



CALTRANS DIVISION OF RESEARCH,  
INNOVATION AND SYSTEM INFORMATION

# Research Results

## Optimizing Bikeshare Service to Connect Affordable Housing Units with Transit Services

Developing a framework to optimize bikeshare services between affordable housing and transit

Planning, Policy and Programming

JULY 2023

**Project Title:**

Optimizing Bikeshare Service to Connect Affordable Housing Units with Transit Services

**Task Number:** 3358

**Start Date:** October 1, 2021

**Completion Date:** November 30, 2022

**Task Manager:**

Stuart Mori  
Associate Transportation Planner  
stuart.mori@dot.ca.gov

### WHAT WAS THE NEED?

Affordable housing has become an important part of urban housing planning. Thus, both Federal and local governments seek to provide more affordable housing for low-income populations. At the same time, Transit-Oriented Development (TOD) has attracted increased interest from local transit agencies. Unfortunately, these two national and local trends have been addressed separately, resulting in a disconnect between affordable housing and transit services.

Much of the research related to affordable housing and transit service has focused on combining these two actions. However, because this is a complex effort, it may not show short-term results. Bikeshare, as a growing micro-mobility service, shows great potential to increase accessibility, especially for disadvantaged populations. Moreover, researchers have not thoroughly examined the potential of bikeshare to solve the accessibility gap between affordable housing and transit services.

### WHAT WAS OUR GOAL?

This work developed a mathematical model and framework to make locations of bikeshare stations more effective between affordable housing and transit services.

### WHAT DID WE DO?

We proposed a multi-modal agent-based model to find the best locations of bike stations by combining mathematical programming, an agent-based model, multi-modal route planning, and hands-on instructions.



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## WHAT WAS THE OUTCOME?

Results indicated about 60% of the affordable housing communities were within a 25-minute bike travel time when the number of bikeshare stations ranged from 25 to 75. When the number of bikeshare stations was increased to 100, most affordable housing communities were within 40 minutes of bike distance, and all of them were less than an hour away. In terms of accessibility, when the number of bikeshare stations (e.g., 100) increased by 70%, the number of Points of Interest (work, health, recreation, and other) were within a 30-minute travel time.

## WHAT IS THE BENEFIT?

The results provided bikeshare planning suggestions to connect affordable housing units and transit services, which can prioritize transit funding. It also provided advice on how bikeshare may increase accessibility, particularly for disadvantaged populations. If affordable housing and transit service can be better connected, it may deliver broader societal benefits.

## LEARN MORE

For more information, see <https://escholarship.org/uc/item/9mp4g0xz>

## IMAGES

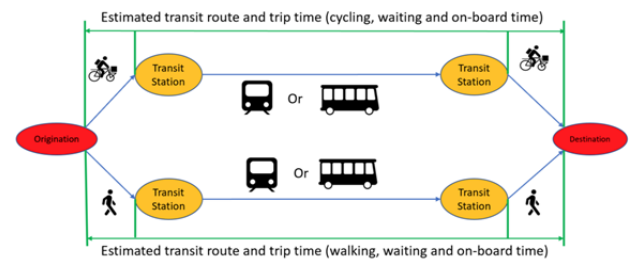


Image 1: Estimated Transit Route and Trip Time