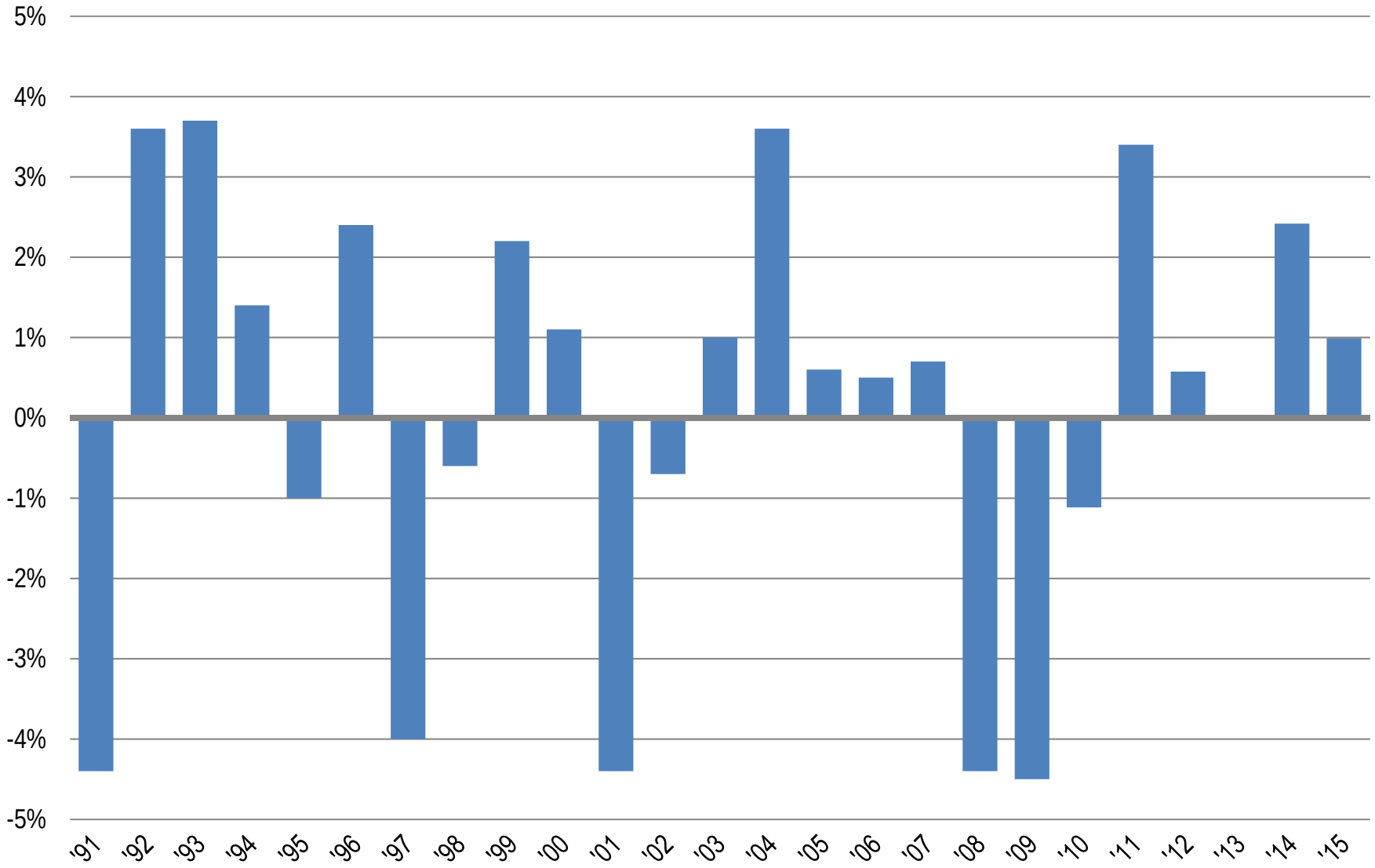
Annual Series



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Citywide

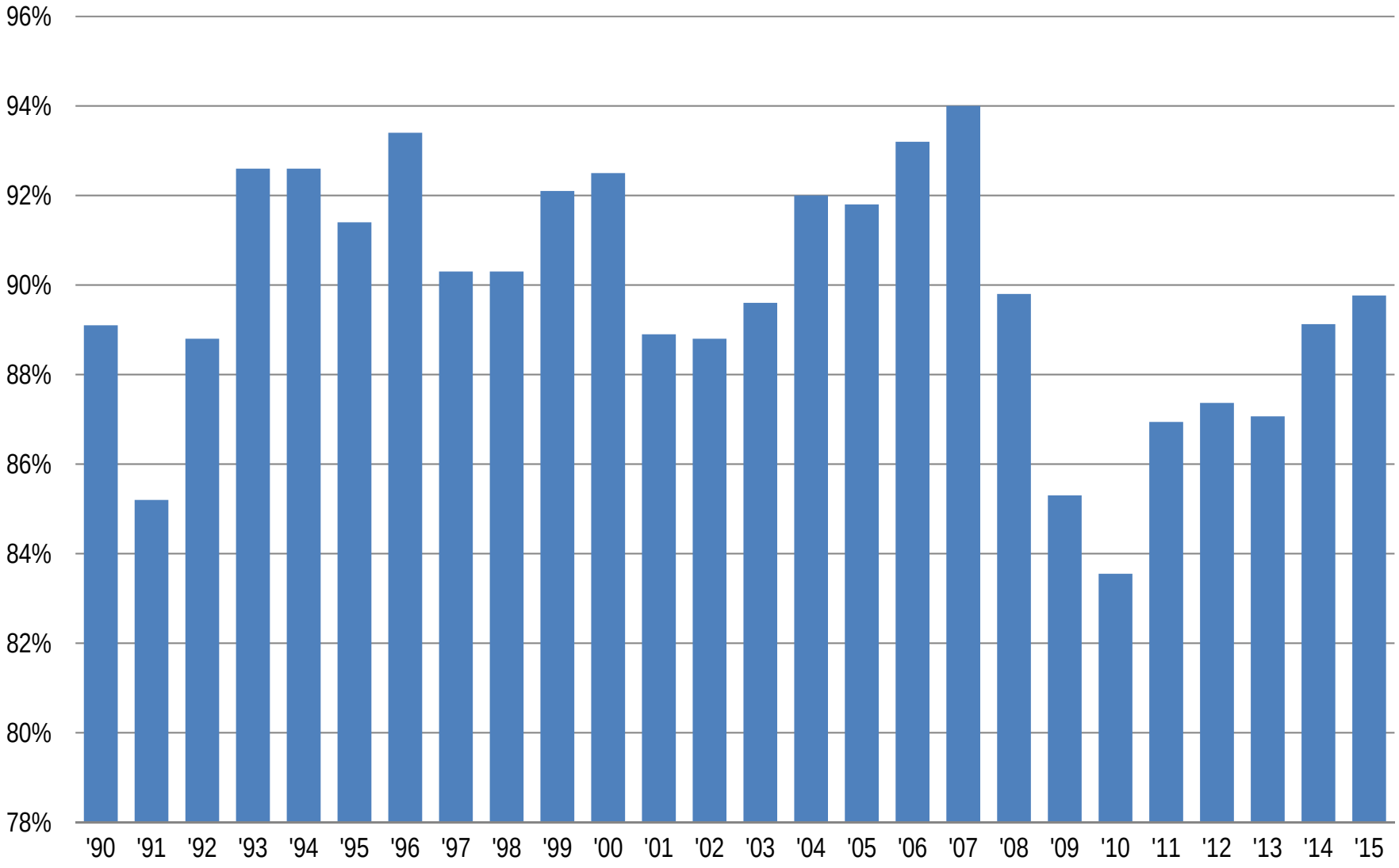
Annual Growth Rates



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Hotels

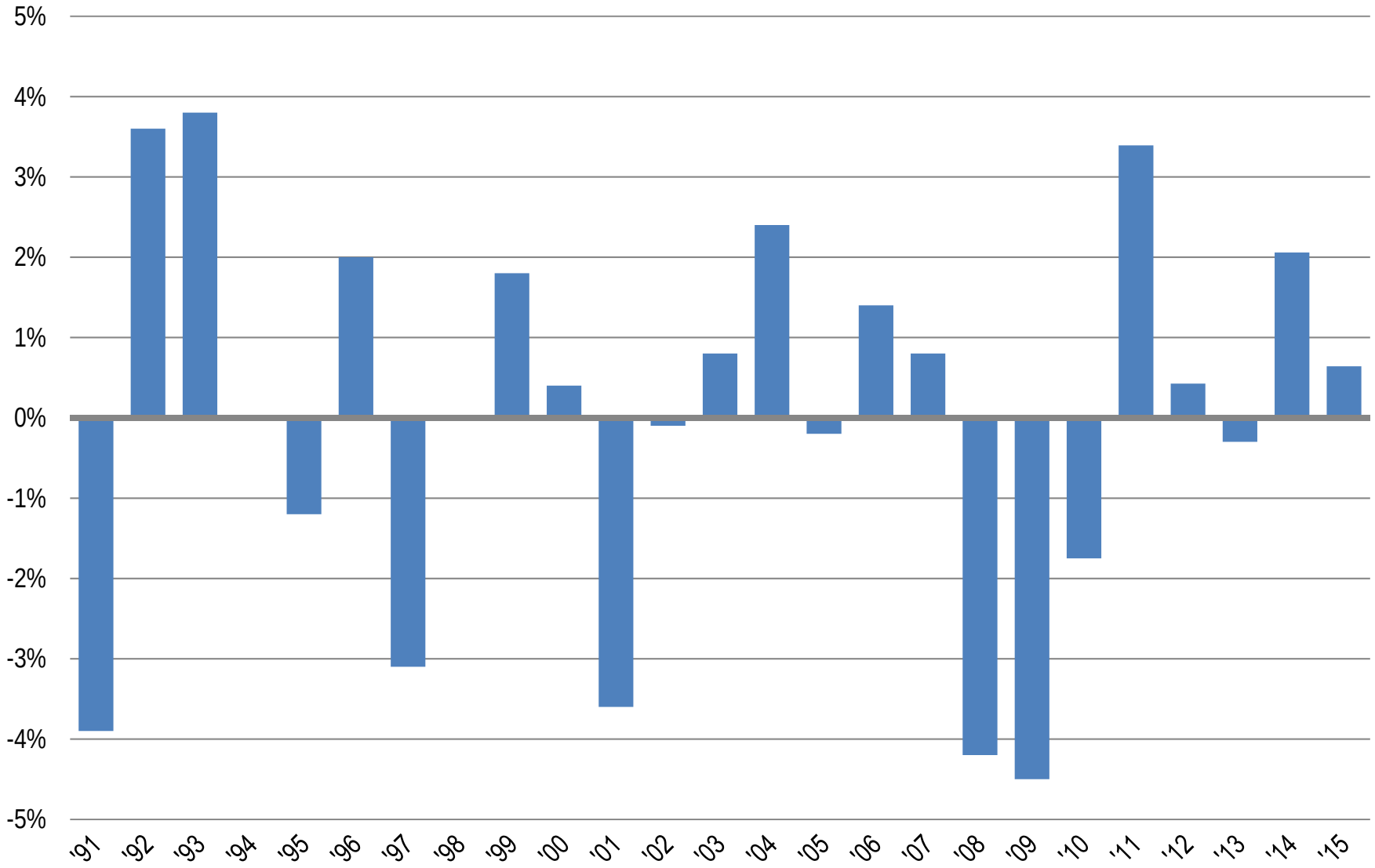
Annual Series



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Hotels

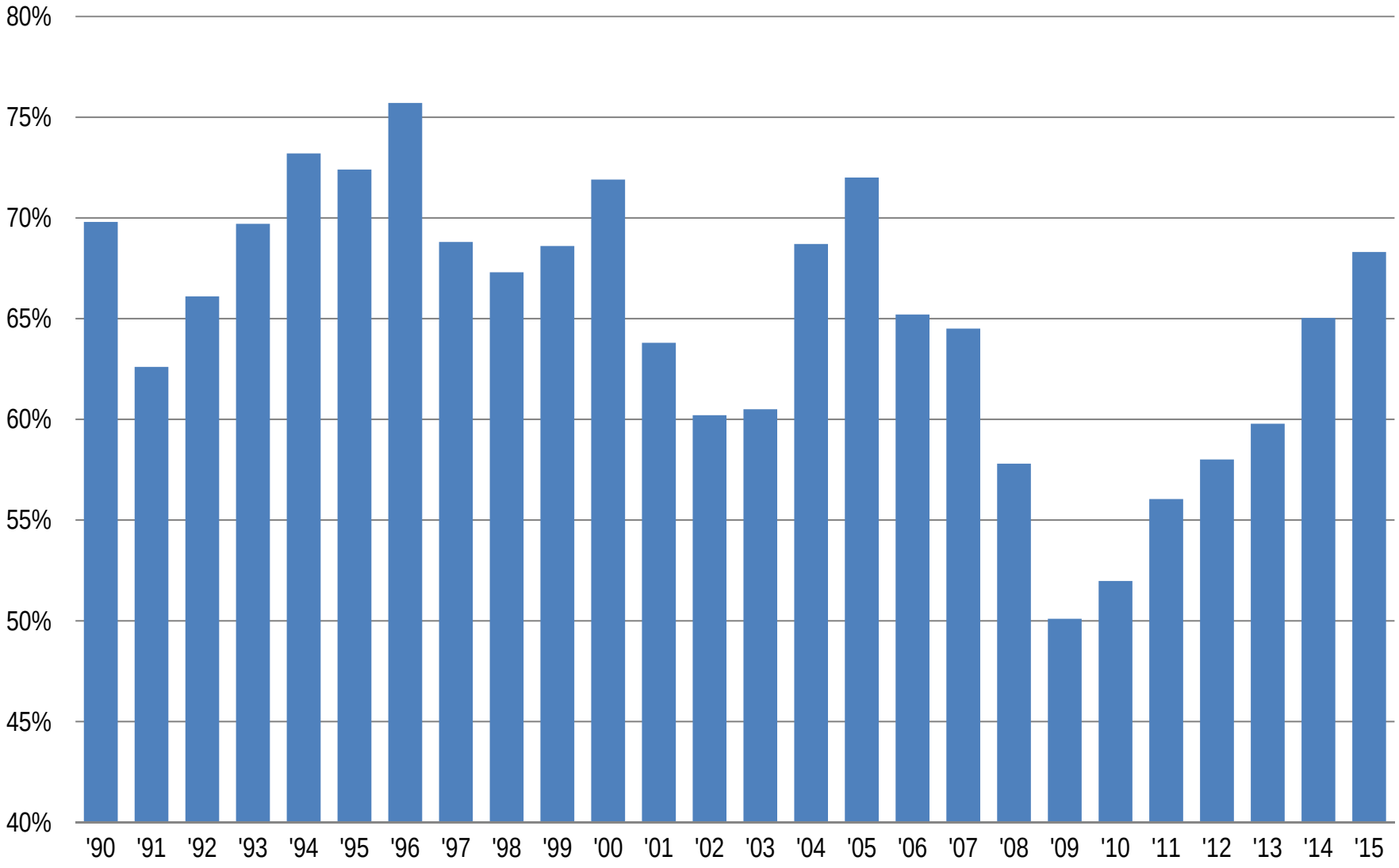
Annual Growth Rates



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Motels

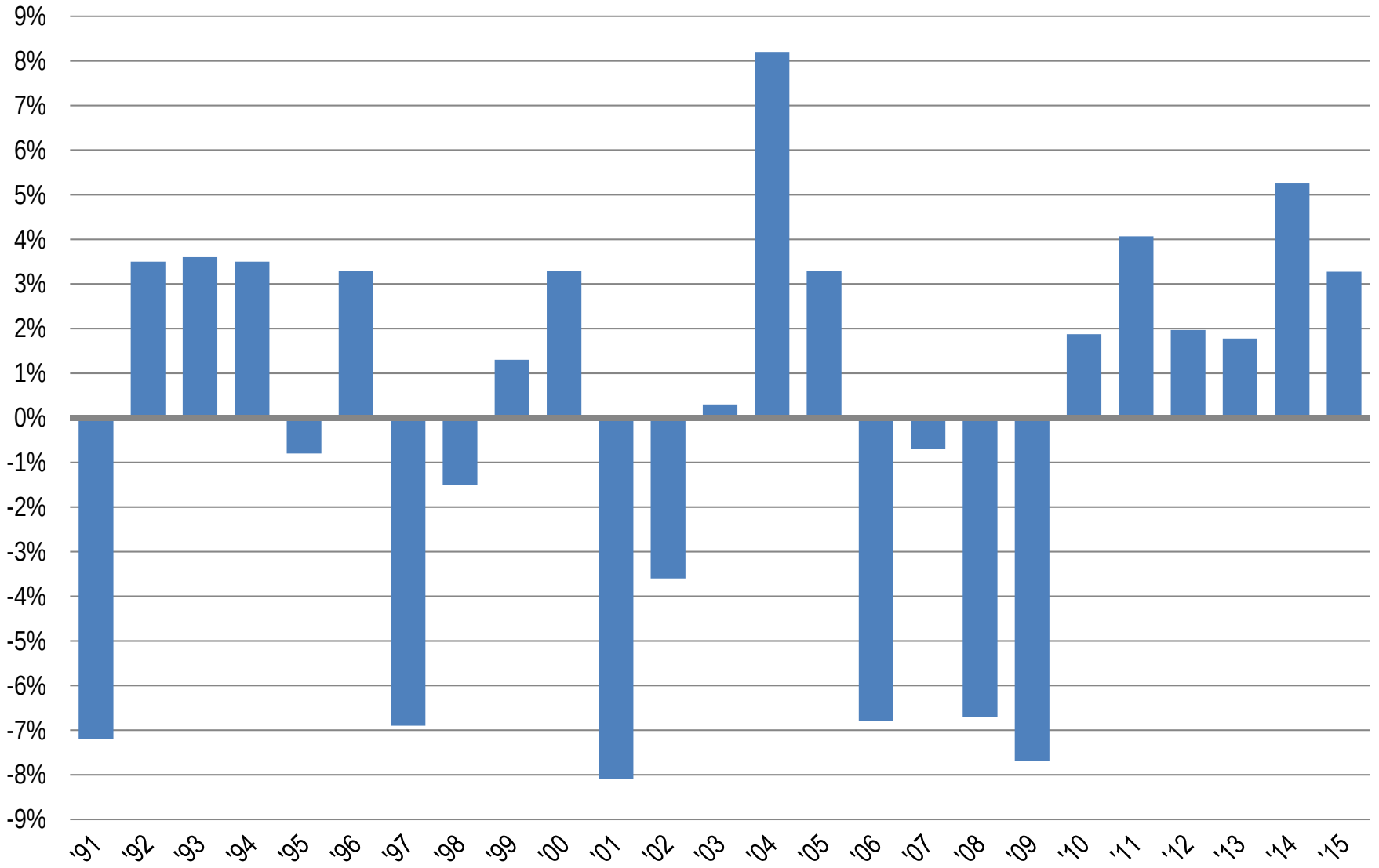
Annual Series



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Motels

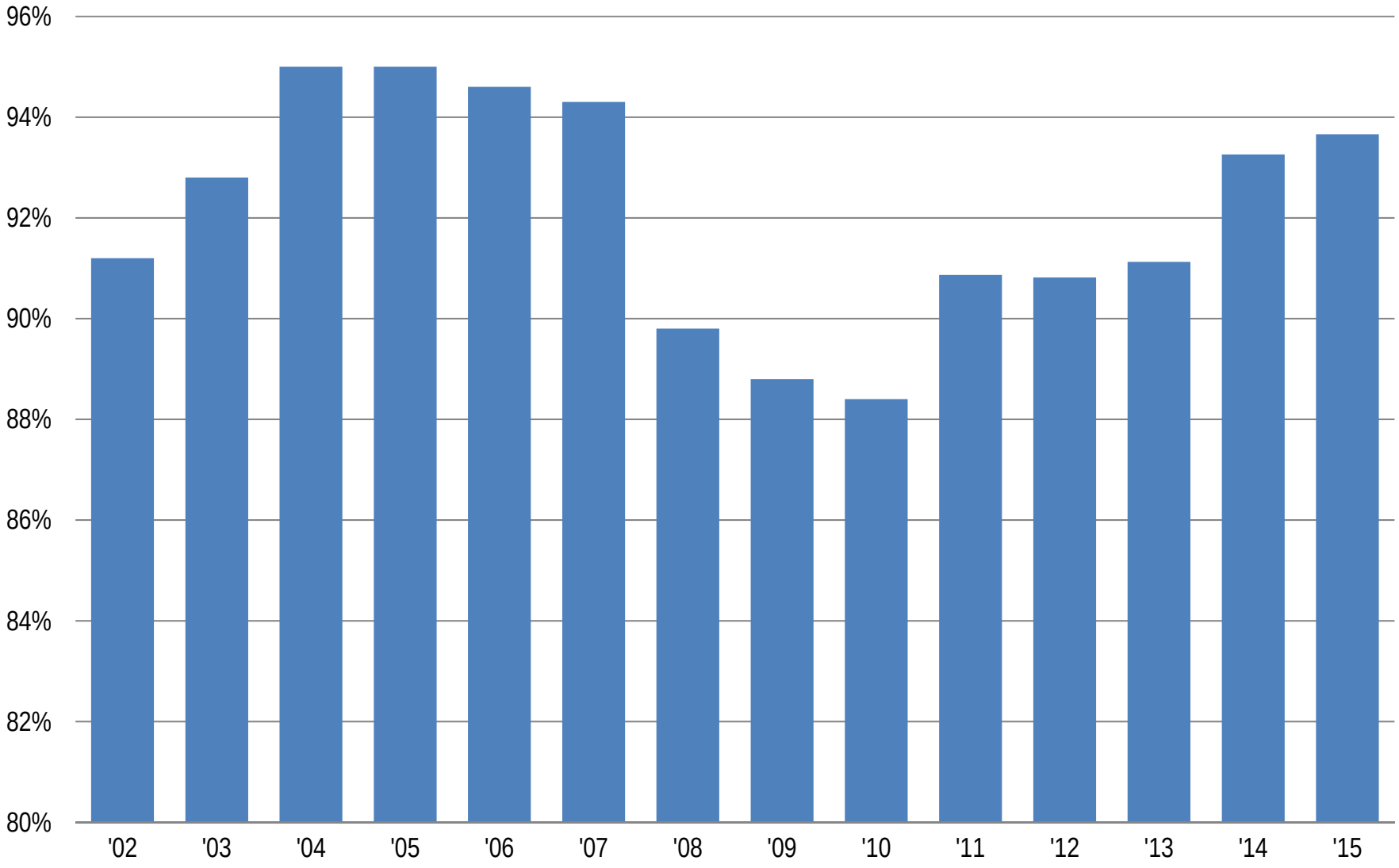
Annual Growth Rates



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Weekends

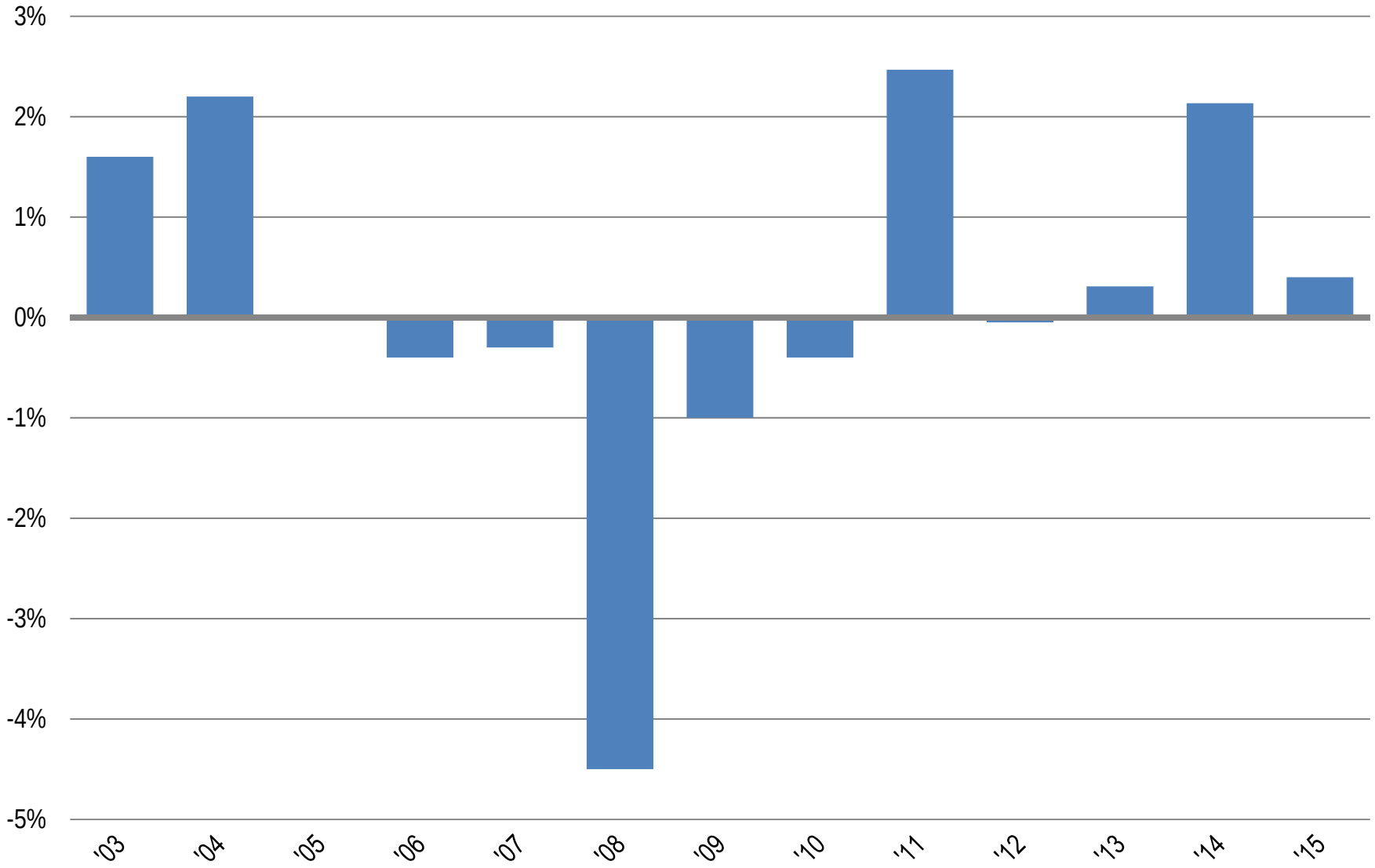
Annual Series



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Weekends

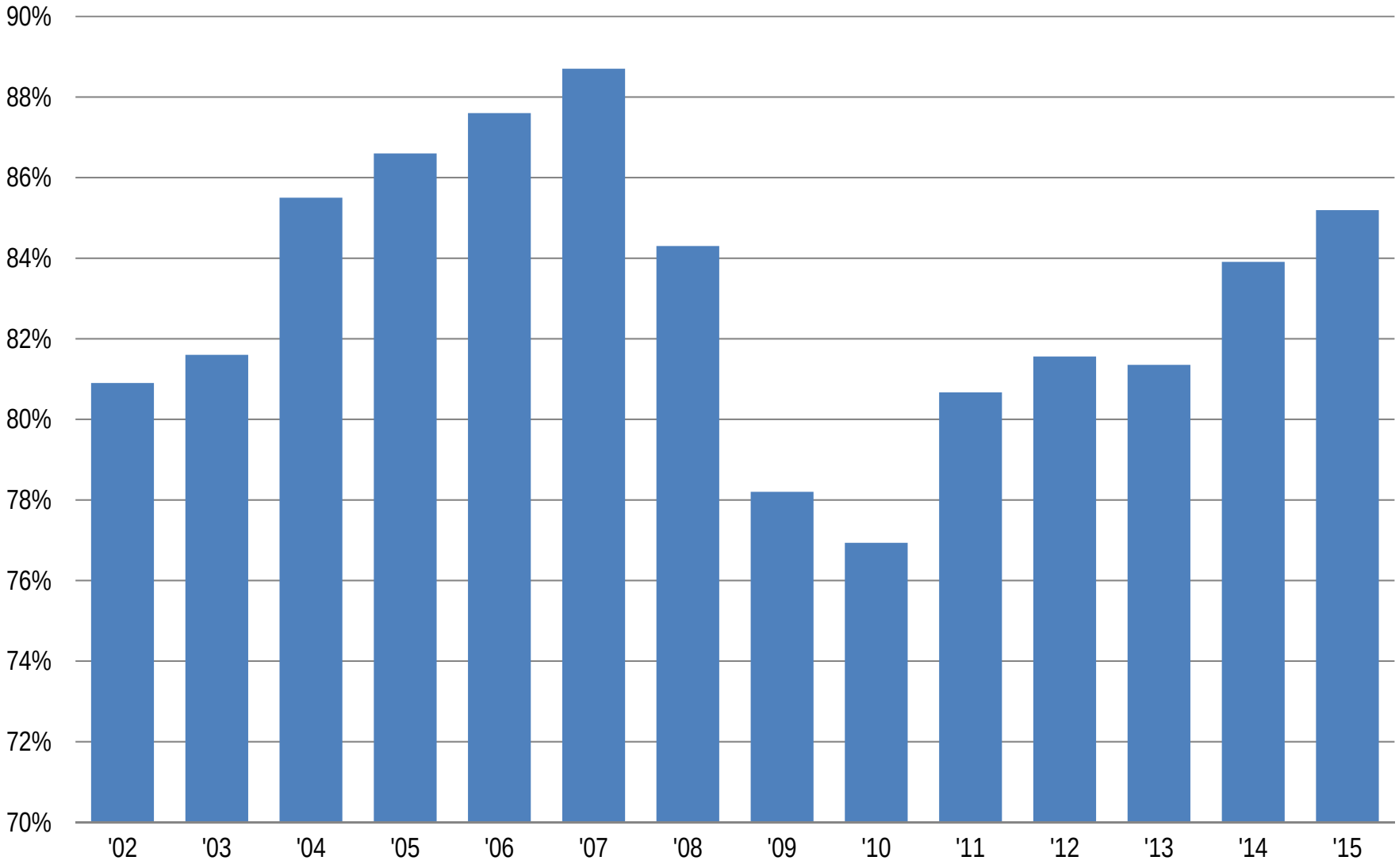
Annual Growth Rates



APPLIED ANALYSIS

Las Vegas Occupancy Rates - Midweek

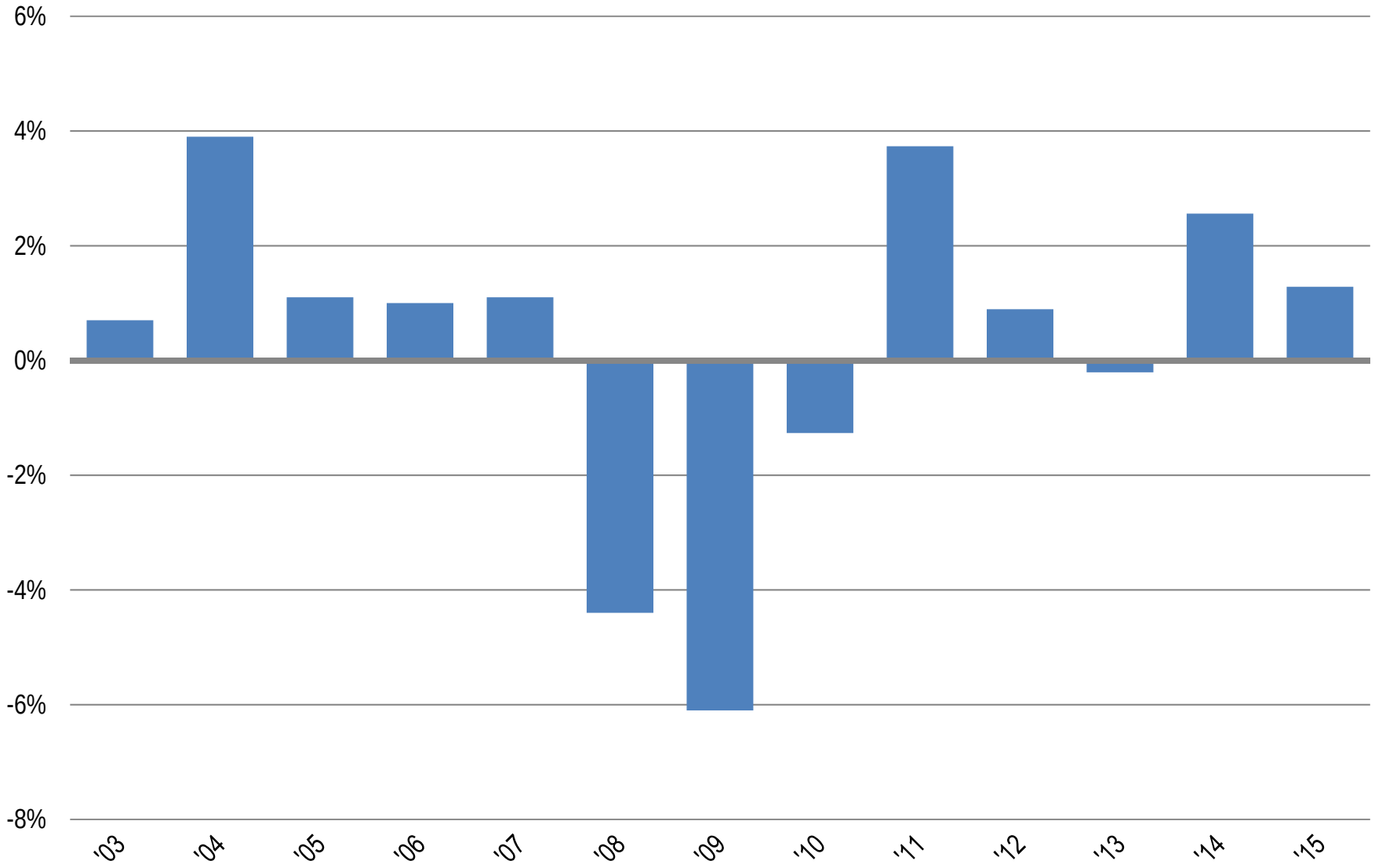
Annual Series



APPLIED ANALYSIS

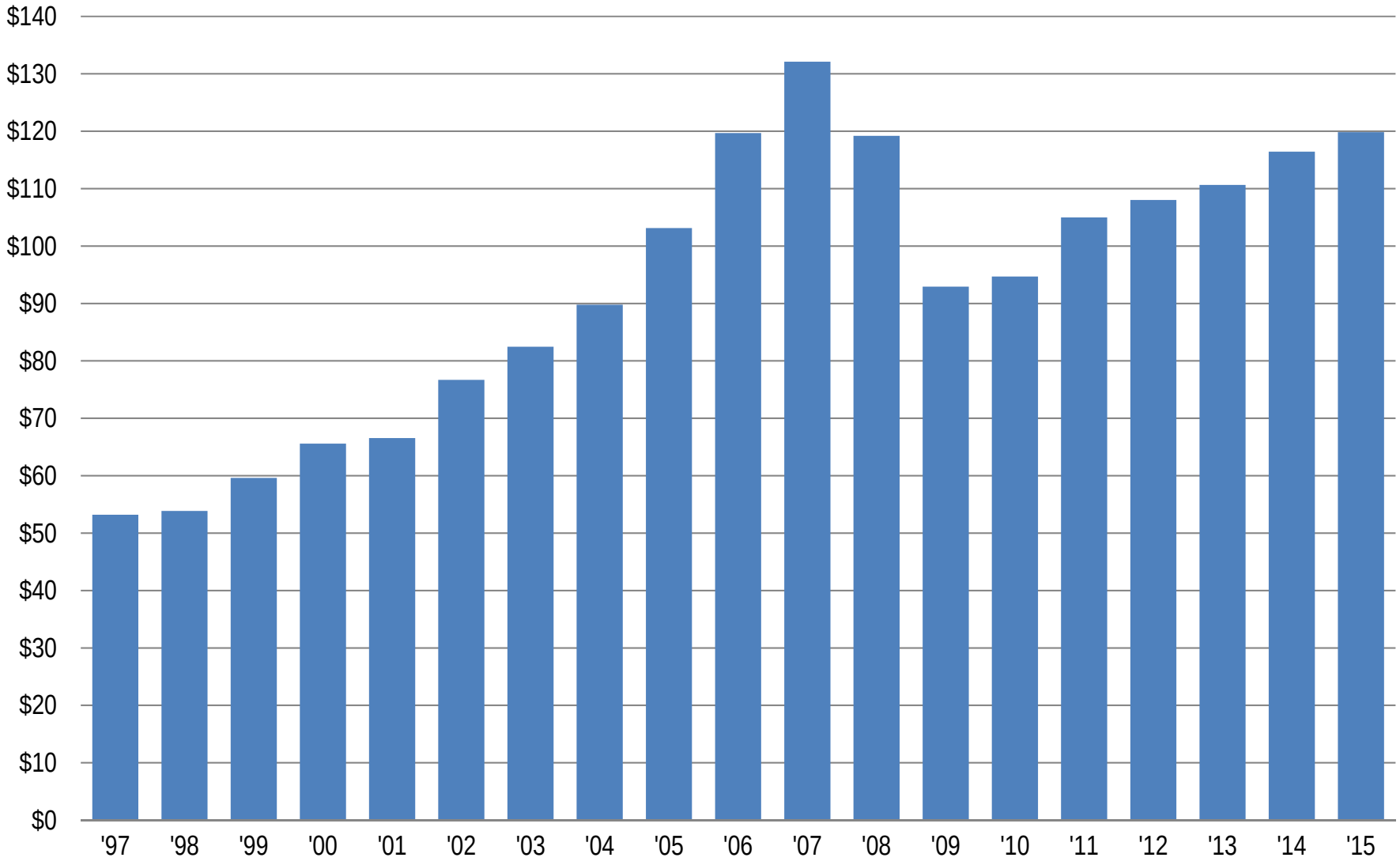
Las Vegas Occupancy Rates - Midweek

Annual Growth Rates



APPLIED ANALYSIS

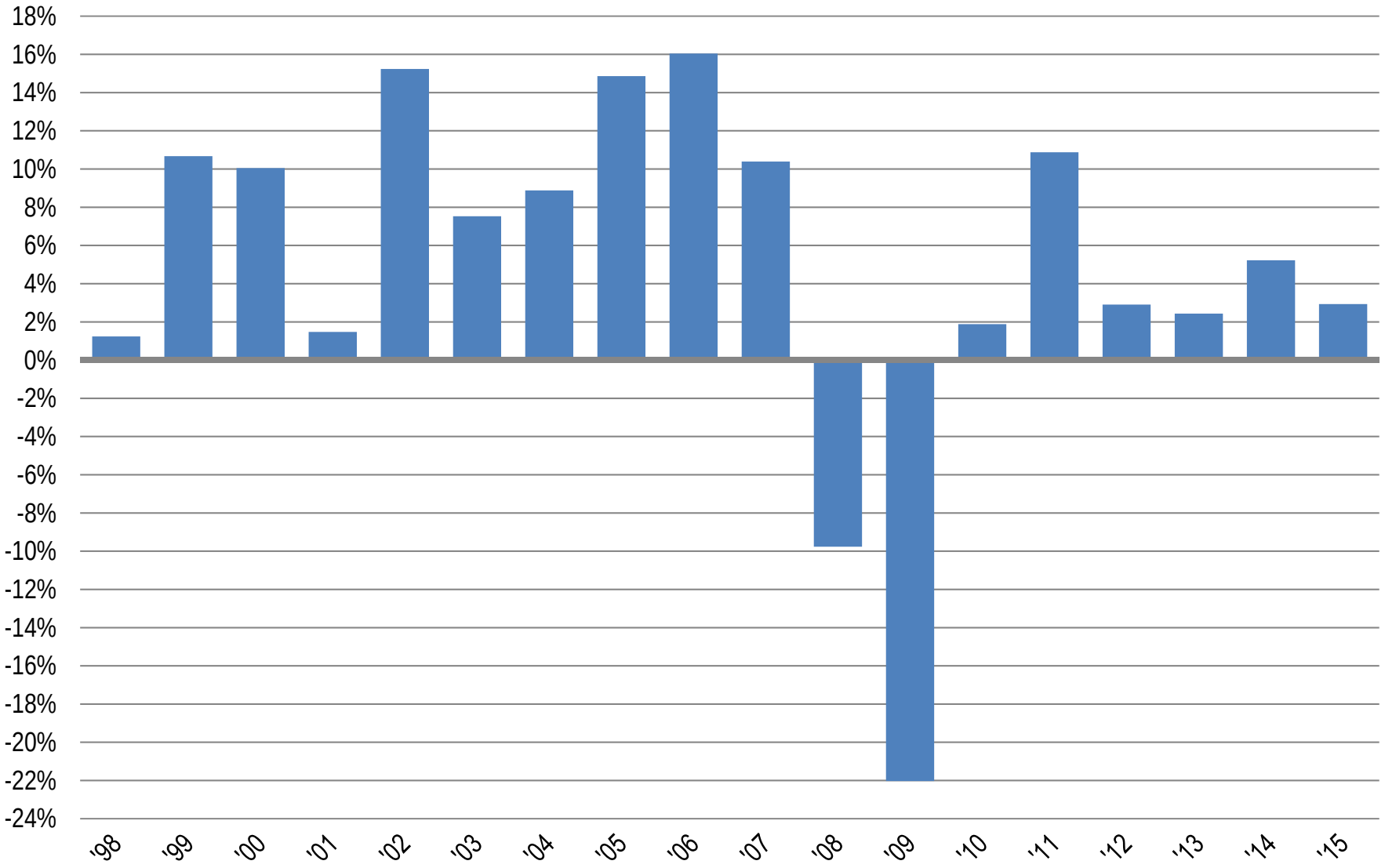
Las Vegas Average Daily Room Rates
Annual Series



APPLIED ANALYSIS

Las Vegas Average Daily Room Rates

Annual Growth Rates



APPLIED ANALYSIS

Steer Davies Gleave
Projection Model: Demand Projection
CONSERVATIVE SCENARIO

Exhibit B-1
Conservative Scenario: Demand Projection

	2000 Historical	2001 Historical	2002 Historical	2003 Historical	2004 Historical	2005 Historical	2006 Historical	2007 Historical	2008 Historical	2009 Historical	2010 Historical	2011 Historical	2012 Historical	2013 Historical
Visitor Volume														
Values														
Las Vegas - Convention	3,853,363	5,014,241	5,105,450	5,657,796	5,724,864	6,166,194	6,307,961	6,209,253	5,899,725	4,492,275	4,521,067	4,850,272	4,944,014	5,107,416
Las Vegas - Non-Convention (Leisure)	31,996,328	30,003,076	29,966,054	29,882,330	31,663,917	32,400,523	32,606,928	32,987,508	31,581,827	31,859,194	32,680,375	34,078,436	34,783,008	34,560,805
Total Las Vegas	35,849,691	35,017,317	35,071,504	35,540,126	37,388,781	38,566,717	38,914,889	39,196,761	37,481,552	36,351,469	37,201,442	38,928,708	39,727,022	39,668,221
Convention Visitors as a Share of Total	10.7%	14.3%	14.6%	15.9%	15.3%	16.0%	16.2%	15.8%	15.7%	12.4%	12.2%	12.5%	12.4%	12.9%
Non-Convention Visitors as a Share of Total	89.3%	85.7%	85.4%	84.1%	84.7%	84.0%	83.8%	84.2%	84.3%	87.6%	87.8%	87.5%	87.6%	87.1%
Annual Growth Rates														
Las Vegas - Convention	2.1%	30.1%	1.8%	10.8%	1.2%	7.7%	2.3%	-1.6%	-5.0%	-23.9%	0.6%	7.3%	1.9%	3.3%
Las Vegas - Non-Convention (Leisure)	6.5%	-6.2%	-0.1%	-0.3%	6.0%	2.3%	0.6%	1.2%	-4.3%	0.9%	2.6%	4.3%	2.1%	-0.6%
Total Las Vegas	6.0%	-2.3%	0.2%	1.3%	5.2%	3.2%	0.9%	0.7%	-4.4%	-3.0%	2.3%	4.6%	2.1%	-0.1%
Travel Measures														
Traffic Counts:														
I-15 at NV/CA Border	37,707	37,809	37,868	38,074	38,799	39,649	40,383	39,808	37,686	39,199	40,082	40,344	41,712	42,485
All Major Highways, Excluding I-15 at Border	32,586	35,163	40,537	39,722	43,122	45,895	46,578	46,893	44,407	44,916	46,578	59,500	58,334	59,759
All Major Highways	70,294	72,973	78,405	77,796	81,921	85,544	86,961	86,701	82,093	84,115	86,661	99,844	100,046	102,244
I-15 at NV/CA Border Share	53.6%	51.8%	48.3%	48.9%	47.4%	46.3%	46.4%	45.9%	45.9%	46.6%	46.3%	40.4%	41.7%	41.6%
All Major Highways, Excluding I-15 Share	46.4%	48.2%	51.7%	51.1%	52.6%	53.7%	53.6%	54.1%	54.1%	53.4%	53.7%	59.6%	58.3%	58.4%
Visitor Arrivals by Ground Transportation:														
Visitors Arriving by Ground via I-15	10,384,636	9,434,684	9,485,726	9,566,479	9,385,186	9,473,962	9,758,531	9,718,316	9,807,691	9,825,380	10,151,803	8,808,794	9,441,158	9,560,251
Visitors Arriving by Ground via Other Highways	8,974,197	8,774,321	10,154,316	9,980,591	10,430,867	10,966,398	11,255,509	11,447,935	11,556,794	11,258,472	11,797,048	12,991,283	13,203,245	13,447,317
Visitors Arriving by Ground Transportation	19,358,833	18,209,005	19,640,042	19,547,069	19,816,054	20,440,360	21,014,040	21,166,251	21,364,485	21,083,852	21,948,851	21,800,076	22,644,403	23,007,568
Share of Total Visitors Arriving via I-15	29.0%	26.9%	27.0%	26.9%	25.1%	24.6%	25.1%	24.8%	26.2%	27.0%	27.3%	22.6%	23.8%	24.1%
Share of Total Visitors Arriving via Other Highways	25.0%	25.1%	29.0%	28.1%	27.9%	28.4%	28.9%	29.2%	30.8%	31.0%	31.7%	33.4%	33.2%	33.9%
Share of Total Visitors Arriving by Ground Transport	54.0%	52.0%	56.0%	55.0%	53.0%	53.0%	54.0%	54.0%	57.0%	58.0%	59.0%	56.0%	57.0%	58.0%
Air Transportation:														
En/Deplaned Passenger Counts - McCarran	36,865,866	35,179,960	35,009,011	36,265,932	41,441,531	44,267,370	46,304,376	47,729,527	44,074,642	40,469,012	39,810,277	41,481,204	41,667,596	41,857,059
Visitors Arriving by Air	16,490,858	16,808,312	15,431,462	15,993,057	17,572,727	18,126,357	17,900,849	18,030,510	16,117,067	15,267,617	15,252,591	17,128,632	17,082,619	16,660,653
Share of Visitors Arriving by Air	46.0%	48.0%	44.0%	45.0%	47.0%	47.0%	46.0%	46.0%	43.0%	42.0%	41.0%	44.0%	43.0%	42.0%
Annual Growth Rates														
I-15 at NV/CA Border	4.3%	0.3%	0.2%	0.5%	1.9%	2.2%	1.9%	-1.4%	-5.3%	4.0%	2.3%	0.7%	3.4%	1.9%
All Major Highways, Excluding I-15 at Border	-0.5%	7.9%	15.3%	-2.0%	8.6%	6.4%	1.5%	0.7%	-5.3%	1.1%	3.7%	27.7%	-2.0%	2.4%
En/Deplaned Passenger Counts - McCarran	9.3%	-4.6%	-0.5%	3.6%	14.3%	6.8%	4.6%	3.1%	-7.7%	-8.2%	-1.6%	4.2%	0.4%	0.5%
Hotel Performance Measures														
Hotel Inventory	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593
Hotel Room Nights Available	44,642,287	45,622,632	46,261,444	46,777,335	47,351,027	48,392,570	48,490,787	48,649,041	49,961,921	51,516,729	53,685,406	54,490,748	54,944,854	54,772,469
Hotel Room Nights Occupied	39,776,278	38,642,369	38,859,613	39,760,735	41,953,010	43,166,172	43,496,236	43,978,733	42,967,252	41,986,134	43,154,119	45,654,165	46,350,563	46,191,449
Ratio - Visitors per Room Night Occupied	0.90	0.91	0.90	0.89	0.89	0.89	0.89	0.89	0.87	0.87	0.86	0.85	0.86	0.86
Total Hotel/Motel Occupancy Rate	89.1%	84.7%	84.0%	85.0%	88.6%	89.2%	89.7%	90.4%	86.0%	81.5%	80.4%	83.8%	84.4%	84.3%

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APPLIED ANALYSIS

	2014 Historical	2015 Historical	2016 Projected	2017 Projected	2018 Projected	2019 Projected	2020 Projected	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
Visitor Volume														
Values														
Las Vegas - Convention	5,194,580	5,710,303	5,938,715	6,045,612	6,130,251	6,191,553	6,237,990	6,275,418	6,300,519	6,319,421	6,338,379	6,357,394	6,376,466	6,395,596
Las Vegas - Non-Convention (Leisure)	35,931,932	36,601,913	36,733,155	36,796,945	36,864,398	36,937,346	37,008,064	37,071,423	37,131,456	37,182,733	37,234,067	37,285,457	37,336,904	37,388,408
Total Las Vegas	41,126,512	42,312,216	42,671,870	42,842,557	42,994,648	43,128,899	43,246,053	43,346,841	43,431,975	43,502,154	43,572,446	43,642,851	43,713,371	43,784,004
Convention Visitors as a Share of Total	12.6%	13.5%	13.9%	14.1%	14.3%	14.4%	14.4%	14.5%	14.5%	14.5%	14.5%	14.6%	14.6%	14.6%
Non-Convention Visitors as a Share of Total	87.4%	86.5%	86.1%	85.9%	85.7%	85.6%	85.6%	85.5%	85.5%	85.5%	85.5%	85.4%	85.4%	85.4%
Annual Growth Rates														
Las Vegas - Convention	1.7%	9.9%	4.0%	1.8%	1.4%	1.0%	0.8%	0.6%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%
Las Vegas - Non-Convention (Leisure)	4.0%	1.9%	0.4%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
Total Las Vegas	3.7%	2.9%	0.9%	0.4%	0.4%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Travel Measures														
Traffic Counts:														
I-15 at NV/CA Border	42,318	44,419	44,765	44,910	45,034	45,138	45,223	45,288	45,336	45,366	45,602	45,839	46,076	46,314
All Major Highways, Excluding I-15 at Border	60,406	64,785	64,885	64,693	64,471	64,221	63,944	63,642	63,317	62,970	62,909	62,848	62,786	62,724
All Major Highways	102,725	109,204	109,649	109,603	109,505	109,359	109,167	108,930	108,653	108,336	108,511	108,686	108,862	109,038
I-15 at NV/CA Border Share	41.2%	40.7%	40.8%	41.0%	41.1%	41.3%	41.4%	41.6%	41.7%	41.9%	42.0%	42.2%	42.3%	42.5%
All Major Highways, Excluding I-15 Share	58.8%	59.3%	59.2%	59.0%	58.9%	58.7%	58.6%	58.4%	58.3%	58.1%	58.0%	57.8%	57.7%	57.5%
Visitor Arrivals by Ground Transportation:														
Visitors Arriving by Ground via I-15	9,826,609	9,810,045	9,886,363	9,918,491	9,945,935	9,968,878	9,987,496	10,001,968	10,012,464	10,019,153	10,071,289	10,123,568	10,175,990	10,228,554
Visitors Arriving by Ground via Other Highways	14,026,768	14,307,918	14,329,923	14,287,554	14,238,554	14,183,306	14,122,178	14,055,529	13,983,703	13,907,032	13,893,556	13,880,000	13,866,364	13,852,648
Visitors Arriving by Ground Transportation	23,853,377	24,117,963	24,216,286	24,206,045	24,184,490	24,152,184	24,109,675	24,057,497	23,996,166	23,926,185	23,964,845	24,003,568	24,042,354	24,081,202
Share of Total Visitors Arriving via I-15	23.9%	23.2%	23.4%	23.7%	23.9%	24.2%	24.4%	24.7%	24.9%	25.2%	25.4%	25.4%	25.4%	25.4%
Share of Total Visitors Arriving via Other Highways	34.1%	33.8%	33.3%	32.8%	32.3%	31.8%	31.3%	30.8%	30.3%	29.8%	29.6%	29.6%	29.6%	29.6%
Share of Total Visitors Arriving by Ground Transport	58.0%	57.0%	56.8%	56.5%	56.3%	56.0%	55.8%	55.5%	55.3%	55.0%	55.0%	55.0%	55.0%	55.0%
Air Transportation:														
En/Deplaned Passenger Counts - McCarran	42,885,350	45,389,074	45,590,044	46,213,627	46,790,283	47,118,677	47,515,812	47,852,013	48,255,030	48,614,668	48,677,477	48,754,628	48,831,462	48,916,800
Visitors Arriving by Air	17,273,135	18,194,253	18,455,584	18,636,512	18,810,159	18,976,716	19,136,379	19,289,344	19,435,809	19,575,969	19,607,601	19,639,283	19,671,017	19,702,802
Share of Visitors Arriving by Air	42.0%	43.0%	43.3%	43.5%	43.8%	44.0%	44.3%	44.5%	44.8%	45.0%	45.0%	45.0%	45.0%	45.0%
Annual Growth Rates														
I-15 at NV/CA Border	-0.4%	5.0%	0.8%	0.3%	0.3%	0.2%	0.2%	0.1%	0.1%	0.1%	0.5%	0.5%	0.5%	0.5%
All Major Highways, Excluding I-15 at Border	1.1%	7.2%	0.2%	-0.3%	-0.3%	-0.4%	-0.4%	-0.5%	-0.5%	-0.5%	-0.1%	-0.1%	-0.1%	-0.1%
En/Deplaned Passenger Counts - McCarran	2.5%	5.8%	0.4%	1.4%	1.2%	0.7%	0.8%	0.7%	0.8%	0.7%	0.1%	0.2%	0.2%	0.2%
Hotel Performance Measures														
Hotel Inventory	150,544	149,213	149,447	149,820	151,658	156,245	156,245	156,245	158,745	158,745	158,745	160,745	159,245	162,745
Hotel Room Nights Available	54,751,855	54,587,881	54,505,450	54,616,228	55,019,735	56,192,298	57,029,425	57,029,425	57,485,675	57,941,925	57,941,925	58,306,925	58,398,175	58,763,175
Hotel Room Nights Occupied	47,497,234	47,896,317	48,303,436	48,496,649	48,668,813	48,820,781	48,953,396	49,257,774	49,354,517	49,434,266	49,514,143	49,594,149	49,674,285	49,754,550
Ratio - Visitors per Room Night Occupied	0.87	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Total Hotel/Motel Occupancy Rate	86.8%	87.7%	88.6%	88.8%	88.5%	86.9%	85.8%	86.4%	85.9%	85.3%	85.5%	85.1%	85.1%	84.7%

	2028 Projected	2029 Projected	2030 Projected	2031 Projected	2032 Projected	2033 Projected	2034 Projected	2035 Projected	2036 Projected	2037 Projected	2038 Projected	2039 Projected	2040 Projected
Visitor Volume													
Values													
Las Vegas - Convention	6,414,783	6,434,027	6,453,329	6,472,689	6,492,107	6,511,583	6,531,118	6,550,712	6,570,364	6,590,075	6,609,845	6,629,675	6,649,564
Las Vegas - Non-Convention (Leisure)	37,439,969	37,491,586	37,543,260	37,594,991	37,646,779	37,698,623	37,750,524	37,802,482	37,854,497	37,906,569	37,958,698	38,010,883	38,063,126
Total Las Vegas	43,854,751	43,925,613	43,996,589	44,067,680	44,138,886	44,210,207	44,281,643	44,353,194	44,424,861	44,496,644	44,568,543	44,640,558	44,712,689
Convention Visitors as a Share of Total	14.6%	14.6%	14.7%	14.7%	14.7%	14.7%	14.7%	14.8%	14.8%	14.8%	14.8%	14.9%	14.9%
Non-Convention Visitors as a Share of Total	85.4%	85.4%	85.3%	85.3%	85.3%	85.3%	85.3%	85.2%	85.2%	85.2%	85.2%	85.1%	85.1%
Annual Growth Rates													
Las Vegas - Convention	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Las Vegas - Non-Convention (Leisure)	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Total Las Vegas	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Travel Measures													
Traffic Counts:													
I-15 at NV/CA Border	46,553	46,792	47,032	47,273	47,514	47,756	47,998	48,242	48,486	48,730	48,975	49,221	49,468
All Major Highways, Excluding I-15 at Border	62,661	62,598	62,535	62,472	62,408	62,343	62,279	62,214	62,148	62,082	62,016	61,950	61,883
All Major Highways	109,214	109,390	109,567	109,744	109,921	110,099	110,277	110,455	110,634	110,812	110,991	111,171	111,350
I-15 at NV/CA Border Share	42.6%	42.8%	42.9%	43.1%	43.2%	43.4%	43.5%	43.7%	43.8%	44.0%	44.1%	44.3%	44.4%
All Major Highways, Excluding I-15 Share	57.4%	57.2%	57.1%	56.9%	56.8%	56.6%	56.5%	56.3%	56.2%	56.0%	55.9%	55.7%	55.6%
Visitor Arrivals by Ground Transportation:													
Visitors Arriving by Ground via I-15	10,281,262	10,334,113	10,387,109	10,440,248	10,493,532	10,546,962	10,600,536	10,654,256	10,708,122	10,762,134	10,816,293	10,870,599	10,925,052
Visitors Arriving by Ground via Other Highways	13,838,851	13,824,974	13,811,015	13,796,976	13,782,855	13,768,652	13,754,367	13,740,001	13,725,552	13,711,020	13,696,406	13,681,708	13,666,927
Visitors Arriving by Ground Transportation	24,120,113	24,159,087	24,198,124	24,237,224	24,276,387	24,315,614	24,354,903	24,394,257	24,433,674	24,473,154	24,512,699	24,552,307	24,591,979
Share of Total Visitors Arriving via I-15	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%
Share of Total Visitors Arriving via Other Highways	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%
Share of Total Visitors Arriving by Ground Transport	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%
Air Transportation:													
En/Deplaned Passenger Counts - McCarran	48,995,620	49,072,180	49,151,504	49,231,264	49,311,612	49,390,958	49,470,409	49,550,442	49,630,616	49,710,874	49,791,114	49,871,534	49,952,148
Visitors Arriving by Air	19,734,638	19,766,526	19,798,465	19,830,456	19,862,499	19,894,593	19,926,739	19,958,937	19,991,188	20,023,490	20,055,844	20,088,251	20,120,710
Share of Visitors Arriving by Air	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Annual Growth Rates													
I-15 at NV/CA Border	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
All Major Highways, Excluding I-15 at Border	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
En/Deplaned Passenger Counts - McCarran	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Hotel Performance Measures													
Hotel Inventory	162,745	164,245	163,245	163,245	163,245	166,245	164,245	165,245	166,245	166,245	167,745	166,245	166,245
Hotel Room Nights Available	59,401,925	59,675,675	59,766,925	59,584,425	59,584,425	60,131,925	60,314,425	60,131,925	60,496,925	60,679,425	60,953,175	60,953,175	60,679,425
Hotel Room Nights Occupied	49,834,945	49,915,469	49,996,124	50,076,909	50,157,825	50,238,871	50,320,048	50,401,357	50,482,797	50,564,368	50,646,071	50,727,907	50,809,874
Ratio - Visitors per Room Night Occupied	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Total Hotel/Motel Occupancy Rate	83.9%	83.6%	83.7%	84.0%	84.2%	83.5%	83.4%	83.8%	83.4%	83.3%	83.1%	83.2%	83.7%

	2000 Historical	2001 Historical	2002 Historical	2003 Historical	2004 Historical	2005 Historical	2006 Historical	2007 Historical	2008 Historical	2009 Historical	2010 Historical	2011 Historical	2012 Historical	2013 Historical
HOTEL-CASINO														
Supply														
Hotel Room Inventory, Beginning of Period	120,294	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481
Hotel Additions (net) - Historical	3,976	2,340	177	3,695	1,021	1,683	(581)	342	7,582	8,412	(6)	1,226	320	112
Hotel Additions - Projected														
2016														
Residence Inn (South) #2														
Thunderbird Hotel (formerly Aruba Hotel & Spa)														
2017														
Lucky Dragon Hotel & Casino														
Starwood Hotels & Resorts (Name TBD)														
TBD (formerly Tod Hostel Motel)														
2018														
Residence Inn Marriott (Henderson)														
SpringHill Suites Marriott														
Alon Las Vegas														
Mardi Gras Hotel and Casino														
2019 and Beyond														
Resorts World Las Vegas (Phase 1)														
Fairfield Marriott (NW)														
Wynn Paradise Park														
Other Future Projects (Additions)														
Future Demolitions (Reductions)														
Hotel Room Inventory, End of Period	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593
Average Room Nights Available	44,642,287	45,622,632	46,261,444	46,777,335	47,351,027	48,392,570	48,490,787	48,649,041	49,961,921	51,516,729	53,685,406	54,490,748	54,944,854	54,772,469
Annual Growth Rate	5.3%	2.2%	1.4%	1.1%	1.2%	2.2%	0.2%	0.3%	2.7%	3.1%	4.2%	1.5%	0.8%	-0.3%

Exhibit B-1
Conservative Scenario: Supply Projection

	2014 Historical	2015 Historical	2016 Projected	2017 Projected	2018 Projected	2019 Projected	2020 Projected	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
HOTEL-CASINO														
Supply														
Hotel Room Inventory, Beginning of Period	150,593	150,544	149,213	149,447	149,820	151,658	156,245	156,245	156,245	158,745	158,745	158,745	160,745	159,245
Hotel Additions (net) - Historical	(49)	(1,331)	234	373	1,838	4,587	0	0	2,500	0	0	2,000	(1,500)	3,500
Hotel Additions - Projected														
2016														
Residence Inn (South) #2			124											
Thunderbird Hotel (formerly Aruba Hotel & Spa)			110											
2017														
Lucky Dragon Hotel & Casino				206										
Starwood Hotels & Resorts (Name TBD)				125										
TBD (formerly Tod Hostel Motel)				42										
2018														
Residence Inn Marriott (Henderson)					100									
SpringHill Suites Marriott					252									
Alon Las Vegas					1,100									
Mardi Gras Hotel and Casino					386									
2019 and Beyond														
Resorts World Las Vegas (Phase 1)						3,500								
Fairfield Marriott (NW)						87								
Wynn Paradise Park						1,000								
Other Future Projects (Additions)			-	-	-	-	-	-	2,500	1,500	-	2,000	-	3,500
Future Demolitions (Reductions)			-	-	-	-	-	-	-	(1,500)	-	-	(1,500)	-
Hotel Room Inventory, End of Period	150,544	149,213	149,447	149,820	151,658	156,245	156,245	156,245	158,745	158,745	158,745	160,745	159,245	162,745
Average Room Nights Available	54,751,855	54,587,881	54,505,450	54,616,228	55,019,735	56,192,298	57,029,425	57,029,425	57,485,675	57,941,925	57,941,925	58,306,925	58,398,175	58,763,175
Annual Growth Rate	0.0%	-0.3%	-0.2%	0.2%	0.7%	2.1%	1.5%	0.0%	0.8%	0.8%	0.0%	0.6%	0.2%	0.6%

APPLIED ANALYSIS

	2028 Projected	2029 Projected	2030 Projected	2031 Projected	2032 Projected	2033 Projected	2034 Projected	2035 Projected	2036 Projected	2037 Projected	2038 Projected	2039 Projected	2040 Projected
HOTEL-CASINO													
Supply													
Hotel Room Inventory, Beginning of Period	162,745	162,745	164,245	163,245	163,245	163,245	166,245	164,245	165,245	166,245	166,245	167,745	166,245
Hotel Additions (net) - Historical	0	1,500	(1,000)	0	0	3,000	(2,000)	1,000	1,000	0	1,500	(1,500)	0
Hotel Additions - Projected													
2016													
Residence Inn (South) #2													
Thunderbird Hotel (formerly Aruba Hotel & Spa)													
2017													
Lucky Dragon Hotel & Casino													
Starwood Hotels & Resorts (Name TBD)													
TBD (formerly Tod Hostel Motel)													
2018													
Residence Inn Marriott (Henderson)													
SpringHill Suites Marriott													
Alon Las Vegas													
Mardi Gras Hotel and Casino													
2019 and Beyond													
Resorts World Las Vegas (Phase 1)													
Fairfield Marriott (NW)													
Wynn Paradise Park													
Other Future Projects (Additions)	-	1,500	1,000	-	-	3,000	-	1,000	1,000	-	1,500	-	-
Future Demolitions (Reductions)	-	-	(2,000)	-	-	-	(2,000)	-	-	-	-	(1,500)	-
Hotel Room Inventory, End of Period	162,745	164,245	163,245	163,245	163,245	166,245	164,245	165,245	166,245	166,245	167,745	166,245	166,245
Average Room Nights Available	59,401,925	59,675,675	59,766,925	59,584,425	59,584,425	60,131,925	60,314,425	60,131,925	60,496,925	60,679,425	60,953,175	60,953,175	60,679,425
Annual Growth Rate	1.1%	0.5%	0.2%	-0.3%	0.0%	0.9%	0.3%	-0.3%	0.6%	0.3%	0.5%	0.0%	-0.4%

	2000 Historical	2001 Historical	2002 Historical	2003 Historical	2004 Historical	2005 Historical	2006 Historical	2007 Historical	2008 Historical	2009 Historical	2010 Historical	2011 Historical	2012 Historical	2013 Historical
Visitor Volume														
Values														
Las Vegas - Convention	3,853,363	5,014,241	5,105,450	5,657,796	5,724,864	6,166,194	6,307,961	6,209,253	5,899,725	4,492,275	4,521,067	4,850,272	4,944,014	5,107,416
Las Vegas - Non-Convention (Leisure)	31,996,328	30,003,076	29,966,054	29,882,330	31,663,917	32,400,523	32,606,928	32,987,508	31,581,827	31,859,194	32,680,375	34,078,436	34,783,008	34,560,805
Total Las Vegas	35,849,691	35,017,317	35,071,504	35,540,126	37,388,781	38,566,717	38,914,889	39,196,761	37,481,552	36,351,469	37,201,442	38,928,708	39,727,022	39,668,221
Convention Visitors as a Share of Total	10.7%	14.3%	14.6%	15.9%	15.3%	16.0%	16.2%	15.8%	15.7%	12.4%	12.2%	12.5%	12.4%	12.9%
Non-Convention Visitors as a Share of Total	89.3%	85.7%	85.4%	84.1%	84.7%	84.0%	83.8%	84.2%	84.3%	87.6%	87.8%	87.5%	87.6%	87.1%
Annual Growth Rates														
Las Vegas - Convention	2.1%	30.1%	1.8%	10.8%	1.2%	7.7%	2.3%	-1.6%	-5.0%	-23.9%	0.6%	7.3%	1.9%	3.3%
Las Vegas - Non-Convention (Leisure)	6.5%	-6.2%	-0.1%	-0.3%	6.0%	2.3%	0.6%	1.2%	-4.3%	0.9%	2.6%	4.3%	2.1%	-0.6%
Total Las Vegas	6.0%	-2.3%	0.2%	1.3%	5.2%	3.2%	0.9%	0.7%	-4.4%	-3.0%	2.3%	4.6%	2.1%	-0.1%
Travel Measures														
Traffic Counts:														
I-15 at NV/CA Border	37,707	37,809	37,868	38,074	38,799	39,649	40,383	39,808	37,686	39,199	40,082	40,344	41,712	42,485
All Major Highways, Excluding I-15 at Border	32,586	35,163	40,537	39,722	43,122	45,895	46,578	46,893	44,407	44,916	46,578	59,500	58,334	59,759
All Major Highways	70,294	72,973	78,405	77,796	81,921	85,544	86,961	86,701	82,093	84,115	86,661	99,844	100,046	102,244
I-15 at NV/CA Border Share	53.6%	51.8%	48.3%	48.9%	47.4%	46.3%	46.4%	45.9%	45.9%	46.6%	46.3%	40.4%	41.7%	41.6%
All Major Highways, Excluding I-15 Share	46.4%	48.2%	51.7%	51.1%	52.6%	53.7%	53.6%	54.1%	54.1%	53.4%	53.7%	59.6%	58.3%	58.4%
Visitor Arrivals by Ground Transportation:														
Visitors Arriving by Ground via I-15	10,384,636	9,434,684	9,485,726	9,566,479	9,385,186	9,473,962	9,758,531	9,718,316	9,807,691	9,825,380	10,151,803	8,808,794	9,441,158	9,560,251
Visitors Arriving by Ground via Other Highways	8,974,197	8,774,321	10,154,316	9,980,591	10,430,867	10,966,398	11,255,509	11,447,935	11,556,794	11,258,472	11,797,048	12,991,283	13,203,245	13,447,317
Visitors Arriving by Ground Transportation	19,358,833	18,209,005	19,640,042	19,547,069	19,816,054	20,440,360	21,014,040	21,166,251	21,364,485	21,083,852	21,948,851	21,800,076	22,644,403	23,007,568
Share of Total Visitors Arriving via I-15	29.0%	26.9%	27.0%	26.9%	25.1%	24.6%	25.1%	24.8%	26.2%	27.0%	27.3%	22.6%	23.8%	24.1%
Share of Total Visitors Arriving via Other Highways	25.0%	25.1%	29.0%	28.1%	27.9%	28.4%	28.9%	29.2%	30.8%	31.0%	31.7%	33.4%	33.2%	33.9%
Share of Total Visitors Arriving by Ground Transport	54.0%	52.0%	56.0%	55.0%	53.0%	53.0%	54.0%	54.0%	57.0%	58.0%	59.0%	56.0%	57.0%	58.0%
Air Transportation:														
En/Deplaned Passenger Counts - McCarran	36,865,866	35,179,960	35,009,011	36,265,932	41,441,531	44,267,370	46,304,376	47,729,527	44,074,642	40,469,012	39,810,277	41,481,204	41,667,596	41,857,059
Visitors Arriving by Air	16,490,858	16,808,312	15,431,462	15,993,057	17,572,727	18,126,357	17,900,849	18,030,510	16,117,067	15,267,617	15,252,591	17,128,632	17,082,619	16,660,653
Share of Visitors Arriving by Air	46.0%	48.0%	44.0%	45.0%	47.0%	47.0%	46.0%	46.0%	43.0%	42.0%	41.0%	44.0%	43.0%	42.0%
Annual Growth Rates														
I-15 at NV/CA Border	4.3%	0.3%	0.2%	0.5%	1.9%	2.2%	1.9%	-1.4%	-5.3%	4.0%	2.3%	0.7%	3.4%	1.9%
All Major Highways, Excluding I-15 at Border	-0.5%	7.9%	15.3%	-2.0%	8.6%	6.4%	1.5%	0.7%	-5.3%	1.1%	3.7%	27.7%	-2.0%	2.4%
En/Deplaned Passenger Counts - McCarran	9.3%	-4.6%	-0.5%	3.6%	14.3%	6.8%	4.6%	3.1%	-7.7%	-8.2%	-1.6%	4.2%	0.4%	0.5%
Hotel Performance Measures														
Hotel Inventory	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593
Hotel Room Nights Available	44,642,287	45,622,632	46,261,444	46,777,335	47,351,027	48,392,570	48,490,787	48,649,041	49,961,921	51,516,729	53,685,406	54,490,748	54,944,854	54,772,469
Hotel Room Nights Occupied	39,776,278	38,642,369	38,859,613	39,760,735	41,953,010	43,166,172	43,496,236	43,978,733	42,967,252	41,986,134	43,154,119	45,654,165	46,350,563	46,191,449
Ratio - Visitors per Room Night Occupied	0.90	0.91	0.90	0.89	0.89	0.89	0.89	0.89	0.87	0.87	0.86	0.85	0.86	0.86
Total Hotel/Motel Occupancy Rate	89.1%	84.7%	84.0%	85.0%	88.6%	89.2%	89.7%	90.4%	86.0%	81.5%	80.4%	83.8%	84.4%	84.3%

Steer Davies Gleave
Projection Model: Demand Projection
BASE CASE SCENARIO

Exhibit B-2
Base Case Scenario: Demand Projection

	2014 Historical	2015 Historical	2016 Projected	2017 Projected	2018 Projected	2019 Projected	2020 Projected	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
Visitor Volume														
Values														
Las Vegas - Convention	5,194,580	5,710,303	5,995,818	6,181,689	6,345,503	6,500,968	6,637,488	6,750,326	6,844,830	6,935,867	7,023,501	7,112,243	7,202,106	7,293,105
Las Vegas - Non-Convention (Leisure)	35,931,932	36,601,913	36,781,832	36,980,961	37,186,187	37,384,308	37,586,423	37,797,771	38,013,501	38,219,240	38,415,407	38,612,250	38,809,767	39,007,954
Total Las Vegas	41,126,512	42,312,216	42,777,650	43,162,649	43,531,690	43,885,276	44,223,911	44,548,097	44,858,331	45,155,106	45,438,908	45,724,493	46,011,873	46,301,059
Convention Visitors as a Share of Total	12.6%	13.5%	14.0%	14.3%	14.6%	14.8%	15.0%	15.2%	15.3%	15.4%	15.5%	15.6%	15.7%	15.8%
Non-Convention Visitors as a Share of Total	87.4%	86.5%	86.0%	85.7%	85.4%	85.2%	85.0%	84.8%	84.7%	84.6%	84.5%	84.4%	84.3%	84.2%
Annual Growth Rates														
Las Vegas - Convention	1.7%	9.9%	5.0%	3.1%	2.7%	2.5%	2.1%	1.7%	1.4%	1.3%	1.3%	1.3%	1.3%	1.3%
Las Vegas - Non-Convention (Leisure)	4.0%	1.9%	0.5%	0.5%	0.6%	0.5%	0.5%	0.6%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%
Total Las Vegas	3.7%	2.9%	1.1%	0.9%	0.9%	0.8%	0.8%	0.7%	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%
Travel Measures														
Traffic Counts:														
I-15 at NV/CA Border	42,318	44,419	44,876	45,246	45,597	45,930	46,245	46,543	46,824	47,090	47,555	48,025	48,499	48,977
All Major Highways, Excluding I-15 at Border	60,406	64,785	65,046	65,176	65,276	65,347	65,390	65,406	65,396	65,363	65,604	65,845	66,087	66,330
All Major Highways	102,725	109,204	109,921	110,422	110,873	111,277	111,635	111,949	112,221	112,452	113,159	113,870	114,586	115,306
I-15 at NV/CA Border Share	41.2%	40.7%	40.8%	41.0%	41.1%	41.3%	41.4%	41.6%	41.7%	41.9%	42.0%	42.2%	42.3%	42.5%
All Major Highways, Excluding I-15 Share	58.8%	59.3%	59.2%	59.0%	58.9%	58.7%	58.6%	58.4%	58.3%	58.1%	58.0%	57.8%	57.7%	57.5%
Visitor Arrivals by Ground Transportation:														
Visitors Arriving by Ground via I-15	9,826,609	9,810,045	9,910,870	9,992,595	10,070,169	10,143,708	10,213,329	10,279,149	10,341,285	10,399,851	10,502,702	10,606,434	10,711,056	10,816,573
Visitors Arriving by Ground via Other Highways	14,026,768	14,307,918	14,365,446	14,394,301	14,416,407	14,432,047	14,441,502	14,445,045	14,442,943	14,435,457	14,488,698	14,542,037	14,595,474	14,649,009
Visitors Arriving by Ground Transportation	23,853,377	24,117,963	24,276,317	24,386,897	24,486,576	24,575,755	24,654,831	24,724,194	24,784,228	24,835,308	24,991,399	25,148,471	25,306,530	25,465,583
Share of Total Visitors Arriving via I-15	23.9%	23.2%	23.4%	23.7%	23.9%	24.2%	24.4%	24.7%	24.9%	25.2%	25.4%	25.4%	25.4%	25.4%
Share of Total Visitors Arriving via Other Highways	34.1%	33.8%	33.3%	32.8%	32.3%	31.8%	31.3%	30.8%	30.3%	29.8%	29.6%	29.6%	29.6%	29.6%
Share of Total Visitors Arriving by Ground Transport	58.0%	57.0%	56.8%	56.5%	56.3%	56.0%	55.8%	55.5%	55.3%	55.0%	55.0%	55.0%	55.0%	55.0%
Air Transportation:														
En/Deplaned Passenger Counts - McCarran	42,885,350	45,389,074	45,703,059	46,558,813	47,374,317	47,944,924	48,590,088	49,178,525	49,839,659	50,461,572	50,762,578	51,080,085	51,399,133	51,728,812
Visitors Arriving by Air	17,273,135	18,194,253	18,501,334	18,775,752	19,045,114	19,309,521	19,569,081	19,823,903	20,074,103	20,319,798	20,447,508	20,576,022	20,705,343	20,835,477
Share of Visitors Arriving by Air	42.0%	43.0%	43.3%	43.5%	43.8%	44.0%	44.3%	44.5%	44.8%	45.0%	45.0%	45.0%	45.0%	45.0%
Annual Growth Rates														
I-15 at NV/CA Border	-0.4%	5.0%	1.0%	0.8%	0.8%	0.7%	0.7%	0.6%	0.6%	0.6%	1.0%	1.0%	1.0%	1.0%
All Major Highways, Excluding I-15 at Border	1.1%	7.2%	0.4%	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	-0.1%	0.4%	0.4%	0.4%	0.4%
En/Deplaned Passenger Counts - McCarran	2.5%	5.8%	0.7%	1.9%	1.8%	1.2%	1.3%	1.2%	1.3%	1.2%	0.6%	0.6%	0.6%	0.6%
Hotel Performance Measures														
Hotel Inventory	150,544	149,213	149,447	149,820	151,658	156,245	156,245	156,245	158,745	162,745	162,745	164,745	163,245	166,745
Hotel Room Nights Available	54,751,855	54,587,881	54,505,450	54,616,228	55,019,735	56,192,298	57,029,425	57,029,425	57,485,675	58,671,925	59,401,925	59,766,925	59,858,175	60,223,175
Hotel Room Nights Occupied	47,497,234	47,896,317	48,423,176	48,858,985	49,276,729	49,676,980	50,060,306	50,622,838	50,975,377	51,312,621	51,635,122	51,959,651	52,286,219	52,614,840
Ratio - Visitors per Room Night Occupied	0.87	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Total Hotel/Motel Occupancy Rate	86.8%	87.7%	88.8%	89.5%	89.6%	88.4%	87.8%	88.8%	88.7%	87.5%	86.9%	86.9%	87.4%	87.4%

Note: This Page Is Intended To Be Printed on Tabloid Paper (11x17)
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APPLIED ANALYSIS

	2028 Projected	2029 Projected	2030 Projected	2031 Projected	2032 Projected	2033 Projected	2034 Projected	2035 Projected	2036 Projected	2037 Projected	2038 Projected	2039 Projected	2040 Projected
Visitor Volume													
Values													
Las Vegas - Convention	7,385,253	7,478,566	7,573,058	7,668,743	7,765,638	7,863,757	7,963,115	8,063,729	8,165,614	8,268,787	8,373,263	8,479,059	8,586,192
Las Vegas - Non-Convention (Leisure)	39,206,810	39,406,330	39,606,511	39,807,351	40,008,845	40,210,991	40,413,784	40,617,220	40,821,297	41,026,009	41,231,352	41,437,323	41,643,916
Total Las Vegas	46,592,063	46,884,896	47,179,569	47,476,094	47,774,483	48,074,748	48,376,899	48,680,950	48,986,911	49,294,796	49,604,615	49,916,382	50,230,108
Convention Visitors as a Share of Total	15.9%	16.0%	16.1%	16.2%	16.3%	16.4%	16.5%	16.6%	16.7%	16.8%	16.9%	17.0%	17.1%
Non-Convention Visitors as a Share of Total	84.1%	84.0%	83.9%	83.8%	83.7%	83.6%	83.5%	83.4%	83.3%	83.2%	83.1%	83.0%	82.9%
Annual Growth Rates													
Las Vegas - Convention	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
Las Vegas - Non-Convention (Leisure)	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Total Las Vegas	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Travel Measures													
Traffic Counts:													
I-15 at NV/CA Border	49,458	49,944	50,435	50,929	51,427	51,930	52,437	52,949	53,465	53,985	54,509	55,038	55,572
All Major Highways, Excluding I-15 at Border	66,572	66,816	67,059	67,303	67,548	67,793	68,038	68,284	68,530	68,777	69,024	69,271	69,519
All Major Highways	116,031	116,760	117,494	118,232	118,975	119,723	120,476	121,233	121,995	122,762	123,533	124,310	125,091
I-15 at NV/CA Border Share	42.6%	42.8%	42.9%	43.1%	43.2%	43.4%	43.5%	43.7%	43.8%	44.0%	44.1%	44.3%	44.4%
All Major Highways, Excluding I-15 Share	57.4%	57.2%	57.1%	56.9%	56.8%	56.6%	56.5%	56.3%	56.2%	56.0%	55.9%	55.7%	55.6%
Visitor Arrivals by Ground Transportation:													
Visitors Arriving by Ground via I-15	10,922,994	11,030,326	11,138,575	11,247,749	11,357,856	11,468,902	11,580,895	11,693,843	11,807,754	11,922,634	12,038,492	12,155,336	12,273,172
Visitors Arriving by Ground via Other Highways	14,702,640	14,756,367	14,810,188	14,864,103	14,918,110	14,972,209	15,026,399	15,080,679	15,135,047	15,189,503	15,244,046	15,298,675	15,353,387
Visitors Arriving by Ground Transportation	25,625,635	25,786,693	25,948,763	26,111,852	26,275,966	26,441,111	26,607,295	26,774,522	26,942,801	27,112,138	27,282,538	27,454,010	27,626,560
Share of Total Visitors Arriving via I-15	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%
Share of Total Visitors Arriving via Other Highways	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%
Share of Total Visitors Arriving by Ground Transport	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%
Air Transportation:													
En/Deplaned Passenger Counts - McCarran	52,053,700	52,378,154	52,707,387	53,039,010	53,373,195	53,708,299	54,045,484	54,385,264	54,727,193	55,071,222	55,417,258	55,765,521	56,116,041
Visitors Arriving by Air	20,966,428	21,098,203	21,230,806	21,364,242	21,498,517	21,633,636	21,769,605	21,906,427	22,044,110	22,182,658	22,322,077	22,462,372	22,603,549
Share of Visitors Arriving by Air	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Annual Growth Rates													
I-15 at NV/CA Border	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
All Major Highways, Excluding I-15 at Border	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
En/Deplaned Passenger Counts - McCarran	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Hotel Performance Measures													
Hotel Inventory	166,745	168,245	167,245	170,245	170,245	173,245	171,245	175,245	176,245	176,245	177,745	177,745	177,745
Hotel Room Nights Available	60,861,925	61,135,675	61,226,925	61,591,925	62,139,425	62,686,925	62,869,425	63,234,425	64,146,925	64,329,425	64,603,175	64,876,925	64,876,925
Hotel Room Nights Occupied	52,945,526	53,278,291	53,613,147	53,950,107	54,289,186	54,630,395	54,973,749	55,319,261	55,666,945	56,016,813	56,368,881	56,723,161	57,079,668
Ratio - Visitors per Room Night Occupied	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Total Hotel/Motel Occupancy Rate	87.0%	87.1%	87.6%	87.6%	87.4%	87.1%	87.4%	87.5%	86.8%	87.1%	87.3%	87.4%	88.0%

	2000 Historical	2001 Historical	2002 Historical	2003 Historical	2004 Historical	2005 Historical	2006 Historical	2007 Historical	2008 Historical	2009 Historical	2010 Historical	2011 Historical	2012 Historical	2013 Historical
HOTEL-CASINO														
Supply														
Hotel Room Inventory, Beginning of Period	120,294	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481
Hotel Additions (net) - Historical	3,976	2,340	177	3,695	1,021	1,683	(581)	342	7,582	8,412	(6)	1,226	320	112
Hotel Additions - Projected														
2016														
Residence Inn (South) #2														
Thunderbird Hotel (formerly Aruba Hotel & Spa)														
2017														
Lucky Dragon Hotel & Casino														
Starwood Hotels & Resorts (Name TBD)														
TBD (formerly Tod Hostel Motel)														
2018														
Residence Inn Marriott (Henderson)														
SpringHill Suites Marriott														
Alon Las Vegas														
Mardi Gras Hotel and Casino														
2019 and Beyond														
Resorts World Las Vegas (Phase 1)														
Fairfield Marriott (NW)														
Wynn Paradise Park														
Other Future Projects (Additions)														
Future Demolitions (Reductions)														
Hotel Room Inventory, End of Period	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593
Average Room Nights Available	44,642,287	45,622,632	46,261,444	46,777,335	47,351,027	48,392,570	48,490,787	48,649,041	49,961,921	51,516,729	53,685,406	54,490,748	54,944,854	54,772,469
Annual Growth Rate	5.3%	2.2%	1.4%	1.1%	1.2%	2.2%	0.2%	0.3%	2.7%	3.1%	4.2%	1.5%	0.8%	-0.3%

	2014 Historical	2015 Historical	2016 Projected	2017 Projected	2018 Projected	2019 Projected	2020 Projected	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
HOTEL-CASINO														
Supply														
Hotel Room Inventory, Beginning of Period	150,593	150,544	149,213	149,447	149,820	151,658	156,245	156,245	156,245	158,745	162,745	162,745	164,745	163,245
Hotel Additions (net) - Historical	(49)	(1,331)	234	373	1,838	4,587	0	0	2,500	4,000	0	2,000	(1,500)	3,500
Hotel Additions - Projected														
2016														
Residence Inn (South) #2			124											
Thunderbird Hotel (formerly Aruba Hotel & Spa)			110											
2017														
Lucky Dragon Hotel & Casino				206										
Starwood Hotels & Resorts (Name TBD)				125										
TBD (formerly Tod Hostel Motel)				42										
2018														
Residence Inn Marriott (Henderson)					100									
SpringHill Suites Marriott					252									
Alon Las Vegas					1,100									
Mardi Gras Hotel and Casino					386									
2019 and Beyond														
Resorts World Las Vegas (Phase 1)						3,500								
Fairfield Marriott (NW)						87								
Wynn Paradise Park						1,000								
Other Future Projects (Additions)			-	-	-	-	-	-	2,500	4,000	-	2,000	-	3,500
Future Demolitions (Reductions)			-	-	-	-	-	-	-	-	-	-	(1,500)	-
Hotel Room Inventory, End of Period	150,544	149,213	149,447	149,820	151,658	156,245	156,245	156,245	158,745	162,745	162,745	164,745	163,245	166,745
Average Room Nights Available	54,751,855	54,587,881	54,505,450	54,616,228	55,019,735	56,192,298	57,029,425	57,029,425	57,485,675	58,671,925	59,401,925	59,766,925	59,858,175	60,223,175
Annual Growth Rate	0.0%	-0.3%	-0.2%	0.2%	0.7%	2.1%	1.5%	0.0%	0.8%	2.1%	1.2%	0.6%	0.2%	0.6%

Note: This Page Is Intended To Be Printed on Tabloid Paper (11x17)

	2028 Projected	2029 Projected	2030 Projected	2031 Projected	2032 Projected	2033 Projected	2034 Projected	2035 Projected	2036 Projected	2037 Projected	2038 Projected	2039 Projected	2040 Projected
HOTEL-CASINO													
Supply													
Hotel Room Inventory, Beginning of Period	166,745	166,745	168,245	167,245	170,245	170,245	173,245	171,245	175,245	176,245	176,245	177,745	177,745
Hotel Additions (net) - Historical	0	1,500	(1,000)	3,000	0	3,000	(2,000)	4,000	1,000	0	1,500	0	0
Hotel Additions - Projected													
2016													
Residence Inn (South) #2													
Thunderbird Hotel (formerly Aruba Hotel & Spa)													
2017													
Lucky Dragon Hotel & Casino													
Starwood Hotels & Resorts (Name TBD)													
TBD (formerly Tod Hostel Motel)													
2018													
Residence Inn Marriott (Henderson)													
SpringHill Suites Marriott													
Alon Las Vegas													
Mardi Gras Hotel and Casino													
2019 and Beyond													
Resorts World Las Vegas (Phase 1)													
Fairfield Marriott (NW)													
Wynn Paradise Park													
Other Future Projects (Additions)	-	1,500	1,000	3,000	-	3,000	-	4,000	1,000	-	1,500	-	-
Future Demolitions (Reductions)	-	-	(2,000)	-	-	-	(2,000)	-	-	-	-	-	-
Hotel Room Inventory, End of Period	166,745	168,245	167,245	170,245	170,245	173,245	171,245	175,245	176,245	176,245	177,745	177,745	177,745
Average Room Nights Available	60,861,925	61,135,675	61,226,925	61,591,925	62,139,425	62,686,925	62,869,425	63,234,425	64,146,925	64,329,425	64,603,175	64,876,925	64,876,925
Annual Growth Rate	1.1%	0.4%	0.1%	0.6%	0.9%	0.9%	0.3%	0.6%	1.4%	0.3%	0.4%	0.4%	0.0%

	2000 Historical	2001 Historical	2002 Historical	2003 Historical	2004 Historical	2005 Historical	2006 Historical	2007 Historical	2008 Historical	2009 Historical	2010 Historical	2011 Historical	2012 Historical	2013 Historical
Visitor Volume														
Values														
Las Vegas - Convention	3,853,363	5,014,241	5,105,450	5,657,796	5,724,864	6,166,194	6,307,961	6,209,253	5,899,725	4,492,275	4,521,067	4,850,272	4,944,014	5,107,416
Las Vegas - Non-Convention (Leisure)	31,996,328	30,003,076	29,966,054	29,882,330	31,663,917	32,400,523	32,606,928	32,987,508	31,581,827	31,859,194	32,680,375	34,078,436	34,783,008	34,560,805
Total Las Vegas	35,849,691	35,017,317	35,071,504	35,540,126	37,388,781	38,566,717	38,914,889	39,196,761	37,481,552	36,351,469	37,201,442	38,928,708	39,727,022	39,668,221
Convention Visitors as a Share of Total	10.7%	14.3%	14.6%	15.9%	15.3%	16.0%	16.2%	15.8%	15.7%	12.4%	12.2%	12.5%	12.4%	12.9%
Non-Convention Visitors as a Share of Total	89.3%	85.7%	85.4%	84.1%	84.7%	84.0%	83.8%	84.2%	84.3%	87.6%	87.8%	87.5%	87.6%	87.1%
Annual Growth Rates														
Las Vegas - Convention	2.1%	30.1%	1.8%	10.8%	1.2%	7.7%	2.3%	-1.6%	-5.0%	-23.9%	0.6%	7.3%	1.9%	3.3%
Las Vegas - Non-Convention (Leisure)	6.5%	-6.2%	-0.1%	-0.3%	6.0%	2.3%	0.6%	1.2%	-4.3%	0.9%	2.6%	4.3%	2.1%	-0.6%
Total Las Vegas	6.0%	-2.3%	0.2%	1.3%	5.2%	3.2%	0.9%	0.7%	-4.4%	-3.0%	2.3%	4.6%	2.1%	-0.1%
Travel Measures														
Traffic Counts:														
I-15 at NV/CA Border	37,707	37,809	37,868	38,074	38,799	39,649	40,383	39,808	37,686	39,199	40,082	40,344	41,712	42,485
All Major Highways, Excluding I-15 at Border	32,586	35,163	40,537	39,722	43,122	45,895	46,578	46,893	44,407	44,916	46,578	59,500	58,334	59,759
All Major Highways	70,294	72,973	78,405	77,796	81,921	85,544	86,961	86,701	82,093	84,115	86,661	99,844	100,046	102,244
I-15 at NV/CA Border Share	53.6%	51.8%	48.3%	48.9%	47.4%	46.3%	46.4%	45.9%	45.9%	46.6%	46.3%	40.4%	41.7%	41.6%
All Major Highways, Excluding I-15 Share	46.4%	48.2%	51.7%	51.1%	52.6%	53.7%	53.6%	54.1%	54.1%	53.4%	53.7%	59.6%	58.3%	58.4%
Visitor Arrivals by Ground Transportation:														
Visitors Arriving by Ground via I-15	10,384,636	9,434,684	9,485,726	9,566,479	9,385,186	9,473,962	9,758,531	9,718,316	9,807,691	9,825,380	10,151,803	8,808,794	9,441,158	9,560,251
Visitors Arriving by Ground via Other Highways	8,974,197	8,774,321	10,154,316	9,980,591	10,430,867	10,966,398	11,255,509	11,447,935	11,556,794	11,258,472	11,797,048	12,991,283	13,203,245	13,447,317
Visitors Arriving by Ground Transportation	19,358,833	18,209,005	19,640,042	19,547,069	19,816,054	20,440,360	21,014,040	21,166,251	21,364,485	21,083,852	21,948,851	21,800,076	22,644,403	23,007,568
Share of Total Visitors Arriving via I-15	29.0%	26.9%	27.0%	26.9%	25.1%	24.6%	25.1%	24.8%	26.2%	27.0%	27.0%	26.8%	26.6%	26.4%
Share of Total Visitors Arriving via Other Highways	25.0%	25.1%	29.0%	28.1%	27.9%	28.4%	28.9%	29.2%	30.8%	31.0%	32.0%	29.2%	30.4%	31.6%
Share of Total Visitors Arriving by Ground Transport	54.0%	52.0%	56.0%	55.0%	53.0%	53.0%	54.0%	54.0%	57.0%	58.0%	59.0%	56.0%	57.0%	58.0%
Air Transportation:														
En/Deplaned Passenger Counts - McCarran	36,865,866	35,179,960	35,009,011	36,265,932	41,441,531	44,267,370	46,304,376	47,729,527	44,074,642	40,469,012	39,810,277	41,481,204	41,667,596	41,857,059
Visitors Arriving by Air	16,490,858	16,808,312	15,431,462	15,993,057	17,572,727	18,126,357	17,900,849	18,030,510	16,117,067	15,267,617	15,252,591	17,128,632	17,082,619	16,660,653
Share of Visitors Arriving by Air	46.0%	48.0%	44.0%	45.0%	47.0%	47.0%	46.0%	46.0%	43.0%	42.0%	41.0%	44.0%	43.0%	42.0%
Annual Growth Rates														
I-15 at NV/CA Border	4.3%	0.3%	0.2%	0.5%	1.9%	2.2%	1.9%	-1.4%	-5.3%	4.0%	2.3%	0.7%	3.4%	1.9%
All Major Highways, Excluding I-15 at Border	-0.5%	7.9%	15.3%	-2.0%	8.6%	6.4%	1.5%	0.7%	-5.3%	1.1%	3.7%	27.7%	-2.0%	2.4%
En/Deplaned Passenger Counts - McCarran	9.3%	-4.6%	-0.5%	3.6%	14.3%	6.8%	4.6%	3.1%	-7.7%	-8.2%	-1.6%	4.2%	0.4%	0.5%
Hotel Performance Measures														
Hotel Inventory	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593
Hotel Room Nights Available	44,642,287	45,622,632	46,261,444	46,777,335	47,351,027	48,392,570	48,490,787	48,649,041	49,961,921	51,516,729	53,685,406	54,490,748	54,944,854	54,772,469
Hotel Room Nights Occupied	39,776,278	38,642,369	38,859,613	39,760,735	41,953,010	43,166,172	43,496,236	43,978,733	42,967,252	41,986,134	43,154,119	45,654,165	46,350,563	46,191,449
Ratio - Visitors per Room Night Occupied	0.90	0.91	0.90	0.89	0.89	0.89	0.89	0.89	0.87	0.87	0.86	0.85	0.86	0.86
Total Hotel/Motel Occupancy Rate	89.1%	84.7%	84.0%	85.0%	88.6%	89.2%	89.7%	90.4%	86.0%	81.5%	80.4%	83.8%	84.4%	84.3%

	2014 Historical	2015 Historical	2016 Projected	2017 Projected	2018 Projected	2019 Projected	2020 Projected	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
Visitor Volume														
Values														
Las Vegas - Convention	5,194,580	5,710,303	6,052,921	6,343,461	6,584,513	6,768,879	6,927,271	7,058,889	7,168,302	7,279,411	7,392,242	7,506,821	7,623,177	7,741,336
Las Vegas - Non-Convention (Leisure)	35,931,932	36,601,913	36,936,290	37,247,599	37,597,206	37,992,615	38,403,427	38,830,761	39,270,374	39,698,689	40,116,007	40,537,560	40,963,387	41,393,528
Total Las Vegas	41,126,512	42,312,216	42,989,211	43,591,060	44,181,719	44,761,494	45,330,698	45,889,651	46,438,676	46,978,099	47,508,249	48,044,381	48,586,564	49,134,865
Convention Visitors as a Share of Total	12.6%	13.5%	14.1%	14.6%	14.9%	15.1%	15.3%	15.4%	15.4%	15.5%	15.6%	15.6%	15.7%	15.8%
Non-Convention Visitors as a Share of Total	87.4%	86.5%	85.9%	85.4%	85.1%	84.9%	84.7%	84.6%	84.6%	84.5%	84.4%	84.4%	84.3%	84.2%
Annual Growth Rates														
Las Vegas - Convention	1.7%	9.9%	6.0%	4.8%	3.8%	2.8%	2.3%	1.9%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
Las Vegas - Non-Convention (Leisure)	4.0%	1.9%	0.9%	0.8%	0.9%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
Total Las Vegas	3.7%	2.9%	1.6%	1.4%	1.4%	1.3%	1.3%	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%
Travel Measures														
Traffic Counts:														
I-15 at NV/CA Border	42,318	44,419	45,098	45,695	46,278	46,847	47,402	47,945	48,474	48,991	49,721	50,462	51,213	51,974
All Major Highways, Excluding I-15 at Border	60,406	64,785	65,367	65,823	66,251	66,652	67,026	67,376	67,700	68,001	68,591	69,186	69,785	70,389
All Major Highways	102,725	109,204	110,465	111,518	112,529	113,499	114,429	115,320	116,174	116,992	118,312	119,648	120,998	122,363
I-15 at NV/CA Border Share	41.2%	40.7%	40.8%	41.0%	41.1%	41.3%	41.4%	41.6%	41.7%	41.9%	42.0%	42.2%	42.3%	42.5%
All Major Highways, Excluding I-15 Share	58.8%	59.3%	59.2%	59.0%	58.9%	58.7%	58.6%	58.4%	58.3%	58.1%	58.0%	57.8%	57.7%	57.5%
Visitor Arrivals by Ground Transportation:														
Visitors Arriving by Ground via I-15	9,826,609	9,810,045	9,959,886	10,091,777	10,220,540	10,346,238	10,468,936	10,588,703	10,705,605	10,819,712	10,981,007	11,144,565	11,310,415	11,478,590
Visitors Arriving by Ground via Other Highways	14,026,768	14,307,918	14,436,492	14,537,172	14,631,677	14,720,199	14,802,928	14,880,053	14,951,764	15,018,243	15,148,530	15,279,845	15,412,195	15,545,586
Visitors Arriving by Ground Transportation	23,853,377	24,117,963	24,396,378	24,628,949	24,852,217	25,066,437	25,271,864	25,468,756	25,657,368	25,837,955	26,129,537	26,424,410	26,722,610	27,024,176
Share of Total Visitors Arriving via I-15	26.2%	26.1%	23.4%	23.7%	23.9%	24.2%	24.4%	24.7%	24.9%	25.2%	25.4%	25.4%	25.4%	25.4%
Share of Total Visitors Arriving via Other Highways	31.8%	30.9%	33.3%	32.8%	32.3%	31.8%	31.3%	30.8%	30.3%	29.8%	29.6%	29.6%	29.6%	29.6%
Share of Total Visitors Arriving by Ground Transport	58.0%	57.0%	56.8%	56.5%	56.3%	56.0%	55.8%	55.5%	55.3%	55.0%	55.0%	55.0%	55.0%	55.0%
Air Transportation:														
En/Deplaned Passenger Counts - McCarran	42,885,350	45,389,074	45,929,088	47,020,745	48,081,035	48,901,907	49,805,790	50,659,769	51,595,169	52,498,260	53,074,115	53,671,479	54,275,124	54,894,475
Visitors Arriving by Air	17,273,135	18,194,253	18,592,834	18,962,111	19,329,502	19,695,057	20,058,834	20,420,894	20,781,307	21,140,145	21,378,712	21,619,971	21,863,954	22,110,689
Share of Visitors Arriving by Air	42.0%	43.0%	43.3%	43.5%	43.8%	44.0%	44.3%	44.5%	44.8%	45.0%	45.0%	45.0%	45.0%	45.0%
Annual Growth Rates														
I-15 at NV/CA Border	-0.4%	5.0%	1.5%	1.3%	1.3%	1.2%	1.2%	1.1%	1.1%	1.1%	1.5%	1.5%	1.5%	1.5%
All Major Highways, Excluding I-15 at Border	1.1%	7.2%	0.9%	0.7%	0.7%	0.6%	0.6%	0.5%	0.5%	0.4%	0.9%	0.9%	0.9%	0.9%
En/Deplaned Passenger Counts - McCarran	2.5%	5.8%	1.2%	2.4%	2.3%	1.7%	1.8%	1.7%	1.8%	1.8%	1.1%	1.1%	1.1%	1.1%
Hotel Performance Measures														
Hotel Inventory	150,544	149,213	149,447	149,820	151,658	156,245	159,245	159,245	161,745	165,745	165,745	168,245	166,745	172,745
Hotel Room Nights Available	54,751,855	54,587,881	54,505,450	54,616,228	55,019,735	56,192,298	57,576,925	58,124,425	58,580,675	59,766,925	60,496,925	60,953,175	61,135,675	61,956,925
Hotel Room Nights Occupied	47,497,234	47,896,317	48,662,658	49,343,935	50,012,546	50,668,835	51,313,159	52,147,330	52,771,222	53,384,204	53,986,646	54,595,888	55,212,004	55,835,074
Ratio - Visitors per Room Night Occupied	0.87	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Total Hotel/Motel Occupancy Rate	86.8%	87.7%	89.3%	90.3%	90.9%	90.2%	89.1%	89.7%	90.1%	89.3%	89.2%	89.6%	90.3%	90.1%

	2028 Projected	2029 Projected	2030 Projected	2031 Projected	2032 Projected	2033 Projected	2034 Projected	2035 Projected	2036 Projected	2037 Projected	2038 Projected	2039 Projected	2040 Projected
Visitor Volume													
Values													
Las Vegas - Convention	7,861,327	7,983,178	8,106,917	8,232,574	8,360,179	8,489,762	8,621,353	8,754,984	8,890,686	9,028,492	9,168,433	9,310,544	9,454,858
Las Vegas - Non-Convention (Leisure)	41,828,026	42,266,922	42,710,257	43,158,073	43,610,414	44,067,321	44,528,838	44,995,009	45,465,877	45,941,487	46,421,884	46,907,112	47,397,217
Total Las Vegas	49,689,353	50,250,100	50,817,174	51,390,647	51,970,593	52,557,083	53,150,191	53,749,993	54,356,564	54,969,979	55,590,317	56,217,656	56,852,074
Convention Visitors as a Share of Total	15.8%	15.9%	16.0%	16.0%	16.1%	16.2%	16.2%	16.3%	16.4%	16.4%	16.5%	16.6%	16.6%
Non-Convention Visitors as a Share of Total	84.2%	84.1%	84.0%	84.0%	83.9%	83.8%	83.8%	83.7%	83.6%	83.6%	83.5%	83.4%	83.4%
Annual Growth Rates													
Las Vegas - Convention	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
Las Vegas - Non-Convention (Leisure)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Total Las Vegas	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
Travel Measures													
Traffic Counts:													
I-15 at NV/CA Border	52,746	53,529	54,323	55,128	55,944	56,772	57,611	58,462	59,325	60,200	61,087	61,986	62,898
All Major Highways, Excluding I-15 at Border	70,998	71,611	72,230	72,853	73,481	74,114	74,752	75,394	76,042	76,695	77,353	78,016	78,684
All Major Highways	123,744	125,141	126,553	127,981	129,425	130,886	132,363	133,857	135,367	136,895	138,440	140,002	141,582
I-15 at NV/CA Border Share	42.6%	42.8%	42.9%	43.1%	43.2%	43.4%	43.5%	43.7%	43.8%	44.0%	44.1%	44.3%	44.4%
All Major Highways, Excluding I-15 Share	57.4%	57.2%	57.1%	56.9%	56.8%	56.6%	56.5%	56.3%	56.2%	56.0%	55.9%	55.7%	55.6%
Visitor Arrivals by Ground Transportation:													
Visitors Arriving by Ground via I-15	11,649,120	11,822,037	11,997,373	12,175,161	12,355,434	12,538,225	12,723,569	12,911,498	13,102,049	13,295,257	13,491,156	13,689,784	13,891,176
Visitors Arriving by Ground via Other Highways	15,680,024	15,815,518	15,952,072	16,089,695	16,228,392	16,368,170	16,509,037	16,650,998	16,794,061	16,938,232	17,083,519	17,229,927	17,377,465
Visitors Arriving by Ground Transportation	27,329,144	27,637,555	27,949,446	28,264,856	28,583,826	28,906,395	29,232,605	29,562,496	29,896,110	30,233,489	30,574,675	30,919,711	31,268,641
Share of Total Visitors Arriving via I-15	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%
Share of Total Visitors Arriving via Other Highways	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%
Share of Total Visitors Arriving by Ground Transport	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%
Air Transportation:													
En/Deplaned Passenger Counts - McCarran	55,513,720	56,137,382	56,770,932	57,411,966	58,060,733	58,715,584	59,377,799	60,047,988	60,725,754	61,411,117	62,104,049	62,804,856	63,513,646
Visitors Arriving by Air	22,360,209	22,612,545	22,867,728	23,125,791	23,386,767	23,650,687	23,917,586	24,187,497	24,460,454	24,736,491	25,015,643	25,297,945	25,583,434
Share of Visitors Arriving by Air	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Annual Growth Rates													
I-15 at NV/CA Border	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
All Major Highways, Excluding I-15 at Border	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
En/Deplaned Passenger Counts - McCarran	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
Hotel Performance Measures													
Hotel Inventory	172,745	176,245	175,245	181,245	181,245	184,245	182,245	186,245	187,245	191,745	194,745	194,745	194,745
Hotel Room Nights Available	63,051,925	63,690,675	64,146,925	65,059,425	66,154,425	66,701,925	66,884,425	67,249,425	68,161,925	69,165,675	70,534,425	71,081,925	71,081,925
Hotel Room Nights Occupied	56,465,174	57,102,386	57,746,788	58,398,463	59,057,492	59,723,958	60,397,945	61,079,537	61,768,822	62,465,886	63,170,815	63,883,700	64,604,630
Ratio - Visitors per Room Night Occupied	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Total Hotel/Motel Occupancy Rate	89.6%	89.7%	90.0%	89.8%	89.3%	89.5%	90.3%	90.8%	90.6%	90.3%	89.6%	89.9%	90.9%

Exhibit B-3
Aggressive Scenario: Supply Projection

	2000 Historical	2001 Historical	2002 Historical	2003 Historical	2004 Historical	2005 Historical	2006 Historical	2007 Historical	2008 Historical	2009 Historical	2010 Historical	2011 Historical	2012 Historical	2013 Historical
HOTEL-CASINO														
Supply														
Hotel Room Inventory, Beginning of Period	120,294	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481
Hotel Additions (net) - Historical	3,976	2,340	177	3,695	1,021	1,683	(581)	342	7,582	8,412	(6)	1,226	320	112
Hotel Additions - Projected														
2016														
Residence Inn (South) #2														
Thunderbird Hotel (formerly Aruba Hotel & Spa)														
2017														
Lucky Dragon Hotel & Casino														
Starwood Hotels & Resorts (Name TBD)														
TBD (formerly Tod Hostel Motel)														
2018														
Residence Inn Marriott (Henderson)														
SpringHill Suites Marriott														
Alon Las Vegas														
Mardi Gras Hotel and Casino														
2019 and Beyond														
Resorts World Las Vegas (Phase 1)														
Fairfield Marriott (NW)														
Wynn Paradise Park														
Other Future Projects (Additions)														
Future Demolitions (Reductions)														
Hotel Room Inventory, End of Period	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593
Average Room Nights Available	44,642,287	45,622,632	46,261,444	46,777,335	47,351,027	48,392,570	48,490,787	48,649,041	49,961,921	51,516,729	53,685,406	54,490,748	54,944,854	54,772,469
Annual Growth Rate	5.3%	2.2%	1.4%	1.1%	1.2%	2.2%	0.2%	0.3%	2.7%	3.1%	4.2%	1.5%	0.8%	-0.3%

Exhibit B-3
Aggressive Scenario: Supply Projection

	2014 Historical	2015 Historical	2016 Projected	2017 Projected	2018 Projected	2019 Projected	2020 Projected	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
HOTEL-CASINO														
Supply														
Hotel Room Inventory, Beginning of Period	150,593	150,544	149,213	149,447	149,820	151,658	156,245	159,245	159,245	161,745	165,745	165,745	168,245	166,745
Hotel Additions (net) - Historical	(49)	(1,331)	234	373	1,838	4,587	3,000	0	2,500	4,000	0	2,500	(1,500)	6,000
Hotel Additions - Projected														
2016														
Residence Inn (South) #2			124											
Thunderbird Hotel (formerly Aruba Hotel & Spa)			110											
2017														
Lucky Dragon Hotel & Casino				206										
Starwood Hotels & Resorts (Name TBD)				125										
TBD (formerly Tod Hostel Motel)				42										
2018														
Residence Inn Marriott (Henderson)					100									
SpringHill Suites Marriott					252									
Alon Las Vegas					1,100									
Mardi Gras Hotel and Casino					386									
2019 and Beyond														
Resorts World Las Vegas (Phase 1)						3,500								
Fairfield Marriott (NW)						87								
Wynn Paradise Park						1,000								
Other Future Projects (Additions)			-	-	-	-	3,000	-	2,500	4,000	-	2,500	-	6,000
Future Demolitions (Reductions)			-	-	-	-	-	-	-	-	-	-	(1,500)	-
Hotel Room Inventory, End of Period	150,544	149,213	149,447	149,820	151,658	156,245	159,245	159,245	161,745	165,745	165,745	168,245	166,745	172,745
Average Room Nights Available	54,751,855	54,587,881	54,505,450	54,616,228	55,019,735	56,192,298	57,576,925	58,124,425	58,580,675	59,766,925	60,496,925	60,953,175	61,135,675	61,956,925
Annual Growth Rate	0.0%	-0.3%	-0.2%	0.2%	0.7%	2.1%	2.5%	1.0%	0.8%	2.0%	1.2%	0.8%	0.3%	1.3%

APPLIED ANALYSIS

	2028 Projected	2029 Projected	2030 Projected	2031 Projected	2032 Projected	2033 Projected	2034 Projected	2035 Projected	2036 Projected	2037 Projected	2038 Projected	2039 Projected	2040 Projected
HOTEL-CASINO													
Supply													
Hotel Room Inventory, Beginning of Period	172,745	172,745	176,245	175,245	181,245	181,245	184,245	182,245	186,245	187,245	191,745	194,745	194,745
Hotel Additions (net) - Historical	0	3,500	(1,000)	6,000	0	3,000	(2,000)	4,000	1,000	4,500	3,000	0	0
Hotel Additions - Projected													
2016													
Residence Inn (South) #2													
Thunderbird Hotel (formerly Aruba Hotel & Spa)													
2017													
Lucky Dragon Hotel & Casino													
Starwood Hotels & Resorts (Name TBD)													
TBD (formerly Tod Hostel Motel)													
2018													
Residence Inn Marriott (Henderson)													
SpringHill Suites Marriott													
Alon Las Vegas													
Mardi Gras Hotel and Casino													
2019 and Beyond													
Resorts World Las Vegas (Phase 1)													
Fairfield Marriott (NW)													
Wynn Paradise Park													
Other Future Projects (Additions)	-	3,500	1,000	6,000	-	3,000	-	4,000	1,000	4,500	3,000	-	-
Future Demolitions (Reductions)	-	-	(2,000)	-	-	-	(2,000)	-	-	-	-	-	-
Hotel Room Inventory, End of Period	172,745	176,245	175,245	181,245	181,245	184,245	182,245	186,245	187,245	191,745	194,745	194,745	194,745
Average Room Nights Available	63,051,925	63,690,675	64,146,925	65,059,425	66,154,425	66,701,925	66,884,425	67,249,425	68,161,925	69,165,675	70,534,425	71,081,925	71,081,925
Annual Growth Rate	1.8%	1.0%	0.7%	1.4%	1.7%	0.8%	0.3%	0.5%	1.4%	1.5%	2.0%	0.8%	0.0%

	2000 Historical	2001 Historical	2002 Historical	2003 Historical	2004 Historical	2005 Historical	2006 Historical	2007 Historical	2008 Historical	2009 Historical	2010 Historical	2011 Historical	2012 Historical	2013 Historical	2014 Historical	2015 Historical	2016 Projected	2017 Projected	2018 Projected	2019 Projected	2020 Projected
Visitor Volume																					
Values																					
Conservative Scenario	35,849,691	35,017,317	35,071,504	35,540,126	37,388,781	38,566,717	38,914,889	39,196,761	37,481,552	36,351,469	37,201,442	38,928,708	39,727,022	39,668,221	41,126,512	42,312,216	42,671,870	42,842,557	42,994,648	43,128,899	43,246,053
Base Case Scenario	35,849,691	35,017,317	35,071,504	35,540,126	37,388,781	38,566,717	38,914,889	39,196,761	37,481,552	36,351,469	37,201,442	38,928,708	39,727,022	39,668,221	41,126,512	42,312,216	42,777,650	43,162,649	43,531,690	43,885,276	44,223,911
Aggressive Scenario	35,849,691	35,017,317	35,071,504	35,540,126	37,388,781	38,566,717	38,914,889	39,196,761	37,481,552	36,351,469	37,201,442	38,928,708	39,727,022	39,668,221	41,126,512	42,312,216	42,989,211	43,591,060	44,181,719	44,761,494	45,330,698
Annual Growth Rates																					
Conservative Scenario	6.0%	-2.3%	0.2%	1.3%	5.2%	3.2%	0.9%	0.7%	-4.4%	-3.0%	2.3%	4.6%	2.1%	-0.1%	3.7%	2.9%	0.8%	0.4%	0.4%	0.3%	0.3%
Base Case Scenario	6.0%	-2.3%	0.2%	1.3%	5.2%	3.2%	0.9%	0.7%	-4.4%	-3.0%	2.3%	4.6%	2.1%	-0.1%	3.7%	2.9%	1.1%	0.9%	0.9%	0.8%	0.8%
Aggressive Scenario	6.0%	-2.3%	0.2%	1.3%	5.2%	3.2%	0.9%	0.7%	-4.4%	-3.0%	2.3%	4.6%	2.1%	-0.1%	3.7%	2.9%	1.6%	1.4%	1.4%	1.3%	1.3%
Traffic Counts on I-15 at NV/CA Border																					
Values																					
Conservative Scenario	37,707	37,809	37,868	38,074	38,799	39,649	40,383	39,808	37,686	39,199	40,082	40,344	41,712	42,485	42,318	44,419	44,765	44,910	45,034	45,138	45,223
Base Case Scenario	37,707	37,809	37,868	38,074	38,799	39,649	40,383	39,808	37,686	39,199	40,082	40,344	41,712	42,485	42,318	44,419	44,876	45,246	45,597	45,930	46,245
Aggressive Scenario	37,707	37,809	37,868	38,074	38,799	39,649	40,383	39,808	37,686	39,199	40,082	40,344	41,712	42,485	42,318	44,419	45,098	45,695	46,278	46,847	47,402
Annual Growth Rates																					
Conservative Scenario	4.3%	0.3%	0.2%	0.5%	1.9%	2.2%	1.9%	-1.4%	-5.3%	4.0%	2.3%	0.7%	3.4%	1.9%	-0.4%	5.0%	0.8%	0.3%	0.3%	0.2%	0.2%
Base Case Scenario	4.3%	0.3%	0.2%	0.5%	1.9%	2.2%	1.9%	-1.4%	-5.3%	4.0%	2.3%	0.7%	3.4%	1.9%	-0.4%	5.0%	1.0%	0.8%	0.8%	0.7%	0.7%
Aggressive Scenario	4.3%	0.3%	0.2%	0.5%	1.9%	2.2%	1.9%	-1.4%	-5.3%	4.0%	2.3%	0.7%	3.4%	1.9%	-0.4%	5.0%	1.5%	1.3%	1.3%	1.2%	1.2%
En/Deplaned Passenger Counts - McCarran																					
Values																					
Conservative Scenario	36,865,866	35,179,960	35,009,011	36,265,932	41,441,531	44,267,370	46,304,376	47,729,527	44,074,642	40,469,012	39,810,277	41,481,204	41,667,596	41,857,059	42,885,350	45,389,074	45,590,044	46,213,627	46,790,283	47,118,677	47,515,812
Base Case Scenario	36,865,866	35,179,960	35,009,011	36,265,932	41,441,531	44,267,370	46,304,376	47,729,527	44,074,642	40,469,012	39,810,277	41,481,204	41,667,596	41,857,059	42,885,350	45,389,074	45,703,059	46,558,813	47,374,317	47,944,924	48,590,088
Aggressive Scenario	36,865,866	35,179,960	35,009,011	36,265,932	41,441,531	44,267,370	46,304,376	47,729,527	44,074,642	40,469,012	39,810,277	41,481,204	41,667,596	41,857,059	42,885,350	45,389,074	45,929,088	47,020,745	48,081,035	48,901,907	49,805,790
Annual Growth Rates																					
Conservative Scenario	9.3%	-4.6%	-0.5%	3.6%	14.3%	6.8%	4.6%	3.1%	-7.7%	-8.2%	-1.6%	4.2%	0.4%	0.5%	2.5%	5.8%	0.4%	1.4%	1.2%	0.7%	0.8%
Base Case Scenario	9.3%	-4.6%	-0.5%	3.6%	14.3%	6.8%	4.6%	3.1%	-7.7%	-8.2%	-1.6%	4.2%	0.4%	0.5%	2.5%	5.8%	0.7%	1.9%	1.8%	1.2%	1.3%
Aggressive Scenario	9.3%	-4.6%	-0.5%	3.6%	14.3%	6.8%	4.6%	3.1%	-7.7%	-8.2%	-1.6%	4.2%	0.4%	0.5%	2.5%	5.8%	1.2%	2.4%	2.3%	1.7%	1.8%
Hotel Room Nights Occupied																					
Values																					
Conservative Scenario	39,776,278	38,642,369	38,859,613	39,760,735	41,953,010	43,166,172	43,496,236	43,978,733	42,967,252	41,986,134	43,154,119	45,654,165	46,350,563	46,191,449	47,497,234	47,896,317	48,303,436	48,496,649	48,668,813	48,820,781	48,953,396
Base Case Scenario	39,776,278	38,642,369	38,859,613	39,760,735	41,953,010	43,166,172	43,496,236	43,978,733	42,967,252	41,986,134	43,154,119	45,654,165	46,350,563	46,191,449	47,497,234	47,896,317	48,423,176	48,858,985	49,276,729	49,676,980	50,060,306
Aggressive Scenario	39,776,278	38,642,369	38,859,613	39,760,735	41,953,010	43,166,172	43,496,236	43,978,733	42,967,252	41,986,134	43,154,119	45,654,165	46,350,563	46,191,449	47,497,234	47,896,317	48,662,658	49,343,935	50,012,546	50,668,835	51,313,159
Annual Growth Rates																					
Conservative Scenario	6.7%	-2.9%	0.6%	2.3%	5.5%	2.9%	0.8%	1.1%	-2.3%	-2.3%	2.8%	5.8%	1.5%	-0.3%	2.8%	0.8%	0.8%	0.4%	0.4%	0.3%	0.3%
Base Case Scenario	6.7%	-2.9%	0.6%	2.3%	5.5%	2.9%	0.8%	1.1%	-2.3%	-2.3%	2.8%	5.8%	1.5%	-0.3%	2.8%	0.8%	1.1%	0.9%	0.9%	0.8%	0.8%
Aggressive Scenario	6.7%	-2.9%	0.6%	2.3%	5.5%	2.9%	0.8%	1.1%	-2.3%	-2.3%	2.8%	5.8%	1.5%	-0.3%	2.8%	0.8%	1.6%	1.4%	1.4%	1.3%	1.3%
Hotel Room Inventory																					
Values																					
Conservative Scenario	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593	150,544	149,213	149,447	149,820	151,658	156,245	156,245
Base Case Scenario	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593	150,544	149,213	149,447	149,820	151,658	156,245	156,245
Aggressive Scenario	124,270	126,610	126,787	130,482	131,503	133,186	132,605	132,947	140,529	148,941	148,935	150,161	150,481	150,593	150,544	149,213	149,447	149,820	151,658	156,245	159,245
Annual Growth Rates																					
Conservative Scenario	3.3%	1.9%	0.1%	2.9%	0.8%	1.3%	-0.4%	0.3%	5.7%	6.0%	0.0%	0.8%	0.2%	0.1%	0.0%	-0.9%	0.2%	0.2%	1.2%	3.0%	0.0%
Base Case Scenario	3.3%	1.9%	0.1%	2.9%	0.8%	1.3%	-0.4%	0.3%	5.7%	6.0%	0.0%	0.8%	0.2%	0.1%	0.0%	-0.9%	0.2%	0.2%	1.2%	3.0%	0.0%
Aggressive Scenario	3.3%	1.9%	0.1%	2.9%	0.8%	1.3%	-0.4%	0.3%	5.7%	6.0%	0.0%	0.8%	0.2%	0.1%	0.0%	-0.9%	0.2%	0.2%	1.2%	3.0%	1.9%
Hotel Room Occupancy																					
Values																					
Conservative Scenario	89.1%	84.7%	84.0%	85.0%	88.6%	89.2%	89.7%	90.4%	86.0%	81.5%	80.4%	83.8%	84.4%	84.3%	86.8%	87.7%	88.6%	88.8%	88.5%	86.9%	85.8%
Base Case Scenario	89.1%	84.7%	84.0%	85.0%	88.6%	89.2%	89.7%	90.4%	86.0%	81.5%	80.4%	83.8%	84.4%	84.3%	86.8%	87.7%	88.8%	89.5%	89.6%	88.4%	87.8%
Aggressive Scenario	89.1%	84.7%	84.0%	85.0%	88.6%	89.2%	89.7%	90.4%	86.0%	81.5%	80.4%	83.8%	84.4%	84.3%	86.8%	87.7%	89.3%	90.3%	90.9%	90.2%	89.1%

Note: This Page Is Intended To Be Printed on Tabloid Paper (11x17)

	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected	2028 Projected	2029 Projected	2030 Projected	2031 Projected	2032 Projected	2033 Projected	2034 Projected	2035 Projected	2036 Projected	2037 Projected	2038 Projected	2039 Projected	2040 Projected
Visitor Volume																				
Values																				
Conservative Scenario	43,346,841	43,431,975	43,502,154	43,572,446	43,642,851	43,713,371	43,784,004	43,854,751	43,925,613	43,996,589	44,067,680	44,138,886	44,210,207	44,281,643	44,353,194	44,424,861	44,496,644	44,568,543	44,640,558	44,712,689
Base Case Scenario	44,548,097	44,858,331	45,155,106	45,438,908	45,724,493	46,011,873	46,301,059	46,592,063	46,884,896	47,179,569	47,476,094	47,774,483	48,074,748	48,376,899	48,680,950	48,986,911	49,294,796	49,604,615	49,916,382	50,230,108
Aggressive Scenario	45,889,651	46,438,676	46,978,099	47,508,249	48,044,381	48,586,564	49,134,865	49,689,353	50,250,100	50,817,174	51,390,647	51,970,593	52,557,083	53,150,191	53,749,993	54,356,564	54,969,979	55,590,317	56,217,656	56,852,074
Annual Growth Rates																				
Conservative Scenario	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Base Case Scenario	0.7%	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Aggressive Scenario	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
Traffic Counts on I-15 at NV/CA Border																				
Values																				
Conservative Scenario	45,288	45,336	45,366	45,602	45,839	46,076	46,314	46,553	46,792	47,032	47,273	47,514	47,756	47,998	48,242	48,486	48,730	48,975	49,221	49,468
Base Case Scenario	46,543	46,824	47,090	47,555	48,025	48,499	48,977	49,458	49,944	50,435	50,929	51,427	51,930	52,437	52,949	53,465	53,985	54,509	55,038	55,572
Aggressive Scenario	47,945	48,474	48,991	49,721	50,462	51,213	51,974	52,746	53,529	54,323	55,128	55,944	56,772	57,611	58,462	59,325	60,200	61,087	61,986	62,898
Annual Growth Rates																				
Conservative Scenario	0.1%	0.1%	0.1%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Base Case Scenario	0.6%	0.6%	0.6%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Aggressive Scenario	1.1%	1.1%	1.1%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
En/Deplaned Passenger Counts - McCarran																				
Values																				
Conservative Scenario	47,852,013	48,255,030	48,614,668	48,677,477	48,754,628	48,831,462	48,916,800	48,995,620	49,072,180	49,151,504	49,231,264	49,311,612	49,390,958	49,470,409	49,550,442	49,630,616	49,710,874	49,791,114	49,871,534	49,952,148
Base Case Scenario	49,178,525	49,839,659	50,461,572	50,762,578	51,080,085	51,399,133	51,728,812	52,053,700	52,378,154	52,707,387	53,039,010	53,373,195	53,708,299	54,045,484	54,385,264	54,727,193	55,071,222	55,417,258	55,765,521	56,116,041
Aggressive Scenario	50,659,769	51,595,169	52,498,260	53,074,115	53,671,479	54,275,124	54,894,475	55,513,720	56,137,382	56,770,932	57,411,966	58,060,733	58,715,584	59,377,799	60,047,988	60,725,754	61,411,117	62,104,049	62,804,856	63,513,646
Annual Growth Rates																				
Conservative Scenario	0.7%	0.8%	0.7%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Base Case Scenario	1.2%	1.3%	1.2%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Aggressive Scenario	1.7%	1.8%	1.8%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
Hotel Room Nights Occupied																				
Values																				
Conservative Scenario	49,257,774	49,354,517	49,434,266	49,514,143	49,594,149	49,674,285	49,754,550	49,834,945	49,915,469	49,996,124	50,076,909	50,157,825	50,238,871	50,320,048	50,401,357	50,482,797	50,564,368	50,646,071	50,727,907	50,809,874
Base Case Scenario	50,622,838	50,975,377	51,312,621	51,635,122	51,959,651	52,286,219	52,614,840	52,945,526	53,278,291	53,613,147	53,950,107	54,289,186	54,630,395	54,973,749	55,319,261	55,666,945	56,016,813	56,368,881	56,723,161	57,079,668
Aggressive Scenario	52,147,330	52,771,222	53,384,204	53,986,646	54,595,888	55,212,004	55,835,074	56,465,174	57,102,386	57,746,788	58,398,463	59,057,492	59,723,958	60,397,945	61,079,537	61,768,822	62,465,886	63,170,815	63,883,700	64,604,630
Annual Growth Rates																				
Conservative Scenario	0.6%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Base Case Scenario	1.1%	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Aggressive Scenario	1.6%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
Hotel Room Inventory																				
Values																				
Conservative Scenario	156,245	158,745	158,745	158,745	160,745	159,245	162,745	162,745	164,245	163,245	163,245	163,245	166,245	164,245	165,245	166,245	166,245	167,745	166,245	166,245
Base Case Scenario	156,245	158,745	162,745	162,745	164,745	163,245	166,745	166,745	168,245	167,245	170,245	170,245	173,245	171,245	175,245	176,245	176,245	177,745	177,745	177,745
Aggressive Scenario	159,245	161,745	165,745	165,745	168,245	166,745	172,745	172,745	176,245	175,245	181,245	181,245	184,245	182,245	186,245	187,245	191,745	194,745	194,745	194,745
Annual Growth Rates																				
Conservative Scenario	0.0%	1.6%	0.0%	0.0%	1.3%	-0.9%	2.2%	0.0%	0.9%	-0.6%	0.0%	0.0%	1.8%	-1.2%	0.6%	0.6%	0.0%	0.9%	-0.9%	0.0%
Base Case Scenario	0.0%	1.6%	2.5%	0.0%	1.2%	-0.9%	2.1%	0.0%	0.9%	-0.6%	1.8%	0.0%	1.8%	-1.2%	2.3%	0.6%	0.0%	0.9%	0.0%	0.0%
Aggressive Scenario	0.0%	1.6%	2.5%	0.0%	1.5%	-0.9%	3.6%	0.0%	2.0%	-0.6%	3.4%	0.0%	1.7%	-1.1%	2.2%	0.5%	2.4%	1.6%	0.0%	0.0%
Hotel Room Occupancy																				
Values																				
Conservative Scenario	86.4%	85.9%	85.3%	85.5%	85.1%	85.1%	84.7%	83.9%	83.6%	83.7%	84.0%	84.2%	83.5%	83.4%	83.8%	83.4%	83.3%	83.1%	83.2%	83.7%
Base Case Scenario	88.8%	88.7%	87.5%	86.9%	86.9%	87.4%	87.4%	87.0%	87.1%	87.6%	87.6%	87.4%	87.1%	87.4%	87.5%	86.8%	87.1%	87.3%	87.4%	88.0%
Aggressive Scenario	89.7%	90.1%	89.3%	89.2%	89.6%	90.3%	90.1%	89.6%	89.7%	90.0%	89.8%	89.3%	89.5%	90.3%	90.8%	90.6%	90.3%	89.6%	89.9%	90.9%

E Journey time and speed data

Journey times were used for several purposes:

- General understanding of travel patterns , both over time and across the daytime
- Model inputs:
  - Zone-to-zone drive times
  - Zonal access and egress times to airports and train stations

The primary source for journey times was Google Maps. This is an appropriate source because it is how many drivers collect information when planning their trips, both for estimated journey times and routing decisions. The tool is available both in the initial planning stages of a trip and while making the trip in real time via a mobile device. The data that underlies Google Maps comes from two main sources. The first is road sensors managed by local transportation authorities. The second is cell phone records from people using devices running Google's Android operating system or those using Google Maps on another operating system.

SDG has developed several tools that utilize the Google Maps API (application programming interface) to collect data. These tools allow bulk queries to be submitted to the Google Maps database, rather than having to manually select origins, destinations and departure/arrival times as a typical user does. Data was collected for autos and public transportation following the methodologies described below.

E1 Zone to Zone Drive Times

SDG's primary speed collection tool, which can be programmed to collect data at regular intervals over time, is designed to gather speeds on a road segment-level basis. 204 major road segments (across 24 different highways) were chosen to generate time-sensitive travel times. These segments correspond to the highways that users would use to travel between California and Las Vegas. They are shown in Figure G.1 and Figure G.2. Speeds on each of these segments were collected every half hour from the beginning of March to the middle of April (approximately 413,000 records in total).

Figure E.1: Road segments

Source: Steer Davies Gleave

Figure E.2: Road segments: Close up on Los Angeles

Source: Steer Davies Gleave

These segments make up the bulk of a user's trip, but for complete zone-to-zone travel times, additional highway access and egress times were collected. A "centroid" was chosen for each zone. If the zone was consistently populated, the actual centroid was used. If not, a point corresponding to a major population center near the centroid or that used a route representative for the zone overall was used. These points are shown in Figure G.3 below.

Figure E.3: Zone centers with airports and HSR stations

Source: Steer Davies Gleave

Free flow travel times were collected from each of these points to the closest of the above highway segments (or from a highway to a point for the Las Vegas zones).

All-day average segment travel times were used to enumerate the optimal route from each California zone to each Las Vegas using the Python NetworkX package, which find the shortest distance between points in a network.

Table G.1 provides the time periods for which zone-to-zone travel times were determined.

Table E.1: Time period definitions

Period\Direction	To Las Vegas (Arrival Time)	From Las Vegas (Departure Time)
Peak	Friday 12:00 to 20:00	Sunday 10:00 to 18:00
Off-Peak	All other times	All other times

Source: Steer Davies Gleave

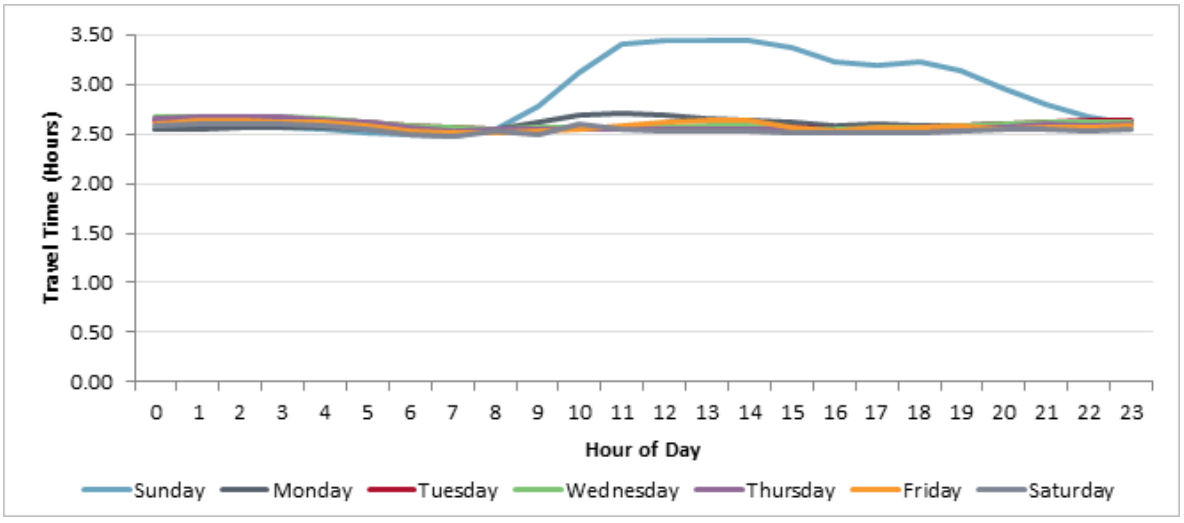
Since many of these trips are many hours long, it was necessary to shift these time periods for zones farther from Las Vegas to align with the peak and off-peak definitions used within our forecasting model. Segments were each associated with a number of hours to "shift" their peaks appropriately. For example, if it took 3 hours to travel from a given highway segment to Las Vegas, its to-Las Vegas peak became 9:00 to 17:00. The appropriate "peak period" was used for each hour when calculating the total travel time. These consisted of the following three parts:

- Static origin to highway travel time
- Average highway travel time along segments in that time period
- Static highway to destination travel time

E1.1 Speed/Travel Time Trends

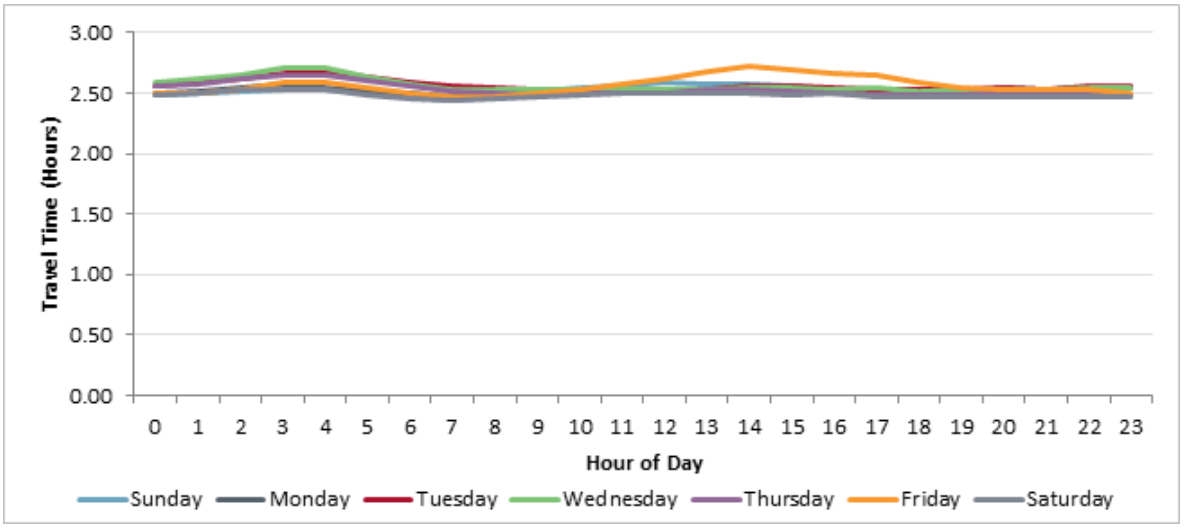
Figure G.4 and G.5 show how travel times on I-15 vary across different times of day and days of the week. While the trip takes 2.5 hours most days, it takes up to an hour longer on Sunday afternoons and 15 minutes longer on Friday afternoons.

Figure E.4: Las Vegas to Barstow Travel Times



Source: Google maps and SDG analysis

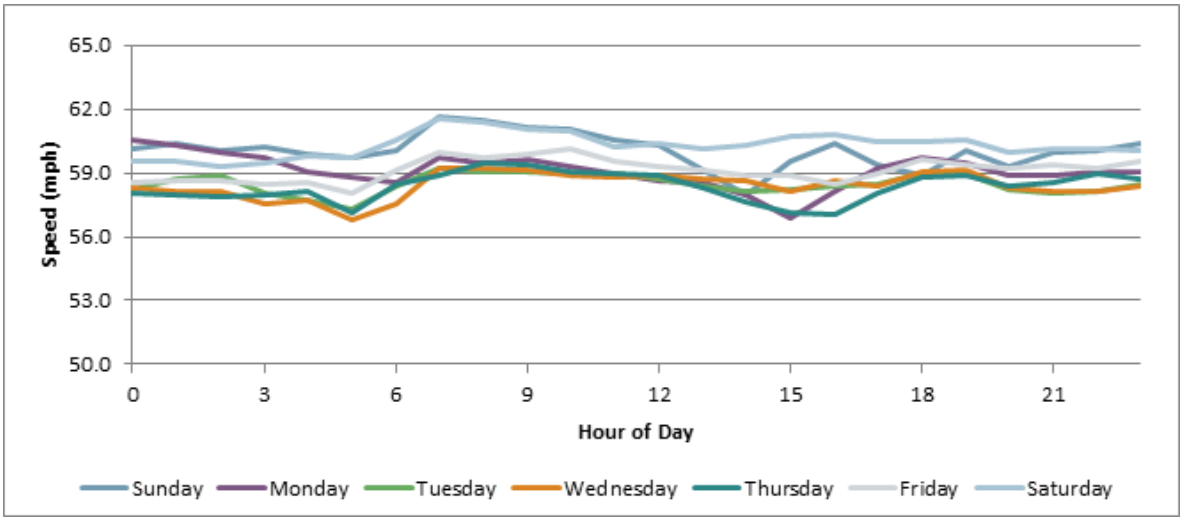
Figure E.5: Barstow to Las Vegas Travel Times



Source: Google maps and SDG analysis

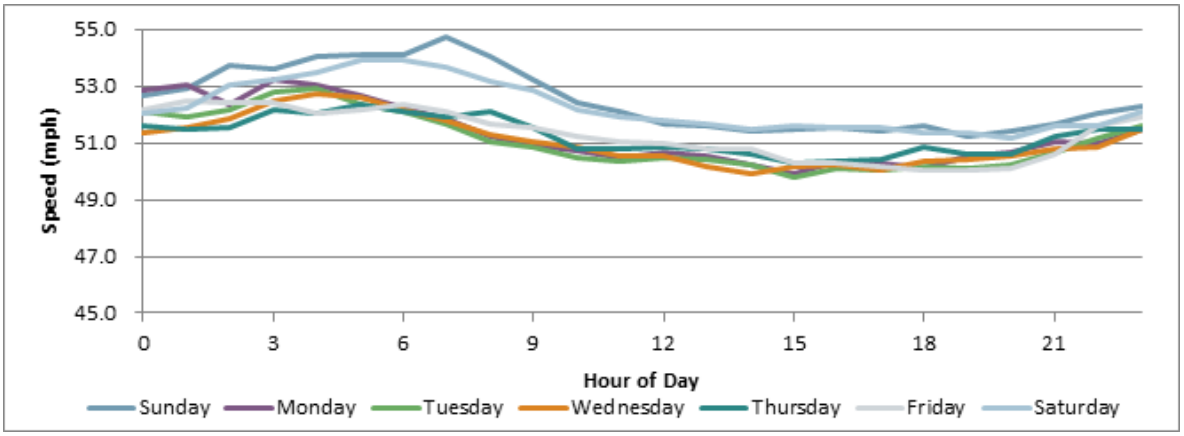
Figures G.6 to G.9 show speed profiles over time of day and days of the week for several key links.

Figure E.6: Speed Profile of CA-58 Eastbound (I-5 to I-15)



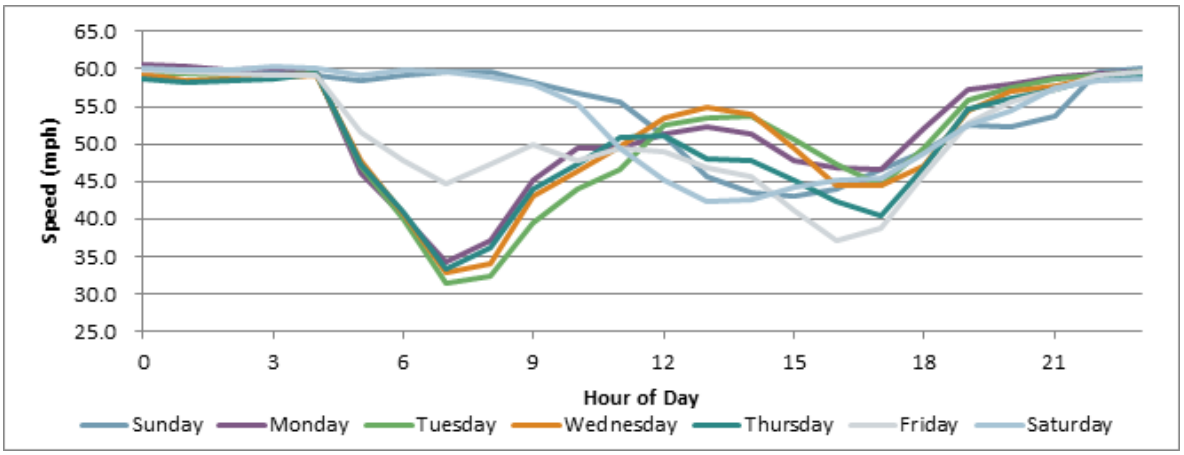
Source: Google maps and SDG analysis

Figure E.7: Speed Profile of CA-138 and CA-18 Eastbound (CA-14 to I-15)



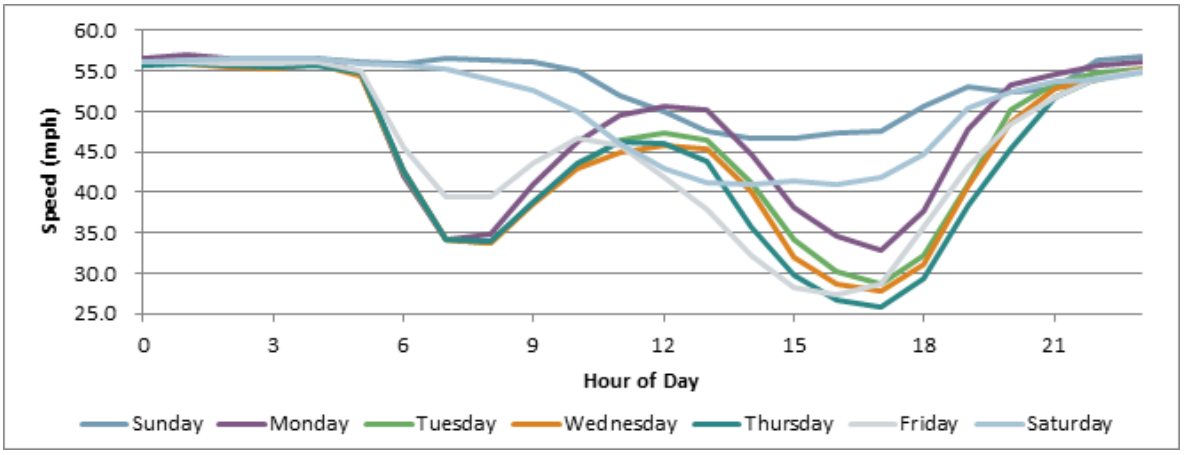
Source: Google maps and SDG analysis

Figure E.8: Speed Profile of CA-210 Eastbound (I-405 to I-15)



Source: Google maps and SDG analysis

Figure E.9: Speed Profile of I-405 Northbound (I-5 to I-5)



Source: Google maps and SDG analysis

E2 Airport and Station Access Times

The Google Maps API was also used to collect travel times between zone centroids and major transportation hubs. For trips whose primary modes were air or rail, their complete travel time also includes access and egress time to and from the airport or train station. These travel times were collected for both driving and public transportation options.

Public transportation times were collected such that a traveler would be expected to reach the airport or train station at 16:00 on Friday afternoon. Some zones which lacked public transportation options were not included. Data also could not be collected for a small number of zones because their local transit operators do not provide Google with the necessary information to include their service in its online tools.

The data collected included the trip's total duration and fare; the mode, transit provider, and route number/name of each leg of the journey; and the scheduled departure and arrival times for each leg, including the wait time between trip segments.

Driving access and egress times (and trip distances) were collected for free flow conditions.

F Results tables

The following tables provide full Base Case results for all forecast years between 2015 and 2050.

Table F.1: Results tables: 2015-2018

Metric	Originating Market	2015	2016	2017	2018
In-scope market (round-trips)	Southern California	15,602,542	15,860,694	16,123,494	16,391,033
	Northern California	-	-	-	-
	Las Vegas	3,783,799	3,928,464	4,078,660	4,234,599
	Other	4,731,485	4,852,042	4,975,862	5,103,037
	TOTAL	24,117,825	24,641,200	25,178,016	25,728,668
HSR capture rate (%)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Captured HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Induced HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Total HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
HSR revenue ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-

Source: Steer Davies Gleave

Table F.2: Results tables: 2019-2022

Metric	Originating Market	2019	2020	2021	2022
In-scope market (round-trips)	Southern California	16,663,405	16,940,706	17,223,033	17,510,486
	Northern California	-	-	-	-
	Las Vegas	4,396,500	4,564,590	4,739,108	4,920,297
	Other	5,233,659	5,367,827	5,505,639	5,647,198
	TOTAL	26,293,564	26,873,123	27,467,780	28,077,981
HSR capture rate (%)	Southern California	-	-	14%	21%
	Northern California	-	-	-	-
	Las Vegas	-	-	7%	10%
	Other	-	-	4%	7%
	TOTAL	-	-	11%	16%
Captured HSR ridership (round-trips)	Southern California	-	-	2,358,234	3,594,372
	Northern California	-	-	-	-
	Las Vegas	-	-	329,120	512,421
	Other	-	-	246,762	380,800
	TOTAL	-	-	2,934,116	4,487,593
Induced HSR ridership (round-trips)	Southern California	-	-	200,423	304,541
	Northern California	-	-	-	-
	Las Vegas	-	-	6,560	10,221
	Other	-	-	-	-
	TOTAL	-	-	206,983	314,763
Total HSR ridership (round-trips)	Southern California	-	-	2,558,657	3,898,913
	Northern California	-	-	-	-
	Las Vegas	-	-	335,680	522,642
	Other	-	-	246,762	380,800
	TOTAL	-	-	3,141,099	4,802,356
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	97	97
	Northern California	-	-	-	-
	Las Vegas	-	-	82	82
	Other	-	-	96	96
	TOTAL	-	-	96	96
HSR revenue ($, 2015 prices)	Southern California	-	-	249,092,260	379,943,379
	Northern California	-	-	-	-
	Las Vegas	-	-	27,637,531	43,025,105
	Other	-	-	23,650,207	36,516,429
	TOTAL	-	-	300,379,999	459,484,913

Source: Steer Davies Gleave

Table F.3: Results tables: 2023-2026

Metric	Originating Market	2023	2024	2025	2026
In-scope market (round-trips)	Southern California	17,714,689	17,921,733	18,131,665	18,344,535
	Northern California	-	-	-	-
	Las Vegas	5,054,680	5,192,733	5,334,556	5,480,253
	Other	5,754,100	5,863,123	5,974,311	6,087,708
	TOTAL	28,523,469	28,977,589	29,440,532	29,912,496
HSR capture rate (%)	Southern California	26%	27%	27%	30%
	Northern California	-	-	-	-
	Las Vegas	13%	14%	14%	19%
	Other	9%	9%	9%	11%
	TOTAL	20%	21%	21%	24%
Captured HSR ridership (round-trips)	Southern California	4,592,027	4,875,395	4,917,549	5,428,910
	Northern California	-	-	-	-
	Las Vegas	664,982	717,149	734,741	1,065,098
	Other	491,246	526,654	536,396	645,414
	TOTAL	5,748,256	6,119,198	6,188,686	7,139,422
Induced HSR ridership (round-trips)	Southern California	389,143	413,236	416,893	570,536
	Northern California	-	-	-	-
	Las Vegas	13,298	14,378	14,768	75,609
	Other	-	-	-	-
	TOTAL	402,441	427,614	431,661	646,145
Total HSR ridership (round-trips)	Southern California	4,981,170	5,288,631	5,334,442	5,999,446
	Northern California	-	-	-	-
	Las Vegas	678,281	731,527	749,509	1,140,707
	Other	491,246	526,654	536,396	645,414
	TOTAL	6,150,697	6,546,812	6,620,347	7,785,567
Average HSR round-trip fare ($, 2015 prices)	Southern California	97	97	97	103
	Northern California	-	-	-	-
	Las Vegas	82	82	82	87
	Other	96	96	96	101
	TOTAL	96	96	96	100
HSR revenue ($, 2015 prices)	Southern California	485,285,142	515,107,733	519,435,600	616,112,424
	Northern California	-	-	-	-
	Las Vegas	55,826,686	60,197,411	61,665,093	99,664,772
	Other	47,122,742	50,535,525	51,486,881	65,022,268
	TOTAL	588,234,570	625,840,670	632,587,574	780,799,465

Source: Steer Davies Gleave

Table F.4: Results tables: 2027-2030

Metric	Originating Market	2027	2028	2029	2030
In-scope market (round-trips)	Southern California	18,560,392	18,779,287	19,001,272	19,226,401
	Northern California	-	-	3,463,276	3,525,989
	Las Vegas	5,629,929	5,783,693	6,806,439	6,992,431
	Other	6,203,358	6,321,309	5,254,751	5,356,829
	TOTAL	30,393,679	30,884,289	34,525,739	35,101,650
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	9%	13%
	Las Vegas	21%	21%	26%	28%
	Other	11%	11%	17%	18%
	TOTAL	25%	25%	25%	26%
Captured HSR ridership (round-trips)	Southern California	5,602,179	5,682,785	5,793,999	5,860,346
	Northern California	-	-	296,042	452,823
	Las Vegas	1,176,062	1,226,212	1,764,003	1,963,235
	Other	684,075	703,385	899,483	990,652
	TOTAL	7,462,316	7,612,382	8,753,526	9,267,055
Induced HSR ridership (round-trips)	Southern California	587,488	595,726	751,503	759,075
	Northern California	-	-	26,385	40,479
	Las Vegas	83,624	87,403	208,331	232,369
	Other	-	-	-	-
	TOTAL	671,112	683,129	986,219	1,031,922
Total HSR ridership (round-trips)	Southern California	6,189,667	6,278,511	6,545,502	6,619,420
	Northern California	-	-	322,427	493,302
	Las Vegas	1,259,686	1,313,615	1,972,334	2,195,604
	Other	684,075	703,385	899,483	990,652
	TOTAL	8,133,428	8,295,511	9,739,745	10,298,978
Average HSR round-trip fare ($, 2015 prices)	Southern California	104	104	107	107
	Northern California	-	-	198	198
	Las Vegas	88	89	94	96
	Other	102	102	112	116
	TOTAL	101	102	108	110
HSR revenue ($, 2015 prices)	Southern California	643,920,178	655,035,549	698,191,199	710,773,997
	Northern California	-	-	63,989,387	97,825,141
	Las Vegas	111,291,345	116,328,466	186,161,210	211,527,047
	Other	69,642,654	71,805,099	100,631,981	114,900,308
	TOTAL	824,854,177	843,169,115	1,048,973,777	1,135,026,493

Source: Steer Davies Gleave

Table F.5: Results tables: 2031-2034

Metric	Originating Market	2031	2032	2033	2034
In-scope market (round-trips)	Southern California	19,467,150	19,711,227	19,958,682	20,209,565
	Northern California	3,580,346	3,635,605	3,691,784	3,748,897
	Las Vegas	7,151,396	7,313,974	7,480,249	7,650,304
	Other	5,434,432	5,513,225	5,593,227	5,674,457
	TOTAL	35,633,324	36,174,032	36,723,941	37,283,223
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	16%	17%	17%	17%
	Las Vegas	29%	29%	29%	29%
	Other	19%	20%	20%	20%
	TOTAL	27%	27%	27%	27%
Captured HSR ridership (round-trips)	Southern California	5,920,426	5,977,007	6,034,185	6,091,969
	Northern California	582,795	623,342	633,385	643,603
	Las Vegas	2,064,824	2,114,301	2,156,441	2,199,428
	Other	1,053,049	1,078,995	1,094,435	1,110,111
	TOTAL	9,621,094	9,793,644	9,918,446	10,045,111
Induced HSR ridership (round-trips)	Southern California	767,052	774,884	782,808	790,825
	Northern California	52,220	55,985	57,022	58,079
	Las Vegas	244,838	251,172	256,644	262,237
	Other	-	-	-	-
	TOTAL	1,064,109	1,082,042	1,096,474	1,111,140
Total HSR ridership (round-trips)	Southern California	6,687,478	6,751,891	6,816,994	6,882,794
	Northern California	635,015	679,327	690,407	701,682
	Las Vegas	2,309,662	2,365,473	2,413,085	2,461,665
	Other	1,053,049	1,078,995	1,094,435	1,110,111
	TOTAL	10,685,204	10,875,686	11,014,920	11,156,251
Average HSR round-trip fare ($, 2015 prices)	Southern California	108	108	109	109
	Northern California	199	199	199	200
	Las Vegas	98	99	100	100
	Other	120	121	122	122
	TOTAL	112	113	114	114
HSR revenue ($, 2015 prices)	Southern California	722,317,070	732,295,348	742,418,928	752,690,035
	Northern California	126,166,123	135,224,967	137,690,005	140,202,500
	Las Vegas	226,860,883	234,339,163	240,288,011	246,388,417
	Other	125,963,776	130,516,450	133,029,972	135,593,263
	TOTAL	1,201,307,852	1,232,375,928	1,253,426,917	1,274,874,215

Source: Steer Davies Gleave

Table F.6: Results tables: 2035-2038

Metric	Originating Market	2035	2036	2037	2038
In-scope market (round-trips)	Southern California	20,463,929	20,721,828	20,983,314	21,248,443
	Northern California	3,806,962	3,865,996	3,926,015	3,987,037
	Las Vegas	7,824,224	8,002,099	8,184,017	8,370,071
	Other	5,756,934	5,840,679	5,925,711	6,012,052
	TOTAL	37,852,050	38,430,601	39,019,057	39,617,602
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	17%	17%	17%	17%
	Las Vegas	29%	29%	29%	28%
	Other	20%	20%	20%	20%
	TOTAL	27%	27%	27%	27%
Captured HSR ridership (round-trips)	Southern California	6,150,364	6,209,378	6,269,019	6,329,292
	Northern California	653,998	664,573	675,332	686,277
	Las Vegas	2,243,279	2,288,013	2,333,646	2,380,198
	Other	1,126,030	1,142,193	1,158,605	1,175,270
	TOTAL	10,173,671	10,304,157	10,436,602	10,571,038
Induced HSR ridership (round-trips)	Southern California	798,934	807,139	815,439	823,836
	Northern California	59,158	60,258	61,380	62,525
	Las Vegas	267,952	273,792	279,760	285,860
	Other	-	-	-	-
	TOTAL	1,126,043	1,141,188	1,156,579	1,172,221
Total HSR ridership (round-trips)	Southern California	6,949,299	7,016,517	7,084,457	7,153,128
	Northern California	713,155	724,831	736,712	748,802
	Las Vegas	2,511,231	2,561,805	2,613,407	2,666,058
	Other	1,126,030	1,142,193	1,158,605	1,175,270
	TOTAL	11,299,714	11,445,345	11,593,181	11,743,259
Average HSR round-trip fare ($, 2015 prices)	Southern California	110	110	111	111
	Northern California	200	201	201	201
	Las Vegas	101	101	102	102
	Other	123	123	124	125
	TOTAL	115	115	116	116
HSR revenue ($, 2015 prices)	Southern California	763,110,931	773,683,914	784,411,320	795,295,523
	Northern California	142,763,411	145,373,716	148,034,415	150,746,530
	Las Vegas	252,644,255	259,059,501	265,638,231	272,384,627
	Other	138,207,333	140,873,211	143,591,947	146,364,616
	TOTAL	1,296,725,929	1,318,990,341	1,341,675,914	1,364,791,296

Source: Steer Davies Gleave

Table F.7: Results tables: 2039-2042

Metric	Originating Market	2039	2040	2041	2042
In-scope market (round-trips)	Southern California	21,517,269	21,789,851	22,027,024	22,266,994
	Northern California	4,049,080	4,112,163	4,168,877	4,226,438
	Las Vegas	8,560,355	8,754,964	8,944,140	9,137,404
	Other	6,099,721	6,188,741	6,275,010	6,362,575
	TOTAL	40,226,426	40,845,719	41,415,051	41,993,411
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	17%	17%	17%	17%
	Las Vegas	28%	28%	28%	28%
	Other	20%	20%	20%	20%
	TOTAL	27%	27%	27%	27%
Captured HSR ridership (round-trips)	Southern California	6,390,206	6,451,767	6,524,493	6,598,090
	Northern California	697,414	708,744	719,548	730,530
	Las Vegas	2,427,687	2,476,132	2,531,630	2,588,373
	Other	1,192,193	1,209,377	1,229,011	1,248,976
	TOTAL	10,707,499	10,846,020	11,004,682	11,165,968
Induced HSR ridership (round-trips)	Southern California	832,332	840,928	850,971	861,143
	Northern California	63,693	64,884	65,994	67,125
	Las Vegas	292,093	298,464	305,587	312,881
	Other	-	-	-	-
	TOTAL	1,188,118	1,204,275	1,222,553	1,241,149
Total HSR ridership (round-trips)	Southern California	7,222,538	7,292,695	7,375,464	7,459,233
	Northern California	761,106	773,628	785,542	797,654
	Las Vegas	2,719,780	2,774,595	2,837,217	2,901,254
	Other	1,192,193	1,209,377	1,229,011	1,248,976
	TOTAL	11,895,617	12,050,295	12,227,235	12,407,117
Average HSR round-trip fare ($, 2015 prices)	Southern California	112	112	112	112
	Northern California	202	202	202	202
	Las Vegas	103	103	103	103
	Other	125	126	126	126
	TOTAL	117	117	117	117
HSR revenue ($, 2015 prices)	Southern California	806,338,934	817,544,005	826,531,089	835,622,802
	Northern California	153,511,104	156,329,200	158,650,424	161,008,740
	Las Vegas	279,302,979	286,397,686	292,838,622	299,424,520
	Other	149,192,311	152,076,149	154,676,359	157,321,523
	TOTAL	1,388,345,328	1,412,347,040	1,432,696,494	1,453,377,585

Source: Steer Davies Gleave

Table F.8: Results tables: 2043-2046

Metric	Originating Market	2043	2044	2045	2046
In-scope market (round-trips)	Southern California	22,509,797	22,755,469	23,004,047	23,255,568
	Northern California	4,284,858	4,344,151	4,404,332	4,465,414
	Las Vegas	9,334,844	9,536,550	9,742,614	9,953,131
	Other	6,451,458	6,541,679	6,633,259	6,726,220
	TOTAL	42,580,956	43,177,849	43,784,252	44,400,333
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	17%	17%	17%	17%
	Las Vegas	28%	28%	28%	28%
	Other	20%	20%	20%	20%
	TOTAL	27%	27%	27%	27%
Captured HSR ridership (round-trips)	Southern California	6,672,569	6,747,941	6,824,218	6,901,411
	Northern California	741,692	753,040	764,574	776,299
	Las Vegas	2,646,387	2,705,703	2,766,349	2,828,354
	Other	1,269,276	1,289,919	1,310,909	1,332,252
	TOTAL	11,329,925	11,496,602	11,666,049	11,838,317
Induced HSR ridership (round-trips)	Southern California	871,444	881,876	892,442	903,142
	Northern California	68,276	69,449	70,644	71,861
	Las Vegas	320,349	327,996	335,825	343,840
	Other	-	-	-	-
	TOTAL	1,260,070	1,279,321	1,298,911	1,318,844
Total HSR ridership (round-trips)	Southern California	7,544,013	7,629,817	7,716,660	7,804,554
	Northern California	809,969	822,489	835,218	848,161
	Las Vegas	2,966,737	3,033,699	3,102,173	3,172,194
	Other	1,269,276	1,289,919	1,310,909	1,332,252
	TOTAL	12,589,994	12,775,923	12,964,960	13,157,161
Average HSR round-trip fare ($, 2015 prices)	Southern California	112	112	112	112
	Northern California	202	202	202	201
	Las Vegas	103	103	103	103
	Other	126	126	126	126
	TOTAL	117	117	117	117
HSR revenue ($, 2015 prices)	Southern California	844,820,442	854,125,327	863,538,791	873,062,187
	Northern California	163,404,782	165,839,194	168,312,633	170,825,766
	Las Vegas	306,158,646	313,044,338	320,085,011	327,284,155
	Other	160,012,426	162,749,863	165,534,645	168,367,597
	TOTAL	1,474,396,296	1,495,758,722	1,517,471,080	1,539,539,705

Source: Steer Davies Gleave

Table F.9: Results tables: 2047-2050

Metric	Originating Market	2047	2048	2049	2050
In-scope market (round-trips)	Southern California	23,510,071	23,767,595	24,028,178	24,291,860
	Northern California	4,527,412	4,590,342	4,654,217	4,719,054
	Las Vegas	10,168,197	10,387,910	10,612,371	10,841,681
	Other	6,820,581	6,916,367	7,013,599	7,112,299
	TOTAL	45,026,262	45,662,214	46,308,365	46,964,895
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	17%	17%	17%	17%
	Las Vegas	28%	28%	28%	29%
	Other	20%	20%	20%	20%
	TOTAL	27%	27%	27%	27%
Captured HSR ridership (round-trips)	Southern California	6,979,533	7,058,595	7,138,609	7,219,588
	Northern California	788,219	800,336	812,654	825,177
	Las Vegas	2,891,749	2,956,566	3,022,836	3,090,591
	Other	1,353,955	1,376,025	1,398,466	1,421,286
	TOTAL	12,013,457	12,191,521	12,372,565	12,556,642
Induced HSR ridership (round-trips)	Southern California	913,980	924,956	936,072	947,331
	Northern California	73,101	74,364	75,651	76,961
	Las Vegas	352,048	360,451	369,055	377,864
	Other	-	-	-	-
	TOTAL	1,339,128	1,359,771	1,380,778	1,402,157
Total HSR ridership (round-trips)	Southern California	7,893,513	7,983,551	8,074,681	8,166,919
	Northern California	861,320	874,700	888,305	902,138
	Las Vegas	3,243,797	3,317,017	3,391,890	3,468,456
	Other	1,353,955	1,376,025	1,398,466	1,421,286
	TOTAL	13,352,585	13,551,292	13,753,342	13,958,798
Average HSR round-trip fare ($, 2015 prices)	Southern California	112	112	112	112
	Northern California	201	201	201	201
	Las Vegas	103	103	103	103
	Other	126	127	127	127
	TOTAL	117	117	117	117
HSR revenue ($, 2015 prices)	Southern California	882,696,885	892,444,274	902,305,763	912,282,777
	Northern California	173,379,274	175,973,848	178,610,195	181,289,032
	Las Vegas	334,645,340	342,172,216	349,868,517	357,738,058
	Other	171,249,558	174,181,382	177,163,937	180,198,107
	TOTAL	1,561,971,056	1,584,771,721	1,607,948,411	1,631,507,973

Source: Steer Davies Gleave

The following tables provide full results for Infrastructure Phase 0 (Las Vegas-Victorville) for all forecast years between 2015 and 2050.

Table F.10: Results tables Phase 0: 2015-2018

Metric	Originating Market	2015	2016	2017	2018
In-scope market (round-trips)	Southern California	15,602,542	15,860,694	16,123,494	16,391,033
	Northern California	-	-	-	-
	Las Vegas	3,783,799	3,928,464	4,078,660	4,234,599
	Other	3,985,540	4,097,324	4,212,267	4,330,460
	TOTAL	23,371,880	23,886,481	24,414,421	24,956,092
HSR capture rate (%)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Captured HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Induced HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Total HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
HSR revenue ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-

Source: Steer Davies Gleave

Table F.11: Results tables Phase 0: 2019-2022

Metric	Originating Market	2019	2020	2021	2022
In-scope market (round-trips)	Southern California	16,663,405	16,940,706	17,223,033	17,510,486
	Northern California	-	-	-	-
	Las Vegas	4,396,500	4,564,590	4,739,108	4,920,297
	Other	4,451,996	4,576,970	4,705,480	4,837,628
	TOTAL	25,511,901	26,082,266	26,667,621	27,268,411
HSR capture rate (%)	Southern California	-	-	14%	20%
	Northern California	-	-	-	-
	Las Vegas	-	-	6%	8%
	Other	-	-	5%	7%
	TOTAL	-	-	11%	16%
Captured HSR ridership (round-trips)	Southern California	-	-	2,353,437	3,588,404
	Northern California	-	-	-	-
	Las Vegas	-	-	261,377	407,362
	Other	-	-	224,248	346,552
	TOTAL	-	-	2,839,062	4,342,318
Induced HSR ridership (round-trips)	Southern California	-	-	200,862	305,355
	Northern California	-	-	-	-
	Las Vegas	-	-	5,245	8,181
	Other	-	-	-	-
	TOTAL	-	-	206,107	313,535
Total HSR ridership (round-trips)	Southern California	-	-	2,554,299	3,893,759
	Northern California	-	-	-	-
	Las Vegas	-	-	266,622	415,543
	Other	-	-	224,248	346,552
	TOTAL	-	-	3,045,169	4,655,853
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	97	97
	Northern California	-	-	-	-
	Las Vegas	-	-	83	83
	Other	-	-	99	99
	TOTAL	-	-	96	96
HSR revenue ($, 2015 prices)	Southern California	-	-	247,554,114	377,841,217
	Northern California	-	-	-	-
	Las Vegas	-	-	22,101,186	34,440,951
	Other	-	-	22,296,243	34,467,765
	TOTAL	-	-	291,951,543	446,749,933

Source: Steer Davies Gleave

Table F.12: Results tables Phase 0: 2023-2026

Metric	Originating Market	2023	2024	2025	2026
In-scope market (round-trips)	Southern California	17,714,689	17,921,733	18,131,665	18,344,535
	Northern California	-	-	-	-
	Las Vegas	5,054,680	5,192,733	5,334,556	5,480,253
	Other	4,936,862	5,038,145	5,141,519	5,247,028
	TOTAL	27,706,231	28,152,611	28,607,741	29,071,816
HSR capture rate (%)	Southern California	26%	27%	27%	27%
	Northern California	-	-	-	-
	Las Vegas	10%	11%	11%	11%
	Other	9%	10%	10%	10%
	TOTAL	20%	21%	21%	21%
Captured HSR ridership (round-trips)	Southern California	4,586,639	4,872,046	4,916,561	4,961,591
	Northern California	-	-	-	-
	Las Vegas	529,267	571,457	586,161	601,246
	Other	447,603	480,440	489,911	499,579
	TOTAL	5,563,509	5,923,944	5,992,633	6,062,416
Induced HSR ridership (round-trips)	Southern California	390,386	414,773	418,662	422,599
	Northern California	-	-	-	-
	Las Vegas	10,654	11,530	11,855	12,189
	Other	-	-	-	-
	TOTAL	401,040	426,303	430,517	434,788
Total HSR ridership (round-trips)	Southern California	4,977,025	5,286,819	5,335,222	5,384,190
	Northern California	-	-	-	-
	Las Vegas	539,921	582,987	598,016	613,435
	Other	447,603	480,440	489,911	499,579
	TOTAL	5,964,549	6,350,247	6,423,150	6,497,204
Average HSR round-trip fare ($, 2015 prices)	Southern California	97	97	97	97
	Northern California	-	-	-	-
	Las Vegas	83	83	83	83
	Other	99	100	100	100
	TOTAL	96	96	96	96
HSR revenue ($, 2015 prices)	Southern California	482,894,657	512,882,922	517,507,266	522,183,912
	Northern California	-	-	-	-
	Las Vegas	44,744,800	48,308,714	49,548,832	50,820,951
	Other	44,533,231	47,816,520	48,775,753	49,755,222
	TOTAL	572,172,688	609,008,156	615,831,850	622,760,085

Source: Steer Davies Gleave

Table F.13: Results tables Phase 0: 2027-2030

Metric	Originating Market	2027	2028	2029	2030
In-scope market (round-trips)	Southern California	18,560,392	18,779,287	19,001,272	19,226,401
	Northern California	-	-	-	-
	Las Vegas	5,629,929	5,783,693	5,941,657	6,103,935
	Other	5,354,717	5,464,630	5,576,814	5,691,316
	TOTAL	29,545,037	30,027,610	30,519,743	31,021,651
HSR capture rate (%)	Southern California	27%	27%	27%	27%
	Northern California	-	-	-	-
	Las Vegas	11%	11%	11%	11%
	Other	10%	10%	10%	9%
	TOTAL	21%	21%	21%	20%
Captured HSR ridership (round-trips)	Southern California	5,007,146	5,053,232	5,099,857	5,147,029
	Northern California	-	-	-	-
	Las Vegas	616,720	632,594	648,879	665,585
	Other	509,447	519,519	529,800	540,296
	TOTAL	6,133,312	6,205,345	6,278,536	6,352,909
Induced HSR ridership (round-trips)	Southern California	426,587	430,625	434,714	438,856
	Northern California	-	-	-	-
	Las Vegas	12,532	12,885	13,248	13,621
	Other	-	-	-	-
	TOTAL	439,119	443,510	447,963	452,478
Total HSR ridership (round-trips)	Southern California	5,433,732	5,483,856	5,534,571	5,585,886
	Northern California	-	-	-	-
	Las Vegas	629,252	645,480	662,127	679,206
	Other	509,447	519,519	529,800	540,296
	TOTAL	6,572,431	6,648,855	6,726,499	6,805,387
Average HSR round-trip fare ($, 2015 prices)	Southern California	97	97	97	97
	Northern California	-	-	-	-
	Las Vegas	83	83	83	83
	Other	100	100	100	100
	TOTAL	96	96	96	96
HSR revenue ($, 2015 prices)	Southern California	526,913,590	531,697,040	536,535,015	541,428,281
	Northern California	-	-	-	-
	Las Vegas	52,125,901	53,464,534	54,837,724	56,246,366
	Other	50,755,377	51,776,677	52,819,594	53,884,607
	TOTAL	629,794,868	636,938,252	644,192,333	651,559,255

Source: Steer Davies Gleave

Table F.14: Results tables Phase 0: 2031-2034

Metric	Originating Market	2031	2032	2033	2034
In-scope market (round-trips)	Southern California	19,467,150	19,711,227	19,958,682	20,209,565
	Northern California	-	-	-	-
	Las Vegas	6,242,637	6,384,491	6,529,569	6,677,943
	Other	5,778,208	5,866,432	5,956,011	6,046,964
	TOTAL	31,487,995	31,962,151	32,444,262	32,934,472
HSR capture rate (%)	Southern California	27%	27%	27%	26%
	Northern California	-	-	-	-
	Las Vegas	11%	11%	11%	11%
	Other	9%	9%	9%	9%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	5,195,519	5,244,528	5,294,062	5,344,129
	Northern California	-	-	-	-
	Las Vegas	678,730	692,136	705,810	719,755
	Other	547,941	555,700	563,573	571,563
	TOTAL	6,422,190	6,492,364	6,563,445	6,635,447
Induced HSR ridership (round-trips)	Southern California	443,264	447,724	452,236	456,802
	Northern California	-	-	-	-
	Las Vegas	13,912	14,209	14,513	14,823
	Other	-	-	-	-
	TOTAL	457,177	461,933	466,749	471,624
Total HSR ridership (round-trips)	Southern California	5,638,783	5,692,252	5,746,299	5,800,931
	Northern California	-	-	-	-
	Las Vegas	692,642	706,346	720,322	734,577
	Other	547,941	555,700	563,573	571,563
	TOTAL	6,879,366	6,954,297	7,030,194	7,107,072
Average HSR round-trip fare ($, 2015 prices)	Southern California	97	98	98	99
	Northern California	-	-	-	-
	Las Vegas	83	84	84	85
	Other	100	101	101	102
	TOTAL	96	97	97	98
HSR revenue ($, 2015 prices)	Southern California	549,185,591	557,060,302	565,054,290	573,169,459
	Northern California	-	-	-	-
	Las Vegas	57,703,663	59,198,794	60,732,741	62,306,516
	Other	54,930,423	55,996,941	57,084,580	58,193,764
	TOTAL	661,819,677	672,256,037	682,871,610	693,669,740

Source: Steer Davies Gleave

Table F.15: Results tables Phase 0: 2035-2038

Metric	Originating Market	2035	2036	2037	2038
In-scope market (round-trips)	Southern California	20,463,929	20,721,828	20,983,314	21,248,443
	Northern California	-	-	-	-
	Las Vegas	6,829,689	6,984,883	7,143,604	7,305,931
	Other	6,139,312	6,233,078	6,328,283	6,424,949
	TOTAL	33,432,931	33,939,789	34,455,201	34,979,323
HSR capture rate (%)	Southern California	26%	26%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	11%	11%	11%	11%
	Other	9%	9%	9%	9%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	5,394,735	5,445,885	5,497,587	5,549,846
	Northern California	-	-	-	-
	Las Vegas	733,977	748,482	763,275	778,363
	Other	579,672	587,901	596,251	604,726
	TOTAL	6,708,384	6,782,268	6,857,113	6,932,936
Induced HSR ridership (round-trips)	Southern California	461,421	466,095	470,824	475,609
	Northern California	-	-	-	-
	Las Vegas	15,140	15,463	15,793	16,131
	Other	-	-	-	-
	TOTAL	476,560	481,558	486,617	491,740
Total HSR ridership (round-trips)	Southern California	5,856,156	5,911,980	5,968,410	6,025,455
	Northern California	-	-	-	-
	Las Vegas	749,116	763,945	779,069	794,494
	Other	579,672	587,901	596,251	604,726
	TOTAL	7,184,944	7,263,825	7,343,731	7,424,675
Average HSR round-trip fare ($, 2015 prices)	Southern California	99	100	100	101
	Northern California	-	-	-	-
	Las Vegas	85	86	86	87
	Other	102	103	103	104
	TOTAL	98	99	99	100
HSR revenue ($, 2015 prices)	Southern California	581,407,749	589,771,128	598,261,602	606,881,208
	Northern California	-	-	-	-
	Las Vegas	63,921,154	65,577,718	67,277,300	69,021,018
	Other	59,324,932	60,478,525	61,655,000	62,854,817
	TOTAL	704,653,834	715,827,372	727,193,902	738,757,044

Source: Steer Davies Gleave

Table F.16: Results tables Phase 0: 2039-2042

Metric	Originating Market	2039	2040	2041	2042
In-scope market (round-trips)	Southern California	21,517,269	21,789,851	22,027,024	22,266,994
	Northern California	-	-	-	-
	Las Vegas	7,471,947	7,641,736	7,806,794	7,975,417
	Other	6,523,099	6,622,756	6,721,959	6,822,653
	TOTAL	35,512,316	36,054,343	36,555,777	37,065,065
HSR capture rate (%)	Southern California	26%	26%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	11%	11%	11%	11%
	Other	9%	9%	9%	9%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	5,602,670	5,656,066	5,721,277	5,787,292
	Northern California	-	-	-	-
	Las Vegas	793,751	809,445	827,815	846,601
	Other	613,327	622,056	632,599	643,322
	TOTAL	7,009,748	7,087,566	7,181,691	7,277,215
Induced HSR ridership (round-trips)	Southern California	480,451	485,351	491,244	497,215
	Northern California	-	-	-	-
	Las Vegas	16,476	16,828	17,231	17,644
	Other	-	-	-	-
	TOTAL	496,927	502,178	508,475	514,859
Total HSR ridership (round-trips)	Southern California	6,083,121	6,141,416	6,212,522	6,284,507
	Northern California	-	-	-	-
	Las Vegas	810,227	826,273	845,046	864,245
	Other	613,327	622,056	632,599	643,322
	TOTAL	7,506,675	7,589,745	7,690,166	7,792,074
Average HSR round-trip fare ($, 2015 prices)	Southern California	101	102	102	102
	Northern California	-	-	-	-
	Las Vegas	87	88	88	88
	Other	104	105	105	105
	TOTAL	100	100	100	100
HSR revenue ($, 2015 prices)	Southern California	615,632,019	624,516,140	631,573,432	638,715,910
	Northern California	-	-	-	-
	Las Vegas	70,810,022	72,645,489	74,288,490	75,968,676
	Other	64,078,450	65,326,382	66,438,619	67,569,866
	TOTAL	750,520,490	762,488,010	772,300,540	782,254,452

Source: Steer Davies Gleave

Table F.17: Results tables Phase 0: 2043-2046

Metric	Originating Market	2043	2044	2045	2046
In-scope market (round-trips)	Southern California	22,509,797	22,755,469	23,004,047	23,255,568
	Northern California	-	-	-	-
	Las Vegas	8,147,682	8,323,669	8,503,456	8,687,127
	Other	6,924,862	7,028,607	7,133,913	7,240,803
	TOTAL	37,582,341	38,107,745	38,641,416	39,183,498
HSR capture rate (%)	Southern California	26%	26%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	11%	11%	11%	11%
	Other	9%	9%	9%	10%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	5,854,120	5,921,773	5,990,261	6,059,596
	Northern California	-	-	-	-
	Las Vegas	865,815	885,464	905,560	926,112
	Other	654,228	665,319	676,598	688,070
	TOTAL	7,374,162	7,472,556	7,572,419	7,673,778
Induced HSR ridership (round-trips)	Southern California	503,264	509,391	515,598	521,887
	Northern California	-	-	-	-
	Las Vegas	18,067	18,500	18,943	19,397
	Other	-	-	-	-
	TOTAL	521,330	527,890	534,541	541,284
Total HSR ridership (round-trips)	Southern California	6,357,384	6,431,164	6,505,859	6,581,483
	Northern California	-	-	-	-
	Las Vegas	883,881	903,964	924,503	945,509
	Other	654,228	665,319	676,598	688,070
	TOTAL	7,895,492	8,000,446	8,106,960	8,215,061
Average HSR round-trip fare ($, 2015 prices)	Southern California	102	102	102	102
	Northern California	-	-	-	-
	Las Vegas	88	88	88	88
	Other	105	105	105	105
	TOTAL	100	100	100	100
HSR revenue ($, 2015 prices)	Southern California	645,944,678	653,260,858	660,665,587	668,160,016
	Northern California	-	-	-	-
	Las Vegas	77,686,889	79,443,991	81,240,862	83,078,403
	Other	68,720,450	69,890,703	71,080,961	72,291,569
	TOTAL	792,352,017	802,595,552	812,987,410	823,529,988

Source: Steer Davies Gleave

Table F.18: Results tables Phase 0: 2047-2050

Metric	Originating Market	2047	2048	2049	2050
In-scope market (round-trips)	Southern California	23,510,071	23,767,595	24,028,178	24,291,860
	Northern California	-	-	-	-
	Las Vegas	8,874,765	9,066,456	9,262,288	9,462,349
	Other	7,349,301	7,459,430	7,571,216	7,684,685
	TOTAL	39,734,137	40,293,481	40,861,682	41,438,894
HSR capture rate (%)	Southern California	26%	26%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	11%	11%	11%	11%
	Other	10%	10%	10%	10%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	6,129,788	6,200,850	6,272,792	6,345,627
	Northern California	-	-	-	-
	Las Vegas	947,131	968,627	990,611	1,013,095
	Other	699,737	711,602	723,670	735,942
	TOTAL	7,776,656	7,881,079	7,987,073	8,094,664
Induced HSR ridership (round-trips)	Southern California	528,258	534,712	541,251	547,875
	Northern California	-	-	-	-
	Las Vegas	19,862	20,338	20,825	21,324
	Other	-	-	-	-
	TOTAL	548,119	555,049	562,076	569,199
Total HSR ridership (round-trips)	Southern California	6,658,046	6,735,562	6,814,043	6,893,502
	Northern California	-	-	-	-
	Las Vegas	966,992	988,965	1,011,436	1,034,419
	Other	699,737	711,602	723,670	735,942
	TOTAL	8,324,775	8,436,129	8,549,149	8,663,864
Average HSR round-trip fare ($, 2015 prices)	Southern California	101	101	101	101
	Northern California	-	-	-	-
	Las Vegas	88	88	88	88
	Other	105	105	105	105
	TOTAL	100	100	100	100
HSR revenue ($, 2015 prices)	Southern California	675,745,314	683,422,668	691,193,277	699,058,362
	Northern California	-	-	-	-
	Las Vegas	84,957,535	86,879,201	88,844,363	90,854,007
	Other	73,522,875	74,775,235	76,049,010	77,344,568
	TOTAL	834,225,725	845,077,103	856,086,650	867,256,937

Source: Steer Davies Gleave

The following tables provide full results for Infrastructure Phase 1 (Las Vegas-Palmdale) for all forecast years between 2015 and 2050.

Table F.19: Results tables Phase 1: 2015-2018

Metric	Originating Market	2015	2016	2017	2018
In-scope market (round-trips)	Southern California	15,602,542	15,860,694	16,123,494	16,391,033
	Northern California	-	-	-	-
	Las Vegas	3,783,799	3,928,464	4,078,660	4,234,599
	Other	4,731,485	4,852,042	4,975,862	5,103,037
	TOTAL	24,117,825	24,641,200	25,178,016	25,728,668
HSR capture rate (%)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Captured HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Induced HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Total HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
HSR revenue ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-

Source: Steer Davies Gleave

Table F.20: Results tables Phase 1: 2019-2022

Metric	Originating Market	2019	2020	2021	2022
In-scope market (round-trips)	Southern California	16,663,405	16,940,706	17,223,033	17,510,486
	Northern California	-	-	-	-
	Las Vegas	4,396,500	4,564,590	4,739,108	4,920,297
	Other	5,233,659	5,367,827	5,505,639	5,647,198
	TOTAL	26,293,564	26,873,123	27,467,780	28,077,981
HSR capture rate (%)	Southern California	-	-	14%	21%
	Northern California	-	-	-	-
	Las Vegas	-	-	7%	10%
	Other	-	-	4%	7%
	TOTAL	-	-	11%	16%
Captured HSR ridership (round-trips)	Southern California	-	-	2,358,234	3,594,372
	Northern California	-	-	-	-
	Las Vegas	-	-	329,120	512,421
	Other	-	-	246,762	380,800
	TOTAL	-	-	2,934,116	4,487,593
Induced HSR ridership (round-trips)	Southern California	-	-	200,423	304,541
	Northern California	-	-	-	-
	Las Vegas	-	-	6,560	10,221
	Other	-	-	-	-
	TOTAL	-	-	206,983	314,763
Total HSR ridership (round-trips)	Southern California	-	-	2,558,657	3,898,913
	Northern California	-	-	-	-
	Las Vegas	-	-	335,680	522,642
	Other	-	-	246,762	380,800
	TOTAL	-	-	3,141,099	4,802,356
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	97	97
	Northern California	-	-	-	-
	Las Vegas	-	-	82	82
	Other	-	-	96	96
	TOTAL	-	-	96	96
HSR revenue ($, 2015 prices)	Southern California	-	-	249,092,260	379,943,379
	Northern California	-	-	-	-
	Las Vegas	-	-	27,637,531	43,025,105
	Other	-	-	23,650,207	36,516,429
	TOTAL	-	-	300,379,999	459,484,913

Source: Steer Davies Gleave

Table F.21: Results tables Phase 1: 2023-2026

Metric	Originating Market	2023	2024	2025	2026
In-scope market (round-trips)	Southern California	17,714,689	17,921,733	18,131,665	18,344,535
	Northern California	-	-	-	-
	Las Vegas	5,054,680	5,192,733	5,334,556	5,480,253
	Other	5,754,100	5,863,123	5,974,311	6,087,708
	TOTAL	28,523,469	28,977,589	29,440,532	29,912,496
HSR capture rate (%)	Southern California	26%	27%	27%	27%
	Northern California	-	-	-	-
	Las Vegas	13%	14%	14%	14%
	Other	9%	9%	9%	9%
	TOTAL	20%	21%	21%	21%
Captured HSR ridership (round-trips)	Southern California	4,592,027	4,875,395	4,917,549	4,960,181
	Northern California	-	-	-	-
	Las Vegas	664,982	717,149	734,741	752,767
	Other	491,246	526,654	536,396	546,332
	TOTAL	5,748,256	6,119,198	6,188,686	6,259,279
Induced HSR ridership (round-trips)	Southern California	389,143	413,236	416,893	420,596
	Northern California	-	-	-	-
	Las Vegas	13,298	14,378	14,768	15,168
	Other	-	-	-	-
	TOTAL	402,441	427,614	431,661	435,764
Total HSR ridership (round-trips)	Southern California	4,981,170	5,288,631	5,334,442	5,380,776
	Northern California	-	-	-	-
	Las Vegas	678,281	731,527	749,509	767,935
	Other	491,246	526,654	536,396	546,332
	TOTAL	6,150,697	6,546,812	6,620,347	6,695,043
Average HSR round-trip fare ($, 2015 prices)	Southern California	97	97	97	97
	Northern California	-	-	-	-
	Las Vegas	82	82	82	82
	Other	96	96	96	96
	TOTAL	96	96	96	96
HSR revenue ($, 2015 prices)	Southern California	485,285,142	515,107,733	519,435,600	523,810,699
	Northern California	-	-	-	-
	Las Vegas	55,826,686	60,197,411	61,665,093	63,168,851
	Other	47,122,742	50,535,525	51,486,881	52,457,356
	TOTAL	588,234,570	625,840,670	632,587,574	639,436,906

Source: Steer Davies Gleave

Table F.22: Results tables Phase 1: 2027-2030

Metric	Originating Market	2027	2028	2029	2030
In-scope market (round-trips)	Southern California	18,560,392	18,779,287	19,001,272	19,226,401
	Northern California	-	-	-	-
	Las Vegas	5,629,929	5,783,693	5,941,657	6,103,935
	Other	6,203,358	6,321,309	6,441,607	6,564,300
	TOTAL	30,393,679	30,884,289	31,384,536	31,894,636
HSR capture rate (%)	Southern California	27%	27%	27%	27%
	Northern California	-	-	-	-
	Las Vegas	14%	14%	14%	14%
	Other	9%	9%	9%	9%
	TOTAL	21%	21%	21%	21%
Captured HSR ridership (round-trips)	Southern California	5,003,298	5,046,907	5,091,016	5,135,631
	Northern California	-	-	-	-
	Las Vegas	771,238	790,165	809,560	829,435
	Other	556,465	566,800	577,342	588,093
	TOTAL	6,331,001	6,403,873	6,477,918	6,553,159
Induced HSR ridership (round-trips)	Southern California	424,344	428,139	431,982	435,872
	Northern California	-	-	-	-
	Las Vegas	15,580	16,002	16,437	16,883
	Other	-	-	-	-
	TOTAL	439,924	444,141	448,418	452,755
Total HSR ridership (round-trips)	Southern California	5,427,642	5,475,046	5,522,998	5,571,504
	Northern California	-	-	-	-
	Las Vegas	786,818	806,168	825,997	846,317
	Other	556,465	566,800	577,342	588,093
	TOTAL	6,770,925	6,848,015	6,926,336	7,005,914
Average HSR round-trip fare ($, 2015 prices)	Southern California	97	97	97	97
	Northern California	-	-	-	-
	Las Vegas	82	82	82	82
	Other	96	96	96	96
	TOTAL	95	95	95	95
HSR revenue ($, 2015 prices)	Southern California	528,233,677	532,705,190	537,225,905	541,796,498
	Northern California	-	-	-	-
	Las Vegas	64,709,578	66,288,192	67,905,632	69,562,861
	Other	53,447,361	54,457,315	55,487,648	56,538,801
	TOTAL	646,390,616	653,450,697	660,619,185	667,898,160

Source: Steer Davies Gleave

Table F.23: Results tables Phase 1: 2031-2034

Metric	Originating Market	2031	2032	2033	2034
In-scope market (round-trips)	Southern California	19,467,150	19,711,227	19,958,682	20,209,565
	Northern California	-	-	-	-
	Las Vegas	6,242,637	6,384,491	6,529,569	6,677,943
	Other	6,657,944	6,752,973	6,849,409	6,947,271
	TOTAL	32,367,731	32,848,692	33,337,659	33,834,780
HSR capture rate (%)	Southern California	27%	27%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	14%	13%	13%	13%
	Other	9%	9%	9%	9%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	5,182,635	5,230,132	5,278,127	5,326,626
	Northern California	-	-	-	-
	Las Vegas	845,445	861,768	878,408	895,372
	Other	596,002	604,024	612,160	620,413
	TOTAL	6,624,083	6,695,924	6,768,695	6,842,411
Induced HSR ridership (round-trips)	Southern California	440,125	444,427	448,779	453,180
	Northern California	-	-	-	-
	Las Vegas	17,237	17,599	17,968	18,346
	Other	-	-	-	-
	TOTAL	457,362	462,026	466,747	471,526
Total HSR ridership (round-trips)	Southern California	5,622,761	5,674,559	5,726,906	5,779,806
	Northern California	-	-	-	-
	Las Vegas	862,682	879,366	896,376	913,718
	Other	596,002	604,024	612,160	620,413
	TOTAL	7,081,445	7,157,949	7,235,442	7,313,937
Average HSR round-trip fare ($, 2015 prices)	Southern California	98	98	99	99
	Northern California	-	-	-	-
	Las Vegas	83	83	84	84
	Other	97	97	98	98
	TOTAL	96	96	97	97
HSR revenue ($, 2015 prices)	Southern California	549,380,268	557,076,300	564,886,345	572,812,186
	Northern California	-	-	-	-
	Las Vegas	71,331,919	73,146,147	75,006,705	76,914,780
	Other	57,595,612	58,672,808	59,770,793	60,889,983
	TOTAL	678,307,799	688,895,255	699,663,843	710,616,948

Source: Steer Davies Gleave

Table F.24: Results tables Phase 1: 2035-2038

Metric	Originating Market	2035	2036	2037	2038
In-scope market (round-trips)	Southern California	20,463,929	20,721,828	20,983,314	21,248,443
	Northern California	-	-	-	-
	Las Vegas	6,829,689	6,984,883	7,143,604	7,305,931
	Other	7,046,583	7,147,367	7,249,643	7,353,436
	TOTAL	34,340,202	34,854,078	35,376,561	35,907,809
HSR capture rate (%)	Southern California	26%	26%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	13%	13%	13%	13%
	Other	9%	9%	9%	9%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	5,375,634	5,425,158	5,475,204	5,525,778
	Northern California	-	-	-	-
	Las Vegas	912,667	930,299	948,275	966,601
	Other	628,785	637,276	645,889	654,626
	TOTAL	6,917,086	6,992,733	7,069,368	7,147,005
Induced HSR ridership (round-trips)	Southern California	457,633	462,138	466,694	471,304
	Northern California	-	-	-	-
	Las Vegas	18,731	19,124	19,526	19,936
	Other	-	-	-	-
	TOTAL	476,364	481,262	486,220	491,240
Total HSR ridership (round-trips)	Southern California	5,833,268	5,887,296	5,941,899	5,997,082
	Northern California	-	-	-	-
	Las Vegas	931,398	949,423	967,801	986,537
	Other	628,785	637,276	645,889	654,626
	TOTAL	7,393,450	7,473,995	7,555,589	7,638,245
Average HSR round-trip fare ($, 2015 prices)	Southern California	100	100	101	101
	Northern California	-	-	-	-
	Las Vegas	85	85	86	86
	Other	99	99	100	100
	TOTAL	98	98	99	99
HSR revenue ($, 2015 prices)	Southern California	580,855,633	589,018,527	597,302,738	605,710,169
	Northern California	-	-	-	-
	Las Vegas	78,871,590	80,878,387	82,936,451	85,047,099
	Other	62,030,798	63,193,671	64,379,041	65,587,357
	TOTAL	721,758,022	733,090,585	744,618,230	756,344,625

Source: Steer Davies Gleave

Table F.25: Results tables Phase 1: 2039-2042

Metric	Originating Market	2039	2040	2041	2042
In-scope market (round-trips)	Southern California	21,517,269	21,789,851	22,027,024	22,266,994
	Northern California	-	-	-	-
	Las Vegas	7,471,947	7,641,736	7,806,794	7,975,417
	Other	7,458,767	7,565,661	7,670,268	7,776,398
	TOTAL	36,447,984	36,997,247	37,504,086	38,018,810
HSR capture rate (%)	Southern California	26%	26%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	13%	13%	13%	13%
	Other	9%	9%	9%	9%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	5,576,885	5,628,532	5,692,587	5,757,419
	Northern California	-	-	-	-
	Las Vegas	985,284	1,004,332	1,026,890	1,049,955
	Other	663,489	672,480	683,485	694,673
	TOTAL	7,225,658	7,305,344	7,402,962	7,502,048
Induced HSR ridership (round-trips)	Southern California	475,968	480,685	486,452	492,293
	Northern California	-	-	-	-
	Las Vegas	20,355	20,783	21,278	21,784
	Other	-	-	-	-
	TOTAL	496,323	501,469	507,730	514,077
Total HSR ridership (round-trips)	Southern California	6,052,852	6,109,218	6,179,039	6,249,712
	Northern California	-	-	-	-
	Las Vegas	1,005,639	1,025,115	1,048,168	1,071,739
	Other	663,489	672,480	683,485	694,673
	TOTAL	7,721,981	7,806,812	7,910,691	8,016,124
Average HSR round-trip fare ($, 2015 prices)	Southern California	101	102	102	102
	Northern California	-	-	-	-
	Las Vegas	87	87	87	87
	Other	101	101	101	101
	TOTAL	99	100	100	100
HSR revenue ($, 2015 prices)	Southern California	614,242,752	622,902,454	629,867,724	636,915,941
	Northern California	-	-	-	-
	Las Vegas	87,211,679	89,431,575	91,436,160	93,485,694
	Other	66,819,078	68,074,670	69,208,217	70,360,789
	TOTAL	768,273,509	780,408,699	790,512,101	800,762,425

Source: Steer Davies Gleave

Table F.26: Results tables Phase 1: 2043-2046

Metric	Originating Market	2043	2044	2045	2046
In-scope market (round-trips)	Southern California	22,509,797	22,755,469	23,004,047	23,255,568
	Northern California	-	-	-	-
	Las Vegas	8,147,682	8,323,669	8,503,456	8,687,127
	Other	7,884,074	7,993,317	8,104,153	8,216,604
	TOTAL	38,541,553	39,072,455	39,611,656	40,159,299
HSR capture rate (%)	Southern California	26%	26%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	13%	13%	13%	13%
	Other	9%	9%	9%	9%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	5,823,040	5,889,458	5,956,686	6,024,733
	Northern California	-	-	-	-
	Las Vegas	1,073,539	1,097,652	1,122,307	1,147,516
	Other	706,048	717,612	729,370	741,323
	TOTAL	7,602,626	7,704,723	7,808,363	7,913,572
Induced HSR ridership (round-trips)	Southern California	498,209	504,201	510,271	516,419
	Northern California	-	-	-	-
	Las Vegas	22,302	22,833	23,376	23,932
	Other	-	-	-	-
	TOTAL	520,511	527,034	533,647	540,351
Total HSR ridership (round-trips)	Southern California	6,321,249	6,393,660	6,466,957	6,541,152
	Northern California	-	-	-	-
	Las Vegas	1,095,841	1,120,485	1,145,683	1,171,448
	Other	706,048	717,612	729,370	741,323
	TOTAL	8,123,137	8,231,757	8,342,010	8,453,923
Average HSR round-trip fare ($, 2015 prices)	Southern California	102	102	102	102
	Northern California	-	-	-	-
	Las Vegas	87	87	87	87
	Other	101	101	101	101
	TOTAL	100	100	100	100
HSR revenue ($, 2015 prices)	Southern California	644,048,164	651,265,466	658,568,935	665,959,675
	Northern California	-	-	-	-
	Las Vegas	95,581,186	97,723,666	99,914,189	102,153,832
	Other	71,532,709	72,724,303	73,935,903	75,167,846
	TOTAL	811,162,059	821,713,435	832,419,027	843,281,353

Source: Steer Davies Gleave

Table F.27: Results tables Phase 1: 2047-2050

Metric	Originating Market	2047	2048	2049	2050
In-scope market (round-trips)	Southern California	23,510,071	23,767,595	24,028,178	24,291,860
	Northern California	-	-	-	-
	Las Vegas	8,874,765	9,066,456	9,262,288	9,462,349
	Other	8,330,695	8,446,449	8,563,893	8,683,051
	TOTAL	40,715,531	41,280,501	41,854,359	42,437,261
HSR capture rate (%)	Southern California	26%	26%	26%	26%
	Northern California	-	-	-	-
	Las Vegas	13%	13%	13%	13%
	Other	9%	9%	9%	9%
	TOTAL	20%	20%	20%	20%
Captured HSR ridership (round-trips)	Southern California	6,093,609	6,163,327	6,233,896	6,305,329
	Northern California	-	-	-	-
	Las Vegas	1,173,292	1,199,646	1,226,593	1,254,145
	Other	753,476	765,832	778,394	791,166
	TOTAL	8,020,377	8,128,805	8,238,883	8,350,640
Induced HSR ridership (round-trips)	Southern California	522,647	528,955	535,344	541,817
	Northern California	-	-	-	-
	Las Vegas	24,501	25,084	25,681	26,292
	Other	-	-	-	-
	TOTAL	547,148	554,039	561,026	568,109
Total HSR ridership (round-trips)	Southern California	6,616,256	6,692,282	6,769,241	6,847,146
	Northern California	-	-	-	-
	Las Vegas	1,197,793	1,224,731	1,252,274	1,280,438
	Other	753,476	765,832	778,394	791,166
	TOTAL	8,567,525	8,682,844	8,799,909	8,918,749
Average HSR round-trip fare ($, 2015 prices)	Southern California	102	102	102	102
	Northern California	-	-	-	-
	Las Vegas	87	87	87	87
	Other	101	101	101	102
	TOTAL	100	100	100	100
HSR revenue ($, 2015 prices)	Southern California	673,438,802	681,007,452	688,666,773	696,417,931
	Northern California	-	-	-	-
	Las Vegas	104,443,698	106,784,912	109,178,627	111,626,021
	Other	76,420,478	77,694,146	78,989,207	80,306,022
	TOTAL	854,302,978	865,486,510	876,834,608	888,349,974

Source: Steer Davies Gleave

The following tables provide full results for Infrastructure Phase 2 (Las Vegas-Burbank) for all forecast years between 2015 and 2050.

Table F.28: Results tables Phase 2: 2015-2018

Metric	Originating Market	2015	2016	2017	2018
In-scope market (round-trips)	Southern California	15,602,542	15,860,694	16,123,494	16,391,033
	Northern California	-	-	-	-
	Las Vegas	3,783,799	3,928,464	4,078,660	4,234,599
	Other	4,731,485	4,852,042	4,975,862	5,103,037
	TOTAL	24,117,825	24,641,200	25,178,016	25,728,668
HSR capture rate (%)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Captured HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Induced HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Total HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
HSR revenue ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-

Source: Steer Davies Gleave

Table F.29: Results tables Phase 2: 2019-2022

Metric	Originating Market	2019	2020	2021	2022
In-scope market (round-trips)	Southern California	16,663,405	16,940,706	17,223,033	17,510,486
	Northern California	-	-	-	-
	Las Vegas	4,396,500	4,564,590	4,739,108	4,920,297
	Other	5,233,659	5,367,827	5,505,639	5,647,198
	TOTAL	26,293,564	26,873,123	27,467,780	28,077,981
HSR capture rate (%)	Southern California	-	-	14%	21%
	Northern California	-	-	-	-
	Las Vegas	-	-	7%	10%
	Other	-	-	4%	7%
	TOTAL	-	-	11%	16%
Captured HSR ridership (round-trips)	Southern California	-	-	2,358,234	3,594,372
	Northern California	-	-	-	-
	Las Vegas	-	-	329,120	512,421
	Other	-	-	246,762	380,800
	TOTAL	-	-	2,934,116	4,487,593
Induced HSR ridership (round-trips)	Southern California	-	-	200,423	304,541
	Northern California	-	-	-	-
	Las Vegas	-	-	6,560	10,221
	Other	-	-	-	-
	TOTAL	-	-	206,983	314,763
Total HSR ridership (round-trips)	Southern California	-	-	2,558,657	3,898,913
	Northern California	-	-	-	-
	Las Vegas	-	-	335,680	522,642
	Other	-	-	246,762	380,800
	TOTAL	-	-	3,141,099	4,802,356
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	97	97
	Northern California	-	-	-	-
	Las Vegas	-	-	82	82
	Other	-	-	96	96
	TOTAL	-	-	96	96
HSR revenue ($, 2015 prices)	Southern California	-	-	249,092,260	379,943,379
	Northern California	-	-	-	-
	Las Vegas	-	-	27,637,531	43,025,105
	Other	-	-	23,650,207	36,516,429
	TOTAL	-	-	300,379,999	459,484,913

Source: Steer Davies Gleave

Table F.30: Results tables Phase 2: 2023-2026

Metric	Originating Market	2023	2024	2025	2026
In-scope market (round-trips)	Southern California	17,714,689	17,921,733	18,131,665	18,344,535
	Northern California	-	-	-	-
	Las Vegas	5,054,680	5,192,733	5,334,556	5,480,253
	Other	5,754,100	5,863,123	5,974,311	6,087,708
	TOTAL	28,523,469	28,977,589	29,440,532	29,912,496
HSR capture rate (%)	Southern California	26%	27%	27%	30%
	Northern California	-	-	-	-
	Las Vegas	13%	14%	14%	19%
	Other	9%	9%	9%	11%
	TOTAL	20%	21%	21%	24%
Captured HSR ridership (round-trips)	Southern California	4,592,027	4,875,395	4,917,549	5,428,910
	Northern California	-	-	-	-
	Las Vegas	664,982	717,149	734,741	1,065,098
	Other	491,246	526,654	536,396	645,414
	TOTAL	5,748,256	6,119,198	6,188,686	7,139,422
Induced HSR ridership (round-trips)	Southern California	389,143	413,236	416,893	570,536
	Northern California	-	-	-	-
	Las Vegas	13,298	14,378	14,768	75,609
	Other	-	-	-	-
	TOTAL	402,441	427,614	431,661	646,145
Total HSR ridership (round-trips)	Southern California	4,981,170	5,288,631	5,334,442	5,999,446
	Northern California	-	-	-	-
	Las Vegas	678,281	731,527	749,509	1,140,707
	Other	491,246	526,654	536,396	645,414
	TOTAL	6,150,697	6,546,812	6,620,347	7,785,567
Average HSR round-trip fare ($, 2015 prices)	Southern California	97	97	97	103
	Northern California	-	-	-	-
	Las Vegas	82	82	82	87
	Other	96	96	96	101
	TOTAL	96	96	96	100
HSR revenue ($, 2015 prices)	Southern California	485,285,142	515,107,733	519,435,600	616,112,424
	Northern California	-	-	-	-
	Las Vegas	55,826,686	60,197,411	61,665,093	99,664,772
	Other	47,122,742	50,535,525	51,486,881	65,022,268
	TOTAL	588,234,570	625,840,670	632,587,574	780,799,465

Source: Steer Davies Gleave

Table F.31: Results tables Phase 2: 2027-2030

Metric	Originating Market	2027	2028	2029	2030
In-scope market (round-trips)	Southern California	18,560,392	18,779,287	19,001,272	19,226,401
	Northern California	-	-	-	-
	Las Vegas	5,629,929	5,783,693	5,941,657	6,103,935
	Other	6,203,358	6,321,309	6,441,607	6,564,300
	TOTAL	30,393,679	30,884,289	31,384,536	31,894,636
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	-	-
	Las Vegas	21%	21%	21%	21%
	Other	11%	11%	11%	11%
	TOTAL	25%	25%	25%	24%
Captured HSR ridership (round-trips)	Southern California	5,602,179	5,682,785	5,732,419	5,782,608
	Northern California	-	-	-	-
	Las Vegas	1,176,062	1,226,212	1,255,755	1,286,016
	Other	684,075	703,385	716,226	729,320
	TOTAL	7,462,316	7,612,382	7,704,400	7,797,944
Induced HSR ridership (round-trips)	Southern California	587,488	595,726	601,058	606,456
	Northern California	-	-	-	-
	Las Vegas	83,624	87,403	89,749	92,157
	Other	-	-	-	-
	TOTAL	671,112	683,129	690,807	698,613
Total HSR ridership (round-trips)	Southern California	6,189,667	6,278,511	6,333,477	6,389,064
	Northern California	-	-	-	-
	Las Vegas	1,259,686	1,313,615	1,345,504	1,378,173
	Other	684,075	703,385	716,226	729,320
	TOTAL	8,133,428	8,295,511	8,395,207	8,496,557
Average HSR round-trip fare ($, 2015 prices)	Southern California	104	104	104	104
	Northern California	-	-	-	-
	Las Vegas	88	89	89	89
	Other	102	102	102	102
	TOTAL	101	102	102	102
HSR revenue ($, 2015 prices)	Southern California	643,920,178	655,035,549	660,550,042	666,123,073
	Northern California	-	-	-	-
	Las Vegas	111,291,345	116,328,466	119,126,078	121,991,593
	Other	69,642,654	71,805,099	73,141,305	74,504,215
	TOTAL	824,854,177	843,169,115	852,817,425	862,618,881

Source: Steer Davies Gleave

Table F.32: Results tables Phase 2: 2031-2034

Metric	Originating Market	2031	2032	2033	2034
In-scope market (round-trips)	Southern California	19,467,150	19,711,227	19,958,682	20,209,565
	Northern California	-	-	-	-
	Las Vegas	6,242,637	6,384,491	6,529,569	6,677,943
	Other	6,657,944	6,752,973	6,849,409	6,947,271
	TOTAL	32,367,731	32,848,692	33,337,659	33,834,780
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	-	-
	Las Vegas	21%	21%	21%	21%
	Other	11%	11%	11%	11%
	TOTAL	24%	24%	24%	24%
Captured HSR ridership (round-trips)	Southern California	5,837,542	5,893,057	5,949,161	6,005,861
	Northern California	-	-	-	-
	Las Vegas	1,311,342	1,337,170	1,363,512	1,390,376
	Other	739,214	749,251	759,433	769,761
	TOTAL	7,888,098	7,979,479	8,072,106	8,165,998
Induced HSR ridership (round-trips)	Southern California	612,610	618,836	625,134	631,506
	Northern California	-	-	-	-
	Las Vegas	94,136	96,158	98,224	100,334
	Other	-	-	-	-
	TOTAL	706,746	714,994	723,358	731,840
Total HSR ridership (round-trips)	Southern California	6,450,152	6,511,893	6,574,295	6,637,367
	Northern California	-	-	-	-
	Las Vegas	1,405,478	1,433,329	1,461,736	1,490,710
	Other	739,214	749,251	759,433	769,761
	TOTAL	8,594,844	8,694,473	8,795,464	8,897,838
Average HSR round-trip fare ($, 2015 prices)	Southern California	105	105	106	106
	Northern California	-	-	-	-
	Las Vegas	89	89	90	90
	Other	103	103	104	104
	TOTAL	102	102	103	103
HSR revenue ($, 2015 prices)	Southern California	675,438,167	684,890,202	694,481,288	704,213,570
	Northern California	-	-	-	-
	Las Vegas	125,096,397	128,280,509	131,545,963	134,894,844
	Other	75,885,767	77,293,738	78,728,649	80,191,029
	TOTAL	876,420,331	890,464,449	904,755,899	919,299,444

Source: Steer Davies Gleave

Table F.33: Results tables Phase 2: 2035-2038

Metric	Originating Market	2035	2036	2037	2038
In-scope market (round-trips)	Southern California	20,463,929	20,721,828	20,983,314	21,248,443
	Northern California	-	-	-	-
	Las Vegas	6,829,689	6,984,883	7,143,604	7,305,931
	Other	7,046,583	7,147,367	7,249,643	7,353,436
	TOTAL	34,340,202	34,854,078	35,376,561	35,907,809
HSR capture rate (%)	Southern California	30%	30%	29%	29%
	Northern California	-	-	-	-
	Las Vegas	21%	21%	21%	21%
	Other	11%	11%	11%	11%
	TOTAL	24%	24%	24%	24%
Captured HSR ridership (round-trips)	Southern California	6,063,163	6,121,075	6,179,602	6,238,753
	Northern California	-	-	-	-
	Las Vegas	1,417,774	1,445,715	1,474,212	1,503,275
	Other	780,238	790,867	801,650	812,588
	TOTAL	8,261,175	8,357,657	8,455,464	8,554,616
Induced HSR ridership (round-trips)	Southern California	637,952	644,474	651,072	657,748
	Northern California	-	-	-	-
	Las Vegas	102,490	104,693	106,943	109,242
	Other	-	-	-	-
	TOTAL	740,443	749,167	758,015	766,990
Total HSR ridership (round-trips)	Southern California	6,701,115	6,765,548	6,830,674	6,896,501
	Northern California	-	-	-	-
	Las Vegas	1,520,264	1,550,408	1,581,155	1,612,517
	Other	780,238	790,867	801,650	812,588
	TOTAL	9,001,618	9,106,824	9,213,479	9,321,606
Average HSR round-trip fare ($, 2015 prices)	Southern California	107	107	107	108
	Northern California	-	-	-	-
	Las Vegas	91	91	92	93
	Other	105	105	106	106
	TOTAL	104	104	105	105
HSR revenue ($, 2015 prices)	Southern California	714,089,230	724,110,481	734,279,575	744,598,800
	Northern California	-	-	-	-
	Las Vegas	138,329,293	141,851,504	145,463,728	149,168,275
	Other	81,681,422	83,200,381	84,748,469	86,326,263
	TOTAL	934,099,946	949,162,366	964,491,773	980,093,338

Source: Steer Davies Gleave

Table F.34: Results tables Phase 2: 2039-2042

Metric	Originating Market	2039	2040	2041	2042
In-scope market (round-trips)	Southern California	21,517,269	21,789,851	22,027,024	22,266,994
	Northern California	-	-	-	-
	Las Vegas	7,471,947	7,641,736	7,806,794	7,975,417
	Other	7,458,767	7,565,661	7,670,268	7,776,398
	TOTAL	36,447,984	36,997,247	37,504,086	38,018,810
HSR capture rate (%)	Southern California	29%	29%	29%	29%
	Northern California	-	-	-	-
	Las Vegas	21%	20%	20%	20%
	Other	11%	11%	11%	11%
	TOTAL	24%	24%	24%	24%
Captured HSR ridership (round-trips)	Southern California	6,298,535	6,358,954	6,430,860	6,503,629
	Northern California	-	-	-	-
	Las Vegas	1,532,915	1,563,145	1,598,222	1,634,086
	Other	823,685	834,943	848,497	862,276
	TOTAL	8,655,135	8,757,042	8,877,579	8,999,991
Induced HSR ridership (round-trips)	Southern California	664,502	671,335	679,363	687,494
	Northern California	-	-	-	-
	Las Vegas	111,591	113,990	116,708	119,491
	Other	-	-	-	-
	TOTAL	776,092	785,325	796,072	806,985
Total HSR ridership (round-trips)	Southern California	6,963,036	7,030,289	7,110,223	7,191,123
	Northern California	-	-	-	-
	Las Vegas	1,644,506	1,677,135	1,714,930	1,753,578
	Other	823,685	834,943	848,497	862,276
	TOTAL	9,431,228	9,542,367	9,673,651	9,806,977
Average HSR round-trip fare ($, 2015 prices)	Southern California	108	109	109	109
	Northern California	-	-	-	-
	Las Vegas	93	94	94	94
	Other	107	107	107	107
	TOTAL	106	106	106	106
HSR revenue ($, 2015 prices)	Southern California	755,070,481	765,696,980	774,176,959	782,756,319
	Northern California	-	-	-	-
	Las Vegas	152,967,512	156,863,870	160,386,451	163,988,174
	Other	87,934,350	89,573,329	91,056,978	92,565,402
	TOTAL	995,972,343	1,012,134,179	1,025,620,389	1,039,309,895

Source: Steer Davies Gleave

Table F.35: Results tables Phase 2: 2043-2046

Metric	Originating Market	2043	2044	2045	2046
In-scope market (round-trips)	Southern California	22,509,797	22,755,469	23,004,047	23,255,568
	Northern California	-	-	-	-
	Las Vegas	8,147,682	8,323,669	8,503,456	8,687,127
	Other	7,884,074	7,993,317	8,104,153	8,216,604
	TOTAL	38,541,553	39,072,455	39,611,656	40,159,299
HSR capture rate (%)	Southern California	29%	29%	29%	29%
	Northern California	-	-	-	-
	Las Vegas	21%	21%	21%	21%
	Other	11%	11%	11%	11%
	TOTAL	24%	24%	24%	24%
Captured HSR ridership (round-trips)	Southern California	6,577,273	6,651,802	6,727,229	6,803,564
	Northern California	-	-	-	-
	Las Vegas	1,670,756	1,708,249	1,746,583	1,785,777
	Other	876,283	890,522	904,997	919,712
	TOTAL	9,124,311	9,250,572	9,378,808	9,509,053
Induced HSR ridership (round-trips)	Southern California	695,728	704,068	712,514	721,068
	Northern California	-	-	-	-
	Las Vegas	122,341	125,258	128,245	131,303
	Other	-	-	-	-
	TOTAL	818,069	829,326	840,759	852,371
Total HSR ridership (round-trips)	Southern California	7,273,001	7,355,870	7,439,743	7,524,632
	Northern California	-	-	-	-
	Las Vegas	1,793,097	1,833,507	1,874,828	1,917,081
	Other	876,283	890,522	904,997	919,712
	TOTAL	9,942,380	10,079,898	10,219,567	10,361,424
Average HSR round-trip fare ($, 2015 prices)	Southern California	109	109	109	109
	Northern California	-	-	-	-
	Las Vegas	94	94	93	93
	Other	107	107	107	107
	TOTAL	106	106	106	106
HSR revenue ($, 2015 prices)	Southern California	791,436,301	800,218,163	809,103,180	818,092,643
	Northern California	-	-	-	-
	Las Vegas	167,670,816	171,436,196	175,286,175	179,222,654
	Other	94,099,016	95,658,244	97,243,515	98,855,269
	TOTAL	1,053,206,133	1,067,312,603	1,081,632,870	1,096,170,566

Source: Steer Davies Gleave

Table F.36: Results tables Phase 2: 2047-2050

Metric	Originating Market	2047	2048	2049	2050
In-scope market (round-trips)	Southern California	23,510,071	23,767,595	24,028,178	24,291,860
	Northern California	-	-	-	-
	Las Vegas	8,874,765	9,066,456	9,262,288	9,462,349
	Other	8,330,695	8,446,449	8,563,893	8,683,051
	TOTAL	40,715,531	41,280,501	41,854,359	42,437,261
HSR capture rate (%)	Southern California	29%	29%	29%	29%
	Northern California	-	-	-	-
	Las Vegas	21%	21%	21%	21%
	Other	11%	11%	11%	11%
	TOTAL	24%	24%	24%	24%
Captured HSR ridership (round-trips)	Southern California	6,880,819	6,959,007	7,038,139	7,118,228
	Northern California	-	-	-	-
	Las Vegas	1,825,852	1,866,826	1,908,719	1,951,553
	Other	934,671	949,879	965,339	981,055
	TOTAL	9,641,343	9,775,712	9,912,197	10,050,836
Induced HSR ridership (round-trips)	Southern California	729,731	738,506	747,393	756,394
	Northern California	-	-	-	-
	Las Vegas	134,434	137,640	140,922	144,283
	Other	-	-	-	-
	TOTAL	864,166	876,146	888,315	900,677
Total HSR ridership (round-trips)	Southern California	7,610,551	7,697,513	7,785,532	7,874,622
	Northern California	-	-	-	-
	Las Vegas	1,960,286	2,004,466	2,049,642	2,095,836
	Other	934,671	949,879	965,339	981,055
	TOTAL	10,505,508	10,651,858	10,800,512	10,951,513
Average HSR round-trip fare ($, 2015 prices)	Southern California	109	109	109	109
	Northern California	-	-	-	-
	Las Vegas	93	93	93	93
	Other	108	108	108	108
	TOTAL	106	106	106	106
HSR revenue ($, 2015 prices)	Southern California	827,187,862	836,390,165	845,700,895	855,121,416
	Northern California	-	-	-	-
	Las Vegas	183,247,577	187,362,933	191,570,754	195,873,118
	Other	100,493,950	102,160,009	103,853,909	105,576,116
	TOTAL	1,110,929,389	1,125,913,107	1,141,125,557	1,156,570,650

Source: Steer Davies Gleave

The following tables provide full results for Infrastructure Phase 3 (Las Vegas-Anaheim) for all forecast years between 2015 and 2050.

Table F.37: Results tables Phase 3: 2015-2018

Metric	Originating Market	2015	2016	2017	2018
In-scope market (round-trips)	Southern California	15,602,542	15,860,694	16,123,494	16,391,033
	Northern California	-	-	-	-
	Las Vegas	3,783,799	3,928,464	4,078,660	4,234,599
	Other	4,731,485	4,852,042	4,975,862	5,103,037
	TOTAL	24,117,825	24,641,200	25,178,016	25,728,668
HSR capture rate (%)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Captured HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Induced HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Total HSR ridership (round-trips)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-
HSR revenue ($, 2015 prices)	Southern California	-	-	-	-
	Northern California	-	-	-	-
	Las Vegas	-	-	-	-
	Other	-	-	-	-
	TOTAL	-	-	-	-

Source: Steer Davies Gleave

Table F.38: Results tables Phase 3: 2019-2022

Metric	Originating Market	2019	2020	2021	2022
In-scope market (round-trips)	Southern California	16,663,405	16,940,706	17,223,033	17,510,486
	Northern California	-	-	-	-
	Las Vegas	4,396,500	4,564,590	4,739,108	4,920,297
	Other	5,233,659	5,367,827	5,505,639	5,647,198
	TOTAL	26,293,564	26,873,123	27,467,780	28,077,981
HSR capture rate (%)	Southern California	-	-	14%	21%
	Northern California	-	-	-	-
	Las Vegas	-	-	7%	10%
	Other	-	-	4%	7%
	TOTAL	-	-	11%	16%
Captured HSR ridership (round-trips)	Southern California	-	-	2,358,234	3,594,372
	Northern California	-	-	-	-
	Las Vegas	-	-	329,120	512,421
	Other	-	-	246,762	380,800
	TOTAL	-	-	2,934,116	4,487,593
Induced HSR ridership (round-trips)	Southern California	-	-	200,423	304,541
	Northern California	-	-	-	-
	Las Vegas	-	-	6,560	10,221
	Other	-	-	-	-
	TOTAL	-	-	206,983	314,763
Total HSR ridership (round-trips)	Southern California	-	-	2,558,657	3,898,913
	Northern California	-	-	-	-
	Las Vegas	-	-	335,680	522,642
	Other	-	-	246,762	380,800
	TOTAL	-	-	3,141,099	4,802,356
Average HSR round-trip fare ($, 2015 prices)	Southern California	-	-	97	97
	Northern California	-	-	-	-
	Las Vegas	-	-	82	82
	Other	-	-	96	96
	TOTAL	-	-	96	96
HSR revenue ($, 2015 prices)	Southern California	-	-	249,092,260	379,943,379
	Northern California	-	-	-	-
	Las Vegas	-	-	27,637,531	43,025,105
	Other	-	-	23,650,207	36,516,429
	TOTAL	-	-	300,379,999	459,484,913

Source: Steer Davies Gleave

Table F.39: Results tables Phase 3: 2023-2026

Metric	Originating Market	2023	2024	2025	2026
In-scope market (round-trips)	Southern California	17,714,689	17,921,733	18,131,665	18,344,535
	Northern California	-	-	-	-
	Las Vegas	5,054,680	5,192,733	5,334,556	5,480,253
	Other	5,754,100	5,863,123	5,974,311	6,087,708
	TOTAL	28,523,469	28,977,589	29,440,532	29,912,496
HSR capture rate (%)	Southern California	26%	27%	27%	30%
	Northern California	-	-	-	-
	Las Vegas	13%	14%	14%	19%
	Other	9%	9%	9%	11%
	TOTAL	20%	21%	21%	24%
Captured HSR ridership (round-trips)	Southern California	4,592,027	4,875,395	4,917,549	5,428,910
	Northern California	-	-	-	-
	Las Vegas	664,982	717,149	734,741	1,065,098
	Other	491,246	526,654	536,396	645,414
	TOTAL	5,748,256	6,119,198	6,188,686	7,139,422
Induced HSR ridership (round-trips)	Southern California	389,143	413,236	416,893	570,536
	Northern California	-	-	-	-
	Las Vegas	13,298	14,378	14,768	75,609
	Other	-	-	-	-
	TOTAL	402,441	427,614	431,661	646,145
Total HSR ridership (round-trips)	Southern California	4,981,170	5,288,631	5,334,442	5,999,446
	Northern California	-	-	-	-
	Las Vegas	678,281	731,527	749,509	1,140,707
	Other	491,246	526,654	536,396	645,414
	TOTAL	6,150,697	6,546,812	6,620,347	7,785,567
Average HSR round-trip fare ($, 2015 prices)	Southern California	97	97	97	103
	Northern California	-	-	-	-
	Las Vegas	82	82	82	87
	Other	96	96	96	101
	TOTAL	96	96	96	100
HSR revenue ($, 2015 prices)	Southern California	485,285,142	515,107,733	519,435,600	616,112,424
	Northern California	-	-	-	-
	Las Vegas	55,826,686	60,197,411	61,665,093	99,664,772
	Other	47,122,742	50,535,525	51,486,881	65,022,268
	TOTAL	588,234,570	625,840,670	632,587,574	780,799,465

Source: Steer Davies Gleave

Table F.40: Results tables Phase 3: 2027-2030

Metric	Originating Market	2027	2028	2029	2030
In-scope market (round-trips)	Southern California	18,560,392	18,779,287	19,001,272	19,226,401
	Northern California	-	-	-	-
	Las Vegas	5,629,929	5,783,693	5,941,657	6,103,935
	Other	6,203,358	6,321,309	6,441,607	6,564,300
	TOTAL	30,393,679	30,884,289	31,384,536	31,894,636
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	-	-
	Las Vegas	21%	21%	28%	30%
	Other	11%	11%	12%	13%
	TOTAL	25%	25%	26%	27%
Captured HSR ridership (round-trips)	Southern California	5,602,179	5,682,785	5,793,999	5,860,346
	Northern California	-	-	-	-
	Las Vegas	1,176,062	1,226,212	1,686,349	1,843,469
	Other	684,075	703,385	796,670	832,456
	TOTAL	7,462,316	7,612,382	8,277,018	8,536,270
Induced HSR ridership (round-trips)	Southern California	587,488	595,726	751,503	759,075
	Northern California	-	-	-	-
	Las Vegas	83,624	87,403	199,053	218,027
	Other	-	-	-	-
	TOTAL	671,112	683,129	950,556	977,101
Total HSR ridership (round-trips)	Southern California	6,189,667	6,278,511	6,545,502	6,619,420
	Northern California	-	-	-	-
	Las Vegas	1,259,686	1,313,615	1,885,402	2,061,495
	Other	684,075	703,385	796,670	832,456
	TOTAL	8,133,428	8,295,511	9,227,574	9,513,372
Average HSR round-trip fare ($, 2015 prices)	Southern California	104	104	107	107
	Northern California	-	-	-	-
	Las Vegas	88	89	90	91
	Other	102	102	101	101
	TOTAL	101	102	103	103
HSR revenue ($, 2015 prices)	Southern California	643,920,178	655,035,549	698,191,199	710,773,997
	Northern California	-	-	-	-
	Las Vegas	111,291,345	116,328,466	170,263,138	187,002,561
	Other	69,642,654	71,805,099	80,711,216	84,233,007
	TOTAL	824,854,177	843,169,115	949,165,553	982,009,565

Source: Steer Davies Gleave

Table F.41: Results tables Phase 3: 2031-2034

Metric	Originating Market	2031	2032	2033	2034
In-scope market (round-trips)	Southern California	19,467,150	19,711,227	19,958,682	20,209,565
	Northern California	-	-	-	-
	Las Vegas	6,242,637	6,384,491	6,529,569	6,677,943
	Other	6,657,944	6,752,973	6,849,409	6,947,271
	TOTAL	32,367,731	32,848,692	33,337,659	33,834,780
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	-	-
	Las Vegas	31%	30%	30%	30%
	Other	13%	13%	13%	13%
	TOTAL	27%	27%	27%	27%
Captured HSR ridership (round-trips)	Southern California	5,920,426	5,977,007	6,034,185	6,091,969
	Northern California	-	-	-	-
	Las Vegas	1,909,640	1,947,201	1,985,506	2,024,571
	Other	848,984	860,242	871,659	883,239
	TOTAL	8,679,050	8,784,450	8,891,351	8,999,779
Induced HSR ridership (round-trips)	Southern California	767,052	774,884	782,808	790,825
	Northern California	-	-	-	-
	Las Vegas	226,224	231,096	236,074	241,160
	Other	-	-	-	-
	TOTAL	993,275	1,005,981	1,018,883	1,031,985
Total HSR ridership (round-trips)	Southern California	6,687,478	6,751,891	6,816,994	6,882,794
	Northern California	-	-	-	-
	Las Vegas	2,135,863	2,178,297	2,221,580	2,265,731
	Other	848,984	860,242	871,659	883,239
	TOTAL	9,672,326	9,790,430	9,910,234	10,031,764
Average HSR round-trip fare ($, 2015 prices)	Southern California	108	108	109	109
	Northern California	-	-	-	-
	Las Vegas	91	92	92	93
	Other	102	102	103	103
	TOTAL	104	104	105	105
HSR revenue ($, 2015 prices)	Southern California	722,317,070	732,295,348	742,418,928	752,690,035
	Northern California	-	-	-	-
	Las Vegas	194,993,897	199,928,228	204,987,914	210,176,151
	Other	86,293,026	87,870,281	89,477,387	91,114,928
	TOTAL	1,003,603,992	1,020,093,857	1,036,884,229	1,053,981,113

Source: Steer Davies Gleave

Table F.42: Results tables Phase 3: 2035-2038

Metric	Originating Market	2035	2036	2037	2038
In-scope market (round-trips)	Southern California	20,463,929	20,721,828	20,983,314	21,248,443
	Northern California	-	-	-	-
	Las Vegas	6,829,689	6,984,883	7,143,604	7,305,931
	Other	7,046,583	7,147,367	7,249,643	7,353,436
	TOTAL	34,340,202	34,854,078	35,376,561	35,907,809
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	-	-
	Las Vegas	30%	30%	30%	30%
	Other	13%	13%	13%	13%
	TOTAL	27%	26%	26%	26%
Captured HSR ridership (round-trips)	Southern California	6,150,364	6,209,378	6,269,019	6,329,292
	Northern California	-	-	-	-
	Las Vegas	2,064,410	2,105,039	2,146,473	2,188,729
	Other	894,983	906,895	918,976	931,229
	TOTAL	9,109,757	9,221,312	9,334,468	9,449,251
Induced HSR ridership (round-trips)	Southern California	798,934	807,139	815,439	823,836
	Northern California	-	-	-	-
	Las Vegas	246,357	251,665	257,089	262,630
	Other	-	-	-	-
	TOTAL	1,045,291	1,058,804	1,072,528	1,086,467
Total HSR ridership (round-trips)	Southern California	6,949,299	7,016,517	7,084,457	7,153,128
	Northern California	-	-	-	-
	Las Vegas	2,310,766	2,356,704	2,403,562	2,451,360
	Other	894,983	906,895	918,976	931,229
	TOTAL	10,155,048	10,280,116	10,406,996	10,535,717
Average HSR round-trip fare ($, 2015 prices)	Southern California	110	110	111	111
	Northern California	-	-	-	-
	Las Vegas	93	94	94	95
	Other	104	104	105	105
	TOTAL	106	106	106	107
HSR revenue ($, 2015 prices)	Southern California	763,110,931	773,683,914	784,411,320	795,295,523
	Northern California	-	-	-	-
	Las Vegas	215,496,219	220,951,483	226,545,391	232,281,483
	Other	92,783,498	94,483,706	96,216,171	97,981,525
	TOTAL	1,071,390,648	1,089,119,103	1,107,172,883	1,125,558,531

Source: Steer Davies Gleave

Table F.43: Results tables Phase 3: 2039-2042

Metric	Originating Market	2039	2040	2041	2042
In-scope market (round-trips)	Southern California	21,517,269	21,789,851	22,027,024	22,266,994
	Northern California	-	-	-	-
	Las Vegas	7,471,947	7,641,736	7,806,794	7,975,417
	Other	7,458,767	7,565,661	7,670,268	7,776,398
	TOTAL	36,447,984	36,997,247	37,504,086	38,018,810
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	-	-
	Las Vegas	30%	30%	30%	30%
	Other	13%	13%	13%	13%
	TOTAL	26%	26%	26%	26%
Captured HSR ridership (round-trips)	Southern California	6,390,206	6,451,767	6,524,493	6,598,090
	Northern California	-	-	-	-
	Las Vegas	2,231,824	2,275,773	2,326,778	2,378,925
	Other	943,658	956,264	971,322	986,627
	TOTAL	9,565,687	9,683,804	9,822,593	9,963,642
Induced HSR ridership (round-trips)	Southern California	832,332	840,928	850,971	861,143
	Northern California	-	-	-	-
	Las Vegas	268,292	274,076	280,621	287,322
	Other	-	-	-	-
	TOTAL	1,100,624	1,115,004	1,131,592	1,148,465
Total HSR ridership (round-trips)	Southern California	7,222,538	7,292,695	7,375,464	7,459,233
	Northern California	-	-	-	-
	Las Vegas	2,500,116	2,549,849	2,607,398	2,666,247
	Other	943,658	956,264	971,322	986,627
	TOTAL	10,666,311	10,798,808	10,954,185	11,112,107
Average HSR round-trip fare ($, 2015 prices)	Southern California	112	112	112	112
	Northern California	-	-	-	-
	Las Vegas	95	96	96	96
	Other	106	106	106	106
	TOTAL	107	108	108	108
HSR revenue ($, 2015 prices)	Southern California	806,338,934	817,544,005	826,531,089	835,622,802
	Northern California	-	-	-	-
	Las Vegas	238,163,386	244,194,823	249,684,776	255,298,223
	Other	99,780,413	101,613,492	103,284,275	104,982,863
	TOTAL	1,144,282,733	1,163,352,320	1,179,500,140	1,195,903,888

Source: Steer Davies Gleave

Table F.44: Results tables Phase 3: 2043-2046

Metric	Originating Market	2043	2044	2045	2046
In-scope market (round-trips)	Southern California	22,509,797	22,755,469	23,004,047	23,255,568
	Northern California	-	-	-	-
	Las Vegas	8,147,682	8,323,669	8,503,456	8,687,127
	Other	7,884,074	7,993,317	8,104,153	8,216,604
	TOTAL	38,541,553	39,072,455	39,611,656	40,159,299
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	-	-
	Las Vegas	30%	30%	30%	30%
	Other	13%	13%	13%	13%
	TOTAL	26%	26%	26%	26%
Captured HSR ridership (round-trips)	Southern California	6,672,569	6,747,941	6,824,218	6,901,411
	Northern California	-	-	-	-
	Las Vegas	2,432,242	2,486,754	2,542,488	2,599,471
	Other	1,002,183	1,017,993	1,034,063	1,050,395
	TOTAL	10,106,994	10,252,688	10,400,768	10,551,278
Induced HSR ridership (round-trips)	Southern California	871,444	881,876	892,442	903,142
	Northern California	-	-	-	-
	Las Vegas	294,183	301,208	308,401	315,765
	Other	-	-	-	-
	TOTAL	1,165,627	1,183,084	1,200,842	1,218,907
Total HSR ridership (round-trips)	Southern California	7,544,013	7,629,817	7,716,660	7,804,554
	Northern California	-	-	-	-
	Las Vegas	2,726,425	2,787,962	2,850,888	2,915,236
	Other	1,002,183	1,017,993	1,034,063	1,050,395
	TOTAL	11,272,620	11,435,772	11,601,611	11,770,185
Average HSR round-trip fare ($, 2015 prices)	Southern California	112	112	112	112
	Northern California	-	-	-	-
	Las Vegas	96	96	96	96
	Other	106	107	107	107
	TOTAL	108	108	107	107
HSR revenue ($, 2015 prices)	Southern California	844,820,442	854,125,327	863,538,791	873,062,187
	Northern California	-	-	-	-
	Las Vegas	261,037,945	266,906,784	272,907,646	279,043,502
	Other	106,709,720	108,465,322	110,250,151	112,064,695
	TOTAL	1,212,568,108	1,229,497,433	1,246,696,587	1,264,170,384

Source: Steer Davies Gleave

Table F.45: Results tables Phase 3: 2047-2050

Metric	Originating Market	2047	2048	2049	2050
In-scope market (round-trips)	Southern California	23,510,071	23,767,595	24,028,178	24,291,860
	Northern California	-	-	-	-
	Las Vegas	8,874,765	9,066,456	9,262,288	9,462,349
	Other	8,330,695	8,446,449	8,563,893	8,683,051
	TOTAL	40,715,531	41,280,501	41,854,359	42,437,261
HSR capture rate (%)	Southern California	30%	30%	30%	30%
	Northern California	-	-	-	-
	Las Vegas	30%	30%	30%	30%
	Other	13%	13%	13%	13%
	TOTAL	26%	26%	26%	26%
Captured HSR ridership (round-trips)	Southern California	6,979,533	7,058,595	7,138,609	7,219,588
	Northern California	-	-	-	-
	Las Vegas	2,657,731	2,717,298	2,778,200	2,840,467
	Other	1,066,996	1,083,869	1,101,018	1,118,449
	TOTAL	10,704,260	10,859,761	11,017,827	11,178,503
Induced HSR ridership (round-trips)	Southern California	913,980	924,956	936,072	947,331
	Northern California	-	-	-	-
	Las Vegas	323,306	331,026	338,931	347,025
	Other	-	-	-	-
	TOTAL	1,237,285	1,255,982	1,275,003	1,294,356
Total HSR ridership (round-trips)	Southern California	7,893,513	7,983,551	8,074,681	8,166,919
	Northern California	-	-	-	-
	Las Vegas	2,981,037	3,048,324	3,117,131	3,187,492
	Other	1,066,996	1,083,869	1,101,018	1,118,449
	TOTAL	11,941,546	12,115,743	12,292,830	12,472,859
Average HSR round-trip fare ($, 2015 prices)	Southern California	112	112	112	112
	Northern California	-	-	-	-
	Las Vegas	96	96	96	96
	Other	107	107	107	107
	TOTAL	107	107	107	107
HSR revenue ($, 2015 prices)	Southern California	882,696,885	892,444,274	902,305,763	912,282,777
	Northern California	-	-	-	-
	Las Vegas	285,317,391	291,732,421	298,291,768	304,998,681
	Other	113,909,455	115,784,936	117,691,654	119,630,132
	TOTAL	1,281,923,731	1,299,961,631	1,318,289,185	1,336,911,590

Source: Steer Davies Gleave

Forecasts for Infrastructure Phase 4 (CaHSR to NorCal) are not provided separately, as they are consistent with those presented for the Base Case.

G Yield management

G1 Yield management for HSR services

With an intercity rail operation that experiences significant peaks in demand, ridership can be managed and revenue optimized by implementing a yield management system. Specific segments are less time-constrained, and can be induced by price differentials to choose earlier or later departures. There is a symbiotic relationship between revenue management and demand management within an effective yield management strategy.

In Europe for example, Eurostar (the HSR operator between London and Paris, Brussels and South of France) use their revenue management system to alter the price points available for each class of travel, depending on time of departure and the number of days in advance of travel, in order to maximize potential revenue for each train.

The yield management approach should avoid alienating potential customers by ensuring fare rules are perceived as “fair” and appear to follow a logical pattern. This will be particularly important for HSR services via the HDC, given the high level of repeat trips to Las Vegas. The fact that potential passengers will be making comparable transactions for hotel accommodation, also governed by yield management pricing, should help to make them more accepting of variable price points.

G1.1 Principles of an effective yield management strategy

An effective yield management strategy needs to assess and make assumptions on a number of factors, including:

- Price elasticity;
- Predictable patterns of demand;
- Market segmentation;
- Advance booking;
- Duration of stay;
- User type;
- Bundling tickets with other offers or services; and
- Induced demand.

The remainder of this appendix discusses each of these factors and relates each to the specific case of future HSR services between California and Las Vegas.

Price elasticity

An effective yield management strategy depends on identifying specific customer segments with high price elasticity and structuring offers to quota controls.

High levels of competition will typically lead to high fare elasticities, as a range of travel alternatives are available to potential users. The HSR services will be competing with airlines and car.

Predictable patterns of demand

There must be significant – and predictable - variation of demand over time to allow appropriate quotas to be set. The variables include seasonal variations and variations by day of week and time of day.

The core market for the HSR services will be visitors from California traveling to Las Vegas on the I-15. There is considerable time-series data available on I-15 traffic flows (by month, day, hour and direction). It is reasonably straightforward to obtain a seasonal profile of demand and the pattern has been fairly consistent across recent years. Traffic is lowest in January and February, rising to a peak in July[128]. In addition, the calendar of conventions and events provides advance information to predict demand surges.

Market segmentation

Traditional yield management strategies use effective barriers, referred to as “fences”, to separate and target market segments. This can be done by:

- Minimizing opportunities for price comparison;
- Changing the nature of the product in each segment to discourage people trading between them; and
- Limiting potential for re-sale of discounted offers by third parties.

These fences can be based on purchase patterns, product characteristics and/or customer characteristics. They typically take the form of restrictions on the availability and use of the defined product, such as:

- Minimum advance booking period (more than X days in advance);
- Time of use (specified departure period or a specific train);
- Minimum time away (number of nights or Saturday night stay);
- ‘Black-out’ periods of high demand when a product is not available for sale;
- Cancellation and refund conditions (non-refundable or high cost of change);
- User type (e.g. seniors who may be more price sensitive than working age adults and can be readily identified);
- Bundling (requires combined purchase with other services e.g. hotel accommodation); and
- Origin specific for return trips (reflect attractiveness to, and journey purpose of local residents versus visitors).

[128] Source: Nevada Department of Transportation Traffic Counts for I-15 at State Line

Advance booking

One of the requirements for an effective yield management system is a significant proportion of demand willing to reserve seats in advance.

The Las Vegas leisure and business market has a high proportion of visitors booking hotels in advance. Visitor profile data collected by LVCVA on visitors from Southern California in 2015 indicates that 26% planned their trip more than one month in advance, 65% between a week and a month in advance and only 9% planned their trip less than a week in advance.

Duration of stay

A range of stay durations makes it possible to segment the market between shorter trips for business and leisure hotel-based trips, and visitors staying with friends and family who tend to stay for longer trips.

It should also be possible to separate time inflexible weekend trips (staying over a Saturday night), from those which may be more flexible and hence price sensitive. This is the opposite pattern to traditional models of airline pricing that sought to separate out the business market by requiring a Saturday night stay in order to benefit from cheaper prices.

Bundling

Resorts in Las Vegas are experienced with yield management techniques to persuade people to visit and trade-up as part of a travel package. This is a unique market which creates opportunities for bundling HSR fares with show tickets, restaurants, hotel stay and/or other incentives.

Induced demand

Demand for leisure travel is not fixed and there are segments of the market in which additional demand may be generated by a combination of new opportunities and attractive pricing. The challenge is to ensure demand is entirely new rather than abstracted from potentially higher yield market segments. One option would be to target the day trip market, where trips are currently made to other destinations.

G2 Leveraging market characteristics

The characteristics of the potential HSR market influence how it can be segmented for the purposes of yield/revenue management. There are two distinct sub-markets: demand originating in California and demand originating in Las Vegas.

G2.1 Demand originating in California

There are three main types of in-scope California visitors:

- Leisure travelers staying in hotels – typically small groups (two to three people), peaking at weekends (Friday to Sunday);
- Leisure travelers staying with friends and family in Las Vegas; and
- Business and convention travelers.

Leisure travelers staying in hotels

Our analysis shows the majority of leisure travelers visiting Las Vegas drive . Results from our Focus Group exercise suggest these market segments have some overlap (individuals drive some trips and fly for others, depending on the cost at the time).

The prevalence of small groups sharing a car presents a marketing challenge and opportunity. In such cases the price comparison will be against the cost of the car trip for the whole group, rather than by individual. This means the perceived cost of driving for a group of four or five may be little more than for two people traveling together. Marketing a group fare product based on a car load with a flexible number of passengers risks abstraction from people who might otherwise be tempted to "link up" to minimize their costs.

With over two-thirds of California residents traveling in groups of two, one option would be a standard fare offer based on two people traveling together and an add-on rate for additional passengers.

Visitors typically book hotel rooms in advance and one pricing option would be bundling HSR fare and hotel stay in Las Vegas in a single package.

Leisure travelers staying with friends and family in Las Vegas

People staying with friends and family in Las Vegas will tend to avoid costs of hotels and some meals, and stay for longer than the average visitor. This means although these potential customers may be more price sensitive than other leisure travelers, it may be possible to target the market by offering reduced rates for longer duration stays.

Business conference and convention travelers

Business traffic is typically midweek Monday to Thursday, but with some major conventions and events generating their own distinct peaks.

Business and convention markets may be addressed by selling business-to-business direct to corporate travel managers and convention organizers. Discounts relative to standard fares may be related to volume of bookings and spend.

To capitalize on mid-week attendance, it should be possible to offer dedicated "business" accommodation (with appropriately bundled services) at a premium, and provide a sense of exclusivity from the tourist market.

G2.2 Demand originating in Las Vegas / Clark County

The time profile of demand by direction of travel for trips to California by Las Vegas/Clark County residents is likely to be significantly different from that of visitors to Las Vegas. It should therefore be possible to encourage travel in the contra-peak direction with attractive fares, whilst maintaining maximum capacity for high yielding peak visitor traffic originating in California.

G3 Products and pricing options

G3.1 Return vs one way pricing

Although most tickets are likely to be purchased on a round-trip basis, it is possible to present price options on a one-way basis, as with airline ticketing. This provides flexibility for potential users to choose from a menu of prices by time of day for any given date, but with the return leg pricing conditional on the direction of travel, the return date and duration of stay.

G3.2 Time of travel

Peak movements

Visitor peaks are very specific to Las Vegas, with large visitation volume over the weekend, specifically Friday (inbound) and Sunday (outbound). Air fares on most airlines between California and Las Vegas are set accordingly, being significantly higher on weekends (Friday to Sunday) than mid-week rates for the same journey.

It should be possible for the HSR operator to apply a similar pricing premium for travel at peak times, although price differentials may be lower, given the main comparator is likely to be the cost of driving where the main peak differentiator will be potential for longer delays on the road.

Contra-peak movements

With a high proportion of trips from California to Las Vegas on Friday and from Las Vegas on Sunday, the return leg of many peak period train journeys is likely to be operating with low load factors. This creates an opportunity to market these contra-peak services at a significant discount to generate incremental revenue by attracting Las Vegas/Clark County residents heading to California destinations over the weekend.

G3.3 Duration of stay

Long stay (5+ days)

With Friday and Saturday nights the most popular times for tourists visiting Las Vegas, pricing could reflect whether the planned trip included these peak times. However, care is needed to avoid offering the potentially less price-elastic corporate and conventions market unnecessary discounts on their mid-week travel.

As noted in Chapter 3, most trips to Las Vegas are relatively short, with 82% of SoCal visitors staying in hotels for three nights or less in 2015. Offering discounts for longer stays would potentially help to segment the home stay (non-hotel) market, as these travelers typically stay longer and are can generally be more flexible about the timing of their trip.

Day returns

Attractively priced Day return fares can also be marketed, creating the opportunity to induce demand in what is currently a very small market. Potential users include current day trip visitors to Southern California Tribal casinos who may be persuaded to change destination if the combination of convenience and price was attractive. Availability of these fares may be limited to trains in the morning to avoid potential revenue abstraction from the core tourist market, who are likely to travel later in the day.

G3.4 Discounts and product categories

Senior discounts

There is potential tension between maximizing revenue from business/ convention visitors and attracting mid-week leisure travelers. However, with a significant proportion of mid-week leisure travelers likely to be retired persons, it should be possible to effectively segment the market by offering discounted rates to seniors at these times, and either reducing or removing these concessions at the weekend.

Class of travel and package options

It is envisioned that there will be at least two classes of seating provided on the HSR trains. This creates opportunities to upsell travelers at times when demand in premium class is low.

It is possible to further segment the market by offering distinct service packages within each class, reflecting add-ons such as inclusive food/drink, more convenient parking or valet parking, and lounge access at stations.

G3.5 Frequent traveler loyalty progams

The characteristics of Las Vegas visitors indicate there is a significant level of repeat visits by residents of California. Repeat visitors are likely to have a more accurate perception of the reality of driving conditions and travel times by road than first time visitors, and may therefore be more receptive to the journey time benefits offered by HSR.

As selling to existing customers is generally easier than to first time users, it is important to structure an offer which both encourages and rewards loyalty. Introducing a “Members Club” or “Loyalty Program” would allow the repeat visitor market to be identified, its profile understood and facilitate targeted promotions. Loyalty programs such as MGM’s M-life are an important element in Las Vegas resort operators’ marketing.

Eurostar offers a “frequent traveler” loyalty program based on usage, and is used to secure benefits such as lounge access, fast track security, and a range of reward options. There is also a “plus points” loyalty option where accumulated points (including from friends and family) can be used to buy e-vouchers providing discounts on future ticket purchases.

An alternative loyalty model offers paid-for club membership, which offers access to discounts on headline prices and vouchers for selected add-on services. This strategy is used by both airlines and rail companies in Europe, often overlaid on standard yield managed fares. “Railcards” providing fixed rate discounts on headline ticket prices are offered by several European railways on a commercial basis. These products are aimed at encouraging regular travel by train and require multiple trips to recoup the outlay. Examples include Deutsche Bahn’s Bahncard range with 25% or 50% discounts depending on the initial fee. First class variants are also available at a higher price. Discounts on the purchase price are available to concession groups (e.g. young persons under 26 years of age) or small groups (e.g. Great Britain’s Two Together Railcard). The Dutch railways Voordeelurenkaart provides options of free weekend travel, combined with 40% discount at off-peak times, or a higher price product offering 40% discount on all travel. A key advantage of this approach is that the initial outlay acts as an incentive to additional travel: as the initial outlay is spread over more journeys the effective discount increases.

Eurotunnel (a rail shuttle operating for cars between England and France) has a different model for people traveling on a regular basis. It requires an account to be set up, with payment in advance for ten single journeys, which can be taken over a 12 month period. The account structure allows flexible booking (up to the day before) with fixed price supplements for daily peaks and an additional high peak charge, which are deducted from the account balance. It is claimed this product offers savings for someone making at least three return trips. No refund of unused credit is available, and the account expires at the end of 12 months. Potential to re-sell discounted travel is limited by the requirement to present the original credit/debit card.

For trips between California and Las Vegas the equivalent product would be a paid-for product which would require two or more return trips per annum to justify purchase, providing discounts which could vary according to the time of travel, with deeper discounts mid-week and less at weekends.

G4 Implementing an effective yield management strategy

The effectiveness of a yield management strategy is critically dependent on ability to accurately predict the pattern of demand. Both highly loaded and lightly loaded services provide opportunities whereby revenue can be increased through yield management.

There is already comprehensive data on traffic flows on the I-15, by day and hour of the day, which will provide a valuable starting point for any yield management system. In addition, once services start, there will be accurate loading data on every single departure through the ticketing/ reservation system, which can be combined with data on traveler characteristics provided during the booking process. This data can also be used to provide input to a customer database.

Customer Relationship Management (CRM) systems are employed by leading intercity rail operators, analyzing customer profiles to define and understand customer segments. The results guide the content and contact strategies of carefully targeted marketing campaigns to build awareness, stimulate interest and in turn drive revenues.

A database of customers' journey history including trip purpose, frequency of travel, spend and other preferences can be used to make a more personalized booking experience, removing complexity, whilst making the process flexible by offering added-value options and upgrades likely to appeal to the specific needs and desires of the individual, such as pre-ordering a menu choice, taxi or valet parking. In this way the net revenue yield can be increased. The approach means that customers feel valued and will be likely to choose HSR in future.

The reservation database can also be used for customer communication in advance of travel, so that the user has all the information needed to make their journey confidently. The information provided will let the customer know how to find assistance, make any necessary changes to their booking and buy additional add-ons. Again, this helps to drive customer satisfaction and loyalty.

H Glossary

This appendix provides a comprehensive list of all terms used in this report, together with a description of each term.

Table H.1: Glossary of terms

Term	Description
AA	Applied Analysis
AAA	American Automobile Association
AADT	Annual Average Daily Traffic
Access Time	The time taken to access a particular mode of transport (e.g. airport access time)
ADR	Average Daily Rate
ADT	Average Daily Traffic
African American	Citizen/Resident of the United States who have ancestors from the black populations of Africa
AirSage	Company who process cell phone data. http://www.airsage.com/site/index.cfm
BTS	Bureau of Transport Statistics
BUR	Bob Hope Airport
CA	California
CAGR	Compound Annual Growth Rate
CaHSR	California High Speed Rail
Caltrans	California Department of Transportation
Capture	Number of passengers diverted from their current mode to HSR
Caucasian/White	Person with white skin pigmentation
CBER	Center for Business and Economic Research
Conventions	Following journey purposes: attending a convention or corporate meeting, all other business/work related purposes
CPI	Consumer Price Index
CSTDM	California State Travel Demand Model
CTPP	Census Transportation Planning Product
DB1B	Airline Origin and Destination Survey
DoF	Department of Finance

Term	Description
Egress Time	The time taken to arrive at your final destination after completing a journey using a particular mode of transport (e.g. time taken to travel from airport to home)
EIA	Energy Information Administration
Elasticity	The ratio of the percentage change in one variable to the percentage change in another variable
EMU	Electrical Multiple Unit
Farebox revenue	Revenue from ticket sales
FAT	Fresno Yosemite International Airport
Fly-drive	A trip where a person flies to their destination, picks up a car and drives to a secondary destination
FRA	Federal Railroad Administration
Gate-to-Gate Time	Doors close time at Airport A to Doors open time at Airport B
GDP	Gross Domestic Product
Generalized Cost	The total cost expressed in dollars of making a journey from end to end. Time estimates are converted in dollars using value of time assumptions.
GRP	Gross Regional Product
HDC	High Desert Corridor
HDC JPA	High Desert Corridor Joint Powers Authority
Headway	The time between passenger rail services in a given direction
Hispanic/Latino	Resident of the United States of Hispanic American (Hispanic or Latin American) origin
HOV	High Occupancy Vehicle Lane
HSR	High Speed Rail
I-15	Interstate route 15
Induced Demand	Number of passengers using HSR to make a trip they wouldn't otherwise have made
Induced Revenue	Revenue generated from passengers using HSR to make trips they wouldn't otherwise have made
Inland Empire	Riverside and San Bernardino counties
IRS	Internal Revenue Service
IRS SOI	Internal Revenue Service statistics of income
IVT	In Vehicle Time
LAS	McCarran International Airport
LAX	Los Angeles International Airport
LGB	Long Beach Airport
LV	Las Vegas
LVCC	Las Vegas Convention Center
LVCVA	Las Vegas Convention and Visitor Authority
MGM	MGM Resorts International
Mode constant	The modal preference for one mode of transport compared to another

Term	Description
MPH	Miles per hour
MPO	Metropolitan Planning Organization
Multi-race	Person who identifies themselves as being of “two or more” racial backgrounds
NDOT	Nevada Department of Transportation
NorCal	Northern California
Nominal	Nominal, or current prices: the actual recorded monetary value of a product over a defined period
Northern California	All Californian counties from Kern and San Luis Obispo and further north.
NV	Nevada
OAG	Official Airline Guide
OAK	Oakland International Airport
OD	Origin-Destination
Off peak	Travel on the highway network at all non peak times. See definition of peak.
ONT	Ontario Airport
Peak	Friday northbound: arriving at Victorville station between 12pm and 8pm Sunday southbound: arriving at Las Vegas station between 10am and 6pm
Peak Spreading	The process of moving demand from a high peak time to periods adjacent to the peak in order to make maximum use of existing capacity
Price base	The specific base period upon which real prices are calculated.
PwC	PricewaterhouseCoopers
Ramp-up	The time between service opening and the full level of patronage to be realized
Real	The derived value of a product pertaining to a specific base period. The effects of inflation have been removed
REMI	Regional Economic Models Inc.
RP	Revealed Preference data
RV	Recreational Vehicle
SAN	San Diego International Airport
SANBAG	San Bernardino Associated Governments
SANDAG	San Diego Regional Planning Agency
SCAG	Southern California Association of Governments
SDG	Steer Davies Gleave
SFO	San Francisco International Airport
SJC	San Jose International Airport
SMF	Sacramento International Airport
SNA	John Wayne Airport
SNTIC	Southern Nevada Tourism Infrastructure Committee
SoCal	Southern California

Term	Description
Southern California	Counties of: Los Angeles, Santa Barbara, Ventura, San Bernardino, Orange, Riverside, San Diego and Imperial
SP	Stated Preference
Stateline	The state border between California and Nevada on the I-15 at Primm
STR	Smith Travel Research
The Strip	South Las Vegas Boulevard between Sahara Ave (North) and Russell Rd (South) in Las Vegas
Tourists	Following journey purposes: vacation, leisure, gambling, visiting friends and relatives, wedding, other
USDOT	United States Department of Transportation
Value of Time	The amount of money a person is prepared to pay in order to save journey time
Visitation	Number of Visitors
WiSE	Wireless Signal Extraction
XW	XpressWest
Zone Centroid	Intersection in a zone of all straight lines that split the zone into two identically-sized shapes

Source: Steer Davies Gleave