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STA and City of Vallejo

Vallejo Passenger Rail Study

Final Report

Reference:

Revision 2 | May 2024

Job number 294885-00

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Document Verification

Project title	Vallejo Passenger Rail Study
Document title	Task 7: Final Report
Job number	294885-00
Document ref	
File reference	

Revision	**Date**	**Filename**	Vallejo PRS Final Report DRAFT 2024-03-28		
01	3/28/24	**Description** First Draft			
			Prepared by	**Checked by**	**Approved by**
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02	5/10/24	**Filename**			
		Description			
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		Filename			
		Description			
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		Signature			

Issue Document Verification with Document ☐

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Appendices

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Acknowledgements

This Study was a collaboration between the Solano Transportation Authority (STA) and the City of Vallejo.

The consultant team included:

- Arup, Oakland, CA
- JMA Civil, Oakland, CA
- Matoff & Associates, Winters, CA
- LSC Transportation Consultants, Tahoe City, CA

Funding was for this Study was jointly provided by the City of Vallejo and the STA.

1. Summary

1.1 Introduction

High travel demand between Vallejo and Fairfield, Suisun City, Napa and Marin/Sonoma, coupled with a lack of adequate transit services, results in automobile travel overwhelming limited roadway capacity, and leads to congestion, slow travel times, and stress on area residents.

The Vallejo 2017 General Plan acknowledges these concerns and suggests:

- Enhancing regional transit service for residents, employees, and visitors.
- Working with regional transportation agencies to coordinate regional transit planning activities, including increased frequency of bus, ferry, and rail service, timed connections, and tourism support.
- Studying the feasibility of a visitor rail connection between the Vallejo Ferry Terminal and the Napa Valley in coordination with private investors.
- Increasing regional transit and ferry ridership to and from Vallejo, particularly by commuters and visitors.

The State Rail Plan emphasizes a statewide network of interconnected corridors and proposes a rail link between Suisun/Fairfield and Napa but does not include a link to Vallejo.

1.2 Study Purpose and Need

The study explores the feasibility of passenger rail service within Vallejo as well as service that would connect to nearby communities such as Napa, Fairfield/Suisun City, and Novato.

This study identifies travel demand from Vallejo to the East Bay and will assume, for the purposes of this study, that demand will be served by connecting services, but any proposed rail project will not preclude a direct Vallejo to East Bay rail connection.

1.2.1 Need

The study assesses market demand and ability of existing infrastructure to support a future passenger rail service. Where the existing infrastructure is inadequate, the study identifies necessary improvements and provides rough order of magnitude cost estimates to make such improvements.

1.2.2 Purpose

The objectives of the study include the following:

- Assess potential ridership market demand.
- Conduct an assessment to determine if passenger rail would best meet the ridership demand – through better reliability, added capacity or faster travel times – or if other types of transit service, such as bus or light-rail, should be considered.

- Identify potential community impacts, including benefits (such as significantly reduced congestion and faster and more convenient transportation alternatives) and costs (such as property encroachment, noise and lights, and financial costs).
- Engage the public through an open and inclusive outreach effort to garner feedback from the local community and understand concerns or support for new transit service(s), including passenger rail.

1.2.3 Guiding Principles

- The study will deliver and be governed by the Vallejo General Plan and the STA's Comprehensive Transportation Plan (2020) and be consistent with the State Rail Plan (2018).
- Any proposed rail service will substantially adhere to all relevant railroad design criteria, including Union Pacific Railroad (UPRR), California Public Utilities Commission (CPUC) and others as identified.
- The study will identify travel market segments and develop service plans to meet those market demands.
- The default service frequency is not less than every 30 minutes and ideally every 15 minutes, depending on ridership demand. Service will be timed and coordinated with other regional services and with local transit service.
- A proposed rail service will coordinate and balance vehicle selection, service plans, and rail infrastructure to provide a useful transit service.
- Stations will be located in areas of high trip generation or identified/planned development sites.

1.3 Executive Summary

The city of Vallejo and the Solano Transportation Authority undertook the Vallejo Passenger Rail Study to determine the feasibility of new passenger rail service to Vallejo. The Study assumed that existing railroad rights-of-way would be utilized for the route of a new passenger rail, with new track to be laid to connect to the Vallejo Ferry Terminal. The Study determined that a new passenger rail service is feasible based on the following:

- The existing conditions of the railroad and potential engineering required.
- The present travel market demand, including current and future land uses.
- The regulatory environment in the North Bay region and the State of California.
- Current and future rail vehicle technology.
- Conceptual service plans that match demand and are compatible with existing plans for future rail service in the Bay Area.
- The opportunities and impacts that a new passenger rail service may have on the surrounding community.
- Rough order of magnitude cost estimates to build and operate the service.
- Community input.

The Study identified a viable passenger rail service for Vallejo using a western alignment of existing freight rail infrastructure owned by the City of Vallejo, along with existing freight rail leading north of the city owned by Union Pacific Railroad. Four preliminary station sites were chosen in the City of Vallejo, one in American

Canyon, and one near Napa Junction. Two service concepts were identified that would provide connections to future North Bay Rail service as envisioned under the California State Rail Plan and to Capitol Corridor trains in Suisun/Fairfield. These two concepts are shown in the map below:

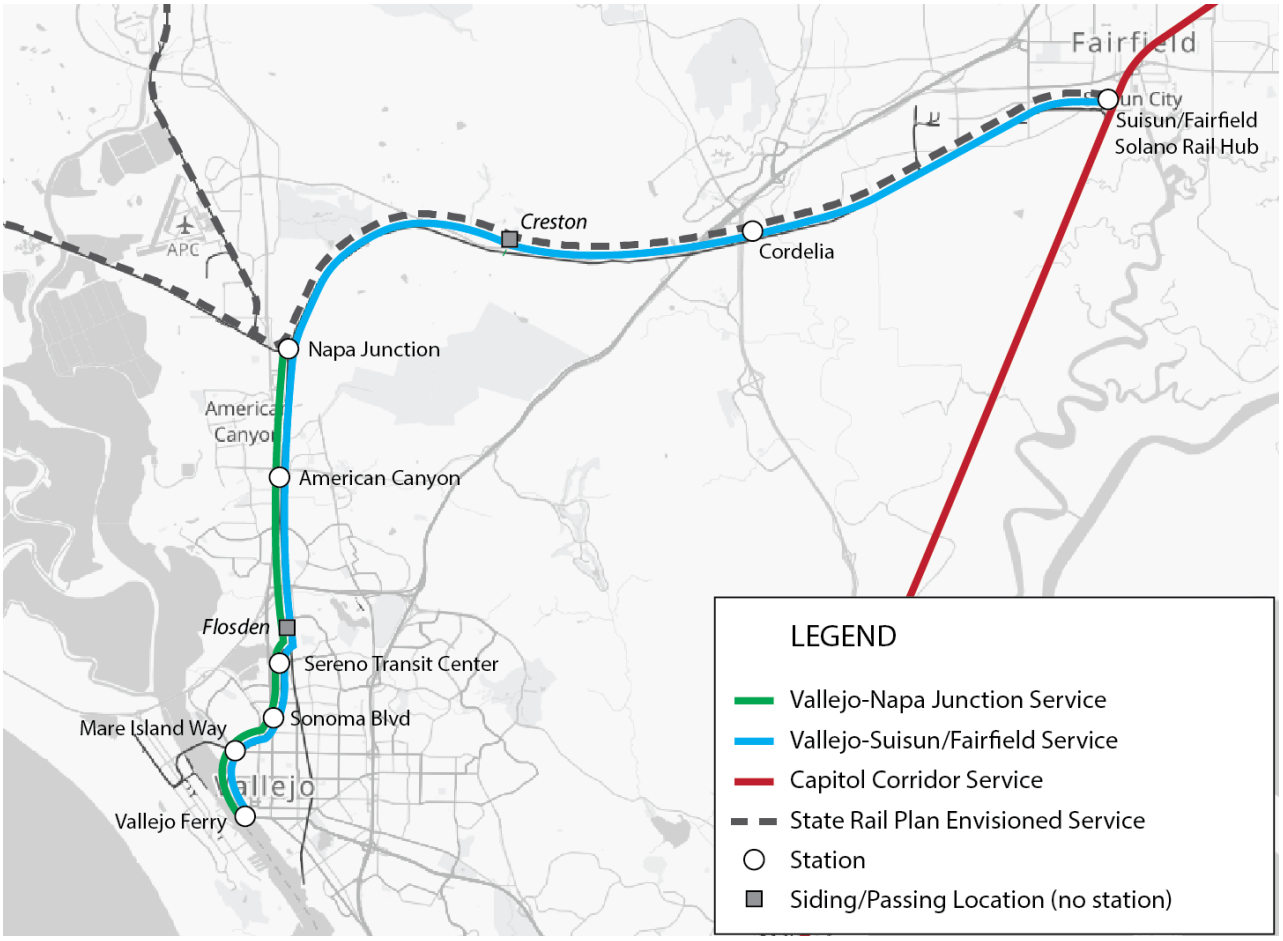


Figure 1: Vallejo Passenger Rail Service Options and Station Locations

The City of Vallejo and the STA will use the results of this study to work with State and local agencies and the local community to include a direct rail connection to Vallejo in the next iteration of the California State Rail Plan.

2. Previous Studies

Interest in providing rail service to and through Vallejo has been considered several times over the last 25 years. Several studies have examined a rail link and other transit infrastructure in the study area, including:

- Napa/Solano Passenger/Freight Rail Study (2003)
- California State Rail Plan (2018 Edition and 2023 Draft)
- SolTrans Comprehensive Operational Analysis (2018)
- SMART - Passenger Rail Service Novato to Suisun City (2019)
- SMART and SolanoExpress Station Feasibility Study (2021)
- SR-37 Comprehensive Multimodal Corridor Plan (2021)
- Solano Rail Hub: Project Benefits and Design Alternatives (2022)
- California State Route 37 Express Bus Plan (2023)

2.1.1 Napa/Solano Passenger/Freight Rail Study (2003)

This study considered the potential of passenger rail and enhanced rail freight activity between Napa and Solano counties. Conducted for the Napa Valley Transportation Authority (NVTA), formerly the Napa County Transportation Planning Agency (NCTPA), and Solano Transportation Authority (STA), this study analyzed the economic feasibility of passenger rail and enhanced rail freight activity, compared potential rail vs. existing and potential bus services operating costs, and examined the long-term potential of connecting passenger rail services.

Rail service targeted both Vallejo residents and visitors – including those visiting the region's wineries in Napa – focused on a Suisun/Fairfield to Vallejo route and a St. Helena to Vallejo route. A single visitor serving line was also considered – Vallejo - Napa (Rutherford).

A key recommendation was to extend the Mare Island branch (alternatively known as the West Alignment) to a new intermodal station at the existing Vallejo Ferry Terminal. While requiring about a mile of new track along the waterfront, and potentially reducing some green areas, this connection would optimize travel times and benefit from other transit co-located at the station. The rail extension could also support and enhance Vallejo's "extensive redevelopment plans for its waterfront which included transit-supportive design and land use." In addition to intermodal stations, the existing Sereno Transit Center in Vallejo was also identified as a rail stop to achieve maximum ridership.

The study found passenger rail in Napa and Solano Counties technically feasible. The freight rail operators, California Northern Railroad (CFNR), Napa Valley Railroad (NVRR – operator of the Wine Train), and Union Pacific Railroad (UPRR), indicated their willingness to consider hosting passenger services if infrastructure improvements were delivered that would allow freight service and the Wine Trains to be operated efficiently. However, a high capital cost was identified (between $99 million and $138 million in 2003 dollars) resulting in a finding that passenger service may not be economically feasible; conversely, the study also highlighted the need for STA and NCTPA to prevent the abandonment of freight rail lines should passenger rail be pursued in the future.

In the study's public outreach, the reaction was mixed and dependent on location. Napa County residents overall preferred tourist focused rail service. Solano County stakeholders supported rail service to the East Bay and San Francisco rather than service to Napa County or between Vallejo and Suisun City/Fairfield.

2.1.2 California State Rail Plan

2018 Edition

The 2018 California State Rail Plan (SRP) northern California recommendations include high frequency service along the existing Capitol Corridor from Sacramento, with an extension into downtown San Francisco's Salesforce Transit Center via a new tunnel. Up to six trains per hour in each direction could serve the Solano Rail Hub, providing a capacity of 4,000 passengers an hour. Additionally, the SRP calls for service from a "Solano County Hub" westward to Napa and Novato and an integrated bus service from Napa to Vallejo.

The "Solano County Rail Hub" is an important transfer point, providing connections to Sonoma Marin Area Rapid Transit (SMART) via Jameson Canyon and through Napa County, as well as its current service stop for Capitol Corridor, new regional express bus services, and local transit connections. The Solano County Rail Hub, under this vision, creates a significant node for future economic activity and development. STA identified the actual location as the existing Suisun-Fairfield Amtrak Station during STA's SMART and SolanoExpress Station Feasibility Study; in January 2021, the STA Board formally concurred. At this location, the presence of the upgraded rail station allows for significant land use density with housing and jobs in downtown Priority Development Areas located in both the City of Fairfield and the City of Suisun City.

2023 Draft

The 2023 Draft State Rail Plan envisions an integrated bus service between Suisun/Fairfield and Napa and between Suisun/Fairfield and Novato in the short- and mid-term which would be improved to a regional rail connection in the long-term, and an integrated bus service between Vallejo and Napa in the long-term.

The Rail Plan does not indicate a future direct rail connection into Vallejo. However, separate from the purpose and need of this study, the Caltrans Department of Rail and Mass Transportation, along with the Capitol Corridor Joint Powers Authority, have pursued potential realignment scenarios for the Capitol Corridor service through Vallejo contained within the Carquinez High-Level Bridge Crossing Study. That study explores new crossings to alleviate delays on Capitol Corridor service caused by the raising of the Suisun Bay Bridge for marine traffic.

2.1.3 SolTrans Comprehensive Operational Analysis (2018)

The SolTrans Comprehensive Operational Analysis considered service changes to Solano County Transit (SolTrans) routes to provide better service. This study includes Vallejo as all the routes under consideration for modification are in the city. Seven Service Alternatives were identified. They include:

- Route reconfiguration making an important east-west connection across northern Vallejo, enhancing service in southwest Vallejo, solving inefficient route segments, and reducing the need for transfers.
- Implementing a new short-term bus line along the key North Sonoma Blvd. corridor.
- Extending weekday service until 9pm.
- Providing consistent hourly service on Sundays.
- Providing consistent hourly service on Grand Circle Route and Route 1.
- Eliminating a route serving medical trips between Vallejo and Benicia which can be better serviced by a Transportation Network Company.
- Finally, replacing demand-responsive transit with transportation network company (TNC) service.

Additionally, the study recommended phasing in service modification, for which Minor and Moderate Revision options were developed. These revisions included reducing service and revising route frequency. The Recommended Plan, which includes all seven Service Alternatives, Peak Buses would be expected to decrease.

The Minor Revision Package has a net decrease in all alternatives, except for Peak Buses, in comparison to the existing service. In this plan, Peak Buses would be expected to have no change. The Moderate Revision Package also features an overall increase in all strategies, except for Peak Buses, in comparison to the existing service. In this plan, Peak Buses would be expected to decrease.

2.1.4 SMART Passenger Rail Service Novato to Suisun City (2019)

The SMART Passenger Rail Service Novato to Suisun City Study considered the engineering feasibility of extending SMART trains from Novato to the Suisun-Fairfield Amtrak Station via American Canyon and Cordelia. The study directly addressed the 2018 SRP, which recommends the evaluation of passenger rail servicing connecting the SMART system to the Capitol Corridor system. The SRP identifies both Napa and Novato as terminals for this connection but does not preclude Vallejo. This may have direct or indirect effects on the results of this Study, as the proposed rail services both serve American Canyon, and one of the services proceeds to the Suisun-Fairfield Amtrak Station.

Implementing passenger rail service would require improvements to existing trackway and bridges, new stations, and installation of a new signal system with Positive Train Control (PTC). Additionally, the study discussed the use of alternative vehicle and propulsion options including Electric Multiple Unit, Compressed Natural Gas/Hybrid, Battery, and Hydrogen Fuel Cells.

The Study found implementing passenger service along this corridor is feasible and identified that the development of operating plans and ridership estimates would be a key next step. Notably, the study does not include a direct rail transit connection from Suisun/Fairfield or Novato into the Cities of Vallejo or Napa.

2.1.5 SMART and SolanoExpress Station Feasibility Study (2021)

Following on the 2019 SMART Novato to Suisun City Study, the SMART and SolanoExpress Station Feasibility Study conducted for the STA focused on the most viable station locations for this new service, called the “Solano County Hub”. Vallejo was not within the scope of this study; however, it is considered in the larger decision making as a potential extension from the Novato to Suisun line and within the larger regional and state rail planning.

The guiding principles for the selection of other stations were as follows: integration and connection with the community, accessibility and safety for all users, customer comfort and accommodation, incorporation of Solano's values of environmental, social responsibility and sustainable development, and total life cycle objectives. Further, stations would support regional land use needs and local development. Additional sites were considered in Cordelia. Two of these stations border Interstates 80 and 680 which is a key roadway to get from Cordelia to Vallejo. A key result of the study was to advance the Suisun-Fairfield Amtrak Station as the “Solano Rail Hub” for designation by Caltrans and future funding. In January 2021, the STA Board of Directors officially designated the Suisun-Fairfield Station as the location of the Solano Rail Hub Project.

While the study focused on the Novato to Suisun City corridor, there is valuable Location-Based Service data detailing volume of intercounty trips with origins or destinations in Vallejo. The study notes a large volume of trips originating from Solano County with almost 50% destined for the East Bay, and about 10% of the trips destined for either Marin/Sonoma, Sacramento or San Francisco. Vallejo’s primary trip patterns were to Benicia, Fairfield, the East Bay and Napa.

2.1.6 SR-37 Comprehensive Multimodal Corridor Plan (2021)

The SR-37 Comprehensive Multimodal Corridor plan calls for new transit services including electric buses, new routes, micro-mobility options, park and ride, bus stops and stations in the near-term and a passenger rail system

connecting SMART passenger rail system in Novato and the Capitol Corridor passenger rail system in Suisun City in the long-term. The studies supporting that project indicate significant transit service challenges (primarily from dispersed destinations) which suggest that for the near-term, buses, micro transit, or on-demand services should be the transit focus for that corridor.

2.1.7 Solano Rail Hub: Project Benefits and Design Alternatives (2022)

Following on the SMART/Solano Express Station Study, the 2022 Solano Rail Hub: Project Benefits and Design Alternatives Study focused on conceptual design of the existing Suisun-Fairfield Station to specifically study its function as the SRP Solano Rail Hub. The Solano Rail Hub concept links Capitol Corridor, future SMART trains, and regional buses. Based on previous studies, the Suisun-Fairfield/Amtrak Capitol Corridor Station was selected to be this hub for Solano County.

While the assumptions of this study did not include a dedicated Vallejo service, the Novato to Suisun passenger rail alignment has the potential to expand to Vallejo in the future.

2.1.8 California State Route 37 Express Bus Plan (2023)

The Express Bus Plan, still in draft phase, is an update of the SR 37 Travel Behavior and Transit Feasibility Study (2019) to examine how travel behavior and demand may have changed in the corridor since the COVID-19 pandemic. The Study examined the 21-mile corridor between the US 101 in Novato in Marin County and I-80 in Vallejo in Solano County. The updated market demand assessment found that travel to Marin/Sonoma Counties is more dispersed while travel to Solano County is more concentrated in key cities dominated by Vallejo. Overall, the updated assessment indicated that the traffic volumes and related demand supports a weekday, work trip oriented fixed-route transit service, supplemented with encouragement of ridesharing in the SR 37 corridor.

The Study proposes express bus service to primarily serve weekday commute trips, combined with innovative ridesharing and mobility-on-demand services to supplement the transit service and reduce congestion and drive-alone mode share throughout the corridor.

3. Rail Alignment Selection

This Study assessed the feasibility of two rail alignments within Vallejo to provide (1) primarily intra-city rail service in Vallejo from the Vallejo Ferry Terminal to American Canyon as well as (2) regional rail service between the Vallejo Ferry Terminal and either Napa, Novato or Fairfield-Suisun – where rail corridors exist with existing train services (Napa Valley Wine Train, SMART and Capitol Corridor, respectively). These alignments branch about 1,100 feet northeast of the Broadway/Sereno intersection (this location is referred to by the railroad as "Flosden"). The West Alignment turns diagonally to the southwest, and eventually leads to the Mare CausewayBridge at Tennessee Street. The Central Alignment proceeds due south through the city and eventually crosses Curtola Parkway at Solano Avenue. Either alignment would require new track on Curtola Parkway or Mare Island Way to reach a new rail terminal adjacent to the Vallejo Ferry Terminal.

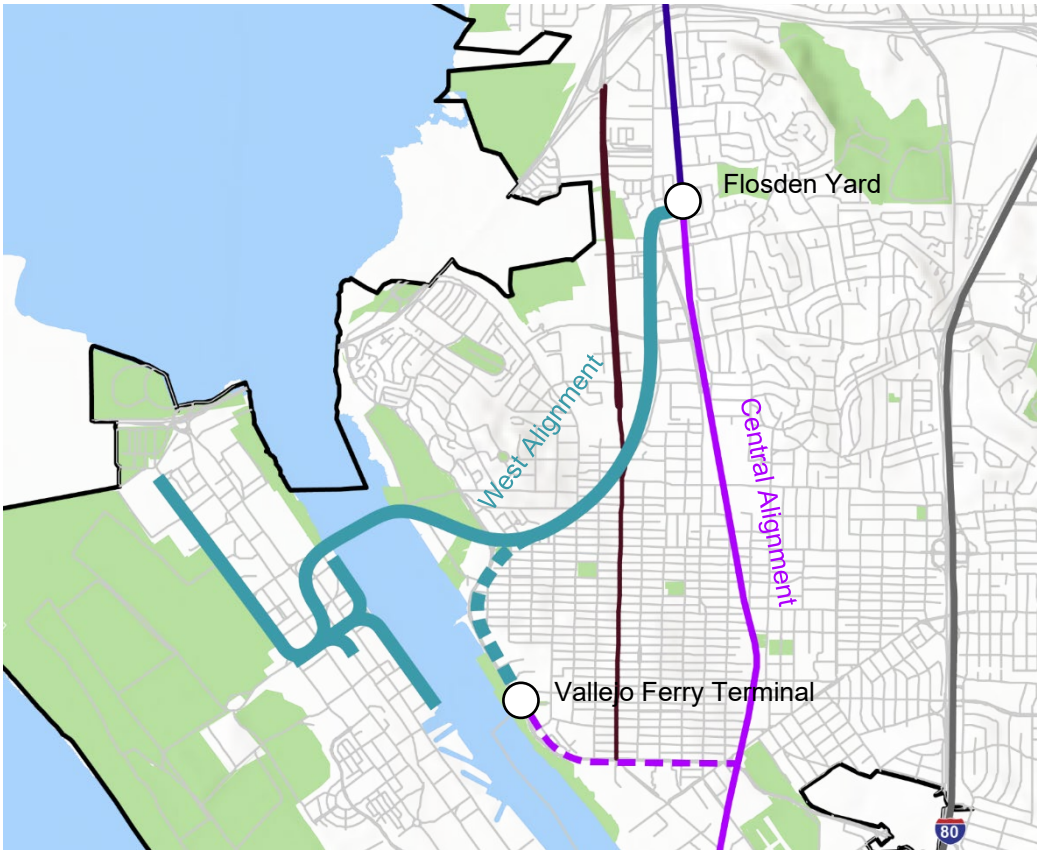


Figure 2 West and Central Alignments. Dashed line indicates where new track is needed.

3.1 West Alignment

The West Alignment branches from the Central Alignment at the small Flosden Yard, located at GIS coordinate 38.130771702524065, -122.25017191901757, and crosses Broadway and then crosses Sereno about 300 feet west of Broadway. The alignment then parallels Couch Street, crosses Sonoma Boulevard near Mississippi, and then enters a deep cut under Sacramento Street until reaching Tennessee Street and Mare Island Way. The current line continues across the Mare Island Causeway to the Island. From this point at Tennessee Street, new

track would be laid along Mare Island Way to the Vallejo Ferry Terminal. Total distance from the Flosden Yard junction to the ferry is about 13,650 feet; total new track (Mare Island Way) is about 4,100 feet.

Stations

As indicated in Figure 3, as many as three intermediate stops could be provided on the West Alignment.

Figure 3 West Alignment & Potential Stations

These intermediate stations are indicated as follows:

Stop	Location	Activity	Notes
Sereno Transit Center	Sereno, north side	Transit Center/Walmart	Directly adjacent to transit center – about 1,100 feet to Kaiser Hospital
Sonoma Blvd	Sonoma Blvd, north side of Couch Street	Commercial	City preferred location
Tennessee & Mare Island Way	Tennessee, east of Wilson	Mare Island Gateway	Requires grading and intersection realignment

The distance between Sereno and Sonoma is about three quarters of a mile, and the distance from Sonoma to Tennessee/Mare Island is about 6/10 of a mile. All proposed stations have at-grade access to streets.

Preliminary Travel Market

Replica Travel Data product was used to assess overall travel from reasonable walksheds at each station to walksheds to every other potential station in Solano and Napa Counties. Census block groups were identified that are within walking distance (about half-mile) to each station and then totaled all the travel from that station walkshed to every other station that has been considered (eight to nine depending on the alignment option). The intent is to identify current travel in each alignment.

Since Sereno and the Vallejo Ferry are common stations on either the West or Central alignments, they do not have significant impact on the alignment analysis.

For the West Alignment, the overall travel is about 20,000 trips to and from the other potential station sites, with about 12,000 trips assigned to the Sonoma Station, and about 8,000 trips to the Tennessee/Mare Island Station area. Note these are very high-level calculations of overall existing activity. This data is for all trips (not just transit trips) and is used to identify the potential market.

Right of Way Ownership

The City of Vallejo owns and controls the entire right of way from Flosden into Mare Island. The ROW north of Flosden is owned by UPRR.

3.2 Central Alignment

The Central Alignment continues south from the Mare Island/West Alignment branch at GIS coordinate 38.130771702524065, -122.25017191901757, and crosses Sereno at the Kaiser Hospital. The alignment then runs almost due south passing west of Vallejo High School and Corbus Field, crossing Tennessee Street and then crossing Curtola Parkway. At this point, new track would be laid along Curtola/Mare Island Way to the Vallejo Ferry Terminal. Total distance from Flosden to the ferry is about 17,700 feet; total new track (Mare Island Way) is about 5,200 feet.

Stations

As indicated in Figure 4, up to three stops could be provided on the Central Alignment.

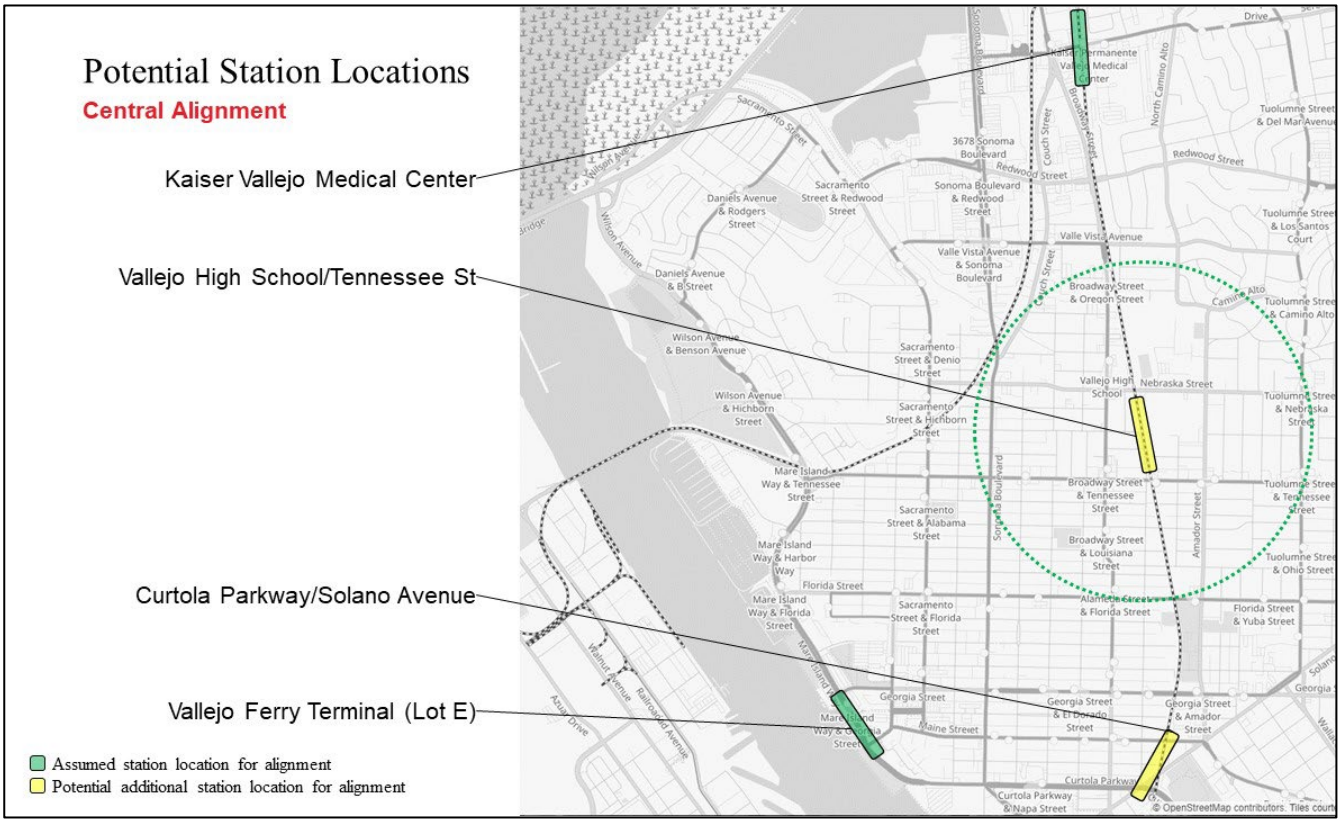


Figure 4: Central Alignment & Possible Stations

These intermediate stations are indicated as follows:

Stop	Location	Activity	Notes
Sereno/Kaiser	Sereno, south side	Kaiser Hospital	Directly adjacent to hospital – walk of about 250 feet.
Vallejo HS OR Tennessee Street	Nebraska St, north side OR Tennessee Street, north side	Vallejo HS/Corbus Field Tennessee Business District	Alternative stops separated by about 1,200 feet (6-minute walk)
Curtola/Solano	Curtola, south of Solano	Small retail; Wilson Park	Requires grading and intersection realignment

The distance between each stop is about one mile.

Preliminary Travel Market

The Replica Travel Data was also used to consider overall travel in the walksheds of the Central Alignment stations. Overall activity is somewhat greater on the Central Alignment, with about 50,000 one-way trips that originate in its walkshed. About 30,000 trips originate in the Curtola-Solano walkshed, and another 20,000 trips originate in the VHS Station walkshed. This data is for all trips (not just transit trips) and is used to identify the potential market.

Right of Way Ownership

The Union Pacific Railroad owns the right of way and leases it to California Northern Railroad, which is responsible for rail operations.

3.3 City General Plan and Study Guiding Principles

The City General Plan identifies transportation as a key driver of economic development. Included are policies intended to enhance regional transit services, increase regional transit and ferry ridership to and from Vallejo, and improve visitor connections between the Vallejo Ferry and Napa.

The study's Guiding Principles state:

- Stations will be located in areas of high trip generation and identified or planned development sites.
- Positive and negative community impacts will be assessed, and mitigations will be proposed.

There are tradeoffs between these alignment options. The West Alignment is shorter and requires less construction along Mare Island Way. The Central Alignment provides slightly better access to Kaiser Hospital, and much better access to Vallejo High School and the Gibson Park area, which is reflected in its overall travel being greater than the West Alignment.

3.4 City's Preferred Alignment

Based on the General Plan's focus on in-fill development along the Sonoma Boulevard Corridor, the city staff recommend the West Alignment as the preferred option. The overall conclusion is that the West Alignment is better situated to serve the most people in the community, with more redevelopment potential compared to the Central Alignment and better opportunities for increased density. The West Alignment and station locations are shown in the figure below.

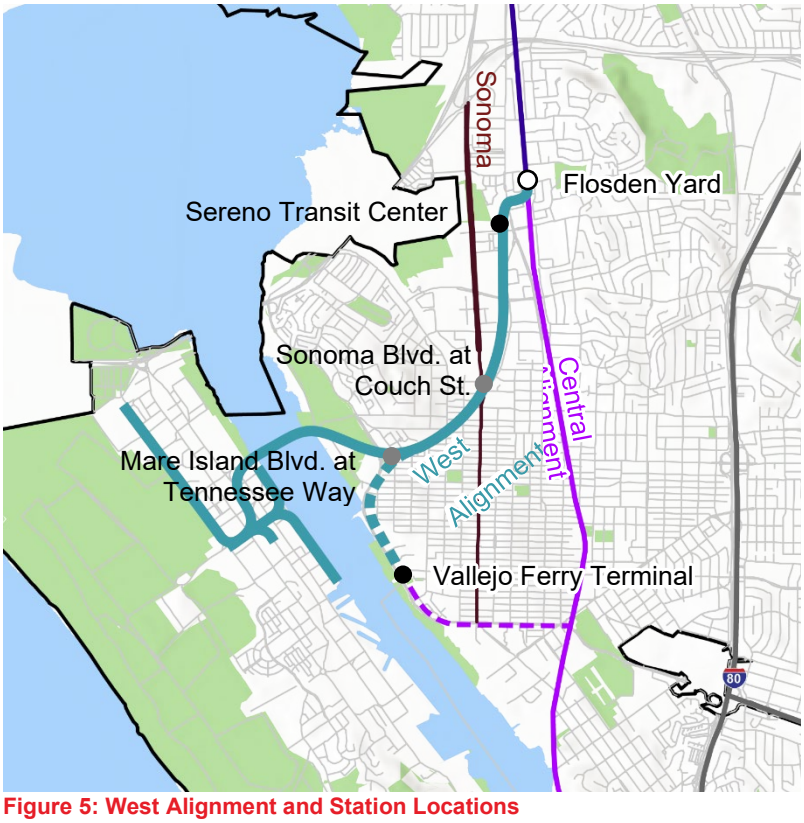


Figure 5: West Alignment and Station Locations

4. Existing Conditions

To enable a robust analysis, an understanding of the condition of the current railroad infrastructure and the functioning of the adjacent roadways, transit services, and land uses are critical data needs. The Existing Conditions Report provides a comprehensive evaluation of various critical elements including:

- Railroad rights-of-way lines and infrastructure
- Rail-served facilities
- Utility crossings
- Highway operations
- Transit service
- Adjacent land use in the City of Vallejo

These components are essential for understanding the operational capacity, compatibility, and potential challenges that may arise when integrating passenger rail services into the existing freight rail network.

By thoroughly examining these aspects, the report will serve as a foundation for informed decision-making, effective planning, and coordinated efforts among stakeholders, ultimately contributing to the successful development of a sustainable and efficient passenger rail system.

4.1 Existing Rail Right-of-Way

The Existing Rail Right-of-Way section delves into the current ownership and usage of rail corridors in the Vallejo area, which is critical for assessing the feasibility of proposed passenger rail services. Please refer to Figure 6: Rail Right-of-Way (ROW) Ownership below for an overview of the Key ROW Segments evaluated in the study.

Key ROW Segments and Ownership:

- Mare Island Spur (Owned by the City of Vallejo)
  - Extends from Flosden Yard to Mare Island.
  - Used for freight operations.
  - Approximately 2.6 miles long with a ROW width of 60 to 80 feet.
- Vallejo to Napa Junction (Owned by UPRR)
  - Connects Vallejo and Napa Junction.
  - Leased to CFNR for freight services.
  - Spans about 7.3 miles and traverses Vallejo and American Canyon.
- Suisun/Fairfield to Napa Junction (Owned by UPRR)
  - Links Suisun/Fairfield with Napa Junction.
  - Also leased to CFNR for freight services.
  - Approximately 12.6 miles, passing through American Canyon, Cordelia, Fairfield, and parts of Solano County.
- Napa to Napa Junction (Owned by UPRR)
  - Runs south from NVRR interchange at Rocktram to Napa Junction.
  - Used for freight services by CFNR.
  - Around 5.1 miles in length, covers areas in American Canyon and Napa.

- Napa to Saint Helena (Owned by NVRR)
  - Extends north from Rocktram to St. Helena.
  - Primarily for the Napa Valley Wine Train (tourist/excursion operations).
  - Covers approximately 22 miles through Napa, Yountville, St. Helena, and unincorporated Napa County.
- Novato to Brazos/Green Island (Owned by SMART)
  - From Novato to UPRR/CFNR interchange at Napa Junction.
  - Currently for limited freight operations; potential passenger service corridor.
  - Roughly 24 miles long, parallels State Route 37.
- Brazos/Green Island to Napa Junction (Owned by UPRR)
  - East/West route ending at Napa Junction.
  - Dedicated to freight operations under a lease to CFNR.
  - The segment is about 2.2 miles through American Canyon.

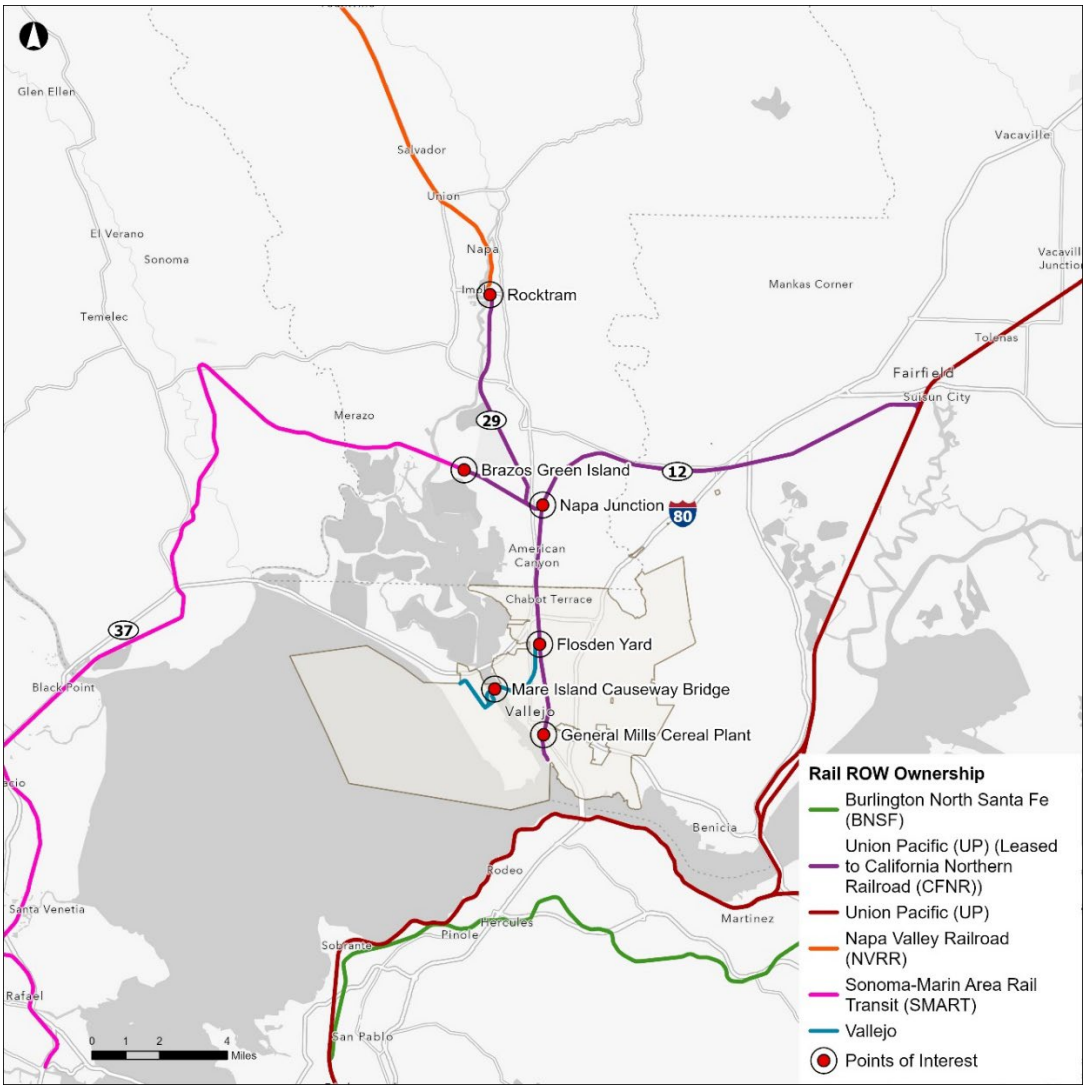


Figure 6: Rail Right-of-Way (ROW) Ownership

Historical Context:

- The various rail routes, primarily established in the late 19th and early 20th centuries, have been instrumental in shaping regional connectivity and economic development.
- Ownership and operational control have evolved over time, with current key stakeholders being the City of Vallejo, UPRR, SMART, and NVRR.
- These routes initially catered to both passenger and freight services but have since diversified, with some focusing exclusively on freight and others, like the Napa Valley Wine Train, serving as tourist attractions.

4.1.1 Key Rail Infrastructure

Prior feasibility studies for passenger rail service have studied and catalogued critical rail infrastructure elements within the study area. A desktop analysis, along with a limited field assessment, was conducted to verify and identify any changes to the key rail-related infrastructure since the previous reports. This involved evaluating publicly accessible data from UPRR, CFNR, and NVRR, such as track charts, projected enhancements, and existing and predicted freight train service levels. The aim was to define and document the current and anticipated baseline conditions of the infrastructure and operations on the rail corridors within the study area.

The following section synthesizes information gathered from past studies, offering an overview of critical rail infrastructure components, including mainlines, sidings, connections, structures, utilities, and the overall condition of the track infrastructure.

The current track adequately facilitates low-speed, low-priority freight operations, with top speeds set between ten and twenty miles per hour while meeting all minimum regulatory requirements. The entire track infrastructure is currently maintained to support existing usage while prioritizing minimal upkeep costs to sustain the current condition of the rail lines. This approach ensures a functional system for its current operations while delaying significant investment until a change in service or safety standards warrants.

Establishing passenger service on the various routes would necessitate substantial financial investments to adhere to the strict safety, reliability, comfort and speed standards of passenger transport. The following summary provides a detailed look into these key rail infrastructure areas, organized by ROW ownership.

4.1.2 Mainlines

The table below provides a general overview of the existing railway lines in the study areas focusing on four critical segments: Vallejo to Napa Junction, Suisun/Fairfield to Napa Junction, Napa Junction to Napa, and Napa to Saint Helena. These segments form the backbone of the region's freight network. Notably, all segments, as well as the SMART owned lines to Novato, converge at Napa Junction, a pivotal juncture. This strategic wye connection enables smooth and seamless transitions between the segments.

Table 1 - Summary of Mainline Routes and Distances

Route Segment	Length
Vallejo/Mare Island to Napa Junction (City & UPRR)	~ 7.3 miles
Suisun/Fairfield to Napa Junction (UPRR)	~ 12.6 miles
Napa Junction to Napa (UPRR)	~ 5.6 miles
Napa Junction to Brazos Junction (UPRR)	~ 2.2 miles
Brazos Junction to Novato/Hamilton Station (SMART)	~ 26.2 miles
Napa to Saint Helena (NVRR):	~ 22.0 miles

4.2 Interchanges, Wyes, Sidings, and Yards

The following section offers an overview of the key components of the rail infrastructure such as interchanges, wyes, sidings, and yards within the study area. These elements are utilized in the existing freight railway operations and facilitate railcar movement, switching activities, and assembling or disassembling of trains. Grasping the existing use of these components is critical in estimating future requirements and pinpointing potential enhancements that may be needed with the introduction of passenger service in the region. The following subsections provide a detailed account of these elements, their locations, and their respective functions. Within the following sections, CFNR is mentioned in the context of lessee operator for freight operations on UPRR owned assets.

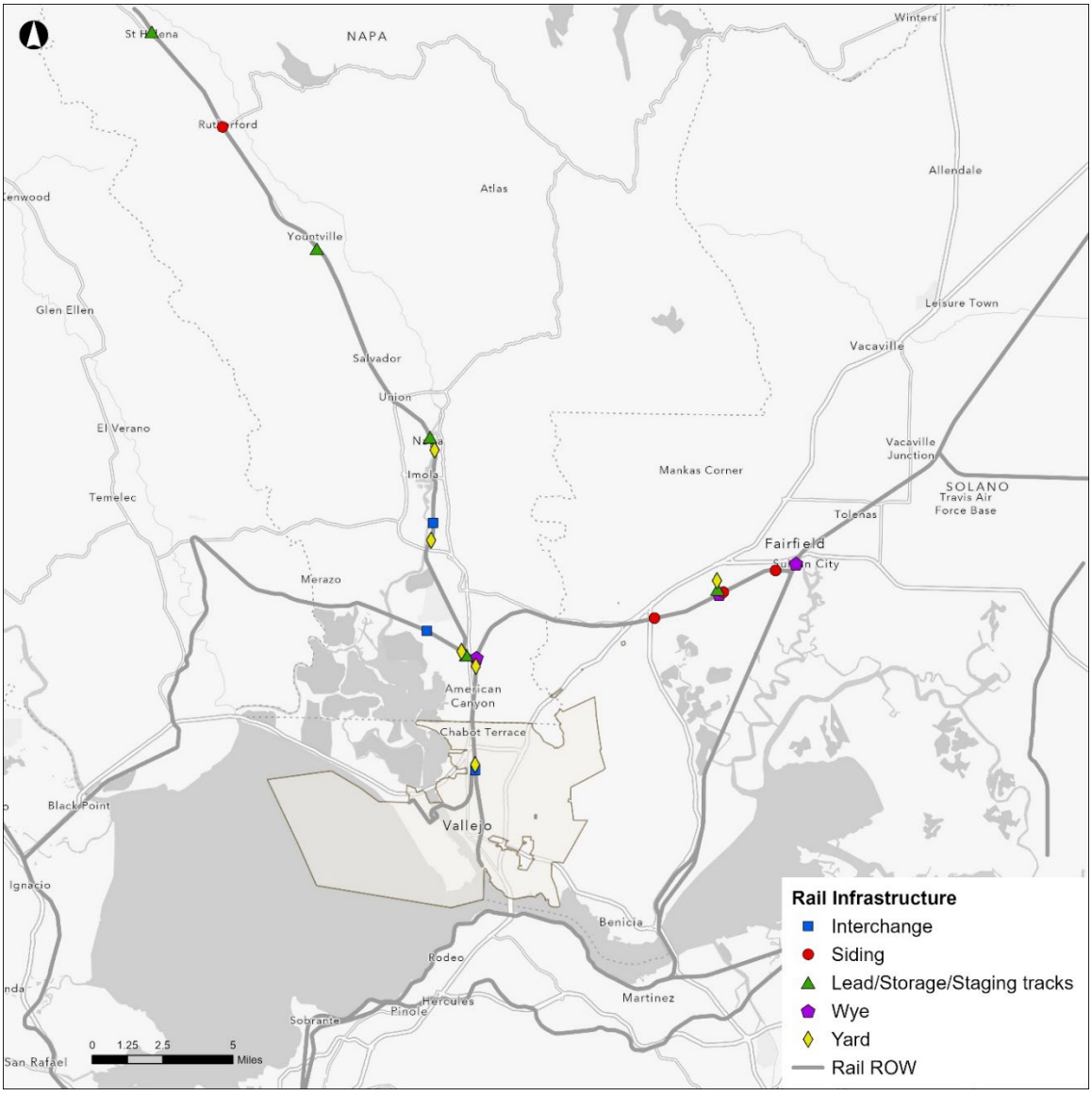


Figure 7: Interchanges, Wyes, Sidings, and Yards

4.2.1 Interchanges and Wyes –

A rail interchange is where a transfer of cars from one railroad to another at a common junction point can take place. A rail wye is an arrangement of tracks were three lines meet that forms a "Y" shape. This section summarizes rail infrastructure elements within the Vallejo study area, combining insights from prior studies with updated field assessments. It establishes a current baseline of the infrastructure and operations along these corridors for use in contemplating passenger rail service.

Existing interchanges and wyes within the project study area are as follows:

- Suisun/Fairfield Wye and UPRR/CFNR Interchange
- Fairfield Busch Wye
- Napa Junction Wye
- Brazos Junction CFNR/SMART Interchange
- Vallejo Mare Island Spur/CFNR Interchange (Figure 8: Flosden Yard & Junction, Vallejo)
- NVRR/CFNR Interchange

Figure 8: Flosden Yard & Junction, Vallejo. (Source: Google Earth)

4.2.2 Sidings and Yards

Sidings - secondary tracks that allow trains on the same line to pass one another, and yards - complex systems of tracks for storing, sorting, or loading/unloading railroad cars, are central to efficient and effective railway operations. These components serve as critical elements in ensuring that freight and passenger services can operate concurrently without causing delays or interruptions.

Existing siding and yards within the project study area are as follows:

- Suisun/Fairfield Lead Track & Siding
- Fairfield Siding and Runaround
- Cordelia Road Fairfield Storage/Staging Tracks
- Fairfield Busch Yard
- Cordelia Siding
- Napa Junction/American Canyon Yard and CFNR Shop
- Flosden Yard

4.2.3 Structures, Tunnels, Drainage Crossings

This section offers an overview of existing bridges, structures, tunnels, and drainage crossings identified within the study area. These structures were initially identified in the Napa/Solano Passenger/Freight Rail Study in 2003 within the ROW owned by UPRR and NVRR. Further desktop research was conducted to detect any features not captured or summarized in previous reports. Any structures, tunnels, and drainage crossings previously reported or discovered during the current assessment are classified in the following tables, segmented accordingly.

The 2003 study suggested that the structures were generally in a usable condition with any necessary repairs to bridges and other structures being relatively minor for facilitating passenger rail service. The purpose of this section is to pinpoint discoverable features using desktop methods which would subsequently need more detailed evaluation for their application in a secure and reliable passenger system. Some modifications or upgrades may be necessary to facilitate potential passenger services contingent on infrastructure requirements dictated by the network design or the need to maintain ongoing freight service. This section does not make any judgments on the condition of the identified features, rather, it is merely a summary of features recognized in earlier studies and current investigations.

Mare Island Spur (City of Vallejo) -

The Mare Island Rail Spur has no track structures, tunnels, or significant drainage crossings apart from the overhead structure at Sacramento Ave. This 1930's era structure recently underwent a significant replacement by the City of Vallejo. As a result of this upgrade, reliability and consistency of rail service in this corridor has likely improved.

Rail traffic heading towards Mare Island does traverse the existing Mare Island Causeway bridge, but it is beyond the scope of this study (as it was with previous studies) to examine or evaluate the condition of the bridge.

Total Features: ±2

Key Features:

- Overhead Roadway Structure (Sacramento St.): 95 feet at milepost 1.5.
- Mare Island Causeway: Approximately 2,000 feet at milepost 2.4.

Flosden to Napa Junction (UPRR/CFNR) –

The following segment spotlights various structures, tunnels, and significant drainage crossings present within Flosden to Napa Junction section owned by UPRR. A complete list of these elements are summarized below. Broadly speaking, the current structural components are restricted to culvert crossings and other minor drainage-related structures. Notably, State Route 37 extends overhead within this segment and is of recent construction having been completed in the mid-2000's.

Total Features: 7

Key Features:

- Railway Bridges/Structures range from 10 to 110 feet in length.
- Notable Overhead Roadway Structures (Route 37 off-ramp and Route 37): 40 feet and 110 feet respectively.
- Several possible culvert crossings noted.

Napa Junction to Suisun/Fairfield (UPRR/CFNR) –

This portion highlights different structures, tunnels, and drainage crossings within the Napa Junction to Suisun/Fairfield segment owned by UPRR. An inventory of these components are summarized below. Several culverts and drainage crossings are located throughout this segment. Drainage crossings within the Jameson Canyon region are challenging to pinpoint due to dense tree cover and restricted site access. Notably, the rail line crosses Interstate 80 overhead via an elevated structure and runs beneath an elevated portion of Interstate 680 near Cordelia.

Total Features: ±19

Key Features:

- Railway Bridges/Structures range from 16 to 72 feet in length.
- Overhead Roadway Structures at Route 29 and Devlin Rd, each 50 feet in length.
- Several possible culvert crossings, including one at Sheehy Creek.

4.2.4 Utilities

The 2003 Napa/Solano Passenger/Freight Study along with limited site observations, providing the basis for this current utility review, identified various utility crossings (electricity, water, gas, telecommunications) across rail segments. Information for this review was limited to the 2003 study's data, provided by UPRR/CFNR, and further site observations, as updated contracts weren't accessed for this evaluation. Utility crossing details, organized by segment, indicate that municipal utilities typically intersect the tracks laterally within city limits. The 2003 study found no utilities hindering infrastructure expansion for passenger operations. However, a more in-depth collection and review of utility records and agreements could enhance understanding of utilities in the area, aiding in planning for potential rail developments and early construction phase estimations.

Mare Island Spur (City of Vallejo) -

Historical railroad valuation maps for this track segment were unavailable, and it wasn't included in the 2003 Napa/Solano Passenger/Freight Rail Study. Field observations didn't reveal any longitudinal utilities within the corridor. Municipal utilities like water, power, sewer, and communication lines are expected to intersect the tracks laterally, particularly at grade crossings, within city limits. Any agreements for these utilities likely involve the City of Vallejo and utility owners. Due to limited information, details of these agreements are not currently provided for this segment.

Vallejo to Napa Junction (UPRR/CFNR) –

The following offers a summary of the lateral utility crossings located between Vallejo and Napa Junction. During the limited site visits, no longitudinal utilities were identified within this segment.

Total Crossings Identified: ±16 lateral utility crossings.

Types of Utilities: Includes power line and pipeline crossings, and cable line crossings.

Lease Holders: Mainly Pacific Gas & Electric and Pacific Bell Telephone Company.

Key Utilities:

- Several power line crossings dating back to the early 1970s.
- Multiple pipeline crossings and non-electric cable line crossings.

Napa Junction to Suisun/Fairfield (UPRR/CFNR) –

The following summarizes lateral utility crossings identified between Napa Junction and Suisun/Fairfield. During limited site visits, markers indicative of longitudinal utilities was spotted at various crossing points such as Watson Lane in American Canyon, Lopes Road in Cordelia, Cordelia Road, Beck Ave, and Pennsylvania Ave in Fairfield. These markers indicated the presence of fiber optic lines generally on the southern side of the ROW line. Historical railroad valuation maps failed to conclusively illustrate any lines within the UPRR ROW at this location. It is worth highlighting that the 2003 study concluded that there were no longitudinal utilities present in this ROW at the time of the study, however, utility crossing agreements with M.L. Media Partners at MP 54.1 are dated mid-1993 which suggests that fiber optics have been present in the ROW since at least this date. It is assumed that fiber optic cable runs longitudinal the length of the segment.

Total Crossings Identified: ±27 lateral utility crossings.

Types of Utilities: Power line, pipeline, and fiber optic line crossings.

Key Observations:

- Presence of fiber optic lines, indicated by markers at various crossings.
- Historical data suggests fiber optics have been present in the ROW since at least the mid-1990s.

Notable Agreements: Include older agreements dating back to the 1950s and 1960s for pipelines and power lines.

4.2.5 Physical Track Infrastructure

An evaluation of the physical infrastructure on various segments within the study area was completed. The original tracks were laid in the late 19th century and have since undergone only periodic upgrades to maintain track standards sufficient for sole freight traffic or low speed passenger service in the case of NVRR. Segments with less traffic saw fewer upgrades, and some, like on NVRR, were even temporarily abandoned.

Track, Turnouts, and Ballast Conditions

The study provided a detailed overview of the existing track and turnout infrastructure. In summary, track and turnouts are not sufficient to support a safe and reliable passenger service without considerable capital investment. The study identified the following:

Infrastructure Development and Current State

- **Investment Trends**: Investment and maintenance of the existing infrastructure has historically followed minimum standards required to maintain freight service demand.
- **Condition Variance**: Track conditions vary, influenced by historical freight service patterns.
- **Existing Conditions**: Tracks are currently maintained for low-speed freight service (around 10 mph), meeting FRA Class II Track Standards.

Upgrading for Passenger Service

- **Requirements**: Comprehensive overhaul needed for safe, reliable passenger service.
- **Specific Upgrades**: Includes replacing rail, ties, ballast, turnouts, road crossings, and upgrading road crossing protection.
- **Structures and Bridges**: No substantial work anticipated, but detailed future studies necessary.
- **Geometric Alignment**: Existing alignment deemed suitable for upgrades.

A summary of the finding by segment is provided below:

City of Vallejo Owned Track

The Mare Island Spur's rail infrastructure is notably better compared to other connecting rail segments, featuring a combination of jointed and continuously welded rail, each weighing 119 pounds per yard. The weight of the rail suggests significant past refurbishments (other sections of rail are lighter, when rail equipment weight and dimensions were considerably lower than they are today), but the exact timeline of these upgrades is unknown. The ties in this segment vary in age, reflecting a history of maintenance and upgrades, with some likely replaced in the last twenty years. Secured with double-shoulder plates, spikes, and rail anchors, these ties might be suitable for passenger service, subject to detailed inspection.

Tie longevity is affected by factors like wood type, size, and particularly drainage conditions. Ties in areas with good drainage tend to last longer. However, the ballast, mainly rounded river rock, is a concern. Its shape and contamination with dirt and silt reduce its effectiveness for high-speed operations. Despite superficial additions of angular rock during maintenance, the predominance of the original rounded rock requires replacement for better stability. Figure 9 shows typical track conditions in this segment.

Figure 9: Mare Island Spur

Vallejo to Napa Junction (UPRR/CFNR) –

The Vallejo-Napa Junction rail segment is in poor condition, characterized by numerous battered and broken rail ends. The rails, mainly 33'-39' long and weighing 90 pounds per yard, are generally inadequate, although some crossings have been upgraded to 113-pound rails. The wooden ties, which have been intermittently replaced to meet regulatory standards, are not suitable for passenger service due to varying age and condition. These ties, fixed with single-shoulder spikes without rail anchoring, have a lifespan heavily influenced by drainage quality.

Figure 10: CFNR Vallejo Line

The turnouts in this segment are predominantly 90 pounds, adhering to historical standards set by the Southern Pacific Railroad. They consist of various manual types but reflect the overall poor tie condition. Despite compliance-driven tie replacements, the turnout infrastructure needs major improvements for passenger rail use.

The ballast, largely composed of older, rounded river rock, is contaminated with dirt and silt, reducing its effectiveness. This ballast type lacks the necessary interlocking ability for higher-speed operations and would require replacement. Despite the addition of angular rock during maintenance, a significant amount of the original, less effective rounded rock remains under the ties and needs comprehensive replacement. Figure 10 illustrates these typical track conditions in the segment.

Napa Junction to Suisun/Fairfield (UPRR/CFNR) –

This segment features 39' jointed rails weighing 112-136 pounds per yard, primarily comprised of relay rails repurposed from mainline locations. The mainline commonly has 131–132-pound sections, while yards and sidings feature lighter 90–110-pound rails. Rail conditions include refurbished at-grade crossings with 136-pound continuously welded rail. Tie conditions vary, with some having a lengthy service history. Fasteners are mostly double shouldered with track spikes and rail anchoring in heavier sections. Turnouts, adhering to Southern Pacific Railroad standards, range from 130-136 pounds. However, the infrastructure, including turnouts and ties, would require improvements for passenger service. The rock ballast, a mix of crushed and rounded river rock, has been contaminated in some areas, compromising its support capacity.

4.2.6 Signaling System

At present, none of the segments analyzed in this study have a signalized system in place.
To establish passenger services on these segments, installation, and operation of signaling systems will be required.

4.3 Roadway-Rail Crossings:

Railroad grade crossings, where roadways intersect with tracks at the same level, are crucial safety points equipped with control and warning devices. These crossings are categorized into active and passive types:

- Active Grade Crossings: Feature dynamic warning systems like flashing lights, bells, and gate arms, supplemented by passive devices such as crossbucks ('yield to the train' signs), yield or stop signs, and pavement markings.
- Passive Grade Crossings: Solely rely on passive warning devices for safety.

Figure 11 - CFNR-Sereno Grade Crossing

Crossings are also classified as public (part of public roadways and maintained by a public authority) or private (on private roads for use by the owner or authorized individuals, not maintained by a public highway authority). Over time, many crossings in the studied segments have been modernized with continuous welded rail and precast inlay concrete panels for enhanced safety. However, existing signals, designed for low-speed operations, require significant upgrades for higher-speed rail operations. For public crossings, any crossings that currently lack active warning devices will most likely need to be upgraded to active warning devices to comply with the latest state safety standards. The exact design of these warning devices will be based on several factors, including but not limited to track geometry, line of sight, timetable, train speed, and the nature and frequency of crossing use.

Mare Island Spur –

This segment has a series of public crossings, all equipped with gated signals. Key crossings include major streets like Broadway, Sereno Dr, and Redwood Rd. In total, there are 9 public crossings within this segment, each featuring advanced safety mechanisms.

Vallejo to Napa Junction –

This segment includes a mix of public crossings, with several featuring gated signals and a few governed by stop signs. Streets like S Napa Junction Rd, Donaldson Way, and American Canyon Rd are part of these crossings. The segment has around 13 public crossings, varying from gated signals to stop signs. Rail crossing locations from Napa Junction through Vallejo are shown in Figure 13 below.

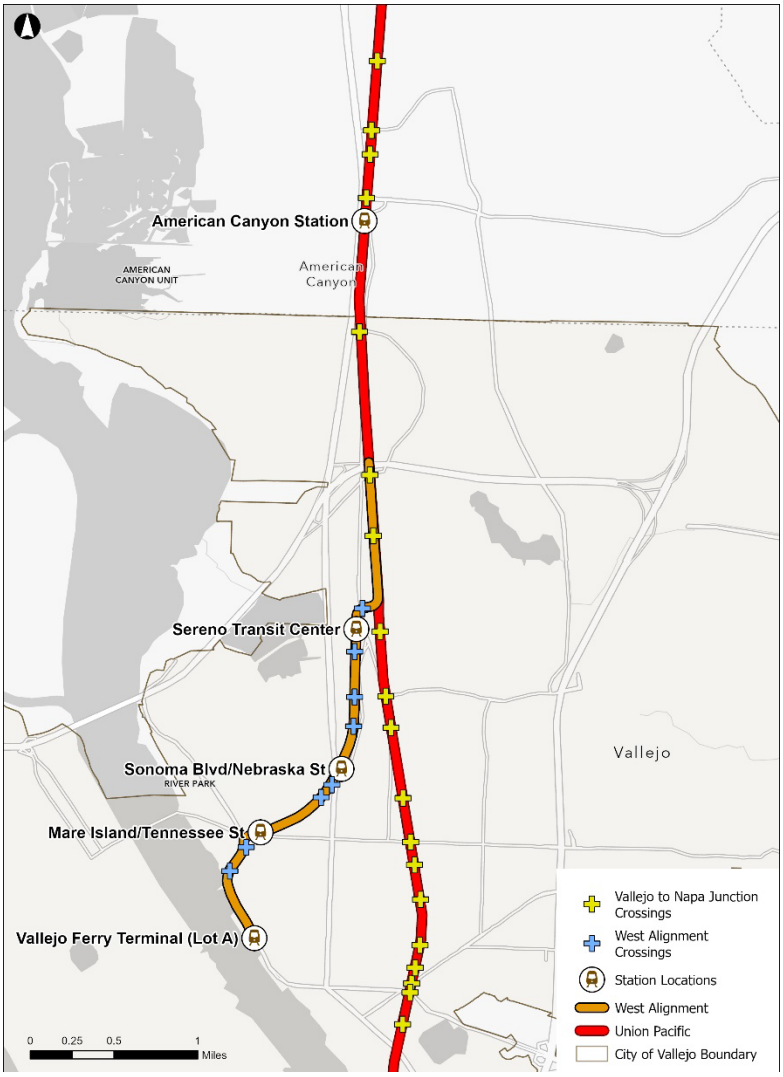


Figure 12: Railroad crossings in Vallejo and American Canyon

Napa Junction to Suisun/Fairfield –

This section features both public and private grade crossings, including gated ones and those with stop signs. Notable crossings include Cordelia Rd and Lopes Rd. There are about 18 crossings in this segment, a combination of public gated, public stop sign, and private stop sign crossings.

4.4 Existing Freight Operations

Freight operations in the study area are primarily managed by the California Northern Railroad (CFNR), under a lease agreement with Union Pacific Railroad (UPRR), the owner of the line. The lease includes UPRR-owned assets in the area and other UPRR assets operated by CFNR in California. Key aspects of these operations include:

- **Freight Service and Pricing**: UPRR determines freight service prices, handles customer billing, and collects charges. CFNR, as UPRR's agent, is compensated based on the total freight charges per

shipment. CFNR operates daily service (Monday through Friday) during daylight hours, offering basic and additional services for extra fees.

- **Interchange Operations**: Freight car interchange between UPRR and CFNR occurs at the Suisun/Fairfield wye. Railcars arrive from UPRR's Roseville yard at night and are handed over to CFNR. CFNR also switches operations for customers in Vallejo, American Canyon, or Napa from the Napa Junction/American Canyon yard and for Suisun/Fairfield industry from the Fairfield-Busch yard.
- **Locomotive Positioning**: CFNR locomotives are positioned near the two operating areas to facilitate switching. Locomotives are repositioned between areas as needed for operational purposes.
- **Freight Operations Beyond Napa**: North of Napa (Rocktram) to St. Helena, freight operations are conducted by Napa Valley Railroad (NVRR, Wine Train operator) on an irregular basis. While NVRR currently has no active freight customers, it has the potential to facilitate shipments.
- **Operations West of Brazos Junction**: The former Northwestern Pacific Railroad line, now owned by Sonoma-Marin Area Rail Transit (SMART), sees freight car exchanges with CFNR at the UPRR interchange near Green Island Road.
- **Freight Industries and Volumes**: In 2001, CFNR managed about 17,500 carloads, serving around 20 active customers. However, with changes over time, such as the closures of General Mills and Napa Pipe, and reduced volumes at Anheuser-Busch, the number of active customers has declined to about 11, with freight volumes approximately half of what they were in 2001, estimated at around 8,000 railcars annually. CFNR also offers storage for unused railcars.

There are approximately 11 active freight customers. These industries are located along the rail line, each within specific segments, reflecting the current utilization of the rail for freight operations and include:

- **Mare Island Spur**: 1 industry (Alstom Mare Island)
- **Napa Junction to Vallejo**: 1 industry (Adobe Lumber)
- **Napa Junction to Suisun/Fairfield**: 3 industries (Sheldon United Terminal, Strategic Materials, Amcor Rigid Plastics)
- **Napa Junction to Napa**: 2 industries (Biagi Napa Logistics Park, Napa Logistics Park)
- **Napa Junction to Brazos Junction**: 3 industries (G3 Enterprises, Central Valley Builders, Biagi Green Island Rd)

4.5 Future Freight Development Opportunities

In the Vallejo, American Canyon/Napa, and Suisun/Fairfield areas, there are several inactive but rail-connected facilities with potential for future freight rail development. These sites are distributed across different rail segments:

Vallejo to Napa Junction Segment:

- Includes the previous General Mills Site, which is a significant underused industrial location with existing rail connectivity.

Napa Junction to Napa Segment:

- Contains multiple inactive sites such as a Waste Transfer Site, Biagi Airpark Warehouse, and the Previous Napa Pipe Site.

Napa Junction to Brazos Junction Segment:

- Houses several warehouses along with the All Bay Mill & Lumber Co.

These locations, being connected to rail lines, hold substantial promise for reviving rail-related industrial activities and supporting regional economic growth.

4.6 Highway Operations

This section provides an assessment of existing highways near the City of Vallejo including lane configurations, annual average daily traffic (AADT), average speeds, and highway transit services. These highways and significant arterials include:

- Highway 29/Sonoma Boulevard
- Highway 37
- Highway 12
- Interstate 80
- Interstate 780 (excluded because a rail service would not serve this corridor)

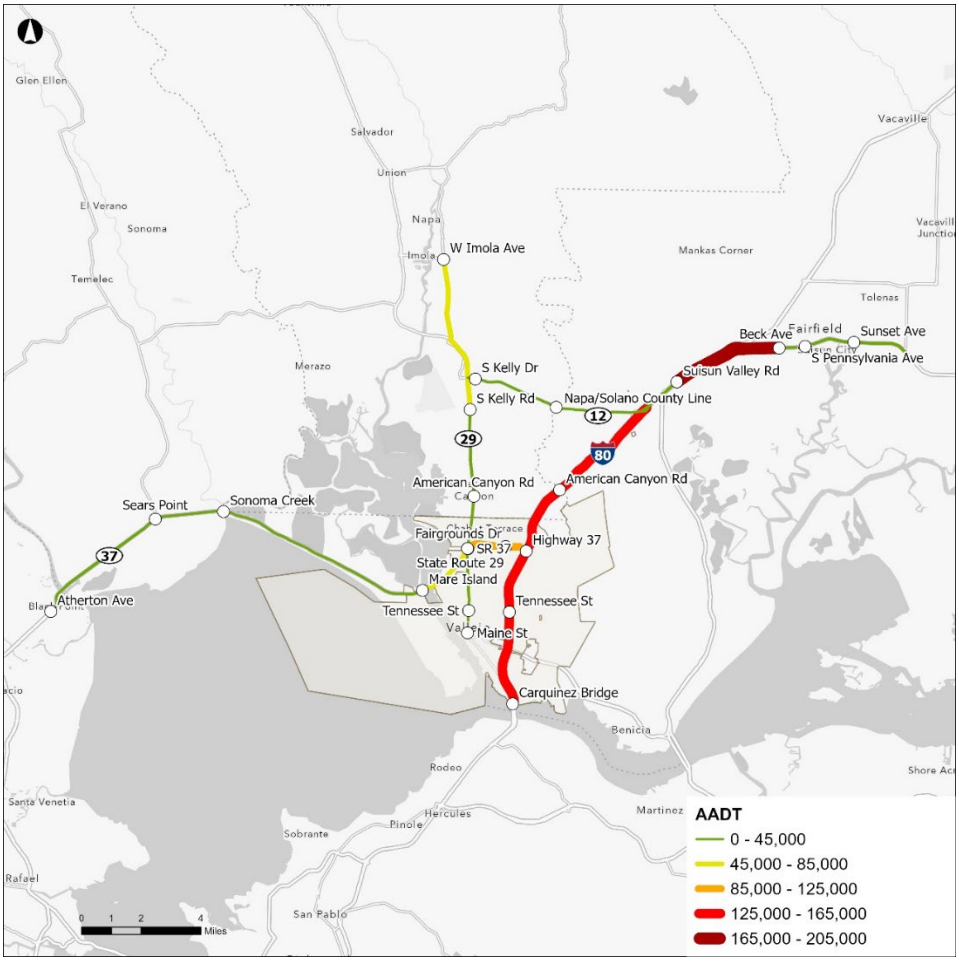


Figure 13: AADT Volumes

4.6.1 Highway 37 to Novato

Highway 37 is a 21-mile east-west State Route that connects Interstate 80 in Vallejo to U.S. Route 101 in Novato. Highway 37 is primarily a four-lane road with two lanes in each direction except for a 9-mile stretch between Mare Island and Sears Point where the highway is a two-lane road with one lane in each direction. There are studies underway for widening the highway.

The speed limit is 65 mph for the four-lane segments and 55 mph for the two-lane segments. The average speed on Highway 37 during congestion is 45 mph from Vallejo to Novato.

There are currently no public transit services on Highway 37 to connect Novato and Vallejo.

- SolTrans Red Line operates on Highway 37 from Highway 29 to Interstate 80 to connect Vallejo with Fairfield.

There is currently no transit-friendly infrastructure on Highway 37 and transit vehicles using this highway are subject to peak traffic conditions.

4.6.2 Highway 29 to Napa

Highway 29 is a north-south state route that connects Vallejo to Napa. In Vallejo, Highway 29 is referred to as Sonoma Boulevard which is primarily a four-lane road with two lanes in each direction except for sections near Lincoln Elementary School where Sonoma Boulevard is a two-lane road with one lane in each direction. In Vallejo, Highway 29 is slower with numerous traffic signals. Highway 29 becomes a four-lane road with fewer traffic signals and smoother traffic beyond Vallejo.

The speed limit for Highway 29 is 30 mph for Sonoma Boulevard in Vallejo and 55 mph for more free-flowing sections towards Napa. The average speed on Highway 29 during congestion is 28 mph from Vallejo to Napa.

For SolTrans Transit:

- The Red Line operates on Highway 29 to connect Richmond BART, Vallejo, and Fairfield.
- Route 7A/7B utilizes Highway 29 in servicing Vallejo.

For Vine Transit:

- The Vine Napa-BART express route, routes 11 and 11X all utilize Highway 29 to connect Napa with the El Cerrito del Norte BART station, with intermediate stops in Vallejo.

There is currently no transit-friendly infrastructure on Highway 29 with transit vehicles subject to peak traffic conditions. Bus stop facilities on Sonoma Boulevard are currently unsheltered.

4.6.3 Highway 12 to Suisun/Fairfield

Highway 12 is a four-lane, east-west State Route connecting Napa and Fairfield-Suisun. Approaching Fairfield, Highway 12 merges with Interstate 80, a twelve-lane road with six lanes in each direction, then splits from I-80 and continues as a four-lane road to Fairfield-Suisun.

The speed limit for Highway 12 at all sections between Napa and Fairfield-Suisun is 55 mph. The average speed during congestion is 30mph from Napa to Fairfield-Suisun.

The Vine Transit Napa-Solano Express Route operates on Highway 12 to connect Napa to Fairfield-Suisun.

There is no transit-friendly infrastructure on Highway 12 in the four-lane section. In the merge with Interstate 80, there is one HOV lane in each direction that the transit vehicles can use.

4.6.4 Interstate 80 – Carquinez Bridge to American Canyon Road

Interstate 80 is the primary highway connecting Vallejo to the East Bay and San Francisco, and eastward to Sacramento.

The speed limit for Interstate 80 at all sections within Vallejo is 65 mph. The average speed during congestion within Vallejo is 30mph.

SolTrans/Solano County Express and Vine Transit all operate on sections of I-80.

4.7 Transit Services

Vallejo enjoys multimodal transit service with ferries and buses providing access within and outside the city; these services have varying levels of quality – speed, convenience, and comfort – highlighted in this section.

4.7.1 Systems Overview

SolTrans, the local operator, VINE Transit (the Napa operator) and San Francisco Bay Ferry all provide service within the city and connections to important nodes outside Vallejo. These include downtown San Francisco, Napa, Fairfield/Suisun, Davis, and Walnut Creek as shown in Figure 15. There are 311 miles of transit service within the Vallejo boundaries. Capitol Corridor train service between San Jose and Sacramento is available at the Suisun/Fairfield Station.

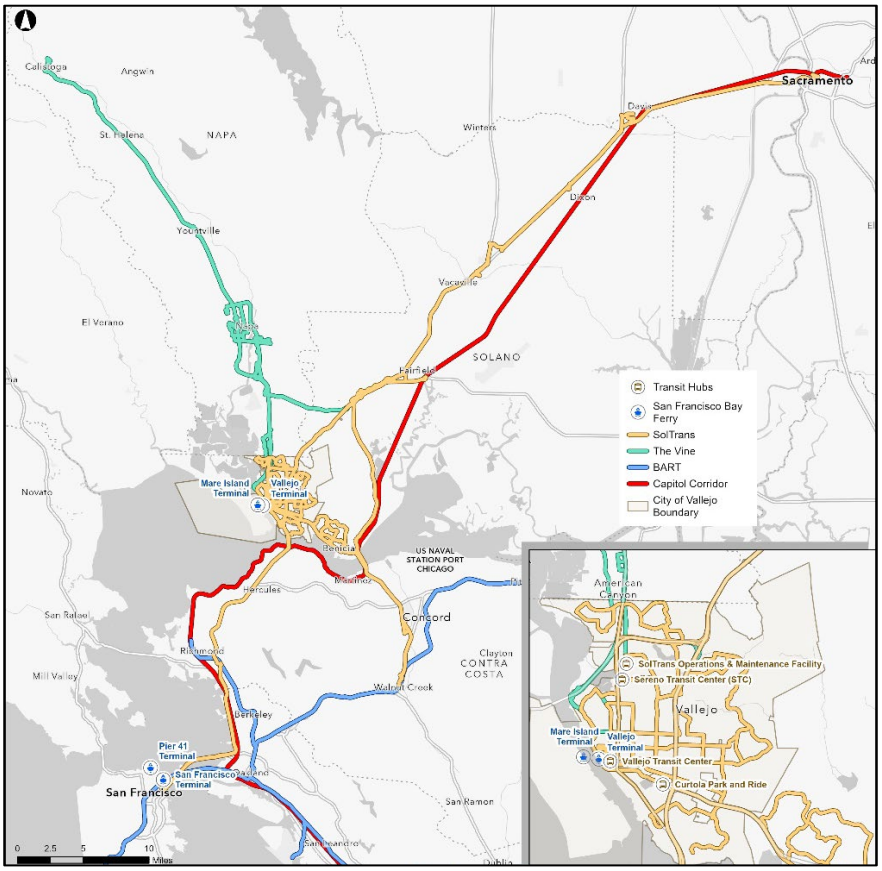


Figure 14. Transit systems in Vallejo - SolTrans, VINE Transit, and BART

SolTrans offers local bus service in Vallejo and Benicia, and express service from Davis to San Francisco. Transit partners to consult for future passenger rail service may include the City of Vallejo, City of Benicia, Solano Mobility, Solano Transportation Authority, City of Fairfield Transit (FAST), Napa Vine Transit, Flix Bus, Greyhound, Capitol Corridor, WETA, and the Metropolitan Transportation Commission (MTC). There are four SolTrans transit hubs as shown in Figure 16.

Vallejo Transit Center (VTC)

Curtola Park & Ride

Sereno Transit Center (STC)

SolTrans Operations & Maintenance Facility

Figure 15. SolTrans transit hubs

Figure 16. City of Vallejo existing transit service and potential station locations

The San Francisco Bay Ferry provides a connection from Solano and Napa Counties to Downtown San Francisco via the Vallejo Ferry Terminal. Passengers can transfer from the Vallejo Ferry Terminal to Suisun/Fairfield via SolTrans and to Napa via The Vine which connects to the Napa Valley Wine Train.

Figure 17. San Francisco Bay Ferry terminals

VINE Transit is operated by the Napa Valley Transportation Authority (NVTA) providing access to Calistoga to the north, El Cerrito to the south with connections to the BART system, and to Fairfield/Suisun to the east. Routes 11, 11X, and 29 pass through Vallejo which offers another regional connection option in addition to SolTrans.

4.7.2 Opportunity Areas

The existing conditions provide residents with a robust transit system offered by multiple agencies in the region. While the current system does provide connections to key locations in the region, there may be gaps and barriers to connectivity and rider experience to accommodate different types of riders and destinations. The following sections will identify challenge areas and key connections within the current system.

4.7.2.1 Challenges, barriers, gaps

The following challenges, gaps, and barriers should be considered with the new proposed passenger rail line in order to improve efficiency, connections, and rider experience.

- Reliability – identify the current ability to meet promised scheduled times and identify how a rail service could provide fewer schedule variances than current transit services or highway travel.
- Availability – identify whether there is a need for better service frequencies, and longer spans-of-operating times. Conduct an analysis of traveler demographics, their destinations, and the purpose of their trips. Extending routes, service hours, or reducing headways during peak hours may be needed to increase overall ridership and recover lost ridership from the pandemic.
- Transfers – multiple transfers can become costly, consider low-income programs and discounted transfers. In some cases, a rider may need to transfer up to 3 times using local routes, express routes, and possibly the ferry. Multiple transfers cost riders money and time and can also impact rider experience.

- Efficiencies – identify how a new passenger rail will complement the existing transit system and provide easy transfers that match up with the current transit schedules to reduce wait times. Aligning new service with existing service can improve ease of use and improve the overall system quality and rider experience. Schedule alignment, especially with the ferry, will reduce logistics planning by the rider and provide for a smoother and stress-free ride.
- Fare – new passenger rail services could consider senior and low-income programs that align with other discounted fares within the region. An analysis of rider demographics and origin/destination can inform how different groups use the system and the total cost of their trips.
- Paratransit – current system needs supplemental services via paratransit for senior and mobility-impaired passengers.

4.7.2.2 Key connections

There are five key transfer locations in the existing transit system (Figure 19). Transfer locations within the study area include:

- **Vallejo Terminal** – central hub that connects to all regions. Two VINE Transit routes reach this hub from Napa.
- **Fairfield/Suisun** – direct connection to VINE Transit and SolTrans routes; the SolTrans Blue Line ends in Sacramento. Connection to Capital Corridor train service.

Transfer locations outside the study area include:

- **El Cerrito del Norte** – direct connection to VINE Transit and SolTrans routes, transfer to BART system.
- **Downtown San Francisco** – direct connection to SolTrans and the San Francisco Bay Ferry, transfer to the BART and Muni systems.
- **Walnut Creek** – direct connection to SolTrans route, transfer to the BART system.

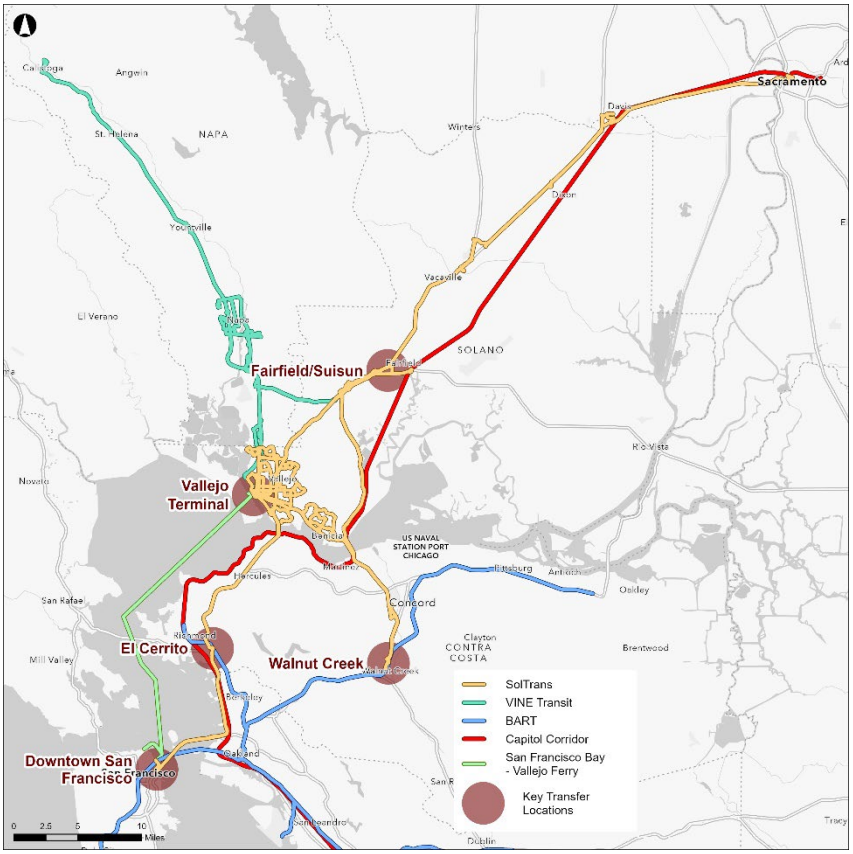


Figure 18. Key transfers

4.8 Land Uses – City of Vallejo

4.8.1 Purpose

The purpose of this chapter is to provide an assessment of land use conditions in proximity to the proposed four stations and rail alignment within the City of Vallejo. This assessment provides context on the socioeconomic conditions within the city, a synthesis of applicable land use policies, and assessments of existing zoning guidelines within the proposed rail alignment and four station areas.

4.8.2 Guiding Policies

4.8.2.1 Citywide Policies

General Plan 2040

Adopted in August 2017, the planning framework outlined in the city's *General Plan* adopts a vision for future land uses and development capacity through 2040. "Action MTC-1.1D" in the *General Plan* calls for the feasibility analysis of visitor rail connections between the Vallejo Ferry Terminal and the Napa Valley.

Based on 2014 Solano County Assessor data, approximately 40 percent of land within the city is used for residential uses, followed by open space and industrial uses. The general plan update resulted in the development of nineteen guiding principles that were later referenced while crafting the *Zoning Code*. These guiding principles are grouped into four themes: 1) "community and people"; 2) "nature and the built environment"; 3) "economy, education, and training"; and 4) "mobility, transportation, and connectivity".

Title 16: Zoning Code

Adopted in July 2021, the city's *Zoning Code* implements the land use recommendations of the *General Plan* and provides guidelines for future development. Vallejo has six zoning district classes as well as six specific plans and three special overlay districts. These zoning district classes include:

- **Residential** districts with permitted residential density ranging from 9 up to 50 units per net acre.
- **Mixed use** districts with permitted residential density ranging from 30 up to 90 units per net acre.
- **Commercial** districts with permitted residential density up to 50 units per net acre in most districts.
- Non-residential districts, including **office and medical** districts; **industrial** districts, and **other/special districts**.

4.8.2.2 Relevant Specific Plans and Special Overlay Districts

Development in proximity to the proposed station areas and rail alignment would be governed by three relevant specific plans and three special overlay districts, the boundaries of which are shown in Figure 20. The *Mare Island Specific Plan* was not reviewed since it is not within walking distance of the proposed rail alignment or stations. These plans include:

White Slough Specific Plan

The *White Slough Specific Plan* was adopted in 1995 with most recent updates completed in 2010. The specific plan applies to select parcels located in the area west of the proposed Sereno Transit Center station. It is largely

focused on wetland habitat and natural resources preservation, flood mitigation, shoreline access, and traffic congestion on SR-37 and nearby streets.

Downtown Vallejo Specific Plan

The *Downtown Vallejo Specific Plan* was adopted in 2005 with most recent updates completed in 2013. The Downtown Mixed Use (DMX) zoning designation was created in 2021 to implement the specific plan. The specific plan area is divided into five districts with varying design guidelines and land use goals. These districts include: the Georgia Street Corridor, Central Downtown, Civic Center, Outer Downtown, and Southwest Downtown. The proposed Vallejo Ferry Terminal (Lot A) station would be located within Civic Center.

Sonoma Boulevard Specific Plan

The *Sonoma Boulevard Specific Plan* was adopted in 2017. The specific plan area is divided into four focus areas: North, Central North, Central South, and South. The proposed Sonoma Boulevard & Nebraska Street Station would be located within the Central North Focus Area and the station location has already been designated as a "transit-oriented development node". Directly north and south of the station along Sonoma Boulevard have recommended mixed use zoning designations as well as multimodal streetscape improvements.

Vallejo Waterfront Planned Development Master Plan and Design Guidelines

Development along the Napa River between Solano Avenue and Tennessee Street is governed by the *Vallejo Waterfront Planned Master Plan and Design Guidelines*. Adopted in 2007, with amendments as of August 2013, the purpose of the master plan per the city's website is to encourage development along the city's waterfront to be "vibrant, mixed use, and transit-oriented". The city has plans to adopt a Waterfront Specific Plan that would provide future land use recommendations and guidelines for this area.

Waterfront Specific District

The City-owned Waterfront property is instrumental in achieving the City's objective of focusing future growth in the Downtown/Waterfront District and to foster the Waterfront as a vibrant, mixed use and transit-oriented environment. The City is preparing to undergo a Specific Plan process to ensure the vision meets the community objectives and economic development potential while being integrated into the existing urban fabric.

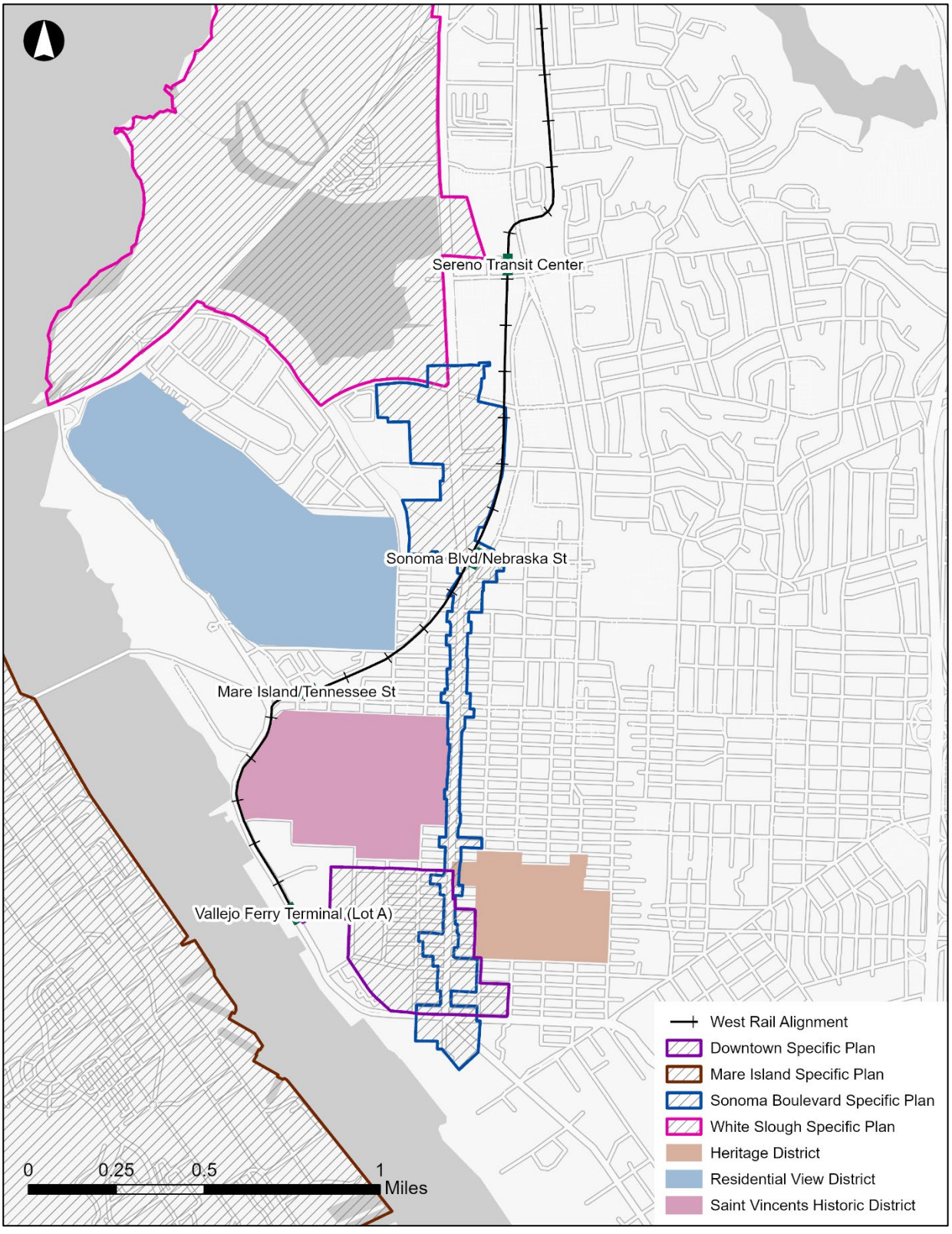
Heritage Special District and *St. Vincent's Historic Special District*

Select parcels north and east of the proposed Vallejo Ferry Terminal (Lot A) station are within the Architectural Heritage District and the St. Vincent's Historic District. These districts are formed to preserve areas and specific buildings determined to have architectural history or cultural relevance to the city. Preservation and rehabilitation requirements and design review processes apply within the district.

Residential View Special District

The Residential View District applies to select parcels in the area north of the proposed Mare Island Way & Tennessee Street station. Development within the district is generally limited to one- and two-story structures to preserve views of visual resources. Additional design guidelines and entitlement review processes apply within the district.

Figure 19: Applicable Specific Plans and Special Overlay Districts



4.8.3 Community Context

Most of the city's population is concentrated to the east of the proposed rail alignment, though redevelopment on Mare Island may add population west of the alignment in the coming years. To compare the socioeconomic characteristics of each station area to citywide averages, the census tract in which proposed stations are located was used as a reference. These include:

- Vallejo Ferry Terminal (Lot A) Station – Census Tract 2509
- Mare Island Way & Tennessee Street Station – Census Tract 2516
- Sonoma Boulevard & Nebraska Street Station – Census Tract 2515
- Sereno Transit Center Station – Census Tract 2518.02

Key socioeconomic findings include:

- **Population clusters**: The proposed Sonoma Boulevard & Nebraska Street Station would be located in an area with the largest population, while the Vallejo Ferry Terminal would be the densest. All of the proposed stations except the Sereno Transit Center Station are located in census tracts with higher population density than the citywide average.
- **Housing and commute trends**: The number of housing units is similar across the four proposed stations. Fewer housing units are owner-occupied compared to citywide averages. All of the stations except for the proposed Mare Island Way & Tennessee Street Station are located in census tracts where residents have shorter mean commute times than citywide averages.
- **Disadvantaged communities**: The proposed rail alignment runs entirely through Equity Priority Communities designated by MTC. The proposed rail alignment is entirely located within census tracts with some of the highest CalEnviroScreen 4.0 percentile scores in the state. The census tract in which the proposed Vallejo Ferry Terminal station is located is also a federally designated disadvantaged community (DAC)[1].
- **Environmental justice**: The census tracts containing the four proposed stations all have higher pollution burden scores than citywide averages. Exposure to lead, groundwater threats, hazardous waste, solid waste, and cleanup sites are some of the pollutants that residents in these census tracts are more vulnerable to. Similarly, rates of health disorders such as cardiovascular disease, low birth weight, and asthma are higher than citywide averages.

[1] ETC Explorer - State Results | USDOT Equitable Transportation Community (ETC) Explorer (arcgis.com)

4.8.4 Zoning Analysis

Zoning within the station areas of the four proposed stations was evaluated to understand development constraints and opportunities. Analysis was completed within a half-mile radius of each proposed station. Calculations are an approximation based on the quality and availability of City of Vallejo GIS zoning data. Figure 21 shows the zoning designations per the *Zoning Code* within a half-mile radius of each of the four stations.

4.8.4.1 Overview of Existing Zoning

Sereno Transit Center Station

The proposed Sereno Transit Center station would be the northernmost station along the proposed rail alignment. It is surrounded by a mix of both residential- and employment-focused land uses. The maximum residential density permitted is highest amongst parcels located southwest of the proposed station. Central Corridor Commercial, Low Density Residential, and Resource Conservation are the top three zoning designations by land acreage within a half mile of the proposed station. The Sereno Transit Center and Sonoma Boulevard stations have the highest amount of land zoned as Limited Industrial within the four proposed station areas.

Sonoma Boulevard & Nebraska Street Station

The proposed Sonoma Boulevard & Nebraska Street station is centrally located within close proximity to a high number of parcels designated in Plan Bay Area 2050 as Priority Development Areas. It has the greatest variety of zoning in the surrounding station area, with permitted residential density highest along Sonoma Boulevard and directly northwest of the proposed station. Public & Semi-Public, Residential Low Density, and Residential Medium Density are the top three zoning designations by land acreage within a half mile of the proposed station.

Mare Island Way & Tennessee Street Station

The proposed Mare Island Way & Tennessee Street station is bound by waterfront natural resource areas to the west and lower-density residential to the north and south. Permitted residential density is highest along Tennessee Street and to the southeast of the proposed rail alignment. Increased residential density to the west of the proposed station is limited by the River Park, which is zoned as Resource Conservation. Residential Low Density; Parks, Recreation, and Open Space; and Waterfront Mixed Use are the top three zoning designations by land acreage within a half mile of the proposed station. It has the lowest residential density potential of 7,102 units within a half-mile of the proposed station. Of the four proposed stations, it has the most Residential Low-Density parcels located within a half mile.

Vallejo Ferry Terminal (Lot A) Station

The proposed Vallejo Ferry Terminal station would be the southernmost station along the proposed rail alignment. Downtown Mixed Use, Waterfront Mixed Use, and Low Density Residential are the top three zoning designations by land acreage within a half mile of the proposed station. The proposed station is located directly west of a high number of parcels designated in Plan Bay Area 2050 as Priority Development Areas. It has the highest residential density potential of 13,024 units within a half-mile of the proposed station.

Figure 20: Zoning Designations Within Half-Mile of Proposed Stations

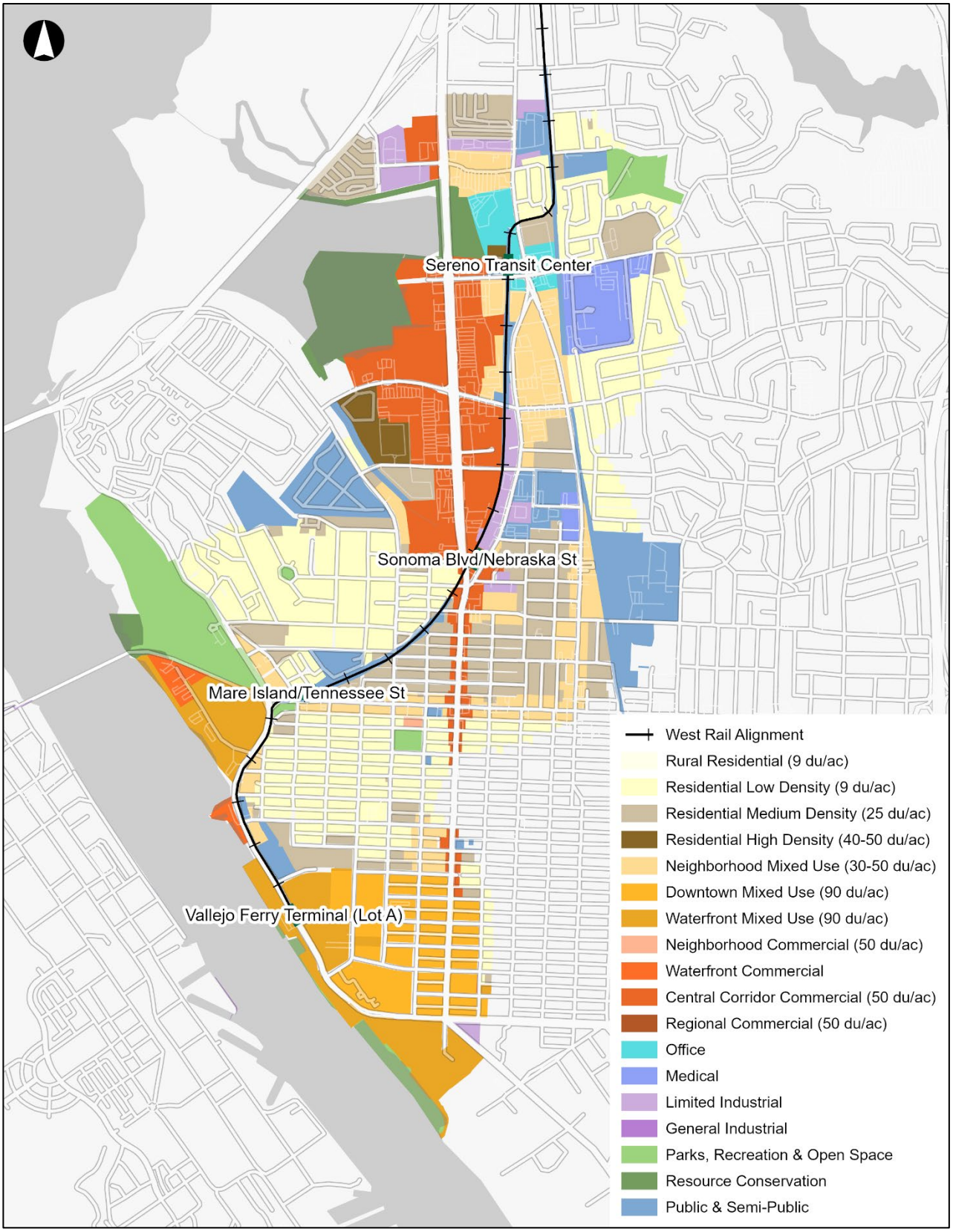
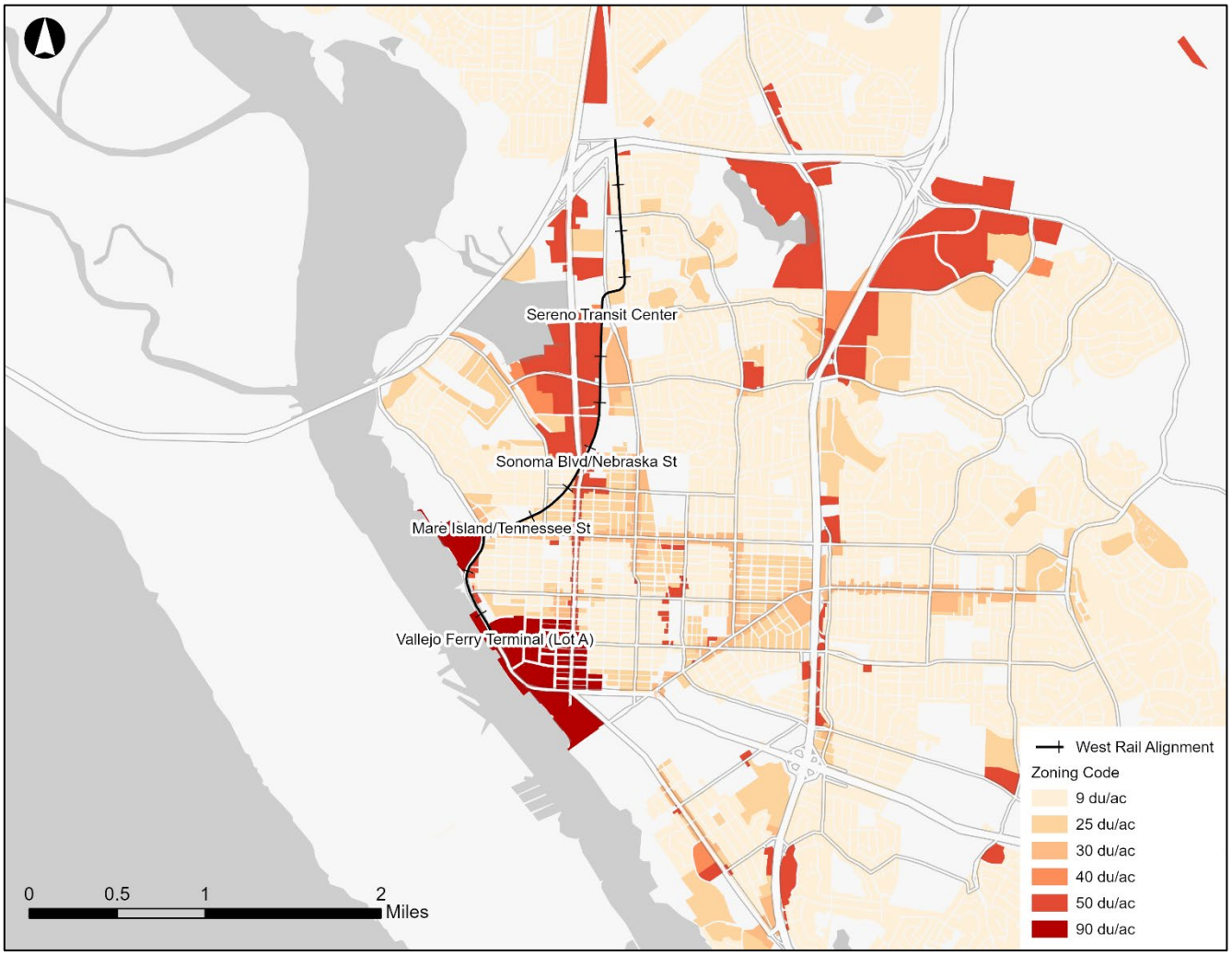


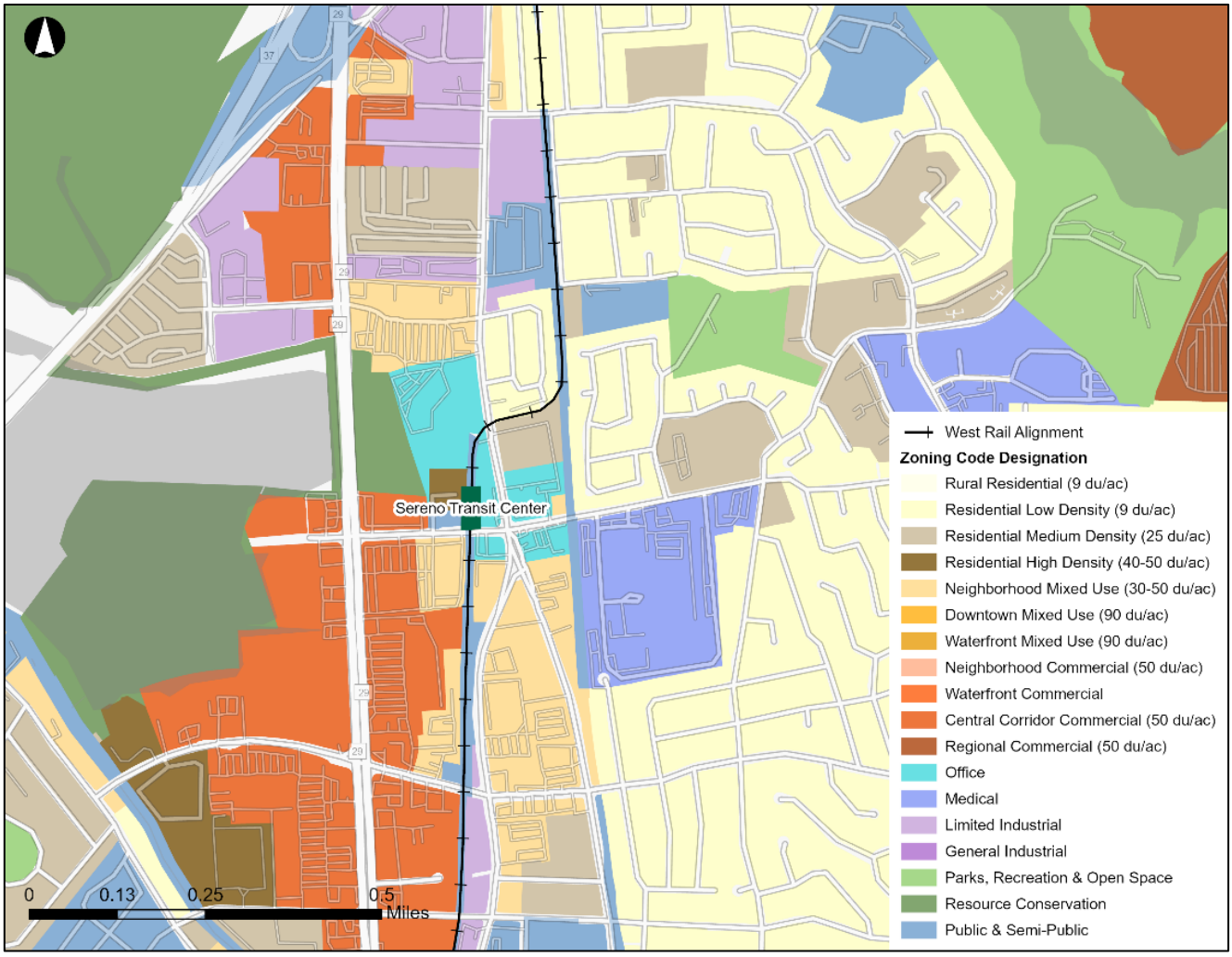
Figure 21: Maximum Residential Density Permitted by *Zoning Code*



4.8.4.2 Sereno Transit Center Station

The proposed Sereno Transit Center station is surrounded by a combination of residential and employment-focused land uses. Land within the immediate station area (less than a quarter mile from the proposed station) along Sereno Drive and Broadway is zoned as Neighborhood Mixed Use and Medical, with mostly low-rise commercial to the south and medical offices directly northeast of the proposed station. A significant portion of land within the immediate station area is currently used as surface parking lots. There is currently a mobile home park community, Redwood Mobile Home Park, located along the rail ROW near the proposed station. More than 75 acres of land west of the proposed station along Sonoma Boulevard is zoned as Central Corridor Commercial and has been primarily developed into low-rise commercial strip malls. Land directly northeast of the proposed station (including the Kaiser Permanente Vallejo Medical Center) and west of the proposed station is designated by *Plan Bay Area 2050* as priority development areas. Parcels west of Sonoma Boulevard are within the *White Slough Specific Plan* area.

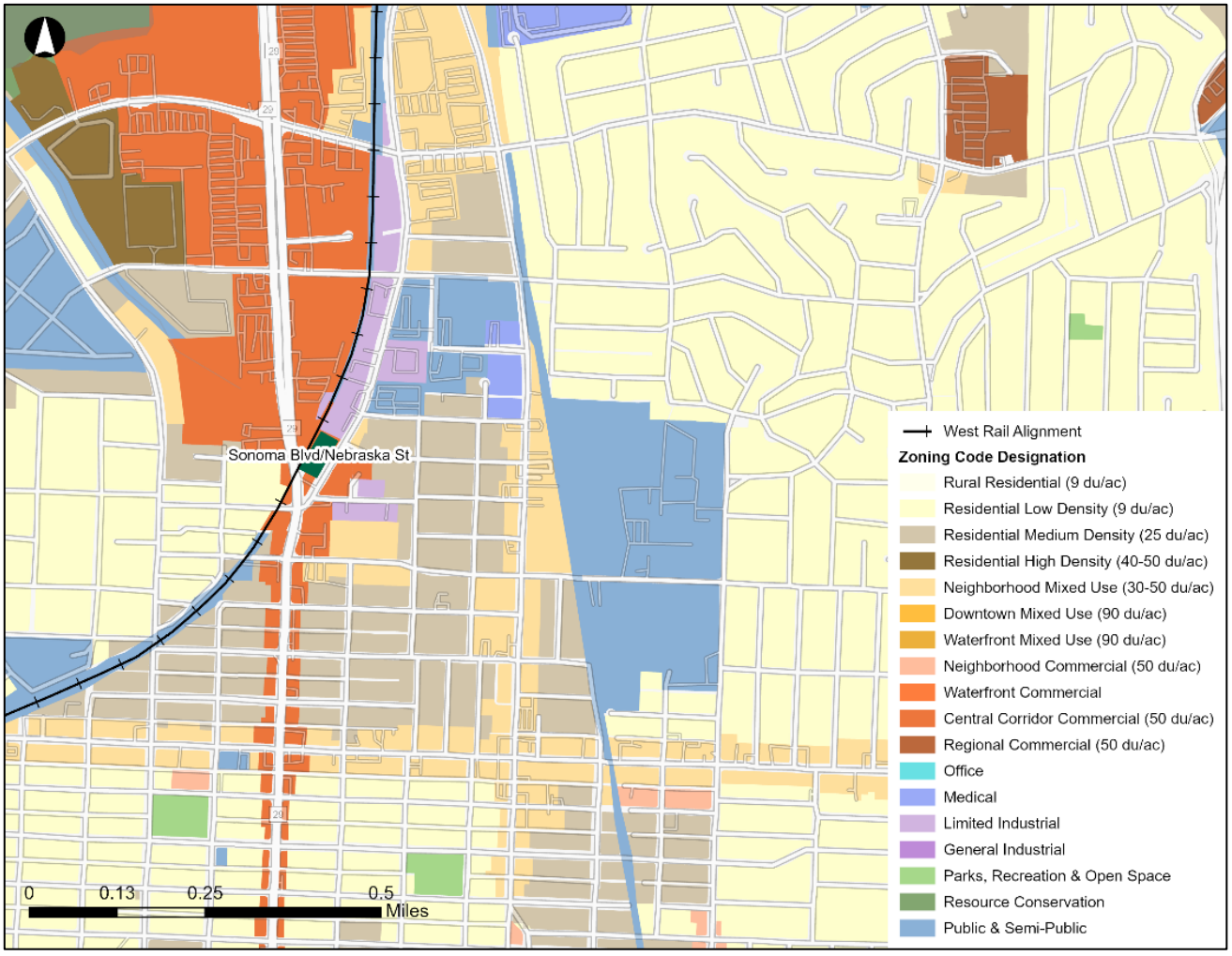
Figure 22: Zoning Map – Sereno Transit Center Station



4.8.4.3 Sonoma Boulevard & Nebraska Street Station

The proposed station at Sonoma Boulevard and Nebraska Street has the greatest variety of zoning in the surrounding station area. Permitted residential density is highest along Sonoma Boulevard where nearly all parcels are zoned as Central Corridor Commercial and are within the *Sonoma Boulevard Specific Plan* area. Directly north of the proposed station are more than 70 acres of developed land zoned as Central Commercial Corridor that is predominantly low-rise commercial strip malls with the potential to be developed into higher density residential. Additional development opportunities may exist in the areas east and to the south of the proposed station where parcels are currently zoned as Residential Medium Density. The area directly west of the proposed station is predominantly low density residential. The high number of parcels zoned as Public & Semi-Public can be attributed to the nearby presence of two high schools. Nearly all of the land within a half mile of the proposed station are designated by *Plan Bay Area 2050* as priority development areas.

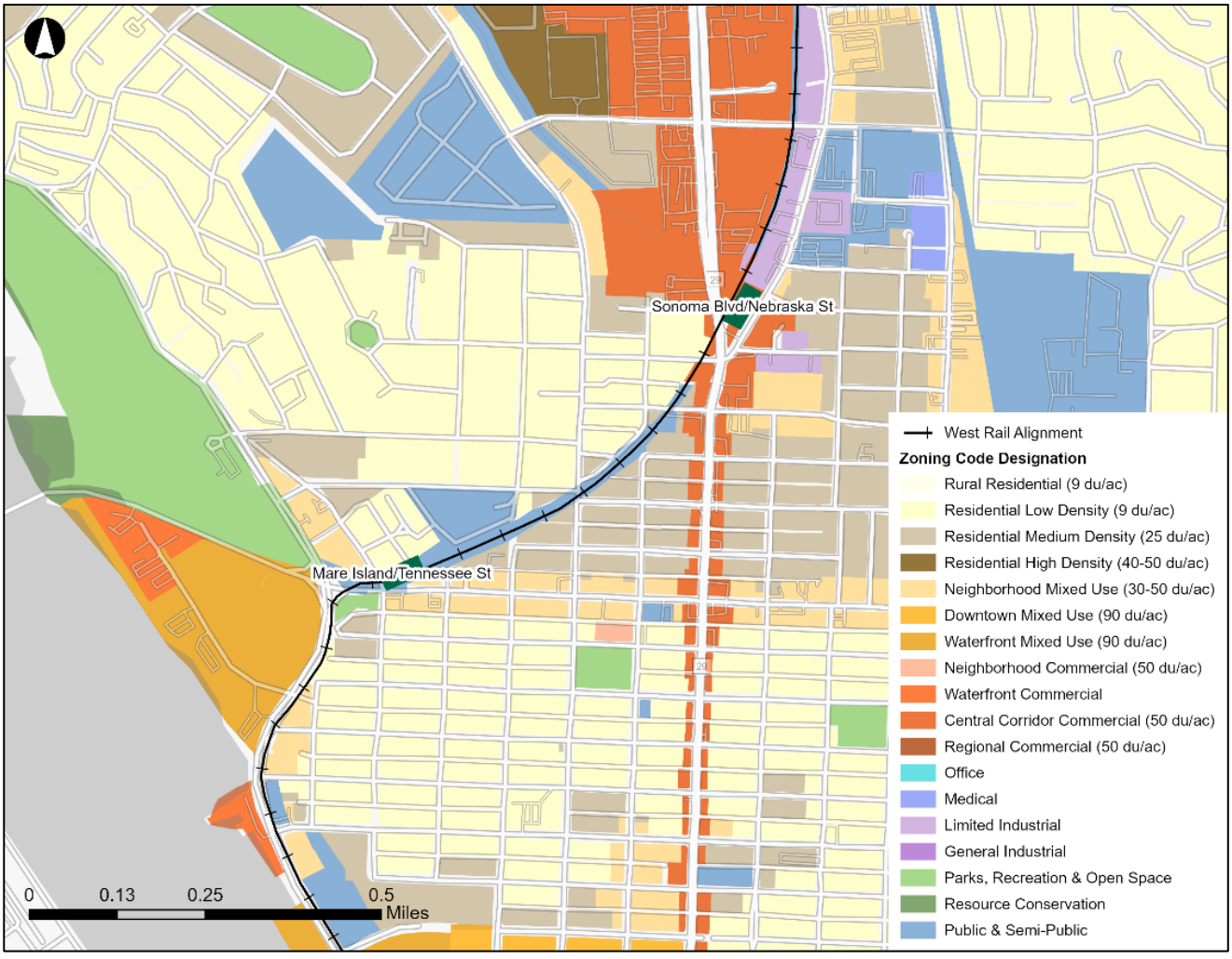
Figure 23: Zoning Map - Sonoma Boulevard & Nebraska Street Station



4.8.4.4 Mare Island Way & Tennessee Street Station

The proposed station at Mare Island Way & Tennessee Street is surrounded by primarily low-density residential parcels. Permitted residential density is highest along Tennessee Street and to the southeast of the proposed rail alignment. The Vallejo Educational Academy is located directly northeast of the proposed station. Directly west of the proposed station, adjacent to the Vallejo Municipal Marina, is approximately 7 acres of vacant land that is zoned for Waterfront Mixed Use and was designated by *Plan Bay Area 2050* as a priority development area. Increased residential density to the west of the proposed station is limited by the River Park, which is zoned as Resource Conservation, located directly north of the aforementioned vacant parcel, though redevelopment on Mare Island may add new population centers across the Napa River in the coming years.

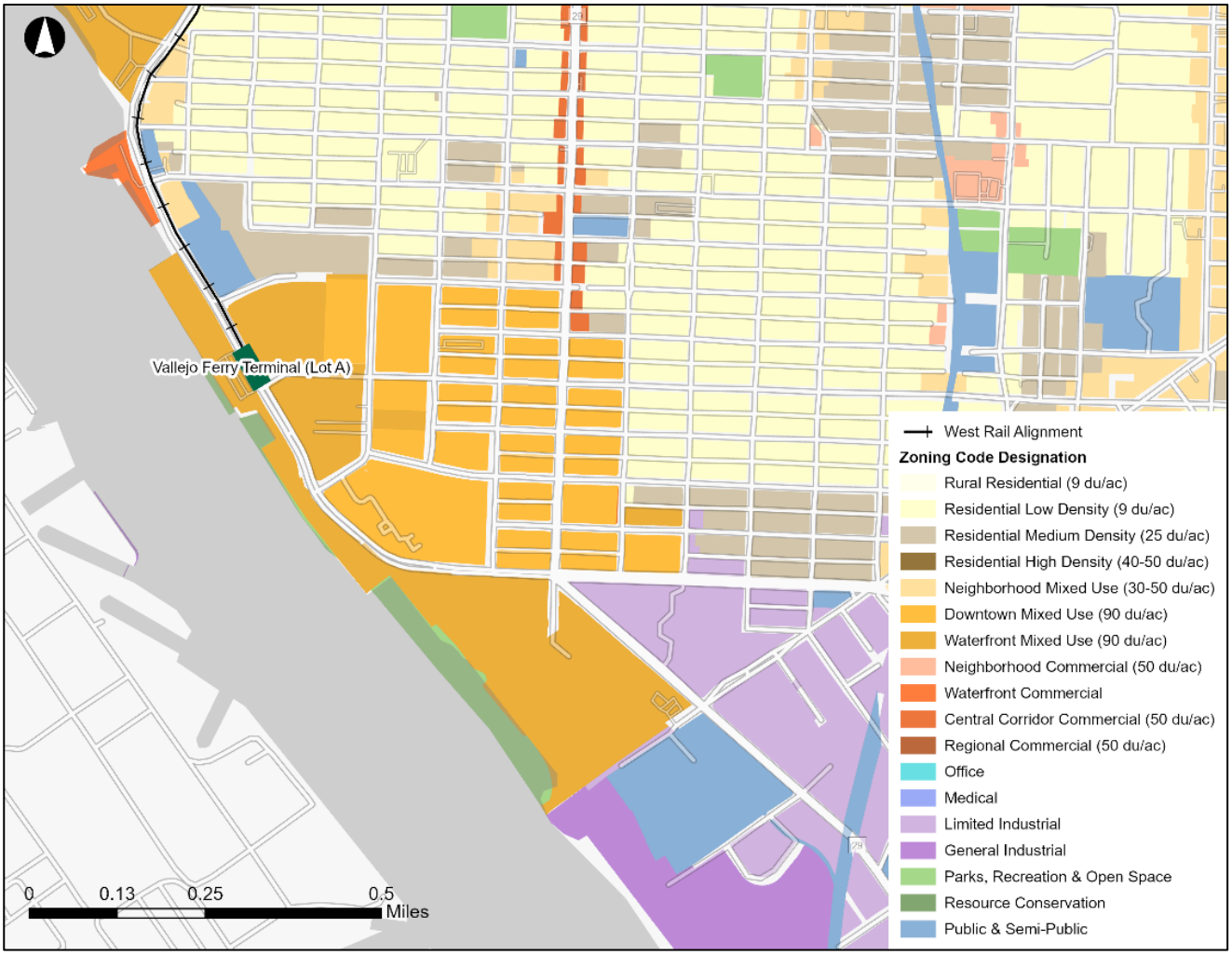
Figure 24: Zoning Map - Mare Island Way & Tennessee Street Station



4.8.4.5 Vallejo Ferry Terminal (Lot A) Station

The proposed Vallejo Ferry Terminal Station is surrounded by primarily higher density mixed uses. Permitted residential density is highest along the city's waterfront at Mare Island Way and parcels west of Sutter Street. The proposed station would be directly south of several civic landmarks, including the Martin Luther King Jr. and Marina Vista Memorial Parks, the Vallejo John F. Kennedy Library, and City Hall. The Downtown Specific Plan and the Sonoma Boulevard Specific Plan are applicable to parcels east of the proposed station. Many parcels may fall within the future Waterfront Specific Plan. Nearly all parcels within a half mile of the proposed station are designated by Plan Bay Area 2050 as priority development areas.

Figure 25: Zoning Map - Vallejo Ferry Terminal (Lot A) Station



4.8.5 Summary of Findings

Table 2 summarizes the findings outlined in this chapter for the four station areas.

Table 2: Summary of land use assessment findings for proposed station areas

Sereno Transit Center Station	Sonoma Boulevard & Nebraska Street Station
Predominant Zoning: Central Corridor Commercial, Low Density Residential, and Resource Conversation **Possible Sensitive Sites**: Mobile home park along rail ROW, nearby wetlands/resource conservation areas. **Possible Trip Attractors**: Kaiser Permanente Medical Center **Constraints**: High socioeconomic community burdens indicated by CalEnviroScreen 4.0 scores. **Opportunities**: Possible infill development at existing surface parking lots, and jobs-focused TOD reflective of higher medical and office zoning.	**Predominant Zoning**: Public & Semi-Public, Residential Low Density, and Residential Medium Density **Possible Sensitive Sites**: Existing residential developments south of proposed station along existing southbound rail ROW. **Possible Trip Attractors**: Vallejo DMV **Constraints**: Existing residential developments south of proposed station along existing southbound rail ROW. **Opportunities**: The *Sonoma Boulevard Specific Plan* establishes higher-density mixed uses. Significant amount of land is already designated as Priority Development Areas. Possible infill development of existing low-rise commercial strip malls.
Mare Island Way & Tennessee Street Station	**Vallejo Ferry Terminal (Lot A) Station**
Predominant Zoning: Residential Low Density; Parks, Recreation, and Open Space; and Waterfront Mixed Use **Possible Sensitive Sites**: River Park and nearby resource conservation areas **Possible Trip Attractors**: Waterfront and marina, Vallejo Educational Academy **Constraints**: Restricted to the north and west by waterfront, parks, and resource conservation areas. Increased development within the existing low-density residential neighborhoods north of the proposed station would be limited by Residential View District. Lowest estimated residential density potential (7,102 units) of the four proposed stations. **Opportunities**: Infill development at vacant parcel west of proposed station. Possible mixed use TOD within immediate station area and waterfront. Possible infill and missing-middle housing development within existing low-rise residential neighborhoods surrounding the proposed station.	**Predominant Zoning**: Downtown Mixed Use, Waterfront Mixed Use, and Low Density Residential **Possible Sensitive Sites**: Nearby civic landmarks and parks **Possible Trip Attractors**: Downtown Vallejo **Constraints**: High socioeconomic community burdens indicated by CalEnviroScreen 4.0 scores and federally designated disadvantaged community status. Restricted to the north and west by waterfront, parks, and resource conservation areas. Several nearby civic landmarks within station area that would need to be relocated or incorporated into higher density development. Development may be limited by Heritage and Historic District design guidelines. **Opportunities**: Highest estimated residential density potential (13,024 units) of the four proposed stations. Significant amount of land already designated as Priority Development Areas. Possible high-density mixed use development east of the proposed station within Downtown.

4.8.6 Constraints

4.8.6.1 Proximity to disadvantaged communities

The proposed rail alignment runs entirely through MTC Equity Priority Communities and is entirely located within census tracts with some of the highest CalEnviroScreen 4.0 percentile scores in the state. The census tract in which the proposed Vallejo Ferry Terminal station is located is also a federally designated disadvantaged community. These findings should be considered as part of any future stakeholder engagement efforts to ensure that the participation process is inclusive and that recommendations are reflective of community values. Future development and upzoning within station areas should prioritize affordable housing opportunities, displacement prevention, and other policies that protect vulnerable residents.

4.8.6.2 Waterfront access

Development opportunities at both the proposed Mare Island Way & Tennessee Street station and Vallejo Ferry Terminal station are restricted to the west by the Napa River. At the proposed Vallejo Ferry Terminal station, while there are development opportunities, it is assumed that the west side (water side) cannot be developed and continues to be a community recreational resource. The Mare Island Way & Tennessee Street station also has a large amount of land zoned as Resource Conservation northwest of the proposed station.

4.8.6.3 Existing residential development located along proposed rail alignment

To both the north and south of the proposed Mare Island Way & Tennessee Street station are predominantly low-rise residential parcels that border the proposed rail right-of-way. Additionally, there is currently a mobile home park community located near the proposed Sereno Transit Center station. These sites bordering the ROW could warrant additional community input.

4.8.7 Opportunities

4.8.7.1 Priority development areas

The proposed rail alignment and stations are all within proximity to designated Priority Development Areas. Priority Development Areas (PDAs) are locally designated areas within existing communities that have been identified and approved by local cities or counties for future growth. These areas are typically accessible to transit, jobs, shopping and other services. Sonoma Boulevard has the potential to be a higher density transit-rich corridor since it is in close to proximity to the proposed alignment, Downtown Vallejo, and is centrally located within most of the city's priority development areas.

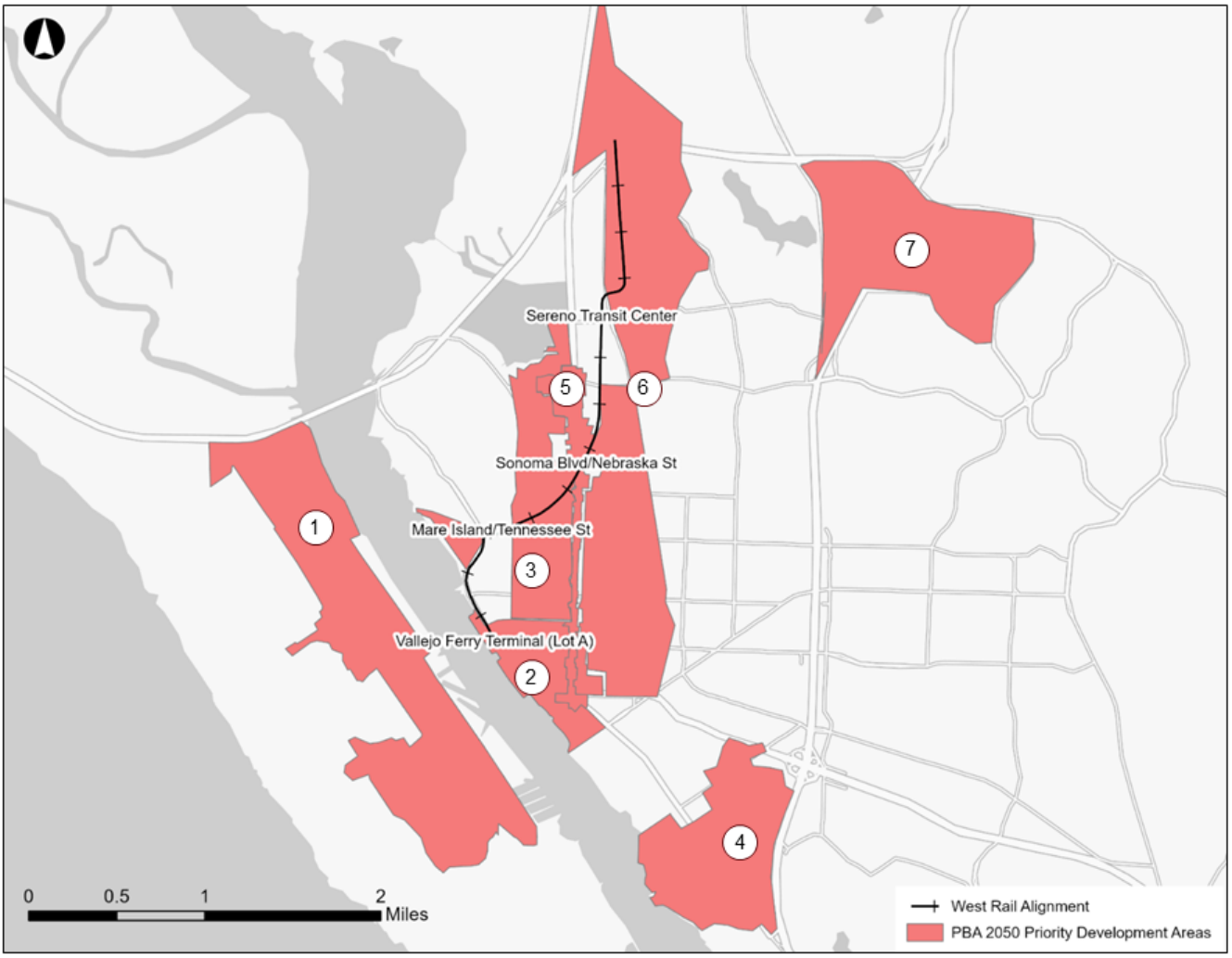


Figure 26 Plan Bay Area 2050 Priority Development Areas:
1) Mare Island, 2) Waterfront & Downtown, 3) Central Corridor West, 4) Carquinez Heights, 5) Sonoma Boulevard, 6) Central Corridor East, 7) Solano 360

4.8.7.2 Underutilized parcels

Several opportunity sites exist along the proposed rail alignment that should be considered for increased development. Directly west of the proposed Mare Island Way & Tennessee Street station, adjacent to the Vallejo Municipal Marina, is approximately 7 acres of vacant land that is zoned for Waterfront Mixed Use and was designated by *Plan Bay Area 2050* as a priority development area. The city has plans for this parcel to be developed as part of an eventual Downtown/Waterfront District specific plan. The areas surrounding the proposed Sonoma Boulevard & Nebraska Street and the Sereno Transit Center stations are also well suited for increased development, as it is predominantly low-rise commercial strip malls today. A significant number of surface parking lots exist in the neighborhoods surrounding the proposed rail alignment that could either be upzoned or already have the zoning in place to be developed at higher densities.

4.8.7.3 Targeted transit-oriented development

Several activity clusters could be considered as part of future transit-oriented development considerations within the proposed four station areas. The Sereno Transit Center station has a cluster of parcels currently zoned as Office and Medical uses, and the presence of Kaiser could serve as higher density medical or office-focused employment. At the proposed Sonoma Boulevard & Nebraska Street station, more mixed uses could be considered to balance both nearby residential and commercial zoning. Finally, both the proposed Mare Island Way & Tennessee Street Stations and the Vallejo Ferry Terminal station could support higher density housing while also providing connections to waterfront resources, civic landmarks, and recreational opportunities within Downtown.

5. Market Demand

5.1 Summary

Significant travel exists and could increase within station catchment areas of a rail system in Vallejo. Rail rights-of-way exist from central and western Vallejo into California's rail network, with the closest destinations including Novato, Napa, and Suisun/Fairfield. The consultant team assessed the overall market demand that exists within the rail corridors of Vallejo to first, destinations within Vallejo and second, to destinations beyond Vallejo. For the purposes of this study, the city identified the West Alignment within Vallejo to be used for analysis.

A rail service along the West Alignment (see Figure 28) in Vallejo may attract some riders, but a continuation of this service into the broader state rail network at Napa Junction will improve the service's utility by providing more connections than a Vallejo-only service would. Therefore, the inclusion of rail service into Vallejo could be considered in the next California State Rail Plan should the City of Vallejo and the Solano Transportation Authority choose to advance the concept.

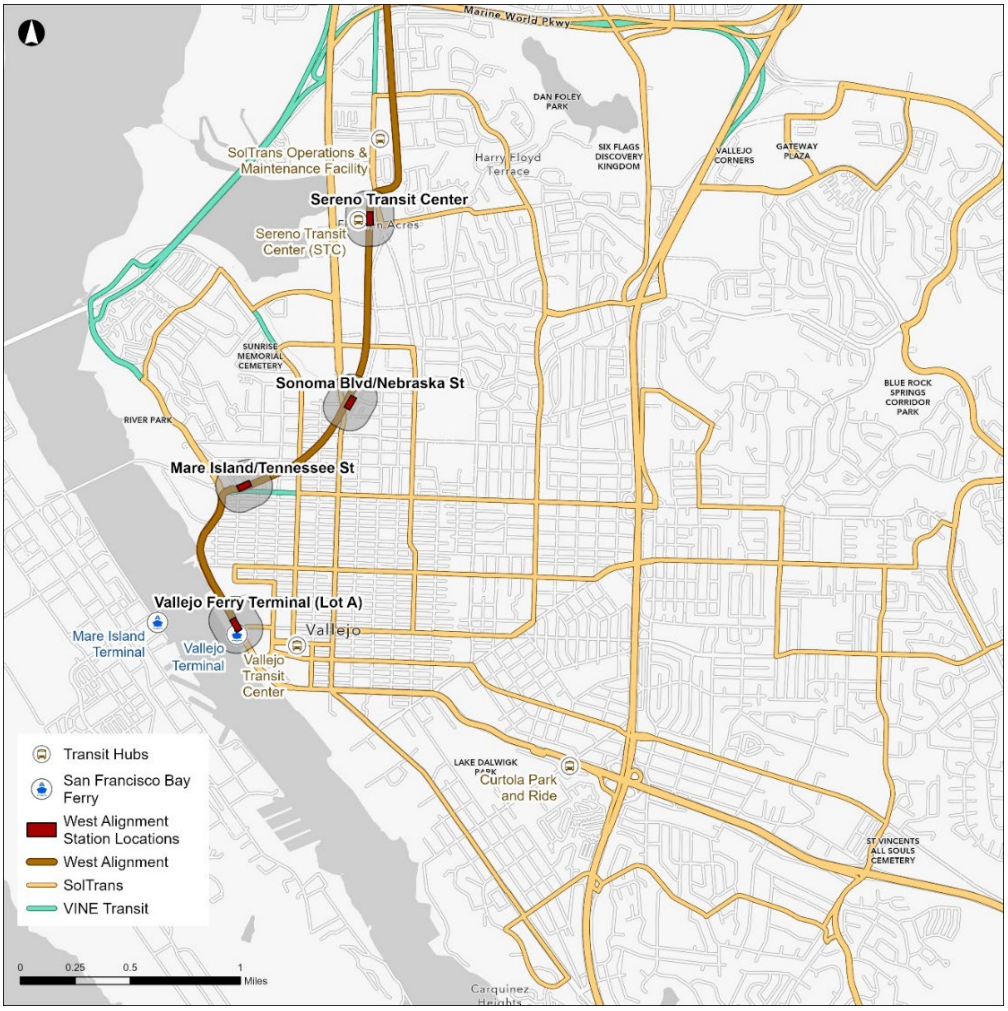


Figure 27: West Alignment and connecting transit services in Vallejo.

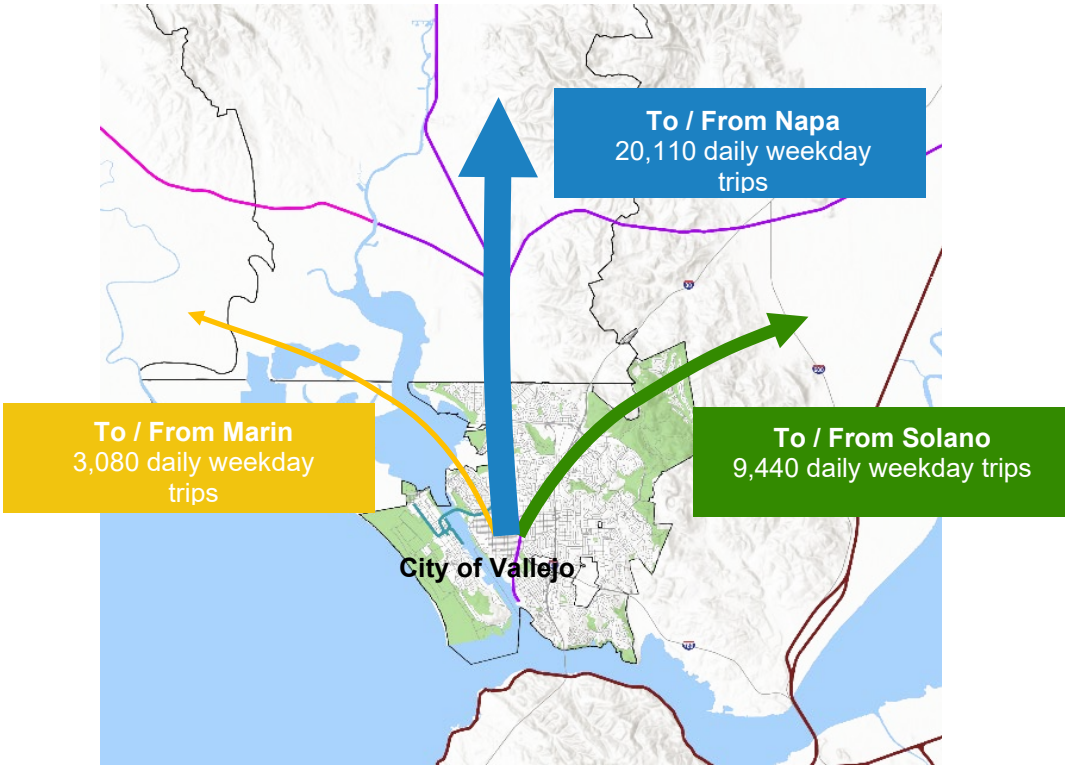
The overall travel demand market within the station catchment areas of the West Alignment (including connecting passengers from the Vallejo – San Francisco Ferry), indicates that in Fall 2022 about **82,000 daily trips** were made on all modes with origins and destinations within these catchments.

The State Rail Plan lays out a strategy for investments and needed steps designed to increase California's economic growth, improve quality of life, improve equity of the state's most vulnerable and impacted communities, and advance the state's ambitious climate action goals. Should the rail system within Vallejo connect to the state rail system as envisioned in the State Rail Plan at Napa Junction, there is potential for much higher demand. The total number of weekday trips on all modes, according to Fall 2022 data, that occurred within the rail corridor catchments of the West Alignment and the rail corridor catchments in the external markets of Marin County, Napa County, and Solano County are shown in Table 4 and Figure 29 below. This excludes intra-Vallejo trips as well as passengers connecting from other rail systems such as Capitol Corridor at the Solano Rail Hub (Suisun-Fairfield Station) and SMART in Marin County.

Table 3: External Market Demand

Total Market Demand to/from Vallejo	
Marin County	3,080
Napa County	20,110
Solano County	9,440

Figure 28: External Market Demand (Total Trips)



5.2 Travel Demand Data

5.2.1 Replica "Big Data" Demand

The consultant team evaluated the order of magnitude baseline market demand for a potential Vallejo passenger rail project using the Replica "Big Data" product as a basis for the analysis. The scale of market potential is based on existing travel demand and does not include any future demand forecasts that account for other regional transportation improvements or changes in employment or population. This analysis relies on input assumptions and demand elasticities from academic literature and only provides a potential range of ridership, based on the overall total market and potential rail mode shares that could be realized. More detailed ridership modelling is required if and when a rail project enters a future stage of project development.

Replica is a big data vendor that builds and maintains megaregional scale activity-based travel demand models. The California Megaregion model includes the entire state of California and Nevada. Replica is updated annually and seasonally to represent a typical weekday or weekend in either a Fall or Spring season. It is calibrated and validated with GPS and location-based services (LBS) data, highway vehicle counts, transit ridership data, and other demographic and economic data like credit card transactions.

Arup pulled baseline travel demand data from Replica for all person trips within the California megaregion for a typical weekday and weekend condition for Fall 2022.

5.2.1.1 Methodology

Arup first determined the overall travel market – for all trips – that exists along the Vallejo-Napa, Vallejo-Novato, and Vallejo-Suisun/Fairfield rail alignments. The steps taken were as follows:

1. Identify Alignments
2. Identify and Locate Stations
3. Determine Station Catchments
4. Count All Travel from Each Catchment to Every Other Station Catchment

The identification of each alignment relied on accepting the existing operating railroad infrastructure within Vallejo and from Vallejo to Napa, Novato, and Suisun/Fairfield and comparing the two alignments within Vallejo to determine the most practical alignment. From that cooperative process with city staff, the West Alignment was chosen to simplify the analysis, along with a proposed extension to the Vallejo Ferry Terminal, and combined with the other railroad rights-of-way.

The next step developed station typologies each of which has different characteristics, investment needs and attractiveness related to ridership. These typologies enable estimation of the potential geographic capture of person trips to transit with a new rail line. Station typologies have varying first/last mile mode definitions and represent different sizes of geographic areas based on the mode that riders can take.

Table 4: Station Typologies and Catchment Areas

Station Typology	Definition	Station Names	Catchment Definition
Park and Ride	Stations that will have parking facilities and are located near major highway/arterial	American Canyon Road	10-minute drive
Community Station	Stations that primarily serve local origins and destinations within walking distance. Limited parking.	Sonoma Boulevard Mare Island Way/Tennessee Street	15-minute walk
Intermodal Transfer	Connects to other transit services	Vallejo Ferry Terminal Sereno Transit Center	30-minute transit ride
External Markets	Stations not directly connected to Vallejo passenger rail but with opportunities for transfers to other transit services, like Amtrak or WETA ferry service	Davis Sacramento Berkely Oakland San Francisco	30-minute transit ride

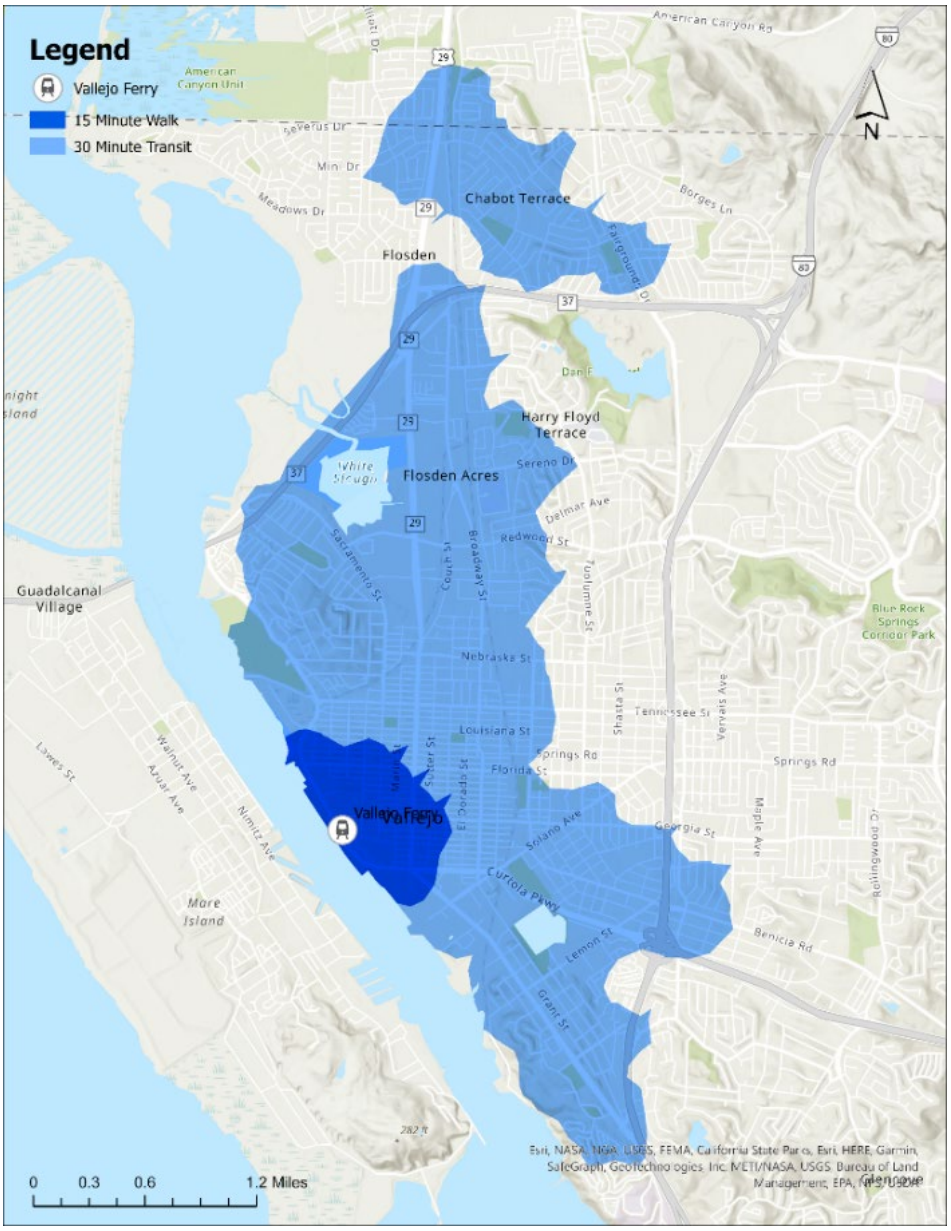
Stations assumed outside Vallejo are located on existing active or semi-active railroad corridors and connect with additional rail service at two locations: with SMART in Novato and with Capitol Corridor at the Solano Rail Hub in Suisun/Fairfield.

Defining Catchment Areas

Using accessibility modeling with OpenTripPlanner that is based on an existing Open Street Map network and scheduled transit service through agencies' General Transit Feed Specification (GTFS), catchments were drawn around future station locations that visualize how far people can travel by different modes in a given time.

Figure 30 shows the output of this accessibility modelling for the Vallejo Ferry terminal.

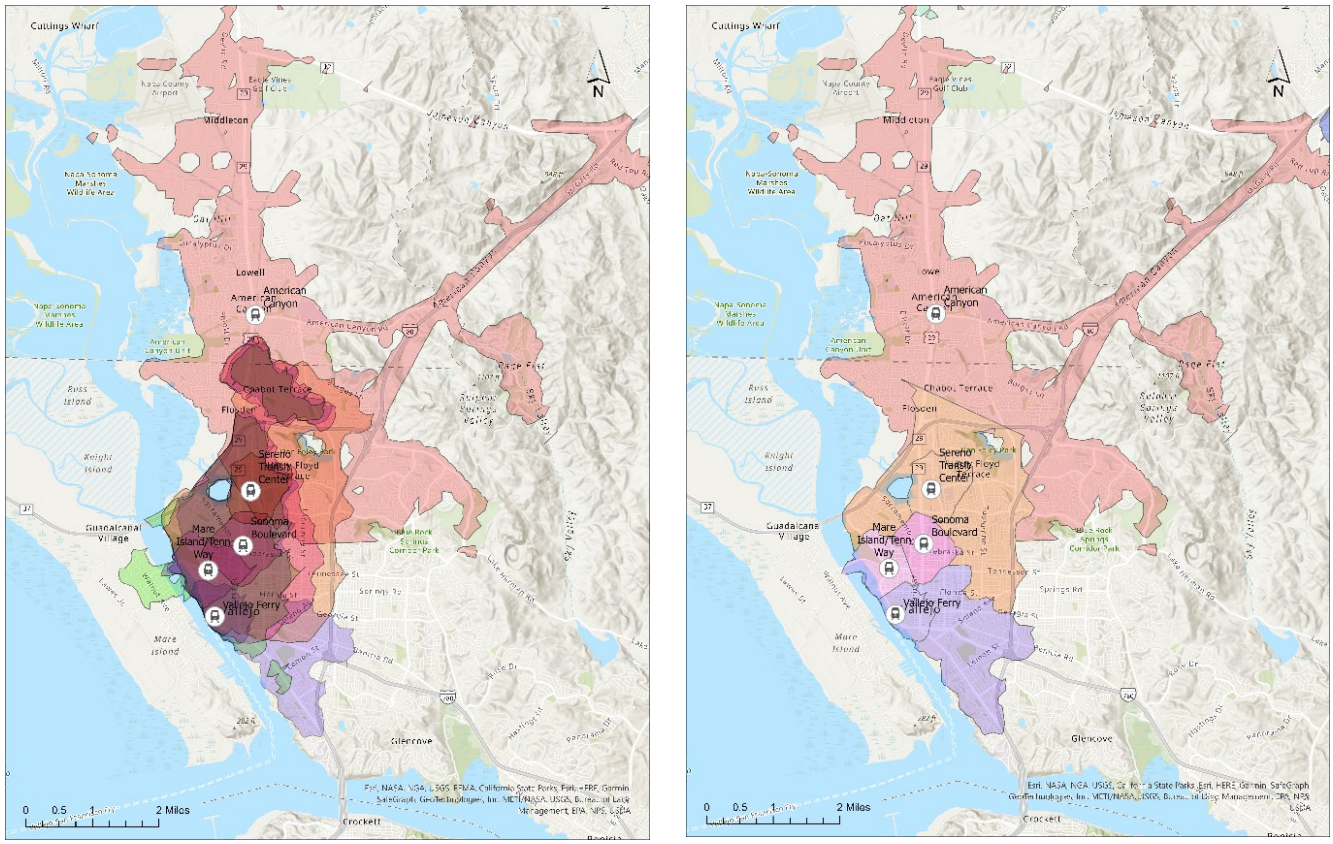
Figure 29: Accessibility Modelling Outputs - Catchment Areas for Vallejo Ferry Terminal



Managing Overlapping Catchments

Many of the proposed Vallejo rail stations have overlapping catchment areas. To avoid double counting existing demand between these catchments, GIS post-processing (Thiessen polygon splitting) was required to adjust catchment boundaries so there are no overlapping features.

Figure 30: Catchment Overlap (left) and Thiessen Splitting Output (right). Colors indicate station catchment.



Catchment Areas to Census Block Groups

The smallest geographical unit for the Replica Fall 2022 trip tables was origin and destination locations at the US Census block group level. Block groups are statistical divisions of census tracts and are defined to contain between 600 and 3,000 people. Block groups were assigned to catchment areas based on the centroid of the block group boundary. This enables Replica trips to be aggregated by catchment area to assign demand to rail stations.

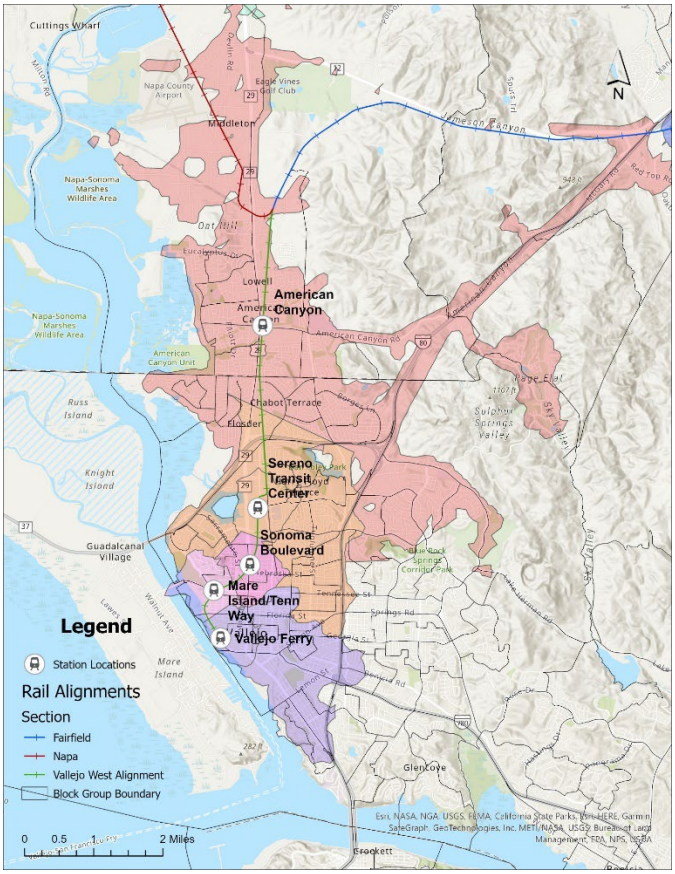


Figure 31: Station Catchment by Block Group

5.2.2 Baseline Total Travel Between Catchments

Once catchment areas and block groups were defined, Arup aggregated Replica trip tables to station catchments to evaluate the baseline person trip demand by origin and destination. Person trip demand was removed for any internal zone demand (i.e., American Canyon to American Canyon) and for specific catchments that a Vallejo rail line would not serve (i.e., Vallejo Ferry to San Francisco).

Weekday Fall 2022

For an average weekday, the station catchment origin-destination pairs within Vallejo with the greatest demand include Vallejo Ferry to Sereno Transit Center and American Canyon to Sereno Transit Center. Outside of Vallejo, the station catchment origin-destination pairs with the greatest demand include those in Napa.

Table 5: Vallejo-Only Average Weekday Person Trip Demand Fall 2022 Source: Replica

Vallejo Only Average Weekday Person Trip Demand Fall 2022 Source: Replica	San Francisco	Vallejo Ferry	Mare Island/Tennessee Way	Sonoma Boulevard	Sereno Transit Center	American Canyon
San Francisco	-	-	50	100	850	1,025
Vallejo Ferry	-	-	750	2,225	6,825	4,825
Mare Island/Tennessee Way	50	775	-	525	1,400	675
Sonoma Boulevard	125	2,325	475	-	4,150	2,100
Sereno Transit Center	875	6,800	1,425	4,150	-	15,400
American Canyon	1,100	4,650	725	2,075	15,475	-
					Total:	81,925

Table 6: Vallejo to Solano Average Weekday Person Trip Demand Fall 2022 Source: Replica

Vallejo to Solano Average Weekday Person Trip Demand Fall 2022 Source: Replica	San Francisco	Vallejo Ferry	Mare Island/Tennessee Way	Sonoma Boulevard	Sereno Transit Center	American Canyon	Solano Station Areas
San Francisco	-	-	50	100	850	1,025	625
Vallejo Ferry	-	-	750	2,225	6,825	4,825	675
Mare Island/Tennessee Way	50	775	-	525	1,400	675	75
Sonoma Boulevard	125	2,325	475	-	4,150	2,100	350
Sereno Transit Center	875	6,800	1,425	4,150	-	15,400	1,675
American Canyon	1,100	4,650	725	2,075	15,475	-	2,025
Solano Station Areas	625	725	75	400	1,550	1,950	1,425
						Total:	94,100

Note: Solano Station Areas include Suisun/Fairfield and Cordelia Stations.

Table 7: Vallejo to Napa Average Weekday Person Trip Demand Fall 2022 Source: Replica

Vallejo to Napa Average Weekday Person Trip Demand Fall 2022 Source: Replica	San Francisco	Vallejo Ferry	Mare Island/Tennessee Way	Sonoma Boulevard	Sereno Transit Center	American Canyon	Napa Station Areas
San Francisco	-	-	50	100	850	1,025	800
Vallejo Ferry	-	-	750	2,225	6,825	4,825	650
Mare Island/Tennessee Way	50	775	-	525	1,400	675	175
Sonoma Boulevard	125	2,325	475	-	4,150	2,100	300
Sereno Transit Center	875	6,800	1,425	4,150	-	15,400	2,675
American Canyon	1,100	4,650	725	2,075	15,475	-	6,100
Napa Station Areas	800	625	200	300	2,700	6,375	18,400
						Total:	122,025

Note: Napa Station Areas include stations north of Napa Junction.

Table 8: Vallejo to Novato Average Weekday Person Trip Demand Fall 2022 Source: Replica

Vallejo to Novato Average Weekday Person Trip Demand Fall 2022 Source: Replica	San Francisco	Vallejo Ferry	Mare Island/Tennessee Way	Sonoma Boulevard	Sereno Transit Center	American Canyon	Novato
San Francisco	-	-	50	100	850	1,025	-
Vallejo Ferry	-	-	750	2,225	6,825	4,825	25
Mare Island/Tennessee Way	50	775	-	525	1,400	675	-
Sonoma Boulevard	125	2,325	475	-	4,150	2,100	25
Sereno Transit Center	875	6,800	1,425	4,150	-	15,400	75
American Canyon	1,100	4,650	725	2,075	15,475	-	100
Novato	-	50	-	25	100	75	-
						Total:	82,400

The baseline internal Vallejo demand within station catchments is about 82,000 person trips daily. Trips between the Vallejo stations catchments to Solano County adds another 11,000 person trips daily, to Napa adds another 22,000 person trips daily, and to Novato adds another 475 person trips daily. Note that the tables also include trips internal to those areas outside Vallejo.

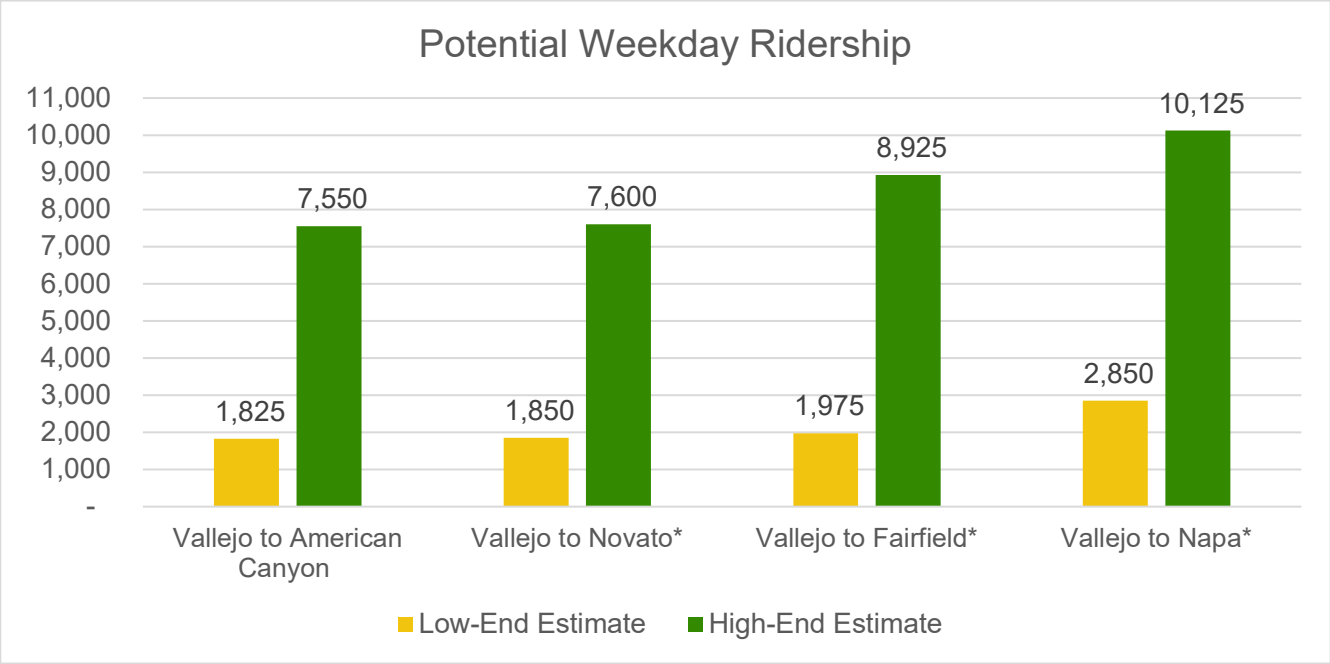
5.2.3 Potential Vallejo Passenger Rail Ridership

Potential ridership market of Vallejo was estimated by analyzing baseline travel demand data from Replica. Catchment areas were defined for potential rail stations to the geographies and travel demand from surrounding areas that can be captured by future rail transit service. Demand elasticities informed by academic and empirical research are used to adjust baseline transit mode share by catchment area to account for improved transit service

frequencies, transit service miles, transit-oriented development, travel time competitiveness, and transfer penalties.

Low and high estimates were developed to account for the uncertainty and assumptions used in this analysis. Low-range estimates assume baseline transit mode split by catchment area, adjusting for travel time competitiveness and transfer penalties only. High-range estimates assume baseline transit mode split but adjusted based on demand increases anticipated through improved transit frequencies, transit service miles, and transit-oriented development.

Figure 32: Average Daily Ridership



*Ridership projections are inclusive of ridership for Vallejo to American Canyon.

The total high demand for all markets combined approaches 12,000 passengers daily (note that Vallejo to Fairfield and Vallejo to Napa include internal Vallejo trips). Rail ridership to Novato was negligible and would not significantly increase from the Vallejo Only ridership estimate.

In summary, the baseline ridership within Vallejo could be increased with an extension to Napa by about 34% and by about 18% by operating to Suisun/Fairfield.

5.2.4 Tourism and Event Demand

Vallejo's General Plan identifies the city as a "gateway to the inner Bay Area and the Napa Valley." The General Plan calls for studying "the feasibility of a visitor rail connection between the Vallejo Ferry Terminal and the Napa Valley" and suggests the city could benefit economically from developing these gateways.

Any rail system serving Vallejo is likely to carry a high capital cost, and expanding the market for the service can provide additional rationale for these investments. Serving recreational travel during periods when capacity is not needed for commuting and other purposes can generate revenue to help support the service while generating additional regional support. People visiting Vallejo or Napa Valley for tourism and special events represent a potentially significant rail ridership market. A rail line between Vallejo and Napa could easily serve tourists traveling either directly between the two communities or tourists traveling from other communities in the

Bay Area with easy connectivity to Vallejo, whether by car, transit, or ferry. The tourist market should therefore be considered in addition to the typical travel patterns of residents when planning a future rail service.

5.2.4.1 Existing Vallejo Tourism Data

The City of Vallejo has dedicated significant resources towards building tourist infrastructure and attractions. Six Flags Discovery Kingdom has been a staple destination in Vallejo for more than 35 years, drawing upwards of 800,000 visitors annually prior to the COVID-19 pandemic.[2] In more recent years, the City of Vallejo has also advanced the redevelopment of Mare Island into a world-class tourist destination, with the island now hosting sites such as the Mare Island Brewing Company, Mare Island Art Studios, and Vino Godfather Winery among other historical places such as St. Peter's Chapel.[3] Both Six Flags and Mare Island are open year-round. Improved connectivity between Vallejo and Napa, Fairfield, Suisun City, and Novato by rail service would likely support the continued growth of Vallejo's tourist sector by increasing the number of transportation options for visitors.

Special Events

Major annual events are held in Vallejo each year. The Solano County Fair sees the greatest total attendance of any event throughout the year, drawing approximately 25,000 people over the course of its four-day run each summer. The Luft 9 Porsche Experience has seen the greatest daily attendance of any event, however, with approximately 10,000 people visiting for the one-day showcase. The Vallejo Waterfront Weekend is a festival dedicated to celebrating Vallejo, Mare Island, and Solano County, serving as a showcase and fundraising opportunity for local nonprofits. Besides the Solano County Fair, most major events in Vallejo are held on Mare Island or the Waterfront.

It is likely that up to 1,000 daily visitors in season would use a Vallejo-Napa rail service. Additional details on tourism and event demand related to a rail service between Vallejo and Napa are included in a separate technical memo.

[2] Raskin-Zrihen, R. (2019). *2020 could be a banner year for Vallejo tourism, officials say.* Times Herald. https://www.timesheraldonline.com/2019/05/08/2020-could-be-a-banner-year-for-vallejo-tourism-officials-say/

[3] Seeto, M. (2022). *6 reasons to make Mare Island your next weekend trip.* Thrillist. https://www.thrillist.com/travel/san-francisco/mare-island-california-travel-guide

6. Operations

6.1 Vehicles and Infrastructure

Regional passenger railroad service in the Bay Area is currently provided by two types of vehicles:

- Capitol Corridor or Caltrain type locomotives with coaches
- SMART or eBART style Multiple-Unit (MU) self-propelled trains

Figure 33: Locomotive with coach (Capitol Corridor train)

Figure 34: Multiple-Unit train (Stadler FLIRT)

The Study evaluated which of these two types of vehicles could best serve a rail connection to the city of Vallejo. The two vehicle types are evaluated based on two possible routings for a rail service in the following scenarios:

- Option 1: Vallejo to Napa Junction, using Capitol Corridor type trains.
- Option 2: Vallejo to Napa Junction, using MU trains.
- Option 3: Vallejo via Napa Junction to Suisun/Fairfield (Solano Rail Hub), using MU trains.

The Study considers several factors to determine the appropriate vehicle and associated technology, including track and signal infrastructure, station infrastructure, and regulatory environments.

6.1.1 Regulatory Context

Safety and operational regulation of rail passenger services in the United States falls under two categories:

1. Systems that are operated on the tracks of the “national railroad network” – generally freight railroads, such as UPRR. Passenger operations running on freight railroads, like the freight railroads themselves, are almost entirely regulated by the Federal Railroad Administration (FRA), which is part of the US Department of Transportation.
2. Rail transit systems, such as BART or Sacramento Light Rail, which in most cases run on track owned by a public entity independent of the national freight railroad network. Regulation of rail transit systems is a state responsibility; in California that responsibility is exercised by the California Public Utilities Commission (CPUC).

Option 1

In Option 1 of this study, the concept is to retain railroad operation employing railroad locomotives and passenger cars like those used on Capitol Corridor trains and assume no temporal separation of freight and passenger operation. Under the conceptual level of service, FRA regulations would include installation of Positive Train Control (PTC), a complex electronic system which enforces signal indications and permissible speeds, collision avoidance, and roadway worker protection. Other regulations would include hours of service limitations for certain safety-critical employees and qualification training of staff, retention of training plans, and documentation. The system would be expected to adopt the "General Code of Operating Rules" (GCOR), which specifies many details of how the railroad is to be operated. The FRA also has critical oversight powers when reviewing railroad operating plans and can be expected to require minimum two-person train crews.

Options 2 and 3

Options 2 and 3 could be regulated by either the FRA (as in Option 1) or the California Public Utilities Commission (CPUC). Options 2 and 3 would need to limit the current marginal freight railroad into a solely night service, essentially making the FRA regulated system only "exist" from about 11pm to 5am. In the day, a rail transit service under CPUC regulation would exist – basically creating a situation where the right-of-way hosts two different rail existences but never at the same time. An applicable approach would be based on the Commission's General Order 143B, which deals with Light Rail Transit. While this General Order is typically applied to electrified light rail systems, San Diego Trolley and the Oceanside-Escondido Sprinter both offer examples of freight branch lines formerly owned by mainline railroads which were sold to public entities that subsequently used them for frequent rail transit service during most of the day under CPUC rules. If regulated by the CPUC, special accommodations for any potential freight traffic would be required.

6.1.2 Service and Rolling Stock

From the Market Demand studies that have been performed, the range of ridership for a Vallejo service either as a shuttle making connections at Napa Junction (Options 1 and 2) or running through between Vallejo and the Solano Rail Hub at Suisun/Fairfield (Option 3) corresponds to peak one-hour loadings of 191 – 735 passengers. At a 30-minute headway, or two trains per hour per direction, this would correspond to train loadings of 96-368 passengers per train.

Locomotive Trains

Option 1 trains would operate in "push-pull" mode, as they do on the Capitol Corridor, and other California intercity and commuter railroad lines. "Push-pull" trains have a locomotive and set of cars with a "cab car" at the end of the train from which the locomotive can be controlled. The train has full operational capability whether the train is being pulled by the locomotive, or pushed by the locomotive which is controlled by the cab at the other end of the train. The great advantage of push-pull operation is elimination of the need to turn locomotives around at terminals.

In Option 1, trains would consist of one locomotive (Siemens "Charger", the engine type most recently purchased by the state for Capitol Corridor, assumed for example purposes), one California cab car in push-pull mode, and one to three California Car coaches, depending on actual demand. Overall consist per train: locomotive, one cab car and 1-3 coaches.

Multiple Unit Trains

Options 2 and 3 are based on using Multiple Unit (MU) equipment. MU cars are powered cars arranged to operate in trains singly, or in trains of multiple cars. Control of all the cars in the train is exercised by one operator in the active cab of the lead car in the train. They may be referred to as DMUs, EMUs or, HMUs, depending on the source of power (Diesel, Electric or Hydrogen).

For Option 2, MU trains can reverse direction more quickly at terminals than the Option 1 equipment and protocols and in general have faster acceleration and deceleration than a locomotive-hauled train.

Fleet Requirements

Using Capitol Corridor-type equipment for Option 1, we estimate that an assumed 30-minute headway between Vallejo Ferry-Napa Junction will require three trains in service. Using MU trains for Options 2 and 3, we estimate that an assumed 30-minute headway between Vallejo Ferry-Napa Junction will require two trains in service. For Option 3, we estimate that a 30-minute headway between Vallejo Ferry and the Solano Rail Hub via Napa Junction can be operated with three or four trains in service.

In both Options 2 and 3, using MU equipment, trains would be made up of one or two MU cars (Stadler two-coach FLIRT units assumed for example), depending on actual ridership.

Total fleet requirements (peak requirement plus spares) under these assumptions:

- Option 1: 4 locomotives, 4 California cab cars, 4-10 California Car coaches (12-22 vehicles total)
- Option 2: 3 to 5 two-car MU sets (6-10 vehicles total)
- Option 3: 4 to 7 two-car MU sets (8 to 14 vehicles total)

California Cars have a seated capacity of 89 passengers and Stadler FLIRT cars (currently in operation on Metrolink's Arrow service) have a seated capacity of 116. Total seated train capacities for each type of train are shown in the table below. Note, there is additional capacity for standing passengers, the total of which can vary based on operator specifications of acceptable passenger standing density.

Total seated capacity of trains, by number of cars.

	1-car	2-car	3-car
California Car	89	178	267
Stadler FLIRT	116	232	n/a

6.1.3 Travel Time

The attractiveness of rail transit to riders is dominantly influenced by travel time, particularly when compared to driving. The time advantage of rail transit is most prominent during peak traffic hours, when it can bypass congestion experienced by private vehicles and buses. The ability to offer faster journeys is a key factor in attracting riders. Additionally, the choice of vehicle type impacts overall travel speed with each vehicle having different acceleration and deceleration characteristics.

Passenger locomotives with coaches such as the one used for Capital Corridor typically have an acceleration of 0.3 mph/s and a deceleration of 0.7 mph/s[4]. These trains are powered by a single engine that is attached to multiple coaches.

MU trains such as the ones used for SMART have an acceleration of 0.78 mph/s with a deceleration of 2.1 mph/s[5]. MUs can accelerate and decelerate quicker with motors on multiple cars rather than a single engine. This translates to quicker response to acceleration and braking command. Note that these figures are provided for the diesel-powered vehicles currently servicing SMART. Other existing Diesel MUs can accelerate up to 2.2 mph/s

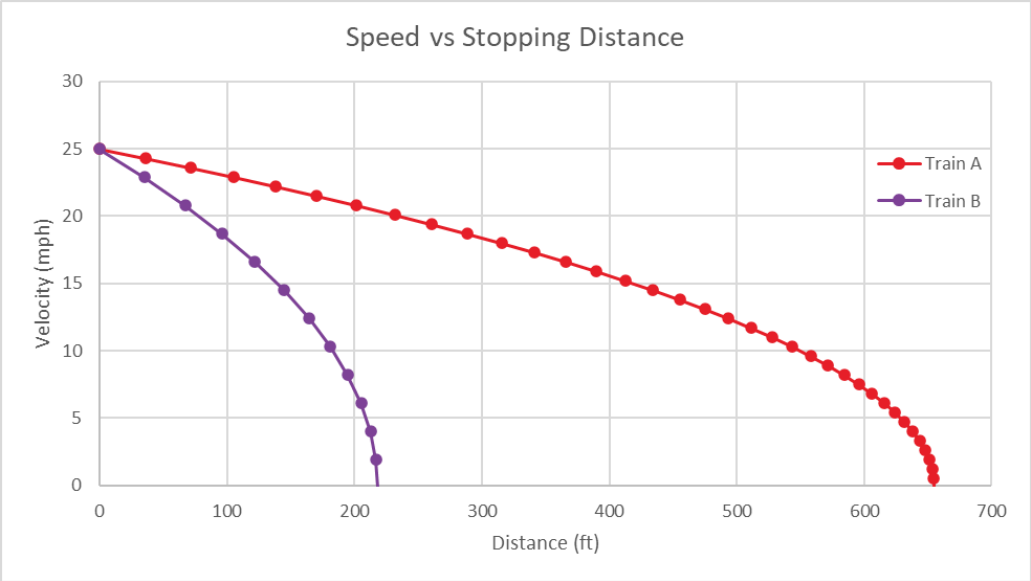
[4] Amtrak ACS-64: Speed, power, efficiency, Siemens Mobility Division, June 2011

[5] Diesel Multiple Unit Alternative, Connecticut Department of Transportation, March 2016.

and Electric/hydrogen MUs are expected to accelerate and decelerate faster due to the electric motor providing immediate torque and regenerative braking.

For example, a locomotive train moving at 25mph would require 36 seconds over 655 feet to come to a complete stop, whereas an MU train moving at 25mph would require 12 seconds over 218 feet to come to a complete stop. See the chart below for a speed vs. stopping distance graph comparing the two vehicle types.

Figure 35: Speed vs. Distance graph for a Locomotive (Train A) and an MU train (Train B)



The proposed spacing of stations in Vallejo is roughly 3/4 of a mile between stations, with stations spaced further apart outside of Vallejo city borders. This rail transit spacing requires trains to accelerate and decelerate quickly to achieve an efficient and competitive travel time. MU trains have faster acceleration and deceleration to passenger locomotives which is advantageous for start-stop rail transit operations. For urban and suburban rail networks, MUs will offer better overall travel time efficiency.

6.1.4 Flexibility

The California State Rail Plan outlines the State's vision for an "integrated rail and transit network that delivers on California's ambitious economic, environmental and equity goals"[6]. The State Rail Plan guides rail investments and proposes a unified network that connects various passenger rail services to other transportation modes.

MU trains and passenger locomotives generally use the same tracks with the same standard gauge as comparable rail networks in the rest of the State. This gives both vehicle types the flexibility to interface with existing and future rail services supporting the vision of creating a unified network.

MU trains can be more flexible in operations and infrastructure adaptation. All units in MU trains are powered, which provides redundancy and may facilitate operational recovery in case one unit fails. Passenger locomotives running singly may become a single point of failure. MU trains are often smaller and lighter than passenger locomotives which reduces wear on tracks and require smaller maintenance and storage facilities.

[6] California State Rail Plan, Caltrans, 2023.

While MU trains and passenger locomotives are both suited to use the same tracks and integrate with other rail services in the State Rail Plan, MU trains offer the best flexibility in interfacing with commuter passenger rail infrastructure and interlining with SMART.

6.1.5 Vehicle Profiles

When considering rail vehicles, the broader impacts on local communities must also be considered. These impacts are in terms of safety, accessibility, noise, vibration, and visual aesthetics.

- *Safety* strives for operational and personal safety.
- *Accessibility* refers to the train's ability to cater to the needs of all community members, including those with disabilities.
- *Noise pollution and vibrations* generated by trains may affect the quality of life of nearby residents.
- *Visually*, the rail vehicle can conflict with the landscape and aesthetic character of an area.

Train Safety

MU trains have faster acceleration and deceleration to passenger locomotives. Additionally, MU trains can adjust speed more easily than locomotives. While passenger locomotives are generally safe, there are advantages for MU trains that make it a safer option.

Accessibility

MU trains are typically designed for level boarding from a 24" platform meeting the minimal gap requirements of the Americans with Disabilities Act. This design without steps to climb accommodates passengers with mobility impairments or those with strollers, makes the boarding process accessible for everyone, and reduces the dwell time at stations. Conventional passenger cars usually require steps to board, or on board, which may pose challenges to certain passengers. MU trains frequently have more doors along each train which helps passengers easily enter the train. These differences make MU trains more accessible to the entire community.

Visual Aesthetics

MU trains feature smaller, more modern designs that could align with the forward-looking vision of a community. The smaller design can be less imposing on communities, especially in urban or suburban communities adjacent to business and homes. MU trains are often more customizable in livery design which can lend to a uniform appearance and be adapted to the identity of the region. Passenger locomotives may appear more cluttered and imposing which may not blend well with the surrounding urban area.

Figure 36: Comparison of MU and locomotive-hauled trains at grade crossings.

NCTD Sprinter MU Train

Amtrak California (San Joaquins) Locomotive Train

6.1.6 Track Infrastructure

To support safe and reliable passenger service, extensive upgrades to various aspects of the existing infrastructure would be required. This would include enhancements to the track, roadbed, structures, ditches and drainage systems, at-grade crossings, and other associated infrastructure. Further, the development of infrastructure to facilitate operations and maintenance would be essential for the successful implementation of passenger rail service under the options evaluated.

It is assumed that, in alignment with the State Rail Plan, Caltrans would financially sponsor the rehabilitation and upgrade of the track infrastructure from Suisun/Fairfield, Napa Junction, Napa, and Novato. These upgrades would be designed to support track speeds of up to 79 mph and will encompass the necessary signaling system to enable a 30-minute bi-directional headway. Additionally, if conventional locomotive-hauled equipment under FRA regulation is envisioned, the installation of positive train control (PTC) will be required.

For all options, the trackage between the Vallejo Ferry station and Napa Junction will need to undergo a full rehabilitation to support passenger trains operating at higher speeds than current infrequent freight trains.

6.1.7 Signal Infrastructure

There is no existing signaling infrastructure within the corridors under consideration. The introduction of passenger service in these corridors will require the implementation of a train control system. The type of infrastructure required is dependent on selected option and varies per the following:

- **Option 1:** Requires a PTC signal system, given the operation of railroad-type locomotives and cars under FRA regulation. PTC systems are generally more sophisticated and more expensive than traditional block signal systems.
- **Option 2 & 3:** Can require either a PTC or block signal system. Trains would operate at track speeds up to 55 mph with a block signal system under CPUC regulation. If speeds over 55 mph are desired, an enforced signal system as per CPUC's General Order 143-B will be required, though current concepts do not anticipate exceeding 55 mph.

6.2 Concept Operating Plans

The Study investigated two conceptual service plans to provide passenger rail service to Vallejo with key connections at Napa Junction or the Suisun/Fairfield Station. This memo details the general assumptions for providing a viable passenger rail service, conceptual timetables for each service, fleet and operating infrastructure requirements, and implications of different propulsion types.

6.2.1 Service Plans

Two conceptual service plans are presented here. The first provides for rail service between a terminal at the Vallejo Ferry and a station near Watson Lane at Napa Junction. At that point, a cross-platform transfer connection would be available to and from proposed trains shown in the California State Rail plan running between a new Solano Rail Hub at the Suisun/Fairfield Station at the east end and either Napa, Novato, or both on the west end. The second plan incorporates trains running through from the Vallejo Ferry Terminal via Napa Junction directly to and from the Suisun/Fairfield Station, with an additional station near Lopes Road in Cordelia. This concept could also offer cross-platform transfer connections at Napa Junction to and from Novato and Napa. See Figure 38 for an illustration of these services.

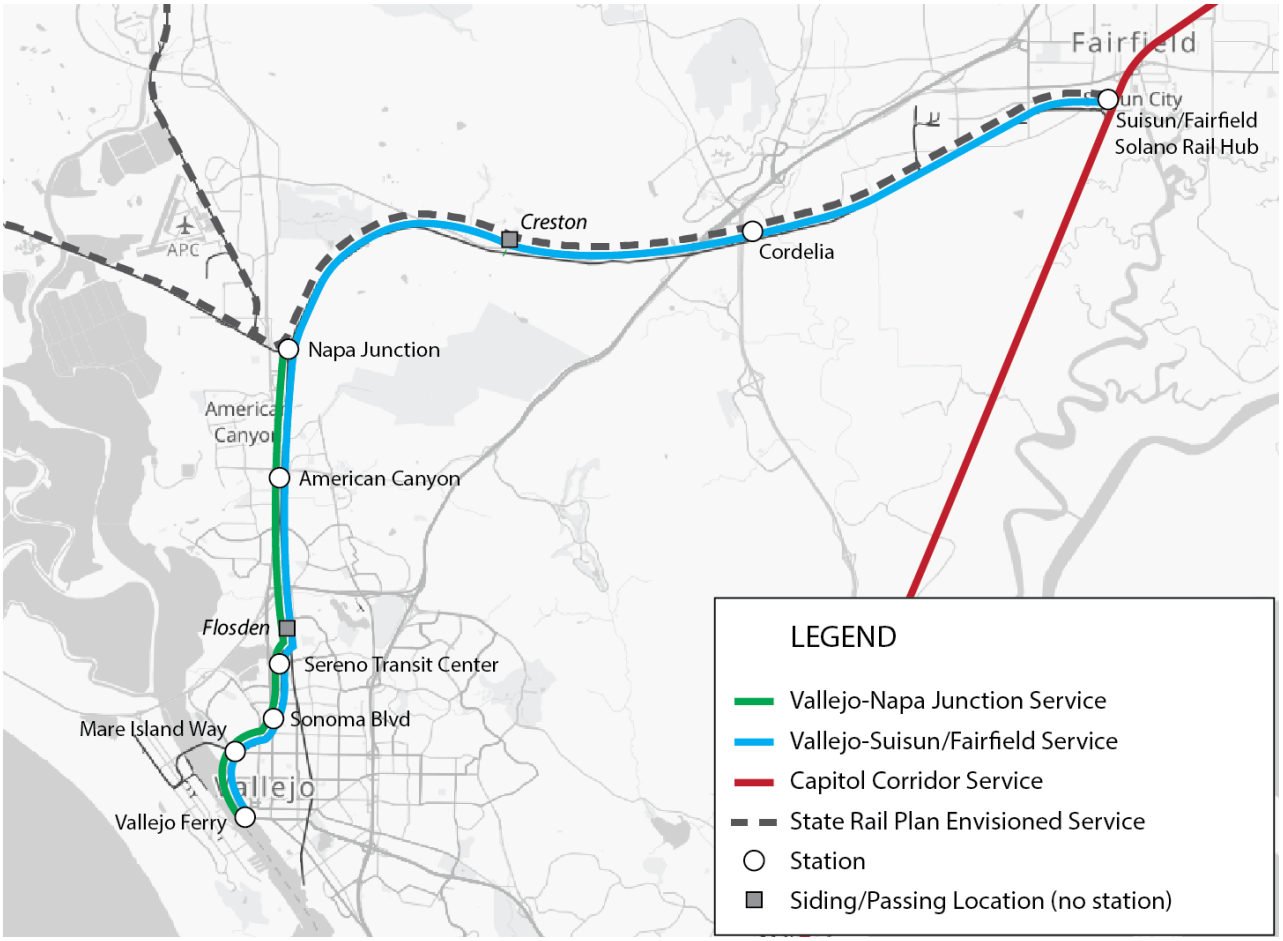


Figure 37: Vallejo Passenger Rail Service Options and Station Locations

Both plans assume a 30-minute all-day headway. The beginning of the service day is determined on weekdays by a connection from the first westbound Capitol Corridor train of the morning, and to the first Vallejo Ferry departure to San Francisco. In the evening trains connect from the last arriving ferry at Vallejo and to the last eastbound Capitol Corridor train to Sacramento at the Suisun/Fairfield Station. On weekends and holidays the same 30-minute headway would be provided, with the same length of the service day (approximately 16 hours), but with a later start in the morning and later operation into the evening.

An operations facility is assumed near Flosden in Vallejo, the present site of a three-track yard, located 2.8 miles from the Ferry Terminal, south of Tuolumne Street and near the Solano Transit (SolTrans) administrative offices at 1850 Broadway. Trains would pull in and out from this facility to and from Napa Junction or the Suisun/Fairfield Station to enter service in the morning and finish their service day. Both conceptual plans would require northbound and southbound trains to pass each other here, so that facility design would provide for two running tracks, as well as fleet storage and maintenance functions. The alternative concept providing through service to the Suisun/Fairfield Station would require an additional second passing track at Creston near the county line in the Jameson Canyon area about halfway between Napa Junction and Cordelia if the North Bay East-West service is not yet in operation. (See Figure 38 above for the approximate locations of these passing tracks.)

Both concepts assume operation by two-car multiple unit (MU) trains. No specific recommendation about the equipment can be made at this time, but for purely illustrative purposes in these service concepts the two-car Stadler FLIRT will be used, with 116 seats and standee room for another 118. This would be similar to DMUs

operated by BART between Pittsburg/Bay Point and Antioch, and by the Metrolink Arrow service between San Bernardino and Redlands.

Figure 38 Multiple Unit trains in service in California.

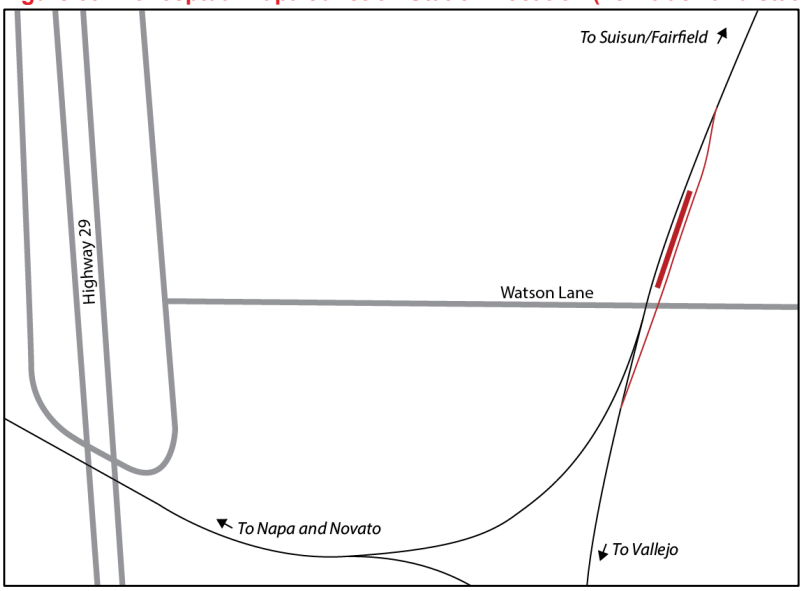
Stadler GTW eBART Train.

Stadler FLIRT Metrolink Arrow Train.

6.2.1.1 Vallejo to Napa Junction

The Vallejo-Napa Junction concept would run from a single-track terminal at the Vallejo Ferry 6.3 miles to a station near Watson Lane in the Napa Junction area. This is just east of the point at which the track serving the Novato and Napa lines joins the Vallejo branch. Cross-platform transfers would be available between trains from Vallejo serving one side of the platform, and trains serving Suisun/ Fairfield, Napa, and Novato on the opposite side. See Figure 40 for a conceptual drawing of the station and track location at Napa Junction.

Figure 39: Conceptual Napa Junction Station Location (new track and station in red)



Schedule

The distance from the Vallejo Ferry rail terminal and the Napa Junction station at Watson Lane is 6.3 miles, with an estimated one-way running time of 21 minutes. This is an average commercial revenue service speed of 18

mph. There would be four intermediate passenger stations. The 30-minute headway would require two trainsets in operation. Six minutes of terminal layover time would be scheduled at the Vallejo Ferry, and 12 minutes at Napa Junction. This is illustrated in the timetable below.

Table 9: Vallejo-Napa Junction Timetables

	Northbound Service						
SF Ferry Arrival	**Vallejo Ferry**	**Mare Island Way**	**Sonoma Blvd**	**Sereno Transit Center**	***Flosden (no station)***	**American Canyon**	**Napa Junction**
-	5:26	5:28	5:30	5:36	*5:38*	5:40	5:47
-	5:56	5:58	6:00	6:06	*6:08*	6:10	6:17
-	6:26	6:28	6:30	6:36	*6:38*	6:40	6:47
-	6:56	6:58	7:00	7:06	*7:08*	7:10	7:17
-	7:26	7:28	7:30	7:36	*7:38*	7:40	7:47
7:35	7:56	7:58	8:00	8:06	*8:08*	8:10	8:17
	Every thirty (30) minutes, then:						
18:20	18:26	18:28	18:30	18:36	*18:38*	18:40	18:47
-	18:56	18:58	19:00	19:06	*19:08*	19:10	19:17
19:00	19:26	19:28	19:30	19:36	*19:38*	19:40	19:47
-	19:56	19:58	20:00	20:06	*20:08*	20:10	**20:17
-	20:26	20:28	20:30	20:36	*20:38*	20:40	**20:47

**Pull into Flosden after end of service.

Southbound Service							
Napa Junction	**American Canyon**	***Flosden (no station)***	**Sereno Transit Center**	**Sonoma Blvd**	**Mare Island Way**	**Vallejo Ferry**	SF Ferry Departure
*4:59	5:06	*5:08*	5:10	5:16	5:18	5:20	5:30
*5:29	5:36	*5:38*	5:40	5:46	5:48	5:50	6:00
5:59	6:06	*6:08*	6:10	6:16	6:18	6:20	-
6:29	6:36	*6:38*	6:40	6:46	6:48	6:50	7:15
Every thirty (30) minutes, then:							
18:29	18:36	*18:38*	18:40	18:46	18:48	18:50	19:05
18:59	19:06	*19:08*	19:10	19:16	19:18	19:20	-
19:29	19:36	*19:38*	19:40	19:46	19:48	18:50	-
19:59	20:06	*20:08*	20:10	20:16	20:18	20:20	-

*Pull out of Flosden before beginning of service.

Fleet Requirements

In addition to the two trainsets required for operation in weekday revenue service, a third would be required for routine maintenance purposes, and to provide schedule "protection" when another set is out of service for an unscheduled purpose. There may also be extraordinary events during which the system is called upon to accommodate unusually large crowds, requiring two-unit MU operation on some trains. The total fleet

requirement for Vallejo-Napa Junction service is therefore three MU trainsets. The operating and maintenance facility at Flosden would be designed to store and service this fleet.

6.2.2 Vallejo to the Suisun/Fairfield Station via Napa Junction

As in the Napa Junction concept, the Vallejo-Suisun/Fairfield Station concept would operate from a single-track terminal at the Vallejo Ferry. From this terminal, trains would run 18.9 miles to a single-track terminal at a new Solano Rail Hub at the Suisun/Fairfield Station. This concept would also provide for a 30-minute all-day headway. The beginning of the service day would be determined on weekdays by a connection from the first westbound Capitol Corridor train of the morning, currently (January 2024) scheduled to arrive at Suisun/Fairfield at 4:45 AM. An adjustment of 5-7 minutes between Capitol Corridor and Vallejo schedules could be negotiated to confirm the operability of this connection. At the Vallejo end, trains would meet the first Ferry departure. In the evening, trains connect from the last arriving ferry at Vallejo and to the last eastbound Capitol Corridor train at Suisun /Fairfield. On weekends and holidays, the same 30-minute headway would be provided, and the same length of the service day assumed with a later start in the morning and later operation into the evening.

To accommodate this longer line, a third trainset would be required, leading to a requirement for a second passing siding east of Napa Junction. Based on preliminary estimated running times, and a 30-minute headway, the second siding would be located between the Napa Junction Station and the Cordelia Station at Lopes Road, in Jameson Canyon in the vicinity of the Solano/Napa County line near a point referred to by the railroad as Creston.

Schedules

The distance from the Vallejo Ferry rail terminal and Suisun/Fairfield is 18.9 miles, with a preliminary estimated one-way running time of 40 minutes. This is an average commercial revenue speed of 28.4 mph. There would be six intermediate passenger stations. The 30-minute headway would require three trainsets in operation. Six minutes of terminal layover time would be scheduled at the Vallejo Ferry, leaving only four minutes at Suisun/Fairfield. This is illustrated in the timetable below.

Table 10: Vallejo-Suisun/Fairfield Timetables

Northbound Service										
Vallejo Ferry	**Mare Island Way**	**Sonoma Blvd**	**Sereno Transit Center**	*Flosden (no station)*	**American Canyon**	**Napa Junction**	*Creston (no station)*	**Cordelia**	**Suisun/ Fairfield**	CC NB/EB Departure
5:26	5:28	5:30	5:36	*5:38*	5:40	5:47	*5:53*	5:55	6:06	-
5:56	5:58	6:00	6:06	*6:08*	6:10	6:17	*6:23*	6:25	6:36	6:47
6:26	6:28	6:30	6:36	*6:38*	6:40	6:47	*6:53*	6:55	7:06	-
6:56	6:58	7:00	7:06	*7:08*	7:10	7:17	*7:23*	7:25	7:36	-
7:26	7:28	7:30	7:36	*7:38*	7:40	7:47	*7:53*	7:55	8:06	8:32
7:56[1]	7:58	8:00	8:06	*8:08*	8:10	8:17	*8:23*	8:25	8:36	-
Every thirty (30) minutes, then:										
18:56	18:58	19:00	19:06	*19:08*	19:10	19:17	*19:23*	19:25	19:36	
19:26[1]	19:28	19:30	19:36	*19:38*	19:40	19:47	*19:53*	19:55	**20:06	20:17
19:56	19:58	20:00	20:06	*20:08*	20:10	20:17	*20:23*	20:25	**20:36	
20:26	20:28	20:30	20:36	*20:38*	20:40	20:47	*20:53*	20:55	**21:06	21:19

**Pull into Flosden after end of service.

[1]. San Francisco Ferry connections.

	Southbound Service									
CC SB/WB Arrivals	**Suisun/ Fairfield**	**Cordelia**	*Creston (no station)*	**Napa Junction**	**American Canyon**	*Flosden (no station)*	**Sereno Transit Center**	**Sonoma Blvd**	**Mare Island Way**	**Vallejo Ferry**
-	*4:40	4:51	*4:53*	4:59	5:06	*5:08*	5:10	5:16	5:18	5:20[1]
4:51	*5:10	5:21	*5:23*	5:29	5:36	*5:38*	5:40	5:46	5:48	5:50[1]
-	*5:40	5:51	*5:53*	5:59	6:06	*6:08*	6:10	6:16	6:18	6:20
5:51	6:10	6:21	*6:23*	6:29	6:36	*6:38*	6:40	6:46	6:48	6:50[1]
-	6:40	6:51	*6:53*	6:59	7:06	*7:08*	7:10	7:16	7:18	7:20
6:51	7:10	7:21	*7:23*	7:29	7:36	*7:38*	7:40	7:46	7:48	7:50
	Every thirty (30) minutes, then:									
-	18:10	18:21	*18:23*	18:29	18:36	*18:38*	18:40	18:46	18:48	18:50
18:36	18:40	18:51	*18:53*	18:59	19:06	*19:08*	19:10	19:16	19:18	19:20
-	19:10	19:21	*19:23*	19:29	19:36	*19:38*	19:40	19:46	19:48	18:50[1]
-	19:40	19:51	*19:53*	19:59	20:06	*20:08*	20:10	20:16	20:18	20:20

*Pull out of Flosden before beginning of service.

[1]. San Francisco Ferry connections.

Fleet Requirements

In addition to the three trainsets required for operation in weekday revenue service, a fourth would be required for routine maintenance purposes, and to provide schedule "protection" when another set is out of service for an unscheduled purpose. There may also be extraordinary events during which the system is called upon to

accommodate unusually large crowds, requiring two-unit MU operation on some trains. The total fleet requirement for Vallejo-Napa Junction service is therefore four MU trainsets.

6.2.3 Transfers

The proposed Napa Junction station is the key to viability of Vallejo passenger rail service. The service concepts outlined here all provide connectivity between Vallejo and other North Bay passenger markets. Although details of Novato and Napa passenger service envisioned in the State Rail Plan are not yet available, the frequent service described here should make transfers convenient. The viability of cross-platform transfers with level boarding, requiring a short, level walk between trains with no steps or other obstacles, has been successfully demonstrated by BART at Pittsburg/Bay Point. Frequent service means minimization of waiting times at transfers, an advantage that can be further enhanced through cooperative service planning with schedule and fare coordination.

6.2.4 Introduction of Zero Emission Vehicles

By the time this service is in operation, zero-emission propulsion will likely be a core regulatory requirement of new passenger rail services in California. This creates significant differences in facility design and operating cost, which vary with the technology chosen.

One option is electric propulsion using hydrogen fuel cells as the energy source. The nine-mile Arrow Route, from San Bernardino to Redlands, is scheduled to introduce hydrogen fuel-cell powered Stadler FLIRT H2 trains in late 2024. These vehicles operate on an electric drive with hydrogen fuel as the energy source, with a reported range of more than 280 miles (about seven round trips from Vallejo to Suisun/Fairfield) and a maximum speed of 79mph. Hydrogen is operationally similar to diesel (quick fueling, modest changes in operating procedures). Note that while the current hydrogen fuel is currently not a “green” fuel (with more than 90% of hydrogen petroleum based), there is a possibility that future hydrogen fuel production will qualify as “green.” Issues of storage, maintenance and supply will also need to be solved.

Battery-Electric is another option. Its downside is limited range, and a 1-megawatt hour battery capacity (about three times the capacity of most battery-electric transit buses) may only allow enough range for about three round trips from Vallejo to Suisun/Fairfield. Mitigations could include more batteries, but they are expensive and heavy. Another option is adding one additional trainset into the Vallejo-Suisun/Fairfield schedule (expanding from three to four trainsets) for about eight hours in the middle of the day to allow all the trainsets to charge for about 30 minutes at Suisun-Fairfield. This would extend the service range to at least 12 round trips (or a span-of-service exceeding 16 hours). The benefit is that PG&E already has a substation across the street from the Suisun-Fairfield station, making the power connections much easier. The cost of an additional trainset would need to be considered, along with larger terminal facilities necessary because the trains are dwelling longer. There could also be additional costs for crewing if the schedule becomes too constricting. If the terminal is shared with trains to Napa and Novato, the Suisun-Fairfield Station MU terminal could include multiple tracks and platforms.

7. Community

This section summarizes both potential impacts and opportunities this service could have for the surrounding community. Temporary impacts from construction and permanent impacts from the introduction and operation of a new train service can affect the surrounding community, including traffic/mobility, safety, equity, air quality, noise and vibration. However, there are opportunities for the community as well, such as new transit-oriented development and improvements in downtown and the proposed station areas.

7.1 Temporary Impacts

Construction, including rehabilitation of existing track, installation of signals and new track, and station infrastructure has the strong potential to impact traffic, safety, air quality, and noise for the surrounding community throughout the construction period. Successful construction management can reduce/minimize these impacts.

7.1.1 Traffic

Construction activities would mostly be limited to the rail right of way and temporary traffic impacts would likely occur at rail crossings, station sites, and the new track to the ferry. Temporary traffic impacts might include street or lane closures and related congestion impacts. Street closures would require users to take alternative routes, bringing traffic, activity, and congestion onto adjacent streets. This could be mitigated at certain non-residential areas by scheduling construction in the nighttime or off-peak travel times to minimize disruption.

Street closures may also disrupt transit and rail freight service, which will have to be temporarily rerouted during the construction period. Some SolTrans and VINE Transit bus routes may need to be rerouted to adjacent streets to reach their destination.

Other, smaller traffic impacts may result from temporary traffic lane, parking lane, or sidewalk closures. A closed traffic lane may impact level of service and create safety impacts as discussed in the next section. Parking lane closures and the need for construction truck loading zones may result in temporary parking loss. Sidewalk closures would impact pedestrians, who may have to take different and potentially longer routes to get to their destinations, though best practice requires minimizing these detours through the provision of temporary accessible routes. The City and the contractor will have to develop a traffic control plan, mitigation strategies, and a stakeholder engagement plan to effectively communicate closures and service disruptions and alternatives to the public. Early engagement with neighborhood residents and stakeholders to identify and discuss traffic mitigation that address specific concerns (e.g., loading needs for businesses and potential interferences with business operations) are a best practice to implement.

7.1.2 Safety

Construction activities create temporary conditions which can be inherently unsafe if not properly managed. Safety impacts might be related to increased or unexpected traffic conditions and the presence of construction equipment and heavy vehicles. Closing streets or lanes may substantially change traffic circulation patterns and create unsafe conditions for drivers and pedestrians if safety is not prioritized. Reducing the right-of-way space for traffic may force users to share limited space. For example, closing a bike lane due to construction would require bicyclists to share a lane with higher speed vehicle traffic, which can put the bicyclist at higher risk for conflicts. Driver field of view may be obstructed by temporary construction fencing, signage, or large, parked vehicles, and increase the risk for conflicts. The construction management plan needs to take into account all safety hazards and risks and identify solutions to remove them.

Street and sidewalk closures may also impact people with disabilities who may lose access to Americans with Disabilities Act (ADA) ramps that are essential to getting around. Temporary fencing and construction staging areas may also reduce available sidewalk space for pedestrians. Obstructed ADA paths and ramps would need to be replaced with other accessible routes. Building in mitigation measures and temporary sidewalks and ADA ramps must be considered during the construction period, if applicable.

Construction safety impacts are especially a concern for three intersections, where there is potentially high pedestrian activity due to proximity to schools, parks, hospitals, and other community serving uses. Starting at Sereno Transit Center, Kaiser Hospital is within 1000 feet of the existing alignment at Sereno Dr and any construction at the intersection should consider the access needs of the hospital workers and visitors especially in emergency situations. At Sonoma and Nebraska, within 2,500 ft of the proposed station, there are two high schools and educational safety campaigns may be needed to inform students on safety around construction sites in the area. Lastly, at Mare Island Way and Georgia St, there is potential high pedestrian activity due to proximity to the ferry terminal, public library, and nearby parks. Building new track in this area could result in safety impacts related to closing lanes and intersections or introducing fencing that impairs views. Identifying mitigation measures and safe alternatives to impacted intersections is critical to keeping the surrounding community safe during the construction period.

7.1.3 Air Quality

Construction and rehabilitation of rail infrastructure can result in dust and exhaust emissions. Dust emissions can come from any soil movement, utility relocation, station construction, or transportation of construction materials. Exhaust emissions come from operation of construction equipment and construction-related transportation. Inhaling dust emissions can have health impacts such as respiratory irritation, asthma, and increased risk of respiratory, cardiovascular damage, and cancer.[7]

The level of air quality impact from construction would be considered high for the areas within 200 feet of the construction site without mitigation. This is especially a concern if there are any sensitive receptors near the construction areas such as parks, schools, hospitals, clinics, community centers, senior centers, and residential areas. The immediate areas around the proposed alignment include residential, industrial, commercial, and public uses such as a middle and high school. The City and contractor will need to include a Basic Construction Emission Control Practices (Best Management Practices) with dust control measures and truck idling reduction measures to mitigate against potential air quality impacts and keep the surrounding communities safe from poor air quality.

7.1.4 Noise and Vibration

Temporary noise and vibration generated by construction methods and operation of equipment can be considered intrusive and impact nearby buildings and sensitive noise receptors, which include schools, residences, libraries, hospitals, and care facilities. There are sensitive noise receptors located along the study alignment, including residences, schools, and hospitals, which could be impacted by construction noise. Some of the loudest construction equipment include bulldozers, scrapers, cranes, pumps, pavers, pile drivers, and haul trucks, and some of the common vibration producing equipment include pile drivers, jack hammers, pavement breakers, hoe rams, drills, bulldozers, and backhoes.[8] High noise levels can cause sleep disturbances and interfere with normal speech and communication[9]. It can also impact local business operation and overall quality of life for neighbors.

7 Mingpu Wang, Gang Yao, Yujia Sun, Yang Yang, Rui Deng, Exposure to construction dust and health impacts – A review, Chemosphere, Volume 311, Part 1, 2023, 136990, ISSN 0045-6535, https://doi.org/10.1016/j.chemosphere.2022.136990.

8 FTA. Transit Noise and Vibration Impact Assessment, May 2006.

9 CA Office of Planning and Research. https://files.ceqanet.opr.ca.gov/4224-2/attachment/nNQie1_P9oL2Clb8wrgeUoY3WRpXuNNalb1u_qtIsd_Y1ZfXD06L8TCbpjXmJIWgffa-uYZgmeQBx-Wi0

Minimizing noise impacts or limiting duration of noise impacts is therefore essential to ensuring nearby residents are not heavily burdened by the construction. The contractor will need to prepare a Noise and Vibration Control Plan to provide adequate control measures to address any noise and vibration resulting from the project.

7.2 Permanent Impacts

The completion of a new passenger rail system with four new stations in Vallejo will have long-term permanent impacts (positive and negative) for the city, local community, economy, and traffic in the area. These impacts are discussed in detail in the next sections.

7.2.1 Traffic/mobility

New passenger rail service will increase opportunities for travel between Vallejo, Napa Junction, and Suisun/Fairfield. This study's Market Demand Report (2023) estimates potential daily ridership on the new rail service of 1,825 to 7,550 trips, which includes new trips and trips that replace vehicle trips. Should rail transit prove to be a competitive and convenient option for travelers in the area, these markets could see more of a mode shift from driving to transit.

A mode shift to transit between these cities could remove some traffic from Highways 12, 29, 37, and Interstate 80, potentially improving peak hour travel times for drivers. Highway 37 between Vallejo and Novato is prone to congestion, and the proposed rail service to the ferry terminal and connecting ferry service may be able to relieve some of the traffic. Travel times for buses using Highways 12, 29, and 37 would also improve, however, the new rail service may take some riders off existing transit services covering the same destinations. As a result, travel times for drivers and existing bus passengers could benefit from this new transit service.

Reduced vehicle miles traveled (VMT) due to the mode shift can also improve traffic safety for all users. High annual vehicle miles traveled is strongly correlated with high number of traffic fatalities, and therefore actions that reduce VMT also reduce risk of traffic fatalities. Implementing traffic calming measures in conjunction with the mode shift is also key to improve safety and mobility for pedestrians.[10]

Most of the traffic and mobility benefits from the proposed rail service rely on a significant mode shift from cars to the new service. This is possible only if the new transit service is affordable. Post-pandemic travel patterns have shown that many commuters continue to work from home and have not returned to regular transit use post-pandemic, but non-commute trips by transit reliant communities consistently use transit and their trips should be prioritized in designing service[11]. Transit reliant riders include riders such as youth, seniors, and people with disabilities, and peoples with low incomes. Fares need to be affordable to make the proposed service an accessible alternative. Affordable fares are further discussed in Section 7.2.5. Safe, convenient, reliable, and affordable transit access between these markets reinforces mobility lifelines for transit-reliant communities and creates an attractive alternative to driving.

7.2.2 Safety

Permanent safety impacts may also result from higher speed passenger trains in the area. While freight trains occasionally travel through this area, passenger trains will add to the rail traffic and at higher speeds, which can put pedestrians and cars at risk of getting injured by a fast train at grade crossings. Train safety refers to a train's

10 Washington State Department of Transportation. The Case for Reducing VMT. https://wsdot.wa.gov/sites/default/files/2023-06/GMA-Reference-TheCaseForReducingVMT.pdf

11 Rowlands, DW and Tracy Hadden Loh. Ensuring the intertwined post-pandemic recoveries of downtowns and transit systems. Brookings Institute. 2023 Aug 8. https://www.brookings.edu/articles/ensuring-the-intertwined-post-pandemic-recoveries-of-downtowns-and-transit-systems/

ability to avoid and respond to crashes. Lightweight rolling stock are able to stop more quickly in the event of an emergency while locomotive-hauled systems generally have longer stopping distances.[12]

Higher frequency trains also require more safety interventions along the alignment and at-grade crossings. According to the Solano Rail Crossings Safety Improvements Plan (2024), there were a total of 133 incidents that occurred at 39 crossings in Solano County between January 2012 and December 2022:

- 127 incidents were collisions, and six incidents were near misses.
- There were 42 train related incidents, and from those incidents, 12 involved fatalities, 11 involved injuries, and 19 resulted in no injuries.
- There were 85 total incidents recorded that occurred at rail crossings but where a train was not directly involved. These incidents include Vehicle/Vehicle, Vehicle/Pedestrian and Vehicle/Bicycle incidents. Of these non-train related incidents, none involved a fatality, 35 resulted in injuries and 50 resulted in no injuries.

Prioritizing safety at grade crossings, where train tracks and street traffic cross at the same level, is key to reducing injuries and fatalities. The proposed alignment would cross Vallejo at 16 existing and 7 new grade crossings. Grade crossings should include active warning and control devices such as bells, flashing lights, and gates in addition to passive warning devices such as crossbucks (Figure 41), stop signs and pavement markings. The City will own the public grade crossings and will need to update existing infrastructure at grade crossings to prioritize safety. The City should work in partnership with community-based organizations to conduct rail safety education programs in the vicinity of any new grade crossing. Creating safety educational campaigns for the community including schools and business to make them aware of new safety impacts associated with new passenger rail is also essential to keeping the community safe.

Figure 40 Image of Crossbuck

7.2.3 Noise

The study assumes that zero-emission propulsion for trains will be required by the time a passenger rail service in Vallejo is operational. This significantly reduces noise generated by the engines, leaving vibrations, train whistles, and gate bells as the primary impacts. Since locomotive-hauled trains are larger and heavier, they will cause greater noise and vibration than multiple unit trains.

High noise pollution from trains can have health impacts such as stress, sleep loss, high blood pressure, and reduction in quality of life and opportunities for tranquility. In some severe cases, there could be loss of hearing.[13] It is important that the proposed train service does not create noise impact that can harm communities, especially communities that already live with existing health concerns and environmental burdens. Implementing

12 Connecticut Department of Transportation. Diesel Multiple Unit Alternative. March 2016. https://www.dotdata.ct.gov/CCRS/docs/DMU%20-%20CCRS_Draft_Final_Report_2016-05-19.pdf

13 California High Speed Rail Authority. Noise pollution https://calhsr.com/environmental-review/noise-pollution/

sufficient mitigation measures and design improvements to manage noise levels is necessary to reduce the impact from the proposed train service.

The proposed service will run at 30-minute headways in each direction, or four trains per hour, which will result in repeated higher noise levels than existing conditions. The Federal Railroad Administration requires trains to sound their horn in advance of grade crossings and under other circumstances as a universal safety precaution for 15-20 seconds. Local communities can request to establish quiet zones (1/2 mile in length) where the train horn is not routinely sounded as long as there are other safety engineering improvements implemented to reduce the level of risk (e.g., medians to prevent motorists from driving around a lowered gate, converting two-way street to one-way street, etc.)[14]. Gates that include ringing bells while active are another source of noise near at-grade crossings. More frequent train service in the area would inevitably create more noise and the City should work with the community and relevant authorities to identify the appropriate mitigation measures to minimize noise impacts.

MU trains, using either electric or hydrogen propulsion, will generate a moderate level of noise and vibrations, but they will have lighter cars than regular passenger locomotive trains. MU trains would also travel faster than the current freight trains (MU trains would operate at 55mph whereas current freight trains have been operating at 10-20mph), which means residents at home will perceive noise and vibrations from a MU train for a shorter duration of time than that of a slower-moving train. Noise from MU trains can be further mitigated with built-in wheel dampers (coverings over the side of the wheels) that can reduce noise produced by the friction between the wheels and the tracks. Locomotive-hauled trains will have more impacts as result of their heavier weight.

7.2.4 Air quality

Depending on the amount of mode shift from private vehicles to rail transit, the surrounding community could benefit from less auto emissions due to fewer vehicles on the road. Trains would run on electric or hydrogen power. Depending on the power source, electric and hydrogen powered trains can reduce the amount of emissions affecting surrounding communities, improving health outcomes.

Transportation is also one of the largest contributors to greenhouse gas emissions and climate change. Well-used rail transportation produces lower greenhouse gas emissions than other travel modes (i.e., cars, airplanes) so replacing these modal trips with train trips can reduce overall greenhouse gas emissions. Emissions can be further reduced by using zero-emission power sources.[15] The amount of air quality benefit would depend on ridership and the amount of mode shift from driving to public transit.

7.2.5 Equity and Environmental Justice

While the proposed passenger rail service has the potential to bring new transit access and opportunities to the area, it also has the potential to bring equity impacts to a community that has lower income and a high pollution burden. The proposed rail alignment runs entirely through Equity Priority Communities designated by MTC and is located within census tracts with some of the highest CalEnviroScreen 4.0 percentile scores in the state. The census tract where the proposed Vallejo Ferry Terminal station is located is also a federally designated disadvantaged community (DAC), which means the community is experiencing a high degree of transportation insecurity, environmental burden, social vulnerability, health vulnerability, and climate risk vulnerability. These designations indicate that the surrounding community has high rates of environmental pollution exposure, high rates of health disorders, and has been historically underserved. Planning and design of the new rail service

14 California Public Utilities Commission. Rail Safety Division. Quiet Zone. https://www.cpuc.ca.gov/industries-and-topics/rail-safety/rail-crossings-and-engineering/quiet-zone

15US DOT Federal Railroad Administration. https://railroads.dot.gov/rail-network-development/environment/rail-climate-considerations#:~:text=The%20transportation%20sector%20emits%20the,passenger%20and%20freight%20rail%20transportation.

would need to ensure new service in the area benefits the community and does not further contribute to existing pollution burdens and economic challenges.

CalEnviroscreen scores are a product of pollution burden (average of exposures and environmental effects) and population characteristics (average of sensitive populations and socioeconomic factors). The proposed alignment runs through tracts with scores of 66.54 and above (out of 100), as indicated in red and orange in Figure 42. The data indicates that residents in these census tracts are most vulnerable to exposure to lead, groundwater threats, hazardous waste, solid waste, and cleanup sites. Sereno Transit Center and Vallejo Ferry Terminal Stations are the two station areas with the highest concentration of pollution burdens. Compared to the surrounding tracts in the study area, Sereno Transit Center has high rates of exposure to solid waste, unsafe drinking water, and diesel particulate matter emissions. Vallejo Ferry Terminal has high rates of pollution related to clean up sites, groundwater threats, and pesticides compared to surrounding tracts. Rates of health disorders such as cardiovascular disease, low birth weight, and asthma are higher in the study area than citywide averages. Construction and new infrastructure in these areas can increase public exposure to lands formerly contaminated by lead, solid waste, hazardous waste, and pesticides and managing these risks during construction is critical to reducing impacts on the community.

The proposed rail service also has the potential to positively address these issues by providing an alternative to single occupancy driving, reducing air quality impacts. Construction sites in this area would provide an opportunity to clean up contamination to ensure the area is brought up to current standards.

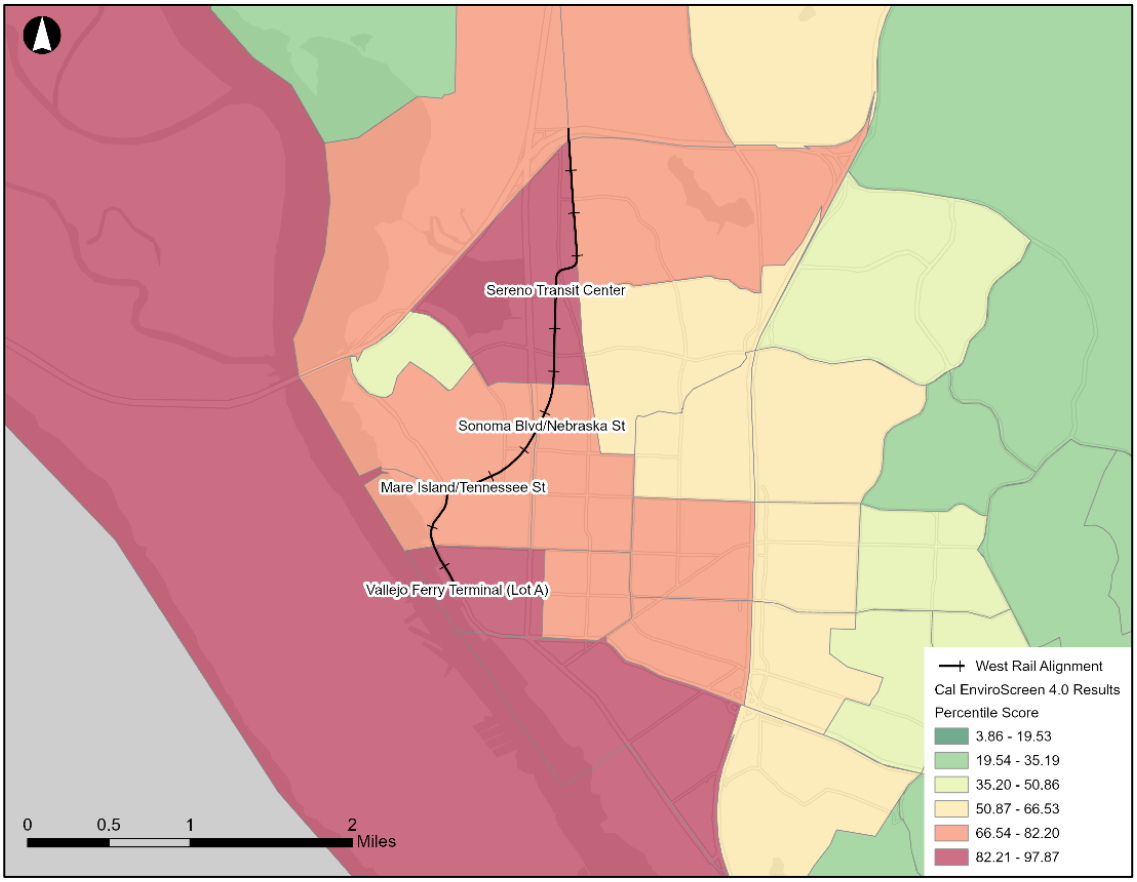


Figure 41: CalEnviroScreen 4.0 Percentile Scores (Source: California Office of Environmental Health Hazard Assessment)

The mode shift from vehicle trips to transit trips can contribute to improved health outcomes for the surrounding communities. Reducing vehicle miles traveled (VMT) reduces auto emissions and is likely to reduce the prevalence of asthma for those living near heavy traffic[16]. Trains using non-diesel sources of energy would help maintain healthy air quality conditions for nearby residents. Providing a convenient and reliable alternative to driving can also encourage nearby residents to drive less and walk to the train station to get to their destination. A 2012 health impact assessment found that improving public transit and increasing the concentration and diversity of uses was associated with increased levels of physical activity, reduced collisions, and improved air pollution. Walking and using more active modes can contribute to a more active lifestyle that can improve health outcomes.

Most highways and rail lines were built through communities to transport commuters from suburban neighborhoods to jobs in the central business district, while most of the negative impact fell on the areas right next to highways. Transportation infrastructure is often built near or through low-income and minority populations and have historically divided communities and bisected neighborhoods. While freight rail infrastructure already exists in this part of Vallejo, new passenger rail service will bring more frequent, higher-speed trains, new stations, and associated infrastructure that could have an additional impact on the surrounding community and reinforce this barrier. Designing safe crossings and unobtrusive infrastructure is important to not physically divide communities. The new transit system should be designed for more than just passengers going in and out of Vallejo but should also consider the quality of life for those living and working adjacent to the new rail service. Collaboration with the community and community groups will be needed to develop inclusive design and service plans for the new transit system that benefit the surrounding community and minimizes potential harms.

Fares for using passenger rail and associated transit services should take into account the ability of residents to pay for the service. Affordability alongside convenience and reliability of a transit service are critical to building ridership. Assuming standard transit fares of $0.20-$0.30 per mile (i.e., BART, Caltrain), potential transit riders on the line can expect to pay - between $2-$4.50 for a one-way trip (15 miles). For those with low income, spending this amount daily can be a large portion of their overall income. Keeping fares low ensures lower income households are not bearing a high transportation cost burden. Coordination with regional fare programs and public subsidies are critical to keeping transit affordable to encourage mode shift and improve mobility options for those who do not or cannot drive. Clipper START is a pilot program offering 50% discounts on Bay Area transit lines for those that meet the qualifying income requirement (200% of the federal poverty level or below). Surveying the community to understand who might use the service, their travel needs, and barriers to access service can ensure diverse needs are accounted for in the design and operation of the new service.

The City General Plan identifies transportation as a key driver of economic development, but rail investments that have spurred new development and investment (such as transit-oriented development) also have the potential effect of raising costs and displacing residents who can no longer afford to live in the area[17]. The land immediately around the proposed alignment would likely be rezoned to accommodate higher density development from its current lower density uses, which include public, residential, commercial, office, and mixed use. While transit-oriented development (TOD) can be beneficial in terms of environmental and local economic impact[18], delivering equitable TOD requires an explicit commitment to achieving equitable outcomes

16 Meng, Ying-Ying, et. Al. Living Near Heavy Traffic Increases Asthma Severity. August 2006. https://healthpolicy.ucla.edu/publications/Documents/PDF/Living%20Near%20Heavy%20Traffic%20Increases%20Asthma%20Severity.pdf

17 Boarnet, Marlon, et. Al. 2018. National Center for Sustainable Transportation (NCST). “Do Rail Transit Stations Induce Displacement?”

18 Transit Oriented Development Institute. Sustainability. http://www.tod.org/sustainability.html

through processes and anti-displacement strategies that ensure disadvantaged communities benefit from and are not displaced by new development[19].

Anti-displacement strategies might include inclusionary zoning, housing trust funds, commercial stabilization, community benefits agreements, public investment, and other strategies that include financing measures to fund more affordable housing creation at all price points and sizes to fit a wide range of households.[20] Community benefits agreements would require collaboration from the impacted community, and can include funding for community programs or reduced fare program for those living adjacent to the alignment to mitigate equity impacts. At the core of equitable TOD is active community engagement, ensuring that the community's concerns and goals are at the center of the conversation. When planning for TOD, the City should prioritize equity and include anti-displacement and community stabilization measures to ensure that vulnerable residents and businesses are not displaced as a result of new investment in the area.

7.2.6 Opportunity Areas

The City and STA can also leverage the proposed passenger rail service to meet other mobility and economic development goals.

Downtown Vallejo and Sonoma Blvd Area

Most of the area surrounding the alignment is poised for future development. The proposed rail alignment and stations are all within designated Plan Bay Area Priority Development Areas (PDAs), or places near public transit that are planned for new homes, jobs, and community amenities[21]. PDAs are identified and planned by local governments and receive regional funding to integrate PDA plans into their local zoning code. The City of Vallejo has seven PDAs, four of which include the proposed alignment. Thus, the area around the proposed alignment will significantly change in the coming years to include more housing and become a more transit-oriented community.

19 Project Connect. Equitable Transit-Oriented Development (ETOD) https://www.projectconnect.com/projects/etod

20 PolicyLink. 2022. https://allincities.org/toolkit/equitable-transit-oriented-development

21MTC. Priority Development Areas. https://mtc.ca.gov/planning/land-use/priority-development-areas-pdas

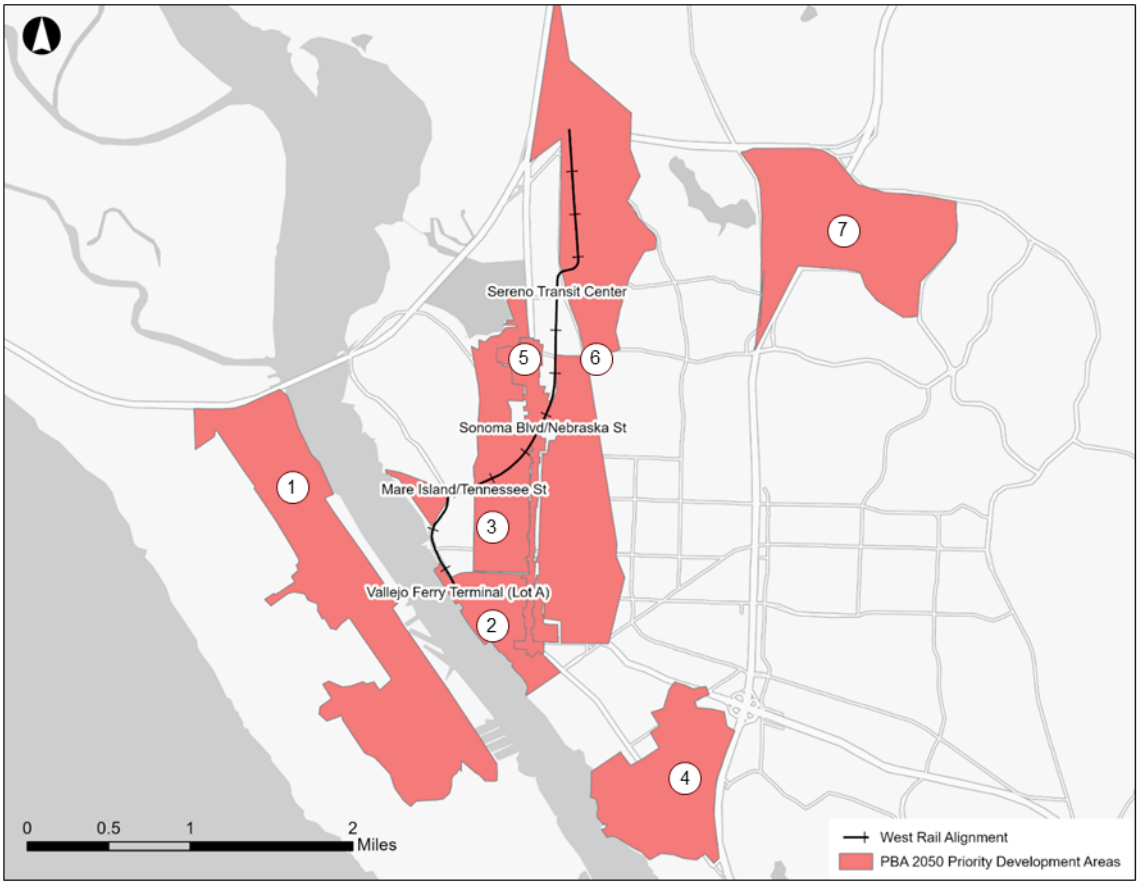


Figure 42 Plan Bay Area 2050 Priority Development Areas:
1) Mare Island, 2) Waterfront & Downtown, 3) Central Corridor West, 4) Carquinez Heights, 5) Sonoma Boulevard, 6) Central Corridor East, 7) Solano 360

In the Downtown Specific Plan (2005), the City identified 41 acres City-owned public parking lots, vacant parcels, and low-density sites that are opportunity sites for future development that can accommodate future growth. In addition to the PDAs, the City is also interested in developing any existing vacant or single-story commercial structures in the near term as part of transit-oriented development.

Similarly, Sonoma Boulevard has been identified as a key corridor for the City, linking it with the East Bay to the south and Napa Valley to the North. The Sonoma Boulevard Corridor Design Plan characterizes the street as currently "underperforming" but based on its location could be transformed to catalyze economic growth for the area through sustainable streetscape and improved bicycle and pedestrian routes. The proposed Sonoma Boulevard & Nebraska Street Station would be located within the Central North Focus Area of the corridor and the station location has already been designated as a "transit-oriented development node".

Figure 44 shows Sonoma Boulevard and the respective planning focus areas. The Central North Focus Area currently contains several light industrial businesses and a variety of commercial uses and can be expanded to serve as an incubator for new business or a hub for vocational training. Parcels directly north and south of the station along Sonoma Boulevard are recommended for mixed use zoning designations as well as multimodal

streetscape improvements[22]. Sonoma Boulevard has the potential to be a higher-density transit-rich corridor since it is in close to proximity to the proposed alignment, Downtown Vallejo, and is centrally located within most of the city's priority development areas.

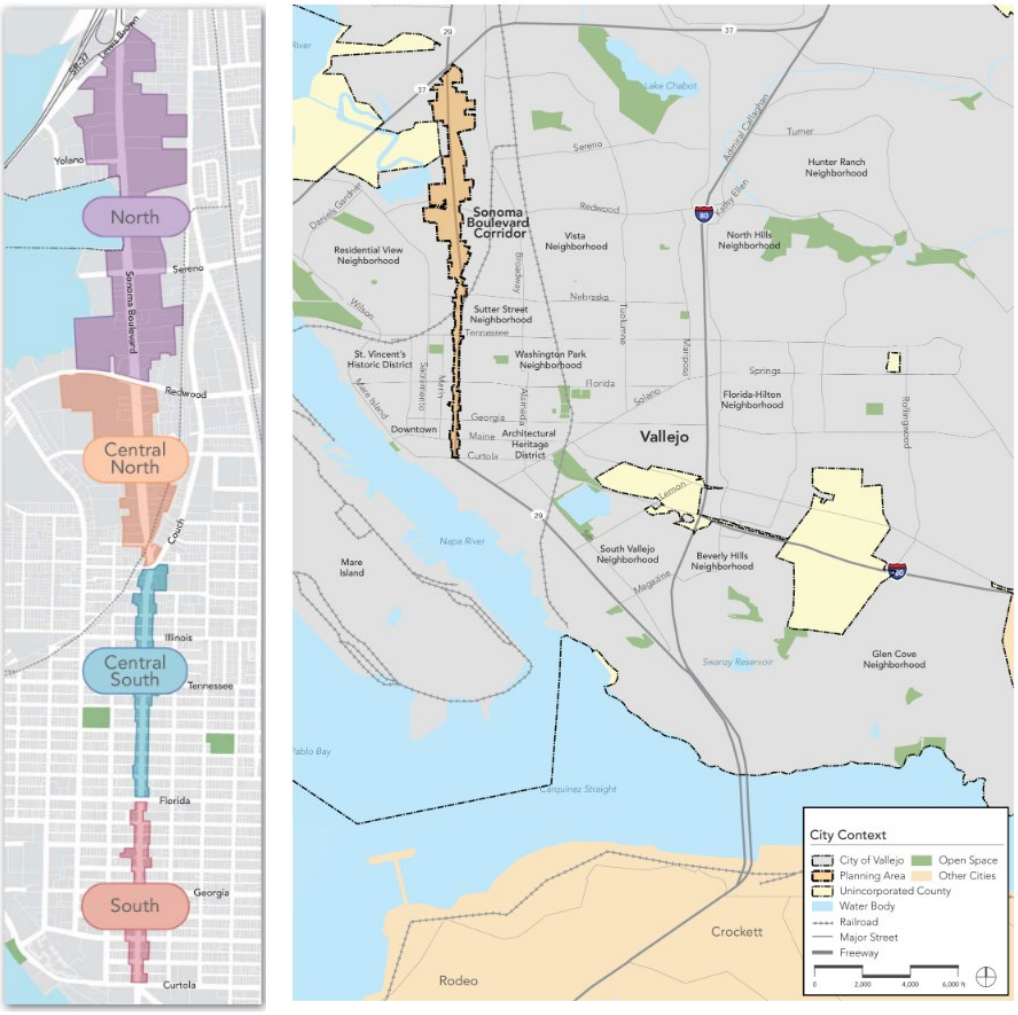


Figure 43 Sonoma Boulevard (Source: City of Vallejo)

Transit Oriented Development Opportunities

One of the goals of transit-oriented development is reducing car dependency and greenhouse gas emissions by creating more walkable communities centered around transit and higher density mix of housing and commercial uses. An equally important reason for building transit-oriented development is that higher density land uses also improves transit ridership. Denser downtowns are correlated with higher shares of both commute and non-commute transit trips. Studies have also shown that increasing the employment density in the Central Business District improves commuter rail trips and increasing residential density around station areas improves light rail

22 City of Vallejo. Sonoma Boulevard Corridor Design Plan. https://www.cityofvallejo.net/our_city/departments_divisions/planning_development_services/planning_division/major_development_specific_plan_docs

ridership.[23] In other words, concentrating more jobs downtown and higher density housing at station areas can improve rail ridership. Therefore, integrating land use and transit planning is key to ensuring healthy ridership on a new rail service.

Several activity clusters could be considered as part of future transit-oriented development considerations within the proposed four station areas (0.5-mile radius around the proposed stations). The Sereno Transit Center station has a cluster of parcels currently zoned as Office and Medical uses, and the presence of Kaiser could serve as an attractor for higher density medical or office-focused employment. At the proposed Sonoma Boulevard & Nebraska Street station, more mixed uses could be considered to balance both nearby residential and commercial zoning. Finally, both the proposed Mare Island Way & Tennessee Street Stations and the Vallejo Ferry Terminal station could support higher density housing while also providing connections to waterfront resources, civic landmarks, and recreational opportunities within Downtown.

Several opportunity sites also exist along the proposed rail alignment that should be considered for increased development. Directly west of the proposed Mare Island Way & Tennessee Street station, adjacent to the Vallejo Municipal Marina, is approximately 7 acres of vacant land that is zoned for Waterfront Mixed Use and was designated by Plan Bay Area 2050 as a priority development area. The city has plans for this parcel to be developed as part of an eventual Downtown/Waterfront District specific plan. The areas surrounding the proposed Sonoma Boulevard & Nebraska Street and the Sereno Transit Center stations are also well suited for increased development, as it is predominantly low-rise commercial strip malls today. A significant number of surface parking lots exist in the neighborhoods surrounding the proposed rail alignment that could either be upzoned or already have the zoning in place to be developed at higher densities. The City should coordinate these development plans with the development of the proposed rail alignment to ensure the new residents and businesses resulting from these development plans benefit from the proposed rail service and the rail service benefits from the new ridership.

Integration with Existing Transit

Coordinating service plans with existing transit services (Soltrans, Vine, WETA, Capitol Corridor) to improve the convenience of using transit and encourage higher ridership on the new service is recommended to attract higher ridership and maximize benefits of investing in rail and transit infrastructure. The proposed passenger rail service should complement the existing transit system and provide easy transfers that match up with the current transit schedules to reduce wait times for riders. Aligning new service with existing service can improve ease of use and improve the overall system quality and rider experience. Schedule alignment will reduce logistics planning by the rider and provide for a smoother and stress-free ride. The service plan for the proposed service should be based on a survey analysis of rider demographics, their destinations, and the purpose of their trips. Extending routes or service hours could be explored in the future to increase overall ridership.

Transfers between service providers should be timed and seamless. Vallejo Ferry Terminal and Sereno Transit Hub would be major transfer stations for the proposed service and sending more bus lines to these locations can provide more connecting lines and benefit existing riders.

23 Davis, Judy S. and Samuel Seskin. Effects of Urban Density on Rail Transit. Lincoln Institute of Land Policy. https://www.lincolninst.edu/publications/articles/effects-urban-density-rail-transit

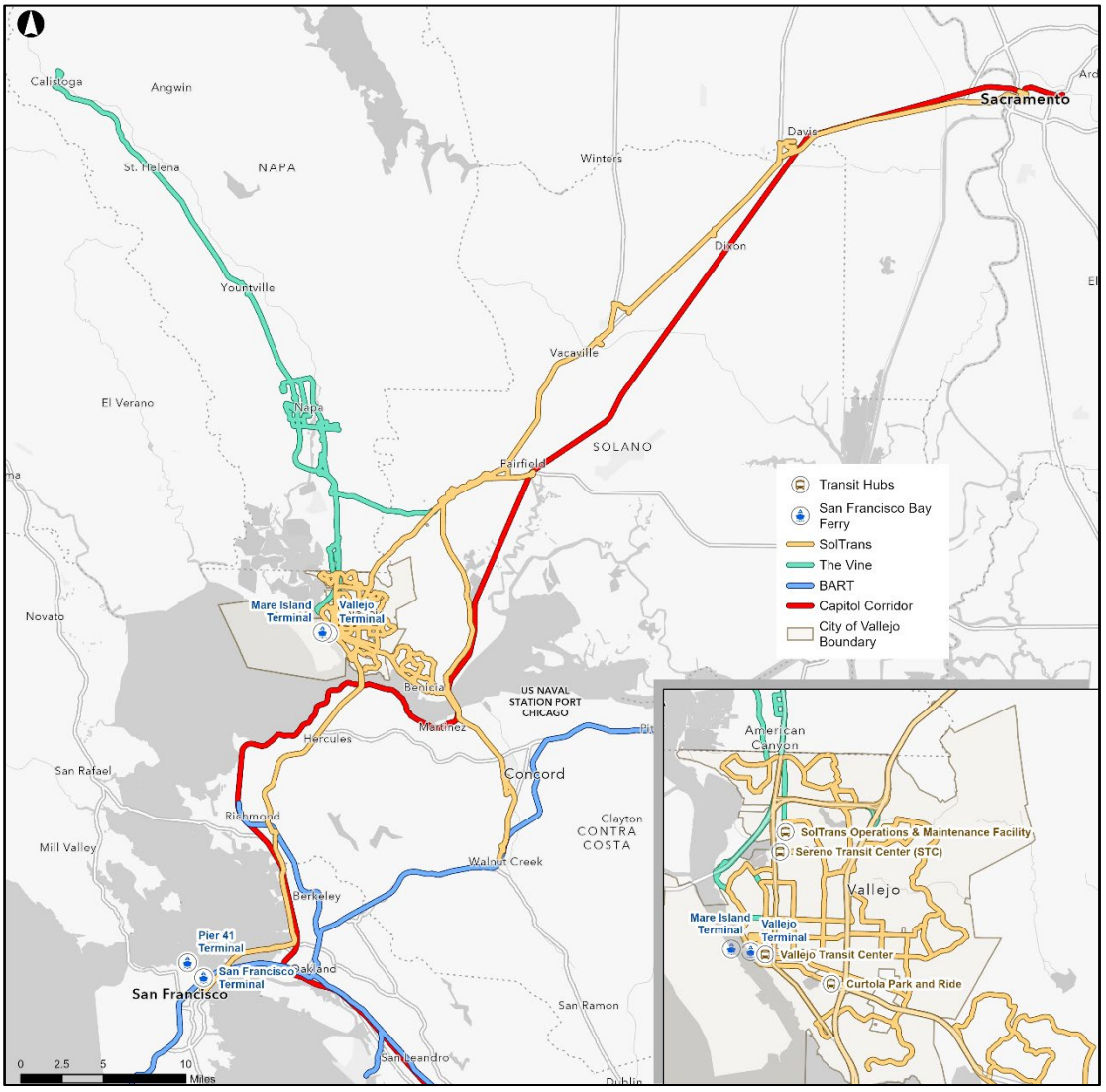


Figure 44 Transit systems in Vallejo - SolTrans, VINE Transit, and BART

Mobility Improvements

Stations should be designed with multi-modal access in mind. Many trips will require a transfer to another mode and easing the transition to/from the station is an important factor to promote system usage. Existing stations like Sereno Transit Center could consider improvements such as secure short- and long-term bicycle storage, park and ride lots, shared micro mobility, and car share options. Rolling stock selection should consider the inclusion of bike facilities on board, making bike access to and from stations more feasible for users who are concerned about last mile connections or potential risk of bike theft. The City should coordinate with Soltrans to improve access to bus stops and improve the timing and frequency of bus routes to increase the convenience of using transit, as well as coordinate with WETA and Capitol Corridor to ensure convenient transfers at terminals. The City should also coordinate efforts with the Solano Mobility first and last mile programs to fill first and last mile gaps at stations.

The City can also take advantage of new transit service to build out a safer multimodal network to the new stations via bicycle lanes and pedestrian improvements. Currently, there are many gaps in the bike network near

the proposed alignment and filling these gaps with designated bike routes connected to stations (especially transfer stations) could make bicycling to transit more feasible. Bike infrastructure interventions can range from protected, separated bicycle paths to bike boulevards on slower streets.

Pedestrian improvements can include repairing sidewalk pavement, widening sidewalks, filling sidewalk gaps, calming traffic, reconfiguring surface parking lots to create a safer pedestrian environment, pedestrian scale lighting, and increasing active frontage adjacent to the station. Currently, the streets adjacent to station sites are not designed to accommodate pedestrian users, with wide streets, extensive surface parking lots, and large intersections. In the short-term, improving safety at intersections by reducing crossing distances, increasing pedestrian visibility, and slowing vehicle speeds can be important first steps. In the longer term, land use and streetscape changes should occur in tandem with mobility improvements to create a safe and welcoming environment for pedestrians.

8. Cost

The Study identified and listed the capital investments needed to support project implementation, then developed capital cost estimates based on the full list of infrastructure needs and operating cost estimates based on the vehicles, infrastructure, operations, and conceptual transit service plans detailed in Task 3. These are high-level Rough Order of Magnitude costs for capital improvements and operational expenses.

- Capital improvements are based on the thorough review of existing conditions completed in Task 2 and were developed to support the conceptual transit service plans in Task 3 and were reviewed against industry best-practices.
- Capital costs are benchmarked against other similar projects and industry best-practice.
- Operating costs are assessed using the Federal Transit Administration's National Transit Database (NTD)-reported unit operating cost for similar services.

All related data are included in the Appendix. A summary of the cost ranges is shown in Table 12 below, however other combinations of route, signaling systems, and vehicles are possible.

	Vallejo to Napa Junction	Vallejo to Napa Junction	Vallejo to Napa Junction	Vallejo to Suisun/ Fairfield	Vallejo to Suisun/ Fairfield	Vallejo to Suisun/ Fairfield
	Locomotive + PTC	**Multiple-Unit + Block Signaling**	**Multiple-Unit + PTC**	**Locomotive + PTC**	**Multiple-Unit + Block Signaling**	**Multiple-Unit + PTC**
Capital Cost Estimate	$590,270,000	$510,654,000	$514,528,000	$1,363,803,000	$1,265,157,000	$1,278,422,000
*Annual Operating Cost Estimate	$22,597,000	$8,707,000	$8,707,000**	$66,715,000	$25,707,000	$25,707,000**

*Depending on labor agreements and rules.

**FRA requirements may necessitate additional staff on board trains operating under PTC, which may increase operating costs.

Table 11: Cost Estimates Summary

9. Public Outreach

9.1 Public Outreach plan

To support and guide the study's efforts, an educational and inclusive Public Outreach Plan (POP) to engage the region's public and major stakeholders at the end of the Study process was developed. The STA, City of Vallejo, and the consultant team established the public outreach objectives below to be achieved through one comprehensive Public Meeting.

9.1.1 Objectives

The following three objectives were identified to guide public outreach throughout the duration of the study:

1. Provide study area residents and stakeholders with diverse and accessible opportunities to learn about the study process and findings, with a focus on Vallejo residents and stakeholders.
2. Facilitate an opportunity for residents and stakeholders to provide input on the study process regarding their key desired outcomes and concerns.
3. Document the Public Meeting and the feedback received.

9.1.2 Marketing Plan

For the Public Meeting, print and web advertisements were created using Adobe InDesign. These advertisements were either equipped with links to the project webpage, to be hosted by the City of Vallejo, or were clickable in the case of online advertisements. There were four primary elements of the marketing effort:

- The project **webpage** featured information regarding the project, workshop events, virtual presentation links, and any other project materials that will be made available for the public to review. This information will also be provided for posting on the Vallejo and STA websites.
- Print and web **advertisements** were placed in several news media outlets and on relevant Facebook pages.
- Project **flyers** were created to raise awareness of the Public Meeting, its time, and location. These also featured the link to the project webpage and were provided to the City of Vallejo and SolTrans for posting on buses and at the transit centers.
- LSC also requested access to **email** lists available to the City of Vallejo and STA. With permission, LSC sent out email blasts to recipients of lists to encourage participation and to direct people to online information.

9.2 Summary of Public Outreach Activity

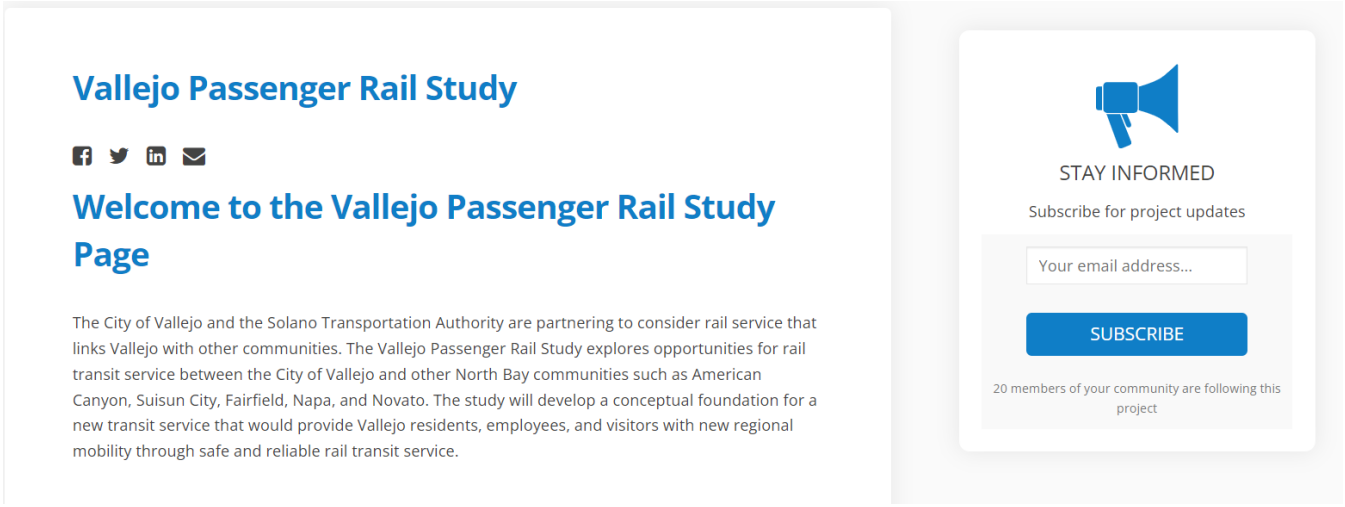
9.2.1 Stakeholder Database

In the initial phases of the Feasibility Study, a stakeholder list of approximately 30 community stakeholders were identified for continued project updates and inclusion of the study planning process. The stakeholder database included representatives of local Chambers of Commerce, Business Associations, City staff and representatives, as well as local transportation representatives. An additional effort was made to include representatives of both the Spanish- and Tagalog-speaking communities in the region as well. The database includes both phone

numbers and email addresses, which were used in notifying the public regarding the hybrid workshop, the online virtual workshops, and the online surveys.

9.2.2 Project Website and Frequently Asked Questions

A project website was available to the community during the duration of the feasibility study. The community was urged throughout the planning process to visit www.myvallejo.com/passenger-rail-study to stay informed. The website hosted a general project description, the virtual online workshops, as well as links to the online survey. A "Frequently Asked Questions" or FAQ was also posted on the site for those wanting to learn more about the project.



9.2.3 Public Workshop

A public workshop was held on March 7th ,2024 from 4:30pm to 6:00pm at the John F. Kennedy Library in Vallejo. The workshop was held in a hybrid format with approximately 25 members of the community, including city and county staff, attended in person, as well as an additional 25 members of the public attending the workshop virtually. Mayor McConnell was in attendance in addition to various representatives of the City, Solano Transportation Authority, and local transit agencies. A detailed presentation of the study results was provided by City Staff and the consultant team which was followed by an extensive question and answer sessions which included both in-person and virtual attendees. A recording of the workshop was taken for further reflection and consideration by the study team.

The notification process for the meeting included a series of invitation emails and flyers in English, Spanish, and Tagalog sent to the stakeholder contacts and the study team to distribute. A total of three reminder emails were sent over the three weeks leading up to the event using Constant Contact.

9.2.4 Online Virtual Workshops

Several weeks after the hybrid workshop, an online virtual workshop was launched to further educate the public and stakeholders about the Feasibility Study. It provided the same presentation slide deck from the March 7th workshop with a voiceover narration in English, Spanish, and Tagalog. The slide deck was also translated in Spanish and Tagalog and made available to the public through the project website. Several emails were from sent to the stakeholder database list urging participants to watch the workshop video, participate in our online survey, and share it with their colleagues, friends, and family.

9.2.5 Online Community Survey Description and Results

An online survey was launched during the workshop urging the public to share their opinions on specific aspects of the study. The survey received a total of 93 responses, all of which were in English. Please see the Vallejo Public Outreach Final Report (May 2024) for additional details.

10. Conclusions and Next Steps

A substantial market exists for fast, effective, and attractive transit services to and from Vallejo, with demand both within the city (and American Canyon) and to regional destinations, accessed by connections to the state rail network. A passenger rail service can provide a superior travel product, with fast speeds and reliable operation.

A rail service along the West alignment in Vallejo could attract some riders, but the analysis shows that the demand for an internal Vallejo-only service is lower than travel demand to the adjacent North Bay counties that could help support an integrated passenger rail service. The moderate demand of intra-Vallejo trips (between 1,800 and 7,500 daily weekday trips) may be better served by bus service in the near term. However, the higher demand of Vallejo to Napa (2,800 to 10,000 daily weekday trips) and Vallejo to Solano (2,000 to 9,000 daily weekday trips) is a demand that would be better served by rail. The top destinations for a rail service extending beyond Vallejo's borders are (in descending order): Napa, Solano, and Marin markets. Tourism and event demand may augment weekend demand and prove attractive for major events.

An attractive passenger rail service could be successful in providing a new transit option for thousands of Vallejo residents, both for recreational and work travel. Doing so could allow service workers living in Vallejo to have better and shorter commutes and reduce the need for second vehicles in their households. New rail service in Vallejo could:

- Reduce the dependence on cars for basic mobility.
- Promote more environmentally friendly transportation.
- Reduce greenhouse gas emissions.
- Contribute to global efforts to combat climate change.
- Spur housing and economic development.
- Support the growth of more walkable communities.
- Enhance intermodal connectivity with local ferry and bus services.

This Study has prepared initial preliminary capital and operating cost forecasts that will need to be further evaluated in future studies. While 10,000 to 12,000 daily riders could use the service, it is likely that the cost to deliver the project – whether as a "shuttle" to Napa Junction or as a direct route to the Solano Rail Hub in Suisun-Fairfield – will range from $500 million to more than a billion dollars.

Introducing passenger rail service to Vallejo can lead to economic growth, environmental benefits, and improved transportation options for residents and visitors alike. Collaboration among stakeholders is essential to fully realize these benefits. Therefore, the City of Vallejo and the Solano Transportation Authority should work with Caltrans, the CCJPA, and appropriate adjacent counties to advance concepts of rail service in Vallejo, and work towards the inclusion of rail service into Vallejo in the next California State Rail Plan.