



# 4

## Proposed Passenger Improvements and Investments

Chapter 4 presents the service improvements and investments needed to achieve the Rail Plan Vision. The Rail Plan supports near-term plans and proposals being developed in individual corridors and regions, with a targeted completion date of 2022; but presents a flexible, corridor-level framework for developing the passenger rail system over the plan's long-term, 2040 time horizon. This framework is intended to serve as the basis for State-led service implementation planning, to be undertaken in coordination with regional agencies, rail operators, and stakeholders to achieve the 2040 Vision. The Rail Plan does not seek to prescribe specific projects or solutions and their associated costs, but rather to provide a path for implementation and a common understanding of how the state's rail network should develop to meet the State's goals.

## 4.1 Network Integration Strategic Service Planning

The 2018 State Rail Plan Vision was developed as part of the State's Network Integration Strategic Service Planning (NISSP) process. The overarching goal of the NISSP is to plan for a statewide passenger rail system that maximizes the performance potential of intercity passenger rail as a time- and cost-competitive travel option for meeting the state's transportation needs and goals. The network planning process undertaken as part of the Rail Plan included an assessment of statewide travel demand, existing rail service and infrastructure, service types responding to market demand in different regions or corridors, and infrastructure elements required to support service levels and address infrastructure constraints. The draft network vision was developed through an iterative process of network planning, ridership and revenue modeling, capital improvement analysis, and operations and revenue analysis.

In addition to the demand and infrastructure analysis from the NISSP, the most recent planning or programming documents in each service area were reviewed to identify projects related to passenger rail. Documents reviewed include RTPs, corridor strategic plans, corridor business plans, and programming documents such as the State Transportation Improvement Program (STIP) and the Safe, Reliable, High-Speed Passenger Train Bond Act for the 21st Century (Proposition 1A).

## 4.2 Pulse Scheduling

State network planning in the Rail Plan is based on *pulse scheduling*, which represents uniform train service patterns that repeat throughout the day on regular, recurring time intervals. This timetable-based planning approach allows for timed transfers between services at hub stations where a transfer is required to complete a trip across the state, or to a location served by local transit. The benefit to users of pulse scheduling is that a repeating timetable allows for easy trip planning and seamless travel by ensuring that connections between trains can be made throughout the day, with minimal transfer times. By not requiring a train for every travel market, pulse scheduling allows fewer trains to serve more destinations through connections, similar to the way airlines use hubs to allow smaller communities more frequent access to more destinations than would otherwise be possible, and at a lower cost. Pulse schedule planning allows cost savings to be realized by reducing the set of infrastructure improvements needed to operate services to only those that are necessary to reliably operate the timetable (e.g., the capacity of a single-track railroad can be maximized to operate services before additional track infrastructure is needed to accommodate a greater service frequency).

The Rail Plan has preliminarily identified a 30-minute or 60-minute service frequency (or headway) across most portions of the state by 2040. Because the HSR system will serve as the major artery for the long-distance travel option of the statewide system, the service plans from the 2016 CHSRA Business Plan were used to determine primary time point hubs for the integrated, statewide network.

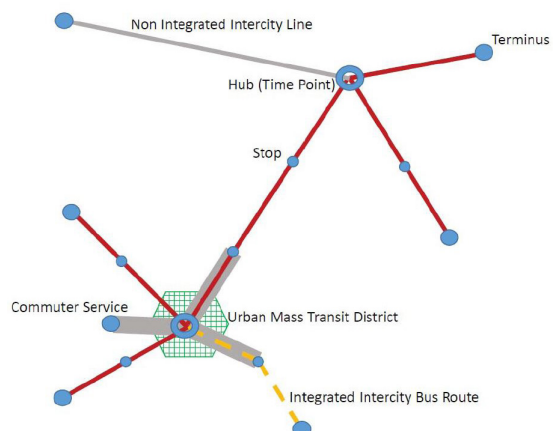


Exhibit 4.1: Sketch of "Pulsed" Services

### 4.3 State Service and Connectivity Goals

The Rail Plan presents the State's goals for providing and connecting services in different regions. Service goals describe the service-desired train frequencies on the state passenger rail network; reflect the travel times needed to provide services that are competitive with automobile and air travel; and provide for timed connections at mobility hubs. These hubs will have co-located rail, transit, bicycle, and pedestrian facilities to connect people to the rail network through coordinated schedules and infrastructure. In some cases, hubs will require infrastructure investments to improve connectivity. However, many of the statewide hubs already exist and only need operational and minor capital improvements to achieve the statewide rail connectivity and service goals.

Service goals balance travel times with the need to schedule connections between services where transfers are needed for travel between different travel markets. Service goals identify where peak (including seasonal) and off-peak services differ in travel times and frequencies, but where there will still be some exceptions to identified frequencies, based on capacity improvements and market demand. Service goals are also operator-neutral and strategic, rather than prescriptive—the Rail Plan does not determine specific operating and institutional responsibilities, which must be negotiated over time to deliver improvements with the 2040 Vision in mind.

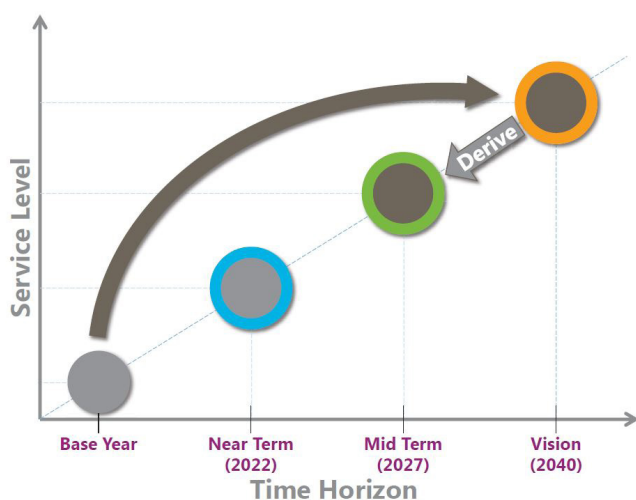
In some cases, service goals are associated with delivery options, where the State's goal can be met with different types or services and capital investments to address funding needs or specific geographical and operational constraints.

Service delivery options represent the physical improvements and capital investments necessary to achieve the service goals; and ultimately, the 2040 Vision.

In other cases, service goals assume that local transit systems will continue operating services at current levels and proceed with planned improvements to provide necessary local and regional connectivity. Where connectivity hubs have been identified on the network, the State will work with regional partners to co-locate all service types at the hubs to enhance mobility and ease of transfer between modes of transit. For the many other transit services not identified on the statewide network, connectivity to the rail network will be important for local and regional mobility; but those decisions will be made by local transit agencies and local decision-makers with the connectivity opportunities that are provided by stops on an expanded statewide network. The State supports needed local connectivity, but based on market analysis, not all local services can connect as part of the pulsed statewide rail network.

### 4.3.1 Phasing

The service goals and service delivery options identified in the Rail Plan provide a strategic framework for service implementation planning, coordination between the State and rail partners, and prioritization of capital improvements in phases tied to the short-term (2022), mid-term (2027), and long-term (2040) Vision in the Rail Plan. The goals of the phased implementation strategy in the Rail Plan are to follow through on the committed, funded service improvements planned across the state (mostly expected to be complete by 2022), which leverages existing assets and prioritizes maximizing use of existing infrastructure. The long-term 2040 Vision defers significant infrastructure investments that are necessary to integrate passenger rail services, and fully realize the possible service and connectivity goals in the 2040 Vision, if funding and regional support are available to deliver those infrastructure elements. The time phases described in the Rail Plan also identify the specific service planning and analysis that are needed to develop and integrate the rail network over time in a manner that is responsive to the needs of local and regional stakeholders. Critically, the time horizons used in the Rail Plan do not tie to the specific completion year of the recommended projects. Some projects may be completed ahead of the specified year; others may be near completed by the Rail Plan date. The project years and corresponding plans serve as important planning markers and meet statutory planning requirements.



**Exhibit 4.2: Implementation Strategies Derivation Process**

### 4.3.2 Interstate Rail Connections

Beyond California's statewide goals, the State has an interest in maintaining long-distance national Amtrak service, with interstate connections to Oregon, Nevada, and Arizona; such connections provide service and access to communities that are not on the high-frequency State passenger rail network. The State also has an interest in developing specific passenger rail corridors in coordination with Nevada and Arizona, to provide for future interstate HSR service to Las Vegas, Nevada; and Phoenix, Arizona. These future HSR connections represent significant opportunities for accommodating interstate travel to these important destinations via passenger rail, which will address congestion on interstate highways and at California's airports.

The Rail Plan also seeks to address cross-border congestion between California and Mexico through passenger rail connections at the border, providing service that is integrated with the state network.



### 4.3.3 Host Railroad Coordination

Freight railroad owners desire to improve existing operating efficiency and preserve future capacity to accommodate growing freight rail traffic. Therefore, they are interested in minimizing or improving passenger rail impacts on existing and future freight rail operations. Caltrans will consider the potential impacts of the planned passenger rail service improvements on railroad capacity, and access to yards and customers. Infrastructure investments necessary for increased passenger train volumes will also add capacity and flexibility to freight operations. The goal will be to enable continued, market-responsive growth in goods movement by freight rail, while also providing for increased passenger capacity. This goal will be achieved through early and continuous dialogue with the freight railroad partners, and progressive identification of shared opportunities.

In some cases, ensuring capacity for passenger and freight rail operations will be realized through development of a shared track infrastructure used by both freight and passenger trains. In other cases, ensuring capacity for freight will involve the development of largely dedicated track for passenger and freight trains in a shared right-of-way, while retaining the ability to share track under certain conditions; or the development of completely separate freight and passenger infrastructure.

The nature of corridor development may change over time as more passenger service is phased in. Limits on passenger train growth in a corridor during early phases of network development will place a premium on using available passenger train slots for the highest-ridership services (often running with more cars on each train than today), while supplementing the service with integrated express bus service during off-peak or lower-demand times of day. Additional growth would be achieved through significant investments in physical infrastructure, in partnership with the freight railroads. In return for granting more passenger trains access to freight railroads' lines, many funding options will be considered, including various combinations of upfront capital project investments and infrastructure access fees, as well as agreements on future capital investments tied to ensuring reliable service for both freight and passenger services. The partners may conclude that future growth needs will require investing in dedicated passenger rail infrastructure for all or a portion of a corridor.

Additionally, where freight and passenger services share a corridor, opportunities may exist to expand or reorganize tenancy agreements with host railroads for passenger services to gain additional capacity on the freight rail network. Passenger service providers must have the ability to purchase additional slots for more passenger service; in this way, services can be scaled to meet market demand over time, while minimizing large capital outlays for new infrastructure and limiting redundant infrastructure as the network evolves toward the 2040 Vision.

Although the Rail Plan reflects a general understanding of the type of investments appropriate to each corridor, specific decisions will be made through detailed implementation planning and host railroad negotiations. A detailed description of the proposed freight rail improvements and investments is included in Chapter 5.

## 4.4 Service Areas and Organizational Framework

In addition to organizing proposed passenger improvements, the three time horizons in the Rail Plan mark important milestones in building toward the 2040 Vision. The geographic service regions described in this chapter were refined from service regions developed in the network planning effort as a framework for understanding, discussing, and organizing future services. Those service areas were developed to facilitate planning and analysis for services that could be grouped into logical statewide rail travel sheds, justified by early market and ridership analysis. HSR and intercity services, as well as several regional services, are likely to operate across more than one service area, and may be described in both where it is necessary to do so.

The Rail Plan defines nine geographic service areas. These service areas were developed to guide planning, based on market analysis, ridership forecasts, and corridor-based planning principles. Exhibit 4.3 visually represents the geographies and the service goals defined in the 2040 Vision. These areas are:

- **Central Valley and Sierra Nevada:** This region includes the state rail network in the San Joaquin and Sacramento Valleys, including service and improvements between Palmdale and Bakersfield in the south, and Sacramento and Redding in the north; as well as connections to Reno, Carson City, the Sierra Nevada, and counties north of Sacramento.
- **North San Francisco Bay Area and the North Coast:** This region includes the state rail network between Sacramento and Oakland/San Francisco, as well as the north San Francisco Bay Area rail network in Marin, Sonoma, Napa, and Solano Counties. The rail network connecting the Stockton area to the San Francisco Bay Area at Martinez is included in this geographic region.
- **South San Francisco Bay Area:** This region includes the state rail network providing services to and from the south San Francisco Bay Area, including the San Francisco-San Jose Peninsula Corridor, the rail network between Oakland and San Jose, and the network carrying services between the Stockton Area and San Jose over the Altamont Pass.
- **Central Coast:** This region encompasses the Central Coast rail network between San Jose in the north and Santa Barbara/Goleta in the south, including the UPRR Coast Route and Monterey and Santa Cruz Branch Lines.
- **Las Vegas to HSR:** This region encompasses the HSR route being privately developed for service between Las Vegas and Victorville or Palmdale. The developer of the Victorville to Palmdale segment (known as the HDC) has not been finalized and could be either public or private sector.
- **LOSSAN North and Antelope Valley:** This region includes the state rail network included in the existing LOSSAN North corridor between San Luis Obispo, Santa Barbara, and Los Angeles. The regional rail corridor between Santa Clarita and Los Angeles is included in this region.
- **Los Angeles Urban Mobility Corridor:** This region includes the high-capacity rail network being developed for different services between Burbank and Anaheim through the Los Angeles Area and LAUS. Services providing connectivity to the state network in the Los Angeles area are included in this region.
- **Inland Empire:** The Inland Empire region includes the rail network connecting San Bernardino and Riverside Counties to Los Angeles, Orange County, and San Diego.
- **LOSSAN South:** The LOSSAN South region includes the existing LOSSAN South Corridor between Los Angeles/Anaheim and San Diego.

State service goals and improvements, organized by timeframe and geographic region, are described in the sections that follow. Exhibit 4.3 shows the entire statewide build-out of the 2040 Vision. The hubs identified on the map represent connectivity points rather than specific station locations, which will be decided through detailed implementation studies with local inputs.

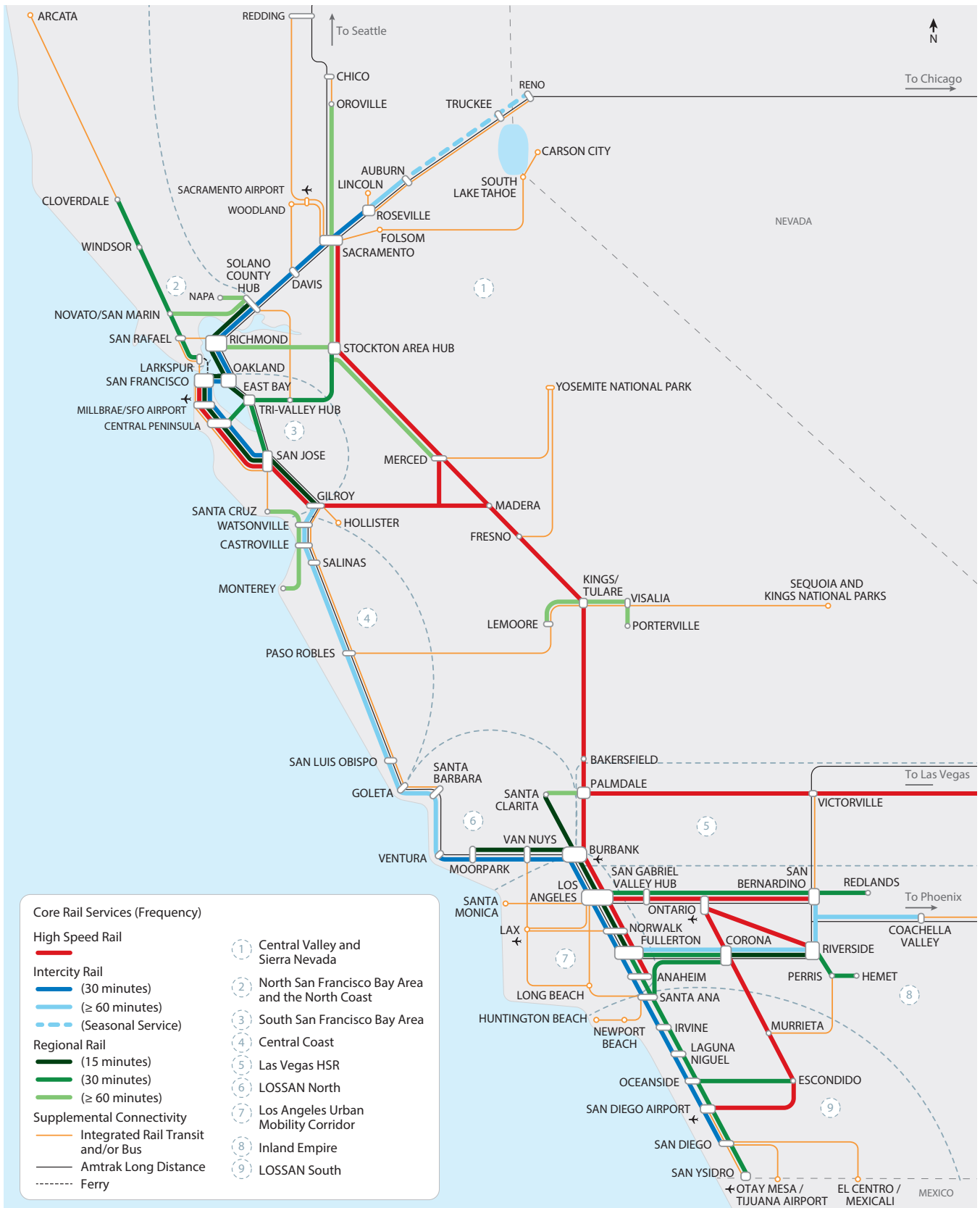


Exhibit 4.3: Caltrans Statewide 2040 Vision Rail Map

## 4.5 2022 Short-Term Plan – Statewide Goals

The 2022 statewide goals identify service improvements that will lay the foundation for integrating the passenger rail network. These improvements have already been or are being planned; and are funded, or likely to be funded, for construction and implementation, and will be underway or completed by 2022.

Additionally, specific planning, environmental, and engineering studies needed to implement service goals in the long-term vision are described here. Because these are preliminary descriptions of studies, and details will not be available until each study begins, scope and definitions are intentionally broad. Service goals related to frequency presented here largely represent peak hour, with possible exceptions to midday or weekend frequency as markets are developed and investments come on line.

Statewide focus areas for the 2022 horizon include:

- Planned and committed projects, including service extensions to Larkspur, Redlands, and Salinas; electrification of the Caltrain service between Gilroy and San Francisco via San Jose; and increased frequencies throughout the state.
- Environmental clearance and preliminary construction for HSR Silicon Valley to Central Valley service and for the ACE extension to Modesto and Ceres.
- Assisting communities statewide in better connecting transit systems to rail, and enhancing station area functions.
- Working with available or identified capacity from existing host railroad agreements; or from opportunities with clear paths for negotiation.
- Strategic planning for fleet management, replacement, and expansion, as well as the expansion or construction of new maintenance facilities.
- Conducting research and development and targeted investments in integrated ticketing and travel planning.
- Identifying opportunities to begin developing integrated schedules and repeated patterns, especially in areas of shared regional and intercity operations.
- Making significant progress in implementing alternative fuels or zero-emission technology on both rail and integrated express bus services.
- Continuation of California advocacy for continuation of the federally funded Amtrak long-distance trains: the *Coast Starlight* (Seattle-Los Angeles), the *California Zephyr* (Emeryville-Chicago), the *Southwest Chief* (Los Angeles-Chicago), and the *Sunset Limited* (Los Angeles-New Orleans). These trains provide the only rail service to a number of California communities throughout the state, and connect the state to the national rail network.
- Service implementation planning for the 2027 and 2040 time horizons.





## 4.6 2022 Short-Term Plan – Regional Goals

### 4.6.1 Central Valley and Sierra Nevada

The 2022 regional goals include building out planned investments in the regional intercity rail network, and integration with full HSR Phase I.

#### Service Goals and Improvements:

- Introduce early-morning service into Sacramento and the Bay Area from the San Joaquin Valley, using mid-corridor starts from Fresno and Stockton.
- Increase peak-period service between Roseville and Sacramento (at least three trains per day in each direction).
- Implement integrated express bus service from Sacramento to Redding via the Sacramento International Airport.
- Implement bi-hourly service between Bakersfield and Stockton.
- Expand service between Stockton and Sacramento, with a target of at least four trains per day in each direction; with potential new stations in Elk Grove, Sacramento, and North Natomas/Sacramento Airport, and integrated express bus continuing to Chico, via Marysville. Related projects include the Stockton Wye and ACE Maintenance Facility Lead Track.
- Increase seasonal integrated express bus service to from Sacramento to Reno and South Lake Tahoe.
- Invest in Bakersfield to Sacramento and Martinez corridor improvements, focused on increasing ridership through faster, integrated train schedules; improved reliability; and better transit connectivity.

#### Planning, Analysis, and Project Development:

- Study expansion of Sacramento-Roseville service to hourly and half-hourly, based on market and network development.
- Plan for additional, post-2025 regional service frequency to Merced via Modesto and Ceres.
- Plan for phased growth in east-west service across the Altamont Pass to hourly off-peak and half-hourly peak service, enabling connectivity to regional transit and statewide rail networks, including connectivity in the Tri-Valley.
- Complete the HSR Connected Corridor Study, planning for phased improvements to northern San Joaquin Valley services, and a clear investment plan that provides enhanced regional and intercity rail services prior to future HSR service.
- Study potential regional rail and integrated express bus needs to communities between Fresno and Bakersfield, and develop recommendations that consider capacity currently used for San Joaquin service, along with regional rail opportunities and the need to feed HSR stations at Fresno, Kings-Tulare, and Bakersfield.
- Develop recommendations for 2027 that primarily leverage existing investments; and for 2040 that consider additional investment opportunities.
- Study expansion of integrated rail service north from Sacramento to Marysville, including potential stations in northern Sacramento, to serve residents and provide connections to Sacramento International Airport.
- Study the potential for seasonal rail service to the Lake Tahoe region during congested travel periods, such as peak-travel weekends, with potential termini in Truckee, California, or Sparks, Nevada, through a bi-state planning effort.
- Study rail options to connect the Sacramento International Airport to the state network.
- Study the potential for regular, daytime passenger rail to Redding.

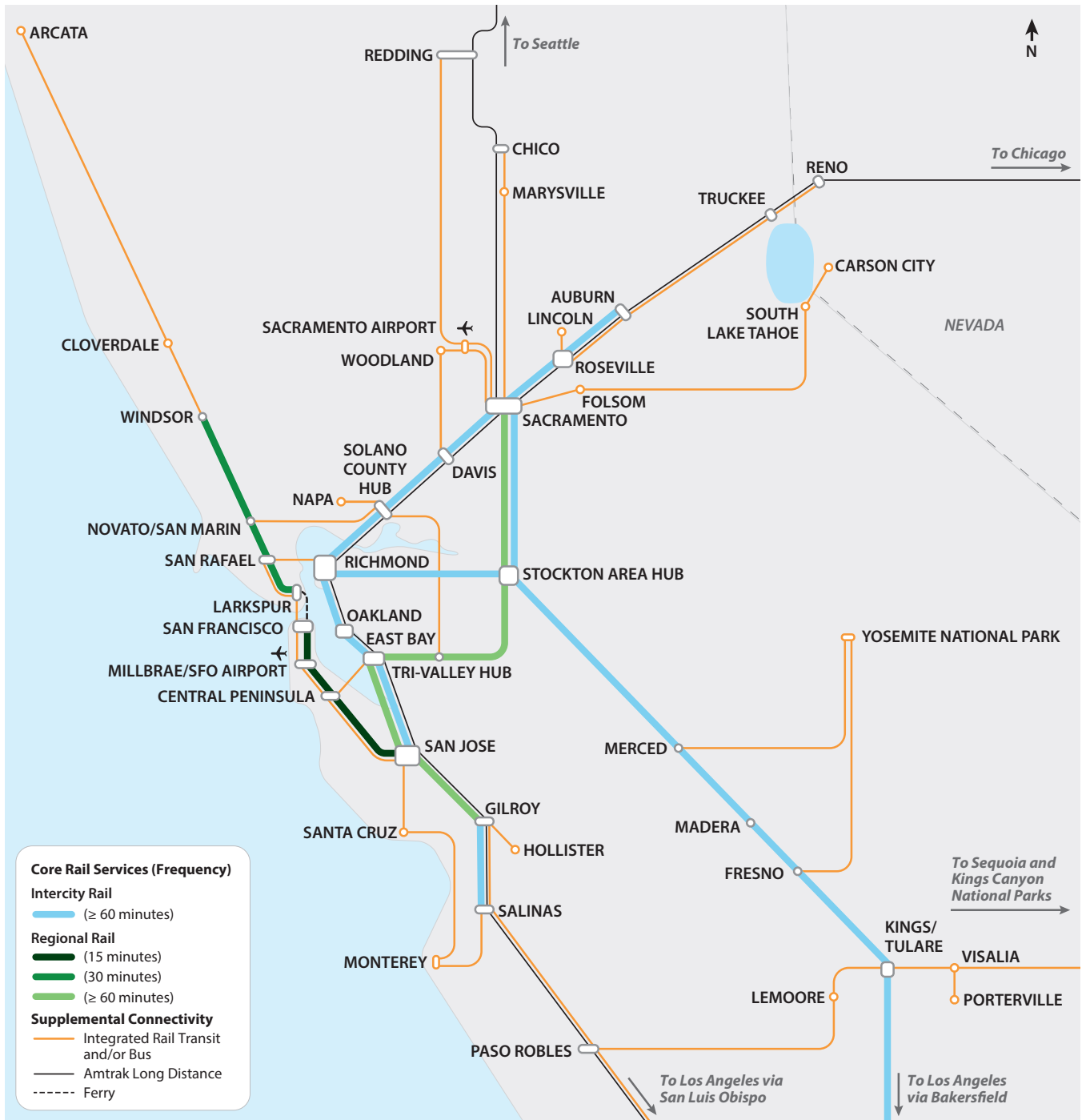


Exhibit 4.4: Northern California Service (2022 Vision)

#### 4.6.2 North San Francisco Bay Area and the North Coast

The 2022 regional goals focus on optimizing existing rail services and building on the recently established SMART service from San Rafael to Sonoma County Airport, with half-hourly peak-period service. Primary goals include improving intercity rail service between Oakland and Roseville, and enhancing connectivity between the North Bay Area and North Coast with the rest of the statewide network.

##### Service Goals and Improvements:

- Improve service speeds and frequencies between Roseville and Oakland with track and right-of-way improvements, and by introducing an optimized rail schedule that better uses capacity available under existing and enhanced railroad agreements across all intercity rail service providers.
- Improve ridership and revenue on intercity and regional rail via improved integrated express bus service and improved connectivity to high-frequency urban transit between Roseville and Oakland.
- Connect SMART at the San Rafael Transit Center to Richmond with integrated express bus service.
- Extend SMART rail service to Larkspur to an integrated ferry connection to San Francisco.
- Establish integrated express bus services to connect to communities north of Windsor (on the North Coast) with SMART, and to connect the Napa Valley with intercity services in Solano County and Martinez.

##### Planning, Analysis, and Project Development:

- Evaluate options for higher-capacity hourly off-peak and half-hourly peak intercity rail service between Sacramento and Oakland on the existing alignment (with the potential for some trips being served by integrated express bus in low-congestion periods).
- Evaluate options for improved connections at Martinez for trains between Stockton and Martinez with those traveling between Sacramento and Oakland.
- Evaluate intercity and regional rail options for the Sacramento to Oakland corridor, allowing both local and express services over all or part of the route. Include an assessment of service needs with and without a new Transbay crossing to San Francisco and the Peninsula, as well as the business-case and phasing recommendations for adding service beyond what is possible on the existing alignment.
- Evaluate options for expanding integrated express bus services connecting northern California communities with SMART and the state's intercity rail corridors.
- Plan for completion of SMART to Cloverdale by 2027.
- Evaluate expansion of rail service from San Rafael, Sonoma, and Napa Counties to Solano County, considering rail service primarily on existing rail alignments, with potential connections to the statewide network at Fairfield-Suisun or near Vallejo.

### 4.6.3 South San Francisco Bay Area

The 2022 regional goals focus on optimizing regional service timetables, building out planned expansion, and electrification investments in the regional transit and commuter rail networks. The Rail Plan supports electrification of the Peninsula Corridor as a high priority. It is the artery through which long-distance services from the Central Valley and Southern California will serve the Bay Area. Caltrain electrification is critical to mitigating congestion on the Highway 101 corridor, and to supporting a key state and national engine for economic growth.

#### Service Goals and Improvements:

- Run six trains per hour in each direction in peak periods, providing express and local service, between San Francisco and San Jose, supported by the Caltrain Modernization Program and Peninsula Corridor Electrification Project.
- Make improvements to the 25th Avenue grade separation and South San Francisco station.
- Improve service speeds and frequencies between San Jose and Oakland with track and right-of-way improvements, and by introducing an optimized rail schedule that better uses capacity available under existing and enhanced railroad agreements across all intercity and regional rail service providers.
- Improve ridership and revenue on intercity and regional rail services by enhancing integrated express bus services and by improving connectivity to high-frequency urban transit networks at rail stations between San Jose and Oakland.
- Provide initial integrated express bus services connecting the Peninsula and East Bay across the Dumbarton Bridge, via regional and intercity rail stations, allowing connectivity to the statewide rail network.
- Provide initial integrated express bus services in the I-680 corridor, using freeway managed lanes to better connect the San Ramon Valley to Sacramento and the Bay Area.
- Enhance integrated express bus services in the Highway 101 corridor using managed lane improvements in San Mateo County between Santa Clara and San Francisco. Provide additional integrated express bus service on the Highway 101 Corridor between San Francisco and San Jose, possibly in separate lanes.

#### Planning, Analysis, and Project Development:

- Plan for integrated all-day, express, and local service between San Francisco and San Jose, allowing all stations to be served at least half-hourly, and to connect with the statewide rail network in San Jose.
- Plan for capacity investments in the San Jose to San Francisco corridor that address 2027 and 2040 growth.
- Evaluate intercity and regional rail options for the San Jose to Oakland corridor, allowing both local and express services over all or part of the route. Include an assessment of service needs with and without a new Transbay crossing to San Francisco and the Peninsula, as well as the business-case and phasing recommendations for adding service beyond what is possible with existing capacity.
- Study the final alignment of the Downtown Extension to Salesforce Transit Center, allowing future high-speed and regional services to serve the Salesforce Transit Center.
- Conduct a long-term Northern California mega-regional demand analysis to refine specific needs and opportunities for an integrated rail and bus network.
- Complete operational analyses of the Salesforce Transit Center with the goal of optimizing capacity to accommodate high-speed, intercity, and regional rail service types and potential through-train service opportunities.
- Continue work with Alameda County to study freight and passenger rail investments in the East Bay and to determine investments by alignment, and select a preferred alignment for Oakland to San Jose passenger rail services.



- Analyze opportunities to provide necessary rail capacity between Oakland and San Jose, considering existing and planned BART and UPRR investments.
- Complete a study of the Dumbarton alignment to connect the Peninsula and East Bay within a regional network, including alternatives for both integrated express bus and rail service.
- Provide half-hourly integrated express bus service in the I-680 corridor, providing connections at the Solano County hub, Martinez, the Tri-Valley hub, and the Pleasanton ACE station.

#### 4.6.4 Central Coast

The 2022 regional goals provide for additional service frequencies connecting the Central Coast and San Francisco Bay Area, and for early planning for the Santa Cruz – Monterey County regional network.

##### Service Goals and Improvements:

- Run two intercity trains per day, connecting the San Francisco Bay Area to Salinas via San Jose, including new stations in Pajaro/Watsonville and Castroville.
- Make early investment in additional local stops on the Coast Route in Soledad and King City, for immediate use by the long-distance *Coast Starlight* and longer-term use by intercity trains between Goleta and Gilroy.
- Provide bi-hourly integrated express bus service connecting communities between San Jose, Salinas, San Luis Obispo, and Santa Barbara, including directly serving significant population centers not on the existing rail line, and providing important connections between trains that terminate in Goleta or San Luis Obispo in the south and San Jose or Salinas in the north.
- Provide enhanced integrated express bus service, connecting the Central Valley at Paso Robles.
- Provide enhanced and initial integrated express bus service, connecting Hollister, Monterey, and Santa Cruz to the statewide rail network.

#### Planning, Analysis, and Project Development

- Analyze opportunities for an enhanced rail network to improve connections between the Monterey Peninsula, Santa Cruz, Salinas, and Hollister to HSR at Gilroy.
- Plan for improvements to the Coast and Santa Barbara Subdivisions to increase frequencies between San Jose and Goleta by 2027 and 2040.

#### 4.6.5 Las Vegas HSR

The State intends to support improvements providing connections to Las Vegas services and will coordinate with the private project sponsor and local planning authorities to develop detailed operations plans. The State will ensure integration and interoperability between California HSR and Las Vegas services.

##### Planning, Analysis, and Project Development:

- Ensure HDC environmental clearance and right-of-way acquisition between Victorville and Palmdale.
- Complete HDC service integration study.

### 4.6.6 LOSSAN North

The 2022 regional goals support service improvements between Los Angeles, Ventura, and Santa Barbara Counties, and connections to regional destinations and the statewide network. Investments by 2022 will improve schedule reliability throughout the corridor.

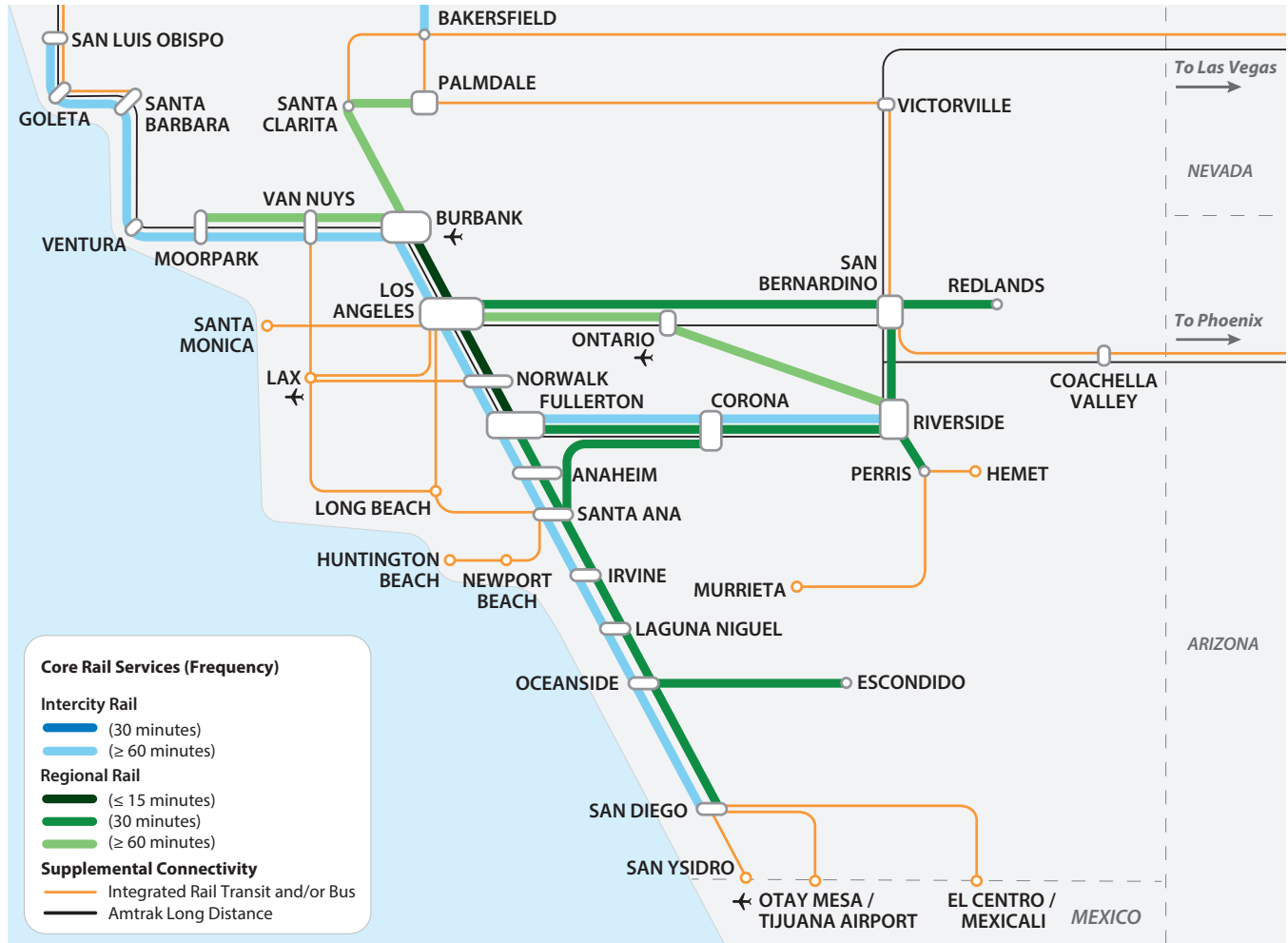


Exhibit 4.5: Southern California Service (2022 Vision)

**Service Goals and Improvements:**

- Invest in LOSSAN North corridor improvements that focus on increasing ridership on existing frequencies through faster, integrated train schedules; improved reliability; and better transit connectivity, which includes investment in layover facilities.
- Increase frequency between Santa Barbara and Los Angeles by at least one train per day in each direction, achieving largely bi-hourly service in the corridor, with some gaps filled by integrated express bus.
- Integrate intercity and regional rail services to provide improved rail service, with at least hourly service at most stations, and at least half-hourly service during the peak.

**Planning, Analysis, and Project Development:**

- Begin detailed planning and implementation studies for improvements in LOSSAN North should as early as possible, addressing:
  - Corridor requirements for achieving 2027 and 2040 phased expansion of service, including goals of hourly intercity service to Goleta, half-hourly regional service to Ventura County, and integrated express and local service on at least half-hourly headways between Chatsworth and Los Angeles.
  - The North LOSSAN Corridor interface with the HSR System at Burbank/Bob Hope Airport.
  - Ongoing planning to address regional rail service needs between Ventura and Santa Barbara Counties during peak periods, building on peak-period service planned for implementation in 2018.

**4.6.7 Los Angeles Urban Mobility Corridor**

The 2022 Short-Term Plan regional goals support the significant regional commitment to rail capacity and service improvements in the Los Angeles area. The Rail Plan seeks to harmonize statewide goals with those investments by integrating service in the Los Angeles Area with the statewide network. The Los Angeles Urban Mobility Corridor, extending from Burbank to Anaheim, is a critical piece of the statewide network that will provide needed freight and passenger capacity in this significantly congested transportation corridor. During this period, construction of run-through tracks at LAUS will advance, but not be complete.

The Rosecrans-Marquardt grade separation will be completed during this time, allowing increases in service from San Diego, Riverside, and Orange Counties.

**Service Goals and Improvements:**

- Develop well-integrated rail service provided by both intercity and regional rail operators, including:
  - hourly express and half-hourly peak (hourly off-peak) local service between Anaheim and LAUS, using capacity benefits of the Rosecrans-Marquardt grade separation;
  - additional local service between Fullerton and Los Angeles as a result of increased service from Perris Valley and Riverside, using capacity benefits of the Rosecrans-Marquardt grade separation; and
  - at least half-hourly peak and hourly off-peak service from Burbank to LAUS.
- Ensure Crenshaw corridor and Regional Connector completion, allowing improved access to statewide rail network.
- Provide initial integrated express bus service between:
  - LAX and Van Nuys;
  - LAX and LAUS, Long Beach, and Los Angeles; and
  - Long Beach and Santa Ana.

### Planning, Analysis, and Project Development:

- Determine final design for run-through tracks at LAUS, accommodating HSR, intercity rail, regional rail, and local transit operators; and begin construction.
- Plan for integration of LA Metro projects with the statewide rail network at key connection points such as Van Nuys, Chatsworth, Burbank, Glendale, LAUS, and Norwalk/Santa Fe Springs.
- Plan to incorporate integrated express bus services as part of the Los Angeles Urban Mobility Corridor regional network.
- Perform implementation planning study for HSR Phase 2 service east of LAUS.

#### 4.6.8 Inland Empire

The 2022 regional goals support service and frequency improvements to connect the Inland Empire to Southern California regional networks and future HSR and interstate service expansions. Advance planning is critical for development of future electrified regional services and phased implementation HSR services in the Inland Empire.

### Service Goals and Improvements:

- Provide half-hourly peak and hourly off-peak regional service between Los Angeles and San Bernardino, and Los Angeles and Riverside/Perris Valley, with integrated express bus to fill any gaps in the schedule caused by insufficient available railroad capacity.
- Provide half-hourly integrated regional service between San Bernardino and Redlands, with train connections to the statewide network.

### Planning, Analysis, and Project Development:

- Plan for achieving 2027 and 2040 phased expansion of service, inclusive of Phase 2 HSR, intercity rail, and regional rail investments connecting Los Angeles and the Inland Empire, service to the Coachella Valley, and service from the Inland Empire to San Diego.
- Form an Interstate Blue Ribbon Commission in cooperation with Arizona to coordinate future service expansion to Arizona via the Inland Empire.





### 4.6.9 LOSSAN South

The 2022 regional goals support analysis of operating complementary services and stopping patterns in a shared corridor along the South LOSSAN and Orange County corridors between Los Angeles and San Diego. Analysis of timetable and regional scheduling will lead to reliability and service speed improvements.

#### Service Goals and Improvements:

- Introduce initial integrated service, featuring hourly express and half-hourly local service between Los Angeles and San Diego (with exceptions to half-hourly local headways based on availability of slots between Los Angeles and Fullerton), taking advantage of the expanded capacity afforded by the completion of the Rosecrans-Marquardt grade separation, the completion of multiple double-track projects in the San Diego region, and other infrastructure improvements.

#### Planning, Analysis, and Project Development:

- Plan for achieving 2027 and 2040 phased expansion of service, inclusive of Phase 2 HSR, intercity rail, and regional rail investments connecting Los Angeles and San Diego; improved connectivity to Mexico border crossings; and enhanced local transit connections at key stations along the corridor.
- Identify maintenance facility requirements for integrated services in LOSSAN South corridor.
- Complete a feasibility study addressing maintenance needs in the LOSSAN South rail corridor. Include a review and analysis of existing and planned train service levels and schedules to facilitate a more synchronized operating pattern in the corridor, one that will no longer require trains to layover at the Santa Fe Depot in Downtown San Diego. The facility itself is at capacity, and residential growth in the area has constrained the ability to expand at the current location. Advance coordinated, multi-agency efforts to implement this study and construct a layover and maintenance facility as soon as possible.



## 4.7 2027 Mid-Term Plan – Statewide Goals

The 2027 service goals focus on targeted improvements for initiating HSR service, and maximizing service in existing rail corridors. Service goals related to frequency presented here largely represent peak hours, with possible exceptions for midday or weekend frequency as markets are developed and investments come on line.

By 2027, there will be a minimum service of every 2 hours on the core system, including integrated express bus services to places like Redding and Reno. The 2027 plan is based on funding levels reasonably expected from sources currently available at the federal, state, and local levels. Some services may be improved well in advance of 2027, while others may be near completion but not yet complete.

### Key Components of the 2027 Plan Include:

- Provide HSR revenue service-ready corridors in the Central Valley (Madera to Bakersfield) and Silicon Valley (San Francisco to Gilroy).
- Initiate statewide pulse-hub operations on at least a bi-hourly basis, with hourly service on certain high-demand corridors.
- Make full use of programmed corridor capacity—e.g., places where agencies intend to have a completed core capacity transit, HSR, or intercity rail project, including:
  - Proposed capacity expansion of the San Bernardino Line;
  - Service expansion and restructuring made possible by the LAUS run-through tracks;
  - Early investment in blended-service corridors (Gilroy-San Francisco and Burbank-Anaheim);
  - Growth of service to Modesto, Ceres, and Merced;
  - Planned capacity in the corridor between Sacramento and Roseville;
  - Targeted expansion of service from Oakland and the Central Valley to San Jose; and
  - Extension of SMART corridor north of Windsor.
- Make full use of negotiated slots on existing capacity.
- Target connectivity investments at hubs to connect to HSR.
- Provide fully developed and operational integrated ticketing.
- Assist communities statewide in better connecting transit systems to rail and enhancing station area functions.
- Implement a new fleet and maintenance facility strategy.
- Perform service implementation planning for the 2040 time horizon.







Exhibit 4.6: Northern California Service (2027 Vision)

## 4.8 2027 Mid-Term Plan – Regional Goals

### 4.8.1 Central Valley and Sierra Nevada

The 2027 Mid-Term Plan regional goals focus on targeted investments to increase service to Sacramento, connecting to the HSR network in Merced, and providing for connections to Southern California.

#### Service Goals and Improvements

- Provide weekday peak-period regional service from Ceres and Madera to the Bay Area, and Merced to the Bay Area; with additional operating frequencies, based on market demand and available railroad capacity. Integrated express bus connections at Merced to regional rail stations during time slots not served by rail on at least a bi-hourly basis, 7 days per week.
- Provide Central Valley HSR services, including hourly service from Madera to Bakersfield, with integrated connections to statewide services, including:
  - demand-based service with the most frequent service during peak travel periods; and
  - demand-based connectivity (at least bi-hourly) to statewide rail and integrated express bus services at HSR.
- Kings-Tulare, Merced, Madera, and Bakersfield stations:
  - continue construction of the remainder of the Phase 1 HSR System.
- Provide half-hourly peak and bi-hourly off-peak service from Roseville to Sacramento, integrated at Roseville with bi-hourly integrated express bus services from Reno and North Lake Tahoe, as well as with local transit services.
- Provide hourly seasonal and bi-hourly off-seasonal service from Roseville to Reno.
- Provide hourly service from Fresno, Madera, and Merced to Sacramento, with connections to and from HSR at the HSR Madera transfer station, including:
  - HSR connection to regional rail corridor stations north of Merced at the Merced HSR station (meeting regional trains extended to Merced);
  - HSR connection to stations north of Merced on the express rail corridor to Stockton and Sacramento at the Madera HSR transfer station; and
  - integrated express bus service to fill any gaps in the schedule caused by railroad capacity limitations.
- Implement 2027 recommendations with a study that addresses rail and integrated express bus service in communities between Fresno and Bakersfield.
- Provide enhanced integrated express bus connections at Sacramento to Carson City and South Lake Tahoe (on a demand-based frequency).
- Provide integrated express bus connections to Yosemite National Park at Merced and Fresno.
- Provide integrated express bus connections at Kings-Tulare to Visalia, Porterville, Lemoore, and the Central Coast, with at least a bi-hourly frequency. Initial integrated express bus service to Sequoia and Kings Canyon National Parks on a demand-based frequency.

#### Planning, Analysis, and Project Development:

- Complete HSR planning efforts to identify the service needs between Madera, Merced, and the rest of the northern San Joaquin Valley and Sacramento, including identification of an alignment and infrastructure that meets express and local station stop needs, and consideration of electrification of the corridor. Begin acquisition of right-of-way.
- Assist communities throughout the Central Valley and the Sierras in better connecting transit systems to rail, and enhancing station area functions, as well as in identifying any additional integrated express bus corridors.
- Determine future regional rail requirements in the southern Central Valley (Lemoore to Visalia/Porterville, plus additional region-identified opportunities).



#### 4.8.2 North San Francisco Bay Area and the North Coast

The Rail Plan supports investments that leverage full use of existing regional corridor capacity between Sacramento and Oakland; expansion of planned rail service in Marin and Sonoma Counties; and implementation of integrated express bus service to the statewide network in Solano County.

##### Service Goals and Improvements

- Provide Integrated regional service from Larkspur to Cloverdale as part of SMART Phase 2, increasing the utility of the service, and providing a rail link between northern Sonoma County and North Coast communities, with ferry connections to San Francisco, including:
  - integrated express bus services connecting SMART services to North Coast communities, to Richmond, to regional and HSR services in San Francisco, and to the statewide rail network at Suisun-Fairfield; and
  - integrated express bus services connecting Napa County and Suisun-Fairfield.
- Provide half-hourly peak and hourly off-peak intercity service from Oakland to Sacramento (with the potential for some trips to be served by integrated express bus in low-congestion periods, should sufficient railroad capacity not be available).
- Stockton-Richmond/Martinez bi-hourly regional service for connections to the statewide rail network.
- Richmond/Martinez station connectivity investment to turn Stockton-Richmond/Martinez trains.
- Implement improvements to the integrated express bus network recommended by the 2022 study.

##### Planning, Analysis, and Project Development:

- Perform implementation planning for a connection from Marin and Napa Counties to the state network at a Solano County hub, based on the results of the 2022 evaluation.
- Plan for a new electrified alignment between Richmond and the Solano County hub, including selection of an alignment and determination of service needs for express and local service on the corridor.
- Begin implementation of the results of the study on intercity and regional rail options for the Sacramento to Oakland corridor, including detailed planning based on the Transbay tunnel decision.
- Assist communities throughout the North Bay and North State area in better connecting transit systems to rail, and enhancing station area functions.



### 4.8.3 South San Francisco Bay Area

The Rail Plan supports investments to leverage HSR connections from San Jose to regional rail and bus services. Future rail service improvements assume BART urban rail expansion to downtown San Jose via Milpitas, and in the Tri-Valley area.

#### Service Goals and Improvements:

- Implement integrated, all-day express and local service between San Francisco and San Jose, with all stations connected at least hourly to the statewide rail network in San Jose.
- Improve San Francisco to San Jose corridor capacity through the first phase of investments in grade separations, grade-crossing improvements, and level boarding at priority locations.
- Provide Silicon Valley HSR half-hourly services from San Francisco to Gilroy with integrated bus connections at Gilroy to points south on the Central Coast. Provide demand-based service, with the most frequent service during peak travel periods.
- Continue construction of the remainder of the Phase 1 HSR System improvements between Gilroy and San Francisco, and the Downtown Extension to the Salesforce Transit Center, allowing as many as four HSR trains per hour to San Francisco.
- Provide half-hourly peak and at least bi-hourly off-peak services between Oakland and San Jose, leveraging initial implementation of Alameda County East Bay rail planning recommendations reached prior to 2022.
- Provide up to half-hourly peak service in the Altamont corridor connecting San Jose and the Stockton Area, with timed connections in the Tri-Valley and East Bay to integrated transit and express bus services.
- Provide hourly integrated express bus services between the East Bay and the Central Valley, filling gaps not served by rail, making connections to other rail and high-frequency transit corridors.
- Provide half-hourly peak and hourly off-peak bus or rail service in the Dumbarton Corridor (based on the results of the 2022 study), with connections in the East Bay to Altamont Corridor, Oakland to San Jose rail, and BART services.
- Open an East Bay hub station near Newark, Hayward, or Fremont to allow connections to north-south service between Oakland and San Jose; and east-west services between the Stockton area and San Jose, and a regional Dumbarton Bay Crossing. The location will be chosen consistent with results of the 2022 study.

#### Planning, Analysis, and Project Development:

- Perform implementation planning for an Oakland hub and East Bay rail network that could connect future service between Sacramento and the East Bay to San Francisco, based on the decisions reached in the mega-regional and Transbay tube studies completed by 2022. The importance and function of the Oakland hub will depend on the design of the services between Sacramento and the Bay Area, and regional planning for a new Transbay tube.
- In all cases, it is very desirable to provide convenient connections between the passenger rail services and the BART network.
- Plan for full grade separation and level boarding on corridor between San Francisco and San Jose, to improve corridor capacity and safety by 2040.
- Assist communities throughout the East Bay, South Bay, Peninsula, and Tri-Valley in better connecting transit systems to rail, and enhancing station area functions.

#### 4.8.4 Central Coast

The Rail Plan supports investments that expand passenger rail access to the Central Coast, connecting services to Phase 1 HSR in the North, and service to the south on the LOSSAN North Corridor between San Luis Obispo and Los Angeles.

##### Service Goals and Improvements:

- Provide at least hourly peak-period regional rail service between Gilroy and San Jose, integrated with the statewide rail system at both Gilroy and San Jose.
- Provide bi-hourly rail service, connecting Salinas to the statewide rail network at Gilroy.
- Provide at least bi-hourly integrated express bus service, connecting Hollister to the statewide rail network at Gilroy.
- Provide bi-hourly integrated intercity rail and integrated express bus service from Salinas to San Luis Obispo, including at least one intercity rail service in addition to the long-distance *Coast Starlight*.
- Provide bi-hourly integrated intercity rail and integrated express bus service from San Luis Obispo to Santa Barbara, including at least three intercity rail frequencies in addition to the long-distance *Coast Starlight*.
- Provide bi-hourly integrated express bus service from Paso Robles to the Central Valley.

##### Planning, Analysis, and Project Development:

- Perform implementation planning for development of an integrated Central Coast intercity rail, regional rail, and express bus network, providing coastal mobility and key connections to the statewide network, including equipment procurement requirements that address the unique operating and market characteristics of coastal service. This includes:
  - implementation planning for connecting Monterey and Santa Cruz to the statewide rail network with regional rail services, if recommended by the 2022 study;
  - determination of an appropriate mix of rail and bus services, based on infrastructure capabilities, market study, and the business case for investments; with an initial goal of planning for rail service every 4 hours between San Luis Obispo and Salinas, and bi-hourly rail service between Salinas and Gilroy; and
  - implementation planning for rail services, including determination of maintenance facility and equipment needs, and opportunities for through-running trains north of Gilroy and south of Goleta.
- Assist communities throughout the Central Coast in better connecting transit systems to rail and enhancing station area functions.





### 4.8.5 Las Vegas HSR

The Rail Plan supports investments connecting privately operated HSR service to Las Vegas with the state passenger rail network, to expand the reach and performance of this service.

#### Service Goals and Improvements:

- Provide integrated express bus services connecting to the statewide rail system in Bakersfield, Palmdale, San Bernardino, and Riverside.
- Include Las Vegas HSR service in the statewide integrated ticketing system.
- Enhance integrated express bus service, in partnership with a private project sponsor, to connect Las Vegas HSR service between Victorville and Las Vegas with the statewide rail network, based on frequency improvements to the corridors serving Bakersfield, Palmdale, San Bernardino, and Riverside.
- Begin construction of the HDC connection, based on the results of HDC environmental clearance, subject to available financing, between Victorville and Palmdale, to connect with Phase 1 HSR service. If HSR service between Las Vegas and Victorville can be advanced and initiated before 2027, the timing for constructing the HDC should be coordinated to extend this service to Palmdale in this timeframe.

#### Planning, Analysis, and Project Development:

- Conduct a long-term, 2040-focused service integration study, addressing Las Vegas HSR and HDC in the context of the statewide network, including the potential for through-train operations.

### 4.8.6 North LOSSAN and Antelope Valley

The 2018 State Rail Plan supports investments by 2027, providing expanded services on the North LOSSAN corridor between San Luis Obispo and Los Angeles, providing access to the Central Coast. This includes services providing access for commute trips in the San Fernando Valley that address significant highway congestion between Ventura, Santa Clarita, and Los Angeles, and services continuing along the Coast Route to popular Central Coast destinations north of San Luis Obispo. Regional services north

of Los Angeles to the Antelope Valley will continue and may change after HSR service begins, based on market demand. The State supports a partnership to provide service south of Santa Clarita.

#### Service Goals and Improvements:

- Make service improvements between Los Angeles and San Luis Obispo that support the following frequencies:
  - at least hourly rail service between Los Angeles and Chatsworth;
  - every-2 hour rail service between Chatsworth and Goleta; and
  - every-4 hour rail service between Goleta and San Luis Obispo.
- Provide half-hourly service to ensure connectivity between the Santa Clarita and San Fernando Valley communities and Los Angeles, and the statewide network, including HSR services.

#### Planning, Analysis, and Project Development:

- Study electrification of corridor segments north of Burbank on the SCRRRA Valley Subdivision and west of Burbank on the LOSSAN North Corridor, to leverage the benefits of HSR electrification. Determine appropriate investments both in conjunction with HSR Phase 1 service in the region, and for the 2040 time horizon.
- Determine the appropriate mix of regional bus and rail services between Santa Clarita and the Antelope Valley for the time when HSR services will be integrated into the regional rail system.
- Study to determine the long-term mix of express and local services that can be supported in the corridor, including the extent of electrification that is possible, and the end point for half-hourly services (i.e., Chatsworth, Moorpark, or Ventura). Decisions about electrifying the corridor will influence service patterns and which corridor sections may need peak-only additional service.
- In the event that capacity cannot be upgraded to allow blended service operations at half-hourly intervals, integrated express bus services could supplement rail services to fill service gaps.



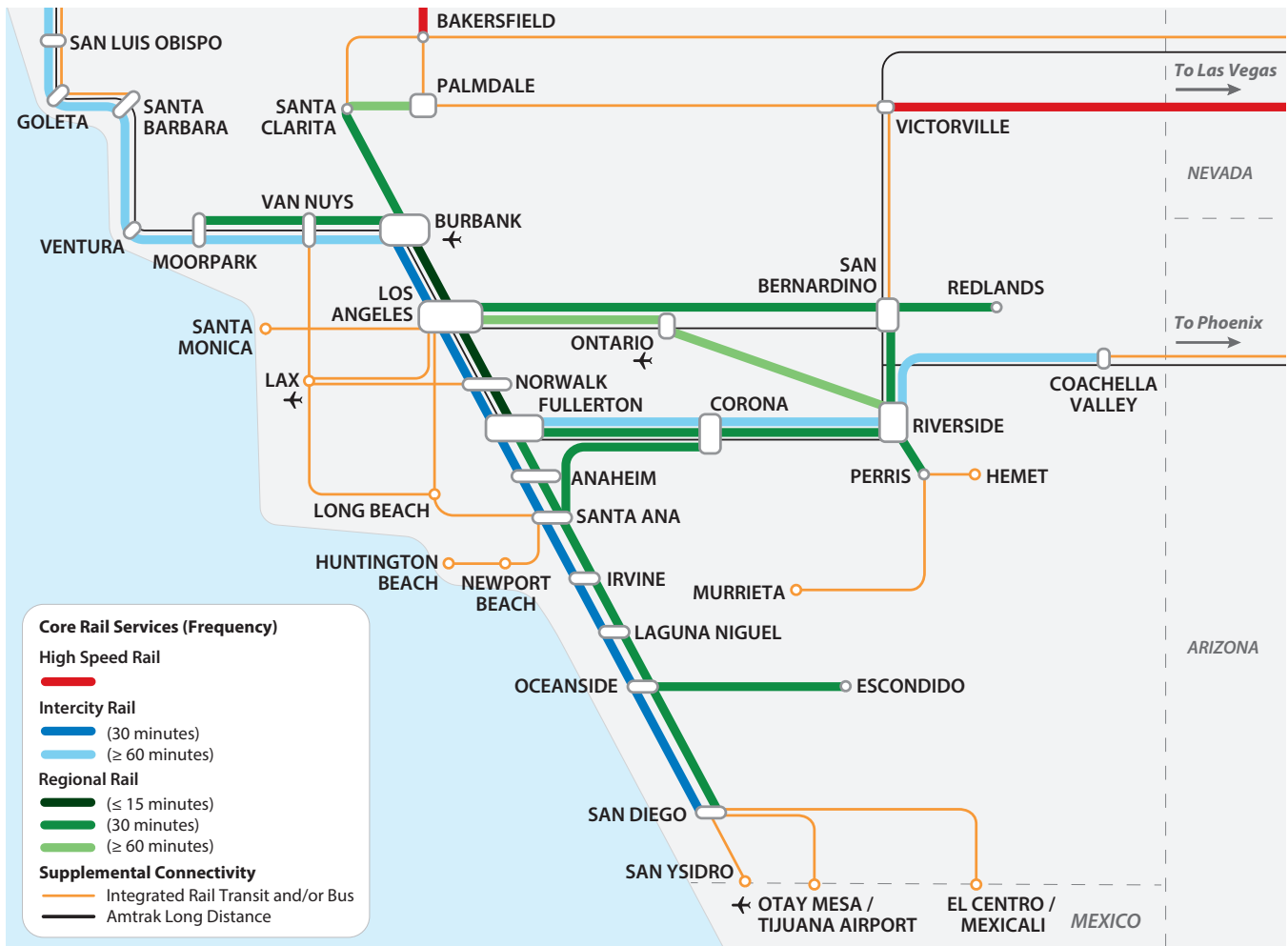


Exhibit 4.7: Southern California Service (2027 Vision)

#### 4.8.7 Los Angeles Urban Mobility Corridor

By 2027, the Los Angeles Urban Mobility Corridor will provide significant capacity and trip-time reductions across the Los Angeles area, and improve the entire rail travel experience from Ventura County to San Diego. With Los Angeles set to host its third Olympic Games in 2028, initial improvements to increase capacity and to permit run-through Metrolink and LOSSAN services at LAUS will provide the ability to move enormous volumes of travelers to Olympic venues spread throughout the region. Investments in these run-through intercity, regional and Olympic services at LAUS will unlock end-to-end travel markets that have been stymied by stub-end operations.

##### Service Goals and Improvements:

- Provide run-through service at LAUS as part of the Link Union Station program, allowing for the restructuring of intercity and regional services passing through LAUS, covering local and express stations throughout the region on at least a half-hourly basis (local stops) and hourly basis (express stops).
- Provide half-hourly integrated express bus services connecting Santa Monica, LAX, and Long Beach to LAUS.
- Continue construction of HSR-supporting infrastructure between Burbank and Anaheim.
- Implement recommendations from 2022 studies related to integrated express bus network and integration of LA Metro high-capacity transit projects into the statewide network.

#### 4.8.8 Inland Empire

The 2018 State Rail Plan supports development of regional rail corridors, providing for statewide connectivity and access between Los Angeles and the Inland Empire. This phased strategy for developing future HSR service between Los Angeles and San Diego makes full use of available capacity, and supports implementation of regional plans for expanding service between Los Angeles, San Bernardino, and Riverside.

##### Service Goals and Improvements:

- Provide half-hourly all-day service on the San Bernardino subdivision between Los Angeles and San Bernardino, with core capacity improvements.
- Provide half-hourly peak-rail service on the 91/Perris Valley Line, with all-day rail and integrated express bus services leveraging remaining available rail slots on the Riverside and 91/Perris Valley Line corridors to connect to the statewide rail network serving Orange County, San Diego, and Los Angeles on a half-hourly basis.
- Make early rail investments with stakeholder engagement and coordination to deliver connecting services between LAUS and Indio in the Coachella Valley.
- Provide half-hourly regional rail service between Perris Valley and Riverside, with extension of rail and/or integrated express bus service to Hemet and Murrieta, based on regional development timelines.

**Planning, Analysis, and Project Development:**

- Determine the extent of 2040 electrification on LAUS to Inland Empire lines; plan for implementation on at least corridors served by express rail service, and potentially also on corridors served by local rail services.
- Plan for half-hourly all-day local service between Los Angeles and Riverside via Fullerton, and between Riverside and Laguna Niguel, by 2040.
- Plan for half-hourly express rail services (to be implemented by 2040) connecting Riverside, San Bernardino, and Ontario with Los Angeles and the rest of the statewide rail system.
- Plan for integrated half-hourly rail service to Hemet by 2040.
- Plan for HSR services connecting Los Angeles, Ontario, Riverside, and San Bernardino to each other and to San Diego, using electrified east-west express rail corridors. Include identification of opportunities to further upgrade corridor speeds through phased investment when Coachella Valley and Arizona rail service plans reach their recommendations.
- Select a corridor for 2040 Coachella Valley regular-interval service.

**4.8.9 LOSSAN South**

The Rail Plan supports improvements by 2027, providing for a regular, frequent service on the LOSSAN South Corridor between Los Angeles and San Diego, supported by Urban Mobility Corridor investments between Los Angeles and Orange Counties. The Rail Plan anticipates that service levels will be fully implemented by 2027 in this corridor, and that future long -distance travel between San Diego and the rest of the state will be served by the State's significant investment in HSR service through the Inland Empire.

**Service Goals and Improvements:**

- Complete maintenance and layover facility investments for integrated services.
- Continue service improvements to solidify half-hourly service to all local stations, with increased reach of half-hourly network due to capacity improvements between Fullerton and Los Angeles, as well as between Fullerton and Riverside.

**Planning, Analysis, and Project Development:**

- Plan for 2040 LOSSAN South network, including increase in express train service to half-hourly, and integration of 2029 HSR services to Anaheim.

## 4.9 2040 Long-Term Vision – Statewide Goals

The 2040 Vision represents the full build-out of the long-term planning goals for the integrated, statewide rail network. The 2040 Vision supports an energy-efficient rail network, which will be realized either through traditional catenary-based systems or other zero or near-zero emission technologies<sup>168</sup>. Service goals related to frequency presented here largely represent peak hours, with possible exceptions for midday or weekend frequencies as markets are developed and investments come on line.

The highlights of the 2040 Vision include:

- HSR expansion and integration beyond the initial operational segments;
- expansion of network capacity in full realization of the integrated service goals;
- establishment of regional rail networks, providing integration with the statewide network and expanded regional access; and
- intensification of services implemented during the short- and mid-term horizon years.



168 As defined in Health and Safety Code Section 44258, “zero-emission vehicle” means a vehicle that produces no emissions of criteria pollutants, toxic air contaminants, and GHGs when stationary or operating, as determined by CARB. “Near-zero-emission vehicle” means a vehicle that uses zero-emission technologies, enables technologies that provide a pathway to zero-emissions operations, or incorporates other technologies that significantly reduce criteria pollutants, toxic air contaminants, and GHG emissions, as defined by CARB in consultation with the California Energy Commission, consistent with meeting the State’s mid- and long-term air-quality standards and climate goals.



Exhibit 4.8: Northern California Service (2040 Vision)



## 4.10 2040 Long-Term Vision – Regional Goals

### 4.10.1 Central Valley and Sierra Nevada

The 2040 Vision expands the reach of the HSR System to the Northern Central Valley, providing for regular, frequent connections to HSR trains from Sacramento to the San Joaquin Valley and Southern California, while also providing service to communities between Merced and Sacramento, and access to the state passenger rail network.

#### Service Goals and Improvements:

- Provide Phase 1 HSR service, with initial hourly service to local stations, and half-hourly service to local stations by 2040.
- Provide electrified HSR run-through service from the Central Valley to Sacramento, including new infrastructure to speed trip times.
- Provide off-peak local service, which is expected to rely on transfers between Bay Area and Sacramento HSR trains at Merced and/or Madera transfer stations to achieve full connectivity.
- Ensure that HSR express stopping patterns and service operate at market-drive levels.
- Provide hourly service between Richmond/Martinez and Stockton, based on transfer locations recommended in the Northern Bay Area study.
- Provide half-hourly rail service from Roseville to Sacramento.
- Extend hourly rail service north from Sacramento to Oroville.
- Provide hourly, timed and integrated express bus service from Oroville to Chico.
- Provide hourly integrated express bus service north from Sacramento to Woodland and communities between.
- Provide every-2-hour integrated express bus service north from Sacramento, via Sacramento International Airport, to Redding and communities between.
- Provide every-2-hour integrated express bus service east from Sacramento to Carson City.
- Provide every-2-hour integrated express bus service east from Roseville to Reno.
- Enhance integrated express bus service to national parks from Kings-Tulare, Fresno, and Merced.
- Provide hourly regional rail service connecting Lemoore, Hanford, King-Tulare HSR station, Visalia, and Porterville, based on the 2027 study.
- Implement 2040 recommendations of the 2022 study on rail and integrated express bus services between Fresno and Bakersfield.



#### 4.10.2 North San Francisco Bay Area

The 2040 Vision in the North San Francisco Bay Area will provide for fast, frequent service connecting the Sacramento region and outer Solano and Contra Costa County suburbs to Oakland and San Francisco, with connections to Napa, Marin, and Sonoma Counties, and to the North Coast. Development of the 2040 Vision in the North San Francisco Bay Area is dependent on decisions to pursue construction of a second Transbay tube between the San Francisco Salesforce Transit Center and Oakland. This possible long-term improvement provides an opportunity to extend conventional electrified rail services, including HSR from Southern California and regional electric service between San Jose and San Francisco, across the Bay to Oakland; and to connect electrified passenger rail service from Sacramento directly to San Francisco and San Jose along the Peninsula Corridor. An electrified conventional rail tube also offers the opportunity for additional regional electric service for regional trips between Solano County and the East Bay to San Francisco and San Jose as an option for relieving severe congestion in the I-80 and I-880 highway corridors, especially during peak commute periods. The cost of a new Transbay tube could be justified by the access to additional travel markets made possible by this improvement, which would support ridership on the intercity passenger rail network and help reduce congestion.

#### Service Goals and Improvements:

- Provide half-hourly electrified intercity service between Sacramento and San Francisco through an Oakland hub (and continuing to San Jose).
- Provide half-hourly electrified regional service between a Solano County hub and San Francisco via a Richmond and Oakland hub.
- Provide half-hourly electrified local service between a Solano County hub and an East Bay hub through Richmond and Oakland on a dedicated electrified passenger line south of Oakland.
- Provide hourly service connecting the Stockton Area hub and Martinez/Richmond.
- Provide half-hourly peak and hourly off-peak service between Cloverdale and Larkspur corridor, with integrated express bus connections from San Rafael to San Francisco and Richmond, and ferry connections from Larkspur to San Francisco.
- Provide hourly service between a Solano County hub and Novato, providing timed connections to service between Cloverdale and Larkspur, or through service to Marin or Sonoma Counties.
- Provide hourly service between Napa and the Solano County hub, providing connection between Napa County and the state rail network.

#### Second Oakland-San Francisco Transbay Crossing

In 2017, San Francisco and San Jose ranked second and fifth, respectively, for worst cities for vehicular congestion in the country – both with 2 to 3 percent more congestion than 2016. Simultaneously, BART trains are running at capacity and at crush-capacity during peak commute hours, and Caltrain reaches bi-directional maximum capacity during the peak. As the regional population grows, continued strain is put on the transportation system; and as the median income and housing prices grow exponentially in the Bay Area core, lower income workers are forced to move farther away from their jobs, increasing their dependency on a congested transportation system. Although these intertwined problems contribute to the State's support of a second Transbay crossing, there are additional megaregional and statewide implications of not building a second crossing. The Rail Plan supports many Bay Area improvements, but without a conventional rail crossing to better connect to the Central Valley and Sacramento regions, the Bay Area will receive much less interregional investment. Without the crossing, the region lacks access to additional markets and to additional railroads, thus decreasing the statewide economic and mobility opportunities associated with Bay Area investments. There are many decisions still to be made regarding the location, type, timeline, funding, and equity concerns of constructing a second Transbay crossing, and the State supports short-term action to study the alternatives; but implementing the Rail Plan vision and pursuing partnerships to generate associated economic growth depend on a second Transbay crossing.

### 4.10.3 South San Francisco Bay Area

The 2040 Vision in the South San Francisco Bay Area supports continued operation of HSR service between San Francisco and Los Angeles in the Peninsula Corridor, with development of regional electric services connecting the East Bay to San Francisco and San Jose—and possible extension of intercity services from Sacramento to San Jose via the electrified Peninsula Corridor, if a second Transbay tube were constructed that carries conventional electric trains. The 2040 Vision assumes that a dedicated passenger line south of Oakland could be electrified at least as far south as an East Bay hub. Services between that hub and San Jose are focused on providing for east-west connectivity to the Tri-Valley and Stockton Area, given the establishment of fast, frequent BART service in the East Bay to San Jose serving regional trips. Development of the South San Francisco Bay Area network in the 2040 Vision provides significant regional and intercity passenger rail options that complement planned urban rail and transit expansion, addressing highway congestion in the San Francisco Bay Area, and providing for connections to the rest of the state.



### Service Goals and Improvements:

- Provide full HSR Phase I service, with direct trains between San Francisco and Los Angeles/ Anaheim, serving HSR local stations half-hourly by 2040.
- Implement integrated all-day express and local services between San Francisco and San Jose, with all stations connected at least half-hourly to the statewide rail network at San Jose.
- Complete San Francisco to San Jose corridor capacity improvements, including grade separations, level boarding, and platform lengthening.
- Implement the recommended Transbay tube alternative, including at least half-hourly electric regional rail, making all local stops between the Salesforce Transit Center and the Richmond and Solano County hubs, as well as the East Bay hub south of Oakland. This also includes intercity trains providing half-hourly service to Sacramento as extensions of half-hourly express service from San Jose to the Salesforce Transit Center.
- Provide half-hourly regional electric services between a Solano County hub and an East Bay hub through Oakland, with half-hourly connectivity or through service to San Jose.
- Provide half-hourly peak and hourly off-peak service, 7 days per week, between the Stockton Area and San Jose through a Tri-Valley hub and an East Bay hub.
- Provide half-hourly bus or rail service in the Dumbarton corridor (based on the results of the 2022 study), integrated with East Bay, BART, and Altamont services.



#### 4.10.4 Central Coast

The 2040 Vision in the Central Coast region supports expansion of services along the Coast Route, providing access to and from Northern and Southern California; and providing for additional through frequencies on a limited but regular schedule, supplemented by integrated express bus connections. The 2040 Vision supports establishment of a regional rail network on the Central Coast, providing connections from Santa Cruz, Monterey, and Salinas to the state network at Gilroy; with the possibility of different train routings to allow Santa Cruz to Monterey service, providing for transportation capacity in the constrained coastal Highway 1 corridor.

##### Service Goals and Improvements:

- As envisioned by the Rail Plan, form a regional rail network, connecting Central Coast communities to each other, feeding into HSR at Gilroy.
- Provide hourly service connecting Gilroy and Salinas, with establishment of a hub station at Pajaro/Watsonville that provides hourly connections to Santa Cruz; and a hub station at Castroville that provides hourly connections to Monterey.
- Provide hourly integrated express bus connection between Gilroy and Hollister.
- Provide hourly integrated intercity rail and express bus service from Salinas to San Luis Obispo, including intercity rail services at least every 4 hours.
- Provide hourly integrated intercity rail and express bus service from San Luis Obispo to Goleta/Santa Barbara, including at least bi-hourly intercity rail services.
- Provide hourly integrated express bus service from Paso Robles to the Central Valley.



San Luis Obispo Station (Source: wikimedia commons, [https://upload.wikimedia.org/wikipedia/commons/6/6a/San\\_Luis\\_Obispo\\_Amtrak\\_Station\\_Ca.\\_-panoramio.jpg](https://upload.wikimedia.org/wikipedia/commons/6/6a/San_Luis_Obispo_Amtrak_Station_Ca._-panoramio.jpg))



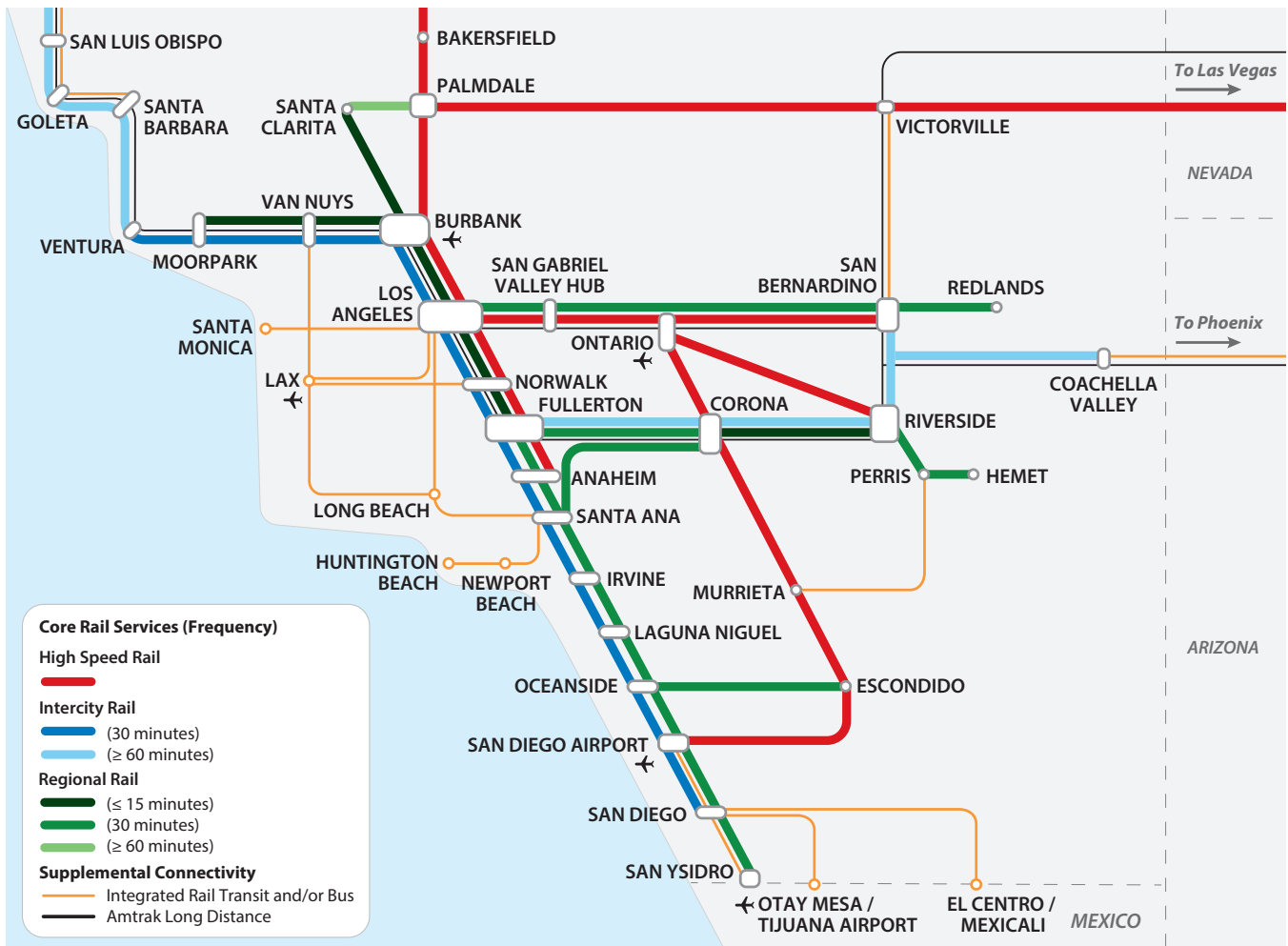


Exhibit 4.9: Southern California Service (2040 Vision)

#### 4.10.5 Las Vegas HSR

The State supports the implementation of HSR service between Las Vegas and Los Angeles via an expanded HSR network beyond Victorville and Las Vegas, to the California Statewide rail network.

##### Service Goals and Improvements:

- Full build-out of HSR Phase I and subsequent expansion and integration will provide regular high-speed connections and through-run connections to Las Vegas via Palmdale to Victorville.

#### 4.10.6 LOSSAN North and Antelope Valley

The Rail Plan identifies integrated rail services that connect communities in the North LOSSAN region to the rest of Southern California, the Central Valley, and southern Nevada via HSR in Burbank and LAUS. Expanded coastal services integrated with regional and intercity services in the Los Angeles area, and HSR connections in Burbank and LAUS provide the LOSSAN North area with fast and frequent access to destinations across Southern California.

##### Service Goals and Improvements:

- Provide service between Goleta and LAUS with the following service characteristics:
  - half-hourly local service between Chatsworth and LAUS;
  - half-hourly express service between Oxnard and LAUS, with timed connections at all hubs (Chatsworth, Van Nuys, and Burbank); and
  - hourly intercity service connecting LAUS and Goleta.
- Develop the Burbank/Bob Hope Airport as a major hub, connecting services extending west to Santa Barbara/Goleta, as well as north to Palmdale.



#### 4.10.7 Los Angeles Urban Mobility Corridor

The Los Angeles Urban Mobility Corridor between Burbank and Anaheim will be an electrified railroad, providing enormous benefits to regional and statewide travel. With electrification and run-through operations at LAUS, the Los Angeles Urban Mobility Corridor will provide valuable traffic relief on Highway 101, I-5, and other regional roadways. The Urban Mobility Corridor will expand commuter options beyond the suburb-to-downtown-Los Angeles market by providing fast, frequent, and reliable services from Ventura County to San Diego, and from to Riverside and San Bernardino.

Statewide connections from the Greater Los Angeles Area to the rest of the state will be achieved by running a half-hourly integrated service that connects Greater Los Angeles with San Diego, the Central Valley, and Northern California.

The Rail Plan supports locally directed transit expansion projects, funded partly by local ballot measures, to continue to build out the passenger rail network in the Los Angeles area and extend the reach of integrated rail and transit services.

Frequent integrated express bus connections will connect communities throughout the Greater Los Angeles Area to the statewide rail system at major hubs, such as LAUS, Burbank, and Santa Ana.

##### Service Goals and Improvements:

- Provide very frequent service between LAUS and Burbank.
  - Provide frequent HSR services to northern California.
  - Provide frequent HSR services to Las Vegas.
  - Provide half-hourly express rail service, continuing on to Oxnard.
  - Provide half-hourly local service, continuing on to Santa Clarita.
  - Provide half-hourly local service, continuing on to Chatsworth.
- Provide very frequent service between LAUS and Fullerton via the Norwalk/Santa Fe Springs hub, with connections between services and connections to urban transit.
  - Provide frequent HSR service.
  - Provide hourly express service to the Inland Empire.
  - Provide half-hourly express service to San Diego.
  - Provide half-hourly service, continuing on to the Inland Empire and making local stops.
  - Provide half-hourly service, continuing on to San Diego and making local stops.
- Provide very frequent service between Fullerton and Anaheim.
  - Provide frequent HSR service, terminating at the Anaheim hub.
  - Provide half-hourly express rail service.
  - Provide half-hourly local rail service.
- Provide half-hourly integrated express bus services, connecting all hubs (Santa Monica, Van Nuys, LAX, Long Beach, and LAUS) to the statewide rail network.
- Form an urban rail network and high-capacity bus rapid transit connections between Los Angeles area hubs, and extend the statewide rail network throughout the Los Angeles region, including:
  - LAUS;
  - Pasadena;
  - Burbank;
  - South El Monte/Whittier;
  - Santa Monica;
  - LAX, Torrance;
  - San Pedro;
  - Long Beach; and
  - Santa Ana.



#### 4.10.8 Inland Empire

The design decisions for the HSR System expansion will have major impacts on the way passenger service is delivered to Inland Empire communities; the planning for HSR is a priority for the State. A routing via Ontario Airport could be combined with one or more spurs that would provide direct, one-seat ride access to Riverside and San Bernardino with high-speed trainsets. This option has the most potential for blended service investments that would increase capacity for trains operating at varying speeds and stopping patterns between Los Angeles and the Inland Empire, and lower the overall capital cost.

Statewide connections from the Inland Empire to the rest of the state are achieved by running a half-hourly integrated service that connects Los Angeles to San Diego via Ontario Airport, and a half-hourly integrated service that connects the Inland Empire

with Orange County. Furthermore, a half-hourly integrated express bus service between Victorville and San Bernardino connects the Inland Empire with Las Vegas from San Bernardino and Riverside. An hourly service connects San Bernardino and Riverside to the Coachella Valley, the city of Indio, and onward to Arizona (including Phoenix). Finally, a half-hourly direct service connects to the Inland Empire from San Diego via Corona, and/or Ontario to Riverside and to San Bernardino.

Further planning efforts for the HSR System expansion can assist in determining the ability to pursue phased implementation that may initially invest in improvements (such as those featured in the routing via Ontario Airport), while creating a pathway to future additional investments in significant dedicated HSR infrastructure all the way to San Bernardino and/or Riverside, perhaps as part of a system connecting to Phoenix.





**Service Goals and Improvements:**

- Provide HSR service between LAUS and San Diego via the Inland Empire, with the following characteristics:
  - HSR trains running from Los Angeles, Riverside, and San Bernardino via Ontario Airport, with trains providing service at local stops at least half-hourly to maximize statewide connectivity;
  - express intercity and HSR trains, providing at least half-hourly all-day service between Los Angeles and San Bernardino via Ontario Airport;
  - express intercity and HSR trains, providing at least half-hourly all-day service between Los Angeles and Riverside via Ontario Airport;
  - HSR trains on express service schedules, driven by market demand between Riverside and San Diego, as well as San Bernardino and San Diego;
  - HSR between Ontario Airport and San Diego via Corona; and
  - the potential to upgrade east-west express rail corridors beyond 2040 to accommodate HSR extension to Coachella Valley and Arizona.
- Provide at least half-hourly local service between LAUS and San Bernardino via Fullerton, Corona, and Riverside.
- Provide half-hourly local service, connecting Laguna Niguel to Riverside via Corona.
- Provide half-hourly local service between Riverside and Hemet via Perris. Trains could continue on to Orange County (Laguna Niguel).
- Provide half-hourly service between LAUS and San Bernardino, making local stops via a San Gabriel Valley hub that provides connectivity to other rail services and urban mass transit.
- Provide hourly service to the Coachella Valley from San Bernardino and Riverside. The State foresees the provision of this service as an opportunity to provide the groundwork for anticipated HSR service to Arizona. The State also envisions that a high-speed line will eventually run between Phoenix and Los Angeles, serving the Coachella Valley.
- Provide half-hourly integrated express bus service from San Bernardino between the Inland Empire and HSR service at Victorville (with service to Las Vegas).

**Planning, Analysis, and Project Development:**

- Complete HSR planning for post-2040 investments, including additional upgrades to east-west infrastructure, planning for HSR to the Coachella Valley and Arizona, and potential connectivity via San Bernardino to Victorville and Las Vegas.



Solana Beach Station (Source: wikimedia commons, Brian Zimmerman, [https://commons.wikimedia.org/wiki/File:Coaster\\_F40PHM-2C\\_2104\\_at\\_Solana\\_Beach,\\_CA.JPG](https://commons.wikimedia.org/wiki/File:Coaster_F40PHM-2C_2104_at_Solana_Beach,_CA.JPG))

#### 4.10.9 LOSSAN South

The Rail Plan calls for multiple connections from Imperial County and the Mexico border area to the statewide network at San Diego, using a combination of potential rail services to San Ysidro, and integrated express bus service from Imperial County/Mexicali and Otay Mesa/Tijuana Airport, allowing cross-border connections. Regular half-hourly regional services between Los Angeles and San Diego will use both local and express service patterns to fully integrate local stations in Orange and San Diego Counties into the statewide network.

The design of this corridor will have major operational impacts on the rest of the state's rail network. This corridor, together with the Peninsula blended-service corridor in the Bay Area, is the most critical corridor to design early and strategically.

#### Service Goals and Improvements:

- Provide at least half-hourly HSR service to stations between San Diego Airport and the Inland Empire and LAUS, with one-seat rides or connections to destinations throughout the state.
- Provide half-hourly express service between Los Angeles and San Diego, with timed connections at hubs in Santa Ana, Laguna Niguel, Oceanside, and the San Diego Airport.
- Provide half-hourly service, making all local stops between LAUS and Laguna Niguel. Laguna Niguel could serve as the southern terminus of electrified local services connecting to the Los Angeles Urban Mobility Corridor.
- Provide half-hourly service between Oceanside and Escondido, with connections to HSR services.
- Provide San Diego integrated transit connections to services to San Ysidro, and integrated express bus connections to Otay Mesa and the Tijuana Airport.
- Create a San Diego hub for HSR, intercity rail, regional rail, and high-capacity transit at the San Diego HSR station.
- Provide half-hourly service from the Mexico border, possibly from Tijuana—with customs and border pre-clearance—to San Diego, if the service can be delivered with a significant improvement in travel time over the existing local transit service.
- Provide integrated express bus service from the San Diego hub to El Centro/Calexico via El Cajon.



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