

Accessibility Tool To Support VDOT's Smart Scale Project Prioritization Process

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Outline

- Motivation for Tool Development
- Development of Accessibility Tool
- Accessibility Models and Results
- Accessibility Tool Visualization
- Live Demonstration

Motivation for Tool Development

- Accessibility scoring one step of VDOT's SMART SCALE process evaluating transportation projects
- Evaluate and score accessibility with and without project implementation
- After proof of concept tests, VDOT commissioned Caliper to develop accessibility tool for Round 4 of SMART SCALE analysis
- Goal to reproduce and improve upon accessibility tool used for Round 3

Development of Accessibility Tool-Data

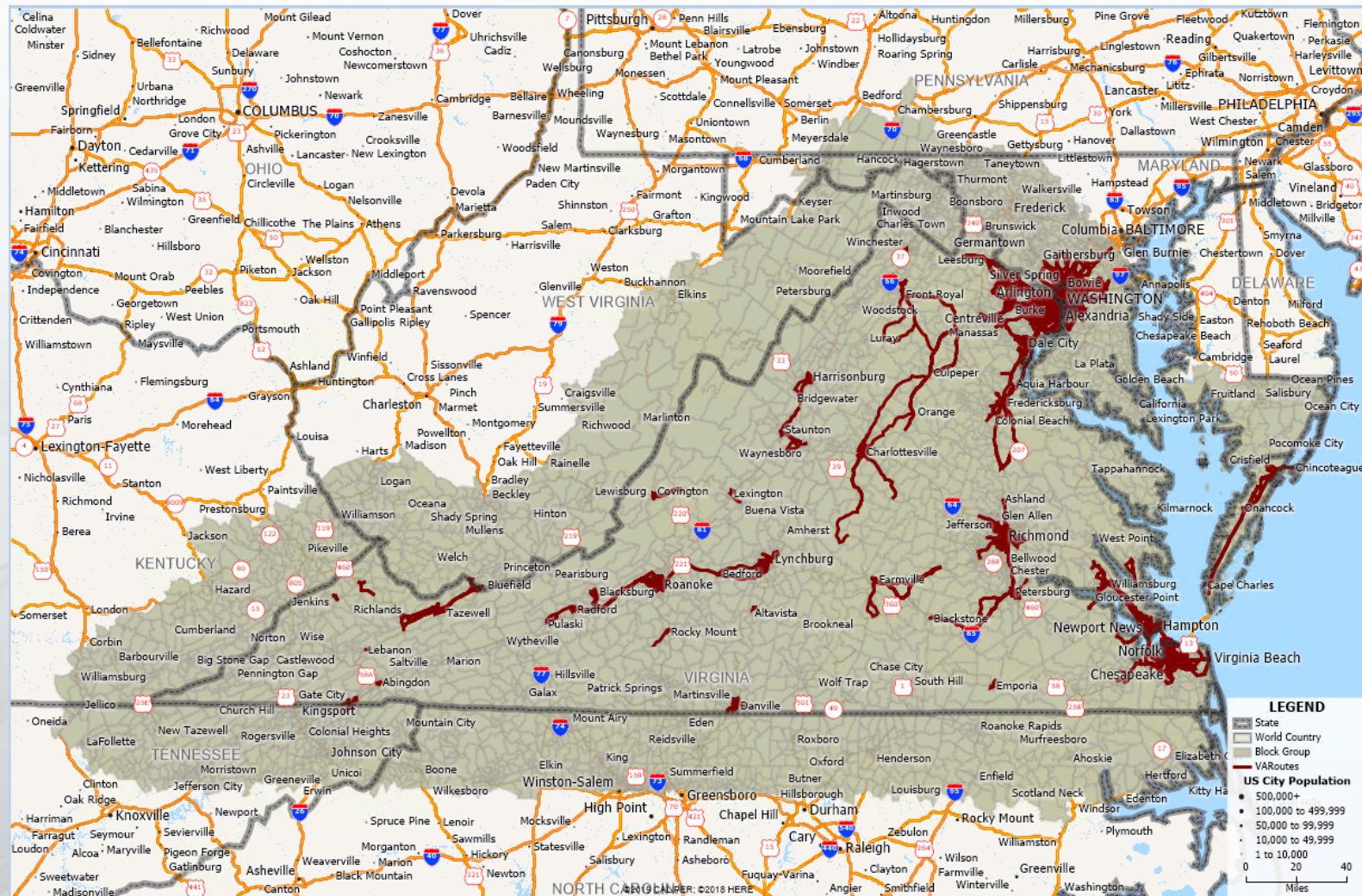
- Analysis area: State of Virginia and 30 mile surrounding area
- Extraction of HERE datasets
 - Streets (~ 2.5 million links) with congested speed estimates by hour, functional class, lanes, speed limits
 - Transit facilities
 - Walking and biking trails
 - Sidewalk and bike data
 - Points of Interest (143,000)
- Demographic Areas
 - Blocks (263,000)
 - Block Groups (10,602)
 - Population, Employment, Disadvantaged Population, Resident Workers (2025, 2030, 2035) provided by VDOT

Development of Accessibility Tool-Data

- **GTFS Datasets**
 - WMATA and major and minor transit operators in Virginia
 - 15 total operators
 - GTFS Routes conflated onto HERE streets using import procedure
 - Schedules used to estimate route headways and stop-to-stop and overall runtimes
 - Special handling for subway, light rail, commuter rail, and ferry routes
- One common dataset is used for all modes and data are not split up into regions

Development of Accessibility Tool-Data

- Modeling Area with Transit Routes



Development of Accessibility Tool-Program

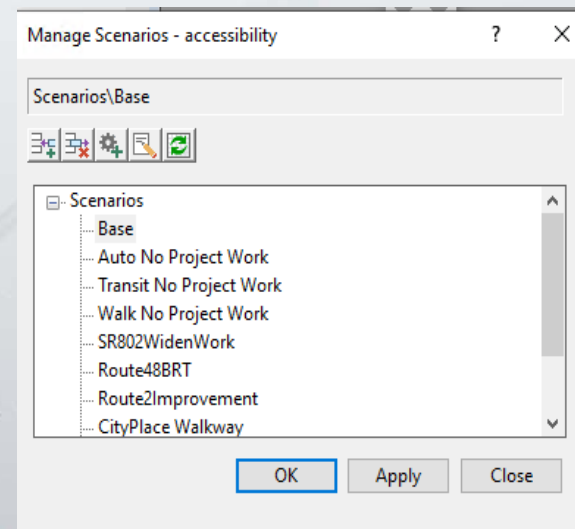
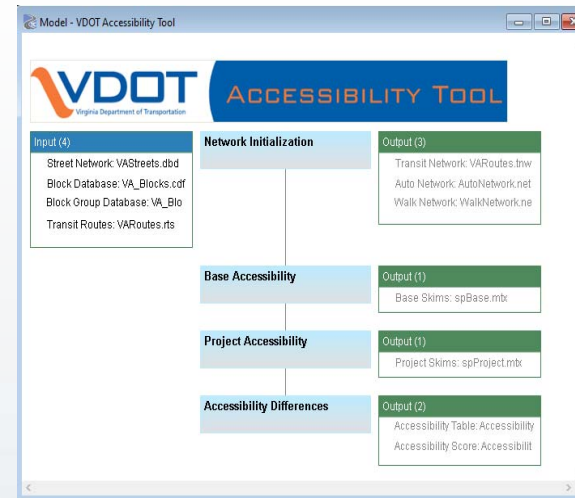
- Developed using GISDK within TransCAD Version 9
- Uses standard GISDK functions, macros, and procedures
- Flowchart manager
- Includes two components
 - Accessibility Models
 - Accessibility Visualizer
- ~4-5 month development time

Accessibility Models

- Network Initialization
- Base and Project skimming (block-to-block and block group-to-block group)
- Base and Project accessibility calculation
 - Total employment accessibility to Block/block group
 - Auto, Transit, Walk projects
 - Work (employment) and non-work (POI) accessibilities
- Project vs. Base accessibility differences
 - Different population and employment weights
 - Result is project score input to SMART SCALE

Accessibility Models

- Flowchart and visualization of inputs and outputs
- Scenario manager within flowchart to define and manage projects



Accessibility Models

- Project parameter manager

Model Parameters - accessibility

Steps
Data Folders
Input Files
General Parameters
Auto Parameters
Transit Parameters
Walk Parameters
Outputs
Display Properties
Model Files
Help Document

General Parameters

Iteration: 1
MaxIterations: 1
Project ID: **NewProject**
Project Type: Auto
ZONETYPE: Block Group
Year: 2030
Period: AM
TimeType: MAX
Purpose Type: Work

Decay Parameters by Mode

| Mode | DecayA | DecayB | DecayC | DecayStart |
|----------------|---------|----------|-----------|------------|
| AutoWork | 1.26103 | -1.2e-05 | -0.054 | 4 |
| TransitWork | 2.34105 | 0.00016 | -0.035005 | 24 |
| WalkWork | 1.01699 | 6e-06 | -0.081001 | 0 |
| AutoNonWork | 1.262 | 0 | -0.073 | 4 |
| TransitNonWork | 1.533 | 0 | -0.029 | 24 |
| WalkNonWork | 1.29 | 0 | -0.077 | 0 |

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- Accessibility score results

Dataview4 - AccessibilityScoreResults

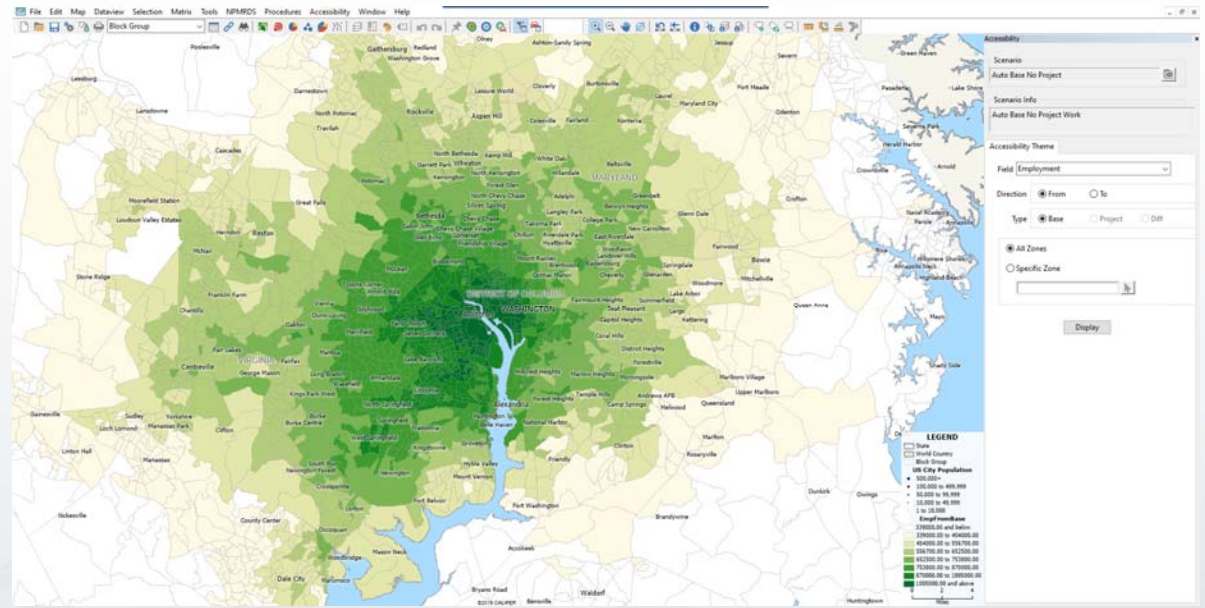
| Measure | Score |
|--|-------|
| UnWeighted POI Access Score From Zone (Score0) | 18.15 |
| UnWeighted POI Access Score To Zone (Score0) | 18.14 |
| Pop + Emp Weighted POI Access Score From Zone (Score1) | 35.71 |
| Pop + Emp Weighted POI Access Score To Zone (Score1) | 35.89 |
| Future(Pop + Emp) - Base(Pop + Emp) Weighted POI Access Score From Zone (Score2) | 34.07 |
| Future(Pop + Emp) - Base(Pop + Emp) Weighted POI Access Score To Zone (Score2) | 34.39 |

Accessibility Tool Visualizer

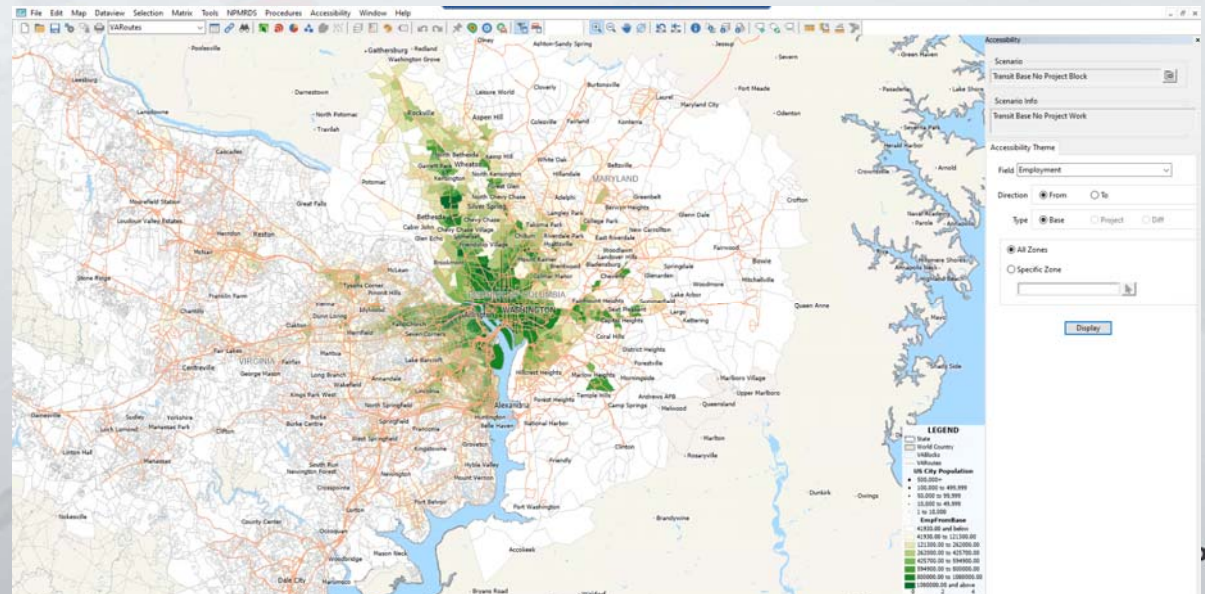
- Visualize accessibilities by block/block group and project
- Employment, Resident Workers, and POI accessibilities from and to zone
- Walk scores
- Project vs. Base differences
- Auto, Transit, Walk accessibilities
- Toolbox control

Accessibility Tool Visualizer

- Auto accessibilities

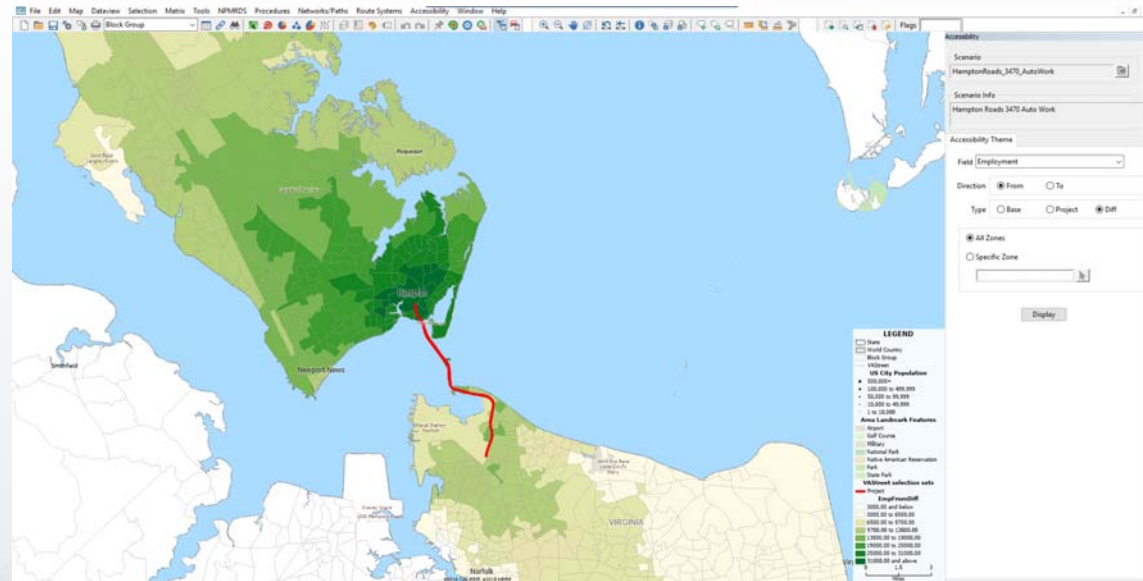


- Transit Accessibilities

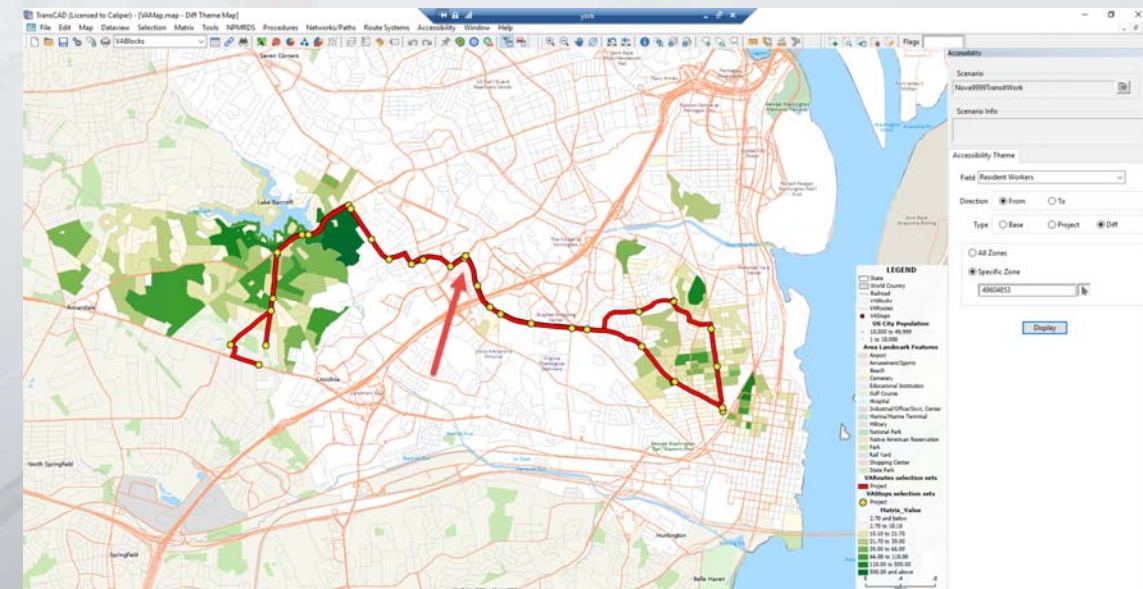


Accessibility Tool Visualizer

- Project minus base accessibility differences

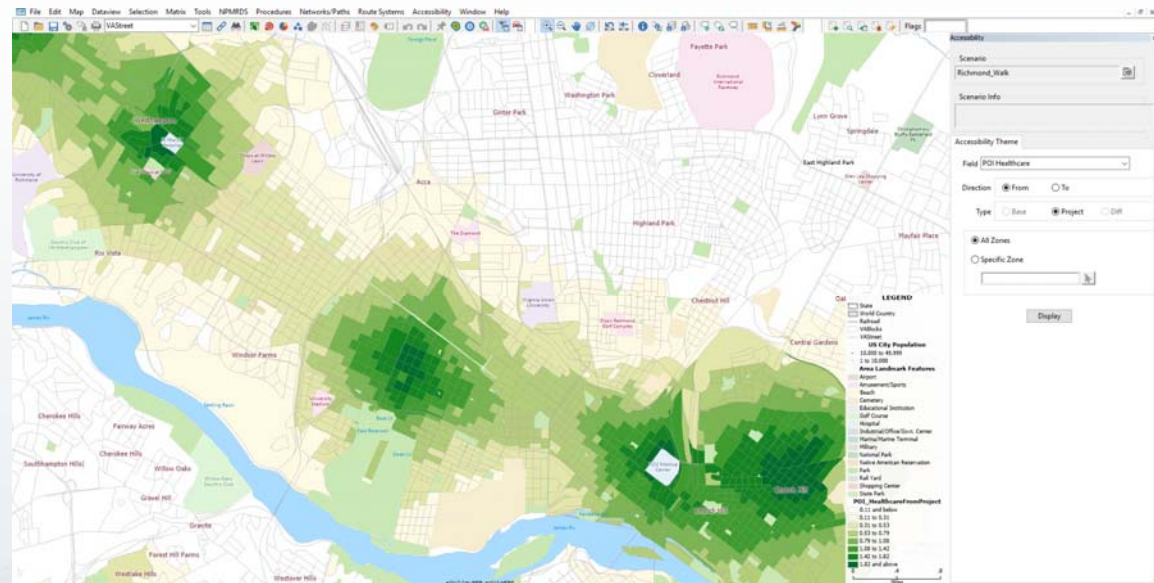


- Zonal accessibilities

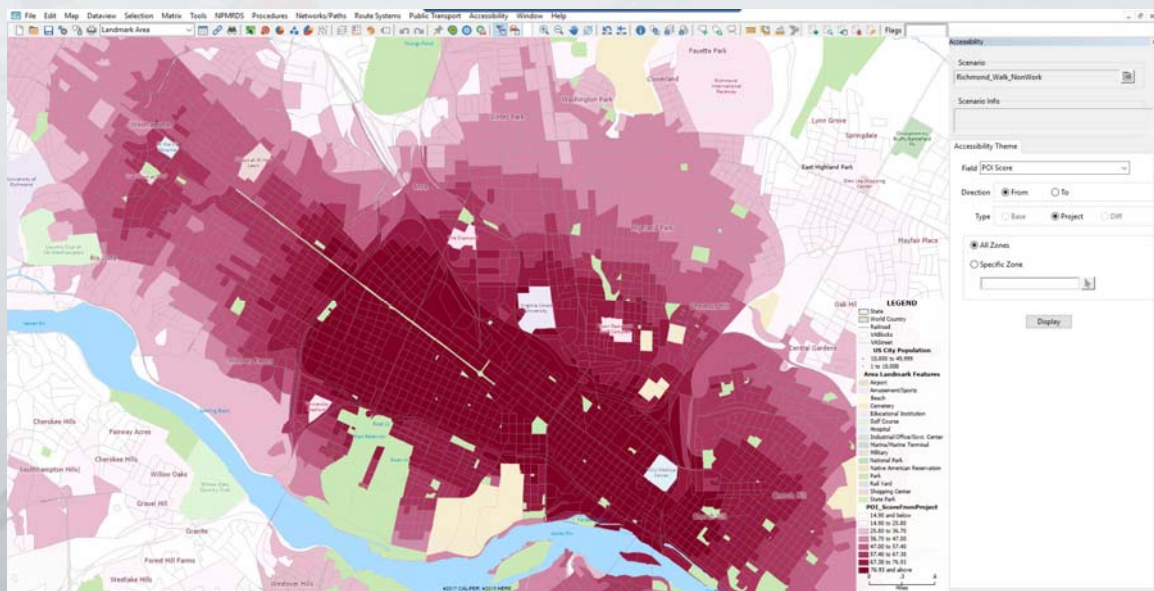


Accessibility Tool Visualizer

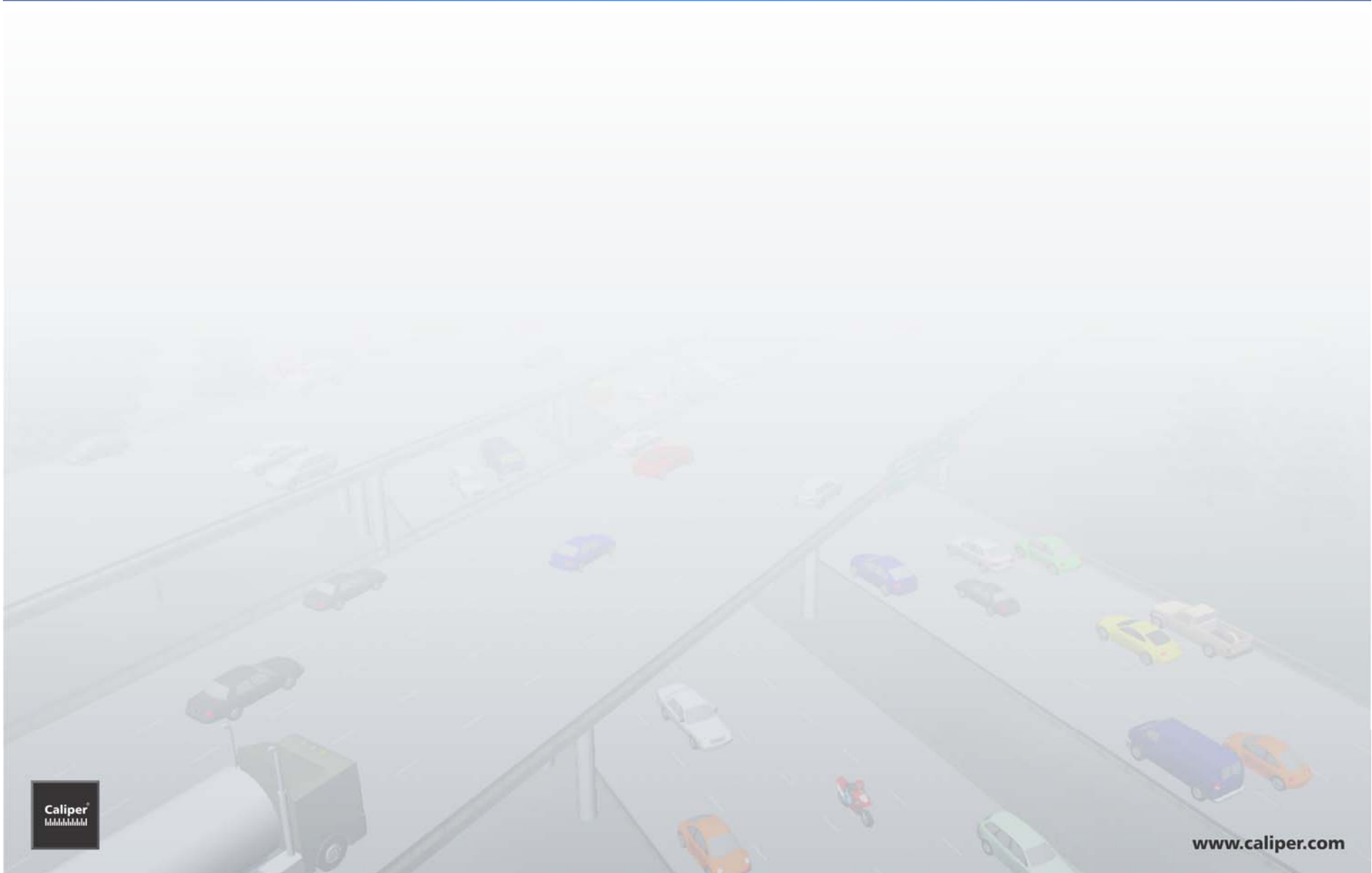
- Accessibilities to Health Care



- Walk Scores



Live Demo



Questions?

