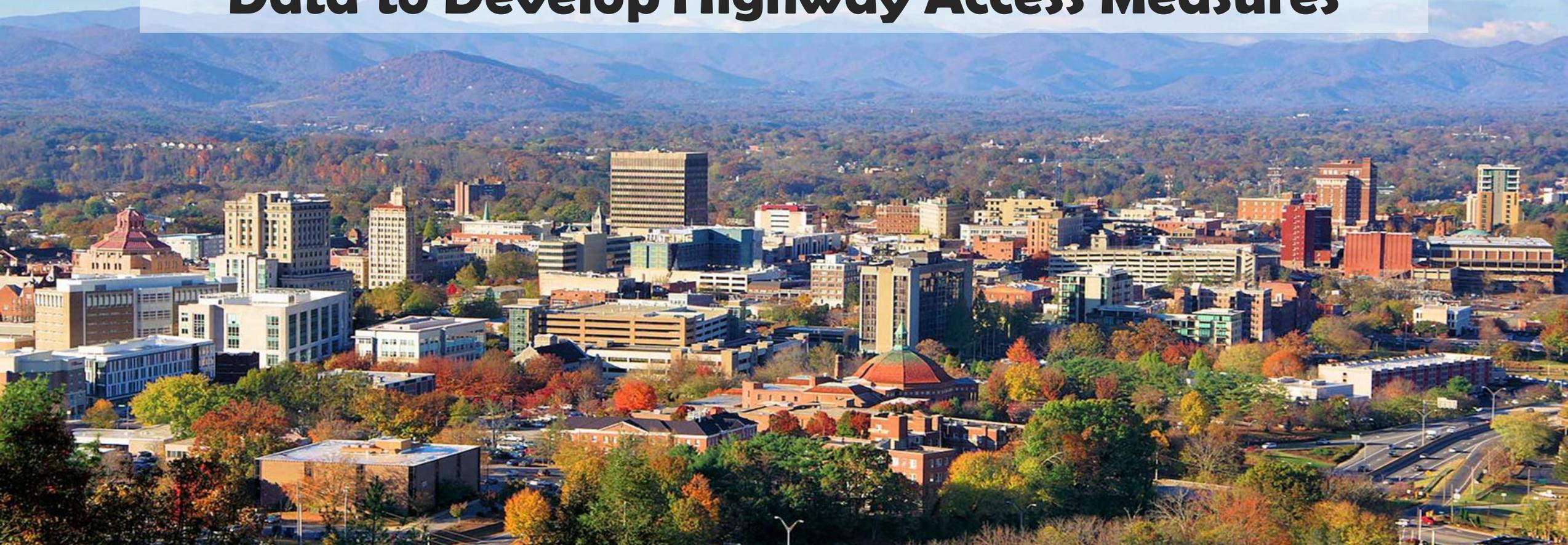
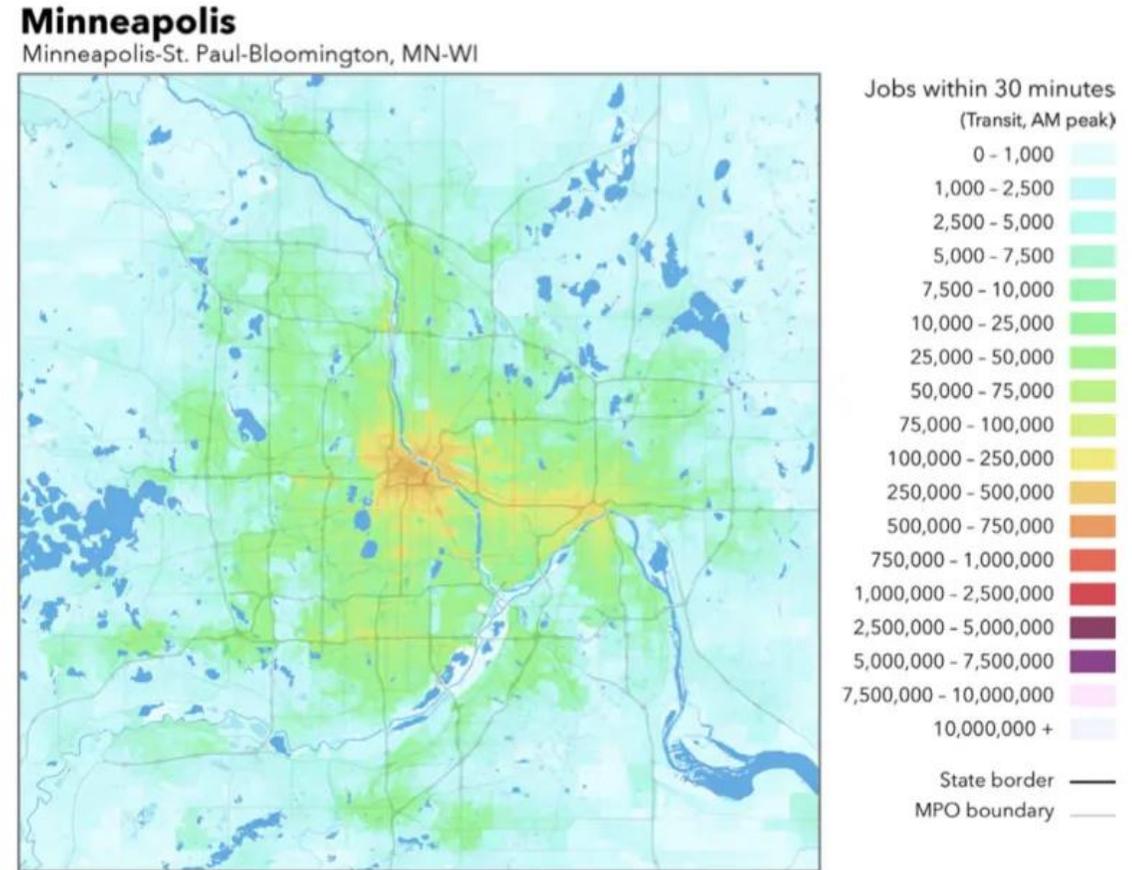


# **Combining LODES, ACS and OpenStreetMap Data to Develop Highway Access Measures**



# Accessibility Measures Defined

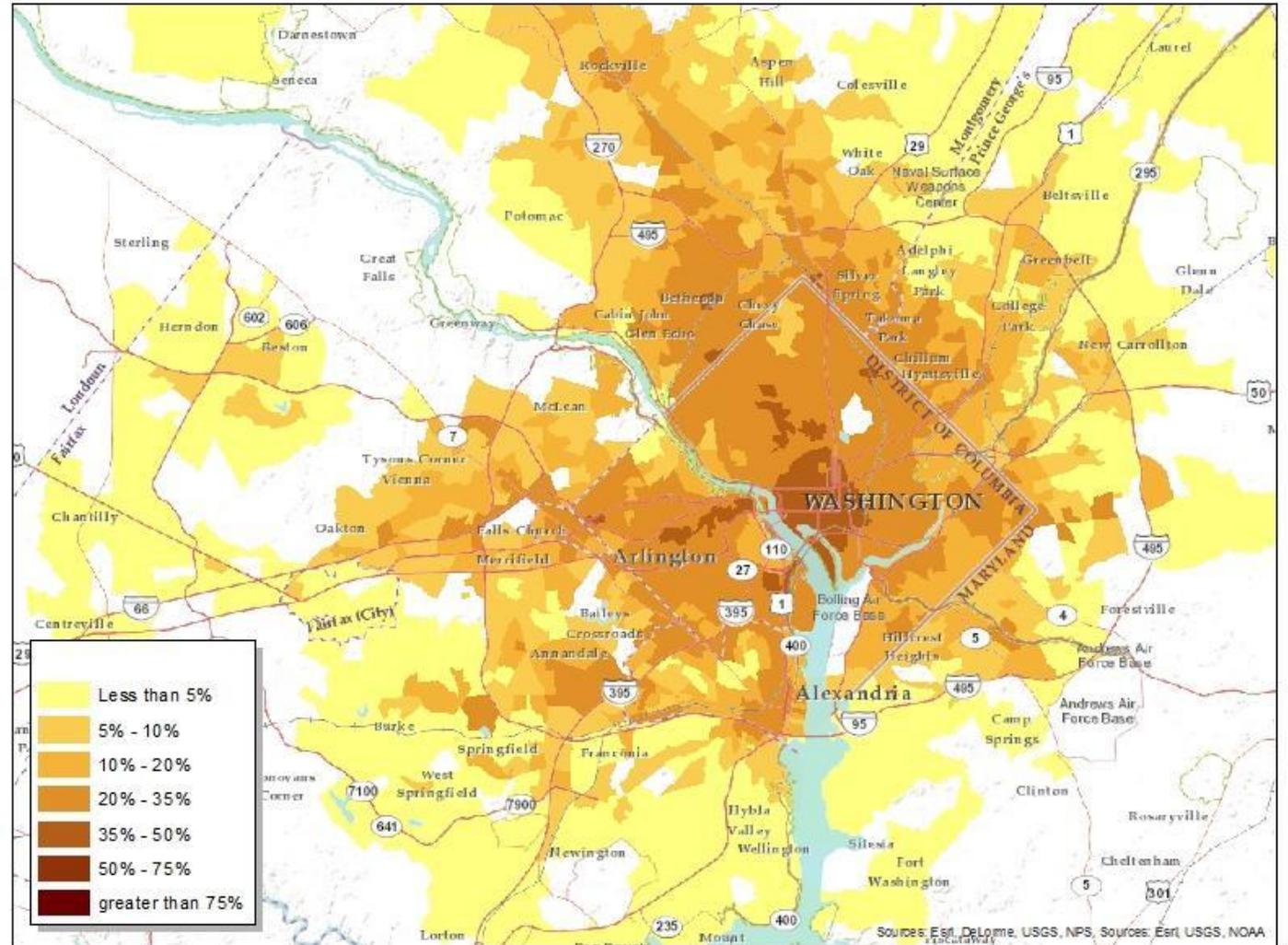
- Defined as the “ease with which someone can reach destinations”
- Example: *How many jobs are within 20 minutes of my home?*
- Many variations upon such measures (e.g. by mode, trip purpose, or time of day)



Source: UMN Accessibility Observatory (<http://access.umn.edu/>)

# Transportation Planning Applications

- Commonly reported measure for EJ / Title VI equity analysis
- Also associated with increased real estate values and development
- Increasingly popular performance measure for sketch-level planning



Source: US EPA Smart Location Mapping (<https://www.epa.gov/smartgrowth/smart-location-mapping>)

# Challenges in Accessibility Modeling

- In 2017 **85%** of Americans drove to work (or carpooled).
- Some understanding of congestion is required to estimate auto accessibility measures!
- However, congestion data is *expensive*:
  - Costly proprietary data (e.g. Here or INRIX)
  - Time-consuming models (i.e. traffic forecasting models)

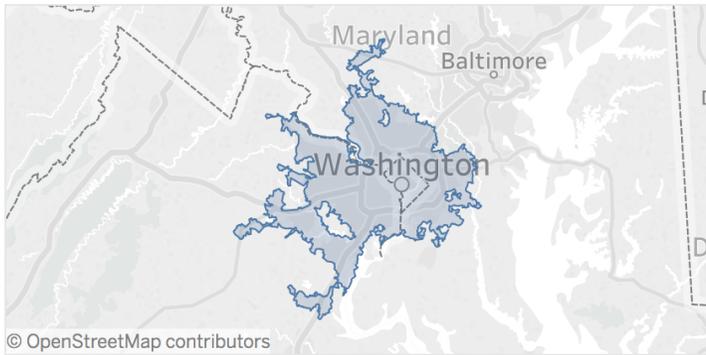


# Measuring Congestion: Travel Time Index (TTI)



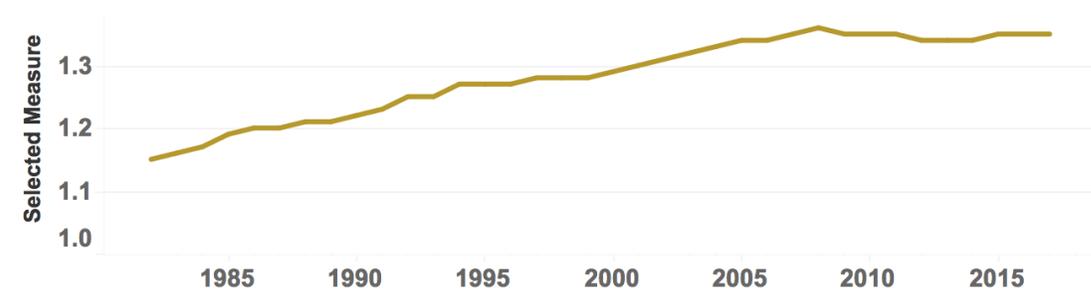
Washington, DC--VA--MD

Year:

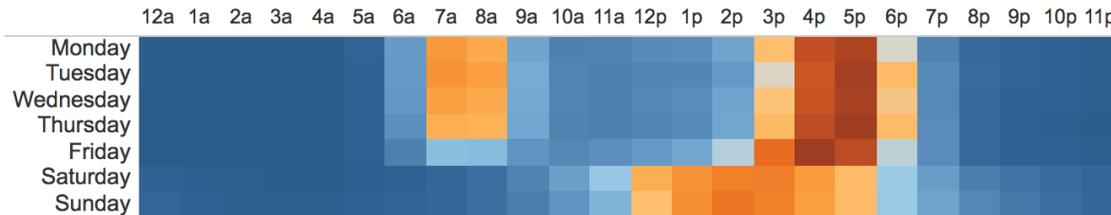


Travel Time Index (TTI)

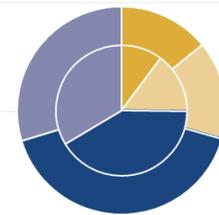
Measure:



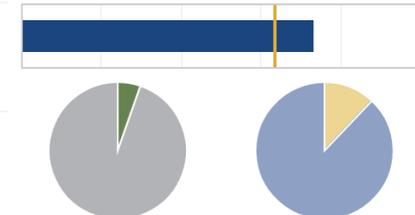
## When Does Congestion Happen?



## Delay Split



## Cost Comparisons



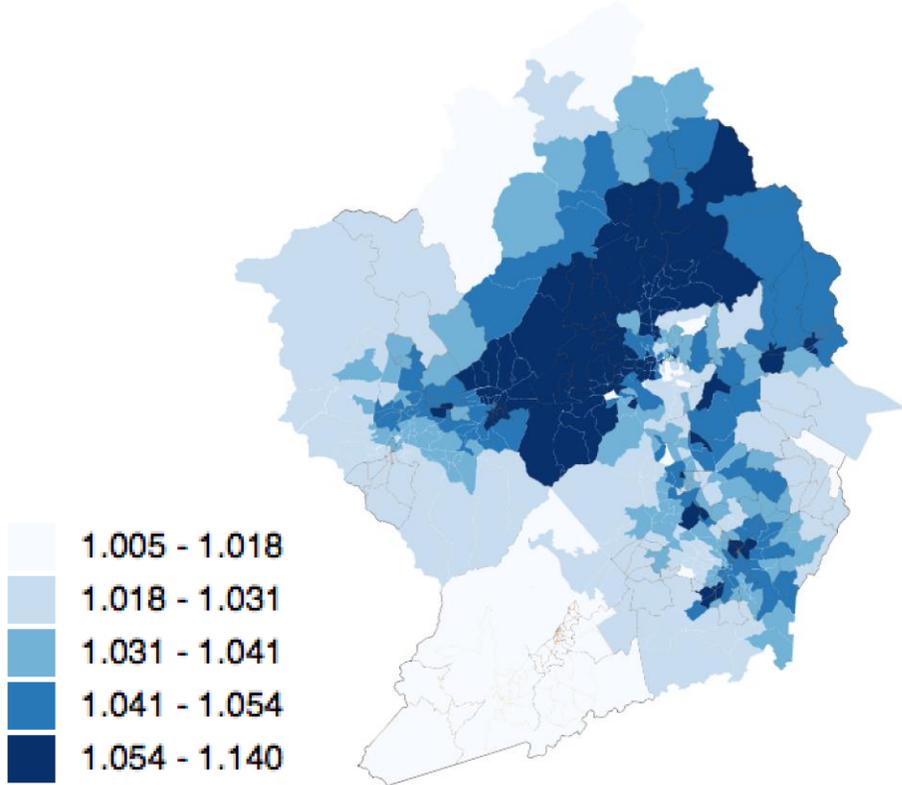
# Computing Local TTI With Freely Available Data

- **OpenStreetMap**
  - A crowd-sourced, routable map of the world
  - Can use *dodgr* routing library to get drive times
- **Census LEHD & LODES**
  - Origin-destination worker flows combined with OSM times to calculate what average commute *would* be if at free-flow speeds
  - Workplace Area Characteristics for jobs at destination
- **Census ACS summary file data (journey to work questions)**

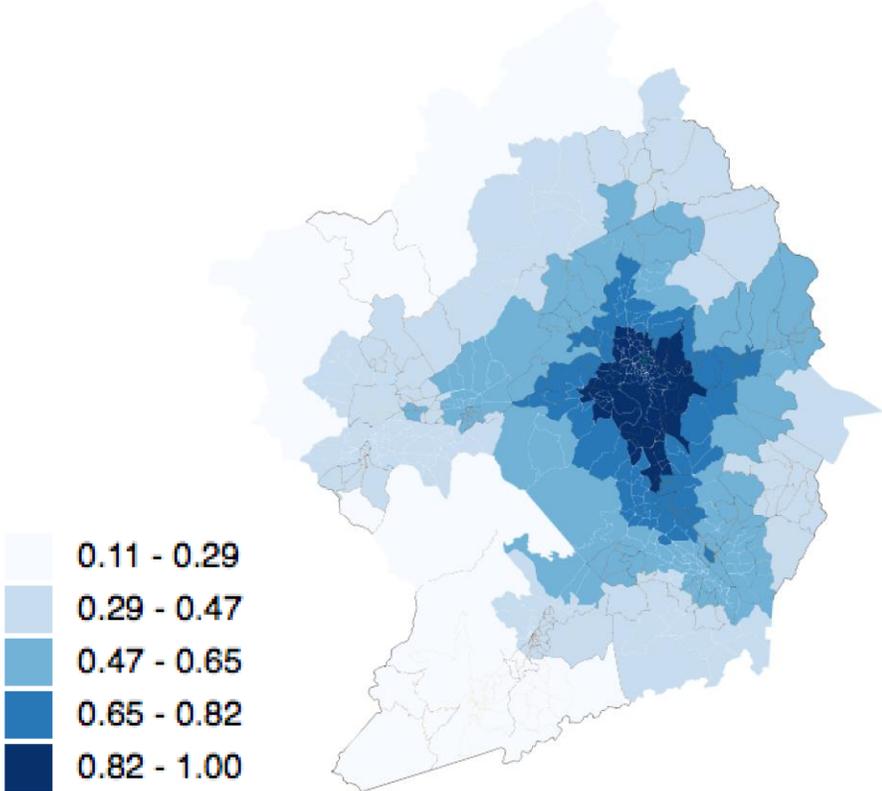


# Case Study: Greater Asheville (2015 Base Year)

Local Travel Time Index (Estimated)



Auto Access to Jobs (Normalized)



# Computing Accessibility: Best Practices

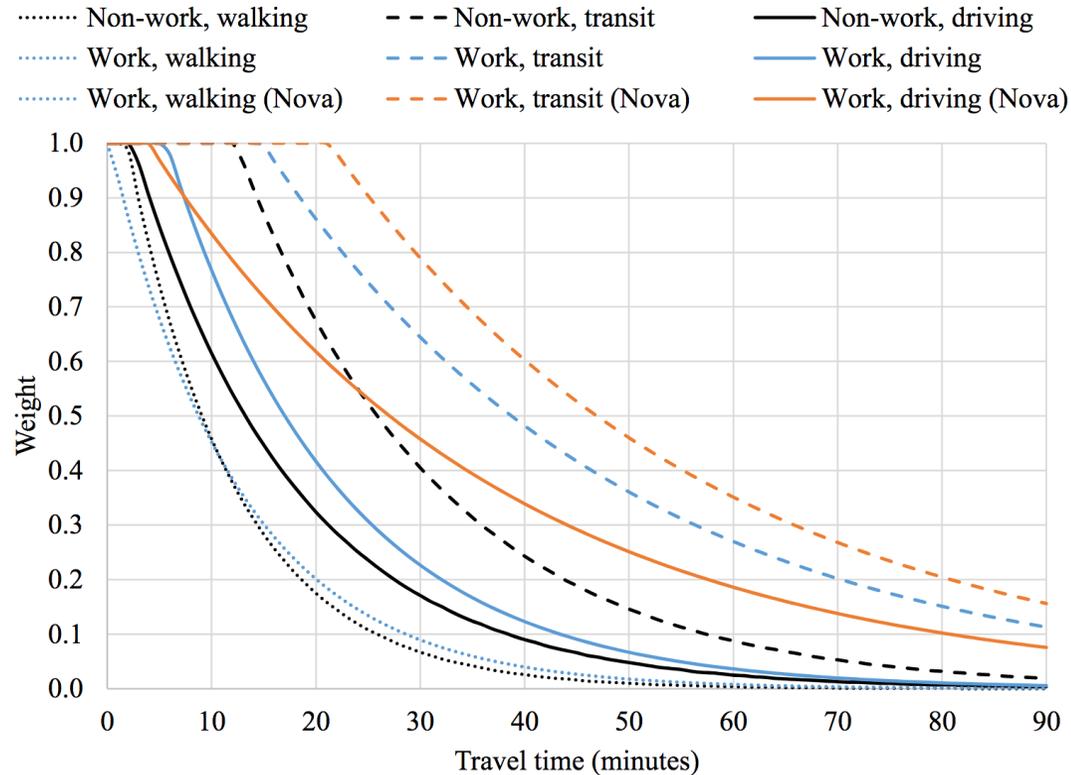


Figure 5. Travel-time decay curves by trip purpose, mode and region, derived from trips represented in the 2009 NHTS for Virginia.

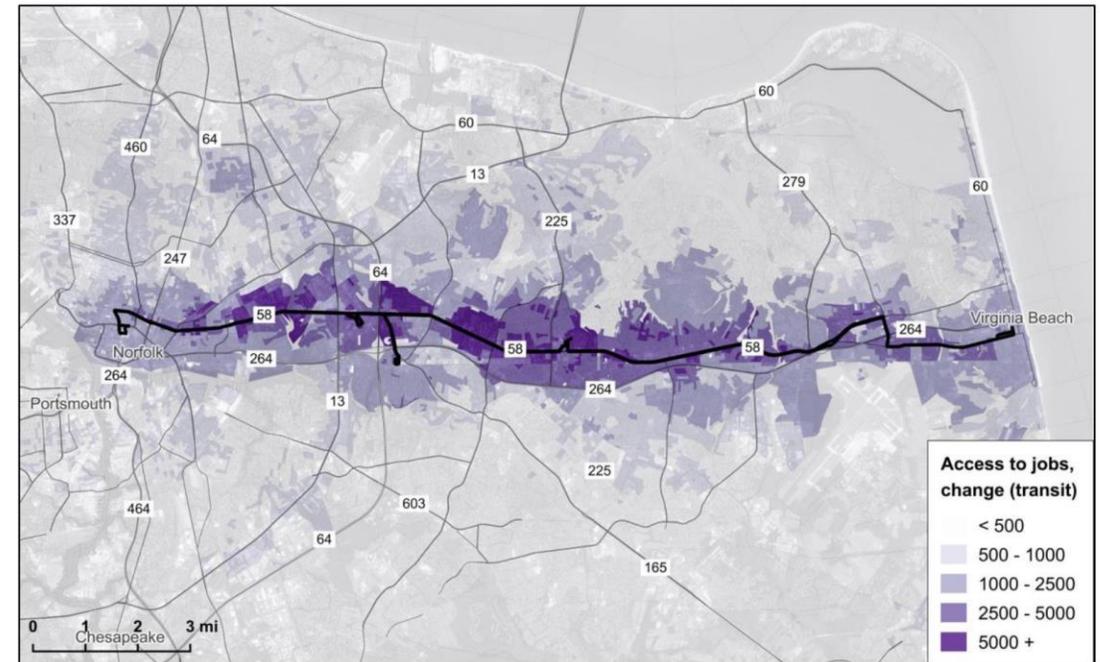


Figure 6. Changes in access to employment resulting from bus line headway improvements.

Source: "Accessibility in practice: A guide for transportation and land use decision making"  
 (Report authored by SSTI for the Virginia Office of Intermodal Planning and Investment)

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The logo for Manhan Group, featuring the word "MANHAN" in a light blue, sans-serif font above the word "GROUP" in a darker blue, sans-serif font. The text is positioned on the left side of the slide, with a decorative blue wave graphic behind it.

MANHAN  
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Special thanks to:

*Tristan Winkler & Nick Kroncke, French Broad River MPO*  
*Daniel Sellers, North Carolina DOT*