Using GIS to Assess and Route Neighborhood Greenways

KTU+A
Planning + Landscape Architecture

Presented by **Diana Smith, GISP**
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Diana Smith, GISP

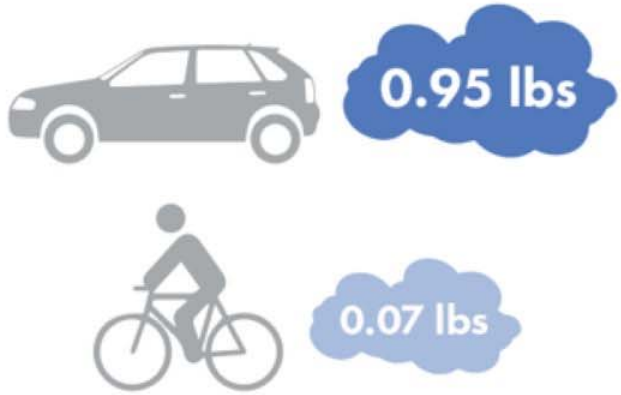
- GIS Technical Manager at KTU+A
- Emphasis on GIS Analysis and Modeling in support of Active Transportation Planning & Community Planning
- Presentation covers work conducted as part of the Bicycle & Pedestrian Master Planning process in several cities around Southern California

KTU+A

- Team of 37 Landscape Architects, Planners, GIS Analysts, Graphic Designers & Irrigation Designers

Why Active Transportation?

- Environmental Benefits
- Health Benefits
- Economic Benefits



Vehicles produce approximately 0.59 lbs of CO2/passenger/mi traveled of carbon emissions. Bicycling only produces 0.05 lbs of CO2/passenger/mi traveled (EPA, 2014).

3 hours of biking per week can reduce your risk of heart disease by 50% (CDC, 2015).

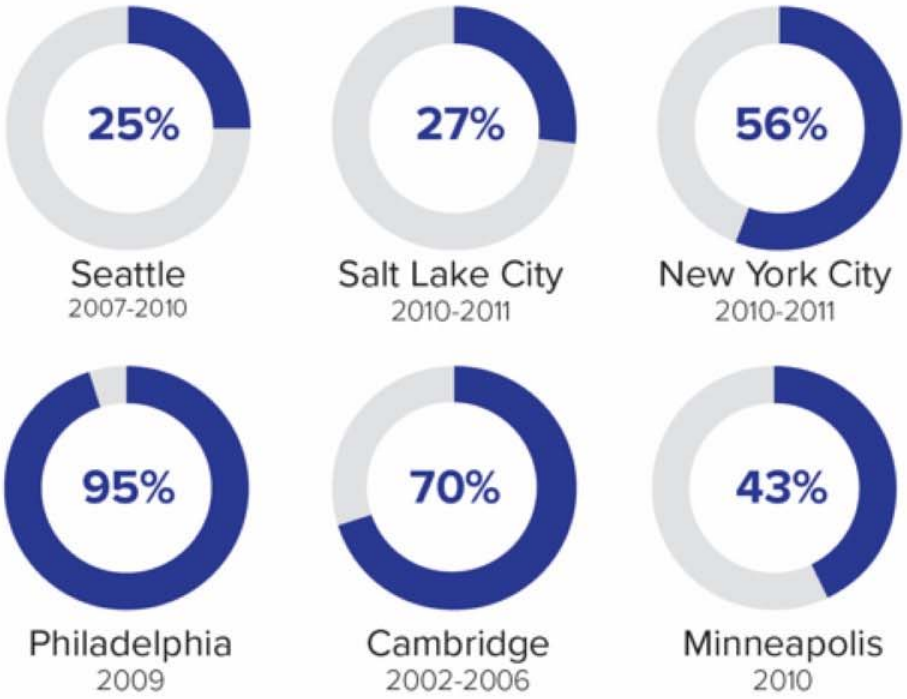
Calories you can burn during a 30-min bike ride *(CDC, 2015).*

13 lbs average weight loss in first year biking to work *(CDC, 2015).*

The Impact of Bicycle Facilities

BICYCLE
RIDERSHIP INCREASE

- According to the Pedestrian-Bicycle Information Center, 2014.



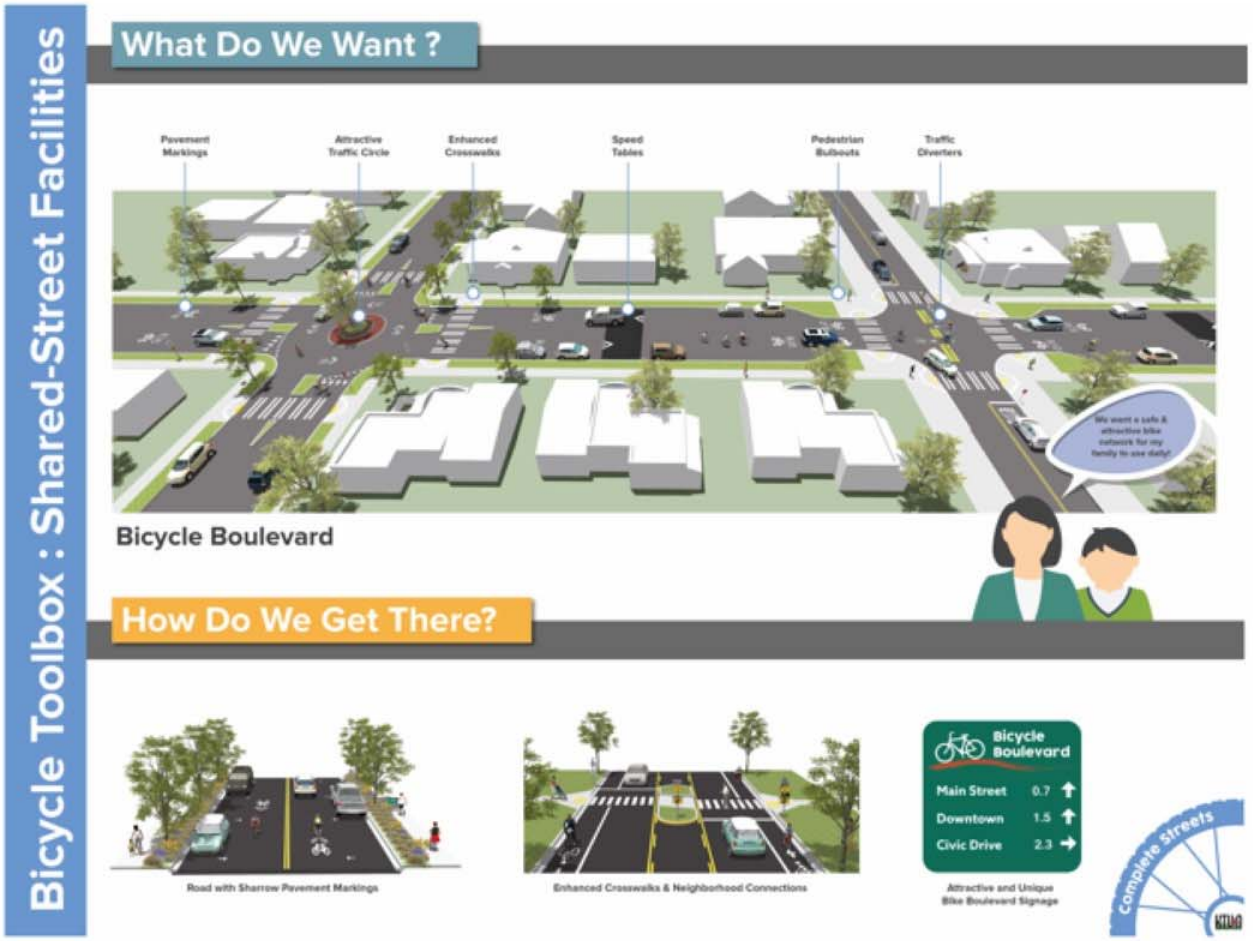
What Makes a NG?

"Neighborhood Greenways are residential streets with low volumes of auto traffic and low speeds where bicycles and pedestrians are given priority."

-City of Portland, PBOT

- Improve safety
- Help people cross busy streets
- Discourage cars from using neighborhood streets to avoid main streets
- Protect the residential character of our neighborhoods
- Keep speeds low
- Get people to where they want to go like parks, schools, shops and restaurants

-City of Seattle, DOT



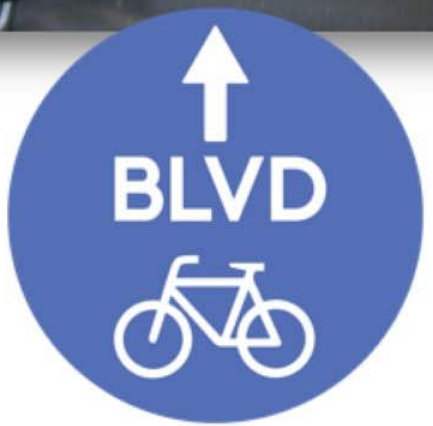
Identifying Potential NGs Using GIS

Key Attributes

- Length
- Speed
- Functional Class
- Major Crossings

Bonus Attributes

- ADT (1500-2000)
- Number of Lanes
- Slope
- Tree Canopy/Shade
- Collisions
- Scenic Quality
- Unpleasant Visual/ Olfactory Land Uses



Typical Routing Analysis

Input Road Network

Isolate Suitable Road Segments

Derive NG Routes

> Hand off to Active Transportation Planner for Analysis and Selection of Recommended Routes

Enhanced Routing Analysis

Weighted Attractor Density

Attributes & Sources

Typical Attributes:

- Length (Shape)
- Speed (OpenStreetMap)
- Functional Class (OpenStreetMap)
- Major Crossings (Geoprocessing)

Augmented Network With:

Spatial Join between Collisions and Road Segments > Classified Segments in three Tiers > Incorporated using Hierarchy Attribute

Collisions (TIMS Berkeley)

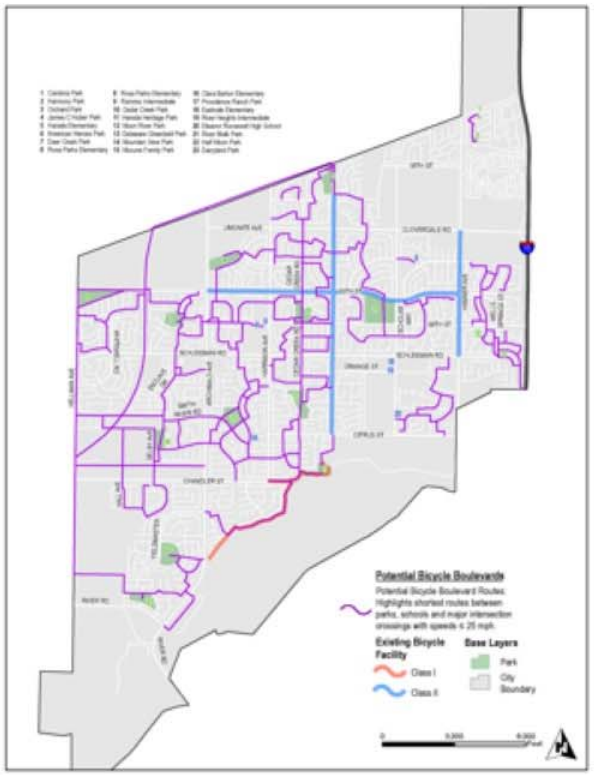
Extracted Lane Data from OpenStreetMap and incorporated into Network.

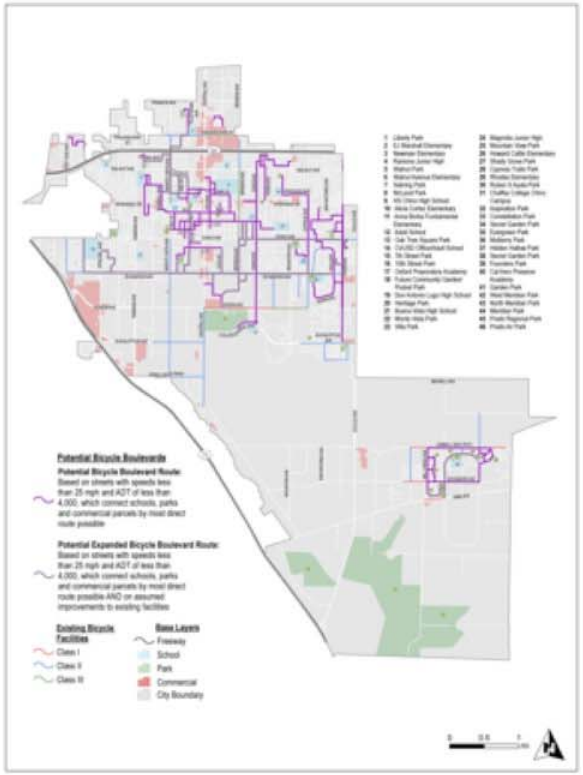
Number of Lanes (OSM)

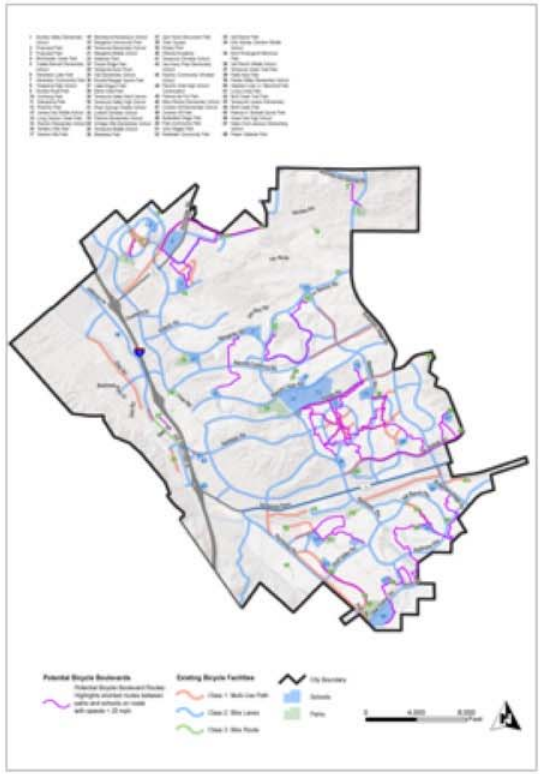
Modeled Global Turns and Heavily Weighted both Right and Left turns adding significant cost to the alternative.

Turns (Generated Global Turns)

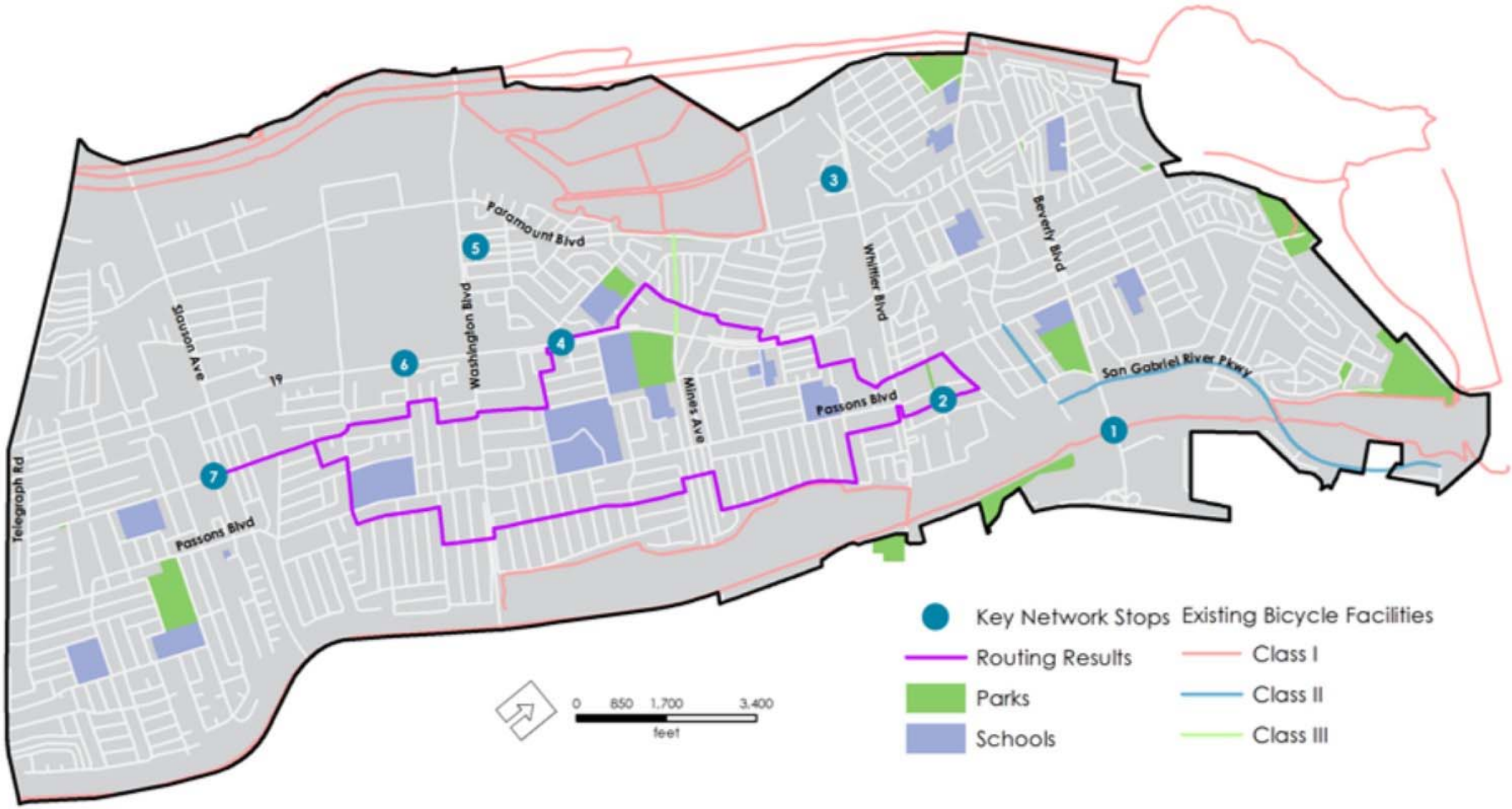
Previous Results







Enhanced Results!



Conclusions

- Previous results presented Transportation Planners with too many options causing 'planning fatigue'
- NG Routes should augment Bicycle Plans – not dominate – these highly refined routes are the ideal compliment to proposed Class I-IIIs
- Heavily weighted global turns replaced need for calculation of out of direction travel
- Future iterations to include Tree Canopy/Shade, Land Use Adjacency, and more!

Questions???