

Environmental

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Project Title:  
Quantify the Effect of Roadside  
Barrier on Near Road Air Pollutant  
Dispersion and Concentration

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## Quantify the Effect of Roadside Barrier on Near Road Air Pollutant Dispersion and Concentration

Using a tracer field study to quantify the effects of solid roadside barriers on dispersion of traffic-generated pollutants.

### WHAT IS THE NEED?

Near road air quality continues to be an important issue for transportation agencies. State and federal publications identify roadside barriers, such as sound walls, as potential measures to improve air quality along the roadway. Yet, there is currently no acceptable air quality dispersion model that meets the federal modeling guideline to quantify the effect of roadside barriers on pollutant dispersion and concentration. Even the U.S. Environmental Protection Agency's (EPA's) preferred dispersion model, Air Quality Dispersion Modeling (AERMOD), does not consider the physical effects of roadside barriers on air flow and pollutant dispersion. The lack of an acceptable dispersion model or computational algorithm to analyze roadside barriers prevents transportation agencies from constructing barriers to receive air quality improvement credits for conformity determination on transportation projects. Without a quantifiable analysis method, it is also a challenge for agencies to justify expending resource to construct roadside barriers solely for air quality improvements.

### WHAT ARE WE DOING?

It is critical that any effort to develop a dispersion algorithm for roadside barriers comply with the federal modeling guideline, to ensure that the air quality improvement benefits the barriers provide are acceptable for environmental analysis on federal and federal-aid transportation projects. A dispersion algorithm which is compatible with AERMOD would allow Caltrans to quantify roadside barriers' effects on air quality in accordance with federal modeling guidance.



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The research team will conduct a tracer field study to quantify the effects of solid roadside barriers on dispersion of traffic-generated pollutants, using tracer gas with a controllable and measurable emission rate under a range of meteorological and traffic conditions.

## WHAT IS OUR GOAL?

The goal of this research is to develop a dispersion algorithm and dataset suitable for evaluation of dispersion model performance in close collaboration with U.S. EPA.

## WHAT IS THE BENEFIT?

California, which has the soundest walls in the nation, has not been able to account for the secondary air quality benefit that its roadway assets have been providing for the public. Additionally, consideration to construct roadside barriers along existing roadway to improve air quality for nearby sensitive receptors, such as schools and hospitals, would be limited to qualitative assessment rather than quantitative analysis. To ensure the deployment potential, this Task is developed in close collaboration with U.S. EPA staff serving as technical advisors.

## WHAT IS THE PROGRESS TO DATE?

This research Task was designed to conduct to quantify the effects of solid roadside barriers on dispersion of traffic-generated pollutants using three field studies: a one-barrier, two-barrier, and no-barrier studies. So far, the researchers can conduct only the one-barrier study and the two remaining filed studies were planned to be completed by summer of 2020. However, due to the lingering COVID-19 restrictions and the resurgence of the Delta variant of the virus it was not possible to conduct the field studies in summer of 2020. It is now planned to conduct the field studies in the summer of 2022 necessitating for a no-cost time only extension. The new end date is now December 2022.