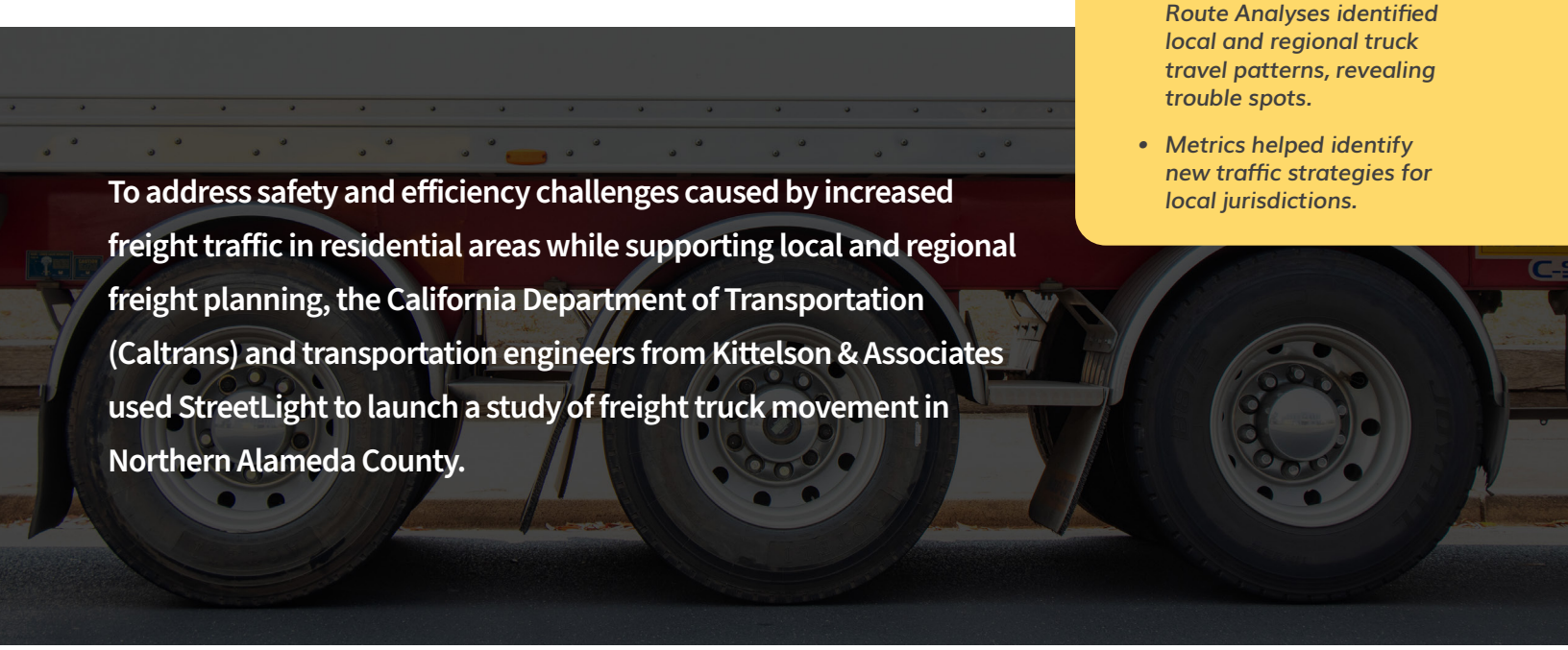
How Comprehensive Truck Traffic Data Enables Safer, More Efficient Routing

EXECUTIVE SUMMARY

- *Big Data study of freight patterns in Northern Alameda County determined goods movement and roadway demand.*
- *Insights from O-D and Top Route Analyses identified local and regional truck travel patterns, revealing trouble spots.*
- *Metrics helped identify new traffic strategies for local jurisdictions.*



To address safety and efficiency challenges caused by increased freight traffic in residential areas while supporting local and regional freight planning, the California Department of Transportation (Caltrans) and transportation engineers from Kittelson & Associates used StreetLight to launch a study of freight truck movement in Northern Alameda County.

Mission: Study Truck Patterns to Address Traffic Interference

To address problems caused by rising freight truck traffic in residential areas — which interfered with bike and pedestrian movement — Caltrans engaged StreetLight to conduct a traffic analysis for Northern Alameda County, which encompasses the freight traffic–heavy Port of Oakland, Oakland International Airport, and industrial areas of East Oakland.

Planners hoped to learn how goods were being moved to and from distribution centers and then use that information to discover where truck traffic was interfering with industrial and residential areas.

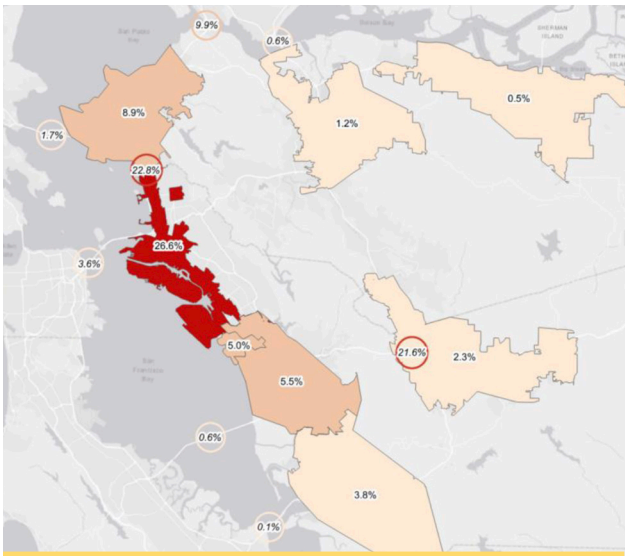
Gathering data from such a large region had historically been difficult for Caltrans (driver surveys were the most common data collection method). Planners hoped that using Big Data sources and analysis provided by StreetLight would lead to more comprehensive, up-to-date, and actionable findings.

"StreetLight can be very effective in refining an analysis and a deep dive study. We could create a narrative that helped us set priorities."

ALEX GARBIER
ENGINEERING ASSOCIATE / PLANNER, KITTELSON

KITTELSON & ASSOCIATES

Caltrans



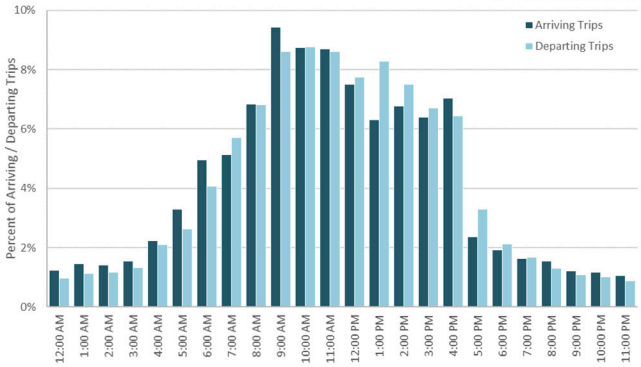
Caption: Origin-Destination Analysis highlights the percentage of trips staying within and trips leaving Northern Alameda for each zone. Trips leaving are noted in circles.

Analysis: Big Data Analysis Shows Precise Truck Movement, Circulation, and Parking

To provide a baseline for normal conditions, planners used StreetLight to gather pre-pandemic 2019 data and insights on Northern Alameda County.

The team analyzed local and regional Origin-Destination (O-D) data of freight trucks traveling from outside and within the county. Freight routes were identified and planners calculated the percent of trips staying within or leaving Northern Alameda for each zone.

The team also observed hourly traffic volume for each zone within the county, validating whether trouble spots occurred when freight movement coincided with regular commute periods. StreetLight's Top Routes Analysis also revealed that route preference did not always align with established truck routes and identified factors (such as heavy traffic and long-distance trips) that caused trucks to deviate from established routes.



Analysis reveals temporal distribution in Northern Alameda County, showcasing percent of arriving and departing trips with a peak between 9 a.m. and noon.

Results: A Fuller View of Freight Traffic for Better Corridor Routing

The completed analysis offered the Caltrans team and local municipal jurisdictions a fuller view of freight traffic in Northern Alameda County:

- Most freight travel occurs along I-880 and in East Oakland, while I-80 and I-580 also see truck traffic.
- Roadway freight trips in Northern Alameda County peak between 9 a.m. and noon.
- Nearly a quarter of all trips originated from the Port of Oakland, with almost as many originating from East Oakland's industrial areas.

Analysis of truck movement helped the team measure roadway performance, revealing reasons (such as congestion) why truck traffic was leaving the freeway at a certain location.

Caltrans shared these results with study area cities, counties, the Metropolitan Transportation Commission, and the Bay Area Air Quality Management District to inform local prioritization of corridor improvements and routes that minimized truck interactions with pedestrians, cyclists, and transit.

The Caltrans/Kittelson planning team found data collection and analysis on this project to be a vast improvement over past projects: "Without StreetLight, getting the insights needed for this project would have been challenging," says Kittelson Associate Engineer Aaron Elias. "The driver surveys would have been cumbersome and impossible for the region of interest."