

## 2. Person-based evaluation of Transit Preferential Treatments (TPTs)

1. Farid, Y.Z., Christofa, E., and Collura, J. 2015. Person-Based Evaluation of Dedicated Bus Lanes and Queue Jumper Lanes at Signalized Intersections with Near-Side Bus Stops. *Transportation Research Record: Journal of the Transportation Research Board*, 2484:182–192.

2. Farid, Y.Z., Christofa, E., and Collura, J. 2014. A Person-based Evaluation of Transit Preferential Treatments on Signalized Arterials. *Transportation Research Board 93rd Annual Meeting*, 12–16 January, Washington, D.C., Paper No. 14-2995.

# Transit Preferential Treatments (TPTs)

## Space Priority Strategies



Source: Viegas, et al (2007)



Source: www.ottawa.ca



Source: www.mta.info

## Time Priority Strategies



Source: www.tc.umn.edu

## Research Objective

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- Given the lack of a comprehensive person-based evaluation of TPTs :
  - *Develop an analytical model to investigate the impact of TPTs on person delay and person discharge flow when implemented individually and in combination at signalized intersections*

# Analytical Model

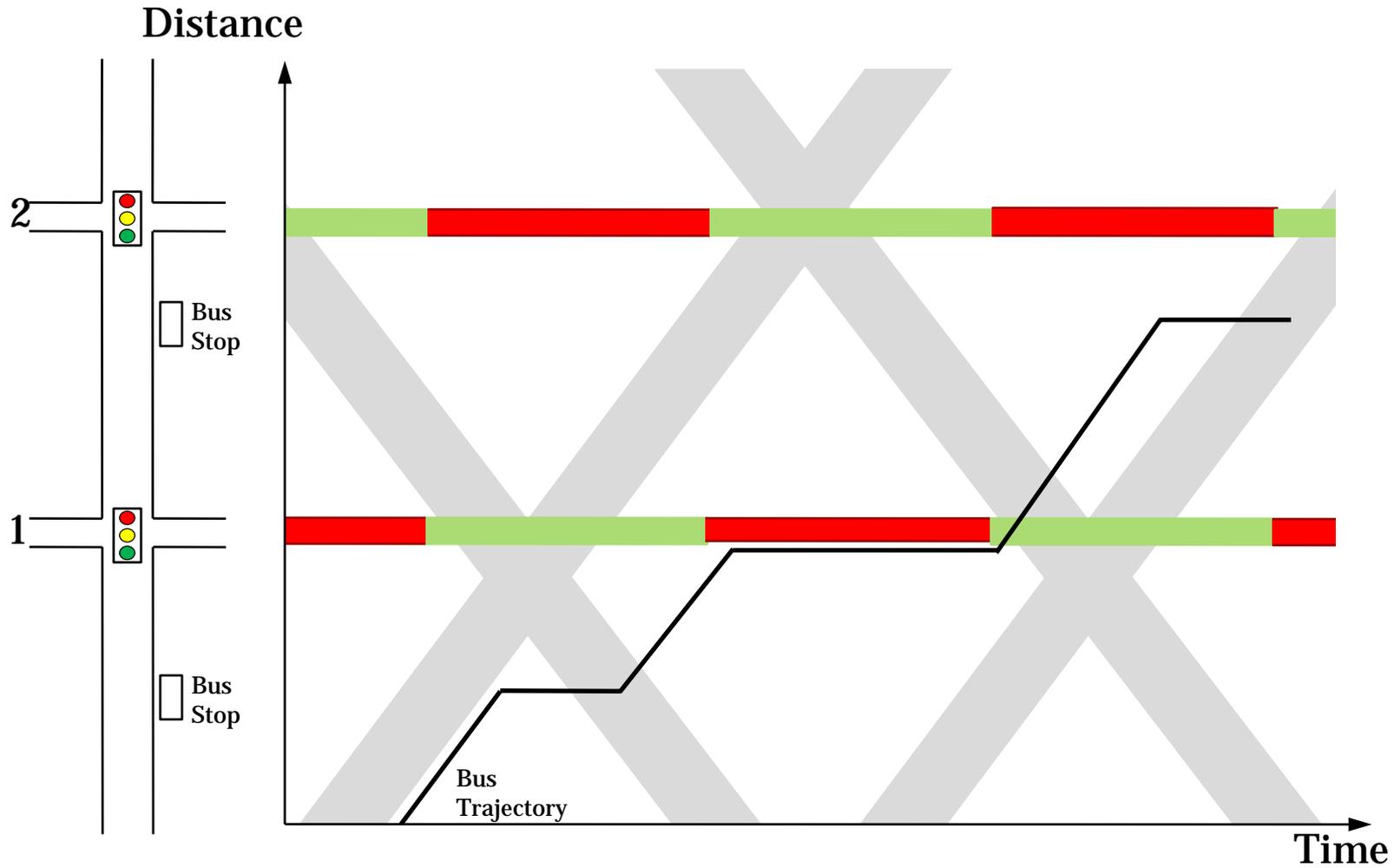
- **Assumptions:**
  - The analytical model accounts only for uniform delay
  - Traffic operations follow the kinematic wave theory
  - There is no platoon dispersion
  
- **ITS Technologies needed for real-world implementation:**
  - Automated Vehicle Location (AVL) Systems



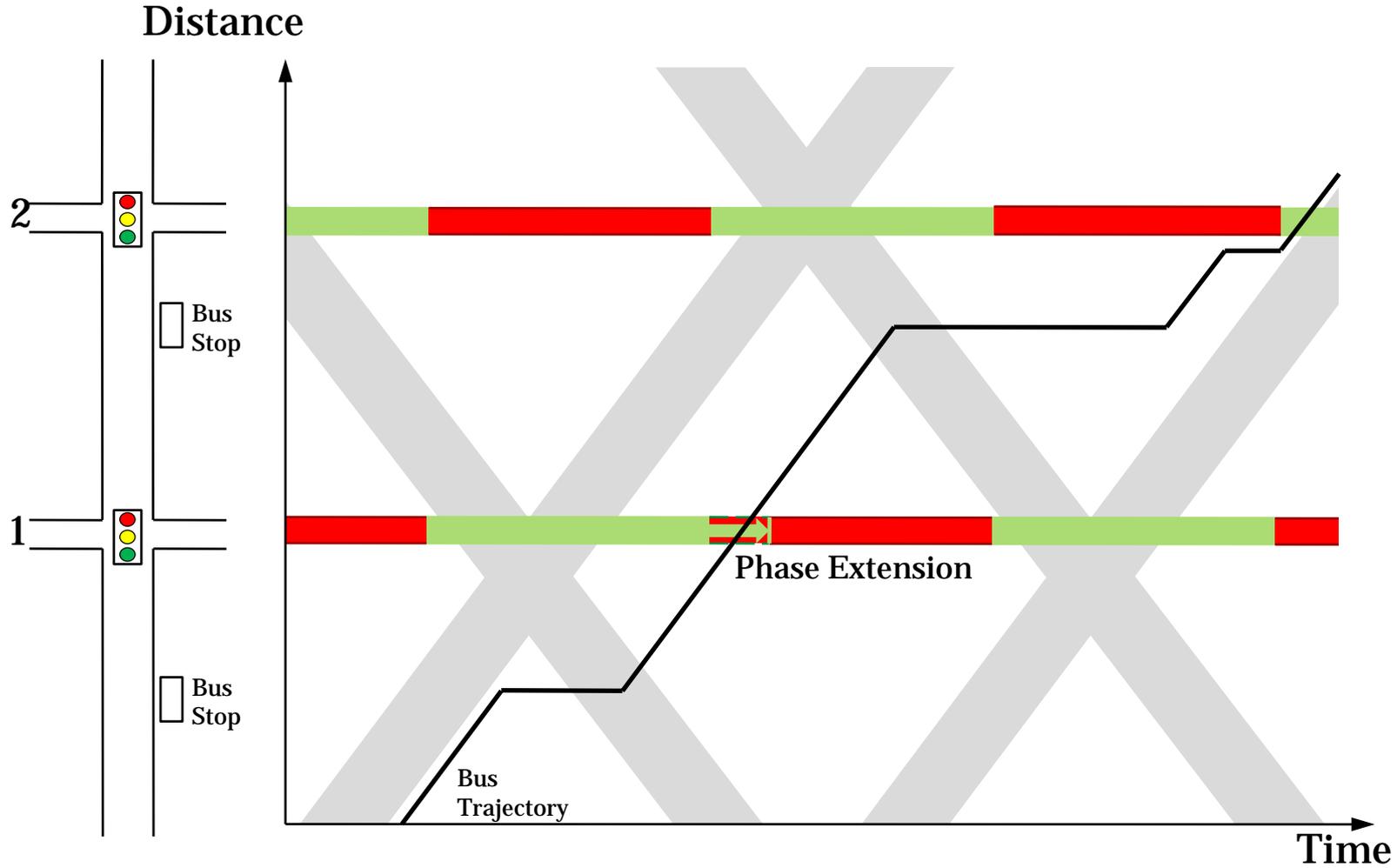
Source: [www.tc.umn.edu](http://www.tc.umn.edu)



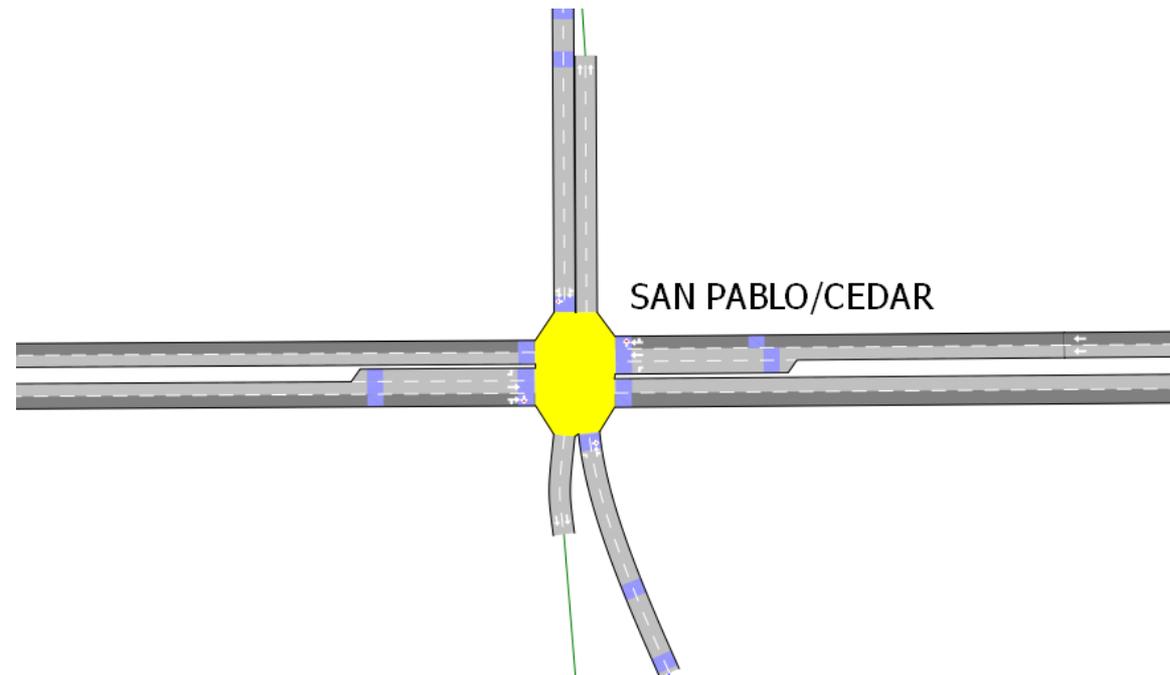
## Phase Extension



# Phase Extension

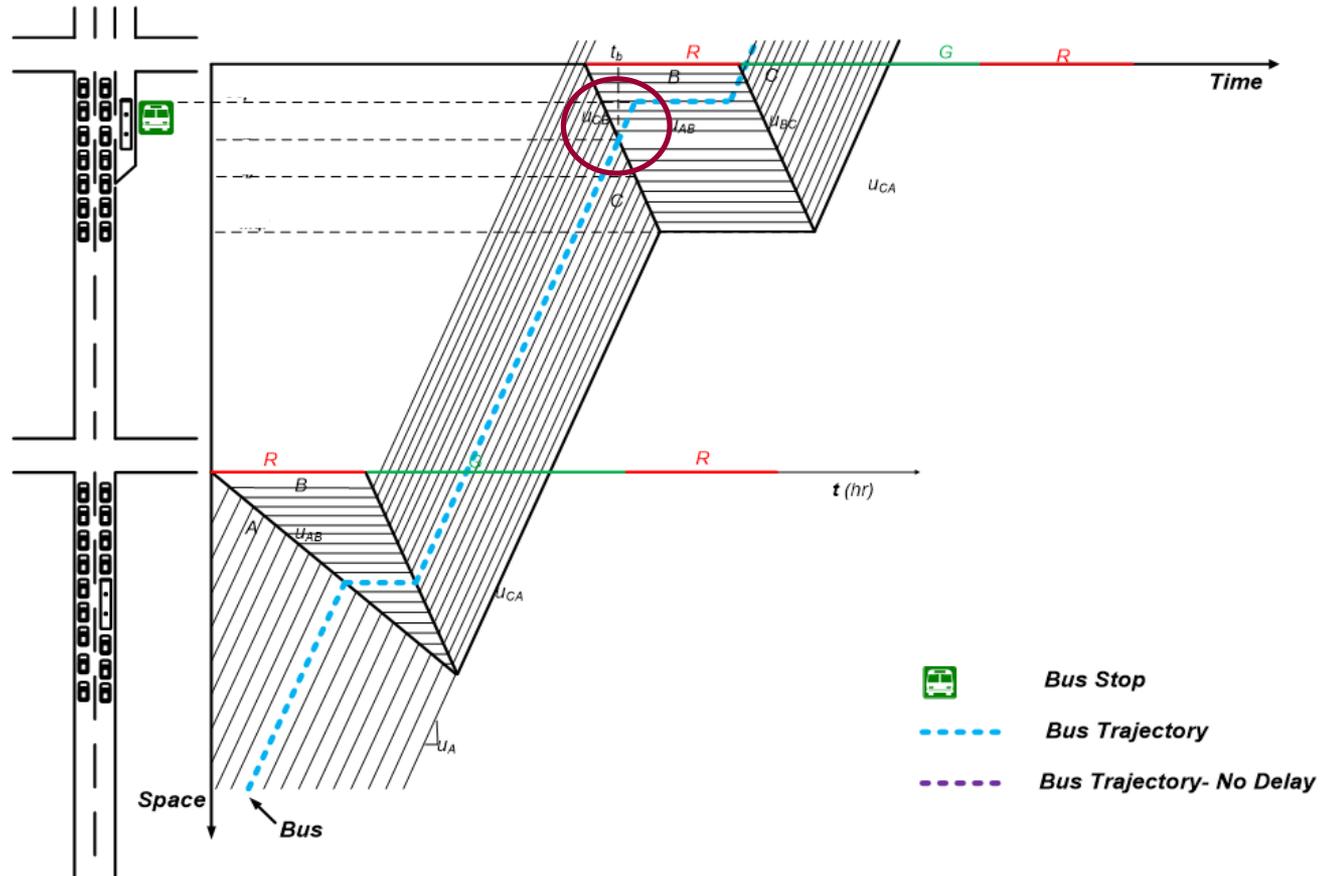


# Phase Extension



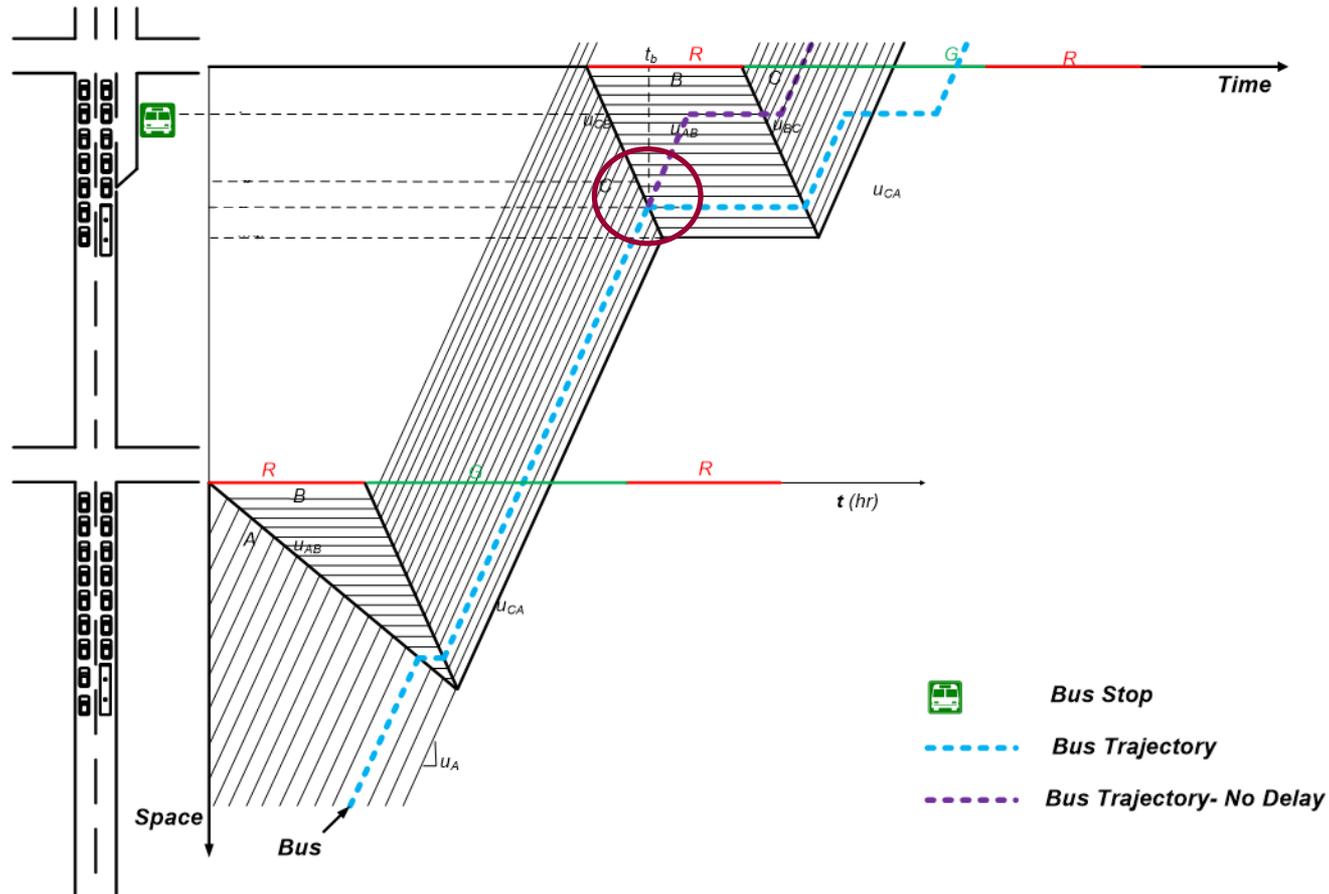
- Bus detectors upstream intersection
- TSP is activated when a bus can pass the intersection by 10 seconds green extension

# Queue Jumper Lane



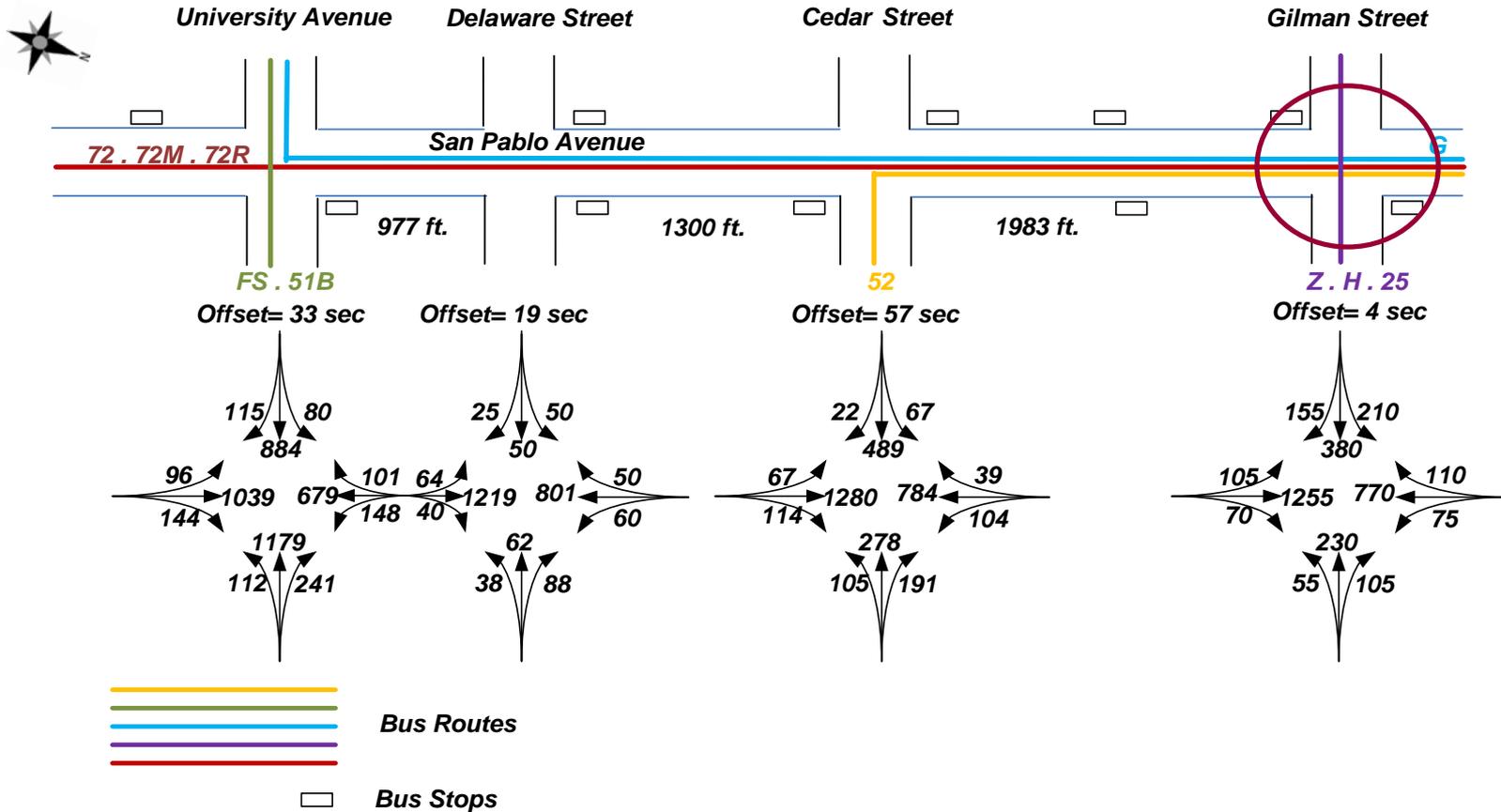
**Time-space diagram illustrating bus utilizing the queue jumper lane.**

# Queue Jumper Lane

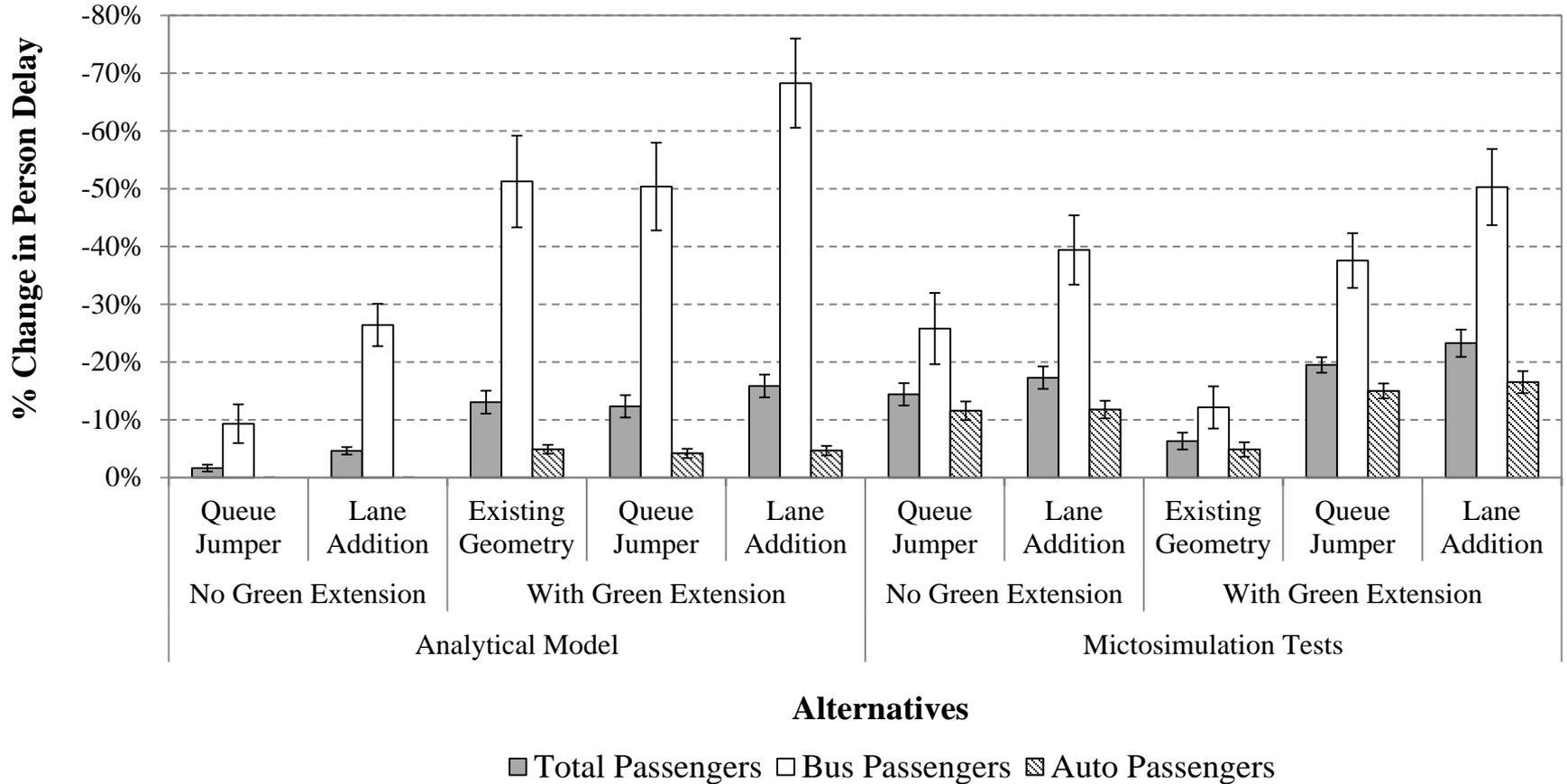


**Time-space diagram illustrating bus not utilizing the queue jumper lane.**

# Test Site: Four-intersection segment of San Pablo Avenue

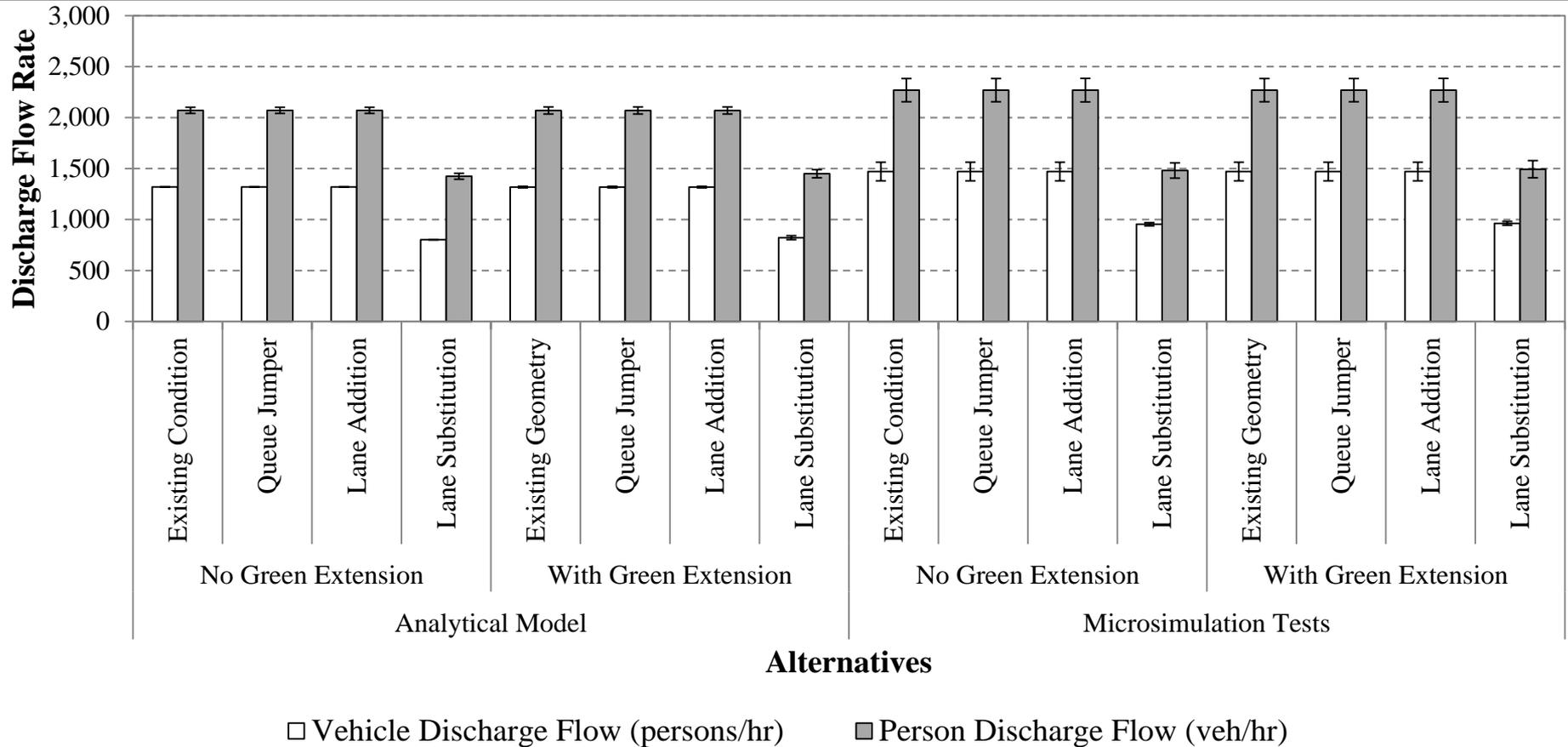


# Results: Percent Change in Person Delay



Analytical and Simulation Tests Results for the % Change in Person Delay of San Pablo Avenue Northbound Direction at the Intersection with Gilman Street

# Results: Person & Vehicle Discharge Flow Rate



Analytical and Simulation Tests Results for the Person Discharge Flow of San Pablo Avenue Northbound Direction at the Intersection with Gilman Street

## Findings

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- The analytical model can be used to assess preferential treatments for various traffic volumes, bus frequencies, and signal timings
- The proposed analytical model can be used to quantitatively assess the impact of space and time preferential treatments on person delay and person discharge flow.