

## **Abstract**

The Sun Link Modern Streetcar route opened on July 25, 2014, in Downtown Tucson and on the University of Arizona campus. Even though the opening of this 3.9-mile route has been hailed as a success due to its role in revitalizing Downtown Tucson, there are still major issues with accessibility to mass transit in greater Tucson. In this study, mass transit accessibility in Tucson is measured using a GIS-based transit accessibility model before and after the opening of the Sun Link system to determine the effect the streetcar had on overall transit accessibility in the Tucson Metropolitan Area. The study is focused on the years 2009 and 2014 (i.e., two points in time, five years apart) to clearly identify accessibility differences before and after the Sun Link system began operation.

The analysis compares transit routes and resulting access for each residential parcel in Tucson to a diverse set of land uses based on the Land Use Public Transportation Accessibility Index (LUPTAI) during the study interval. The study finds that while residential parcel accessibility increased on average, accessibility to a diverse mix of land uses at transit stops themselves decreased on average within the study interval. Recommendations from this analysis are important in determining what areas of Tucson need improvement on mass transit accessibility. This thesis serves as a demonstration of the effects of a new rail transit system in medium-sized metropolitan areas and provides the first implementation of the LUPTAI GIS transit accessibility model in the U.S.