Assessing Suburban Bicycle Infrastructure in Fairfax County, VA
Outline

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Background

What is bicycle infrastructure?

• On– or off–street lanes/paths
• Configured in a variety of ways
• Includes pavement markings on shared lanes with larger vehicles
• Generally does not include sidewalks
• Can include quiet/neighborhood streets

Shared lanes: Seattle DOT

Quiet street with wide shoulder: fabb–bikes.org

Buffered bike lanes: Toole Design Group
Many current studies and summaries of bicycling within an area focus on:

- Large cities
- Bicycle commuters only
- American Community Survey (ACS) data

Background
This is problematic because:

- Most of the country is not cities – hard to apply findings

- The ACS data asks for the most-used commuting mode within the last work week.

- ACS data has a margin of error that often exceeds 100% for bicycle commuting – but it usually still the best available

- Not all trips are commutes

[Image of a family in a buffered bike lane] Family in buffered bike lane: Peopleforbikes.org
Project Objective

Develop methodology for assessing suburban bicycle infrastructure, using Fairfax County, VA as a case study.

- Provide an assessment of current infrastructure status and effectiveness
- Identify deterrents to cycling
- Offer recommendations on focus areas for improvement

Bike routes in Fairfax: Fairfax County
Why Fairfax County?

• Mostly–suburban county with large population (1.1 million)

• Proximity to Washington, D.C., one of the most traffic–congested areas in the nation

• Seeking decreased reliance on single–occupancy vehicles for transportation

• Has a network of bicycle–related infrastructure that it plans to expand
Existing Research

• Strong linear correlation between the amount of bicycle-related infrastructure present in a city and the number of bicycle commuters

• Difference between types of bicycle facilities

• Bicyclists will travel farther for a less stressful journey

• Number of lane-miles less important than:
  • Level of network connectivity
  • Overall network density

Portland’s Bicycle Network: Alta Planning
Schoner and Levinson (2012) note that discontinuities in the bicycle network may have three potential consequences:

1. Forcing the cyclist into mixed traffic
2. Requiring lengthy detours to avoid mixed traffic
3. Discouraging cycling altogether

Four types of cyclists: Reconnecting America

Protected bike lane: WABA
Existing Research

2011 study in the Vancouver area identified the top 10 motivators and top 10 deterrents to riding.

- Two of the motivators involved being separated from traffic
- Five (half) of the deterrents involved traffic risk or safety

Separated from traffic: EPA

Bicycling with traffic: Washington Post
Existing Research

Level of Traffic Stress classification system

1

2

3

4
Primary Data Material

Fairfax County Bicycle Routes

- Have 2014 shapefiles from county planning office (verifying currency)
- Working with county transportation planning office to obtain updated files as well as information on near-future projects

Fairfax County Bicycle Master Plan

- Information on planned improvements over next 10–20 years; potential to evaluate using same criteria

Bicycle Routes in Fairfax County
Proposed Metrics

**Ratio** of bicycle facility miles to county square miles as a base comparison to cities

- Frequently noted in previous studies and can serve as a point of comparison, even if it is not ultimately the best measure

**Connectivity** of the overall network

- Use Esri Network Analyst to build network model, assess connectivity measures, and pinpoint areas needing improvement
Level of Traffic Stress

- Classify network according to LTS 1 or LTS 2 facilities – what will the “Interested but Concerned” group be willing to use?
- Assess connectivity of only the LTS 1/LTS 2 network – does this network connect? If not, does it connect with LTS 3 added?

Stress map showing LTS 1 (green) and 2 (blue): Mekuria et al.
Methodological Details

Fairfax County data

• Includes information on low-volume (neighborhood) streets
  • Will be incorporated as part of bicycling network according to LTS criteria

Network analysis methods:

• **Service area solver** (more advanced buffer tool)
  • Evaluates accessibility, overall coverage, etc.

• **Route tool** (can modify for distance, time, etc. as highest priority)
  • Will use to determine/demonstrate difference between reasonable bicycling routes and street network
Connectivity
clusters/islands
(Mekuria et al. 2012)
• Visually analyze network for clusters or islands
• Statistical analysis is possible, but would require additional tools and possibly more data

Connected node ratio (Dill 2004)
• Number of intersections divided by the number of intersections plus endpoints.
  • Ideal ratio is 0.7 or higher, maximum value possible is 1.
  • Addresses concerns of both density and connectivity determined important by more recent studies
Project Timeline

May–July 2015:
• Meet with Fairfax County Planning Staff
• Adapt project plan according to feedback from proposal presentation, discussions with County staff

Aug–Sept 2015:
• Build network(s) for analysis
• Conduct network analysis

Sept–Nov 2015:
• Analyze and synthesize findings for presentation

Dec 9–11, 2015:
• Present at Transportation Engineering and Safety Conference (State College, PA) – awaiting confirmation
Significance & Limitations

Significance:
• Only known study of a large suburban area
• Uses metrics more likely to be meaningful and accurate
• Applies recently developed methodologies that emphasize key determinants

Limitations:
• Single case study
• Relies heavily on single data source
• Hard to compare to other counties/suburbs at this point because those studies haven’t been done
Primary References


• Andersen, M (2015). Here are the First–ever National Findings about “Interested but Concerned” Bikers. People for Bikes. Available at: http://www.peopleforbikes.org/blog/entry/here-are-the-first-ever-national-findings-about-interested-but-concerned-bik


Primary References (continued)


• Schlossberg, M. et al. (2013) Rethinking Streets: An Evidence-Based Guide to 25 Complete Street Transformations. Available at: http://pages.uoregon.edu/schlossb/ftp/RS/RethinkingStreets_All_V2_high_wCover.pdf


Questions?