# The Evaluation of Bike Infrastructure in City of San Jose

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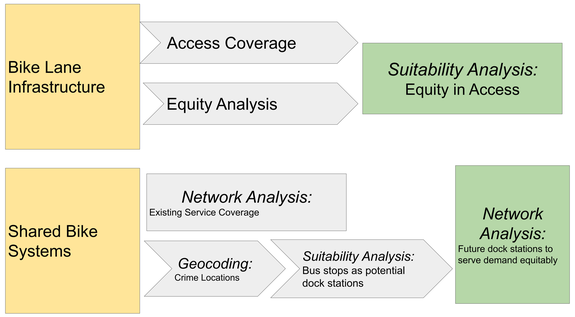
## Background

The city of San Jose is expanding their bike infrastructure aiming to achieve 15% share for bike mode trips by 2040. We aim to analyse the existing bike infrastructure from the lens of equity and access coverage.

## Methodology



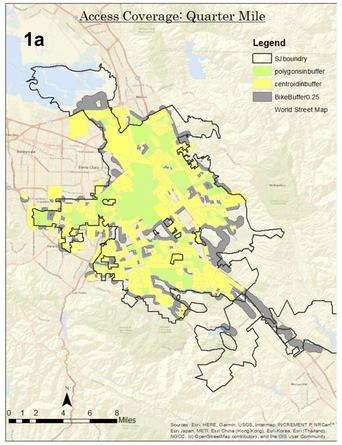

## Research Objectives

1. Evaluate the existing bike lanes for access coverage and equity
2. Analyse the existing shared bike locations for service coverage
   - Propose potential locations for new shared bike docks for higher market share

## Data Sources

- San Jose Bike plan network (2019)
- ACS Block group demographic and income data (5 year estimates 2019)
- Bay wheels share biked location (2021)
- San Jose bike demand from SFCTA Champ model (2015)
- Generated Network map from streets for Santa clara county

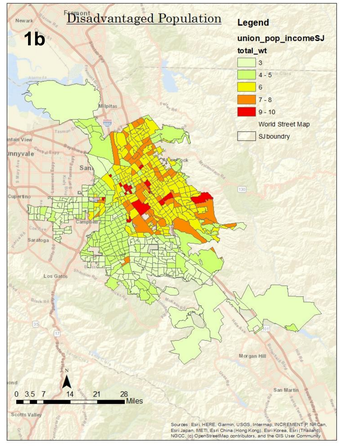
## 1. Bike Lane Infrastructure Analysis




**1a) Access coverage**

- Quarter mile buffer of existing bike lanes
- Block groups(BG) that fall fully within the buffer, full population has access; Partial BG's half population if their centroid falls in the buffer.

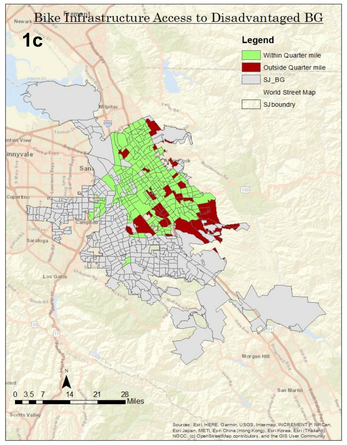
Finding:Good Access for 78% Block Group with 52% population




**1b) Equity Analysis**

- By aggregating senior citizens, youth, minority and low income for each BG

Finding: Disadv BG (Composite weight >=6): 273 BG, 46% population




**1c) Equity in Access Measure**

**43 out of 273 BG** do not have good access to bike lane infrastructure

% disadvantaged population without access = 9%

## 2. Shared Bike Dock Station Analysis

**2a) Existing shared bike system service area**

- Shared bike **service area** with 1,2,3 minutes breaks in green.
- Bike travel demand shown in in yellow.

Finding:

Demand is spread out, but shared bike stations are gathered around downtown. Hence west SJ's high demand remains unserved.

**2b) Location-allocation** analysis for existing shared bike dock locations with method of minimizing impedance.

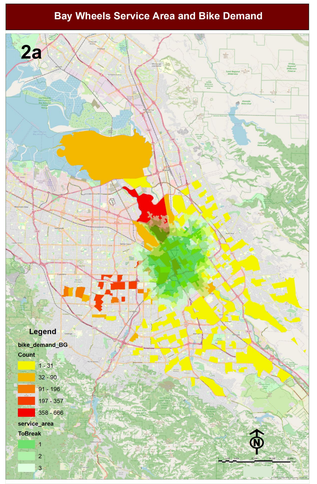
Finding:

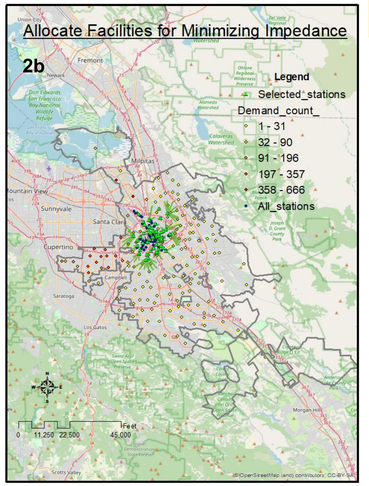
- 49/82 facilities are chosen. Near half of the docks are redundant and only 20% of demand are served

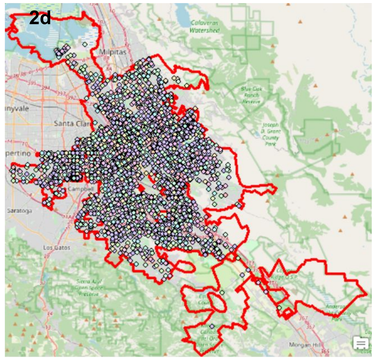
**2c) Propose potential locations for new shared bike docks to serve more people**

Potential facilities: bus stops + existing shared bike stations (1877 in total). Facilities are weighted by **suitability analysis** (Opportunities: Population Density, Land use whether commercial or recreational or not, Locations within 250 m of existing bike lane, No car household in a BG + Constraints including crime), with the total weights ranging from -1 to 9.

**2d) Geocoded c**rime locations in the city to add as constraint in the suitability analysis



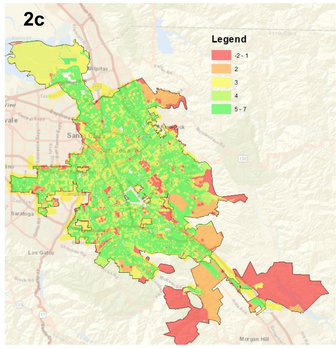




**2e) Tool 1**

Location-allocation analysis with **target market share as 90%**.

Finding 1:

- 11 facilities selected as the potential shared bike stations.
- Although west SJ is within the serviced area of the new proposed stations, south SJ is still underserved.
- From the shared bike company perspective, considering the cost, it is reasonable to expand their market to the high demand area. However, from the government perspective, we also care about equity. Although south SJ has lower demand than other areas, their needs also need to be considered to be served.




**2f) Tool 2**

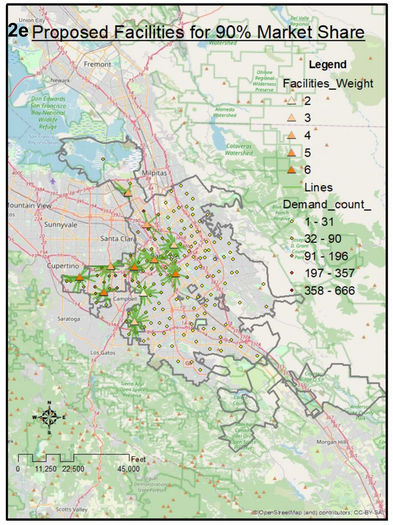
Location-allocation analysis with **minimize facilities** for serving nearly all of the demand.

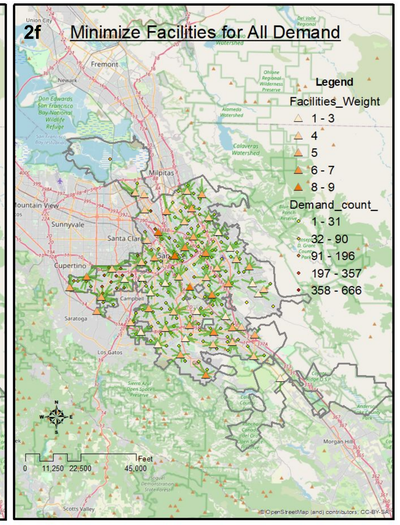
Finding 2:

- 59 proposed locations are chosen(57 new locations + 2 existing stations), and 99% demand are served.
- Redundant bike stations could be moved to the new proposed areas, then more demands will be satisfied.

Value:

Based on our investigation and analysis, shared bike company and government could choose stations from our proposed locations to expand shared bike market and serve more people.




## Limitations

- Data: We take bike demand estimated by travel demand model as the true bike demand. Considering potential mode shift, the demand volume and distribution may also shift. Additional data should be legeraged to achieve a better representation of true bike demand
- Suitability analysis: Opportunity and constraints factors chosen are not comprehensive of all characteristics that would positively and negatively influence potential bike dock station suitability. Constraints like space for setting a station is not considered yet. Factor weights are assigned with subjectivity and may be subject to bias.

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