

Transportation  
Safety and  
Mobility

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**Project Title:**

Connected and Automated  
Vehicle (CAV) Application  
Development

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## Improved Analysis Methodologies and Strategies for Complete Streets

Develop, analyze, and test improved strategies and analysis methodologies for complete streets to facilitate safe and effective mobility for all road users.

### WHAT WAS THE NEED?

A complete street is a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit vehicles, truckers, and motorists, appropriate to the function and context of the facility. There was a need to research safe and effective facility designs and control strategies that facilitate the movements of all road users.

### WHAT WAS OUR GOAL?

Our goal was to have researchers develop and test improved strategies and analysis methodologies for complete streets, taking into consideration the emerging advances in technology on control devices and data availability for multiple sources. The strategies and methodologies were developed through analysis and simulation and were field tested in real world complete street projects. Researchers also developed a bicycle signal priority system at one intersection in the California Connected Vehicle Test Bed in Palo Alto, California.

### WHAT DID WE DO?

The research team at the University of California at Berkeley (UCB) developed and test improved strategies and analysis methodologies for complete streets, taking into consideration the emerging advances in technology on control devices and data availability from multiple sources.

Researchers at UCB prepared a working paper that documents in detail the analysis methodologies for complete streets, the selected test sites and the data collection and analysis efforts.



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California's transportation system

Researchers developed a bicycle signal priority system at one intersection in the California Connected Vehicle Test Bed in Palo Alto, California.

They also prepared and delivered a final report to Caltrans, describing the work performed and recommendations for implementation of the control strategies.

## WHAT WAS THE OUTCOME?

Key findings of this research include the following:

- Equal weighted pavement quality criteria
  - The pavement quality criteria (structural, functional, maintenance) are of relatively equal ranked importance
- Safety related debris are most important
  - Regarding debris types, it was clear that safety-related debris are most important with puncture and slip hazards as ranked most important to bicyclists
- Debris should be measured by area, unless snow
  - When evaluating debris in bike lanes, respondents consistently chose “area” as the most appropriate measurement for evaluating debris in bike lanes, with the one exception being precipitation (i.e., snow). This makes intuitive sense as debris effectively reduces the usable bike lane area. Snow differs in that the impact of snow depends upon snow depth.
- Solid green lanes are most preferred
  - A clear trend is that the solid green lane is most visible/preferred overall, even if faded
- Maximum effective buffer is approximately two car widths (18 ft)
  - The effective buffer function was able to be calibrated from the survey data with a maximum effective buffer of 18 feet (approximately two car widths).

- Height buffer is much more important to bicyclists and horizontal buffer
  - Height of buffer is much more preferred to width separation only, but with diminishing returns and with contextual limitations (e.g., parking protected).

## WHAT IS THE BENEFIT?

The benefits of this research include an improved evaluation methodology for traffic performance of alternative designs for complete streets and development and testing signal control strategies that can improve the performance at signalized intersections for all users.

## LEARN MORE

The final report will be posted to this website when available:  
<https://dot.ca.gov/programs/research-innovation-system-information/research-final-reports>

UC Berkeley Direct Report link:  
<https://escholarship.org/uc/item/2gd0t4cd>

## IMAGES



Image 1: Supporting image for survey question #2 on ranked choice bike lane visibility



Image 2: Supporting image on survey question #5 for ranked choice buffered bike lane type

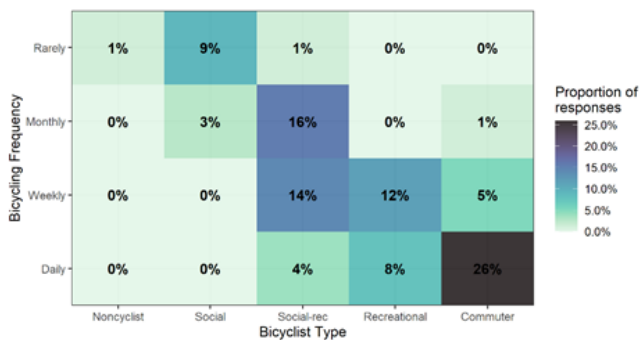


Image 3: Contingency table of bicyclist type and bicycling frequency

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