

National Accessibility Evaluation Task Report

Task 3.1: Calculate Accessibility Datasets

Prepared by the

Accessibility Observatory at the University of Minnesota

October 10, 2016



**ACCESSIBILITY
OBSERVATORY**

UNIVERSITY OF MINNESOTA

Driven to DiscoverSM

1 Task Objectives

The goal of this task is to calculate a nationwide dataset describing job accessibility from each Census block in the U.S., for auto and for transit. For each block, this process will calculate travel times for each mode to all surrounding blocks that can be reached within 60 minutes or less. These travel times will be used to aggregate the number of jobs that can be reached within travel time thresholds of 10, 20, 30, 40, 50, and 60 minutes from each origin block. Extracts from this national dataset will be provided for the jurisdiction of each project partner, and will be distributed electronically.

2 Task Status

This task is complete. [Section 3](#) summarizes the accessibility calculation methodology, and [Section 4](#) provides links to the individual datasets delivered to the project partners. These links will also be made available through the project's web site.

3 Data Sources and Methodology

The following sections provide a brief overview of the data sources and methodology used to prepare this report. A detailed description is available in the separate *Access Across America: Auto 2015 Methodology* and *Access Across America: Transit 2015 Methodology* reports.

3.1 Travel Times by Auto

Travel times by car were calculated using the June 2015 version of TomTom North America, Inc.'s MultiNet and Speed Profile data products. The road network dataset includes roadways of all functional classifications, including local streets through major highways. Speed data for each roadway segment are based on measurements collected by GPS devices during the June 2013 – June 2015 period. For road segments where speed data is provided separately for different days of the week, data for Wednesday is used.

3.2 Travel Times by Transit

Travel times by transit were calculated using General Transit Feed Specification (GTFS) data and OpenStreetMap road network data. GTFS data are included wherever feeds are made available by transit agencies, and the targeted service date for analysis was Wednesday, January 21st, 2015, to reflect non-holiday, normal weekday service schedules.

3.3 Geography

Census blocks are the fundamental unit for travel time and accessibility calculation, and block-level accessibility results are aggregated over larger areas for analysis. When calculating accessibility for an individual origin, all potential destinations within 74.6 miles (120 km) are included, even if those destinations are located in a different state. Only locations within the United States are included. The

metropolitan planning organization (MPO) jurisdictions used for aggregate analysis are based on data provided in the US Department of Transportation's National Transportation Atlas Database 2015¹.

3.4 Population and Job Distribution

Data describing the distribution of labor and employment in the region are drawn from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics program (LEHD)². The LEHD Origin-Destination Employment Statistics (LODES) dataset, which is updated annually, provides Census block-level estimates of employee home and work locations. This analysis uses LODES data from 2014, the most recent available as of this writing.

3.5 Accessibility Calculation

The accessibility metrics presented in this analysis are *cumulative opportunity* metrics — they reflect the total amount of opportunities (in this case, jobs) reachable within given travel time thresholds from an origin location. To calculate these metrics, the travel time calculations described above are performed first to identify the travel time from one origin to all surrounding destinations. Next, the number of jobs at each destination is summed for all destinations that can be reached within a given travel time threshold, providing the accessibility value for a single origin at a single departure time.

This process provides accessibility values for individual Census blocks. To summarize this block-level data to larger areas such as MPOs and states, the accessibility values for the relevant blocks are weighted by the number of workers living in each block and then averaged. This person-weighted approach allows the summary metric to reflect the distribution of residents within the area. For example, a person-weighted accessibility value of 134,173 indicates that a typical resident within the area can reach 134,173 jobs.

Road and highways speeds vary throughout the day. The accessibility data presented in this report assume a departure time of 8 AM in order to represent job accessibility during the AM peak period.

4 Deliverables

The following links provide access to the datasets for each project partner:

- Arkansas:
https://s3.amazonaws.com/ao-nae-data-2015/AR_accessibility_data_2015.zip
- California:
https://s3.amazonaws.com/ao-nae-data-2015/CA_accessibility_data_2015.zip
- District of Columbia:
https://s3.amazonaws.com/ao-nae-data-2015/DC_accessibility_data_2015.zip

¹http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_atlas_database/index.html

²<http://lehd.ces.census.gov/data/>

- Florida:
https://s3.amazonaws.com/ao-nae-data-2015/FL_accessibility_data_2015.zip
- Iowa:
https://s3.amazonaws.com/ao-nae-data-2015/IA_accessibility_data_2015.zip
- North Carolina:
https://s3.amazonaws.com/ao-nae-data-2015/NC_accessibility_data_2015.zip
- Maryland:
https://s3.amazonaws.com/ao-nae-data-2015/MD_accessibility_data_2015.zip
- Minnesota:
https://s3.amazonaws.com/ao-nae-data-2015/MN_accessibility_data_2015.zip
- Virginia:
https://s3.amazonaws.com/ao-nae-data-2015/VA_accessibility_data_2015.zip
- Washington:
https://s3.amazonaws.com/ao-nae-data-2015/WA_accessibility_data_2015.zip
- Wisconsin:
https://s3.amazonaws.com/ao-nae-data-2015/WI_accessibility_data_2015.zip

Additionally, the project team prepared a combined dataset with national coverage, which was used in creating the national reports in Task 4.1.