Fehr & Peers

# Memo

Date: July 8, 2026

To: Kelsey Rodriguez and Zhongping Xu, Caltrans

From: Gaby Picado-Aguilar, Minnie Chen, Molly Sun, and Hugh Louch, Fehr & Peers

**Subject: I-580 Truck Access Study – Traffic Analysis and Operations Technical Memorandum**

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## Introduction

The I-580 Truck Access study (Study) will evaluate the effects of removing the existing weight restriction on vehicles over 9,000 pounds on I-580 through the City of Oakland on traffic, air quality, noise, and racial equity to understand what could happen if the existing weight restriction were removed. This memorandum summarizes results and findings from the existing conditions assessment and traffic analysis for the Study.

The traffic analysis was conducted for the study area shown in **Figure 1,** which encompasses a portion of Alameda County including Berkeley, Oakland, Emeryville, Piedmont, San Leandro, and adjacent communities in Unincorporated Alameda County. The study area includes major freeways I-580, I-880, I-238, I-980, and state routes SR-24 and SR-13. These major corridors, as well as key arterials such as Hesperian Boulevard and Hegenberger Road that serve local and regional freight movement are the focus of the analysis.

The analysis consisted of an existing conditions assessment and system performance evaluation, described below.

1. **Existing Conditions Assessment:** A summary of existing demographics, land uses, truck and vehicle traffic data and travel patterns, and environmental burdens to understand the impact that truck trips have on study area communities.
2. **System Performance Evaluation:** A forecast of potential traffic changes that could result from removing the I-580 truck ban under two scenarios: today and a 2035 horizon year, using the Alameda Contra Costa travel demand model (AlaCC Model), assessed against the study evaluation criteria.

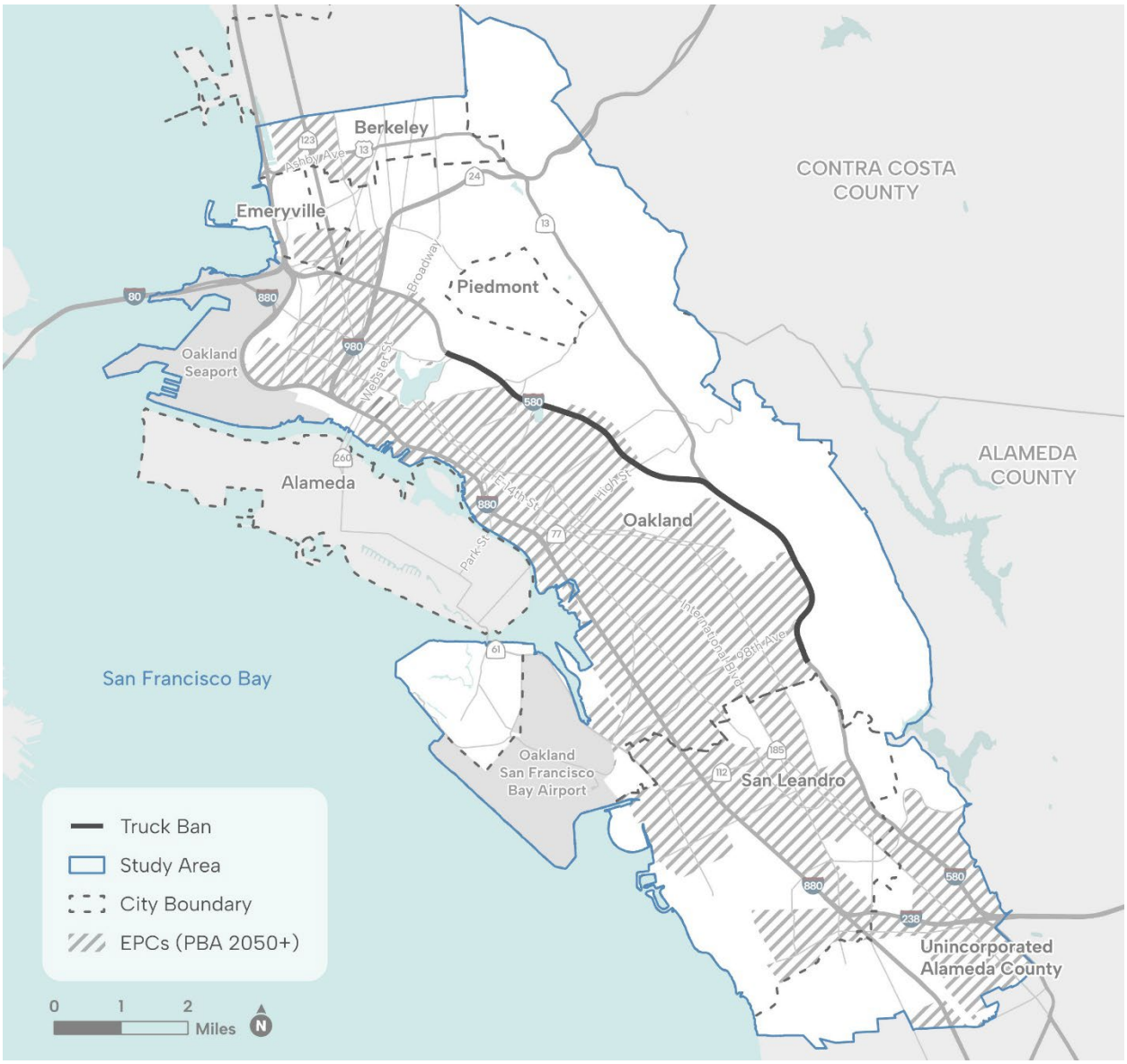
This memorandum does not make a preliminary recommendation as to whether the existing truck ban on I-580 should be removed, and the study will not make a recommendation as to whether the truck ban should be maintained or removed in the future.

This memorandum is organized into the following sections:

1. Key Findings: a summary of key findings from the existing conditions assessment and system performance evaluation.

2. Existing Conditions: a comprehensive overview of existing conditions related to demographics, land uses, traffic and vehicle travel patterns, infrastructure, and environmental conditions.
3. System Performance Assessment: a detailed review of forecasted potential impacts of removing the truck ban on volumes, vehicle miles traveled (VMT), speeds, reliability, delay, and safety for today (referred to as the baseline scenario) and a 2035 horizon year (referred to as the future scenario).

**Figure 1. Study Area**




Source: Fehr & Peers, 2025

The analysis draws on multiple sources with varying definitions of truck classifications. **Table 1** summarizes the data sources used throughout the analysis, their associated time periods, and their respective vehicle class definitions.

**Table 1: Sources for Truck Data Used for Analysis**

| Data Source | Associated Analysis | Time Period | Vehicle Class |
|---|---|---|---|
| Streetlight | Truck Activity | 2025 | • Heavy Duty – Trucks greater than 26,000 pounds, also defined as Class 7-8 commercial vehicles[1] |
| Streetlight | Traffic Conditions on Local Roadways | 2023 | • Medium Duty – Trucks between 10,000 and 26,000 pounds, also defined as Class 3-6 commercial vehicles[1]<br>• Heavy Duty – Trucks greater than 26,000 pounds[1] |
| National Performance Measure Research Data Set (NPMRDS) | Traffic Conditions | 2024 | • All trucks – Larger freight-carrying vehicles, with no truck classification |
| AlaCC Model | System Performance Assessment | 2020, 2035 | • Small/Medium Trucks – very small, small, and medium (two to three-axle) commercial vehicles<br>• Heavy Trucks – Large, combination (four-axle or more) commercial vehicles |

[1] As defined by the Federal Highway Administration's (FHWA) Gross Vehicle Weight Rating (GVWR)

# Key Findings

The existing conditions analysis and baseline and future system performance assessment yield insights into key questions that can help Caltrans understand the potential impacts of removing the existing truck ban on I-580 including: How and why do trucks travel through the study area today? Which communities are most impacted by existing truck traffic? Does existing infrastructure on I-580 preclude truck travel? How could truck volumes and travel patterns change if the truck ban were removed? How could removing the truck ban impact safety and reliability?

The findings documented below, together with results from the forthcoming air quality, noise, and racial equity assessment, can help Caltrans, agency stakeholders, and study area community members better understand what could happen if the truck ban on I-580 is removed.

**Heavy truck activity is concentrated along the I-880 and I-238 corridors**

Heavy truck activity in the study area is heavily concentrated along the I-880 corridor with most activity concentrated near the Oakland Seaport, the Oakland San Francisco Bay Airport, and industrial areas in East Oakland and San Leandro. Fifty percent of heavy truck trips that have an origin or destination at the Oakland Seaport also have an origin or destination in the study area.

Heavy truck volumes are high on I-880 because freight-dependent land uses are concentrated along I-880, and the freeway provides direct access to these freight-focused land uses. Heavy truck volumes are also concentrated on I-880 because trucks are prohibited on I-580. I-238, which connects heavy truck traffic between I-580 and I-880, also carries many heavy trucks.

Because freight dependent land uses are located along I-880, the freeway could continue to carry many trucks even if the truck ban were removed; without the truck ban 50-80 percent of existing truck traffic could be expected to remain on I-880. The truck trips that could to shift to I-580 are forecast to be primarily pass through trips with an origin and/or destination outside of the study area.

**Equity priority communities are most impacted by existing truck traffic**

Because I-880 and I-238 carry very high truck volumes and freight-focused land uses are concentrated around I-880, communities adjacent to both these freeways are most impacted by existing truck traffic. These communities, including West Oakland, portions of East Oakland, San Leandro, and communities like Ashland, Cherryland, and San Lorenzo, in Alameda County encompass many Equity Priority Communities, census tracts with high concentrations of underserved populations, including low-income households, people of color, and other vulnerable groups.

Almost all census tracts along I-238 and I-880 are Equity Priority Communities, and many census tracts along I-880 and I-238 are home to low-income households and sizable Black, Latine, or Asian communities. These communities are also most impacted by diesel particulate matter. In addition, several Equity Priority Communities are located along I-580, primarily south and west of the freeway.

**Existing infrastructure on I-580 does not preclude truck travel**

Existing infrastructure on I-580 can accommodate trucks. All overcrossing structures across I-580 have enough clearance to accommodate trucks. This is reinforced by the fact that buses weighing more than 9,000 pounds travel on I-580 without issue today, and that traffic, including truck traffic, is

diverted from I-880 to I-580 when a SIGAlert[2] is issued in response to a major traffic disruption on I-880.

**Removing the truck ban could result in a shift in heavy trucks from I-880 and I-238 to I-580**

Assuming no additional changes in land use or the transportation network, removing the truck ban could shift truck routing and bring approximately 3,800 trucks per day to I-580 in 2035, combined across both directions, with a substantial share of those trucks (~3,100 daily trucks) shifting to I-580 from I-880 (and many from I-238). Even with this shift, approximately 6,200 daily trucks could remain on I-880. With this shift, it is possible there could be no change in the total volume of trucks traveling on I-580, I-880, and I-238 combined.

Although removing the truck ban could impact truck routing, forecasts suggest traffic flows on study area freeways may not be meaningfully impacted if the truck ban is removed. While traffic could increase at bottlenecks such as the Bay Bridge approach, increases may be in the range of 10-125 passenger car equivalents per hour, compared to an average existing total volume of 28,500 passenger car equivalents per hour. Other traffic flow metrics including congested vehicle speeds and hours of delay are forecast to show little change.

**Removing the truck ban may not meaningfully increase the total number of daily trucks traveling through the study area or markedly degrade freeway traffic flows**

Removing the truck ban may not substantially change truck volumes in the study area. Forecasts suggest total heavy truck volume across I-580, I-880, and I-238 combined may stay unchanged. Forecasts also indicate up to 900 daily heavy trucks could travel on SR 13 if the ban were removed, as compared to approximately 400 daily heavy trucks if the ban were maintained, but forecasts suggest this could be offset by a decrease in truck volumes on I-238, I-980, and SR-24.

**Removing the truck ban could increase the severity and frequency of truck-involved freeway collisions, requiring further evaluation**

Removing the truck ban could increase the share of trucks traveling at speeds greater than 55 MPH on freeways. This could increase the severity of truck-involved collisions due to the greater kinetic energy associated with larger vehicles and higher speeds. Removing the truck ban could also slightly increase heavy truck Vehicle Miles Traveled (VMT) on freeways in the study area which could also result in higher frequency of truck-involved collisions. A more detailed evaluation of the potential safety performance of the truck ban removal is needed.

**Removing the truck ban could increase truck volumes on some local streets**

Heavy truck VMT could increase on local arterials by 4 percent and local arterials that provide connections between freeways, including Hesperian Boulevard, 150th Avenue, and West Grand Avenue, which are all locally designated truck routes could see an increase in truck traffic if the truck ban is removed. Because SR 13 connects directly into I-580 (which has a truck ban), it is subject to a *de facto* ban that currently prevents truck travel on SR 13. As a result, removing the ban could result in increased heavy truck volumes on Ashby Avenue and Tunnel Road, both segments of SR 13.

[2] SIGAlert is a notification system used by the California Highway Patrol (CHP) to alert drivers about incidents that disrupt traffic flow, typically on interstates or major roads.

# Existing Conditions

The following section summarizes existing conditions in the study area, compiling data on land uses, freight trip generators, freight networks and facilities, and traffic conditions providing insight into the factors that shape truck demand, truck origin and destination patterns, and existing truck routing. The existing conditions analysis sheds light on the impact of freight traffic on study area communities by analyzing demographic data, collision data, and environmental data to understand how communities in the study area are exposed to truck traffic today, and how this impacts health and safety outcomes.

## Demographics

The study area is home to approximately 713,000 people and 264,000 households and is racially and economically diverse: 73 percent of people are People of Color, and nearly half of all households earn under $50,000 annually (**Table 2**).

### Equity Priority Communities

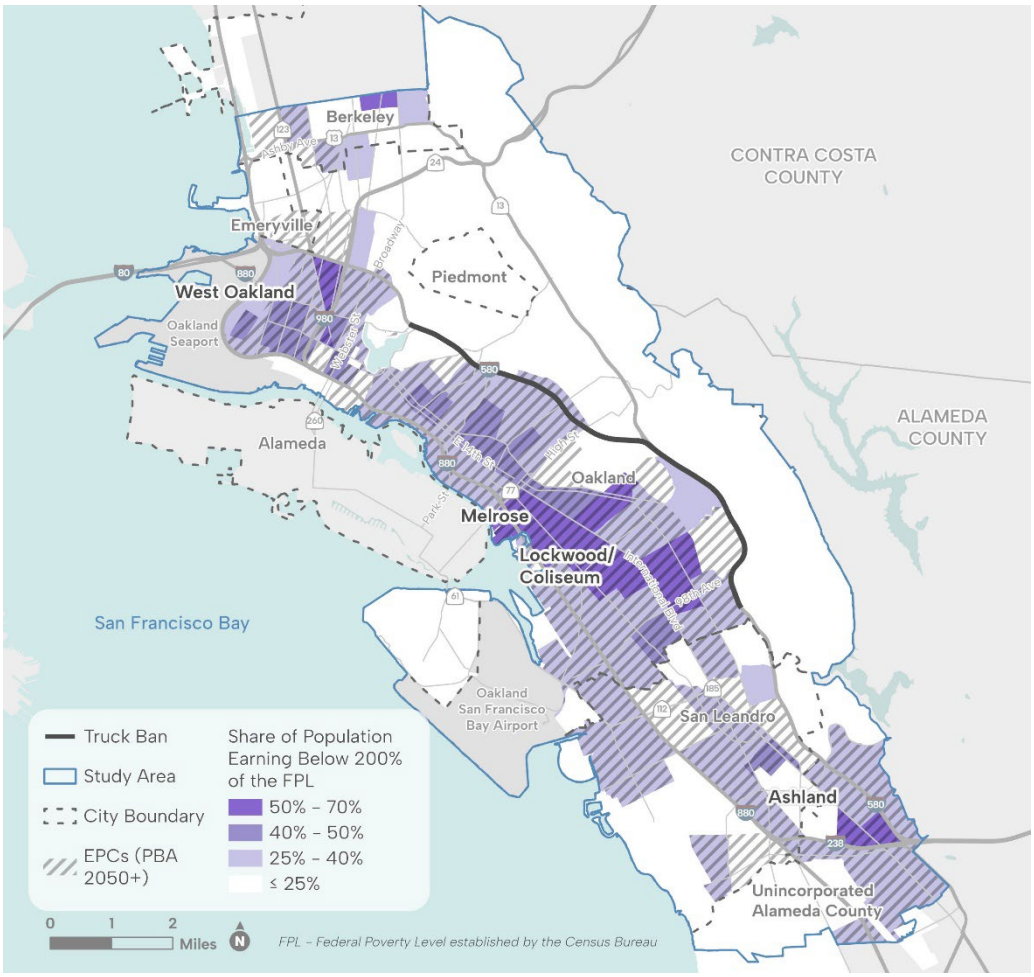
As shown in **Figure 1**, most Equity Priority Communities (EPCs) in the study area are located west of I-580. Overall, 27 percent of the study area population live in households earning below 200 percent of the Federal Poverty Level, and as shown in **Figure 2**, a higher share of residents living west of I-580 are low-income, compared to those living east of the freeway.

**Table 2: Household Income in the Study Area**

| Household Income Bracket | Percent of Households |
|---|---|
| < $25,000 | 3% |
| $25,000 - $49,999 | 45% |
| $50,000 - $79,999 | 28% |
| $80,000 - $99,999 | 15% |
| $100,000 - $149,999 | 8% |
| > $150,000 | 1% |

Source: U.S. Census Bureau, "American Community Survey 5-Year Estimates", 2023

**Figure 2: Household Income in the Study Area**



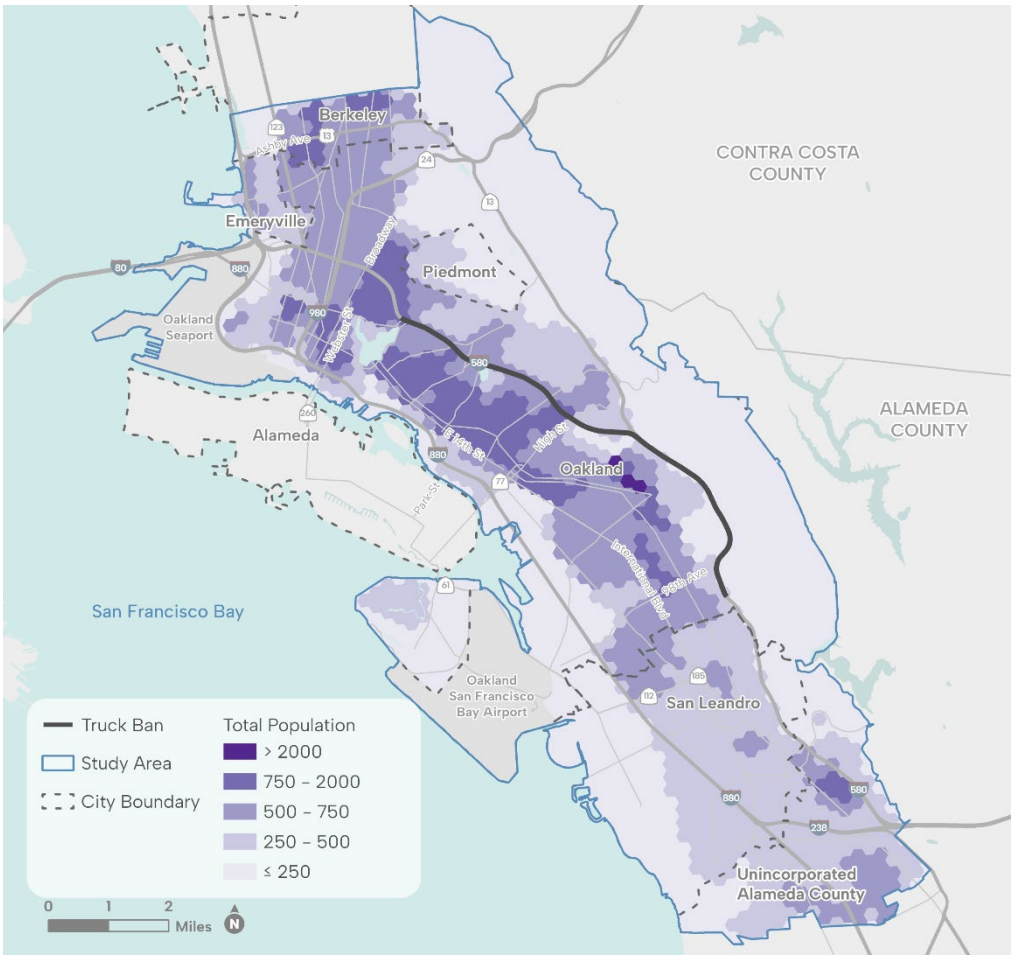

Source: U.S. Census Bureau, "American Community Survey 5-Year Estimates", 2023

## Population Density

The study area includes a range of residential contexts, from suburban to urban, with population densities ranging from approximately 3 to 188,000 residents per square mile. Residential density is generally higher in areas west of I-580 as compared to areas east of I-580.

Neighborhoods with highest population densities include portions of Fruitvale, East Oakland, West Oakland, Downtown Oakland, Grand Lake, Ashland, and South Berkeley—all located west of I-580 and SR 13 (**Figure 3**).

**Figure 3. Population Density in the Study Area**



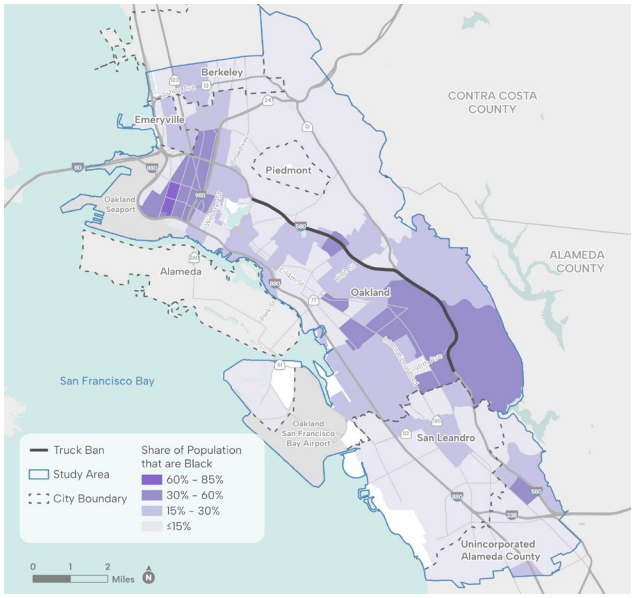

Source: U.S. Census Bureau, "American Community Survey 5-Year Estimates", 2023

## Race/Ethnicity

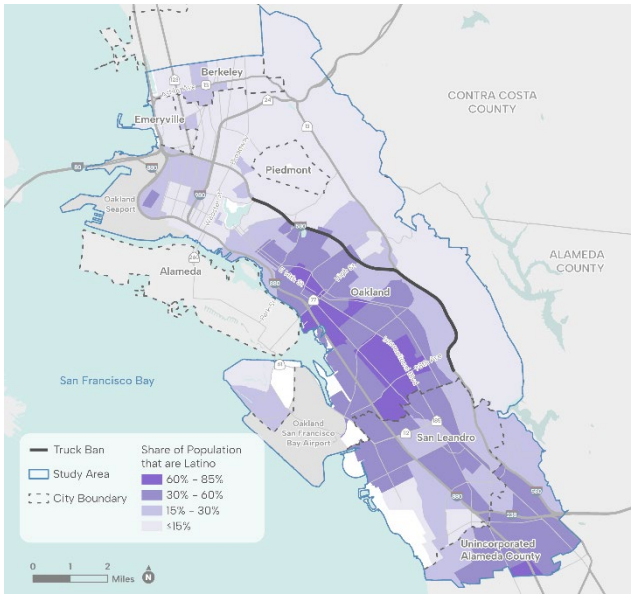
The study area is racially diverse, with 73 percent of residents identifying as People of Color. As shown in **Figure 4**, areas west of I-580 have higher proportions of Black, Latine, and Asian residents compared to areas east of I-580, which have a notably higher share of White residents. Compared to Alameda County overall, the study area has higher proportions of Black and Hispanic residents, a smaller share of Asian residents, and similar proportions of White and other racial groups.

**Figure 4: Race and Ethnicity of Study Area Residents**

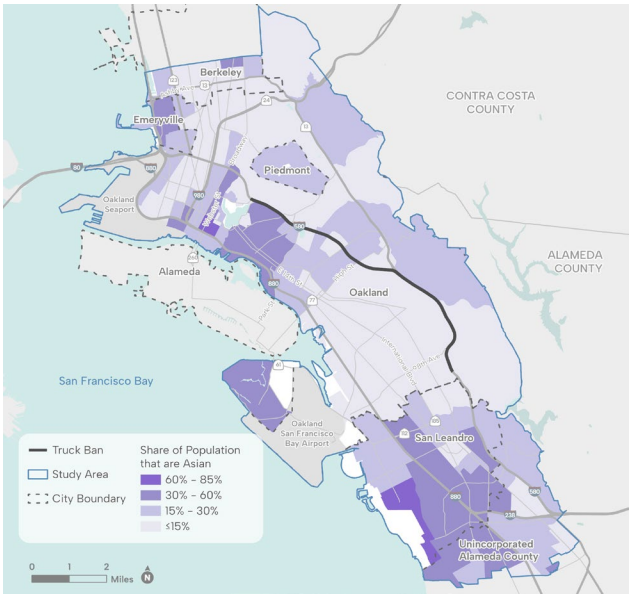
Black Population




Latino Population




Asian Population




Source: U.S. Census Bureau, "American Community Survey 5-Year Estimates", 2023

## Age

The study area has a lower share of age-defined sensitive populations compared to Alameda County overall. Youth under 10 comprise 5 percent of the study area population (compared to 11 percent countywide) and are distributed throughout the study area. Residents aged 75 and older represent 6 percent of the study area population—similar to the countywide share—and are primarily concentrated east of I-580, as well as in San Leandro and Unincorporated Alameda County.

## Land Uses and Freight Generators

Most land uses that generate heavy truck trips in the study area are adjacent to I-880. This corridor provides access to the study area's two primary freight activity generators– the Oakland Seaport and the Oakland San Francisco Bay Airport – and industrial areas in Oakland near the Coliseum and San Leandro. These destinations are directly served by I-880 and are not directly served by I-580. There are no major freight generators located along I-580.

### Drivers of Truck Demand in the Study Area

Heavy truck demand is shaped by consumer demand for goods, international shipping logistics, and the capacity of the seaport, airport, rail infrastructure and road infrastructure to support goods movement. As demand for consumer goods and raw materials increases, demand for freight movement across all modes also increases. Because the study area is home to major goods movement hubs, including the Oakland Seaport and the Oakland San Francisco Bay Airport, shifts in global and national consumption and trade patterns drive changes in goods movement in the study area by road, rail, air and sea. This is reflected in the variance in annual twenty-foot equivalent unit containers (TEUs)[3] handled by the Oakland Seaport, as shown in **Table 4**.

Although global and national economic trends drive overall demand for goods and goods movement, the Oakland Seaport is currently constrained in its capacity to serve this demand, which limits the quantity of goods that move through the study area. Studies, including MTC's Northern California Megaregion Goods Movement Study (2019) and the Alameda County Goods Movement Plan (2016), have identified operational challenges at the Oakland Seaport that restrict the number of trucks that can transport goods to and from the Oakland Seaport. Some of these bottlenecks include challenges efficiently loading and unloading larger ships that carry more cargo, an absence of pick-up schedules that result in up to 4-hour truck queues at the port, and delays at at-grade railroad crossings within the Oakland Seaport. To address these challenges, the Alameda County Goods Movement Plan recommended investments in rail access to increase the share of cargo moving to and from the Port by rail rather than by truck, and in 2017, a new near-dock rail yard was built using $100 million in State and Federal grants. These priorities are reflected in the Port of Oakland's 2025-2030 Strategic Plan which calls for several strategies focused on addressing truck bottlenecks including implementing the GoPort Freight Intelligent Transportation System Project[4] to improve truck traffic flows, and roadway and rail efficiency projects such as the 7th Street Grade Separation and Adeline Street access improvements.

Changes to roadway capacity can indirectly influence truck demand by changing the cost of transporting goods by truck compared to other modes,[5] though many other factors including trip length contribute to mode choice for goods movement, and trucks are the typically utilized mode for shorter trips. Higher congestion increases the cost of moving goods by truck, while lower congestion reduces the cost of moving goods by truck. This can make truck movement more attractive,

[3] Standard measure of cargo capacity that represents one 20-foot-long shipping container. TEUs are commonly used to measure container traffic at ports. https://databank.worldbank.org/metadataglossary/world-development-indicators/series/IS.SHP.GOOD.TU

[4] GoPort Freight Intelligent Transportation System Project, Alameda CTC, Spring 2025. https://www.alamedactc.org/wp-content/uploads/2025/06/1442000_7SGSP_FITS_FS_20250522.pdf

[5] NCHRP Report 388: A Guidebook for Forecasting Freight Transportation Demand, 1997. https://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_388.pdf

assuming other bottlenecks (for example, those described at the Oakland Seaport), are not more severe and do not limit goods movement in and out of major hubs.

## Port of Oakland

### SEAPORT

In 2024, the Oakland Seaport handled 2.26 million TEUs, down 9.5 percent from 2.5 million TEUs in 2019 (**Table 4**). Top import commodities include furniture, plastic products, batteries, and glassware; top export commodities include paper and paperboard, edible units, meats, and metal scrap. The Port of Richmond, which is just outside the study area and serves as a hub for transporting oil, handled higher tonnage than the Oakland Seaport in 2023 (**Table 3**). In addition to marine cargo activity, the Union Pacific (UP) and Burlington Northern Santa Fe (BNSF) intermodal railyards are located within the Port of Oakland, and trucks also access the Seaport to pick up freight transferred from rail.

**Table 3: Tonnage of Select US Water Ports, by Total Tons**

| | 2023 | | 2022 | | 2013 | | % change 2022-2023 | % change 2013-2023 |
|---|---|---|---|---|---|---|---|---|
| | Rank in US | Tons | Rank | Tons | Rank in US | Tons | | |
| Houston Port Authority, TX | 1 | 309.5 | 1 | 293.8 | 2 | 229.2 | 5.3 | 35.0 |
| Port of Long Beach, CA | 6 | 85.3 | 5 | 93.0 | 5 | 84.5 | -8.3 | 0.9 |
| Port of Los Angeles, CA | 11 | 55.4 | 11 | 59.8 | 9 | 57.9 | -7.4 | -4.4 |
| Richmond, CA | 26 | 25.8 | 28 | 23.6 | 27 | 23.5 | 9.2 | 9.4 |
| **Oakland Seaport, CA** | **35** | **16.4** | **33** | **18.0** | **33** | **19.3** | **-9.2** | **-`15.4** |

Source: Bureau of Transportation Statistics (2025), National Transportation Statistics: Tonnage of Top 50 U.S. Water Ports, Ranked by Total Tons

**Table 4: Oakland Seaport Container Volumes in TEUs**

| Year | Import Full | Export Full | Total Full | Import Empty | Export Empty | Total Empty | Grand Total |
|---|---|---|---|---|---|---|---|
| **2019** | **975,210** | **931,019** | **1,906,229** | **191,255** | **402,977** | **594,232** | **2,500,461** |
| 2020 | 996,139 | 928,462 | 1,924,601 | 192,031 | 345,257 | 537,288 | 2,461,889 |
| 2021 | 1,055,949 | 852,346 | 1,908,295 | 166,840 | 373,418 | 540,258 | 2,448,553 |
| 2022 | 991,229 | 760,940 | 1,752,169 | 167,264 | 418,174 | 585,438 | 2,337,607 |
| 2023 | 838,231 | 736,213 | 1,574,444 | 172,390 | 318,876 | 491,266 | 2,065,709 |
| **2024** | **964,240** | **776,100** | **1,740,340** | **163,473** | **359,109** | **522,582** | **2,262,921** |
| **% change (2019-2024)** | **-1.1%** | **-16.6%** | **-8.7%** | **-14.5%** | **-10.9%** | **-12.1%** | **-9.5%** |

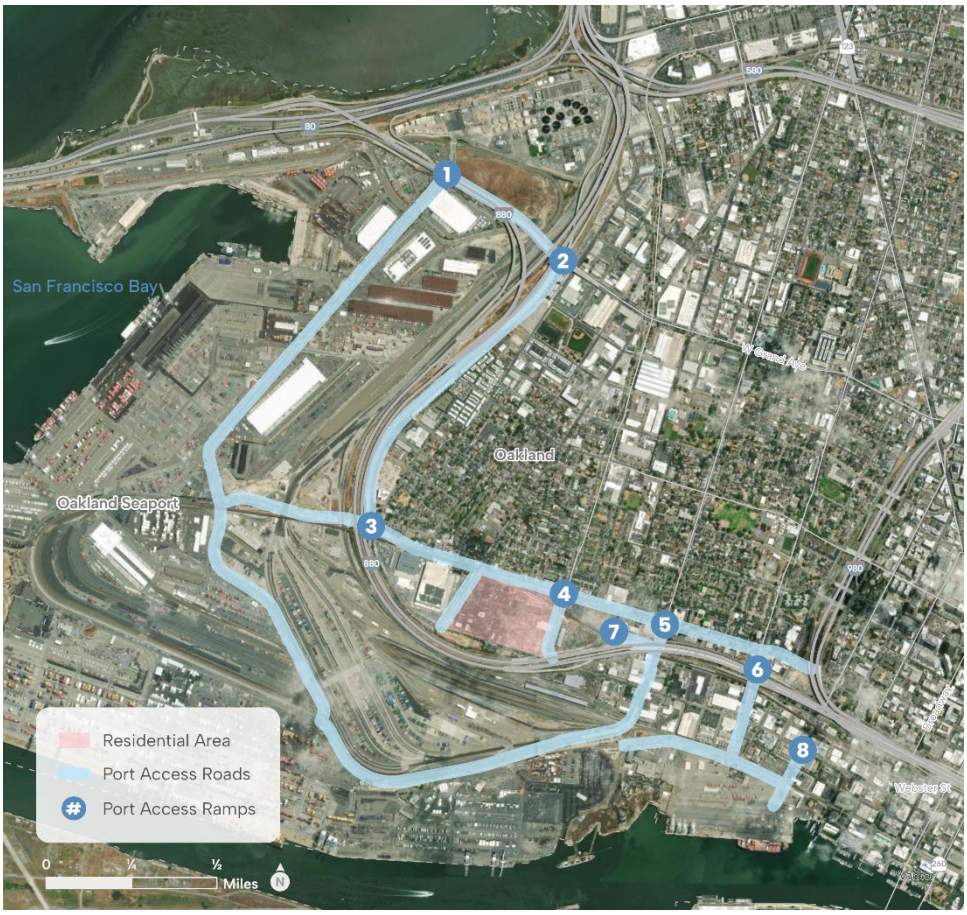
Source: Oakland Seaport Annual Report (https://www.oaklandseaport.com/business/facts-figures)

As shown in **Figure 5**, there are eight access points to the Oakland Seaport, listed below. Terminals are located to the west of I-880.

1. I-880 & Maritime Street
2. I-880 & Grand Avenue
3. I-880 & 7th Street
4. 7th Street & Mandela Parkway
5. 6th Street & Adeline Street
6. 6th Street & Market Street
7. 5th Street & Union Street
8. 3rd Street & Martin Luther King Jr Way

I-580 does not provide direct access to the Oakland Seaport; from I-580 vehicles must travel on I-80 (exiting shortly before the I-80 toll plaza) or local streets to access the Oakland Seaport, although there is an on-ramp from Maritime Street and West Grand Avenue that provides access to the I-80 eastbound to I-580 eastbound connector. There is also no direct connection from I-580 west to I-880 south or from I-880 north to I-580 east.

**Figure 5: Access to the Oakland Seaport from the Freeway Network**




Source: Fehr and Peers, 2025

### OAKLAND SAN FRANCISCO BAY AIRPORT

As of 2023, the Oakland San Francisco Bay Airport ranked as the 12th largest airport in the United States by landed cargo weight, handling more than 3.2 billion pounds of mail and freight.[6] Located adjacent to I-880 in southeast Oakland, the airport's air cargo logistics facilities are directly accessed from I-880 via Hegenberger Road, 98th Avenue, and Davis Street and Doolittle Drive, as shown in **Figure 6.**

**Figure 6: Access to the Oakland San Francisco Bay Airport's Cargo Facilities**


Source: Fehr and Peers, 2025

## Industrial Land Uses

To understand the spatial distribution of land uses that generate freight activity, this study analyzed employment in freight-dependent land uses—industries that rely on the efficient movement, storage, and handling of goods. These industries were identified using the North American Industry

[6] Final Calendar Year 2023 All-Cargo Landed Weight, FAA. https://www.faa.gov/sites/faa.gov/files/2024-09/ARP-CY2023-all-cargo-airports-final.pdf

Classification System (NAICS), which classifies business establishments by primary economic activity.[7]

As shown in **Figure 7**, freight-dependent employment is heavily concentrated along the I-880 corridor, with significant clusters near key freight hubs, including the Oakland Seaport and the Oakland International Airport. In contrast, the eastern portion of the study area has substantially lower levels of freight employment, consistent with its predominantly residential land use pattern.

As shown in **Table 5**, freight-dependent industries account for over 72,000 jobs in the study area. Transportation and Warehousing (26 percent) and Retail Trade (23 percent) are the dominant sectors, together representing nearly half of all freight-dependent employment. Construction (15 percent) and Manufacturing (15 percent) also account for a significant portion of the employment.

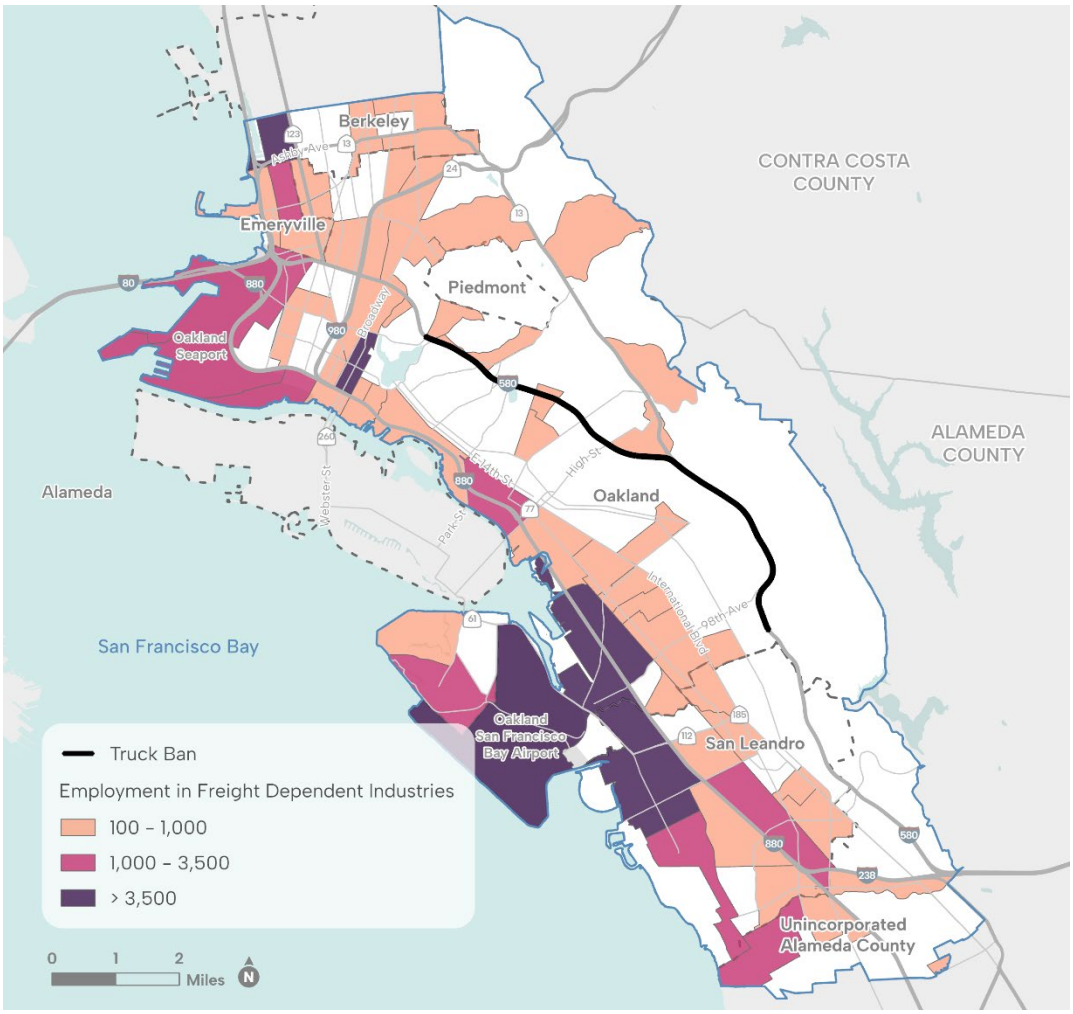
**Table 5. Employment in Freight Dependent Industries within the Study Area**

| NAICS Industry | Employment | Employment Share (%) |
|---|---|---|
| Transportation and Warehousing | 19,105 | 26% |
| Retail Trade | 16,403 | 23% |
| Construction | 11,156 | 15% |
| Manufacturing | 11,048 | 15% |
| Wholesale Trade | 8,164 | 11% |
| Utilities | 6,172 | 9% |
| Agriculture, Forestry, Fishing and Hunting | 363 | 1% |
| Mining, Quarrying, and Oil and Gas Extraction | 6 | Less than 1% |
| ***Total*** | ***72,417*** | ***100%*** |

Source: 2022, Longitudinal Employer-Household Dynamics Survey

[7] 2022 Longitudinal Employer-Household Dynamics data was used and aggregated to census tract level, and the NAICS code analyzed include: Agriculture, Forestry, Fishing and Hunting (NAICS 11), Mining, Quarrying, and Oil and Gas Extraction (NAICS 21), Utilities (NAICS 22), Construction (NAICS 23), Manufacturing (NAICS 31-33), Wholesale Trade (NAICS 42), Retail Trade (NAICS 44-45), and Transportation and Warehousing (NAICS 48-49).

**Figure 7. Employment in Freight Dependent Industries by Census Tract**




Source: 2022, Longitudinal Employer-Household Dynamics Survey

## Truck Activity

Heavy truck trips within the study area are typically associated with freight generators, including the Oakland Seaport, Oakland San Francisco Bay Airport, and industrial areas along I-880 and I-80 where freight-intensive uses such as warehouses are concentrated.

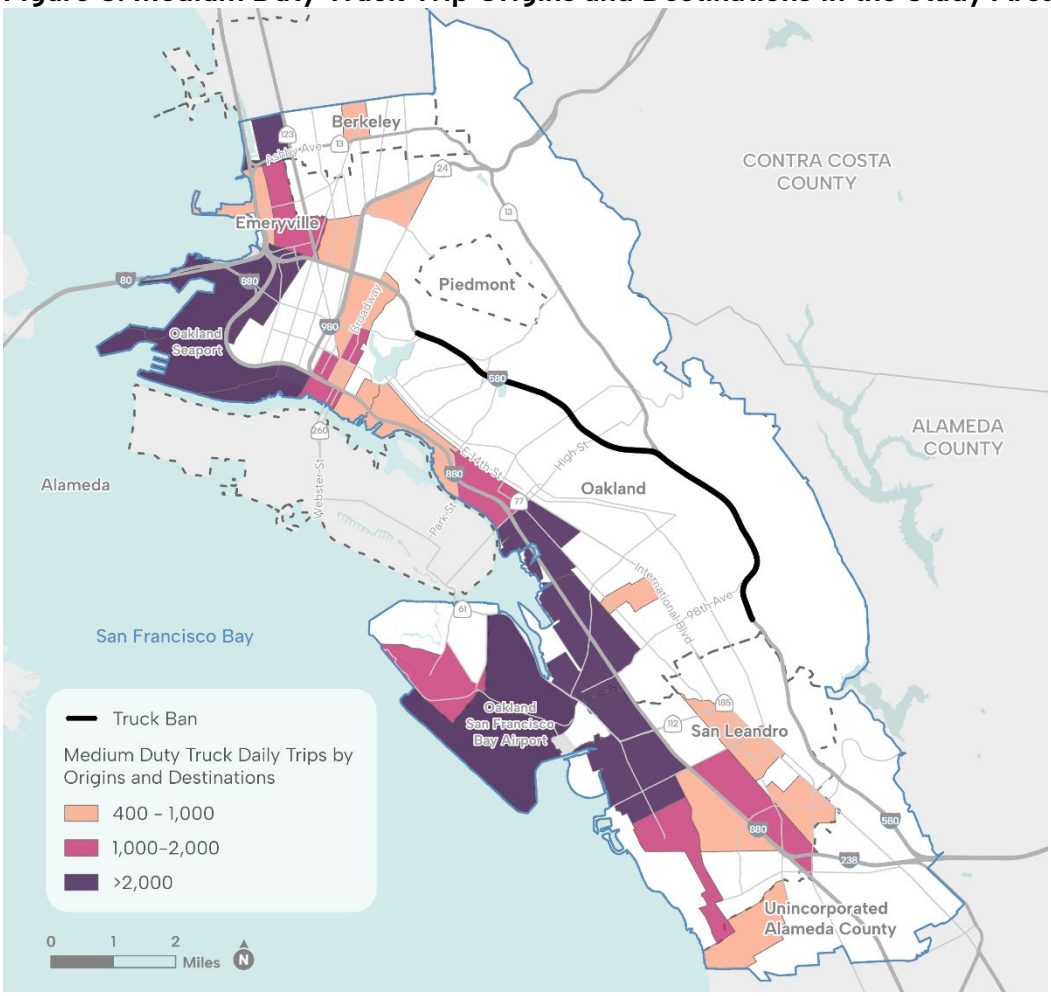
### LOCAL TRUCK ACTIVITY

To assess freight demand in the study area, truck activity was evaluated for trips with either an origin or destination within the study area. Study area truck activity was calculated by aggregating the number of trips originating from and ending in each census tract within the study area. The data was sourced from Locus' 2023 dataset, a location-based services platform that provides origin-destination trip data.

The truck activity analysis identified distinct spatial patterns by medium and heavy-duty trucks. As shown in **Figure 8** and **Figure 9,** medium and heavy-duty truck activity is highly concentrated along the I-880 corridor, with significant activity centered around the Oakland Seaport and Oakland San

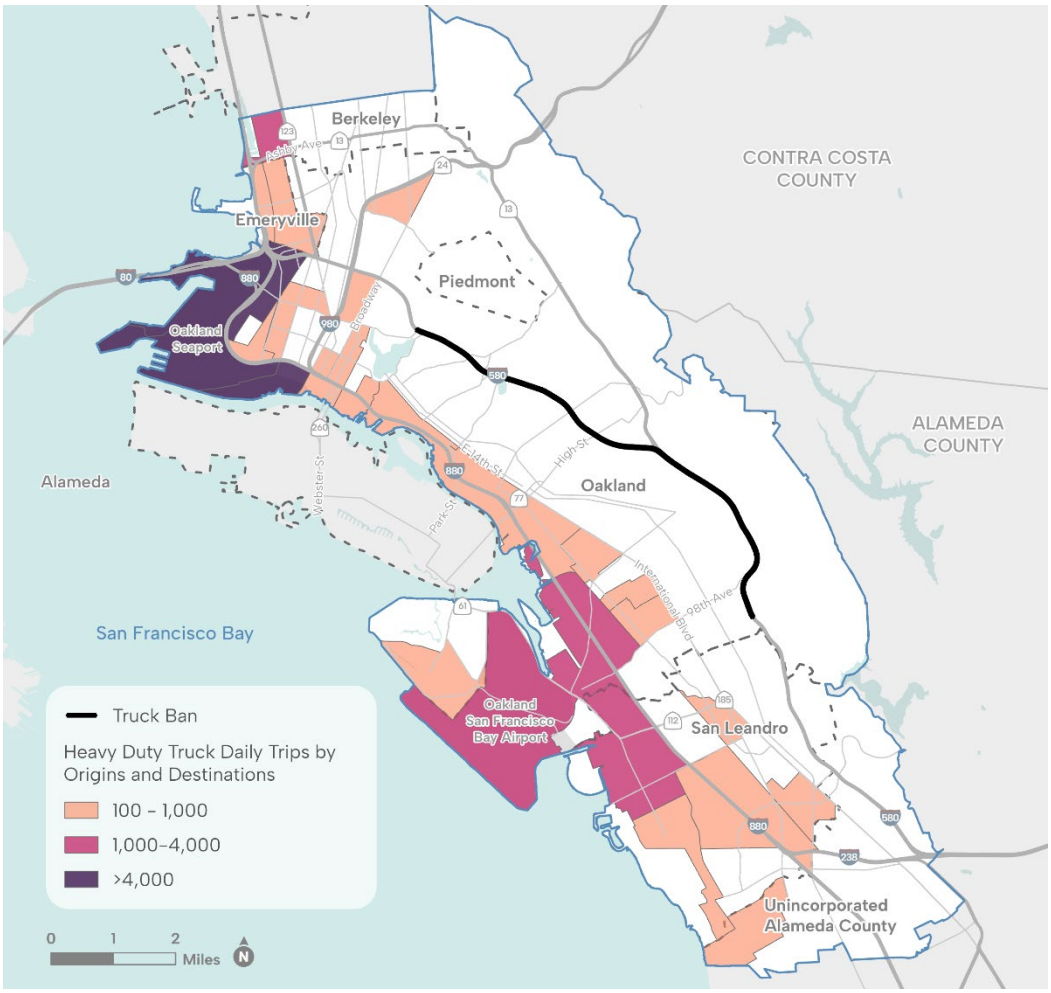
Francisco Bay Airport. This pattern reflects the primary drivers of heavy truck movement: long-distance shipping, freight dependent industrial activity, marine shipping, and air cargo operations associated with these major intermodal facilities.

**Figure 8: Medium Duty Truck Trip Origins and Destinations in the Study Area**




Source: LOCUS 2023

**Figure 9. Heavy Duty Truck Trip Origins and Destinations in the Study Area**




Source: LOCUS 2023

## ORIGIN-DESTINATION ANALYSIS OF REGIONAL TRAVEL PATTERNS

StreetLight data was used to identify origins and destinations of heavy truck trips that pass through the study area. Origin-Destination patterns were evaluated at the following two screenlines:

1. I-238 between the I-580 and I-880 interchanges
2. I-880 south of the I-238 interchange

The analysis found that 15 to 20 percent of trucks at each screenline do not have an origin or destination along I-880.

As shown in **Figure 10** and **Table 6**, I-580 could be a viable alternative for 17 percent of trucks traveling on eastbound I-238 today that do not have an origin or destination along I-880. Specifically, 17 percent of trucks traveling east along I-238 have origins north or west of the study area. These trips could be served by I-580 if the freeway were open to heavy truck traffic. **Table 6** lists the top origins for trucks traveling eastbound through I-238.

**Table 6: Origins for Trucks Passing through I-238 in EB Direction**

| Origin Locations | Share of Truck Trips |
|---|---|
| **I-580 as a Viable Alternative Route** | |
| North of I-880 | 11% |
| West from I-80 | 6% |
| **I-580 is not Viable Alternative Route** | |
| South of I-880 | 35% |
| Oakland Seaport | 18% |
| San Leandro | 13% |
| Other Areas within Study Area | 11% |
| Oakland San Francisco Bay International Airport | 6% |

Source: StreetLight, January – May 2025

**Figure 10: Origins for Trucks Passing through I-238 in EB Direction**


Source: StreetLight, January – May 2025
Notes: Segments with less than 5% of truck activity are not shown; therefore, percentages shown do not add up to 100 percent

**Figure 11 and Table 7** present Origin-Destination patterns for trucks accessing I-880 from the south, showing that 20 percent of these trucks are destined for areas north of the study area or along I-980 in Oakland—destinations that could be served by I-580. **Table 7** shows the destination locations for trucks passing through I-880 in the northbound direction. I-580 could be a viable alternative for 20 percent of trucks traveling on northbound on I-880 today that have destinations north or east of the study area. These trips could be served by I-580 if the freeway were open to heavy truck traffic.

### Figure 11: Destinations for Trucks Passing through I-880 in the NB Direction


Source: StreetLight, January – May 2025
Notes: Segments with less than 5% of truck activity are not shown; therefore, percentages shown do not add up to 100 percent

### Table 7: Destinations for Trucks Passing through I-880 in the NB Direction

| Destination Locations | Share of Truck Trips |
|---|---|
| **I-580 as a Viable Alternative Route** | |
| North of I-880 | 18% |

| Destination Locations | Share of Truck Trips |
|---|---|
| Other areas via I-980 | 2% |
| **I-580 is not a Viable Alternative Route** | |
| East of I-238 | 43% |
| San Leandro | 15% |
| Oakland San Francisco Bay International Airport | 15% |
| Other Areas within Study Area | 7% |

Source: StreetLight, January – May 2025

An additional Origin-Destination analysis was completed for heavy truck trips with an origin or destination at the Oakland Seaport. About 16 percent of heavy truck trips ending at the Oakland Seaport have an origin within San Leandro or Oakland, underscoring the importance of land uses on both sides of I-880 in port logistics and goods redistribution. Of the remaining heavy truck trips to the port, 40 percent have an origin east of the study area, 10 percent to the north, and 2 percent to the south and 2 percent to the west as shown in **Figure 12**. The remaining 30 percent of trips come from origins representing less than 2 percent of overall truck traffic. The share of truck trips for each top origin location is also listed in **Table 8**.

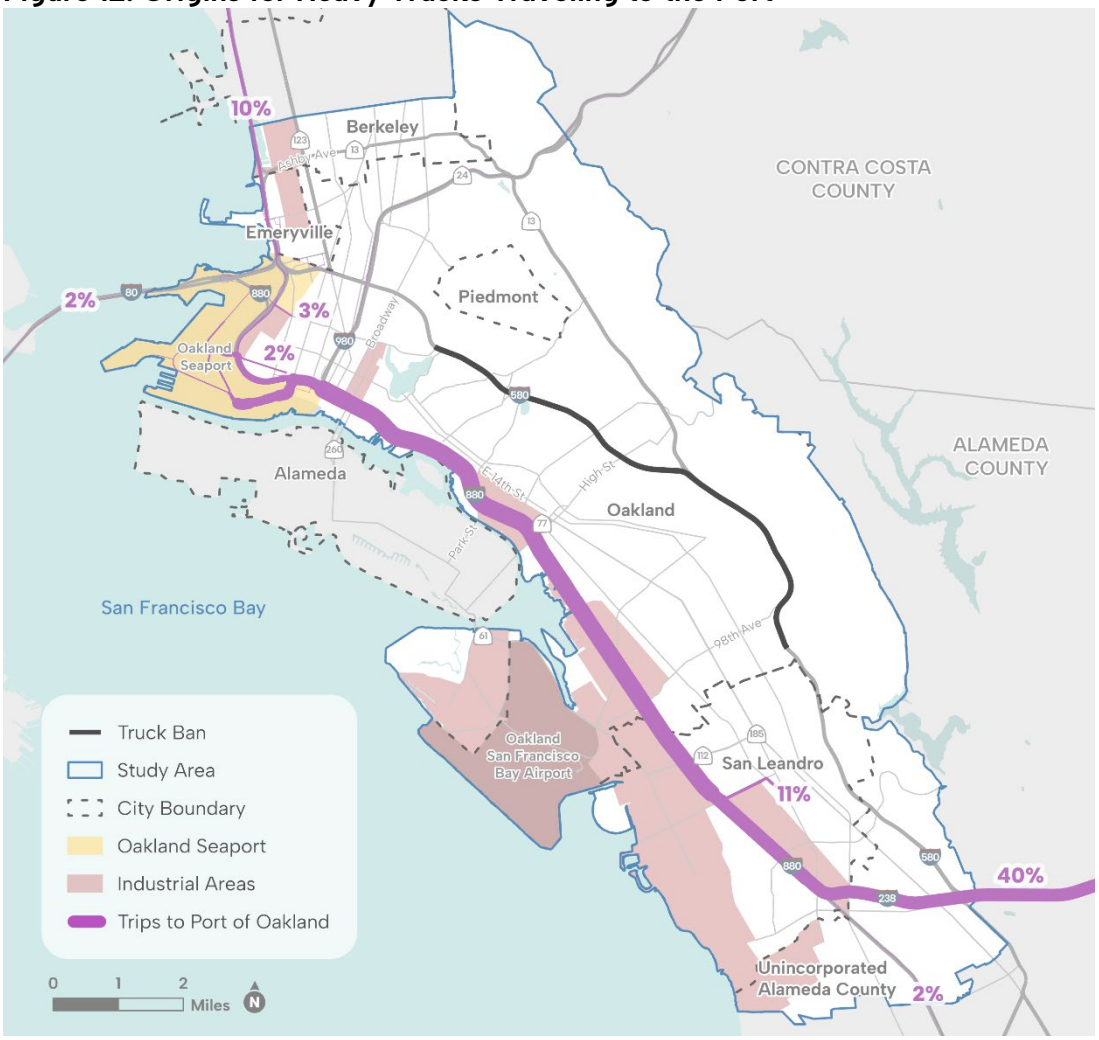
**Table 8: Origins for Heavy Trucks Traveling to the Port**

| Origin Locations | Share of Truck Trips |
|---|---|
| Industrial Areas (San Leandro and Oakland) | 16% |
| East of I-238 | 40% |
| North of I-880 | 10% |
| South of I-880 | 2% |
| West of I-80 | 2% |
| Other Origins[1] | 30% |

Source: StreetLight, January – May 2025
Notes:

1. Segments with less than 2 percent truck trips are included under "Other Origins". The share of trips with other origins is high due to the high level of dispersion for Heavy Truck trips

**Figure 12: Origins for Heavy Trucks Traveling to the Port**




Source: StreetLight, January – May 2025
Notes: Segments with less than 2 percent truck trips are not labeled; therefore, percentages shown do not add up to 100 percent

## Land Use Conflicts

### SENSITIVE RECEPTOR LOCATIONS

Sensitive receptor locations are places where populations particularly vulnerable to health impacts from air pollution, such as youth, seniors, and people with asthma tend to gather, including schools, healthcare facilities, and senior centers.[8] To reduce exposure to Diesel Particulate Matter, the California Air Resources Board (ARB) recommends locating sensitive land uses at least 1,000 feet from distribution centers that serve more than 100 trucks per day.[9]

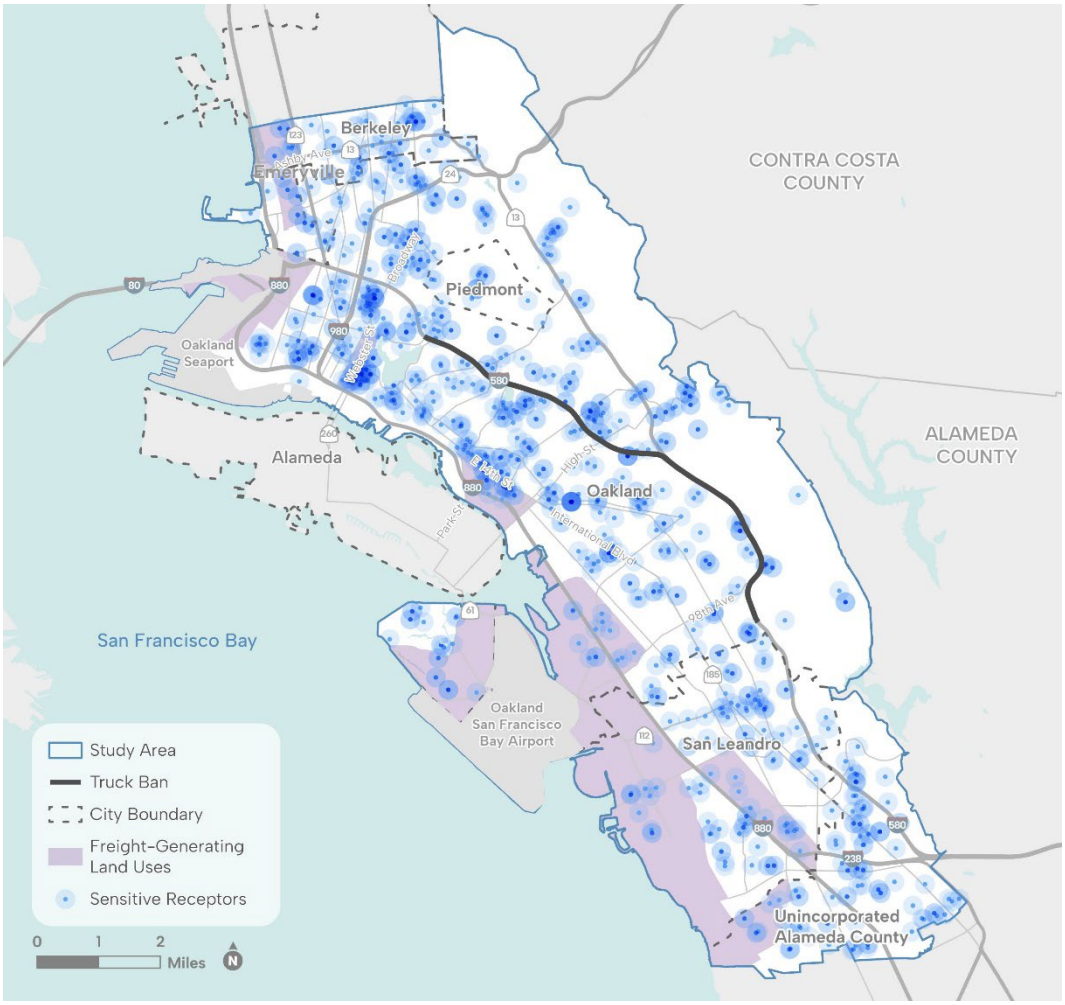
[8] Bay Area Air District, Sensitive Receptor Assessment. https://ww2.arb.ca.gov/capp/cst/rdi/sensitive-receptor-assessment

[9] California Air Resources Board, Air Quality and Land Use Handbook, 2004. https://www.aqmd.gov/docs/default-source/ceqa/handbook/california-air-resources-board-air-quality-and-land-use-handbook-a-community-health-perspective.pdf

As shown in **Figure 13**, the study area contains 815 sensitive receptor locations, including 538 schools and daycare facilities and 121 elder care facilities. Of these, 110 sensitive receptors locations (13.5 percent) are located in industrial census tracts that generate high levels of freight activity.

Numerous sensitive receptors are located near both I-880 and I-580: 41 are within 1,000 feet of I-880 and 72 are within 1,000 feet of I-580.

**Figure 13. Sensitive Receptor Locations in the Study Area**

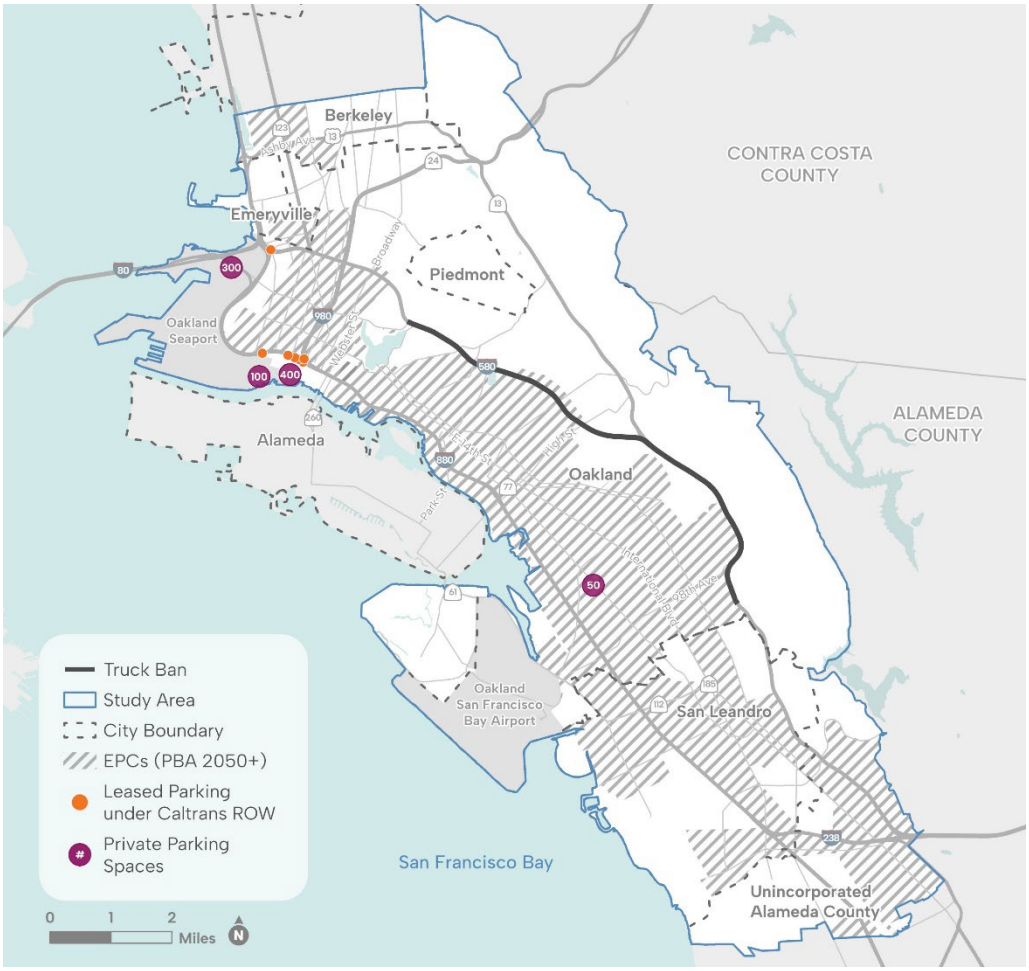



Source: Bay Area Air Quality Management District (BAAQMD), 2021-2023

Note: Sensitive receptors are shown in semi-transparent blue, with darker shades indicating higher concentrations of receptors

## Freight Networks & Facilities

**Figure 14: Existing Truck Parking in the Study Area**




Source: Caltrans, 2025.

### Truck Parking Facilities

Existing truck parking facilities are primarily located along the I-880 corridor (**Figure 14**), where private operators provide approximately 850 truck parking spaces at the Oakland Seaport and near the Coliseum. Caltrans also leases storage areas along I-80, I-880, and I-980, though the total capacity of these sites is unknown. The study area currently has no designated truck rest areas, and there is no truck parking along I-580.

## Traffic Conditions

This section presents truck traffic conditions on freeways and local roadways. Several travel performance measures were examined including:

- Truck traffic volumes and percentage
- Truck travel time reliability
- Vehicle hours of delay for all vehicles

I-880 and I-238 function as the region's primary freight corridors and carry the highest daily truck volumes. Among freeways in the study area, I-880 experiences the greatest overall traffic delay and worst truck travel time reliability while I-580 experiences moderate congestion. The local roadway network also plays a key role in supporting regional and local freight movement, with major arterials like Grand Avenue, Hegenberger Road, and state routes such as SR 112 (Davis Street), providing connections between major freight corridors, the Oakland Seaport, and nearby freight-dependent industry clusters. Detailed analysis for freeways and local roadways is presented below.

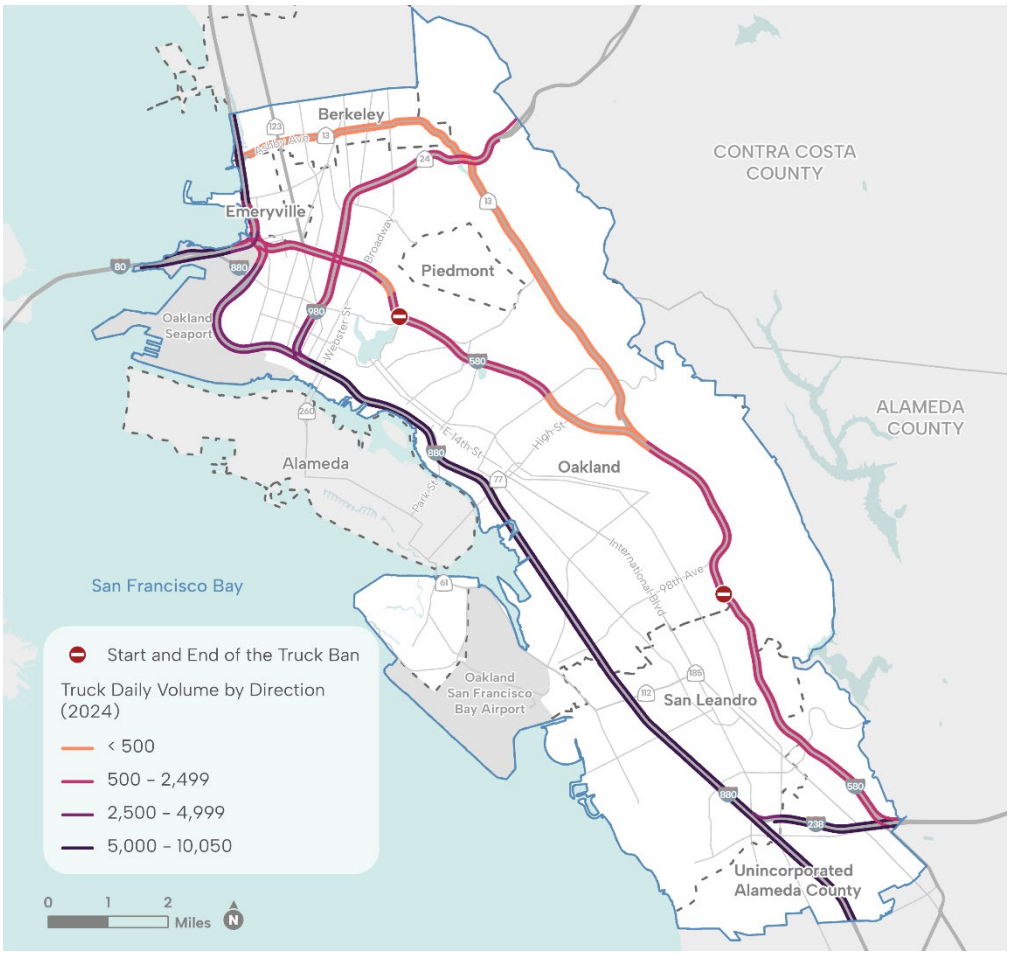
## Freeways

### TRUCK VOLUMES AND PERCENTAGES

Truck volumes measure overall truck activity in a region. **Figure 15** shows the average daily truck volumes, while **Figure 16** shows the daily share of total traffic volume comprised of trucks, on the highway network in the study area from the Federal Highway Administration's National Performance Measure Research Data Set (NPMRDS).[10] The highest volumes are observed on the I-238 and I-880 corridors, each carrying over 5,000 trucks per direction each day. Truck volumes are also high on I-980. In contrast, I-580 carries substantially lower truck volumes, ranging from fewer than 500 to 2,500 daily trucks per direction. Truck activity is still observed on I-580 because the truck ban applies only to heavy trucks, and trucks that weigh less than 4.5 tons are permitted to use this route.

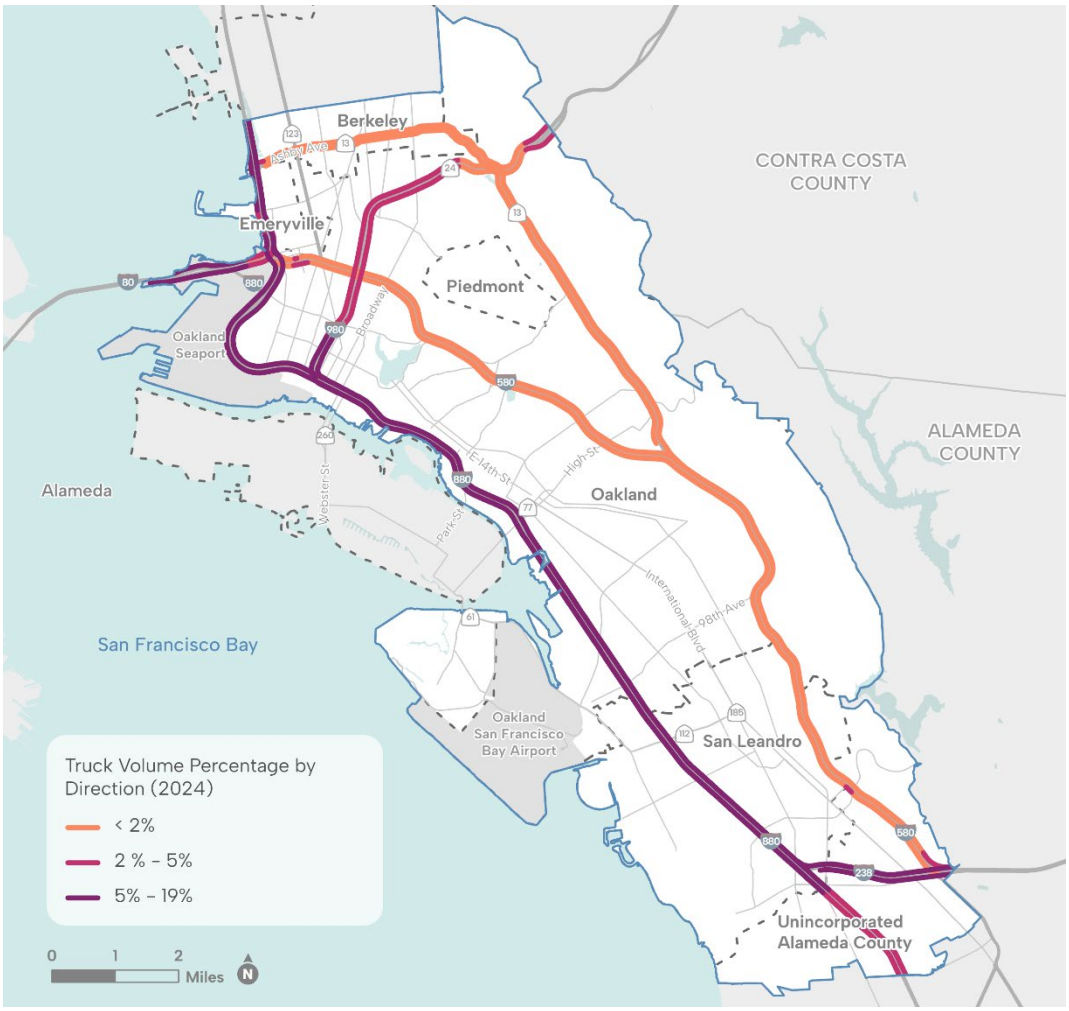
[10] The I-580 truck ban is effective for heavy trucks; however, the NPMRDS "Truck" category includes lighter commercial vehicles that are not subject to the restriction.

**Figure 15. Daily Truck Volume by Direction**




Source: 2024 NPMRDS

**Figure 16. Daily Truck Share of Total Traffic Volume by Direction**




Source: 2024 NPMRDS

## TRAVEL TIME RELIABILITY

Truck Travel Time Reliability (TTTR) is a freight performance measure that reflects the variability of travel time over time.[11] TTTR is calculated as the ratio of the 95th percentile truck travel time to the 50th percentile (median) truck travel time; higher TTTR values indicate less predictable travel. For example, a TTTR ratio equal to 1.5 indicates that truck travel times may be 1.5 times as long as median truck travel times for a given time period. In general, TTTR values greater than 1.5 are considered indicative of unreliable truck travel times. This measure is important for transportation planning because unreliable freight movement requires drivers to budget for extra travel time to ensure on-time arrivals, which can slow down supply chain operations and increase freight cost. TTTR calculated is based on 2024 NPMRDS data for free flow and congested travel time data.

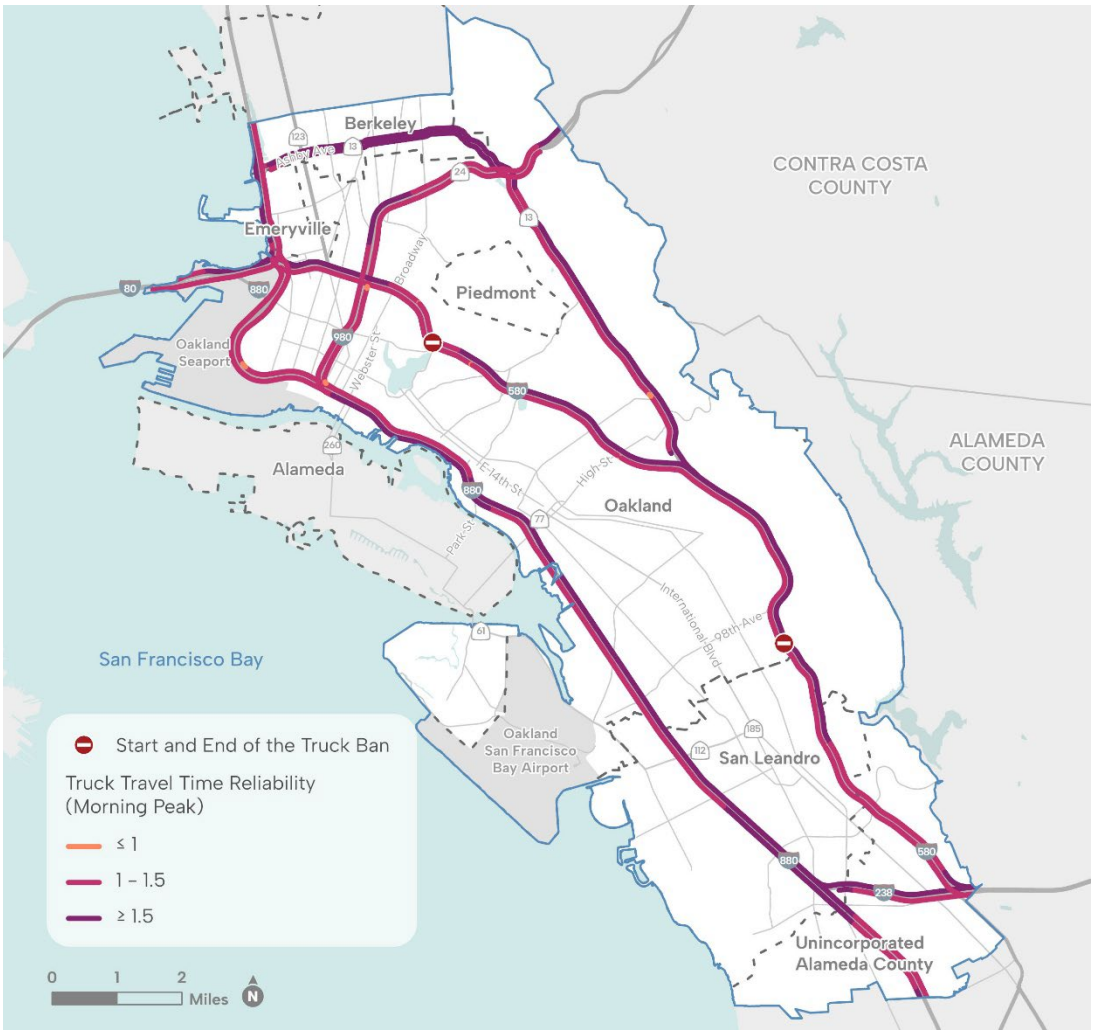
Freeways in the study area experience notable reliability challenges, highlighting the need for targeted operational strategies, such as interchange improvements, truck traffic rerouting, or managed lanes, to support more predictable freight movement. It is important to note that the lack of

[11] For this study, NPMRDS 2024 data was used to calculate the TTTR for the highways within the study corridor.

truck travel time reliability during peak periods is primarily a function of non-truck travel congestion. This is particularly evident on I-580, where reliability issues persist despite low truck volumes.

As shown in **Figure 17,** TTTR during the AM peak (6-10 AM) is generally low throughout the study area and truck travel times are least reliable in the peak commute direction. I-880 northbound is unreliable throughout most of the study area, especially between I-238 and Fruitvale, while I-880 southbound is unreliable between I-980 and 29th Avenue and near the I-238 interchange. I-238 westbound is unreliable, and I-580 is unreliable in the northbound direction through most of the study area.

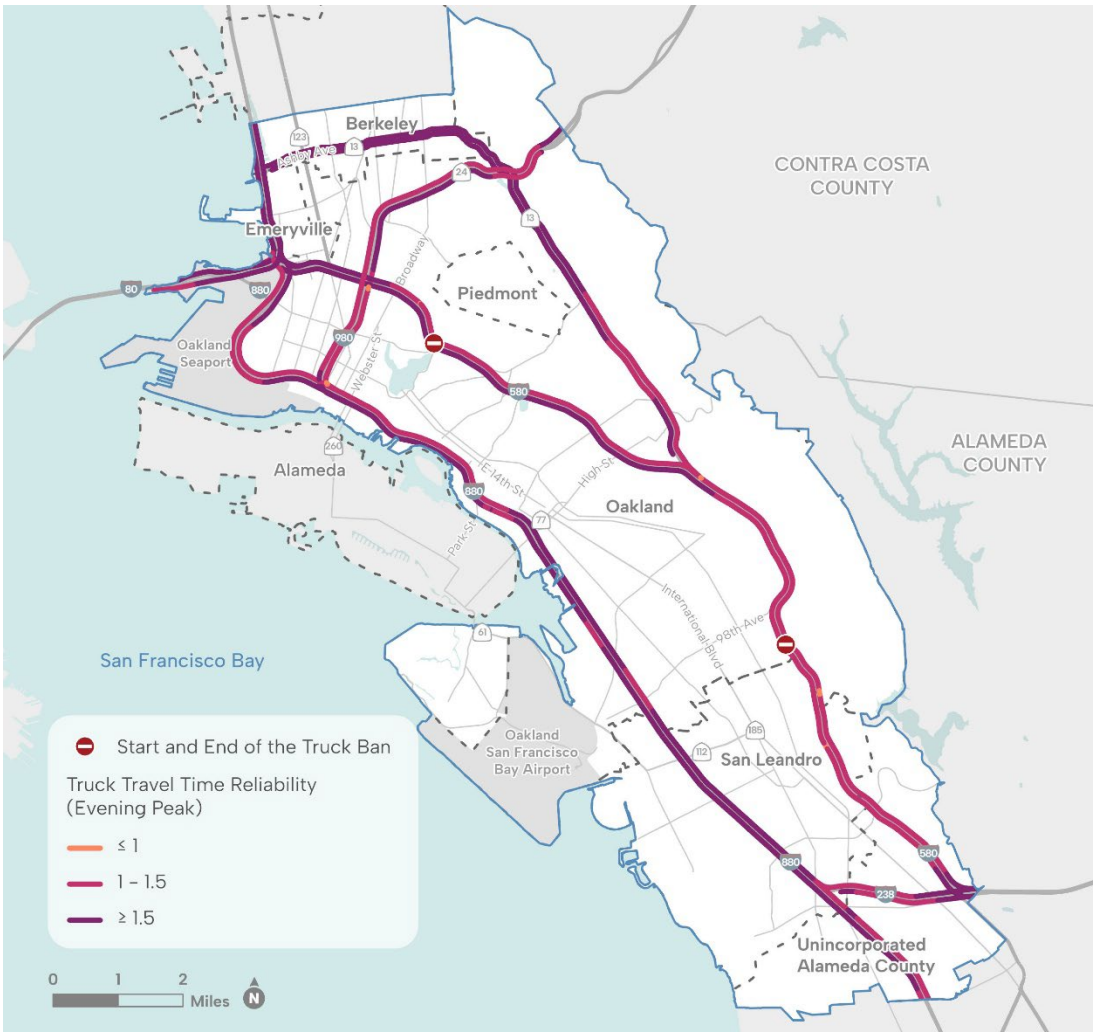
**Figure 17. Truck Travel Time Reliability by Morning Peak Hours**




Source: 2024 NPMRDS

As shown in **Figure 18**, TTTR during the PM peak (3-7 PM) is generally low across the study area, with the poorest reliability occurring in the peak commute direction. I-880 northbound is unreliable between San Lorenzo and Fruitvale, and I-880 southbound is unreliable through most of the study area. I-238 shows diminished reliability in both directions, and I-580 is unreliable eastbound between the Bay Bridge and Eastmont Hills.

**Figure 18. Truck Travel Time Reliability by Afternoon Peak Hours**




Source: 2024 NPMRDS

## VEHICLE DELAY

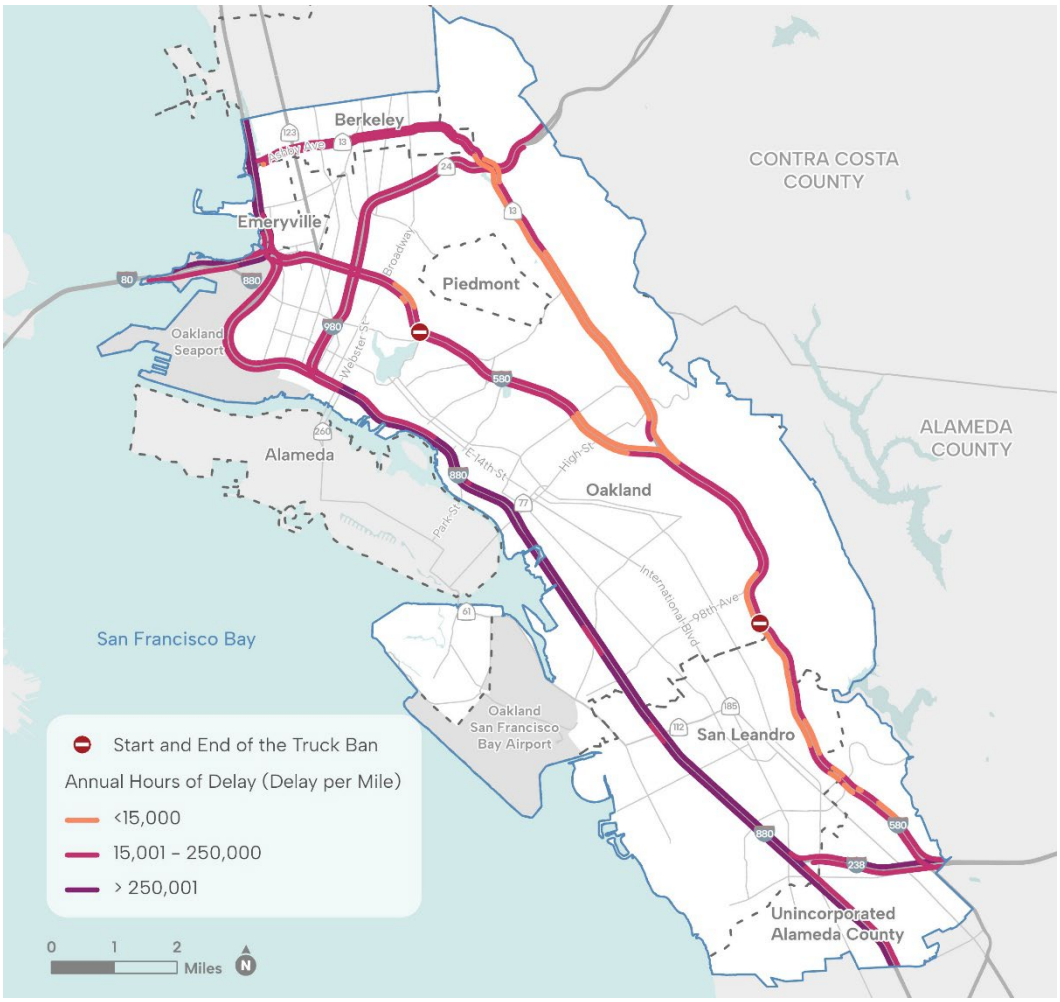
Vehicle Hours of Delay (VHD) quantifies the amount of extra time vehicles spend due to congestion, measured as the difference between actual travel time and uncongested (free-flow) travel time. VHD directly reflects roadway network inefficiency and can have significant long-term economic impacts, particularly when considering the value of travel time for freight and passengers. VHD also serves as a proxy for environmental impacts, as truck emissions are highest at speeds below 20 mph and increase in locations with slow-moving or stopped traffic.

For this study, VHD is calculated by comparing the NPMRDS observed vehicle travel time against the NPMRDS "free-flow" or uncongested travel time for a specific road segment. Total VHD per mile, measured as the VHD on a segment normalized by the segment length in miles, was calculated for all vehicles, including trucks, to reflect overall congestion across the network.

**Figure 19** shows that VHD varies significantly by corridor. I-880 experiences high levels of delay throughout the entire corridor within the study area, reflecting its role in serving high volumes of

interregional trips made by both passenger vehicles and trucks. I-980 and the western-most sections of I-80 and I-580 experience moderate delays. In contrast, the segment of I-580 where the truck ban is in effect generally experiences low to moderate delays.

**Figure 19. Vehicle Hours of Delay**




Source: 2024 NPMRDS

## BOTTLENECKS

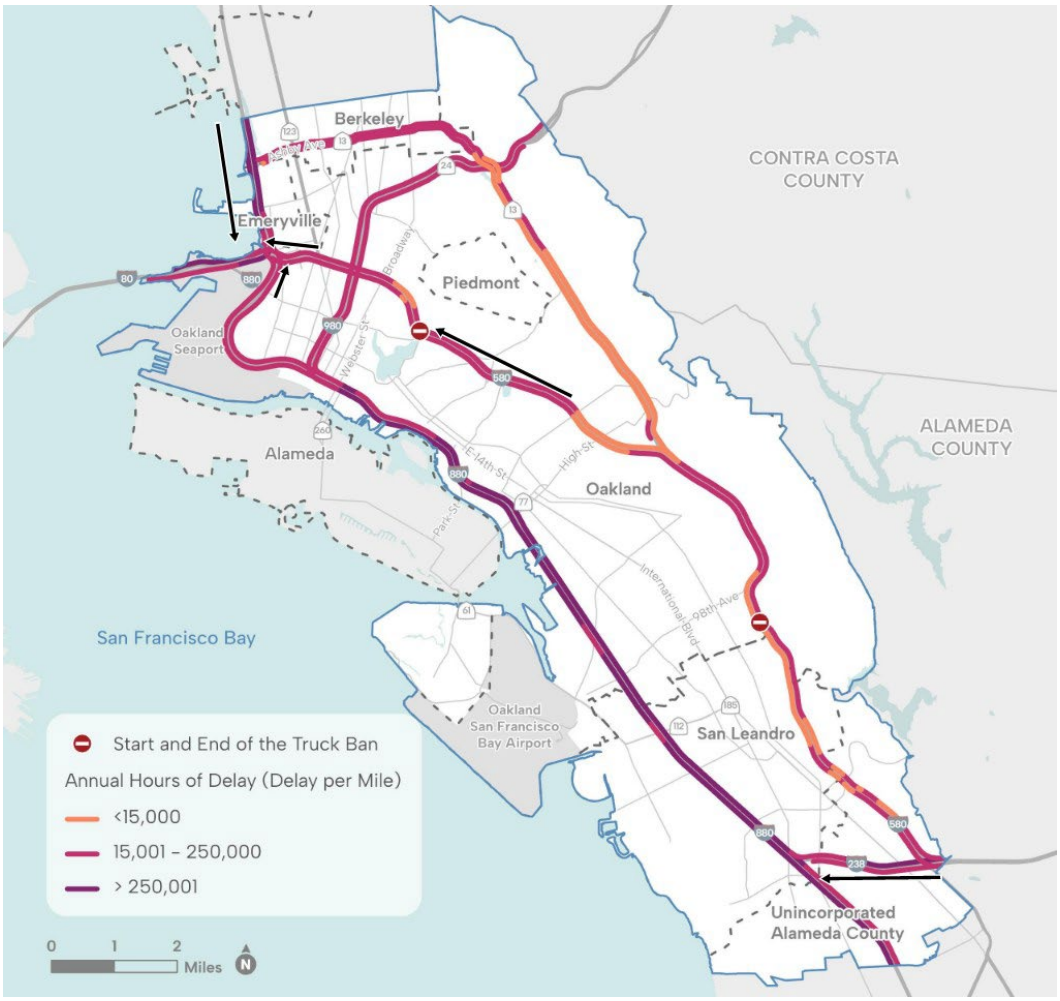
Top travel bottlenecks are identified using the VHD measure and shown in **Table 9.** The Bay Bridge, where three freeways merge in the westbound direction, creates a system of bottlenecks on each freeway. Similarly, the I-580 interchange with Grand Avenue/Lakeshore Ave and I-238 merge with I-880 create bottlenecks in the system.

## Table 9. Top Bottlenecks in the Study Region

| Bottleneck | Roadway | From | AADT (Max) | Annual Delay per Mile (Max) |
|---|---|---|---|---|
| Bay Bridge Toll Plaza | I-80 WB[1] | Ashby Ave (SR 13) | 287,500 | 942,000 |
| | I-580 WB | SR-24/I-980 | 192,800 | 193,200 |
| | I-880 NB | West Grand Ave | 54,000 | 102,200 |
| I-580 at Lakeshore Ave | I-580 WB | Coolidge Avenue | 182,000 | 23,100 |
| I-880/I-238 merge | I-238 WB | I-580 | 76,000 | 279,700 |

Source: 2024 NPMRDS
Note:
1. This segment is signed as I-80 westbound and I-580 eastbound

## Figure 20. Top Bottlenecks in the Study Region




Source: 2024 NPMRDS

## SAFETY

Truck-involved freeway collisions in the study area increased 30 percent between 2020 and 2024 (**Table 10**), outpacing the 7 percent growth in truck volumes.[12] Over half of those collisions occurred on I-880, while less than 6% of all collisions were observed on I-580. This is expected given the ban on heavy trucks on a large segment of I-580 today. Between 2020 and 2024, a total of 1,362 truck-involved collisions accounted for 8 percent of all freeway collisions, with 30 collisions resulting in Killed or Seriously Injured (KSI) outcomes (2 percent of all truck-involved freeway collisions). In contrast, four percent of non-truck-involved freeway collisions resulted in KSI outcomes.

**Table 10: Freeway Truck-Involved Collisions in the Study Area (2020-2024)**

| Freeway | 2020 | 2024 | Percent Change (2020-2024) |
|---|---|---|---|
| I-880 | 121 | 168 | 39% |
| I-80 | 61 | 68 | 11% |
| I-238 | 18 | 30 | 67% |
| I-580 | 15 | 16 | 7% |
| SR 24 | 11 | 15 | 36% |
| I-980 | 2 | 2 | 0% |
| SR 13 | 2 | 0 | -100% |
| **Total** | **230** | **299** | **30%** |

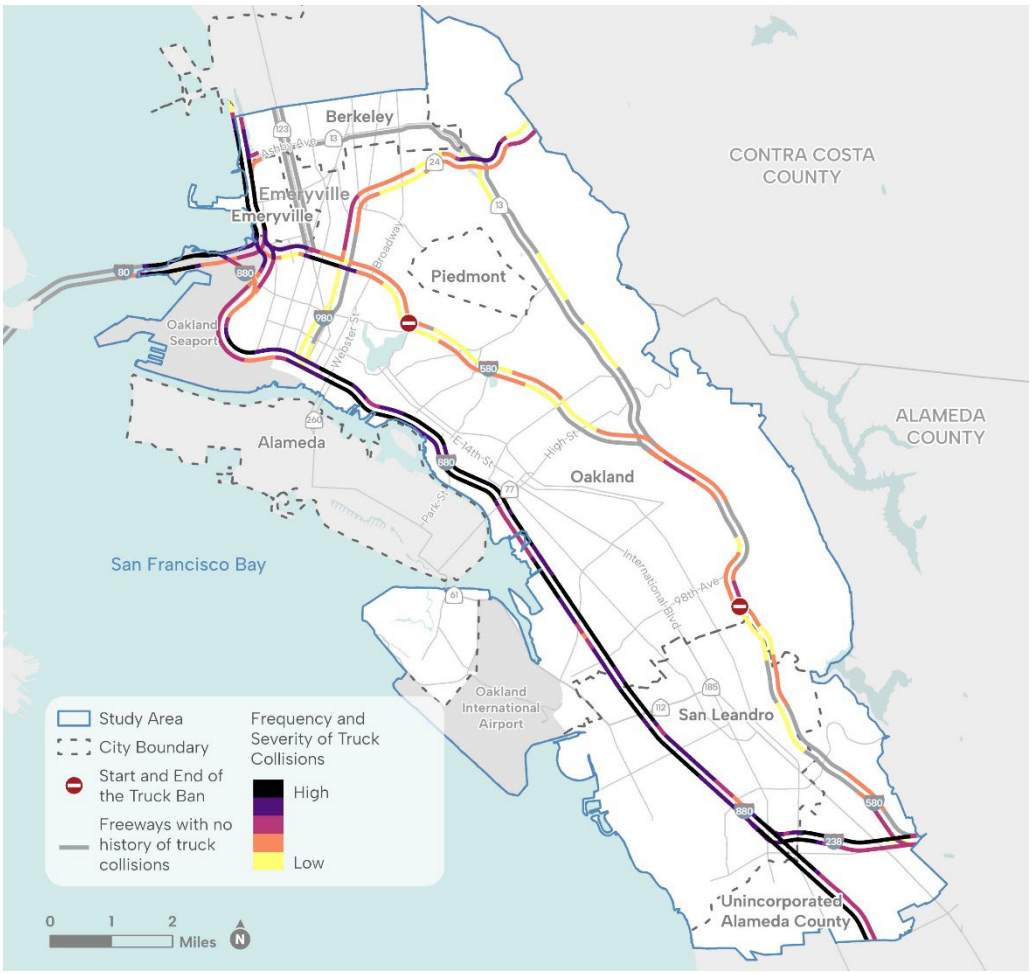
Source: Statewide Integrated Traffic Records System (SWITRS) and Transportation Injury Mapping System (TIMS), 2020-2024

Unsafe lane changes were the primary collision factor, accounting for 42 percent of freeway collisions, followed by unsafe speed, which accounted for 25 percent (see **Table 11**). **Figure 21** identifies locations with a high frequency and/or severity of truck collisions,[13] with hotspots concentrated near Jack London Square, Fruitvale, the Coliseum, San Lorenzo, and north of the MacArthur Maze. I-880 and I-238 have the highest concentration of severe and fatal collisions.

[12] Based on AADT data for trucks between 2020 and 2024, sourced from NPRMDS.

[13] Collision data is weighted by severity with fatal and serious injury crashes weighted at 10 times PDO crashes and other injury crashes weighed at 5 times PDO crashes, and aggregated into half-mile segments, where each segment is given an associated score based on the number and severity of collisions.

## Figure 21: Truck-Involved Collisions on Freeways




Source: Statewide Integrated Traffic Records System (SWITRS) and Transportation Injury Mapping System (TIMS), 2020-2024. Data set includes large trucks and semi-trucks, including big rigs with or without a trailer attached. This does not include pickups or delivery vans.

## Table 11: Collision Profile of Truck-Involved Collisions on Freeways (2020-2024)

| Primary Collision Factor | Share of Truck-Involved Collisions on Freeways (2020-2024) |
|---|---|
| Unsafe Lane Change | 42% |
| Unsafe Speed | 25% |
| Improper Turning | 16% |
| Other | 11% |
| Other Improper Driving | 6% |

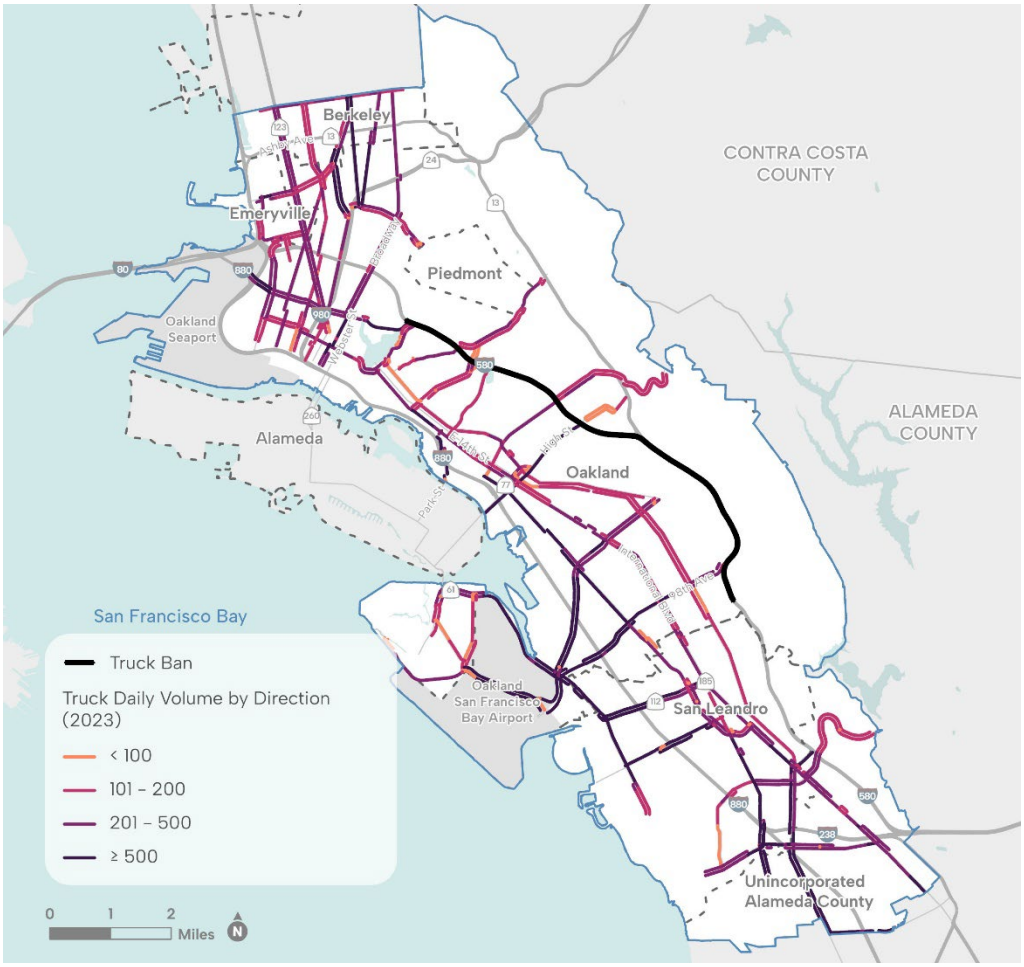
Source: SWITRS and TIMS, 2020-2024

## Local Roadways

### VOLUMES

**Figure 22** shows local truck volumes and highlights several key corridors that are critical to regional logistics and industrial operations.[14] In West Oakland, local streets like Grand Avenue are heavily used by trucks connecting to the Oakland Seaport and the Bay Bridge. In Southeast Oakland and San Leandro, major arterials such as Hegenberger Road, 98th Avenue, Davis Street, and Marina Boulevard function as primary freight connectors, channeling trucks from the I-880 freeway to surrounding industrial parks and warehouses. Several arterials including High Street and 98th Avenue provide heavy truck access to areas west of I-580 that lack more direct freeway access due to the truck ban.

**Figure 22. Local Daily Truck Volume by Direction**




Source: Streetlight, 2023

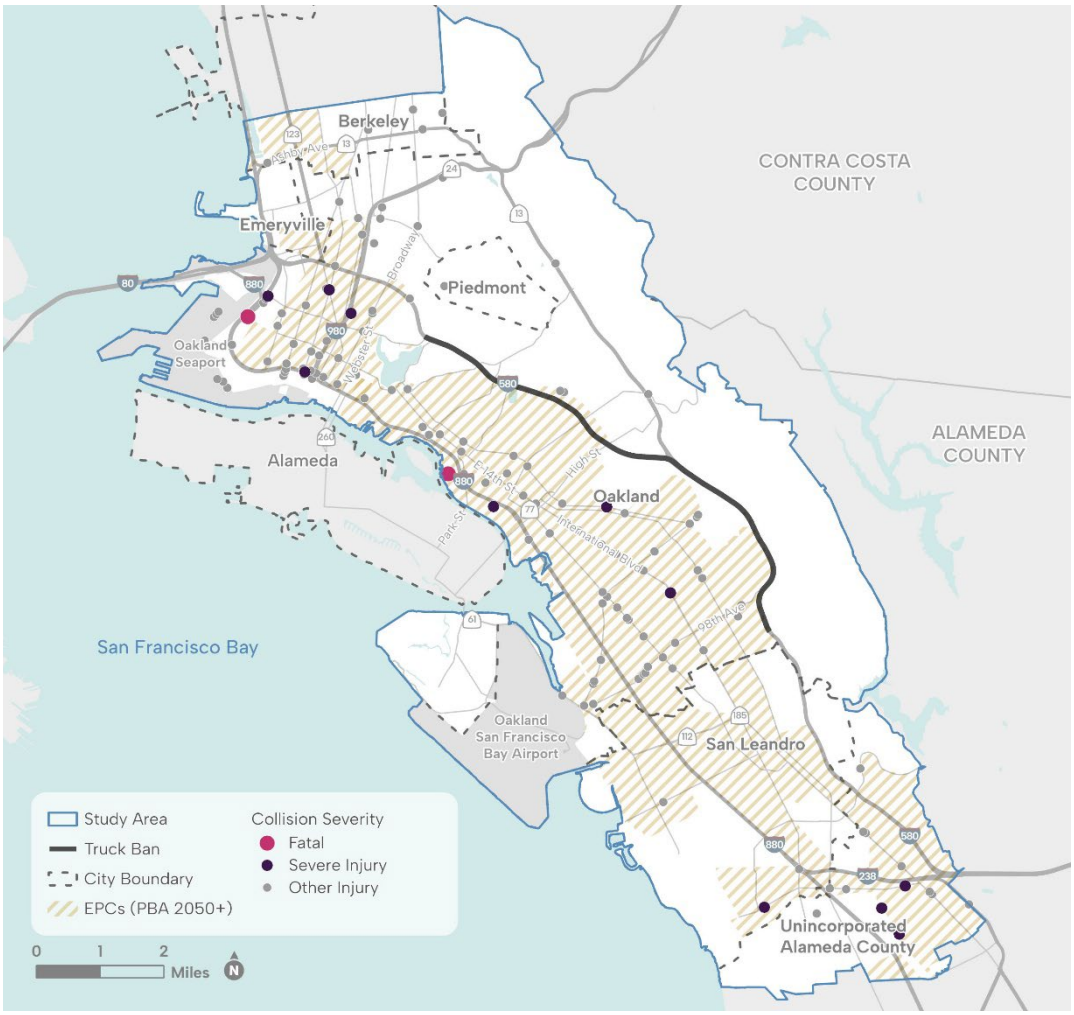
### SAFETY

Between 2020 and 2024, there were 159 truck-involved collisions on local streets, with 22 percent of those resulting in KSIs. As shown in **Figure 23**, EPCs experienced 70 percent of all truck-involved KSI

[14] Data based on 2023 StreetLight heavy and medium truck volume. StreetLight defines heavy trucks as trucks weigh more than 26,000 pounds and medium trucks as trucks weighing between 10,000 and 26,000 pounds.

collisions and 64 percent of the 22 truck-involved collisions with bicyclists or pedestrians. As shown in **Table 12**, improper turning caused the majority of truck-involved collisions on local roads, while unsafe speed contributed to 20 to 25 percent of collisions.

**Figure 23: Truck-Involved KSI and Injury Collisions on Local Roads**




Source: SWITRS and TIMS, 2020-2024. Data set includes large trucks and semi-trucks, including big rigs with or without a trailer attached. This does not include pickups or delivery vans.

**Table 12: Collision Profile of Truck-Involved Collisions on Local Roads (2020-2024)**

| Primary Collision Factor | Share of Truck-Involved Collisions on Local Roads (2020-2024) |
|---|---|
| Improper Turning | 33% |
| Unsafe Speed | 20% |
| Other | 17% |
| Traffic Signals and Signs | 16% |
| Vehicle Right of Way Violation | 8% |
| Unsafe Lane Change | 5% |

| Primary Collision Factor | Share of Truck-Involved Collisions on Local Roads (2020-2024) |
|---|---|
| Other Improper Driving | 1% |

Source: SWITRS and TIMS, 2020-2024

## Infrastructure Conditions

Because I-580 is not used by trucks today, there are concerns that I-580 has structural limitations that could preclude future travel from trucks. Overcrossing structure height, freeway interchange type, and freeway pavement condition were analyzed to understand if existing infrastructure conditions pose a barrier to truck travel. Buses and paratransit that weigh more than 4.5 tons are permitted to use I-580 today[15] and heavy trucks are occasionally observed along I-580 in violation of the truck ban, as well as during SigAlert events related to major lane closures on I-880, suggesting that existing infrastructure conditions may not pose a barrier to freeway truck travel. This is supported by the infrastructure review which finds that the vertical clearance of overcrossings on I-580 and interchange configurations do not preclude truck travel, although a more detailed analysis is still needed.

### Overcrossing Structures

In accordance with the California Vehicle Code, trucks (including loads) cannot exceed a height of 14 feet. As shown in **Figure 24**, overcrossing structures across I-580 provide vertical clearance ranging from 14'11" to over 16' and therefore should not prevent heavy truck travel. Within the truck ban segment, most overcrossings are at least 15'. Notably, there are several overcrossings under 15' on I-580 outside the truck ban segment.

[15] AC Transit lines NX3, 682, 683 all use the portion of I-580 on which trucks are banned

**Figure 24: Overcrossing Structure Heights on I-580**


Source: Google Maps (2025)

## Interchange Types

Interchange design and ramp intersection control configurations along I-580 varies throughout the corridor, with the typical interchange types shown in **Figure 25**. Tighter interchange configurations such as L-1 and L-4 can constrain truck movements through tighter turning radii and more limited maneuvering space, but can accommodate truck traffic with appropriate speed management and turning practices. The more careful maneuvering needed to navigate these ramps could increase travel times but should not prevent or pose a barrier to truck travel.

North of the SR 13 junction, interchanges are predominantly Type L-5 with signalized ramp intersections. Most of these ramps are also signalized for both directions, with some stop-controlled off-ramps at locations like Harrison Street, Grand Avenue, and Fruitvale Avenue. South of SR 13 within the truck ban segment, interchanges are Type L-1 or L-4, while interchanges south of the truck ban segment are primarily Type L-6. These ramps are primarily stop-controlled in the eastbound and west directions, with signalized exceptions at Edwards Avenue and 98th Avenue.

**Figure 25: Typical Interchange Types in the Study Area**

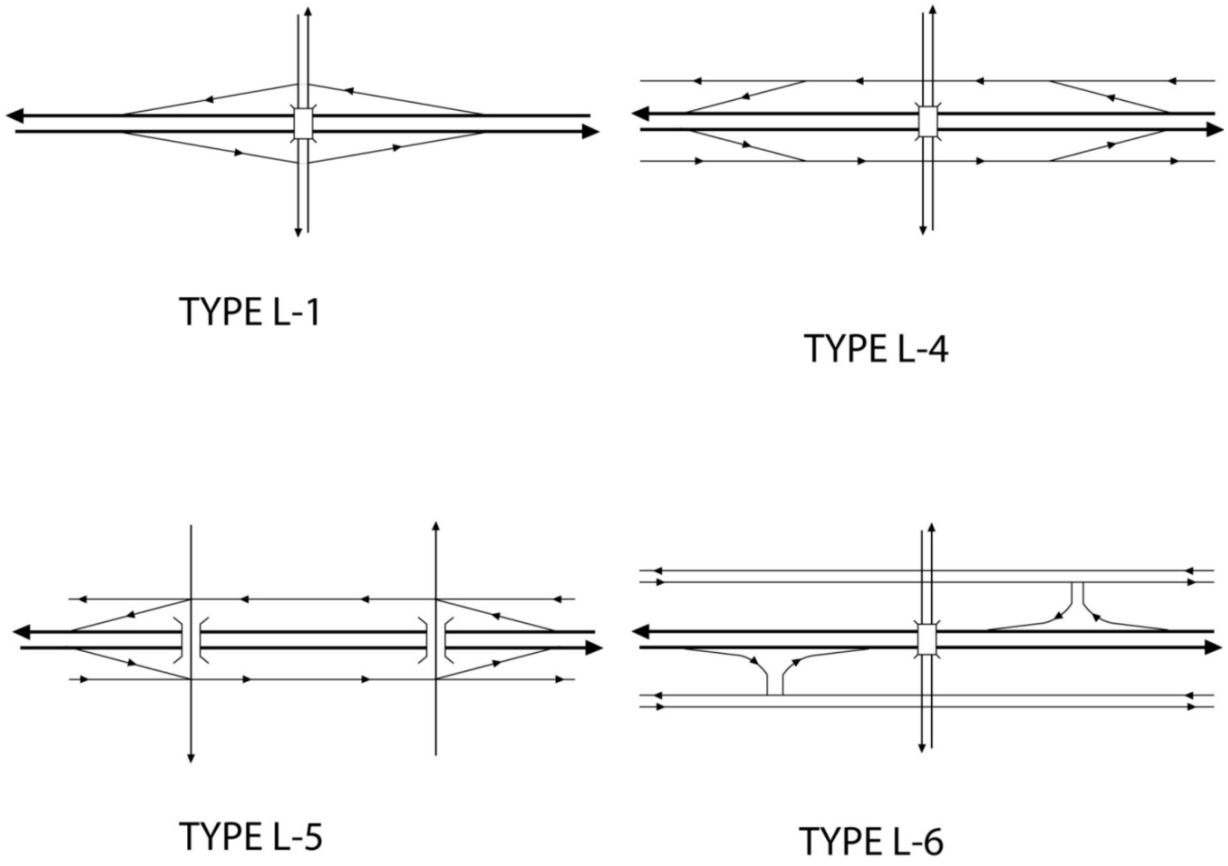
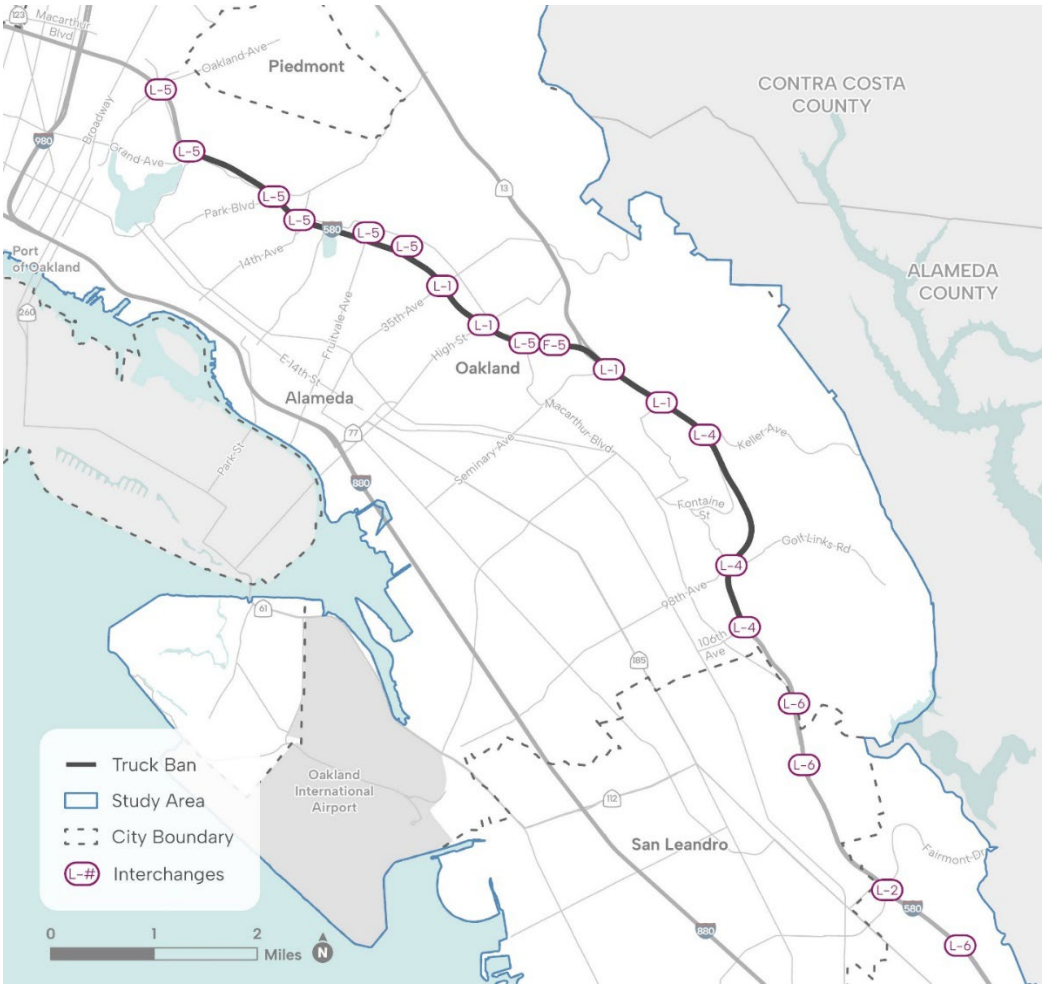


**Figure 26: Interchange Types along I-580**




Source: Google Maps (2025)

## Pavement Conditions

Existing pavement conditions were assessed because heavy trucks result in substantial wear and tear on pavement due to their weight. This can increase paving needs and costs for local jurisdictions and Caltrans.

### FREEWAYS

Pavement conditions on freeways in the study area are generally fair to good, and were assessed against Caltrans' pavement rating system, show in **Figure 27**. I-580 is primarily paved with concrete, which can be more expensive to install than asphalt, but typically is more durable to heavy loads. In contrast, I-880 is paved with asphalt which can be less expensive to install but has a shorter life expectancy. The rating system tailors the condition criteria to each pavement type, resulting in a single R.O.B.Y.G designation used for all corridors in the study area.

**Figure 27: Example of Pavement Conditions based on Caltrans' Rating System**


Source: ***Caltrans (2025), 2023 State of the Pavement Report***

Within the study area, the best pavement conditions are observed on I-880, which has been repaved within the last five years, with 94 percent of lane miles are rated green, indicating pavement conditions show no distress or very low distress, even though the freeway carries most of the study area's truck traffic. On I-238, which also carries many trucks, pavement conditions are more mixed. Only 4 percent of lane miles are rated green while 67 percent are rated yellow indicating minor surface distress and 29 percent rated blue indicating poor ride quality.

Pavement conditions on I-580 in the study area are generally good with 97 percent of lane miles receiving a green or yellow rating, although 2 percent of lane miles received a rating of red indicating major structural distress.

**Table 13: Freeway Pavement Condition (2023)**

| Corridor | Post Mile Extent | Lane-Miles | Green | Yellow | Blue | Orange | Red |
|---|---|---|---|---|---|---|---|
| I-80 | R1.075 to 5.305 | 39 | 90% | 3% | 7% | 0% | 0% |
| I-238 | R14.469 to 16.696 | 12 | 4% | 67% | 29% | 0% | 0% |
| I-580 | R30.451 to 46.471R | 110 | 72% | 25% | 0% | 1% | 2% |
| I-880 | 18.364 to R35.797R | 112 | 94% | 4% | 1% | 0% | 0% |
| I-980 | 0.354 to 2.032 | 8 | 82% | 1% | 14% | 3% | 0% |
| SR 13 | 4.262 to 13.735 | 35 | 65% | 10% | 25% | 0% | 0% |
| SR 24 | R1.847 to R6.241 | 27 | 82% | 8% | 2% | 6% | 1% |
| | **Total** | **340** | **79%** | **14%** | **5%** | **1%** | **1%** |

Source: *Caltrans Pavement Program (2023), Pavement Condition Summary Report (PaveM)*

### ARTERIALS

MTC aggregates pavement condition index (PCI) data for all jurisdictions in the Bay Area. PCI is measured on a scale of 1-100, with a score of 80-100 indicating pavement conditions are excellent or very good, 60-79 indicating pavement conditions are good or fair, 50-59 indicating pavement conditions are at risk, and 0-49 indicating pavement conditions are poor or failed.

PCI varies on arterials that carry high volumes of truck traffic including Grand Avenue, Hegenberger Road, 98th Avenue, and Marina Boulevard, as shown in **Table 14** below.

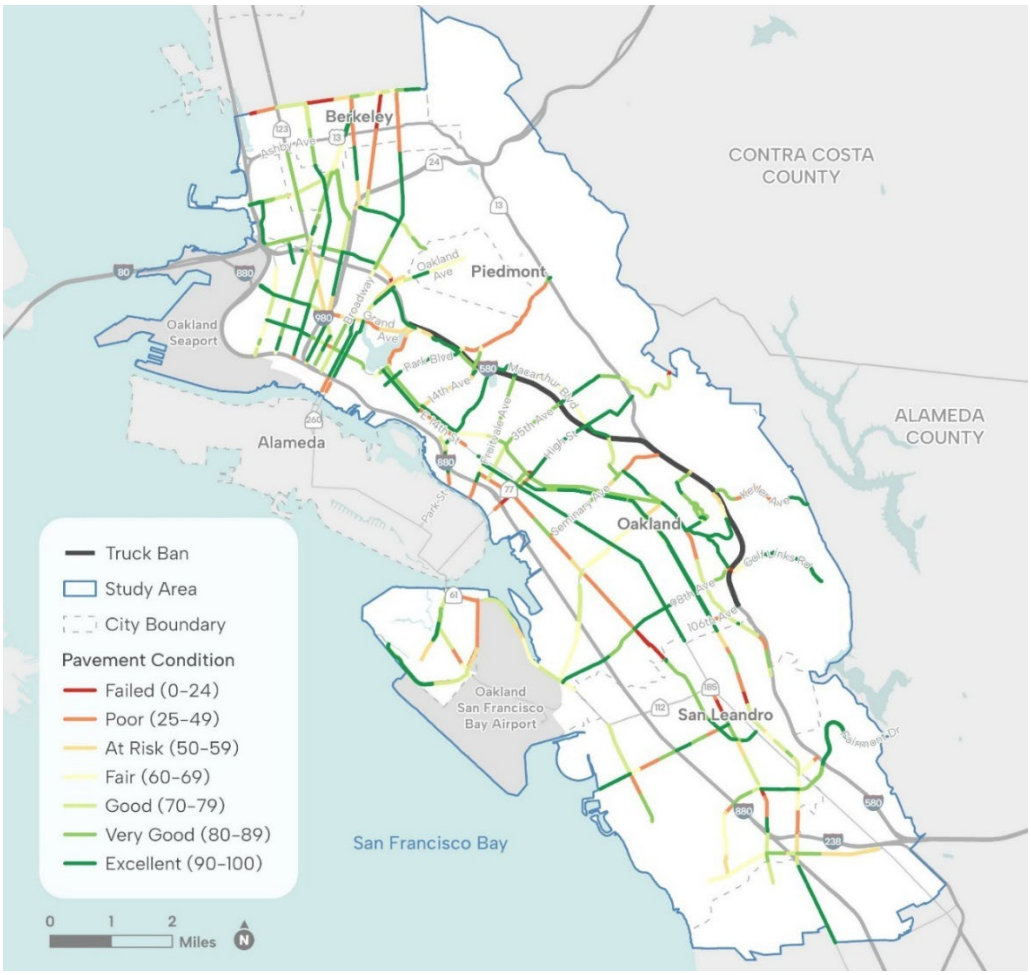
**Table 14: PCI on Select Study Area Arterials**

| Jurisdiction | Road | Extent | PCI Range |
|---|---|---|---|
| Oakland | Grand Avenue[16] | Broadway to MacArthur Boulevard | Poor-At Risk |
| Oakland | Hegenberger Road | SR 61 to SR 185 | Fair-Good |
| Oakland | 98th Avenue | Stanley Avenue to SR 61 | Very Good-Excellent |
| San Leandro | Marina Boulevard | Neptune Drive to Menlo Street; Merced Street to Alvarado Street; San Leandro Street to Washington Avenue | Fair-Excellent |
| San Leandro | Marina Boulevard | Railroad Tracks to Merced Street; Alvarado Street to San Leandro Boulevard | Poor |

Source: MTC and Vital Signs (2025), Street Pavement Conditions

[16] This corridor will undergo construction for the Grand Avenue Complete Streets Paving Project in late 2026. Source: https://www.oaklandca.gov/Government/Oakland-Improvement-Projects/Grand-Avenue-Complete-Streets-Paving-Project

**Figure 28. Pavement Condition Index for Arterials in the Study Area**




Source: *MTC (July 2025), Vital Signs: Street Pavement Condition – Streets and Roads*

## Environmental Conditions and Health Outcomes

Environmental burdens in the study area were evaluated using CalEnviroScreen 4.0, a statewide tool that identifies communities disproportionately affected by pollution and by socioeconomic or health conditions that increase vulnerability to environmental hazards.[17] CalEnviroScreen uses a percentile-based scoring system to provide a relative ranking of exposure for all census tracts in California.

In the study area, the communities that bear the greatest cumulative environmental burdens are those in the flatlands of the inner East Bay including West Oakland, East Oakland, and parts of San Leandro. In these areas, people are more likely to face health challenges that are both caused and exacerbated by exposure to air pollution.

[17] CalEnviroScreen 4.0, 2021. https://oehha.ca.gov/sites/default/files/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf

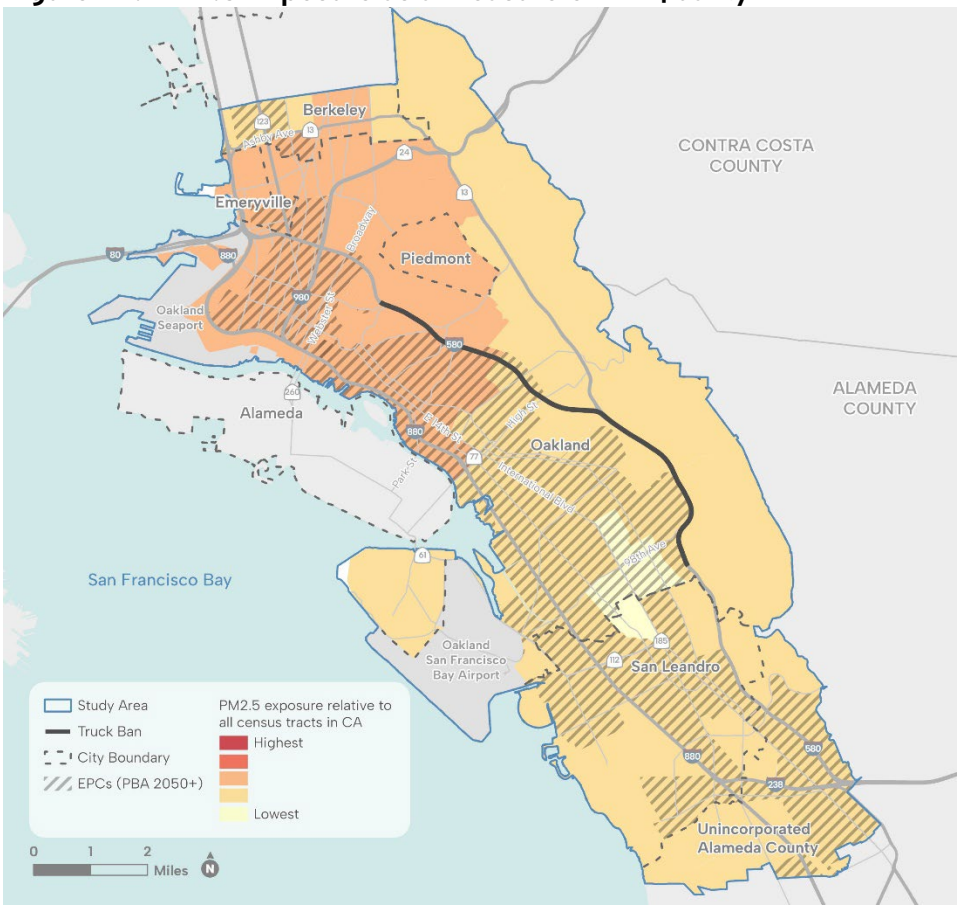
## Pollution Burdens

### PM2.5

PM2.5, or fine particulate matter, poses health risks because it affects the heart and lungs, and children, the elderly and people with asthma are most susceptible to the impacts of PM2.5 There are many sources of PM2.5 including cars and trucks, wood burning, and other activities that involve combustion.

Relative to the rest of the state, PM2.5 exposure in the study area is moderate and there are no census tracts that rank above the 60th percentile for PM2.5 exposure. Higher PM2.5 levels are concentrated in the northwest portion of the study area, including Emeryville, Piedmont, and parts of Oakland such as Downtown, West Oakland, North Oakland, and the Eastlake/Fruitvale neighborhoods.

**Figure 29: PM2.5 Exposure as a Measure of Air Quality**




Source: CalEnviroScreen 4.0

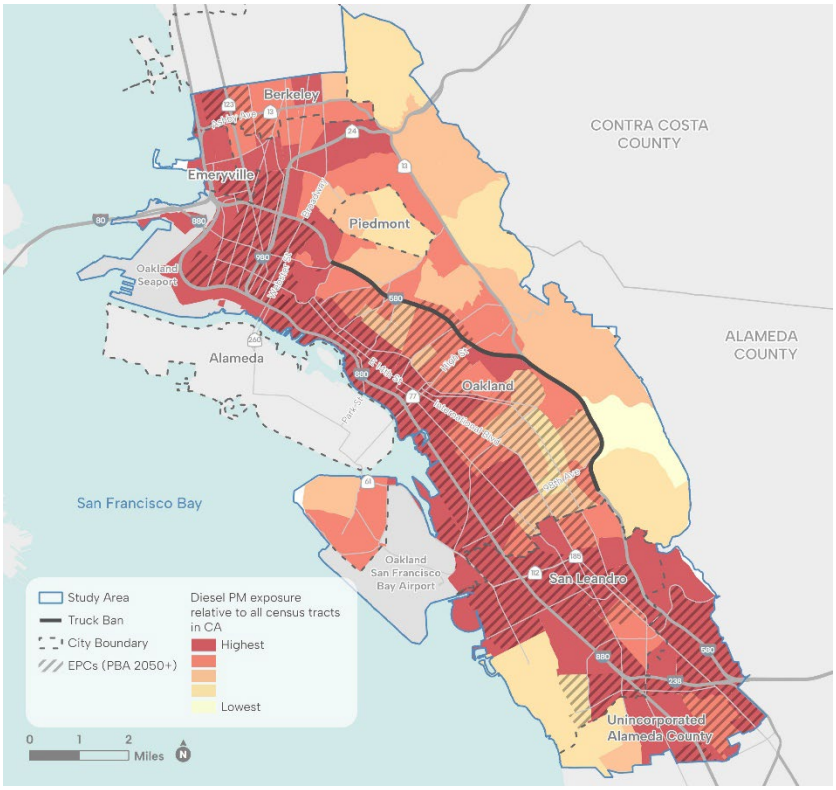
### DIESEL PARTICULATE MATTER

Diesel particulate matter is produced by trucks, buses, ships, and other vehicles with diesel engines, and tends to be concentrated near ports, freeways, and other locations with heavy diesel vehicle traffic. Exposure to diesel particulate matter can result in major health problems including cardiovascular and pulmonary disease as well as lung cancer. People with existing respiratory disease,

such as asthma, are particularly susceptible to the health impacts from diesel particulate matter exposure.

Diesel particulate matter (diesel PM) emissions are elevated across the study area, with especially high levels in neighborhoods west of I-580 and SR 13. According to CalEnviroScreen methodology, 82 census tracts (50 percent of all study area tracts) within the study area are within the top 20th percentile for statewide diesel PM exposure. Most of these census tracts are EPCs and to the west of I-580 and SR 13.

**Figure 30: Diesel Particulate Matter as a Measure of Air Quality**

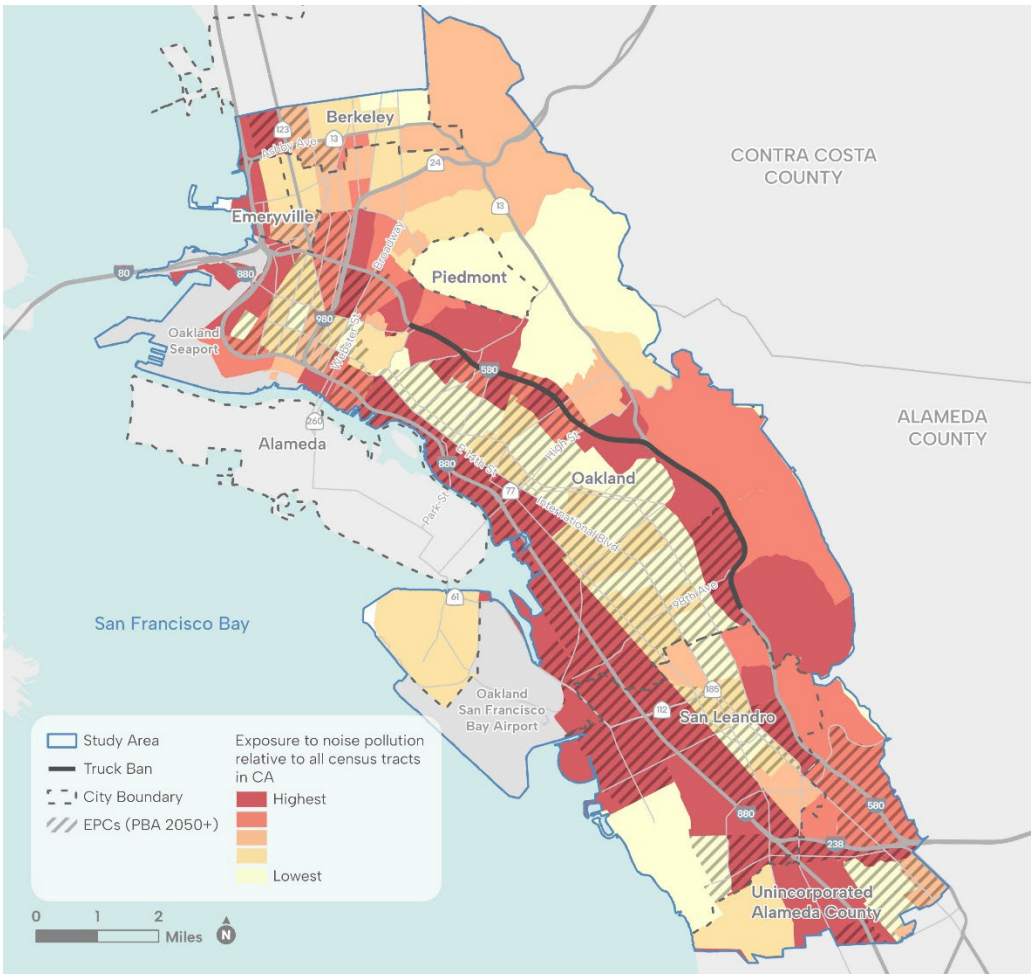



Source: CalEnviroScreen 4.0

## NOISE

Traffic impact measures vehicle volumes on roadways to estimate the distribution of adverse traffic impacts, including noise and exposure to vehicle exhaust on nearby communities. In the study area, traffic impacts are highest along the I-880, I-580, I-238, and I-80 corridors, as these roadways carry high volumes of traffic through the study area.

**Figure 31: Traffic Impact as a Measure of Noise Pollution**




Source: CalEnviroScreen 4.0

## Health Outcomes

### ASTHMA

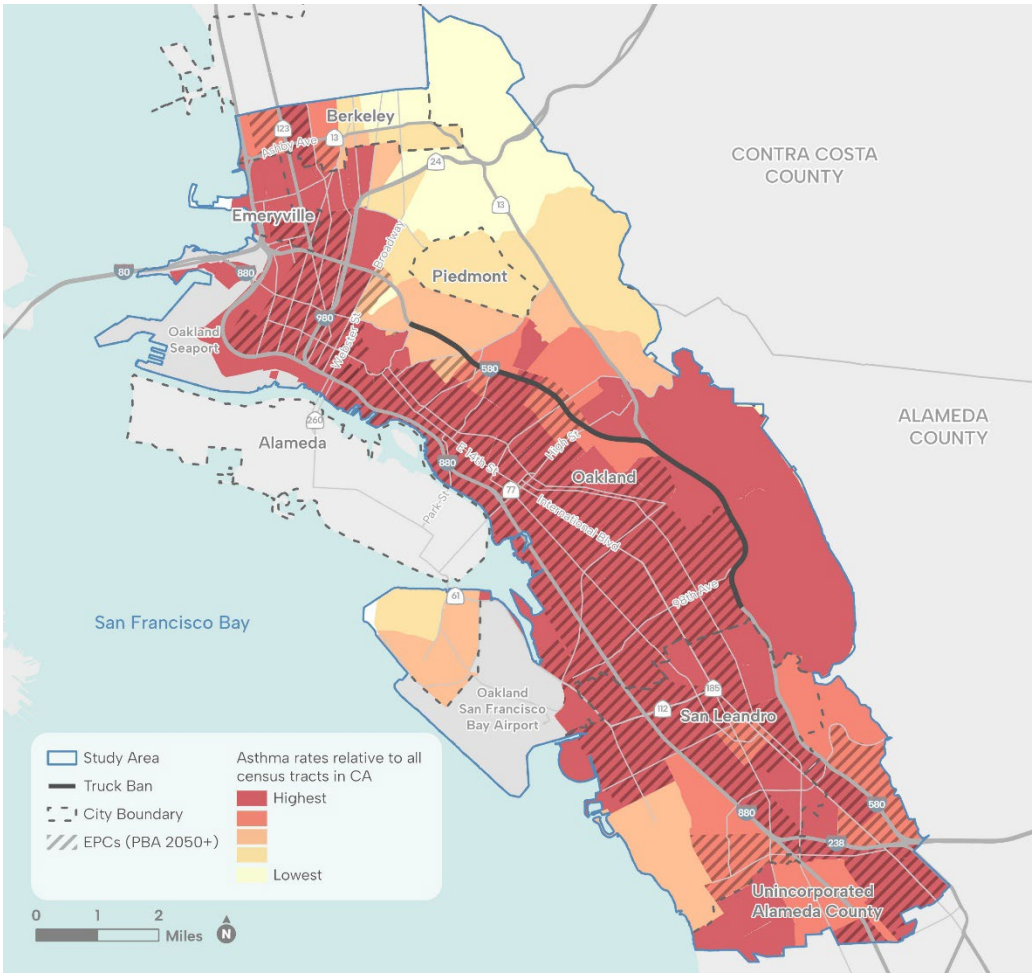
Exposure to pollutants such as PM2.5 and diesel particulate matter can cause asthma, worsen existing asthma symptoms, or increase a person's susceptibility to diseases such as pneumonia or the flu.[18] Emergency department visits for asthma are high across the study area as compared to the rest of the state and 108 census tracts (65 percent of study area tracts) are within the top 20th percentile for statewide Asthma emergency department visits.

The highest asthma impacts are observed in equity priority communities and communities to the west of I-580 and SR 13, however high asthma impacts are also observed in the East Oakland Hills, a

[18] CalEnviroScreen 4.0, 2021. https://oehha.ca.gov/sites/default/files/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf

neighborhood to the east of I-580, which ranks in the top 10th percentile for asthma emergency department visits.

**Figure 32: Emergency Department Visits for Asthma**



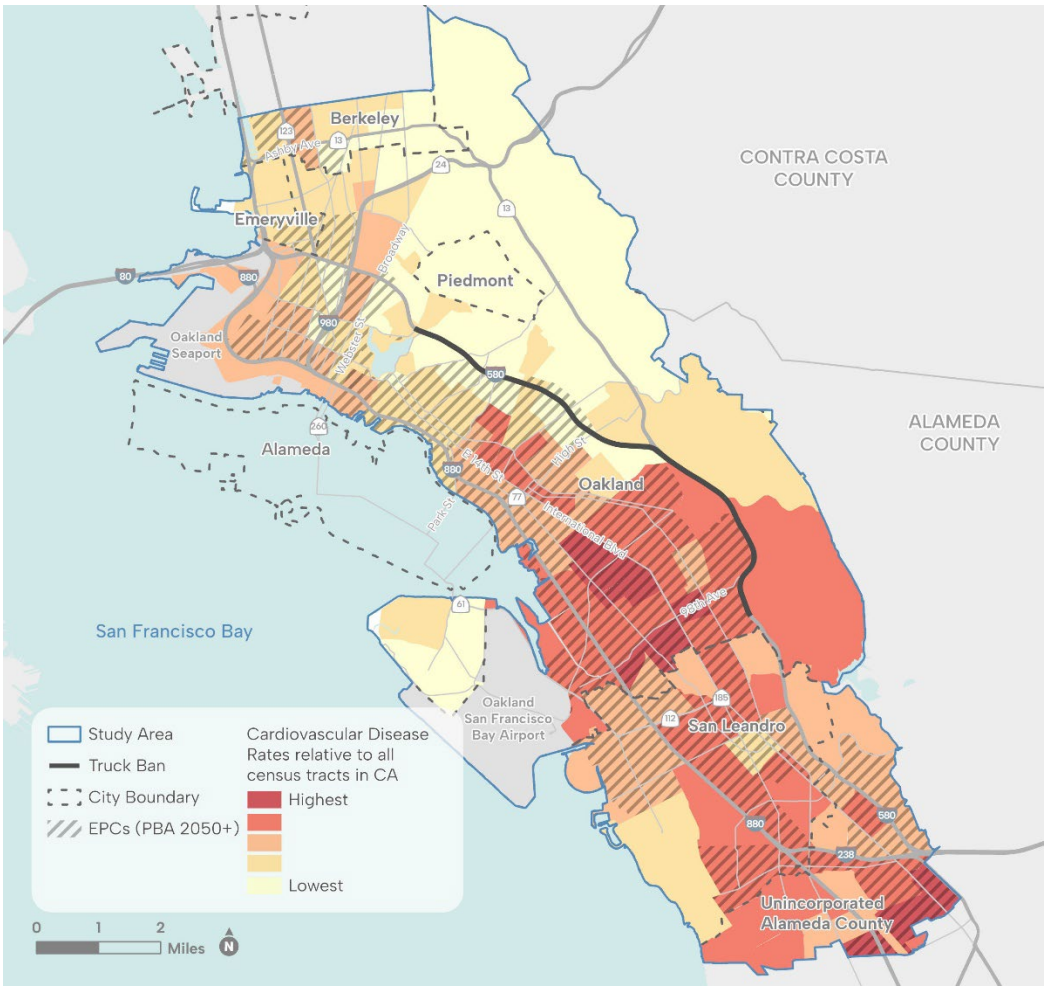

Source: CalEnviroScreen 4.0

## CARDIOVASCULAR DISEASE

While there are several risk factors for cardiovascular disease, evidence indicates that exposure to air pollution can exacerbate adverse health outcomes, including increased risk of death, for people with a history of cardiovascular illness. The highest rates of cardiovascular disease are observed in the southern portion of the study area, southeast of Seminary Avenue in Oakland, where several neighborhoods, including the Coliseum neighborhood and parts of Cherryland are in the top 20th percentile for emergency room visits for cardiovascular disease. As described in **Figure 33,** people living in these neighborhoods also experience high levels of air pollution, particularly Diesel Particulate Matter, which can aggravate existing cardiovascular disease.

Rates of cardiovascular disease are also high to the west of I-580, but air pollution is lower in these neighborhoods.

**Figure 33: Emergency Department Visits for Cardiovascular Disease**




Source: CalEnviroScreen 4.0

# System Performance Assessment

## Introduction

The system performance assessment uses a travel demand model to forecast how travel patterns could change in the study area if the truck ban were to be lifted under baseline and future year scenarios. Performance measures are evaluated against a subset of the study's evaluation criteria and will be combined with the air, noise, and racial equity performance measures to understand as to what could happen if the truck ban on I-580 is removed.

## Methodology and Model Assumptions

### Methodology

The AlaCC Model was used to assess how removing the truck ban could change the system performance within the study area. The AlaCC Model is an Activity Based Model consistent in structure to MTC's Activity Based Model. While the "off the shelf" AlaCC model is also consistent with Plan Bay Area 2050, the Model was adjusted for this analysis as described in the Scenarios and Assumptions section below.

The following measures were extracted from the model to assess system performance:

- Heavy truck volumes
- Heavy truck Vehicles Miles Traveled (VMT)
- Heavy truck congested speeds
- Person hours of delay
- Bottleneck capacity and throughput

Performance measures such as queue lengths or travel time reliability require multiple simulations to estimate average and atypical conditions, which are not captured by travel demand models such as AlaCC.

The unit of trip-making in activity-based models are simulated from a synthetic population. The activities, or trip-making decisions, of each person are simulated throughout the course of a typical weekday. Truck trips are generated based on existing land use (number of households, and employment across industries). The AlaCC Model models the Oakland Seaport and Oakland San Francisco Bay Airport as special generators, based on historic trip data, a set truck trip growth rate and time of day distribution, independent of land use.

### Scenarios and Assumptions

Four scenarios were evaluated for system performance, with key assumptions summarized in **Table 15**.

The future scenario assumes the 2035 policy environment is identical to today's policy environment. This is because regional policies that are included in Plan Bay Area 2050 and the default 2035 model environment, such as all-lane tolling and 55 mph on freeways, yield results that make it difficult to isolate the effects of removing the truck ban.

- **Today With Ban:** a 2019/2020 pre-COVID scenario with the truck ban on I-580 in place.

- **Today No Ban:** a 2019/2020 pre-COVID scenario with full removal of the truck ban on I-580.
- **Future (2035) With Ban:** a future scenario with the truck ban in place. This scenario assumes that the only changes between today and 2035 is baseline household and employment growth. The policy environment is identical to today's policy environment, and there is no change in transit service provision or roadway capacity.[19]
- **Future (2035) No Ban:** a future scenario with the truck ban removed. This scenario assumes that the only changes between today and 2035 are baseline household and employment growth, and the removal of the truck ban. The policy environment is identical to today's policy environment, and there is no increase in transit service provision or roadway capacity.

**Table 15. Summary of Analyzed Scenarios**

| Scenario | Scenario Year | Truck Ban on I-580 | Land Use Scenario | Regional Policies | Transit Service Provision | Roadway Capacity |
|---|---|---|---|---|---|---|
| Today With Ban | 2019 | Ban in place | 2019 land use | 2019 conditions | 2019 transit service | 2019 roadway capacity |
| Today No Ban | 2019 | Ban removed | 2019 land use | 2019 conditions | 2019 transit service | 2019 roadway capacity |
| Future With Ban | 2035 | Ban in place | 2035 land use | 2019 conditions, excludes PBA2050 regional policies[1] | 2019 transit service | 2019 roadway capacity |
| Future No Ban | 2035 | Ban removed | 2035 land use | 2019 conditions, excludes PBA2050 regional policies[1] | 2019 transit service | 2019 roadway capacity |

Source: Fehr & Peers, 2025.
Notes:
1. Excludes regional policies such as all-lane tolling, 55 mph speeds on freeways, and other regional policies from the Regional Transportation Plan (RTP).

The AlaCC Model assumes that truck trips remain fixed by time of day (Early AM, AM, Midday, PM, and Evening), as shown in **Table 16**. In practice, this means the model does not shift the timing of truck trips in response to congestion in the network; instead, it assigns the same set of truck trips by time period across the network based on congested travel times. As a result, changes observed between the "with ban" and "no ban" scenarios could be interpreted as route-choice effects rather than demand-induced effects, supporting a clearer assessment of the ban's influence on corridor usage and system performance. **Table 16** also describes the hours covered by each modeled time period.

[19] As a result of these simplifying assumptions, the amount of congestion forecast by the model for 2035 may be overstated.

**Table 16. Heavy Truck Time of Day Distribution**

| Time Period | Heavy Truck Distribution (I-I)[1] | Heavy Truck Distribution (IX-XI)[2] |
|---|---|---|
| Early AM (3 AM – 6 AM) | 11.5% | 9.5% |
| AM (6 AM – 10 AM) | 16.0% | 11.0% |
| Midday (10 AM – 3 PM) | 30.0% | 43.0% |
| PM (3 PM – 7 PM) | 31.0% | 27.0% |
| Evening (7 PM – 3 AM) | 11.5% | 9.5% |
| ***Daily*** | ***100%*** | ***100%*** |

Source: Fehr & Peers, 2025.
Notes:
1. I-I trips are trips that start and end within the Bay Area/San Joaquin County
2. IX-XI trips are trips that start in Bay Area/San Joaquin County, and end outside of the Bay Area/San Joaquin County.

## Evaluation Criteria and Performance Measures

Traffic related performance measures are limited to metrics that can be reasonably estimated using a travel demand model, as shown in **Table 17**. The AlaCC Model is a regional, long-range planning tool that predicts travel patterns at an aggregate level, based on average, deterministic conditions. Based on previous studies, findings from the AlaCC model at the scale of the I-580 study area are expected to have a margin of error of +/- 1%.[20] A travel demand model like the AlaCC Model cannot reliably estimate performance measures such as queue lengths or travel time reliability, which often require multiple simulations to estimate average and extraneous conditions. These measures require the granular, time-dependent analysis provided by operations models that focus on detailed, corridor-level or intersection-level performance under specific traffic conditions, incorporating signal timing, lane configurations, and stochastic conditions.

The following table describes the evaluation criteria and performance measures that were selected to evaluate the impact of the truck ban using outputs from the AlaCC model. Additional criteria related to air quality and noise will also be used to evaluate the truck ban and will be assessed separately as part of the study's Air and Noise analysis.

**Table 17. Truck Ban Performance Assessment Evaluation Criteria and Performance**

| Evaluation Criteria | Performance Measures |
|---|---|
| Amount of heavy truck traffic traveling through the study area | • Heavy truck volumes in the study area<br>• Heavy truck Vehicles Miles Traveled (VMT) in the study area |
| Exposure to truck traffic on local streets | • Heavy truck volumes on study area arterials<br>• Heavy truck VMT on study area arterials |

[20] I-580 Transit and Multimodal Strategy, Technical Evaluation Memo, November 12, 2024.

| Evaluation Criteria | Performance Measures |
|---|---|
| Frequency and severity of truck collisions on local streets | • Heavy truck VMT on study area arterials<br>• Heavy truck speed on study area arterials |
| Roadway degradation and maintenance costs | • Heavy truck VMT on study area arterials<br>• Heavy truck VMT on study area freeways |
| Travel conditions on study area freeways | • Heavy truck volumes on study area freeways<br>• Heavy truck VMT on study area freeways<br>• Person hours of delay on study area freeways<br>• Truck travel time reliability<br>• Bottleneck throughput on study area freeways |
| Frequency and severity of truck collisions on study area freeways | • Heavy truck VMT on study area freeways<br>• Heavy truck speed on study area freeways |
| Goods movement efficiency through the study area | • Heavy truck VMT on study area freeways and arterials<br>• Truck travel time reliability<br>• Truck delay |

Source: Fehr & Peers, 2025.

## Baseline System Performance

Baseline system performance compares performance measures for today's conditions with and without the truck ban. The following section of the report describes baseline system performance for all performance measures listed in **Table 17**.

### Performance Measures

#### VOLUMES

**Table 18** shows average of the total volume of vehicles modeled on all segments of the identified roads. This estimate is calculated by dividing total VMT by road miles and, as such, does not represent the actual number of vehicles on any given segment. Differences in roadway length can make it appear there are more vehicles on average, even if the total on any given segment is similar. As shown in **Table 18**, about 4,400 heavy trucks per day could shift from I-880/I-238 to I-580 if the truck ban is removed. This could result in a substantial reduction in truck volumes on I-238, as fewer trucks travel between I-580 and I-880. There could be no change  no change in the volume of trucks traveling on I-238, I-580, and I-880 combined, although there may be a modest increase in trucks on SR 13.

**Table 18. Daily Average Freeway Volumes, Today With and Without the Truck Ban**

| Freeway | Passenger Vehicles | | | Small/Medium Truck | | | Heavy Truck | | |
|---|---|---|---|---|---|---|---|---|---|
| | Today With Ban | Today No Ban | Delta | Today With Ban | Today No Ban | Delta | Today With Ban | Today No Ban | Delta |
| I-580 | 112,500 | 110,300 | -2,200 | 16,500 | 16,200 | -300 | 100 | 4,500 | +4,400 |
| I-880 | 139,600 | 142,300 | +2,700 | 30,100 | 30,600 | +500 | 10,700 | 6,900 | -3,800 |
| I-238 | 74,700 | 76,100 | +1,400 | 10,700 | 10,900 | +200 | 7,400 | 3,300 | -4,100 |
| *I-580/ I-880/I-238* | *121,000* | *219,000* | +300 | *21,900* | *22,000* | +100 | *5,400* | *5,400* | -- |
| SR 13 | 85,600 | 85,000 | -600 | 6,800 | 6,600 | -200 | 400 | 900 | +500 |
| I-980 | 59,800 | 60,700 | +900 | 12,400 | 12,600 | +200 | 900 | 600 | -300 |
| SR 24 | 108,100 | 108,500 | +400 | 7,200 | 7,200 | - | 1,900 | 1,800 | -100 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Notes: increase, decrease

Lifting the truck ban on I-580 could have minimal effect on passenger vehicles and small/medium truck volume, with estimated changes across major freeways generally within the 2 percent range. A small number of passenger vehicles may shift from I-580 to I-880 if the truck ban is removed. I-880 and I-238 could gain 2,700 and 1,400 daily passenger vehicles respectively, while I-580 could see about 2,000 fewer daily passenger vehicles.

Lifting the truck ban on I-580 could change how heavy truck traffic travels on local arterials, though the impacts are modest. The AlaCC model also does not account for local policies and projects that could reduce roadway capacity, restrict local truck travel, or otherwise alter local truck travel patterns, which could result in different travel behavior than projected by the model.

As shown in **Table 19**, removing the ban could increase daily heavy truck volumes on arterials that connect I-580 to I-880, including Hesperian Boulevard and 150th Street. Both arterials could see approximately 400 additional heavy trucks per day. Tunnel Road and Ashby Avenue (both of which are part of SR 13) could see an increase in heavy trucks as removing the truck ban on I-580 increases heavy truck access to SR 13.

**Table 20** shows three arterial segments that could experience decreases of more than 100 daily trucks. 7th Street near I-880 could see 300 fewer daily heavy trucks, and two segments of Telegraph Avenue in North Oakland and Berkeley could see 100 fewer daily trucks each.

**Table 19: Arterials with the Greatest Increase in Heavy Truck Traffic**

| Arterials | Extents | Heavy Truck | | |
|---|---|---|---|---|
| | | Today With Ban | Today No Ban | Delta |
| Hesperian Boulevard | 150th Street to Grant Avenue | 50 | 490 | +440 |
| 150th Street | Hesperian Boulevard to Foothill Boulevard | 110 | 500 | +390 |
| Tunnel Road (CA 13) | Domingo Avenue to Hiller Drive | 170 | 440 | +270 |
| Ashby Avenue (CA 13) | Domingo Avenue to Telegraph Avenue | 120 | 310 | +190 |
| Grand Avenue | Harrison Street to MacArthur Boulevard | 20 | 160 | +140 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Notes: increase, decrease

**Table 20: Arterials with the Greatest Decrease in Heavy Truck Traffic**

| Arterials | Extents | Heavy Truck | | |
|---|---|---|---|---|
| | | Today With Ban | Today No Ban | Delta |
| 7th Street | Maritime Street to I-880 | 2810 | 2500 | -300 |
| Telegraph Avenue | Ashby Avenue to Claremont Avenue | 360 | 170 | -190 |
| Telegraph Avenue | 55th Street to 51st Street | 240 | 120 | -120 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Notes: increase, decrease

### VEHICLES MILED TRAVELED

**Figure 34** through **Figure 36** summarize daily modeled VMT for study area freeways and arterials by vehicle class. The figures show that removing the truck ban could result in minor shifts in passenger and small/medium truck travel in response to higher truck volumes on I-580, but larger changes to the distribution of heavy truck VMT. In **Figure 36**, the nearly 4,000% increase in heavy truck VMT on I-580 is driven by the very low existing heavy truck volumes under the current truck ban.

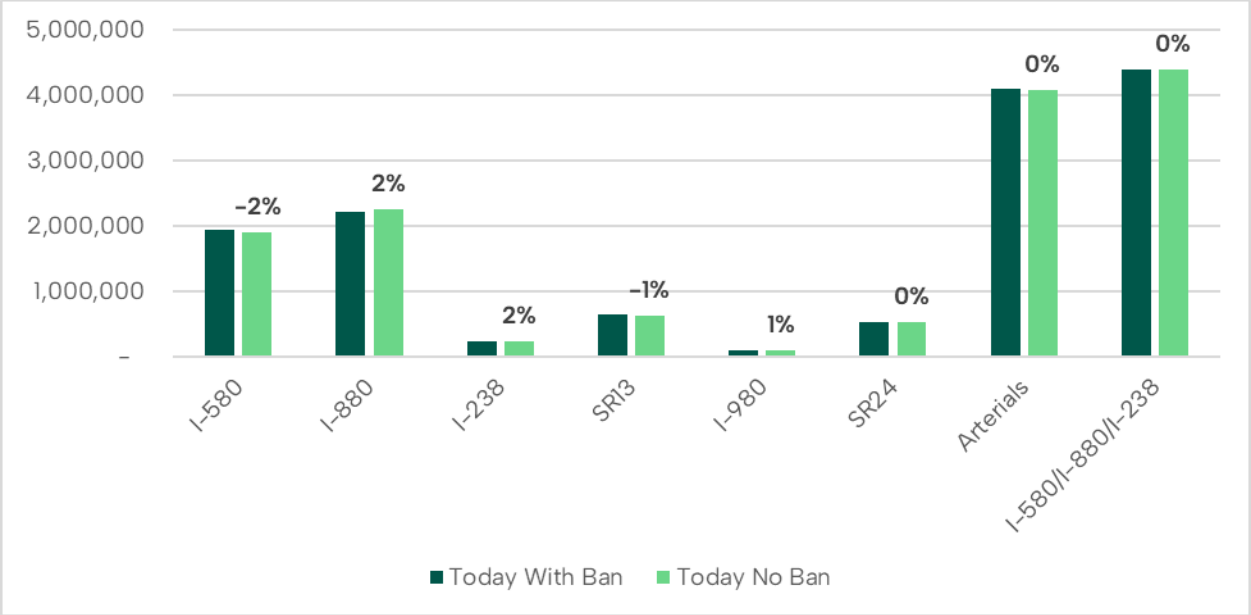
A sizable share of heavy truck VMT could be redistributed from I-880/I-238 to I-580 if the I-580 truck ban is removed. While heavy truck VMT on I-580 could increase substantially, this could be accompanied by a decrease on heavy truck VMT on I-880 and I-238 as heavy trucks are rerouted from I-880/I-238 to I-580. VMT across I-580/I-880/I-238 could increase by 1 percent, even as overall truck volumes remain similar.

I-980 (-38 percent), and SR 24 (-10 percent) could see declines in VMT as truck travel patterns shift in response to the truck ban removal, although these short segments have smaller base VMT numbers. Heavy truck VMT on study area arterials could grow by about 4 percent.

Passenger vehicle VMT may remain largely unchanged under a no ban scenario, with the largest shifts from I-580 to I-880/I-238. Changes to small and medium truck VMT may also be negligible, with modeled variations of up to 2 percent.

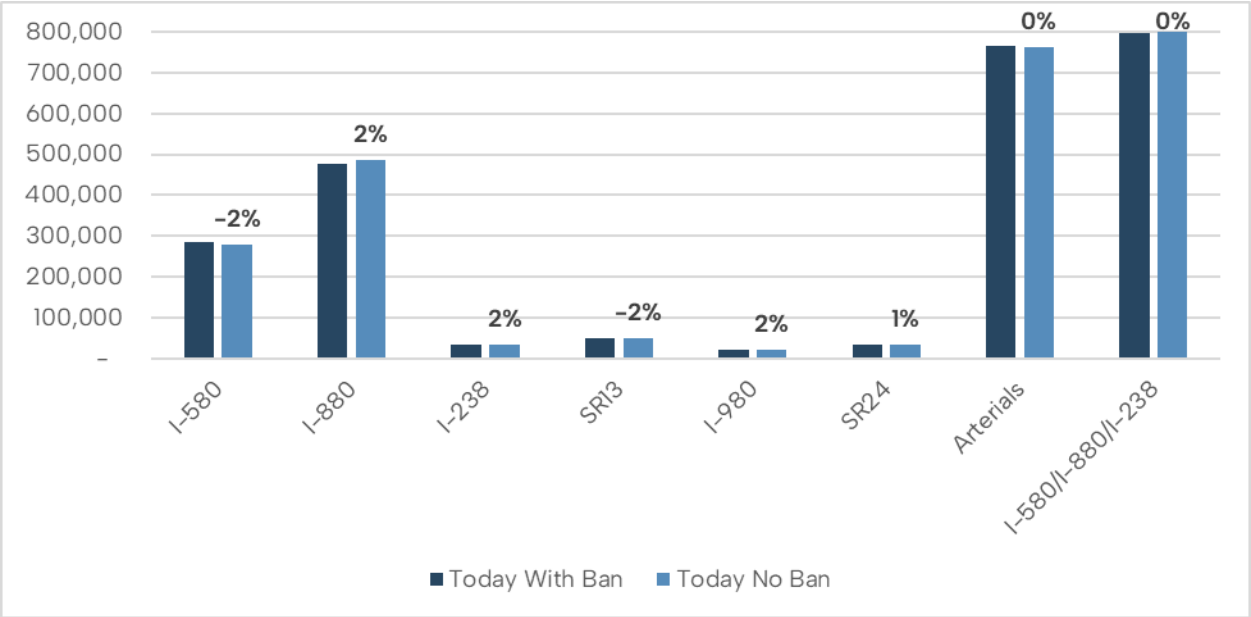
A detailed breakdown of VMT numbers by facility type and vehicle class for today with and without ban can be found in **Appendix A**.

**Figure 34. Daily Passenger Vehicle VMT by Facility Type, Today With Ban and Today No Ban**



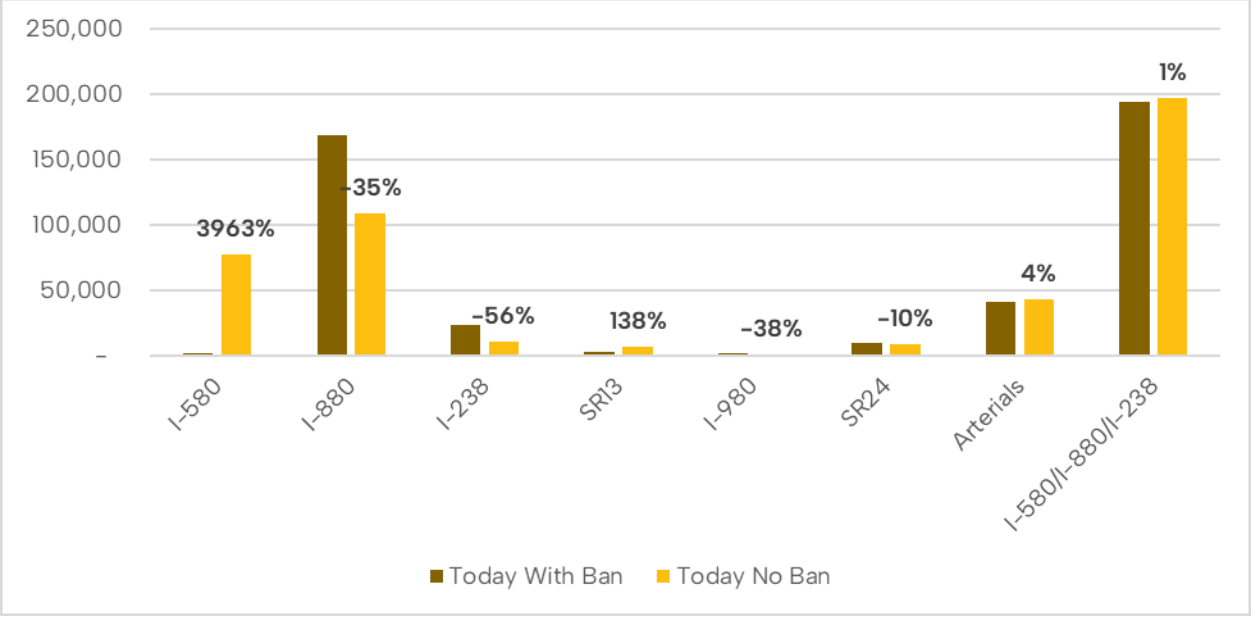

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.

**Figure 35. Daily Small and Medium Truck VMT by Facility Type, Today With Ban and Today No Ban**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.

**Figure 36. Daily Heavy Truck VMT by Facility Type, Today With Ban and Today No Ban**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.

### SPEEDS

A summary of modeled VMT by speed bin for all modeled vehicle classes at the daily level is presented for freeways and arterials in **Table 21** and **Table 22**, respectively. Speed bins that could see an increase of more than 1 percentage point of VMT with the truck ban removed are highlighted in

green, while speed bins that could see a decrease of more than 1 percent of VMT are highlighted in yellow. With the truck ban removed, heavy trucks on freeways could see meaningful increases in speeds – the share vehicle miles traveled at speeds over 55 mph could increase from 49 percent of vehicle miles to 67 percent of vehicle miles.

There is no modeled change to passenger vehicle and small and medium truck speeds on arterials. While there could be a slight increase in the share of heavy truck VMT at speeds greater than 35 MPH on arterials, there could also be an increase in the share of heavy truck VMT at speeds below 25 MPH and the majority of truck VMT on arterials is estimated to remain at speeds below 35 MPH.

**Table 21. Daily Freeway VMT by Speed Bin, Today With and Without the Truck Ban**

| Speed Bins (mph) | Passenger Vehicles | | Small/ Medium Trucks | | Heavy Trucks | | Total Volumes | |
|---|---|---|---|---|---|---|---|---|
| | Today With Ban | Today No Ban | Today With Ban | Today No Ban | Today With Ban | Today No Ban | Today With Ban | Today No Ban |
| <30 | 2% | 2% | 1% | 1% | 2% | 1% | 2% | 2% |
| 35-40 | 3% | 2% | 3% | 3% | 3% | 2% | 3% | 2% |
| 40-45 | 4% | 3% | 5% | 3% | 6% | 2% | 4% | 3% |
| 45-50 | 9% | 9% | 10% | 9% | 14% | 8% | 10% | 9% |
| 50-55 | 20% | 21% | 21% | 23% | 26% | 20% | 20% | 21% |
| 55-60 | 31% | 32% | 33% | 36% | 27% | 35% | 31% | 33% |
| 60-65 | 31% | 31% | 27% | 25% | 22% | 32% | 30% | 30% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Notes: >1 percentage point increase, > 1 percentage point decrease

**Table 22. Daily Arterial VMT by Speed Bin, Today With and Without the Truck Ban**

| Speed Bins (mph) | Passenger Vehicles | | Small/ Medium Trucks | | Heavy Trucks | | Total Volumes | |
|---|---|---|---|---|---|---|---|---|
| | Today With Ban | Today No Ban | Today With Ban | Today No Ban | Today With Ban | Today No Ban | Today With Ban | Today No Ban |
| <25 | 16% | 16% | 20% | 20% | 13% | 15% | 17% | 17% |
| 25-30 | 21% | 21% | 20% | 20% | 17% | 16% | 21% | 21% |
| 30-35 | 52% | 52% | 51% | 51% | 62% | 61% | 52% | 52% |
| 35-40 | 7% | 7% | 6% | 6% | 6% | 8% | 7% | 7% |
| 40-45 | 2% | 2% | 1% | 1% | 1% | 0% | 1% | 1% |
| 45-50 | 1% | 1% | 1% | 1% | 1% | 0% | 1% | 1% |
| 50-55 | 1% | 1% | 1% | 1% | 0% | 0% | 1% | 1% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Notes: >1 percentage point increase, > 1 percentage point decrease

## BOTTLENECK THROUGHPUT

The effects of removing the truck ban on study area bottlenecks are summarized in **Table 23** and **Table 24** for the AM and PM peak periods respectively. Model forecasts suggest that no new bottlenecks might be formed in the study area from removing the truck ban. During the AM peak, additional passenger car equivalents could pass through the I-238/I-880 merge in the westbound direction and I-580 westbound approaching the Bay Bridge. In the PM peak, additional passenger car equivalents could pass through I-80 westbound and I-580 westbound approaching the Bay Bridge, and the I-580 interchange with Lakeshore Avenue and Grand Avenue. The scale of changes in both the AM and PM periods is estimated to be small, ranging from 10 to 125 average additional vehicles per hour.

**Table 23. Changes in Throughput in Study Area Bottlenecks, Today With and Without the Truck Ban (AM Peak Period, 6 AM – 10 AM)**

| Study Area Bottlenecks | | | Today with and Without Ban Delta | | | |
|---|---|---|---|---|---|---|
| Bottleneck | Roadway | From | Passenger Vehicle Volume[1] | Small/Medium Truck Volume[1] | Heavy Truck Volume[1] | PCE[2] |
| I-880/I-238 Merge | I-238 WB | I-580 | +400 | +30 | -130 | **+180** |
| Bay Bridge Toll Plaza | I-80 WB[3] | Ashby Ave (SR 13) | -130 | <20 | <20 | **-140** |
| | I-580 WB | SR-24/I-980 | +300 | <20 | +100 | **+500** |
| | I-880 NB | West Grand Ave | <20 | <20 | -70 | **-110** |
| I-580/Lakeshore Ave | I-580 WB | Coolidge Ave | -30 | <20 | +120 | **+210** |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Note:
1. Volumes reflect the total across a 4-hour period.
2. Passenger car equivalent values were estimated based on the following factors for each vehicle type: passenger vehicle = 1 PCE, small and medium trucks = 1 PCE, heavy trucks = 2 PCE, based on the AlaCC Model specification.
3. This segment is signed as I-80 westbound and I-580 eastbound

**Table 24. Changes in Throughput in Study Area Bottlenecks, Today With and Without the Truck Ban (PM Peak Period, 3 PM – 7 PM)**

| Study Area Bottlenecks | | | Today with and Without Ban Delta | | | |
|---|---|---|---|---|---|---|
| Bottleneck | Roadway | From | Passenger Vehicle Volume[1] | Small/Medium Truck Volume[1] | Heavy Truck Volume[1] | PCE[2] |
| I-880/I-238 Merge | I-238 WB | *I-580* | -130 | <20 | -430 | **-1,000** |
| Bay Bridge Toll Plaza | I-80 WB[3] | Ashby Ave (SR 13) | 20 | <20 | <20 | **+40** |
| | I-580 WB | SR-24/I-980 | -220 | -50 | +360 | **+460** |
| | I-880 NB | West Grand Ave | +180 | +25 | -260 | **-320** |

| Study Area Bottlenecks | | | Today with and Without Ban Delta | | | |
|---|---|---|---|---|---|---|
| Bottleneck | Roadway | From | Passenger Vehicle Volume[1] | Small/Medium Truck Volume[1] | Heavy Truck Volume[1] | PCE[2] |
| I-580/Lakeshore Ave | I-580 WB | Coolidge Ave | -380 | -75 | +500 | **+540** |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Note:

1. Volumes reflect the total across a 4-hour period.
2. Passenger car equivalent values were estimated based on the following factors for each vehicle type: passenger vehicle = 1 PCE, small and medium trucks = 1 PCE, heavy trucks = 2 PCE, based on the AlaCC Model specification.
3. This segment is signed as I-80 westbound and I-580 eastbound

### TRUCK TRAVEL TIME RELIABILITY (TTTR) INDEX

FHWA defines the Truck Travel Time Reliability (TTTR) Index as the ratio of the 95th-percentile truck travel time to the free-flow travel time for a given peak period. Historical travel time data, typically covering one year, is used to estimate the 95th-percentile travel time. Higher TTTR index values indicate lower travel time reliability. FHWA provides the National Performance Management Research Data Set (NPMRDS) data to provide consistent estimates of TTTR across the U.S.

Regional travel demand models cannot provide information to calculate TTTR, because they are calibrated and validated for an average weekday. The TTTR index is influenced by both recurring congestion, commonly reflected by slower congested speeds, and non-recurring congestion, caused by incidental events such as weather events, traffic crashes, special events, and other variable events. While incidental events cannot be modeled, there is a direct relationship between congested speeds and the TTTR index. In general, as congested speeds become slower during peak hours or peak periods, travel time reliability decreases. As delay increases, the TTTR index increases at a faster rate than traffic volume due to the non-linear nature of the speed–flow relationship. Further, non-recurrent events magnify the impact of congestion. For example, collisions can take more time to access and clear in congested conditions.

For the purposes of assessing the impacts on truck travel time reliability, congested speeds were used as a proxy. Congested speeds were extracted from the AlaCC modeling scenarios, and compared against the existing travel time reliability index. Declining congested speeds are generally expected to lead to worse truck travel time reliability.

**Table 25** shows that removing the truck ban could result in minimal changes to congested speeds on freeways within the study area, with average peak speeds potentially remaining unchanged on most segments, while congested speeds on a few segments could change by 1-2 miles per hour.

**Table 25. Change in Contested Speeds for Freeway Segments with Lowest Travel Time Reliability, Today With and Without Ban**

| Segment | Extents | Direction | Truck Travel Time Reliability With Ban | Free Flow Speeds (mph) | PM Peak Period Congested Speeds Today (mph) | |
|---|---|---|---|---|---|---|
| | | | | | With Ban | Without Ban |
| I-580 | Between SR 24 and Broadway | Eastbound | 4.4 | 55 | 46 | **44 (-2)** |
| | | Westbound | 2.4 | 55 | 52 | 52 |
| | Between High St and SR 13 | Eastbound | 3.0 | 65 | 64 | 64 |
| | | Westbound | 1.4 | 65 | 65 | 65 |
| | Between Miramar Ave and I-238 | Eastbound | 1.8 | 60 | 58 | 58 |
| | | Westbound | 1.6 | 65 | 65 | 65 |
| I-880 | Between I-980 and Madison St | Eastbound | 1.4 | 55 | 52 | 52 |
| | | Westbound | 4.1 | 55 | 44 | **45 (+1)** |
| | Between 29th Ave and Fruitvale Ave | Eastbound | 1.6 | 60 | 45 | 45 |
| | | Westbound | 1.3 | 60 | 42 | **43 (+1)** |
| | Between Marina Blvd and I-238 | Eastbound | 2.2 | 60 | 44 | **45 (+1)** |
| | | Westbound | 2.2 | 60 | 50 | 50 |

Source: NPMRDS, 2024 and AlaCC Model, Truck Access Study Custom Scenario, 2020.

### PERSON AND TRUCK HOURS OF DELAY

Passenger hours of delay quantifies how much extra time passengers spend traveling due to congestion or other system inefficiencies. It converts vehicle hours of delay to passenger hours of delay to focus the metric on people rather than vehicles. **Table 26** shows that removing the truck ban could result in a small decrease in passenger hours of delay systemwide. Freeway facilities could experience a negligible net decrease of 130 daily passenger hours of delay, while arterial delay could decrease by 40 daily passenger hours.

While daily passenger hours of delay could increase very slightly on I-580, SR 13 and SR 24 if the ban is removed, passenger hours of delay could decrease on I-880 and I-238. These changes suggest that removing the ban could generate some route choice adjustments but may not meaningfully change total passenger hours of delay within the study area.

**Table 26. Average Daily Passenger-Hours of Delay[1] by Facility Type, Today With Ban and Today No Ban**

| Facility | Today With Ban | Today No Ban | Delta |
|---|---|---|---|
| I-580 | 1,850 | 2,050 | +200 |
| I-880 | 7,450 | 7,100 | -340 |
| I-238 | 660 | 620 | -40 |
| I-580/I-880 Combined | 9,960 | 9,780 | -180 |
| SR 13 | 3,340 | 3,350 | +10 |
| I-980 | 20 | 20 | - |
| SR 24 | 1,360 | 1,400 | +40 |
| All Study Area Freeways | 14,680 | 14,550 | -130 |
| Arterials | 17,990 | 17,950 | -40 |
| Study Area Total | 32,670 | 32,500 | -170 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Note:
1. Passenger hours of delay were estimated based on the following vehicle occupancy factors for each vehicle type: drive alone = 1 passenger/vehicle, shared 2 = 2 passengers/vehicle, shared 3+ = 3.3 passengers/vehicle.

**Table 27** describes systemwide passenger-hours of delay and truck delay by time period. Most current delay occurs in the AM and PM peak periods, regardless of scenario and vehicle type. With the truck ban removed, passenger hours of delay could increase very slightly during the AM peak, but decrease during the midday and PM hours, though all changes are estimated to be modest.

If the ban is lifted, overall truck delay could decline by 100 hours per day, or just over 2 percent. The improvement is concentrated in midday period, with the AM and PM peak period delay unchanged. This suggests lifting the truck ban may result in slightly more efficient routing and better speed/flow conditions during midday. This is reinforced by the fact that truck VMT could shift to higher speed bins as shown previously (**Table 21**).

**Table 27. Passenger-Hours of Delay[1] and Truck Delay by Time of Day, Today With Ban and Today No Ban**

| Time Period | Passenger-Hours Delay | | | Truck Delay | | |
|---|---|---|---|---|---|---|
| | Today With Ban | Today No Ban | Delta | Today With Ban | Today No Ban | Delta |
| Early AM (3 AM – 6 AM) | <50 | <50 | - | <50 | <50 | - |
| AM (6 AM – 10 AM) | 11,700 | 11,800 | +100 | 800 | 800 | - |
| Midday (10 AM – 3 PM) | 6,000 | 5,800 | -200 | 1,200 | 1,100 | -100 |

| Time Period | Passenger-Hours Delay | | | Truck Delay | | |
|---|---|---|---|---|---|---|
| | Today With Ban | Today No Ban | Delta | Today With Ban | Today No Ban | Delta |
| PM (3 PM – 7 PM) | 14,500 | 14,400 | -100 | 2,400 | 2,400 | - |
| Evening (7 PM – 3 AM) | 500 | 500 | - | - | <50 | - |
| *Daily* | ***32,700*** | ***32,500*** | -200 | 4,400 | ***4,300*** | -100 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2020.
Note:

1. Passenger hours of delay were estimated based on the following vehicle occupancy factors for each vehicle type: drive alone = 1 passenger/vehicle, shared 2 = 2 passengers/vehicle, shared 3+ = 3.3 passengers/vehicle. Truck delay was not converted to person delay.

## Baseline Performance Assessment

The baseline performance assessment uses analysis results to assess the impact of removing the truck ban on I-580 against the study's evaluation criteria, as shown in **Table 28** below.

The performance assessment finds that removing the truck ban may not meaningfully change the total amount of truck traffic traveling through the study area on the freeway network. The results show that truck traffic could shift away from I-880 and I-238 towards I-580, but there is no overall increase in volume on these three roadways combined. Overall, this could result in negligible impacts for passenger vehicles with a very slight reduction delay and increases in speed for passenger vehicles on I-880 and I-238 and very slight increases in delay and decreases in speed for passenger vehicles on I-580. Modeled changes on I-580, I-238, and I-880 may be almost imperceptible given the number of vehicles traveling along both routes.

Model results show that heavy truck speeds could increase on study area freeways, and a higher share of heavy trucks could travel at speeds greater than 55 MPH during the AM and PM peaks. While higher speeds indicate improved traffic flow, increased heavy truck speeds could increase the severity of truck-involved freeway collisions, though more focused safety analysis is needed to holistically understand potential changes to collisions.

The performance assessment indicates the potential for more mixed outcomes on local arterials. The model indicates that heavy truck VMT on arterials could increase by 4 percent which could result in higher local roadway maintenance needs and expose local residents more directly to truck traffic.

Finally, the model indicates that removing the truck ban could marginally benefit goods movement as trucks could have greater flexibility to travel on the least congested routes, as reflected by the modeled reduction in truck delay, increased truck speeds, and limited change to truck travel time reliability.

**Table 28. Evaluation of Removing the Ban Today**

| Criteria | Performance Measures | Result of Removing the Ban |
|---|---|---|
| **Amount of heavy truck traffic traveling through the study area** | Heavy truck volumes in the study area | Daily heavy truck volumes may not increase across I-580/I-880/I-238 combined. |
| | Heavy truck VMT in the study area | Daily heavy truck VMT on I-580/I-880/I-238 combined may increase by one percent. |
| Assessment | **May support removing the ban.** Removing the truck ban may not meaningfully change the amount of heavy truck traffic traveling through the study area. | |
| **Exposure to truck traffic on local streets** | Heavy truck volumes on study area arterials | Heavy truck traffic could increase on some arterials (e.g., Hesperian) but could decrease on others (e.g., 7th Street). Increases in volume could be as high as 400 daily heavy trucks. |
| | Heavy truck VMT on study area arterials | Daily heavy truck VMT may increase by 4 percent on study area arterials. |
| Assessment | **May support maintaining the ban.** Removing the truck ban could have a mixed impact on study area arterials. Some arterials could see an increase in heavy trucks while others could see a decrease. | |
| **Frequency and severity of truck collisions on local streets** | Heavy truck VMT on study area arterials | Daily heavy truck VMT may increase by 4 percent on study area arterials, increasing exposure to truck-involved collisions. |
| | Heavy truck speed on study area arterials | The share of heavy truck VMT at speeds greater than 35 MPH could increase by 2 percent, but the share of heavy truck VMT at speeds less than 25 MPH could also increase by 2 percent, making it challenging to determine how changes in truck speed could impact collision severity. |
| Assessment | **May support maintaining the ban.** Removing the truck ban could increase the frequency of truck collisions on local streets. | |
| **Roadway degradation and maintenance costs** | Heavy truck VMT on study area arterials | Daily heavy truck VMT may increase by 4 percent on study area arterials, potentially increasing maintenance costs for local jurisdictions. |
| | Heavy truck VMT on study area freeways | Daily heavy truck VMT may increase substantially on I-580 to almost 80,000 daily vehicle miles. This could increase maintenance costs for Caltrans due to an increased need for repaving on I-580. Total freeway VMT also could increase slightly which may increase total maintenance costs. |
| Assessment | **May support maintaining the ban.** Removing the truck ban could increase VMT on study area arterials and on study area freeways, resulting in increased maintenance needs. | |

| Criteria | Performance Measures | Result of Removing the Ban |
|---|---|---|
| **Travel conditions on study area freeways** | Heavy truck volumes on study area freeways | Daily heavy truck volumes may not increase across I-580/I-880/I-238 combined. |
| | Heavy truck VMT on study area freeways | Daily heavy truck VMT on I-580/I-880/I-238 combined may increase by one percent. |
| | Person hours of delay on study area freeways | There is a minor decrease in daily passenger-hours of delay on study area freeways, although delay could increase on I-580 and decrease on I-880. |
| | Truck Travel Time Reliability | Congested speeds along the most unreliable freeway segments may experience very little change. |
| | Bottleneck throughput on study area freeways | Some bottlenecks could see an increase in passenger car equivalents, while other could see a decrease, although the scale of the change is small (10-125 PCEs per hour). |
| Assessment | **May support removing the ban.** Removing the truck ban may not worsen travel conditions on the study area freeway network. As trucks shift to I-580 travel conditions on I-880 and I-238 could improve while degrading slightly on I-580. | |
| **Frequency and severity of truck collisions on study area freeways** | Heavy truck VMT on study area freeways | Daily heavy truck VMT on I-580/I-880/I-238 combined may increase by 1 percent, increasing exposure to truck-involved collisions. |
| | Heavy truck speed on study area freeways | The share of vehicles traveling 55 MPH or faster could increase during the AM and PM peak periods. The higher kinetic energy associated with increased truck speeds could result in more severe collisions. |
| Assessment | **May support maintaining the ban.** Removing the truck ban could increase the frequency and severity of truck-involved collisions on study area freeways. Further evaluation of safety may be needed to understand how curves and grades on I-580 could impact truck-involved collisions. | |
| **Goods movement efficiency through the study area** | Heavy truck VMT on study area freeways and arterials | Daily heavy truck VMT on I-580/I-880/I-238 combined may increase by 1 percent. |
| | Truck travel time reliability | Congested speeds along the most unreliable freeway segments may experience very little change, with speeds on I-580 remaining faster than I-880. Trucks could also have greater flexibility in route choice and be able to avoid incidents such as collisions that reduce reliability. |
| | Truck delay | Removing the truck ban could reduce truck delay on study area freeways and arterials. |

| Criteria | Performance Measures | Result of Removing the Ban |
|---|---|---|
| Assessment | **May support removing the ban.** Removing the truck ban could improve goods movement efficiency by providing trucks with more route choices, reducing delay and increasing travel time reliability. | |

## Future System Performance

This section of the memo describes the potential traffic impact of removing the truck ban under 2035 conditions. As described under the Scenarios and Assumptions section of this memorandum, the future scenario accounts for baseline household and employment growth, but assumes no other regional policy changes and that transit service provision and roadway capacity are the same in 2035 as they are today.

The same performance measures used to assess Baseline System Performance were estimated for the Future System Performance scenarios. Performance measures should not be compared across the Baseline and Future scenarios, because job and population growth between 2020 and 2035 results in increased congestion in 2035 that alters both truck and vehicle travel patterns.

### 2020–2035 Growth

Households within the study area are forecast to grow by 31 percent, while employment is forecast to grow by 10 percent as shown in **Table 29**, with overall trip activity forecasted to increase by similar rates. This baseline growth could lead to increased congestion within the study area.

**Table 29. Study Area Population, Household and Employment Growth Rate**

| Land Use | Today | 2035 | % growth |
|---|---|---|---|
| Households | 258,900 | 338,200 | 31% |
| Population | 703,200 | 823,200 | 17% |
| Employment | 406,500 | 448,000 | 10% |

Source: AlaCC Model, 2025.

Heavy truck trips could grow within the study area, as a function of population and employment growth and growth at the Oakland Seaport. Overall daily heavy truck activity is forecast to increase by about 15 percent (**Table 30**), with the largest difference in heavy truck volumes concentrated in the midday (+27,500) and PM Periods (+26,600). Heavy truck trips to and from the Oakland Seaport make up about 5 percent of all daily heavy truck trips within the study area.

**Table 30. Study Area Heavy Truck Trip Growth Rate (2020–2035)**

| Time Period | 2020 | Additional trucks by 2035 | Growth Rate |
|---|---|---|---|
| Early AM (3 AM – 6 AM) | 74,600 | + 9,700 | 15% |
| AM (6 AM – 10 AM) | 102,100 | + 13,400 | 15% |
| Midday (10 AM – 3 PM) | 204,700 | + 27,500 | 16% |
| PM (3 PM – 7 PM) | 202,900 | + 26,600 | 15% |

| Time Period | 2020 | Additional trucks by 2035 | Growth Rate |
|---|---|---|---|
| Evening (7 PM – 3 AM) | 74,700 | + 9,800 | 15% |
| ***Daily*** | 659,000 | + 87,000 | 15% |

Source: AlaCC Model, 2025.

Given the expected increase in volumes by 2035 along the clean policy environment future consideration, increased congestion in the study area is expected. Therefore, trucks that have the possibility to avoid the study area altogether (e.g., choosing other routes) could choose alternative routes, resulting in lower volumes on study area freeways. Trucks coming to and from areas within the study, such as the Port of Oakland, have no alternative and would likely remain in the study area.

## Performance Measures

### VOLUMES

Similarly, **Table 31** shows how modeled traffic volumes in 2035 could change if the truck ban is removed. As with the baseline performance assessment, the estimate shown in **Table 31** is an average of the total vehicles traveling on all segments of the identified roads, and is calculated as VMT divided by road miles, and as such, does not represent the actual number of vehicles on any given segment. Differences in roadway length can make it look like there are more vehicles on average, even if the total on any given segment is similar.

Removing the truck ban could result in a shift in heavy truck volumes between I-880/I-238 and I-580, consistent with the baseline scenario. However, as compared to baseline scenario, modeled changes in heavy truck volumes are smaller. This is likely because future scenario is more congested, which results in fewer travel time differences between I-580 and I-880. The change in volume of passenger vehicles and small/medium trucks is minimal, changing by less than 1 percent for each freeway.

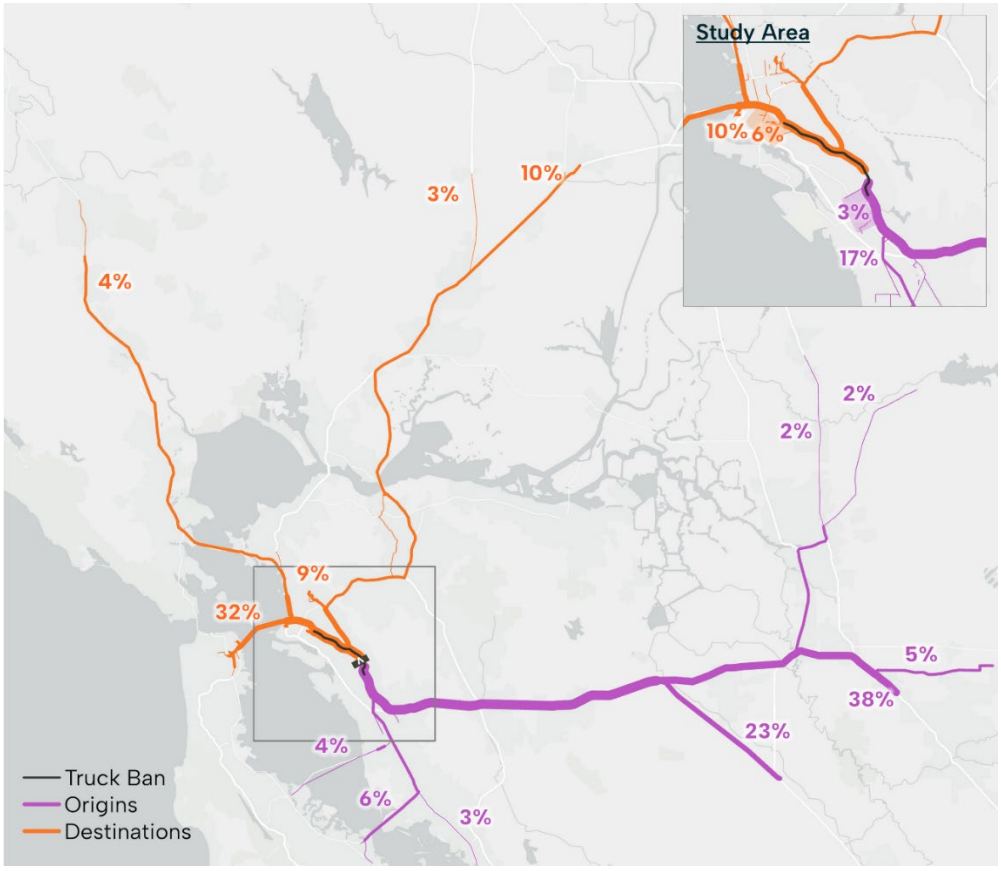
**Table 31. Daily Average Freeway Volumes, Future With Ban and Future No Ban**

| Freeway | Passenger Vehicles | | | Small/Medium Truck | | | Heavy Truck | | |
|---|---|---|---|---|---|---|---|---|---|
| | Future With Ban | Future No Ban | Delta | Future With Ban | Future No Ban | Delta | Future With Ban | Future No Ban | Delta |
| I-580 | 130,000 | 127,700 | **-2,300** | 7,400 | 7,300 | **-100** | 0 | 3,800 | **+3,800** |
| I-880 | 163,100 | 165,700 | **+2,600** | 15,300 | 15,500 | **+200** | 9,300 | 6,200 | **-3,100** |
| I-238 | 87,300 | 88,500 | **+1,200** | 5,000 | 5,100 | **+100** | 6,400 | 2,900 | **-3,500** |
| *I-580/ I-880/I-238* | *140,700* | *140,900* | **+100** | *10,600* | *10,700* | **+100** | *4,700* | *4,800* | **+100** |
| SR 13 | 94,100 | 93,900 | **-200** | 3,400 | 3,300 | **+100** | 300 | 700 | **+400** |
| I-980 | 68,900 | 69,700 | **+800** | 7,500 | 7,500 | - | 800 | 500 | **-300** |
| SR 24 | 119,900 | 120,200 | **+300** | 3,800 | 3,800 | - | 1,800 | 1,700 | **-100** |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Notes:
1. increase, decrease
2. Values shown are rounded to the nearest 100. As a result, calculations based on these values may not exactly match percentage changes described in the text.
Table 32

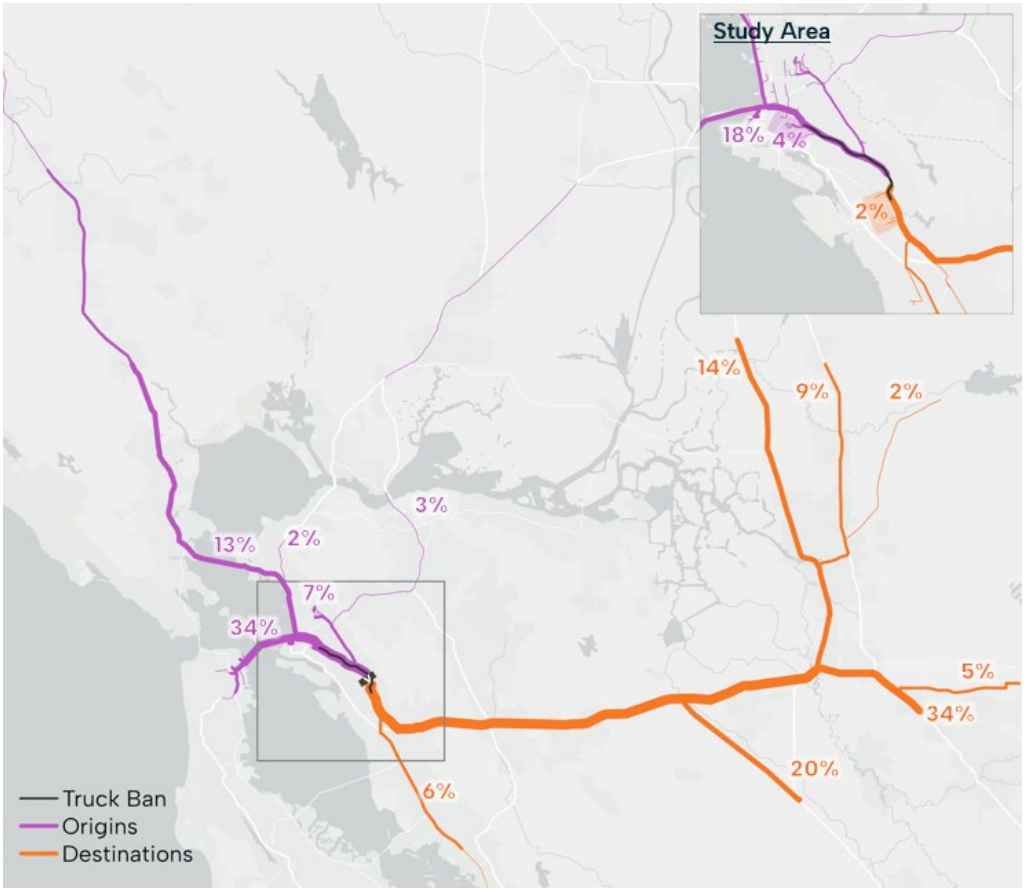
Forecasts suggest that the heavy trucks that could shift from I-880 to I-580 may primarily be pass through trips with an origin and/or destination outside of the study area. As shown in **Figure 37 and Figure 38,** if the ban is removed, over 80 percent of heavy trucks traveling westbound on I-580 and over 90 percent traveling eastbound may have an origin or destination outside the study area.

**Figure 37: Origins and Destinations for Heavy Truck Trips Passing through I-580 in the Westbound Direction**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 38: Origins and Destinations for Heavy Truck Trips Passing through I-580 in the Eastbound Direction**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Table 32** and **Table 33** show the estimated difference in modeled traffic volumes on arterials in the study area with the truck ban removed. Lifting the ban under the 2035 scenario could produce similar changes to heavy truck traffic on arterials as observed under baseline conditions. Truck volumes could increase on arterials including Hesperian Boulevard and 150th Avenue and decrease on 7th Street and Telegraph Avenue. As noted under the baseline performance assessment, the AlaCC model does not account for local policies and projects that could reduce roadway capacity, restrict local truck travel, or otherwise alter local truck travel patterns as compared to model results.

**Table 32. Arterials with Greatest Increase in Daily Heavy Truck Traffic**

| Arterials | Extents | Heavy Truck | | |
|---|---|---|---|---|
| | | Future With Ban | Future No Ban | Delta |
| Hesperian Boulevard | 150th Avenue to I-880 | 40 | 300 | +260 |
| 150th Avenue | Hesperian Boulevard to Foothill Boulevard | 100 | 320 | +220 |
| Tunnel Road (CA 13) | Domingo Avenue to Hiller Drive | 120 | 320 | +200 |
| Grand Avenue | Harrison Street to I-580 | 20 | 160 | +140 |

| Arterials | Extents | Heavy Truck | | |
|---|---|---|---|---|
| | | Future With Ban | Future No Ban | Delta |
| Ashby Avenue (CA 13) | Colby Street to Domingo Avenue | 90 | 220 | +130 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Notes: increase, decrease

**Table 33: Arterials with Greatest Decrease in Heavy Truck Traffic**

| Arterials | Extents | Heavy Truck | | |
|---|---|---|---|---|
| | | Future With Ban | Future No Ban | Delta |
| 7th Street | Maritime Street to I-880 | 3410 | 3110 | -300 |
| Telegraph Avenue | Woolsey Street to 61st Street | 430 | 290 | -140 |
| East 14th Street | Maud Avenue to 150th Avenue | 150 | 50 | -100 |

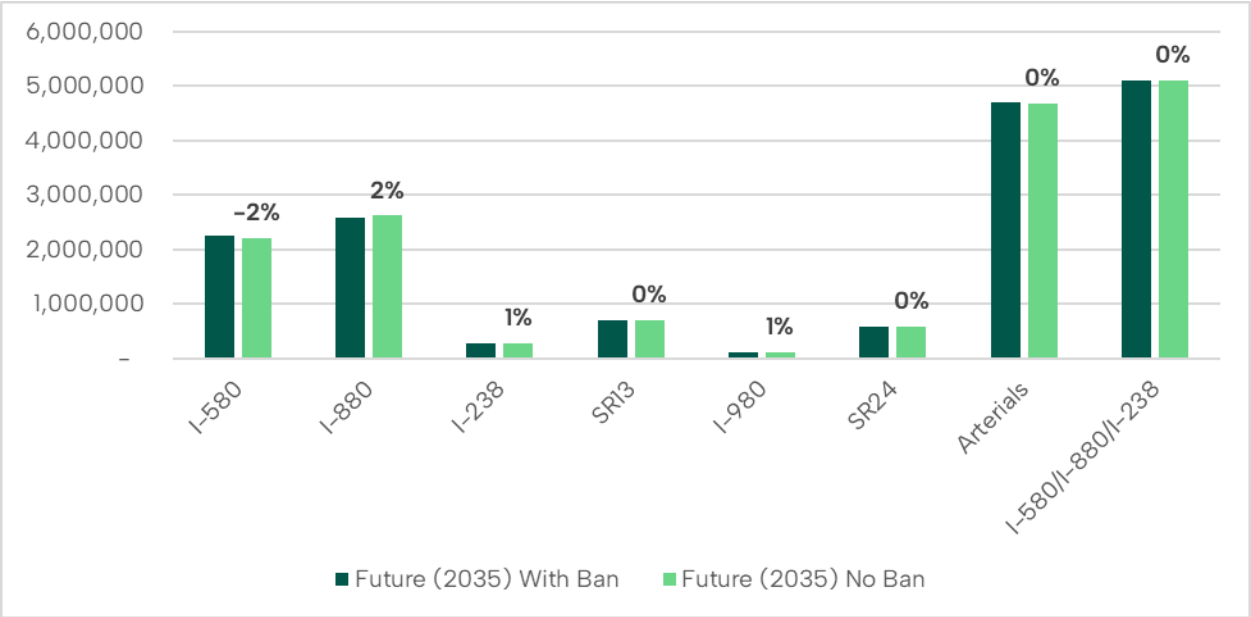
Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Notes: increase, decrease

## VEHICLES MILED TRAVELED

**Figure 39** through **Figure 41** summarize estimated daily VMT for study area freeways and arterials across passenger vehicles, small/medium trucks, and heavy trucks in 2035. Consistent with the baseline scenario, if the truck ban on I-580 is removed, heavy truck VMT could be redistributed from I-880/I-238 to I-580. As shown in **Figure 41**, VMT across I-580/I-880/I-238 could increase by 2 percent overall.

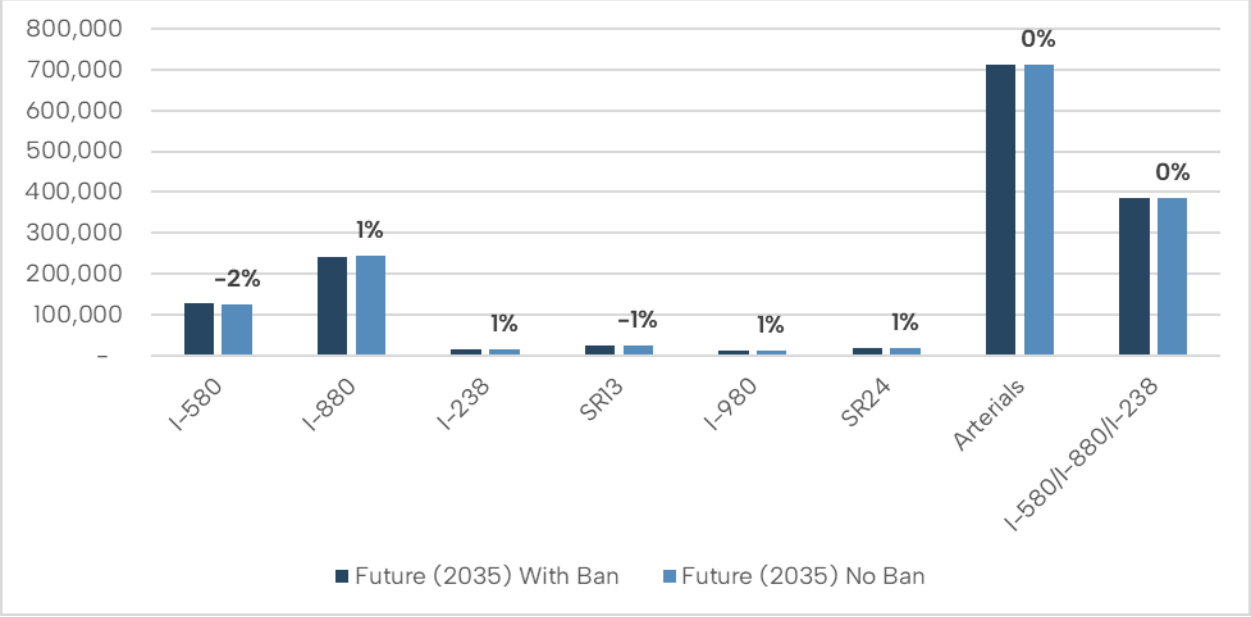
A detailed breakdown of potential changes to truck VMT by facility type and vehicle class can be found in **Appendix A**.

**Figure 39. Daily Passenger Vehicle VMT by Facility Type, Future With Ban and Future No Ban**



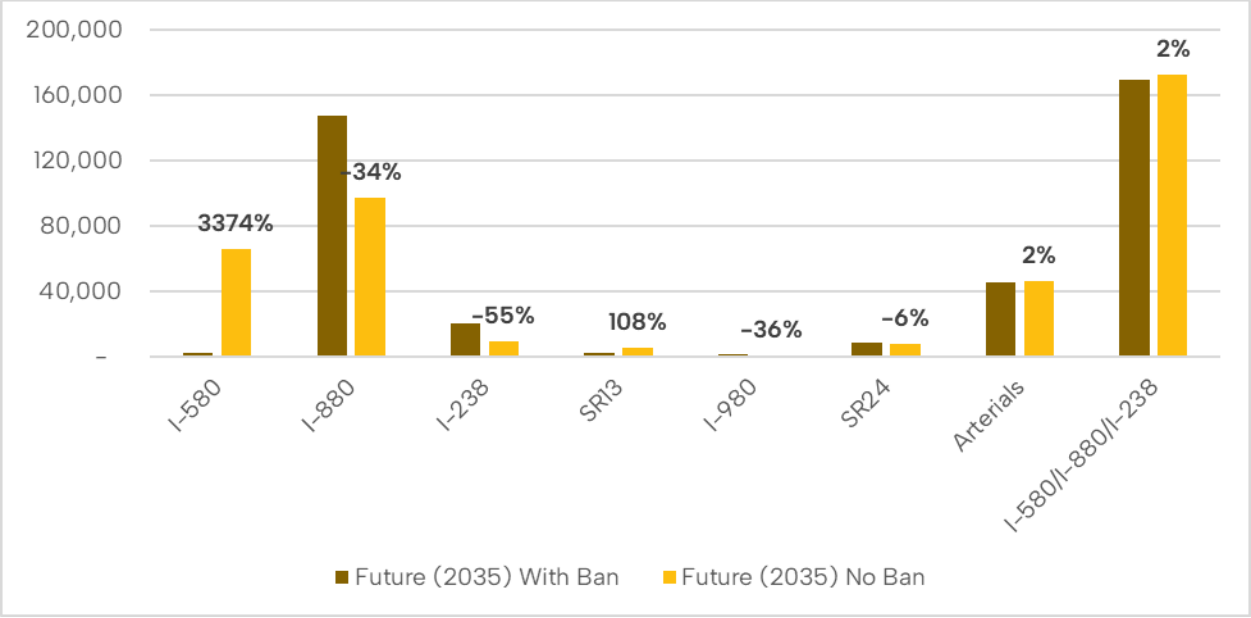

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 40. Daily Small and Medium Truck VMT by Facility Type, Future With Ban and Future No Ban**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 41. Daily Heavy Truck VMT by Facility Type, Future With Ban and Future No Ban**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

### SPEEDS

A summary of VMT by speed bin for all modeled vehicle classes for the AM and PM peak periods is presented in **Table** 34 and **Table 35**, respectively. Speed bins that could see an increase of more than 1 percent of VMT with the truck ban removed are highlighted in **green**, while speed bins that could see a decrease of more than 1 percent of VMT are highlighted in **yellow**.

Consistent with the baseline scenario, heavy trucks could travel at increased speeds with the truck ban removed; there could be a 15-percentage point increase in trucks travelling at speeds above 55MPH. This is slightly lower than the 18-percentage point increase shown in the baseline scenario for today, likely due to the overall increase in congestion expected in the future. Speeds were extracted from the

The estimated change in heavy trucks traveling at speeds greater than 35 MPH on arterials may be negligible, with no estimated changes of over 1 percentage point.

**Table 34. Daily Freeway VMT by Speed Bin, Future With and Without the Truck Ban**

| Speed Bins (mph) | Passenger Vehicles | | Small/ Medium Trucks | | Heavy Trucks | | Total Volumes | |
|---|---|---|---|---|---|---|---|---|
| | Future With Ban | Future No Ban | Future With Ban | Future No Ban | Future With Ban | Future No Ban | Future With Ban | Future No Ban |
| <30 | 4% | 4% | 4% | 4% | 4% | 3% | 4% | 4% |
| 35-40 | 3% | 2% | 3% | 3% | 3% | 2% | 3% | 2% |
| 40-45 | 6% | 6% | 7% | 7% | 8% | 5% | 6% | 6% |
| 45-50 | 9% | 8% | 11% | 9% | 12% | 7% | 10% | 8% |

| Speed Bins (mph) | Passenger Vehicles | | Small/ Medium Trucks | | Heavy Trucks | | Total Volumes | |
|---|---|---|---|---|---|---|---|---|
| | Future With Ban | Future No Ban | Future With Ban | Future No Ban | Future With Ban | Future No Ban | Future With Ban | Future No Ban |
| 50-55 | 21% | 22% | 25% | 26% | 27% | 22% | 22% | 23% |
| 55-60 | 31% | 32% | 30% | 32% | 24% | 34% | 31% | 32% |
| 60-65 | 26% | 26% | 20% | 19% | 22% | 27% | 25% | 25% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Notes: >1 percentage point increase, > 1 percentage point decrease

**Table 35. Daily Arterial VMT by Speed Bin, Future With and Without the Truck Ban**

| Speed Bins (mph) | Passenger Vehicles | | Small/ Medium Trucks | | Heavy Trucks | | Total Volumes | |
|---|---|---|---|---|---|---|---|---|
| | Future With Ban | Future No Ban | Future With Ban | Future No Ban | Future With Ban | Future No Ban | Future With Ban | Future No Ban |
| <25 | 19% | 19% | 23% | 24% | 14% | 15% | 19% | 19% |
| 25-30 | 26% | 26% | 27% | 26% | 21% | 20% | 26% | 26% |
| 30-35 | 45% | 45% | 43% | 43% | 57% | 56% | 45% | 45% |
| 35-40 | 6% | 6% | 3% | 3% | 7% | 8% | 6% | 6% |
| 40-45 | 2% | 2% | 2% | 2% | 1% | 1% | 2% | 2% |
| 45-50 | 1% | 1% | 1% | 1% | 0% | 0% | 1% | 1% |
| 50-55 | 1% | 1% | 1% | 1% | 0% | 0% | 1% | 1% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Notes: increase, decrease

### BOTTLENECK THROUGHPUT

The potential effects of removing the truck ban on study area bottlenecks are summarized in **Table 36** and **Table 37** for the AM and PM peak periods respectively. No new bottlenecks are estimated to be formed in the study area from removing the truck ban under future conditions. During the AM and PM peak periods, additional passenger car equivalents could pass through the Bay Bridge approach bottleneck on I-80 westbound and I-580 westbound, and the I-580 interchange with Lakeshore Avenue and West Grand Avenue. The scale of changes in both the AM and PM periods is estimated to be small, ranging from 10 to 80 average additional vehicles per hour.

**Table 36. Changes in Throughput in Study Area Bottlenecks, Future With and Without the Truck Ban (AM Peak Period, 6 AM – 10 AM)**

| Study Area Bottlenecks | | | Future with and Without Ban Delta | | | |
|---|---|---|---|---|---|---|
| Bottleneck | Roadway | From | Passenger Vehicle Volume[1] | Small/Medium Truck Volume[1] | Heavy Truck Volume[1] | PCE[2] |
| I-880/I-238 merge | I-238 WB | I-580 | +50 | <20 | -140 | -220 |
| Bay Bridge Toll Plaza | I-80 WB[3] | Ashby Ave (SR 13) | +320 | <20 | <20 | +330 |
| | I-580 WB | SR-24/I-980 | +100 | <20 | +110 | +320 |
| | I-880 NB | West Grand Ave | +35 | <20 | -70 | -110 |
| I-580 at Lakeshore Ave | I-580 WB | Coolidge Avenue | -170 | <20 | +140 | +110 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Note:
1. Volumes reflect the total across a 4-hour period.
2. Passenger car equivalent values were estimated based on the following factors for each vehicle type: passenger vehicle = 1 PCE, small and medium trucks = 1 PCE, heavy trucks = 2 PCE, based on the AlaCC Model specification.
3. This segment is signed as I-80 westbound and I-580 eastbound

**Table 37. Changes in Throughput in Study Area Bottlenecks, Future With and Without the Truck Ban (PM Peak Period, 3 PM – 7 PM)**

| Study Area Bottlenecks | | | Future with and Without Ban Delta | | | |
|---|---|---|---|---|---|---|
| Bottleneck | Roadway | From | Passenger Vehicle Volume[1] | Small/Medium Truck Volume[1] | Heavy Truck Volume[1] | PCE[2] |
| I-880/I-238 merge | I-238 WB | I-580 | -200 | <20 | -320 | -830 |
| Bay Bridge Toll Plaza | I-80 WB[3] | Ashby Ave (SR 13) | -20 | <20 | +20 | +30 |
| | I-580 WB | SR-24/I-980 | -240 | <20 | +280 | +300 |
| | I-880 NB | West Grand Ave | +220 | <20 | -190 | -140 |
| I-580 at Lakeshore Ave | I-580 WB | Coolidge Avenue | -370 | <20 | +340 | +300 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Note:
1. Volumes reflect the total across a 4-hour period.
2. Passenger car equivalent values were estimated based on the following factors for each vehicle type: passenger vehicle = 1 PCE, small and medium trucks = 1 PCE, heavy trucks = 2 PCE, based on the AlaCC Model specification.
3. This segment is signed as I-80 westbound and I-580 eastbound

### TRUCK TRAVEL TIME RELIABILITY INDEX

As described earlier under baseline performance measures, given that travel demand models cannot provide accurate information for calculating TTTR index, congested speeds are used as a proxy measure to evaluate how reliability could change if the truck ban is removed. Consistent with findings from the baseline scenario, **Table 38** shows that removing the truck ban could result in minimal changes to congested speeds on freeways within the study area, with a potential small increase in speeds on two segments of I-880. However, the most unreliable segments on I-880 may remain virtually unchanged. Congested speeds on I-580 could remain the same under a no ban scenario, except for the most unreliable segment (TTR > 4) where congested speeds decrease slightly. Overall, congested speeds on I-580 may remain faster than I-880 with the truck ban removed.

**Table 38. Change in Contested Speeds for Freeway Segments with Lowest Travel Time Reliability, Future With and Without Ban**

| Segment | Extents | Direction | Travel Time Reliability | Free Flow Speeds (mph) | PM Peak Period Congested Speeds in 2035 (mph) | |
|---|---|---|---|---|---|---|
| | | | | | With Ban | Without Ban |
| I-580 | Between SR 24 and Broadway | Eastbound | 4.4 | 55 | 44 | 43 (-1) |
| | | Westbound | 2.4 | 55 | 51 | 51 |
| | Between High St and SR 13 | Eastbound | 3.0 | 65 | 64 | 64 |
| | | Westbound | 1.4 | 65 | 65 | 65 |
| | Between Miramar Ave and I-238 | Eastbound | 1.8 | 60 | 55 | 55 |
| | | Westbound | 1.6 | 65 | 64 | 64 |
| I-880 | Between I-980 and Madison St | Eastbound | 1.4 | 55 | 52 | 52 |
| | | Westbound | 4.1 | 55 | 44 | 44 |
| | Between 29th Ave and Fruitvale Ave | Eastbound | 1.6 | 60 | 43 | 44 (+1) |
| | | Westbound | 1.3 | 60 | 39 | 39 |
| | Between Marina Blvd and I-238 | Eastbound | 2.2 | 60 | 40 | 41 (+1) |
| | | Westbound | 2.2 | 60 | 51 | 51 |

Source: NPMRDS, 2024 and AlaCC Model, Truck Access Study Custom Scenario, 2035.

### PERSON AND TRUCK HOURS OF DELAY

**Table 39** shows that removing the ban could result in a small decrease in passenger hours of systemwide delay, across all facilities. The one exception is on the I-580 corridor, which could experience a minor increase of 200 passenger hours of delay when the ban is removed. Meanwhile, **Table 40** shows that passenger hours of delay could decrease across all time periods for all vehicle types when the truck ban is removed.

**Table 39. Average Daily Passenger-Hours of Delay by Facility Type, Future With Ban and Future No Ban**

| Facility | Future With Ban | Future No Ban | Delta |
|---|---|---|---|
| I-580 | 3,000 | 3,200 | +200 |
| I-880 | 10,400 | 10,100 | -300 |
| I-238 | 1,000 | 900 | -100 |
| I-580/I-880/I-238 Combined | 14,400 | 14,200 | -200 |
| SR 13 | 4,300 | 4,300 | - |
| I-980 | <50 | <50 | - |
| SR 24 | 1,600 | 1,600 | - |
| All Study Area Freeways | 20,300 | 20,100 | -200 |
| Arterials | 26,100 | 25,900 | -200 |
| Study Area Total | 46,400 | 46,100 | -300 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Table 40. Average Passenger Hours of Delay and Truck Delay by Time of Day, Future With Ban and Future No Ban**

| Time Period | Passenger-Hours Delay | | | Truck Delay | | |
|---|---|---|---|---|---|---|
| | Future With Ban | Future No Ban | Delta | Future With Ban | Future No Ban | Delta |
| Early AM (3 AM – 6 AM) | <50 | <50 | - | <50 | <50 | - |
| AM (6 AM – 10 AM) | 17,100 | 17,100 | - | 800 | 700 | -100 |
| Midday (10 AM – 3 PM) | 8,300 | 8,100 | -200 | 1,100 | 1,000 | -100 |
| PM (3 PM – 7 PM) | 20,600 | 20,300 | -300 | 2,100 | 2,000 | -100 |
| Evening (7 PM – 3 AM) | 600 | 600 | - | <50 | <50 | - |
| ***Daily*** | ***46,600*** | ***46,100*** | -500 | ***4,000*** | ***3,700*** | -300 |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

## Future Performance Assessment (2035)

**Table 41** summarizes the future performance assessment based on the analysis results presented under the Future System Performance section of this memo.

The performance assessment for the future scenarios does not reveal any additional considerations compared to the baseline assessment. Overall, removing the truck ban may not meaningfully change the total amount of truck traffic traveling through the study area on the freeway network. The future assessment results continue to show:

- Truck traffic could shift away from I-880 and I-238 towards I-580, potentially resulting in reduced delay and faster travel speeds for passenger vehicles on I-880 and I-238 but negligible changes to traffic flow for passenger vehicles on I-580.
- The potential for increased speeds on study area freeways, which could see a higher share of vehicles traveling at speeds greater than 55 MPH during the AM and PM peaks, potentially increasing the severity of truck-involved freeway collisions, though more focused safety analysis is needed to holistically understand potential changes to collisions.
- Mixed outcomes on local arterials, which could see an increase of heavy truck VMT of 4 percent across the study area. This could increase local roadway maintenance needs particularly on arterials like Hesperian Boulevard, 150th Street, and Tunnel Road where increases in truck volumes are modeled.
- Potential benefits to goods movement as trucks could have greater flexibility to travel on the least congested routes, as reflected by the modeled reduction in truck delay.

**Table 41. Evaluation of Removing the Ban under the Future Scenario (2035)**

| Criteria | Performance Measures | Result of Removing the Ban |
|---|---|---|
| **Amount of heavy truck traffic traveling through the study area** | Heavy truck volumes in the study area | Daily heavy truck volumes could increase by 100 daily trucks across I-580/I-880/I-238 combined. |
| | Heavy truck VMT in the study area | Daily heavy truck VMT on I-580/I-880/I-238 combined could increase by 2 percent. |
| Assessment | **May support removing the ban.** Removing the truck ban may not meaningfully change the amount of heavy truck traffic traveling through the study area. | |
| **Exposure to truck traffic on local streets** | Heavy truck volumes on study area arterials | Heavy truck traffic could increase on some arterials (e.g., Hesperian) but decreases on others (e.g., Telegraph). Increases in volume could be as high as 270 daily heavy trucks. |
| | Heavy truck VMT on study area arterials | Daily heavy truck VMT could increase by 2 percent on study area arterials |
| Assessment | **May support maintaining the ban.** Removing the truck ban may have a mixed impact on study area arterials. Some arterials could see an increase in heavy while others could see a decrease. | |

| Criteria | Performance Measures | Result of Removing the Ban |
|---|---|---|
| **Frequency and severity of truck collisions on local streets** | Heavy truck VMT on study area arterials | Daily heavy truck VMT could increase by 2 percent on study area arterials, increasing exposure to truck-involved collisions. |
| | Heavy truck speed on study area arterials | The share of trucks traveling at speeds greater than 35 percent may be negligible (1 percent), making it challenging to determine how changes in truck speed could impact collision severity. |
| Assessment | **May support maintaining the ban.** Removing the truck ban could increase the frequency of truck collisions on local streets. | |
| **Roadway degradation and maintenance costs** | Heavy truck VMT on study area arterials | Daily heavy truck VMT could increase by 2 percent on study area arterials, potentially increasing maintenance costs for local jurisdictions |
| | Heavy truck VMT on study area freeways | Daily heavy truck VMT could increase on I-580 to almost 65,000 daily miles. This could increase maintenance costs for Caltrans due to an increased need for repaving on I-580. Total freeway VMT also increases slightly which may increase total maintenance costs. |
| Assessment | **May support maintaining the ban.** Removing the truck ban may increase truck VMT on study area arterials and on study area freeways, which could result in increased wear and tear and maintenance needs. | |
| **Travel conditions on study area freeways** | Heavy truck volumes on study area freeways | Daily heavy truck volumes could increase by 100 daily trucks across I-580/I-880/I-238 combined. |
| | Heavy truck VMT on study area freeways | Daily Heavy truck VMT on I-580/I-880/I-238 may increase by 2 percent. |
| | Person hours of delay on study area freeways | There could be a minor decrease in daily passenger-hours of delay on study area freeways, although delay increases on I-580 and decreases on I-880. |
| | Truck Travel Time Reliability | Congested speeds along the most unreliable freeway segments may experience very little change. |
| | Bottleneck throughput on study area freeways | With the truck ban removed, some bottlenecks could see an increase in passenger car equivalents passing through, while others could see a decrease, although the scale of the change may be small (10-80 PCEs per hour) |
| Assessment | **May support removing the ban.** Removing the truck ban may not worsen travel conditions on the study area freeway network. As trucks shift to I-580, travel conditions could improve on I-880 and I-238 while travel conditions may slightly degrade on I-580. | |

| Criteria | Performance Measures | Result of Removing the Ban |
|---|---|---|
| **Frequency and severity of truck collisions on study area freeways** | Heavy truck VMT on study area freeways | Daily heavy truck VMT on I-580/I-880/I-238 combined could increase by 2 percent, increasing exposure to truck-involved collisions. |
| | Heavy truck speed on study area freeways | The share of vehicles traveling 55 MPH or faster could increase during the AM and PM peak periods. The higher kinetic energy associated with increased truck speeds could result in more severe collisions. |
| Assessment | **May support maintaining the ban.** Removing the truck ban could increase the frequency and severity of truck-involved collisions on study area freeways. Further evaluation of safety may be needed to understand how curves and grades on I-580 could impact truck-involved collisions. | |
| **Goods movement efficiency through the study area** | Heavy truck VMT on study area freeways and arterials | Daily heavy truck VMT on I-580/I-880/I-238 combined may increase by 2 percent. |
| | Truck travel time reliability | Congested speeds along the most unreliable freeway segments may experience very little change. |
| | Truck delay | Removing the truck ban could reduce truck delay across the study area |
| | Access to truck parking | Trucks may have to travel farther to access truck parking, since there are no parking facilities adjacent to I-580 |
| Assessment | **May support removing the ban.** Removing the truck ban could improve goods movement efficiency by providing trucks with more route choices which reduces delay and increases travel time reliability, although new truck parking and rest locations may be needed | |

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# Appendix A

**Table A.1. Daily VMT by Facility Type (Freeway vs Arterial), Today With and Without Ban**

| | Existing With Ban | | | | Existing No Ban | | | | Delta (Existing With Ban vs Existing No Ban) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Passenger Vehicles | Small/ Medium Truck | Heavy Truck | Total | Passenger Vehicles | Small/ Medium Truck | Heavy Truck | Total | Passenger Vehicles | Small/ Medium Truck | Heavy Truck | Total |
| **I-580** | 1,942,400 | 285,500 | 1,900 | 2,229,800 | 1,905,300 | 279,000 | 77,200 | 2,261,500 | -37,100 | -6,500 | 75,300 | 31,700 |
| **I-880** | 2,207,800 | 475,800 | 168,700 | 2,852,300 | 2,251,800 | 484,900 | 109,200 | 2,845,900 | 44,000 | 9,100 | -59,500 | -6,400 |
| **I-238** | 236,500 | 34,000 | 23,500 | 294,000 | 241,100 | 34,600 | 10,400 | 286,100 | 4,600 | 600 | -13,100 | -7,900 |
| **I-580, I-880 & I-238 Combined** | **4,386,700** | **795,300** | **194,100** | **5,376,100** | **4,398,200** | **798,500** | **196,800** | **5,393,500** | **11,500** | **3,200** | **2,700** | **17,400** |
| **SR 13** | 638,500 | 50,400 | 2,900 | 691,800 | 634,400 | 49,400 | 6,900 | 690,700 | -4,100 | -1,000 | 4,000 | -1,100 |
| **I-980** | 103,100 | 21,300 | 1,600 | 126,000 | 104,600 | 21,700 | 1,000 | 127,300 | 1,500 | 400 | -600 | 1,300 |
| **SR 24** | 519,700 | 34,500 | 9,400 | 563,600 | 521,800 | 34,800 | 8,500 | 565,100 | 2,100 | 300 | -900 | 1,500 |
| **Arterials** | 4,088,800 | 765,100 | 41,300 | 4,895,200 | 4,081,700 | 763,600 | 42,800 | 4,888,100 | -7,100 | -1,500 | 1,500 | -7,100 |
| **Study Area** | 9,736,800 | 1,666,600 | 249,300 | 11,652,700 | 9,740,700 | 1,668,000 | 256,000 | 11,664,700 | 3,900 | 1,400 | 6,700 | 12,000 |

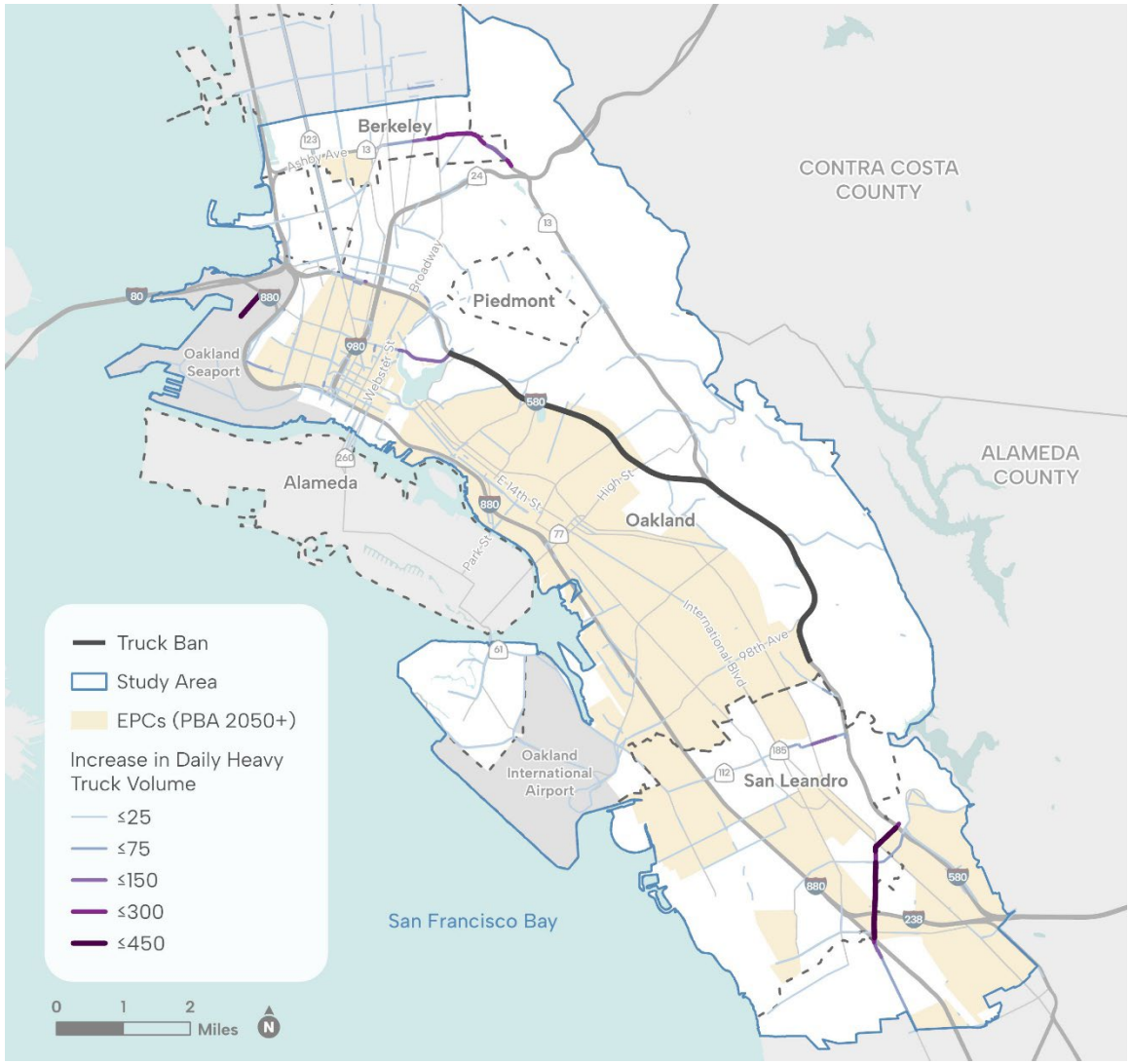
Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Table A.2. VMT by Facility Type (Freeway vs Arterial), Future (2035) With Ban and Without Ban**

| | Future With Ban | | | | Future No Ban | | | | Delta (Future With Ban vs Future No Ban) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Passenger Vehicles | Small/ Medium Truck | Heavy Truck | Total | Passenger Vehicles | Small/ Medium Truck | Heavy Truck | Total | Passenger Vehicles | Small/ Medium Truck | Heavy Truck | Total |
| **I-580** | 2,246,100 | 127,600 | 1,900 | 2,375,600 | 2,206,500 | 125,400 | 66,000 | 2,397,900 | -39,600 | -2,200 | 64,100 | 22,300 |
| **I-880** | 2,580,500 | 241,800 | 147,600 | 2,969,900 | 2,621,300 | 244,700 | 97,500 | 2,963,500 | 40,800 | 2,900 | -50,100 | -6,400 |
| **I-238** | 276,700 | 16,000 | 20,200 | 312,900 | 280,200 | 16,200 | 9,100 | 305,500 | 3,500 | 200 | -11,100 | -7,400 |
| **I-580, I-880 & I-238 Combined** | ***5,103,300*** | ***385,400*** | ***169,700*** | ***5,658,400*** | ***5,108,000*** | ***386,300*** | ***172,600*** | ***5,666,900*** | 4,700 | 900 | 2,900 | 8,500 |
| **SR 13** | 702,500 | 25,200 | 2,500 | 730,200 | 700,800 | 24,900 | 5,200 | 730,900 | -1,700 | -300 | 2,700 | 700 |
| **I-980** | 118,800 | 12,900 | 1,400 | 133,100 | 120,200 | 13,000 | 900 | 134,100 | 1,400 | 100 | -500 | 1,000 |
| **SR 24** | 576,800 | 18,200 | 8,600 | 603,600 | 578,000 | 18,300 | 8,100 | 604,400 | 1,200 | 100 | -500 | 800 |
| **Arterials** | 4,693,700 | 712,100 | 45,700 | 5,451,500 | 4,688,900 | 711,800 | 46,400 | 5,447,100 | -4,800 | -300 | 700 | -4,400 |
| **Study Area** | 11,195,100 | 1,153,800 | 227,900 | 12,576,800 | 11,195,900 | 1,154,300 | 233,200 | 12,583,400 | 800 | 500 | 5,300 | 6,600 |

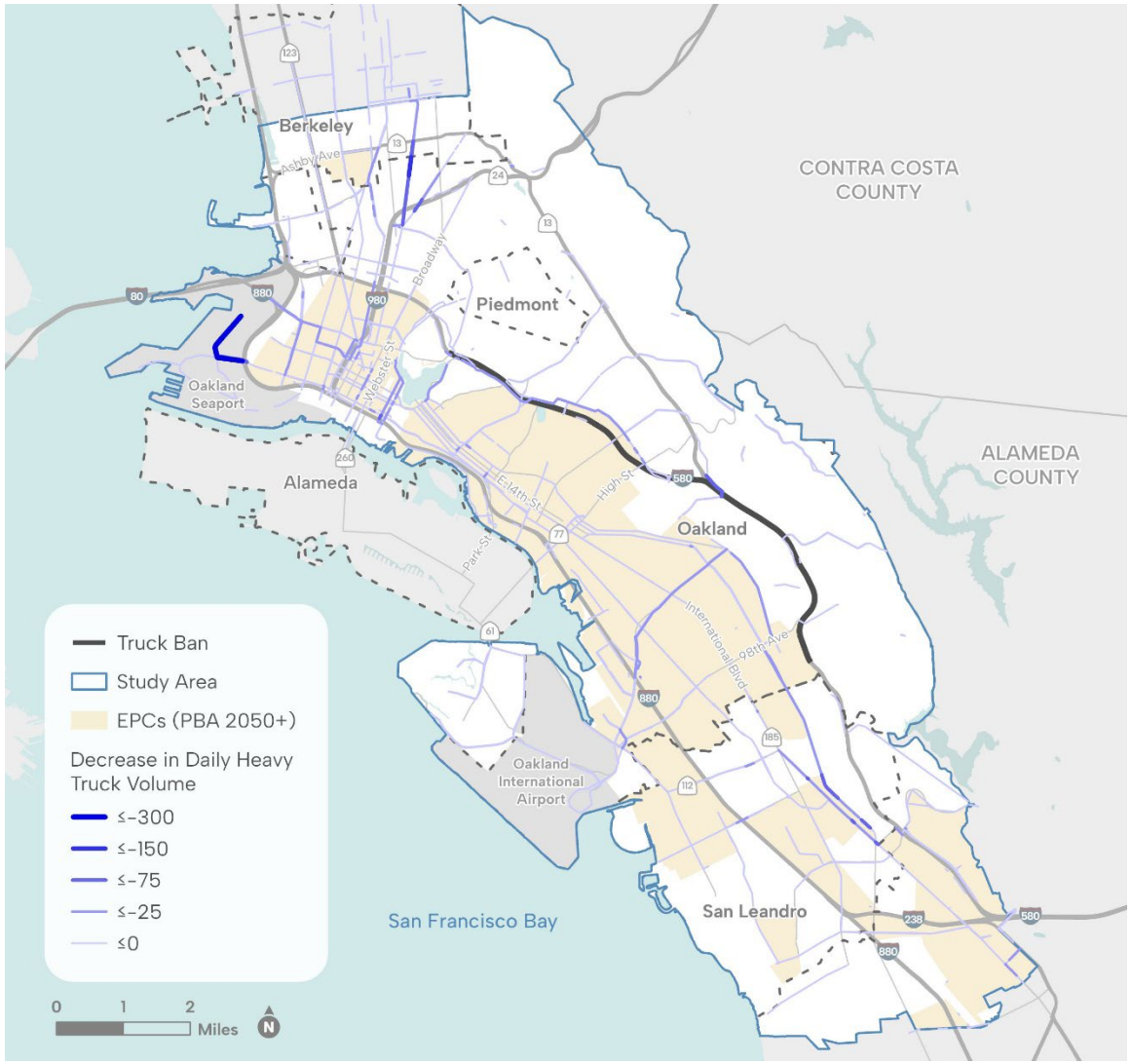
Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 42: Increase in Daily Heavy Truck Volume on Arterials in Baseline Scenario**



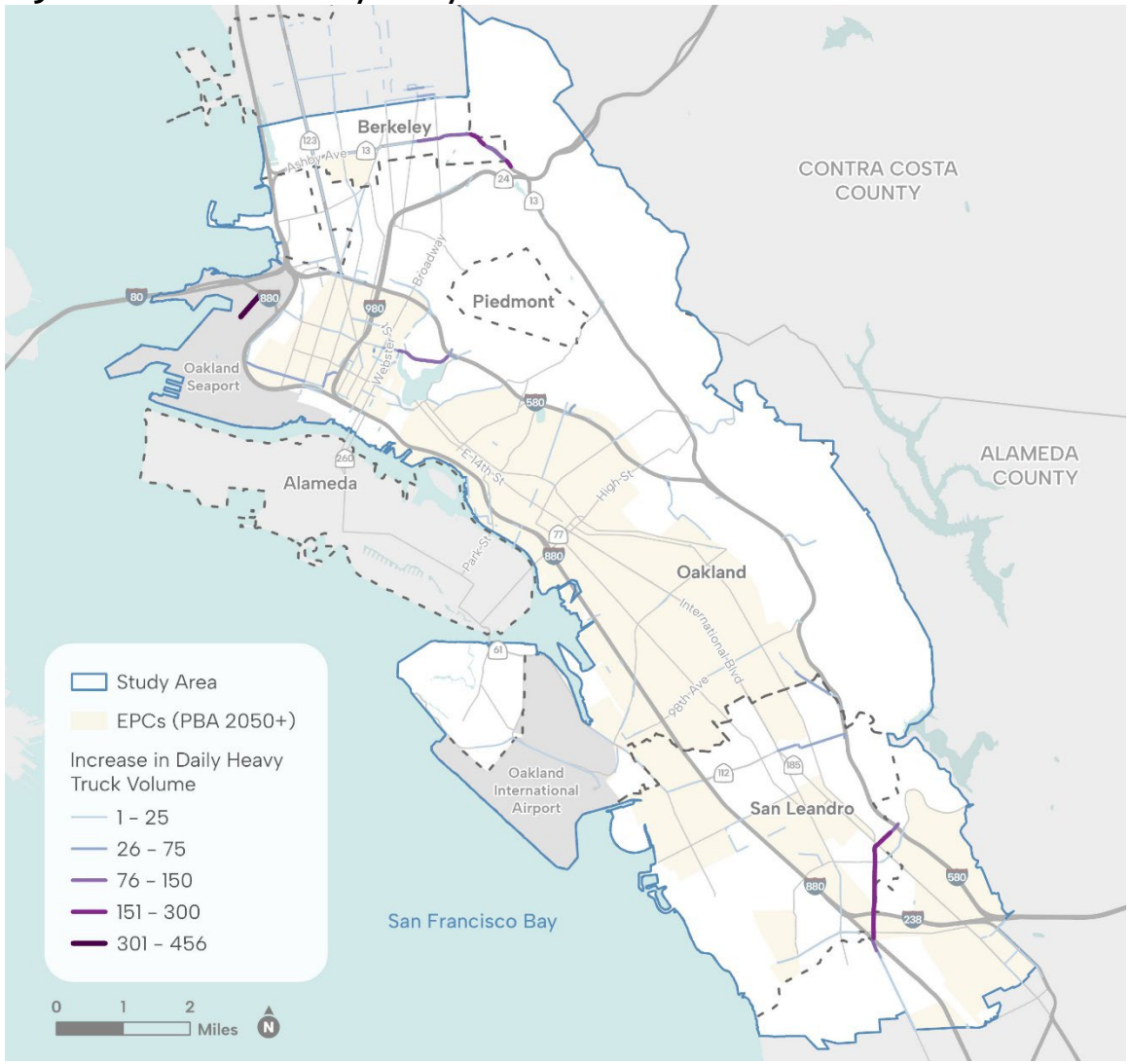

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 43: Decrease in Daily Heavy Truck Volume on Arterials in Baseline Scenario**



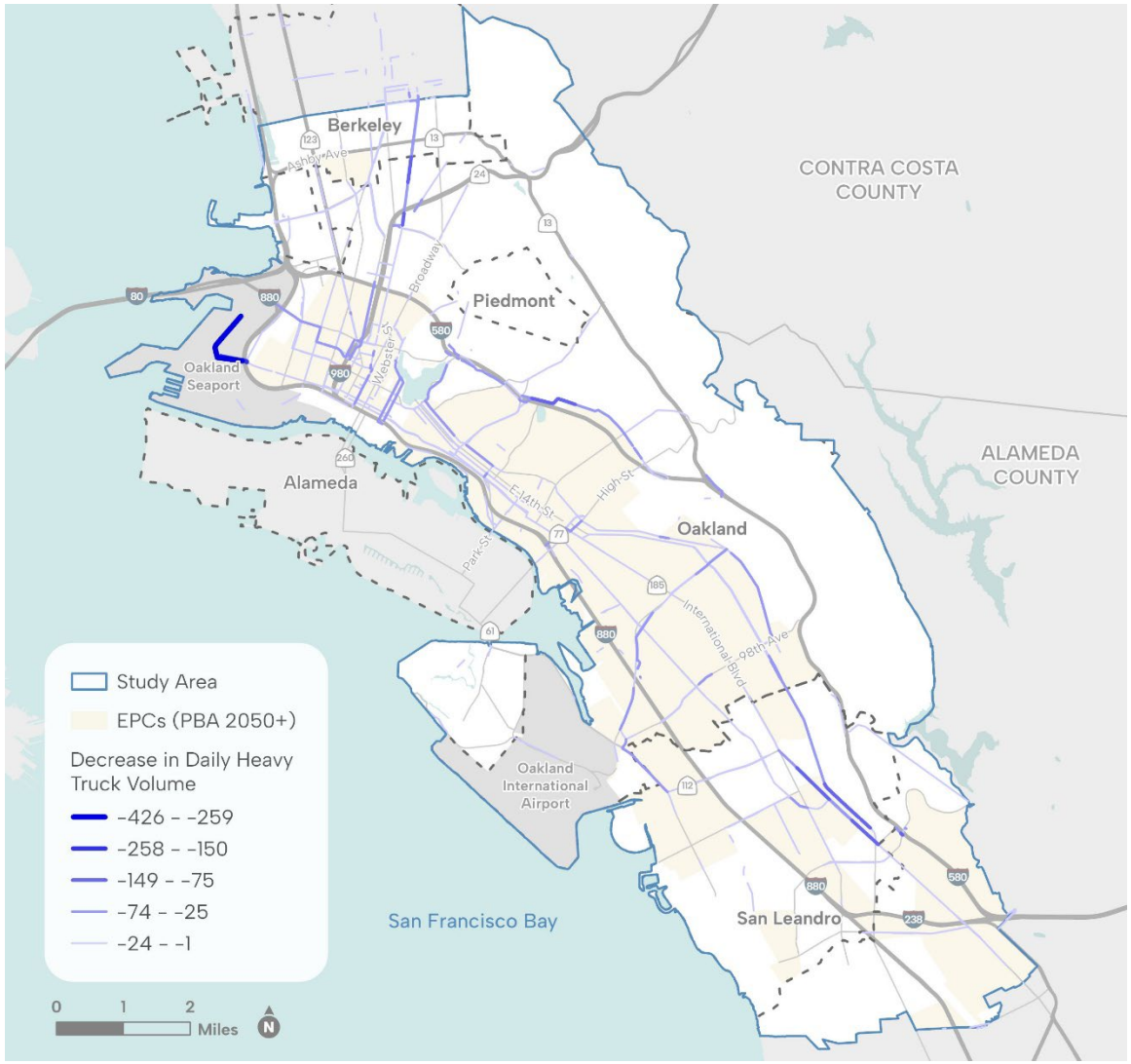

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 44: Increase in Daily Heavy Truck Volume on Arterials in Future Scenario**



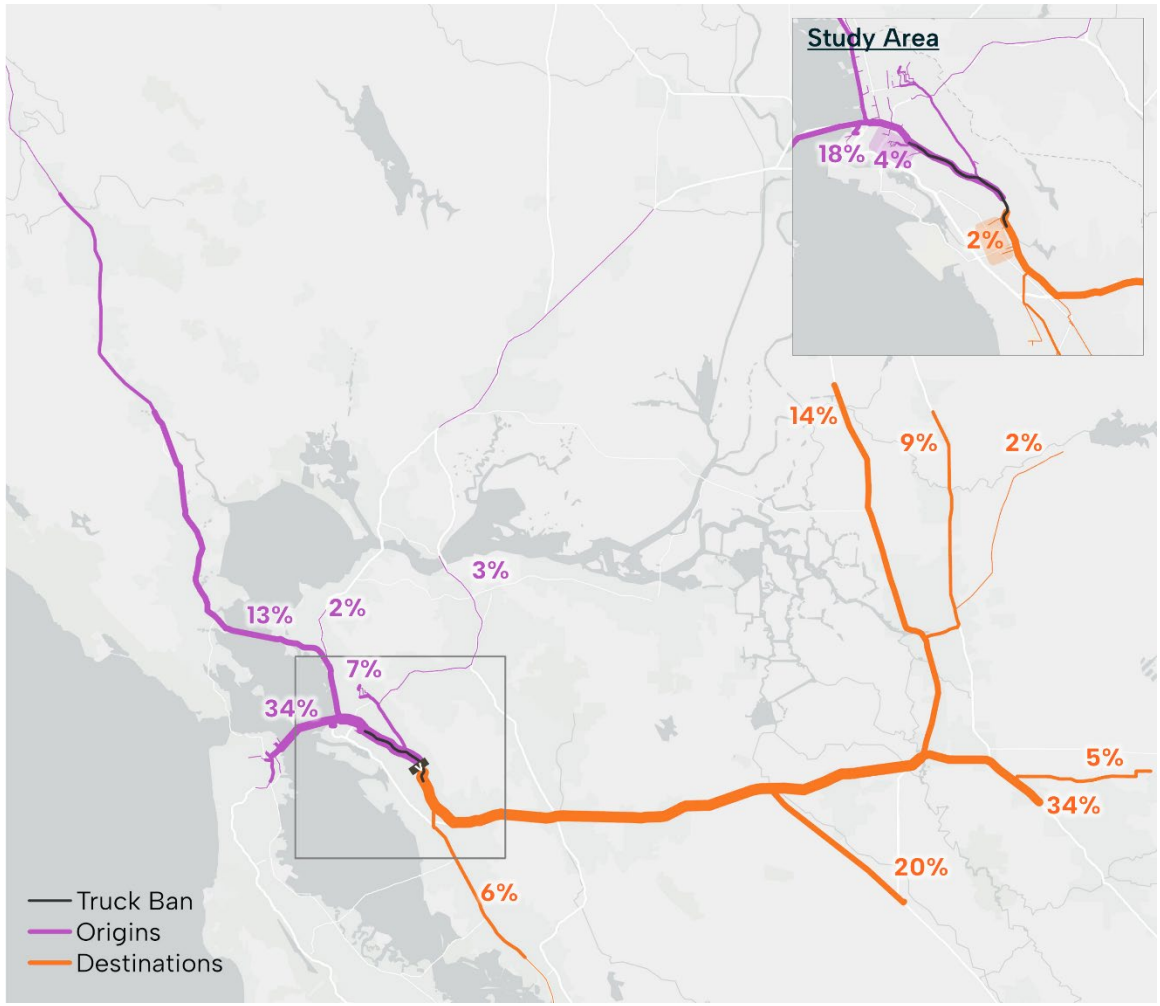

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 45: Decrease in Daily Heavy Truck Volume on Arterials in Future Scenario**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 46: I-580 Eastbound Passthrough Trips in Future No Ban Scenario**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Notes: Origins and destinations with less than 2% of truck tricks not shown.

**Table 42: Origins for Trucks Passing through I-580 in Eastbound Direction**

| Origins | Share of Truck Trips |
|---|---|
| Local origins | 22% |
| San Francisco and Peninsula through Bay Bridge | 34% |
| North Bay through I-580 eastbound | 15% |
| Northern Alameda County, Contra Costa County and North Bay and San Joaquin County through SR 13 | 10% |
| Other origins | 19% |

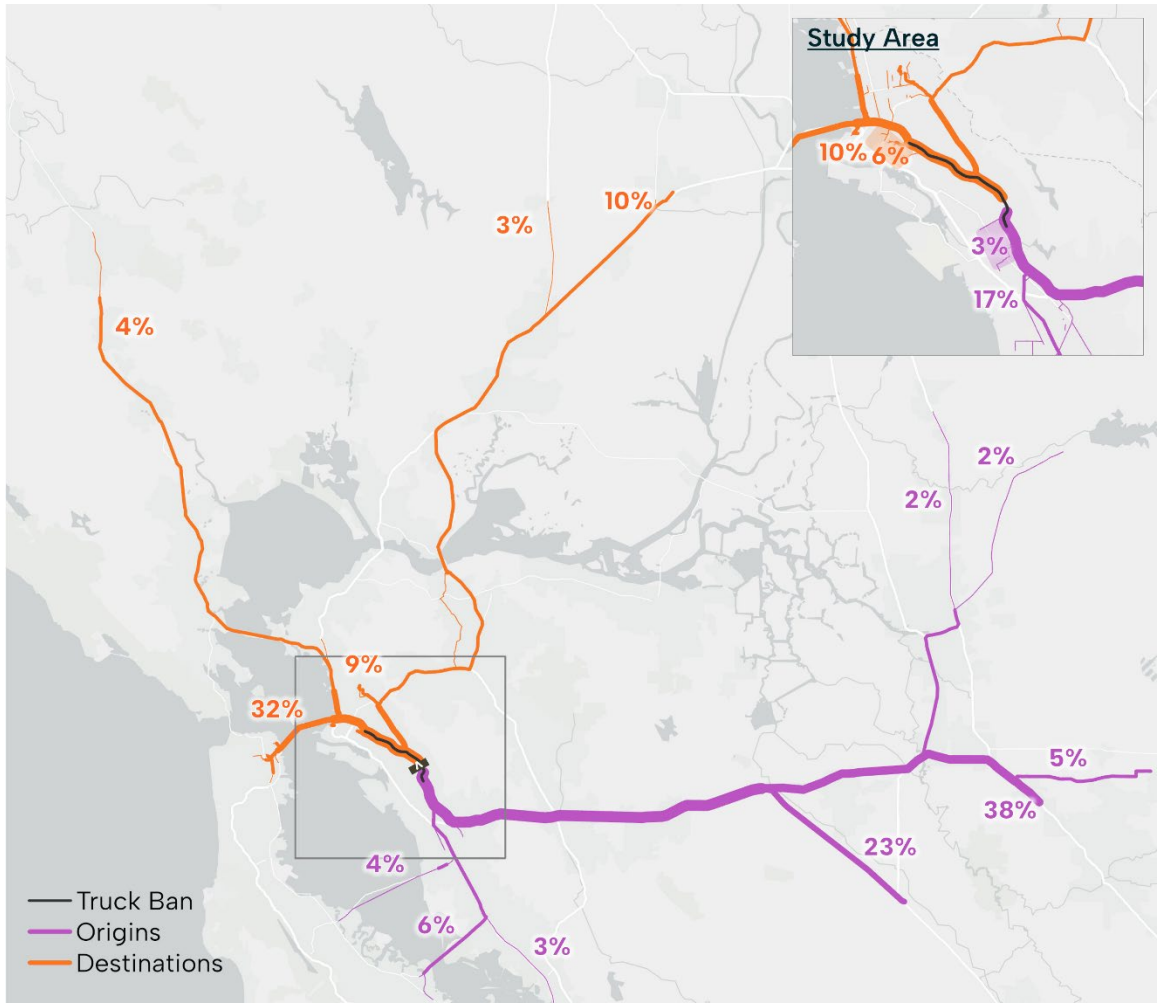
Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Table 43: Destinations for Trucks Passing through I-580 in Eastbound Direction**

| Destination Locations | Share of Truck Trips |
|---|---|
| Local destinations | 2% |
| South Bay through I-880 southbound | 6% |
| Central Valley through I-580 westbound | 20% |
| San Joaquin County through I-5 northbound, north of SR 120 | 25% |
| Central Valley through SR 120 westbound | 39% |
| Other destinations | 8% |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Figure 47: I-580 Westbound Passthrough Trips in Future No Ban Scenario**




Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.
Origins and destinations with less than 2% of truck tricks not shown.

**Table 44: Origins for Trucks Passing through I-580 in Westbound Direction**

| Origins | Share of Truck Trips |
|---|---|
| Local origins | 3% |
| South Bay and Peninsula through I-880 northbound | 13% |
| Central Valley through I-580 westbound | 23% |
| San Joaquin County through I-5 northbound, north of SR 120 | 4% |
| Central Valley through SR 120 westbound | 43% |
| Other origins | 14% |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.

**Table 45: Destinations for Trucks Passing through I-580 in Westbound Direction**

| Destinations | Share of Truck Trips |
|---|---|
| Local destinations | 16% |
| San Francisco and Peninsula through Bay Bridge | 32% |
| North Bay through I-580 westbound | 4% |
| Northern Alameda County, Contra Costa County and North Bay and San Joaquin County through SR 13 | 22% |
| Other destinations | 26% |

Source: AlaCC Model, Truck Access Study Custom Scenario, 2035.