The Megaregional Case for a New Transbay Rail Crossing

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BAY AREA COUNCIL ECONOMIC INSTITUTE

About this Report

This report builds on two previous reports by the Bay Area Council Economic Institute: *The Case for a Second Transbay Transit Crossing* and *The Northern California Megaregion: Innovative, Connected, and Growing*, both completed in 2016. The analysis presented here uses publicly available information to highlight the benefits of a new transbay rail crossing and the Link21 program. A new transbay rail crossing refers to a specific project—a passenger rail crossing in the transbay corridor between San Francisco and Oakland. The details of the new transbay rail crossing project have yet to be determined, including the exact location of the crossing and how it connects to BART and other regional rail networks. The Link21 program will include improvements to both BART and regional rail service, reinforcing the vision of an integrated passenger rail network in the Northern California Megaregion.

Acknowledgments

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About the Institute

Since 1990, the Bay Area Council Economic Institute has been the leading think tank focused on the economic and policy issues facing the San Francisco/Silicon Valley Bay Area, one of the most dynamic regions in the United States and the world's leading center for technology and innovation. A valued forum for stakeholder engagement and a respected source of information and fact-based analysis, the Institute is a trusted partner and adviser to both business leaders and government officials. Through its economic and policy research and its many partnerships, the Institute addresses major factors impacting the competitiveness, economic development and quality of life of the region and the state, including infrastructure, globalization, science and technology, and health policy. It is guided by a Board of Trustees drawn from influential leaders in the corporate, academic, non-profit, and government sectors.

The Institute is housed at and supported by the Bay Area Council, a public policy organization that includes hundreds of the region's largest employers and is committed to keeping the Bay Area the world's most competitive economy and best place to live. The Institute also supports and manages the Bay Area Science and Innovation Consortium (BASIC), a partnership of Northern California's leading scientific research laboratories and thinkers.

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Executive Summary

Transportation systems are a critical component of a well-functioning economy. The ability to efficiently move both people and goods provides residents access to job opportunities and necessary services, and offers businesses a wider talent pool and larger customer base. States and regions that prioritize transportation infrastructure not only create pathways to improved economic competitiveness, strategic investments also have positive implications for equity and the environment.

The Bay Area region and the State of California are rightly focused on the immediate health and economic recovery from the COVID-19 pandemic, but the pandemic has also created an opportunity to re-envision blueprints for future growth. While uncertainty about the pace of economic recovery is immense and the long-term structural changes that will remain after the pandemic subsides are unknown, it is safe to assume that the state's issues related to housing, transportation, the environment, the economy, and equity will not fade away with COVID-19.

Population growth has blurred the boundaries between the state's metropolitan areas, particularly in Northern California. Our 2016 report on the Northern California Megaregion highlighted many trends in megaregional growth and the connections and interdependencies between regions. Housing markets are no longer local or even regional in nature, as exemplified by a growing wave of Bay Area migrants to Sacramento; and affordability challenges in urban areas have resulted in increasing commute times. Yet planning at a megaregional scale is difficult as governmental structures do not match the megaregion's geography.

Transportation systems are one area where megaregional trends are most visible, and megaregional coordination on infrastructure planning is already taking place, particularly around passenger rail systems. Transportation creates the physical points of connectivity in the Northern California Megaregion, enabling commutes, business trips, and leisure travel—all of which are key to the success of the economy across the megaregion. In 2018, approximately 187,000 people were commuting into the nine-county Bay Area for work, a number that was rising each year; however, more than 95% of those commuters were driving.

If highways and rail lines are the circulatory system of the Northern California Megaregion, then the transbay corridor—connecting San Francisco and Oakland—is the critical artery for travel. Prior to the pandemic, Bay Bridge traffic during peak commute hours was at a standstill almost daily and BART riders through the transbay tube, the existing BART tunnel between West Oakland and downtown San Francisco, were experiencing crush loads—both pointing to a need for added travel capacity and resilience against system delays.

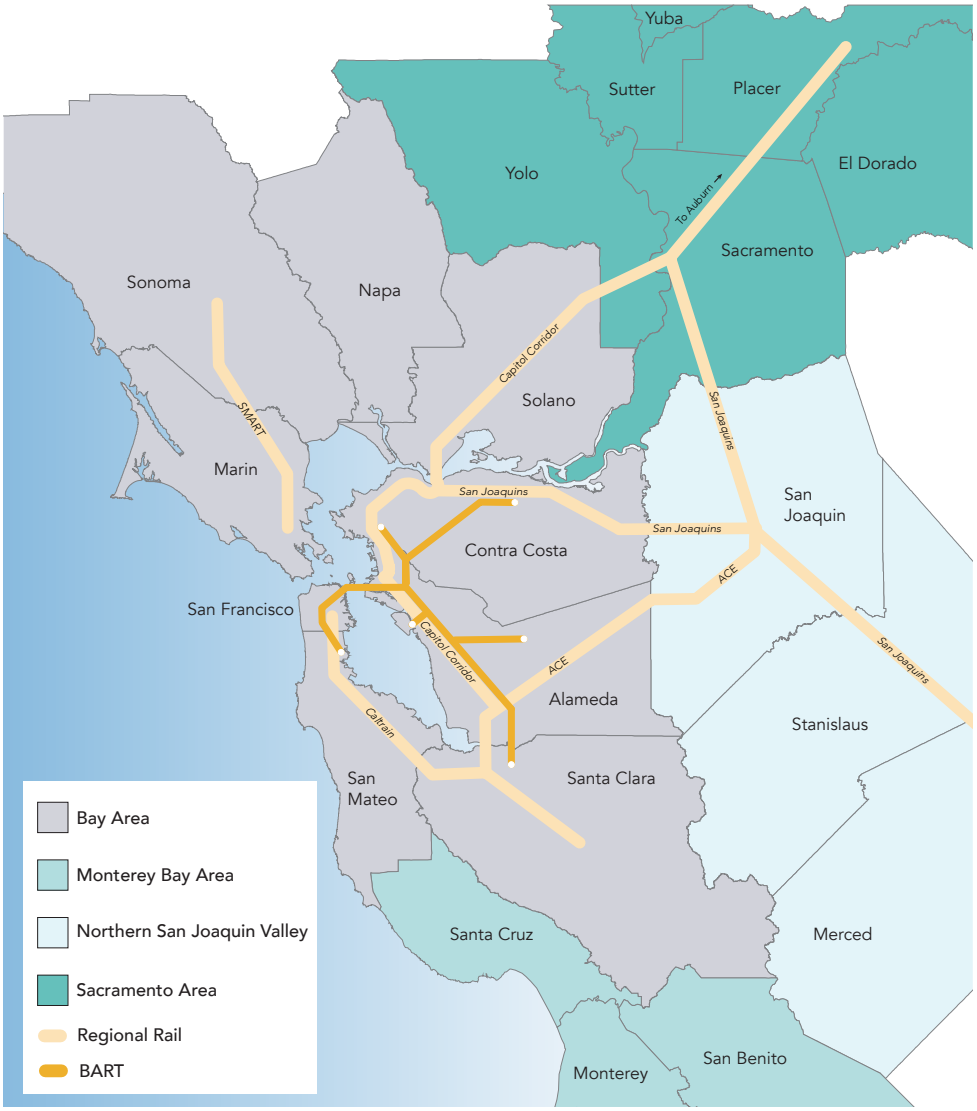
Ideas for a new crossing of the San Francisco Bay date back to at least 1991, when the Metropolitan Transportation Commission studied new alternatives for the transbay corridor. With additional funding recently secured through ballot measures and support from the state, new studies are being undertaken and a partnership between BART and Capitol Corridor has formed to analyze the possibility of a new passenger rail crossing that could serve both BART and regional rail passengers who ride systems such as Capitol Corridor, Caltrain, Altamont Corridor Express, Amtrak San Joaquins, and eventually high-speed rail.

The potential for a new rail crossing to serve multiple markets and connect into the regional rail system means the project would have immense impacts within the transbay corridor and across the Northern California Megaregion. A new crossing becomes more than a capacity solution, it becomes a transformative investment for a broad population. New markets for rail travel will be opened—particularly trips between Sacramento / Northern San Joaquin Valley, San Francisco, and the Peninsula that are now completed via car or with long travel times and multiple transfers via rail and transit—and new opportunities for economic growth will be created.

To understand the megaregional context of a new transbay rail crossing, this report outlines the trends that have helped to form a more integrated megaregion:

- The Northern California Megaregion is home to 12.7 million people and nearly 5.8 million jobs. The Bay Area holds 69% of the megaregion's jobs (compared to 61% of the population), the Sacramento Area has 18% (20% population), the Northern San Joaquin Valley has 8% (13% population), and the Monterey Bay Area has 5% (6% population). Mismatches in job and population concentrations show the need for improved connections.

Northern California Megaregion Existing Rail Network



- While the Bay Area is the hub for population and employment in the megaregion, population is growing rapidly in the non-Bay Area counties of the megaregion. Since 2012, the combined population growth in the six counties of the Sacramento Area and the three counties of the Northern San Joaquin Valley has been identical to the combined growth in San Francisco, San Mateo, Alameda, and Contra Costa counties (approximately 300,000 people added).
- In 2019, 32,500 employed people moved away from the San Francisco Bay Area to other parts of the megaregion, up from 15,000 in 2012. Of those 32,500 people, approximately 9,700 continued to work within the Bay Area region. The number of migrants moving in the reverse direction, into the San Francisco Bay Area from other parts of the megaregion, has declined from 22,000 in 2012 to 19,200 in 2019.

These trends have shaped usage of the megaregion's transportation systems, as key gateways into the Bay Area region have seen sharp spikes in usage. Of note, the corridors with fast, frequent rail service, the transbay corridor (BART) and the I-101/I-280 corridor (Caltrain), have the highest transit shares among their users: 51% and 19%, respectively. No other key corridor in the megaregion has a transit mode share over 10%. Other megaregional travel characteristics that create the need to improve transbay corridor capacity include:

- Commutes in the Bay Area and the rest of the megaregion have become longer. Commutes among those working in the San Francisco Bay Area that are 50+ minutes have increased as a percentage of the total from 11% in 2010 to 19% in 2018. In the other 12 counties in the megaregion, the share of total commutes over 50 minutes each way rose from 6% in 2010 to 8% in 2018. For jobs located in San Francisco and San Mateo counties as of 2018, 24% of the total workforce commutes over 50 minutes, up from 15% in 2010.
- In 2018, 187,000 people who live outside the nine-county San Francisco Bay Area commuted daily to the nine counties for work. Most of these megaregional commuters live in San Joaquin County (37%) and Sacramento County (14%). Of the total, 22,115 are commuting to San Francisco and San Mateo counties, or 12% of the total in-commute.
- For workers in San Francisco and San Mateo counties, 29% commute using transit. Of workers employed in those two counties, 31% of those living in the nine-county Bay Area take transit, while only 12% of those commuting from the other 12 megaregion counties take transit. This trend is likely due to the lack of transit that originates in the outer counties of the megaregion and directly connects to counties across the bay.
- Within the megaregion, the fastest growing home and work location pair between 2010 and 2018 (among pairs that have at least 1,000 commuters traveling between the two locations in both 2010 and 2018) originated from San Joaquin County and ended in San Francisco (up 243%), growing in number by 2,825.

A new transbay rail crossing not only provides added capacity within the transbay corridor, it is a lynchpin project that unlocks the potential of numerous other rail improvements in the 21 counties of the Northern California Megaregion. Planners are calling this overarching program of passenger rail network improvements Link21, of which a key project is a new transbay rail crossing between San Francisco and Oakland. With new access to the San Francisco and Peninsula markets, planned infrastructure improvements for regional rail will form a megaregional rail network that can serve customer needs across the Bay Area, Sacramento, and the Northern San Joaquin Valley and provide a much greater percentage of total trips in the Northern California Megaregion. Without a new transbay rail crossing, some of these new rail investments will only serve to add to the transbay corridor bottleneck.

The Link21 program will include improvements to both BART and regional rail service, reinforcing the state rail plan's vision of an integrated passenger rail network in the Northern California Megaregion. Combined investments in BART and regional rail have the potential to provide the following benefits:

Reducing Travel Times Across the Megaregion

A new transbay rail crossing between Oakland and San Francisco has the potential to reduce travel times for all populations traveling between and within the San Francisco Bay Area, Sacramento Area, Northern San Joaquin Valley, and the Monterey Area if implemented in coordination with other megaregional rail projects.

- **More Destinations within One Hour by Rail:** Link21 will make more destinations accessible via the current rail network and encourage and enable more people to choose rail for different purposes, including those who are transit dependent. Access to more jobs, educational institutions, health care centers, and entertainment within an hour will make travel by rail a viable option on any day of the week for business, school, or leisure trips. While the details of a new transbay rail crossing and how it connects to BART and other regional rail networks will determine future transit travel times, an easier trip will create more demand for the service—at the very least moving trips to transit that would have otherwise been completed with a car. Other trips could also become more viable via transit if onerous transfers are eliminated.
- **Direct Access and One-seat Rides:** A new rail crossing in the transbay corridor could enable one-seat rides between some major destinations in the megaregion that currently lack a direct rail connection. The Link21 program will look at different ways to improve the passenger experience by serving high-demand weekday and weekend destinations. Since megaregional travelers traverse long distances through traffic-congested corridors, reducing travel times by rail is critical for moving people more efficiently.
- **Mode Shift Also Benefits Highway Trips:** With a new transbay rail crossing creating capacity, increasing reliability, and inducing demand within the rail transit network, travel time benefits can also accrue to users of the highway system. By replacing car trips with rail transit trips, highway congestion could be eased for goods movement or those commuters without a transit option.

Improved Service Delivery

As alternative investment plans are developed for the Link21 program, planners will evaluate the benefits of capital and operational improvements to offer a better travel experience for passengers.

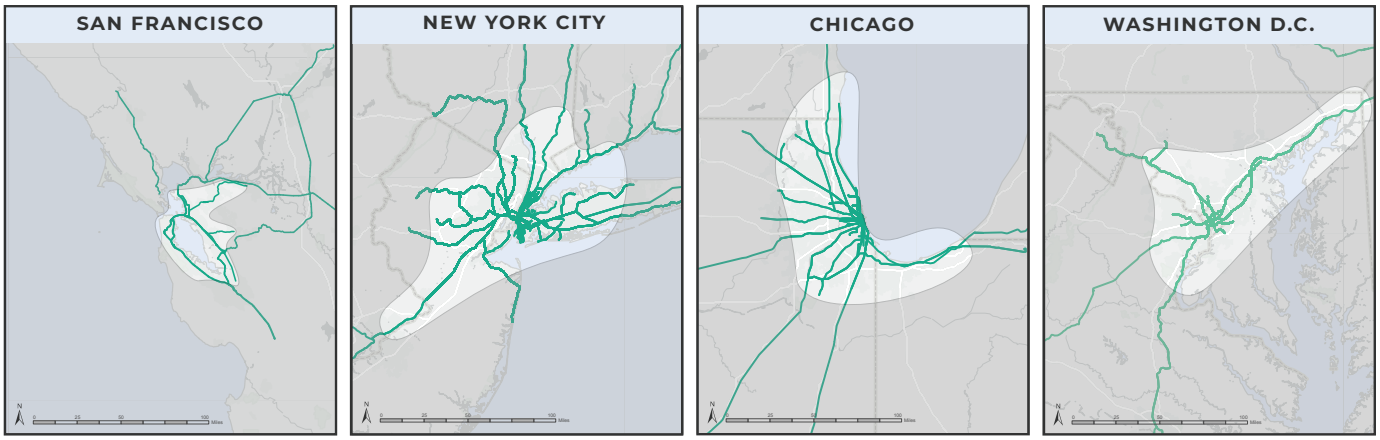
- **Service Reliability:** Investments in the Link21 program will improve service reliability so that trains run on time and can more easily recover from unexpected delays. Train on-time performance could greatly improve for regional rail trips, especially where passenger rail must share tracks with freight trains. Constructing passing tracks or alternate routes around congested bottlenecks in the system provides a backstop for BART and regional rail if there are equipment, service, or medical issues that cause train delays.
- **Reduced Wait Times:** Link21 could reduce wait times for passengers by enabling more frequent service and by making connections between trains more seamless.
- **Extended Service Hours:** A new transbay rail crossing and associated improvements could allow extended service hours in the rail network. Extended service hours (early-bird / late-night) would serve people who commute outside typical work hours, especially essential workers and those in the construction, hospitality, and air transportation industries. Implementation of such service will be determined as the program advances.

Economic Benefits

COVID-19 has made clear the economic divisions present in the Northern California Megaregion, as inland regions more reliant on service industries struggle with high unemployment while coastal areas, and the tech economy in particular, are relatively less impacted. By tying together once-disparate regions, Link21 can provide a more equitable trajectory for long-term economic growth across the megaregion.

- **Easier Commutes:** A new transbay rail crossing and a robust megaregional rail network can increase the viability of rail travel for commutes. Riding transit can be easier to navigate, more predictable, and allow for productivity while traveling.

One-Hour Passenger Rail Commute Sheds from City Centers



Max Distance by Rail
~35 miles in an hour

Max Distance by Rail
~80 miles in an hour

Max Distance by Rail
~55 miles in an hour

Max Distance by Rail
~85 miles in an hour

- **Increased Access to Jobs:** A new transbay rail crossing can link affordable housing with higher paying jobs and enable increased rail transit service to more jobs and destinations overall. In 2018, 79% of the megaregion's jobs in Professional and Business Services were located in the Bay Area, while 92% of jobs in the Information sector were located there. These are the two most geographically imbalanced employment sectors in the megaregion, and they are also the providers of some of the highest-wage jobs. With the concentration of high-paying jobs in the megaregion's core of San Francisco and Silicon Valley, facilitating commutes from locales with more affordable housing will become even more important for economic opportunity.

- **Expanded Choices:** The Link21 program enables greater reach and frequency of public transportation between markets, thus expanding the options people have in locating their homes and where employers locate their businesses. Efficient rail systems can make the Northern California Megaregion more competitive against peer U.S. metropolitan regions and global megaregions, as shorter travel times mean companies can recruit over a larger geographic area and access a larger talent pool. Additionally, companies with multiple offices or clients spread across the megaregion can benefit from faster trips between more rail-connected destinations.

- **Increased Jobs-Housing Balance:** Link21 can support re-balancing the megaregional employment profile, particularly if companies seek to create satellite offices in locations that are connected by train to headquarters in San Francisco or Silicon Valley. Rail stations with higher usage provide an opportunity to create more affordable housing and living wage jobs near the traditional urban core. This would make station areas more attractive for denser, transit-oriented investments—thereby limiting the need for extremely long commute trips over time.

Environmental Benefits

With vehicle miles traveled rising in key corridors, projects that make transit more attractive will be paramount in meeting the state's environmental goals.

- **Reduced GHG Emissions:** The largest single contributor to greenhouse gas (GHG) emissions in California is the transportation sector, making up 40% of all GHG emissions in 2017. An improved megaregional rail network can shift more people from single-occupancy vehicle travel to a greener transportation mode. Even as cars become greener, there are additional benefits related to traffic congestion relief that can be achieved by reducing car travel. The new transbay rail crossing was found by the Metropolitan Transportation Commission to be the single most cost-effective transit expansion program to reduce GHG emissions and vehicle miles traveled in the Bay Area.

1

Introduction

Long-term Economic Growth, Stability, and Resiliency of the Northern California Megaregion Hinges on Efficient, Connected Transit

The COVID-19 pandemic has altered life across California, the United States, and the globe. However, it is a temporary state. Office buildings will reopen, in-person meetings will take place, and leisure trips will again be commonplace. When the pandemic subsides, California's housing, transportation, economic, and environmental issues will remain—and some may have become worse.

Now is the time to both re-prioritize investment decisions and re-envision the structures in which those decisions are made. Planning today for future cycles of economic prosperity will allow for more sustainable growth for decades to come. This is particularly true for transportation in the Northern California Megaregion, where changes to how people travel across the 21 counties can have positive implications for the economy, the environment, and equity. Residents agree: a June 2020 survey showed that 79% of voters in the megaregion believe plans to fix long-term transportation challenges still need to be developed amidst the pandemic.

Prior to the pandemic, the levels of interdependence among the 21 megaregion counties were growing each year. A crisis in housing affordability was pushing more population further from the core employment areas; more commuters were making longer trips; and in turn, employers and transportation planners were looking at innovative ways to limit commutes that are destructive to both quality of life and the environment. While COVID-19 may have temporarily changed the trajectories of those trend lines, the next wave of megaregional growth is likely to bring these issues back to the forefront.

The 21 counties of the Northern California Megaregion—as defined in the Bay Area Council Economic Institute's 2016 report—are made up of a diverse set of interdependent regional economies:

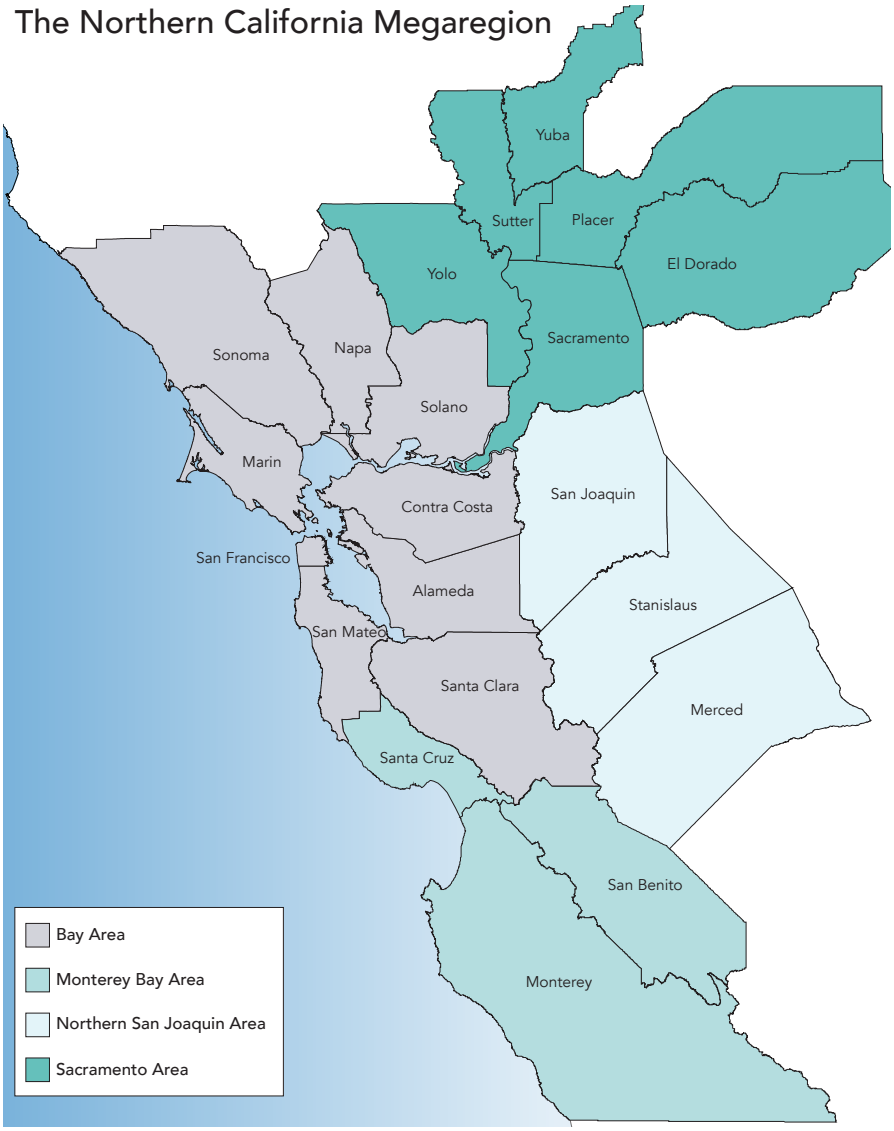
- The nine-county San Francisco Bay Area has produced some of the world's largest companies and is the employment core of the megaregion.
- The six-county Sacramento Area is an employment hub in its own regard, home to not just the state capital but an array of industries.
- The three-county Northern San Joaquin Valley is one of the fastest growing areas of the entire state in terms of population and is a hub for logistics, distribution, agriculture, and food products.

- The three-county Monterey Bay Area includes a large tourism and agricultural footprint.

Home to 12.7 million people in total, and producing nearly $1.1 trillion of combined GDP, the individual regions of the Northern California Megaregion combine to form a powerful economic unit. As commute sheds, housing markets, goods movement patterns, and even global competitiveness strategies have expanded to cover larger geographies, megaregions have increasingly become a critical geographic scale for coordinated planning and investment.

The most tangible area of connectivity in any megaregion is the link provided by transportation. In particular, efficient rail transit connectivity over a vast geography has been immensely important to the long-term sustainability of megaregional economies in Europe, Asia, and to a certain extent, the northeastern part of the United States. Examples of global rail networks and the economic opportunities they can unlock will be explored throughout this report. In the Northern California Megaregion, however, rail transit has to date not provided the frequency, speed, or connectivity needed to make it a widespread option for travel.

The Northern California Megaregion



This report begins by looking extensively at population, employment, and travel patterns for the Northern California Megaregion. Later chapters will analyze a number of regional corridors of importance within the megaregion to better understand the travel mode preference and demand in each. In particular, the transbay corridor—connecting San Francisco to the East Bay—rises to the top of the list of critical bottlenecks for Bay Area travel. While solving transbay corridor congestion is key for the nine-county Bay Area, this report makes the case that unlocking that bottleneck with a new transbay rail crossing can be an integral investment in unlocking a much broader megaregional rail network, which planners are calling Link21.

To recognize the impacts of the Link21 program and a new transbay rail crossing, the economic context in which these projects will be undertaken must be understood. This report will seek to highlight the economic potential that a more efficient rail transit system could bring to the Northern California Megaregion, including significant time savings for commuters and economic advantages for the megaregion's employers and workers alike.

2

Interdependence of the Northern California Megaregion

Employment and population dynamics—specifically, the geographic shapes of each—are critical to understanding how the Northern California Megaregion functions today and into the future. While various factors play a role in the interdependence of the economy in the Northern California Megaregion, one of the root causes is the geographic mismatch between job locations and home locations.

The concentration of job growth in locations with high costs of living, such as San Francisco and Silicon Valley, and increasing out migration from the Bay Area to other locations within the megaregion are a cause of this mismatch. As this imbalance has grown, the demand for travel between different locations within the megaregion has grown, positioning the economy to be increasingly dependent on the efficient flow of people over long distances. These trends, further explored in this chapter, not only justify the need for a highly-connected, transit-rich Northern California Megaregion, but they also point to a future in which households and employers stop living and working in a single location or region, and associate more with a megaregional network of cities.

The successful uptake of remote work by many office workers during COVID-19 has accelerated this trend. These same dynamics also apply to workers across many middle- and low-wage industries that will still commute to work locations five days per week.

Megaregion Population and Employment

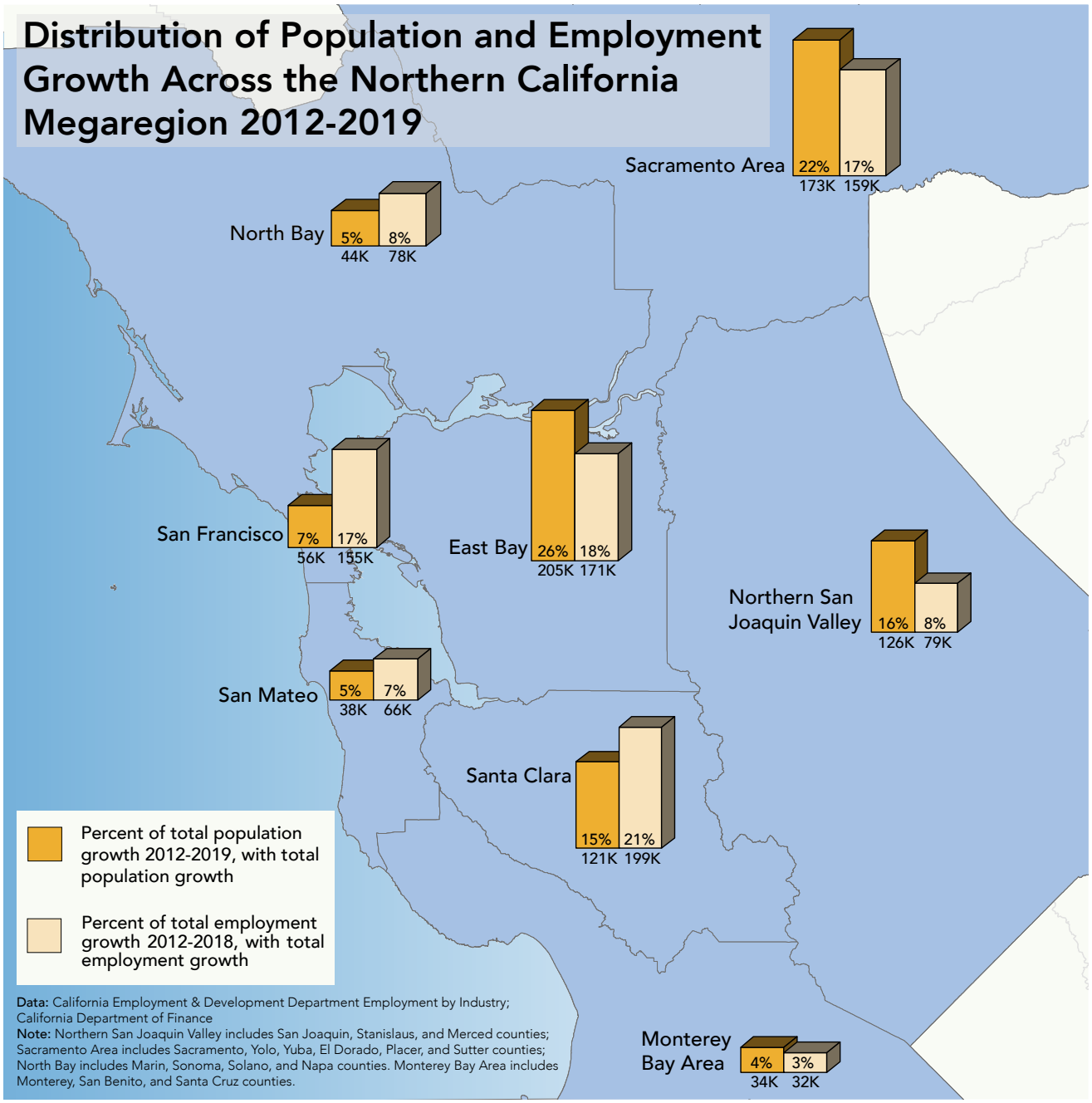
The geographic location of population and job growth demonstrates the need for efficient people movement in the megaregion. Between 2012 and 2019, San Francisco, San Mateo, and Santa Clara counties added 265,000 jobs, but only 159,000 people. Over that same period, the East Bay, Sacramento Area, and Northern San Joaquin Valley each produced opposite effects—with population growth outpacing employment growth.

This mismatch reveals the dependency that the coastal counties' economies have on the inland geographies of the megaregion to house population growth. As employment in core urban areas has grown, the labor pool must also grow to support the speed of business expansion. However, as population growth has not kept up with employment growth in San Francisco, San Mateo, and Santa Clara counties, employers are recruiting over wider distances and employees are making longer commutes.

In the reverse, the inland counties have populations that rely on the diversity of employment opportunities, in terms of industry and occupation, that the coastal counties offer. The megaregional economy is thus dependent on the efficient flow of people between different locations to allow for the maximum number of

feasible home-and-job-location pairs to simultaneously meet the demand of business labor pool needs and deliver diverse employment opportunities to all communities in the megaregion.

The map below depicts population and employment growth in different areas of the Northern California Megaregion. For the purposes of this analysis, the nine-county Bay Area is further broken down into sub-regions, with the North Bay encompassing Marin, Sonoma, Napa, and Solano counties and the East Bay including Alameda and Contra Costa counties. The analysis will also place special focus on San Francisco and San Mateo counties, as trends in those two counties are creating additional demand for transbay travel.



The largest job-producing portions of the Bay Area are notable in that they are connected to each other via high-frequency transit offered by BART (serving Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara counties), Caltrain (servicing San Francisco, San Mateo, and Santa Clara counties), as well as numerous local bus networks that provide regional connections.

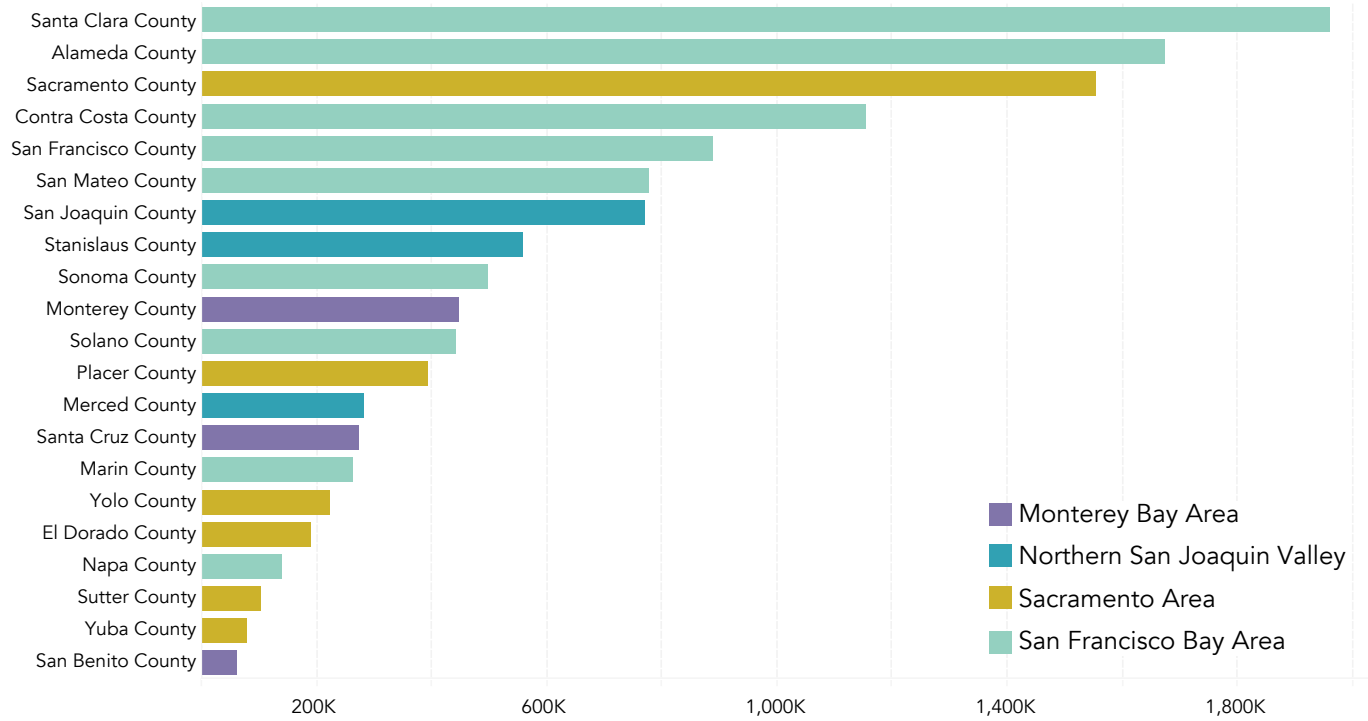
At megaregional scale, Capitol Corridor provides service through Placer, Sacramento, Yolo, Solano, Contra Costa, Alameda (with a bus connection San Francisco), and Santa Clara Counties, though at relatively limited intervals when compared to BART. Capitol Corridor does have the second highest ridership of all state-supported intercity routes in the U.S.—trailing only the Pacific Surfliner in southern California. Fifth on that list is the Amtrak San Joaquins service, which provides rail connectivity in the Northern San Joaquin Valley with roundtrips between Oakland and Bakersfield as well as between Sacramento and Bakersfield.

Population Trends

The population size and growth trends shown within this section demonstrate the necessity to prioritize rail transit investments that allow for more connections serving the fast-growing geographies in the megaregion, such as the counties of the East Bay, Sacramento County, and San Joaquin County.

As shown below, population in the Northern California Megaregion is concentrated in Bay Area counties, while large population centers in Sacramento and San Joaquin counties would benefit from enhanced megaregional rail service, and increased frequency and quicker travel times to San Francisco, San Mateo, and Santa Clara counties. Since 2012, the combined population growth in the Sacramento Area and the Northern San Joaquin Valley has been identical to the combined growth in San Francisco, San Mateo, and the East Bay (approximately 300,000 people added).

Total Population by County in the Northern California Megaregion (2019)



The top five counties in terms of total population in the Northern California Megaregion are Santa Clara, Alameda, Sacramento, Contra Costa, and San Francisco counties. The Bay Area holds 61% of the megaregion's total population of 12.7 million; the Sacramento Area has 20% of the population; the Northern San Joaquin Valley is home to 13% of the population; and the Monterey Bay Area holds 6% of the 2020 population.

Notably, the regions of the megaregion also have vastly different age demographics, which has important current and future workforce implications:

- The San Francisco Bay Area has more people between the age of 35 and 49 than between age of 20 and 34, while the opposite is true for Sacramento Area, Northern San Joaquin Valley, and the Monterey Bay Area—showing that the outer area of the megaregion has a workforce that skews younger.
- In the Bay Area, the number of people age 20 to 34 decreased by 1.0% between 2018 and 2019; whereas, that same age group grew by 2.1% in the Sacramento Area, and by 2.4% in the Northern San Joaquin Valley over the same one-year period.

Over the period from 2012 to 2020, 15 of the 21 Northern California Megaregion counties grew population faster than the state overall, on a percentage basis. Of the fastest growing places in the megaregion since 2012 by percentage, Placer, San Joaquin, San Benito, San Francisco, and Yolo counties top the list. While growth in San Francisco is highly correlated with a rapid rise in employment over this period, the other fast-growing counties have added population without similar increase in jobs, as explored in the next section.

Population Trends in Megaregion Counties

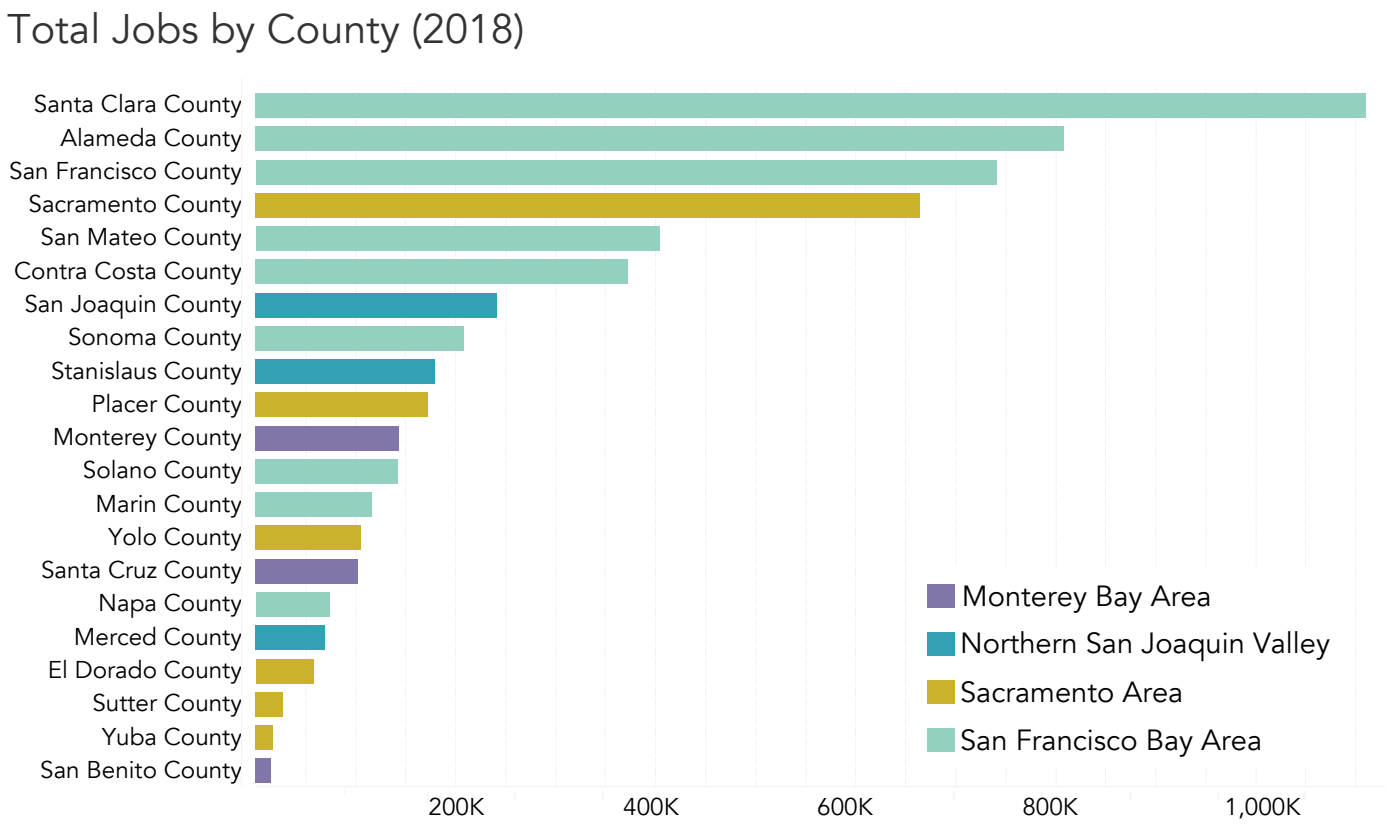
County	Annual Population Growth % (2012-2020)	Population Growth 2012-2020
Santa Clara	0.75%	127,043
Alameda	0.87%	124,917
Sacramento	0.84%	112,819
Contra Costa	0.81%	81,091
San Joaquin	1.13%	74,505
San Francisco	0.89%	68,517
Placer	1.29%	44,063
San Mateo	0.53%	36,242
Stanislaus	0.73%	35,533
Solano	0.62%	23,729
Merced	0.87%	21,192
Monterey	0.48%	18,522
Yolo	0.87%	16,718
El Dorado	0.75%	12,510
Yuba	0.86%	5,858
San Benito	1.10%	5,835
Sutter	0.66%	5,800
Marin	0.18%	4,169
Sonoma	0.09%	4,143
Santa Cruz	0.16%	3,901
Napa	0.06%	714
State Total	0.53%	-

Data: California Department of Finance
Analysis: Bay Area Council Economic Institute

Global Megaregion Spotlights:

The interdependency of the Northern California Megaregion merits the need for a transit system that can support the megaregion's residents and span the megaregion's major job hubs and city centers. There are several examples across the globe that can provide insights into how megaregional transit projects can enhance business, commute, leisure, and tourism travel. The three examples highlighted later in this report from the Netherlands, Italy, and Hong Kong/China represent rail transit routes that cover a similar distance as between San Francisco and Sacramento (88 miles).

Employment Trends



Overall, the Northern California Megaregion is home to nearly 5.8 million jobs as of 2018. The Bay Area holds 69% of the megaregion's total jobs (compared to 61% of the population), the Sacramento Area has 18% (versus 20% population), the Northern San Joaquin Valley has 8% (versus 13% population), and the Monterey Bay Area has 5% (compared to 6% population).

While the three counties with the most jobs in the megaregion are in the San Francisco Bay Area, a few counties in the Sacramento Area and Northern San Joaquin Valley rank higher in jobs numbers than several of the San Francisco Bay Area counties. Notably, Sacramento County is home to the fourth highest number of jobs in the megaregion and San Joaquin County outranks the individual four North Bay counties of the San Francisco Bay Area in terms of job numbers.

Job growth broken down by industry and region reveals a more nuanced understanding of the connected nature of the megaregional economy. The concentration of job growth within certain industries in different geographic locations further shows the need for the efficient flow of people across the megaregion, which is key to keeping each industry thriving:

- 79% of the megaregion's jobs in Professional and Business Services were located in the Bay Area in 2018, while 92% of jobs in the Information sector were located there. These are two most geographically imbalanced employment sectors in the megaregion, and they are also the providers of some of the highest-wage jobs in the megaregion.
- 71% of the megaregion's total job growth from 2012 to 2018 was in the San Francisco Bay Area, but the counties within the Bay Area experienced vastly different levels of job growth. Several Bay Area counties added fewer jobs than other megaregional counties outside of the nine counties. See **Appendix A** for a full accounting of job growth by county and sector.

- Just three counties produced more than 50% of the megaregion's job growth since 2012; they are Santa Clara County (21.2% of growth), San Francisco County (16.5%), and Alameda County (13.4%).
- Sacramento County accounted for 9.6% of the total megaregional job growth since 2012, the fourth largest share out of all 21 counties in the megaregion, evidence that Sacramento has a growing presence as a job hub in the megaregion.
- 12% of the entire megaregional job growth between 2012 and 2018 was in Professional and Business Services in just San Francisco County and Santa Clara County.
- Even outside of industries that traditionally grow in urban cores, the Bay Area outperformed the other regions in terms of jobs added. For example, the San Francisco Bay Area saw 55% of the job growth in the Trade, Transportation, and Utilities sector, and 70% of the job growth in the Goods Producing sector—showing that efficient travel across the region is key for individuals working in all industries, not just those holding jobs typically located in urban employment centers.
- The six-county Sacramento Area as a whole added roughly the same number of jobs as San Francisco County, both accounting for about 17% of total job growth. Sacramento Area job growth was driven by jobs added in the Education and Health Services, compared to San Francisco County where Professional and Business Services dominated.

Components of Megaregion Job Growth (2012-2018)

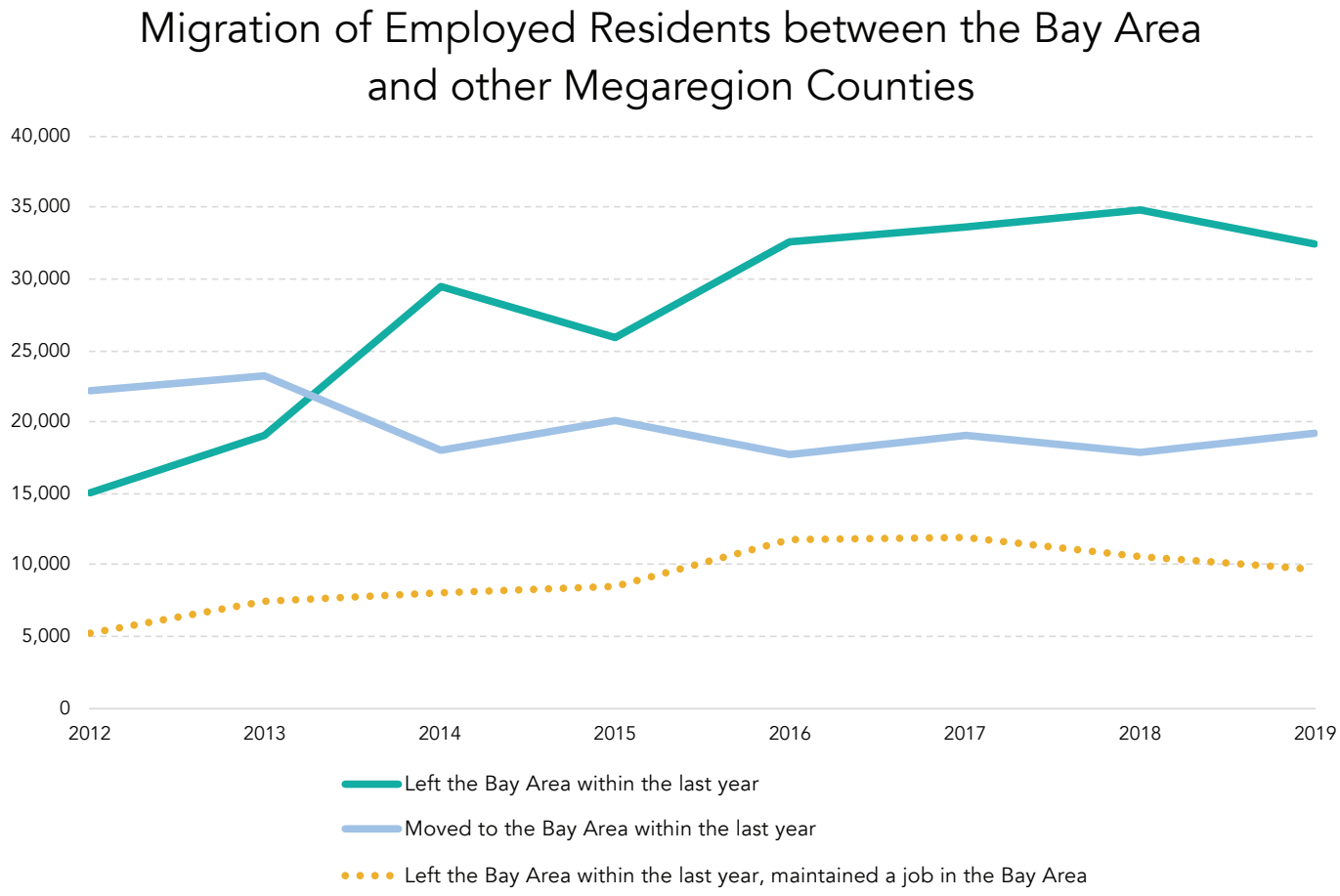
	Education and Health Services	Financial Activities	Goods Producing	Government	Information	Leisure and Hospitality	Other Services	Professional and Business Services	Trade, Transportation, and Utilities	Total
San Francisco Bay Area	11.0%	2.2%	12.4%	3.7%	8.6%	8.4%	1.8%	17.3%	5.9%	**71.2%**
San Francisco County	1.0%	1.1%	1.2%	0.9%	2.2%	1.2%	0.5%	6.3%	2.0%	16.5%
San Mateo County	1.1%	0.3%	0.8%	0.3%	1.9%	0.9%	0.1%	1.5%	0.1%	7.0%
Santa Clara County	3.8%	0.4%	3.1%	0.6%	4.0%	2.4%	0.4%	6.3%	0.3%	21.2%
East Bay	3.2%	0.4%	4.6%	1.3%	0.5%	2.6%	0.5%	2.6%	2.6%	18.2%
North Bay	1.9%	0.0%	2.7%	0.5%	0.0%	1.3%	0.2%	0.7%	0.9%	8.2%
Sacramento Area	3.8%	0.6%	3.0%	1.8%	-0.4%	2.4%	0.6%	2.7%	2.3%	**17.0%**
Northern San Joaquin Valley	1.3%	0.0%	1.5%	1.5%	0.0%	1.1%	0.2%	0.6%	2.3%	**8.5%**
Monterey Bay Area	0.6%	0.1%	0.8%	0.5%	-0.1%	0.8%	0.2%	0.4%	0.2%	**3.4%**
Total	**16.6%**	**2.9%**	**17.6%**	**7.5%**	**8.2%**	**12.7%**	**2.8%**	**20.9%**	**10.7%**	**100%**

Note: East Bay includes Alameda and Contra Costa counties; North Bay Includes Sonoma, Marin and Napa counties.
Data: California EDD Industry Employment Data
Analysis: Bay Area Council Economic Institute

Megaregion Migration Patterns

Over the past eight years, the number of employed individuals moving out of the nine-county Bay Area to other regions in the Northern California Megaregion has increased. In the chart below, the teal line shows the total migration from the Bay Area to other parts of the megaregion, the light blue line shows migration in the opposite direction (other parts of the megaregion into the Bay Area), and the yellow line shows the subset of people that move out of the Bay Area but continue to work there. The upward trend in those that move out, but continue to work in the Bay Area, is one of the main drivers of the need for an integrated rail network that enables people to travel easier and more conveniently between their homes and jobs.

In 2019, 32,500 people moved away from the San Francisco Bay Area to other parts of the megaregion, up from 15,000 in 2012. Of those 32,500 people, approximately 7,000 moved from San Francisco and San Mateo counties and approximately 9,700 continued to work within the Bay Area region. Over the same time period, the number of people moving in the reverse direction, into the San Francisco Bay Area from other parts of the megaregion, has declined from 22,000 in 2012 to 19,200 in 2019. These movements resulted in a net of 13,300 employed residents moving from the Bay Area to other megaregion counties in 2019.



Data: American Community Survey 1-year Estimates
Note: Employed residents age 16+ who moved between the nine county San Francisco Bay Area and the 12 other counties in the Northern California Megaregion

Certain locations within the megaregion are particularly popular for those leaving the San Francisco Bay Area:

- The largest share leaving the Bay Area are relocating to one of six counties in the Sacramento Area, with 17,290 people making that move in 2019 alone. While more recent data is not yet available, the COVID-19 pandemic appears to be pushing people from the San Francisco Bay Area to more affordable locations. Redfin lists Sacramento as the second most popular home search destination (by net inflows) in the second quarter of 2020. San Francisco is the number one origin location for Sacramento home searches.
- The Northern San Joaquin Valley is also a popular destination for relocation, with 10,500 people relocating to the three Northern San Joaquin Valley counties in 2019.
- The counties most popular among employed residents relocating from the Bay Area are consistently Sacramento County and San Joaquin County. Over the eight-year period, Sacramento County had an average of 6,200 employed adults relocate from the Bay Area per year and San Joaquin County had an average of 6,100.

Global Megaregion: Guangzhou - Hong Kong

The Guangzhou to Hong Kong high-speed connection crosses 142 kilometers, or 88 miles in approximately 50 minutes. In contrast, it takes approximately one hour and 53 minutes to drive between these two cities. Named the Vibrant Express, this train began operation in 2018 and is the first bullet train to connect Hong Kong to mainland China. Normal trains also run between these two cities, but can take approximately two hours. The Vibrant Express stops at cities such as Shenzhen and Dongguan between its final destinations at Hong Kong and Guangzhou. On a daily basis, this train route operates over 30 times.

The national and global economic prominence of Guangzhou and Hong Kong emphasizes the need and importance of the Vibrant Express' speed and reliability: Guangzhou is the capital of Guangdong Province—the most populous provincial region in mainland China—and Hong Kong is one of Asia's major hubs for international trade and investment. These cities, along with others, form a "Greater Bay Area," a concept that began in 2017 when regional and central government leaders incorporated a Guangdong-Hong Kong-Macau Greater Bay Area region in China's 13th Five Year Plan for the 2016-2020 period. Later on, this became a governmental project that would encourage further connections between the cities by leveraging their respective assets, such as Hong Kong's financial market and Guangzhou's consumer market.

Migration Characteristics from Bay Area to 12 Outer Megaregion Counties (2019)

Area relocating to:	Sacramento Area	Northern San Joaquin Valley	Monterey Bay Area	All three sub-regions total	San Francisco Bay Area Residents *(data in this column represents share of all residents as opposed to 'movers')*
Total movers	17,290	10,508	4,738	32,536	4,117,439
Median household Income of movers	$110,000	$84,800	$167,000	$106,000	$151,500
Percent of movers still employed in San Francisco Bay Area	12%	56%	37%	30%	95%
Percent of movers still employed in San Francisco and San Mateo counties	3%	6%	7%	5%	29%
Percent of movers with bachelor's degree or higher	52%	15%	48%	34%	52%
Top 3 employment industries for those that have relocated	1. Professional Scientific & Technical Services 2. Health Care and Social Assistance 3. Retail Trade	1. Accommodation & Food Services 2. Construction 3. Health Care and Social Assistance	1. Professional Scientific & Technical Services 2. Educational Services 3. Construction	1. Accommodation & Food Services 2. Health Care and Social Assistance 3. Professional Scientific & Technical Services	1. Professional Scientific & Technical Services 2. Health Care & Social Assistance 3. Manufacturing

Data: American Community Survey 1-year estimates 2019
Analysis: Bay Area Council Economic Institute

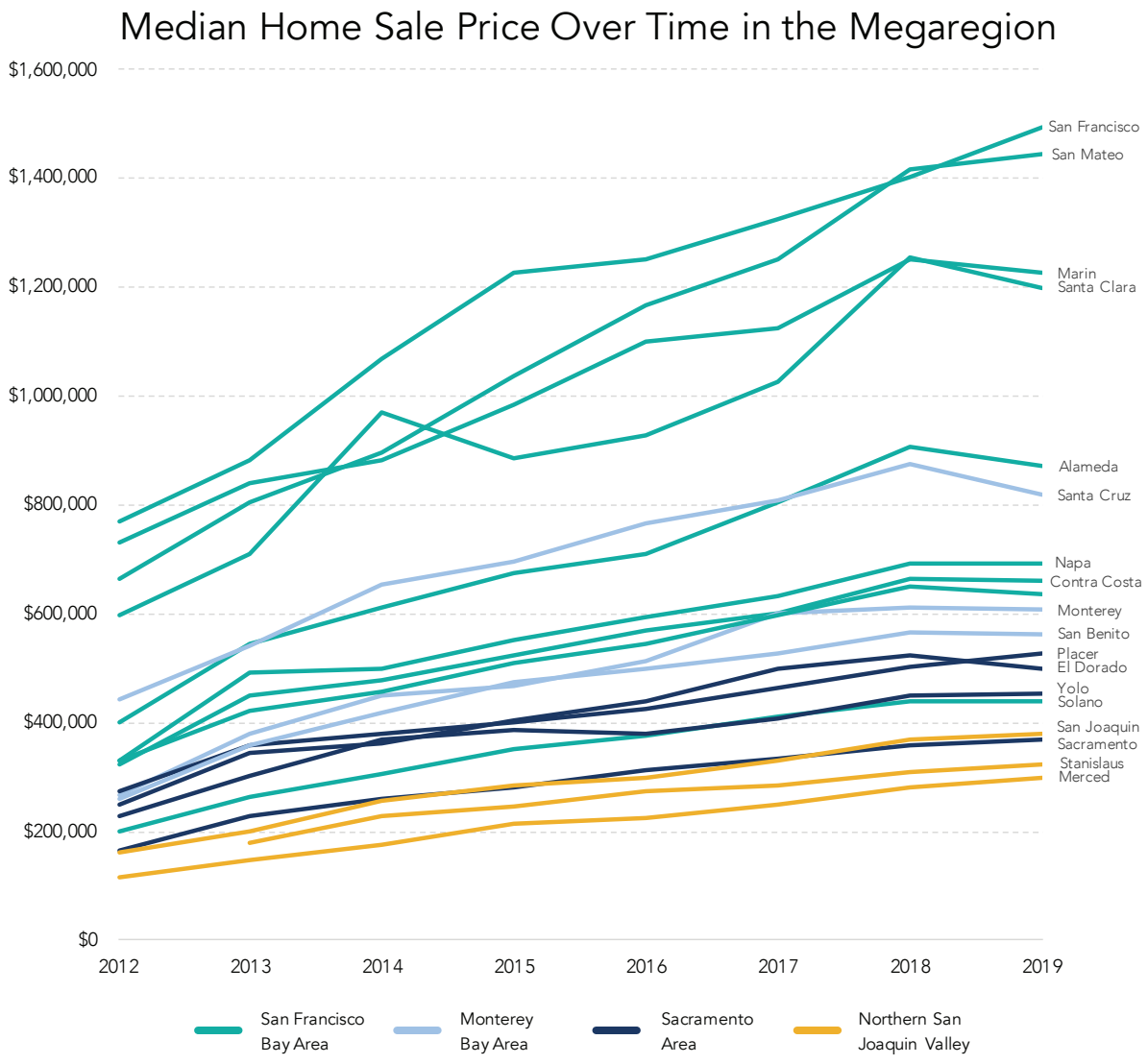
The characteristics of those relocating to different parts of the Northern California Megaregion reveal interesting dynamics of the megaregional economy and show the growing needs for transportation systems connecting the megaregion that equitably serve all demographics.

- **Employment Location:** Of those relocating from the Bay Area to other parts of the megaregion, 30% maintained a job in the San Francisco Bay Area; representing 9,700 people in 2019. As a reference, 9% of the population in the 12 non-Bay Area counties are employed in the Bay Area counties.
- **Income:** Employed residents moving from the San Francisco Bay Area to the Sacramento Area have a median household income of $110,000—which is significantly lower than the San Francisco Bay Area median of over $150,000. Those moving to the Northern San Joaquin Valley have a median household income $84,800. Those moving to the Monterey Bay Area have higher incomes.
- **Industry:** The largest share of those moving to the Sacramento Area are employed in Professional and Technical Services, and Accommodation and Food Services tops the list for megaregional migrants moving to Northern San Joaquin Valley.
- **Education:** 15% of those relocating to the Northern San Joaquin Valley have a bachelor's degree or higher compared to 52% overall in the San Francisco Bay Area.

Housing Costs

The varying home prices in different counties further illustrate why the megaregion has increasingly experienced high degrees of people movement over the past decade. The rise in housing costs in certain counties, mainly in the San Francisco Bay Area, has caused a growing disparity between the cost of housing in the San Francisco Bay Area and the other three sub-regions in the megaregion.

In 2012, the difference between the county with the lowest median home price (Merced) and the county with the highest median home price (San Francisco) was $653,000. In 2019, the difference between median home prices in those two counties had jumped to $1,193,000. Over that same period of time, the highest percent increase in home sale prices have been in counties outside of the San Francisco Bay Area, with Merced, San Joaquin, Monterey, and Sacramento counties seeing the largest increase in home sale prices on a percentage basis. It should be noted that many of these counties were highly impacted by the Great Recession, thus their home prices in 2012 were depressed.



Data: Redfin, Median Sale Price

The divergence in the cost of homes in the San Francisco Bay Area and the rest of the megaregion and the rapidly rising cost of housing in the outer counties are both trends that align with the population and job growth geographic mismatch and the out-migration from the San Francisco Bay Area to the wider megaregion. Together, these data points explain the dependence that the economies across the megaregion have on one another and frame the need for a rail transit strategy that visualizes the megaregion as one collective economy.

Megaregion Home Sale Prices (2012-2019)

County	Median Percent Increase	Median Price Increase
San Francisco Bay Area		
Alameda	118%	$470,000
Contra Costa	103%	$335,000
Marin	67%	$493,000
Napa	109%	$361,000
San Francisco	94%	$724,000
San Mateo	117%	$779,000
Santa Clara	100%	$601,000
Solano	121%	$241,000
Sonoma	92%	$305,000
Sacramento Area		
El Dorado	99%	$249,000
Placer	93%	$254,000
Sacramento	124%	$205,000
Yolo	98%	$225,000
Monterey Bay Area		
Monterey	127%	$340,000
San Benito	116%	$302,000
Santa Cruz	85%	$375,000
Northern San Joaquin Valley		
Merced	160%	$184,000
San Joaquin	138%	$220,000
Stanislaus	81%	$325,000

Data: Redfin, Median Sale Price

2

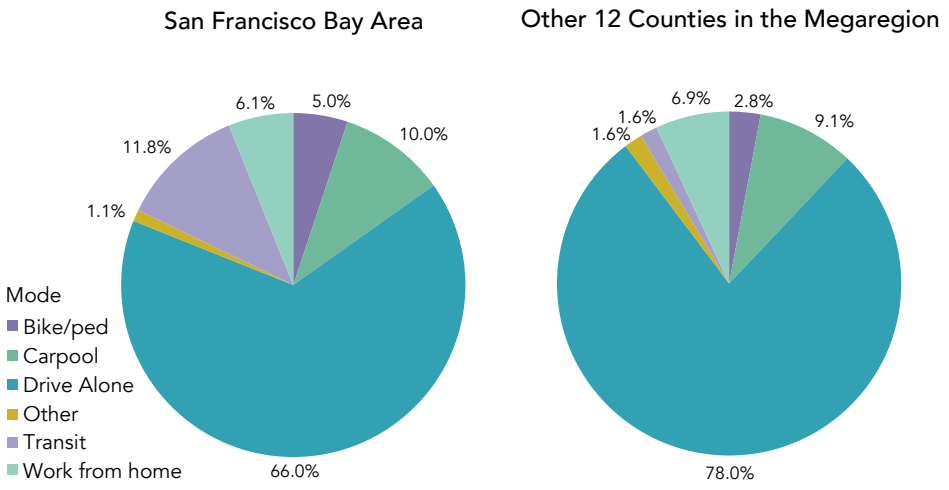
Transportation Dynamics of the Northern California Megaregion

The mismatched job and population growth of the Northern California Megaregion and the migration patterns within it paint a picture of the need for improved transportation connectivity. This chapter dives into the effects of those trends with a view of current travel dynamics within the megaregion and changes over time. Understanding travel patterns allows for informed decisions on transit investments that equitably and efficiently serve travel needs and preferences in the megaregion. This chapter profiles commuters based on characteristics, such as where they live and work, their mode choice (i.e., means of travel), the industry they are employed in, and their income level.

Profile of Megaregional Commuters

The travel options available to residents living across the megaregion greatly influence their travel behavior. This section provides a snapshot of those current travel choices in the megaregion based on varying profiles.

Mode Share among megaregion residents employed in the San Francisco Bay Area versus those employed in the other 12 megaregional counties

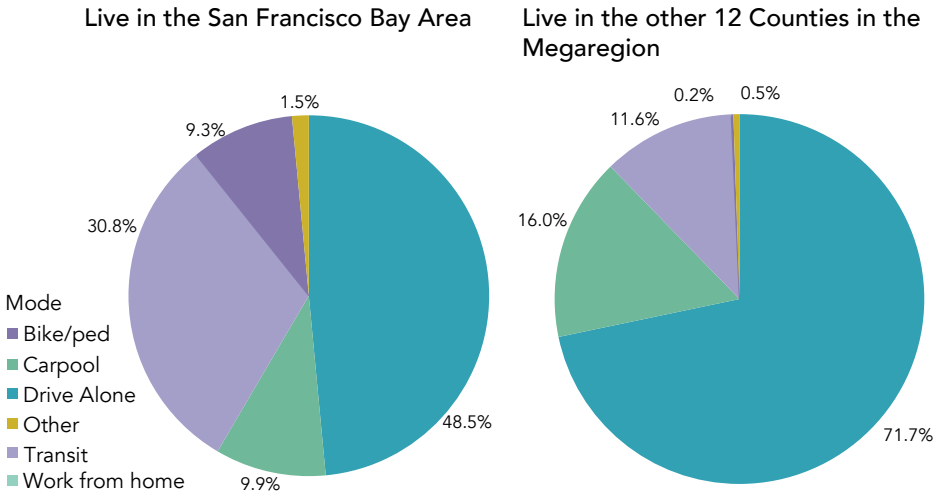


Data: American Community Survey 1-Year Estimates 2018

Mode Share

- 11.8% of the workforce employed in the nine-county San Francisco Bay Area commute using transit, compared to only 1.6% of the total workforce employed in the other 12 counties in the megaregion, exhibiting the limited transit availability or poor transit competitiveness compared to car travel in the 12 counties outside the Bay Area.
- For commuters that work in San Francisco or San Mateo counties, 29.0% commute using transit. Within the workforce of those two counties, 30.8% of those living in the nine-county San Francisco Bay Area take transit, while only 11.6% of those commuting from the other 12 megaregion counties do. This trend is likely due to the lack of transit that originates in the outer counties of the megaregion.

Mode share among megaregional residents commuting to San Francisco and San Mateo counties



Data: American Community Survey 1-Year Estimates 2018

Industry

- Among people who work in the nine-county San Francisco Bay Area, people working in the Finance and Insurance (21% transit mode share), Information (21%), and Management of Companies and Enterprises (19%) and Professional and Technical Services (18%) sectors are most likely to take transit. For commutes with destinations to San Francisco and San Mateo counties, workers in Utilities (46% mode share), Finance and Insurance (44%), and Professional and Technical Services (37%) have the highest transit use.
- The workforce employed in the 12 non-Bay Area counties in the megaregion are most likely to take transit if they work in Public Administration (4%), Accommodation and Food Services (3%), and Educational Services (3%).

Income

- In the San Francisco Bay Area, transit riders have a median household income of $163,000 compared to $150,000 among those who drive alone.
- In the other 12 counties of the megaregion, the reverse is true. Transit riders have a lower median household income of $90,000 compared to $99,100 among those who commute in single occupancy cars. This reverse trend may indicate transit is used as a necessity in areas outside the core.
- The table on the following page displays mode share breakdowns by industry of occupation for all workers with employment in San Mateo and San Francisco counties. The table shows high shares of transit ridership in high-wage occupations—most notably jobs in Professional Services, which are likely to be located in core areas with transit access.

Mode Share for All Employees Working in San Francisco and San Mateo counties, sorted by transit usage

Industry	Drive Alone	Transit	Carpool	Work from home	Bike/ped	Other	Total
Professional, Scientific, and Technical Services	80,205	84,035	15,470	17,150	25,359	3,222	225,441
Finance and Insurance	25,560	30,642	5,199	3,054	4,427	880	69,762
Health Care and Social Assistance	67,214	28,939	12,801	4,705	10,433	977	125,069
Retail Trade	44,257	28,290	9,396	2,843	9,632	1,879	96,297
Accommodation and Food Services	35,084	26,732	9,228	1,295	11,847	1,073	85,259
Information	26,124	22,763	5,790	2,671	5,306	953	63,607
Educational Services	39,342	17,226	7,843	1,369	8,615	1,187	75,582
Manufacturing	32,644	15,774	7,810	3,721	2,494	393	62,836
Public Administration	20,645	14,909	4,111	1,602	1,980	594	43,841
Administrative Services and Waste Management	25,307	14,128	5,269	2,644	4,025	1,242	52,615
Other Services, except Public Administration	25,741	13,044	4,728	2,452	5,213	850	52,028
Transportation and Warehousing	44,966	10,302	7,575	1,011	2,793	1,157	67,804
Arts, Entertainment, and Recreation	12,792	9,503	1,696	1,498	3,882	237	29,608
Construction	39,675	9,157	10,412	1,769	1,527	840	63,380
Real Estate and Rental/Leasing	15,065	7,624	2,493	4,755	2,438	551	32,926
Utilities	2,699	3,420	594	350	261	51	7,375
Wholesale Trade	10,991	3,051	1,808	791	1,449	115	18,205
Management of Companies and Enterprises	937	1,298	364	139	393	72	3,203
Agriculture, Forestry, Fishing, and Hunting	912	825	491	160	56	137	2,581
Military	184	334			40		558
Mining, Quarrying, and Oil and Gas Extraction	132						132
Total	550,476	341,996	113,078	53,979	102,170	16,410	1,178,109

Data: American Community Survey 1-year estimates

Megaregional In-Commuters

- In 2018, 187,000 people who live outside the nine-county San Francisco Bay Area commuted daily to the nine counties for work. The majority of these people commuting from outside the nine-county Bay Area are traveling to jobs in Santa Clara County (35%) or Alameda County (32%). Most of these megaregional commuters live in San Joaquin County (37%) or Sacramento County (14%). Of the total, 22,115 are commuting to San Francisco and San Mateo counties, or 12% of the total in-commute.
- Many of the megaregional counties are highly dependent on a workforce of in-commuters (people working within a county but residing outside of it). The number of in-commuters to megaregional counties is summarized in the first table on the following page. Notably, San Francisco and San Mateo counties have two of the three highest shares of workers in-commuting from other counties at 46.2% and 43.8% of total workers, respectively.
- Only 8,000 of the 187,000 megaregional commuters take transit. Transit riders who commute into the nine counties are predominately individuals employed in the Manufacturing (2,000 transit riders) and Professional Scientific and Technical Services (1,000 transit riders) sectors.
- Low levels of commuters between county pairs in the second table on the following page can also signal the difficulty in traveling between two locations. Demand for certain trips between concentrated home or job markets could be induced if they were easier (i.e., quicker, with more frequent service) to complete via transit.

In-Commuting Workers by Megaregion County (2018)

County	Total Workers in County	Total In-Commuters from Outside of County	% of Total Workers In-Commuting	In-Commuters from non-Bay Area Megaregion Counties	% of Total Workers from non-Bay Area Megaregion Counties
San Francisco	759,875	351,320	46.2%	12,720	1.7%
Alameda	775,596	268,896	34.7%	59,256	7.6%
Santa Clara	1,119,654	267,534	23.9%	65,386	5.8%
San Mateo	418,234	183,184	43.8%	9,395	2.2%
Sacramento	698,062	122,021	17.5%		
Contra Costa	405,779	90,840	22.4%	15,337	3.8%
Placer	181,443	63,330	34.9%		
Yolo	113,202	52,119	46.0%		
San Joaquin	263,166	49,294	18.7%		
Marin	124,757	41,227	33.0%	1,746	1.4%
Solano	154,313	29,928	19.4%	15,497	10.0%
Stanislaus	191,510	28,970	15.1%		
Napa	73,496	21,261	28.9%	3,775	5.1%
Sonoma	231,471	18,319	7.9%	3,938	1.7%
Santa Cruz	111,224	16,432	14.8%		
Monterey & San Benito	197,684	12,995	6.6%		
El Dorado	61,767	10,164	16.5%		
Merced	84,621	8,050	9.5%		
Sutter & Yuba	52,410	5,405	10.3%		

Data: American Community Survey 1-year Estimates
Analysis: Bay Area Council Economic Institute

Number of commuters traveling between home and work county pairs

	County of Work									
County of Residence	Alameda	Contra Costa	Marin	Napa	San Francisco	San Mateo	Santa Clara	Solano	Sonoma	Total
El Dorado	2,342	264	64		89	259	761	358		4,137
Merced	1,477	195	16		101	506	6,287	258	233	9,073
Monterey & San Benito	762	144			555	664	17,802	99		20,026
Placer	820	399	316	399	1,142	340	996	1,182	574	6,168
Sacramento	4,549	2,944	760	1,008	3,432	2,172	2,732	6,019	1,849	25,465
San Joaquin	38,810	10,019	315	285	3,830	3,421	11,448	1,768	18	69,914
Santa Cruz	690		46		1,378	1,188	19,903		552	23,757
Stanislaus	9,425	778		94	2,127	784	4,835	664	268	18,975
Sutter & Yuba	47	186		1,863	66		275	405	47	2,889
Yolo	334	408	229	126		61	347	4,744	397	6,646
Total	59,256	15,337	1,746	3,775	12,720	9,395	65,386	15,497	3,938	187,050

Data: American Community Survey 1-year estimates

- The top five employment industries of in-commuters into the nine-county Bay Area are:
  1. Construction – 32,500, 17% of total
  2. Manufacturing – 25,000, 14% of total
  3. Healthcare and Social Assistance – 16,000, 9% of total
  4. Professional Scientific and Technical Services – 15,000, 8% of total
  5. Administrative Support and Waste Management Services – 13,000, 7% of total
- Top five home and work location county pairs for megaregional in-commutes in 2018:
  1. San Joaquin to Alameda – 21% of total
  2. Santa Cruz to Santa Clara – 11% of total
  3. Monterey & San Benito to Santa Clara – 10%
  4. San Joaquin to Santa Clara – 6% of total
  5. Stanislaus to Alameda – 5% of total
- Megaregional in-commuters potentially using the transbay corridor (i.e., all megaregional commuters with destinations in San Francisco and San Mateo counties, minus those originating in the Monterey Bay Area) totaled 18,300 in 2018, or 10% of all megaregional in-commutes. That number would put the transbay megaregional commute third on the list in the previous bullet.
- Top five home and work location county pairs with the largest percent change in commuters between 2010 and 2018 (among pairs that have at least 1,000 commuters traveling between the two locations in both 2010 and 2018). Three of the top five fastest growing home and work location pairs include Sacramento County as a home location):
  1. San Joaquin to San Francisco: +243%
  2. Sacramento to Santa Clara: +127%
  3. Sacramento to Contra Costa: +127%
  4. Sacramento to Alameda: +122%
  5. San Joaquin to San Mateo: +105%
- Median household income of in-commuters is $18,000 higher than the median income of all households in the 12 non-Bay Area counties, but $33,000 lower than that of those who live in the San Francisco Bay Area. Higher wages in the Bay Area are somewhat offset by travel costs. Commuting by transit to these employment opportunities is only realistic for a small subset of the group because convenient transit options are often limited.

Change in Commuters by Work and Home Location

For pairs that had at least 1,000 commuters in 2010 and 2018

	County of Work (San Francisco Bay Area)					
County of Residence (Other 12 megaregion counties	Alameda	Contra Costa	San Francisco	San Mateo	Santa Clara	Solano
El Dorado	+1,171					
Merced					+2,458	
Monterey San Benito					+6,614	
Placer					+64	
Sacramento	+2,474	+1,644	+960	+897	+1,614	-1,032
San Joaquin	+11,627	+5,203	+2,825	+1,744	+5,350	-393
Santa Cruz				+84	+2,537	
Stanislaus	+3,905				+1,432	
Yolo						-492

Data: American Community Survey 1-Year Estimates 2010, 2018

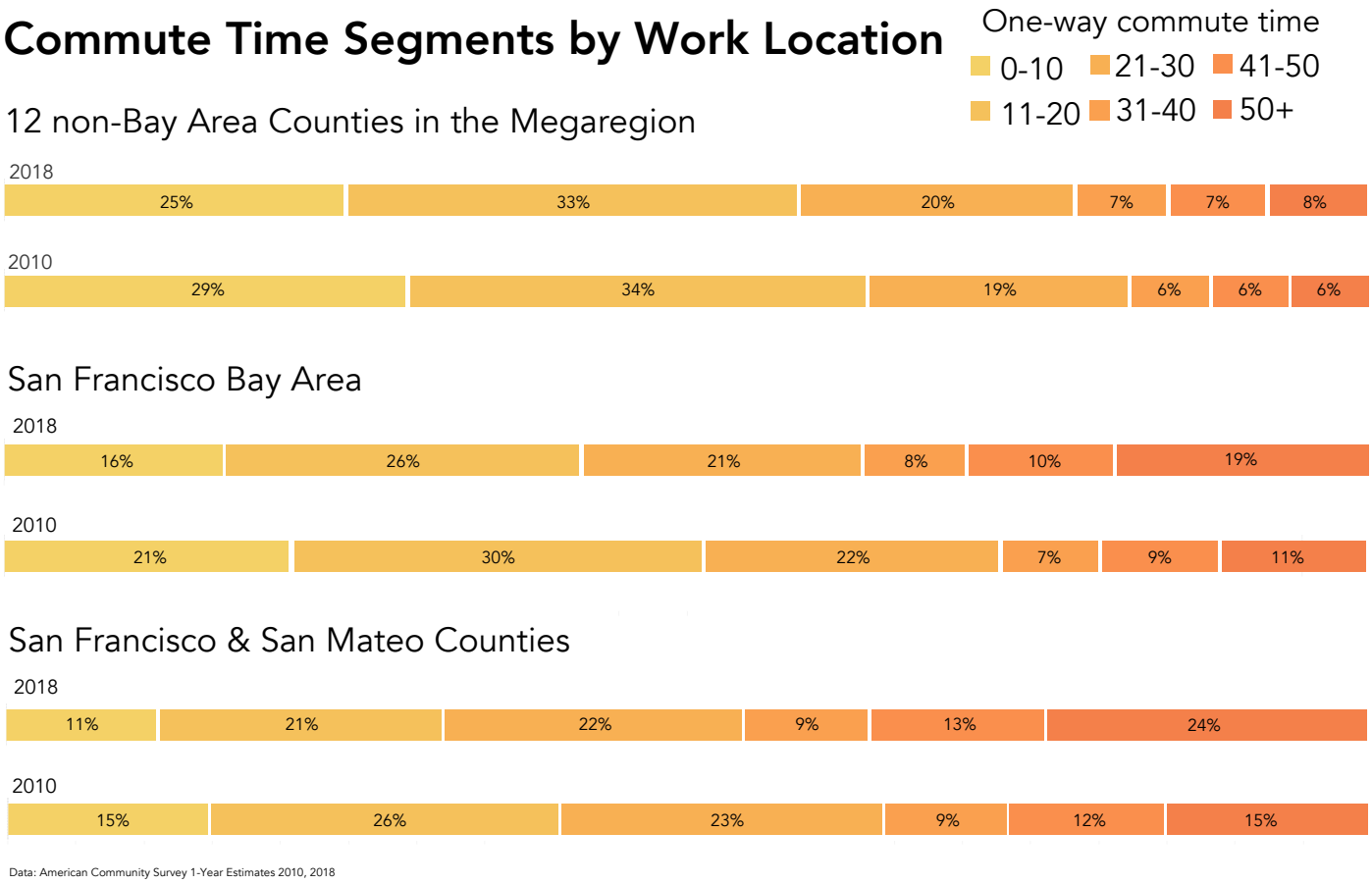
Commute Times

The majority of the workforce in the Northern California Megaregion spends only 30 minutes or less commuting in each direction. However, there is significant variance depending on worker industry, income level, and home and work location. The following chart shows commute times based on county of employment.

At a high level, travel time data shows that most commuters in the Northern California Megaregion experience a maximum commute time of 60 minutes in each direction, and there is a steep drop-off in the number of commuters with travel times greater than one hour. Across the megaregion, 426,000 people commute between 51 and 60 minutes each way, while only 56,000 commute between 61 and 70 minutes each way.

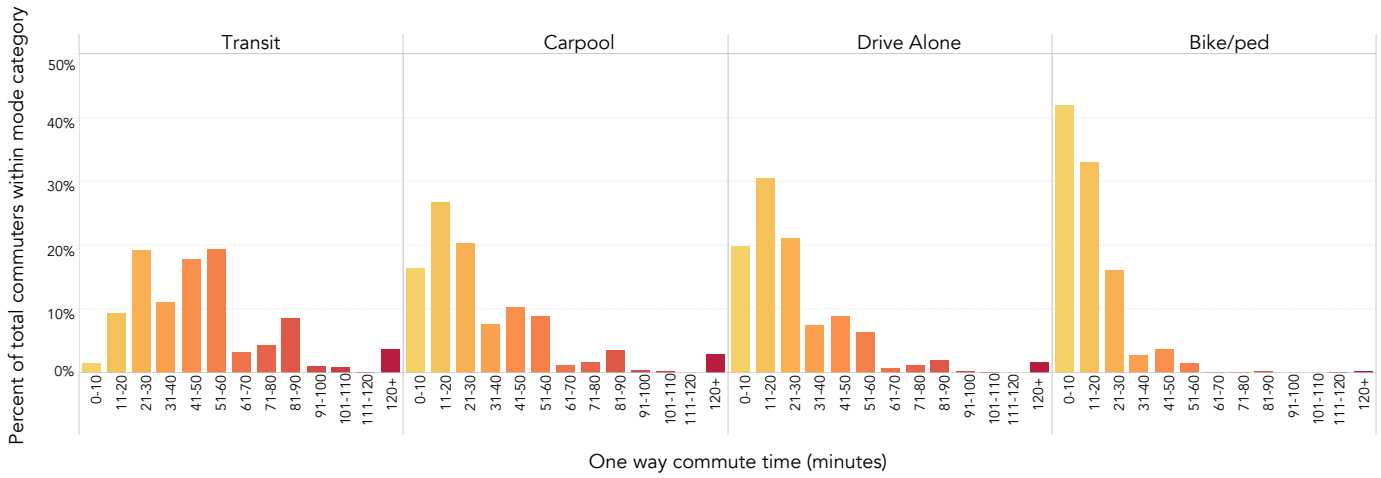
Over time, commutes in the San Francisco Bay Area and the rest of the megaregion have become longer. Commutes among those working in the San Francisco Bay Area that are 50+ minutes have increased as a percentage of the total from 11% in 2010 to 19% in 2018. In the other 12 counties in the megaregion, the share of total commutes over 50 minutes each way rose from 6% in 2010 to 8% in 2018. In San Francisco and San Mateo counties, as of 2018, 24% of the total workforce employed in the two counties commutes over 50 minutes, up from 15% in 2010.

Commute Time Segments by Work Location



Data: American Community Survey 1-Year Estimates 2010, 2018

Travel time to work by mode



Data: American Community Survey 1-Year Estimates

As shown above, those taking transit are willing to accept longer commutes than any other mode. 19% of transit riders travel between 51 and 60 minutes each way, compared to just 9% of those who carpool, 6% of those who drive alone and 1% who bike or walk. Other travel time characteristics are presented below:

- A larger share of people employed in San Francisco have long commutes than the megaregion average. Of people employed in San Francisco, 14% have a commute greater than 60 minutes, compared with 8% overall for the megaregion—a reflection of both the housing limitations and strong draw of employment opportunities in San Francisco.
- Segmenting commute times by income levels for those that work in San Francisco and San Mateo counties shows little significant difference. For workers with less than $100,000 per year in household income, 35% have a commute of 40 minutes or greater. For those with a household income greater than $100,000 per year, 38% have a commute over 40 minutes.
- When looking at the industry composition of commute times for all workers, those employed in the Bay Area in Utilities and Educational Services have the longest commutes. People employed in Construction and Public Administration industries have the longest commutes of those employed in the other 12 counties in the megaregion.

In general, the megaregional workforce experiences maximum travel times of up to one hour in each direction to reach their workplace. Targeting transit investments that produce travel times to meet or exceed this threshold (i.e., transit trips that are 60 minutes or less) would likely have a impact on transit adoption, particularly if connections are made between geographies that have high housing or employment concentrations. This would create many benefits for the megaregion such as a more sustainable transportation system and a wider labor pool for business.

In addition, the longer travel times people accept to work in the core counties in the San Francisco Bay Area show the continued draw of employment in the nine counties. As such, investing in transit connections between these counties and the wider megaregion has the ability to increase access to high wage jobs for people living in more affordable home locations.

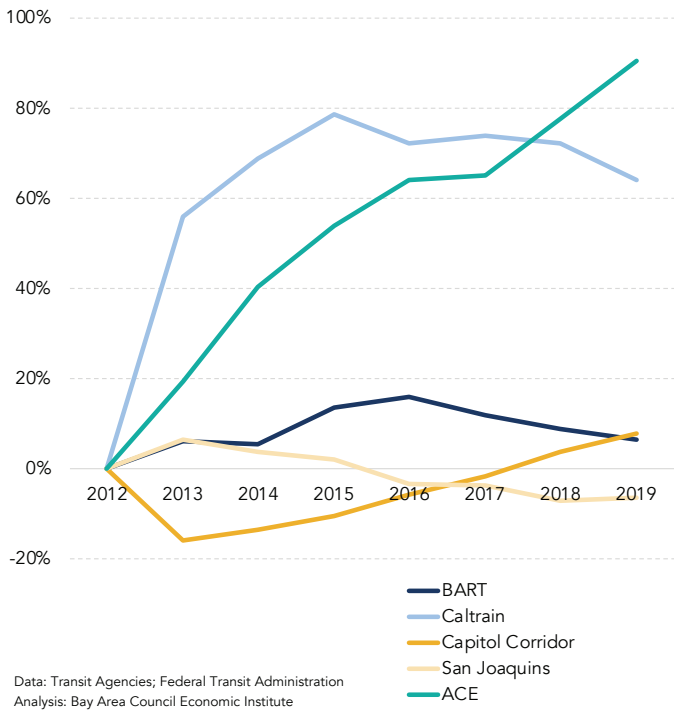
Regional Rail: Existing Connectivity and Ridership

As analyzed previously, commute flows into San Francisco and San Mateo counties from all corners of the Northern California Megaregion are growing rapidly. However, with only one of the major rail transit operators in the region able to cross the bay, the transportation system is severely constrained. BART service is constrained by having only a single two-track crossing, which limits headways systemwide. BART is also unable to offer express trains due to the lack of passing tracks systemwide, or to offer late-night service due to the maintenance closure required every night.

Examining the popularity of current rail services provides further evidence as to why a new transbay rail crossing would help deliver transit options that fit the needs of the megaregion. The chart depicts ridership trends between 2012 and 2018.

- **Altamont Corridor Express (ACE) Rail**, operating four trains in each direction every weekday between Stockton and San Jose, carries a small percentage of the total rail passengers in the megaregion but has seen the largest percent increase in total annual ridership since 2012 out of any rail agency. As one of the only rail options in the megaregion that connects directly from the 12 outer counties to one of the main urban job hubs (San Jose), the growth in ridership displays the growing popularity of direct transit access between inland and coastal geographies of the megaregion. In 2019, ACE carried over 1.5 million total passengers.
- **Capitol Corridor**, connecting the Sacramento Area to Santa Clara County with links to the BART system and connecting buses to San Francisco, has seen slight growth in the last few years. The trip between San Jose and Sacramento is three hours in one direction, making it an unrealistic daily commute route despite offering a direct connection between two major cities in the megaregion. In 2019, Capitol Corridor had total ridership of just under 1.8 million, with 55% of trips reported as commute-related.
- **Caltrain**, a commuter service connecting San Francisco and Santa Clara counties with express options, has also seen significant growth in ridership over the period. This is possibly a testament to the express train options—unlike other rail operators, Caltrain owns most of its right-of-way—keeping commute times under one hour between more home and work location pairs. In 2019, Caltrain carried 17.7 million total passengers.
- **Amtrak San Joaquins** is an intercity rail service providing five daily roundtrips between Oakland and Bakersfield, and two daily roundtrips between Sacramento and Bakersfield. The San Joaquins are unique in that much of their ridership connects to or from an Amtrak Thruway Motorcoach bus route. Ridership on the San Joaquins has been consistent at just over 1.0 million passengers in 2019, with many passengers using the service for leisure trips.
- **BART** still carries the most passengers (over 118 million in its 2019 fiscal year) by far out of any rail transit agency in the megaregion, as its frequency and station locations make it a valuable option for riders. BART ridership has actually been falling in recent years after peaking in 2016.

Growth in Annual Rail Ridership Since 2012 in the Northern California Megaregion



Data: Transit Agencies; Federal Transit Administration
Analysis: Bay Area Council Economic Institute

Existing Rail Connectivity in the Northern California Megaregion

3

Gateway Corridors in the Northern California Megaregion

The key gateway corridors across the megaregion that connect the major metropolitan job hubs with geographies that offer affordable, varied housing options have been overwhelmed with growing congestion in the years following the Great Recession. For example, the Altamont Pass (I-580), the two interstates connecting Silicon Valley and San Jose to San Francisco (US-101 and I-280), the I-880 highway between San Jose and the East Bay, and the I-80 corridor, including the Bay Bridge, have seen steady increases in vehicular traffic during the congested peak commute times.

Together, these key megaregional corridors deliver employers access to their workforce and vice versa, they facilitate the movement of goods, and they are also used for leisure travel. The megaregional labor pool encompasses numerous dispersed work and home location pairs across the 21 counties, making transportation corridor performance a key influence on location decisions for businesses. Choices, such as expanding hiring within the Northern California Megaregion or opening new locations in other regions of the U.S., hinge on the effectiveness of the transportation system as a whole.

The specific transportation connections between urban job centers and popular residential locations influence where companies decide to locate and or expand within the region. Housing decisions are similarly influenced by the availability and speed of transportation options, impacting land use in areas with direct connections to the job rich metropolitan centers in the megaregion.

Investing in a new transbay rail crossing and the Link21 program unlocks more direct connectivity between many home and work locations and holds the potential to create benefits across the megaregion. Understanding the level of congestion and types of commuters using different corridors across the region today helps uncover how and where these benefits might result from a new transbay rail crossing.

This chapter compares the key corridors in the megaregion, focusing on the transbay corridor itself and several corridors that feed into the transbay corridor. In addition, several other corridors in the region with varying transit options are assessed to compare commute and travel habits when different travel options are available to customers along a corridor.

Transbay Corridor

The transbay corridor is the most congested corridor in the region. The eastbound and westbound approaches to the Bay Bridge on I-80 rank as the two worst commutes in the Bay Area by the Metropolitan Transportation Commission (MTC). While this list only takes into account the nine counties, some of the commutes that begin outside of the San Francisco Bay Area feed into the transbay corridor, making it a key connection for the megaregion as a whole.

The transbay corridor directly connects Alameda County, the county with the largest number of out-commuters in the megaregion (285,500), and San Francisco County, the county with the largest number of in-commuters in the megaregion (351,300). Aside from the direct connection between those two counties, it also supports several other heavily trafficked commute corridors that feed into the transbay corridor, such as SR-24, I-580, I-880, and I-980. Between 2012 and 2018, the transbay corridor added more commuters than any other route studied here, with 59,000 commuters added to the route over the period.

Compared to other corridors, the transbay corridor has the highest transit ridership (including rail, bus, and ferry) by a significant amount at 51% of the corridor's total mode share. The transbay corridor has seen climbing transit usage from 2012 to 2018, with transit making up nine percentage points more of the mode share than it did in 2012. With the shortest rail headway in the megaregion at 15 minutes, BART's frequency makes it attractive for all types of trips.

Over a quarter of San Francisco's workforce relies on the transbay corridor to get to work, with 27% of the total workforce commuting across the bay. Similarly, approximately 6% of the San Mateo workforce commutes uses the transbay corridor. The transbay corridor commute is also dominated by employees in industries that are most likely to take transit: Professional, Scientific, and Technical Services and Finance and Insurance rank as the second and third most likely industry to take transit in the megaregion.

Despite high use of transit, the transbay corridor has the largest vehicle hours of delay (VHD) per mile out of all the key corridors analyzed, with 350 VHD per mile of freeway on an average weekday, leaving room for significant improvements through the corridor with increased investment in transit. As the corridor with the largest decrease in single occupancy commuting over the six-year period, there is an appetite among commuters to find an option other than single occupancy cars to cross the bay.

Transbay Corridor

Daily Commuters	261,000 total		Between 2012 and 2018: +29% +59,000
Top 3 Industries (with number of commuters)	1. Professional Scientific and Technical Services 49,049	2. Healthcare and Social Assistance 24,582	3. Finance and Insurance 21,988

Mode Share					
	Drive Alone	**Transit**	**Carpool**	**Bike/Ped**	**Other**
2018 Mode Share	36%	51%	10%	1%	2%
Change (2012-2018)	-5%	+9%	-4%	+0%	+0%

Travel Options				
BART	**End Points East**	**End Points West**	**Average Weekday Ridership (2019)**	**Headway**
	Richmond, Antioch, Dublin/Pleasanton, South Fremont	San Francisco	114,724 transbay entries	~15 minutes; 2-5 minutes at busier stations
WETA	**End Points East**	**End Points West**	**Average Weekday Ridership 2018**	**Headway**
	Vallejo, Richmond, Oakland, Alameda, Harbor Bay	San Francisco	9,036 trips	~30 mins at peak
Bus (WestCAT, AC Transit)	**End Points East**	**End Points West**	**Average Weekday Ridership 2018**	**Headway**
	WestCAT– Hercules Transit Center; AC Transit– 28 lines serving Alameda and Contra Costa counties	San Francisco	15,560 trips	WestCAT– 15 min; AC Transit– 21 min – 1 per day
Bay Bridge (I-80)	**Average Weekday VHD**	**Average Weekday VMT**	**Average Daily Toll Tags**	**Length of Corridor**
	4,653 W 2,334 E	1,301,726 W 1,132,646 E	133,087	10 mi W 10 mi E

Note: Mode share and commuters consist of people who commute between San Francisco County and Alameda, Contra Costa, El Dorado, Merced, Napa, Placer, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, Yuba, and Yolo counties and one third (assuming a share of this group travels on the Dumbarton and San Mateo-Hayward bridges) of the commuters between San Mateo county and Alameda, Contra Costa, El Dorado, Merced, Napa, Placer, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, Yuba, and Yolo counties. VHD calculated for the ten mile stretch five miles west and five miles east of the Alameda County and San Francisco County line that falls on the middle of the bay bridge.

Average VMT (vehicle miles traveled) and VHD (vehicle hours of delay) is the median value for all Wednesdays in February 2020. VHD has a threshold of below 35 mph.

Data: Mode Share & Commuters: American Community Survey 1-year Estimates; Travel Options: Agency specific ridership data; Caltrans Performance Measurement System (PeMS); Bay Area Toll Authority.

Corridors Feeding into the Transbay Corridor

I-580 / Altamont Pass Corridor

Connecting the Northern San Joaquin Valley to the San Francisco Bay Area and feeding into the transbay corridor, the I-580 corridor is an essential connection for commuters and goods movement. This corridor saw the largest percent increase in commuters out of the five corridors examined, with a 50% increase in commuters between 2012 and 2018. The corridor has one rail option (ACE) with four trains in each direction during each weekday, which is likely a factor in the I-580 corridor being the only corridor where single occupancy commuting has become a larger portion of the total corridor mode share over the last six years.

Construction and manufacturing sectors are more common professions on the I-580 commute, as opposed to the professional sectors that dominate the transbay and U.S. 101/I-280 corridors. The number of commuters in these industries shows the demand within the Bay Area for these services is partially supported by a workforce that lives in the outer megaregion.

I-580 Corridor

Daily Commuters	105,300 total		Between 2012 and 2018: +50% +35,000
Top 3 Industries (with number of commuters)	1. Construction 19,901	2. Manufacturing 16,026	3. Healthcare and Social Assistance 10,333

Mode Share					
	Drive Alone	**Transit**	**Carpool**	**Bike/Ped**	**Other**
2018	75%	5%	19%	0%	1%
Change (2012-2018)	+2%	+2%	-4%	+0%	+0%

Travel Options				
ACE	End of line East	End of line West	Average Daily Ridership (2018)	Headway
	Stockton	San Jose	5,360 trips	~1 hour 4 trains eastbound AM; 4 trains westbound PM
I-580	Average Weekday VHD	Average Weekday VMT	Length of Corridor	
	3,452 W 8,493 E	4,715,881 W 5,329,298 E	76.5 mi W 76.5 mi E	

Note: Mode share and commuters consist of people who commute between the three Northern San Joaquin Valley counties and the nine San Francisco Bay Area counties.

Average VMT (vehicle miles traveled) and VHD (vehicle hours of delay) is the median value for all Wednesdays in February 2020. VHD has a threshold of below 35 mph.

Data: Mode Share & Commuters: American Community Survey 1-year Estimates; Travel Options: Agency specific ridership data; PeMs.

Global Megaregion: Milan - Turin

Turin and Milan are two of Northern Italy's densest and most globally connected cities. As the financial capital of Italy, Milan is known for its concentration of commercial office space, while Turin, a former industrial powerhouse, continues to serve as an employment center for industry, education, and tourism. Despite their differences, the relationship between Turin and Milan is strengthened through high-speed rail service.

Today, the train time between both cities is approximately 45-50 minutes, covering a distance of approximately 125 kilometers or close to 80 miles. This train time is able to compete with the driving time between these two cities, which is approximately one hour and 44 minutes by car. According to Rail Europe, there are approximately 59 trains that run this route each day, with fewer trips occurring on weekends. The Turin-Milan railway is a fully electrified railway that has operated as a high-speed railway since 2006.

I-80 Corridor

Connecting the six Sacramento Area counties to the San Francisco Bay Area and feeding into the transbay corridor, the I-80 corridor provides an essential connection for commuting, business travel, and leisure trips within the megaregion. Capitol Corridor provides direct connection from Sacramento to the East Bay and a bus or BART connection to San Francisco. The people who commute by rail transit between the Sacramento Area and San Francisco have a higher income than those who make that same commute by car. The number of commuters on the I-80 corridor increased by 43% over the last six years, the second largest percent increase out of all the corridors studied here.

I-80 Corridor

Daily Commuters	65,500 total	Between 2012 and 2018: +43% +19,500	
Top 3 Industries (with number of commuters)	1. Construction 10,641	2. Public Administration 8,270	3. Healthcare and Social Assistance 7,720

Travel Options

Capitol Corridor	**End of Line East**	**End of Line West**	**Average Weekday Ridership (2019)**	**Headway**
	Sacramento	San Jose	5,762	Peak 30 min Off-peak 2 hrs
I-80	**Average Weekday VHD**	**Average Weekday VMT**		**Length of Corridor**
	8,339 W 8,043 E	9,676,647 W 10,150,464 E		156.92 mi W 157.71 mi E

Mode Share

	Drive Alone	Transit	Carpool	Bike/Ped	Other
2018	78%	4%	15%	1%	1%
Change (2012-2018)	-2%	+1%	+1%	-1%	+0%

Note: Mode share and commuters consist of people who commute between the six Sacramento Area counties and the nine San Francisco Bay Area counties. Segment of I-80 includes length of interstate within the megaregion.

Average VMT (vehicle miles traveled) and VHD (vehicle hours of delay) is the median value for all Wednesdays in February 2020. VHD has a threshold of below 35 mph.

Data: Mode Share & Commuters: American Community Survey 1-year Estimates; Travel Options: Agency specific ridership data; PeMs.

Other Key Corridors in the Megaregion

U.S.-101 / I-280 Corridor

The corridor between San Francisco, the Peninsula, and the Monterey Bay Area supports the largest number of commuters out of all the five corridors analyzed. Both U.S. 101 and I-280 support auto travel along this corridor, and Caltrain offers both express and local train options between San Francisco and Gilroy in Santa Clara County. The high frequency services offered by Caltrain deliver the second highest transit mode share out of any corridor in the megaregion, at 19%; second only to the transbay corridor.

From 2012 to 2018, single occupancy commuting along this corridor has declined by five percentage points and transit usage has increased by five percentage points. Over the same time period, Caltrain average weekday ridership increased by 54%, from 42,000 in 2012 to 65,000 in 2018. This route is also popular for employee sponsored commuter shuttles, which play a role as a pseudo transit agency in many cases, transporting thousands of people each day.

I-880 Corridor

The I-880 corridor connects the East Bay to Silicon Valley and San Jose. The corridor has a 7% share of commuters utilizing transit, with Capitol Corridor service paralleled by BART's extension to San Jose. The transit percentage is more likely to include those that use bus lines or employer-sponsored shuttles (particularly because transit as a percentage of mode share has increased over the past six years as these shuttles have become increasingly popular in the region).

Manufacturing is by far the most common industry of employment for these commuters, likely fueled by the advanced manufacturing clusters located along the corridor. With new BART service in 2020, and the second most common industry being professional and business services—an industry with occupations that commonly take transit in the megaregion—the I-880 corridor is poised to see further shift toward transit adoption once the BART connection to downtown San Jose is fully completed.

Corridor Performance and Opportunities for Transit in the Megaregion

There are relatively limited transit connections on corridors that connect the San Francisco Bay Area with the 12 other counties in the megaregion, and none of them deliver a trip in under an hour or with high frequency. The high use of transit in corridors that do offer direct transit trips into urban cores with high frequency, including the transbay corridor and the U.S. 101/I-280 corridor shows the potential for gains in transit ridership if transit were to reach similar levels of frequency and trip durations along other corridors.

The I-580 (+50%) and the I-80 (+43%) corridors are the two corridors adding commuters at the fastest rate in the megaregion, together adding 55,000 commuters since 2012. They also both have limited rail frequency and feed into the transbay corridor. Given this dynamic, a new rail crossing of the bay has the potential to catalyze other transit investments that improve transit frequency, availability, and direct connection along these two corridors across the Northern California Megaregion.

I-101 / I-280 Corridor

Daily Commuters	357,500		Between 2012 and 2018: +17% +52,600
Top 3 Industries (with number of commuters)	1. Professional Scientific and Technical Services 64,404	2. Manufacturing 40,248	3. Healthcare and Social Assistance 37,794

Travel Options				
Caltrain	**End of line South**	**End of line North**	**Average Weekday Ridership (2018)**	**Headway**
	Gilroy	San Francisco	65,095 trips	15-20 minutes during peak
US-101	**Average Weekday VHD**	**Average Weekday VMT**	**Length of Corridor**	
	16,549 N 11,890 S	16,224,954 N 11,414,411 S	278.42 mi N 277.88 mi S	
I-280	**Average Weekday VHD**	**Average Weekday VMT**	**Length of Corridor**	
	4,424 N 8,036 S	3,363,967 N 3,332,756 S	56.7 mi N 57.5 mi S	

Mode Share	Drive Alone	Transit	Carpool	Bike/Ped	Other
2018 Mode Share	67%	19%	11%	2%	2%
Change (2012-2018)	-5%	+5%	-1%	1%	-1%

Note: Mode share and commuters consist of people who commute between the three Monterey Bay Area counties and San Francisco, San Mateo, and Santa Clara counties; Santa Clara County and San Francisco County; San Francisco County and San Mateo County; and Santa Clara County and San Mateo County. Segment of US-101 includes length of interstate within the megaregion.

Average VMT (vehicle miles traveled) and VHD (vehicle hours of delay) is the median value for all Wednesdays in February 2020. VHD has a threshold of below 35 mph.

Data: Mode Share & Commuters: American Community Survey 1-year Estimates; Travel Options: Agency specific ridership data; PeMs.

I-880 Corridor

Daily Commuters	149,000 total	Between 2012 and 2018: +14% +18,000	
Top 3 Industries (with number of commuters)	1. Manufacturing 40,562	2. Professional Scientific and Technical Services 28,391	3. Health Care and Social Assistance 11,997

Travel Options

BART	**Origin**	**Destination**	**Ridership**	**Headway**
	Service to Santa Clara County began 2020			
I-880	**Average Weekday VHD**		**Average Weekday VMT**	**Length of Corridor**
	7,224 N 5,926 S		4,300,282 N 4,351,178 S	46.0 mi N 45.7 mi S

Mode Share

	Drive Alone	Transit	Carpool	Bike/Ped	Other
2018	80%	7%	12%	1%	0%
Change (2012-2018)	-1%	+3%	-3%	+0%	+0%

Note: Mode share and commuters consist of people who commute between Santa Clara County and the combination of Alameda and Contra Costa counties.

Average VMT (vehicle miles traveled) and VHD (vehicle hours of delay) is the median value for all Wednesdays in February 2020. VHD has a threshold of below 35 mph.

Data: Mode Share & Commuters: American Community Survey 1-year Estimates; Travel Options: Agency specific ridership data; PeMs.

4

Vision for a Connected Northern California Megaregion

The key corridors outlined in the previous chapter show how nearly all of the main routes across the Bay Area and Northern California Megaregion are accompanied by a transit option. But transit in these corridors does not provide the same level of service to all customers. For example, Caltrain service has headways (i.e., the amount of time between trains) during the peak commute of 15 to 20 minutes, it offers express service between San Francisco and San Jose with limited stops, and it runs in a corridor that is dense in both population and jobs—thus it carries more passengers than any other rail line in the megaregion, except for BART.

Unlike Caltrain, intercity services like Capitol Corridor, Altamont Corridor Express, and Amtrak San Joaquins—all of which provide critical megaregional rail connectivity—operate on track right-of-way that is owned by freight operators. This arrangement means passenger rail agencies only get a certain number of slots per day, limiting their frequency and often posing scheduling problems if freight trains are delayed.

While new right-of-way acquisition would be the most direct path to an improved megaregional rail network, it is also the most costly and complicated path forward. In addition to strategic right-of-way improvements planned in coordination with freight operators, passenger rail agencies are contemplating numerous investments across the Northern California Megaregion to improve their service delivery.

The largest and most transformational rail improvement project is the new transbay rail crossing. A more direct connection to San Francisco for regional rail would give the megaregional rail network better access to a large travel market, and in turn would make rail travel more attractive across the megaregion. The new transbay rail crossing also ties together numerous other large-scale rail projects currently planned or underway in the Northern California Megaregion.

This chapter looks ahead to plans and proposals from rail agencies across the megaregion, highlighting how each project fits into a broader vision for a megaregional rail network. In addition to offering new and convenient ways for people to travel by rail, a new transbay rail crossing and an efficient megaregional rail network has major implications for the future growth of the Northern California Megaregion.

Population Projections

In Chapter Two, this report outlined a key feature of the Northern California Megaregion: population growth and employment growth are imbalanced geographically. Of the megaregion's 12.7 million population in 2020, 61% reside within the San Francisco Bay Area. The Bay Area also holds 69% of the megaregion's employment, as of 2018. While the Bay Area does have the majority of the population and employment, state forecasts show that population in the nine Bay Area counties will grow at slower rates compared to the Sacramento Area and the Northern San Joaquin Valley.

Projections from the state's Department of Finance show that the Northern California Megaregion will have a population of 14.6 million by 2040—making up approximately one-third of the state's total population, adding nearly 2 million people, and growing more quickly than the state overall. In particular, the Northern San Joaquin Valley will grow its population by 1.00% per year and the Sacramento Area will experience growth of 0.81% per year—both significantly higher than the statewide average of 0.45% growth per year. The table in **Appendix B** depicts future population estimates by county as calculated by state officials.

While the impacts of the COVID-19 pandemic on work and home preferences will likely not be fully understood for many years, it is possible that significant shifts from these projections could occur. In one direction, a greater shift toward remote work—whereby employees only need to be in a physical office space a few times per week—could allow for even more dispersal of the population across the Northern California Megaregion, furthering the growth trends in places like Sacramento and Merced. On the other end of the spectrum, localities in the Northern San Joaquin Valley that were severely impacted by the recession a decade ago may struggle to recover from the COVID-19 recession. A lack of local economic opportunity could reverse the fast population growth trends across much of the Northern San Joaquin Valley.

Global Megaregion: Netherlands

The Netherlands has a highly interconnected rail system that connects nearly every major city and town. The Eindhoven to Amsterdam route is operated by Nederlandse Spoorwegen (NS) Intercity, which was introduced in the 1970s as a way to provide fast, domestic train services that could connect major hubs in the country. The route, which stretches 112 kilometers or 69 miles, cuts diagonally across the Netherlands, linking the capital of the Netherlands (Amsterdam) to the country's technology and design hub (Eindhoven). According to Rail Europe, the average journey time by train is 1 hour and 22 minutes.

Eindhoven is home to a thriving startup and entrepreneurial environment, making its ease of connectivity to Amsterdam even more significant for daily commuters and international business visitors alike. Although no ridership data is available for this route, 2011 data from the Netherlands' Central Agency for Statistics indicated that over half of the Netherlands' workers commuted to work in another municipality.

The Future of Rail Connectivity in the Megaregion

Even though predicting future population growth within the megaregion is difficult, population numbers are likely to rise and trends in housing, jobs, and economic activity will continue to shape the megaregion into a cohesive unit. Increased interdependency of a larger population will bring about new needs for connectivity on top of the travel demands that stressed many of the megaregion's key corridors before the pandemic.

The current vision for rail transit in California is articulated in the 2018 California State Rail Plan, which provides the blueprint for how the Northern California Megaregion can be better linked by rail transit. Rather than proposing investments in specific corridors, the rail plan instead paints a picture of how California can create networked hubs that connect key markets in the state through incremental investments. The rail plan prioritizes connectivity and seamless integration between systems, with timed transfers, electrified trains, and dedicated right-of-way all leading to faster service that meets customers' travel demands.

Based on investments included in the California State Rail Plan, the map below overlays the existing rail transit network in the megaregion with major planned investments. It is not meant to provide an exhaustive accounting of all projects—for example, Capitol Corridor has numerous projects either underway or planned that would allow for faster travel. Instead, it shows projects with the potential to open new travel markets and alter rail travel times in the megaregion.

Northern California Megaregion Rail Network & Proposed Projects

The remainder of this section will outline the set of projects highlighted in the map on the previous page, detailing the potential that each has to better connect the different parts of the Northern California Megaregion.

1. New Transbay Rail Crossing

The lynchpin project at the core of the megaregion will have significant impacts beyond making a connection between San Francisco and the East Bay. While this analysis does not consider potential landing sites for a new rail crossing, a 2019 analysis by the Metropolitan Transportation Commission did outline a number of different crossing types and locations. Depending on the location and design of the crossing, new markets for BART could be created in the East Bay, while standard gauge rail services (Caltrain and Capitol Corridor) could finally be able to cross the bay. Listed as number nine in the map on the previous page, the Downtown San Francisco extension of Caltrain to the Salesforce Transit Center makes East Bay-to-Peninsula rail travel feasible, with connections across California also possible through the high-speed rail system.

2. Dumbarton Rail Crossing

Paralleling the Dumbarton Bridge, which connects the East Bay near Union City to Silicon Valley between Palo Alto and Redwood City, the Dumbarton Rail Bridge was constructed in 1910 and its use was discontinued in 1982. For the last 30 years, numerous feasibility studies have been completed that have looked at re-introducing rail transit to the corridor that would serve as another cross-bay transit option. While COVID-19 has slowed progress on a new project study led by SamTrans, initial concepts for rail transit include options that would re-construct the rail bridge and connect to Caltrain at Redwood City, with East Bay connection options to BART, Capitol Corridor, and ACE service.

Proposed Dumbarton Rail Alignment

3. Valley Link

Altamont Corridor Express (ACE) service connecting the Bay Area and San Joaquin Valley currently runs four trains on weekdays in each direction between Stockton and San Jose. ACE connects into the BART system through a bus transfer at the Dublin/Pleasanton BART station. With BART deciding not to proceed with an extension to Livermore in 2018, planning dollars were transferred to the Tri-Valley San Joaquin Valley Regional Rail Authority, which is now planning for the Valley Link rail system to carry passengers between the Dublin/Pleasanton BART station and North Lathrop in phase one of the project, with a second phase continuing the service to Stockton. The initial service plan will offer timed connections to BART at a frequency ranging from every 12 minutes during peak hours and 36 minutes in off-peak hours between Mountain House and Dublin/Pleasanton to 24 minutes during peak hours and 72 minutes in off-peak hours between Dublin/Pleasanton and stations beyond Mountain House.

Valley Link Planned Alignment

4. Valley Rail

To enhance commuter and intercity rail service, the San Joaquin Regional Rail Commission (which governs ACE) and the San Joaquin Joint Powers Authority (which governs the San Joaquins) are jointly implementing Valley Rail. Valley Rail expands service for the San Joaquins and ACE and plans an extension of ACE service between Sacramento and Merced.

The plan proposes six new stations servicing both ACE and the San Joaquins between Stockton and Sacramento and eight new stations servicing ACE between Stockton and Merced. Funded with $500 million from the state's Transit and Intercity Rail Capital Program, the plan is divided into six projects that are in various phases of environmental review and design.

Valley Rail would provide two new roundtrips on the San Joaquins service to/from Sacramento—one to/from Fresno, and another to/from Bakersfield. The projects enabling this San Joaquins service expansion include a grade separation in Stockton, a relocation of the Madera station, a new station in Oakley, and the Sacramento extension project. The planned northern terminus of the extension is at Natomas/Sacramento Airport, which includes a proposed shuttle service between the station and Sacramento International Airport.

For ACE, additional service outlined to date would include one roundtrip between Sacramento and San Jose, one roundtrip between Sacramento and Stockton, and three roundtrips between Sacramento and the proposed Ceres station. In addition to some of the projects enabling the San Joaquins service expansion that contribute to expanded ACE services, Valley Rail proposes extending ACE service to Sacramento and Merced.

Three projects within Valley Rail would enable this service: the Sacramento Extension, the Lathrop-Ceres extension, and the Ceres-Merced extension. The Lathrop-Ceres extension consists of constructing and upgrading tracks within the existing Union Pacific Railroad right-of-way, a distance of approximately 24 miles. The Ceres-Merced extension consists of constructing and upgrading tracks a distance of approximately 34 miles.

5. California High Speed Rail

Phase 1 of California High Speed Rail includes connections from the Central Valley to Gilroy, San Jose, and on to San Francisco. Currently, 119 miles of track are under construction between Madera and Poplar Avenue near Bakersfield. Plans for the Central Valley segment call for 171 miles of electrified track connecting Merced, Fresno, and Bakersfield. The connection to Merced is especially important for megaregional travel, as it would create a connection with a planned expansion of the ACE system (discussed previously) that would then allow for connectivity into the Bay Area. While funding for the connection from Merced to Gilroy has not yet been identified, the environmental clearance process is underway. Phase 2 of the project in the Northern California Megaregion also includes a connection from Merced to Sacramento, which includes stations in Modesto and Stockton. The California High Speed Rail Authority is also working with Caltrain on an electrification project that will eventually allow for blended Caltrain and high-speed rail service.

Valley Rail Service Plan

6. SMART Cloverdale Extension

SMART began operating a full passenger service schedule on August 25, 2017, connecting San Rafael in Marin County to the Sonoma County Airport, just north of Santa Rosa. SMART's passenger rail service currently operates across 12 stations, with 16 stations planned for the ultimate buildout of the system. SMART has carried a total of 1.4 million passengers over three years, with weekly ridership averaging 13,922. SMART's most heavily traveled stations to date are San Rafael and Petaluma Downtown, and new services to Larkspur and Downtown Novato were added in late 2019. An extension to Windsor is scheduled to be completed in late 2021, leaving only 22 miles of track to the north and platforms in Healdsburg and Cloverdale left to fund to build out the entire system envisioned when voters approved a sales tax measure in 2008.

7. BART to San Jose Phase 2

With the opening of the Milpitas and Berryessa stations in May 2020, BART and the Santa Clara Valley Transportation Authority completed Phase 1 of BART's extension into Santa Clara County. The second phase of the project will extend BART service a further six miles from Berryessa into downtown San José, terminating in Santa Clara. With service scheduled to commence in 2030, rail service will fully cover the southern portion of the bay, as a connecting point at Diridon Station will allow for transfers between BART, ACE, Capitol Corridor, and high-speed rail. The project is currently in the design and engineering phase, with construction projected to begin in 2022.

BART to San Jose Phase 2 Alignment

8. Monterey County Rail Extension

The Transportation Agency for Monterey County is the lead agency on a project that will extend Caltrain service from Gilroy south to Salinas on existing track. The project includes improvements to the Gilroy and Salinas stations, as well as a layover facility in Salinas. When completed in 2022, two roundtrips between Salinas and San Francisco will be offered each day. Future phases of the project will include stations in Castroville and Pajaro, connecting to proposed rail service to the Monterey Peninsula and Santa Cruz County, respectively. While currently unfunded, the 16-mile corridor between Castroville and Monterey along Highway 1 is publicly owned and an environmental review process is studying light rail and bus rapid transit alternatives. From Pajaro, the 32-mile Santa Cruz Branch Line is currently being studied with funds from an approved Santa Cruz County transportation measure in 2016.

Proposed Monterey County Rail Extension

9. Caltrain Downtown Rail Extension

The Caltrain Downtown Rail Extension project will extend Caltrain and future California High Speed Rail service 1.3 miles from the 4th and King station to the new Salesforce Transit Center. The project is being overseen by the Transbay Joint Powers Authority. The project includes an underground station at 4th and Townsend, a two-level train station at the Transit Center with a BART/Muni pedestrian connector to the Embarcadero station, and an intercity bus facility with direct escalator access to the Transit Center train station. The total cost of the project is estimated at $3.9 billion, of which $66 million has been allocated from the Proposition K half-cent transportation sales tax funds. The project is in early design phases and the Transbay Joint Powers Authority has a goal to complete the project by 2029 pending funding which currently faces a significant gap.

10. Novato to Suisun City Passenger Rail

The current California State Rail Plan—published in 2018—includes a rail connection between the SMART system and Capitol Corridor, with potential end stations at Novato and Suisun City/Fairfield. Currently, the major transportation link between Marin County and Solano County is Highway 37, which is often congested and sometimes flooded during heavy rains.

SMART completed a feasibility study in 2019 with funding from the state that analyzed multiple project options at a total cost between $840 million and $1.22 billion. Planners analyzed a rapid deployment scenario with four daily round trips and a higher level of service scenario with 10 daily round trips. The project is predicated on the use of existing trackway. From Novato to the Napa River, track is owned by SMART, with the remainder of the trackway to Suisun City owned by Union Pacific Railroad. Dedicated funding has not been identified for the project.

11. Capitol Corridor Vision Implementation Plan

The plan outlines the improvements necessary to create future Capitol Corridor service that is faster, more frequent, more reliable, cleaner, quieter, and better connected to other public transit. Some of the key improvements include alleviating the bottleneck in the Jack London waterfront district where trains run in the middle of a city street, widening of the tracks between Oakland and Richmond to create passenger-only right-of-way, and creating a new right-of-way between Richmond and Suisun City-Fairfield.

The plan outlines the steps needed to create a dedicated passenger rail-only right-of-way, as that was determined to be a dominant factor in expanding capacity and service levels and enabling electrification. The cost of the plan is broken into phases based on the segments, totaling $15.8 billion over several decades of implementation.

12. Altamont Corridor Vision

The Altamont Corridor Vision is a long-term vision to create a universal rail corridor connecting the Northern San Joaquin Valley and the Tri-Valley to San Jose. The vision is the result of a partnership between the Tri-Valley San Joaquin Valley Regional Rail Authority (Valley Link), the San Joaquin Regional Rail Commission (ACE), and the San Joaquin Joint Powers Authority (Amtrak San Joaquins). The proposed vision would modernize the infrastructure in the corridor to support electrified service allowing for passenger rail services to share corridors, stations, and maintenance facilities.

Near-term components include two additional round trips between the Northern San Joaquin Valley and San Jose including weekend service, Valley Link phase one to North Lathrop, and Altamont Pass tunnel and alignment improvements. Mid-term plans include four additional round trips between the Northern San Joaquin Valley and San Jose, improvements between Newark and Alviso, and Valley Link phase two extension to Stockton. The long-term or final vision includes 15 minute to half hour frequency between San Jose and the Northern San Joaquin Valley during peak hours with one-seat rides on universal infrastructure.

13. Caltrain Long Range Service Vision

The Caltrain Business Plan is an overarching vision for the future of the Caltrain service with four different components. One of the components is a Long Range Service Vision, which was adopted in 2019, and directs the agency's future service goals through 2040. The overall vision is to reach 15-minute frequencies for both local and express trains between Blossom Hill (South San Jose) and Salesforce Transit Center, timed cross-platform transfers at Redwood City, and 30-minute frequencies to Morgan Hill and Gilroy. Additionally, contingent on the Downtown Rail Extension, Caltrain plans to have all of its trains serving the Salesforce Transit Center.

The 2040 vision outlines plans for capital investments totaling $23 billion and new service investments that total $370 million in annual operating costs by 2040. The capital investments that contribute to the service vision include grade separations, rail infrastructure and system improvements, station improvements, and fleet upgrades. The service improvements have a goal of delivering eight trains per direction per hour during peak hours and six trains during off-peak hours. In addition, the vision plans for four High Speed Rail trains in each direction during peak hours and three during off-peak hours running along the shared corridor between San Jose and San Francisco. The goal travel time between the Salesforce Transit Center and San Jose Diridon Station is 61 minutes for express trains and 85 minutes for local trains.

Taken together, this set of 13 projects and programs has transformative potential for the rail system of the Northern California Megaregion. With multiple projects listed having connections into the ends of the BART and Caltrain systems, it is likely that these infrastructure investments will add ridership traveling to core urban areas—some of it going through the transbay corridor. This dynamic is why a new transbay rail crossing can have reinforcing benefits both inside and outside of the megaregion's core. It simultaneously makes projects at the edges of the megaregion more attractive to riders by opening up easier access to travel markets, and it becomes even more necessary to relieve future bottlenecks in one of the megaregion's critical corridors. Additional benefits are discussed in the next chapter.

5

Megaregional Benefits of a New Transbay Rail Crossing

In previous chapters, this analysis has outlined employment, population, and travel trends in the megaregion, highlighted key corridors, and catalogued potential future rail investments. This chapter seeks to shed light on the megaregional benefits of a new transbay rail crossing. In particular, four sets of benefits are highlighted: reduced travel times, improvements to the traveler experience, economic benefits for businesses and other employers, and positives for the environment.

Reducing Travel Times Across the Megaregion

A new transbay rail crossing between Oakland and San Francisco has the potential to reduce travel times for all populations traveling between and within the San Francisco Bay Area, Sacramento Area, Northern San Joaquin Valley, and the Monterey Area if implemented in coordination with other megaregional rail projects. Planners are calling this program of coordinated investments across 21 counties Link21.

- **More Destinations within One Hour by Rail:** Link21 will make more destinations accessible via the current rail network and encourage and enable more people to choose rail for different purposes, including those who are transit dependent. Access to more jobs, educational institutions, health care centers, and entertainment within an hour will make travel by rail a viable option on any day of the week for business, school, or leisure trips. While the details of a new transbay rail crossing and how it connects to BART and other regional rail networks will determine future transit travel times, an easier trip will create more demand for the service—at the very least moving trips to transit that would have otherwise been completed with a car. Other trips could also become more viable via transit if onerous transfers are eliminated.
- **Direct Access and One-seat Rides:** Research shows that transit preference for any given trip is negatively correlated with the number of transfers (Taylor, 2009). That is, a higher number of transfers leads to lower transit use. A new rail crossing in the transbay corridor could enable one-seat rides between some major destinations in the megaregion that currently lack a direct rail connection. The Link21 program will look at different ways to improve the passenger experience by serving high-demand weekday and weekend destinations. Since megaregional travelers traverse long distances through traffic-congested corridors, reducing travel times by rail is critical for moving people more efficiently.

- **Mode Shift Also Benefits Highway Trips:** With a new transbay rail crossing creating capacity, increasing reliability, and inducing demand within the rail transit network, travel time benefits can also accrue to users of the highway system. By replacing car trips with rail transit trips, highway congestion could be eased for goods movement or those commuters without a transit option.

Improved Service Delivery

As alternative investment plans are developed for the Link21 program, planners will evaluate the benefits of capital and operational improvements to offer a better travel experience for passengers.

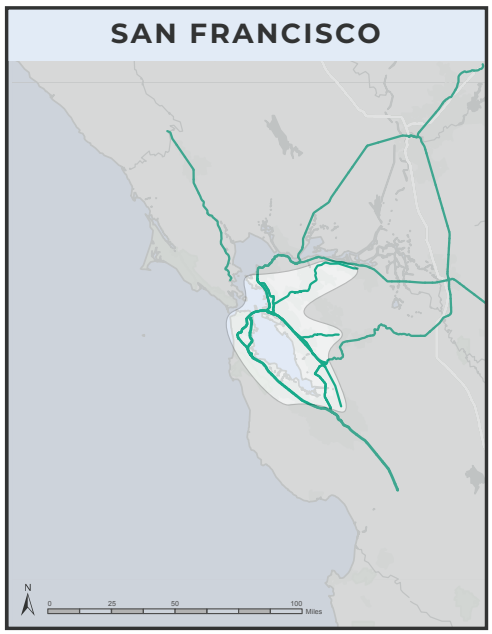
- Service Reliability: Investments in the Link21 program will improve service reliability so that trains run on time and can more easily recover from unexpected delays. Train on-time performance could greatly improve for regional rail trips, especially where passenger rail must share tracks with freight trains. Constructing passing tracks or alternate routes around congested bottlenecks in the system provides a backstop for BART and regional rail if there are equipment, service, or medical issues that cause train delays.
- Reduced Wait Times: Link21 could reduce wait times for passengers by enabling more frequent service and by making connections between trains more seamless.
- Extended Service Hours: A new transbay rail crossing and associated improvements could allow extended service hours in the rail network. Extended service hours (early-bird / late-night) would serve people who commute outside typical work hours, especially essential workers and those in the construction, hospitality, and air transportation industries. Implementation of such service will be determined as the program advances.

Economic Benefits

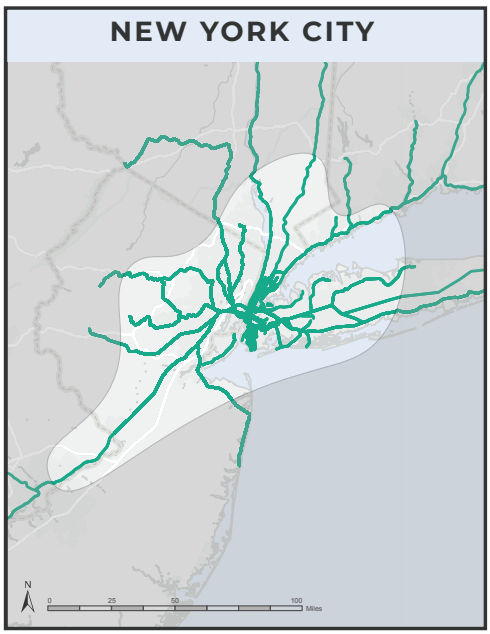
COVID-19 has made clear the economic divisions present in the Northern California Megaregion, as inland regions more reliant on service industries struggle with high unemployment while coastal areas, and the tech economy in particular, are relatively less impacted. By tying together once-disparate regions, Link21 can provide a more equitable trajectory for long-term economic growth across the megaregion.

- **Easier Commutes:** A new transbay rail crossing and a robust megaregional rail network can increase the viability of rail travel for commutes. Riding transit can be easier to navigate, more predictable, and allow for productivity while traveling.
- **Increased Access to Jobs:** A new transbay rail crossing can link affordable housing with higher paying jobs and enable increased rail transit service to more jobs and destinations overall. In 2018, 79% of the megaregion's jobs in Professional and Business Services were located in the Bay Area, while 92% of jobs in the Information sector were located there. These are the two most geographically imbalanced employment sectors in the megaregion, and they are also the providers of some of the highest-wage jobs. With the concentration of high-paying jobs in the megaregion's core of San Francisco and Silicon Valley, facilitating commutes from locales with more affordable housing will become even more important for economic opportunity.
- **Expanded Choices:** The Link21 program enables greater reach and frequency of public transportation between markets, thus expanding the options people have in locating their homes and where employers locate their businesses. Efficient rail systems can make the Northern California Megaregion more competitive against peer U.S. metropolitan regions and global megaregions, as shorter travel times mean companies can recruit over a larger geographic area and access a larger talent pool. Additionally, companies with multiple offices or clients spread across the megaregion can benefit from faster trips between more rail-connected destinations. The maps on the following page show one-hour rail commute distances to and from San Francisco and peer cities. Rail networks in and around New York City, Chicago, and Washington, D.C. provide more coverage in one hour than in the Northern California Megaregion, giving more viable travel choices to their residents.

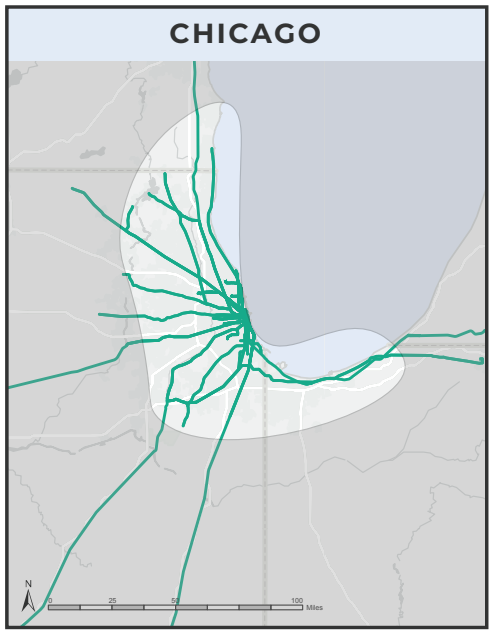
One-Hour Passenger Rail Commute Sheds from City Centers



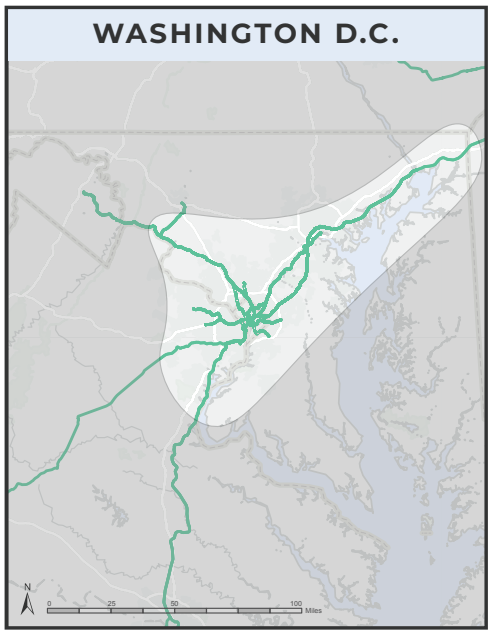
Max Distance by Rail
~35 miles in an hour



Max Distance by Rail
~80 miles in an hour



Max Distance by Rail
~55 miles in an hour



Max Distance by Rail
~85 miles in an hour

LEGEND

- Areas accessible from each city's downtown within 1-hour of travel by passenger rail. Data is based on agency timetables.
- Passenger rail lines, excluding light rail, that connect directly to each city's downtown. On the San Francisco map, rail lines that do not directly connect to downtown are also shown.

- **Increased Jobs-Housing Balance:** Link21 can support re-balancing the megaregional employment profile, particularly if companies seek to create satellite offices in locations that are connected by train to headquarters in San Francisco or Silicon Valley. Rail stations with higher usage provide an opportunity to create more affordable housing and living wage jobs near the traditional urban core. This would make station areas more attractive for denser, transit-oriented investments—thereby limiting the need for extremely long commute trips over time.

Environmental Benefits

With vehicle miles traveled rising in key corridors, projects that make transit more attractive will be paramount in meeting the state's environmental goals.

- **Reduced GHG Emissions:** The largest single contributor to greenhouse gas (GHG) emissions in California is the transportation sector, making up 40% of all GHG emissions in 2017. An improved megaregional rail network can shift more people from single-occupancy vehicle travel to a greener transportation mode. Even as cars become greener, there are additional environmental benefits related to traffic congestion relief that can be achieved by reducing car travel. The new transbay rail crossing was found by the Metropolitan Transportation Commission to be the single most cost-effective transit expansion program to reduce GHG emissions and vehicle miles traveled in the Bay Area.
- **Climate Change Adaptation:** Link21 has the potential to address some challenges of climate change by incorporating resiliency into the planning and design of the future rail network.

Conclusion

Many of the challenges of the Northern California Megaregion are shared across its cities, counties, and regions. These challenges, such as housing affordability, access to living wage jobs, income inequality, and climate change are also interrelated in many ways.

While there is no silver bullet solution, transportation infrastructure that reshapes the boundaries of where people can live and work is an investment that can have the multiple benefits outlined in this section. It can provide access to jobs, connect to affordable housing markets, and reduce greenhouse gas emissions.

This report has focused on the potential of a new transbay rail crossing, but it has done so in the context of the broader Northern California Megaregion. A new transbay rail crossing on its own would have significant travel impacts in the San Francisco Bay Area. However, when it is combined with investments in regional rail (i.e., the Link21 program), its benefits extend far beyond the nine Bay Area counties into the Sacramento region and the Northern San Joaquin Valley.

A broader vision for travel—one that ties together rail agencies from across the megaregion—is required to create a more cohesive, more sustainable, more equitable, and more economically competitive unit. The Northern California Megaregion has tremendous untapped potential that the Link21 program and a new transbay rail crossing can unlock. Now is the time to re-envision and re-prioritize the transformational investments needed to put the Northern California Megaregion on a new trajectory for growth. Planning through a megaregional lens for the next cycle of economic prosperity will allow for problem-solving at scale and will lead to more opportunities for households and businesses for decades to come.

Share of Industry Job Growth in Each County (2012-2018)

	Educational and Health Services	Financial Activities	Goods Producing	Government	Information	Leisure and Hospitality	Other Services	Professional and Business Services	Trade, Transportation and Utilities
Alameda County	10.24%	6.93%	23.32%	13.17%	6.65%	14.09%	12.78%	8.66%	17.20%
Contra Costa County	9.09%	5.84%	2.78%	4.25%	-0.78%	6.71%	3.76%	3.62%	6.76%
El Dorado County	0.96%	1.82%	2.36%	0.99%	0.13%	1.76%	1.13%	0.20%	0.89%
Marin County	1.60%	-5.84%	3.14%	0.71%	-0.26%	2.52%	2.63%	-0.41%	1.59%
Merced County	1.28%	0.73%	1.33%	3.54%	-0.13%	0.92%	0.38%	0.00%	1.49%
Monterey County	1.98%	1.09%	1.45%	4.53%	-0.65%	3.44%	1.50%	1.32%	1.89%
Napa County	0.45%	-0.36%	2.48%	0.85%	-0.13%	2.35%	0.75%	0.61%	1.09%
Placer County	4.80%	11.68%	4.17%	3.26%	0.13%	4.11%	6.02%	4.18%	4.17%
Sacramento County	14.72%	9.12%	8.76%	11.61%	-4.43%	11.33%	13.53%	7.54%	12.92%
San Benito County	0.19%	0.00%	0.85%	0.28%	0.00%	0.17%	0.38%	0.15%	-0.70%
San Francisco County	5.95%	36.13%	6.71%	12.61%	27.51%	9.65%	19.17%	30.11%	18.59%
San Joaquin County	3.07%	1.09%	4.17%	10.48%	-0.39%	4.28%	4.14%	1.53%	15.81%
San Mateo County	6.65%	11.68%	4.29%	4.11%	23.73%	7.21%	3.38%	7.03%	0.89%
Santa Clara County	22.78%	14.23%	17.58%	7.51%	48.89%	18.71%	14.66%	30.01%	2.78%
Santa Cruz County	1.28%	1.46%	1.99%	2.27%	-0.13%	2.35%	5.64%	0.20%	0.60%
Solano County	4.35%	0.73%	3.63%	1.13%	0.00%	1.85%	2.26%	0.56%	2.98%
Sonoma County	4.93%	5.47%	6.16%	4.39%	0.13%	3.27%	3.01%	2.39%	3.18%
Stanislaus County	3.45%	-0.36%	2.84%	5.81%	0.00%	3.69%	3.38%	1.32%	3.98%
Sutter County	0.64%	0.00%	0.36%	0.99%	0.00%	0.17%	0.75%	0.15%	0.89%
Yolo County	1.15%	-1.46%	1.33%	6.80%	-0.13%	1.17%	0.75%	0.71%	2.78%
Yuba County	0.45%	0.00%	0.30%	0.71%	-0.13%	0.25%	0.00%	0.10%	0.20%

Appendix A: Job Growth by County and Industry (cont'd)

Share of Megaregional Job Growth by Industry (2012-2018)

	Educational and Health Services	Financial Activities	Goods Producing	Government	Information	Leisure and Hospitality	Other Services	Professional and Business Services	Trade, Transportation and Utilities
Alameda County	1.704%	0.202%	4.110%	0.990%	0.543%	1.789%	0.362%	1.810%	1.842%
Contra Costa County	1.512%	0.170%	0.490%	0.319%	-0.064%	0.852%	0.106%	0.756%	0.724%
El Dorado County	0.160%	0.053%	0.415%	0.075%	0.011%	0.224%	0.032%	0.043%	0.096%
Marin County	0.266%	-0.170%	0.554%	0.053%	-0.021%	0.319%	0.075%	-0.085%	0.170%
Merced County	0.213%	0.021%	0.234%	0.266%	-0.011%	0.117%	0.011%	0.000%	0.160%
Monterey County	0.330%	0.032%	0.256%	0.341%	-0.053%	0.437%	0.043%	0.277%	0.202%
Napa County	0.075%	-0.011%	0.437%	0.064%	-0.011%	0.298%	0.021%	0.128%	0.117%
Placer County	0.799%	0.341%	0.735%	0.245%	0.011%	0.522%	0.170%	0.873%	0.447%
Sacramento County	2.449%	0.266%	1.544%	0.873%	-0.362%	1.437%	0.383%	1.576%	1.384%
San Benito County	0.032%	0.000%	0.149%	0.021%	0.000%	0.021%	0.011%	0.032%	-0.075%
San Francisco County	0.990%	1.054%	1.182%	0.948%	2.247%	1.224%	0.543%	6.293%	1.991%
San Joaquin County	0.511%	0.032%	0.735%	0.788%	-0.032%	0.543%	0.117%	0.319%	1.693%
San Mateo County	1.107%	0.341%	0.756%	0.309%	1.938%	0.916%	0.096%	1.469%	0.096%
Santa Clara County	3.790%	0.415%	3.098%	0.564%	3.993%	2.374%	0.415%	6.271%	0.298%
Santa Cruz County	0.213%	0.043%	0.351%	0.170%	-0.011%	0.298%	0.160%	0.043%	0.064%
Solano County	0.724%	0.021%	0.639%	0.085%	0.000%	0.234%	0.064%	0.117%	0.319%
Sonoma County	0.820%	0.160%	1.086%	0.330%	0.011%	0.415%	0.085%	0.500%	0.341%
Stanislaus County	0.575%	-0.011%	0.500%	0.437%	0.000%	0.468%	0.096%	0.277%	0.426%
Sutter County	0.106%	0.000%	0.064%	0.075%	0.000%	0.021%	0.021%	0.032%	0.096%
Yolo County	0.192%	-0.043%	0.234%	0.511%	-0.011%	0.149%	0.021%	0.149%	0.298%
Yuba County	0.075%	0.000%	0.053%	0.053%	-0.011%	0.032%	0.000%	0.021%	0.021%

Appendix B: Megaregion Population Projections

Region / County	2019 Population Estimate (Calculated 2020)	2040 Population Estimate (Calculated 2020)	Compund Annual Growth Rate
San Francisco Bay Area			
Alameda	1,674,115	1,967,920	0.77%
Contra Costa	1,153,077	1,333,992	0.70%
Marin	261,627	256,609	-0.09%
Napa	140,062	143,631	0.12%
San Francisco	889,360	1,005,762	0.59%
San Mateo	776,252	838,724	0.37%
Santa Clara	1,961,117	2,248,482	0.65%
Solano	442,145	493,928	0.53%
Sonoma	498,480	485,017	-0.13%
SF Bay Area Total	**7,796,235**	**8,774,065**	**0.56%**
Sacramento Area			
El Dorado	191,210	213,033	0.52%
Placer	394,737	511,683	1.24%
Sacramento	1,553,253	1,799,258	0.70%
Sutter	103,580	133,610	1.22%
Yolo	222,868	253,965	0.62%
Yuba	78,292	99,755	1.16%
Sacramento Area Total	**2,543,940**	**3,011,304**	**0.81%**
Northern San Joaquin Valley			
Merced	283,408	374,210	1.33%
San Joaquin	771,700	963,236	1.06%
Stanislaus	558,395	650,911	0.73%
NSJV Total	**1,613,503**	**1,988,357**	**1.00%**
Monterey Bay Area			
Monterey	446,539	495,807	0.50%
San Benito	62,782	80,788	1.21%
Santa Cruz	274,545	273,882	-0.01%
Monterey Bay Area Total	**783,866**	**850,477**	**0.39%**
Megaregion Total	**12,737,544**	**14,624,203**	**0.66%**
State of California Total	**39,959,096**	**43,946,653**	**0.45%**

Data Source: California Department of Finance Population Projections

Analysis: Bay Area Council Economic Institute

BAY AREA COUNCIL
ECONOMIC
INSTITUTE

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