California
Freight Mobility Plan

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CalSTA
CALIFORNIA STATE TRANSPORTATION AGENCY

Caltrans

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EXECUTIVE SUMMARY

The central pillar of California's economy is the freight transportation system which is the core support for a wide array of industries and commercial activities that create and grow vibrant communities and far-reaching national and international trade, directly supporting over 1.3 million freight-specific jobs in the State.[1] California's freight transportation system is the strongest in the nation, a position that is being challenged by competing freight systems in other states and countries and changing technology. To continue to successfully engage the global market, California will need to strengthen its position through strategic investment decisions and maintaining a sustainable freight system. The California Freight Mobility Plan (CFMP) responds to these needs through various initiatives and an extensive set of projects identified in the Plan.

The State, its public agency partners, and the private sector have invested in the State's freight system for more than 150 years to create the nation's most diverse, highest capacity freight network that not only links the State to the national and global economies but also serves as the nation's primary gateway to the Pacific Rim. This freight system has served California exceedingly well, enabling the State to become the 8th largest economy in the world in 2013. The State is committed to a broader, long-term vision for accelerating the transition of California's multimodal freight system from its already robust stature, to being a safer, more efficient and reliable, less polluting freight system.

California Freight Mobility Plan Vision

"As the national gateway for international trade and domestic commerce, California enhances economic competitiveness by collaboratively developing and operating an integrated, multimodal freight transportation system that provides safe, sustainable freight mobility. This system facilitates the reliable and efficient movement of freight and people while ensuring a prosperous economy, social equity, and human and environmental health".

As recommended by the United States Department of Transportation guidance in response to the federal transportation legislation, Moving Ahead for Progress in the 21st Century (MAP-21), and in response to related State requirements, the California State Transportation Agency (CalSTA) convened the California Freight Advisory Committee (CFAC). The CFAC is composed of 62-member organizations (see Page 61 for list of organizations) that represent a wide array of freight industry, government, environmental, and community interests and is chaired by the California Department of Transportation (Caltrans). The CFAC developed the Vision Statement

and the Goals for the CFMP as well as advising the State on CFMP content and other matters. The CFAC is a permanent State advisory group but individual membership is subject to change.

California Freight Mobility Plan Goals

Economic Competitiveness
Improve the contribution of the California freight transportation system to economic efficiency, productivity, and competitiveness

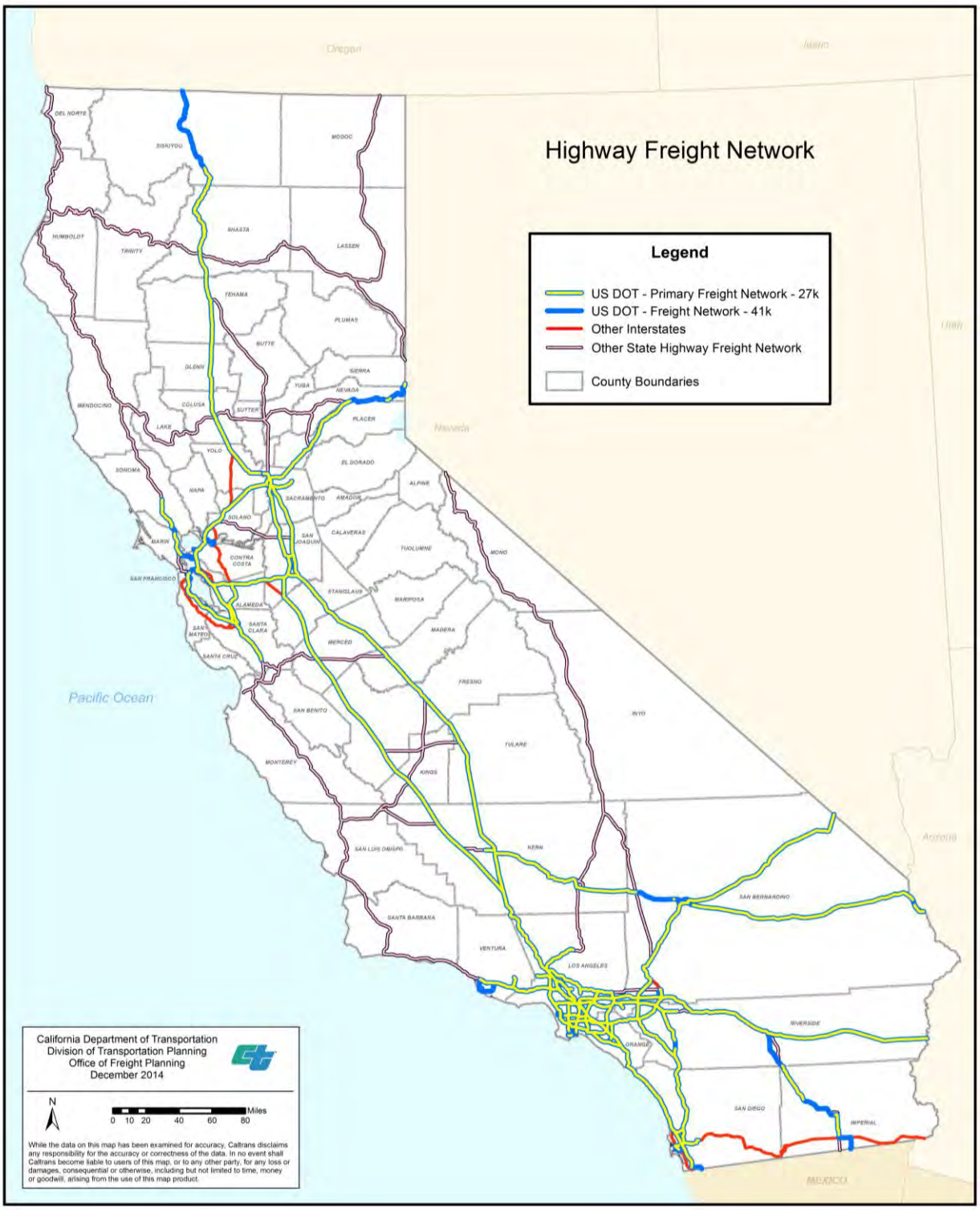
Safety & Security
Improve the safety, security, and resilience of the freight transportation system

Freight System Infrastructure Preservation
Improve the state of good repair of the freight transportation system

Environmental Stewardship
Avoid and reduce adverse environmental and community impacts of the freight transportation system

Congestion Relief
Reduce costs to users by minimizing congestion on the freight transportation system

Innovative Technology & Practices
Use innovative technology and practices to operate, maintain, and optimize the efficiency of the freight transportation system while reducing its environmental and community impacts



Source: Caltrans, Division of Transportation Planning (DOTP)

Airports with Major Cargo Operations
Bob Hope (Burbank) Airport (BUR)
Fresno Yosemite International Airport (FAT)
John Wayne / Orange County Airport (SNA)
LA/Ontario International Airport (ONT)
Long Beach Municipal Airport (LGB)
Los Angeles International Airport (LAX)
Norman Y. Mineta San Jose International Airport (SJC)
Oakland International Airport (OAK)
Sacramento International Airport (SMF)
Sacramento Mather Airport (MHR)
San Diego International Airport (SAN)
San Francisco International Airport (SFO)

Ports of Entry	Route	County
Calexico East	7	Imperial
Otay Mesa	905	San Diego
Otay Mesa East (future)	11 (unconstructed)	San Diego
Tecate	188	San Diego

Freight Intermodal Facilities	City	County
City of Industry Intermodal Facility (UP)	City of Industry	Los Angeles
Fresno Intermodal Facility	Fresno	Fresno
Hobart Yard (BNSF)	Los Angeles	Los Angeles
Lathrop Intermodal Facility	French Camp	San Joaquin
Los Angeles Intermodal Facility (UP)	City of Commerce	Los Angeles
Los Angeles Transportation Center (UP)	Los Angeles	Los Angeles
Oakland International Gateway Intermodal Facility (BNSF)	Oakland	Alameda
On-Dock Intermodal Facility (PHL)	Wilmington	Los Angeles
Railport - Oakland (UP)	Oakland	Alameda
San Bernardino Intermodal Facility (BNSF)	San Bernardino	San Bernardino
Stockton Intermodal Facility	Stockton	San Joaquin
UP Long Beach ICTF	Long Beach	Los Angeles

Seaports
Port of Benicia
Port of Hueneme
Port of Humbolt Bay
Port of Long Beach
Port of Los Angeles
Port of Oakland
Port of Redwood City
Port of Richmond
Port of San Diego
Port of San Francisco
Port of Stockton
Port of West Sacramento

Source: Caltrans, Division of Transportation Planning (DOTP)

The California Freight Mobility Plan Serves Four Purposes:

1. It builds on the successes of previous California freight plans such as the Goods Movement Action Plan (2007) and current programs such as the Trade Corridors Improvement Fund (TCIF) to identify an updated, cohesive freight vision and a project action list that establishes the need for a new, substantial freight funding program.

2. It responds to federal freight planning guidelines under MAP-21 and related State requirements to prepare a freight plan that is consistent with federal guidelines.

3. It provides a foundation for air quality improvement and energy transition programs to guide and support the freight sector in achieving criteria pollutant and greenhouse gas reduction targets.

4. It serves as a catalyst to normalize freight as a regular aspect of transportation planning at all levels of government in California.

The history of investing in California's freight system by both the public and private sectors is most recently exemplified by the very successful TCIF Program that is investing $2.0 billion in voter approved transportation infrastructure bonds to make capital improvements to key facilities and corridors that link the State and the nation to the global trade market. This measure passed in the year 2006 has garnered approximately $5.2 billion in additional matching funds from federal, State, regional, local, and private sources to deliver and construct 81 high-priority seaport, railroad, and highway projects for a total program investment of $7.2 billion. The TCIF Program is rapidly approaching the full allocation of available funding and most of the Program's projects are already under construction or have been completed. State legislation, enacted in 2014, extends the TCIF Program indefinitely and makes the Program eligible to receive and allocate non-bond funds such as federal freight funding or new State sourced funding. The Program has been and will continue to be managed by the California Transportation Commission in cooperation with an array of public agencies and the freight industry.

The CFMP builds upon the success of the TCIF Program's targeting of infrastructure investments along the highest volume freight corridors and at the busiest freight gateways. While the CFMP recognizes the need to invest broadly in the State's widely distributed freight system in order to

serve the freight needs of every region of the State, similar to the implementation of the TCIF Program, the CFMP also finds the need for the preponderance of freight system investments to be applied where the freight volume demand is the highest and the need is the greatest. The CFMP categorizes the State's designated freight highway network into three tiers, with Tier 1 representing highways having the highest truck volumes and providing essential connectivity to and between key freight gateways and regions. Similarly, the freight rail network is also divided into three tiers. The Tier 1 designations closely align with, but go further than, the corridors and facilities reflected in the TCIF Program. The CFAC and other freight stakeholders will collaborate to refine the tiered freight network, prioritizing the 700+ projects included in the CFMP. Priority will be given to those projects that meet the goals of this Plan. It is expected that the Project List will be regularly updated to respond to the needs of the dynamic freight industry, emerging State and federal policies, and the regional planning process that includes freight projects in Regional Transportation Plans.

The CFMP has been developed to be fully consistent with MAP-21 freight plan guidelines. The six CFMP goals are closely aligned with the six MAP-21 freight planning goals and the CFMP chapters respond directly to the eleven focus areas identified in the federal guidelines. Tables listing how the CFMP aligns with each of these aspects are included in the Plan. However, the State, along with the CFAC found the scope of the federal freight planning guidance to be insufficient. The CFMP identifies a much more extensive multimodal freight system than proposed by MAP-21 and provides more detail regarding community and environmental considerations. Further, MAP-21 did not specifically address the freight-related needs of Native American communities. The CFMP includes a chapter specifically addressing the connectivity of Native American Tribal Trust Lands to the National and State Freight Systems. The CFMP continues to exceed the federal guidance by including an extensive set of appendices that provide regional and modal freight summaries, discussions of various freight trends and issues, links to sources for additional details, and other information. The appendices are intended in part to serve as an information resource to help other public agencies incorporate freight planning in their day-to-day planning activities.

Several of the State's largest Metropolitan Planning Organizations and a few of the smaller Regional Transportation Planning Agencies have developed or are developing freight plans that are used to help inform the development of the more comprehensive Regional Transportation Plan (RTP). Regional freight plans are becoming more common, and several of them have been funded recently through federal planning grant funds provided by Caltrans. In the San Joaquin Valley, the eight MPOs developed a joint freight plan that covers the entire Valley. In the Southern California region, the Southern California Association of Governments (SCAG) and the San Diego Association of Governments (SANDAG) coordinate closely on their freight planning

activities and in the case of SANDAG, extend that coordination to government agencies in Mexico. This coordination and collaboration across agencies and with the freight industry and advocacy groups is a key strength of California's freight planning.

A core premise of the CFMP is that where regional and sub-regional freight plans have been developed and formally adopted by the governing board of a public agency through an open public process, the priorities and projects contained in those plans will be utilized to inform the CFMP where they are consistent with achieving the CFMP's goals. Additional considerations for State freight project prioritization include freight network location, project type, priority goals, funding program requirements, and other factors that may be used by the State when identifying individual projects to endorse, sponsor, or fund.

PROJECT LIST

The accompanying Freight Project List (Appendix A) provides a comprehensive list of projects along with project attributes that assist in sorting and prioritizing projects for available funding programs or to help establish the need for the creation of specific, targeted funding. The list yields 707 projects addressing all freight modes, with an estimated total cost of approximately $138 billion. The list will be regularly updated as needed to include freight projects contained in newly adopted RTPs or freight projects that are amended into RTPs.

Under MAP-21, freight projects must be included in a state adopted freight plan in order to be eligible for certain federal funding benefits. Though there is not yet a federal freight funding program, it is anticipated that such a program will be created and to be eligible for funding, a project will have to be in a state freight plan that is consistent with federal freight planning guidelines.

To help focus investments to the greatest needs, the freight network has been categorized into three tiers with Tier 1 being the highest priority and Tier 3, while still critical to freight movement and needing investment, having the relatively lowest freight network priority. However, all three tiers are of higher priority for freight funding than the much larger balance of the transportation system. It is expected that the preponderance of freight funding will be applied to projects along Tier 1 network segments and the gateways, hubs, and last mile connectors they serve.

Gateways, Corridors, Connectors, Hubs, and Initiatives

The freight system is generally comprised of: 1) gateways, 2) corridors, 3) last-mile connectors, 4) hubs, and 5) broad initiatives, as well as the vast fleet of vehicles, equipment, and technologies that utilize the infrastructure. Focusing and prioritizing the hundreds of projects

contained in the Freight Project List on these five focus areas can garner the most benefits to the State by concentrating resources in the areas of greatest freight activity and need.

GATEWAYS

The national and international freight gateways for California are the State's seaports, airports, international border ports of entry, and major highway border points with neighboring states. All of the goods and services that enter or leave the State pass through these nodes. Each gateway needs to function efficiently, minimize delay, ensure safety and security, and keep transaction costs to a minimum, all without creating impacts on neighbors. Each gateway requires specific actions and projects to address its unique needs.

CORRIDORS

Connecting to each gateway are one or more highway or rail corridors that provide regional, state, intra-regional, intra-state, and national connectivity. For the highway system, the corridors are part of the proposed federal Primary Freight Network or are on the State Freight Network. As with the gateways, all of the goals can be applied to the corridors and all require focused investment and collaboration among jurisdictions, communities, and the freight industry to make the needed improvements.

LAST MILE CONNECTORS

Linking many of the gateways and corridors are "last-mile" connectors which provide the final segment of the delivery stream. These roadways to ports, commercial airports, ships, and pipelines are essential, often overlooked components of the freight system that require investment.

HUBS

Freight hubs vary widely in scale and attributes. Generally, a hub is a place where freight modes intersect and there is a transfer of freight between modes. Intermodal rail yards, transloading centers, and areas surrounding air cargo facilities and seaports are examples of freight hubs. Hubs may also serve as gateways. Freight projects may be specifically identified to improve the transaction speed at such hubs, reduce impacts, improve safety, increase efficiency, expand capacity, and a range of additional actions.

BROAD INITIATIVES

Broad initiatives are actions, projects or programs that are implemented across a wide geographic area. Implementing real-time truck driver information services, state-wide safety programs, and energy conservation incentive programs are examples of broad initiatives. As mentioned frequently throughout the CFMP, air quality and energy transition objectives are among the highest priorities for the CFMP and are examples of broad initiatives.

CFMP Improvement Strategy

The CFMP Improvement Strategy is multi-tiered to address the needs of California's full, multi-modal integrated freight system, as well to respond to each of the goals contained in the CFMP and their corresponding federal freight goals. This strategy allows freight projects the opportunity to seek a wide variety of funding, and to accommodate the unique needs of California's diverse regions. The listing of strategies and project types does not imply a priority order. There are multiple strategies and project types that need to be pursued in parallel, based on priorities that may vary by geographic area and according to regional and local plans.

Six broad strategies have been identified to address the CFMP Vision and Goals as summarized below.

1) Maintain and enhance existing assets
2) Apply new technologies and system operations practices
3) Address negative impacts of freight movement
4) Strategically add new capacity
5) Strengthen the collaborative approach
6) Create dedicated, reliable, long-term freight funding programs

Four project types can be used to target funding to specific program goals such as "fix-it-first."

1) System Preservation
2) Operations and Management
3) Community and Environmental Stewardship
4) Capacity Expansion

Five geographic contexts apply to the freight network and individual projects.

1) Gateways
2) Corridors
3) Last mile connectors
4) Hubs
5) Broad initiatives

Sorting projects by these and other categories identified in the Project List enables the selection of projects for prioritized funding based on the targeted outcomes of those projects and the specific goals and objectives of individual funding programs. The categorization also assists decision makers and the public to better understand the types of freight projects that are being implemented and the amount of public and private funding being invested to achieve particular goals and objectives.

Perhaps the most important and nationally relevant statement coming from the CFMP is the need for substantial, dedicated freight funding programs at the national, state, and regional levels, so that the improvements identified in the Plan, and the freight plans of other states, can be implemented. Importantly, if new freight funding is provided, it needs to be new funding, not funding redirected from other transportation purposes or programs. The entire transportation system is already underfunded and cannot accommodate a redirection of its limited funding to other purposes.

INTRODUCTION

BACKGROUND

On July 6, 2012, President Barack Obama signed into law Public Law 112–141, the Moving Ahead for Progress in the 21st Century Act (MAP–21). The Act provided over $105 billion in needed funds for surface transportation programs for fiscal years (FY) 2013 and 2014 and transformed the framework for investments to guide the growth and development of the country's vital transportation infrastructure.

Sections 1117 and 1118 of MAP–21 directed the Secretary of Transportation to encourage each state to develop a comprehensive state freight plan outlining immediate and long-range plans for freight-related transportation investments. Section 1116 of MAP–21 authorized DOT to increase the federal share of project costs to 95 percent for a highway project on the US Interstate system, or 90 percent for a non-Interstate project if the project is certified by the Secretary of Transportation to make a demonstrable improvement in the efficiency of freight movement and is included in the state freight plan.

In October 2012, the US Department of Transportation provided the required guidance on the freight planning process states must undertake to qualify for the freight prioritization provisions of Section 1116. The guidance also explained the importance of state freight plans:

> *Because freight transportation is critical to the economic vitality of the United States, renewed attention to safe and efficient freight transportation can have a positive effect on the economic growth of the United States. State Freight Plans can identify freight transportation facilities that are critical to each state's economic growth and give appropriate priority to investments in such facilities. In doing so, such Plans can enhance economic growth at both the State and National level, thus enhancing the Nation's economic competitiveness.*[2]

In September 2013, California passed Assembly Bill (AB) 14 (Lowenthal, 2013) requiring the California State Transportation Agency (CalSTA) to establish the freight advisory committee recommended by US DOT, prepare a state freight plan consistent with federal guidance, and submit the plan to designated State recipient agencies by December 31, 2014.

The Secretary of CalSTA assigned responsibility for drafting the CFMP to the California Department of Transportation (Caltrans) in consultation with the California Freight Advisory Committee (CFAC) formed in compliance with AB 14.

The CFMP has been created to directly respond to MAP-21 guidance and to address additional State priorities and issues. In creating it, Caltrans worked closely with CalSTA, the 62-member CFAC, and others. The Plan has four primary components: 1) Policies, Strategies, and Implementation; 2) Freight System Assets, Condition, Performance, and Forecast; 3) Context of Freight Issues in California; and 4) Appendices that include a comprehensive list of freight projects, fact sheets detailing specific freight facilities and regions, information regarding applicable regulations and processes used in developing the CFMP, and a set of freight trend analyses that highlight key issues and initiatives. The CFMP is structured so that it can be readily updated by section to respond to changes within the dynamic freight industry and public policy arena. As emerging federal and state freight-related policy and guidance is issued, the CFMP will be amended to align with those policies and guidance. Additionally, as regional freight plans receive approval from their respective boards or commissions, relevant sections of the CFMP will be updated to reflect the new information.

Looking beyond the CFMP, the State, through an integrated State agency effort, is committed to a broader freight vision that is intended to guide California towards a future sustainable freight system.

SECTION 1: POLICIES, STRATEGIES, AND IMPLEMENTATION

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CHAPTER 1.1

VISION AND IMPLEMENTATION

California has the eighth largest economy in the world. The State's transportation system is the most extensive, least polluting, highest capacity, and most technically advanced multimodal freight transportation system in the United States. It handles the highest value international commerce of any state in the nation and among the highest total freight volumes. This unparalleled system connects California's international gateways to the rest of the country through several high-speed, high-capacity, multimodal gateways and corridors that provide access to every state in the nation. California is building upon these strengths to create an even more efficient, less-polluting, and higher-capacity freight sector to not just compete in the twenty-first century but to emerge as a global leader.

California's evolving freight system is focused on strengthening and preserving the existing system while making strategic improvements to increase mobility and safety while protecting communities and the environment. This will be accomplished by improving corridor mobility, strengthening intermodal connections, maximizing operational efficiencies, minimizing air pollutants and impacts to communities, enhancing safety and security, heightening the system's resilience, adding capacity and dedicated freight facilities where needed, and preserving and maintaining the tremendous assets already developed. This steadily improving freight system will continue to support vibrant manufacturing, technology development, agriculture, logistics, and other economic sectors across the state, and will continue to serve as an essential international trade gateway for the rest of the country.

Looking ahead to the year 2040, California's freight system will be dominated by near-zero-emissions vehicles and equipment powered by a modernized energy production and distribution system and a robust mix of renewable and clean energy sources. The largest urban areas will have dedicated freight corridors and hubs – some of them automated – that separate passenger and freight movements and minimize impacts to surrounding communities. Rural areas of the state, including Native American Tribal lands, will be served by high-quality freight facilities that provide access to national and global markets. Local and regional agencies will be guided by detailed freight transportation plans that integrate land use and economic development. The transition to this twenty-first century freight system will rely on both public and private funds invested in countless infrastructure projects, vehicle and equipment purchases, technology applications, and system management approaches. It will require incremental change and large-scale improvements implemented by public and private entities and oriented toward achieving a shared freight vision for California.

FIGURE 2. CALIFORNIA FREIGHT MOBILITY PLAN VISION

CALIFORNIA FREIGHT MOBILITY PLAN VISION

As the national gateway for international trade and domestic commerce, California enhances economic competitiveness by collaboratively developing and operating an integrated, multimodal freight transportation system that provides safe, sustainable freight mobility. This system facilitates the reliable and efficient movement of freight and people while ensuring a prosperous economy, social equity, and human and environmental health.

The California Freight Mobility Plan Vision is consistent with, and built upon, the policies of the California Transportation Plan (CTP), which itself is structured upon the framework established by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and various State laws, particularly those related to air quality and the interconnection of land use and transportation. The Vision is also consistent with the California Department of Transportation's new Mission Statement. The Vision recognizes that all modes must be included in the California Freight Mobility Plan (CFMP) in order to achieve a truly integrated, intermodal freight network.

The Vision provides a common platform for informing and guiding the development of freight transportation policy, programs, and project prioritization across all sectors of California's freight system, public and private. It was crafted in collaboration with the 62-member California Freight Advisory Committee which was created to help inform the development of this plan and to serve as an ongoing freight advisory body to the State. From this Vision, six overarching goals and a complementary set of more specific objectives and strategies were developed. They are consistent with the goals and objectives of the federal freight plan guidelines detailed in Chapter 1.4 – Guiding Policies, Partnerships, and Outreach. These goals, as well as additional attributes described later in this chapter, are correlated with the full set of projects identified in the Freight Project List in Appendix A. The Freight Project List can be readily sorted by policy and funding objective and filtered to identify those matching the selection criteria of various funding programs.

FIGURE 3. CALIFORNIA FREIGHT MOBILITY PLAN FRAMEWORK

CALIFORNIA FREIGHT MOBILITY PLAN GOALS

Economic Competitiveness

Improve the contribution of the California freight transportation system to economic efficiency, productivity, and competitiveness

Safety and Security

Improve the safety, security, and resilience of the freight transportation system

Freight System Infrastructure Preservation

Improve the state of good repair of the freight transportation system

Environmental Stewardship

Avoid and reduce adverse environmental and community impacts of the freight transportation system

Congestion Relief

Reduce costs to users by minimizing congestion on the freight transportation system

Innovative Technology and Practices

Use innovative technology and practices to operate, maintain, and optimize the efficiency of the freight transportation system while reducing its environmental and community impacts

CFMP OBJECTIVES AND STRATEGIES

The Objectives and Strategies identified on the following pages support the CFMP goals listed above and are intended to serve as a means to achieve the goals. The goals are not prioritized; all are considered essential.

It is expected and desired that individual strategies and projects, will support more than one goal and therefore more than one objective. Those projects that most effectively address multiple goals and objectives and are on higher network tier segments would likely be of higher funding priority than those that have a narrower impact and are on a lower network tier.

TABLE 1. CALIFORNIA FREIGHT MOBILITY PLAN GOALS, OBJECTIVES, AND STRATEGIES

ECONOMIC COMPETITIVENESS Improve the contribution of the California freight transportation system to economic efficiency, productivity, and competitiveness	
Objectives	**Strategies**
1. Build on California's history of investments to seek sustainable and flexible funding solutions with federal, private, and green partners 2. Invest in freight projects that enhance economic activity, freight mobility, reliability, and global competitiveness	1. Conduct a cost-benefit analysis for each freight project proposed for programming 2. Reduce transportation costs by eliminating bottlenecks and recurrent delay, making operational improvements, and accelerating rapid incident response on priority freight corridors 3. Seek creation of national, state, and regional dedicated freight funding programs 4. Expand capacity of freight corridors, or subsections through infrastructure or operational improvements 5. Eliminate unnecessary freight lifts or handling 6. Improve system condition and performance on priority freight corridors 7. Coordinate with other states and regions to improve multi-jurisdictional freight corridors to reduce delay, increase speed, improve reliability, and improve safety
SAFETY AND SECURITY **Improve the safety, security, and resilience of the freight transportation system**	
Objectives	**Strategies**
1. Reduce rates of incidents, collisions, fatalities, and serious injuries associated with freight movements 2. Utilize technology to increase the resilience and security of the freight transportation system	1. Reduce points of conflict on the freight system by constructing railroad grade crossings where there is a history of crashes and at crossings that have a high volume of vehicle and train traffic 2. Create truck-only lanes and facilities and encourage off-peak usage 3. Fully implement positive train control 4. Expand number and scope of cargo security screenings 5. Expand the system of truck parking facilities 6. Ensure consistent and effective safety and security requirements at all California ports 7. Identify alternate freight routes to maintain freight movement at times of disruption by disaster or other causes 8. Inventory and assess risks for freight facilities vulnerable to sea level rise and other natural disasters, and prioritize for abandoning, armoring, adapting, moving, or replacing

FREIGHT SYSTEM INFRASTRUCTURE PRESERVATION
Improve the state of good repair of the freight transportation system

Objectives	Strategies
1. Apply sustainable preventive maintenance and rehabilitation strategies	1. Ensure adequate and sustainable funding for preservation of the freight system 2. Expand scope of freight system rehabilitation projects to include facility modernization, where possible and merited, to increase range of available funding sources 3. Make preservation projects multipurpose 4. Identify maintenance and preservation needs on priority freight corridors

ENVIRONMENTAL STEWARDSHIP
Avoid and reduce adverse environmental and community impacts of the freight transportation system

Objectives	Strategies
1. Integrate environmental, health, and social equity considerations in all stages of freight planning and implementation, including considering impacts and mitigation relative to the context of the project location 2. Conserve and enhance natural and cultural resources 3. Avoid and reduce air and water pollution, greenhouse gas (GHG) emissions, and other negative impacts associated with freight transportation by transitioning to a lower-carbon and more efficient freight transportation system 4. Implement freight projects that demonstrate, enable, implement or incentivize use of advanced, clean technologies (including zero- and near-zero-emissions technologies) and efficiency measures needed to attain ambient air quality standards and achieve needed air toxics and GHG emission reductions	1. Establish corridor-specific impact reduction goals and projects 2. Incentivize and prioritize freight projects that maximize GHG, criteria pollutant, and air toxin emission reductions 3. Incentivize impact reduction 4. Implement projects in freight corridors that are specifically targeted to avoid, reduce, or mitigate freight impacts on the environment and community 5. Support and fund research focused on impact reductions and mitigation 6. Ensure coordination and alignment of the Plan with State GHG reduction goals and requirements and State and federal air quality standards 7. Develop an efficiency metric that captures the intensity of pollutants per unit of freight moved

CONGESTION RELIEF
Reduce costs to users by minimizing congestion on the freight transportation system

Objectives	Strategies
1. Develop, manage, and operate an efficient, integrated freight system 2. Identify causes and solutions to freight bottlenecks 3. Invest strategically to optimize system performance	1. Create a multimodal freight bottleneck list for priority corridors and prioritize for correction 2. Identify most-congested freight corridors and facilities and prioritize for improvement through individual projects 3. Implement vehicle detection on priority corridors to identify problem areas across modes, particularly targeted to truck data 4. Construct railroad grade separations at high-volume roadway crossings 5. Add mainline track and sidings to accommodate demand for freight and passenger rail services 6. Implement system management and expand freight travel information availability with the focus on freight corridors 7. Expand freight travel information availability to entire truck fleet

INNOVATIVE TECHNOLOGIES AND PRACTICES Use innovative technology and practices to operate, maintain, and optimize the efficiency of the freight transportation system while reducing environmental and community impacts	
Objectives	**Strategies**
1. Support research, demonstration, development, and deployment of innovative technologies	1. Prioritize Freight plan projects that implement state-of-the-art and demonstration technologies
2. Promote the use of zero- and near-zero-emissions technologies within the freight industry to support the State Implementation Plan (SIP), attainment of California greenhouse gas reduction targets, and reduction of local air toxics	2. Support deployment of new, non-fossil fuel distribution, recharging facilities, and shoreside power on the freight system, focusing on particular regions and corridors
3. Support and incorporate the use of low-carbon renewable fuels	3. Support implementation of cleaner, quieter engine technologies
4. Promote innovative technologies and practices that utilize real-time information to move freight on all modes more efficiently	4. Research opportunities for automation of certain freight movements

Addressing the listed set of goals, objectives, and strategies is a monumental task that can be achieved only through the combined efforts of the State, public and private freight stakeholders, and the freight industry. The public sector's role in constructing, operating, and maintaining many freight facilities, such as roadways and seaports, is critical. Key investments, land use decisions, and regulatory activities implemented by the public sector heavily influence the business operations of private-sector freight operators who are dependent on these public facilities and also are responsible for their own facilities and equipment. Solutions that meet the goals and objectives of public and private freight interests while also addressing community and environmental needs are solutions that should be assigned a high priority.

IMPLEMENTATION

California has the largest, most diverse economy in the United States – an economy supported by the largest, most diverse freight system in the nation. The state's geographic location on the Pacific Rim and the scarcity of east/west transportation corridors in North America contribute to provide California with a natural competitive edge. California's national and international trade status can also be attributed to decades of innovation and investment that built the transportation system, created industries, and enhanced agricultural production. While California's freight industry is the most extensive and sophisticated in the nation, substantial additional investment is needed to attain the goals of this Plan. Many of the techniques and technologies that will help meet the goals are currently being developed within the state's freight industry and the California State University system, supported by funding from public and private sources.

Strategies for Implementation

Going forward, we must build upon California's natural advantages and the investments of past generations by:

1. Maintaining and enhancing existing assets,
2. Applying new technologies and system operations practices to improve the performance of all aspects of the freight system,
3. Addressing the negative impacts of freight movement as a component of each freight project and through programs and projects specifically targeted to address impacts on a broad scale,
4. Strategically adding new capacity,
5. Strengthening collaboration among State and regional agencies, advisory groups, the freight industry, communities, and advocacy groups, and
6. Creating dedicated, reliable, long-term freight funding programs.

A multifaceted, system-wide approach that addresses all six of these high-level improvement strategies will help ensure that the future freight system is both fiscally and environmentally sustainable.

There is one word in the CFMP Vision Statement that is most critical to the success of the State's freight future: "collaboratively." It is only through collaboration that the six broad strategies can be implemented and the CFMP vision achieved. Absent a collaborative approach, little can be accomplished. California's regional agencies have proven highly effective in establishing collaborative relationships with their regional freight partners and increasingly, coordinating among themselves on freight-related matters. **Strengthening the collaborative approach should be formalized by regional agencies through the establishment of regional freight committees, and where there are not a sufficient number of freight partners to support a committee, at a minimum, regional agencies should designate a lead staff person to serve as a freight liaison.** At the State level, the California Freight Advisory Committee (CFAC) serves as a forum for expanded collaboration among government agencies, the freight industry, communities, and advocacy groups. The CFAC is a permanent committee, whose role is to advise the State on freight-related matters, including the development of Caltrans' CFMP.

The CFMP goals are further refined by the strategies by focusing attention and resources on the most critical needs, identifying more specific project objectives, providing a structure for prioritizing projects, and other actions for the allocation of funding. Prioritization must be flexible to meet local and regional needs while also responding to State and national needs. This will involve the implementation of hundreds of individual freight projects, air quality

improvements, and energy transition programs at regional and State levels. They will be funded by a variety of public agencies, private organizations, and public-private partnerships. Delivering this large set of projects and programs to implement a cohesive improvement strategy that meets the needs of project sponsors, communities, the State, and the nation will be challenging, but it is achievable.

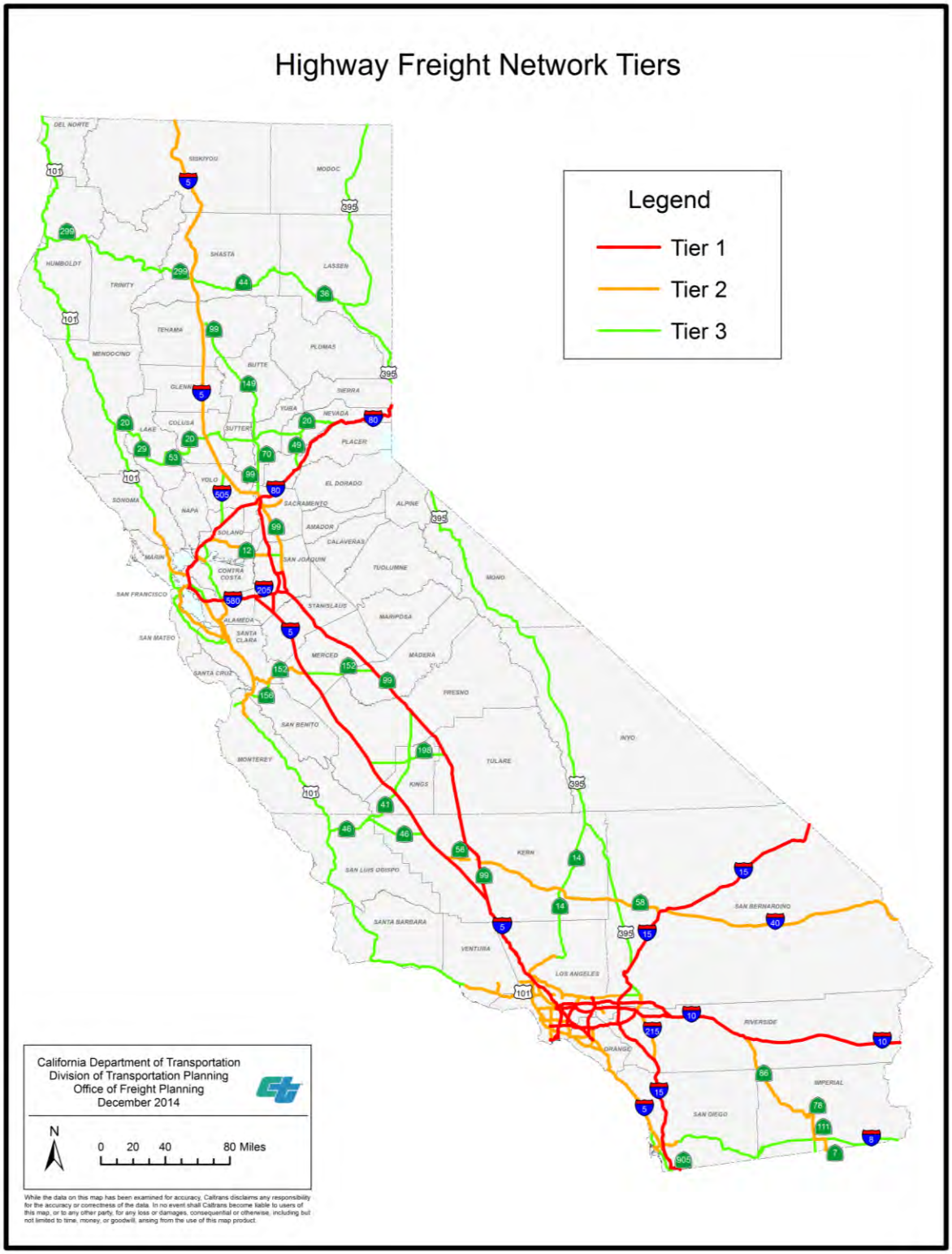
Dedicated, reliable funding is the foundation for meeting these goals. Without it, few, if any can be met. Thus, development of long-term, reliable sources of substantial funding that can be applied to the wide range of freight projects and public and private project sponsors is critical.

California's Approach

Achieving the CFMP goals must be approached with the recognition that the vast scale of California's freight system and freight-related industries requires regional and local leadership that addresses freight needs within the context of their jurisdictions. The State does not have sufficient local knowledge to consistently determine individual solutions, project locations, and regional priorities, particularly when the State is not the owner/operator of the respective freight mode or facility. Improvement strategies that work well for the border region with Mexico may not be applicable to the ports of San Pedro Bay and may be largely irrelevant to the rural northern portion of the state. A core premise of the improvement strategy is that where regional and sub-regional freight plans have been developed and formally adopted by the governing board of a public agency through an open public process, the priorities and projects contained in those plans will be utilized to develop the CFMP where those plans are consistent with achieving the CFMP's goals. Additional considerations for State freight project prioritization include freight network location (network tiers), project type, priority goals, funding program requirements, and other factors that may be used by the State when identifying projects to endorse, sponsor, or fund.

Given that public funding for freight projects is very limited and the identified need for freight system improvements extensive, it is necessary to focus on the highest priority needs rather than distributing funds equally across California on a formula basis. The CFMP categorizes the designated highway and freight rail networks into three tiers for each facility type with those portions of the network having the highest truck and rail volumes being Tier 1 and those with lower volumes being Tier 2 or Tier 3. Priority consideration is also given for some freight network components having lower freight volumes but providing key interstate or international connections. While all of the freight network facilities are important, the Tier 1 facilities are more likely to have projects prioritized for funding. It is intended that the attribute fields contained in the Freight Project List can and will be used to further inform the prioritization process to achieve specific objectives and that such a process will be implemented as funding program criteria are developed and issued.

FIGURE 3. HIGHWAY FREIGHT NETWORK TIERS



Source: Caltrans, Division of Transportation Planning (DOTP)

Emerging funding programs can also use the Freight Project List attribute fields and their corresponding projects to inform the creation of the funding criteria. As future freight projects are identified and developed, it is expected that sponsoring organizations will integrate high-priority attributes into their projects specifically to improve their funding opportunities.

Most of the Tier 1 highways have been identified by the Federal Highway Administration as components of the proposed national Primary Freight Network (PFN). Not all of California's portion of the PFN routes is included in Tier 1. Those portions of the PFN that are not included in Tier 1 are designated as Tier 2, with Tier 2 including additional Interstate and State Routes. Tier 3 represents the balance of the highway freight network. Combined, all three highway tiers represent a subset of California's entire State Highway System. The freight rail network has been similarly tiered, with those rail lines providing key connectivity to major seaports and transcontinental rail routes categorized as Tier 1, the balance of the Class 1 railroads being Tier 2, and the short line railroads categorized as Tier 3.

FIGURE 4. INTERSTATE 80 AT DONNER PASS – TIER 1 FREIGHT HIGHWAY DESIGNATION

Source: Caltrans

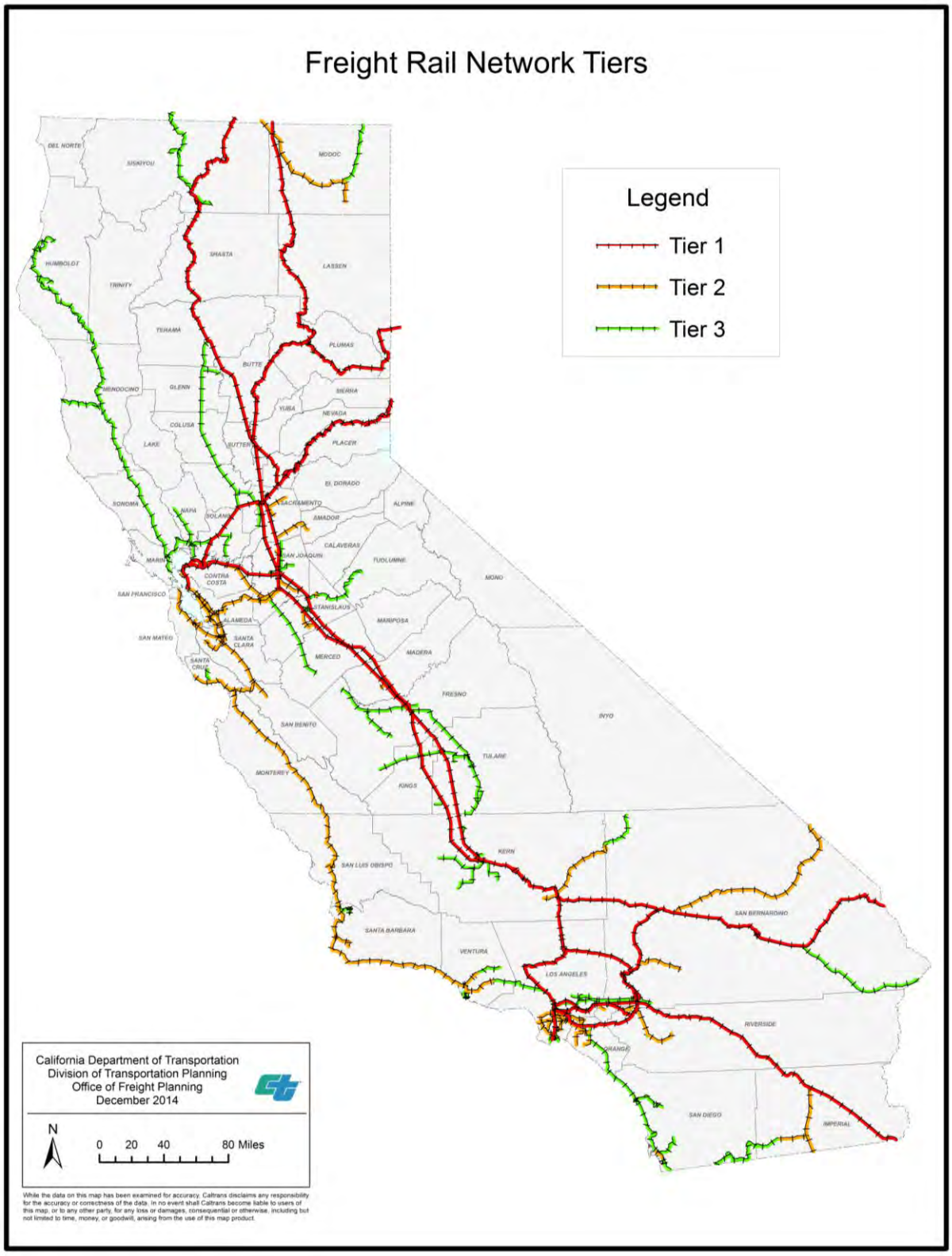
FIGURE 5. HIGWAY FREIGHT NETWORK TIERS – NORTHERN CALIFORNIA

Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 6. HIGWAY FREIGHT NETWORK TIERS – SOUTHERN CALIFORNIA

Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 7. FREIGHT RAIL NETWORK TIERS



Source: Caltrans, Division of Transportation Planning (DOTP)

The Regional Planning Process

Through the regional planning process, Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Agencies (RTPAs) develop Regional Transportation Plans (RTPs) that address all transportation modes, including freight. The RTPs contain a list of transportation projects that includes freight projects with identified potential funding sources. As may be required for a particular MPO or RTPA, air quality conformity analysis is conducted for designated air quality nonattainment areas. The freight projects included in the RTP project list are included in the conformity analysis. In order to be eligible for federal transportation funding, transportation projects, including freight, must be in an RTP.

Developing an RTP is a public process that involves local member agencies, transportation stakeholders, advocacy groups, and the public. All of the transportation needs of the respective regions are considered for a period extending approximately 25 years into the future. RTPs are updated on a four- or five-year cycle depending on the specific regional agency. With the complex regional planning process and the multi-year cycle, it is essential that freight projects be included in the process at the beginning of an RTP update cycle so that the freight projects are assured of inclusion in the final RTP. This requires the freight industry to be actively involved in the development of RTPs and emphasizes the need for regional agencies to form and coordinate freight advisory committees and assign dedicated staff to work with their freight industry representatives.

In many RTPs, freight projects are specifically identified within a freight category, while in other RTPs, freight projects are not specifically identified but are instead addressed by a project that encompasses many transportation needs, including freight. Several of the state's largest MPOs and a few of the smaller RTPAs have developed, or are developing, freight plans that are used to help inform the development of the more comprehensive RTP. Regional freight plans are becoming more common, and several of them have been funded recently through planning grants provided by Caltrans, using federal planning funds. In the San Joaquin Valley, the Valley's eight MPOs joined together to develop a joint freight plan that covers the entire Valley. ***The CFMP recommends that when the RTP Guidelines are updated, freight is required as a specific section within the RTPs.***

Gateways, Corridors, Connectors, Hubs, and Initiatives

Earlier, this chapter discussed the naturally occurring and human-built advantages that characterize California's freight system and the need to build on those advantages going into the future. That system is built on an underlying, organized structure of infrastructure components that consist of: 1) gateways, 2) corridors, 3) last-mile connectors, 4) hubs, and 5) broad policy initiatives that apply to multiple components. Utilizing the infrastructure and being affected by policy initiatives are the thousands of vehicles and pieces of equipment that

move the freight over the infrastructure network. Focusing and prioritizing the hundreds of projects in the Freight Project List on these five focus areas may garner the most benefits to the State by concentrating resources in the areas of greatest freight activity.

Gateways

The national and international freight gateways for California are the State's seaports, airports, international border ports of entry, and major highway border points with neighboring states. All of the goods and services that enter or leave the state pass through these nodes. Each gateway needs to function efficiently, minimize delay, ensure safety and security, and keep transaction costs to a minimum, all without creating impacts on neighbors. Currently, there are bottlenecks, capacity restrictions, congestion, insufficient information resources, and other obstacles that create delays, add cost, and impact communities. Improving these gateways is a high priority. Each gateway requires specific actions and projects to address its unique needs. **Projects that improve the functioning of the gateways and reduce or eliminate associated impacts should be prioritized for funding.**

Corridors

Corridors connect gateways and provide regional, state, intra-regional, intrastate, and national connectivity. For the highway system, the corridors are part of the federal Primary Freight Network or are on the State Freight Network (see Chapter 2.1). In addition to highways, corridors also include the Class I railroad lines that provide connectivity to other regions and states. As with the gateways, all of the goals and project types can be applied to the corridors. Some of the corridors are the subject of multistate partnerships (Interstates 15, 80, and 5, for example) and are particularly important for interstate commerce. Others, such as State Routes 60 and 99 and Interstates 580 and 710, are essential to interstate commerce and regional freight movement but do not directly link to other states. All require focused investment and collaboration among jurisdictions, communities, and the freight industry to make the needed improvements. It is likely that public funding investments will be concentrated along these corridors to achieve the greatest system impact. Project prioritization should be conducted collaboratively among regions, local agencies, communities, industry, and the State.

Last-Mile Connectors

Linking many of the gateways and corridors are the smaller locally owned roadways and short-line railroads that serve as "last-mile" connectors. They are essential to the function of the freight system. The highways typically have very high truck volumes but have not always had the level of pavement maintenance and preservation funding necessary to keep them in a state of good repair. Such connectors often run adjacent to or through neighborhoods populated by lower income communities. Addressing these connector roads requires very close coordination with local agencies and communities to help ensure that both pavement condition and

community impacts are considered, but it also requires funding that may not be readily available. These roadways are not yet on the federal or State networks and are typically reliant on local funding. As last-mile connectors are identified through local and regional freight planning efforts and incorporated into Board-adopted freight plans, those connectors should be added to the State Freight Network. Guidelines for identifying such routes will need to be developed in a manner that is consistent with the pending federal designation of rural and urban connectors. A similar process would be applied to routes providing connectivity to Native American Tribal Trust Lands. Similar to last-mile road connectors, short-line railroads provide last-mile connectors from the Class I railroads to seaports and agricultural, manufacturing, industrial, mining, and other facilities that generate heavy or large loads. **Such rail connections are key to the ongoing viability of many of those facilities.**

Hubs

Freight hubs vary widely in scale and attributes. Generally, a hub is a place where freight modes intersect and freight is transferred between modes. Intermodal rail yards, transloading centers, areas surrounding air cargo facilities, and seaports are all examples of freight hubs. Hubs may also serve as gateways. Freight projects may be specifically identified to improve the transaction speed at such hubs, reduce impacts, improve safety and security, increase efficiency, expand capacity, and a range of additional actions.

Broad Initiatives

Broad initiatives are actions, projects, or programs that are implemented across a wide geographic area. Statewide safety programs, energy conservation incentive programs, and real-time truck driver information services are three examples of broad initiatives. As mentioned previously, air quality and energy transition objectives are among the highest priorities for the CFMP. The needed improvements must take place across vast regions – sometimes the entire state. Occasionally, as with cargo ships, they must take place on an international scale. There are also highly localized actions to address issues at specific freight facilities. While the Air Resources Board, regional air quality management districts, and the California Energy Commission provide financial incentives to help fund the transition to lower emissions technologies and energy sources, the incentives are not sufficient, and, in many cases, the respective private enterprise does not have sufficient resources either. It is necessary to develop additional funding options and to make related projects eligible for federal freight funding.

FREIGHT PROJECT LIST

As required by US DOT's Interim Guidance on State Freight Plans and State Freight Advisory Committees, a list of freight projects has been compiled and is included in Appendix A. The statewide listing includes all regionally designated freight projects and freight-related projects contained in RTPs. The list will be updated as new RTPs are adopted. When the current RTPs were developed, there was no common statewide definition of a freight project. The CFMP seeks to establish a consistent definition for freight projects that will be included in future RTPs. The definition below, generally though not fully, applies to the project list contained in this Plan.

A freight project is defined as:

> *An improvement that significantly contributes to the freight system's economic activity or vitality; relieves congestion on the freight system; improves the safety, security, or resilience of the freight system; improves or preserves the freight system infrastructure; implements technology or innovation to improve the freight system or reduce or avoid its negative impacts; or reduces or avoids adverse community and/or environmental impacts of the freight system.*

In addition to projects listed in the fiscally constrained portion of RTPs (projects with a reasonable assurance of funding availability), the Freight Project List also contains projects that are not yet in the fiscally constrained portion of the RTP but are likely to be added when a reasonably assured source of funding is identified. The Freight Project List includes additional freight projects that may not have been identified in an RTP but have been formally adopted by a governing board, such as a Port Authority, which means the project has been considered within the public planning process. In order to receive federal funding, these projects will likely need to be included in the RTP.

Each project in the Freight Project List is classified by the CFMP goal(s) it will address. In many instances, a project addresses more than one goal, which is ideal. Linking each project with the goal(s) it supports allows funding applicants and providers to better understand how the project contributes to the overarching goals established by the State and federal government, as well as those of specific funding programs. Such classifications will also assist the State in developing and implementing new funding programs that may be targeted to specific goals. Regional agencies and freight system owner/operators may also be encouraged to propose new funding programs that may be targeted to specific goals. Regional agencies and freight system

owner/operators may also be encouraged to propose new projects that meet specific goals and funding program needs.

Four categories of projects are identified. Projects that:

1. Preserve and maintain the system,
2. Make operational, safety, and system management improvements,
3. Enhance communities and the environment, or
4. Expand facility capacity.

These project categories are applicable statewide and also align with the broad strategies discussed earlier. The Freight Project List also indicates project readiness, existing funding commitments, and whether a project is located on California's multimodal State Freight Transportation System or the federal Primary Freight Network.

Under MAP-21, freight projects must be included in a state-adopted freight plan to qualify for certain federal funding benefits. Though there is not yet a federal freight funding program, it is anticipated that such a program will be created and that in order to qualify for funding, a project will have to be in a state freight plan consistent with federal freight planning guidelines. The CFMP includes the full set of freight projects listed in the State's RTPs. Project sponsors may seek funding that is most appropriate and best suited for the region or locality. The State will also likely prioritize projects where the State has discretionary funding authority so that available funds are primarily applied along Tier 1 corridors, though projects on Tier 2 and 3 corridors will also be eligible and considered for discretionary funds.

Listed below are the CFMP goals with examples of project types and characteristics that may support those goals. Ideally, individual projects will address more than one goal, such as an Innovative Technology project addressing Environmental Stewardship needs or a Congestion Relief project improving Economic Competitiveness. It is anticipated that the most competitive projects will be those that address more than one of the goals and have the greatest measurable impact on those goals. Similarly, the most competitive projects are likely to be those that are located on Tier 1 of the designated federal Primary Freight Network or the State Freight Network.

1. **Goal: Economic Competitiveness**
   a. Projects that create additional economic efficiency and productivity in our existing freight infrastructure system through provision of congestion relief
   b. Projects or improvements that reduce the costs of doing business in California, that promote growth in freight-dependent industries, or otherwise incentivize investment in goods movement infrastructure

c. Capacity expansion of freight corridors, or subsections through infrastructure or operational improvements
d. Improvements that eliminate unnecessary freight lifts or handling
e. Supports growth in freight-related job creation, employment, publicly owned or controlled infrastructure assets, and tax revenues
f. Protects California's freight industry from undue competition and loss of market share

2. **Goal: Safety and Security**
   a. Truck-only lanes and facilities
   b. Projects that encourage off-peak usage of freight facilities
   c. Expansion of the system of truck parking facilities
   d. Projects to abandon, armor, adapt, move, or replace freight facilities that are vulnerable to sea level rise and other natural disasters
   e. Positive Train Control as an addition to an existing project, not as a stand-alone project
   f. Railroad grade crossings where there is a history of crashes and at crossings that have high volume of vehicle and train traffic
   g. Projects that accelerate rapid incident response
   h. Supports robust cargo security efforts

3. **Goal: Freight System Infrastructure Preservation**
   a. Sustainable preventive maintenance, rehabilitation, and preservation projects, with a focus on multi-purpose projects

4. **Goal: Environmental Stewardship**
   a. Corridor-specific impact reduction projects
   b. Projects that maximize reductions in greenhouse gas, criteria pollutant, and air toxin emissions
   c. Projects that are specifically targeted to avoiding, reducing, or mitigating freight impacts on the environment and community
   d. Projects that locate freight distribution facilities to the closest proximity of origin for the quickest, most efficient distribution of freight
   e. Railroad grade crossings

5. **Goal: Congestion Relief**
    a. Projects that eliminate bottlenecks and recurrent delay
    b. Operational improvements
    c. Improvements targeted to the most congested freight corridors
    d. Implementation of detection, system management, and expansion of freight travel information availability, particularly targeted to truck data
    e. Railroad grade crossings
    f. Addition of mainline track and sidings to accommodate demand for freight and passenger rail services

6. **Goal: Innovative Technology and Practices**
    a. Implementation of state-of-the-art and demonstration technologies
    b. Deployment of new, non-fossil fuel distribution, recharging facilities, and shoreside power on the freight system, focusing on particular regions and corridors
    c. Implementation of new engine technologies that are cleaner and quieter

NEXT STEPS

Final provisions of MAP-21 are still under development and the next federal transportation authorization has yet to be written. It is widely anticipated that the next federal transportation bill will refine MAP-21's freight provisions, address the inadequacies of the proposed Primary Freight Network, and contain a funding program component. Further, a national freight plan is pending and it will likely provide direction and opportunities for state freight plans to address. Though MAP-21 is silent on amending state freight plans, and California's Assembly Bill 14 (Lowenthal, 2013) directs the California State Transportation Agency (CalSTA) to update the State's freight plan every five years, this version of the CFMP assumes the Plan will be amended to address the ongoing federal process so that California's freight plan is consistent with national policy and programs. The CFMP is intended to be an active, "living" document that will be updated to keep pace with dynamic changes in the freight industry and international trade.

In addition to participating in federal freight planning efforts, the Air Resources Board (ARB) launched the development of the California Sustainable Freight Strategy (2014) in January. Over the last year, ARB has met with over 220 companies, associations, organizations, and agencies to seek their input on the objectives of a sustainable freight system, and key public and private actions needed to meet those objectives. Some stakeholders have provided recommendations on specific objectives for the future freight system, and actions to achieve them. Others have shared ideas on analyses and process, such as coordinated State Freight Plans.

The State, through an integrated State agency effort, is committed to a broader sustainable freight vision through an integrated State agency effort that is intended to guide the transition of California's freight system to a sustainable freight system.

ARB is developing an initial document that describes ARB's vision and options for a clean freight system that is expected to be released in Spring 2015. ARB's document along with the CFMP will help facilitate discussions with other agencies and stakeholders on how to achieve a sustainable freight system in California.

At the regional and sub-regional levels, including individual seaports and airports, the planning process and project identification is continuous. As these processes proceed and generate adopted plans through an official public process, such as the development of an RTP and its project list, the CFMP will be amended to incorporate the new information and projects as appropriate. As new freight trends emerge, or significant changes occur at the regional level, relevant sections of the freight plan will be updated to reflect them.

It is essential that the State identify freight-related priorities that reflect State programs, initiatives and goals. While the CFMP incorporates a tremendous number of freight projects and an extensive network, the State recognizes the need to focus limited fiscal resources where they can achieve the greatest benefits. Projects located along Tier 1 network segments would likely be the highest priority for State directed funding.

RESEARCH

There is a substantial need for a wide variety of freight-related research in California and the development of companion plans to the CFMP. Partner agencies, university research groups, and the freight industry are conducting a tremendous amount of research on clean fuels, efficient engines, automation, and other topics. Several potential additional topics include:

- State Maritime Plan
- Vulnerability, Resiliency and Recovery of Freight Network
- Economic Impact of Freight Network
- Freight Trends of Key Industries
- Mitigating Freight Impacts to Communities
- Statewide Truck Parking Study
- Statewide Warehousing and Distribution Center Analysis
- Statewide Freight Model

SUMMARY

The CFMP Improvement Strategy is multi-tiered to address the needs of California's full, multimodal, integrated freight system; to respond to each of the goals contained in the CFMP and their corresponding federal freight goals; to position freight projects to seek a wide variety of funding; and to reflect the unique needs of California's diverse regions. An aggregate of the freight projects included in each of the State's regional transportation plans yields a list of 700 projects, addressing all freight modes, with an estimated cost of approximately $138 billion as detailed in Appendix A.

Six broad strategies have been identified to address the CFMP Vision and Goals as summarized below.

1. Maintain and enhance existing assets,
2. Apply new technologies and system operations practices,
3. Address negative impacts of freight movement,
4. Strategically add new capacity,
5. Strengthen the collaborative approach, and
6. Create dedicated, reliable, long-term freight funding programs.

Individual freight projects can be categorized into one of four types that can be used to target funding to specific program goals, such as "fix-it-first":

1. System Preservation
2. Operations and Management
3. Community and Environmental Stewardship
4. Capacity Expansion

Further, each project, or set of projects, can be identified as addressing freight needs within five structural contexts that are directly related to the State's and nation's freight systems and networks:

1. Gateways
2. Corridors
3. Last-mile connectors
4. Hubs
5. Broad initiatives

Sorting projects by these and other categories identified in the Freight Project List enables the selection of projects for prioritized funding based on the specific expected outcomes of those projects and the specific goals and objectives of individual funding programs. While each of the CFMP goals is important and helps to create a balanced plan, not all of the goals are likely to be eligible for funding under every funding program. The categorization also assists decision makers and the public to better understand the types of freight projects that are being implemented and the amount of public and private funding being invested to achieve particular goals and objectives. To help focus investments to the greatest needs, the freight network has been categorized into three tiers with Tier 1 being the highest priority and Tier 3, while still critical to freight movement and needing investment, having the relatively lowest freight network priority. However, all three tiers are of higher priority for freight funding than the much larger balance of the transportation system. It is expected that the preponderance of freight funding will be applied to projects along Tier 1 network segments and the gateways, hubs, and last mile connectors they serve.

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CHAPTER 1.2

STRENGTHS AND NEEDS

California's freight-related strengths and needs differ from those of other states by an order of magnitude. The vast scale of California and its lengthy coastline, the size and diversity of its economy, the extent and complexity of its multimodal freight transportation system, its strong regional and local planning and infrastructure funding capacities, its largest-in-the-nation population, and its geographic position on the Pacific Rim and border with Mexico all generate unique strengths and needs too numerous to list. However, there are overarching strengths and needs that summarize the whole. Ironically, many of the State's greatest strengths also create its greatest needs, such as the vastness of the State's freight system, which necessitates enormous investments in asset preservation and impact reductions.

For readers wanting a more detailed identification of the State's freight-related strengths and needs, in addition to the CFMP chapters that discuss specific topics called for by MAP-21 Guidance, the Appendices provide an extensive set of Fact Sheets and Freight Trends Analyses with in-depth information regarding each region of the State, the highest-volume freight-related airports and maritime facilities, and numerous individual freight topics. Many of the Appendices also contain links to referenced documents and public and private organizations that can provide more information.

STRENGTHS

Extent of Existing Multimodal Freight System

California has a wide range of freight modal options, redundancy of freight corridors, multiple choices for maritime and air cargo, two Class-1 railroads, an expansive value-added manufacturing capacity, and a strong logistics industry that boasts the country's largest concentration of warehousing and transloading facilities. The State is not reliant on one port or one corridor to engage in commerce with the rest of the nation or world. The facility choices and redundancy provided by this freight system are strengths for not only California, but also for the US as a whole. It provides opportunities through competition to keep shipping costs down and provides options when a facility's operations are halted due to inclement weather or other causes. For more detail, see Chapter 2.1.

Strong, Diverse Economy and Large Population Base

California has the eighth largest economy in the world. This strong economy is supported by the freight industry but in turn also supports the freight industry that serves the nation by providing an already substantial asset base and workforce that can be readily adapted to handle more cargo destined for other states or being exported from those states to other countries. As the nation's most populous state, California's consumer market supports a robust freight system that is well positioned to seek discretionary cargo being transported through California. The large economy and large population help to ensure continuous investments in California's multimodal transportation system. For more detail, see Chapter 3.2.

Regional Freight Plans

California's Metropolitan Planning Organizations (MPOs) and their smaller counterparts, Regional Transportation Planning Agencies (RTPAs), are highly effective in their transportation planning responsibilities. The largest MPOs already have, or are developing, regional freight plans that are far-reaching and well executed. The plans are developed in partnership with the freight industry and its many stakeholders. In some cases, multiple MPOs have joined together to create multiagency freight plans, as the eight MPOs in the San Joaquin Valley have done. These regional freight plans and their companion Regional Transportation Plans serve as the primary source for freight projects included within the CFMP. The strength of the regional freight plans, having been developed in a partnership process and vetted by a board of directors that is composed of local elected officials, strengthens their input to the CFMP and provides a multilevel freight planning process that provides detail and perspective not available in a state-level plan. In some instances the freight planning has been addressed at the sub-regional level as has been done very effectively by the Gateway Cities Council of Governments.

Innovative Achievements

Environmental Achievements

California has the most far-reaching, effective environmental policies and regulations in the country, if not the world, particularly related to transportation and more specifically, freight transportation. As detailed in Chapter 3.4, Community and Environmental Context, California has the cleanest, lowest-emissions freight system in the nation and continues to develop new approaches and technologies to further reduce environmental impacts from freight, particularly air and water quality impacts. These achievements are due to both regulation and voluntary industry actions. The state's freight industry is the national leader in utilizing low-emissions freight vehicles and is moving steadily toward creating a near-zero-emissions freight transportation sector. This reduction in impacts to communities and the environment is a noteworthy strength and one the state is building upon. As new, lower-polluting systems, fuels

and vehicles are developed and deployed, there is a companion effort to apply new methods and technologies to improving freight moving efficiencies to increase throughput while also reducing congestion and delay. California's freight industry is at the forefront of researching, developing, and implementing the new freight systems of the twenty-first century.

GMAP

The Goods Movement Action Plan (GMAP) was issued by the California Business, Transportation and Housing Agency (now the California State Transportation Agency, or CalSTA) and the California Environmental Protection Agency (CalEPA) in two phases in 2005 and 2007. It was a major milestone in statewide policy and planning for freight transportation, trade corridors, and related air quality issues.

A product of a transparent and inclusive process that involved a diverse group of stakeholders, the GMAP provided analysis, strategies, and recommendations to address California's goods movement needs for capacity expansion, improved efficiency, enhanced security, job creation, and the mitigation of public health, environmental, and community impacts. Similarly, the goals in the CFMP emphasize the importance of economic competitiveness, congestion relief, safety and security, the preservation of freight infrastructure, innovative technology, and addressing environmental and community impacts.

The GMAP focused on four goods movement priority regions and corridors in California – the Los Angeles/Inland Empire Region, the San Diego/Border Region, the Central Valley Region and the Bay Area Region – and identified solutions within these regions to reduce congestion and accommodate expansion of trade between California, the rest of the nation, and the world, while simultaneously preserving the environment.

The California Freight Mobility Plan expands upon the GMAP's regional approach to address freight needs of the entire state by focusing on specific corridors within each region and by strengthening the attention given to tribal, environmental, and community issues.

TCIF Program

In 2006, California voters passed a transportation bond that included $2 billion for freight projects. The resulting Trade Corridors Improvement Fund (TCIF) Program has subsequently attracted a large amount of matching funds such that the current program has a total project cost of approximately $7.2 billion. The processes and groups that were established to implement the TCIF program have been tremendously successful and serve as an excellent example of how to implement a large, multimodal freight program across a state while involving project sponsors and stakeholders at numerous public and private levels. Chapter 1.3 provides detail regarding the TCIF Program and links to related program websites.

TRANSPORTATION SALES TAX MEASURES

Many counties in California, primarily the large urban counties that, not coincidentally, have large freight transportation sectors, have implemented voter-approved transportation sales tax measures. These sales tax measures can be very difficult to pass because they require a two-thirds voter approval. Once passed, however, they generate transportation revenues that exceed the funding amounts of traditional State and federal sources. These counties, referred to as the "Self-Help Counties," have formed a coalition to further their collective goals. While the vast majority of the funding generated by the sales taxes is used to fund passenger transportation projects and programs, the freight system often benefits as well. Some of the projects funded in the TCIF program, briefly discussed above, also received funding from transportation sales taxes. Voter willingness to support transportation projects through self-imposed sales taxes is a strength that provides the opportunity to leverage investment from a broader range of funding sources.

Multi-state collaboration

California is engaged in multistate efforts to collaboratively plan for, manage, rehabilitate, and operate key corridors, while aiding in identification of funding for capital and operational improvements throughout the corridors. California's ability to work with other states allows it to plan and implement corridor management and operational strategies across state borders to effectively and efficiently move freight and passengers through key corridors on the Primary Freight Network. Collaborative efforts such as these will be essential in achieving the vision, goals and objectives contained in the CFMP.

Geographic Position

California's location on the Pacific Coast enables it to have numerous deep water seaports and marine terminals, with several of the ports able to handle the largest vessels in existence. The Ports of San Pedro Bay can handle even larger ships that are being planned. While ports to the north of California have a shorter shipping distance and less travel time from ports in Asia, California's larger and superior ground transportation system and more extensive warehousing, manufacturing, value-added services, and California's access to more US markets puts the State's ports and the rest of the State's freight system in a strong competitive position. The complex, mountainous terrain of the Western US and the very low population densities of the region limit the number of highway and rail corridors connecting the West Coast to the rest of the nation. California is fortunate to have several of the highest capacity corridors, with some of them linking directly to major urban areas in other states (Phoenix, Las Vegas, Salt Lake City, Denver, and others). Owing to the very large consumer market and production capacity of California's cities, international trade is drawn to California's freight system to serve not just California but a substantial portion of the rest of the nation as well.

The juxtaposition of the Southern California Mega Region across the border from Mexico's Tijuana and Mexicali regions provides enormous opportunities for international commerce. As detailed in Chapter 3.7, Mexico is one of California's most important trade partners. Tijuana's location close to the Southern California freight system and the connecting Interstate and transcontinental railroad corridors provides access to the entire US.

NEEDS

FUNDING

The foundation strategy of the CFMP is to obtain substantial, predictable, long-term freight funding. Without a reliable funding source, freight projects have few options. They must compete for traditional passenger funding, potentially increasing costs for freight shipments, compete for very limited federal TIGER funding, wait for another State bond program, or just not get built. **Obtaining new, dedicated, permanent State and federal freight funding is the highest priority need identified by the CFMP.** The new funding needs to be applicable to all freight modes and to mitigation of impacts from the freight industry, including meeting air quality and greenhouse gas goals. In addition to new freight funding programs, California needs to continue to develop public-private partnerships to bolster available freight funding with leveraged private investment in the Primary Freight Network.

STRENGTHEN MULTI-AGENCY COORDINATION TO ACHIEVE AIR QUALITY AND OTHER STATEWIDE GOALS

Caltrans and the California State Transportation Agency (CalSTA) recognize the need to take a leadership position in transforming the State's transportation system to one that is more fiscally and environmentally sustainable. The State has a responsibility to *provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability* (Caltrans Mission Statement), a responsibility that is fully consistent with the CFMP vision.

This leadership role, however, is shared with others, such as the California Transportation Commission, the Governor's Office of Business and Economic Development, the Air Resources Board, and the California Energy Commission. Caltrans and CalSTA are working to bring all of our planning and modal program processes under a coordinated system to implement the types of projects that, while achieving Caltrans' and CFMP goals, will also achieve the State's broader goals for transportation, economic development, environmental health, and land use. This effort supports the "fix-it-first" priority for transportation resources, fosters job creation and economic growth, and strengthens the process of transforming the transportation system

to better align transportation policies with sustainability and environmental stewardship policies. It can extend beyond State projects; it can also assist regional and local transportation agencies with decision-making.

The California Freight Mobility Plan is an opportunity to begin a broader, systemwide approach to transportation, land use, and technology coordination that is tied to selecting and implementing specific programs and projects. We are taking the opportunity in the CFMP to begin the discussion and will continue to develop and support parallel efforts in companion plans, such as the California Transportation Plan, Interregional Transportation Strategic Plan, and California State Rail Plan.

The CFMP and ARB Sustainable Freight Strategy share common environmental stewardship and sustainability goals. The January 2014 resolution of the Strategy directed ARB staff to develop and provide criteria for specific recommendations that will achieve a sustainable freight system and meet climate, air quality, and GHG goals. Broad principles and criteria will be developed for new and expanded freight facilities that will be used as tool and decision maker for at risk communities near freight hubs.

Needed Guidance

The development of guidance is needed in the near term (one to three years) to ensure that transportation, environmental, and land use projects are implemented in a manner consistent with Caltrans' mission, the vision of the CFMP and aligned with the State's broader environmental sustainability goals. In accordance with concepts outlined in Sustainable Freight Strategy public engagement materials, Caltrans will collaborate with ARB and other partners in developing a guidance document that would address a wide range of freight issues which may include:

- Principles and criteria for assessing the environmental and sustainability implications of transportation infrastructure projects earlier in the transportation planning process;
- Identifying and implementing near-term actions to reduce localized risk in communities near freight facilities (e.g., warehouses and distribution centers);
- Provision of safe, secure truck parking in urban and rural areas;
- Linking the region's complete streets design concept to freight movement;
- Developing truck-only facilities, such as truck lanes, that also consider community exposure to air pollution;
- Shifting the movement of freight to more efficient and less-polluting modes; and

- Industry-wide use of low-emissions vehicles; and supporting further development of advanced technologies.

This type of information would be made available to project sponsors, lead agencies, the freight industry and the public. Stakeholder involvement and public outreach will be essential throughout the development of the guidance and its use in transportation planning and programming processes. To be successful, ***it is essential that the freight industry itself be fully engaged in these discussions.*** This discussion will also need to be raised at related workgroup committees and agencies beyond the California Freight Advisory Committee (California Federal Programming Group, Statewide Conformity Working Group, California Transportation Commission, Native American Advisory Council, Rural Counties Task Force, Regional Transportation Planning Agencies, Self-Help Counties, Regional Boards, California Air Pollution Control Officers' Association, California State Association of Counties, California Councils of Government, League of Cities, Strategic Growth Council, Governor's Office of Planning and Research, Governor's Office of Business and Economic Development, Housing and Community Development, and advocacy groups).

Dedicated Truck Facilities

With very few exceptions, trucks utilize the same local roads, state highways, and Interstates used by automotive travelers. Delay due to urban congestion adds costs to trucking, increases the emission of harmful pollutants and GHG, increases collision potential, and generally reduces the economic competitiveness of congested regions. While substantial investments are being made to shift auto travelers to transit, passenger rail, and other modes, the needs for dedicated truck facilities is essentially totally unmet, with the exception of the proposed I-710 project, small demonstration projects that are under development, and truck climbing lanes for steep ascents. Dedicated truck lanes are needed for the highest-volume truck routes along strategically selected corridors.

Identification of Highest Priority Freight Corridors and Facilities for Investment

The $138 billion in freight-related projects identified in the Freight Project List (Appendix A), far exceeds any reasonable expectation of fundability. Given the enormity of the state's freight system and the relatively small amount of potential freight funding, a subset of the Freight Project List is needed to identify actionable projects over a 10-year period that address the state's most critical freight needs. The very successful Trade Corridors Improvement Fund (TCIF) Program, detailed in Chapter 1.3, has a total cost of approximately $7.2 billion dollars for 81 projects. This provides a perspective of what may be viewed as reasonably achievable by a new freight funding program. The tiered freight corridors included in this Plan align well with the TCIF investment corridors. Building on the success of the TCIF Program, this Plan also prioritizes particular corridors for higher investment priority. Projects that respond to the goals and

objectives of this Plan and are located along high priority corridors or at the gateways, hubs and last-mile connectors that are served by those corridors should be prioritized for funding when freight funding becomes available.

Mode Shift

There have been numerous calls for mode shift from less efficient to more efficient and lower polluting modes, with the particular intent of reducing truck traffic in congested urban areas. A challenge is that the majority of the truck hauls occur within the urbanized region or connect the region to nearby communities that host warehousing, transloading, and distribution facilities. Such short trips generally are not a financially viable market for rail shipments, and many of the urban rail corridors are already congested with existing freight and passenger services sharing the same track. Adding a substantial number of additional freight rail trains and tracks to accommodate short-distance service may not be practical. **There is a need to explore a new mode of transport, one that does not use traditional highways or rail lines for intra-urban trips, to minimize short haul truck trips, increase efficiency, and reduce transportation related pollutants in urban areas.**

Maintain Competitive Edge

California's facilitation of the transport of approximately 40 percent of the nation's containerized cargo presents a tantalizing target for other states and countries. With the unparalleled size of the California freight sector, competitors don't need to redirect a substantial portion of California's discretionary freight market to make a substantial economic impact on their own freight sectors. However, California's competition is extensive, with competing ports on the West Coast of Canada, Washington, Oregon, and Mexico, and the soon-to-be -widened Panama Canal providing enhanced access to ports along the Gulf and Atlantic Coasts. Small or moderate freight market share losses to many of these competitors will coalesce into a significant loss for California. While California will always have a substantial freight sector due to its large population, strong economy, and proximity to major urban areas in neighboring states, the discretionary portion of the freight sector, the portion that supports thousands of additional well-paying jobs, does not have to use California's freight system.

Maintain and Preserve the Freight System

The sheer magnitude of California's freight system necessitates an enormous investment in maintenance and preservation. While the Class-1 railroads, seaports, and airports do an admirable job of maintaining and preserving their facilities, highway and local road facilities that support both passenger and freight transportation, especially those handling the highest volumes of truck traffic, are in vital need of additional funding for maintenance and preservation.

Capacity Expansion

Projected freight volumes for California will increase substantially in the coming years. Many components of the current freight system are already stretched to meet demand, and increased freight volumes may exceed the capacity of some components. Strategic investment is needed to expand the capacity of the State's seaports, landside operations at the highest-volume air cargo airports, rail lines, intermodal facilities, truck facilities, and others. Specific expansion needs are identified in the freight sections of Regional Transportation Plans and facility-specific plans, such as Port Plans.

Climate Change Planning

While sea level rise and climate change are globally important, they are particularly challenging in the long term for California's freight industry and for all other states with coastal freight facilities. The State's numerous seaports and maritime facilities support the economy, but they are also a potential liability as the sea level rises and inundates critical facilities from seaports to airports, rail lines, highways, and the electricity generating and distribution facilities expected to support a near-zero-emissions freight sector. **California needs a sea-level-rise plan addressing the freight industry that is developed in coordination with the freight industry, government agencies, and communities.**

Education

California faces a potential gap between demand for freight services and the availability of a qualified workforce. While a variety of training and certification programs are currently offered, there is a great need for proactive workforce development in the freight sector. The State would greatly benefit from a comprehensive educational strategy to provide specialized programs in transportation planning and freight and supply chain management across all modes.

FIGURE 8. INTERSTATE 80 – WINTER MAINTENANCE

SOURCE: CALTRANS

CHAPTER 1.3

CURRENT FUNDING PROGRAMS

Currently, there is no permanent, dedicated, multipurpose freight funding program for California or the nation. While California has several funding programs that focus on transitioning freight vehicles and equipment to technologies that pollute less, are more efficient, and utilize cleaner fuels, those programs do not address the broader needs of California's full, multimodal freight system. Funding from the State's 2006 voter-approved transportation bond program is winding down, highway trust funds from gas taxes are dwindling, and competition for other limited funding resources that are available for freight purposes is fierce. Insufficient funding for freight transportation projects leads to more traffic congestion, increased community and environmental impacts, elevated freight transportation costs, and steeper consumer prices, which results in a higher cost of living and a less productive and competitive economy.

This Plan is written with the intention that, should new freight funding sources be developed, the identified projects and priorities included in the Plan will be considered in the corresponding funding program's development process. This chapter discusses various federal, State, and local freight funding programs in addition to details regarding the most recent bond program, including sources for potential matching funds. As will become evident, project sponsors depend upon funds from multiple sources and programs, not single sources. Therefore, it is essential to retain broad funding program eligibility for freight projects.

FEDERAL FUNDING

TRANSPORTATION INVESTMENT GENERATING ECONOMIC RECOVERY PROGRAM

Since 2009, the Federal Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant Program[3] has been funding freight projects on a nationally competitive basis. Although not specifically for freight, this program has proven to be a vital funding component for many freight projects around the country, including projects in California; however, it also has several disadvantages:

- TIGER funds rarely provide more than 25 percent of project cost; thus, access to and coordination of multiple funding sources is necessary.
- Its national scope and relatively low funding amount mean only a small number of freight projects are funded in any one state during a funding cycle.

- Limited amount is sought by a large number of competing applicants.
- Specific project selection criteria vary from cycle to cycle and the application process is cumbersome, making it difficult for smaller entities to compete.
- Infrequent and irregular funding cycles do not provide a predictable or reliable funding source for long-term fiscal planning, project development, and project delivery through construction.
- While sponsors of freight projects in California have been very pleased to receive TIGER funding and recognize it as an essential component of project funding packages, project sponsors need a federal freight funding program that enables long term planning and a reasonable level of assurance of federal funding availability into the future.

Harbor Maintenance Trust Fund

The Harbor Maintenance Trust Fund (HMTF), established in 1986 by United States Code (USC) §9505 to support the operation and maintenance of ports and harbors, is funded by the Harbor Maintenance Tax (HMT). The HMT is a federal tax imposed on shippers based on the value of goods shipped through ports. In 1998, the US Supreme Court declared tax collection on exports unconstitutional; since then, the tax has been collected only on imports. The tax revenue is placed in the HMTF to be used for maintenance dredging, dredged material disposal areas, jetties, and breakwaters on federal navigational channels. Appropriations from the HMTF have lagged behind revenues collected into the HMTF for many years. HMT revenues are approximately $1.6 billion per year, with expenditures averaging $850 to $900 million per year. The resulting HMTF surplus was approximately $7 billion at the end of fiscal year 2012 due to its growth by hundreds of millions of dollars each year.[4,5] For years, California has been a donor state – some years generating over 30 percent of HMTF revenue and receiving just 4 percent in return.

The Water Resources Reform and Development Act of 2014 (House of Representatives 3080, Schuster), established minimum target levels of HMT distributions for allowable uses under HMTF. These targets call for 67 percent of the HMT collected in 2014 to be distributed in 2015, increasing by 2 to 4 percent per year through 2024, with 100 percent of the HMT being made available in 2025. However, there is no requirement for appropriators to meet these target levels. Nonetheless, this newly enacted legislation should help ensure that the HMT is being used in a timelier manner and that more funds will be returned to California.

Other Federal Funding

Other existing federal funding sources include the Projects of National or Regional Significance (PNRS) and programs under the Transportation Infrastructure, Finance and Innovation Act

(TIFIA). Surface transportation projects that qualify for US Code – Title 23 funds and are of national or regional importance are eligible for funding under the PNRS Program.[6] This program seeks to improve economic productivity, facilitate international trade, relieve congestion, and enhance movement of passengers and freight. Similar to the TIGER Program, PNRS Program funding levels, cycle frequency, and criteria are not reliable for long-term fiscal planning. The TIFIA Program provides credit assistance for nationally or regionally significant surface transportation projects. This assistance includes loans, loan guarantees, and lines of credit.[7]

On the operations side, Motor Carrier Safety Assistance Program (MCSAP) grants are directly available to states from the Federal Motor Carrier Safety Administration (FMCSA). MCSAP lead agencies can apply for Basic and Incentive grant funding by submitting a commercial vehicle safety plan. If funds are approved, the FMCSA will reimburse 80 percent of eligible costs incurred in a fiscal year. The California Highway Patrol (CHP) continues to pursue its goal of reducing commercial truck-at-fault fatal and injury collisions through aggressive enforcement and quality inspections through the use of MCSAP funds.

STATE FUNDING

PROPOSITION 1B

Voter-approved Proposition 1B enacted the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, which provided nearly $20 billion in bonds for specified purposes.[8] The following subset of programs from the bond act is linked to goods movement:

- Trade Corridors Improvement Fund (TCIF) Program,
- Goods Movement Emission Reduction Program, and
- California Ports and Maritime Security Grant Program.

TRADE CORRIDOR IMPROVEMENT FUND

The Trade Corridor Improvement Fund (TCIF) Program, managed by the California Transportation Commission (CTC), provides $2 billion in bond proceeds, along with an additional $500 million from the State Highway Account (SHA), to cover State transportation priorities. The CTC works with Caltrans, regional agencies, corridor coalitions, and project sponsors to conduct TCIF Program oversight, including project management and technical assistance in the development and delivery of freight projects. The initial set of TCIF projects, many of which were identified in the State's 2007 Goods Movement Action Plan (GMAP), were concentrated along high-priority freight corridors. The GMAP was prepared by the Business, Transportation and Housing Agency (now the California State Transportation Agency, CalSTA) and the California Environmental Protection Agency. The TCIF Program includes the following elements:

- Project funding is restricted to the project construction phase with a 50 percent matching fund requirement.
- Prior to fund allocation, projects must have already cleared all project development phases, such as environmental, design, and right-of-way.
- Types of projects include mainline rail, grade separation, seaport, highway, and intermodal projects.

The TCIF Program's $2.0 billion in funding, plus approximately $4.7 billion in additional federal (including TIGER funds), state, regional, local, and private funds resulted in a combined total program value of over $7.2 billion as of December, 2014. The program is approaching the end of funding availability, with almost all of the projects either completed or in the construction phase. Project cost savings have created additional limited capacity to fund new projects; however, there is no successor state freight funding program after the TCIF Program ends.

Per TCIF guidelines, all TCIF projects were required to be under construction by December 31, 2013; however, in August 2013, to utilize savings from existing projects, CTC approved an extension of the TCIF Program, allowing new projects to receive an allocation through June 2014 and to award construction contracts by December 2014. This savings policy was again extended by the CTC in March 2014, allowing projects funded by savings until June 2016 to allocate and December 2016 to award. For detailed project information, including the most current quarterly report, see http://www.catc.ca.gov/programs/tcif.htm and http://www.catc.ca.gov/1baccount/prop1breport.htm.

On September 29, 2014, Governor Jerry Brown approved Senate Bill (SB) 1228, which continued the existence of the TCIF for the purpose of receiving and expending revenues from sources other than the Proposition 1B Bond Act, but it does not provide any additional revenue for the TCIF Program. This potential new revenue would be appropriated by the CTC for similar TCIF program purposes, such as infrastructure improvements that benefit the state's land ports of entry, seaports, and airports. Funds transferred from the Greenhouse Gas (GHG) Reduction Fund into the TCIF would be subject to all requirements of existing law applicable to those funds, including furthering the regulatory purposes of the California Global Warming Solutions Act of 2006. The text of SB 1228 can be found in Appendix H-2-3.

TCIF Projects

Table 2 contains a list all 81 projects included in the TCIF Program as of December, 2014. These projects are in various stages of development or have been completed. Without this dedicated freight funding source, it is unlikely that such an extensive set of projects would have been implemented over the past several years.

Table 3: TCIF Project Match Funding Sources presents a diverse sample of the various types of funds needed to meet the project funding requirements. Some projects are funded by a single source in addition to TCIF program funds. Other projects are funded by multiple sources in addition to TCIF funding. The same fund source can often be used for many project types. This table, though not an exhaustive list of freight project financial resources, clearly shows that it is necessary to develop a custom funding package for each freight project. Much of the investment in freight infrastructure has come from the private sector and public-private partnerships. Freight rail is almost exclusively owned and operated by private rail lines, many shipping operations rely on funds from private, non-governmental sources, and warehousing and distribution centers, as well as trucking fleets, are primarily privately funded.

Table 3 also indicates that a tremendous range of project types can be funded from non-freight-specific funding sources. As was mentioned previously, the TCIF program served as the catalyst, drawing all these funding sources together to deliver the impressive set of freight projects. It is the expectation of the CFMP that if another freight funding program is provided at the State or federal level, similar results will occur. Detailed project information can be found at the Bond Accountability website: http://www.bondaccountability.dot.ca.gov/bondacc/.

TABLE 2. TRANSPORTATION CORRIDOR INVESTMENT FUND (TCIF) PROJECTS

Project Status as of December, 2014

Under Construction | Construction Completed | Construction Not Started

TCIF Project Number	Project Type	Nominated By	Project Description	Total Project Cost (x1,000)
2	Rail	Caltrans / BNSF	Richmond Rail Connector	$22,650
3	Port	Port of Oakland	Outer Harbor Intermodal Terminals (OHIT)	$499,241
4	Highway	Metropolitan Transportation Commission	I-880 Reconstruction, 29th & 23rd Avenues, Oakland	$97,912
5	Highway	Metropolitan Transportation Commission	I-580 Eastbound Truck Climbing Lane	$49,485
6	Rail	Caltrans/BNSF	Tehachapi Trade Corridor Rail Improvement	$26,040
9	Rail	City of Sacramento	Sacramento Intermodal Track Relocation	$81,292
10	Highway	San Joaquin Council of Governments	State Route 4 West Crosstown Freeway Extension Stage 1	$165,678
11	Port	Port of Stockton / Contra Costa County	San Francisco Bay To Stockton Ship Channel Deepening Project	$15,000
12	Highway	Metropolitan Transportation Commission	I-80 Eastbound Cordelia Truck Scales Relocation	$88,392
15	Grade Separation	Alameda Corridor East Construction Authority	San Gabriel Valley Grade Separation Program	$732,190
17	Grade Separation	City of Santa Fe Springs	Alameda Corridor East (ACE): Gateway-Valley View Grade Separation Project	$65,077
18	Rail	Southern California Regional Rail Authority	New Siding On The Antelope Valley Line For Freight Trains	$14,700
19	Highway	Port of Los Angeles	I-110 Freeway Access Ramp Improvement State Route 47/I-110 NB Connector Widening	$42,268
20	Highway	Port of Los Angeles	I-110 Freeway & C Street Interchange Improvements	$39,385
21	Highway	City of Commerce	Washington Boulevard Widening & Reconstruction	$32,000
22	Grade Separation	Port of Los Angeles	South Wilmington Grade Separation	$76,823
23	Port	Port of Long Beach	Gerald Desmond Bridge Replacement	$ 1,288,101
24	Port	Port of Long Beach	Ports Rail System - Tier 1 (Pier F Support Yard)	$30,176
25	Port	Port of Long Beach	Ports Rail System - Tier 1 (Track Realignment At Ocean Boulevard)	$44,756
32	Port	Port of Los Angeles	Ports Rail System - Tier 1 (West Basin Road Rail Access Improvements)	$137,656
34	Highway	Orange County Transportation Authority	State Route 91 Connect Aux. Lanes Through Interchange On Westbound State Route 91 Between State Routes 57 And I-5	$62,977
35	Grade Separation	Orange County Transportation Authority	State College Boulevard Grade Separation	$74,644
36	Grade Separation	Orange County Transportation Authority	Placentia Avenue Undercrossing	$72,843
37	Grade Separation	Orange County Transportation Authority	Orangethorpe Avenue Grade Separation	$108,595

TCIF Project Number	Project Type	Nominated By	Project Description	Total Project Cost (x1,000)
38	Grade Separation	Orange County Transportation Authority	Kraemer Boulevard Undercrossing	$68,799
40	Grade Separation	Orange County Transportation Authority	Lakeview Avenue Overcrossing	$87,873
41	Grade Separation	Orange County Transportation Authority	Tustin Avenue / Rose Drive Overcrossing	$88,175
42	Grade Separation	City of Riverside	Columbia Avenue Grade Separation	$33,003
43	Grade Separation	City of Corona	Auto Center Drive Grade Separation	$32,675
44	Grade Separation	City of Riverside	Magnolia Avenue Grade Separation - UPRR	$50,248
45	Grade Separation	City of Riverside	Iowa Avenue Grade Separation	$32,000
46	Grade Separation	City of Banning	Sunset Avenue Grade Separation	$33,042
47	Grade Separation	City of Riverside	Streeter Avenue Grade Separation	$36,000
48	Grade Separation	Riverside County	Avenue 56 Grade Separation	$29,394
50	Grade Separation	Riverside County	Grade Separation At Clay Street Railroad Grade Crossing	$30,806
51	Grade Separation	City of Riverside	Riverside Avenue Grade Separation	$32,154
53	Grade Separation	Riverside County	Grade Separation At Magnolia Avenue Railroad Grade Crossing - BNSF	$51,609
54	Highway	City of Riverside	March Inland Cargo Port Airport - I-215 Van Buren Boulevard - Ground Access Improvements	$66,776
56	Highway	San Bernardino Associated Governments	I-10 Cherry Avenue Interchange Reconstruction	$77,806
58	Highway	San Bernardino Associated Governments	I-10 Riverside Ave Interchange Reconstruction	$29,741
59	Grade Separation	San Bernardino Associated Governments	Ace Glen Helen Parkway Grade Separation	$25,885
61	Grade Separation	San Bernardino Associated Governments	Ace South Milliken Avenue Grade Separation	$75,649
63	Grade Separation	San Bernardino Associated Governments	Palm Avenue Grade Separation	$25,123
64	Grade Separation	San Bernardino Associated Governments	Lenwood Road Grade Separation	$31,154
66	Highway	City of Oxnard	US 101 Rice Avenue Interchange Reconstruction	$73,597
67	Highway	San Diego Association of Governments	State Route 905	$82,953
68	Highway	San Diego Association of Governments	State Route 11/Otay Mesa East Port of Entry	$606,954
69	Highway	Port of San Diego	Bay Marina Drive At I-5 At-Grade Improvements	$3,172
70	Port	Port of San Diego	10th Avenue/Harbor Drive At-Grade Improvements	$4,551
72	Highway	Port of San Diego	Civic Center Drive At Harbor Drive And I-5 At-Grade Improvements	$2,193
74	Rail	San Diego Association of Governments	Southline Rail Improvements - Yard Expansion	$40,460

TCIF Project Number	Project Type	Nominated By	Project Description	Total Project Cost (x1,000)
75	Rail	San Diego Association of Governments	Southline Rail Improvements -Mainline Improvements	$48,925
76	Rail	San Diego Association of Governments	Los Angeles-San Diego Rail Corridor Agency (Lossan) North Rail Corridor At Sorrento	$ 44,000
77	Highway	Imperial Valley Association of Governments	Brawley Bypass State Route 78/111	$70,305
81	Highway	Northern California Trade Corridors Coalition	Sperry Road Extension	$56,582
82	Grade Separation	Northern California Trade Corridors Coalition	Marina Bay Parkway Grade Separation	$42,180
83	Rail	Caltrans / BNSF / UP	Colton Crossing Project	$ 138,536
84	Grade Separation	San Bernardino Associated Governments	Laurel Street/BNSF Railway Grade Separation	$58,725
85	Grade Separation	Riverside County	Avenue 52 Grade Separation	$29,866
86	Port	Port of Los Angeles	Alameda Corridor West Terminus Intermodal Railyard -West Basin Railyard Extension	$72,987
87	Port	Port of Los Angeles	Cargo Transportation Improvement Emission Reduction Program	$169,695
88	Grade Separation	Alameda Corridor East Construction Authority	Baldwin Avenue Grade Separation	$77,391
89	Highway	Northern California Trade Corridors Coalition	Solano I-80/I-680/State Route 12 Connector	$99,247
90	Port	Ventura County Transportation Commission / Alameda Corridor Transportation Authority	Hueneme Road Widening	$2,924
91	Highway	Ventura County Transportation Commission	US 101 Improvements	$46,525
92	Port	Port of West Sacramento	West Sacramento Rail Plan-Pioneer Bluff Bridge	$22,525
93	Rail	San Diego Association of Governments	Sorrento Valley Double Track	$36,381
94	Highway	Metropolitan Transportation Commission	US 101 Freeway Performance Initiative	$ 24,764
95	Grade Separation	Alameda Corridor East Construction Authority	Ace Puente Avenue Grade Separation	$99,019
96	Grade Separation	Alameda Corridor East Construction Authority	Ace Fairway Drive Grade Separation	$142,213
97	Highway	County of Yuba	State Route 70 / Feather River Boulevard Interchange	$19,350
98	Highway	Northern California Trade Corridors Coalition / Caltrans	US 50 Natoma Overhead Widening And Onramp Improvements	$8,459
99	Grade Separation	Orange County Transportation Authority	Raymond Avenue Grade Separation	$112,190
100	Highway	San Bernardino Associated Governments	Phase 2 Tippecanoe Interchange Improvements	$59,789
101	Highway	San Joaquin Council of Governments / Caltrans	State Route 99 Ramp Improvements	$3,040
102	Port	Port of Los Angeles	TraPac Terminal Automation-Automated Shuttle Carrier Maintenance & Repair	$ 5,681
103	Rail	City of Fairfield	Fairfield/Vacaville Intermodal Station – New Track And Grade Separation	$22,600

TCIF Project Number	Project Type	Nominated By	Project Description	Total Project Cost (x1,000)
104	Highway	San Diego Association of Governments	State Route 905/State Route 125 Northbound Connectors	$ 26,157
105	Highway	City of Salinas	Sanborn Rd/US 101 Interchange Improvements and Elvee Drive Extension	4,100
106	Rail	Southern California Regional Rail Authority	Vincent Siding Extension at CP Quartz and Second Platform at Vincent/Acton Grade Station	17,400
107	Highway	San Joaquin Council of Governments/Caltrans	Southbound State Route 99 Ramp Improvements	8,410
			Grand Total	**$ 7,189,639**

TABLE 3. TRANSPORTATION CORRIDOR INVESTMENT FUND (TCIF) PROJECT MATCH FUNDING SOURCES

Fund Source	Fund Type	Project Type	TCIF Project Number
Local	AMTRAK	Rail	9
Federal	ARRA - American Recovery and Reinvestment Act	Rail, Highway	9, 91
Private	BNSF Railway (formerly Burlington Northern Santa Fe Railroad)	Rail, Grade Sep	2, 6, 42, 45, 53, 59, 63, 64, 83, 84
Local	Bridge Tolls	Highway	12, 89
State	PTA - Public Transportation Account	Rail	6, 83
Local	Capital Corridor Funds	Rail	9
Federal	CMAQ - Congestion Management Air Quality	Rail, Grade Sep, Highway	9, 17, 35 ,37, 40, 45, 46, 50, 53, 63, 85, 92, 94
Federal	Intermodal Surface Transportation Efficiency Act (ISTEA) Demonstration Funds	Highway	66
Federal	Pre-ISTEA Demonstration Funds	Highway	58
Federal	Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEALU) Demonstration Funds	Grade Sep, Highway, Port	15, 51, 63, 66, 68, 69, 77, 85, 88, 90
Federal	Transportation Equity Act for the 21st Century (TEA21) Demonstration Funds	Grade Sep, Highway	4, 17, 35, 38, 40, 46, 51, 66, 67, 74, 88
Private	Developer	Port, Rail	3, 9
Federal	Federal Bridge Discretionary Program	Highway	23
Federal	Federal Railroad Administration (FRA) Section 9002	Rail	9
Federal	Federal Transit Administration (FTA) Section 5307	Grade Sep, Rail	21, 93
Federal	HBRR - Highway Bridge Replacement and Rehabilitation	Highway	23
Federal	High Speed Intercity Passenger Rail Program - FRA	Rail	9
Federal	HPP - Federal High Priority Project funds	Rail, Grade Sep, Highway	9, 17, 21, 23, 64, 70
Local	Local - Development Funds	Rail, Grade Sep, Highway	9, 42, 43, 44, 53, 54, 58, 59, 61, 63, 82
Local	Local - Community Reinvestment Bonds - City of Sac	Rail	9
Local	Local - Other	Grade Sep, Port, Highway, Rail	32, 35, 36, 42, 43, 44, 45, 46, 51, 54, 58, 66, 67, 68, 81, 85, 88, 90, 91, 92, 99, 100, 101, 103,104, 106
Local	Local - Regional Transportation Impact Fees	Highway	10, 105
Local	Local – Transportation Development Act (TDA) Grant Riverside County Transportation Commission (RCTC)	Grade Sep	47, 53

Fund Source	Fund Type	Project Type	TCIF Project Number
Local	Local - Water Funds - City of Sacramento	Rail	9
Local	LTF - Local Transportation Funds	Port, Grade Sep, Highway, Rail	24, 25, 43, 45, 46, 48, 50, 53, 56, 58, 64, 70, 74, 75, 76, 82, 84, 97
Local	Measure 2 – Metropolitan Transportation Commission (MTC)	Highway	4, 12
Local	Measure 2 – Orange County Transportation Authority (OCTA)	Highway, Grade Sep	34, 35, 38, 41
Local	Measure A - RCTC	Highway	54
Local	Measure A - Sacramento County	Rail	9
Local	Measure I – San Bernardino Associated Governments (SANBAG)	Highway, Grade Sep	56, 58, 59, 61, 63
Local	Measure K – San Joaquin Council of Governments (SJCOG)	Highway, Grade Sep	10, 81
Local	Measure M - OCTA	Grade Sep	36, 37, 40, 99
Local	Measure R – Los Angeles (LA) Metro	Grade Sep	15
Local	Measure J – Contra Costa Transportation Authority (CCTA)	Grade Sep	82
Federal	NCPD - National Corridor Planning and Development Program	Grade Sep	15, 81
State	Other Proposition 1B	Rail, Highway, Grade Sep	9, 23, 53, 61, 64, 99
Federal	PNRS - Projects of National and Regional Significance (Section 1301)	Rail, Highway, Grade Sep	9, 23, 43, 45, 50, 63
Local	Port - General Revenue Funds	Port, Grade Sep, Rail	19, 20, 22, 32, 86, 102
Local	Port - Other	Port, Highway	3, 11, 23, 72
Local	Proposition C Sales Tax – Los Angeles County Metropolitan Transportation Authority (LACMTA)	Rail, Port, Grade Sep, Highway	18, 19, 20, 21, 22, 23
State	PUC - Public Utilities Commission Section 190 Grade Separation Program	Grade Sep	15, 17, 42, 43, 44, 45, 47, 51, 53
Federal	RSTP - Regional Surface Transportation Program	Highway, Grade Sep	23, 40, 41, 45, 46, 47, 51, 64, 90, 91, 97, 105
Local	SCRRA - Southern California Regional Rail Authority	Rail	18
State	SHOPP - State Highway Operations and Protection Program	Highway	4, 12, 23, 94, 100, 101, 107
State	STIP - State Transportation Improvement Program	Highway	4, 56, 58, 66, 76, 77, 89, 91
State	TCRP - Traffic Congestion Relief Program	Highway, Grade Sep	12, 17, 36, 84
Federal	TIGER - Transportation Investment Generating Economic Recovery	Port, Rail	3, 24, 25, 83
Private	UP - Union Pacific Railroad	Grade Sep, Rail, Port	44, 47, 61, 83, 84, 92
Federal	US Army Corps of Engineers	Port	11
Federal	CBIP - Coordinated Border Infrastructure Program	Highway, Rail	68, 74, 104
Federal	FTA 5309	Rail	74

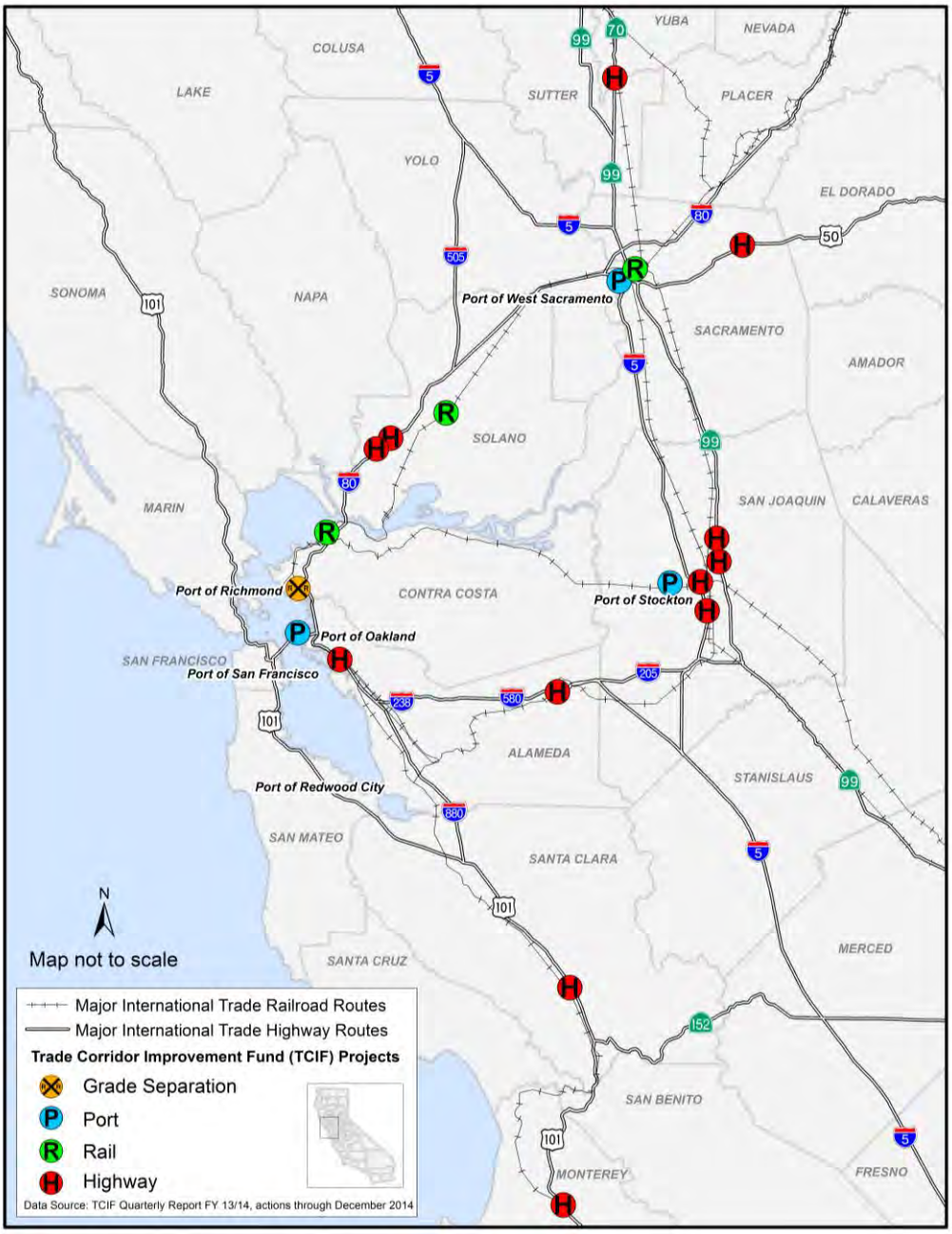
Fund Source	Fund Type	Project Type	TCIF Project Number
Federal	Federal Transportation & Community System Preservation Pilot Program	Highway	91

As shown on the following two maps, TCIF projects are concentrated in Northern and Southern California. Rather than distributing limited TCIF funding evenly across the state, the CTC used a corridor-based approach that emphasized corridors with higher volumes of freight movement and complemented the goods-movement planning work already completed. Regional agencies within each corridor created coalitions to select individual projects and to administer TCIF funds for their respective corridors. This successful concept ensures that the regional agencies within the corridor have a platform to discuss their needs and to prioritize projects. It has been well received by both the regional agencies and the TCIF Program, and it serves as a good model for any future freight funding program.

FIGURE 9. STATE ROUTE 70, SUTTER COUNTY – A PROPOSITION 1B PROJECT

Source: Caltrans

FIGURE10. NORTHERN CALIFORNIA TRANSPORTATION CORRIDOR INVESTMENT FUND (TCIF) PROJECTS



Source: Caltrans

TCIF Project Breakdown*

- **Seaports:** 3 Projects - $537 Million
- **Railroads:** 3 Projects - $127 Million
- **Grade Separations:** 1 Project - $42 Million
- **Highways:** 12 Projects - $625 Million

**Dollar amounts are rounded. See TCIF Projects table on pages 42-45 for exact dollars.*

FIGURE 11. SOUTHERN CALIFORNIA TRANSPORTATION CORRIDOR INVESTMENT FUND (TCIF) PROJECTS

Source: Caltrans

Project Breakdown*

- **Seaports**: 9 Projects - $1.756 Billion
- **Railroads**: 8 Projects - $366 Million
- **Grade Separations**: 29 Projects - $2.413 Billion
- **Highways**: 16 Projects - $917 million

**Dollar amounts are rounded. See TCIF Projects table on pages 42-45 for exact dollars.*

Goods Movement Emission Reduction Program

This $1 billion program is a partnership between California Air Resources Board (ARB) and local agencies to reduce air pollution emissions and health risks from freight movement along California's major trade corridors. The program offers financial incentives to owners of equipment used in freight movement to upgrade to cleaner technologies. Funded projects must achieve early or extra emission reductions not otherwise required by law or regulation. A majority of funding has been spent to upgrade trucks, but locomotive, harbor craft, electrical infrastructure for ships at berth and truck stop/distribution centers projects have also received funding. Additional information on the Goods Movement Emission Reduction Program is located at: http://www.arb.ca.gov/bonds/gmbond/gmbond.htm.

California Port and Maritime Security Grant Program

The California Port and Maritime Security Grant Program (CPMSGP) directs $100 million for projects that maximize the maritime community's ability to prevent and/or recover from natural and unnatural disasters and also boost the economy by creating jobs. Ports and maritime organizations using this business model will be better positioned to save lives, protect the environment, and sustain continuity of operations. Funds in this account were allocated by the California Emergency Management Agency. Additional information on the CPMSGP can be found at: http://www.bondaccountability.dot.ca.gov/bondacc/MainMenuAction.do?%3E&page=1000062.

State of California Incentive Programs

The State of California runs a number of additional programs that provide funding for research, development, commercialization, and deployment of cleaner vehicles, fuels, and fueling infrastructure. Each of these programs has different statutory mandates and goals, but collectively they help modernize the freight system and reduce the air quality and climate change impacts from the freight system in California. In addition to these State programs, local air districts in California provide complementary funding to reduce emissions from transportation sources, including freight.

In addition to Goods Movement Emission Reduction Program funds, ARB oversees freight-related programs, such as the Carl Moyer Memorial Air Quality Standards Attainment Program and the Air Quality Improvement Program (AQIP), which are implemented in partnership with local air districts. Over the next several years, these programs will distribute hundreds of millions of dollars via grants to reduce emissions from vehicles and equipment including on-road trucks, locomotives, harbor craft, and cargo handling equipment. Funds from the proceeds of ARB's Cap-and-Trade program will be used to reduce GHG emissions. These and other State programs are discussed next.

The Carl Moyer Memorial Air Quality Standards Attainment Program

The Carl Moyer Program is a grant program run by ARB and local air districts that funds the incremental cost of cleaner-than-required engines, equipment, and other sources of air pollution. This program provides incentives to obtain early or extra emission reductions – especially targeting emission sources in environmental justice communities and areas disproportionately impacted by air pollution. Its primary objective is to obtain cost-effective and surplus emission reductions to be credited toward California's legally enforceable obligations in the State Implementation Plan (SIP) – California's road map for attaining the health-based national ambient air quality standards. Many of the funded engine retrofits and replacements are used in freight transport. In the first 14 years following its inception in 1998, the Carl Moyer Program provided over $980 million in State and local matching funds. Additional information on the Carl Moyer Program can be found at: http://www.arb.ca.gov/msprog/moyer/moyer.htm.

Air Quality Improvement Program

The ARB's Air Quality Improvement Program (AQIP), created by Assembly Bill (AB) 118 (Núñez, Chapter 750, Statutes of 2007), is an incentive program with an annual budget of about $25 million to fund clean vehicle and equipment projects that reduce criteria pollutants and air toxic emissions, often with concurrent climate change benefits. ARB has focused AQIP investments in technology-advancing projects that also provide immediate emission reductions, including initial deployment of hybrid and zero-emissions trucks, zero-emissions and plug-in hybrid passenger cars, and other advanced technology demonstrations critical to meeting California's long-term air quality and climate change goals. AQIP investments are an important component in the transformation of the California vehicle fleet to near-zero- and zero-emissions vehicles. Additional information on AQIP is found at: http://www.arb.ca.gov/msprog/aqip/aqip.htm .

Cap-and-Trade Program

The ARB has developed a market-based Cap-and-Trade Program as a key part of its greenhouse gas reduction strategy to meet the requirements of the Global Warming Solutions Act of 2006 [Chapter 488, Statutes of 2006 (AB 32, Núñez/Pavley)]. A portion of the allowances required for compliance with the Cap-and-Trade Program are sold at auction, and the proceeds from sale of the State-owned allowances at these auctions will be used to fund projects that support efforts to reduce GHG emissions and have the potential to leverage national funding. Some of these investments will be aimed at reducing freight-related emissions. For example, the FY 2014-15 State Budget appropriated $200 million to ARB for low-carbon transportation projects that reduce greenhouse gas emissions and accelerate the commercialization of advanced emission reduction technologies for freight and passenger transportation, with a priority given to

disadvantaged communities. Additional information on the investment of auction proceeds is located at: http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/auctionproceeds.htm.

Alternative and Renewable Fuel and Vehicle Technology Program

The California Energy Commission's (CEC) Alternative and Renewable Fuel and Vehicle Technology Program, also created by AB 118, provides nearly $100 million annually through 2024 to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the State's climate change goals. Over $400 million has been invested to date in more than 250 projects, with approximately 30 percent of the funding going to advanced-technology truck projects. Funding over the life of the program will be about $1.5 billion for advanced technologies, low-carbon fuels, fueling infrastructure, and vehicle projects. More information on the Alternative and Renewable Fuel and Vehicle Technology Program is located at: http://www.energy.ca.gov/altfuels/index.html.

Electric Program Investment Charge Program

Programs such as the CEC's Electric Program Investment Charge (EPIC) Program, its predecessor – the Public Interest Energy Research (PIER) Program – and others, provide investments in applied research and development, technology demonstration and deployment, and market facilitation for clean energy technologies. Some of these investments are aimed at advancing technology in the freight sector. For example, the CEC has funded the California Hybrid, Efficient and Advanced Truck (CalHEAT) Research Center, a California-based resource center for research, development, demonstration, and commercialization of advanced, efficient truck technologies and systems. This research center works in partnership with diverse stakeholders to develop and implement an overall research and market transformation plan to inform manufacturers and suppliers on the status of clean-truck technology, gaps, and needs for commercialization, as well as to guide State investment and funding for hybrid, efficient, and advanced truck technologies. More information on CEC research is located at: http://www.energy.ca.gov/research/. For more information about CalHEAT, see http://www.calstart.org/Projects/CalHEAT.aspx.

The ARB, the CEC, regional air districts, and other public agencies provide competitively based funding for freight projects that achieve specific goals associated with the funding source program, as the previous examples attest. These funds are largely focused on projects that address air quality, GHG emissions, alternative energy, new engine technologies, and more efficient freight operations. These have been essential resources for projects that have achieved dramatic emissions reductions in drayage trucking fleets and at seaports and rail yards. Since 2006, diesel particulate matter emissions have been reduced by over 70 percent; with levels still decreasing in the areas surrounding California's largest seaports – largely due to

regulations imposed by ARB and voluntary measures by the ports of Los Angeles, Long Beach, and Oakland.

FIGURE 12. PORT OF LOS ANGELES – ELECTRIC TRUCK PROTOTYPE, A ZERO-EMISSIONS VEHICLE

Source: Port of Los Angeles

REGIONAL FUNDING

Voter-approved transportation sales tax measures at the county level sometimes include freight projects or projects that benefit freight as well as passenger movement. Some of these tax revenues have been and are being used to supplement and leverage additional State and federal funds. Seaports, airports, and railroads provide their own project funding through fees charged to customers. Many of these sources provide funds only for maintenance, operation, or expansion of sponsor facilities, or for off-site mitigation to address impacts from the sponsor facilities.

The State's four largest metropolitan planning organizations – Southern California Association of Governments (SCAG), Metropolitan Transportation Commission (MTC), San Diego Association of Governments (SANDAG), and Sacramento Area Council of Governments (SACOG) – along with a coalition of all eight San Joaquin Valley MPOs and smaller regional planning agencies and localities have prepared or are preparing regional freight plans that include freight project lists articulating freight goals and objectives for their respective regions. As new regional freight planning efforts move forward, it is expected that the resulting plans will be consistent with the CFMP vision and goals while also addressing other regional and local needs. Having a broadly defined State freight plan and numerous detailed regional and local freight plans with consistent goals will strengthen the importance of freight issues within the transportation planning arena to support the need for, and help justify the development of, dedicated freight funding programs at the national, State, and regional levels. As efforts move forward to create permanent, dedicated freight funding sources, there is a clear need for project sponsors to remain eligible to apply to multiple funding sources currently available, as listed on the following pages.

CONCLUSION

While several freight project funding sources have accomplished impressive results, freight projects, in general, are not well funded in California. The projects discussed in this chapter received limited, one-time, or short-term funding. The TIGER and PNRS funds, while they can be critical components of a complete funding package, are not predictable, reliable, and continuing resources. The TCIF Program is winding down, and no long-term, comprehensive freight funding program has been established to replace it. ARB, CEC, and regional air district funds are focused more narrowly to achieve important, specific objectives respective to each of the agencies' programs.

California's freight industry is a vital component of the state's economic health. Creation of an ongoing program to provide reliable, substantial public funding for freight projects is critical if the industry is to remain competitive, continue its mitigation of community and environmental impacts, and retain its extensive employment base. The program cannot redirect existing transportation funding; those resources are already insufficient to meet current needs. New funds must be found and specifically dedicated to freight transportation projects to augment existing funding sources, not to replace that funding. The total amount of freight funding needs to increase substantially.

CHAPTER 1.4

GUIDING POLICIES, PARTNERSHIPS, AND OUTREACH

GUIDING LAWS AND POLICIES

On July 6, 2012, MAP-21 was signed into law, providing over $105 billion for surface transportation programs over federal fiscal years 2013 and 2014. MAP-21 included detailed provisions to improve the condition and performance of the national freight network and to support investment in freight-related projects.[9] Implementation of MAP-21 marked the first time in history the federal government provided standards and guidance for state freight transportation planning. Although freight has long held a position of prominence in transportation planning, there has never been a national freight plan, and state and regional agencies lacked guidelines for a common format. In the absence of federal guidance, some states developed plans on their own, such as California's Goods Movement Action Plan (GMAP) released in 2005 (Phase I) and 2007 (Phase II). Several agencies in California also developed regional freight plans. These independently developed plans are excellent as far as they go. Each has resulted, or will result, in the implementation of a coordinated set of freight projects. But with global trade continuing to expand, and locations of resource extraction, manufacturing, and consumption shifting continuously, a robust, coordinated, national freight plan is a necessity.

MAP-21 recommended that the US Department of Transportation encourage each state to develop a state freight plan and form a state freight advisory committee to assist in its development. Pursuant to these recommendations, US DOT released *Interim Guidance on State Freight Plans and State Freight Advisory Committees,*[10] and the California Assembly enacted AB 14 (Lowenthal, 2013), which mandated creation of the freight plan recommended in accordance with MAP-21 and expanded the recommended advisory committee membership to include specific State agencies and categories of freight stakeholders. AB 14 also required CalSTA to develop the Plan by December 31, 2014 and update it every five years thereafter.[11]

The guidelines and requirements of MAP-21, AB 14, and other State and federal laws, were used as the foundation of the CFMP. The Plan was developed through a highly collaborative process that incorporated feedback from many freight stakeholders, including those represented on the CFAC, and community and environmental justice organizations. That process, described in detail in this chapter, resulted in the vision, goals and objectives outlined in Chapter 1.1, a reflection of the state's unique priorities and position in the national and global economies.

Contents of the California Freight Mobility Plan

US DOT's Interim Guidance includes the following recommended elements of a state freight plan:

- Strategic Goals
- The Economic Context of Freight Transportation Planning
- Freight Policies, Strategies, and Institutions
- State Freight Transportation Assets
- The Conditions and Performance of the State's Freight Transportation System
- Freight Forecast
- Overview of Trends, Needs, and Issues
- Strengths and Problems of the State's Freight Transportation System
- The State's Decision-Making Process
- The State's Freight Improvement Strategy
- Implementation Plan

On the next page, Table 4 shows how the chapters of the CFMP align with the content recommended by the Interim Guidance.

Table 4. State Freight Plan Required Elements

U.S. Department of Transportation Guidance on Contents of State Freight Plans		California Freight Mobility Plan
Section 1118 of MAP–21 requires that State Freight Plans developed pursuant to Section 1118 include, at a minimum, the following elements:		These elements have been included in the following chapters of the CFMP:
1	An identification of significant freight system trends, needs, and issues with respect to the state	Chapter 1-2: Strengths and Needs Chapter 3-1: Native American Freight Connections Chapter 3-2: Economic Context of Freight Chapter 3-3: Labor and Workforce Development Chapter 3-4: Community and Environmental Context Chapter 3-5: Safety, Security, and Resiliency Chapter 3-6: ITS and Technology Chapter 3-7: California-Mexico Border Factsheet and Trend Sheet Appendices (Freight/Rail, Airports, Trucking, Seaports, Regions, and District Freight Planning)
2	A description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the state	Chapter 1-1: Vision and Implementation Chapter 1-4: Guiding Policies, Partnerships, & Outreach Chapter 2-2: Freight System Condition and Performance
3	A description of how the plan will improve the ability of the state to meet the national freight goals established under section 167 of title 23, United States Code	Chapter 1-1: Vision and Implementation Chapter 1-4: Guiding Policies, Partnerships, & Outreach
4	Evidence of consideration of innovative technologies and operational strategies, including intelligent transportation systems, that improve the safety and efficiency of freight movement	Chapter 1-1: Vision and Implementation Chapter 1-4: Guiding Policies, Partnerships, & Outreach Chapter 3-6: ITS and Technology
5	In the case of routes on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of roadways, a description of improvements that may be required to reduce or impede the deterioration	Chapter 1-2: Strengths and Needs Chapter 2-2: Freight System Condition & Performance
6	An inventory of facilities with freight mobility issues, such as truck bottlenecks, within the state, and a description of the strategies the State is employing to address those freight mobility issues	Chapter 1-1: Vision and Implementation Chapter 2-1: Freight System Assets Chapter 2-2: Freight System Condition & Performance

Table 5. State Freight Plan Recommended Elements

The Department is suggesting the following structure as a recommended model for states to follow.		These additional elements have been included in the following chapters of the CFMP:
1	Strategic Goals	Chapter 1-1: Vision and Implementation Chapter 1-4: Guiding Policies, Partnerships, and Outreach
2	The Economic Context of Freight Transportation Planning	Chapter 3-2: Economic Context of Freight Chapter 3-3: Labor and Workforce Development
3	Freight Policies, Strategies, and Institutions	Chapter 1-1: Vision and Implementation Chapter 1-3: Current Funding Programs Chapter 1-4: Guiding Policies, Partnerships, and Outreach
4	State Freight Transportation Assets	Chapter 2-1: Freight System Assets
5	The Conditions and Performance of the State's Freight Transportation System	Chapter 1-2: Strengths and Needs Chapter 2-2: Freight System Condition and Performance
6	Freight Forecast	Chapter 2-3: Freight Forecast
7	Overview of Trends, Needs, and Issues	Chapter 1-2: Strengths and Needs Chapter 3-1: Native American Freight Connections Chapter 3-2: Economic Context of Freight Chapter 3-3: Labor and Workforce Development Chapter 3-4: Community and Environmental Context Chapter 3-5: Safety, Security, and Resiliency Chapter 3-6: ITS and Technology Chapter 3-7: California-Mexico Border Factsheet and Trend Sheet Appendices (Freight/Rail, Airports, Trucking, Seaports, Regions, and District Freight Planning)
8	Strengths and Problems of the State's Freight Transportation System	Chapter 1-2: Strengths and Needs
9	The State's Decision-Making Process	Chapter 1-1: Vision and Implementation Chapter 1-2: Strengths and Needs Chapter 1-3: Current Funding Programs Chapter 1-4: Guiding Policies, Partnerships, and Outreach
10	The State's Freight Improvement Strategy	Chapter 1-1: Vision and Implementation
11	Implementation Plan	Chapter 1-1: Vision and Implementation

The goals of the National Freight Policy established in 23 United States Code (U.S.C.) 167 are summarized below:

- Improving the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness;
- Reducing congestion on the freight transportation system;
- Improving the safety, security, and resilience of the freight transportation system;
- Improving the state of good repair of the freight transportation system;
- Using advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight transportation system; and
- Reducing adverse environmental and community impacts of the freight transportation system.

Similarly, California's goals for its multimodal freight network reflect the importance of economic competitiveness, congestion relief, safety and security, the preservation of freight infrastructure, innovative technology, and addressing environmental and community impacts.

Stakeholder Collaboration and Public Outreach

California's freight system involves a complex network of infrastructure connecting all regions of the State and a very diverse set of public advocacy groups and stakeholders, from those in freight, logistics, and warehousing, to farmers exporting their crops and residents of communities adjacent to freight facilities. All struggle to represent their interests in a complicated planning and funding process that spans multiple State agencies, and government at the local and regional levels.

The CFMP aims to serve all of their needs by coordinating across agencies and including comprehensive representation across diverse sets of stakeholders. By including all interested segments, the CFMP complies with national and State requirements and also promises a smoother, more functional implementation for greater success in addressing California's freight issues and guiding future investments.

California Freight Advisory Committee (CFAC)

In response to Section 1117 of MAP-21 directing the US Secretary of Transportation to encourage each state to establish a state freight advisory committee, Caltrans collaborated with CalSTA to establish the CFAC in April of 2013. Consistent with MAP-21 guidance, the CFAC consists of "a representative cross-section of public and private sector freight stakeholders, including representatives of ports, shippers, carriers, freight-related associations, the freight

industry workforce, and the transportation departments of the State and local governments". A list of the CFAC's member organizations can be found below.[12]

AB 14 reinforces MAP-21's recommendation by making formation of the committee a requirement. Additionally, AB 14 expands the CFAC membership to include "the California Transportation Commission, the Department of Transportation, the Public Utilities Commission, the State Lands Commission, the State Air Resources Board, regional and local governments, and environmental, safety, and community organizations." Caltrans, by delegation from CalSTA, has been tasked by CalSTA's Secretary to develop the CFMP and to coordinate the CFAC in consultation with them.

FIGURE 12. CALIFORNIA FREIGHT ADVISORY COMMITTEE MEETING, LONG BEACH, CA – JUNE 2013

Source: Port of Long Beach

FIGURE 13. CALIFORNIA FREIGHT ADVISORY COMMITTEE (CFAC) MEMBER ORGANIZATIONS

Alameda County Transportation Commission
Automobile Club of Southern California
Assembly Representatives (2)
Association of Monterey Bay Area Governments
Bay Area Air Quality Management District
BNSF Railway
California Air Resources Board
California Airports Council
California Association of Port Authorities
California Chamber of Commerce
California Department of Housing and Community Development
California Department of Public Health
California Energy Commission
California Farm Bureau Federation
California Highway Patrol
California Marine and Intermodal Transportation System Advisory Council (CALMITSAC)
California Natural Resources Agency
California Public Utilities Commission
California Retailers Association
California Short Line Railroad Association
California State Lands Commission
California Transportation Commission
California Trucking Association
Center for Community Action and Environmental Justice
Coalition for Clean Air
Communities for a Better Environment
Devine Intermodal
FedEx Corporation
Governor's Office of Business and Economic Development (GO-Biz)
Greenlining Institute
International Brotherhood of Teamsters, Joint Council No. 42
International Longshore and Warehouse Union
Los Angeles County Metropolitan Transportation Authority
Los Angeles World Airports
Metropolitan Transportation Commission
Mobility-21
National Association of Industrial Office Properties SoCal Chapter
Native American Advisory Committee
Natural Resources Defense Council
Pacific Merchant Shipping Association
Port of Long Beach
Port of Los Angeles
Port of Oakland
Rural Counties Task Force
Sacramento Area Council of Governments
San Bernardino Associated Governments
San Diego Association of Governments
San Francisco International Airport
San Joaquin Valley Air Pollution Control District
San Joaquin Valley Regional Planning Agencies
Senate Representative
Shasta County Regional Transportation Agency
Sierra Club California
Silicon Valley Leadership Group
South Coast Air Quality Management District
Southern California Association of Governments
Transpo Group
Union Pacific Railroad
United Parcel Service
United States Customs and Border Protection
US Department of Transportation - Federal Highway Administration

The CFAC meets at least four times a year at venues throughout the state to assist in developing the CFMP, facilitate discussion of freight-related topics, assist in coordinating regional freight priorities, and advise the State on freight-related priorities, issues, projects, and funding needs. The CFAC is comprised of 62 freight stakeholder representatives and is chaired by Caltrans. While the Committee's organizational structure does not identify formal subcommittees, CFAC meetings often include breakout group sessions during which members form smaller groups to engage in focused discussions on specific topics. This dynamic approach best utilizes the expertise of those serving on the CFAC.

FIGURE 14. CFAC COMMITTEE MEMBERS PARTICIPATING IN A TOUR OF THE PORT OF STOCKTON'S M-580 BARGE OPERATIONS IN 2013.

Source: Caltrans

The CFAC has supported California in a number of freight-related activities since the committee was established. Specifically, the CFAC participated in the development of the State's official response to US DOT regarding the federally proposed Primary Freight Network (PFN). CFAC comments were integrated into a comment letter (included as Appendix G-4) submitted by the Secretary of CalSTA to the Secretary of US DOT. In a similar effort, Caltrans is collaborating with the CFAC to compose a freight policy recommendation letter for submittal to US DOT in preparation for the reauthorization of MAP-21.

The CFAC is subject to the Bagley-Keene Open Meeting Act[13] set forth in Government Code Sections 11120-11132, which covers all state boards and commissions. Generally, it requires these bodies to publicly post notice of meetings, make agendas available ten days prior to meetings, accept public testimony, and conduct meetings in public unless specifically authorized by the Act to meet in closed session.

CFAC meetings are open to the public and are publicly announced on the CFAC's website. An agenda and corresponding meeting materials are made publicly available at least ten days prior to each meeting. Each CFAC agenda item includes a public comment period. Presentations, summary notes and audio or video recordings of the meeting are posted on the website following each meeting. All electronic meetings (e.g., webinars) are made publically available as well.

Native American National/Tribal Consultation

A full 20 percent of the federally recognized Native American tribes in the US are located in California. The state is home to 110 federally recognized tribes and many unrecognized tribes. They are diverse in language and culture and have survived centuries of colonialism and disenfranchisement.

In compliance with numerous Presidential Memoranda, US DOT Executive Orders, State Executive Orders, State and Federal laws and policies, and Caltrans Director's Policy (DP-19, 8/29/01) which specifically requires Caltrans to engage with tribal governments prior to making decisions, taking actions, or implementing programs that may impact tribal communities, Caltrans engages with tribal governments as early as possible in planning processes.

US DOT Executive Order DOT 5301.1 defines tribal consultation as *"Meaningful and timely discussion in an understandable language with tribal governments during the development of regulations, policies, programs, plans or matters that significantly or uniquely affect federally recognized American Indian and Alaska Native Tribes and their governments."*

The Secretary of the Interior's Standards and Guidelines offers the following definition for consultation:

"Consultation" means the process of seeking, discussing, and considering the views of Native American Tribes, and, where feasible, seeking agreement with them on how historic properties should be identified, considered, and managed.

"Consultation" also means the direct and interactive (i.e., collaborative) involvement of Native American tribes in the development of regulatory policies on matters with tribal implications. Consultation is the active, affirmative process of (1) identifying and seeking input from appropriate Native American governing bodies, community groups and individuals; and (2) considering their interest as a necessary and integral part of agency's transportation decision-

making process. This definition adds to any statutorily mandated notification procedures. The goal of notification is to provide an opportunity for comment; however, with consultation procedures, the burden is on the federal agency to show that it has made a "good faith effort to elicit feedback."

Federal legislation also requires state departments of transportation to coordinate, cooperate, and consult with tribal governments in statewide and metropolitan transportation planning processes. This is in addition to addressing environmental, cultural, historic, natural, and human resource issues during the implementation of transportation programs and construction projects impacting native nation/tribal reservations and aboriginal lands within the State boundaries.

To maintain improved relationships with tribal governments, Governor Jerry Brown issued Executive Order B-10-11 (September 2011) requiring that "every state department and agency" consult with Native American Tribes before taking action that would impact them. This Executive Order also recognizes the sovereign status of tribal governments and their jurisdiction over lands within reservation boundaries as defined by federal law [18 U.S.C. §1151]. In recognition of tribal sovereignty, California respects the existence of each Tribe's government, values, culture, codes, and laws. As such, the Agency works to address issues in a mutually respectful manner.

FIGURE 15. CFMP NATIVE AMERICAN LISTENING SESSION LOCATIONS

Caltrans has engaged California's tribal governments throughout the development of the CFMP in the following ways:

- **Native American Advisory Committee (NAAC) Meetings**: The NAAC was established in 1996 to ensure that Native American communities have the opportunity to regularly participate in Caltrans' planning, development and implementation of transportation projects and services. Caltrans' Office of Freight Planning (formerly, Office of System, Freight and Rail Planning) has regularly attended NAAC Meetings in 2013 and 2014 to report on the status of the CFMP and to gather input from NAAC members to inform the development of the freight plan.[14]

- **CFAC Representatives**: As previously discussed, CFAC members include a variety of freight stakeholders from throughout the state. Two members of the NAAC also serve on the CFAC to provide a broad representative view of the Native American community throughout the development of the CFMP.

- **Consultation**: Letters were sent by Caltrans District Directors to each of California's federally recognized tribal governments inviting tribal Chairs in their respective districts to engage in government-to-government consultations regarding the draft CFMP and other State plans.

- Listening Sessions: Caltrans convened four regional tribal Listening Sessions from July to December 2013. In addition to discussing the CFMP, the listening sessions also included discussion on other long-range planning documents being prepared by Caltrans, including the California Transportation Plan (CTP) 2040, the Interregional Transportation Strategic Plan, and the Strategic Highway Safety Plan. Three of the listening sessions were hosted by tribal governments at their facilities; one was hosted by the NAAC.[15]

Figure 16. CFMP Focus Group Locations

CFMP Focus Groups

During June of 2013, Caltrans hired VRPA Technologies Inc. to hold a series of four focus group sessions with environmental justice and community organizations around the state as part of its planning process prior to developing the California Freight Mobility Plan. The goals of focus group sessions were to:

- Improve and increase Caltrans' understanding of freight transportation community concerns, issues, and impacts from freight transportation;
- Improve relationships with community groups through continued involvement throughout the CFMP development process; and
- Supply a list of freight transportation impacts on communities during development of the CFMP.

Feedback gathered during the focus groups was summarized into a report, included as Appendix G-2. Highlights of the summary include:

- Respondents agreed that negative effects of freight include health impacts, noise, air quality, traffic, vibration, pavement damage, and a disproportionate impact on certain populations.
- Respondents also agreed that positive effects are job creation and employment.
- Respondents believe that the most unmet needs include efficiency, safety, green technology, collaboration with the public, disproportionately impacted communities, and rail improvements.
- Respondents suggested green technology to reduce impacts and address sustainability goals, innovative funding, more rail systems, double-tracking the existing lines, and use of rail over trucks for hauling.

CFMP Public Workshops

To inform and receive input from the public on the draft CFMP, Caltrans held eight public workshops between June 16 and July 31, 2014. Workshop locations included: Redding, Sacramento, Oakland, Marina (Monterey Area), Fresno, Los Angeles, San Bernardino, and San Diego.

FIGURE 17. CFMP PUBLIC WORKSHOP LOCATIONS

Each public workshop was locally announced via a public notice process prior to the event, had a Spanish-English interpreter present, and was held at a venue compliant with the Americans with Disabilities Act (ADA) that offered available parking and transit access. Each workshop featured a repeating introductory presentation, tables staffed with knowledgeable Caltrans Freight employees to answer questions, and a booth where public comments were collected.

Public input compiled throughout the public workshops was compiled and incorporated into the CFMP where applicable. Information materials used at the workshops are included as Appendix G-3.[16]

NEXT STEPS

Chapter 1.2, Strengths and Needs identifies significant freight system strengths and needs that apply to the transportation of freight throughout the State. The goals and objectives contained in this chapter will help to guide policy and investment decision making to address these needs and issues at many levels. As discussed in Chapter 1-1, Vision and Implementation, the CFMP will also function as a platform providing a foundation that will influence the further development of the State's freight policies and for determining necessary follow-up actions designed to improve the freight transportation system and recommend appropriate roles for Caltrans and other public and private stakeholders.

Work has already begun or will commence shortly on several other freight-related transportation planning efforts described below. Future work will focus on further developing

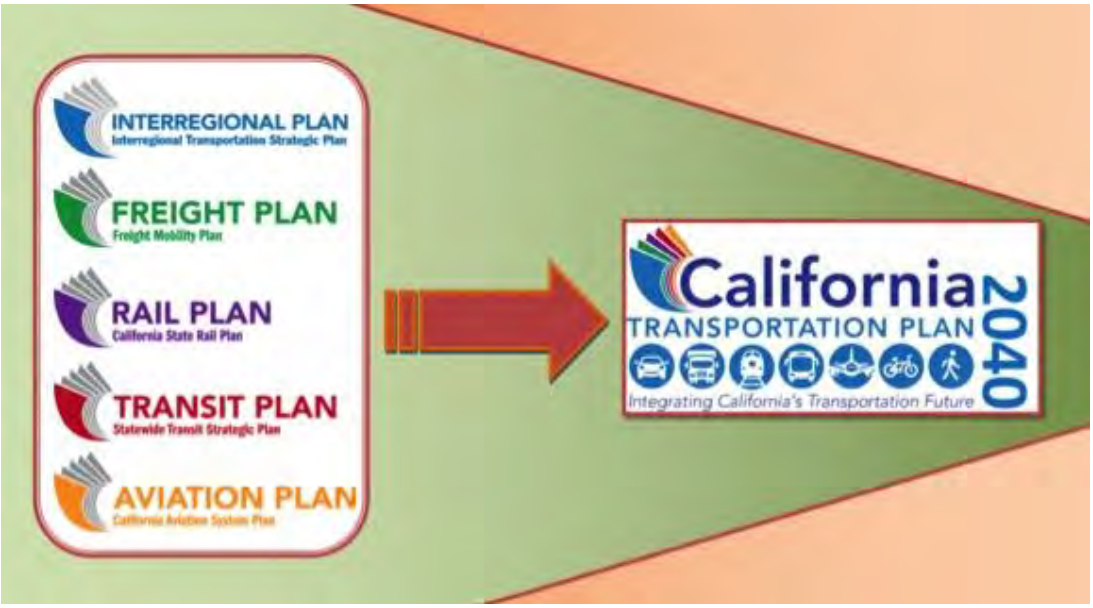
strategies, criteria, and performance measures as part of a more coordinated approach to freight planning activities at the State, regional, and local levels.

California Transportation Plan

In 2006, California completed the California Transportation Plan 2025 (CTP 2025), a long-range transportation policy plan that explored the social, economic, and technological trends and demographic changes anticipated over a 20 year planning horizon and their potential influence on travel behavior. The vision of this plan was one of a fully integrated, multimodal, sustainable transportation system that supports the three outcomes that define quality of life — prosperous economy, quality environment, and social equity (3Es). An addendum to CTP 2025 was completed in 2007, extending the horizon of the plan to 2030 and updating the State's long-range transportation plan to comply with the Safe, Accountable, Flexible, Efficient, Transportation Equity Act – A Legacy for Users (SAFETEA-LU).

California Senate Bill (SB) 391 (Nunez), enacted in 2009, requires Caltrans to update its State transportation plan by December 31, 2015 and every five years thereafter. The bill also requires that the plan address how the State will meet the transportation infrastructure and mobility needs of California, attain air pollution standards required by federal and State law, and achieve Greenhouse Gas (GHG) emissions reductions needed from the entire transportation sector, including freight, interregional travel, and rural areas outside the MPOs required to develop a Sustainable Community Strategy under SB 375.

FIGURE 18. CALIFORNIA TRANSPORTATION PLAN



The CTP 2040 will utilize mode-specific information from Caltrans' five modal plans, including the CFMP and the California State Rail Plan.

The CTP 2040 was initiated with the development of the California Interregional Blueprint (CIB) in early 2010 in response to SB 391. The CIB is a state-level transportation blueprint that articulates the State's vision for an integrated multimodal transportation system that complements regional transportation plans and land use visions. The CIB provides the foundation for the CTP 2040, which will conclude with plan approval by the Secretary of CalSTA in December 2015.

The CTP 2040 will utilize mode specific information and priorities contained in Caltrans' five modal plans (as shown in Figure 18), including the CFMP and the California State Rail Plan, to develop a comprehensive, long-range transportation policy document that will shape how the State will meet the transportation infrastructure and mobility needs of California while attaining air pollution standards and GHG reduction required by federal and State law.[17]

California State Rail Plan

In 2008, the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) was enacted. The federal law seeks to strengthen the national rail network by developing a long-term national vision of the rail system. PRIIA underscores the benefits of integrating rail planning into the statewide transportation planning process. The law requires that states develop state rail plans no less frequently than every five years to be eligible for federal funding for high-speed rail (HSR) and intercity passenger rail programs and projects. The law also encourages states to develop strategies and policies for enhanced passenger and freight rail services that benefit the public. The 2013 California State Rail Plan (CSRP), finalized in October 2013, makes the State compliant with 49 US Code Section 22102 concerning state rail plans and state rail administration.

The 2017 CSRP, which is in its first stages of development at the time of CFMP publication, will incorporate information and priorities contained in the CFMP, as they pertain to freight rail.[18]

AB 528 (Lowenthal, 2013) requires Caltrans to prepare a 10-year State Rail Plan every 5 years, consisting of both passenger and freight rail elements, and sets forth various items that are required to be included in each element.[19]

The CSRP establishes a statewide vision and objectives, sets priorities, and develops implementation strategies to enhance passenger and freight rail service in the public interest. The CSRP uses 2020 as the five-year horizon, 2025 as the 10-year horizon, and 2040 as the 25-year horizon. This 2040 horizon coincides with the analysis horizon of the California Transportation Plan (CTP), the CFMP, and many of California's Regional Transportation Plans. The CSRP provides a comprehensive list of long-range investment needs for California's passenger and freight infrastructure. It supports the State's goal of developing an integrated, multimodal transportation network. Finally, the CSRP will guide federal and State rail

investments that will improve the movement of people and goods while enhancing economic growth and quality of life. The freight rail content provided in the 2013 CSRP has been used to inform the freight rail content in the CFMP, so the two State plans, along with the CTP, are consistent.[20]

Air Resources Board's Freight Planning Efforts

In June 2012, a public review draft of Air Resources Board's (ARB) Vision for Clean Air: A Framework for Air Quality and Climate Planning was released by ARB, the South Coast Air Quality Management District, and the San Joaquin Valley Air Pollution Control District. This joint agency effort took a coordinated look at strategies, with a focus on mobile sources and associated energy production, needed to meet California's multiple air quality and climate goals well into the future.

The Vision for Clean Air is a qualitative demonstration of the needed technology and energy transformation needed to meet California's multiple air quality and climate goals, with a focus on mobile sources and associated energy production. For many of the sectors discussed within the Vision for Clean Air, including freight, zero- and near-zero-emission technologies are in early pre-commercial pilot demonstration stages and may be further developed in coming years. Vision for Clean Air uses modeling to evaluate various scenarios for the coordinated development and accelerated deployment of the types of technologies expected to be needed in each of the sectors to meet federal clean air standards. The scenarios are not yet refined, further, the development of actions and timeframes needed to meet California's goals are outside the scope of the Vision.[21]

The ARB is currently developing a Sustainable Freight Transport Initiative (Initiative) which is a broad, multi-decade effort to develop, fund, and implement the changes necessary to achieve a sustainable freight system that meets air quality and GHG goals. CalSTA and Caltrans are working with ARB on developing the Initiative and, to the greatest extent possible, aligning the CFMP with the Initiative so that the State has consistency between its plans and the resulting implementation programs and projects. This effort builds upon ARB air quality planning and modeling work that has shown the growing proportional contribution of emissions from freight-related sources and the need to transition to zero- and near-zero-emission technologies over the next several decades. The Initiative will be informed by an ongoing, transparent public process that engages freight stakeholders. It will be built upon and coordinated with discussions already taking place with the CFAC.

The 2014 Sustainable Freight Strategy (Strategy) is a concentrated effort to produce a document that describes ARB's vision and options for a clean freight system. ARB worked with stakeholders on the Strategy throughout 2014 and will continue to do so in 2015. The strategy will identify both regulatory and voluntary levers to accomplish a zero/near-zero emission

freight system and include near-term actions for 2015 to further reduce the health risk in communities near freight hubs. Similar to the CFMP, ARB's Strategy also recognizes the value of keeping California's ports and logistics industry competitive; improving mobility to support the delivery of products locally and to other states and countries; creating jobs in California and training local workers to support the new transport system; and increasing energy security.

ARB's Initiative strives to be consistent with and complement other planning efforts taking place at the State and local level, including the CFMP, CSRP, CTP 2040, and regional transportation plans throughout California.[22]

Regional Goods Movement Plans

In addition to Regional Transportation Plans, which address both the transportation of people and goods, many regional and sub-regional agencies have also developed plans to more specifically address freight issues and identify measures and projects to sustain the movement of goods throughout their regions. Table 6, below, provides links to the various regional plans that have recently been completed. In the development of the CFMP, Caltrans has directly incorporated or referenced information from these regional freight plans when applicable; and anticipates that future development of regional freight plans will collaboratively consider and reflect the statewide priorities established in the CFMP. The CFMP's Appendices, particularly B-5, B-6 and B-7, provide region-specific information regarding freight transportation.

TABLE 6. CALIFORNIA REGIONAL GOODS MOVEMENT PLANS

Regional Agency	Goods Movement Plan	Link to Plan
Alameda County Transportation Commission (ACTC)	Currently under development with MTC	http://www.alamedactc.org/goodsmovement
Association of Monterey Bay Area Governments (AMBAG)	Central Coast California Commercial Flows Study	http://www.dot.ca.gov/dist05/planning/pdf/CentralCoastFreightFlowsStudyFinalReport.pdf
Metropolitan Transportation Commission (MTC)	Update currently under development with ACTC	http://www.mtc.ca.gov/planning/rgm/
North State Super Region	North State Transportation for Economic Development Study	http://www.mendocinocog.org/pdf/North%20State%20Report_10-2-13.pdf
Sacramento Area Council of Governments (SACOG)	Currently under development	Pending
San Diego Association of Governments (SANDAG)	2050 Goods Movement Strategy	http://www.sandag.org/index.asp?classid=13&subclassid=96&projectid=443&fuseaction=projects.detail
San Joaquin Valley Regional Transportation Planning Agencies (SJV RTPA)	San Joaquin Valley Interregional Goods Movement Plan	http://www.sjvcogs.org/goods.html
Southern California Association of Governments (SCAG)	On the Move: Southern California Delivers the Goods	http://www.freightworks.org/DocumentLibrary/CRGMPIS%20-%20Final%20Report.pdf

SECTION 2: FREIGHT SYSTEM ASSETS, CONDITION, PERFORMANCE, AND FORECAST

CHAPTER 2.1

FREIGHT SYSTEM ASSETS

INTRODUCTION

California has the most extensive, complex, interconnected freight system in the nation. The system is the result of more than a century of innovative and cooperative private and public investment. With the opening of the first transcontinental railroad in 1869, California's economic connection with the rest of the nation was solidified. Since then, the connection has been strengthened to create an unparalleled freight system that, in 2012, transported approximately 155.1 million tons of freight valued at $684.5 billion, including international imports, to the rest of the United States. The current core freight system includes:

- Twelve deep water seaports (11 private and 1 public),
- Numerous private port and terminal facilities,
- Twelve airports with major cargo operations,
- Two Class I railroads and twenty-six short-line railroads operating over approximately 6,000 miles of railroad track,
- Approximately 5,800 center-line miles of high-traffic-volume interstate and state highways,
- Three existing and one future commercial land border ports of entry (POE) with Mexico,
- Intermodal transfer facilities,
- Approximately 19,370 miles of hazardous liquid (includes crude oil, refined petroleum products, and other highly volatile liquids) and natural gas pipelines,
- A vast warehousing and distribution sector, and
- Numerous local connector roads that complete the "last mile."

This extensive freight system requires an enormous and continuous investment to maintain and modernize. Ports and their navigation channels must be dredged for ever-larger ships; railroad track must be upgraded to handle heavier loads and faster trains; highway pavement must be strengthened to handle more trucks and more cargo; airports must balance passenger and air freight demands; and innovative technologies must be developed and applied across the entire

industry to improve efficiency and reduce costs. These daunting needs must be met at the same time that community and environmental impacts are reduced and, where possible, eliminated. Doing all of this, while maintaining California's international competiveness and retaining millions of freight-related jobs, is a challenge that must be met.

California's freight assets include an extensive inventory of infrastructure essential for supporting the multitude and diversity of the state's freight-dependent industries. The smooth functioning of the system depends on a series of interconnected facilities working in concert. Each component is typically owned and operated by a different public or private organization, often in competition with others. Seaports compete for domestic and international business. The Class I railroads that serve California are the nation's two largest railroads and are competitors; yet, they coordinate their operations and often share the same track. As with California's railroads, each trucking company competes with many others in the state, as well as with logistics firms and owner/operators. Yet, the system works remarkably well due to a network of cooperative relationships and partnerships. With the size and complexity of the state's freight system, there are many opportunities to improve efficiency and reduce community and environmental impacts.

MAP-21 AND THE NATIONAL AND PRIMARY FREIGHT NETWORKS

The Federal Highway Administration is in the process of establishing a National Freight Network (NFN) that consists of interstate highways, selected state highways, and specified local roads. It is not yet clear what the network will include. A less extensive Primary Freight Network (PFN) based on statutory criteria, is also being established (see Figure 19 and Appendix F) that will consist of approximately 30,000 centerline miles of the most critical freight roadways. In part, MAP-21 requires the designation of this network to "assist States in strategically directing resources toward improved system performance for efficient movement of freight on highways, including the national highway system, freight intermodal connectors, and aerotropolis transportation systems."

The NFN is described as a three-tiered network that includes:

1. The PFN, described as most critical to the movement of freight;
2. The portions of the interstate system not designated as part of the primary network; and
3. Critical rural freight corridors (CRFC), described as rural principal arterial roadways that have a minimum of 25 percent of the annual average daily traffic (AADT) of the road, measured in passenger-vehicle-equivalent units from trucks (FHWA Vehicle Class 8 to 13); that provide access to energy exploration, development, installation, or production areas; that connect to the primary freight network or Interstate System, and handle

more than 50,000 twenty--foot equivalent units (TEUs) per year or 500,000 tons of bulk commodities per year.

The NFN may also include critical urban freight corridors (CUFC) that are yet to be identified following pending guidance from FHWA. The NFN seeks to identify the priority freight infrastructure that is essential to supporting the nation's domestic movement of freight and provides connections for exports to and imports from world markets. The designation of this freight network is the first of its kind within the US and demonstrates the increasing national emphasis on freight transportation. Significant intermodal facilities, freight rail facilities, seaports, airports, and international land ports of entry have been acknowledged as key national facilities by FHWA; however, these facilities are not included in the PFN or the NFN. It is expected that future federal authorizations of the Surface Transportation Program will expand the network to not only include a corridor approach with more critical highway and local road freight corridors, but will also reflect the full multimodal nature of the freight system to include all relevant non-highway components such as rail, port, and intermodal facilities. The FHWA identified a potential PFN network of 41,000 centerline miles that includes intermodal connections to critical freight facilities and closes most of the network gaps identified within the 27,000 (ultimately 30,000) centerline mile network (see Figure 19 and Appendix F, Network Assets).

The PFN was designated based on the following statutory criteria:

- Origins and destinations of freight movement within the United States;
- Total freight tonnage and value of freight moved on highways;
- Percentage of annual average daily truck traffic (AADTT) in the average daily traffic on principal arterials;
- AADTT on principal arterials;
- Land and maritime ports of entry;
- Access to energy exploration, development, installation, or production areas;
- Population centers; and
- Network connectivity.

FIGURE 19. DRAFT NATIONAL HIGHWAY PRIMARY FREIGHT NETWORK – 27,000 MILES

CALIFORNIA'S PORTION OF THE NATIONAL FREIGHT NETWORK

California's Department of Transportation (Caltrans), as well as other state departments of transportation, promoted the inclusion of its significant freight roadway facilities into the NFN, specifically for inclusion into the PFN. It is unknown at this time how many centerline miles for California's freight facilities will be included in the final PFN or NFN. The NFN will include all of California's current interstate facilities, a subset of California's State Highway System (SHS), and some of California's critical rural freight corridors (CRFC). FHWA will leave the identification and designation of the CRFC to the states, based on established criteria. However, California and other states that have significant agricultural and extractive industries are seeking to expand the provisions of the CRFC designation to include consideration of routes with high seasonal peak truck traffic. California is also seeking the official designation of freight connections to Native American Trust Lands.

TABLE 7. FHWA PRIMARY FREIGHT NETWORK (PFN) ROUTES - DRAFT

Route	Centerline Miles	Route	Centerline Miles
State Highway/Interstate Routes			
I-10	234.74	SR 118	8.19
I-105	12.97	SR 120	5.59
I-110	17.4	SR 134	2.39
I-15	288.47	SR 14	23.45
I-205	12.96	SR 170	5.96
I-210	48.38	SR 22	9.88
I-215	41.1	SR 23	6.6
I-238	2.16	SR 4	3.37
I-305	2.95	SR 47	1.89
I-40	148.17	SR 55	9.32
I-405	70.73	SR 57	19.34
I-5	716.73	SR 58	101.45
I-580	32.24	SR 60	61.32
I-605	27.46	SR 71	3.63
I-680	27.4	SR 710	2.11
I-710	20.55	SR 78	1.24
I-8	13.96	SR 86	24.27
I-80	156.87	SR 91	58.74
I-805	26.67	SR 99	298.14
I-880	41.78	US 101	168.81
SR 111	12.55	US 50	12.53
Local Roads			
Miramar	5.15		
Totals		**Centerline Miles**	
State Highway/Interstate		2,784.46	
Local Road		5.15	
California		2,789.61	

Source: FHWA - Draft 27K PFN Table

In the draft PFN, California has approximately 2,790 centerline miles along all or some of 43 routes, (see Table 7 and Figures 21 through 24). This total includes 1,274 centerline miles located within 23 urban areas with populations of 200,000 or greater, and 1,515 centerline miles outside those urban areas (FHWA-27k PFN Tables). Due to the very large volume of freight transported on the state's highways and the State's large geographic extent, California received the nation's largest share of the draft PFN mileage –approximately 10 percent of the total. The draft PFN also recognizes two of California's commercial land border POEs – Otay Mesa in San Diego County and Calexico East in Imperial County, although they are not specifically included in the PFN.

The California freight facilities represented in the draft PFN include major south/north and west/east freight corridors traversing much of the state. While the draft PFN is expansive in California, it does not include all of the state's primary freight regions or major freight facilities, there are numerous gaps throughout the state. Specifically, the network is absent from the North Coast, Central Coast, and the Eastern Sierra (see Figure 21). The draft PFN also stops short of including many of California's major freight facilities, including the POEs in San Diego and Imperial Counties. Freight facilities located in California's primary freight regions that are absent from the draft PFN, as well as gaps statewide, are represented in the Highway Freight Network.

FIGURE 20. I-710, LEAVING THE PORTS OF LOS ANGELES AND LONG BEACH

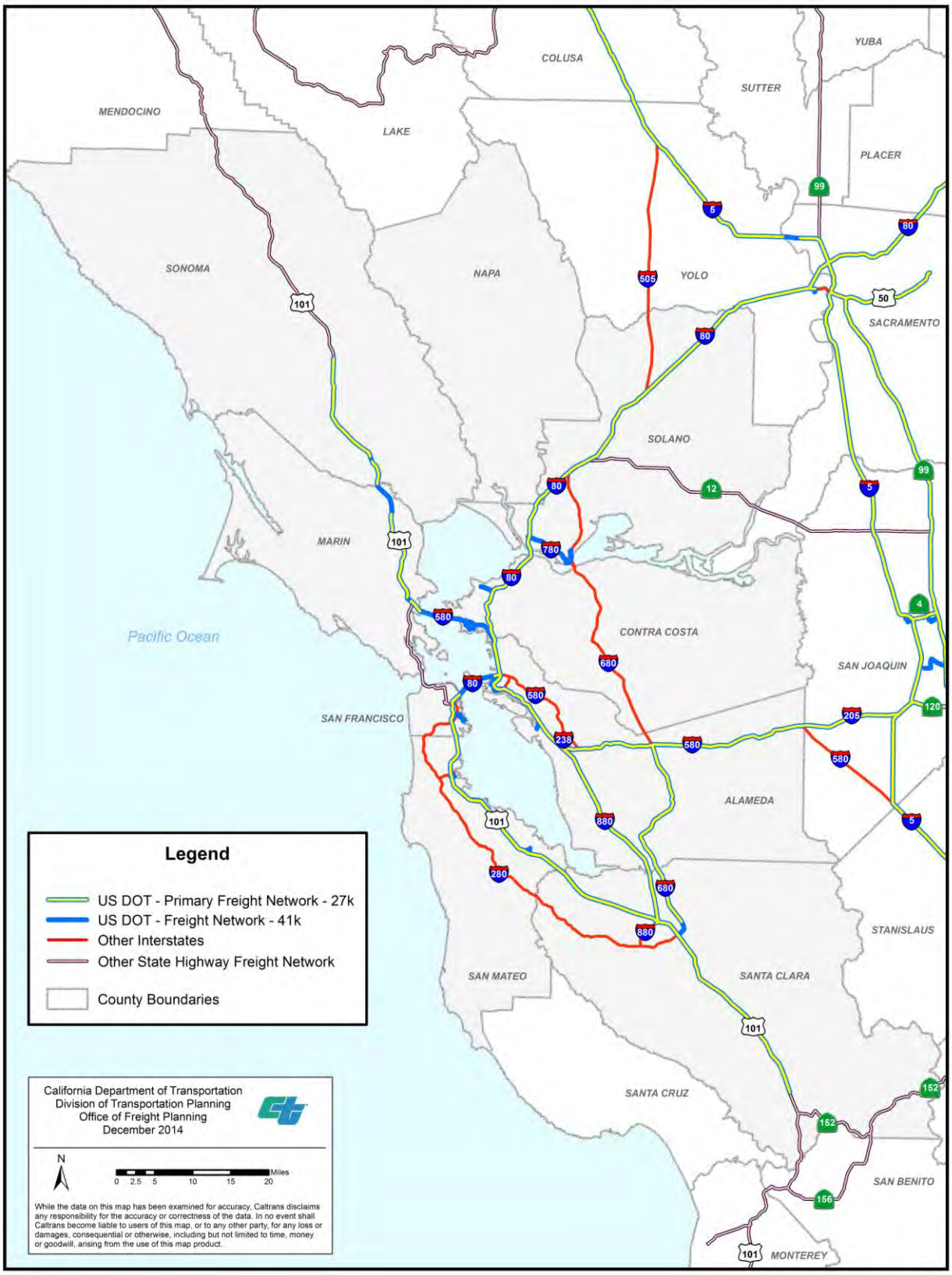
Source: Caltrans

The short-term benefit of inclusion of California's freight infrastructure in the national network is an increase in federal funding to 90 percent for any project included in the CFMP and certified by the Secretary of Transportation to improve the efficient movement of freight, and to 95 percent for such projects that also are on the Interstate system. The anticipated long-term benefit of including California's freight infrastructure in the national network is that it makes a strong case for freight transportation improvements on these routes if future federal surface transportation authorizations include federal funds for freight. Also, these higher-volume freight facilities could be given higher priority for environmental mitigation programs, such as new engine and fuel technologies and operational strategies.

FIGURE 21. HIGHWAY FREIGHT NETWORK

Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 22. HIGHWAY FREIGHT NETWORK – SAN FRANCISCO BAY AREA AND DELTA REGION

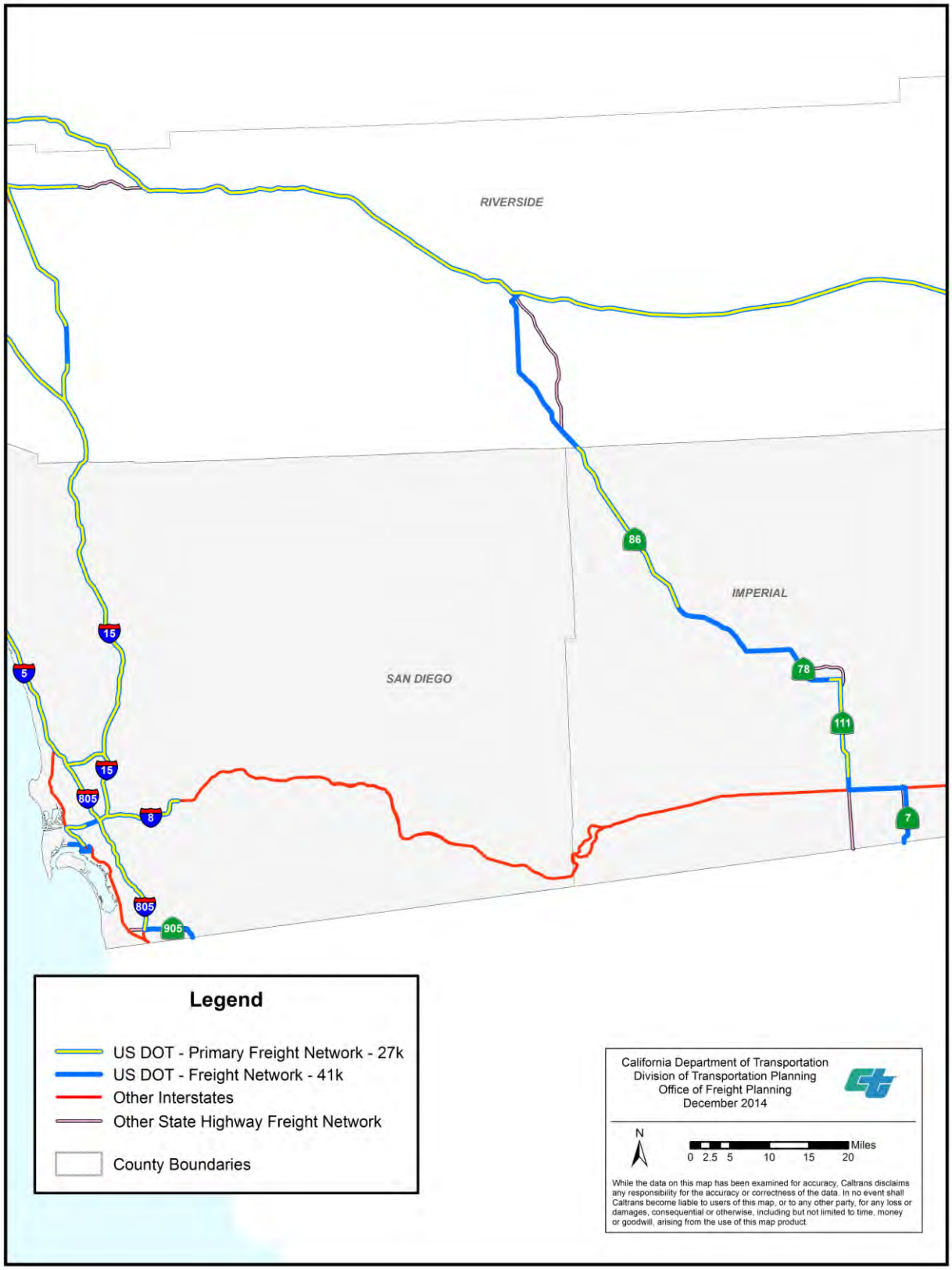


Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 23. HIGHWAY FREIGHT NETWORK – SOUTHERN CALIFORNIA

Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 24. HIGHWAY FREIGHT NETWORK – BORDER REGION



Source: Caltrans, Division of Transportation Planning (DOTP)

CALIFORNIA'S MULTIMODAL STATE FREIGHT SYSTEM

TABLE 8. HIGHWAY FREIGHT NETWORK ROUTES

Route	Centerline Miles	Route	Centerline Miles
Highway/Interstate Routes			
I-10	238.30	**SR 152**	83.68
I-105	17.55	**SR 156**	24.15
I-110	20.63	**SR 170**	6.09
I-15	288.47	**SR 198**	47.71
I-205	14.33	**SR 20**	155.95
I-210	74.50	**SR 22**	10.00
I-215	54.98	**SR 23**	6.83
I-238	2.23	**SR 29**	30.86
I-280	57.51	**SR 299**	138.19
I-380	2.06	**SR 36**	10.16
I-40	154.63	**SR 4**	4.12
I-405	72.52	**SR 41**	81.33
I-5	796.23	**SR 44**	106.73
I-505	32.98	**SR 46**	63.63
I-580	76.46	**SR 47**	2.24
I-605	27.64	**SR 49**	22.66
I-680	70.50	**SR 53**	7.45
I-710/SR 710	24.81	**SR 55**	11.87
I-780	6.88	**SR 57**	24.12
I-8	170.07	**SR 58**	141.50
I-80	204.08	**SR 60**	71.39
I-805	28.73	**SR 66**	0.74
I-880	45.87	**SR 7**	7.36
I-980	2.03	**SR 70**	52.54
SR 1	1.04	**SR 71**	3.69
SR 103	1.59	**SR 78**	6.30
SR 111	21.89	**SR 86**	69.97
SR 118	8.19	**SR 905**	8.54
SR 112	48.97	**SR 91**	59.46
SR 120	6.38	**SR 99**	359.77
SR 134	2.61	**US 101**	807.99
SR 14	117.96	**US 395**	556.83
SR 149	5.54	**US 50/I-305**	18.15
Local Roads			
Miramar Road	5.15	**Figueroa Street**	0.17
Dillon Road	1.51	**W. Willow Street**	0.89
Intermodal Connectors			
Intermodal Connector Mileage*			64.01

Totals	Centerline Miles
Highway/Interstate	**5,700.15**
Local Road	**7.72**
Intermodal Connectors	**64.01**
California	**5,771.88**

**For specific routes see Intermodal Connections section*

Source: Caltrans DOTP, FHWA Draft 27K and 41K Tables

HIGHWAY FREIGHT NETWORK

In 2013, California's State Highway System (SHS) included approximately 15,133 centerline highway miles, of which 2,453 are Interstate and 12,680 non-Interstate, for a total of 50,486 lane miles. The Highway Freight Network is a subset of the SHS that includes all of California's existing Interstate facilities (excluding those where trucks are not permitted, such as a portion of I-580 in Alameda County), the Interregional Transportation Strategic Plan (ITSP) "Focus Routes," and a subset of the SHS that receives Average Annual Daily Truck Traffic (AADTT) – traffic from trucks with 3 to 5+ axles – of 3,000+.

The Highway Freight Network also includes highway corridors that serve agricultural regions with high seasonal truck traffic that do not, when averaged throughout the year, reach the 3,000 AADTT thresholds. However, during the agricultural season, these corridors typically experience truck traffic that exceeds the 3,000+ threshold on a daily basis. The network includes rural routes that connect to the PFN for the interregional movement of freight; serve mining and timber production areas; or provide access to energy exploration, development, installation, or production areas. Taken collectively, the Highway Freight Network represents the routes of most critical importance to the movement of freight within and through the state.

The California Highway Freight Network incorporates all of the freight facilities that FHWA has determined to have significance for freight movement at the national level, including the draft 27,000 PFN, as well as other highway and non-highway facilities that are significant to the movement of freight within the State and facilities that provide connectivity to locations outside the State such as gateways. The network includes a total of approximately 5,772 centerline highway miles along all or some of 68 Interstate and SHS routes, significant local roadways, and intermodal connectors (see Table 8 and Figures 21 through 24). For the SHS, these facilities represent the freight network that is able, or at build-out would be able, to accommodate 3-to-5+-axle trucks consistent with the configurations outlined within the Federal Surface Transportation Assistance Act of 1982 (STAA).

Federal Surface Transportation Assistance Act

The Federal Surface Transportation Assistance Act of 1982 (STAA) authorized the establishment of a national network of highways designated for use by large trucks. On these highways, Federal width and length limits apply. The National Network (NN) includes almost all of the Interstate Highway System and other, specified non-Interstate highways. The network comprises more than 200,000 miles of highways. In 1983, California passed Assembly Bill 866 to implement the STAA provisions. AB 866 also increased the "California Legal" vehicle length from 60 to 65 feet, and its width from 8.0 to 8.5 feet. Caltrans then evaluated State highways, and designated as "Terminal Access" those with geometric standards high enough to accommodate STAA trucks.

In 1986, California passed Senate Bill (SB) 2232, which increased the maximum kingpin-to-rear-axle (KPRA) length from 38 feet to 40 feet for trailers with two or more axles. SB 2232 also directed Caltrans to determine which State highways could not safely accommodate trucks with a 40-foot KPRA length. In December 1989, Caltrans completed the report to the Legislature, "Truck Kingpin-To-Rear Axle Length State Highway System Evaluation." The report states that, of the 15,166 miles comprising the State Highway System, 3,364 miles cannot accommodate a 40-foot KPRA length, and 3,185 miles cannot accommodate a 38-foot KPRA length. Those route segments that cannot accommodate a 40-foot KPRA were designated "Advisory." In California, STAA truck routes and associated terminal access routes are the only roads that can operate the largest combination of tractor-trailer trucks without a special permit.

In addition to the nationally identified freight network, the State has identified a set of high priority US Highway and State Routes that are critical to the interregional movement of freight. Portions of those routes, such as Routes 58 and 99, have been included in the proposed PFN, but many other routes that the State views as a priority for freight investment are not included in the PFN. Those routes have been added to the highway freight network as depicted in Figures 21 – 24 and listed in Table 8. Many of these additional routes are included in the State's Interregional Transportation Strategic Plan that identifies a sub-set of 93 interregional State Routes that are particularly important for interregional freight movement.

FIGURE 25. TRUCK WITH OVERSIZED LOAD

Source: Caltrans, DOTP, Geographic Information Systems (GIS)

While not specifically outlined in this section, California's State Freight System also includes significant local arterials and intermodal connectors that are essential to connecting intermodal freight facilities with the State's Highway Freight and Freight Rail. In creating the NFN, the FHWA has solicited advice from States on how to designate these urban freight routes. The

urban freight routes will be added to this plan via an amendment once the federal designation process is completed.

Trucking is the most commonly used mode for California's freight transportation and almost all freight is transported by truck during some point within the supply chain. For this reason the trucking industry is one of California's most valuable freight assets, particularly for the "first and last mile" of a trip. California must continue to develop, maintain, and operate a safe, efficient, and reliable freight transportation network to accommodate the truck volumes necessary to move freight within the state. (For additional information, please see Appendix B-2 California Trucking Factsheet.)

Freight Rail Network

The freight railroad system in California is comprised of two Class I railroads and 26 short-line railroads. This freight rail network supports the operations of industries throughout the state and links California with domestic and interregional markets. The system is depicted in Figures 29 through 31. Railroads are grouped into three classes – Class I, Class II, and Class III – based on their annual operating revenue. Class I railroads generate in excess of $433.2 million in annual operating revenues. There are no Class II railroads operating in California at this time. Class III railroads are commonly referred to as "short-line" railroads. Class III railroads generate less than $31.9 million in operating revenue.

FIGURE 26. CAJON SUMMIT

Source: Courtesy BNSF Railway Company

The two Class I railroads operating in California are the Union Pacific Railroad (UPRR) and the BNSF Railway Company (BNSF). UPRR is the largest railroad in California in number of employees, payroll, and track miles operated. UPRR operates an expansive network of rail lines that serves diverse regions of California, including the agriculturally rich San Joaquin Valley, the Port of Oakland, the San Francisco Bay Area, and the Los Angeles metropolitan area. UPRR also provides strategic freight rail movement to California's Central Coast, as it parallels the US 101 highway corridor. For its carload services, UPRR operates two system classification yards at West Colton in Southern California and Roseville in Northern California, three regional yards in Lathrop (San Joaquin County), Commerce (Los Angeles County), and Yermo (San Bernardino County), and a railport in Oakland (Alameda County). UPRR also has shared use with BNSF of the on-dock rail terminals at the Port of Los Angeles (POLA) and Port of Long Beach (POLB). UPRR operates nearly 3,288 miles of track within California. In 2011, it handled nearly three million carloads in California. Table 9 includes the key operating statistics. For additional information please see the California Railroad Factsheet located in Appendix B-1.

The BNSF Railway Company is the largest intermodal carrier in the US and is the product of mergers and acquisitions of nearly 400 railroad lines, including two major railroads (Burlington Northern Railroad and the Atchison, Topeka, and Santa Fe Railway). Within California, BNSF operates on more than 2,000 track miles. In 2011, over 1.6 million BNSF carloads originated, and another 1.6 million terminated, in the state. Major BNSF freight hubs include 11 carload yards (including its major facility at Barstow), five dedicated intermodal terminals, and the shared on-dock rail facilities at the POLA and POLB. Along with the on-dock terminals, significant BNSF intermodal facilities in California include off-dock terminals at the Hobart Yard near downtown Los Angeles, the San Bernardino Intermodal Yard, and the Oakland International Gateway near-dock terminal in Oakland. California serves as a gateway to the railroad's transcontinental corridor, which links the POLA and POLB with Chicago.

TABLE 9. CLASS I RAILROAD OPERATING CHARACTERISTICS IN CALIFORNIA

Name	Employees	Payroll (Millions of Dollars)	Track Miles Owned	Track Miles w/Trackage Rights	Total Miles Operated	Originating Carloads	Terminating Carloads
BNSF	2,983	$210	1,155	975	2,130	1,636,623	1,669,449
UPRR	4,741	$400	2,773	515	3,288	1,423,857	1,510,030

Source: 2013 California State Rail Plan

To shippers, the ability to use short-line railroads means lower transportation costs, more flexible local service options, and a greatly expanded market reach for local products through their Class I railroad partners. Without short-line railroads, businesses would be forced into more expensive truck transloads (freight transfer between modes or from smaller to larger

trailers), which typically take place in large cities and add more trucks on an already congested metropolitan highway system. Short-line railroad direct access to industrial, mining, commercial, and agricultural processing facilities enables shipment of loads that are too heavy for trucks to transport over the highway. For many companies, access to short-line railroads is critical to the viability of their business.

California has 26 active short line railroads (two of which are primarily operating passenger trains). This includes 18 short line and 8 switching and terminal railroads operating over 823 route-miles (CSRP 131). Figures 29 through 31 depict California's freight rail network, including the short line railroads that currently provide freight service in California. For additional information please see the California Short Line Railroad Factsheet located in Appendix B-1.

In addition to freight trains, the freight rail network also accommodates the operation of passenger trains throughout the State. In the past, the main freight rail lines had excess capacity to allow the use of passenger trains with little impact to freight services. In recent years, the number of passenger service train trips along many of these shared-use rail corridors has substantially increased. This increase, along with increased numbers and length of freight trains has resulted in a primary railroad network that is operating with far less slack capacity. The majority of current shared-track operations involve passenger services operation over tracks owned by BNSF and UPRR. These operations include all three State-supported routes (portions of the *Pacific Surfliner*, *San Joaquin* and *Capitol Corridor*) and the four Amtrak long-distance trains operating in the state, as well as several commuter services, such as Metrolink, Caltrain, and the Altamont Commuter Express.

FIGURE 27. INTERMODAL RAIL ACTIVITY

Source: Caltrans DOTP

On-dock and near-dock rail facilities play an integral role in the movement of cargo from the dock to rail yards. On-dock facilities are located within a marine port terminal, allowing containers to be moved directly from the dock to the railcar. On-dock terminals handle a significant number of containers (1.84 million lifts in 2010), with volumes projected to reach 6.3 million lifts by 2035. Through its elimination of truck drayage, on-dock rail intermodal transfer is perhaps the most efficient way to handle trainloads of international intermodal containers. Near-dock terminals (facilities that are within a five-mile radius of the port terminal) are essential for providing additional container handling capacity that minimizes long-distance drayage trips. Off-dock intermodal facilities are rail yards located more than five miles from port terminals. They provide substantial capacity for handling port-related (international) containers as well as domestic containers (both transloaded international cargo and pure domestic cargo) and trailers. Containers that are transferred from ships to train via truck drayage are almost all routed to out-of-state locations. There is a concerted effort in California to reduce drayage trips to rail yards and to move the activity as close to the ports as possible.

The freight rail network in California includes a number of significant intermodal rail terminals. Intermodal rail terminals are established to facilitate transfer of containers and trailers between modes (ship to rail, truck to rail, and vice versa). In California, the majority of intermodal rail traffic is associated with the Port of Oakland, POLA, and POLB. A sizeable, but smaller volume, is related entirely to North American Free Trade Agreement (NAFTA) traffic. Intermodal service is typically described as either container-on-flat car or trailer-on-flat car (TOFC). In California, all primary intermodal corridors have sufficient vertical clearances for double-stack service. Double-stacking is not possible with TOFC due to the lack of structural strength in truck trailers and height restrictions along rail corridors due to tunnels and bridges. Table 10 identifies the facility characteristics for the intermodal terminals within California.

TABLE 10. INTERMODAL RAIL FACILITY CHARACTERISTICS

Name	Facility Type	Railroad	Data Year	Existing Yard Capacity (Lifts)	Future Proposed/ Planned Capacity (Lifts)
Southern California					
City of Industry	Off-Dock	UPRR	2010	232,000	1,000,000
East Los Angeles	Off-Dock	UPRR	2010	650,000	1,250,000
Hobart	Off-Dock	BNSF	2010	1,700,000	3,000,000
Intermodal Container Transfer Facility (ICTF)	Near-Dock	UPRR	2010	822,200	1,500,000
Los Angeles Transportation Center (LATC)	Off-Dock	UPRR	2010	340,000	900,000
POLA/POLB On-Dock Intermodal Facilities	30 feet	BNSF/UPRR	N/A	N/A	
San Bernardino	Off-Dock	BNSF	2010	660,000	660,000
Northern California					
Fresno (FRESCA)	Inland	BNSF	N/A	N/A	

Lathrop	Inland	UPRR	Design Capacity	730,000
Oakland International Gateway (OIG)	Near-Dock	BNSF	Current	300,000
Railport-Oakland	Near-Dock	UPRR	Current	450,000
Stockton/Mariposa	Inland	BNSF	Design Capacity	300,000

Source: 2013 California State Rail Plan

Positive train control (PTC) is an advanced technology designed to automatically stop or slow a train to avoid collisions and other incidents. The Rail Safety Improvement Act of 2008 (RSIA) set a major infrastructure safety mandate for the installation of PTC rail technology on Class I railroads that handle poisonous-inhalation hazardous (PIH) materials, as well as on main lines where commuter rail or intercity passenger services are regularly provided (USDOT – FRA). The deadline for the RSIA I December 2015, but due to the complexity of installing PTC, rail operators are seeking an extension. Further discussion of PTC is provided in Chapter 3.5.

FIGURE 28. RAIL ACTIVITY

Source: Port of Long Beach

FIGURE 29. MAJOR FREIGHT FACILITIES – STATEWIDE

Airports with Major Cargo Operations
Bob Hope (Burbank) Airport (BUR)
Fresno Yosemite International Airport (FAT)
John Wayne / Orange County Airport (SNA)
LA/Ontario International Airport (ONT)
Long Beach Municipal Airport (LGB)
Los Angeles International Airport (LAX)
Norman Y. Mineta San Jose International Airport (SJC)
Oakland International Airport (OAK)
Sacramento International Airport (SMF)
Sacramento Mather Airport (MHR)
San Diego International Airport (SAN)
San Francisco International Airport (SFO)

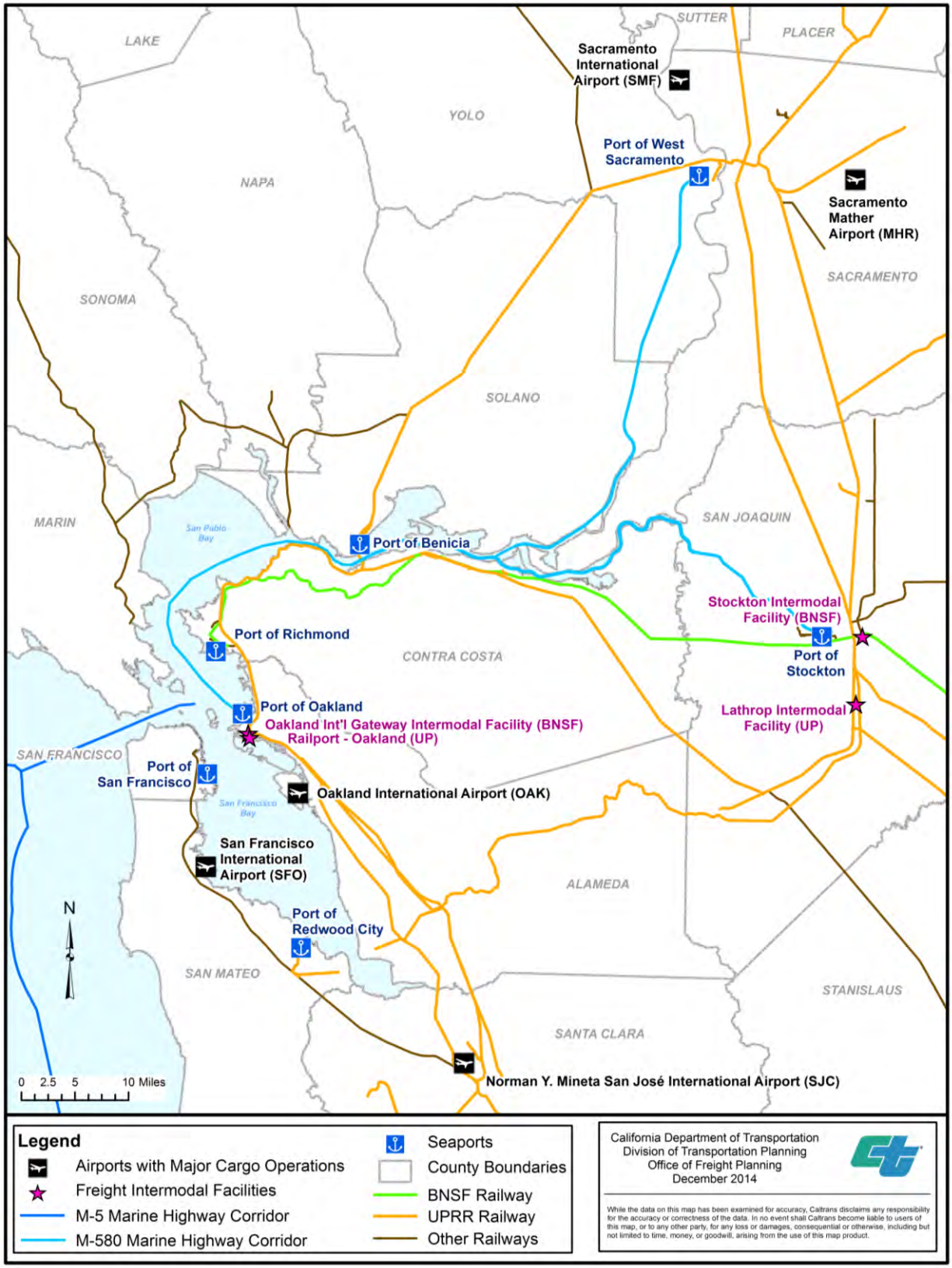
Ports of Entry	Route	County
Calexico East	7	Imperial
Otay Mesa	905	San Diego
Otay Mesa East (future)	11 (unconstructed)	San Diego
Tecate	188	San Diego

Freight Intermodal Facilities	City	County
City of Industry Intermodal Facility (UP)	City of Industry	Los Angeles
Fresno Intermodal Facility	Fresno	Fresno
Hobart Yard (BNSF)	Los Angeles	Los Angeles
Lathrop Intermodal Facility	French Camp	San Joaquin
Los Angeles Intermodal Facility (UP)	City of Commerce	Los Angeles
Los Angeles Transportation Center (UP)	Los Angeles	Los Angeles
Oakland International Gateway Intermodal Facility (BNSF)	Oakland	Alameda
On-Dock Intermodal Facility (PHL)	Wilmington	Los Angeles
Railport - Oakland (UP)	Oakland	Alameda
San Bernardino Intermodal Facility (BNSF)	San Bernardino	San Bernardino
Stockton Intermodal Facility	Stockton	San Joaquin
UP Long Beach ICTF	Long Beach	Los Angeles

Seaports
Port of Benicia
Port of Hueneme
Port of Humbolt Bay
Port of Long Beach
Port of Los Angeles
Port of Oakland
Port of Redwood City
Port of Richmond
Port of San Diego
Port of San Francisco
Port of Stockton
Port of West Sacramento

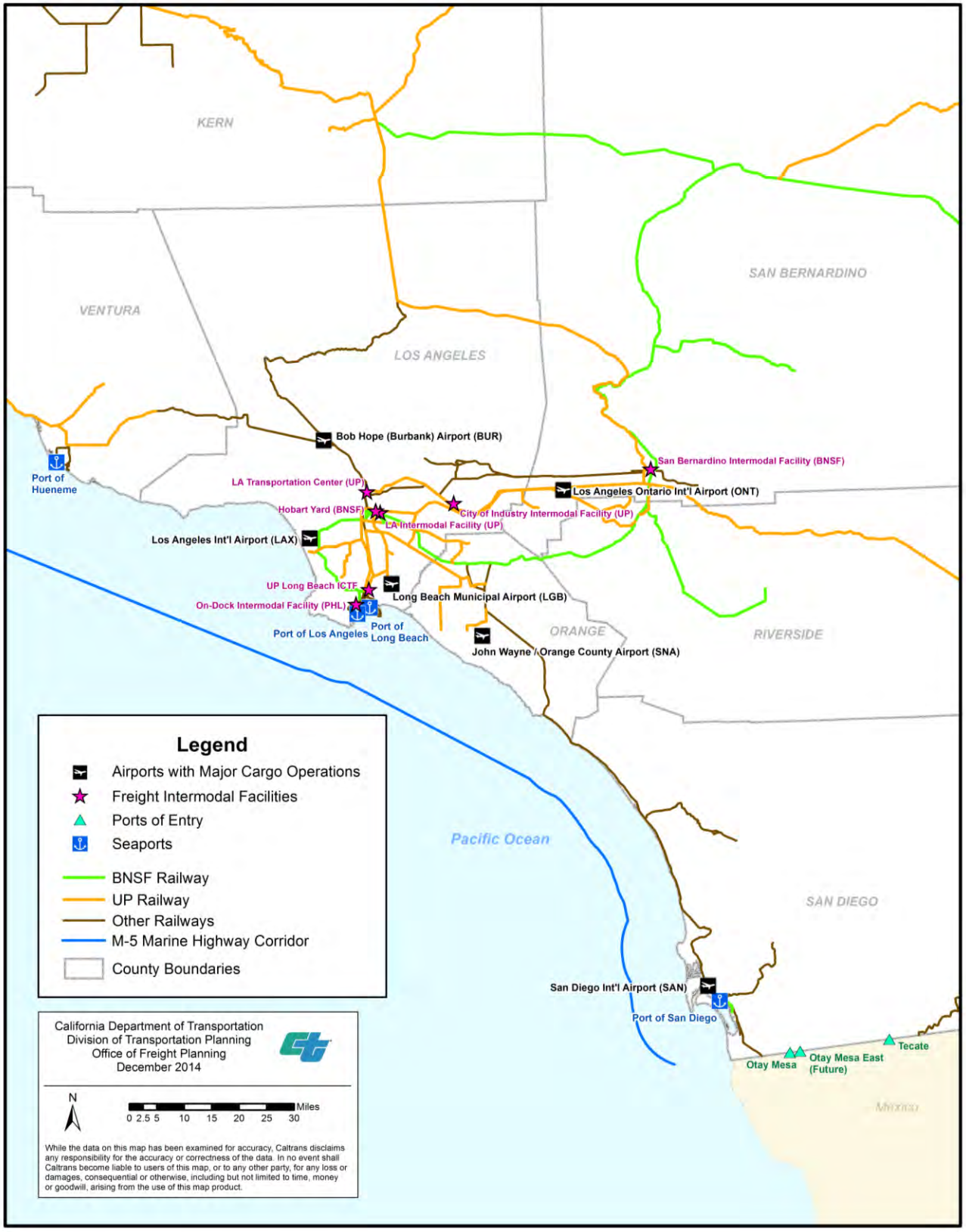
Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 30. MAJOR FREIGHT FACILITIES – SAN FRANCISCO BAY AREA AND DELTA REGION



Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 31. MAJOR FREIGHT FACILITIES – SOUTHERN CALIFORNIA



Source: Caltrans, Division of Transportation Planning (DOTP)

SEAPORTS

Seaports are the linchpin of California's international trade. They are California's freight gateways to the world. The Multimodal State Freight System includes 12 deep water seaports that can accommodate transoceanic vessels. Eleven of these are publically owned and one, the Port of Benicia, is privately owned. The deep water seaports include two inland ports with access to the ocean via the Sacramento/San Joaquin Delta: the Ports of Stockton and West Sacramento (see Table 11 below and Figures 29 though 31). The ports have different navigable channels and berth depths, therefore, there is variance in the sizes of ships and ship draft they can accommodate. All of the ports, with the exception of the Humboldt, utilize on-dock or near-dock rail infrastructure in conjunction with their terminal operations to connect with the national rail network. A factsheet for each port can be found in Appendix B-4.

TABLE 11. PUBLIC AND PRIVATE DEEP WATER SEAPORTS

Seaport	Acres	Rail Access	Highest Value Exports	Highest Value Imports
San Diego	6,000*	On-Dock	Machinery, Metals, Autos/Parts, Heavy Equipment, Food Products	Vehicles, Perishables, Construction Materials, Heavy Equipment
Long Beach (POLB)	3,200	On-Dock	Petroleum Coke and Bulk, Waste Paper, Chemicals, Scrap Metal	Crude Oil, Electronics, Plastics, Furniture, Clothing
Los Angeles (POLA)	4,200	On-Dock	Wastepaper, Animal Feeds, Scrap Metal, Cotton, Resins	Furniture, Apparel, Automobile Parts, Electronic Products
Hueneme	375	Near-Dock	Autos, Produce, General Cargo	Autos, Produce, Liquid Fertilizer, Bulk Liquid
Redwood City	120	On-Dock	Iron Scrap	Aggregates, Sand, Gypsum
San Francisco	1,000+	Near-Dock	Tallow, Vegetable Oil	Steel Products, Boats/Yachts, Wind Turbines, Project Cargo, Aggregate, Sand
Oakland	1,210	Near-Dock	Fruits and Nuts, Meats, Machinery, Wine and Spirits	Machinery, Electronics, Apparel, Wine and Spirits, Furniture
Richmond	200	Near-Dock	Vegetable Oils, Scrap Metal, Coke, Coal, Aggregate, Zinc, Lead	Autos, Petroleum (crude/refined), Bauxite, Magnetite, Vegetable Oils
Stockton	2,000	On-Dock	Iron Ore, Sulfur, Beet Pellets, Coal, Wheat	Liquid Fertilizer, Molasses, Bulk Fertilizer, Cement, Steel Products, Ammonia
Benicia	645	On-Dock	Petroleum Coke	Automobiles
West Sacramento	480	On-Dock	Agricultural and Industrial Products	Agricultural and Industrial Products
Humboldt Bay	-----	N/A	Logs, Wood Chips	Logs, Petroleum, Wood Chips

**Acreage includes land and water.*

Source: SCAG Regional Goods Movement Plan

The four largest deep water seaports in California are Los Angeles, Long Beach, Oakland, and San Diego. All four are included within the top 50 US Containership Ports in 2013 (see Table 12 on the next page). In addition to containerized freight, these seaports handle a variety of cargo including petroleum coke, crude oil, break bulk, bulk, heavy equipment, machinery, roll-on/roll-off cargoes, and many others (see Table 11 above).

TABLE 12. CALIFORNIA'S FOUR TOP RANKING CONTAINERSHIP PORTS FOR NORTH AMERICA 2011 (THOUSANDS OF TEUS)

Port	Rank	Total	Export	Import
Los Angeles	1	6,011	1,954	4,057
Long Beach	2	4,318	1,294	3,024
Oakland	5	1,539	799	740
San Diego	26	52	2	49
Total Top-4		11,920	4,049	7,870

Source: Research and Innovative Technology Administration, U.S. D.O.T. Freight Statistics 2013

FIGURE 32. CONTAINER SHIPS AT PORT

Source: Port of Los Angeles

The Port of Los Angeles, number one in national container volume, and the Port of Long Beach, number two in national container volume, together make up the largest container port complex in the US. They are often referred to as the San Pedro Bay Ports. In 2010, these two ports,

combined were the world's eighth busiest port complex by container volume (SCAG 3-17). The San Pedro Bay Ports along with the Port of Oakland, California's third largest seaport and the nation's eighth largest container port, have sufficient depths to accommodate the largest vessels currently in operation and even larger vessels that are being developed. The remaining seven deep water seaports are smaller in size and scale, specializing in the transport of specific types of cargo, such as dry bulk, break bulk, liquid bulk, construction materials, fresh fruit and produce, automobiles, and other commodities. Table 11 contains some key characteristics of each seaport.

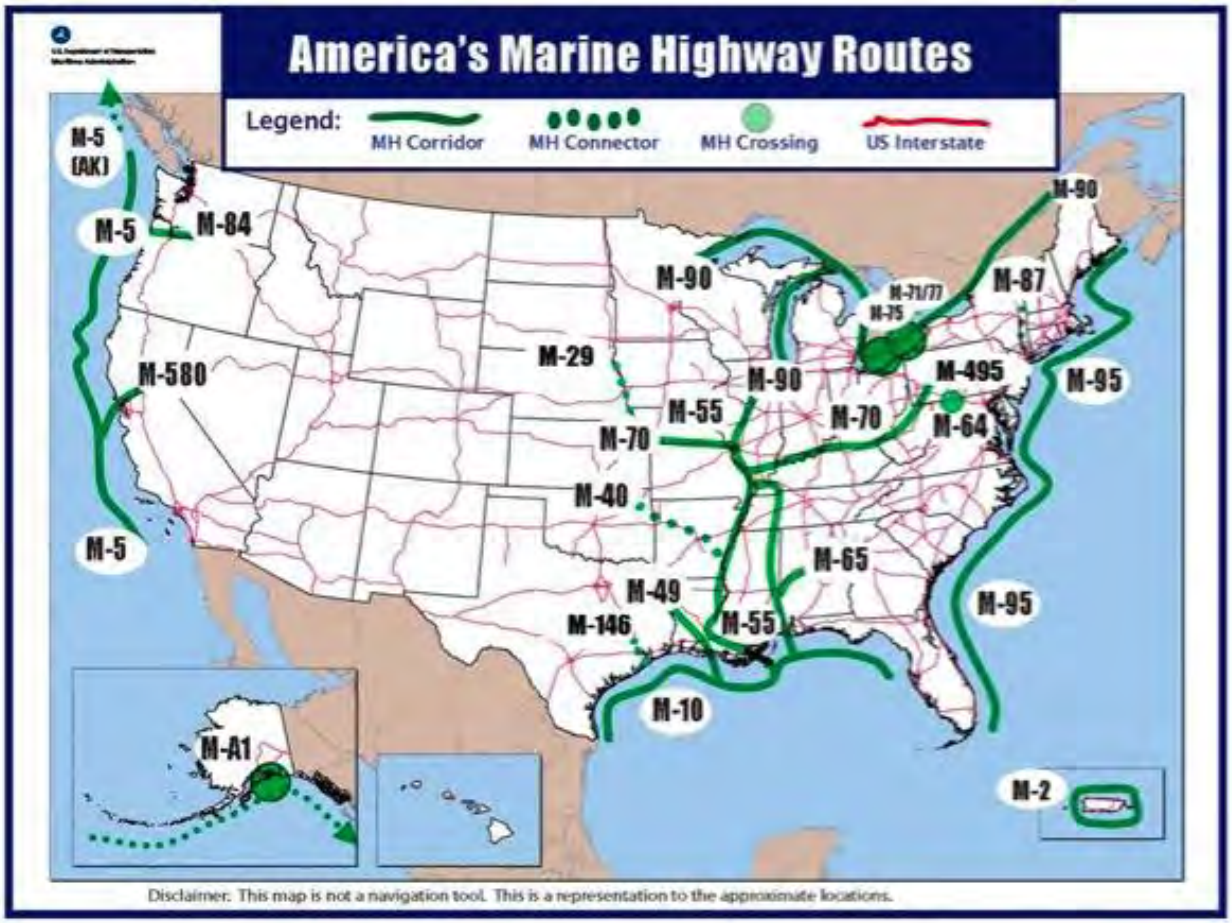
FIGURE 33. PORTS OF LOS ANGELES AND LONG BEACH

California's seaports are extraordinary multimodal facilities that have a tremendous mix of public and private entities, each with its own set of industry responsibilities. This requires efficient interaction between the public and private sectors to meet the needs of the port as a whole. The strength of California's seaports depends on a complex public-private partnership approach for investment in both capital and operational improvements within the seaport complex, including compliance with environmental and safety regulations. Generally, California's seaports are owned by public port authorities that develop port facilities which are then leased to private marine terminal operators and stevedoring companies. Marine terminals load and unload cargo from ships at berth and then receive or discharge that cargo to and from landside trucking and rail operations. This requires a tremendous amount of coordination among all of the parties involved, and all parties must work together toward improvements in efficiency and productivity to minimize delays in the supply chain, stay competitive in both the national and global economies, and reduce or eliminate environmental and community impacts of freight.

In addition to the eleven publically owned deep water seaports, California has one private deep water seaport, the Port of Benicia, and a multitude of privately owned and operated port and terminal facilities, both small- and large-scale, which help to facilitate maritime freight movement along California's coast and to and from interstate and international markets. These private freight facilities handle a variety of cargo that include dry bulk materials, metals, bulk liquids, construction materials, vehicles, electronics, crude oil, petroleum products, and many others.

Consistent with the America's Marine Highway Program developed by the US Department of Transportation Maritime Administration (MARAD), California has been exploring the use of "Marine Highways" that allow freight to be shipped between ports and harbors using navigable waterways instead of landside and highway and rail facilities. Marine Highways can free-up rail capacity and will ultimately reduce truck traffic on already congested parallel highways and further reduce freight-related greenhouse gas (GHG) emissions. Within California, there are two Marine Highways, the M-580 and the M-5 (see Figure 34). The M-580 Marine Highway Corridor is currently suspended due to insufficient demand. When in operation, it carries shipments of containers and bulk goods between the Ports of Oakland and Stockton. The Port of West Sacramento is a partner in the M-580 corridor but has not yet developed container transport services. MARAD is working with California, Oregon, and Washington, to explore development of the M-5 Marine Highway Corridor to help alleviate freight related congestion and garner other benefits along Interstate 5 from the California–Mexico border region in San Diego to the US–Canada border north of Seattle, Washington.

FIGURE 34. MARINE HIGHWAY CORRIDOR



Source: US DOT, Maritime Administration

AIRPORTS

More than 200 airports participate in the movement of air freight in the state of California. Air cargo is shipped both domestically and internationally. Air cargo is usually high in value and particularly time sensitive. The volume and value of freight transported differs dramatically for each airport. The California Multimodal State Freight system includes the 12 busiest major cargo airports, by volume, as detailed in Table 13 (below) and depicted in Figures 29 through 31.

TABLE 13. LEADING AIRPORTS WITH MAJOR CARGO OPERATIONS BY VOLUME (METRIC TONS)

Code	Airport	City	Total Cargo Tonnage 2011	Total Cargo Tonnage 2010	Percent Change
LAX	Los Angeles International Airport	Los Angeles, CA	1,688,351	1,819,344	-7.2%
OAK	Oakland International Airport	Oakland, CA	499,365	510,598	-2.2%
SFO	San Francisco International Airport	San Francisco, CA	381,887	432,488	-11.7%

ONT	Ontario International Airport	Ontario, CA	378,727	379,486	-0.2%
SAN	San Diego International Airport	San Diego, CA	128,282	120,453	6.5%
SMF	Sacramento International Airport	Sacramento, CA	65,326	66,659	-2.0%
BUR	Burbank (Bob Hope) Airport	Burbank, CA	46,259	45,131	2.5%
SJC	Mineta San Jose International Airport	San Jose, CA	39,946	44,783	-10.8%
MHR	Sacramento Mather Airport	Sacramento, CA	37,331	37,481	-0.4%
LGB	Long Beach Airport	Long Beach, CA	25,609	25,816	-0.8%
SNA	Santa Ana (John Wayne) Airport	Santa Ana, CA	14,296	13,474	6.1%
FAT	Fresno Yosemite International Airport	Fresno, CA	10,000	8,749	14.3%
	Total - Top 12		**3,315,379**	**3,504,462**	**-5.4%**

Source: California Air Cargo Groundside Needs Study (2013) and listed sources

FIGURE 35. LOADING OF AIR CARGO

Source: Caltrans DOTP

As indicated in Table 13 above, many of California's largest airports with major cargo operations saw negative growth from 2010 to 2011. The exceptions were SAN, BUR, SNA, and FAT. The total cargo tonnage transported by the top 12 cargo airports declined by 5.4 percent overall. The key challenges facing California's air cargo include modal shifts to trucking, addressing the air freight leakage to other states, the shifting of manufacturing from Asia back to North America (and Europe), and the Panama Canal expansion. Four of California's busiest airports are listed in the top 30 cargo airports for North America. Table 14 on the next page identifies these airports and their rankings.

TABLE 14. CALIFORNIA'S FOUR TOP RANKING AIRPORTS WITH MAJOR CARGO OPERATIONS FOR NORTH AMERICA 2011

Airport	Rank	Airport Code	City	Total Cargo (tons)
Los Angeles International Airport	5	LAX	Los Angeles, CA	1,681,611
Oakland International Airport	13	OAK	Oakland, CA	483,375
San Francisco International Airport	17	SFO	San Francisco, CA	382,019
LA/Ontario International Airport	18	ONT	Ontario, CA	378,782

Source: California Air Cargo Groundside Needs Study(2013) and listed sources

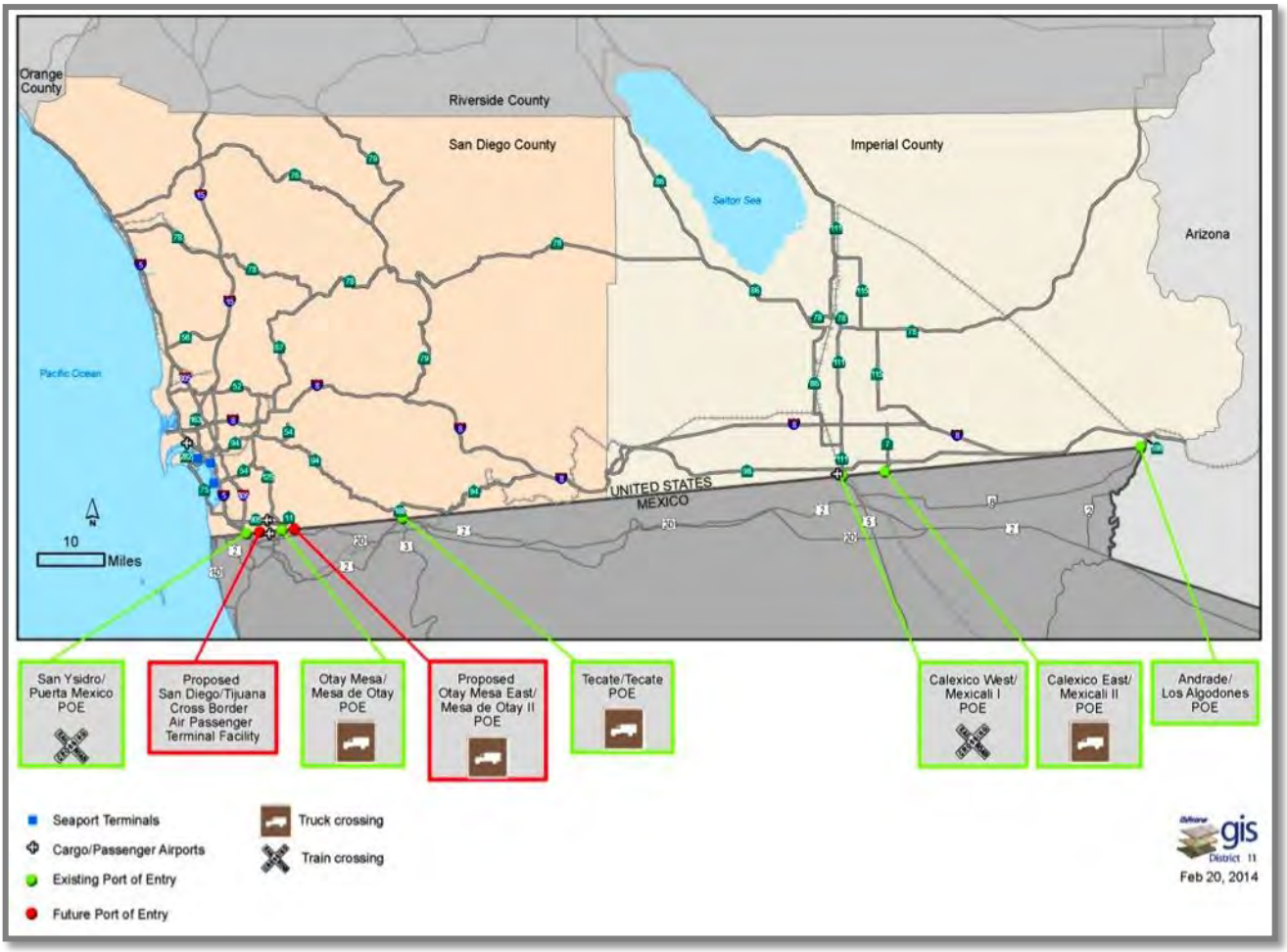
The California Air Cargo Goundside Needs Study (2013) found that the 12 airports at which cargo activities are currently focused should have the individual capacity to address their own future cargo growth. Although some new development or redevelopment will eventually be needed, there are no specific projects currently identified by the airports as critical to accommodating long-term cargo growth.

While California's largest cargo airports appear to have the capacity to handle modest increases in freight movement in the near term, the importance of ground transport of freight to and from cargo airports is a key consideration. Access to airport cargo facilities and transportation to nearby cargo handling and transloading facilities takes place over local roads. Many of these roads are located in dense, high-traffic areas and were not designed to accommodate 53-foot trailers. It is expected that the most critical of these access roads will be included in the critical urban freight corridors (CUFC) pending FHWA guidance, but it is not clear yet what the designation will entail or how it may help address landside congestion issues.[23]

International Border Crossings

California and Mexico share over 130 miles of international border consisting of the southernmost portions of San Diego and Imperial Counties. According to the US Census Bureau, Mexico was California's top trading partner in 2013 and the third largest trading partner of the US. The commercial land border points of entry (POEs) are the main arteries for freight movement between the two nations. California's multimodal state freight system includes all of the existing and proposed commercial land border POEs between California and Mexico, which include Otay Mesa (SR 905), Otay Mesa East (SR 11) – a future commercial land border POE that is under development, Tecate (SR 188 and SR 94) in San Diego County, and Calexico East (SR 7) in Imperial County.

FIGURE 36. CALIFORNIA – MEXICO LAND BORDER PORTS OF ENTRY



Source: Caltrans District 11 GIS

The Otay Mesa POE in San Diego County and the Calexico East POE in Imperial County are the two main California-Mexico freight gateways. The Otay Mesa POE is the third busiest commercial land-border POE on the US-Mexico border by trade value, and the busiest commercial land port in California. Some of the commodities transported between the California and Mexico through the POE include pulp, paper, and allied products; electrical machinery, equipment, and supplies; automobiles and light-duty trucks; and food and farm products. The future Otay Mesa East POE will be accessed on the California side by a tolled highway (SR 11) and is scheduled to open in 2017. This new POE will help reduce freight and passenger traffic congestion at the Say Ysidro, Otay Mesa, and Tecate POEs, as well as provide additional capacity for future growth by offering freight operators traversing the California-Mexico border a new alternative. These commercial land-border POEs are discussed in more detail in Chapter 3.7, California-Mexico Border.

INTERMODAL CONNECTIONS

Intermodal connections are an essential consideration in the discussion of freight movement within California. These connections provide access to facilities that allow efficient transloading freight from one mode to another. Intermodal connectors are generally associated with airports, seaports, rail yards, and warehousing facilities where transfer of freight is completed on-site. Access to and from these facilities is typically located along local roadways that connect to Interstate and State Highway freight corridors and serve as the "last mile" for freight movement.

Often, these local arterials and roadways have not been designed to accommodate the largest combination vehicles and are not designated STAA routes, nor are they engineered to accommodate the amount of AADTT that exists on the roadway. Some of the roadways have among the highest AADTTs in the state. Many of the environmental and community impacts from freight can be most prevalent along these local intermodal connectors (see Chapter 3-5). There are approximately 29 freight intermodal connectors included in the Multimodal State Freight System (see Table 15). A table of the federally recognized National Highway System (NHS) intermodal connectors (including non-freight) within California is included in Appendix F, Network Assets.

TABLE 15. FREIGHT INTERMODAL CONNECTORS

ID	Facility Name	Description	Centerline Miles
CA1A	Burbank - Glendale Airport	Thornton Ave. (Airport to Buena Vista), Buena Vista St. (Thornton to I-5)	0.88
CA29P	Port of Long Beach	Ocean Blvd. (Port to SR-710), 9th/10th St. (Santa Fe to Pico), Pico Ave. (9th/10th to Ocean Blvd.), Santa Fe (Anaheim to 9th), Anaheim St. (Santa Fe to Alameda)	3.38
CA30P	Port of Los Angeles	Seaside Ave./Rte. 47: LB City limits e/o Navy Way to beginning of Rte. 47. N. Front St.: Rte. 47 to John S Gibson Blvd. Harry Bridges Blvd. ('B' St.): Figueroa St. to Alameda St.; Alameda St.: Harry Bridges Blvd. ('B' St.) to Anaheim St.	2.85
CA31P	Port of San Francisco	Cargo Way (Jennings to 3rd), 3rd St. (Cargo Way to Cesar Chavez), Cesar Chavez St. (3rd St. to Rte. 101) - (Cargo Way proposed)	2.10
CA32P	Port of Oakland	Maritime St. (7th to W Grand Ave), W Grand Ave. (Maritime to I-880), 7th St. (Maritime to I-880)	1.96
CA33P	Port of Richmond	Harbor Way (Terminal to I-580). Canal Blvd. (Terminal to I-580)	1.85
CA34P	Port of West Sacramento	Enterprise Blvd. (Industrial Rd. to I-80), Industrial Blvd. (Enterprise Blvd. to Harbor Blvd.), Harbor Blvd. (Industrial Blvd. to US50)	0.40
CA35P	Port of Redwood City	Seaport Blvd. (Port to Rte. 101). Bloomquist St. (Seaport Blvd. to Maple), Maple St. (Bloomquist to Facility)	1.26
CA36P	Port Hueneme	Hueneme Rd. (Port to Los Pasos), Los Pasos (Hueneme to US 101). Ventura Rd. (Hueneme to Channel Island), Channel Island Blvd. (Ventura to Victoria), Victoria Ave. (Channel Island to US 101)	20.45
CA37P	Port of San Diego	Pacific Hwy. (Laurel to NSC Compound), Grape St. (Pacific Hwy. to I-5), Hawthorne St. (Pacific Hwy. to I-5), Broadway (Pacific Hwy. to 11th), 11th St. (Broadway to I-5)	3.13
CA39P	Channel Islands Harbor	Victoria Ave. (Terminal to Rte. 101) mileage include in CA36P	1.02

ID	Facility Name	Description	Centerline Miles
CA3A	Los Angeles Intl. Airport	Century Blvd. (Sepulveda to I-405), Aviation Blvd. (Century Blvd. to I-105), La Cienega Blvd. (Century to I-105), Imperial Hwy. (La Cienega to Sepulveda), Sepulveda Blvd. (Century to I-105), 104th St.	1.02
CA40P	Port of Benicia	Bayshore Rd. (Port to Park), Park Rd. (Bayshore to Industrial), Industrial Way (Park to I-680)	2.30
CA41P	Port of Stockton	Harbor St. (Terminal to Fresno), Fresno Ave. (Harbor to Navy), Navy Dr. (W. Washington to Charter Way), Charter Way (Navy to I-5), @ Washington St. (Navy to Fresno)	1.28
CA4A	Oakland International Airport	Airport Dr. (Hegenberger to Doolittle), Hegenberger Dr. (Doolittle to I-880), 98th Ave. (Airport Dr. to I-880)	1.04
CA5A	Ontario International Airport	Archibald Ave. (Airport to Rte. 10), Vineyard Ave. (Airport to Rte. 10)	1.06
CA60R	Fresno TOPC Rail Yard	North Ave. (Facility to Rte.99)	0.50
CA61R	Long Beach (Carson) Rail Yard	Sepulveda Blvd. (Facility to Rte. 47)	0.70
CA62R	Oakland Rail Yard	Middle Harbor Rd. (7th St. to I-880)	1.18
CA63R	Lathrop Rail Yard	E. Roth Rd. (Lathrop Rail Yard IFC Airport Way to I-5), Airport Way (E. Roth Rd. to French Camp Rd.), French Camp Rd. (Airport Way to Rte. 99)	4.21
CA64R	LA (Nr. Union Station)	Lamar St. (Station to N Main), N. Main St. (Lamar to Daly), Daly St. (N. Main to N. Mission), Mission Rd. (Daly to I-5). Ave 20 (N. Main to N. Broadway), N. Broadway (Ave. 20 to I-5)	1.54
CA65R	Richmond Rail Yard	Canal Blvd. (Facility to Rte. 580)	0.18
CA66R	LA ATSF Rail Yard	Washington Blvd. (Hobart Yard to I-710). Shelia St. (Arrowmile to Atlantic), Atlantic Blvd. (Shelia to Bandini), Bandini Blvd. (S. Downey to I-710) - Connector 2 is proposed)	1.41
CA67R	Stockton Rail Yard	Anderson St. (Facility to Diamond St), Diamond St. (Anderson to Mariposa Rd), Mariposa Rd. (Diamond St to Rte 99), Charter Way (Diamond St to Rte 99)	1.59
CA68R	San Bernardino Rail Yard	2nd St. (I-215 to Mt Vernon), Mount Vermont (4th St to Rialto), 4th St. (Mt Vernon to 5th), Rialto Ave. (Mt Vernon to Sidewinder Mountain Rd.)	1.73
CA69R	City of Industry Rail Yard	Azusa Ave. (Anaheim-Puente Rd. to SR 60), (Anaheim - Puneta Rd. to Arenth Ave.). Fullerton Rd. (Arenth Ave. to SR 60)	0.99
CA78R	UPS - Richmond Terminal	Atlas Rd. (Facility to Richmond Pkwy.), Richmond Pkwy. (Atlas to I-80)	1.83
CA7A	Lindbergh Field - San Diego	N. Harbor Dr. (Terminal to W. Laurel St.), W. Laurel St. (N. Harbor Dr to I-5)	1.56
CA8A	San Francisco Intl. Airport	San Bruno Ave. (US 101 to Airport Entrance)	0.61
Totals			
Intermodal Connectors		Centerline Miles	
28		64.01	

Source: FHWA 41K PFN Intermodal Connectors Table

Native American Roadway Network

The 2010 US Census reported 723,225 American Indians residing in California (includes Alaska Natives). This includes notable populations in every county within the State. There are 110 federally recognized Native American Tribal Governments in California. These are sovereign nations with jurisdiction over their respective Tribal lands. The Indian Reservation Roads (IRR) program established in 1928 funds maintenance, construction, and improvement of IRR routes that do not receive state funding through federal-aid funding (CA IRR Tech Report).

Currently, FHWA is assigned oversight of the IRR program and is responsible for determining available funding to allocate to the Bureau of Indian Affairs (BIA) for projects on the IRR system (CA IRR Tech Report). Many of California's Tribal lands are accessed from, or served directly by, the SHS—including routes identified within the State Highway Freight Network. Future study is needed to: 1) determine what role the IRR system plays in the movement of freight to and from the tribal lands of California, 2) identify which IRR routes, or portions of routes, are already on California State Freight Highway Network, 3) collect goods movement data on the IRR system, and 4) determine how the IRR system supports freight movement within the state as a whole. For more information regarding the Tribal freight issues please see Chapter 3.1.

Pipeline Network

The US Energy Information Administration (EIA) reported in June 2014 that California is one of the Nation's top producers of crude oil and ranks third in petroleum refining capacity, accounting for approximately one-tenth of the US production and refining capacity. California's crude oil and refined petroleum network consists of crude oil and petroleum product pipelines, refineries, terminals, and petroleum ports (see Figure 37). The crude oil pipelines connect California's production areas to refining centers in Los Angeles, the Central Valley, and the San Francisco Bay Area. These refineries are then connected through petroleum product pipelines to refineries and terminals throughout the US. Most of the gasoline imported into California enters by ship via the San Pedro Bay Ports and the San Francisco Bay Area Ports.

According to the EIA, California is second in the nation in the use of natural gas. California's natural gas is largely delivered through the Western Region Natural Gas Pipeline Network (see Figure 38). The main conduits of natural gas to California are the El Paso Natural Gas Company system and Transwestern Pipeline Company system in the southern regions of the State, and the Gas Transmission Northwest Company's interstate system in the northern regions of the state. The southern region systems originate in Texas and parallel each other as they traverse New Mexico and Arizona to deliver large portions of their capacity to California's largest natural gas companies at the state's eastern border. The northern region system delivers Canadian natural gas through Washington and Oregon to California's northern border. California's natural

gas network consists of pipelines, along with the processing plants, terminals, and storage facilities that support the transportation of this important energy resource. In 2012, the estimated natural gas gathering and transmission pipeline in California totaled approximately 11,996 miles (PHMSA). The intrastate transportation and distribution of natural gas in California is dominated by three providers: the California Gas Transmission Company (PG&E) (3,477 miles), the Southern California Gas Company (SoCal) (1,887 miles), and the San Diego Gas and Electric Company (EIA).

Future study is needed to determine which elements of the pipeline network should be included in the California Multimodal State Freight System. Figures 37 and 38 depict California's crude oil and petroleum pipelines and facilities, and the natural gas pipelines and facilities.

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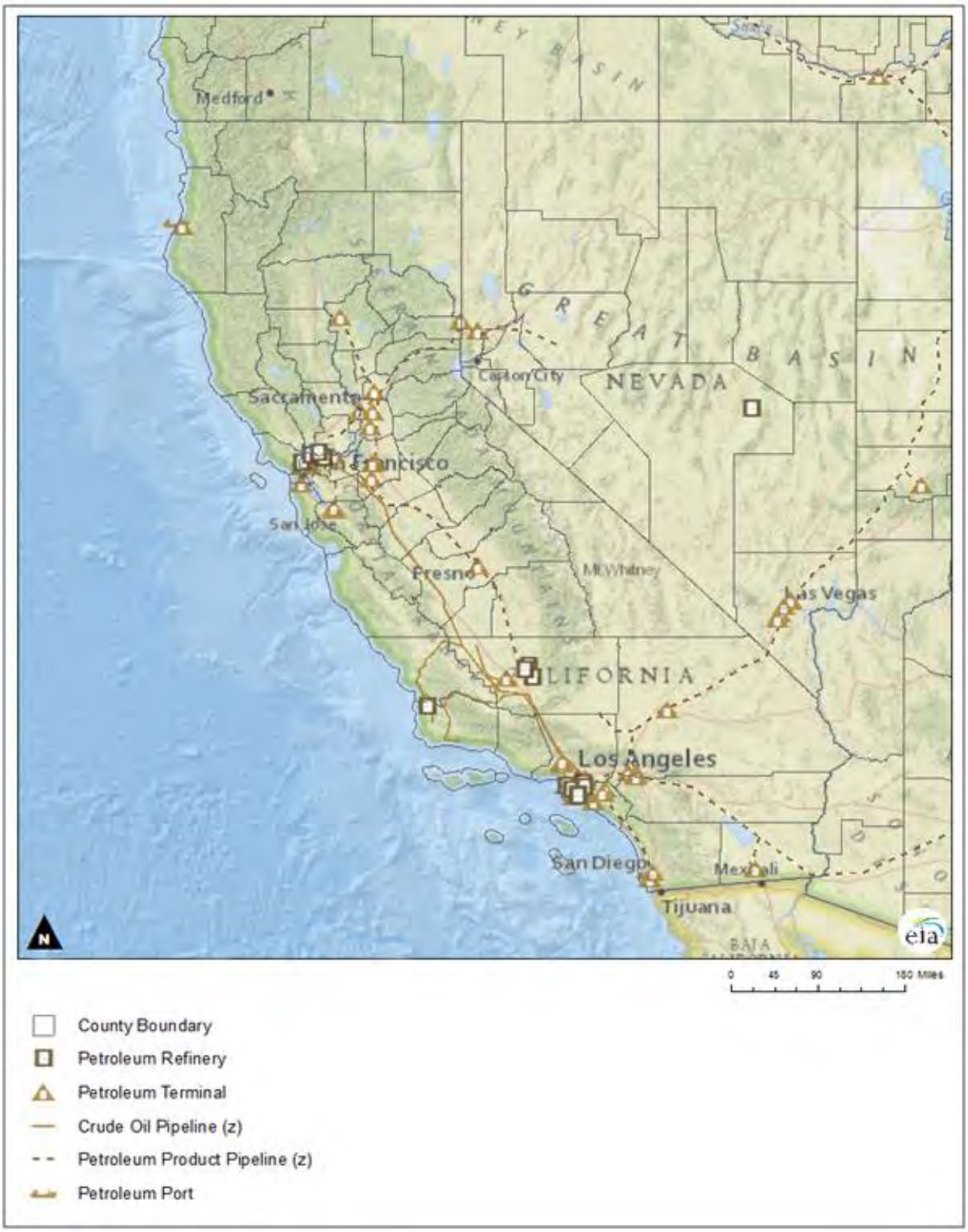
FIGURE 37. OIL AND PETROLEUM PIPELINES AND FACILITIES



Source: EIA Interactive GIS Mapping

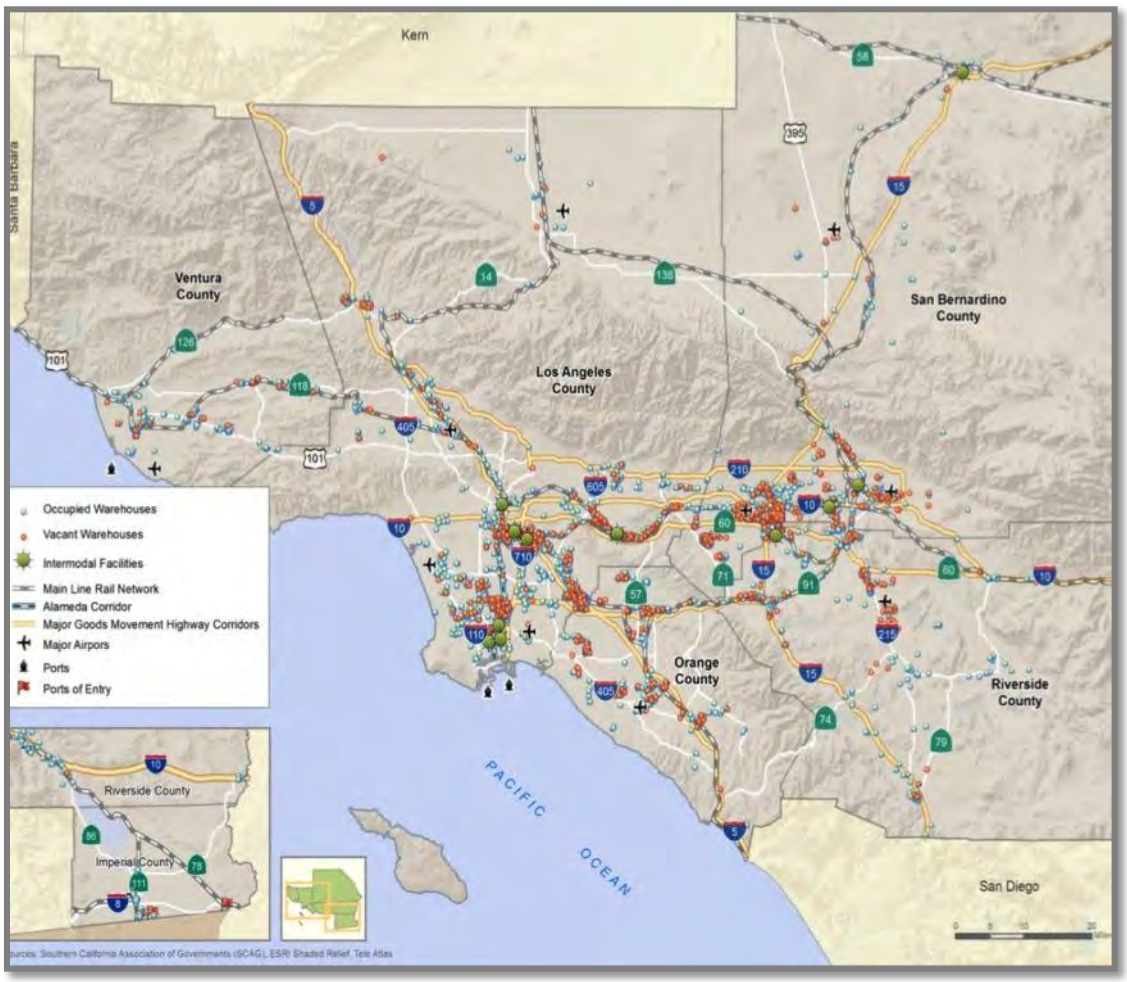
FIGURE 39. NATURAL GAS PIPELINES AND FACILITIES

Source: EIA Interactive GIS Mapping

Warehousing and Distribution Facilities

According to the February 2013 report, "On the Move, Southern California Delivers the Goods" by Southern California Association of Governments (SCAG), "Warehousing and distribution facilities have become an increasingly important component of the global supply chain infrastructure and the integration of these facilities with the rest of the goods movement infrastructure is critical to supply chain performance." The warehousing and distribution sector is particularly important to freight movement in Southern California. The region contains a comprehensive warehousing and distribution network that, based on 2008 SCAG data, comprises approximately 1.02 billion square feet of warehousing land (79.6 percent occupied and 20.4 percent available) and approximately 836 million square feet of warehousing facilities (82.9 percent occupied and 17.1 percent available). Figure 39 depicts the occupied and available warehousing in the Southern California Association of Governments (SCAG) Region.

FIGURE 39. OCCUPIED AND AVAILABLE WAREHOUSE IN THE SCAG REGION



Source: SCAG Regional Goods Movement Study

These facilities provide a variety of functions, including cargo storage, cross-docking, and value-added services (such as sorting, labeling, tagging, etc.). While the lion's share of California's warehousing and distribution activities occur in Southern California, significant facilities exist in other parts of the State as well, particularly the northern San Joaquin Valley.

The California Multimodal State Freight System does not include specific warehousing and distribution regions or centers. Because the warehousing and distribution sector is essential to supporting the efficient movement of freight within and through the State, and the success of these sectors directly impacts the economic competitiveness of the state and the nation, **the CFMP recommends that a statewide assessment of warehousing capacity and distribution be conducted and its findings included in the next state freight plan or as an amendment to this Plan.**

Multistate Corridor Coordination

California is participating in key multistate, multimodal corridor initiatives that include planning and implementation of corridor management and operational strategies aimed at facilitating effective and efficient movement of freight and passengers. These coordination activities seek to plan for, manage, rehabilitate, and operate these corridors collaboratively, while aiding in identification of funding for capital and operational improvements. These efforts consist of the Interstate 15 (I-15) Mobility Alliance, the West Coast Corridor Coalition, the M-5 Marine Highway Corridor, and the Interstate 80 (I-80) Corridor Coalition, and the I-80 Winter Operations Coalition.

Interstate 15 Mobility Alliance

The Interstate 15 (I-15) Mobility Alliance is a multistate cooperative alliance between California, Nevada, Arizona and Utah that has developed a long-range multimodal corridor master plan to address current and future mobility needs along the I-15 corridor. The alliance includes public and private entities seeking to find multimodal solutions for improving the movement of people and freight along the corridor. The I-15 corridor is important for goods movement within California, and for transporting freight from Southern California's international gateways to the eastern US. The I-15 Corridor System Master Plan (I-15 CSMP) identifies emerging technologies and integrated corridor management approaches that allow the partnering states to work collaboratively and enhance communications between traffic management centers and traffic operation centers to benefit the entire corridor. The I-15 Mobility Alliance received funding under the Multistate Corridor Operations and Management (MCOM) program to help execute the I-15 Dynamic Mobility Project (I-15 DMP), which "seeks to obtain, exchange, and disseminate real-time data on all segments of I-15 and all modes, to create a seamless ITS backbone from San Diego to the Utah/Idaho Border".[24] This project is currently in the second phase of implementation.

FIGURE 41. I-15 DYNAMIC MOBILITY PROJECT

Source: Multistate I-15 Dynamic Mobility Project Webpage

Marine 5 Highway Corridor

The Marine 5 (M-5) Highway Corridor is a multistate partnership between California, Oregon, and Washington. The partnership works with seaports, harbors, and a variety of freight stakeholders in all three states to further explore development of a Marine Highway corridor that will help alleviate freight congestion along Interstate 5 from the California–Mexico border to the Washington–Canada border. Additional discussion on the M-5 Highway Corridor is located in the Seaports section of this Plan, page 97.

Interstate 80 Corridor Coalition

Interstate 80 (I-80) is an east/west transcontinental route that traverses the entire nation, from San Francisco, California, to Teaneck, New Jersey. The Coalition began as a multistate partnership between California, Nevada, Utah, and Wyoming, extending from San Francisco to Cheyenne, Wyoming. It has expanded to include Nebraska. The Coalition is developing the I-80 Corridor System Management Plan (I-80 CSMP) that seeks to identify current and future mobility and operational solutions to transportation deficiencies and to enhance livability throughout the corridor. The effort includes a Freight and Logistics working group that seeks to investigate all issues relevant to the topic of freight mobility and the I-80 corridor. The Corridor Coalition, through the I-80 CSMP, is working collaboratively with the I-80 Winter Operations

Coalition to coordinate operations on the I-80 corridor in the Western US. The coordination includes the use of emerging technologies and integrated corridor management approaches to enhance communications between Traffic Management Centers and Traffic Operation Centers, and improve capabilities to deploy real-time weather information for freight transportation operators.

The I-80 Corridor Coalition was awarded funding under the Multistate Corridor Operations and Management (MCOM) program to help execute an operations platform to allow multiple states access to real-time and operational winter travel information, distribute multistate road impact information to truckers, and enhance corridor coalition partnering and activities. The Coalition is leveraging current technology investments within the corridor and synergize with other multistate efforts, such as the I-15 Mobility Alliance (I-80 MCOM application).

FIGURE 42. I-80 CORRIDOR MASTER PLAN EXTENT

Source: I-80 MCOM Grant Application

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CHAPTER 2.2

FREIGHT SYSTEM CONDITION AND PERFORMANCE

Monitoring is the key to transportation system improvement; real solutions must be based on sound data. While California and its partners have carefully invested scarce resources in detection systems and analysis methodologies, much more data is needed, particularly for the less-traveled portions of the freight network. Further investment in data collection across all modes and facilities is needed.

Under MAP-21, US DOT will establish performance measures to guide states in highway-related freight decisions, but that process has yet to be completed. This chapter presents performance measures based on the six CFMP goals. It is anticipated that many of these measures will adopted by US DOT, but others go even further than what may be needed nationally, addressing non-highway modes and associated issues such as air quality, greenhouse gases and community impact reduction in more depth and regulatory oversight. This chapter will be amended at a later date to be consistent with the final federal guidance.

The condition and performance of the freight system is presented in alignment with the six CFMP goals:

- Economic Competitiveness
- Safety and Security
- Freight System Infrastructure Preservation
- Environmental Stewardship
- Congestion Relief
- Innovative Technology and Practices

The following summarized list of proposed metrics by facility type precedes detailed information by three categories: freight infrastructure, congestion, and safety.

Highway Metrics

- Pavement conditions
- Roadway bridge conditions
- Truck travel speed
- Truck hours of delay
- Highway bottlenecks/chokepoints
- Corridor reliability buffer index
- Roadway truck collision fatalities and injuries

Rail Metrics

- Train height clearances
- Track weight accommodation
- Posted maximum train speeds
- Rail bottlenecks/chokepoints
- Railroad grade crossing fatalities and injuries

Seaport Metrics

- Navigation channel depths
- Waterway bridge clearance

HIGHWAY SYSTEM

PAVEMENT

According to the Caltrans 2013 State of the Pavement Report, distressed pavement is considered in poor condition when it contains significant to extensive cracks or provides a poor ride. Pavement in this category would trigger Capital Preventive Maintenance (CAPM) rehabilitation or reconstruction projects. The Caltrans 2013 Five-Year Maintenance Plan states that for every dollar spent on pavement preventive maintenance, four dollars can be saved on future pavement repairs. This highlights the importance of being proactive about funding preventive maintenance projects.

Most highway pavement damage is caused by heavy vehicles. Fully loaded, multi-axle trucks weighing up to 80,000 pounds (40 tons) produce "as much pavement wear as up to 10,000 automobiles," states the 2006 Road Maintenance Issue Brief by the Sacramento Area Council of Governments. Pavement along highways that see a high volume of traffic from heavy trucks is thicker by design, with greater reinforcement; however, according to the 2006 findings of national transportation research organization, California road conditions in major urban areas are still some of the worst in the nation.[25] This suggests that despite the greater reinforcement along these busy corridors, staying on top of the constant wear, particularly from heavy trucks, is more than can be accomplished with limited pavement maintenance budgets.

In 2011, of the total 49,518 highway lane miles in California at that time, 12,333 (25 percent) were in distressed condition. In 2013, partly due to a change in roadway project priorities that shifted more funds directly to pavement preservation and rehabilitation, the number of distressed lane miles was down to 7,821 (16 percent). Of the proposed federal Primary Freight Network (PFN) system within the State, which consists of approximately 17,585 lane miles, 1,866 miles (10.6 percent) were considered distressed in 2011. The current State Highway Freight Network equals approximately 26,753 total lane miles. Of those, 2,656, or 9.9 percent, were distressed in 2011. For details regarding the number of total distressed lane miles by Caltrans district, see the most current Caltrans State of the Pavement Report that is available at: http://www.dot.ca.gov/hq/maint/Pavement/Pavement_Program/PDF/2013_SOP_FINAL-Dec_2013-1-24-13.pdf

Potential Areas for Roadway Deterioration – Regional Overviews

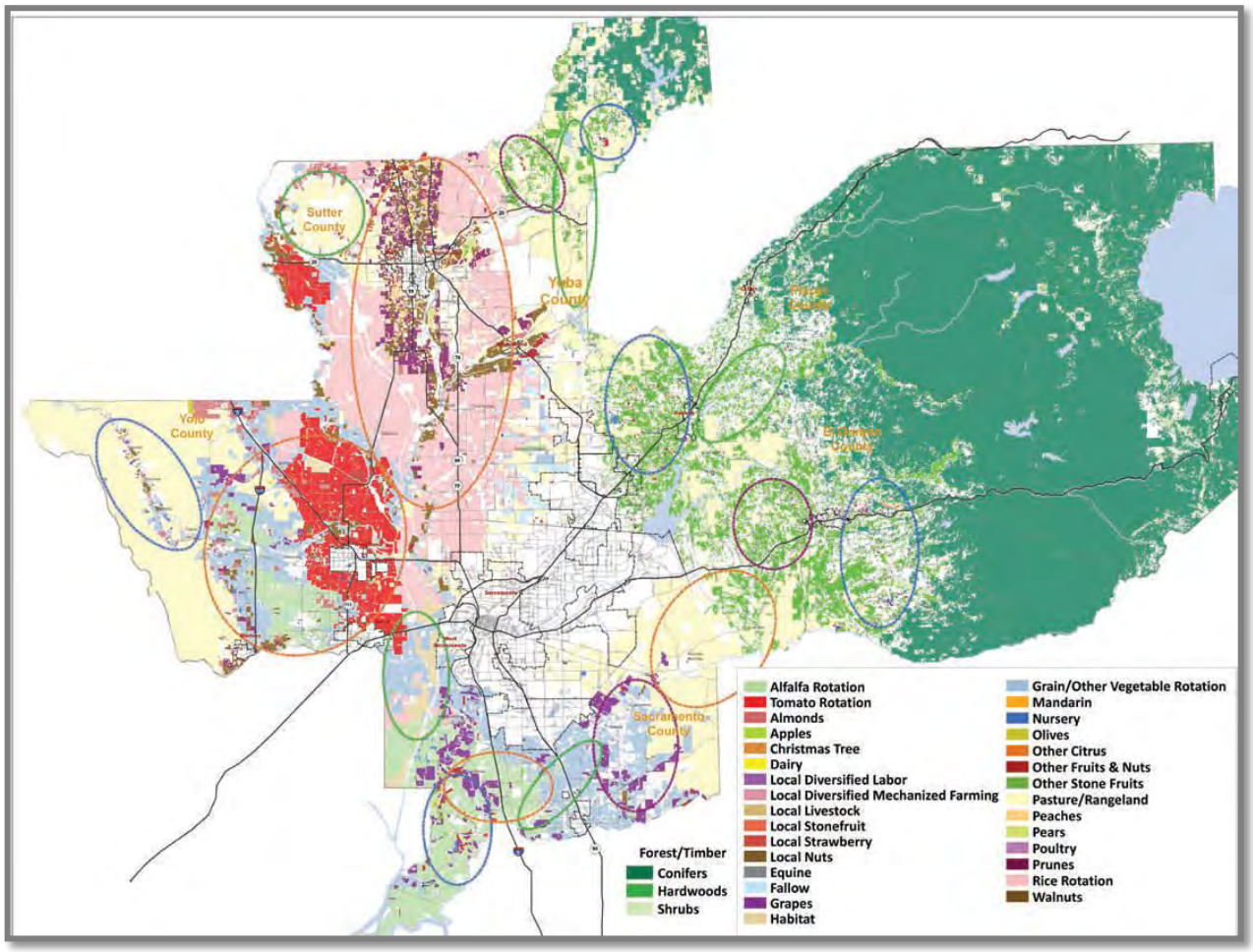
Many local roads that provide first- and last-mile access to critical freight facilities have much poorer pavement conditions than the State Highway System (SHS) and often are not constructed to accommodate the heavy loads they must bear. Industries such as agriculture/food product, wood product, mining, and machinery/manufacturing may exacerbate roadway damage, especially along high-volume local freight routes.

Within the 16 northernmost counties that comprise the North State Super Region, the top three commodity groups by value are agriculture and food products, wood products, and machinery manufacturing. Routes used by the timber industry are typically owned by Caltrans, the US Forest Service, the National Park Service, and the Bureau of Land Management. Generally, wood product activity occurs in the northern and coastal counties, agriculture activity occurs in the Sacramento Valley counties, and machinery manufacturing within Nevada County.

Approximately 70 percent of the land in the six-county greater Sacramento region is agricultural, forest, or other open space (see Figure 42), which closely coincides with heavy concentrations of truck activity. Truck traffic and agriculture is dense along the Sutter-Yuba county border, the

western Sutter County border, and in the heart of Yolo County. Forest/timber is heavy in east El Dorado and Placer counties as well as northern Yuba County.

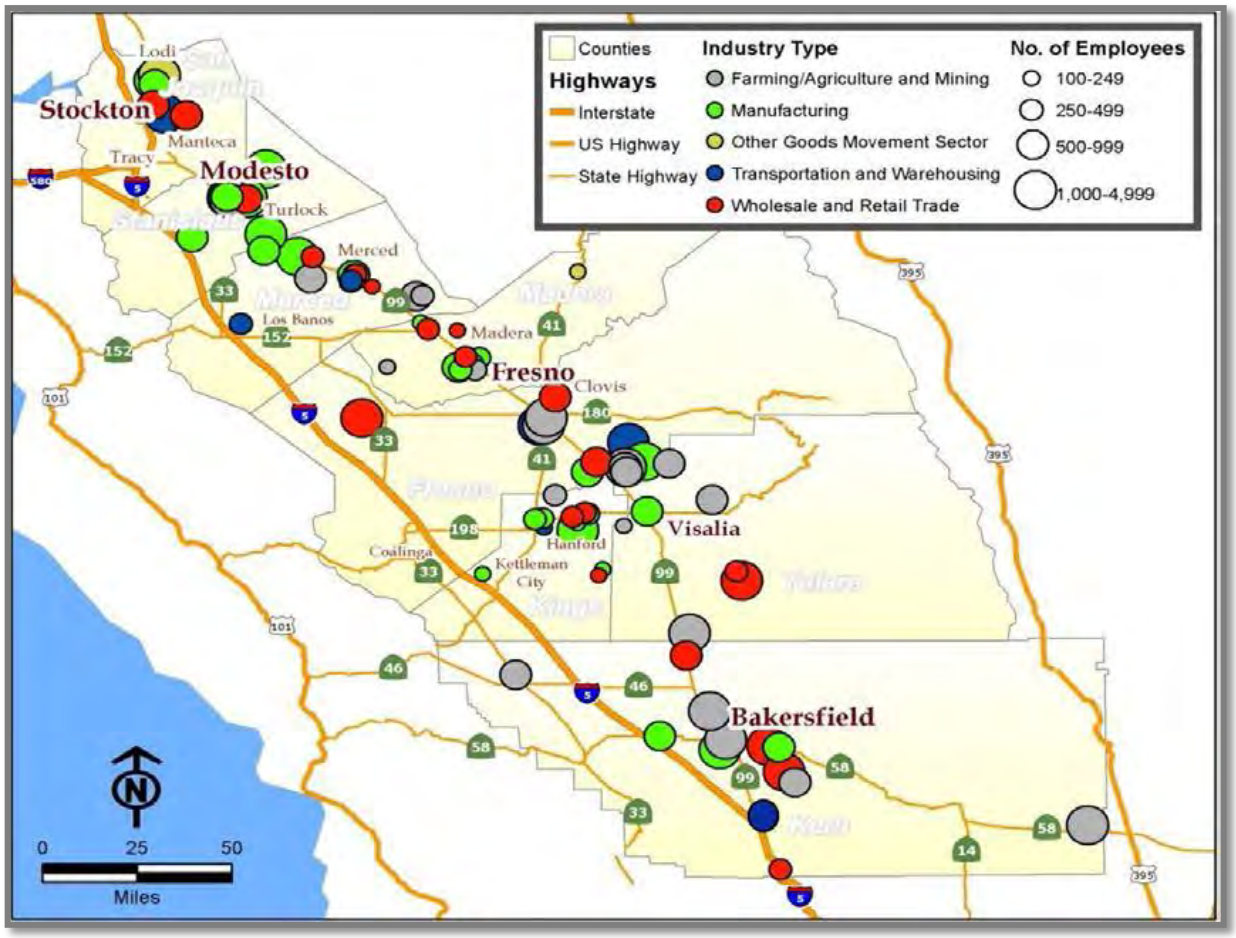
FIGURE 42. RURAL-URBAN CONNECTIONS STRATEGY (RUCS) AGRICULTURAL THEME MAP



Key: Large-Scale Agriculture (orange circles)
Open Space and Recreation (green circles)
Large Lot Residential (purple circles)
Small-Scale Agriculture and Agritourism (blue circles)

In the San Joaquin Valley (Valley), goods movement-dependent businesses are concentrated along State Route (SR) 99, as shown in Figure 43 These industries include food growing and production; food processing and packaging; oil refineries and mineral mining operations; and trucking, transportation, warehousing, and distribution services. The expanding petroleum and natural gas industries in the southern portion of the Valley, while not relying heavily on highway routes included in the Primary Freight Network, is very dependent on State highways and local roads for access to numerous extraction and processing locations.

FIGURE 43. LOCATIONS OF KEY GOODS MOVEMENT BUSINESSES IN THE VALLEY



Source: San Joaquin Valley Interregional Goods Movement Plan, 2013

According to the *San Francisco Bay Area Freight Mobility Study* (Cambridge, 2014), by weight, the top three commodities carried by trucks in the San Francisco Bay Area are waste/scrap, nonmetal mineral products, and gravel. In 2011, the highest truck traffic volumes occurred along I-880 and I-580; however, especially in densely populated areas such as the Bay Area, pavement issues also occur around ports and warehousing/distribution areas, as well on first- and last-mile movements.

Most of the agricultural production, food manufacturing, transportation, and warehousing activities within the five-county Central Coast region are clustered along US 101 and in areas near Watsonville in Santa Cruz and Monterey counties. According to the 2012 Association of Monterey Bay Area Governments' (AMBAG) *Central Coast California Commercial Flows Study*, most truck movement occurs around the cities of Santa Maria, San Luis Obispo (transportation/warehousing), Salinas, Monterey, and Santa Cruz. Truck drivers have expressed

concern about increasing traffic congestion along US 101 in the Santa Barbara, Atascadero, and Prunedale areas.

In the Eastern Sierra/Owens Valley area, heavy truck traffic exists along US 395, which runs from the border with Nevada to Interstate 15. According to the Caltrans 2006 *Goods Movement Study for US 395 Corridor*, most (87 percent) northbound trips along the corridor originate from Southern California, and southbound trips (54 percent) begin in Nevada. In 2006, the most common types of goods included miscellaneous manufacturing, general freight, food/kindred product, farm products, and empties.

Much of the heavy truck traffic within the Southern California Association of Governments (SCAG) and San Diego regions is due to freight transport to or from the seaports, inland regional distribution centers, manufacturing locations, and the border with Mexico. The volume of truck traffic in this region is among the highest in the nation and thus presents a tremendous pavement management challenge, particularly for local roads that may not have been designed to handle the number of heavy trucks that now traverse them. Because the region's truck travel is so extensive, they require focused tracking and reporting beyond the scope of this Plan.

In general, agricultural activity is concentrated in the Imperial Valley, portions of San Diego County and areas of Ventura County. There is no significant timber production. Mining activity includes sand/gravel/crushed stone for construction, specialized mineral extraction in the desert region, and oil production.

Roadway Bridges

According to the Caltrans *State of California's Highway Bridge Inventory Annual Report* 2012/13, 52 percent of the State's bridges are on the SHS and consist of overcrossings or undercrossings. These highway bridges have an average age of 42 years. Bridge health is critical to freight movement because bridge closures can require trip redirection, lengthening travel time, wasting fuel, reducing efficiency, and delaying emergency deliveries and services.

One way to measure bridge performance is to track the number of structurally deficient and/or functionally obsolete bridges. A structurally deficient bridge is one with routine maintenance concerns that do not pose a safety risk or one that is frequently flooded. A bridge is classified by the Federal Highway Administration (FHWA) as functionally obsolete if it fails to meet its design criteria, by either its deck geometry, its load-carrying capacity, its vertical or horizontal clearances, or the roadway alignment of its approach. According to the federal *State Transportation Statistics* document, in 2012, California had 7,156 structurally deficient/functionally obsolete bridges of a total of 24,812, equaling 28.8 percent.

Because bridges categorized as either structurally deficient or functionally obsolete do not necessarily present safety issues, Caltrans currently measures bridge performance by reporting

the number of "distressed" bridges having an identified rehabilitation, replacement, scour, or seismic need. It is anticipated that future federal guidance will specify performance metrics for bridges.

Another aspect of bridge performance for goods movement is their capacity for handling oversized loads, either by weight or dimension. When bridges cannot handle these permitted loads, freight routing is less than optimal. For these oversize loads, Caltrans has a special permitting system that identifies appropriate routes for the particular load. In some cases where extraordinary curve and height clearances are needed, the route may require hundreds of miles of additional travel.

RAIL SYSTEM

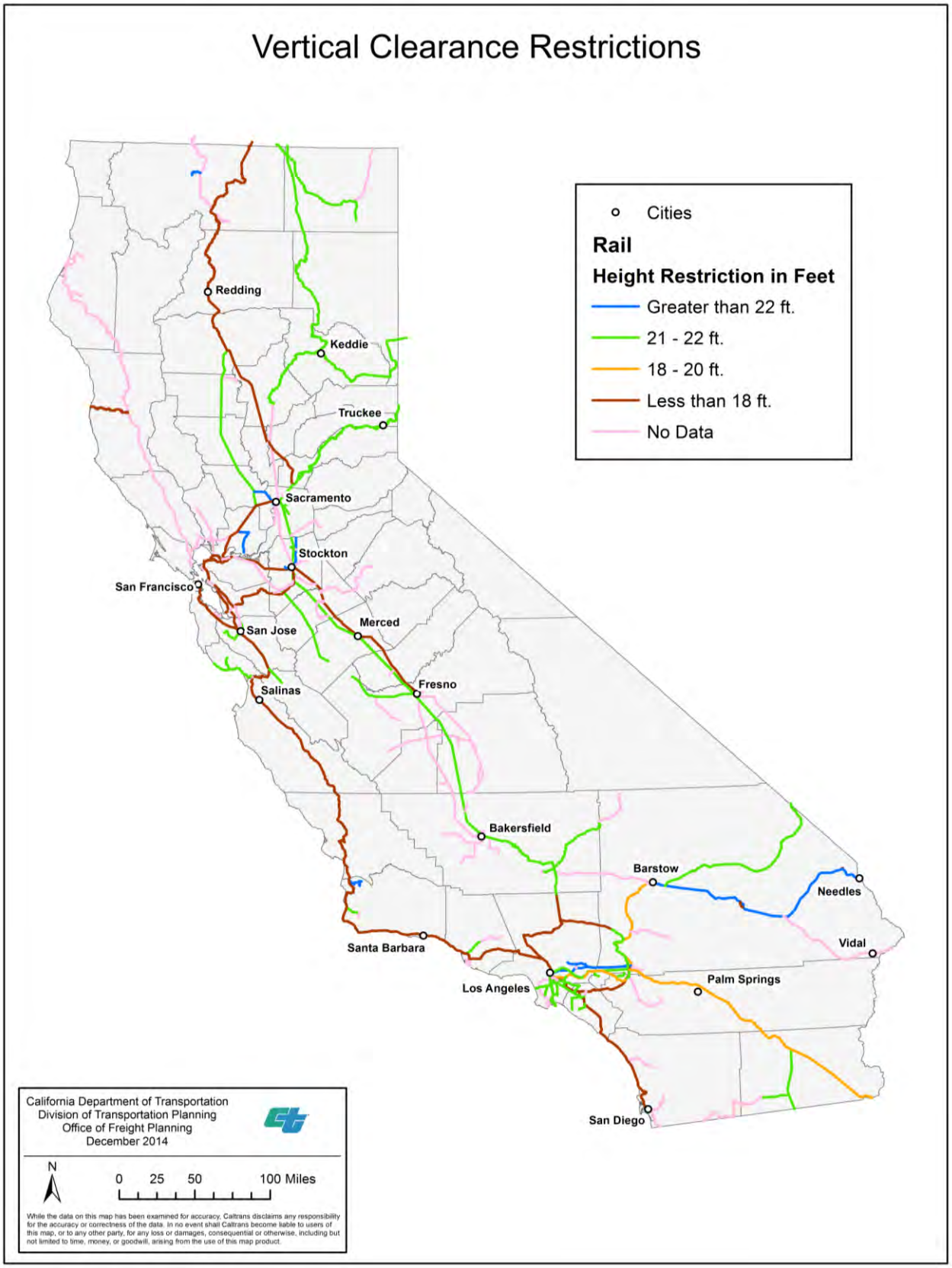
The Class I railroads, Union Pacific Rail Road (UPRR) and BNSF Railway (BNSF), own and operate 79 percent of the track mileage in California. They control system maintenance and infrastructure and, each year, originate over 3 million carloads in the state and terminate and over 3.1 million. As track and other infrastructure are critical to sustaining freight rail service, the Class I Railroads ensure their operating track is well maintained. Short line freight rail owners and operators tend to have fewer resources and find maintenance upkeep more of a challenge. Accordingly, it is common that short line railroads operate at slower speeds and have lighter rail car weights.

Train Height Clearances

By stacking two freight containers on a single rail car, a practice known as double-stacking, railroads can reduce costs and save energy. But double-stacking requires sufficient vertical clearance – typically 19 feet for international boxes and 20 feet 6 inches for domestic boxes.[26] In California, all four of the primary freight intermodal corridors – BNSF Transcontinental, UP Sunset, UP Donner, and Tehachapi – have sufficient vertical clearances for double-stack service. Height limitations, some of which preclude double-stacking along Class I and major short line railroad routes, are shown in Figures 44 and 45. A more detailed listing can be found in Appendix C of the CSRP at:

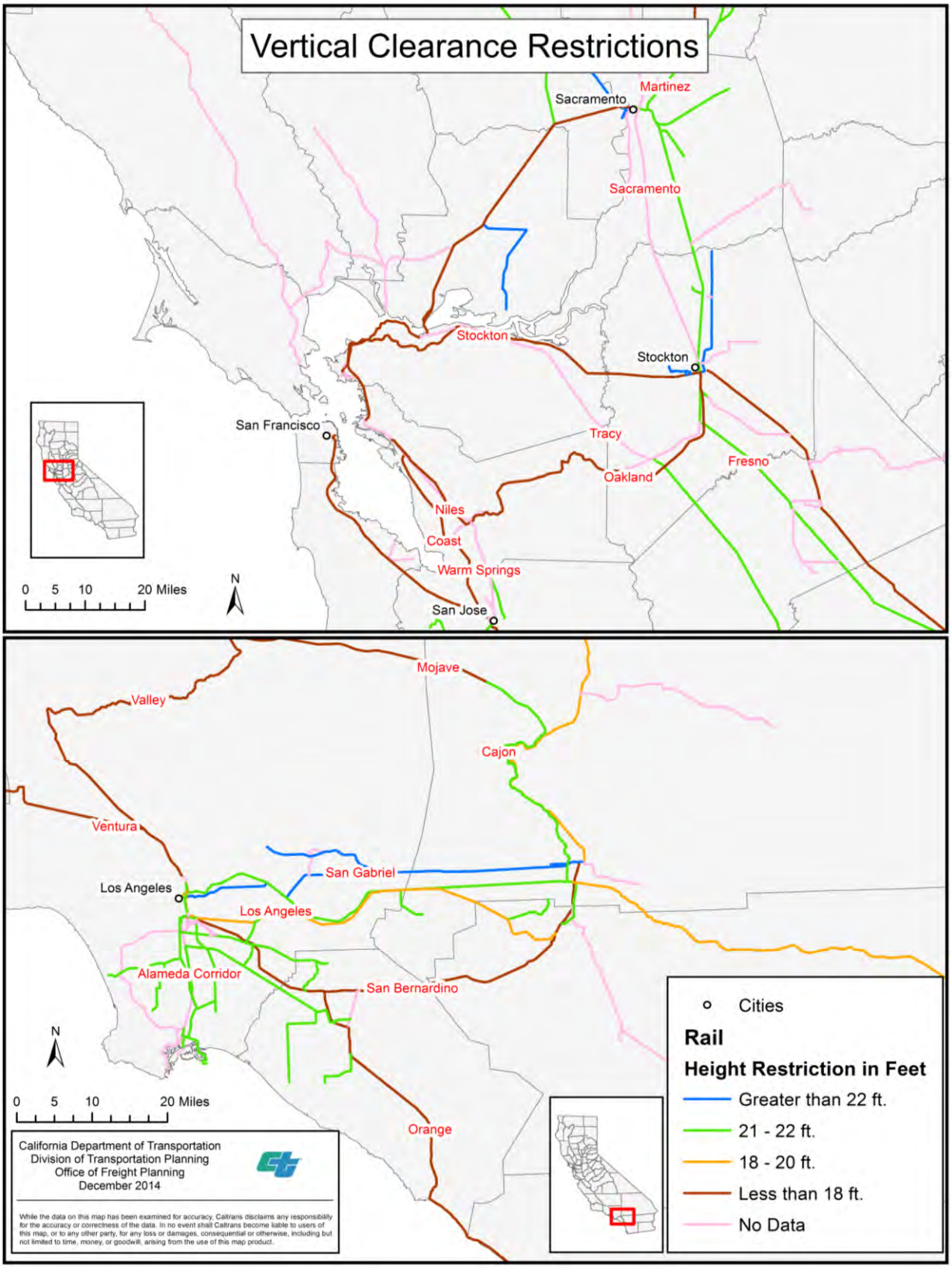
http://californiastaterailplan.dot.ca.gov/docs/Final_Copy_2013_CSRP_Appendices.pdf

FIGURE 44. RAIL HEIGHT LIMITATIONS



Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 45. RAIL HEIGHT LIMITATIONS – NORTHERN AND SOUTHERN CALIFORNIA



Source: Caltrans, Division of Transportation Planning (DOTP)

Track Weight Accommodation

In the mid-1990s, the maximum accepted railcar weight was increased from 263,000 to 286,000 pounds (2013 California State Rail Plan). Railroads wishing to keep their Class I status were required to accommodate this greater weight. The ability of a rail line to support cars of a given weight depends on track conditions, rail weight or gauge, and the capacity and condition of weight-bearing structures such as bridges. Over 95 percent of California's Class I network is generally able to handle the greater weight with only 1.2 percent of total track miles (39 miles in Orange County) rated for less than the standard. Weight data is not currently available for 120.5 miles of Class I track along the San Diego, Olive, and San Gabriel subdivisions.

Although short lines are important for access to industrial sites and transporting heavy loads to last-mile final destinations, larger Class I railroad infrastructure tends to be in better condition. Generally, short line track rail is lighter-weight than Class I rail. Additionally, the tie and ballast conditions of short line track are typically inferior to Class I track, though some short line railroads have excellent track conditions, and short lines often lack an active signaling system. As a result, short line train speeds are generally lower (typically 40 miles per hours, or less for freight trains) and operations are less automated. Only 27.2 percent (283.7 miles) of reported short line mileage in California can accommodate the 286,000-pound maximum; 19 percent can accommodate up to 263,000 pounds; and 19.2 percent are reported to have a maximum capacity of under 263,000 pounds.[27] No weight restriction data is available on 362.6 miles (34.7 percent) of major freight short line track.[28] Although current conditions are probably adequate for existing business, inability to handle standard modern rolling stock will place California short line carriers at a competitive disadvantage when competing for new business. Recognizing the critical importance of short line rail service for industrial and other heavy load purposes and the need to retain those industries, some states have funding programs that support short line railroads. California does not have such a program. **It is a recommendation of the CFMP that the creation of a California short line railroad funding program be investigated.**

SEAPORTS

NAVIGATION CHANNEL DEPTHS

Efficient inbound and outbound movement at California seaports is critical for the State's economic health. To preserve maritime transportation infrastructure, channels and harbors for all ports must be dredged and maintained to adequate navigable depths to accommodate the size of ships the ports are designed to handle. In addition to the State's 12 ports, there are 16 waterways that require minimum vessel depths. The following table indicates minimum channel depths, as determined by the US Army Corp of Engineers (USACE), necessary to handle the largest vessels calling at California ports in 2011. The second column shows actual channel depths as listed in the 2013 *American Association of Port Authorities (AAPA) Seaport Directory*. (Figures are for planning purposes only and are not intended for use in navigation decision making.)

TABLE 16. MINIMUM SEAPORT CHANNEL DEPTH

Channel	USACE	AAPA
San Diego Harbor	39’	37’-47’
Long Beach Harbor	68’	76’
Los Angeles Harbor	57’	53’
Port Hueneme	39’	35’ MLLW*
Redwood City Harbor	38’	30’*
San Francisco Bay Entrance	47’	--
San Francisco Harbor	45’	55’
Oakland Harbor	45’	50’
Richmond Harbor	47’	38’
San Pablo Bay and Mare Island Strait	42’	--
Carquinez Strait	42’	38’
Suisun Bay Channel	42’	--
San Joaquin River	40’	--
Stockton	40’	35’*
Sacramento River	34’	30’
Humboldt Harbor and Bay	34’	38’*

** Mean Lower Low Water (Figures are for planning purposes only and not intended for use in navigation decision making.)*

Waterway Bridge Clearance

The configuration of some California ports requires vessels to heed minimum bridge clearances to avoid collisions. Vertical clearance is measured as the distance from the mean high-water level (high tide) to the bottom of the structural span. Table 17 shows minimum vertical bridge height information for major California seaport bridges.[29] Access to the inland ports of Stockton and West Sacramento may require navigation under smaller fixed bridges and draw bridges. (Figures are for planning purposes only and not intended for use in navigation decision making.)

FIGURE 46. GERALD DESMOND BRIDGE, PORT OF LONG BEACH

Source: Caltrans

TABLE 17. MAJOR BRIDGE VERTICAL CLEARANCES

San Diego-Coronado Bay		
	West Span	156’
	Middle Spans	175’-195’
	East Span	214’
Vincent Thomas		165’
	Middle Span	
Gerald Desmond		
	Current	155’
	New	200’
San Mateo-Hayward		135’
San Francisco-Oakland Bay		
	West	204’-220’
	East	112’
Golden Gate		
	Center	225’
	North Pier	213’
	South Pier	211’
Richmond-San Rafael		
	West Channel	185’
Carquinez		
	North Span	146’
	South Span	132’
Martinez UP Rail Bridge		135’
Rio Vista Bridge		146’

(Figures are for planning purposes only and not intended for use in navigation decision making.)

Airports Runway Condition and Capacity

Eleven of California’s top twelve air cargo-carrying airports also have commercial passenger service, with Mather Airport being the exception. Runway pavement is regularly inspected by federal and State officials for conditions and other compliance measures. These assessments ensure California’s runways are maintained in “good” or better condition. Airport infrastructure, other than runways, is typically maintained by municipalities or regional airport systems.

In 2012, Caltrans contracted with System Metrics Group to determine if the top cargo airports have the capacity to handle future air cargo demand. According to the *California Air Cargo Groundside Needs Study,*[30] California airports have sufficient capacity to meet 2040 demand.

Multimodal Congestion

Traffic congestion occurs when the capacity of a transportation system is unable to match or exceed demand. The concept applies to railroads, port facilities, and airports, as well as to highways and surface streets. For many decades after the Interstate highway system was

completed, population and vehicle miles traveled continued to increase, while road and highway capacity increased only slightly. Today, traffic congestion is chronic, impacting freight as well as passenger travel. Even the non-highway modes are challenged. Fortunately California's Class I railroads, seaports, and airports have been making substantial investments to expand their capacity and reduce costly congestion; however, as much larger ships make calls at California's seaports, the ports and their supporting land-side systems will be challenged to handle the additional volume of traffic and containers. Congestion will be a serious challenge. Besides causing frustration, congestion wastes time, raises business costs and consumer prices, and increases emission of harmful pollutants.

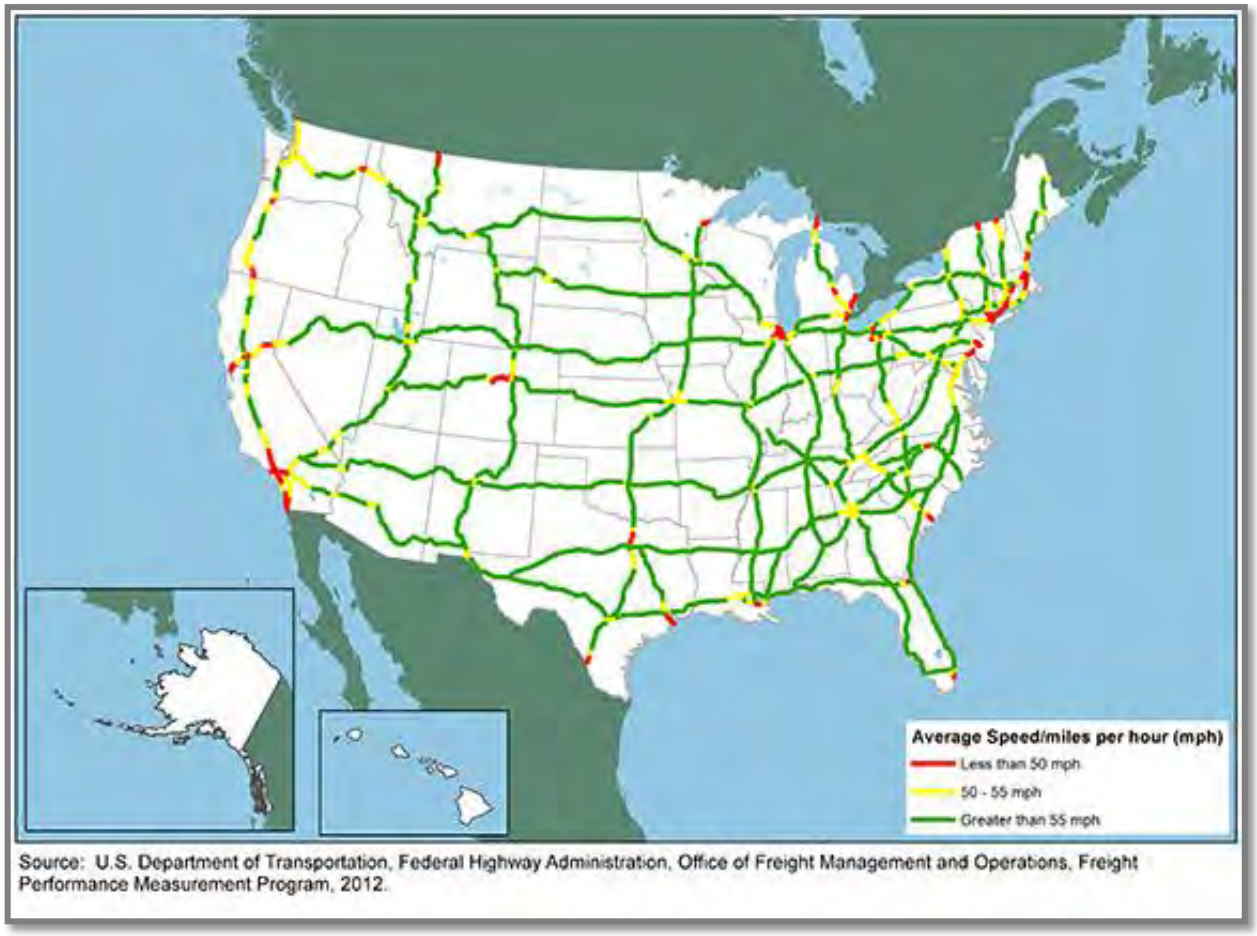
FIGURE 47. PORT OF LONG BEACH TERMINAL EXIT GATES

Source: Caltrans

TRUCK TRAVEL SPEED

When terrain and weather conditions are taken into account, the average travel speed is a good indicator of congestion. In cooperation with private industry, the FHWA tracks speed and travel time reliability at 250 freight-significant California highway infrastructure locations, yielding data on more than 500,000 trucks annually.[31] Average truck speeds generally drop below 55 mph near major urban areas, border crossings, and gateways, and in mountainous terrain. As shown in the map below, large stretches of slower-than-average truck speeds exist on the state's most heavily traveled freight corridors and in urban areas. Slower travel speeds reduce the number of trips per truck per day, resulting in diminished efficiency, elevated costs, and more pollution. The reduced trip numbers also negatively impact the fiscal viability of trucking firms and independent truck drivers.

FIGURE 48. AVERAGE TRUCK SPEEDS ON SELECTED INTERSTATE HIGHWAYS: 2011



Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Performance Measurement Program, 2012.

Posted Maximum Train Speeds

The Federal Railroad Administration (FRA) categorizes train tracks into six classes, segregated by maximum speed limits.

Class I	10 mph	38.5 Miles
Class 2	25 mph	380.2 Miles
Class 3	40 mph	794.8 Miles
Class 4	60 mph	1,086.1 Miles
Class 5	80 mph	1,167.2 Miles
Class 6	110 mph	None

Higher track speeds are linked with better system conditions and faster delivery times, typically equating to more efficient freight movement. Upgrading track and related facilities to allow

higher travel speeds can be a cost-effective investment. Among the factors contributing to reduced speed are:

- Shared track with passenger train service
- Insufficient sidings
- Classification yard locations
- Heavy freight and/or vehicle traffic
- Steep terrain
- Curved rail geometry
- Tunnels
- Limited number of tracks
- Lighter track gauge and low tie/ballast strength

The CSRP identified the following subdivisions and associated lengths in each region that are restricted to speeds of 40 mph (Class 3) or lower.

FIGURE 49. UNION PACIFIC NEAR DONNER PASS

Source: Union Pacific

TABLE 18. CSRP RAIL SUBDIVISIONS RESTRICTED TO 40 MPH (CLASS 3) OR LOWER

	Subdivision	Length in Miles
Central Coast California Region	Ventura	29.4
	Santa Barbara	113.2
	Coast	126.1
Central Valley California Region	Bakersfield	2.3
	Part of Stockton	10.0
	Fresno	29.4
	Part of Sacramento	12.8
Northern California Region	Martinez	42.0
	Roseville	159.4
	Canyon	92.0
	Winnemucca	21.2
	Part of Sacramento	9.4
	Part of Stockton	12.4
	Niles Canyon	6.3
	Valley	54.7
	Oakland	47.6
	Gateway	87.5
	Tracy	53.6
	Black Butte	50.9
Southern California Region	Cajon	15.8
	Yuma	7.4
	San Bernardino	11.0
	Alameda Corridor	17.3
	Mojave – UP	70.1
	Mojave – BNSF	7.1
	Alhambra	4.0
	Los Angeles	5.5
	Cima	6.4
	San Diego	15.0
	Orange	16.8
	Authority Valley	38.5
	Olive	5.4
	San Gabriel	33.3

(Figures are for planning purposes only and not intended for use in navigation decision making.)

Truck Hours Of Delay

The longer freight sits in traffic, the higher the prices of the delayed products and services. As previously mentioned, efficiency diminishes as the number of trips per day per truck is reduced, and same-day vehicle turnaround use is lost. According to the 2013 *Caltrans Mobility Performance Report*, California vehicles were delayed a total of 95.7 million hours in 2010,[32] which equates to an opportunity cost (lost value in terms of salaries and wages) of $1.4 billion, or $3.9 million per day. The 2013 *Caltrans Executive Fact Booklet* reports that, in 2011, annual (automobile and truck) VHD at the 35 mph threshold dropped to 86.5 million, with the dramatic reduction was attributable to the recession. [As described within the truck travel speed measure, there is a discrepancy between what Caltrans considers as a delay threshold (35 mph) and FHWA (55 mph).]

Highway Bottlenecks/Chokepoints

Congestion can be caused by several factors, including the number and width of lanes; the location, spacing, and type of interchanges; shoulder widths; pavement conditions; gaps in the freeway system; vehicle volume; mixed-mode user conflicts; roadway geometry; merges or weaving at transition ramps; steep grades; traffic incidents; road work; special events; and weather. Bottlenecks and chokepoints are common causes of congestion. The following segments within California, identified by national rank, were included among the FHWA's top 250 US Freight Bottleneck locations. All are along the Primary Freight Network.

TABLE 19. FHWA TOP 250 US HIGHWAY FREIGHT BOTTLENECKS

Rank	Location
10	Los Angeles: SR 60 @ SR 57
33	Los Angeles: I-710 @ I-105
36	San Bernardino: I-10 @I-15
41	Oakland: I-80 @ I-580/I-880
57	Corona: I-15 @ SR 91
61	Oakland: I-880 @ I-238
77	Los Angeles: I-110 @ I-105
110	Los Angeles: SR 91 @ SR 55
116	Sacramento I-80 @ I-5
119	Los Angeles I-405 @ I-605
134	San Rafael: I-580 @ US 101
141	Sacramento: I-80 @ SR 51
143	Los Angeles: SR 134 @ SR 2
154	Sacramento: I-80 @ I-305
160	San Diego: I-5 @ SR 163

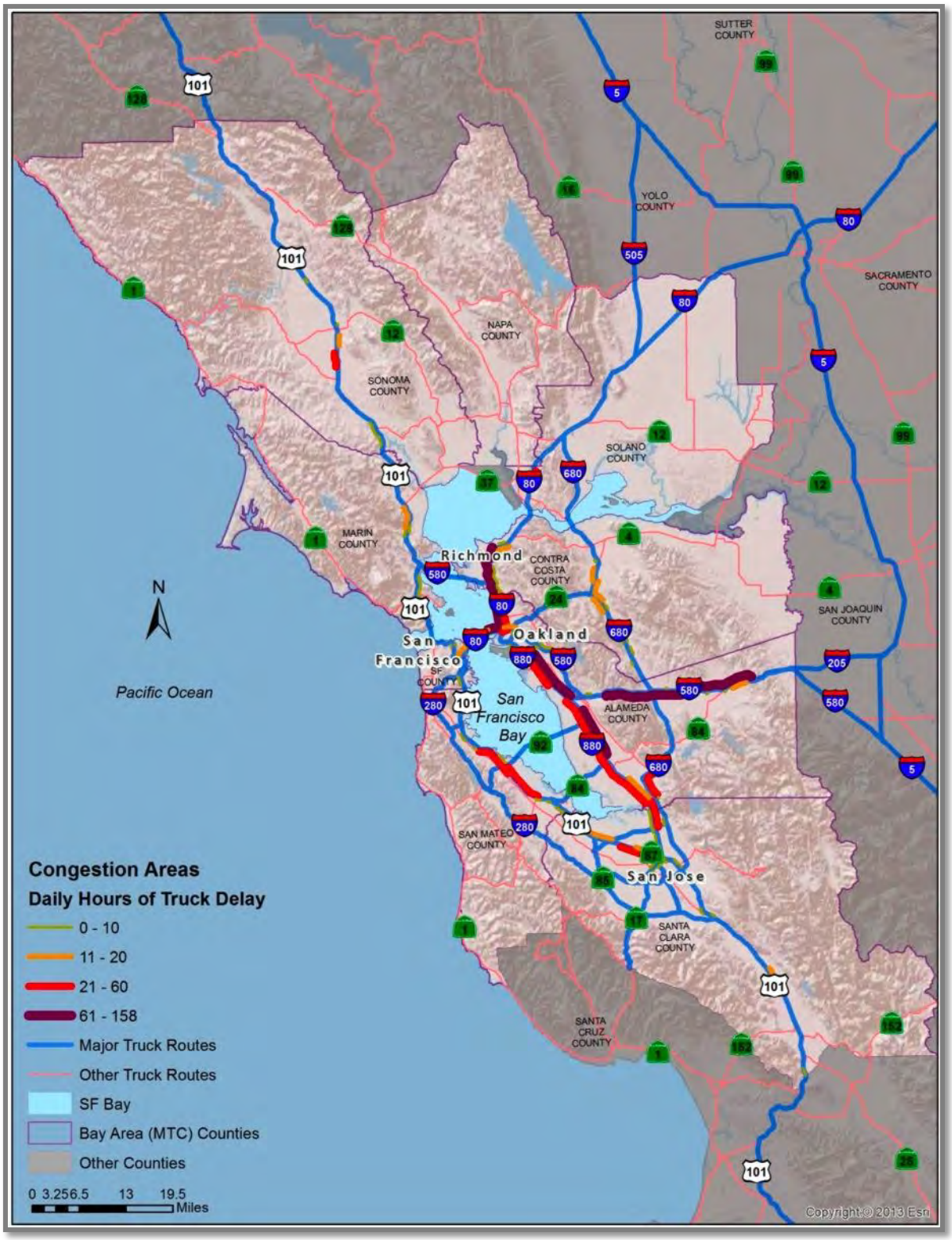
Other congested areas throughout the State have been identified in an assortment of state, regional and local plans, reports, and studies. These documents represent congestion in a variety of ways – by delay, level of service, volume, on a daily or peak-period basis, among others. Caltrans has installed automated vehicle detection devices that record vehicle classifications, travel speed, and vehicle volumes along many highway corridors. Data from these devices is used to create maps depicting bottlenecks and congestion points along the various roadway segments, information which assists in planning analysis and project identification. Shortfalls of this system include: theft of copper wiring and other system components, unreliable results due to a high rate of device failure, delays in data availability due to processing time, and disruptions in data collection due to roadway repair. Due to these limitations, some of the resulting maps do not accurately portray congestion. For example, traffic backups along the Mexican border in the San Diego region are not shown in current maps. In addition, bottlenecks along SR 99, one of the busiest goods movement corridors in the state, are not reflected. According to the 2013 *San Joaquin Valley Interregional Goods Movement Plan,* current congestion along this corridor will worsen, hindering efficient movement of goods to, from, and within the Valley. A more reliable and accurate method of collecting and presenting congestion is needed.

Figure 50 from the 2014 *San Francisco Bay Area Freight Mobility Study* identifies areas of heaviest congestion by direction and daily hours of truck delay. This is an example of how Caltrans may want to track and depict truck congestion in the future.

There are several remedies for congestion. Some of these include:

- Increasing capacity (passing lanes, intersection improvements, turn pockets, turnouts)
- Reducing demand
- Separating modes (rail grade crossing separations)
- Minimizing incident clearance times
- Preventing accidents (interchange/geometry improvements)
- Improving pavement quality
- Improving operations (integrated corridor management, ramp metering, signal timing)
- Encouraging use of alternative modes (rail, barge)
- Adding truck-only lanes or dedicated truck facilities

FIGURE 50. AVERAGE DAILY TOTAL TRUCK DELAYS IN THE BAY AREA



Source: San Francisco Bay Area Freight Mobility Study, March 2014, Prepared By Cambridge Systematics, Inc.

Rail Bottlenecks/Chokepoints

As with reduced track speeds, rail bottlenecks and chokepoints are primarily caused by limitations in track capacity, class or structural strength, limitations in rail yard capacity, steep grades, track geometry, conflicts with passenger service, and double-stack height limitations. The 2013 CSRP identified the following main line and intermodal bottlenecks and chokepoints:

1. UPRR Mojave Subdivision, Kern Junction to Mojave (Tehachapi Trade Corridor)
2. BNSF San Bernardino Subdivision
3. BNSF Cajon Subdivision (Barstow to Keenbrook)
4. UPRR Sunset Route (Yuma Subdivision)
5. UPRR Alhambra and Los Angeles Subdivisions
6. UPRR Mojave Subdivision, Rancho to Keenbrook (Cajon Area)
7. San Diego and Arizona Eastern Railroad
8. Colton Crossing (previously intersecting UPRR and BNSF tracks now have grade separation through a Trade Corridor Improvement Fund project)
9. UPRR Martinez Subdivision (Oakland to Martinez)
10. UPRR Oakland Subdivision
11. BNSF Mainline Stockton to Bakersfield (San Joaquin Corridor)

Corridor Reliability Buffer Index

Truck drivers may lose a competitive edge if shipments are late and need to consistently predict actual arrival times. Average travel time for a corridor does not directly translate into expected delays for individual trips along that corridor. By deriving a reliable, corridor-specific "buffer index" to calculate specific extra time to add to average travel time, the chances of arriving on time increase dramatically. This "buffer index" comes from the collection of travel time data on the heaviest traffic days and comparing those to average travel time. For example, if it usually takes 20 minutes for a trip, and the buffer index is 40 percent, an additional eight minutes (20 minutes x 0.4 = 8 minutes, or 28 minutes total) should be allowed for that stretch to ensure on-time arrival over 90 percent of the time.

Appendix B of the *Caltrans Mobility Performance Report 2010* (dated July 2013) discusses Corridor Travel Time Reliability along most of the Corridor Mobility Improvement Account (CMIA) freeway segments throughout the state (many of which are also on the PFN). The report considers travel time (the time required to travel from one end of a defined corridor to the other) an important measurement tool used to monitor corridor congestion. Travel time reliability refers to the consistency or dependability of travel times, measured day-to-day or

across different times of day. The 2010 report analyzed travel time reliability day-to-day, across all weekdays in the calendar year.

The least reliable CMIA corridors in 2010, as measured by the buffer time index (BTI) during peak congestion, were:

1. Westbound I–80, Alameda County, BTI: 79 percent in the AM peak.
2. Westbound SR–22, Orange County, BTI: 75 percent in the AM peak.
3. Eastbound SR–91, Orange County, BTI: 74 percent in the PM peak.
4. Northbound SR–57, Orange County, BTI: 70 percent in the PM peak.
5. Southbound SR–57, Orange County, BTI: 67 percent in the PM peak.

SAFETY

Safety is important for the entire passenger and freight transportation system. Identifying incident trends can shed light on potential infrastructure and possible operational adjustments that Caltrans and other infrastructure owners/operators can make. In addition, improved technology can eliminate or reduce the severity of certain accidents. California's freight system is generally safe, but when collisions do occur, the consequences can be extreme because of the large mass of freight vehicles and their loads. For more detailed discussion of safety and security, please see Chapter 3.5.

INJURIES AND FATALITIES

Roadway Truck Collisions

In 2012, the California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS) reported that of the 2,758 total number of fatal traffic collisions for the year, 235 involved trucks, and the truck driver was at fault in only 75 of the incidents, indicating that in fatal collisions between cars and trucks, automobile drivers are far more likely to be a fault than truck drivers. Of the total number of 159,696 injury collisions in 2012, there were 5,092 involving trucks and 2,211 where the truck driver was at fault. Drivers in passenger cars alone or pulling trailers were at fault in 1,323 fatal and 97,223 injury collisions. Of the total 2,286 collisions in which truck drivers were at fault, 907 were due to unsafe speed and 751 due to unsafe lane changes or improper turning. A more relevant ratio of casualty/injury per truck usage would be based on the number of truck miles traveled on an annual basis; however, this information is not currently available.

Railroad Grade Crossing

According to the 2013 US DOT, FRA, *Railroad Safety Statistics Preliminary Annual Report*, California had 9,296 grade crossings in 2011. In 2012, there were 32 casualties and 126 non-

fatal (injury) accidents at roadway-rail grade crossings. The report does not differentiate between the number of freight and passenger train incidents; however, it is recommended that freight numbers be separated. Railroad grade separations can completely eliminate this type of collision as well as providing many other measurable benefits for air quality and delay reduction.

Economic Competitiveness

Innovative Technology and Practices

Technology and innovation are keys to global leadership. Many opportunities exist to track the effectiveness of new technologies – the new zero- and near-zero-emission technologies, for example – especially those in the early stages of commercialization. To effectively monitor progress, coordination must be established between Caltrans and agencies that track innovative demonstration and deployment progress, such as the regional air districts, regional transportation commissions, the California Air Resources Board, and the California Energy Commission. The California Freight Advisory Committee provides opportunities to partner with many of these agencies. Where there is a lag in the implementation of new technologies in some sectors of the industry, extra effort can be made to address the shortfall. Measurement and tracking of freight travel speed, reliability, and turn time (trip) improvements before and after technology project implementation could help to bolster the case for further investment in such technologies. Chapter 3.6 presents current and projected ITS deployments (by public and private entities involved in freight operations) that will maximize and increase the safety and efficiency of California's freight transportation system.

Environmental Stewardship

Environmental stewardship broadly refers to taking responsibility for improving environmental quality and achieving sustainability goals.

California is a global leader in striving for environmental sustainability. Each freight mode has already significantly reduced air pollution emissions and other negative impacts as measured over decades. With the State's laws requiring less-polluting fuels, lower emitting vehicles and equipment, and cleaner operating procedures, the air Californians breathe is dramatically cleaner than it was prior to the implementation of the State's air and water pollution reduction programs. However, more work is needed. California still has among the most polluted air basins in the country (South Coast and San Joaquin Valley) and freight related emissions are significant contributors to that pollution, particularly diesel soot.

The following pollutants (typically products of fossil fuel combustion or industrial processes) are flagged by the EPA as "criteria pollutants," or pollutants that cause smog, acid rain, and other health hazards. These pollutants are tracked and serve as appropriate measures.

- Ozone (O3)
- Respirable particulate matter (PM10)
- Fine particulate matter (PM2.5)
- Carbon Monoxide (Co)
- Nitrogen Dioxide (No2)
- Sulfur Dioxide (So2)
- Lead

Some emission concentrations are measured in parts per million (ppm), others in parts per cubic meter (m^3). One part per million is equivalent to one drop of liquid in approximately 13 gallons. To protect the most sensitive individuals in our communities, California and US EPA establish ambient air quality standards (AAQS) for several pollutants that define clean air. AAQS defines the maximum amount of a pollutant that can be present in outdoor air without harm to public health. Emissions standards are more stringent in California.[33]

Assembly Bill (AB) 32 (2006, Nunez) the Global Warming Solutions Act, requires California to reduce greenhouse gases (GHG) that trap heat in the atmosphere to 1990 levels by 2020, and to continue reductions beyond 2020. For the longer term, Governor Brown committed California to emitting 80 percent fewer emissions than 1990 levels by 2050 and has established a parallel transportation target. State and federal GHG targets for the following gases also need to be met:

- Carbon Dioxide (Co2)
- Methane (Ch4)
- Nitrous Oxide (N2o)
- Fluorinated Gases [Including Sulfur Hexaflouride (Sf6), Nitrogen Triflouride (Nf3), Hydrocarbons (Hfc), And Perfluorocarbons (Pfc)]

According to ARB, transportation is the largest contributor to GHG emissions and is the primary source of smog formation and toxic air pollution in the State. Tailpipe emissions account for about 38 percent of the total inventory. Freight vehicles and equipment are responsible for approximately 10 percent of statewide total emissions, 70 percent of diesel particulate matter emissions, and 45 percent of nitrogen oxide emissions.

The largest emissions category within the transportation sector is "on-road", which consists of passenger vehicles (cars, motorcycles, and light-duty trucks), heavy-duty trucks, and buses. ARB annually inventories greenhouse gases in million "tonnes"[34] of CO_2 equivalent.

California is committed to achieving multi-pollutant emission reduction goals through a continuous process. This will begin with transitioning from the existing diesel-dependent freight system into one that operates with significant numbers of zero- and near-zero-emissions engines and alternative transportation fuels. California budgeting supports the transition to low-carbon transportation and provides incentives for pre-commercial demonstration of advanced freight technology to move cargo. Parallel support is also necessary for associated infrastructure in addition to implementation of logistical/efficiency improvements to reduce the emission impacts of moving freight. In short, the freight sector must become more efficient, reliable, clean, and low carbon. This transition will likely include widespread use of alternative transportation fuels, such as electricity, hydrogen, and renewable fuels.

Tracking and measurement are necessary to ensure reductions. There are currently 15 designated air basins in California that are designated for tracking ozone, nitrogen dioxide, PM10, sulfates, and visibility reducing particles. These geographic areas vary in size, depending on the pollutant, the location of emissions sources, meteorology, and topographic features. Counties (or portions of counties) are designated areas for tracking carbon monoxide, sulfur dioxide, lead, and hydrogen sulfide. Some counties span more than one air basin. Table 21 (page 135) represents the attainment status of criteria pollutants for all California counties and their associated air basins.[35]

As of 2013, all designated areas are in attainment (meet or are below required emissions levels) for nitrogen oxides (NO_x), sulfur dioxide (SO_2), and lead. For ozone (O_3), ten of the State's 58 counties have attained the standard and 40 are in nonattainment (the remaining are unclassified, nonattainment-transitional, or have a combined status). According to ARB, both the South Coast Air Basin and the San Joaquin Valley are considered extreme nonattainment for the national 2008 eight-hour ozone standard. In the fine particulate matter (PM2.5) category, 22 counties are in attainment and 17 in nonattainment (the remaining are unclassified or a combination). Only four counties are in attainment for respirable particulate matter (PM10) – all but a few are in nonattainment. In the carbon monoxide (CO) category, 32 counties are in attainment, and the remaining 26 are unclassified or straddle the two if within more than one air basin. For information, please visit ARB's Air Quality Designations page: Http://www.arb.ca.gov/desig/adm/adm.htm.

FIGURE 51. ENERGY FUELING OPTIONS

Source: Port of Long Beach

CONCLUSION

It is vital to track the condition and performance of the multimodal freight system across a wide range of attributes so that the effectiveness of investment goals and objectives can be documented. Such measurements ensure limited capital and operations resources are applied where they are most needed and confirm the value of those investments. With so many ambitious goals, it is necessary to know which approaches are working and to what extent they serve the intentions of their funding programs. As national freight performance measures are developed and implemented, California will implement and likely add to them so that the success of California's initiatives can be accurately tracked.

FIGURE 52. RAIL CONNECTOR TO ALAMEDA CORRIDOR, PORT OF LONG BEACH

Source: Port of Long Beach

CHAPTER 2.3

FREIGHT FORECAST

Forecasting domestic and international freight flows is a serious challenge. Changes in manufacturing locations, global economic forces, competition, new technologies, political dynamics, regulations, trade agreements, opening of new routes, and labor disputes can each affect freight transportation. Significant growth is predicted in both the weight and value of goods moving through California's transportation system. Total California domestic mode shipments are forecast to increase over 160 percent by weight and 250 percent by value by the year 2040 as detailed in the tables included in this chapter.

Based on the US DOT Interim Guidance, the FHWA Freight Analysis Framework (FAF) tool was used to develop freight forecasts. The FAF is a commodity flow database that contains freight flow information by mode, commodity, and origin-destination zones. The data in this chapter was generated using Version 3 (FAF 3) and will be updated when version 4 is released.

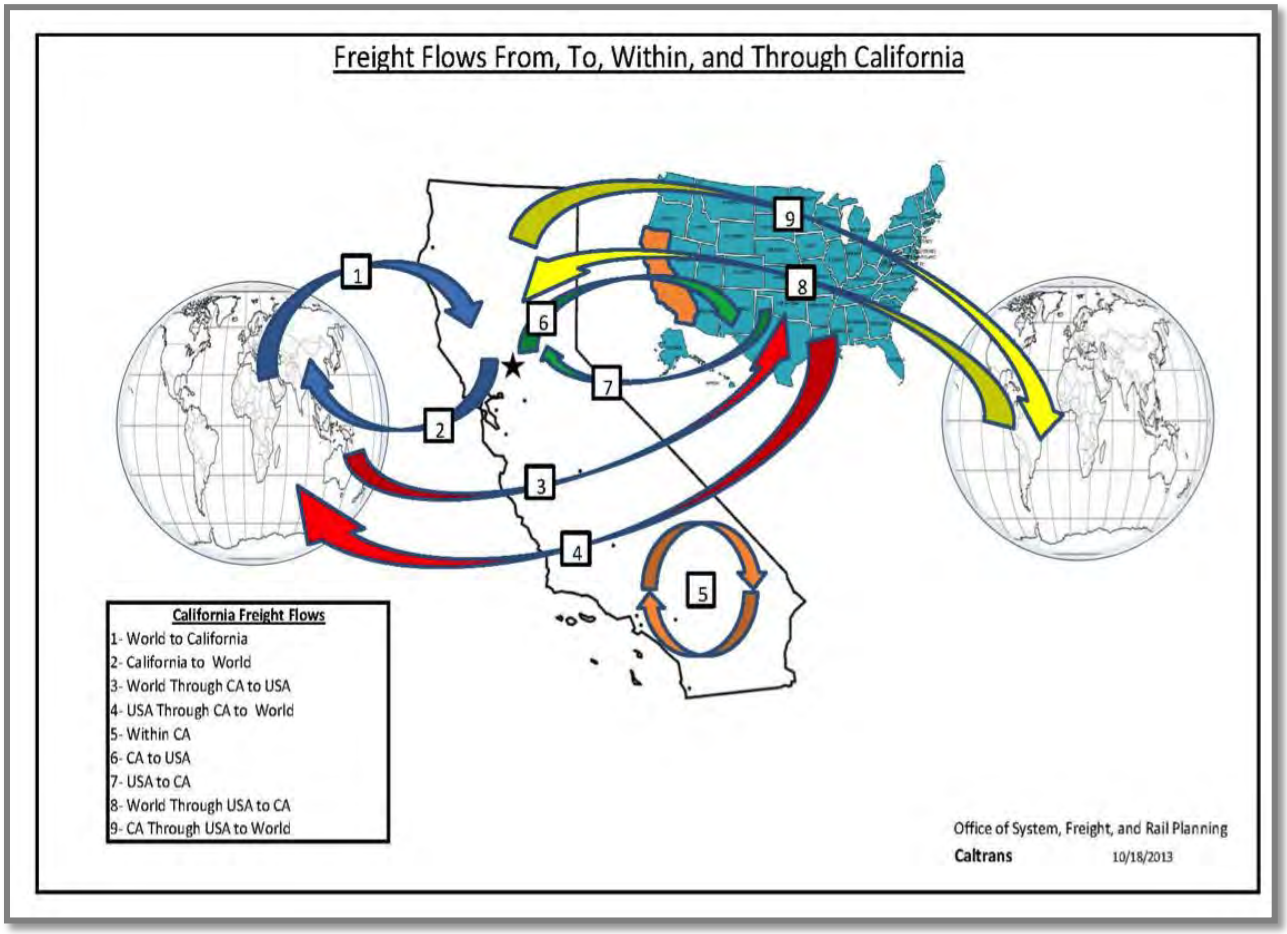
Released in July 2010, and updated in 2014 with 2012 data, the original FAF 3 was based on the 2007 Commodity Flows Survey (CFS) and incorporates other data sources, such as the public-use version of the waybill (a carrier-issued document with details and instructions relating to shipments), Federal Aviation Administration (FAA) air cargo data, and United States Army Corps of Engineers waterborne commerce data. Freight flows by Metropolitan Statistical Areas (MSA) (geographic entities with populations of 50,000 and over defined for use by Federal agencies) and Consolidated Statistical Areas (CSA) (geographic statistical areas that qualify as a MSA and have a population of over 1,000,000) were reported in annual tons moved and monetary value of the goods (in 2007 dollars). Based on MSA and CSA, the FAF 3 is broken up into 123 regions within the US that include 74 major metropolitan areas. There are also eight international "world" regions: Canada, Mexico, Rest of Americas, Europe, Africa, Southwest and Central Asia, Eastern Asia, and South East Asia and Oceania.

FAF mode and value calculations are based on the following nine possible freight flows depicted in Figure 54 on the next page:

1. Major World Regions Flows Destined to CA
2. A Origin Flows Destined to Major World Regions
3. Flows from Major World Regions, through CA, Destined to US States (outside of CA)
4. Flows from States through CA, Destined to Major World Regions

5. CA Intrastate Freight Flows
6. Domestic Flows from CA to States
7. Domestic Flows from States to CA
8. World Regions through States to CA
9. California to World Regions through States

FIGURE 53. FREIGHT FLOWS FROM, TO, WITHIN, AND THROUGH CALIFORNIA



Source: FHWA Freight Analysis Framework, adapted by Caltrans Office of System and Freight Planning (2013)

The complete FAF 3 origin-destination commodity flow matrix is made up of 131 origin, 131 destination, 43 commodity class, and 7 modal category data cells in annual tons and dollars. For purposes of this document, base year freight flows are for 2012 and are forecast for 2025 and 2040. Annual data for 2012 is presented in ktons (thousands of US short tons) for weight and millions in 2012 dollars. The units of measure for 2025 and 2040 data are in ktons for weight and millions of 2007 dollars for value. For inflow shipments, the origin of the flow is the state or major world region of exit, and for export shipments the destination of the flow is the state or region of entry. Foreign shipments include flows between the state of entry and the destination state for imported shipments and flows between the origin state and the state of exit for exported shipments. Mode of transportation consists of three types: the domestic mode (between and within states), the foreign mode (domestic origin to foreign zone of entry), and the inbound mode (between a foreign origin zone of exit and the domestic destination zone of entry).

The realistic expectation is that forecasted tonnage and value figures will likely decline from the 2007-based forecasts when FAF 4 becomes available (anticipated by 2016) and data is adjusted accordingly. FAF forecast data does not take into account events such as natural disasters, armed conflict, recessions, new or restricted highway capacity, transfer of trucked freight to automated conveyances, widespread deployment of new manufacturing technologies, such as 3-D printing, the expansion of the Panama Canal, or other events that could significantly change the forecast. While the freight flow data presented in this report may vary from actual freight flows in the future, the information does highlight relationships and orders of magnitude in the movement of goods.

The FAF international Import Flows component examines flows moved from foreign regions to domestic destinations. Regions for this type of flow include foreign origin region, zone of entry (country or region), and domestic destination. Import shipments that do not move beyond the zone of entry are classified in the “Major World Regions Freight Flows Destined for California” category. The FAF Export Flows component examines flows moved from domestic origins to foreign destinations through California’s ports of exit.

COMMODITIES

Prior to delving into specific flow data for California, it is important to gain some appreciation for the diverse commodities being transported throughout the State. In order to wisely invest scarce transportation funds to meet transport requirements of the various industry sectors, there is a need to understand the type and weight of commodities moved through the transportation system. In addition, it is important to know which commodities have significantly high values, because these commodities will likely be more time sensitive and be impacted by issues such as congestion.

Current and Forecast Top Ten Commodities

The following discussion refers solely to intrastate shipments and international commodities originating or having a final destination in California. In 2012, waste/scrap and gasoline were the leading commodities for the state's freight transportation system. That year, 214,845 ktons, or 15.9 percent of the total freight tonnage, consisted of waste/scrap, followed by gasoline with 147,106 ktons, or 10.9 percent. By 2040, waste/scrap is forecast to continue to be the top commodity for transport and is projected to reach 275,456 ktons. The forecast scenario reveals that nonmetal mineral products are expected to reach 207,374 ktons by 2040 and gravel/stone will reach 168,448 ktons, which would surpass gasoline (at 138,305 ktons) in the amount of weight being transported. Greenhouse gas (GHG) reduction strategies, such as expanded use of low- and zero-emissions vehicles, could contribute to the future decline in demand for gasoline.

The top four commodities by weight in 2012 (waste/scrap, gasoline, nonmetal mineral products, and gravel/stone) comprised over 45 percent of the intrastate and international tonnage with California origins or destinations. The top ten commodities combined represented more than 70 percent of the total weight transported. By 2040, natural sands and fuel oils will drop from this list, making way for mixed freight and cereal grains. In addition, the total share of the top ten commodities by weight will fall to around 66 percent.

TABLE 20. TOP TEN INTRASTATE AND INTERNATIONAL COMMODITIES ORIGINATING FROM OR DESTINED FOR CALIFORNIA BY WEIGHT (YEARS 2012 AND 2040)

Top 2012 Commodities	Weight (in ktons)	Share	Top 2040 Commodities	Weight (in ktons)	Share
Waste and scrap	214,845	15.9%	Waste and scrap	275,456	13.9%
Gasoline	147,106	10.9%	Nonmetallic mineral products	207,374	10.5%
Nonmetallic mineral products	140,453	10.4%	Gravel and crushed stone	168,448	8.5%
Gravel and crushed stone	124,133	9.2%	Gasoline	138,305	7.0%
Crude petroleum	86,022	6.4%	Other agriculture products	126,523	6.4%
Other agriculture products	63,217	4.7%	Crude petroleum	100,427	5.1%
Natural sands	54,886	4.1%	Other foodstuffs	82,896	4.2%
Coal-n.e.c. (not elsewhere classified)	62,643	4.6%	Mixed freight	77,526	3.9%
Other foodstuffs	51,295	3.8%	Cereal grains	71,230	3.6%
Fuel oils	41,239	3.1%	Coal-n.e.c.	60,505	3.1%
2012 Top Ten Total	985,839	72.9%	2040 Top Ten Total	1,308,690	66.1%
2012 All Commodity Total	1,351,574		2040 All Commodity Total	1,980,491	

Source: FHWA Freight Analysis Framework Summary Statistics

In terms of value, the top ten commodity categories are listed in Table 22. It is anticipated that machinery and electronics will continue to lead the list for the 2012 to 2040 time period. The value of these two commodities combined is projected to increase from $336.7 trillion, or 23.6 percent of total, in 2012 to $963.9 trillion, or 30.7 percent of the total, in 2040. Of the top four categories, gasoline is anticipated to lose rank (perhaps due to decline in demand) and pharmaceuticals will gain 439 percent in value, shifting from seventh in rank to fourth. By 2040, textiles/leather and other foodstuffs are expected to drop from the list, and precision instruments and plastics/rubber will rank among the top ten. In 2012, the top ten categories represented over 60 percent of the total commodity value of shipments; in 2040, the percentage will rise to nearly 70, making them important to consider as freight transportation decisions are made.

These top ten lists show that a commodity ranking high in weight does not necessarily rank high in value. In the competitive world, consideration of volume, weight, and value are crucial to maximize effectiveness of the freight transportation system. The statewide stance should be proactive and cannot ignore preparation for potential damage and congestion along corridors due to volume and weight of transported commodities.

TABLE 21. TOP TEN INTRASTATE AND INTERNATIONAL COMMODITIES ORIGINATING FROM OR DESTINED FOR CALIFORNIA BY VALUE (YEARS 2012 AND 2040)

2012 Commodities	Value (in Millions)	Share	2040 Commodities	Value (in Millions)	Share
Machinery	$169,896	11.9%	Machinery	$545,479	17.4%
Electronics	$166,805	11.7%	Electronics	$418,455	13.3%
Gasoline	$111,435	7.8%	Mixed Freight	$246,064	7.8%
Mixed freight	$104,720	7.3%	Pharmaceuticals	$226,368	7.2%
Motorized and other vehicles	$97,802	6.9%	Precision instruments	$190,399	6.1%
Textiles and leather	$61,022	4.3%	Motorized and other vehicles	$135,683	4.3%
Pharmaceuticals	$51,559	3.6%	Miscellaneous manufactured products	$124,567	4.0%
Other foodstuffs	$50,799	3.6%	Gasoline	$105,843	3.4%
Other agriculture products	$47,938	3.4%	Other agricultural products	$95,304	3.0%
Miscellaneous manufactured products	$44,272	3.1%	Plastics and rubber	$93,833	3.0%
2012 Top Ten Total	$906,248	63.5%	2040 Top Ten Total	$2,181,995	69.6%
2012 All Commodities Total	$1,426,365		2040 All Commodities Total	$3,134,935	

Source: FHWA Freight Analysis Framework Summary Statistics

Domestic Mode Shipments

When transporting commodities within or through California, the mode of transportation is considered domestic. There are various ways to group these shipments using the flow numbers corresponding to the nine domestic and international flows represented in Figure 54. For example, domestic-only shipments include California-only (Flow 5) as well as US-only interstate movements involving the State (Flows 6 and 7). Imports and exports originating from or destined only for California are represented by Flows 1 and 2. However, import shipments destined for California can also arrive indirectly through other states (Flow 8), and exports originating in California can leave the country from other states (Flow 9). In addition, there are shipments that are not destined for California but pass through the state, entering our ports as imports and exports (Flows 3 and 4).

Table 22 (below) shows total weight of shipments by flow in ktons, by domestic mode and total value coming into, traveling through, and leaving California for 2012 and forecast for 2040. The total tonnage of California domestic mode shipments is expected to increase by over 160 percent, from nearly 1.8 million ktons (thousands of US short tons) in 2012 to over 2.9 million ktons in 2040. The dollar value associated with these exchanged goods is anticipated to increase by nearly 250 percent, to over $6.9 trillion.

As can be seen in Table 22, representing all nine domestic flows, the trucking industry is currently the predominant mode of transportation for the state's freight shipments. By weight, trucks transport the largest amount of goods into, within, and out of the state, and this is forecast to remain the case through 2040. In 2012, pipelines transported the next highest volume of commodities; however, by 2040, multiple modes and mail is expected to surpass pipelines in rank. Percentage-wise, by weight, both the air and multiple modes and mail categories are expected in increase by over 280 percent between 2012 and 2040, perhaps due to growth in demand for e-commerce. The only mode anticipated to lose share of shipped tonnage is the domestic water mode. More detailed tables regarding domestic flows are discussed later in this chapter.

TABLE 22. DOMESTIC MODE SHIPMENTS BY WEIGHT (IN KTONS*) AND VALUES WITHIN, TO, THROUGH, AND FROM CALIFORNIA (YEARS 2012 AND 2040)

Year	2012	2040	2012	2040	2012	2040
Mode	World to CA (1)		CA to World (2)		World, through CA to Other States (3)	
Truck	42,318	106,890	42,075	133,737	27,413	88,074
Rail	420	1,134	3,561	9,709	1,745	4,253
Water	1,581	5,359	153	341	138	2,163
Air (include truck-air)	31	135	15	62	8	40
Multiple modes and mail	2,506	6,423	9,013	29,757	18,569	63,873
Pipeline	11,513	20,806	3,024	7,082	158	2,363

Other and unknown	1,276	3,552	525	2,322	1,138	3,007
No domestic mode	36,334	41,351	--	--	--	--
Weight Totals in Ktons	95,979	185,649	58,366	183,009	49,169	163,773
Value Totals in Millions	$259,220	$734,713	$124,155	$516,385	$197,082	$783,062
Mode	Other States, through CA to World (4)		Within CA (5)		CA to Other States (6)	
Truck	11,384	43,925	1,023,115	1,416,020	76,928	122,136
Rail	5,221	20,645	9,947	11,122	9,384	17,883
Water	84	229	15,609	17,270	1,314	4,254
Air (include truck-air)	15	89	48	108	691	1,413
Multiple modes and mail	17,574	83,401	14,671	22,796	9,240	16,103
Pipeline	12	11	110,958	106,529	6,787	3,983
Other and unknown	410	1,465	22,882	37,989	1,635	2,344
Weight Totals in Ktons	34,699	149,766	1,197,230	1,611,833	105,979	168,116
Value Totals in Millions	$58,643	$398,772	$1,068,151	$1,883,837	$487,413	$989,704
Mode	Other States to CA (7)		World, through Other States to CA (8)		CA, through Other States to World (9)	
Truck	69,542	177,977	11,289	30,740	10,877	31,775
Rail	38,452	55,536	5,904	16,555	4,626	10,907
Water	17,605	3,796	515	1,945	141	337
Air (include truck-air)	296	811	425	1,660	189	571
Multiple modes and mail	18,105	37,042	3,775	7,472	3,237	7,095
Pipeline	56,734	58,844	37	1,580	--	--
Other and unknown	2,046	5,082	494	1,037	1,583	3,640
Weight Totals in Ktons	202,781	339,086	22,438	60,989	20,652	54,325
Value Totals in Millions	$419,520	$1,131,026	$110,409	$338,368	$47,738	$154,178

**Ktons represent thousands of short tons*
Note: Numbers in parentheses represent corresponding freight flows.
Source: FHWA Freight Analysis Framework Data (FAF 3.5)

CALIFORNIA INTRASTATE AND INTERSTATE FREIGHT FLOWS

Table 23 shows that the vast majority of movements by both weight and value begin and end within California (Flow 5). Total ktons transported within California were 1,197,230 in 2012 and are forecast to reach 1,611,833 ktons by 2040. The data shows the Los Angeles (LA) CSA as the strongest generator of shipments (477,048 ktons) and also the largest recipient (422,116 ktons). By 2040, only a modest increase in total shipments, to 484,088 ktons, is expected from LA CSA; however, an increase in value of over 160 percent is anticipated. Another large California shipment generator is the San Francisco CSA, with 297,391 ktons in 2012, a majority of which is expected to remain in the area of origin. By 2040, shipment volume from this CSA is projected to increase by 139 percent to 413,371 ktons, with a corresponding increase in value of nearly 182 percent, to $417.5 billion.

Tables 24 and 25 (Flows 6 and 7) represent domestic flows between other states and California, and vice versa. Most of the commodities by weight flow from California to Nevada, Arizona, and Texas, are expected to continue to 2040. Texas and Arizona lead in value of commodities coming from California. With regard to freight coming to California from other states, in 2012, Texas, Alaska, and Washington transported the most commodities by weight; which is forecast to change to Arizona, Texas, and Washington by 2040. By value, the top states were Texas, Tennessee, and Ohio in 2012, with Texas, Tennessee, and Arizona forecast to lead by 2040.

TABLE 23. CALIFORNIA (CA) INTRASTATE FREIGHT – FLOW 5 (YEARS 2012, 2025, AND 2040)

REGION		2012		2025		2040	
From	TO	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Los Angeles CA CSA*	Los Angeles CA CSA*	422,115.6	$438,887.9	398,294.5	$525,538.7	414,605.3	$632,358.4
	Remainder of CA	24,052.4	$32,408.2	23,171.6	$48,032.5	29,210.5	$80,913.8
	Sacramento CA-Nevada (NV) CSA (CA Part)	4,688.2	$7,129.1	4,890.0	$12,247.3	6,140.6	$29,664.0
	San Diego CA MSA**	14,006.8	$27,954.3	14,047.2	$35,582.1	14,960.4	$57,322.5
	San Francisco CA CSA	12,184.8	$24,904.7	14,900.0	$36,264.2	19,171.2	$53,271.8
Subtotal		477,047.9	$531,284.2	455,303.2	$657,664.8	484,088.0	$853,530.5
Remainder of California	Los Angeles CA CSA	31,002.4	$26,132.3	40,201.2	$36,212.5	49,187.3	$46,926.8
	Remainder of CA	177,864.7	$105,033.6	234,197.1	$171,413.8	311,067.1	$241,890.9
	Sacramento CA-NV CSA (CA Part)	12,669.0	$12,138.3	19,606.0	$21,081.8	27,482.8	$33,594.8
	San Diego CA MSA	1,795.2	$1,713.6	2,441.1	$2,615.3	3,102.7	$3,503.8
	San Francisco CA CSA	43,031.0	$29,725.4	52,518.5	$46,752.9	72,012.9	$65,969.0
Subtotal		266,362.4	$174,743.1	348,963.8	$278,076.3	462,852.8	$391,885.4
Sacra	Los Angeles CA CSA	3,199.2	$2,466.1	3,225.8	$2,770.0	4,913.3	$3,915.8

	Remainder of CA	19,844.0	$12,691.0	39,662.1	$14,421.4	50,201.4	$25,649.6
	Sacramento CA-NV CSA (CA Part)	58,758.4	$36,915.2	69,250.6	$47,256.7	97,928.0	$74,060.5
	San Diego CA MSA	398.4	$333.7	268.3	$443.1	464.9	$595.2
	San Francisco CA CSA	12,611.3	$11,946.7	25,249.5	$12,424.7	31,723.1	$20,879.6
	Subtotal	94,811.3	$64,352.6	137,656.3	$77,315.9	185,230.8	$125,100.7
San Diego CA MSA**	Los Angeles CA CSA	8,397.8	$17,510.7	8,975.1	$20,055.0	10,035.4	$26,310.6
	Remainder of CA	2,078.1	$2,326.8	1,605.8	$2,686.2	1,939.6	$4,203.2
	Sacramento CA-NV CSA (CA Part)	300.2	$543.6	405.8	$1,023.5	335.4	$1,897.5
	San Diego CA MSA	49,741.6	$45,817.2	46,383.2	$52,404.1	52,360.2	$59,004.7
	San Francisco CA CSA	1,099.8	$1,627.5	1,464.4	$2,765.7	1,619.7	$4,420.7
	Subtotal	61,617.4	$67,825.9	58,834.4	$78,934.5	66,290.4	$95,836.7
San Francisco CA CSA	Los Angeles CA CSA	13,538.3	$20,142.1	13,639.1	$25,599.3	15,642.4	$33,233.0
	Remainder of CA	26,080.9	$18,519.0	31,959.3	$24,763.7	38,673.0	$32,291.1
	Sacramento CA-NV CSA (CA Part)	8,059.1	$7,292.3	10,314.5	$13,732.5	14,814.3	$33,989.5
	San Diego CA MSA	1,056.7	$2,266.8	510.7	$3,030.3	592.9	$3,889.0
	San Francisco CA CSA	248,655.8	$181,725.1	282,610.1	$240,067.5	343,648.8	$314,081.6
	Subtotal	297,390.7	$229,945.3	339,033.7	$307,193.3	413,371.3	$417,484.2
	Grand Totals	1,197,229.6	$1,068,151.1	1,339,791.5	$1,399,184.8	1,611,833.4	$1,883,837.4

** CSA - Consolidated Statistical Area*

***MSA - Metropolitan Statistical Area*

Source: FHWA Freight analysis Framework Data (FAF 3)

TABLE 24. DOMESTIC FREIGHT FLOWS FROM CALIFORNIA TO OTHER UNITED STATES – FLOW 6

	2012		2025		2040	
State	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Alabama	731.0	$4,634.3	856.1	$7,745.9	1,014.9	$11,048.4
Alaska	145.5	$833.5	142.7	$781.6	195.6	$1,014.0
Arizona	13,092.8	$35,097.8	13,577.0	$48,540.0	19,016.8	$71,988.8
Arkansas	535.1	$2,591.0	691.9	$3,237.1	944.8	$4,643.1
Colorado	2,650.8	$11,393.5	3,577.3	$17,738.7	4,707.8	$25,721.0
Connecticut	411.3	$3,286.1	460.3	$4,888.7	483.9	$5,706.1
Delaware	114.9	$1,339.3	138.8	$1,700.5	206.0	$2,476.6
Florida	3,241.9	$28,379.0	3,562.8	$34,539.7	4,271.4	$45,951.4
Georgia	1,961.0	$13,665.7	2,351.3	$17,346.4	2,950.8	$22,867.7
Hawaii	1,281.5	$5,315.3	1,892.2	$8,721.4	2,702.6	$14,808.6
Idaho	841.6	$3,676.2	991.8	$5,974.1	1,213.4	$8,814.2
Illinois	4,329.5	$22,764.3	4,826.5	$27,380.6	5,958.4	$38,033.6
Indiana	1,574.7	$11,141.4	1,864.3	$17,952.6	2,240.9	$24,409.0

	2012		2025		2040	
Iowa	1,398.3	$3,989.9	2,738.2	$5,668.5	5,350.1	$9,047.0
Kansas	852.3	$4,994.2	946.8	$7,588.7	1,210.3	$11,085.0
Kentucky	1,159.4	$15,075.9	1,462.4	$22,254.9	2,092.4	$45,595.3
Louisiana	865.8	$3,174.6	866.2	$4,092.3	876.6	$5,464.8
Maine	112.6	$992.9	126.3	$1,534.6	167.3	$2,265.8
Maryland	1,018.8	$10,518.2	1,248.5	$12,942.2	1,695.5	$19,592.6
Massachusetts	1,004.2	$9,956.0	1,097.0	$10,813.7	1,402.6	$15,727.5
Michigan	1,409.2	$7,453.9	1,623.3	$10,810.4	2,117.0	$15,740.1
Minnesota	1,256.2	$7,696.3	1,476.0	$10,960.9	1,969.4	$16,653.2
Mississippi	367.1	$3,435.3	474.1	$4,325.6	557.4	$5,476.6
Missouri	1,550.0	$7,232.9	1,932.1	$9,873.5	2,513.4	$12,804.8
Montana	452.4	$1,737.5	537.3	$2,339.0	727.7	$3,827.4
Nebraska	481.0	$2,152.5	690.8	$3,341.4	971.2	$5,050.1
Nevada	16,614.1	$26,160.2	18,182.8	$32,888.8	23,914.4	$48,976.5
New Hampshire	154.5	$2,264.1	170.3	$2,820.0	196.8	$3,152.9
New Jersey	2,674.4	$21,292.1	2,806.6	$23,022.1	3,421.2	$32,400.4
New Mexico	1,350.9	$4,619.9	1,297.1	$5,309.2	1,777.7	$8,460.8
New York	2,590.7	$17,641.0	2,975.7	$25,333.6	3,967.8	$42,021.5
North Carolina	1,092.1	$10,629.0	1,252.1	$12,894.6	1,549.6	$18,522.9
North Dakota	119.8	$514.2	208.3	$799.9	293.5	$1,301.3
Ohio	2,115.5	$13,490.0	2,803.2	$20,609.3	3,742.1	$32,204.2
Oklahoma	686.7	$4,405.3	749.5	$5,840.6	892.5	$8,257.5
Oregon	7,564.4	$14,912.2	8,737.8	$21,626.2	11,932.0	$32,927.7
Pennsylvania	2,267.5	$20,907.7	2,844.2	$28,163.4	3,727.6	$39,851.4
Rhode Island	68.2	$622.9	57.9	$742.1	60.0	$841.6
South Carolina	412.4	$3,851.4	490.7	$5,007.9	663.0	$7,485.6
South Dakota	85.5	$535.5	102.1	$732.5	137.4	$1,224.0
Tennessee	1,227.7	$12,387.3	1,410.4	$15,846.6	2,054.7	$31,841.2
Texas	9,392.7	$53,772.2	13,108.0	$75,719.6	16,711.4	$106,360.5
Utah	4,148.7	$13,047.6	5,197.3	$21,384.1	7,032.7	$34,914.4
Vermont	60.8	$550.6	67.0	$703.8	88.8	$1,058.2
Virginia	1,009.3	$9,628.0	1,186.0	$12,303.8	1,524.7	$17,572.9
Washington	7,471.3	$23,125.3	12,408.6	$42,545.2	14,007.5	$46,822.9
Washington DC	35.9	$726.4	27.7	$379.5	33.4	$564.7
West Virginia	179.0	$911.7	181.4	$1,265.3	211.9	$2,092.8
Wisconsin	1,608.3	$8,154.8	1,944.5	$14,066.5	2,384.5	$23,255.1

	2012		2025		2040	
Wyoming	210.1	$736.3	189.9	$990.2	233.2	$1,780.6
Totals	105,979.2	$487,412.9	128,551.1	$674,087.6	168,116.5	$989,704.2

Source: FHWA Freight Analysis Framework Data (FAF 3)

TABLE 25. DOMESTIC FLOWS FROM OTHER UNITED STATES TO CALIFORNIA – FLOW 7

State of Origin	2012 Weight (in Ktons)	2012 Value (in Millions)	2025 Weight (in Ktons)	2025 Value (in Millions)	2040 Weight (in Ktons)	2040 Value (in Millions)
Alabama	3,544.6	$5,616.0	4,462.5	$7,493.0	4,539.1	$10,865.1
Alaska	14,400.3	$6,514.1	5,402.8	$2,552.5	2,495.6	$1,289.9
Arizona	7,367.3	$17,424.7	45,072.5	$41,161.3	57,041.4	$69,875.6
Arkansas	3,560.3	$5,272.9	4,761.9	$7,142.9	4,699.5	$8,252.7
Colorado	4,630.5	$8,023.4	6,272.1	$16,000.0	7,768.7	$25,905.9
Connecticut	623.6	$4,087.7	1,045.6	$9,673.3	2,212.7	$24,302.0
Delaware	179.7	$1,294.8	161.9	$1,110.8	248.3	$1,435.1
Florida	1,814.2	$8,434.1	5,530.9	$21,744.8	6,533.4	$44,478.9
Georgia	2,751.7	$7,936.8	4,014.1	$15,128.0	4,707.8	$21,767.2
Hawaii	144.1	$413.8	101.0	$328.6	179.8	$625.2
Idaho	3,601.0	$2,849.1	4,762.9	$3,856.3	6,474.0	$5,358.9
Illinois	6,540.4	$20,940.5	6,746.1	$34,451.6	8,036.7	$55,368.6
Indiana	2,574.2	$10,853.7	3,779.6	$19,739.0	4,391.8	$29,087.6
Iowa	3,443.6	$5,525.7	4,269.5	$7,667.9	5,039.7	$10,585.1
Kansas	2,806.8	$5,101.0	3,333.7	$8,273.3	4,220.0	$16,479.2
Kentucky	2,218.9	$10,497.3	3,472.9	$22,058.4	4,467.1	$29,279.7
Louisiana	9,660.2	$6,628.8	11,279.8	$10,370.7	11,914.1	$14,189.2
Maine	489.4	$1,044.7	1,041.5	$1,339.1	1,238.2	$1,861.5
Maryland	1,560.7	$3,158.3	1,651.2	$4,732.5	1,610.9	$5,683.6
Massachusetts	1,207.1	$8,524.3	1,931.3	$16,192.2	1,745.1	$25,014.6
Michigan	2,205.3	$12,508.2	3,805.4	$18,888.6	5,738.5	$27,339.5
Minnesota	4,296.8	$11,316.1	6,397.3	$25,844.1	8,180.7	$45,407.2
Mississippi	1,147.0	$2,914.9	1,542.2	$5,229.9	1,534.4	$5,057.7
Missouri	1,953.4	$9,476.2	2,662.4	$13,332.0	3,660.6	$21,043.2
Montana	2,681.2	$1,449.7	2,863.0	$2,219.4	2,802.7	$2,975.2
Nebraska	8,747.1	$4,852.3	7,681.9	$5,531.5	7,444.0	$6,668.8
Nevada	7,430.2	$12,657.7	9,522.4	$26,596.6	12,918.6	$41,092.0
New Hampshire	351.7	$1,851.1	613.9	$8,952.2	716.3	$13,119.3

State of Origin	2012 Weight (in Ktons)	2012 Value (in Millions)	2025 Weight (in Ktons)	2025 Value (in Millions)	2040 Weight (in Ktons)	2040 Value (in Millions)
New Jersey	1,101.5	$13,970.9	1,537.2	$23,486.6	2,136.5	$36,601.5
New Mexico	2,582.7	$2,106.0	2,102.7	$2,521.3	2,094.5	$3,380.5
New York	6,021.7	$20,386.7	6,802.0	$29,626.6	6,364.2	$41,189.0
North Carolina	1,436.5	$8,848.7	1,808.0	$13,113.2	2,105.9	$15,553.4
North Dakota	2,610.8	$1,351.5	8,981.1	$3,963.5	12,211.9	$5,456.9
Ohio	2,866.0	$21,111.0	4,509.9	$35,749.0	5,816.1	$58,387.0
Oklahoma	6,970.7	$4,230.5	10,996.5	$8,296.4	11,887.6	$13,031.9
Oregon	9,897.9	$15,854.4	11,548.5	$32,127.6	12,914.5	$48,254.3
Pennsylvania	3,331.4	$17,320.3	3,935.9	$26,242.4	4,155.8	$38,570.2
Rhode Island	91.0	$848.8	81.7	$861.0	85.4	$994.9
South Carolina	796.4	$3,721.7	1,362.5	$7,719.7	1,947.4	$13,376.6
South Dakota	1,268.4	$1,032.4	2,601.4	$1,794.1	3,559.1	$2,274.3
Tennessee	1,672.7	$26,375.8	2,687.0	$41,534.4	3,850.2	$79,013.6
Texas	31,238.5	$39,362.9	45,522.8	$58,300.7	46,052.0	$93,231.0
Utah	6,466.6	$8,089.6	10,840.3	$16,815.0	12,576.6	$25,081.6
Vermont	95.4	$356.6	256.3	$715.5	483.8	$1,170.1
Virginia	1,421.9	$5,297.6	1,496.7	$8,828.5	1,652.0	$11,371.0
Washington	12,635.2	$17,741.7	14,645.3	$29,013.5	16,666.3	$48,925.0
Washington DC	1.1	$26.5	2.5	$50.5	2.2	$44.7
West Virginia	1,336.8	$1,939.5	1,600.0	$2,745.9	1,319.3	$3,228.6
Wisconsin	2,165.0	$10,601.3	2,783.9	$16,535.8	3,513.7	$23,733.7
Wyoming	4,840.9	$1,777.8	5,686.6	$3,047.7	5,131.7	$3,747.6
Totals	202,780.7	$419,520.1	295,971.4	$720,699.4	339,086.1	$1,131,025.8

Source: FHWA Freight Analysis Framework Data (FAF 3)

INTERNATIONAL SHIPMENTS

This section discusses foreign shipments directly and indirectly destined for California (Flows 1 and 8) and export shipments originating in California (Flows 2 and 9). International shipments arrive in California by various modes; however, the vast majority of the weight brought into California is by ships, mainly through the ports of Los Angeles, Long Beach, and Oakland. Over 94 percent (over 90,000 ktons) of the total international (import mode) shipments to California in 2012 arrived by water (Table 26), only a slight drop in percentage to 92 percent is expected by 2040. Most of the goods arriving in ships are in either break bulk or containerized goods that are transshipped to other modes of transportation in order to be distributed throughout and beyond the State to their final destinations. As can be seen in the domestic mode portion of Table 30, a large shift occurs at the ports where shipments are transferred to trucks (mainly transloaded containerized), other and unknown modes, and pipelines.

Time-sensitive shipments of high value are flown into various California international airports, but primarily to Los Angeles International Airport (LAX). Table 30 illustrates that between 2012 and 2040; both by weight and value of goods inbound from world regions to California (by import mode) via air are forecast to increase by over 410 percent (from 687 ktons to nearly 2,826 ktons and $68.2 billion to $283.2 billion, respectively). In terms of value, air shipments are expected to be the fastest-growing mode of imported cargo into California. In 2012, air cargo accounted for 26 percent of the value of international cargo into the region and in 2040, that share is expected to jump to over 38 percent.

International flows directly into the State by weight are projected to grow by over 193 percent; from 95,979 ktons in 2012 to 185,649 ktons in 2040 (Table 26). The value of international shipments arriving directly into California between 2012 and 2040 is projected to increase by 283 percent. As represented in Table 31 (Flow 8), in 2012 and into the future, Washington and Texas lead the way in transported weight of foreign commodities destined for California, and Alaska and Texas lead by value.

By far, California's largest international trading (both import and export) region, both by weight and value is Eastern Asia – and this trend is forecast to continue into 2040 (see Tables 27 and 28). It is estimated that by 2040, commodities by weight from the Rest of Americas (import) region to California will surpass the volume from the Southwest and Central Asia region. However, by commodity value, Mexico will exceed all regions (except Eastern Asia), followed by Europe, and South East Asia and Oceania.

On the export side from California to world regions (Table 29), after Eastern Asia, both Mexico and Canada will continue to lead in weight transported; and by value, Eastern Asia, Europe and Mexico will lead. With regard to exports originating in California, and exiting to foreign lands through other states (Table 28 – Flow 9), most of the weight will continue to be transported

through Washington and Texas. By value of California commodities exiting from other state ports destined for world regions, Alaska and Texas lead the way in 2012 and will also in 2040.

International freight arriving into California through ground transportation import modes must come from either Mexico or Canada. In 2012, around five percent combined weight from these border countries (about 4,742 ktons) was imported into this country by rail and trucks, and in 2040 the share will reach about seven percent (to over 12,745 ktons). The total value of 2012 outbound shipments from California by all modes to Canada and Mexico was $47 billion (Table 32) and inbound shipments from those countries to California were worth $35.4 billion (from Table 28). By 2040, outbound shipments are projected to grow over 350 percent to $164.7 billion and inbound shipments by over 270 percent to $97.1 billion.

Although forecasted international flows by weight into California (Flows 1 and 8) in the domestic mode, will exhibit close to a 1:1 ratio with goods leaving the state for foreign destinations (Flows 2 and 9) in 2040, the weight of California exports is expected to increase much faster than imports destined for California over the forecast period (300 percent versus around 200 percent). However, the value of these imports will increase to $1.07 trillion, while exports will only reach $670 billion. Therefore, a large trade imbalance is forecast to remain into the future.

Table 26. Major World Regions Flows Destined for California
Flow 1 (Years 2012, 2025, and 2040)

By Import Region						
Import Region	**2012**		**2025**		**2040**	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Africa	4,364.5	$1,936.8	3,525.8	$1,537.2	4,364.6	$1,952.7
Canada	2,851.4	$2,617.4	6,838.9	$6,072.0	9,719.9	$10,138.2
Eastern Asia	28,047.1	$148,077.4	42,581.0	$269,259.7	67,073.5	$446,291.9
Europe	4,852.3	$29,754.5	6,424.8	$47,390.8	8,660.8	$78,001.0
Mexico	8,444.5	$32,851.5	11,786.2	$51,249.0	19,684.0	$86,978.4
Rest of Americas	16,663.1	$9,655.5	31,110.3	$20,156.0	39,715.0	$28,428.4
Southeast Asia and Oceania	4,717.7	$18,579.4	7,183.1	$36,465.7	10,978.6	$60,519.9

Southwest and Central Asia	26,038.6	$15,747.1	23,742.3	$17,304.6	25,452.5	$22,402.5
Totals	95,979.2	$259,219.7	133,192.2	$449,434.9	185,649.0	$734,713.0
By Import Mode						
Import Mode	**2012**		**2025**		**2040**	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Air (include truck-air)	686.5	$68,157.2	1,744.8	$159,651.3	2,825.8	$283,219.3
Multiple modes and mail	62.2	$1,389.1	104.9	$2,520.8	180.0	$4,350.6
Other and unknown	11.4	$181.1	15.6	$265.4	27.2	$461.7
Rail	58.1	$58.6	105.8	$79.4	148.3	$108.5
Truck	4,683.7	$30,888.7	7,502.2	$50,133.6	12,596.7	$85,951.9
Water	90,477.2	$158,545.0	123,719.0	$236,784.3	169,871.1	$360,621.0
Totals	95,979.2	$259,219.7	133,192.2	$449,434.9	185,649.0	$734,713.0
By Domestic Mode						
CA Intrastate Distribution Mode	**2012**		**2025**		**2040**	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Air (include truck-air)	30.9	$2,983.2	87.5	$6,145.7	134.7	$10,253.7
Multiple modes and mail	2,506.4	$9,014.2	4,260.6	$14,776.0	6,422.5	$23,258.7
Other and unknown	37,610.3	$23,420.71	38,530.2	$27,804.94	44,903.3	$36,831.21
Pipeline	11,512.6	$10,121.3	18,664.5	$13,314.1	20,806.3	$15,684.7
Rail	420.0	$581.1	802.1	$1,305.0	1,133.6	$2,251.0
Truck	42,318.4	$212,587.3	66,802.9	$384,595.1	106,889.9	$644,716.4
Water	1,580.6	$511.9	4,044.4	$1,494.2	5,358.7	$1,717.3
Totals	95,979.2	$259,219.7	133,192.2	$449,434.9	185,649.0	$734,713.0

Source: FHWA Freight Analysis Framework Data (FAF 3)

TABLE 27. TOTAL CALIFORNIA ORIGIN FLOWS TO MAJOR WORLD REGIONS – FLOWS 2 AND 9 (YEARS 2012, 2025, AND 2040)

CA Origin Flows Destined for Major World Regions						
World Major Region	2012		2025		2040	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Africa	1,024.4	$1,175.8	1,335.7	$1,613.0	1,872.2	$2,606.6
Canada	9,579.5	$20,000.8	16,542.3	$37,264.2	26,911.0	$63,956.5
Eastern Asia	36,838.4	$75,249.7	76,834.6	$173,988.7	113,309.8	$294,076.9
Europe	4,123.9	$25,530.2	6,622.9	$62,864.0	10,590.6	$111,836.6
Mexico	11,546.7	$27,010.3	20,286.5	$57,211.2	33,772.2	$100,751.5
Rest of Americas	3,917.0	$4,998.8	9,383.6	$14,401.5	14,050.7	$23,984.4
Southeast Asia and Oceania	7,669.9	$14,016.1	14,976.4	$34,085.3	22,921.5	$58,460.9
Southwest and Central Asia	4,318.1	$3,911.2	9,146.7	$8,404.8	13,905.7	$14,889.4
Totals	79,017.9	$171,892.9	155,128.7	$389,832.5	237,333.7	$670,562.7
CA Origin Flows (by Export Mode) Destined for Major World Regions						
Export Mode	2012		2025		2040	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Air (include truck-air)	750.8	$76,385.4	1,566.7	$185,527.4	2,641.5	$327,549.4
Multiple modes and mail	40.0	$497.7	70.7	$753.0	121.1	$1,092.7
Other and unknown	1,159.7	$5,993.3	1,828.2	$14,463.3	2,858.9	$23,508.3
Rail	3,671.7	$2,506.2	6,092.1	$3,778.9	9,733.9	$5,896.6
Truck	12,876.1	$32,105.4	24,392.1	$63,307.5	41,790.6	$112,629.5
Water	60,519.6	$54,404.9	121,179.0	$122,002.4	180,187.7	$199,886.2
Totals	79,017.9	$171,892.9	155,128.7	$389,832.5	237,333.7	$670,562.7

Source: FHWA Freight Analysis Framework Data (FAF 3)

TABLE 28. DOMESTIC FLOWS FROM CALIFORNIA, THROUGH STATES, TO WORLD – FLOW 9

	2012		2025		2040	
≈	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Alabama	22.1	$13.1	27.9	$20.6	44.3	$31.9
Alaska	127.0	$13,381.1	219.0	$29,701.7	350.9	$46,546.7
Arizona	209.0	$500.7	375.3	$873.9	663.5	$1,430.0
Colorado	0.0	$4.1	0.1	$6.2	0.2	$13.4
Delaware	0.8	$3.1	1.5	$5.7	2.3	$8.7
Florida	352.0	$518.7	690.8	$1,026.9	1,165.2	$1,759.8
Georgia	169.1	$603.0	255.2	$1,263.1	374.0	$2,251.0

Hawaii	153.4	$604.9	381.3	$1,575.5	680.3	$2,792.8
Idaho	187.6	$182.6	332.6	$343.0	587.4	$602.0
Illinois	4.5	$376.5	9.1	$647.3	17.3	$1,227.5
Indiana	0.2	$5.3	0.5	$11.9	1.0	$24.6
Kentucky	1.1	$11.8	1.6	$14.4	3.0	$26.8
Louisiana	1,688.6	$2,474.8	2,167.4	$4,474.1	3,994.6	$8,153.7
Maine	18.8	$85.4	27.5	$148.2	43.9	$248.6
Maryland	75.4	$190.9	187.9	$330.8	357.9	$595.4
Massachusetts	39.4	$23.3	87.7	$57.6	130.9	$93.6
Michigan	2,983.9	$6,778.2	4,878.9	$10,191.7	8,521.3	$17,944.1
Minnesota	56.5	$91.5	106.7	$178.5	174.9	$321.7
Mississippi	2.4	$1.2	3.3	$2.0	4.1	$3.1
Missouri	0.0	$0.1	0.0	$0.4	0.0	$0.6
Montana	878.1	$1,328.2	1,652.5	$2,413.2	2,914.7	$4,320.0
New Hampshire	0.2	$1.0	0.5	$2.1	0.8	$3.8
New Jersey	690.6	$1,214.0	1,645.8	$2,816.7	2,635.4	$4,918.5
New Mexico	5.6	$21.2	7.4	$29.2	12.3	$48.1
New York	881.5	$2,370.5	1,520.2	$3,958.0	2,573.1	$7,126.2
North Carolina	49.5	$73.9	96.4	$148.2	166.2	$268.5
North Dakota	262.0	$520.5	322.0	$725.3	502.5	$1,196.1
Ohio	30.4	$1,495.0	46.3	$2,748.9	101.9	$5,033.1
Oregon	1,399.2	$810.9	3,204.7	$1,846.9	3,837.2	$3,155.0
Pennsylvania	17.9	$21.5	37.3	$45.9	72.0	$93.1
Rhode Island	0.4	$0.7	0.3	$0.6	0.4	$0.9
South Carolina	78.0	$254.5	111.1	$456.7	168.4	$773.2
Tennessee	0.0	$1.7	0.1	$2.7	0.1	$4.0
Texas	3,966.3	$7,362.0	7,270.6	$12,071.4	11,940.1	$21,663.9
Vermont	3.7	$18.6	6.4	$45.3	11.6	$89.7
Virginia	182.9	$545.4	322.2	$904.9	533.2	$1,539.4
Washington	6,114.1	$5,847.4	8,012.1	$12,311.7	11,737.6	$19,866.4
Wisconsin	0.0	$0.6	0.0	$1.2	0.1	$2.3
Totals	20,652.4	$47,737.5	34,009.8	$91,402.7	54,324.9	$154,178.2

Source: FHWA Freight Analysis Framework Data (FAF 3)

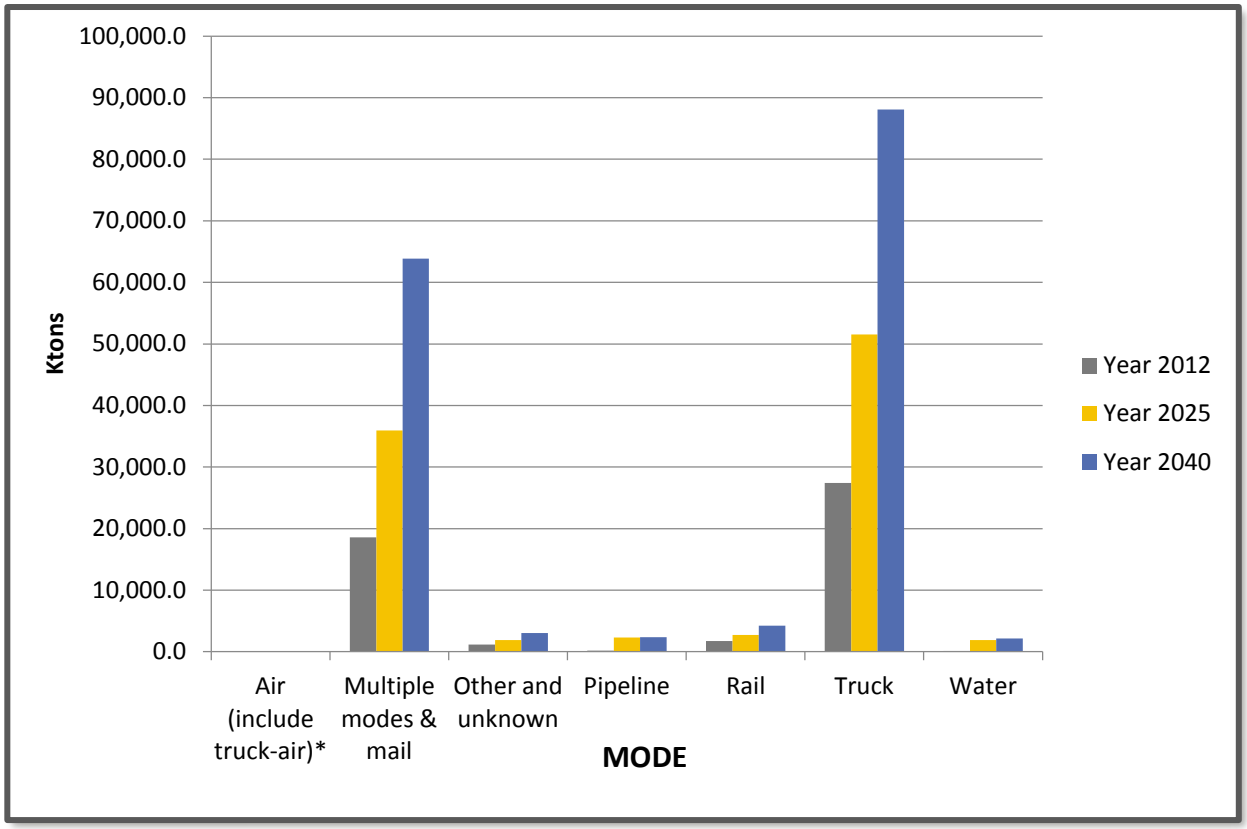
Exports and Imports through, Not destined for, California

This section discusses international shipments that are either destined for, or originating in, the rest of the US and heading to or departing from the eight major world regions using California's ports of entry/exit (i.e., through shipments). To a large extent, this can be considered discretionary trade that could go to/from other states without traversing California. This trade is an important component of the State freight sector as it supports many thousands of jobs at seaport, railroad, trucking, transloading, and warehousing facilities. Although these shipments are not destined for California, some processing or repacking of freight containers may occur here. Many of these goods enter and leave the State using the California SHS in trucks thus

exerting wear and tear on the SHS without generating much revenue to benefit State highway maintenance and operations.

Of the nine possible freight flows, the largest forecasted increases in transported weight will pass through the State between foreign origins and other states. Shipments from major world regions, through California, to other states are expected to increase in weight by 333 percent from 49,168 ktons to 163,773 ktons (Table 31 – Flow 3), while exports from other states through the State to other countries are estimated to increase by over 430 percent from 34,699 ktons to 149,766 ktons (Table 32 – Flow 4). Value figures between 2012 and 2040 in the export direction are forecast to skyrocket by approximately 680 percent from around $59 billion to nearly $399 billion, while in the reverse direction, an increase in import value of 397 percent from $197 billion to $783 billion has been forecast. In terms of value, international movements coming into California ports of entry, in transit for other states, will be almost double that of export flows by 2040 – which is an improvement from the 2012 imbalance, but more exports than imports is healthier for our economy.

FIGURE 54. UNITED STATES IMPORTS THROUGH CALIFORNIA (DOMESTIC MODE)



** Under 100 ktons (thousand short tons)*
Source: FHWA Freight Analysis Framework Data Tabulation Tool

Goods from major world regions destined for other states through California ports arriving in waterborne vessels was 47,521 ktons in 2012, it is expected to climb to 158,721 ktons by year 2040. The vast majority of imported goods are transferred and repacked at the ports of entry or nearby transloading facilities into larger or smaller containers and then onto trucks for subsequent transport to other states through the highway system. To a lesser extent, these imported goods are transported via the national freight rail system.

TABLE 29. IMPORT FLOWS FROM MAJOR WORLD REGIONS, DESTINED FOR US STATES, THROUGH CA FLOW 3 (2012, 2025, AND 2040)

By Region						
Major Region World	2012		2025		2040	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Africa	76.1	$76.7	1,897.3	$976.9	2,187.5	$1,185.9
Canada	88.4	$160.5	577.0	$507.0	634.2	$716.1
Eastern Asia	34,597.0	$151,488.9	67,817.1	$349,581.3	119,623.0	$625,224.5
Europe	3,712.9	$8,199.8	5,022.3	$14,758.1	7,883.5	$24,215.4
Mexico	1,646.4	$7,744.0	2,923.3	$13,069.2	5,024.2	$22,166.8
Rest of Americas	1,322.5	$1,217.4	2,934.7	$2,940.5	4,389.0	$4,436.3
Southeast Asia and Oceania	5,423.0	$19,447.1	9,294.8	$38,451.6	15,386.0	$67,995.3
Southwest and Central Asia	2,302.2	$8,747.4	5,868.3	$20,905.6	8,645.5	$37,121.8
Totals	49,168.5	$197,081.7	96,334.9	$441,190.1	163,772.8	$783,062.0
Flows from Major World Regions, Destined to US States, Through CA (by International Mode)						
International Mode Into CA	2012		2025		2040	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Air (include truck-air)	8.0	$808.0	26.7	$2,449.9	40.6	$3,851.1
Multiple modes and mail	22.1	$313.7	34.5	$572.4	56.1	$946.9
Other and unknown	0.0	$15.8	0.0	$27.1	0.0	$34.1
Rail	208.1	$128.1	330.3	$164.3	441.2	$220.9
Truck	1,409.1	$7,531.5	2,551.3	$12,810.4	4,513.4	$21,809.1
Water	47,521.2	$188,284.5	93,392.0	$425,166.0	158,721.4	$756,200.0
Totals	49,168.5	$197,081.7	96,334.9	$441,190.1	163,772.8	$783,062.0
Flows from Major World Regions, Destined to US States, Through CA (by Domestic Mode)						
Domestic Mode Out Of CA To US	**2012**		2025		2040	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Air (include truck-air)	7.9	$793.7	26.4	$2,429.8	40.1	$3,817.8
Multiple modes and mail	18,569.3	$79,613.2	35,935.5	$183,848.3	63,872.8	$333,508.6
Other and unknown	1,137.7	$4,038.6	1,878.5	$8,367.2	3,007.2	$14,561.4
Pipeline	158.3	$68.4	2,295.8	$1,001.4	2,363.5	$1,030.4

Rail	1,745.1	$3,032.5	2,738.3	$5,231.2	4,252.8	$8,499.3
Truck	27,412.5	$109,474.9	51,551.6	$239,452.4	88,073.8	$420,667.3
Water	137.7	$60.3	1,908.9	$859.9	2,162.7	$977.2
Totals	49,168.5	$197,081.7	96,334.9	$441,190.1	163,772.8	$783,062.0

Source: FHWA Freight Analysis Framework (FAF 3)

TABLE 30. EXPORTS FROM US STATES, THROUGH CALIFORNIA, TO MAJOR WORLD REGIONS – FLOW 4 (YEARS 2012, 2025, AND 2040)

Flows from States, Through CA, Destined for Major World Regions (by Domestic Mode)						
Domestic Mode Into CA	2012		2025		2040	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Air (include truck-air)	15.0	$1,519.2	43.0	$4,365.6	88.7	$9,396.2
Multiple modes and mail	17,574.1	$26,780.9	44,010.1	$103,343.4	83,400.9	$219,040.8
Other and unknown	409.8	$1,214.6	869.1	$5,409.4	1,465.4	$12,148.0
Pipeline	11.9	$4.1	8.3	$3.2	11.0	$4.2
Rail	5,220.5	$4,905.0	11,522.8	$14,668.6	20,645.3	$28,665.4
Truck	11,383.9	$24,113.9	24,530.2	$67,184.8	43,925.2	$129,190.2
Water	83.5	$105.0	148.4	$198.7	229.3	$327.3
Totals	34,698.6	$58,642.7	81,131.9	$195,173.7	149,765.8	$398,772.2
Flows from States, Through CA, Destined for Major World Regions (by Foreign Mode)						
International Export Mode	2012		2025		2040	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Air (include truck-air)	15.1	$1,525.5	43.2	$4,394.5	89.1	$9,458.9
Multiple modes and mail	0.1	$0.4	0.4	$1.5	0.6	$3.2
Other and unknown	2.0	$302.5	6.5	$1,434.4	11.7	$3,830.7
Pipeline	11.9	$4.1	8.3	$3.2	11.0	$4.2
Rail	691.0	$211.1	1,092.3	$383.9	1,588.8	$568.2
Truck	1,056.4	$2,642.1	2,345.6	$6,983.9	4,325.0	$13,751.6
Water	32,922.1	$53,956.9	77,635.8	$181,972.3	143,739.7	$371,155.3
Totals	34,698.6	$58,642.7	81,131.9	$195,173.7	149,765.8	$398,772.2
Flows from States, Through CA, Destined for Major World Regions (by Region)						
World Region Destination	2012		2025		2040	
	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)	Weight (in Ktons)	Value (in Millions)
Africa	24.1	$55.7	65.2	$214.2	133.0	$440.6
Canada	5.0	$102.2	12.4	$361.5	21.0	$767.1
Eastern Asia	24,855.2	$40,169.7	60,764.6	$146,268.3	113,894.5	$304,848.3
Europe	940.7	$703.1	1,939.3	$2,089.4	3,289.6	$3,917.6
Mexico	1,800.0	$3,370.4	3,495.1	$9,469.5	5,996.1	$19,556.9

Rest of Americas	628.3	$299.0	1,840.2	$1,203.3	3,063.2	$2,247.2
Southeast Asia and Oceania	4,892.0	$12,409.6	10,578.5	$31,631.0	19,238.8	$59,809.5
Southwest and Central Asia	1,553.4	$1,533.0	2,436.7	$3,936.4	4,129.6	$7,184.9
Totals	34,698.6	$58,642.7	81,131.9	$195,173.7	149,765.8	$398,772.2

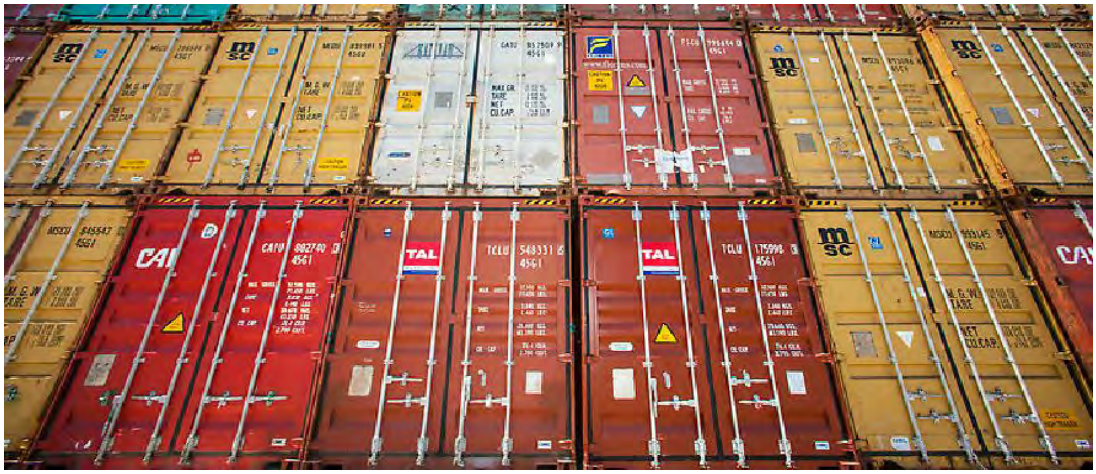
Source: FHWA Freight Analysis Framework (FAF 3)

CONCLUSION

The State's economy is freight transportation-dependent. Despite California's excellent rail, marine, highway, and air connections to national and international destinations, projected growth in freight, even with currently planned improvements, will strain the capacity of the transportation system and potentially increase community and environmental impacts. Investment in our transportation infrastructure is needed to remain competitive with other states and countries that are investing in their transportation networks and to reduce impacts to California's environment and communities. Along with the system investments, mitigation and implementation of best practices will be necessary.

The FAF freight data and forecasts strongly indicate that freight moved on trucks is expected to increase for the foreseeable future. The value of shipments is expected to grow over two times as fast as their weight, thus the cost of trucks delayed by congestion will rise accordingly. Trucks unable to meet shipment schedules will directly affect regional and State economic development and competitiveness. On the other hand, it takes several thousand passenger vehicles passing over a given segment of roadway to do the same damage as one fully loaded, heavy-duty 5-axle truck. Understanding that there will be more truck trips on California highways will inform decision makers of needed infrastructure improvements, such as strengthening pavement design standards, constructing dedicated truck facilities, shortening pavement maintenance schedules, and effecting modal shifts to avoid highway impacts.

FIGURE 55. TEU CONTAINERS



Source: Caltrans

SECTION 3: CONTEXT OF FREIGHT ISSUES IN CALIFORNIA

CHAPTER 3.1

NATIVE AMERICAN FREIGHT CONNECTIONS

California is home to more than one hundred federally recognized Native American Tribes along with many other tribes and individual Native Americans not formally recognized by the federal government. Many of the federally recognized tribes own tribal lands officially designated as reservations or rancherias[36]. Like all communities, Native American communities rely on the freight system to obtain goods and services and to export products. This chapter presents background information and connections between tribal lands and peoples and the California freight system. For more information, please visit Caltrans' Native American Liaison Branch at: http://www.dot.ca.gov/hq/tpp/offices/ocp/nalb/index.html.

NATIVE TRIBES AND POPULATION

> **California's 110 tribal governments represent almost 20 percent of the total number of federally recognized tribal governments in the contiguous United States and Alaska. Many more tribes are currently undergoing the complex process of applying for federal recognition status.[37]**

The nation's federally recognized tribes hold the political status of sovereign nations. This status confers the right of self-governance, including the ability to make laws and to be governed by those laws. Each tribe also has a tribal government that provides multiple programs and services. Once recognized, a tribe is legally entitled to a government-to-government relationship with the US, and the US government has a fiduciary trust responsibility to protect tribal lands, assets, resources, and treaty rights.

California has the nation's largest American Indian and Alaska Native population at 723,225, as reported in the 2010 US Census. Native Americans make up 1.7 percent of the total California population, with about two-thirds of the 58 counties having populations exceeding that percentage. After the city of New York, Los Angeles has the second highest population of American Indian and Alaska Natives (alone or in combination with other races), and as a percentage of total population; the city of Santa Rosa tops the list in California.

TRIBAL LANDS AND PROXIMITY TO FREIGHT FACILITIES

Great expanses of California are regarded as Native American ancestral lands that contain important sacred and spiritual locations, burial grounds, traditional foods and materials, and cultural resources. Currently, federally recognized tribal land is dispersed throughout the State but is most heavily concentrated in areas south and east of Los Angeles County and the Northern California coast. San Diego County is home to 17 tribal governments and 18 reservations – the most in one county in the contiguous US. Sixteen federally recognized tribes located in Riverside and San Bernardino counties are within the Southern California Association of Governments (SCAG) metropolitan planning region. Not all tribes have reservations or rancherias. In general, most tribal lands are located in rural areas.

State highway routes provide vital access and connectivity for tribal lands. However, given the rural location of most reservations and rancherias and the roadway geometric restrictions of some rural State highways, some of the State highways and many local roads providing access to tribal lands do not allow passage by full-size, 53-foot truck trailers (the standard "big rig"). Having to divide large truckloads of goods into smaller trucks can add cost and time to tribal shipment deliveries, resulting in increased business and consumer prices. Terminal access routes and last-mile freight connections are of vital importance to tribal governments engaging in economic development.

Many tribal lands are in close proximity to, or intersect with, California State Highway routes. One hundred (91 percent) of the federally recognized tribes in California have trust land within five miles of a State route. Tribal land in the possession of 86 (78 percent) of the recognized tribes is within two miles of State routes, and 39 (35 percent) of the tribal governments have trust land that intersects with the State Highway System.[38] The following maps (Figures 57 and 58) depict the general location of Native American trust lands in California and their proximity to the highway freight network and freight rail facilities. Due to their small size many of the trust lands are not visible on the maps. A more localized map may be needed to understand the context of a particular tribal location.

Since over 90 percent of tribal lands are close to State highways, improving freight infrastructure access between State thoroughfares and local tribal service roads is crucial. The handful of existing programs dedicated to tribal governments for accessibility projects are listed in Table 33. Continued partnerships with tribes, Caltrans, and local agencies will play a key role in enabling the necessary access and economic development to help alleviate high unemployment in Indian Country.

In its comments to the US Department of Transportation regarding the proposed national Primary Freight Network, the California State Transportation Agency (CalSTA) recommended that the federal freight planning guidance include roadway connections between trust lands

and the federally designated freight network similar to the proposed rural freight connectors and conceptual urban freight connectors. Federal guidance regarding the designation of the rural and urban connectors has not yet been issued. To be consistent with the pending federal designation process, Caltrans will engage in the designation of tribal freight connectors at the same time the rural and urban connectors are identified. In many cases, it is likely that the tribal and rural connectors will utilize the same routes.

As with many neighborhoods in close proximity to major truck routes or rail lines, residents may be negatively impacted by freight activity without benefit from the movement of that freight through their communities. The same can apply to tribal lands in close proximity to the freight system; however, through the consultation process, negative impacts may be identified, avoided or mitigated.

Given the rural location of most reservations and rancherias, tribal residents can rarely take advantage of freight-related employment opportunities. According to the US Department of Labor, 2010 national unemployment rates in Indian Country[39] were five times higher than among non-natives. A December 2013 economic policy report[40] confirms that the overall national Native American unemployment rate far exceeds the non-native unemployment rate. In November 2013, California's unemployment rate was 8.5 percent overall. However, 33 of the 58 counties (57 percent), mostly rural, had unemployment rates above the State average. With the exception of Sierra and Los Angeles counties, the remaining 31 counties with higher unemployment have Native American populations above the State average.

One way Native American tribes can reduce unemployment is through Tribal Employment Rights Ordinances (TEROs) – legislative acts, adopted by the governing body of a federally recognized tribe. Tribal employment policies and programs pursuant to a TERO create job opportunities for Native Americans, especially in rural counties and regions with limited economic opportunities, high unemployment rates, and high levels of Native Americans who live below the national poverty level. Examples of such policies include hiring preferences, job skills banks, and training. Caltrans supports these policies and programs through Department Deputy Directive (DD 74-R2) and related implementation guidelines.[41]

Building a stronger economic base on tribal lands can also help decrease unemployment and facilitate development in Indian Country, as can be attested by some tribes which are already benefitting from vibrant economies. Many Native American tribes have economic potential in areas such as timber, fisheries, gaming, minerals, and tourism; however, all of these businesses require access to goods movement infrastructure.

In particular, the gaming industry is a means for some tribes to generate revenue and job opportunities. As of July 2014, the California Gambling Control Commission identified 60 active tribal casino gaming sites throughout the State. These gaming facilities and the

hotel/conference centers that often accompany them generate significant freight activities for the shipment of food, other supplies, building materials, waste, and other items. Many sites are clustered in Southern California with several scattered throughout the Central Valley and many in northern portions of the State. Being in rural locations, many of these facilities possess only one ingress and egress route, which is shared by freight, customers, emergency services, and employee traffic.

According to the 2014 California Tribal Gaming Impact Study, tribes have a substantial role in State and local economies. In 2010, tribal gaming alone generated over $7.5 billion through operations with more than half ($3.9 billion) generated outside of direct spending from the gaming operations, meaning local businesses and trade located off reservation. In addition, tribes have created over 52,000 jobs generating over $2.7 billion in annual tribal and non-tribal employment income. Many non-gaming tribes are also financially supported by tribes with gaming activities.

TABLE 31. TRIBAL GOVERNMENT FINANCIAL PROGRAMS

Program	Funding Source	Description
Tribal Transportation Program	Highway Account	This program provides access to basic community services for tribal communities. This program replaces the Indian Reservation program.
Federal Lands Transportation Program	Highway Account	This program provides funding for projects that provide access to or within federal or tribal land.
Federal Lands Access Program	Highway Account	This program provides funding to improve access to transportation facilities that are located on or adjacent to, or that provide access to federal or tribal land.
Federal Lands Planning Program	Highway Account	This program provides funding for transportation planning activities on federal lands or tribal facilities, similar to the statewide and metropolitan transportation planning funding.
Tribal High Priority Projects Program	General Fund	This program supplements the Tribal Transportation Program (TTP) by providing funding to tribal communities for high priority projects, or emergency-disaster projects.
Public Transportation on Indian Reservations	Mass Transit Account	This program provides funding for capital, operating, planning, and administrative expenses for public transit projects for rural tribal communities.

Sources: Federal Highway Administration Moving Ahead for Progress in the 21st Century (MAP-21) Federal Lands Highway Programs and Federal Transit Administration Public Transportation on Indian Reservations websites

TRIBAL CONSULTATION

As sovereign powers, the governments of federally recognized tribes are entitled to consultation with the US government on matters affecting their respective tribal lands, cultural heritage sites, and other issues of significance to them. Caltrans Director's Policy (DP-19), "Working with Native American Communities," guides Caltrans' relationship with tribes, requiring the Department to "recognize and respect important California Native American rights, sites, traditions and practices." Tribal consultation is a vital step in the transportation planning process.

In preparing the CFMP, Caltrans staff participated in four "tribal listening sessions" in various locations within the state and received input from 40 Native American tribes at those sessions. The listening sessions were organized to engage with tribal representatives and others regarding several major plans in development by Caltrans, including the CFMP. The tribes provided invaluable insight into tribal transportation needs and tribal consultation protocol. During the sessions, participants expressed the desire for earlier and more substantive consultation. Some stated that tribal consultation should be more open and that tribal input should be more seriously considered. Participants generally agreed that further work should also be done to create partnerships between tribes and regional agencies on funding and project development.

As a result of these suggestions, Caltrans will work to improve the consultation process and build stronger partnerships with the Native American community. This consultation process will emphasize two-way collaboration, communication, education, and timely notice. Prior to the listening sessions, two representatives from the Native American community were invited to serve as members of the California Freight Advisory Committee and have done so. In addition, Caltrans freight planning staff regularly participates in Native American Advisory Committee (NAAC) meetings.

Ideally, early coordination would inform Caltrans District and Headquarters Native American Liaisons regarding freight-related transportation issues with Native American communities in their districts. On a parallel path, District System Planners should identify locations of planned projects in the vicinity of recognized tribes within all pertinent planning documents (for example, Transportation Concept Reports, Project Initiation Documents, and the Interregional Transportation Strategic Plan). With regard to projects that may impact tribal lands, Caltrans staff needs to reach out, coordinate, clarify, and resolve conflicts and ensure compliance with regulations and policy. Most important, Caltrans must begin the process of consultation at the earliest stage possible to allow Native American tribes to help shape the final product.

To further engage regional partners, efforts to identify Native American tribal transportation needs, including a freight project list, in Regional Transportation Plans (RTP) should be pursued. Where Tribal Transportation Plans include freight projects, those projects should be included in the CFMP project list. Nearby planned projects should involve consultation in the form of input to the planned freight project (including railroad crossings, bridge rehabilitation, and roadway expansion) location and design to minimize negative tribal impacts.

As a result of federal consultation requirements and the National Environmental Protection Act (NEPA), many tribes are already active participants with their local Metropolitan Planning Agencies (MPOs) and Regional Transportation Planning Agencies (RTPAs). Historic cultural resources are impacted by both existing and planned projects, and federal and state laws require proper mitigation.

Although the consultation process adds steps to project planning and development, it can ultimately result in speedier approvals and construction by leveraging local knowledge to avert problems and by avoiding challenges. There are also numerous other benefits to consultation, such as preservation of cultural sites, greater community input and buy-in, improved transportation efficiency, and expansion of multimodal transportation services for tribes. Tribal consultation is, therefore, not only an obligation but also an asset to Caltrans' business model.

TRIBAL NEEDS

During 2008-2010, the Caltrans Native American Liaison Branch (NALB) funded 43 statewide tribal transportation needs assessments and engaged in government-to-government consultation with California tribes implementing TERO in an effort to understand tribal transportation needs, employment issues, and concerns. The NALB also conducted research and analysis of TEROs and Native American unemployment issues. Through these efforts, NALB discovered that:

- California TERO Tribal Government unemployment rates ranged from approximately 40 to 75 percent compared to the already high rates of surrounding counties that ranged from 10.5 percent to 27 percent; and
- From 16.7 to 46.7 percent of Native American and Alaska Native populations live below the national poverty level (as determined by the US Census Bureau) in corresponding counties where TERO Tribes are located.[42]

Statewide tribal freight needs typically encompass project coordination and financial assistance with mutually beneficial transportation endeavors, such as roadway access, operations, and maintenance.

TABLE 32. FEDERALLY RECOGNIZED TRIBAL GOVERNMENTS IN CALIFORNIA

Tribe	County
Agua Caliente Band of Cahuilla Indians	Riverside
Alturas Rancheria of Pit River Indians	Modoc
Augustine Band of Cahuilla Mission Indians	Riverside
Barona Group of the Capitan Grande	San Diego
Bear River Band of Rohnerville Rancheria	Humboldt
Benton Paiute Reservation (U-Tu Utu Gwaitu Paiute Tribe)	Mono
Berry Creek Rancheria of Tyme Maidu Indians	Butte
Big Lagoon Rancheria	Humboldt
Big Pine Paiute Tribe of Owens Valley	Inyo
Big Sandy Rancheria of Mono Indians	Fresno

Tribe	County
Big Valley Rancheria of Pomo Indians	Lake
Bishop Paiute Tribe	Inyo
Blue Lake Rancheria	Humboldt
Bridgeport Paiute Indian Colony	Mono
Buena Vista Rancheria of Me-Wuk Indians	Amador
Cabazon Band of Indians	Riverside
Cachil Dehe Band of Wintun Indians (Colusa Rancheria)	Colusa
Cahto Tribe of the Laytonville Rancheria	Mendocino
Cahuilla Band of Mission Indians	Riverside
California Valley Miwok Tribe (aka Sheep Ranch Rancheria of Me-wuk)	Calaveras
Campo Kumeyaay Nation	San Diego
Cedarville Rancheria of Northern Paiute Indians	Modoc
Chemehuevi Reservation	San Bernardino
Chicken Ranch Rancheria of Me-Wuk	Tuolumne
Cloverdale Rancheria of Pomo Indians	Sonoma
Coast Indian Community of Resighini Rancheria	Del Norte
Cold Springs Rancheria of Mono Indians	Fresno
Colorado River Indian Tribes	San Bernardino
Cortina Rancheria of Wintun Indians	Colusa
Coyote Valley Band of Pomo Indians	Mendocino
Dry Creek Rancheria of Pomo Indians	Sonoma
Elem Indian Colony of Pomo (aka Sulphur Bank Rancheria)	Lake
Elk Valley Rancheria	Del Norte
Enterprise Rancheria of Maidu Indians	Butte
Ewiiaapaayp Band of Kumeyaay Indians (aka Cuyapaipe Band of Mission Indians)	San Diego
Federated Indians of Graton Rancheria (formerly known as the Federated Coast Miwok)	Sonoma
Fort Bidwell Indian Community of Paiute	Modoc
Fort Independence Community of Paiute	Inyo
Fort Mojave Indian Tribe	San Bernardino
Fort Yuma Quechan Indian Nation	Imperial
Greenville Rancheria of Maidu Indians	Plumas
Grindstone Rancheria of Wintun-Wailaki Indians	Glenn
Guidiville Band of Pomo Indians	Mendocino
Habematolel Pomo of Upper Lake	Lake
Hoopa Valley Tribe	Humboldt
Hopland Band of Pomo Indians	Mendocino

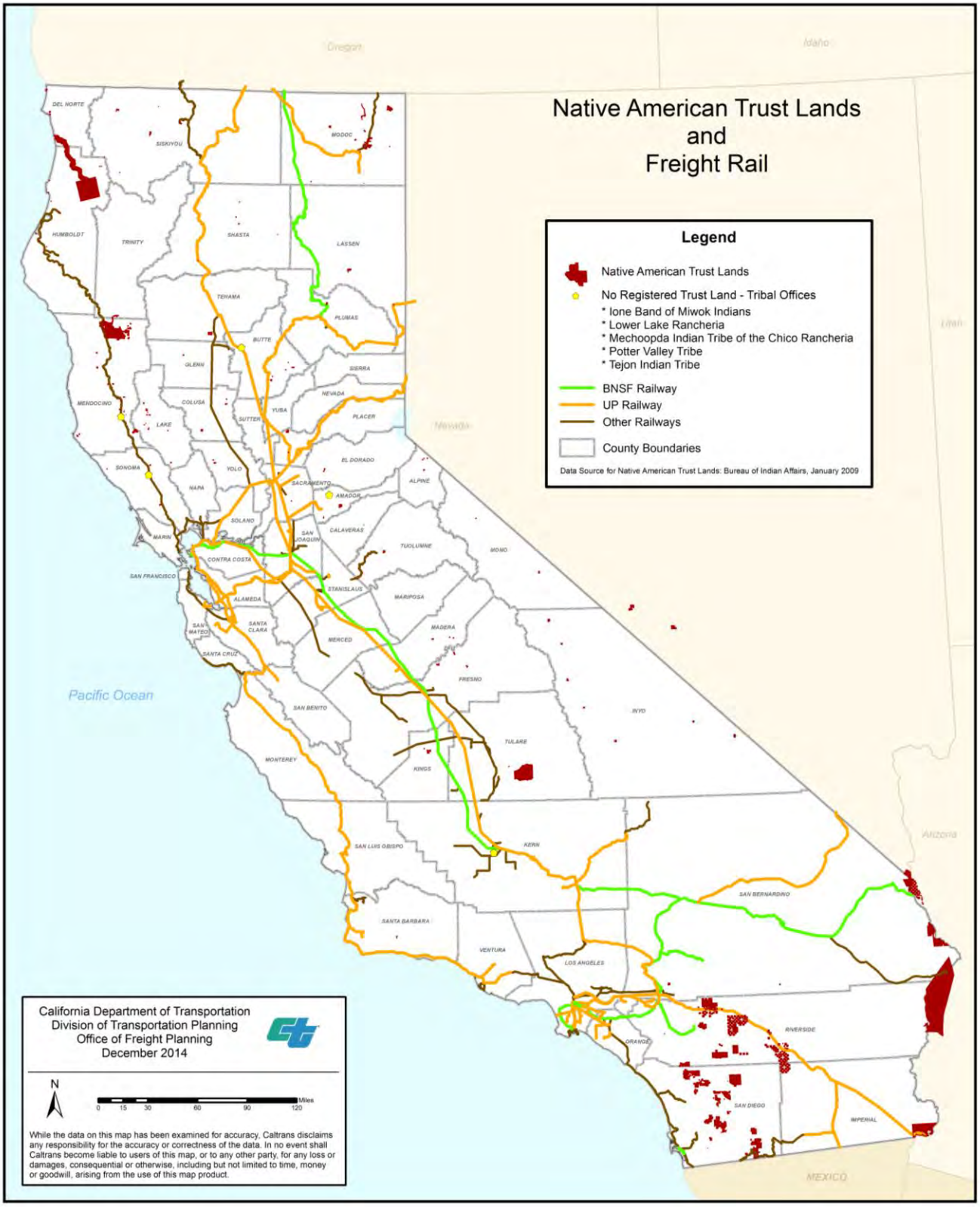
Tribe	County
Inaja and Cosmit Band of Mission Indians	San Diego
Ione Band of Miwok Indians	Amador
Jackson Band of Mi-Wuk Indians	Amador
Jamul Indian Village	San Diego
Karuk Tribe	Siskiyou
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	Sonoma
La Jolla Band of Luiseño Indians	San Diego
La Posta Band of Mission Indians	San Diego
Lone Pine Paiute-Shoshone Reservation	Inyo
Los Coyotes Band of Mission Indians	San Diego
Lower Lake Rancheria Koi Nation	Lake (and Sonoma)
Lytton Rancheria Band of Pomo Indians	Sonoma
Manchester Band of Pomo Indians of the Manchester-Point Arena Rancheria	Mendocino
Manzanita Band of Kumeyaay Nation	San Diego
Mechoopda Indian Tribe of Chico Rancheria	Butte
Mesa Grande Band of Mission Indians	San Diego
Middletown Rancheria of Pomo Indians	Lake
Mooretown Rancheria of Maidu Indians	Butte
Morongo Band of Mission Indians	Riverside
North Fork Rancheria of Mono Tribe	Madera
Pala Band of Mission Indians	San Diego
Paskenta Band of Nomlaki Indians	Tehama
Pauma Band of Luiseño Mission Indians (Pauma and Yuima)	San Diego
Pechanga Band of Luiseño Indians	Riverside
Picayune Rancheria of Chuckchansi	Madera
Pinoleville Pomo Nation	Mendocino
Pit River Tribe (includes XL Rancheria, Lookout Rancheria, Likely Rancheria)	Shasta
Potter Valley Tribe	Mendocino
Quartz Valley Indian Community	Siskiyou
Ramona Band of Cahuilla Mission Indians	Riverside
Redding Rancheria	Shasta
Redwood Valley Rancheria of Pomo	Mendocino
Rincon Band of Luiseño Indians	San Diego
Robinson Rancheria of Pomo Indians	Lake
Round Valley Reservation (Covelo Indian Community)	Mendocino
San Manuel Band of Serrano Mission Indians	Riverside

Tribe	County
San Pasqual Band of Mission Indians	San Diego
Santa Rosa Band of Cahuilla Indians	Riverside
Santa Ynez Band of Chumash Mission Indians	Santa Barbara
Santa Ysabel Band of Diegueño Indians	San Diego
Scotts Valley Band of Pomo	Lake
Sherwood Valley Rancheria of Pomo	Lake
Shingle Springs Band of Miwok Indians	El Dorado
Smith River Rancheria of California	Del Norte
Soboba Band of Luiseno Indians	Riverside
Susanville Indian Rancheria	Lassen
Sycuan Band of the Kumeyaay Nation	San Diego
Table Mountain Rancheria	Fresno
Tachi Yokut Tribe (Santa Rosa Rancheria)	Kings
Tejon Indian Tribe	Kern
Timbisha Shoshone Tribe	Inyo
Torres-Martinez Desert Cahuilla Indians	Riverside
Trinidad Rancheria/Cher-Ae Heights Indian Community	Humboldt
Tule River Indian Tribe	Tulare
Tuolumne Band of Me-Wuk	Tuolumne
Twenty-Nine Palms Band of Mission Indians	San Bernardino
United Auburn Indian Community of the Auburn Rancheria	Placer
Viejas Band of Mission Indians	San Diego
Washoe Tribe of Nevada and California	Alpine
Wilton Rancheria Indian Tribe	Sacramento
Wiyot Tribe, Table Bluff Reservation	Humboldt
Woodfords Community Tribal Council (Part of Washoe Tribe of Nevada and California)	Alpine
Yocha Dehe Wintun Nation (aka Rumsey Indian Rancheria of Wintun)	Yolo
Yurok Tribe	Humboldt

FIGURE 56. NATIVE AMERICAN TRUST LANDS AND HIGHWAY FREIGHT NETWORK

Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 57. NATIVE AMERICAN TRUST LANDS AND MAJOR FREIGHT RAIL FACILITIES



Source: Caltrans, Division of Transportation Planning (DOTP)

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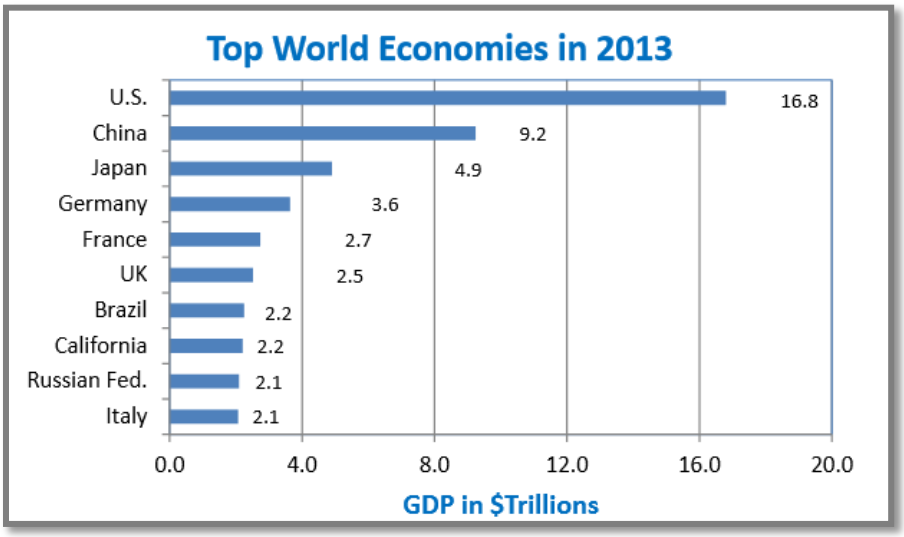
CHAPTER 3.2

ECONOMIC CONTEXT OF FREIGHT

In 2013, California had the eighth largest economy in the world, with the state's gross domestic product (GDP) at $2.2 trillion (see Figure 59).[43] With 12 percent of the United States (US) population, California accounts for 13 percent of the nation's economic output and is leading the nation in economic recovery. The US is the largest economy in the world with a GDP of $16.8 trillion, followed by China at over half of the US total.[44] California's trade is both domestic and global. International trade and investment are major economic engines for the state, broadly benefitting business, communities, consumers, and regional, state, and local governments. The state's economy depends on an efficient, integrated, sustainable, multimodal freight infrastructure. California's diversified economy and its prosperity are tied to exports and imports of both goods and services through the state's key gateways (seaports, airports, and border ports of entry) and the highway and rail corridors that connect the gateways to the rest of the state, the nation, and the world.

FIGURE 58. TOP WORLD ECONOMIES - 2013



Source: United States Of America (USA) Trade Online, US Census Bureau, Foreign Trade Division

Along with income, population drives demand for goods movement. At the domestic level, California's population grew by 0.9 percent, adding 356,000 residents in 2013 for a total state population of 38,340,000 people as of January 1, 2014.[45] California is home to the second largest consumer market in the US – the Los Angeles-Inland Empire region – the first being the

Greater Hudson Valley region of New York State. While imported consumer goods pass through the state to other parts of the US, most stay within the state and are purchased by California consumers. California has historically received 40 percent or more of the nation's trade with Asian countries, (48.8 percent in 2012 at Port of Long Beach/ Port of Los Angeles), with roughly 60 percent of that cargo destined for the California consumer market, primarily in the Los Angeles Basin.

FIGURE 59. CALIFORNIA EXPORTS 2007 - 2012

Source: United States Of America (USA) Trade Online, US Census Bureau, Foreign Trade Division

California's export merchandise in 2013 totaled $168.0 billion, with Mexico being the largest market ($23.9 billion), followed by Canada ($18.9 billion). The top exports from California in 2013 were computer and electronics equipment ($42.4 billion), transportation equipment ($17.7 billion), machinery (except electrical and that is covered under electronics equipment) ($15.1 billion), miscellaneous manufactured commodities ($14.6 billion), and agricultural products ($13.8 billion). One of California's fastest growing exports is dairy products, with exports in 2012 reaching $1.9 billion.

Globalization of production and trade is dependent on a highly complex network of freight transport. For the state to remain competitive, it must meet the demands for an efficient, reliable, safe, and flexible transportation network. In order to achieve the California Freight Mobility Plan's economic competiveness goal to improve the contribution of the California freight transportation system to economic efficiency, productivity, and competitiveness, the transportation system must be able to sustain, adapt, and keep pace in a highly competitive,

global economy. California's roads, highways, bridges, seaports, rail, and international borders are invaluable assets that are critical to our future. Most of the state's highways and bridges were built in the 1950s and 1960s, at a time of major public investment in California's transportation system. Recent highway investments have focused on system preservation, rehabilitation, and operating improvements, rather than capacity expansion and environmental and air quality considerations.

California is an attractive global gateway because of its geographic position, large population, and robust and vast transportation system. The state must continue to improve this system and marginalize costs in order to stay ahead of increasing competition and support the state's economic growth. Failure to invest will put the state and the rest of the nation, which depends on our gateways, at a competitive disadvantage at a time when production and the supply chain offers greater geographic flexibility. The 40 percent of the nation's trade with Asia that passes through California doesn't have to transit the state. If California fails to maintain the competiveness of its freight system, that 40 percent, and the jobs associated with it, could go to other states or even to Canada or Mexico.

Traffic congestion adds cost for shippers, carriers, and manufacturers, and those costs are ultimately passed on to consumers through higher prices or reduced economic competiveness. In 2005, the Federal Highway Administration reported that delay costs truckers $26.60 per hour.[46] But beyond labor costs, truck operating costs are directly connected to fuel costs and damaged vehicle equipment caused by poor road quality, creating higher insurance costs. Traffic bottlenecks and delay reduce reliability, particularly in California's urban areas. According to a Texas Transportation Institute study, in 2011, congestion in 498 metropolitan areas caused urban Americans to travel 5.5 billion hours more to purchase an extra 2.9 billion gallons of fuel for a congestion cost of $121 billion.[47] This severe congestion also greatly affects the trucking industry.

California's seaports are faced with competition from Canada, Mexico, and East Coast and Gulf Coast ports, which have gained substantial import volume and invested heavily in port and landside improvements. The West Coast ports have also made major investments knowing that it is critical to respond to those competitive challenges. Although container volumes in North America have slightly risen, the West Coast ports have seen their proportional share of the total volume drop as compared to their competitors. With the pending opening of the expanded Panama Canal in 2016, discretionary cargo (cargo that could go through another port) could intensify this trend, with larger ships going to the East Coast and Gulf Coast ports in order to eliminate cross-country land transport. By providing closer access to the Mid-West and East Coast markets via these ports shipping costs may be reduced. However, the voyage through the Panama Canal can add many days of travel and it is still uncertain how much trade will shift from West Coast ports to those in the Gulf and Atlantic regions. To remain competitive, it may

be necessary to further strengthen California's freight rail connection to the rest of the nation and address urban freight highway congestion in Southern and Northern California. [The Canal expansion project consists of two new sets of locks, one on the Pacific and one on the Atlantic side of the canal that will support the transition from 5,000 twenty-foot-equivalent-unit (TEU) vessels to 13,000-TEU vessels but cannot accommodate the Post-Panamax vessels of 18,000 TEUs.] Nicaragua is proposing to break ground this year on a 173-mile, inter-ocean canal that would stretch from Punta Gorda on the Caribbean through Lake Nicaragua to the mouth of Brito River on the Pacific. (For more information, refer to the trend sheet in the Appendix on the Nicaraguan Canal.)] Currently, the West Coast is usually the most efficient route for goods exported from China and Japan; however, manufacturers in other parts of Asia may gain efficiencies by accessing East Coast ports via the Suez Canal in Egypt. Canada and Mexico are also `investing in their ports and supporting infrastructure. In addition to investing in ports and supporting infrastructure, other methods to increase system efficiencies are also available including logistical improvements (e.g., ramp meters, HOV/HOT lanes, and adaptive traffic signal control systems).

Freight Gateways and Regions

California has four key freight gateway regions: the San Diego-Mexico Border region, the Los Angeles - Inland Empire region, the San Francisco Bay Area, and the Sacramento - San Joaquin Valley region. Two other regions in California also play critical roles in the state's economy, but are not major freight gateway regions: the North State Super Region and the Central Coast. For additional information on these two regions, please refer to Appendix H.

San Diego-Mexico Border

California shares a 130-mile border with Mexico. The California-Mexico international border has six points of entry (POEs): San Ysidro, Otay Mesa, Tecate, Calexico West, Calexico East, and Andrade. The Otay Mesa POE in San Diego County and the Calexico East POE in Imperial County are the two main California-Mexico freight gateways. The Otay Mesa POE is the second busiest commercial POE on the US-Mexico border, based on the number of truck crossings, and the busiest commercial land port in California. In 2012, the Otay Mesa POE handled approximately 1.5 million trucks and close to $35 billion worth of goods in both directions. The Calexico East POE serves nearly all of the international truck traffic crossings in Imperial County with a total trade value of over $12 billion dollars in 2012. The most transported commodities entering the US by truck through California POEs include pulp, paper, or allied products,[48] electrical machinery, equipment, and supplies; and food and farm products. The Southern California Association of Governments (SCAG) reported in their 2012-2035 Regional Transportation Plan and Sustainable Communities Strategy that in 2010, $10.4 billion of trade passed through the international ports of entry between the US and Mexico in Imperial County alone.

Trade with Mexico supports approximately six million US jobs. Mexico is California's largest export market at $62.3 billion in total trade. According to the US Chamber of Commerce,[49] US trade in goods and services with Canada and Mexico rose from $337 billion in 1993 to $1.182 trillion in 2011. Mexico and Canada make up the two largest markets for US exports, purchasing nearly one-third of all US merchandise. Economic trade through California border gateways has strained the State Highway System, which carries the majority of freight by truck. Border transportation infrastructure needs improvement to handle current and projected growth in bi-national trade. Poor border infrastructure and border crossing delays generate economic, health, and environmental impacts. For additional information on border crossing delays and their impact, see Chapter 3.7.

Los Angeles-Inland Empire (Los Angeles Basin)

The Los Angeles Basin includes Los Angeles, Riverside, San Bernardino, Orange, and Ventura counties, home to over 18 million people.[50] This region is the largest manufacturing center of any metropolitan area in the nation. The Los Angeles Basin is the nation's premier international gateway, supporting international trade through its seaports, international airports, and international land border crossings. These facilities are the critical link between the US economy and the Pacific Rim. A world-class transportation system and access to a large consumer market, both within the region and in nearby Western states, has made this region a logical location for national and regional distribution of a wide variety of products. Growth in logistics-based businesses has created a new and diverse source of employment and economic growth.

The value of two-way trade coming through the Los Angeles Customs District (LACD) was $403.5 billion in 2012, a record high that enabled the LACD to overtake the New York-New Jersey Customs District and regain its top ranking in 2012.[51] With a gain of 4.3 percent, two-way trade through the LACD grew somewhat faster than the US as a whole. Total LACD two-way trade value was forecast to increase by 2.4 percent in 2013 to $413 billion, with a 4.7 percent gain to $433 billion expected in 2014.[52]

The Ports of Los Angeles (POLA) and Long Beach (POLB) are the two largest container ports in North America in number of containers shipped, with the Port of Oakland being the nation's fifth largest container port. While taking in significant international import volumes, these ports – particularly Oakland – are also gateways for California global agricultural exports. Despite the recession, POLA and POLB retained their status as the nation's largest container ports, with the number of TEUs edging up from 14.0 million in 2011 to 14.1 million in 2012.

Economic growth in the Inland Empire areas of Riverside and San Bernardino counties was consistent throughout 2012 as a result of job growth, particularly over the second half of the year. The outlook for the regional economy has improved due to gains in the labor market,

along with gains in housing, construction, and manufacturing. This increase in activity, along with substantial growth in e-commerce, will positively impact the Inland Empire warehouse and distribution system network. Recently, logistics – the analysis and coordination of an organization's supply chain from raw materials to final product – has been the region's fastest growing job sector. The manufacturing sector has shown only minimal growth. Construction, one of the Inland Empire's job creators, is up, but not to pre-recession levels.

San Francisco Bay Area

The San Francisco Bay Area (Bay Area) is home to approximately 7.3 million people. Goods movement-dependent industries account for $490 billion in total output (50 percent of total regional output) and provide over 1.2 million jobs (28 percent of total regional employment). The large difference between the shares of industrial output and shares of employment provided by goods movement-dependent industries in the Bay Area is due to two factors: 1) manufacturing in the Bay Area has shifted increasingly toward high-value products that do not use labor-intensive production processes (such as biotechnology products); and 2) many high-tech product manufacturers have shifted their production activities offshore but have kept their value-added-design-and-development activities in the Bay Area.

Major manufacturing industries in the Bay Area include biotechnology, electronic and precision instruments, wine production, and petroleum refining and chemical production. These industries rely on expedited delivery services, reliable trucking, and air cargo (with the exception of petroleum refining and chemical production), all of which place major demands on transportation system performance. Petroleum and chemical products contribute significantly to the regional economy and are in the process of shifting their transportation mode from water to rail due to the reduction in oil shipments via marine vessels from Alaska and increases in oil shipments for continental US and Canada oil production areas.

Neither the transportation and warehousing sectors nor the wholesale trade sectors have high concentrations relative to national averages, even in the Bay Area sub-regions where goods movement hubs are located, such as the Port of Oakland and Oakland International Airport. To the extent that goods movement industries, particularly value-added services (services that complement and enhance warehousing, transportation, and logistics) and warehousing, can provide good-paying jobs to replace lost manufacturing jobs, the region may not be realizing the full economic benefits of its goods movement gateway and hub status in terms of regional job diversity, particularly in the area of blue-collar jobs.

The Port of Oakland has three core businesses: operation of Oakland International Airport, commercial real estate, and operation of the Port of Oakland. The Port of Oakland is the only California container port that handles more exports than imports. In 2010, the Port of Oakland commissioned an economic study that revealed that the Port and its partners provided almost

73,565 jobs in the region through direct, indirect, and induced employment. Nearly one in five direct jobs created by the Port is held by an Oakland resident, and the jobs associated with the Port paid 10 percent above the regional average. The Port paid over $56 million in taxes, which had a multiplier effect on the economy of over $230 million. Transportation sectors (truck, rail, and "other") were responsible for creating more than 76 percent of the 10,900 direct jobs, with warehousing and storage, government, and construction industries making up the rest. The indirect and induced jobs are mostly in the services sector and government.

San Joaquin Valley

Despite the recent national economic downturn, which hit the San Joaquin Valley particularly hard, the Valley's population has grown by more than 20 percent over the last 10 years, gaining nearly 700,000 residents since 2000 (ranking it as the sixth-fastest-growing region in the US). The current population is nearly 4 million, accounting for about 11 percent of the total statewide population. (Fresno, Kern, and San Joaquin counties combined account for over 50 percent of the population.) By 2040, the Valley's population is expected to more than double, to a total of nearly 8 million.

According to the US Bureau of Labor Statistics, the GDP for goods movement-dependent industries in the Valley's eight-county region in 2010 was approximately $56 billion. This is an increase of about 6 percent from 2009. The industries contributing the most to regional GDP include wholesale and retail trade ($14 billion, or 26 percent of the total), agriculture ($13 billion, or 24 percent of the total), and manufacturing ($12 billion, or 21 percent of the total).

In 2010, approximately 1.2 million people in the Valley were employed across all sectors. Of this total, over 44 percent (564,000 jobs) were associated with goods movement-dependent industries, including agriculture (187,000), wholesale and retail trade (170,000), manufacturing (102,000), and transportation and utilities (48,000). By 2040, goods movement-dependent jobs are expected to increase by over 45 percent (nearly 250,000 jobs). This growth will be led by industries such as transportation and warehousing, wholesale, and retail trade.

The Valley is home to more than 100,000 firms across all sectors, with over 30,000 in goods movement-dependent industries. The majority of businesses (between 80 and 90 percent) are small, with fewer than 20 employees. The largest goods movement-dependent Valley businesses are food growers and producers (including raw fruits and vegetables, nuts, milk and other dairy products), food processors and packagers, oil refineries and mineral mining operations, and trucking, and warehousing and distribution services.

The Valley produces a very large share of California's exports, especially agricultural products, with Canada as the leading destination. In 2010, Canada took in 20.8 percent of California's fresh fruits and nut exports and 64.9 percent of the State's exported edible vegetables and seeds. According to recent statistics from the California Department of Food and Agriculture,

the Valley accounts for over half the value of the state's agricultural commodities, underscoring the region's importance in the export market. The Valley has seen an increase in new distribution and production facilities in recent years partly due to relatively inexpensive land, available labor, and the relocation of many transloading, warehousing, and distribution facilities from the Bay Area due to competition for scarce land.

Sacramento Region

As of January 2013, the six counties that make up the Sacramento Region – El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba – had a population of just over 2.3 million people. In this region, manufacturing employment has been hovering just above 50,000 jobs. Long-term forecasts indicate that manufacturing's share of the regional employment market will continue to shrink. By contrast, jobs within the logistics sector are expected to increase. The logistics sector comprises a variety of industry groups that involve the shipping, receiving, processing, and storage of goods. In 2012, most of the resource-intensive, goods-producing industries were housed in Sacramento County with 47,500 goods-producing jobs.[53] Placer County will add another 7,000 jobs between 2012 and 2032, for a total of 24,000. El Dorado, the fastest growing county in the region, is expected to grow by more than 60 percent over a twenty-year period and reach a total of nearly 8,000 goods producing jobs.[54]

Employment in the wholesale sector accounts for 45 percent of the logistics sector total, with truck transportation the next largest group with more than 6,000 employees or approximately 11 percent. Logistics employment in Sacramento County is a relatively low share of the total, due to the higher share of government and office sector employment in Sacramento County. Logistics employment in Yolo County has a much higher share of employment, reflecting the concentration of logistics activity in West Sacramento, Woodland, and adjacent areas.

TABLE 33. COUNTY RANK BY GROSS VALUE OF AGRICULTURAL PRODUCTION (WITHOUT TIMBER) - 2012

County	Gross Value (x1,000)	State Rank
Yolo	$645,767	21
Sutter	$527,004	23
Sacramento	$460,651	25
Yuba	$207,904	31
El Dorado	$40,067	46
Total	**$**1881393	

Source: California Department of Food and Agricultural, 2013 Report

In 2012, the Sacramento Area Council of Governments (SACOG) region, produced some $1.8 billion worth of agricultural products, all of which traveled by truck over rural roads to shipping, processing or packing points. In Sacramento County, the top five crops were wine grapes, milk,

poultry, corn (field) and pears (Bartlett) which produced nearly $460 million in crops and livestock in 2012. Wine grapes alone accounted for over $149 million in gross value. For the same year, Yolo County's top crops were tomatoes (processing), wine grapes, rice, alfalfa hay, walnuts, and almonds. Sutter County's top crops include milling rice, English walnuts, plums, clingstone peaches and tomatoes (processing). El Dorado County top crops were apples, wine grapes, and cattle and calves.

The heaviest use of rural roads for goods movement is usually during the harvest season from mid-summer through fall. Agricultural products tend to move in bulk, with truckloads approaching the 80,000 pound gross vehicle weight limit. The heaviest products tend to be liquids (fluid milk, fruit juices, wine) and field crops (tomatoes, rice, corn). Inbound chemical fertilizers, pesticides, and animal feed are also very heavy. Many of the rural roads, particularly in the Delta Region, have very tight turns and narrow shoulders due to rivers, canals, and other waterways. Full-size 53-foot trailers may not be able to access agriculture production areas, requiring the use of more, smaller trucks, thus increasing total truck vehicle miles traveled, associated traffic congestion, and air pollutants.

Central California Coast

Since the rate of growth or decline of the population impacts the volume of goods shipments required for consumption by local residents, population trends are a key driver of freight demand in a region. The population of the five-county Central Coast region (Counties of Santa Barbara, San Benito, San Luis Obispo, Santa Cruz, and Monterey) was approximately 1.4 million in 2010. The population of the Central California Coast region grew by 5.1 percent from the years 2000 to 2010, or by nearly 70,000 people, which is about one-half the rate of the state's overall population growth. By 2040, the population of the region is expected to grow approximately 30 percent above 2010's levels.

Gross Regional Domestic Product (GRDP) is one way to measure the size of regional economic production, as it takes regional production, investment, and spending into account. Santa Barbara and Monterey counties are the largest economic engines in the Central Coast region at about $17.7 billion and $16.0 billion, respectively. The five-county Central Coast regional GRP was nearly $54 billion in 2009.

The region's key freight-dependent industries, agriculture, manufacturing, and truck transportation/warehousing are critical to the region in terms of jobs and contributions to the regional economy. They also are critical to one another. With the region's Salinas Valley and other intensively farmed areas serving as nationally significant producers of row crops (often produced on a year-round basis) that are highly perishable and have a high value, reliable trucking is particularly important so that crops are quickly and reliably transported to their final

destinations from neighborhood supermarkets and local restaurants to locations throughout the state and the nation.

Overall, the region experienced a positive growth trajectory from 2001 to 2009, expanding from about $48 billion in 2001 to $53.8 billion in 2009. The region's population and economic trends will impact freight demand in several ways. For example, there is a connection between gross regional domestic product (GRDP) and freight volumes on regional roads. In 1980 through 2004, freight volumes have followed GRDP growth in the US and are anticipated to continue this trend. As a result of this anticipated increase in regional GRDP, additional freight tonnage moving to, from, and within the Central Coast region is expected.

TABLE 34. CALIFORNIA'S TOP 10 AGRICULTURAL EXPORT MARKETS, 2011

Rank	Country	Export Value (millions)	Leading Exports
1	Canada	3,049	Wine, Lettuce, Strawberries
2	European Union	2,214	Almonds, Wine, Pistachios
3	China/Hong Kong	1,382	Almonds, Pistachios, Walnuts
4	Japan	1,415	Rice, Almonds, Beef and Products
5	Mexico	661	Dairy and Products, Processed Tomatoes, Table Grapes
6	South Korea	577	Oranges and Products, Rice, Beef and Products
7	India	360	Almonds, Cotton, Oranges and Products
8	United Arab Emirates	341	Almonds, Walnuts, Hay
9	Turkey	321	Walnuts, Almonds, Processed Tomatoes
10	Taiwan	249	Beef and Products, Almonds, Rice

Source: California Agricultural Resource Directory, 2010 to 2011

North State Super Region

The North State Super Region (NSSR) is a partnership representing the sixteen northern California Regional Transportation Agencies. Partner counties include Del Norte, Siskiyou, Modoc, Humboldt, Trinity, Shasta, Lassen, Mendocino, Tehama, Glenn, Lake, Colusa, Butte, Plumas, Sierra, and Nevada. This region contains 26 percent of California's total land area and 37 percent of California's state and federal roads.[55] The primary focus of the NSSR is to support economic development, access to goods and services, and efficient goods movement through strategic transportation network investments. As of January 2013, the population of the NSSR

was just over 1.1 million, roughly 2.5 percent of the state's population. North State's county populations vary considerably. The most populous counties are Butte, Shasta, and Humboldt. Together, these three counties house more than half of the North State's population, mostly concentrated in small urban areas. If the populations of the next three most populous counties are added, the top six counties account for about three-fourths of the North State's population.

In general, the North State is more dependent than the state as a whole on resource-based industries, such as agriculture, timber, fishing, and nature-related tourism. This reliance on resource-based industries suppresses the income levels of the region because the dominant industries are not highly value-added [North State Transportation for Economic Development Study (NSTEDS), 2013]. The lower regional economic benefits from the extraction of resources without processing or otherwise adding value to those resources restricts the value of those resources to the local economy as few additional jobs are created beyond those required to extract and transport the resources.

Due to a combination of overharvesting and restrictions on production, the counties that rely on the timber and fishing industries need to attract new industries to reverse declining incomes and a corresponding rise in poverty. Reliance on the extraction of natural resources has not been a viable regional economic development strategy in recent years. However, value-added agriculture has proven to be a viable option to generate more revenue from the region's production.

Areas with institutes of higher learning, such as Butte and Humboldt counties, have fared better than other North State counties. These counties are better positioned to attract new, diverse industries because they can provide training opportunities through their universities, as well as a better-educated workforce for technical, professional, and managerial positions. College towns also often offer a wider array of cultural and quality-of-life amenities that can help to attract residents and new industry. Growth in Chico provides an example of such development. Tourism continues to be a viable economic development strategy for many North State counties, despite seasonal limitations. Visitors spend roughly $2.4 billion per year in the North State, and tourism accounts for nearly 33,000 jobs.

Agricultural and food products account for $7 billion in value to the North State, representing nearly 57 percent of all commodity values in the region. This group includes several types of commodities: tree nuts; canned, pickled, and dried fruits and vegetables; flour and malt; beer; wine; and other alcoholic products; grains; fruit; and other crop farming products.

Wood products account for $1.5 billion in North State production, which is second to the $7 billion produced by agriculture and related industries. This commodity group includes the following products: dimension lumber and preserved wood products; logs and roundwood;

wood windows, doors, and millwork; forest, timber, and forest nursery products; paperboard containers; and miscellaneous wood products.

As reported in NSTEDS, the North State has experienced employment losses in many existing industries, such as wood products, construction, and retail trade. These findings are consistent with trends in the timber harvest, housing prices, and retail sales. However, several burgeoning sectors show promise at the state and national level. For example, crop production is growing faster in the North State than in the nation and agricultural support is also growing. Value-added agricultural production, such as canning, processing, and brewing, is a promising opportunity for the North State.

In 2011, California timber production by the top five counties totaled $183.3 million. All of these counties are in rural Northern California: Humboldt, Shasta, Lassen, Siskiyou, and Mendocino. Most of these areas are accessible only by highway. Demand from China is the major reason for increased log exports. In the second quarter of 2013, China imported 349 million board feet of West Coast logs, compared to 243 million board feet earlier in the year. At West Coast ports, 65 percent of outgoing logs and 35 percent of outgoing lumber were destined for China. Total US log exports in the first half of 2013 increased by more than 20 percent compared to the same period in 2012; at the same time, the value increased by more than 27 percent.

FIGURE 60. STATE ROUTE 299, REDDING TO ARCATA

Source: Caltrans

Agricultural, Food, and Beverages

The world's food supply chain has become increasingly global and connected. California is one of only five agricultural regions in world that has a Mediterranean climate. In 2012, California remained the number-one state in cash farm receipts, with 11.3 percent of the US total. California continues to lead the rest of the nation as the country's largest agricultural producer and exporter and "leads all other states in farm income."[56] The state's agricultural sector produces more than 350 commodities, more agricultural variety than any other state. In 2012, California's farmers and ranchers exported about 25 percent of the state's agricultural production. In dollar terms, California's agricultural exports reached a record-breaking $18.18 billion for 2012. California agricultural exports are in high demand globally, particularly in Asia, Europe, Mexico, and Canada.[57] The state produces nearly half of US-grown fruits, nuts and vegetables and leads the nation in milk production.[58] California almonds were the leading export in 2012 with $3.39 billion in international sales; dairy products were second at $1.31 billion in sales.[59] The top 10 agricultural commodities for 2012 were almonds, dairy products,

wine, pistachios, table grapes, rice, oranges and related products, processed tomatoes, and cotton.

California is the world's fourth-leading wine producer after France, Italy and Spain. In 2013, the US became the leading wine-consuming nation at 215 million cases (Wine Institute, 2014).[60] Based on the US Department of Agriculture statistics, Napa County holds the honors for the nation's highest price-per-ton of wine grapes, with an average of $3,389 per ton paid in 2011. Though having a lower ton price than the Napa Valley, the San Joaquin Valley produces most of the nation's wine grapes and wine. Ninety percent of the US wine exports are from California, with revenues reaching $1.55 billion in 2013.

Information Technology and Electronics

Stephen Levy, Director of the Center for Continuing Study of the California Economy said that "California's job growth is largely fueled by the three T's – tech, trade and tourism." The Bay Area, particularly the South Bay portion of the San Francisco Bay Area known as "Silicon Valley", has been home to the world's largest technology corporations and startups. Manufacturing is California's most export-intensive activity. In 2011, manufacturing exports represented 9.4 percent ($120 billion in goods) of California's GDP, and computers and electronic products constituted 29.3 percent of the state's total manufacturing exports.[61] In the San Jose-Sunnyvale-Santa Clara area as well as portions of Alameda and San Mateo counties, technology jobs contributed nearly 29 percent of the jobs in those areas.[62] In 2010, California was first in employment for computer systems and design, Internet and telecommunications, research and development, and engineering services employment.

Electronic Commerce (E-Commerce)

Electronic commerce, also known as e-commerce, has changed the retail industry. Nationally, a number of major e-commerce retailers are developing mega fulfillment centers of more than 2 million square feet near large population centers – especially in California's Inland Empire. Fulfillment centers are differentiated from traditional distribution centers by specialized features including greater building depth, with wider column spacing to accommodate a new generation of warehouse management systems. They also have a need for a higher density of truck and trailer parking, and trailer stalls. Truck and trailer density for some of the newest fulfillment centers, particularly those on regional highways and facilities on local and urban roads, can be three times that of traditional warehouses and distribution centers. As e-commerce continues to increase, companies will be placing greater demand on the distribution infrastructure. One freight aspect of e-commerce is likely to become more challenging over time: delivery vehicle access in dense urban settings. The increasing numbers of delivery vehicles serving dense urban neighborhoods are beginning to create traffic

congestion issues and conflicts with expanding transit services and bicycle networks. Urban street designs must address this issue.

E-commerce replaces paper with digital documents throughout the supply chain. The benefits include standardization of letters of instruction, commercial invoices, bills of landing, certificates, etc., with electronic data interchange. It is taking the paper out of the supply chain. Other benefits include lower costs, faster supply chain transit, greater accuracy, regulatory compliance, increased security and environmental friendliness. However, along with the benefits, comes the expectation that order fulfillment and delivery time will decrease, putting greater strain on already-congested highways and local roads and further challenging pavement maintenance efforts, particularly on roadways not designed for frequent truck traffic.

CONCLUSION

International and domestic trade is an economic driver for both the state and the nation. It is highly dependent on the availability of an integrated, efficient, reliable, safe, and flexible transportation network. Trade creates jobs (direct, induced, indirect, and related jobs), fuels economic growth, creates personal and business income, and generates revenue that contributes to federal, state, and local taxes. Throughout the entire supply chain, jobs are created in manufacturing, retailing, wholesaling, construction, transportation, and warehousing sectors. In a globally competitive environment, addressing freight infrastructure and operations needs must be a priority for California to achieve the CFMP goal of contributing to the state's economic competitiveness. But such efforts must be judicious, balancing economic goals with the goals of safety, security, community, and environmental stewardship.

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CHAPTER 3.3

LABOR AND WORKFORCE DEVELOPMENT

The transportation sector is a major component of California's economy and freight is an integral and important part of the transportation sector. California, in general, has seen an increase in freight sector hiring as the economy continues its recovery. Like the industry itself, freight-related employment is dynamic and continually changing. The push for both the freight transportation industry and labor is toward improved efficiency, greater reliability, reduced costs, increased productivity, faster transaction speed, and improved worker and public safety. This drive toward continual improvement across the entire freight transportation industry makes it necessary for California to adapt, evolve, and innovate to remain competitive at the national and international levels so that the freight sector can better serve the people of California. This is not just a challenge for industry and labor, it is also a challenge for government agencies, as well as educational and vocational training institutions. As new technologies and operations practices are introduced to meet an array of competitive, economic, environmental, safety, and community needs, support for workforce development must be a substantial part of the investment strategy. As critical as it is to make capital investments, there is also a parallel need to invest in human capital. For many years, we have faced the looming threat of the retirement of the baby boomer generation (individuals born between 1946 and 1964); however, that threat is now being realized and has already begun to put pressure on the labor force. Coupled with an economy that is growing, the need has become even greater to ensure that we develop a qualified, skilled labor force.

The Federal Highway Administration (FHWA) has predicted a 92.5 percent growth in freight demand from 2002-2035. Because of this anticipated growth, demand for all commercial freight modes (truck, ship, air, and rail) will increase, with the expectation that trucking will continue to have the dominant share of the activity. It is likely that the forecast growth rate will change when the FHWA is able to incorporate new data covering the recent recession and the still-unfolding economic recovery. With the constant advent of new technologies and shifting international trade and logistics, all forecasts have inherent inaccuracies, particularly in outlying years. Still, it is helpful to understand for both workforce development and infrastructure planning that the general trend is for significant expansion of the freight sector over the next 20 years.

According to the United States Department of Transportation, "one out of every seven jobs in the US is transportation related."[63] Freight, a sub-component of the transportation sector,

employs millions of workers nationwide. The range of job types, skill sets, and career paths within California's freight transportation industry is as diverse and complex as the industry itself. This sector provides a wide range of employment across the freight modes such as for-hire freight carriers, marine terminal workers, rail employees, airport employees (passenger and cargo), truck drivers, private transportation providers, freight forwarders, logistics providers, technicians that service and maintain vehicles, and others.

Many of the jobs in the freight transportation sector are well paid and require highly skilled, technically competent and/or well-educated employees, while many other jobs in the sector pay at or near minimum wage and require fewer skills and less training. The US Bureau of Labor Statistics (BLS) defines blue-collar and service occupations as those that include "precision production, crafts, and repair occupations; handlers; equipment cleaners, helpers, and laborers; and service occupations." According to June 4, 2014, Forbes magazine article, "many varied professions fall under the umbrella of "blue-collar" work, and many of them – particularly in the energy, construction, and transportation industries – pay in the high-five-to-six-figure range."[64]

In general, many of the low-skill positions that require repetitive physical labor are being replaced with automated systems, while at the same time, high-paying and highly skilled new positions are being created to develop, operate, and maintain those same automated systems. Rosalyn Wilson, in her article, "Transportation Jobs are Targets for Automation, Logisticians Are Safe," noted "many jobs have already been eliminated by automation in manufacturing when the tasks require precision, dexterity, and reproducibility, or are purely administrative, or provide a service that does not really require human interaction."[65] Logisticians analyze and coordinate an organization's supply chain from raw materials to final product, through distribution, allocation and delivery. Industries are finding cost savings through optimization of their supply chain. Many sectors in the freight industry are dependent on the skills of logisticians. According to the BLS, the median wage in 2012 for logisticians was $72,700 with employment projected to grow 22 percent from 2012 to 2022, "much faster than the average for all occupations."[66]

Employee retention in the freight industry is fairly strong, particularly in the maritime and rail industries. Turnover is much higher in the trucking industry where there continues to be driver shortages and difficulty with hiring and keeping drivers. In a recent article in the Journal of Commerce (JOC), truck drivers were referred to as "the basic unit of transportation capacity and the glue that holds supply chains together."[67] Through merger and acquisition, trucking companies are looking to increase efficiency through growth.[68] Consolidation of trucking firms is putting pressure on owner-operators and small, independent trucking firms. Many in the trucking industry are finding that the costs of regulation and compliance, along with fuel, maintenance, and insurance, are making it difficult to remain in business.

Warehousing and distribution centers are important sources of employment throughout the state, particularly in Southern California's Inland Empire region, where many new jobs have been created in response to the expansion in e-commerce and other factors. The San Joaquin Valley is also seeing growth in this industry. Land prices in the Valley are relatively low, and its close proximity to both Southern California and the San Francisco Bay Area enables employers to tap into a large blue-collar employee base.

According to the 2012 "Central Coast California Commercial Flows Study," California produces almost half of the US-grown fruits, nuts, and vegetables and, at that time, generated 6.5 percent of US revenue for livestock and associated products. In 2010, the Valley alone had 187,000 agriculture jobs. Agriculture is critical to the economic health of many California regions, including the Central Coast. To reach domestic and global markets, it is imperative that these freight-dependent industries have access to qualified transportation employees and high-quality access to the State and national freight transportation systems.

With much of air freight being transported as belly cargo in passenger planes, flight crews of those planes and their supporting ground crews, while not specifically freight industry employees, nonetheless are part of the freight industry's essential workforce. This chapter will not address labor and workforce development issues related to air cargo since many of those issues are also directly linked to air passenger service and an anticipated national shortage of qualified pilots, implementation of new flight control systems, and other factors that are beyond the scope of this plan.

WORKFORCE CHALLENGES AND OPPORTUNITIES

America's workforce will experience significant changes as "baby boomers" continue to retire, and many retiring early. It is estimated that over 70 million people will retire in the US in the next decade, and this will have massive impacts on industries throughout the country. Two of the California Freight Mobility Plan goals - to "improve the safety, security and resilience of the freight transportation systems" and to "improve the contribution of the California freight transportation system to economic efficiency, productivity and competiveness" are at the crux of this aging workforce shortage issue.

A June 19, 2013, US Government Accountability Office report on rail safety expressed concern about the Federal Rail Administration's ability to do their rail safety oversight mission due to a "lack of succession planning to ensure sufficient staff numbers and expertise"[69] for its aging inspector workforce – a vital safety function. However, the railroad industry is also experiencing similar issues with its aging workforce. Part of its response is for both the Class I and short line railroads to actively recruit military veterans. Veterans transition favorably to rail positions because they respond well to a chain of command, have experience working in teams, are able

to either bring a unique skill set or modify their skill sets to meet rail industry needs, and importantly, have been well-trained for safety.

According to a 2014 Congressional Budget Office (CBO) report, "The Slow Recovery of the Labor Market," the labor force is anticipated to grow at a slower rate relative to its average growth rate of the past few decades, and employment has risen sluggishly – much more slowly than it grew, on average, during the four previous recoveries that lasted more than one year.[70] Numerous factors are currently contributing to this sluggishness, including slower growth in the labor force due to an aging population, the lower labor force participation rate "which has been pushed down by an unusually large number of people deciding not to look for work because of a lack of job opportunities" and "unusually large difficulties in the process of matching workers and available jobs."[71] Many economists believe that baby boomer retirement may weigh down the economy and its long-term growth because fewer workers will be available to replace them, thus, increasing the production burden for those who remain in the labor force.

A November 14, 2013 article in Bloomberg Businessweek called out an issue that many in the freight industry are well aware of: "the coming truck driver drought."[72] In the US, the average age of a commercial truck driver is 55. Currently, it is estimated that there are 30,000 unfilled truck driving jobs,[73] and these numbers are continuing to climb. As the economy improves, the driver shortage is likely to be more acute and safety is likely to become a larger issue until new drivers develop the necessary experience and skills. Many trucking companies are actively recruiting military veterans. At the same time, many truck driving schools are also actively recruiting veterans to get training for their commercial driver's license using the Servicemen's Readjustment Act of 1944 (also known informally as the GI Bill) or other veteran's educational benefits. In addition, on November 21, 2011, President Obama signed into law the "Vow to Hire Heroes Act," which includes tax credits for businesses that hire veterans. Tax credits are based on the length a veteran has been unemployed and range from $2,400 to $5,600. For veteran's disabled in a combat zone and out of work for six months, the tax credit is $9,600.

In the aeronautics industry, the Federal Aviation Administration (FAA) increased the retirement age from the previous mandatory retirement at 55 years old to 65 years old for scheduled pilots. They also instituted a new rule that requires scheduled pilots to get a minimum amount of uninterrupted rest – at least 10 hours between shifts. This will impact the movement of belly cargo, but the rule does not apply to cargo pilots. Many cargo pilots are pushing to be included in this regulation; however, the FAA has not yet applied this to the cargo industry and is still considering the matter. It appears that across the industry (pilots, air traffic controllers, airport managers, etc.) there is a general consensus that the rate of retirement may hinder the development and operations of aviation activity. The FAA uses the Veterans Recruitment Appointment (VRA) program that acts as an expedited hiring authority to hire veterans. This

allows veterans to expedite the often-lengthy competitive hiring process typical of government jobs.

As companies address the issue of an aging workforce, some companies are using a two-pronged approach – retention and succession planning. One approach is to create new work opportunities for the workforce that is retiring by offering more flexibility with working hours and other strategies, such as job-sharing, flextime, telecommuting, and part-time work. In 2006, the American Association for Retired Persons, the Society for Human Resource Management, and the American Petroleum Institute, along with twenty major industry associations and membership organizations, created the Alliance for Experienced Workforce "to promote solution-based strategies for recruiting and retaining 50-plus workers and plan for the demographic challenges that face this country in the years ahead." Along with the named approaches, the alliance also included training programs to update skills, particularly technology skills. However, all levels of employment are undergoing constant change and face great challenges and opportunities as new technologies are developed and are applied throughout the freight industry. More transitional training will be needed as new technology displaces workers within the freight modes, the supply chain and logistics industries.

Freight Railroads

In 2013, US freight railroads employed more than 180,000 people, including 163,000 on Class I railroads and 18,000 on non-Class I railroads (short line and regional railroads). Nationwide, each freight rail job supports 4.5 jobs elsewhere in the economy.[74] Each $1 billion in new rail investment supports more than 17,000 jobs.[75]

The Class I and short line railroads in the state provide railroad careers that tend to be relatively stable. However, some short line railroads find it difficult to recruit employees due to the requirement for multiple skills while paying lower wages than Class I railroads. Railroad employees are also among the best-paid workers in American industry. In 2012, the average US freight railroad employee earned wages of $76,500 and fringe benefits worth $33,200 — for total compensation of $109,700.[76] By contrast, the average wage per full-time employee in the US in 2012 was $55,700 (73 percent of the comparable rail figure) and average total compensation was $69,200 (62 percent of the rail figure).[77] In 2011, there were approximately 8,900 people employed by railroads in California, earning an average salary and benefits of $110,470. [78]

Approximately 86 percent of Class I rail employees and more than half of non-Class I rail employees are unionized under one of more than a dozen labor unions. Labor relations in the rail industry are subject to the Railway Labor Act (RLA). Under the RLA, labor contracts do not expire. Rather, they remain in effect until modified by the parties involved through a complex negotiation process that can take years to conclude.

In 2013, railroads planned to hire some 11,000 new workers nationally, including many veterans. The nation's freight railroads honor a commitment going back more than a century to hire the nation's military service members. The railroads continue to hire veterans at a robust pace, such that veterans comprise 20 to 25 percent of current employees.[79]

TRUCKING

California's trucking industry is massive, reaching every community in the state and transporting almost everything that is shipped. Over 78 percent of California communities depend exclusively on trucks to move their goods.[80] At some point in the supply chain, the trucking industry transports almost all of the items produced in, imported into, or exported out of California. In 2010, trucks transported 88 percent of total manufactured tonnage in the state – over 3.8 million tons per day.[81] This is possible due to the tremendous investment in the infrastructure that accommodates trucks (roadways, for example), trucking equipment, and the people who drive, maintain, and manage the enormous trucking fleet.

As of May 2013, there were approximately 32,800 trucking companies located in California, most of them small, locally owned businesses. These companies are served by a wide range of supporting businesses, large and small. In 2013, the industry provided 622,280 jobs, or 1 out of every 21 jobs in the state. Total trucking industry wages paid in California in 2013 exceeded $30.7 billion, with an average annual trucking industry salary of $49,351.[82] The BLS reported in May 2013 that truck drivers, heavy-tractor-trailer, and light-delivery drivers held 207,750 jobs with a mean annual salary of $38,920. Over half of all drivers have earned a high school diploma or less. In addition to truck drivers, another 20,000 people are employed in supervisory and administrative roles with an annual mean wage of $58,000.[83]

Truck driver employment falls into several major categories: common carrier, contract carrier for-hire, private fleet, owner operator, courier fleet or a specialty carrier (refrigerated, hazardous material, tankers, or commodity-specific). Drivers are either paid a salary, paid hourly, or paid by the mile. Drivers who specialize in heavy hauling, or hauling low boys (low-deck semi-trailers with a drop in deck height), household moving services, cattle, hazardous materials, or refrigerated units are often paid more. For trucking companies that are unionized, employees are typically represented by the International Brotherhood of Teamsters Union.

According to a January 2013 Journal of Commerce article, the annualized driver turnover rate for large carriers has been above 90 percent. That means a carrier with 200 drivers would hire 180 drivers over the course of the year, sometimes filling the same seat several times. The article further goes on to say that both the average US wage and average truck driver wage rose 1.4 percent in 2012, but, the average truck driver wage, at $40,960, is 11.8 percent lower than the US average wage.[84]

MARITIME

In general, jobs in the maritime industry are well paid. Average annual full-time wages for fully registered, unionized longshore workers is approximately $142,000.[85] Maritime careers include shipping and transportation, navigation, engineers, offshore operations, technology, shipbuilding and repair, port and marine terminal operations, clerical, and others.

In the ocean shipping industry, two primary organizations represent labor and cargo carriers on the West Coast. Labor is represented by the International Longshore and Warehouse Union (ILWU). Domestic carriers, international carriers and stevedores that operate in California, Oregon, and Washington are represented by the Pacific Maritime Association (PMA). Members of the PMA hire workers represented by the ILWU. PMA members employ longshore, clerk, and foreman workers along with thousands of "casual" workers who typically work part-time.

The terms of employment are governed by labor contracts that are periodically negotiated between the two organizations, and the results applied to all US West Coast ports. Similar processes and organizations are found in the country's other maritime regions. When agreements cannot be reached, as happened in 2002 on the West Coast, strikes or lockouts can occur, which may severely disrupt the entire freight movement system, sometimes having lasting impacts as shippers permanently redirect their products to ports in other regions or countries. Tens of thousands of truckers, railroad, warehouse, and other support workers may be temporarily out of work because strikes and lockouts stop the flow of goods other sectors handle. While the 2002 dispute was resolved, it was estimated to cost the US economy $1 billion per day.[86]

As of December 2012, PMA members employed nearly 14,000 registered union workers at 29 West Coast ports in California, Oregon, and Washington, and thousands more workers who typically worked part-time. Since the signing of the 2002 agreement that brought the widespread use of technology to the West Coast, the registered workforce has increased by 32 percent. At the time of the CFMP's publication, PMA and the ILWU six-year labor contract (2008-2014) had expired and employees were working without a contract.

A major issue that promises to become more prevalent and complex over time is the implementation of cargo handling automation that enables the handling of more freight, more efficiently, and with fewer workers. Much of this technology is already in place in other countries, particularly Europe, where, in some locations, highly automated terminal operations that require very few people are already in operation. Some ports in California already have, or are planning to implement, various degrees of automation. It is a trend that is likely to accelerate.

The challenge for California's freight industry is to continue to be more efficient to remain economically competitive, and to improve environmental sustainability while retaining high-paying jobs and educating and training the freight industry workforce so that the industry can successfully transition for continued success going forward.

EDUCATION

A rich mix of goods movement-related undergraduate, graduate, and certificate programs are offered at California's state universities, community colleges, and private technical and vocational schools. Many of California's public colleges offer post-secondary education in logistics management, supply chain management, international logistics, etc. The University of California (UC), the California State University (CSU) system, and the California Community College system provide a range of programs from certificates and bachelor's degrees, to graduate and postgraduate programs.

The Maritime Administration nationally provides limited funding to six state maritime academies. One such academy, the California Maritime Academy (Academy), is part of the California State University System and is the only Maritime Academy on the West Coast. The Academy prepares students for careers in international business and logistics, marine engineering technology, global studies and maritime affairs, marine transportation, mechanical engineering, and facilities engineering technology. The nation's maritime academies educate young men and women for service in the American merchant marine, in the US Armed Forces, and in the nation's intermodal transportation system. Located in Vallejo, the Academy's enrollment is currently at approximately 1,100, with a low student-to-faculty ratio.

The Maritime Administration assists by providing training vessels to all six state maritime academies for use in at-sea training and as shoreside laboratories. The ship is a "floating classroom/laboratory" where classroom concepts in marine transportation, engineering and technology are practiced and applied. The school also sponsors study-abroad trips for students studying international business, logistics, maritime security and maritime policy. One of the schools, Cal Maritime, a campus of the California State University, states its mission is to:

> *"Provide each student with a college education combining intellectual learning, applied technology, leadership development, and global awareness. Provide the highest quality licensed officers and other personnel for the merchant marine and national maritime industries. Provide continuing education opportunities for those in the transportation and related industries. Be an information and technology resource center for the transportation and related industries."*[87]

CSU Long Beach is home to the Center for International Trade and Transportation (CITT). CITT has three major research centers – METRANS Transportation Center, a US Department of Transportation-designated University Transportation Center; the UC Davis-led National Center for Sustainable Transportation; and METROFREIGHT, a Volvo Research and Education Foundations Center of Excellence in Urban Freight, based at the University of Southern California. CITT offers credit and non-credit programs in integrated logistics, such as Global Logistics Specialist and the Marine Terminal Operations Professional designation, which is the only program of its kind in the country.

California's Community Colleges offer a wide range of workforce training that supports the freight industry. Sacramento City College and San Diego City College (SDCC) offer Railroad Operations associate degrees and certificate programs. SDCC offers an apprenticeship program in Railroad and Light Rail Operations. The following table is a sampling of the diversity of freight-related programs offered by California's Community Colleges.

TABLE 35. CALIFORNIA COMMUNITY COLLEGES – LOGISTICS/SUPPLY CHAIN MANAGEMENT PROGRAMS

Public Academic Institution	Associate Degree	Certificate Program
Cerritos College	Logistics Management	Logistics and Materials
Chaffey College	Logistics Management	Logistics Management
Coastline Community College	Supply Chain Management	Supply Chain Management
College of Alameda		Office Administration for the Logistics Industry
Fresno City College	Logistics and Distribution Management	Logistics and Distribution Management
Norco College	Logistics Management	Logistics Management
Riverside City College	Logistics Management	Logistics Management
Sacramento City College	Railroad Operations*	Railroad Operations*
San Joaquin Delta College	Transportation	Logistics and Transportation Supervisor Traffic Shipping and Receiving Technician
Santa Monica College	Logistics/Supply Chain Management	Logistics/Supply Chain Management Business Logistics
Skyline College		Import and Export Warehousing and Logistics Warehousing Entry Level International Logistics Custom Broker Air Freight Forwarding Ocean Freight Forwarding
Southwestern College	International Logistics and Transportation	International Logistics and Transportation

* Internships offered

Source: California Community Colleges Chancellor's Office

In addition to these certificate programs, apprenticeship programs and web-based training are offered by organizations, such as the International Union of Operating Engineers and the Teamsters Apprenticeship Fund for Southern California.

CONCLUSION

As the United States slowly recovers from the recent recession, it is entering a period during which a large portion of its baby boomer population is retired or nearing retirement age. Facing a potential future gap between increased demand for freight services and the potential reduction in the availability of a qualified workforce, California must strike a balance between automation of freight operations and the use of manual labor that will retain jobs for the State's population. While a variety of training and certification programs are currently being offered, the freight sector has a great need for proactive workforce development, succession training, and workforce retention programs. The creation of a comprehensive workforce development strategy across all would be beneficial in this regard.

CHAPTER 3.4

COMMUNITY AND ENVIRONMENTAL CONTEXT

The movement of freight is an essential part of our economy and provides needed goods, services, and employment for our communities. Nevertheless, freight transportation also has negative impacts.

Many local communities are impacted by freight transportation-related air pollution, noise, and traffic congestion. Large, heavy-duty vehicles such as trucks, trains, and cranes traditionally use diesel fuel, and cargo ships use bunker fuel on transoceanic voyages. In addition to large vehicles, the industry also uses a wide variety of smaller equipment, such as individual refrigeration units on truck trailers, forklifts, and onboard ship equipment that runs continuously or for long periods of time on diesel fuel. The emissions generated by diesel fuel consumption include diesel soot, other particulate matter (PM), nitrogen oxides (NOx), sulfur oxides (SOx), and other air pollutants that cause health and environmental problems. Children, the elderly, the pregnant and prenatal, and those in poor health are particularly impacted.

FIGURE 61. BASEBALL GAME, PORT OF LOS ANGELES NEAR VINCENT THOMAS BRIDGE

Source: California Air Resources Board

Balancing Economic Benefits with Environmental Costs

The environmental impacts of freight transportation vary by location. In many cases, freight-related activities are located in or adjacent to low-income or otherwise disadvantaged communities. The impacts and the potential solutions are highly dependent on the specific location of the freight activities. Mitigating the air quality issues and exposure to toxic diesel PM will require a long-term vision that includes specific actions needed to attain the vision. To accomplish this, we must call on California's freight industry as a strong partner in meeting these challenges and continue to ensure that the freight transportation system is reliable, efficient, supports a prosperous economy, and contributes to a health environment.

Disadvantaged Communities Hit Hardest

Community impacts from the freight industry, emissions from freight vehicles/equipment being a primary concern, have been longstanding issues. Recent studies show direct correlation between the proximity of community residents to heavy freight industry activity and increased incidence of serious resident health problems such as asthma, other respiratory ailments, cancer, cardiovascular disease, and premature death.[88] The impacts are not limited to health concerns; issues such as noise, traffic congestion, water quality, blight and aesthetics, and vibrations from heavy vehicles also affect the quality of life in many communities.

The freight industry is widely distributed within California along and near truck and rail corridors, rail yards, warehouse districts, sea and airports, intermodal transfer facilities, agricultural processing plants, and industrial and manufacturing facilities. Therefore, the impacts from the freight industry are also widely distributed. The worst effects are often borne by the communities residing near freight corridors and facilities, while the benefits of freight movement are shared by a larger population at the regional, state, or national level. Housing and schools are often located near, or immediately adjacent to, freight facilities—with the communities surrounding the freight network typically being minority, low income, and disproportionately impacted by environmental pollution. Many of California's most densely populated communities also have the greatest amount of freight activity. The connection between location and exposure impacts prompted the California Air Resources Board (ARB) to develop recommendations for locating new sensitive land uses in its Air Quality and Land Use Handbook.[89] This handbook includes recommendations for minimum distances of sensitive land uses – such as residences, schools, day care centers, playgrounds, and medical facilities – from highways and high-traffic roads, distribution centers, rail yards, and port facilities.

Putting census Data to Work

Widely available demographic analysis tools applied to US 2010 Census data enable project, corridor, subregional and regional analyses of "disadvantaged" communities based on a variety

of data sets (attributes), including income, number of housing units, age, ethnicity and other attributes that typify environmental justice populations that have been traditionally underrepresented in planning processes. Merging the data with mapping software provides a geographic representation of selected community attributes in relation to the freight system. Refining the analysis to examine a specified distance (buffer) from a freight corridor or other freight facility can provide planning-level information regarding potentially impacted community members that corresponds to the selected attribute and housing locations close to freight facilities.

The maps contained in Figures 62 through 64 provide examples of two attributes (median household income and number of housing units) that were applied in three regions of the State that have high freight volumes and high populations. Census Blocks that overlap with the specified buffer distance, (for the accompanying maps either 600 or 1,000 feet as reported on the maps) are included in their entirety, even though many of the Census Blocks extend beyond the buffer distance. This is necessary because available data at the mapping scale does not allow determination of specifically where, within the Census Blocks, people live. Such detailed information would be more appropriate at the project level. Very large Census Blocks are typically either sparsely populated or are an intact facility, such as an airport, seaport, or military base.

Disadvantaged communities can be represented by many attributes. For the purpose of the "Low Carbon Transit Operations Program," the "Transit and Intercity Rail Capital Program," and other programs financed by the Greenhouse Gas Reduction Fund, disadvantaged communities are defined by the California Environmental Protection Agency (CalEPA), in accordance with Senate Bill 535 (De Leon, Chapter 830, Statutes of 2012). CalEPA used the CalEnviroScreen tool to assess areas that are disproportionately affected by multiple types of pollution and areas with vulnerable populations. CalEnviroScreen includes numerous indicators in two broad categories – "burden of pollution," which includes exposures and environmental effects, and "population characteristics," which includes sensitive populations and socioeconomic factors. Additional information on the census tracts that have been defined as Senate Bill 535 disadvantaged communities is available at: http://www.calepa.ca.gov/EnvJustice/GHGInvest/.

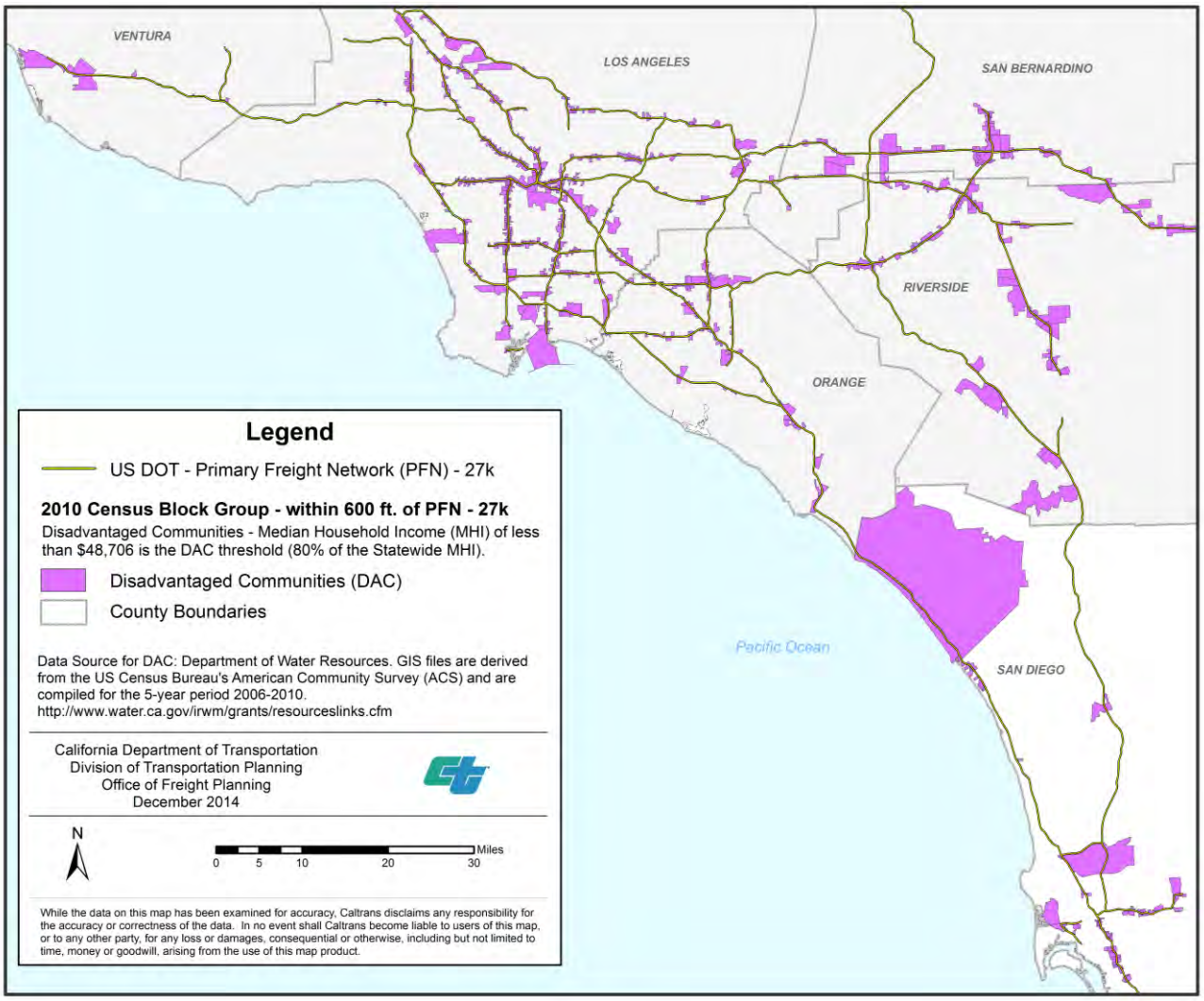
For purposes of demonstrating the analysis method for the CFMP; we selected median household income for Census Blocks located within 600 feet of the proposed federal Primary Freight Network in Southern California and the San Francisco Bay Area. We also selected the number of housing units located within 1,000 feet of Class I railroad tracks in the San Diego region. We could have also selected education level, employment, age, or other attributes. This information is important because it reveals whether low-income households are disproportionately located close to freight-related emission sources. Where low-income households are high in number within an impacted area, those areas may need (or require)

additional analytical studies in the planning and project development processes to identify and address freight impacts and mitigations. The potential benefits to communities for conducting such analyses is enormous and would be a worthy topic for a large study involving multiple agencies and stakeholders, a task that is beyond the scope, resources, and schedule of this Plan.

Analysis of community vulnerabilities to freight-related impacts is needed when developing corridor plans and individual projects and is appropriately done when preparing the respective environmental document for the corridor plan or project. It is also valuable for the CFMP to generally identify the statewide proximity of housing and population to high volume freight facilities. Having this broad view helps to emphasize the importance of addressing residential exposure to negative impacts from those facilities. To illustrate the issue, Caltrans used the California portion of the proposed 27,000-centerline-mile national Primary Freight Network (PFN) as the focus of analysis. Using 2010 US Census data, we identified how many housing units and the total population are located in 2010 Census Blocks (Block) that have at least a portion of the Block located within 1,000 feet of the PFN. California's preliminary portion of the proposed PFN is approximately 2,784 centerline miles of highway. We found that there are approximately 752,000 housing units in Census Blocks located within 1,000 feet of the California portion of the PFN, along with approximately 2,144,000 people. Of course, the total freight system is much more extensive than the PFN facilities and so the total number of housing units and total population within 1,000 feet of all high volume freight facilities is much larger than these figures. Therefore, reducing or eliminating harmful emissions from vehicles and equipment that traverse California's larger freight network provides direct benefit to millions of California residents of all ages, ethnicities, and incomes.

As discussed elsewhere in the CFMP, the widespread implementation of new technologies, energy sources and operations practices will be essential to reducing and eventually eliminating many of the negative impacts from the freight industry. Great progress has already been made and current programs are building on those successes to garner greater impact reductions. Where it is found that disadvantaged communities suffer disproportionally high levels of impacts, those communities may be particularly well suited for the early implementation of improved approaches to impact reduction. Such communities may also be well suited for proactive efforts to improve the environment, not just reactive efforts related to traditional freight projects. In its letter to the US DOT regarding the proposed national Primary Freight Network, the California State Transportation Agency (CalSTA) recommended that community and environmental improvement projects be specifically eligible for federal freight funding. This is an aspect of the California Freight Mobility Plan vision of "ensuring a prosperous economy, social equity, and human and environmental health."

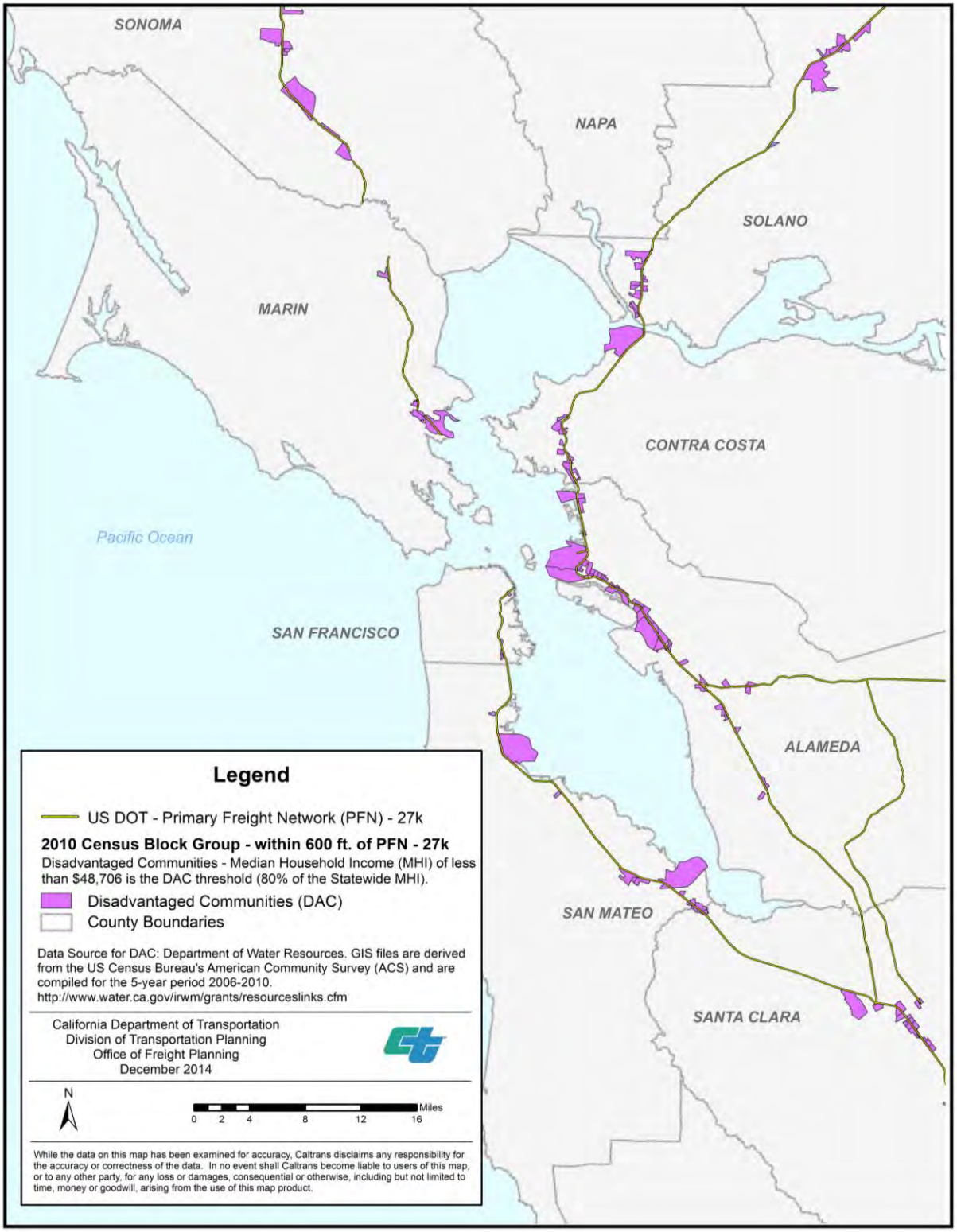
FIGURE 62. PRIMARY FREIGHT NETWORK WITH DISADVANTAGED COMMUNITIES SOUTHERN CALIFORNIA REGION



Source: Caltrans, Division of Transportation Planning (DOTP)

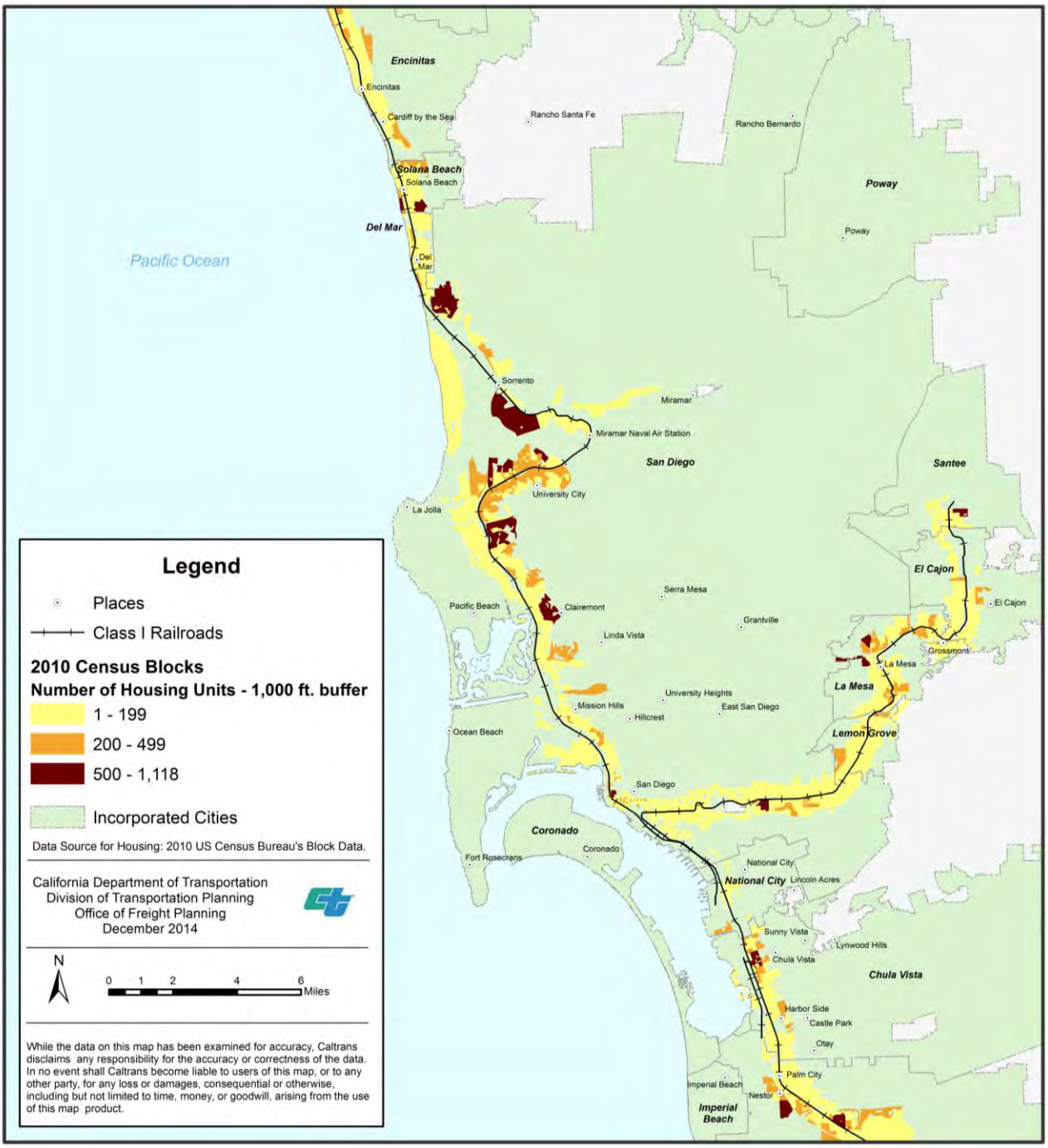
The depicted highway corridors are included in the US DOT proposed national Primary Freight Network. These highways have among the highest truck volumes in the nation. Some of the corridors have a continuous series of US Census Blocks with Median Household Income of less than $48,706, or 80 percent of the statewide Median Household Income, thus earning the designation "disadvantaged."

FIGURE 63. PRIMARY FREIGHT NETWORK WITH DISADVANTAGED COMMUNITIES – SAN FRANCISCO BAY AREA



Source: Caltrans, Division of Transportation Planning (DOTP)

FIGURE 64. PRIMARY FREIGHT NETWORK AND HOUSING UNITS – SAN DIEGO REGION



Source: Caltrans, Division of Transportation Planning (DOTP)

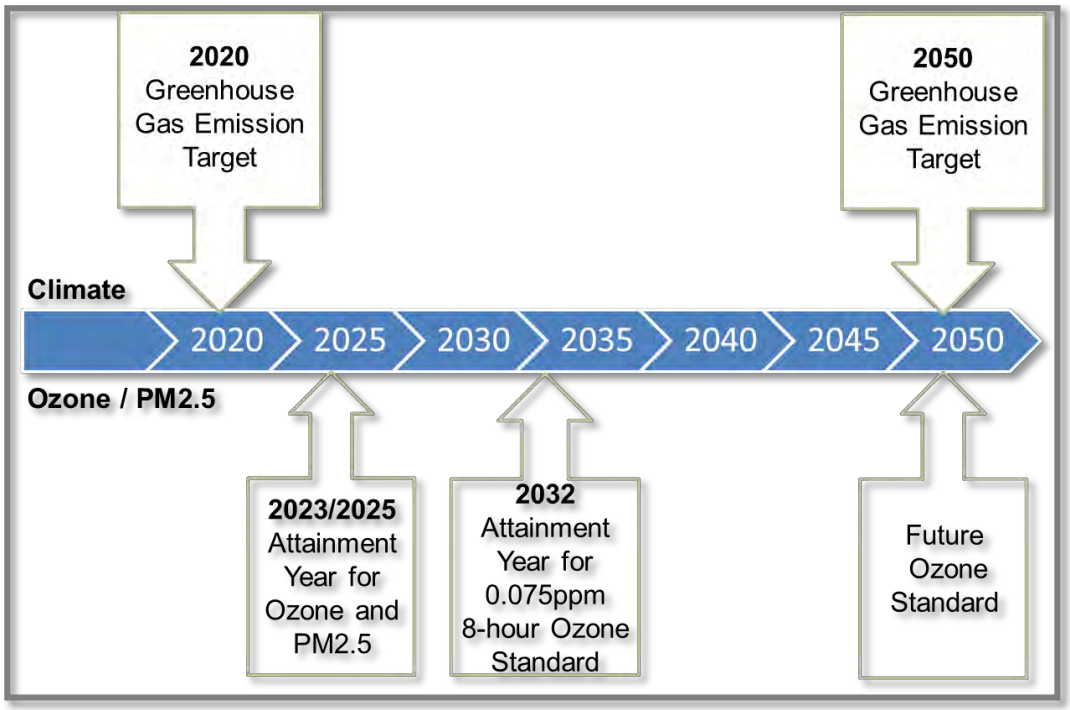
AIR QUALITY AND CLIMATE CHANGE

Transportation is the largest contributor to greenhouse gas (GHG) emissions, with transportation sector tailpipe emissions accounting for about 38 percent of all emissions. It is the state's primary source of smog creation and toxic air pollution. Emissions from freight equipment represents about 10 percent of statewide GHG emissions, about 70 percent of

statewide diesel particulate matter (PM) emissions – a toxic air pollutant and the component of black carbon that is a powerful, short-lived climate pollutant – and about 45 percent of statewide NOx emissions.[90]

In addition to the Federal Clean Air Act that establishes emission targets and requires states to adopt enforceable plans to achieve and maintain air quality standards, California has long been known for its own stringent air quality standards. In recent years, the State passed legislation setting the context for needed emission reductions and improvements to community health, as displayed in Figure 65 below. The Global Warming Solutions Act of 2006 (AB 32, Nunez)[91] requires California to reduce GHG emissions to 1990 levels by 2020, and to maintain and continue reductions beyond 2020. Governor Brown reaffirmed California's commitment to reduce GHG emissions 80 percent from 1990 levels by 2050 in Executive Order B-16-2012[92] by establishing a parallel transportation sector target. Mandatory regional criteria pollutant reduction targets will be established in the 2016 State Implementation Plan (SIP), with expected reductions on the order of 90 percent below 2010 levels in the South Coast and similar reductions in the San Joaquin Valley by 2032 in order to meet the national ambient air quality standard for ozone in 2032.

FIGURE 65. AIR QUALITY AND CLIMATE CHANGE PLANNING HORIZONS



In 1998, California identified diesel exhaust PM as a toxic air contaminant based on its potential to cause cancer, premature death, and other health problems. Fine particulate matter (PM2.5) is particularly damaging to human health. The most vulnerable segments of the population are

children, whose lungs are still developing, and the elderly, who may have other serious health problems. Ongoing research continues to evaluate the exposure and serious health effects of diesel PM.

The ARB is the California state agency charged with developing regulations, strategies, and programs to reduce the emission of smog-forming pollutants, toxics, and GHG emissions from mobile sources such as automobiles, trucks, construction equipment, and other vehicles. The ARB works in partnership with local air districts that have additional responsibilities to reduce emissions. The ARB, along with its air district partners, administers grant and incentive funding to assist trucking and freight operators in purchasing cleaner-than-required vehicles/equipment or complying with regulations sooner than required. In addition, ARB, along with the California Pollution Control Financing Authority, administers a loan assistance program that provides participating financial institutions with incentives to make loans to small businesses for compliant trucks, buses, and retrofit devices. These funding programs were discussed in depth in Chapter 1.4. They include the Carl Moyer Program, Proposition 1B Goods Movement Emission Reduction Program, the ARB Air Quality Improvement Program (AQIP), and the California Energy Commission's (CEC) Alternative and Renewable Fuel and Vehicle Technology Program.

MAP-21[93] sets national performance goals for the Federal-Aid Highway Program in seven areas, including environmental sustainability. To evaluate progress in meeting the goals, the United States Department of Transportation (US DOT) must establish performance measures in the seven areas including traffic congestion and on-road mobile source emissions. In addition, US DOT is tasked in the national freight strategic plan with identifying best practices for improving the performance of the national freight network and mitigating the impacts of freight movement on communities. Many of the programs being implemented in California can serve as best practices for other states to consider implementing and even for national programs.

Other Community Impacts

Beyond the impact of emissions, freight transportation also produces noise, undesirable nighttime lighting, vibrations and traffic congestion, all of which affect the quality of life in communities surrounding freight facilities. Each of these needs to be addressed within the context of the communities where they occur and through larger programs that seek to reduce impacts across many communities or address a specific cause at the source. Such impact reduction projects should be eligible for funding from freight program sources, not just as mitigations for new projects but also as improvements for existing problems.

Positive Impact on Jobs

To better understand community perspectives regarding freight impacts, Caltrans conducted a series of focus groups in early 2013, with representatives from concerned community groups (See Appendix G - Stakeholder Survey Report). Focus groups were held in Fresno, Oakland, Los Angeles, and San Bernardino. During the sessions, it was found that most respondents agreed that negative effects of freight include impacts to health, noise, air quality, traffic, vibration, pavement damage, and disproportionate impacts to environmental justice communities. Participants also identified positive effects from the freight industry, particularly in relation to job creation and employment. The majority of participants believed that areas for improvement include efficiency, safety, green technology, collaboration with the public and environmental justice communities, and rail improvements. Although it was recognized that efforts are being made to varying degrees to address sustainability goals, participants suggested that more should be done using green technology, innovative funding, more rail systems, double-tracking existing rail lines, and choosing rail over trucks for long-distance hauling.

Environmental Impacts by Transportation Mode

Maritime

The 11 publicly owned California deep water seaports and their maritime industry partners are committed to reducing the environmental impacts associated with the maritime industry and have implemented strategies to reduce emissions, including clean air programs, shoreside power options, ship speed reduction, and other environmental initiatives. The privately owned cargo port at Benicia and other privately owned marine terminals are also taking action to reduce impacts.

In 2006, in an effort to reduce emissions and improve air quality, the Ports of Los Angeles and Long Beach[10] (San Pedro Bay Ports) established the Clean Air Action Plan (CAAP).[11] The Plan includes milestones, goals, and recommendations for air quality improvements. CAAP committed the ports to reduce emissions of diesel particulate matter (PM), nitrogen oxides (NOx) and sulfur oxides (SOx). The Plan was updated in 2010 to include new goals and strategies to reduce port-related health risks and emissions based on clean air targets set by state and federal regulatory agencies. Between 2005 and 2012, the POLA/POLB have reduced truck emissions by over 90 percent and total diesel particulate matter from all port area sources (trucks, trains, cargo handling equipment, vessels, and watercraft) by about 90 percent. The POLA/POLB, in conjunction with industry, are continuing to implement zero-emissions technologies and equipment, such as electrified cranes, battery electric trucks, and shoreside electricity for vessels when at berth.

Over the past several years, the San Pedro Bay Ports have been evaluating various zero-emissions technologies for potential application at the ports. Although the ports' environmental mitigation programs have achieved tremendous success, emissions forecasting indicate that the currently known emission reduction strategies will not be adequate to achieve the goals of the San Pedro Bay Standards in the future. Therefore, the Board of Harbor Commissioners for the ports of Los Angeles and Long Beach adopted a roadmap for zero emissions in 2011, to provide direction for moving toward the identification, evaluation, and integration of zero-emissions technologies. The short-term goal is to determine if zero-emission technologies are feasible for the ports and, if so, demonstrate innovative technologies that can be adopted for more efficient and greener movement of cargo. The ultimate goal is to handle the anticipated cargo throughput growth with pollution-free technologies and strategies.

The San Pedro Bay Ports are also working with the Zero-Emission Truck Regional Collaborative, comprising the two ports and other regional agencies with zero-emissions truck initiatives, including Los Angeles County Metropolitan Transportation Authority, Gateway Cities Council of Governments, Southern California Association of Governments, the South Coast Air Quality Mitigation District, and Caltrans. The purpose of the Regional Collaborative is to ensure that zero-emissions initiatives remain a priority of the region, are aligned with policies, and harness the power of collaboration to optimize advocacy and project efforts.

As a part of the Maritime Air Quality Improvement Plan (MAQIP)[94], the Port of Oakland has committed to reducing seaport-related diesel health risks by 85 percent from a 2005 baseline by the year 2020. The Port of Oakland has a Comprehensive Truck Management Program (CTMP)[95] that requires the Port's drayage trucks to meet the specified emission requirements established by ARB in effect in January of each year.

The smaller niche or specialty ports have also established short- and long-term strategic air quality implementation plans. These plans identify projects and programs that will keep the Ports in compliance with environmental regulatory commitments and also identify projects and programs that encourage pollution prevention and natural resource protection.

In addition to producing air emissions, oceangoing vessels, if not properly managed, can also have adverse impacts on California's marine and onshore environments. Ballast water systems used to stabilize and improve maneuverability of vessels are integral to shipping operations. However, ballast water discharged or exchanged in a different port from the port where it was taken can cause problems by introducing non-indigenous species to the environment.

The Marine Invasive Species Program was established in 1999 by the California State Lands Commission to prevent non-indigenous species from being released from commercial vessels into California waters. The program was reauthorized and expanded in 2003 with the Marine Invasive Species Act. To provide continued protection to the marine environment, the State

Water Resources Control Board is coordinating with the State Lands Commission to develop appropriate performance standards for treating ballast water from ships.

Freight Rail

The two Class I railroads serving California, UPRR and BNSF, have signed two voluntary agreements with ARB to address air quality issues. In the first, signed in 1998, the railroads voluntarily agreed to utilize a specified level of clean locomotives by 2010 in the South Coast Air Basin. The second, signed in 2005, commits the railroads to implementing a statewide idling reduction program, performing health risk assessments at all major rail yards, conducting smoke tests on locomotives, and coordinating with communities.[96]

Beginning in 2015, new locomotives will be required to meet Tier 4 emissions standards, which reduce NOx emissions by 76 percent and PM emissions by 70 percent compared to current Tier 3 standards. These locomotives, which rely on exhaust after-treatment technologies and engine improvements to achieve the more stringent standards, are starting to be deployed. The US EPA projects that by 2023, 34 percent of the nationwide Class I line-haul fleet will be Tier 4. The South Coast Air Quality Management District (SCAQMD) has recently proposed an emission control measure that calls on the ARB to pursue enforceable mechanisms within its authority to achieve 95 percent or greater introduction of Tier 4 freight locomotives in the South Coast Air Basin by 2023. This could potentially be achieved through a MOU similar to the one signed by the ARB and freight railroads in 1998 that lead to early introduction of Tier 2 and Tier 3 locomotives. A similar commitment has been offered by the Southern California Regional Rail Authority (SCRRA) for early introduction of Tier 4 locomotives in passenger service. Recent rail fleet purchases for use on State-supported passenger services have included Tier 4 locomotives.

To further reduce emissions, railroads are also implementing low-emissions technologies, including cleaner-burning locomotive engines, multiple smaller engines (GenSets), and natural gas as a fuel source. Natural gas, in particular, may be a viable near-term fuel option that can be implemented in stages. Additionally, UPRR and BNSF have implemented the use of electric wide-span cranes at some intermodal transfer facilities and have proposed use of the cranes at other facilities. It is not yet feasible to install/retrofit these cranes at all intermodal facilities, however. These cranes produce zero on-site emissions and can capture regenerative power each time they lower a load, but they are still dependent on electricity production from off-site facilities.

Trucking

Trucking is the most frequently used freight mode in California, moving approximately 82 percent (by weight) of all goods.[97] More than 80 percent of all communities depend solely on trucks for freight delivery.[98] The ARB estimates approximately 100,000 drayage trucks operate statewide. Nearly 20,000 of these frequently service ports and rail yards.

Through advancements in engine technology and fuel refinements, new diesel truck engines produce 98 percent less PM and NOx emissions than similar engines manufactured before 1990. Sulfur emissions from diesel engines have been reduced by 97 percent since 1999. California's in-use restrictions for on-road trucks are the toughest in the nation. Applicable regulations include the Truck and Bus Regulation, Drayage Truck Rule, Tractor-Trailer Greenhouse Gas Reduction Measure, Periodic Smoke Inspection Program, Emission Control Label, and Commercial Vehicle Idling. These regulations and programs have helped California achieve the lowest-emissions truck fleet in the nation and perhaps even the world. The long-term goal is to transition the California truck fleet to zero- or near-zero on-road emissions by 2050, with substantial participation from the interstate truck fleet as well. It is expected that as California implements emissions reduction programs and supports deployment of new engines and fuel types, other states and countries will follow, as was the case with automotive emissions reduction programs. The resulting improvements in economies of scale would help to reduce the per-unit cost of vehicle replacement for all states.

Incentive programs help offset some of the economic impacts from these regulations. These programs include vouchers for the purchase of approved electric and partial hybrid electric vehicles, price reductions for Class 7 or 8 natural gas trucks, and funds for modernizing existing fleets. However, the majority of cost of the regulation is borne by the private-sector trucking industry.[99]

Air Cargo

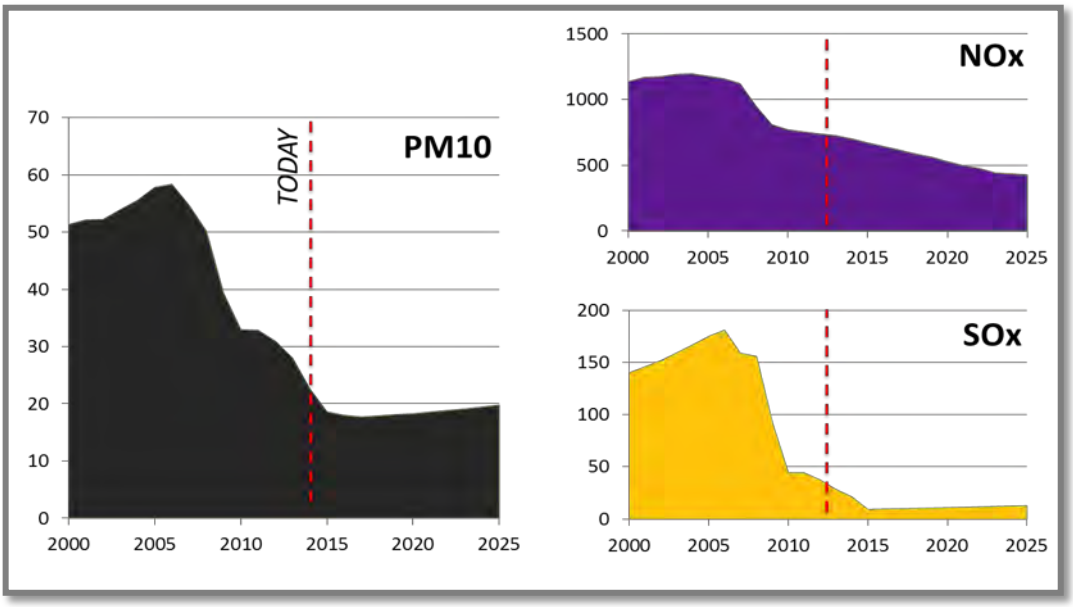
Air cargo is the most polluting method for freight movement per unit of transported freight, particularly for GHGs.[100] As such, the industry is implementing a number of emission reduction measures including lighter-weight aircraft, more efficient external fan engines, and operational changes or flight paths that consume less fuel. The Environmental Protection Agency (EPA) has implemented the Federal Aviation Administration Continuous Lower Energy, Emissions, and Noise (CLEEN) program[101] to achieve NOx emission reductions from new aircraft. This program includes three levels of emission reductions in NOx and greenhouse gas in an increasing percentage of new aircraft engines between 2015 and 2035.

Since air cargo aircraft and passenger aircraft with belly cargo provide services within the State and travel to other states and countries and are regulated by federal law and international agreements, aircraft-related impact reduction initiatives are beyond the scope of this Plan. However, there are groundside initiatives that reduce air cargo related impacts, including the use of natural gas and electric powered ground equipment, the replacement of fueling trucks with pipelines that deliver fuel directly to the aircraft gate, and aircraft idling reduction protocols that are sometimes supported by plugging the aircraft into a power source (similar to shore power for marine vessels) so that engines can be shut off but onboard aircraft power systems remain functional.

Emission Reductions in Progress

California has already made significant progress in reducing emissions from its freight system. Since 2005, through regulations, incentives, enforcement agreements, seaport and industry initiatives, project mitigation, and land use decisions, California has reduced diesel PM emissions – along with the associated health risks – by 70 percent at the largest ports and 50 to 70 percent at the highest-risk rail yards. However, more needs to be done to continue to reduce the impacts from air pollution – diesel PM at the local level, ozone at the regional level, and GHGs at the global level.

FIGURE 66. PROGRESS IN REDUCING FREIGHT EMISSIONS IN CALIFORNIA WITH EXISTING PROGRAMS (TONS/DAY)



Source: ARB January 2014

Looking Forward

Even with the accomplishments to date, additional improvements are still needed to meet air quality mandates. To achieve the State's multi-pollutant emission reduction goals over the long-term, California will need to transition from the existing diesel/petroleum-dependent freight system into a system that is dominated by zero- and near-zero-emissions engines and motors.

For this to be possible, California must ensure the parallel development of the necessary supporting fueling and energy distribution infrastructure. This transition must support continued viability of the freight industry and the numerous economic sectors that depend on it. The State, through an integrated State agency effort, is committed to a broader sustainable freight that is intended to guide the transition of California's freight system to a sustainable

freight system. As a result, criteria should be developed and used to prioritize and fund select freight projects identified in and implemented under the CFMP. These projects should each contribute toward meeting the goals of the transition to a zero/near-zero emission system as applicable.

In addition to these issues, as well as modal, and facility-specific initiatives, California will continue to rely on the California Environmental Quality Act (CEQA)[102] and the National Environmental Protection Act (NEPA)[103] to provide the necessary environmental process for analyzing freight-related projects and programs for their impacts and mitigation. These State and federal laws ensure that construction and infrastructure projects in California receive scrutiny, and that significant environmental impacts, project alternatives, and mitigation measures are addressed in a public manner and with the opportunity for public input.

FIGURE 67. PUBLIC ACCESS, PORT OF OAKLAND

Source: Steve Boland, "CalUrbanist" at Flickr.com, #5508009597

CHAPTER 3.5

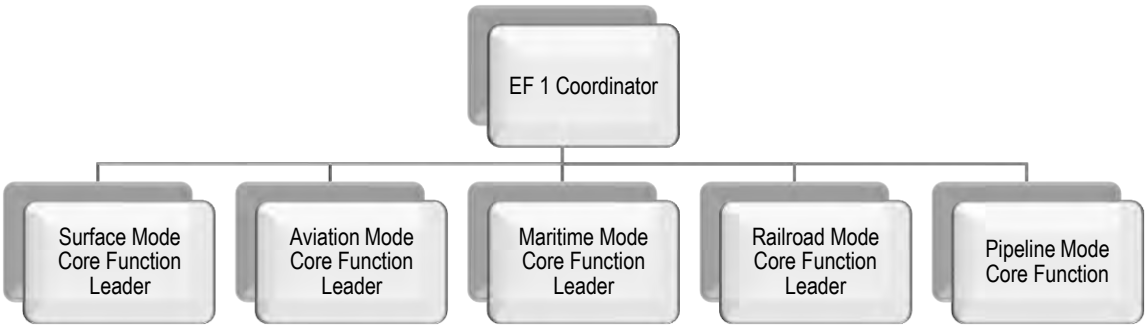
SAFETY, SECURITY AND RESILIENCY

The freight system is a complex network that is susceptible to natural disasters and human-caused events. Whether the result of natural processes, accidents, criminal activity, or terrorist attack, freight system disruptions can have serious, sometimes devastating consequences. California's economy is dependent on the strength, reliability and resiliency of our freight sector, and disruptions can impact the economic health of individual companies, communities, regions, the state, or even the nation. It is essential to ensure that the freight transportation system is able to prevent and minimize negative impacts from such events and to quickly recover when they occur. **The state's entire transportation system needs to strengthen its resilience and the freight system needs to be particularly adaptable so that emergency supplies can be transported and distributed when and where needed.**

EMERGENCY SUPPORT FUNCTIONS

The State of California is prepared to respond quickly and effectively to large-scale safety and security events on a 24-hour basis. When an event or potential event is first detected, the California Office of Emergency Services (Cal OES) is activated to a level appropriate to the magnitude of the threat. All State agencies and volunteer organizations that comprise the State Emergency Response Team are grouped into 17 Emergency Support Functions (ESF) to carry out coordination and completion of assigned missions. These functions represent specific response activities that are common to all disasters. Each ESF comprises one or more primary lead agencies and several other supporting agencies or organizations.[104] (ESF #18 – Cyber Security is under development.)

FIGURE 68. EF 1 - TRANSPORTATION ORGANIZATION DIAGRAM



As shown in the previous figure, the State-level Emergency Function (EF) 1 activities support the coordination of transportation across various modes, including surface, maritime, railroad, aviation and pipeline. The EF 1 lead agency, the California State Transportation Agency (CalSTA), has delegated to the California Highway Patrol (CHP) and Caltrans, the responsibility to provide expertise primarily for surface transportation, and has identified stakeholders from primary and supporting agencies to take the coordination lead for other modes of transportation. According to the State of California Emergency Plan (SEP), EF 1 – Transportation "assists in the management of transportation systems and infrastructure during domestic threats or in response to incidents."

Caltrans specific responsibilities directly related to EF 1 activities:

- Repair, maintain, and operate the SHS during and following emergencies and disasters;
- Assess transportation infrastructure and traffic conditions;
- Assess damage to highway system and establish route priorities during recovery efforts;
- Operate as liaison with the Federal Highway Administration (FHWA) regarding the status of the SHS;
- Operate as liaison with the United States Department of Transportation (US DOT) regarding the status of the SHS;
- Provide transportation policies and guidance as needed;
- Coordinate state agency plans, procedures, and preparations for route recovery, traffic regulation and air transportation; and
- Develop routing and directions for the movement of incident victims out of an impacted area and the delivery of necessary personnel and medical supplies to local medical facilities and shelters.

CHP specific responsibilities directly related to EF 1 activities**:**

- Act as Director of the State Motor Transport Division during times of emergency;
- Perform tasks assigned in the California Emergency Resources Management Plans for transportation during times of a war emergency;
- Continue emergency traffic regulation and control procedures as required;
- Assist Caltrans with traffic route restoration;
- Provide police escorts on closed routes;

- Activate appropriate CHP Emergency Resource Centers to coordinate resources and ensure the timely dissemination of intelligence information;
- Secure routes, regulate traffic flow, and enforce safety standards for evacuation and re-entry into evacuated area;
- Coordinate interstate highway movement on regulated routes with adjoining states;
- Establish highway safety regulations consistent with location, type and extent of emergency conditions; and
- Support Caltrans with traffic route re-establishment, and continue emergency traffic regulation and control procedures as required.

HAZARDOUS MATERIALS TRANSPORT

After the terrorist attacks of September 11, 2001, securing hazardous materials became increasingly important. Hazardous materials – industrial materials that are flammable, corrosive, toxic, explosive, or infectious – play a vital role in the US economy. They are used by industries, such as farming, mining, manufacturing, and pharmaceuticals. They take the form of raw materials, fertilizers, fuels, constituent parts, and other essential inputs. Of all hazardous materials, Toxic Inhalation Hazard (TIH) are among the most dangerous. Chlorine gas and anhydrous ammonia are the most common TIH chemicals; others include sulfur dioxide, ethylene oxide, and hydrogen fluoride, and a variety of other products that are important manufacturing inputs. The potential consequences of a TIH release depend on the severity of the accident or event.

One widely discussed risk-mitigation proposal involves rerouting trains containing TIH tank car loads – for example, by choosing a route with less population exposure. TIH tank cars passing through major population centers were recognized as potential chemical weapons. Proponents of mandatory rerouting of TIH products argued that diverting trains around cities would place fewer people at risk of a terrorist attack, and would also decrease risks due to collisions.

Many hazardous chemicals transported over long distances by rail, and for shorter distances by truck, may be particularly vulnerable to sabotage and disruption. At the federal level, US DOT and the Transportation Security Administration (TSA) have sought to reduce the risk of terrorist attacks on freight. TSA worked with railroad carriers to implement the TIH Risk Reduction Program. TSA assumes that the risk of hazardous materials transport is directly proportional to the dwell time (the length of time that a rail car sits at a particular location), volume, and type of materials transported through densely populated areas. First implemented in New Jersey and New York, the program seeks to establish secure storage areas for TIH materials and to expedite their movement through the system. More recently, the US DOT Pipeline and

Hazardous Materials Safety Administration (PHMSA) has directed rail freight carriers to transport TIH materials over the "safest and most secure commercially practicable routes."

Rail Freight

California has increased state-level oversight of rail freight and strengthened the regulation of railroad security. In addition to its role enforcing federal rail-safety regulations, the California Public Utilities Commission (CPUC) is developing the capacity to improve rail security. The CPUC was charged with enforcing the provisions of Assembly Bill 3023 (Nunez, 2006) requiring railroad operators to conduct risk assessments of their facilities and to develop and implement infrastructure protection programs. In the future, CPUC inspectors are to be federally certified in both safety and security, so that they may issue security enforcement recommendations under the auspices of federal law. Additionally, California actively seeks to bring state-level knowledge regarding rail safety and security to short line rail carriers that may not have the resources to establish robust safety and security programs on their own.

Collision Analysis Working Group

Under the direction of the Federal Railroad Administration (FRA), the Collision Analysis Working Group (CAWG) includes representatives from the American Short Line and Regional Railroad Association, the Association of American Railroads, the Brotherhood of Locomotive Engineers, the United Transportation Union, and the Volpe National Transportation System Center. CAWG was organized to focus on causes of and prevention measures for collision accidents.

CAWG reviewed in detail incidents where human factors contributed to trains "exceeding their authority" by passing a stop signal; failing to comply with a signal requiring restricted speed; or by entering territory without a train order, track warrant, or direct traffic control authority. This information has provided the railroad industry with an opportunity to re-examine its safety practices and policies based on any commonalities found, which will help ensure that every reasonable precaution is taken to prevent future collisions. Recommendations developed through this review and other federally sponsored rail safety initiatives may promote the inclusion of projects identified in state freight and rail plans.

Rail Tank Cars

The US DOT-111 tank car is a type of non-pressurized tank car commonly used in North America. These rail cars are used for transporting a wide spectrum of hazardous goods. The increase in the US of hydraulic fracturing of new oil wells and the insufficient pipeline capacity to transport the petroleum products has led to a rapid increase in use of DOT-111 cars to transport crude oil to refineries. Additionally, ethanol production has soared from 900 million gallons annually in 1990 to nearly 14 billion gallons in 2013. Considering that nearly all of it moves by rail, ethanol has become the highest-volume hazardous material shipped by this mode of transport.

Recently, there have been a series of high profile accidents involving DOT-111 rail cars in the US and Canada. The tanker itself is not suspected of causing derailments, but the National Transportation Safety Board (NTSB) has noted several problems. The tanker's steel shell is too thin to adequately resist puncture in collisions. Each of the tanker cars is especially vulnerable to tears from couplers that can fly up after ripping off between cars. In addition, unloading valves and other exposed fittings on the tops of tankers can break during rollovers. The NTSB has investigated accidents involving flammable liquids being transported in DOT-111 tank cars, including the December 30, 2013, derailment in Casselton, North Dakota,[105] and the June 19, 2009, derailment in Cherry Valley, Illinois.[106] After the Cherry Valley accident, the NTSB issued several safety recommendations to PHMSA[107] regarding the inadequate design and poor performance of the DOT-111 tank cars. The recommendations include making the tank head and shell more puncture resistant and requiring that bottom outlet valves remain closed during accidents.

In addition, on January 2, 2014, PHMSA issued a safety alert addressing the flammability characteristics of the crude oil produced from the Bakken Shale region in the US. When announcing the safety alert, PHMSA reinforced the requirement to properly test, characterize, classify, and, where appropriate, sufficiently degasify hazardous materials prior to and during transportation. They also stressed the need for all potential hazards of the materials to be properly characterized, and assigned the appropriate classification and packing group of crude oil shipments.

FIGURE 69. DOT-111 TANK CAR

Source: Caltrans

Properly classified shipments are paramount for appropriate package selection, for assessment of risks to develop meaningful safety and security plans, and for the safety of emergency responders and other individuals who may come into contact with hazardous materials in

transportation. Therefore, in support of Rail Safety Advisory Letter - 13/13, the NTSB recommended that PHMSA require shippers to sufficiently test and document the physical and chemical characteristics of hazardous materials to ensure the proper classification, packaging, and recordkeeping of products offered in transportation.

The US DOT and the rail industry are launching a safety initiative aimed at instituting new voluntary operating practices for moving crude oil by rail. Through the initiative, railroads plan to take the following steps throughout 2014:

- Perform at least one additional internal rail inspection each year above those required by new FRA regulations on mainlines used by trains moving 20 or more carloads of crude oil. They also will conduct at least two high-tech track geometry inspections each year on those mainline routes. Current federal regulations do not require comprehensive track geometry inspections;

- Equip all trains moving 20 or more carloads of crude oil with either distributed power or two-way telemetry end-of-train devices, which enables train crews to apply emergency brakes from both ends of the train to stop faster;

- Begin using the Rail Corridor Risk Management System (RCRMS) analytical tool to aid in the determination of the safest and most secure routes for trains moving 20 or more cars of crude. Developed in coordination with the US Department of Homeland Security (DHS), PHMSA and FRA, the RCRMS is used by railroads in the routing of security sensitive materials. The tool takes into account 27 risk factors to help assess safety and security, including volume, trip length, population density along a route, local emergency response capability, track quality, and signal systems;

- As of July 1, 2014, the nation's major freight railroads will institute a voluntary practice to operate trains moving 20 or more cars of crude that includes at least one older DOT-111 tank car to move no faster than 40 miles per hour in the federally designated 46 high-threat urban areas;

- Continue to work with communities through which crude oil trains move to address location-specific concerns;

- Begin installing additional wayside detectors (detects defects on passing rail cars, including overheated bearings, damaged wheels, dragging hoses, deteriorating bearings, and cracked wheels, and helps to prevent derailment) every 40 miles along tracks;

- Provide $5 million to develop a specialized crude-by-rail training and tuition assistance program for local first responders, including training in the field and at the Transportation Technology Center Incorporation, a subsidiary of the Association of

American Railroads in Pueblo, Colorado. The funding will provide program development and tuition assistance for an estimated 1,500 first responders in 2014; and

- Develop an inventory of emergency response resources for responding to the release of large amounts of crude along routes used by trains moving 20 or more cars of oil. This inventory will include locations for the staging of emergency response equipment and, where appropriate, contacts for the notification of communities. When the inventory is completed, railroads will provide the US DOT with information on the deployment of the resources and make the information available upon request to appropriate emergency responders.

Positive Train Control Program

Positive Train Control (PTC) systems are integrated command, control, communications, and information systems for controlling train movements with safety, security, precision, and efficiency. PTC systems improve railroad safety by significantly reducing the probability of collisions between trains, casualties to railway workers, damage to equipment, and overspeed accidents. The system can recognize a threat of collision or accident and slow or stop a train automatically to avoid the incident. The NTSB has named PTC as one of its "most-wanted" initiatives for national transportation safety.

One of the catalysts for PTC was the collision of a commuter train with a freight train on September 12, 2008, near Chatsworth, California, which resulted in 25 deaths and over 100 injured passengers. The collision was found to have been caused by the commuter train engineer's failure to respond to a stop signal, resulting in a collision with the oncoming freight train which had not yet entered a siding to let the commuter train pass by. The Rail Safety Improvement Act of 2008 (RSIA) required all Class I railroads (the largest) and all intercity passenger and commuter railroads to implement a PTC system on main line track carrying either passengers or TIH materials by December 31, 2015.

PTC systems consist of digital data link communications networks; continuous and accurate positioning systems, such as Nationwide Digital Global Positioning System; onboard computers with digitized maps on locomotives and maintenance-of-way equipment; in-cab displays; throttle-brake interfaces on locomotives; wayside interface units at switches; wayside detectors; and control center computers and displays. PTC systems may also interface with tactical and strategic traffic planners, work order reporting systems, and locomotive health reporting systems. The remote intervention capability of PTC will permit the control center to stop a train should the locomotive crew be incapacitated or distracted.

In addition to providing a greater level of safety and security, PTC systems also enable a railroad to run scheduled operations, provide improved running time, greater running time reliability, higher asset utilization, and greater track capacity. They will assist railroads in measuring and

managing costs and in improving energy efficiency. PTC systems will be able to optimize acceleration and/or braking to minimize fuel consumption and train-handling forces. To assist crews, these systems can recommend train-handling instructions based on tonnage, track grade, and curvature characteristics, allowable speed, and train-dynamic performance. Simulators can optimize operations by calculating several hundred train-handling alternatives per second and forecasting train velocity several miles in advance.

TRUCK FREIGHT

Truck safety has improved measurably over the past decade. Since 2001, the number of truck crashes, and truck crash-related fatalities and injuries have dropped sharply. From 2001 to 2011, the number of truck crashes dropped 33 percent, outpacing the safety improvements of other vehicles. In this same period, the number of truck-involved fatalities fell 28 percent and the number of truck-involved injuries fell 39 percent. The primary causes in crashes where the truck driver is at fault are driver fatigue, excessive speed, unfamiliarity with the areas traveled, equipment failure, and weather conditions. However, according to recent FHWA data, a passenger car driver is three times as likely to contribute to a fatal crash as was the truck driver's behavior. Trucks can weigh up to 30 times more than passenger vehicles and require more stopping distance, especially when loaded. They also cannot be steered as easily as cars. When involved in a collision with a passenger vehicle, the size and weight of large trucks increases the severity of the damage. Although fatal crash rates for large trucks have fallen (by 77 percent from 1975 to 2009, compared to 64 percent for cars over the same period), truck crashes are more likely to result in severe injuries or fatalities than those involving only cars.

Another serious safety concern is distracted driving and driver inattention. A distraction is anything that diverts the driver's attention from their primary tasks of navigating the vehicle and responding to critical events. According to an in-cab driving study of commercial truck drivers by the Virginia Technical Institute, the most dangerous distraction observed was texting. However, texting and phone calls aren't the only distractions. Distractions can include passengers, eating, drinking, grooming, and in-vehicle technologies such as navigation systems and audio players. The Federal Motor Carrier Safety Administration (FMSCA) and the PHMSA have published rules specifically prohibiting interstate truck, bus drivers, and drivers who transport "placardable"[108] quantities of hazardous materials from texting or using handheld mobile phones while operating their vehicles. The joint rules are the latest actions by US DOT to end distracted driving. Violations can result in fines and/or driver disqualifications and will impact a motor carrier's and/or driver's Safety Measurement System results. With new electronic log device rules, computer programs will track driver activities automatically, ensuring more rigorous monitoring and adherence to rules that limit service hours.

The California Trucking Association (CTA) has a long history of supporting truck safety initiatives and was an early proponent of mandatory drug and alcohol testing for truck drivers, banning

radar detectors in trucks, and prohibiting the use of handheld mobile devices by truck drivers. CTA is now calling for a number of additional safety improvements, such as mandatory use of devices to limit maximum truck speed and a national clearinghouse to track positive drug and alcohol test results and refusals to test.

Commercial Vehicle Enforcement

The California Highway Patrol (CHP) provides safety oversight of approximately 7.4 million commercial vehicles that travel over 32 billion miles each year on California's publicly maintained roadways. Currently, there are 51 commercial vehicle enforcement facilities (CVEF) located throughout the state, with a total of 59 weight scales. (See Appendix F) The CHP has jurisdictional authority over the CVEFs and maintains responsibility for commercial enforcement. The CHP is currently working with Caltrans on the design and construction of the Mountain Pass CVEF, located on the Nevada and California border on Interstate 15.

CHP mobile road enforcement units are used within their eight divisions throughout the State's highways and county roadways. The CHP conducts over 500,000 inspections annually in accordance with the California Vehicle Safety Alliance standards and those set forth in the North American Standard Out-of-Service Criteria. These standards are recognized nationwide as the "gold standard." The CHP has successfully reduced commercial vehicle collisions through aggressive enforcement and education utilizing the Department's Commercial Industry Education Program.

The CHP also provides off-highway enforcement utilizing the Motor Carrier Safety Unit (MSCU), which comprises over 300 non-uniformed motor carrier specialists assigned to one of the eight field divisions throughout the state. During 2013, the MCSU, in concurrence with industry, performed over 26,000 truck terminal inspections.

The CHP and Caltrans are the State agencies designated by the Governor's Office as the certifying officials for size and weight regulations and enforcement. The CHP is the primary agency responsible for the enforcement of size and weight statutes and regulations, pursuant to the California Vehicle Code and Title 13, California Code of Regulations. The California Size and Weight Enforcement Plan is reviewed and updated annually and provided to the FHWA Division office by October 1 each year. The Size and Weight Plan will be followed by the required Size and Weight Certification by January 1 of each year. The CHP provides basic commercial vehicle enforcement training (including size and weight enforcement) for local law enforcement agency personnel. The goal is to provide uniform size and weight enforcement training.

Truck Parking

It has long been acknowledged that a shortage exists of adequate and safe parking for commercial motor vehicle operators at the state and national levels. The demand for commercial vehicle parking far exceeds capacity. As originally conceived, public rest areas were to serve as temporary rest areas and short-term safety breaks for the traveling public. As the trucking industry expanded, these rest areas began to serve as long-term, overnight parking for long-haul commercial vehicle operators, thereby contributing to overcrowding at rest areas. As reported in the National Transportation Research Board National Cooperative Highway Research Program (NCHRP), Synthesis 317: Dealing with Truck Parking Demands (2003), "most parking supply is located in commercial truck parking lots and plazas, and the overcrowding problem (is) concentrated in public rest areas." Factors contributing to the commercial vehicle parking issue include poor geometric design of facilities and access; lack of information at the location on space availability, including amenities; and lack of security. Limits on stays in public facilities and parking space shortages leave truckers with few alternatives. To get needed rest, they park underneath overpasses, on roadway access ramps, and on roadway shoulders. In most cases, these parking locations are illegal as they create safety risks for the driver and other users of the highway or road. Particularly challenging for a truck driver is their difficulty gaining enough acceleration from their parked position to safely enter into the stream of traffic. In addition, "errant vehicles" may stray into these areas and strike parked commercial vehicles. Private truck stops are not always available to provide long-term parking. Lack of facilities can influence route decisions, with route selection based on the availability of amenities, whether the trip is a long or short haul, time of day, and the need for staging areas. Just-in-time delivery scheduling and "rolling warehouse logistics" puts even greater demand on drivers and truck parking facilities.

Legislation (Title 23, Section 752.3 of the Code of Federal Regulations) defines a safety area as "a roadside facility safely removed from the traveled way with parking and such facilities for the motorist deemed necessary for his rest, relaxation, comfort and information needs." Furthermore, the ability to provide amenities to drivers is restricted by U.S Code 23, § 111, which limits commercialization of public rest areas on the Interstate Highway System.

MAP-21 does not include a formal truck parking program; however, it does make truck parking projects eligible for funding under the National Highway Performance Program, the Surface Transportation Program and the Highway Safety Improvement Program. Projects eligible to receive funding include:

- Construction of safety rest areas with truck parking;
- Construction of truck parking areas adjacent to commercial truck stops and travel plazas;

- Opening existing facilities to truck parking, including inspection and weigh stations and park-and ride facilities;
- Promoting availability of publicly or privately-provided truck parking on the National Highway System (NHS);
- Construction of turnouts along the NHS for commercial motor vehicles;
- Capital improvements to public truck parking facilities that close on a seasonal basis, allowing them to remain open all year; and
- Improving the geometric design of interchanges on the NHS to improve access to truck parking facilities.

Trucks parking in undesignated areas have sometimes tragically resulted in death. For example, in 2009 truck driver Jason Rivenburg experienced fatigue while transporting a load. Since there were no rest stations, he pulled into an abandoned gas station to take a nap. As he slept, he was robbed and fatally wounded. As part of MAP-21, $6 million in federal funding was provided for the construction and restoration of safe roadside parking lots where truck drivers can rest. Typically, truck rest areas are located near major truck routes between urban areas and freight facilities. Jason Rivenburg's fate highlights the need for truck rest areas in urban areas. Jason's Law makes construction of safety rest areas, commercial motor vehicle (CMV) parking facilities, electric vehicle and natural gas vehicle infrastructure eligible for federal funding. It also requires US DOT to survey states within 18 months of enactment regarding their CMV traffic and capability to provide CMV parking. US DOT must periodically update this survey and post the results. The CHP, as an executive member of the Commercial Vehicle Safety Alliance (CVSA), has assisted US DOT in an information-gathering exercise related to truck parking, as mandated by MAP-21. In order to meet this mandate, the CHP assists Caltrans in evaluating the capability of the State to provide adequate parking and rest facilities for commercial motor vehicles engaged in interstate transportation.

The availability of parking is not just an issue for truck drivers who struggle to secure parking; but it is also an issue for neighborhoods in the vicinity of freight facilities such as ports, intermodal facilities, warehouse and distribution centers, and manufacturing. Besides creating safety hazards, neighborhoods frequently have to contend with noise, smell, vibration, degradation of air quality, loss of viewshed, and disruption to community cohesion. A recommendation of this Plan is to investigate the potential for creating a truck parking program.

Weight Limits

California follows federal law by placing weight limits on trucks in order to protect pavement and bridges from damage and excessive wear and tear. Truck weight is also a major factor in

the severity of truck-passenger vehicle incidents. Simply put, the heavier the vehicle, the worse the damage. Heavier trucks, and trucks carrying loads in excess of maximum weight limits can be more difficult for the driver to control because they require increased stopping distance; have an increased potential to roll due to a higher center of gravity; and attain higher speeds when traveling downhill, decreasing steering capability.

Caltrans often receives requests to increase truck (or axle) weight limits or to implement programs that would collect additional fees for compensation of overweight loads. There are several reasons for these requests. Hauling larger loads with fewer trucks can help some industries reduce transportation costs and increase efficiency. Competition and changing market conditions puts pressure on freight-dependent industries to lower costs, to provide greater efficiencies and to increase service quality. Transportation costs and flexibility for load size can have a significant effect on economic sustainability, particularly for heavy and bulk commodities and highly priced sensitive goods, such as agriculture, lumber and timber, and construction materials. It is paramount to the economic vitality of the state that we maintain an efficient freight transportation system and support freight-dependent industries. It is also vital that decision makers and the public understand the trade-offs between economic benefit and increased infrastructure and safety costs that occur when increasing load weight limits.

Truck Enforcement Network Systems (TENS)

TENS is an evolving project that runs in parallel and in coordination with the Gateway Cities Technology Plan for Goods Movement Study (October 2012). The project is an excellent example of planning safety and security processes and facilities at the subregional level. This project, described in the Feasibility Study Report (FSR) for the Implementation of a Truck Enforcement Network System for Gateway Cities and Surrounding Regions [(Gateway Cities Council of Governments (GCCG), October 2012)], includes strategies, concepts, and layouts for truck enforcement that meet the needs of the stakeholders within the study area. TENS must also meet the needs of the CHP daily truck enforcement facilities operations. Caltrans is an overseer of the transportation system and works in a partnership with the CHP (operators of the commercial vehicle enforcement facilities) on the design of Commercial Vehicle Enforcement Facilities (CVEF).

Due to the very high truck volumes associated with the San Pedro Bay Ports, current practices of truck enforcement cannot process trucks at a rate that meets present and future demands. New technology is needed. Technology tools that can accurately measure commercial vehicles while they are in motion, for example, Weigh-In-Motion (WIM) can indicate if an inspection is warranted; determine if a commercial vehicle is in compliance with size and weight, safety and credentialing regulations; and pursue noncompliant and high-risk motor carriers and commercial vehicles. These tools include, but are not limited to, infrared brake detectors,

license plate readers, placard readers, inspection software, closed circuit television, and optical character recognition hardware and software.

Drug and Alcohol Use

In 1991, the US Congress passed the Omnibus Transportation Employee Testing Act that required US DOT to implement drug and alcohol testing of safety-sensitive transportation employees. The FMCSA and its antecedent agency have defined drug and alcohol testing rules and regulations for employees who drive commercial vehicles (trucks and buses) that require a commercial vehicle license. Vehicle Code Section 34520 requires motor carriers and drivers subject to the controlled substances and alcohol testing requirements of US DOT to comply with the FMCSA regulations found in Title 49, Code of Federal Regulation, Part 382, or the Federal Transit Administration requirements in 49 CFR Part 655, whichever is applicable. As with trucking and rail, this program is also applicable to safety-sensitive transportation employees in aviation.

For purposes of Part 219, FRA has designated its safety-sensitive employees to be those who perform service covered under the hours-of-service laws (covered service). This includes "contracted" hours of service employees and also individuals who may volunteer to perform hours-of-service duties for a railroad. These generally include train and engine service employees involved in the movement of trains or engines (e.g., conductors, brakemen, switchmen, engineers, locomotive hostlers/helpers), dispatching employees who issue mandatory directives (e.g., train dispatchers, control operators), and signal employees who inspect, repair or maintain signal systems.

The CHP continues to work closely with the trucking industry in an effort to help educate and reduce impaired driving in order to maintain the highest level of compliance. Controlled substances and alcohol testing is required for every motor carrier with a terminal located in California. The goal of the program is to ensure all motor carriers located in the State are inspected for continued compliance with state and federal drug and alcohol testing requirements. These inspections are necessary in the continued efforts to reduce the number of impaired drivers on the road.

Air Freight

Like its passenger counterpart, the airline freight industry is facing stringent security requirements. Since 2010, TSA regulations mandate the screening of all cargo before being loaded and carried by air within the US or internationally. As part of the 9/11 Commission Act of 2007, Congress requires that **all** cargo transported in the holds of passenger airplanes originating in the US be screened at a level commensurate with passenger luggage. The deadline for meeting this mandate was August 3, 2010. TSA is charged with enforcing it.

Recognizing that the problem of screening a wide variety of diverse cargoes and packages is much more complicated than screening passenger baggage and the potential bottleneck in the global supply chain that would be created if all cargo had to be screened at the airport, the TSA devised the Certified Cargo Screening Program (CCSP). Under the CCSP, shippers, freight forwarders, logistics services providers, indirect air carriers, independent cargo screening firms and air carriers can screen cargo and pass it along the supply chain via a secure chain of custody to the airport, where it can go directly onto the aircraft without undergoing additional screening. This approach effectively creates a distributed screening network, allowing screening to be performed at the most cost-effective point in the supply chain, mitigating the impact on system performance and thereby expediting the flow of commerce. The CCSP is a flexible, voluntary program specifically designed to allow shippers with unique requirements to find the approach that best meets their needs. The CCSP requires airlines, freight forwarders and shippers to assume the costs of these security measures to establish a secure air freight transport chain.

NextGen

The Next Generation Air Transportation System (NextGen) modernization of the US air traffic system is due for implementation across the US in stages between 2012 and 2025. NextGen will transform America's air traffic control system from a ground-based system to a satellite-based system. Global Position System (GPS) technology will be used to shorten routes, save time and fuel, reduce traffic delays, increase capacity, and permit controllers to monitor and manage aircraft with greater safety margins. Planes will be able to fly closer together, take more direct routes, and avoid delays caused by airport "stacking" as planes wait for an open runway. To implement this, the Federal Aviation Administration (FAA) is undertaking a wide-ranging transformation of the entire air transportation system. This transformation has the aim of reducing gridlock, both in the sky and at the airports.

Once implemented, NextGen will allow pilots and dispatchers to select their own direct flight path, rather than using a grid-like highway system. By 2020, aircraft are expected to be equipped to tell pilots exactly where their location is in relation to other aircraft, enabling planes to safely fly closer together. By providing more information to ground control and planes, planes are expected to land faster, navigate through weather better, and reduce taxi times so flights and airports themselves can run more efficiently.

Maritime Freight

The maritime industry has always placed a high priority on security. Drug smuggling, custom duty evasion, and piracy have been some of the most important concerns. The international dimensions of the shipping industry, the large number of maritime ports, the vast fleet of global shipping, the range of products carried in vessels, and the difficulty of detection has made the

issue of security in shipping a persistent concern. For ports, vulnerabilities can be exploited from both the landside and the water side. Recently, customs officials have focused more scrutiny on containers in order to identify illicit and/or dangerous cargoes. All containers imported to US seaports are scanned through radiation portal monitors (RPM) prior to leaving a marine terminal on trucks or rail cars. Other selected containers are also scanned or manually inspected by US Customs and Border Protection (CBP) based on their assessment of risk or by random selection.

The United States Coast Guard (USCG) inspects cargoes and containers for compliance with the Federal Hazardous Materials Transportation Law (FHMTL) and the International Safe Container Act of 1977 (ISCA) (46 U.S.C. 80501-80509). Regulations implementing the FHMTL are codified in 49 CFR 107-180. Regulations implementing the ISCA can be found in 49 CFR 450-453. The Coast Guard inspects containers of general cargo to ensure hazardous materials are not being shipped illegally, or as "undeclared hazardous materials." Undeclared hazardous material shipments are a leading cause of transportation incidents.[109]

The USCG also has responsibility for the Transportation Worker Identification Credential (TWIC) program. The TWIC program was developed in accordance with the legislative provision of the Maritime Transportation Security Act (2002, 2010) and the Security and Accountability for Every Port Act of 2006 (SAFE). The TWIC identification card is a tamper-resistant credential that contains biometric information about the holder, rendering the card useless to anyone other than the rightful owner.

Vessel Safety and Security

The Maritime Transportation Security Act of 2002 (P.L. 107-295) was designed to protect the nation's ports and waterways from a terrorist attack. The basic elements of this legislation were adopted by the International Maritime Organization (IMO) in 2002 as the International Ship and Port Security code (ISPS). There are three important features of these interventions. First, is the requirement of an Automated Identity System (AIS) to be fitted on all vessels between 300 gross tonnage and upwards. The AIS requires vessels to have a permanently marked and visible identity number, and a record must be maintained of its flag, port of registry, and address of the registered owner. Second, each port must undertake a security assessment of its assets, facilities and the effects of damages that might be caused. The port must then evaluate its risks, and identify any weaknesses in its physical security, communication systems, and utilities. Third, all cargoes destined for the US must receive customs clearance prior to departure of the ship. In addition, it is proposed that biometric identification for seafarers are implemented and that a national database of sailors be maintained.

The ISPS code is being implemented in ports around the world. Without certification, a foreign port would have difficulty trading with the US. Thus, compliance is becoming an urgent

competitive issue in ports large and small around the world. The cost of securing sites, of undertaking risk assessments, and monitoring ships represents an additional burden without any commercial return. US ports have been able to tap funding from the Department of Homeland Security, but foreign ports have to comply or risk the loss of business. In 2008, legislation in the US required that all containers being shipped to the US undergo screening. Foreign ports will be expected to purchase gamma-ray and x-ray scanners, and undertake screening of all US-bound containers, regardless of the degree of the security threat. This is a further financial and operational cost for foreign ports. Security has become an additional element in determining competitive advantage.

Border Safety and Security

California and Mexico share over 130 miles of an international border. The border is a vital economic gateway for international trade and a key contributor to the economic well-being of both countries. Under the auspices of the Department of Homeland Security, the US Customs and Border Protection (CBP) safeguards the US - Mexico Border. Their top priority is "to keep terrorists and their weapons from entering the US while welcoming all legitimate travelers and commerce."[110] With regard to freight, the CBPs primary responsibility is to secure "the nation's air, land, and sea border to prevent illegal activity while facilitating lawful travel and trade."

The CBP "creates and implements programs using sophisticated technologies, and trains personnel to help achieve the goals of securing US ports and borders while supporting and expediting trade." The Office of International Trade within the CBP organization focuses its resources on high-risk areas that can cause significant revenue loss, harm the US economy, or threaten the health and safety of the American people" and are referred to as Priority Trade Issues. They consist of the following:

- Agriculture (invasive species, agro-terrorism, etc.);
- Anti-dumping and countervailing duties (unfairly low or subsidized price);
- Tariffs (levied on imported goods to offset subsidies made to exporters who produce these goods);
- Import safety (avoiding unsafe products from entering the U.S);
- Intellectual property rights (trademarks, copyrights, and patents, fake goods);
- Penalties, revenue (established as an effective internal control policy for the protection of duties and taxes that are collected from imported merchandise); and
- Textiles (undervalued, misclassified, or illegally transshipped or entered).

Initiated after 9/11, the Free and Secure Trade (FAST) Program is a commercial clearance program for known low-risk shipments entering the US from Mexico and Canada. It allows for expedited processing for commercial carriers who have completed background checks and have completed certain eligibility requirements. Participation in the "trusted trader" program requires that "every link in the supply chain, from manufacturer to maritime freight carrier to driver to importer, is certified under the Customs-Trade Partnership program, or C-TPAT." C-TPAT is a voluntary government-business initiative intended to build cooperative relationships that strengthen and improve overall international supply chain and US border security. Nationwide, there are over 78,000 commercial drivers enrolled in the program and 10,000 companies certified worldwide. Five years of FAST membership costs $50, US or Canadian. One of the key benefits of enrollment for carriers is access to dedicated lanes for greater speed and efficiency in processing transborder shipments. For the US, Mexico, and Canada, the program helps to support supply chain security while promoting economic prosperity.

In February 2014, President Obama issued an Executive Order (E.O. 13659), *Streamlining the Export/Import Process for America's Businesses*, which, among other things, directs federal agencies with a role in trade to design, develop, and integrate their requirements into an electronic "Single Window," known as the International Trade Data System, by December 2016. Currently, there are hundreds of paper forms being used to import and export goods. Through the Automated Commercial Environment (ACE), CBP's cargo processing system, trade transactions will be more efficient, standardized, simplified, less costly, and more predictable for importers and exporters. ACE will streamline collection and improve enforcement and will ultimately serve as the "single window" to enable businesses to electronically transmit the data required by the US government to import or export cargo. This approach will ensure cargo is more secure, will reduce transaction costs for both the government and the trade, and will expedite cargo release. The E.O. also requires agencies to work together to enhance supply chain processes so that the US can compete more effectively in the world marketplace. CBP is also working to design a Government-wide 'trusted trader' partnership program that would integrate CBP's C-TPAT and the Importer Self-Assessment (ISA) with other US government trusted trader programs. On June 16, 2014, CBP, in collaboration with the US Consumer Product Safety Commission and the US Food and Drug Administration, announced the joint effort to begin the testing of the Trusted Trader program.[111] This pilot is expected to inform a comprehensive trusted trader program that standardizes program participation criteria and assists CBP in addressing supply chain security, trade compliance, financial compliance, and enforcement. The program would allow CBP to redirect resources to unknown and high-risk importers, while improving predictability and transparency.[112]

Radiological Responsibilities

As the nations' primary border enforcement agency, the CBP is tasked to do "everything in its power to prevent terrorist and terrorist weapons, including weapons of mass destruction, from entering this country. Nuclear and radiological materials are of particular concern because of the potential to harm large numbers of people and to disrupt the national economy. The goal is to screen 100 percent of all incoming goods, people, and conveyances for radiation.

The CBP is installing radiation portal monitors for nuclear devices and for radiological materials. The monitor is a non-intrusive, passive means to screen trucks and other conveyances for the presence of nuclear devices and radiological materials. Portal monitors will be installed at seaports, land ports of entry and crossings, rail crossings, international airports, and at international mail and express consignment courier facilities.

On a daily basis, the CHP is directly involved with the CBP, in the oversight of all commercial vehicles transporting radioactive materials that enter California through its southern borders. Unlike other states whose roles are often limited to oversight of transportation of radiological materials, the CHP regulates both radiological transportation and radiological threats within the state. The CHP currently has 50 hazardous material specialists assigned statewide, with seven of the specialists assigned to work closely with allied agencies to assist in developing emergency incident protocols.

Freight Transportation Resiliency

In addition to safety and security, MAP-21 identifies resilience of freight movement as an important component of the National Freight Policy. Resilience of the transportation network is the capacity to absorb the disruption of small-scale events, recover quickly from large disasters, and return to normal operating levels. This ability depends on the network structure and the actions taken to preserve or restore service in the event of a disaster or other disruption. Factors that enhance resilience of the transportation system improve responsiveness of operations and infrastructure repairs after a disaster and add capacity and flexibility at critical intermodal connections or choke points in response to a disruption. Resilience is a property of the system as a whole, not its component parts.

The rapid development of e-commerce, economic globalization, just-in-time production, and logistics and supply chain systems over past decades, has led to a significant need for efficient and effective management of freight movements. Businesses and consumers have become increasingly dependent on the freight transport system to deliver their goods with far less inventory stored in regional warehouses and stores. Freight movement in the US has increased dramatically over the past 20 years, and highway vehicle miles traveled grew by approximately 98 percent, however, the highway network expanded less than 5 percent between 1980 and

2007. During that same period, risks from incidents, weather-related hazards, and terrorist attacks on freight transportation systems have also increased significantly. Trucking companies, rail carriers, infrastructure managers, and terminal and port operators must invest to prevent or mitigate the effects of disasters. Individuals, private sector businesses and industries, and public sector government agencies are not immune to sudden events that disrupt normal daily activities. Disasters on the transportation network, whether attributable to nature, human or mechanical error, or human intent, raise the awareness of the need for plans of action to quickly respond and restore mobility.

Accommodating disruptions within the freight transportation system often requires a variety of measures. Reliable freight transportation is a prerequisite for an efficient supply chain. As ground transportation systems have become more congested and less able to accommodate shifting demands, improving resilience of the transportation system itself becomes a priority. Researchers and consultants have provided a number of key insights to address freight transportation resiliency. Two are important to mention here: public-private relationships are integral, and communication capabilities are critical, including strengthening pre-disruption communication within the freight industry to prepare for recovery. Further work is needed on this topic, and it is the recommendation of this Plan to more fully address the subject of freight transportation resilience in the update to the California Freight Mobility Plan.

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CHAPTER 3.6

INTELLIGENT TRANSPORTATION SYSTEMS & TECHNOLOGY

MAP-21 requires state freight plans to include "evidence of consideration of innovative technologies and operational strategies, including intelligent transportation systems (ITS), which improve the safety and efficiency of freight movement."[113]

FIGURE 70. INTELLIGENT TRANSPORTATION SYSTEMS DEFINED

Intelligent Transportation Systems (ITS) - a collection of traditional transportation infrastructure (roads, vehicles, signs), communications, and computer technologies that are used to improve the operation of roadway, rail, air, and maritime systems. ITS technologies refer to electronic sensing technologies that continuously monitor the system's operations, computer systems that process system performance data, electronic devices that can deliver critical information to travelers, and communication networks that carry data flows between the field processing points. ITS emphasizes system operations in an efficient and safe manner through integrated management of various components of the transportation system and its services.[2]

INTELLIGENT TRANSPORTATION SYSTEMS AND FREIGHT PLANS

The freight industry has embraced ITS as a way to reduce costs, increase competitiveness, and mitigate impacts to communities and the environment. ITS technologies allow California's freight infrastructure to increase its efficiency and capacity by enabling the value and volume of freight and freight movement to increase while reducing demands on the system. ITS technologies are versatile in that they can be applied to the vast transportation infrastructure of highways, streets, bridges, tunnels, railways, seaports, and airports, as well as associated vehicles, including cars, buses, trucks, trains, aircraft, and maritime vessels. ITS can also be applied to mobile freight handling equipment, such as cranes, forklifts, and conveyor belts. Even the shipping containers used to transport goods can have ITS applications.

Both public agencies and the private sector have recognized the need for a coordinated, strategic approach to ITS deployment and have established direct links between ITS planning and other transportation and strategic planning efforts. Ideally, the outcomes of ITS planning are activities (including freight projects) incorporated and programmed into statewide, regional, and local transportation plans and freight plans. It is expected that ITS and technology projects will be specifically identified and funded within every freight funding program and that nearly all freight projects will have an ITS or advanced technology component.

ITS TRAINING AND LABOR AGREEMENTS

Critical to the utilization of ITS and advanced technologies is the need for workforce training and labor agreements that address ITS. The labor force must be able to operate and maintain the new technologies, and labor agreements must be updated to reflect the changes. In 2002, the Pacific Maritime Association (PMA) negotiated a landmark labor agreement with the International Longshore and Warehouse Union (ILWU), which allowed for significant investments in the technology necessary to expedite port gate transactions, and planned future investments and improvements. Building on that framework, the parties agreed in 2008 to enable automation at port terminals. Automation of components of the freight transport system will dramatically increase by 2040 and is expected to help achieve significant improvements in safety, reliability, impact reductions, transport speed, freight volumes and efficiency. As a result, these improvements will also generate substantial changes in the workforce. Notably, the size of the workforce has increased significantly since 2002, as technology has enabled greater cargo volumes at West Coast ports. Looking ahead, innovation is expected to be an important driver of volume growth and workforce opportunity.

FREIGHT ITS ELEMENTS

The most common freight ITS elements implemented for freight transportation operations are categorized into several systems. They include:

1. Traffic control and monitoring systems
2. Weigh-In-Motion (WIM) systems
3. Delivery-space booking systems
4. Vehicle and container location and condition monitoring systems
5. Route-planning systems
6. Driving behavior monitoring and controlling systems
7. Crash prevention systems
8. Freight location monitoring systems
9. Freight status monitoring systems
10. Rail management and operations
11. Rail crossing safety systems

Each of these freight ITS elements, described below, is summarized from The International Journal of Logistics Systems and Management (IJLSM).[114]

1. **Traffic control and monitoring systems** – These systems control and manage traffic flow by providing information to traffic authorities and logistics service providers regarding collisions, congestion, traffic flow speed, and vehicles. Technologies such as "smart" traffic lights, plate recognition cameras, and speed cameras are included. Such systems can send updates about vehicle arrival time and delays, improving the efficiency of truck, port, terminal, and warehouse operations. The environmental performance of the transportation operations is increased by decreasing transport time and vehicle idling.
2. **Weigh-in-Motion (WIM) systems** – These systems ensure that vehicles are not overloaded beyond maximum allowable weights. They are used to determine the weight of the vehicles as they move past sensors. Removing overweight vehicles from roadways increases safety and decreases damage to pavement and structures. WIM systems also improve highway system performance by eliminating or reducing truck stop times at static weight-controlling stations. WIM systems can help reduce the risk of accidents by identifying overweight vehicles and flagging them for enforcement action. Broad application of WIM monitoring can provide a wealth of traffic operations data across a wide area or along an extended corridor.

3. **Delivery space-booking systems** – These systems are used to reserve truck parking spaces for a specific vehicle at a specific time and to reserve a time to load or unload the freight. They contribute to efficiency performance by maximizing truck parking in dense urban areas where parking spaces are limited. They also allow truck drivers to find safe parking zones and avoid unsafe zones. Their application potentially reduces the total number of vehicle trips during a specific time period and maximizes utilization of available parking, potentially reducing or delaying the need to construct additional truck parking.
4. **Vehicle and container location and condition monitoring systems** – These systems provide real-time information about the position of vehicles via satellite. Information can accessed by via the web. Sensors on the vehicle can also provide real-time information about the condition of the cargo shipment, container door-lock status, and adherence to the planned route. US Customs service providers can estimate vehicle arrival times and prepare documentation prior to arrival, thus decreasing truck waiting times. Port gate operators can send estimated arrival upates to trucks in the case of cargo ship delays.
5. **Route planning systems** – These systems help with route selection based on real-time roadway and traffic conditions, enabling a driver to reroute and avoid traffic congestion. This can reduce delay for shipments and lower truck emissions.
6. **Driver behavior-monitoring and control systems –** These systems track the speed and acceleration of the vehicle and provide feedback for improving driver performance. Such feedback can lead to reduced crashes and improved fuel economy. The systems can also assist in maintaining a driver's attention to the roadway by providing real-time feedback that would inform them of signs of inattention, such as lane drift.
7. **Crash prevention systems** – These systems use sensors and information feedback to decrease the probability of accidents. Sensors installed on trucks have the capability of sending signals to the driver when the truck is getting too close to an object or is approaching too fast. Sensors and communication equipment installed on vehicles and roadway infrastructure enable vehicle-to-vehicle and vehicle-to-infrastructure communication as well as activating automated vehicle slowing or braking systems.
8. **Freight location monitoring systems** – These systems use Radio Frequency Identification (RFID) tags to allow freight tracking without the need for direct contact or optical scanning. RFID readers can be installed in vehicles, on warehouse doors, and at facility gates. Freight movement is automatically recorded, saving staff time and improving data recording accuracy. The system can read a large number of tags at the same time, improving operating efficiencies.

9. **Freight status monitoring systems** – These systems employ sensors to measure the physical attributes of the goods, such as temperature, humidity, impact-force level, light level, and vibration level. This can improve transportation outcomes by ensuring better quality products upon delivery. These systems are particularly useful for tracking dangerous, fragile, and perishable goods such as chemicals, explosives, medicines, and fresh food. A combination of sensors with automatic identification technologies, such as RFID, provides opportunities to improve the control and monitoring of goods throughout the entire supply chain.
10. **Railroad management and operations** –The benefits from ITS train applications include protection controls for both interstate and state networks, improved network capacity, operational flexibility, service availability, travel times, safety, system reliability, and security. Control and dispatch centers are able to schedule more trains on the same area of track and will also be able to 'fleet trains' heading in the same direction by spacing them more closely while still providing safe stopping distances. Developments in this area highlight the need for interoperability with road-based ITS technology, particularly at railway crossings.
11. **Rail crossing safety systems** - These systems expand the use of ITS to improve rail crossing safety, including low-cost solutions that augment more traditional treatments for crossings, such as signs, flashing lights, and boom gates. The use of short-range communications between oncoming trains and vehicles or roadside installations to warn motor vehicle drivers will likely require integration with other auto and truck-based ITS technologies.

Active ITS Initiatives and Research Projects

PrePass

PrePass is a nationally implemented system that verifies truck weight and credentials while trucks travel at highway speeds, allowing pre-credentialed, safe carriers to bypass inspection stations.[115] PrePass enables qualified trucking firms to electronically comply with state-established weight, safety, and credential requirements while passing detectors at highway speeds. By avoiding weigh-station stops and idling in queues, motor carriers reduce fuel consumption and its associated pollutants and benefit from reduced delivery times. Launched in California in 1995, PrePass is now operational at more than 280 sites in 30 states. By 2012, nearly 456,000 trucks in the US had voluntarily enrolled in PrePass and served approximately 400 million truck trips at PrePass-equipped weigh stations annually (Prepass.com). By reducing congestion in and around weigh facilities and tolling centers, PrePass improves highway safety and reduces vehicle emissions. PrePass enables enforcement personnel to concentrate on those trucks most likely to be noncompliant.

Advanced Transportation Management Information System (ATMIS)

The Ports of Los Angeles and Long Beach have deployed the ATMIS to monitor truck traffic within the Ports using vehicle detection devices and closed-circuit television cameras.[116] A traffic management center operated jointly by the Ports provides traveler information, including real-time traffic conditions and incidents on changeable message signs in the vicinity of the Port area.

PierPASS

The PierPASS program at the Ports of Los Angeles and Long Beach was established to manage and improve truck movements, address congestion, and improve air quality by reducing the number of idling trucks and driver wait time.[117] PierPASS has an "Off-Peak" program that charges a traffic mitigation fee of $50 per twenty-foot-equivalent unit (TEU) container for peak-hour pickups or deliveries. The fees are used to fund additional work shifts neeed to provide service during extended hours. It is estimated that during 2007 and most of 2008 – prior to the economic downturn – off-peak work shifts handled an average of 68,000 truck trips in a typical week, or about 40 percent of all container moves at the two ports on days with both peak and off-peak shifts. Over the past eight years, PierPass Off-Peak gates have grown to handle approximately 55 percent of all container traffic at the ports, accommodating more than 23 million truck transactions, and greatly easing congestion on city streets and nearby freeways during daytime hours.

Gateway Cities Technology Plan for Goods Movement

The Gateway Cities Technology Plan for Goods Movement program represents the most significant fusion of ITS and freight operations technologies attempted to date in North America. Through the integration of traditional freeway, arterial, and traveler information technologies with intermodal freight, port, and truck technologies, this project is studying the potential of providing an end-to-end information support system that can improve the efficiency of goods movement in Southern California. This plan is being developed by the Gateway Cities Council of Governments and the Los Angeles County Metropolitan Transportation Authority, with close involvement from the Ports of Long Beach and Los Angeles, Caltrans, the Southern California Council of Governments, and other key stakeholders.[118]

The Gateway Cities Technology Plan for Goods Movement project is composed of five strategies:

1. Data collection,
2. Transportation operations and management,
3. Emerging goods movement technology applications,

4. I-710 corridor advanced technologies applications, and
5. Commercial vehicle operations planning.

For more information on the Gateway Cities ITS applications and to access their Technology Plan for Goods Movement, please visit http://www.gatewaycog.org/what-we-do/advancing-technology/.

Freight Advanced Traveler Information System (FRATIS)

The US DOT, in conjunction with the Port of Los Angeles, a marine terminal, and a drayage trucking company, is currently testing an advanced intermodal logistics information technology system designed to improve drayage and container handling. This system, termed the Freight Advanced Traveler Information System (FRATIS), is a demonstration project funded by the US Department of Transportation (DOT). The FRATIS project seeks to improve the efficiency of freight operations by using several levels of real-time information to guide adaptive and effective decision making. The FRATIS project is focused on: 1) improving communications and sharing intermodal logistics information between the truck drayage industry and port terminals so that terminals are less congested during peak hours; and 2) improving traveler information available to intermodal truck drayage fleets so that they can more effectively plan around traffic and port congestion. Together, these two areas of focus can result in significant improvements in intermodal efficiency, including reductions in truck trips, reductions in travel times, and improved terminal gate and processing efficiency. These benefits, in turn, will directly result in the public sector benefits of improved air quality, reduced traffic congestion, and increased fuel savings. Technologies that are being utilized during the demonstration test include advanced traveler information, port terminal truck-queue-time measurement, automated ETA messaging to the terminals one day in advance of truck arrivals, direct messaging of trucks by terminals, and employment of an algorithm that will optimize truck deliveries and movements based on several key constraints (e.g., time of day, PierPASS restrictions, terminal queue status, etc.). The primary user interfaces for these technologies are a web application for drayage truck dispatchers, a mobile application for drayage truck drivers, and messaging and alerts functionality for terminal operators. This demonstration project is currently in operational testing that began in December 2013. US DOT will be expanding the FRATIS project to two more container terminals in the Ports of Los Angeles and Long Beach and eight more trucking companies in 2014. The Ports of Los Angeles and Long Beach want to expand this program to all container terminals in the Ports and as many tucking companies as possible. The FRATIS project consists of the following two information technology (IT) applications:

- **Freight Specific Dynamic Travel Planning and Performance**. This IT application bundles all of the traveler information, dynamic routing, and performance monitoring elements that users need. This application will leverage existing data in the public domain, as well

as emerging private sector applications, to provide benefits to both sectors. Other data includes real-time freeway and key arterial speeds and volumes; incident information; road closure information; route restrictions; bridge heights; truck parking availability; cell phone and Bluetooth movement and speed data; weather data; and real-time speed data from fleet management systems.

- **Drayage Optimization.** This IT application combines container load matching and freight information exchange systems to fully optimize drayage operations. The result of the optimization minimizes unproductive bobtail (this refers to a cab or tractor with no trailer or load) moves, spreading out truck arrivals at intermodal terminals throughout the day. Optimizing a freight carrier's itinerary requires a wide range of entities to participate in sharing their data (including rail carriers, metropolitan planning organizations, traffic management centers, customers, and the freight carriers themselves) in a manner that assesses all of the variables and produces an optimized itinerary. This requires development of a complex set of algorithms that leverage data from multiple sources.

I-710 Automated Truck Research

This project will implement a staged progression of commercial vehicle technologies in order to transition from current research-based, automated, commercial vehicle demonstration efforts to staged operational testing of a flow efficiency system of trucks along the planned I-710 truck lanes. The project will build upon the unique operational environment and potential partnerships of the Gateway Cities region to promote and enhance truck automated commercial vehicle research by bringing together the applications of automated commercial vehicle and automation technologies on one of the most heavily congested truck corridors in the country. The project will examine and test the specific design and operational concerns that impact the future development of the I-710 and its approaches.[119]

State Route (SR) 11 - Otay Mesa East (OME) Port of Entry (POE) ITS Technology

San Diego Association of Governments (SANDAG) and Caltrans, along with local, state, and federal agencies in the United States and Mexico, are executing an aggressive plan to self-finance a new border crossing in the San Diego and Baja California region. Annually, approximately $54 billion worth of goods move across the region's borders, and at each individual vehicle crossing, wait times regularly exceed two hours per vehicle. To sustain vibrant and effective commercial cross-border activities, a new port of entry and a connecting state highway are being created. The SR 11 and OME POE project will improve the efficient movement of people and goods between the United States and Mexico. A state-of-the-art POE and commercial vehicle enforcement facility accessed via a toll road will provide shorter and more predictable crossing times. This POE and four-lane state highway will connect the United

States-Mexico border to key regional, state, and international highways, including SR 125, SR 905, and the Tijuana-Tecate and Tijuana-Ensenada free and toll roads.[120]

FIGURE 71. SR-11 AND OTAY MESA EAST PORT OF ENTRY ITS PRE-DEPLOYMENT STRATEGY

Source SANDAG[121]

The ITS Pre-Deployment Strategies for the border crossing will address innovative operating concepts and technologies that could be deployed to ensure a secure, state-of-the-art border crossing. A major focus of the ITS deployment strategy is to help identify better time and travel experiences for passenger and commercial customers, thereby encouraging them to use the tolled border crossing by offering shorter and more predictable wait times. Compared with the current crossing, shorter wait times will also reduce emissions by preventing extended idling of vehicles waiting to cross the border. Upon construction, ITS technology deployed for the project will collect and provide real-time information on border-crossing options, toll rates, and wait times on both sides of the border for the entire San Diego-Baja California region.

SANDAG and Caltrans are pursuing multiple objectives with the new border crossing, including building additional physical capacity at the border, maximizing the efficiency of the new facility with state-of-the-art ITS technologies and innovative operating concepts, and financing the facility development predominantly as a self-help project. The data collection will work seamlessly with an advanced traveler information system to provide accurate and useful data to the customer. It is envisioned that ITS will enable six high-level systems functions along the region's border, including:

1. Data collection and analysis
2. Toll revenue collection
3. Traveler information display
4. Traffic management and monitoring
5. Vehicle safety inspections support
6. Customs and Border Protection (CBP) and Aduanas (Mexican Customs) Operational Assistance.

Smart Truck Parking on California's I-5 Corridor

The Smart Truck Parking project is a collaborative implementation and research effort among Caltrans; the University of California, Berkeley; ParkingCarma; and other partners and is sponsored by the Federal Highway Administration. It is designed to demonstrate the application of real-time parking availability information at truck stops. The premise is that truckers are given access to timely, accurate parking information so they will make better travel decisions. Currently, truckers must search for parking after a full day of driving and often do not have adequate or timely information on where they can park. The lack of information about real-time parking availability may lead to illegal parking, which poses an environmental and safety hazard to both truckers and the public. In some cases, truckers must choose between searching for safe legal parking and impinging on hours of service rules. Truck drivers will be able to check on a website or use a mobile device for real-time parking availability at selected truck stops that are participating in this project to obtain information regarding:

- Real-Time Parking Availability Information
- Truck Stop Attribute Information
- Parking Reservations

The project is currently testing or operating several sensor technologies at truck stops on I-5 in California's Central Valley. Stakeholder outreach efforts are also underway to recruit early adopters and facilitate expanded deployment.[122]

Interstate 80 (I-80) Winter Operations Multistate Coalition

Interstate 80 (I-80) is an east/west transcontinental route that traverses the entire nation, from San Francisco, California, to Teaneck, New Jersey. The Coalition began as a multistate partnership between California, Nevada, Utah, and Wyoming, extending from San Francisco to Cheyenne, Wyoming. It has expanded to include Nebraska. The Coalition is developing the I-80 Corridor System Management Plan (I-80 CSMP) that seeks to identify current and future mobility and operational solutions to transportation deficiencies and to enhance livability throughout the corridor. The effort includes a Freight and Logistics working group that seeks to investigate all issues relevant to the topic of freight mobility and the I-80 corridor. The Corridor Coalition, through the I-80 CSMP, is working collaboratively with the I-80 Winter Operations Coalition to coordinate operations on the I-80 corridor in the Western US. The coordination includes the use of emerging technologies and integrated corridor management approaches to enhance communications between Traffic Management Centers and Traffic Operation Centers, and improve capabilities to deploy real-time weather information for freight transportation operators.

The I-80 Corridor Coalition was awarded funding under the Multistate Corridor Operations and Management (MCOM) program to help execute an operations platform to allow multiple states access to real-time and operational winter travel information, distribute multistate road impact information to truckers, and enhance corridor coalition partnering and activities. The Coalition is leveraging current technology investments within the corridor and synergize with other multistate efforts, such as the I-15 Mobility Alliance (I-80 MCOM application).[123]

FIGURE 72. I-80 WINTER OPERATIONS MULTISTATE COALITION PARTNERS

ource: I-80 Winter Operations Multistate Coalition

CONCLUSION

The implementation of ITS and new technologies, such as those described in this chapter, will play a significant role in helping California pursue the CFMP freight vision and meet the six goals identified in Chapter 1-1 of the CFMP. While meeting these goals, the implementation of ITS and new technologies will also concurrently address State air quality, greenhouse gas, and energy goals. California's population and traffic congestion will continue to grow. Expanding costly infrastructure to meet freight demands is not a standalone solution; the freight system must derive more productivity and capacity from existing facilities and expand only where necessary. The freight industry and public agencies acknowledge the value of using ITS technologies to increase the efficiency and capacity of California's freight infrastructure to meet the rising demands on the transportation system. The public and private sectors must continue to work together to incorporate ITS into freight projects that are identified in state, regional and local plans.

CHAPTER 3.7

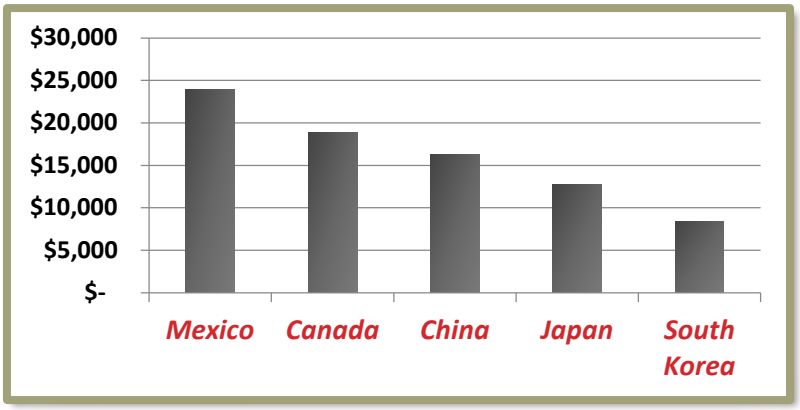
CALIFORNIA-MEXICO BORDER

IMPORTANCE OF THE CALIFORNIA-MEXICO BORDER

Cross-border commerce is important for the continued success of the economies of California, Mexico, and the US as a whole. Mexico is California's number one export market, purchasing 14.2 percent of all California exports, and the second largest export market for the US. Mexico and Canada make up the two largest markets for US exports, purchasing nearly one-third of US produced merchandise. Two-way trade between Mexico and the US has increased dramatically, from $81.4 billion in 1993 to more than $506.6 billion in 2013,[124] and it is expected to continue to grow.

After the terrorist attacks of September 11, 2001, security became the main concern in managing, operating, and planning for the border. These events and subsequent policies generated longer border crossing delays and increased traffic congestion at the ports of entry (POEs). Inadequate infrastructure at border crossings continues to create traffic congestion, delaying freight movement. Border delays increase transportation costs, interrupt just-in-time manufacturing cycles, add to labor costs, and generate harmful environment impacts.

FIGURE 73. CALIFORNIA'S TOP EXPORT MARKETS – 2013 (MILLIONS)



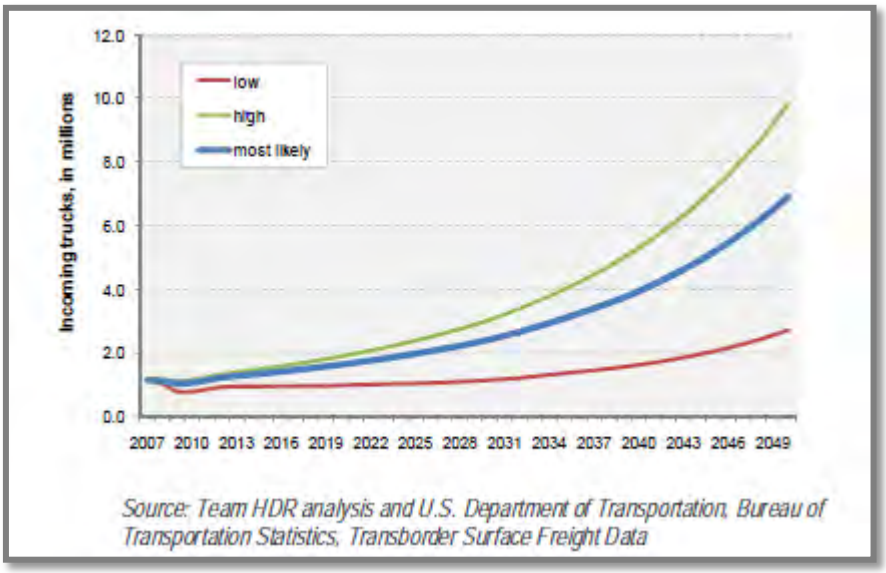
Source: US Department of Commerce, International Trade Administration

It is estimated that by 2050,[125] border crossings in San Diego County will exceed 4.4 million truckloads per year and 39 million tons of goods, valued at $309 billion (an average annual growth of 5.2 percent between 2007 and 2050). Similarly, by 2050, almost 17 million tons of

goods per year are projected to be handled at Imperial County border crossings, with an estimated value of $143 billion (an average annual growth of 5.3 percent). This increase in truck traffic will impact California's already strained POEs and bottlenecks in its State Highway System (SHS) near the border.

Nearly 98 percent of freight moves across the border by truck, many of which use the SHS. Inadequate infrastructure at border crossings creates traffic congestion and delay for freight movement. Border delays increase transportation costs, interrupt manufacturing, add to labor costs, and harm the environment.

FIGURE 74. INCOMING TRUCKS AT ALL REGIONAL LAND POES (2007 – 2050)



Source: Team HDR Analysis and US Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data

A significant portion of the freight entering California from Mexico does not stay within the border region. Nearly 90 percent of the goods entering San Diego County have a final destination elsewhere in California or other states, such as Arizona and Nevada, with some going as far as New York.[126] The land POEs also have strong relationships with San Pedro Bay seaports. At least twelve percent of all laden trucks that originate or are destined for a point outside of the border region have a connection to the seaports in Long Beach and Los Angeles.[127]

In recent years, many US companies have relocated their offshore production from Asia to Mexico; a practice known as nearshoring. The advantages of nearshoring over Asian production include lower wages (in contrast to rising wages in China), improved intellectual property

protection, reduced transportation costs, fewer supply chain disruptions, time zone synchronicity, reduced energy costs, better quality control, improved inventory management, and the simplicity and cost reduction of a shorter supply chain. A leaner supply chain allows for greater product customization and routing flexibility. According to Inbound Logistics, "Product(s) originating in Mexico can reach North American customers in one week or less, versus 20 to 30 days from Asia."

Of additional importance, is the opportunity for "production sharing," a practice in which production and distribution processes are distributed across regional and international borders. The flow of materials and components across the California-Mexico Border during manufacturing helps build strong economic interdependencies, resulting in highly blended economies. One benefit of this relationship is that exports from Mexico to the US include 40 percent US content, far exceeding that of any other foreign import[128] (see Table 38 below). This means that trade between the US and Mexico supports employment in the US as well as Mexico.

TABLE 36. 2011 PRODUCTION SHARING: US-BASED OUTPUT AS PERCENTAGE OF FOREIGN IMPORTS

Importer	US contribution (as percent of value)
Mexico	40%
Canada	25%
Malaysia	8%
Korea	5%
China	4%
Brazil	3%
European Union	2%
Japan	2%
India	2%

Source: Working Together: Economic Ties between the United States and Mexico. Christopher E. Wilson, Woodrow Wilson International Center for Scholars, Mexico Institute. November 2011.

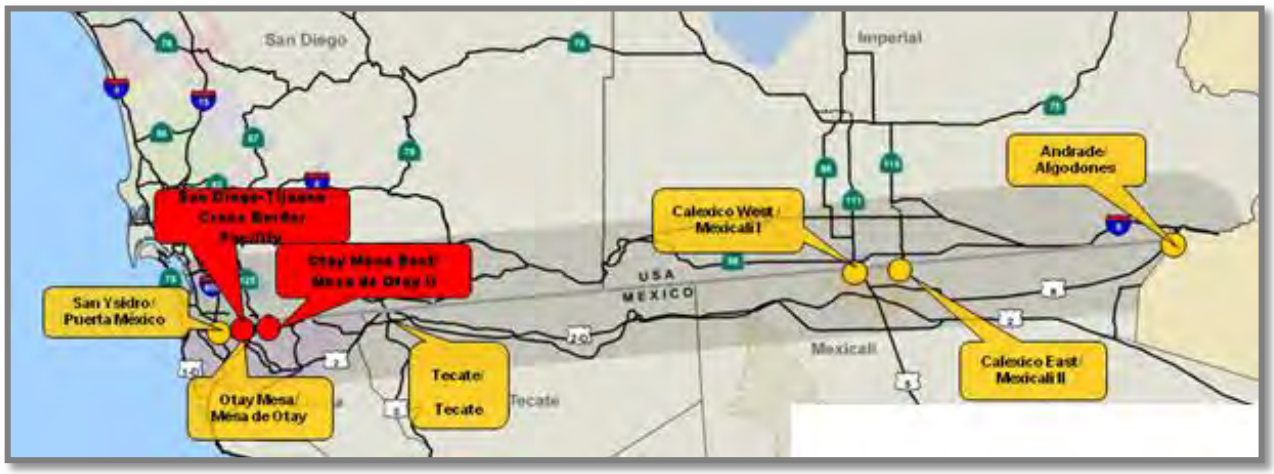
In July 2014, Governor Jerry Brown met with Mexican President Enrique Peña Nieto in Mexico City to help boost bilateral trade and investments between the two neighbors and to expand environmental and economic cooperation. Improving relationships between Mexico and California benefits both countries.

CALIFORNIA GATEWAYS

California and Mexico share over 130 miles of border. The border offers six land ports of entry: San Ysidro, Otay Mesa, Tecate, Calexico West, Calexico East, and Andrade (see Figure 76). The

Otay Mesa POE in San Diego County and the Calexico East POE in Imperial County are the two main California-Mexico freight gateways for trucks. Both the San Ysidro POE in San Diego County and the Calexico West POE in Imperial County also serve as freight gateways for rail operations. The Otay Mesa POE is the second busiest commercial vehicle POE on the US-Mexican border in number of truck crossings. It is also the busiest commercial vehicle land port in California. In 2012, the Otay Mesa POE handled approximately 1.5 million truck crossings in both directions and saw close to $35 billion worth of goods. The Calexico East POE serves nearly all of the international truck traffic crossings in Imperial County, with a total trade value of over $12 billion dollars in 2012. The key commodities trucked from Mexico to the United States through California's land POEs include pulp and paper products; [129]electrical machinery, vehicles, food, and farm products.

FIGURE 75. INTERNATIONAL BORDER REGION PORTS OF ENTRY



Source: Caltrans

In 2017, a new state-of-the-art POE is scheduled to open in the unincorporated San Diego County community of Otay Mesa East, providing a critical relief valve for cross-border congestion. The project includes construction of SR 11 – a tolled, four-lane highway – and a commercial vehicle enforcement facility (CVEF). The planned toll road will enable truck drivers who are willing to pay the toll to significantly reduce lengthy wait times. This project will also help ease congestion of both freight and passenger traffic at the existing San Ysidro, Otay Mesa, and Tecate POEs, providing additional capacity for future growth.

FIGURE 76. TRUCKS AT OTAY MESA POE

The US customs and border protection (CBP), under the auspices of the Department of Homeland Security, is tasked with border management and control, "combining customs, immigration, border security, and agricultural protection into one coordinated and supportive activity." All of these functions are conducted right at the border crossing. (Photo courtesy of San Diego Association of Governments.)

US-Mexico Cross-Border Trucking Pilot Program

From October 14, 2011 to October 10, 2014, the Federal Motor Carrier Safety Administration (FMCSA) conducted the US–Mexico Cross-Border Long-Haul Trucking Pilot Program to evaluate "the ability of Mexico-domiciled motor carriers to operate safely in the United States beyond the municipalities and commercial zones along the United States-Mexico border."[130] Under the program, motor carriers based in Mexico could operate throughout the US for 3 years, and US-domiciled motor carriers gained reciprocal rights to operate in Mexico. Participants were required to complete a "Pre-Authorization Safety Audit" before receiving operating authority. Once authorized, they were required to successfully complete a compliance review. The participation rate was low, with only 13 program-approved carriers. Although the program has ended, the FMCSA has allowed participating Mexican carriers to continue operating in the US. The next step is for a report to be completed by the Motor Carrier Safety Advisory Committee. The report will include recommendations for future actions.

Border Freight Challenges and Opportunities

Economic Impacts of Border Delays

Land POE facilities and border transportation routes are severely congested, resulting in significant delays for trucks crossing the international border. In addition, federal, State, and

regional planning agencies project significant future increases in truck traffic. Annual freight flows are projected to increase in volume by 2.4 percent, and in value by 4.0 percent.[131] Cross-border delays discourage trips across the border and inhibit the potential for growth in long-term business income growth. Border congestion may be an impediment to attracting new investments, as well as supporting existing ones, since uncertain wait times effectively constitute a non-tariff trade barrier. In 2008,[132] over 30,000 potential job opportunities were lost nationwide, including 25,000 in California, due to delays in northbound freight flows and personal trips at the California-Mexico border. The impacts were significant on the south side of the border, as well. Over 11,000 potential job opportunities were lost in Mexico, including 7,600 in Baja, California.

Some of the factors contributing to long wait times and queues at a border crossing include limited POE hours of operation, inadequate infrastructure facilities, and insufficient Customs staffing on both sides of the border. When demand exceeds the capacity of the POE, trucked goods may be delayed up to several hours per crossing. Congestion delays occur both northbound and southbound. For instance, at the Otay Mesa POE, southbound truck traffic waiting to reach the US Customs export facility backs up onto city streets. During backups, trucks block intersections on surface streets, reducing access to local businesses, and increasing pollution to unacceptable levels. Illegal truck maneuvering and passenger vehicle conflicts are common.

Environmental Impacts of Border Delays

The importance of reducing truck idling time at the border is not only to reduce economic cost; it is also important for public health and the environment. Trucks consume up to a gallon of diesel fuel for each hour of idling. Diesel truck emissions – a mixture of gases and solids, including particulate matter (diesel soot), sulfur dioxide, carbon monoxide, hydrocarbons and various air toxins – are particularly harmful to children, seniors, asthma sufferers, people with chronic health problems. Often overlooked, another group that suffers disproportionately from the effects of diesel emissions is truck drivers.

A 2010 San Diego State University study of greenhouse gas (GHG) emissions measured a total of 80,000 metric tons (MT) of carbon dioxide equivalents (CO_2 E) at the three San Diego County POEs (San Ysidro, Otay Mesa, and Tecate, combined).[133] This total represents 0.5 percent of all on-road transportation emissions in San Diego County based on the latest 2006 GHG inventory. Heavy-duty diesel trucks at the Otay Mesa POE commercial crossing contributed the most on a per-vehicle basis (15.3 kilograms CO_2 E/crossing). Vehicles using the "trusted traveler" Secure Electronic Network for Travelers Rapid Inspection (SENTRI) lanes, which can be used by pre-screened, low-risk travelers, contributed the least overall emissions (1.1 kilograms CO_2 E/crossing). Of the total 80,000 MT of GHG emissions, a full 45 percent were generated by idling vehicles waiting to cross the border.

Need for Interagency Coordination

Historically, the California-Mexico border has lacked a single, integrated vision and there has been little attempt to the coordinate the efforts of the federal, State, and local agencies in the area responsible for mobility and security. To address this issue, a California-Baja California Border Master Plan (BMP) is under development. The plan is a bi-national effort to coordinate planning and delivery of projects at POEs and the transportation infrastructure that serves them. Caltrans and the California State Transportation Agency (CalSTA), in partnership with the Secretariat of Infrastructure and Urban Development of Baja California (Secretaría de Infraestructura y Desarrollo Urbano del Estado de Baja California, or SIDUE) and the US/Mexico Joint Working Committee (JWC), retained the San Diego Association of Governments (SANDAG) service bureau to assist in developing the plan.

The BMP was envisioned by the JWC as a pilot project between border states. The California-Baja California region completed its first BMP in 2008. Since then, the California-Baja California approach has been expanded and adapted to other border states and customized to address their needs, resulting in a master planning process for the entire US-Mexico border. The Arizona-Sonora BMP was finalized in February 2013, the Laredo-Coahuila/Nuevo León/Tamaulipas BMP was completed in June 2012, and the El Paso/Santa Teresa-Chihuahua BMP and Lower Rio Grande Valley-Tamaulipas BMP were completed in October 2013. The New Mexico-Chihuahua BMP is under development and is expected to be finalized in 2015.

Growing Trade: The Challenge of Funding Border Projects

After the signing of the North American Free Trade Agreement (NAFTA), cross-border trade between the US and Mexico increased. NAFTA did not provide any funding streams for land POEs or improvements to cross-border connecting transportation facilities, and the increase in cross-border economic activity impacted land POEs and the transportation network serving them. The 1998–2004 Transportation Equity Act for the 21st Century (TEA-21) and the 2005–2011 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) established the Coordinated Border Infrastructure Program to finance border projects. However, the current federal transportation bill, Moving Ahead for Progress in the 21st Century (MAP-21) folded the border financing program into a larger program, leaving border projects to compete with projects from non-border regions.

To facilitate growing volumes of NAFTA trade, border-related agencies must explore opportunities for public-private partnerships. The previously mentioned SR 11/Otay Mesa East POE is such a partnership. The project's estimated total cost of $750 million will be financed primarily through toll revenues. The first segment, funded by $71 million from the Proposition 1B Trade Corridor Improvement Fund and $41 million from the federal Coordinated Border

Infrastructure Programs, is currently under construction. Financing for Phases 2 and 3 is expected to come from tolls and subsequent bond sales.

THE ROLE OF CALTRANS

Caltrans and CalSTA, in partnership with the US General Services Administration, the US Customs and Border Protection (CBP), the US Federal Highway Administration (FHWA), SANDAG, the Imperial County Transportation Commission, and the Southern Association of Governments, works to reduce congestion and improve mobility in California's border international transportation network and at the POEs. Caltrans and CalSTA works with federal, State, and local government agencies and community stakeholders from the US and Mexico and represents the State in a number of national and bi-national forums to address border transportation issues, challenges, and opportunities. Caltrans and CalSTA actively participate in bi-national transportation and planning groups, such as the US-Mexico Joint Working Committee (JWC),[134] the US-Mexico Bi-national Bridges and Border Crossings Group,[135] and the Border Governors Conference (BGC).[136]

As previously described, in 2008, on behalf of the State of California, Caltrans and its project partners delivered the first state JWC US-Mexico Border Master Plan (BMP)[137]. "The California – Baja California Border Master Plan (BMP)" is a landmark plan whose goal is to integrate state, federal, and local input to develop bi-national criteria for prioritizing POE and connected transportation projects. Caltrans and the Baja California Secretariat of Infrastructure and Urban Development (SIDUE) have continued to serve as co-leads in 2014, In September 2014, they obtained approval of the 2014 BMP Update from the JWC.[138] Along with other products from the update, member agencies approved the reorganization and reranking of the POE and border transportation projects. They also initiated a process to develop a framework for a transportation model to conduct POE sensitivity analyses within a bi-national metropolitan region. Further, they documented low-cost operational improvements and non-motorized projects that provide immediate relief to border delays.

CALIFORNIA-MEXICO COORDINATION: THE PATH FORWARD

Many factors, externalities, and events influence the dynamics of the California-Mexico international border. Until 2000, border crossing delays were shorter compared to current congestion levels. In 1998, the JWC completed the Bi-national Border Transportation Planning and Programming Study,[139] which presented an inventory of transportation infrastructure along the US-Mexico border and specified some of the "disconnects" that existed at that time. In 2004, Caltrans, in conjunction with the JWC, reported the results from two key studies. One study, the *Transportation Infrastructure and Traffic Management Analysis of Cross-border Bottlenecks,*[140] prioritized infrastructure projects, and recommended immediate action to relieve bottlenecks. The second study, the *Bi-national Border Transportation Infrastructure*

Needs Assessment,[141] identified major transportation corridors in the border region, developed a quantitative procedure to evaluate the needs for these corridors, and identified transportation projects and possible funding sources. These two studies led to recognition by Caltrans and the JWC of the need to implement master plans for each state bordering Mexico.

The challenges outlined above led to a groundbreaking event in May 2013 in which US President, Barack Obama, and Mexican President, Enrique Peña Nieto, announced the formation of the High Level Economic Dialogue (HLED) to advance strategic economic and commercial priorities central to mutual economic growth, job creation, and global competitiveness. Among the goals laid out in the HLED work plan, the US and Mexico declared the intention to continue modernization and expansion of a bilateral air transport relationship and to develop an agenda of ongoing cooperation on intelligent transportation and freight systems[142]. The SR 11/Otay Mesa East Land POE project has been incorporated into the US/Mexico HLED. The project has been identified as necessary to alleviate existing congestion, accommodate future growth in bi-national trade and traffic, mitigate adverse health impacts, and protect the environment.

FIGURE 77. CALEXICO EAST

Source: Caltrans

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End Notes

[1] California Employment Development Department, Labor Market Statistics, Retrieved 12/8/2014; http://www.labormarketinfo.edd.ca.gov/Content.asp?pageid=1014

[2] Interim Guidance on State Freight Plans and State Freight Advisory Committees, US Department of Transportation https://www.federalregister.gov/articles/2012/10/15/2012-25261/interim-guidance-on-state-freight-plans-and-state-freight-advisory-committees#h-10

[3]Federal Highway Administration (FHWA), Transportation Investment Generating Economic Recovery (TIGER) Discretionary Program: http://www.ops.fhwa.dot.gov/Freight/infrastructure/tiger/index.htm

[4] American Association of Port Authorities: http://www.aapa-ports.org/Issues/USGovRelDetail.cfm?itemnumber=891

[5] Realize America's Maritime Promise, Harbor Maintenance Trust Fund Fairness Coalition: http://www.ramphmtf.org/

[6] More about PNRS: http://www.ops.fhwa.dot.gov/Freight/infrastructure/nat_reg_sig/index.htm.

[7] Information regarding TIFIA can be found at http://www.fhwa.dot.gov/ipd/tifia.

[8] For more information on Proposition 1B, visit the State's Bond Accountability Website at http://www.bondaccountability.dot.ca.gov/bondacc/

[9] See Appendix H-1-1 and http://www.fhwa.dot.gov/map21/factsheets/freight.cfm for more information on MAP-21 provisions.

[10] See the full text of US DOT Interim Guidance on State Freight Plans and State Freight Advisory Committees at https://www.federalregister.gov/articles/2012/10/15/2012-25261/interim-guidance-on-state-freight-plans-and-state-freight-advisory-committees

please visit: www.federalregister.gov/a/2012-25261)

[11] See the complete text of AB 14 at http://www.leginfo.ca.gov/pub/13-14/bill/asm/ab_0001-0050/ab_14_bill_20130906_chaptered.html

[12] For more information on the CFAC and its activities, see http://www.dot.ca.gov/hq/tpp/offices/ogm/cfac.html

[13] See more about the Bagley-Keene Open Meeting Act at http://www.leginfo.ca.gov/cgi-bin/ displaycode ?section=gov&group=11001-12000&file=11120-11132

[14] For more information on the NAAC, see http://www.dot.ca.gov/hq/tpp/offices/ocp/nalb/naac_page.html

[15] For more information on these Listening Sessions, see http://www.dot.ca.gov/hq/tpp/californiatransportationplan2040/native_american_tribal.html

[16] For more information on the CFMP Public workshops, see http://www.dot.ca.gov/hq/tpp/offices/ogm/california_freight_mobility_plan.html.

[17] For more information on SB 391, see http://www.leginfo.ca.gov/pub/09-10/bill/sen/sb_0351-0400/sb_391_bill_20091011_chaptered.html For more information on CTP 2040, see http://www.dot.ca.gov/hq/tpp/californiatransportationplan2040/index.shtml

[18] For more information on PRIIA or 49 US Code §22102, please see: www.fra.dot.gov/eLib/details/L02692

[19] For the complete content of AB 528 see http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml ?bill_id=201320140AB528

[20] For more information on the 2013 California State Rail Plan, see http://californiastaterailplan.dot.ca.gov/

[21] To see the ARB Vision for Clean Air, visit http://www.arb.ca.gov/planning/vision/vision.htm

[22] For more information on ARB's Sustainable Freight Transport Initiative, please refer to: www.arb.ca.gov/gmp/sfti/sfti.htm

[23] For detailed information about each air cargo airport see the Airport Factsheets in Appendix B-3 and the California Air Cargo Groundside Needs Study at http://www.dot.ca.gov/hq/tpp/offices/ogm/air_cargo.html

[24] Multistate I-15 Dynamic Mobility Project, I-15 Mobility Alliance, http://www.i15alliance.org/pro_multistate_dmp.html

[25] "Bumpy Roads Ahead: America's Roughest Rids and Strategies to Make our Roads Smoother" TRIP, October 3, 2013., Washington, D.C., http://www.tripnet.org

[26] *California State Rail Plan*, 2013.

[27] *California State Rail Plan*, 2013; California Department of Transportation, Division of Rail and Mass Transit.

[28] A complete listing of freight rail system characteristics by location can be found in Appendix C of the CSRP http://californiastaterailplan.dot.ca.gov/docs/Final_Copy_2013_CSRP_Appendices.pdf

[29] National Oceanic and Atmospheric Administration (NOAA), http://ocsdata.ncd.noaa.gov/BookletChart/PacificCoastBookletCharts.htm.

[30] http://www.dot.ca.gov/hq/tpp/offices/ogm/air_cargo.html

[31] US Department of Transportation, Federal Highway Administration, Freight Management and Operations; Freight Facts and Figures 2012,http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/12factsfigures/figure3_19.htm

[32] Figure represents vehicle hours of delay (VHD) at the severe congestion threshold speed of 35 mph.

[33] Air Resources Board, "Ambient Air Quality Standards" http://www.arb.ca.gov/research/aaqs/aaqs2.pdf

[34] A metric "tonne" equals 2,204.6 pounds.

[35] California Air Resources Board, Area Designations maps/State and National, website: http://www.arb.ca.gov/desig/adm/adm.htm

[36] Unique to California, the term "rancheria" was originally used in the early 1900's in reference to lands provided to Native American tribes (prevented from purchasing or owning their own land by the Land Claims Act) by the Bureau of Indian Affairs, many of which were on or near rancheros created by Spanish land grants and where tribes had been engaged in indentured servitude. For more information, see the Native American Heritage Commission's Short Overview of California Indian History, at http://www.nahc.ca.gov/califindian.html.

[37] "Answers to Frequently Asked Questions about Native Peoples", Native American Rights Fund, http://www.narf.org/pubs/misc/faqs.html, accessed December 13, 2013.

[38] California Division of Transportation Planning, March 2010.

[39] William Woods, "The Trajectory of Indian Country in California: Rancherias, Villages, Pueblos, Missions, Rancherias, reservations, Colonies, and Rancherias," 44 Tulsa L. Rev. 317 (2008).

[40] Algernon Austin, "High Unemployment Means Native Americans are Still Waiting for an Economic Recovery," Economic Policy Institute *Issue Brief #372*, December 17, 2013, pps. 1-2, 4; http://www.epi.org/publication/high-unemployment-means-native-americans/, accessed on January 2, 2014.

[41] Caltrans Deputy Directive 19, http://dot.ca.gov/hq/tpp/offices/ocp/nalb/Images/TEROsigned.pdf; and Tribal Employment Rights Ordinance (TERO) guidance, http://dot.ca.gov/hq/tpp/offices/ocp/nalb/Images/TERO/TERO_Guide_03_02_2012.pdf, accessed on January 2, 2014.

[42] Data Sources: 2009-2010 Tribal Transportation Needs Assessment Reports prepared by IBI Group, LSC Transportation Consultants, Inc., and Nelson/Nygaard Consulting Associates; CA Employment Development Department Monthly Labor Force Data For Counties (not seasonally adjusted), March 2010; US Census Bureau,

2006-2008 American Community Survey 3-Year Estimates, S1701: Poverty Status in the Past 12 Months, California; GIS Data provided by Bureau of Indian Affairs January 2009, data prepared by GIS, Advanced Systems Planning, DOTP, Caltrans, 2010.

[43] "California Once Again the World's 8th Largest Economy, Center for Continuing Study of the California Economy(CCSCE), press release, July 2014. http://www.ccsce.com/PDF/Numbers-July-2014-CA-Economy-Rankings-2013.pdf

[44] Ibid.

[45] "California Grew by 356,000 Residents in 2013," California Department of Finance, press release, April 30, 2014, http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/documents/E-1_2014_Press_Release.pdf

[46] "Economic Costs of Freight Transportation," FHWA, http://ops.fhwa.dot.gov/freight/freight_analysis/freight_story/costs.htm

[47] Annual Urban Mobility Report, 2012.

[48] This group includes the manufacture of pulp (wood and other fiber), of paper and paperboard, and in the manufacture of paper and paperboard into commodities such as boxes, bags, etc.

[49] United States Chamber of Commerce, *20 Years, NAFTA Triumphant, Assessing Two Decades in Trade, Growth, and Jobs*, 2012. http://www.uschamber.com/sites/default/files/reports/1112_INTL_NAFTA_20Years.pdf

[50] E-1 Cities, Counties, and the State Population Estimates with Annual Percent Change – January 1, 2013 and 2014. California Department of Finance, http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/view.php.

[51] 2013 Los Angeles Trade Numbers, World City, Port of Los Angeles and Los Angeles World Airports.

[52] Ibid.

[53] District 3 Goods Movement Study, Existing Conditions Technical Memorandum – Draft, July 31, 2014, Caltrans. Prepared by System Metrics Group, Incorporated (Inc) in association with CDM Smith, Iteris Inc., and Delcan.

[54] Ibid.

[55] North State Transportation for Economic Development Study: Full Compendium Report, October 2, 2013, NSSR, prepared for by System Metrics Group, Economic Development Research Group, DKS Associates, Wahlstrom and Associates, and Susan Jones Moses and Associates. http://www.srta.ca.gov/pastel/NSTEDS%20Final%20Report%20for%20Web-posting%20TAC_100913.pdf

[56] California Economy, Netstate California, Netstate. Retrieved September 2, 2014. http://www.netstate.com/economy/ca_economy.htm

[57] California Agricultural Statistics Review, 2012-2013, California Department of Food and Agriculture.

[58] Netstate.

[59] California Agricultural Exports, California Department of Food and Agricultural, Retrieved September 2, 2014, http://www.cdfa.ca.gov/statistics/

[60] "California Wine Exports Reach All-Time High in 2013," Wine Institute, Exports, Press Release, February 26, 2014, http://www.wineinstitute.org/resources/exports/article774

[61] "Importance of Manufacturing within California Economy," California State Assembly, Committee on Jobs,, Economic Development and the Economy, Retrieved September 2, 2014, http://ajed.assembly.ca.gov/index

[62] "Technology Works: High Tech Employment and Wages in the US," Bay Area Council Economic Institute Report, 2012

[63] United States Department of Transportation (US DOT., Research and Innovative Technology Administration, Economic Impact on Transportation, http://www.rita.dot.gov/bts/programs/freight_transportation/html/transportation.html, retrieved May 5, 2014.

[64] Kathryn Dill, "15 High-Paying Blue Collar Jobs," Forbes,, June 4, 2014, Retrieved August 19, 2014: http://www.forbes.com/sites/kathryndill/2014/06/04/15-high-paying-blue-collar-jobs/

[65] http://www.freightmatters.us/transportation-jobs-are-targets-for-automation-logisticians-are-safe/

[66] Bureau of Labor and Statistics, retrieved August 13, 2014, http://www.bls.gov/ooh/business-and-financial/logisticians.htm

[67] "The Driver Shortage," Journal of Commerce (JOC), May 12, 2014, Retrieved: August 19, 2014, http://www.joc.com/special-topics/driver-shortage:

[68] Go By Truck News, February 15, 2014

[69] United States Government Accountability Office, Rail Safety – Preliminary Observations o Federal Rail Safety Oversight and Positive Train Control Implementation, June 19, 2013; page 12. (http://www.gao.gov/assets/660/655298.pdf)

[70] The Slow Recovery of the Labor Market, Congressional Budget Office (CBO), February 4, 2014., http://www.cbo.gov/publication/45011

[71] The Budget and Economic Outlook: 2014 to 2024. http://www.cbo.gov/sites/default/files/cbofiles/attachments/45010-breakout-Chapter2.pdf

[72] "Why No One Wants to Drive a Truck Anymore," Bloomberg Businessweek: http://www.businessweek.com/articles/2013-11-14/2014-outlook-truck-driver-shortage

[73] Cassidy, William. "Running on Empty." Journal of Commerce, V.15 N16, August 4, 2014L 10-13

[74] Association of American Railroads (AAR), The Economic Impact of America's Freight Railroads, retrieved August 14, 2014, https://www.aar.org/keyissues/Documents/Background-Papers/Economic%20Impact%20of%20US%20Freight%20RRs.pdf

[75] Union Pacific, Financial Performance, retrieved August 14, 2014, http://www.up.com/aboutup/corporate_info/sustainability/economic_impact/financial_performance/index.htm

[76] AAR, Railroads and Labor, retrieved August 14, 2014, https://www.aar.org/economy/Pages/Railroads-And-Labor.aspx

[77] Ibid.

[78] AAR, Freight Railroads in California, retrieved August 14, 2014, https://www.aar.org/keyissues/Documents/Railroads-States/California-2010.pdf.

[79] [79] AAR, Railroads and Labor, retrieved August 14, 2014, https://www.aar.org/economy/Pages/Railroads-And-Labor.aspx

[80] Ibid.

[81] California Fast Facts, American Transportation Research Institute and California Trucking Association. http://www.atri-online.org/state/data/california/CaliforniaFastFacts.pdf

[82] Ibid.

[83] Ibid.

[84] "Truck Drivers: By the Numbers, 2013," William B. Cassidy, http://www.joc.com

[85] "US West Coast Labor Negotiations: Frequently Asked Questions," Journal of Commerce, August 28, 2014, http://www.joc.com/port-news/longshoreman-labor/international-longshore-and-warehouse-union/us-west-coast-labor-negotiations-frequently-asked-questions

[86] Bill Mongelluzzo, McKenna Optimistic on West Coast Contract Negotiations, JOC, March 4, 2014. Retrieved August 21, 2014. http://www.joc.com/port-news/longshoreman-labor/pacific-maritime-association/mckenna-optimistic-west-coast-contract-negotiations_20140304.html

[87] Cal Maritime, A Campus of the California State University, http://www.csum.edu/web/about/mission

[88] The Pacific Institute, *Paying With Our Health, The Real Cost of Freight Transport in California* and *At a Crossroads in our Region's Health: Freight Transport and the Future of Community Health in the San Francisco Bay Area, http://pacinst.org/issues/environmental-health-and-justice/freight-transport-justice*

[89] http://www.arb.ca.gov/ch/landuse.htm

[90] Sustainable Air Transport, California Air Resources Board, Board presentation, January 2014. http://www.arb.ca.gov/board/books/2014/012314/14-1-5pres.pdf

[91] AB 32: http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.html

[92] http://gov.ca.gov/news.php?id=17472

[93] http://www.fhwa.dot.gov/map21/

[94] http://www.portofoakland.com/pdf/environment/maqip090515.pdf

[95] http://www.portofoakland.com/maritime/ctmp.aspx

[96] CARB Statewide Railyard Agreement, http://www.arb.ca.gov/railyard/2005agreement/2005agreement.htm

[16] 2007 BTS/US Census Commodity Flow Survey: Shipment Characteristics by Mode of Transportation for State of Origin

[17] American Trucking Association website http://www.trucking.org

[99] ARB Diesel Activities – Mobile Vehicles and Equipment, http://www.arb.ca.gov/diesel/mobile.htm

[100] http://www.epa.gov/otaq/aviation.htm#regs

[101] https://www.faa.gov/about/office_org/headquarters_offices/apl/research/aircraft_technology/cleen/

[102] http://resources.ca.gov/ceqa/more/faq.html#enforce

[103] http://www.epa.gov/compliance/nepa/index.html

[104] http://www.calema.ca.gov/PlanningandPreparedness/Pages/State-Emergency-Plan.aspx

[105]National Transportation Safety Board: Preliminary Report, Railroad DCA14MR004 http://www.ntsb.gov/investigations/2013/casselton_nd/casselton_nd.html

[106] http://www.ntsb.gov/investigations/summary/RAR1201.html

[107] http://www.ntsb.gov/doclib/recletters/2012/R-12-005-008.pdf

[108] Placards are temporary warning signs affixed to commercial vehicles when they carry large amounts of hazardous materials; thus a "placardable" vehicle is one that contains a large quantity of one or more hazardous materials.

[109] See U.S.C.G. http://www.uscg.mil/hq/cg5/cg544/container.asp

[110] Citation.

[111] https://www.federalregister.gov/articles/2014/06/16/2014-13992/announcement-of-trusted-trader-program-test

[112] http://www.dhs.gov/news/2014/07/16/written-testimony-cbp-senate-committee-appropriations-subcommittee-homeland-security

[113] http://www.fhwa.dot.gov/wadiv/programs/its/

[2] http://www.its.dot.gov/faqs.htm

[114] Vahid Mirzabeiki, *The International Journal of Logistics Systems and Management (IJLSM),* Volume 14, Number 4, 2013 (http://www.inderscience.com/info/inarticle.php?artid=52748).

[115] http://www.prepass.com/Pages/Home.aspx

[116] http://cedb.asce.org/cgi/WWWdisplay.cgi?309510

[117] http://www.pierpass.org/about-2/

[118] http://www.metro.net/projects/gcits/

[119] Gateway Cities Technology Plan for Goods Movement Study, http://gatewaycog.org/publications/Gateway_Cities_Tech_Plan_overview_710%20PC%205-31-12.pdf

[120] SANDAG website, Comprehensive Transportation Projects http://www.sandag.org/index.asp?projectid=56&fuseaction=projects.detail

[121] Ibid.

[122] UC Berkeley Transportation Sustainability Research Center, http://tsrc.berkeley.edu/SmartTruckParkingForecastingParkingAvailabilityatTruckStops

[123] Interstate 80 Interstate Winter Operations Coalition website, http://www.kimley-horn.com/projects/i-80coalition/index.html

[124] CalChamber Advocacy, *Trade Overview*, http://www.calchamber.com/International/Portals/Mexico/Pages/Default.aspx

[125] San Diego Association of Governments (SANDAG), *San Diego and Imperial Valley Freight Gateway Study*, March 2010. http://www.sandag.org/uploads/publicationid/publicationid_1479_10924.pdf

[126] SANDAG, *San Diego and Imperial Valley Freight Gateway Study*, March 2010. http://www.sandag.org/uploads/publicationid/publicationid_1479_10924.pdf

[127] Caltrans, 2003 Commercial Vehicle Border Crossing Survey.

[128] *Wilson Center, Mexico Institute, et al, The State of the Border Report – A Comprehensive Analysis of the US-Mexico Border, May 2013.*

[129] This group includes the manufacture of pulp (wood and other fiber), paper, and paperboard, as well as the manufacture of paper and paperboard into commodities, such as boxes, bags, etc.

[130] FMSCA, US-Mexico Cross-Border Trucking Pilot Program, http://www.fmcsa.dot.gov/international-programs/mexico-cross-border-trucking-pilot-program

[131] SANDAG, *San Diego and Imperial Valley Freight Gateway Study*, March 2010. http://www.sandag.org/uploads/publicationid/publicationid_1479_10924.pdf

[132] Caltrans, SANDAG, *Economic Impacts of Wait Times at the California-Mexico Border 2009 Update*. http://www.dot.ca.gov/dist11/departments/planning/pdfs/systplan/ImpactsOfBorderDelayFinalReport_January2010.pdf

[133] Barzee, Suzanne Louise, *Greenhouse gas emissions due to vehicle delays at the San Diego-Tijuana border crossings*, San Diego State University, Dissertation, 2010.

[134] The US-Mexico Joint Working Committee (JWC) has its roots in the NAFTA between the US, Canada, and Mexico. The JWC's primary focus is to facilitate efficient, safe, and economical cross-border transportation movements and cooperate on land transportation planning. The JWC's main objectives are: to promote effective communication and coordination; analyze current and future transportation infrastructure needs; and evaluate transportation demand and infrastructure impacts.

[135] The purpose of the US-Mexico Bi-national Group on Bridges and Border Crossings is to provide a forum for a bi-national effort to manage the planning, construction, and maintenance of planned, ongoing, or new border crossing projects and Ports of Entry along the 1,952 mile US-Mexico border.

[136] The US-Mexico Border Governors Conference (BGC) is a mechanism for ongoing dialogue and consultation, as well as a close working relationship among the governors of the Border States in order to generate bi-national

cooperation between the states, as well as for the prosperity and improvement of the quality of life for the inhabitants of the region. At BGC conferences, governors discuss state and regional issues and opportunities.

[137] http://www.dot.ca.gov/dist11/departments/planning/pdfs/systplan/10-California-BajaCaliforniaBorderMasterPlanSeptember2008.pdf

[138]

[139] http://www.borderplanning.fhwa.dot.gov/study_4phases.asp

[140] http://www.borderplanning.fhwa.dot.gov/bottleneckStudy/bottleRpt.pdf

[141] http://www.borderplanning.fhwa.dot.gov/tocBINS.asp

[142] http://www.whitehouse.gov/the-press-office/2013/09/20/fact-sheet-us-mexico-high-level-economic-dialogue