

Geographic Coverage Analysis and Location Optimization for Vaccine Providers

Dennis Kim

Vaccine Data Analytics

Department of Immunization

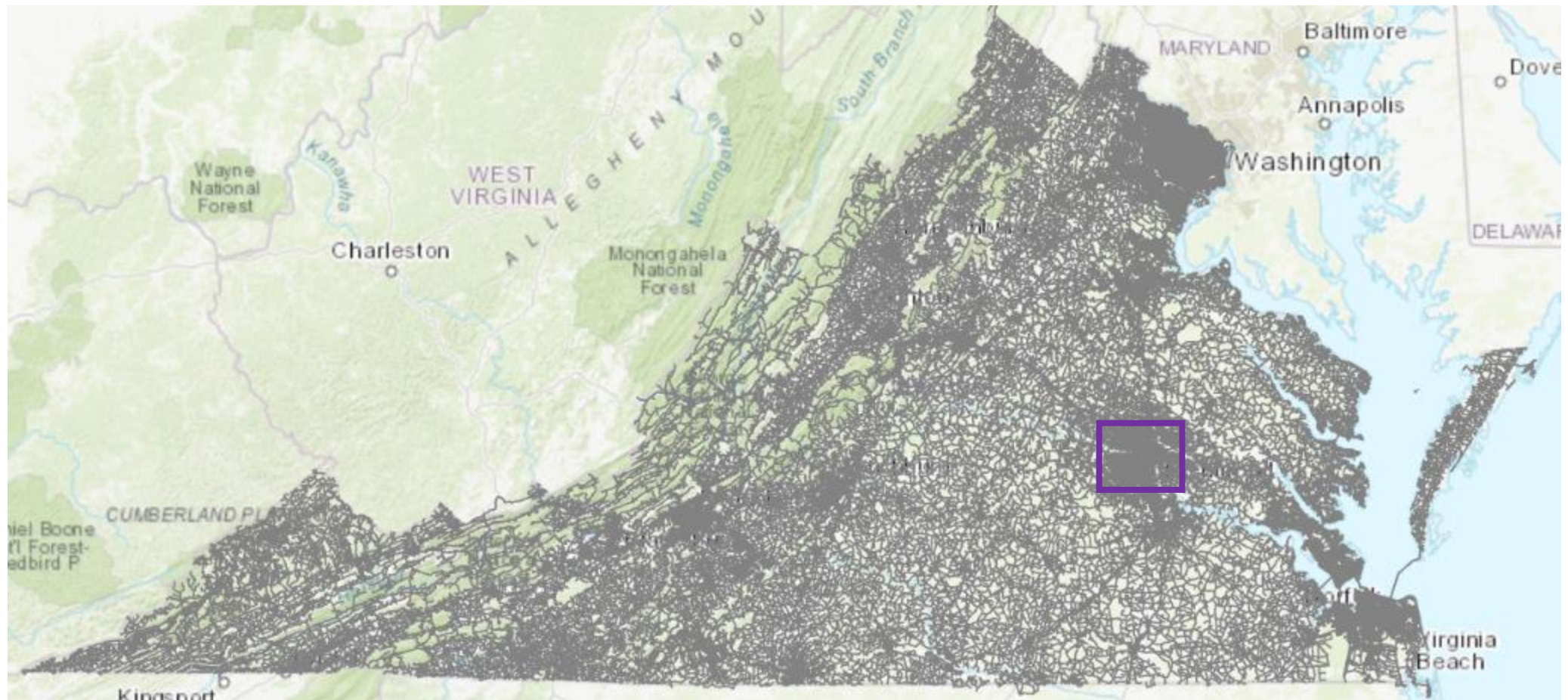
Virginia Department of Health

Background

- The Vaccines for Children (VFC) and CDC Bridge Access Program were the subjects of our Geographic Coverage Analysis and Location Optimization Project
- We gathered input data from various sources, located gaps in coverage, and optimized potential new locations using geographic analysis

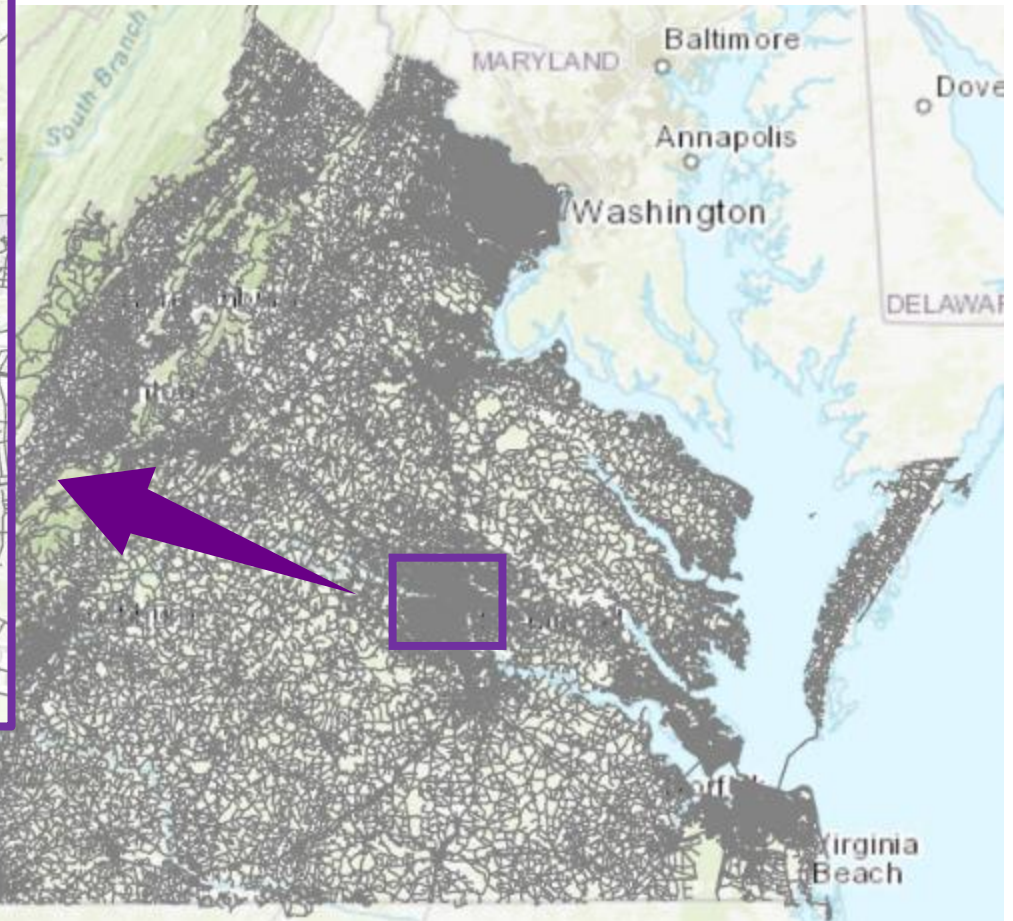
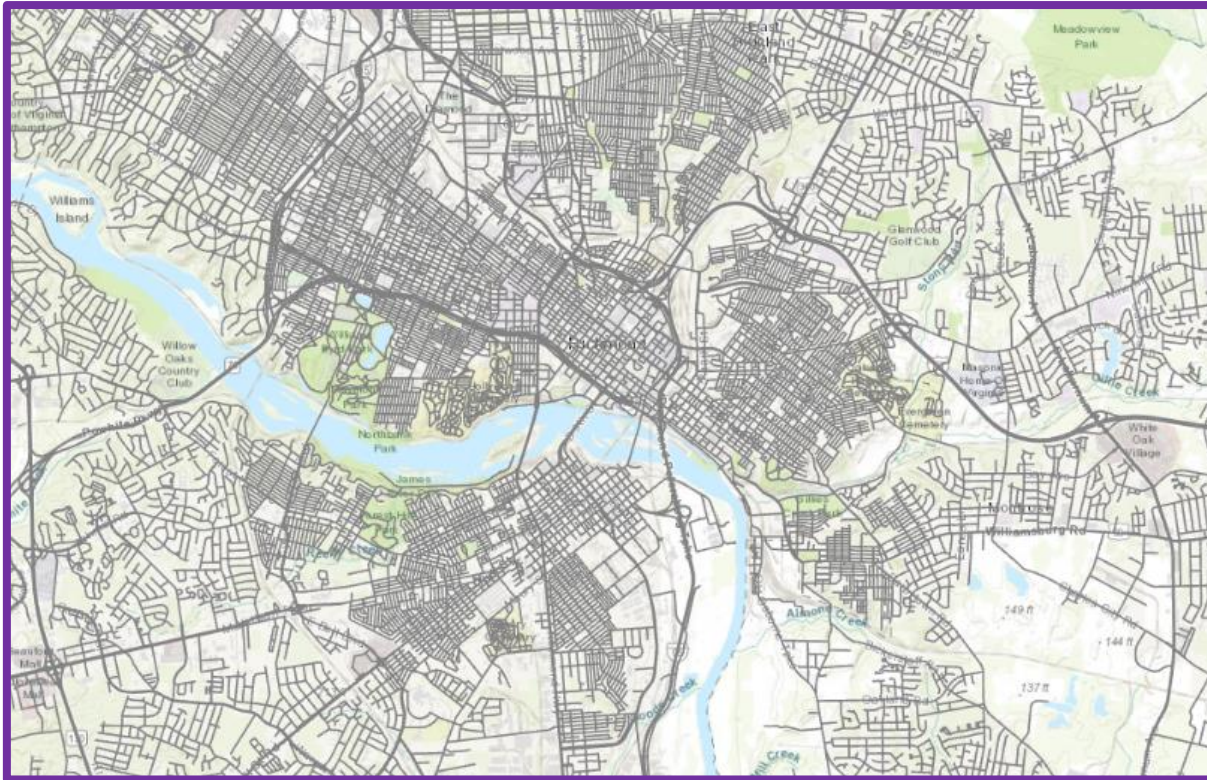


- The Virginia Geographic Information Network (VGIN) manages the Road Centerline (RCL) geospatial database which includes addresses, roads and routing elements, and other geographic information which we use for our routing, and drive and walk time coverage analysis





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- **Social Vulnerability** refers to the potential negative effects on communities caused by external stresses on human health.
- The **VDH Office of Health Equity (OHE)** developed a Virginia specific SVI Index Geospatial Database by Census Tract for all of these factors, which underlaid the mapping analysis

Socioeconomic Status

Below 150% poverty,
Unemployed, Housing
cost burden, No high
school diploma, No
health insurance

Household Characteristics

65+, Aged 17 or
younger, Civilian with a
disability, Single-parent
households, English
language proficiency

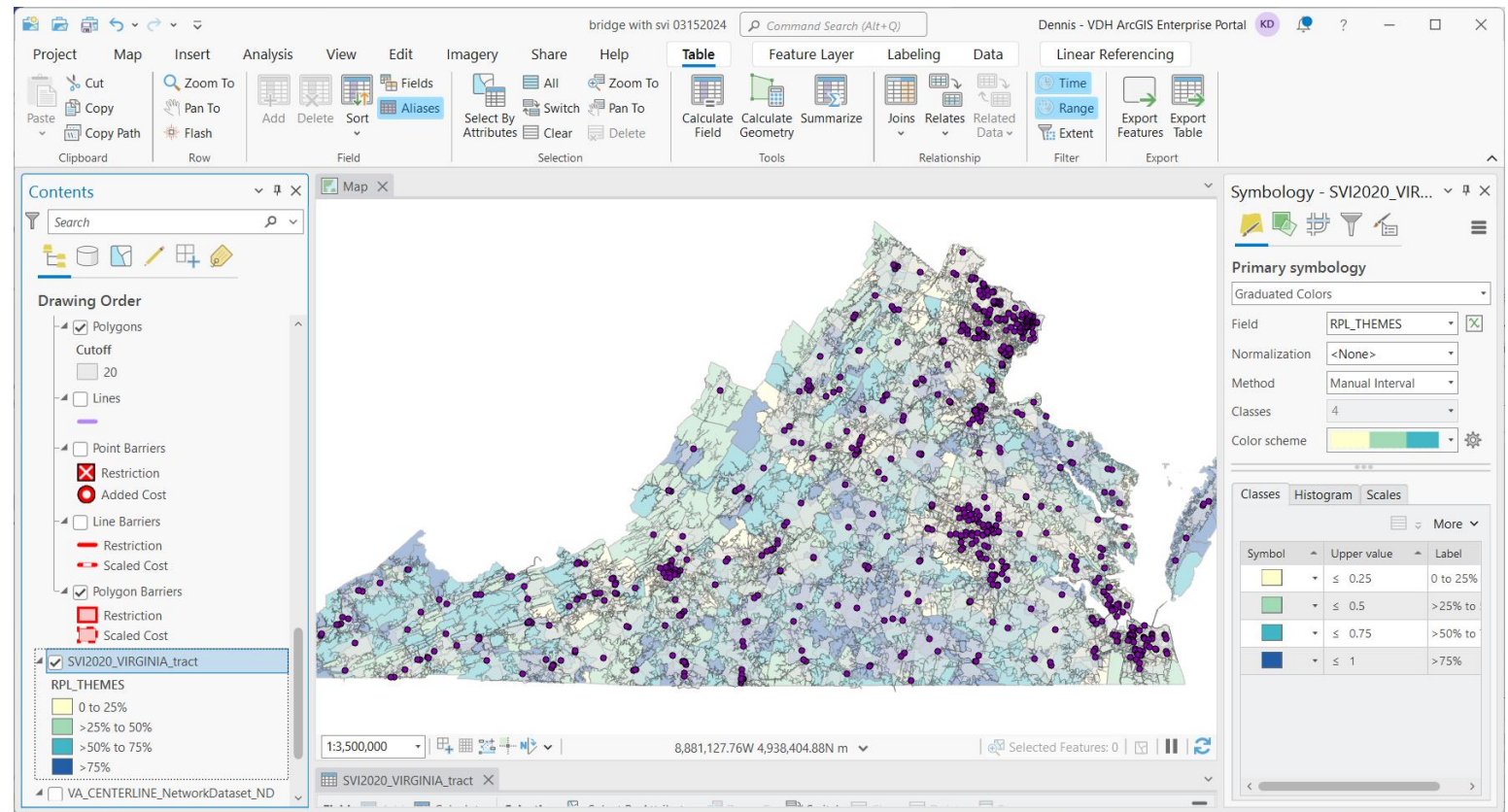
Racial and ethnic minority status

Hispanic or Latino;
Black and African
American, Asian and
Pacific Islander, etc.

Housing type & transportation

Multi-unit structures,
Mobile homes,
Crowding, No vehicle,
Group quarters

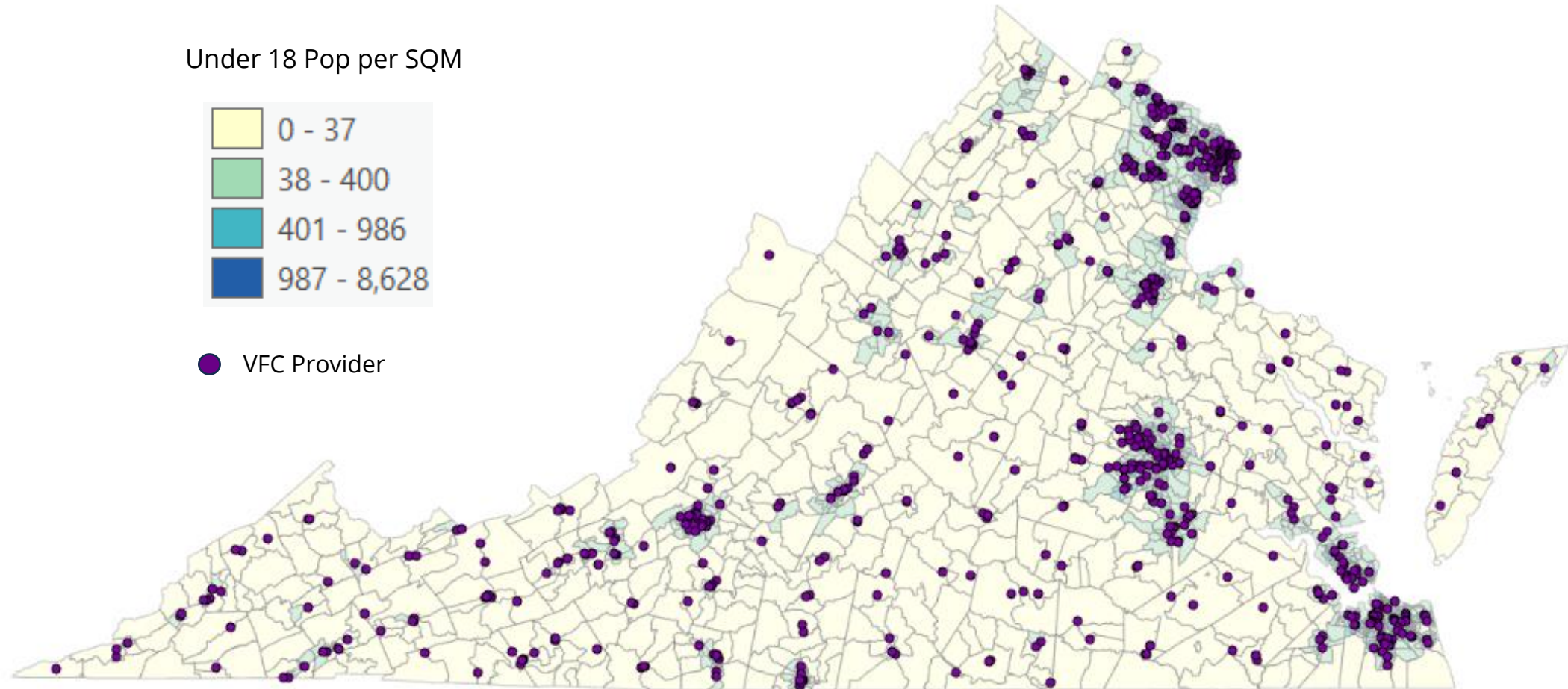
- The Virginia Immunization Information System (VIIS) is a statewide registry system which stores immunization data
- Combining Provider Level Vaccination data with VGIN road data overlaid on SVI data in ArcGIS allowed us to calculate drive times, coverage areas and areas of need for Virginia



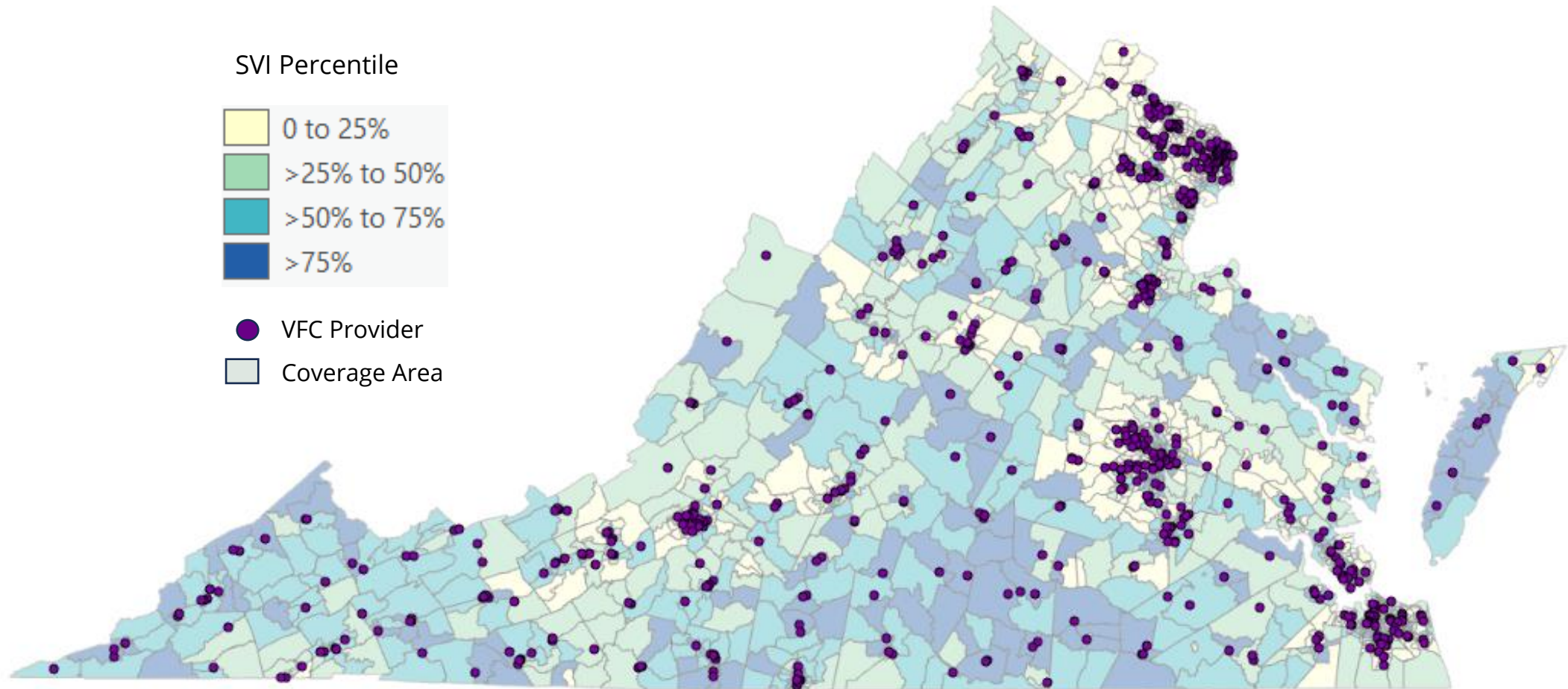
Vaccines for Children

Using Walking and Driving Coverage Areas to Identify Areas of Need

- VFC Providers are concentrated around Population Dense areas

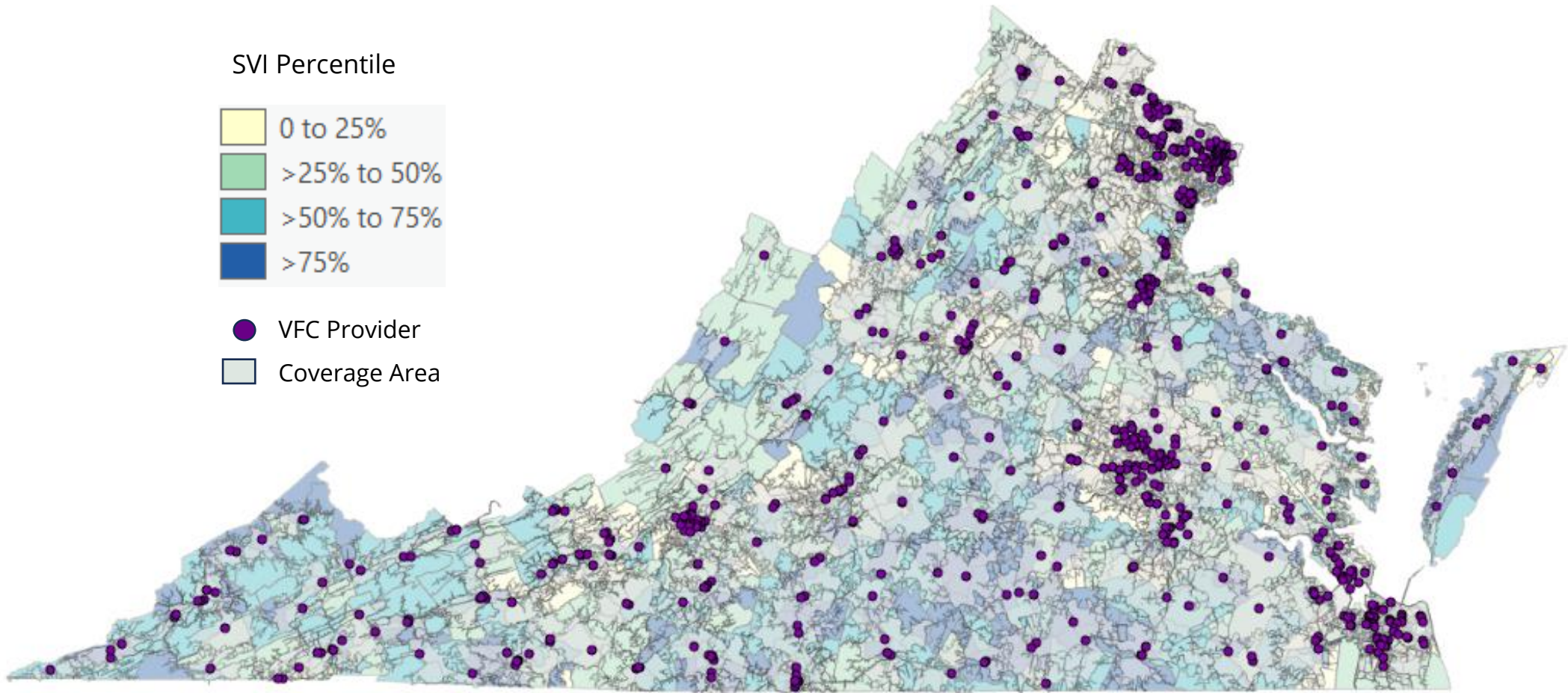


- There are large areas of higher Social Vulnerability across Virginia with coverage from the VFC Program

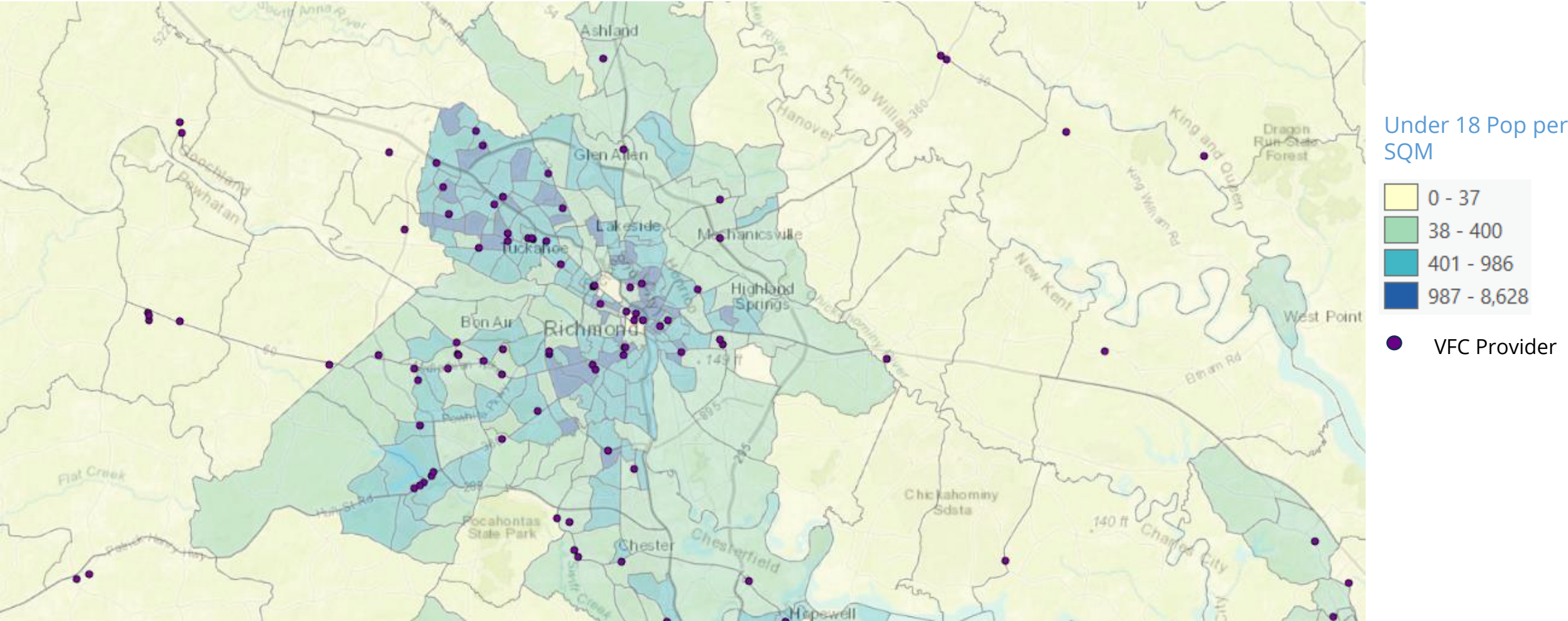


*Higher Number is more Vulnerable

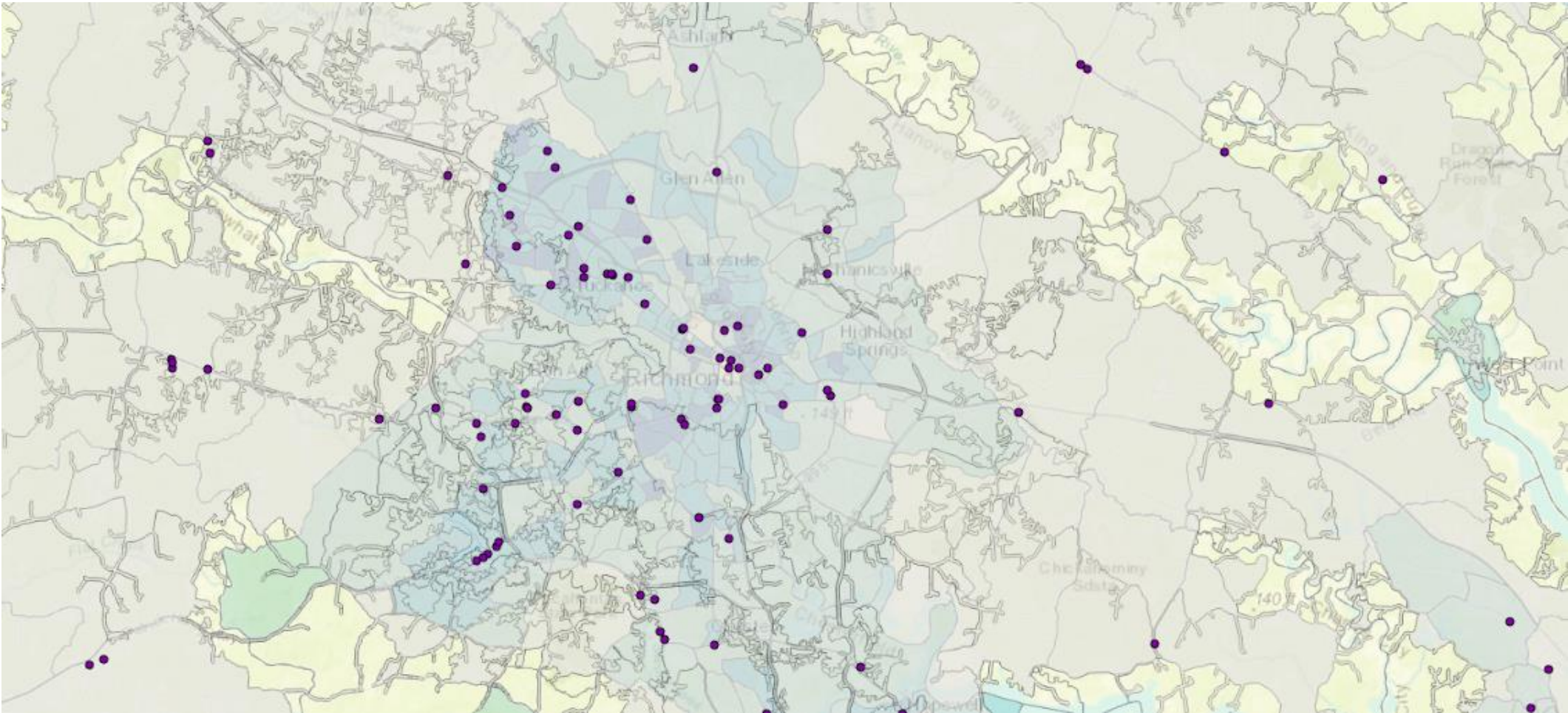
- The 20 minute Drive Coverage area shows that much of the state is covered by existing VFC providers



VFC Providers Coverage Area with Under 18 Population Density



VFC Providers Coverage Area with Under 18 Population Density

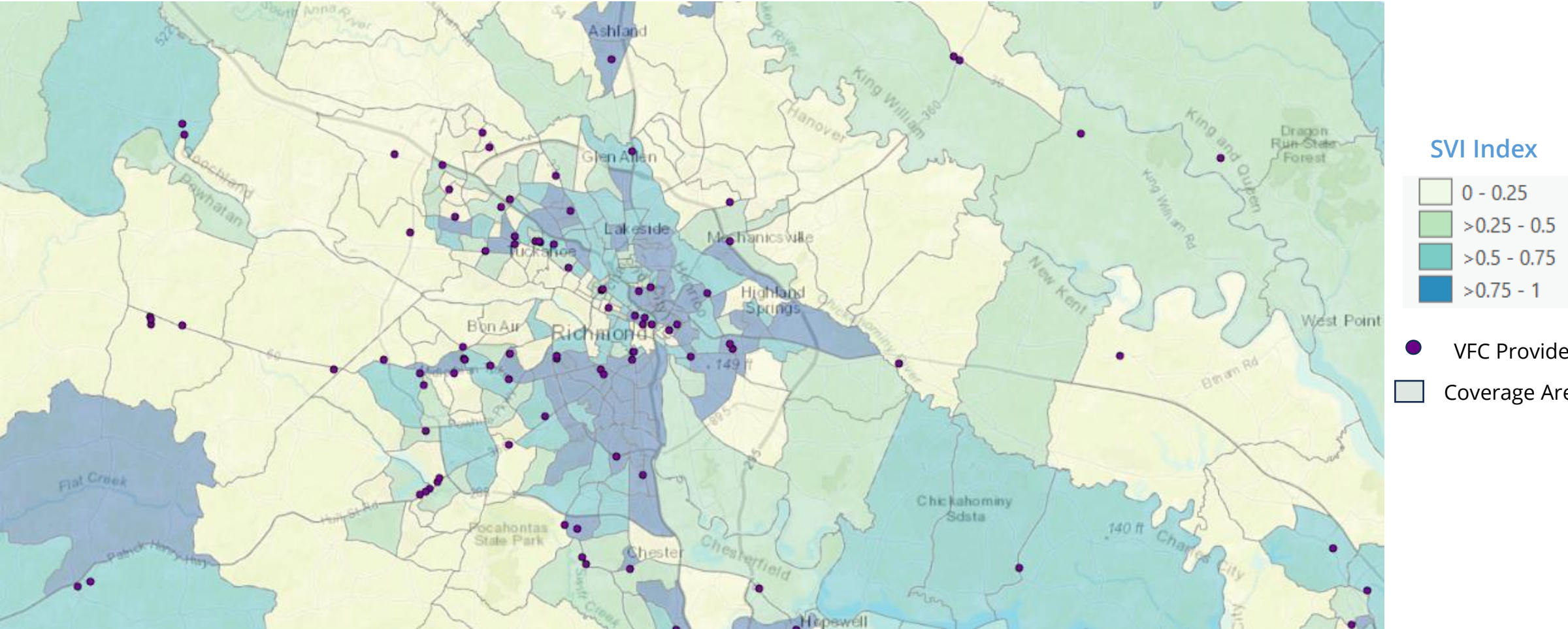


Under 18 Pop per SQM

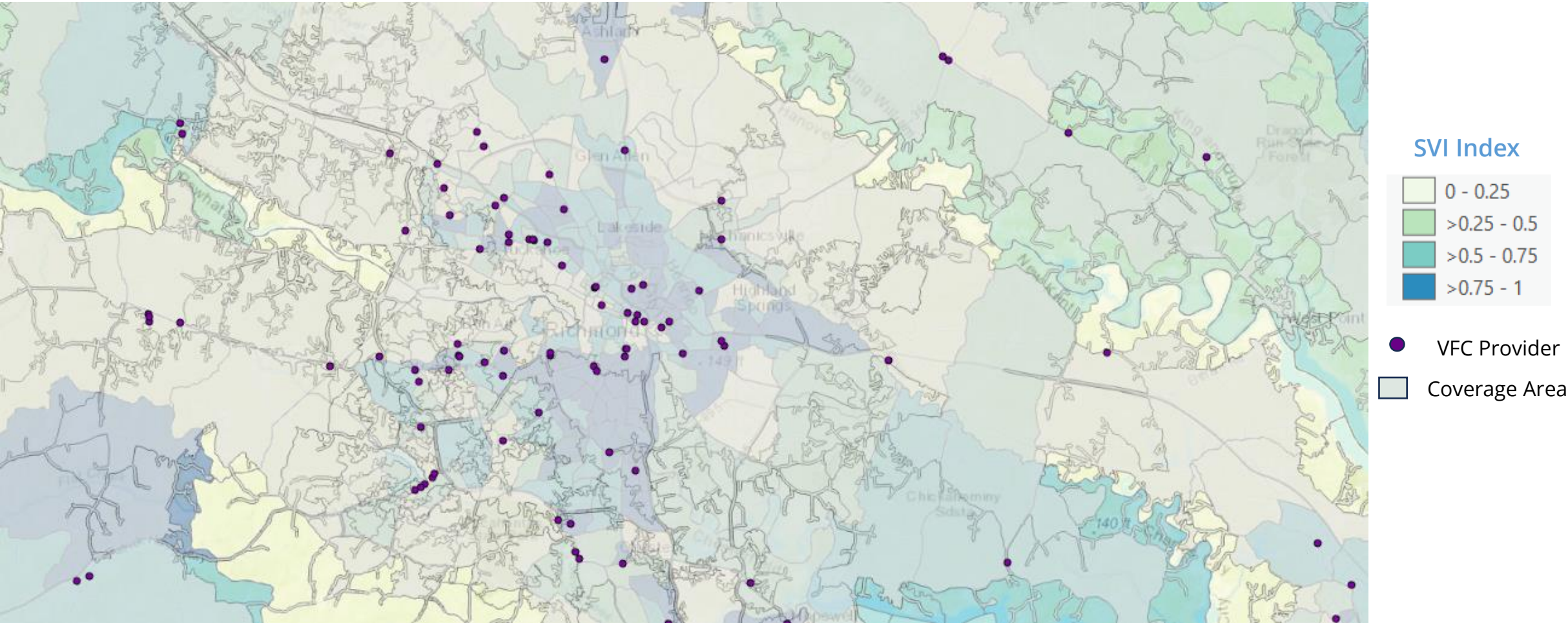
- 0 - 37
- 38 - 400
- 401 - 986
- 987 - 8,628

- VFC Provider
- Coverage Area

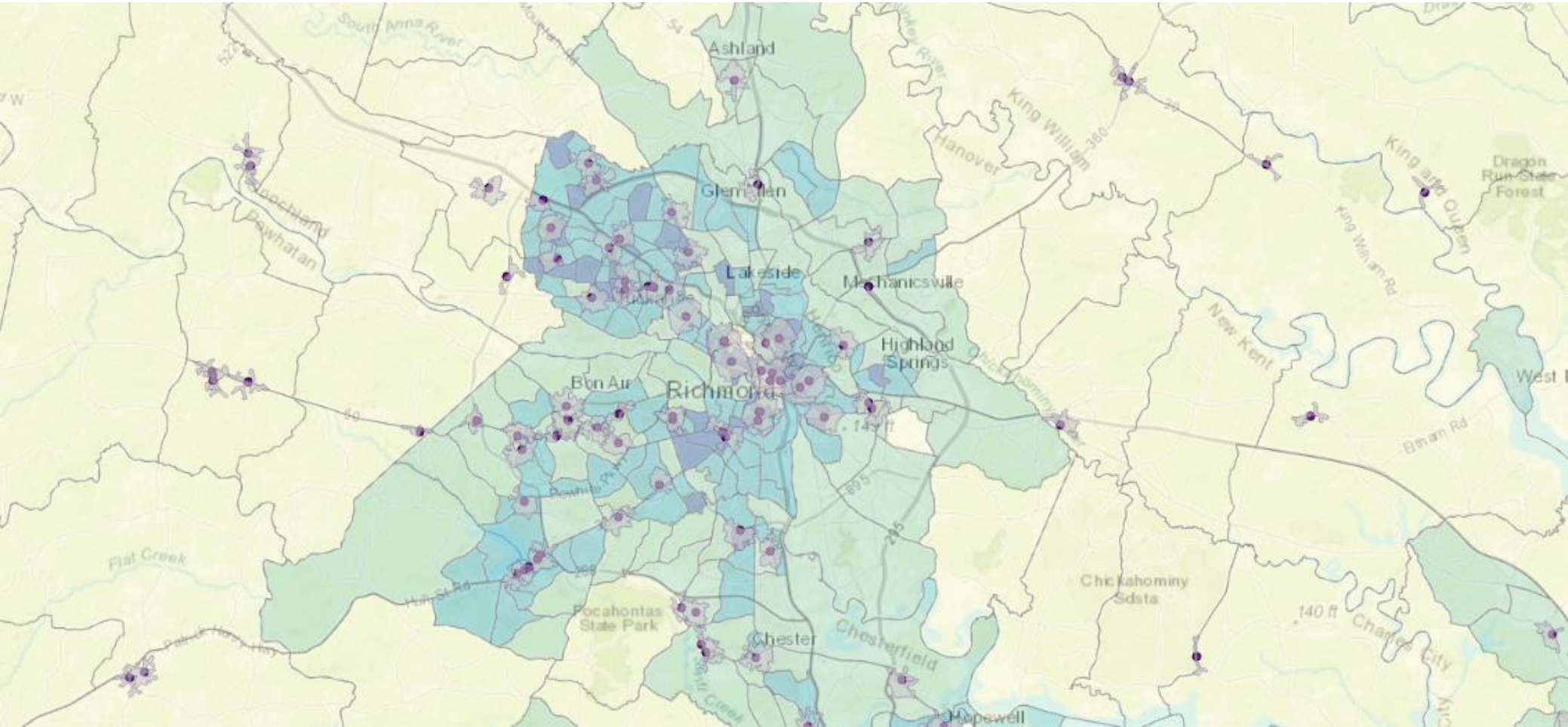
VFC Providers Coverage Area Over SVI



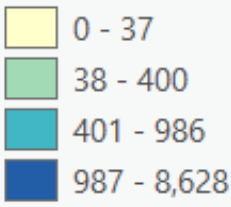
VFC Providers Coverage Area Over SVI



VFC Providers Coverage Area Over SVI

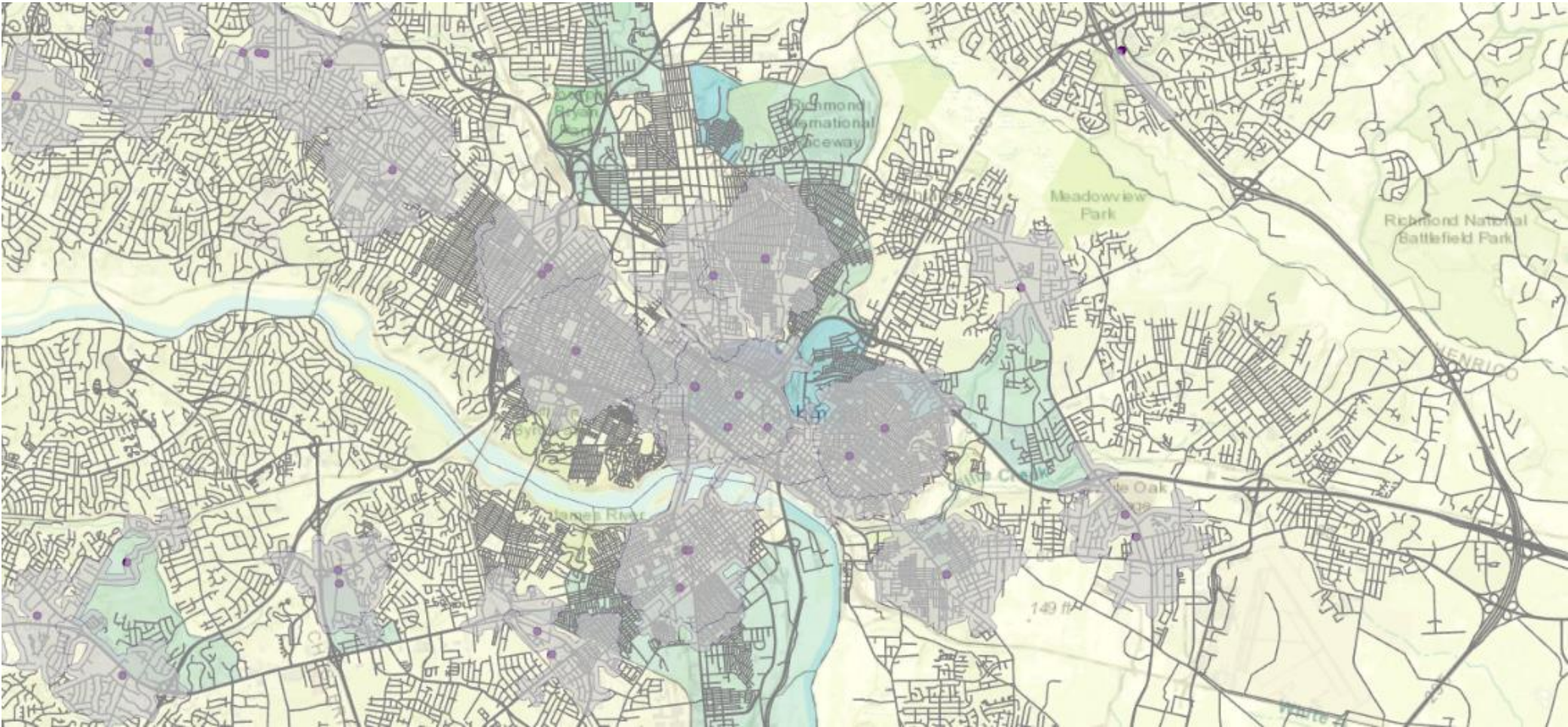


Under 18 Pop per SQM

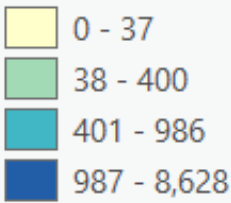


- VFC Provider
- Coverage Area

VFC Providers Walking Coverage Area with Population Density



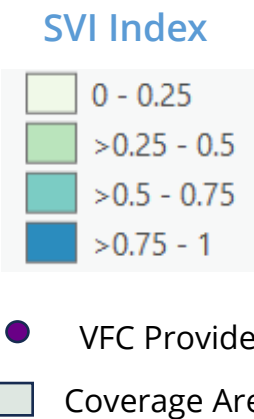
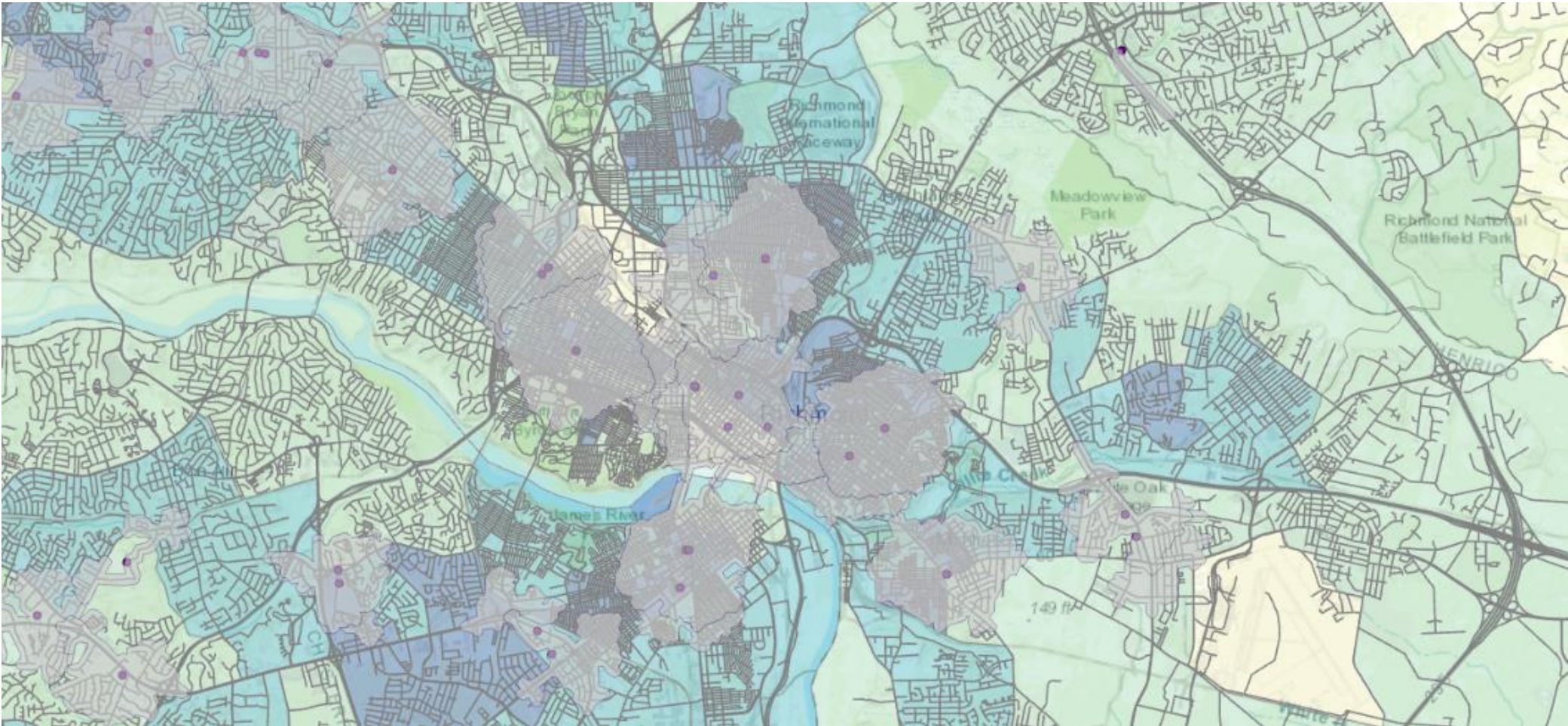
Under 18 Pop per SQM



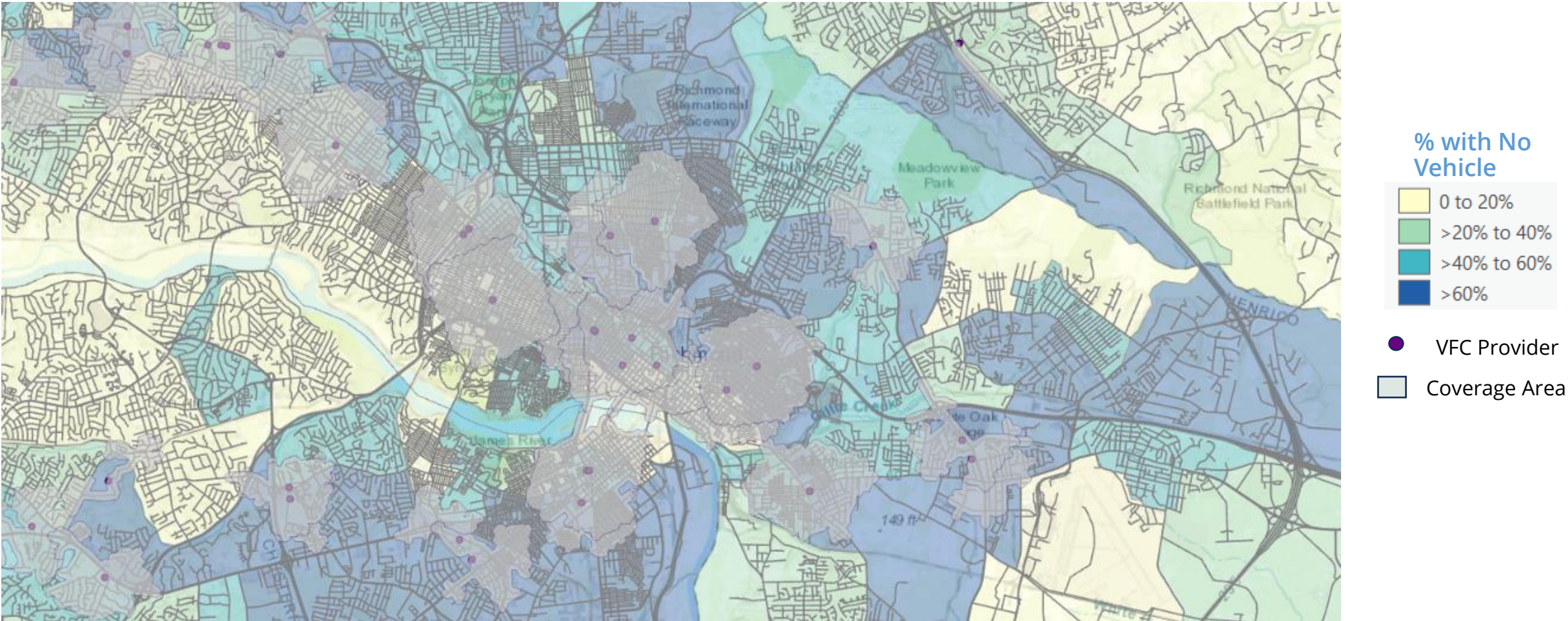
● VFC Provider

□ Coverage Area

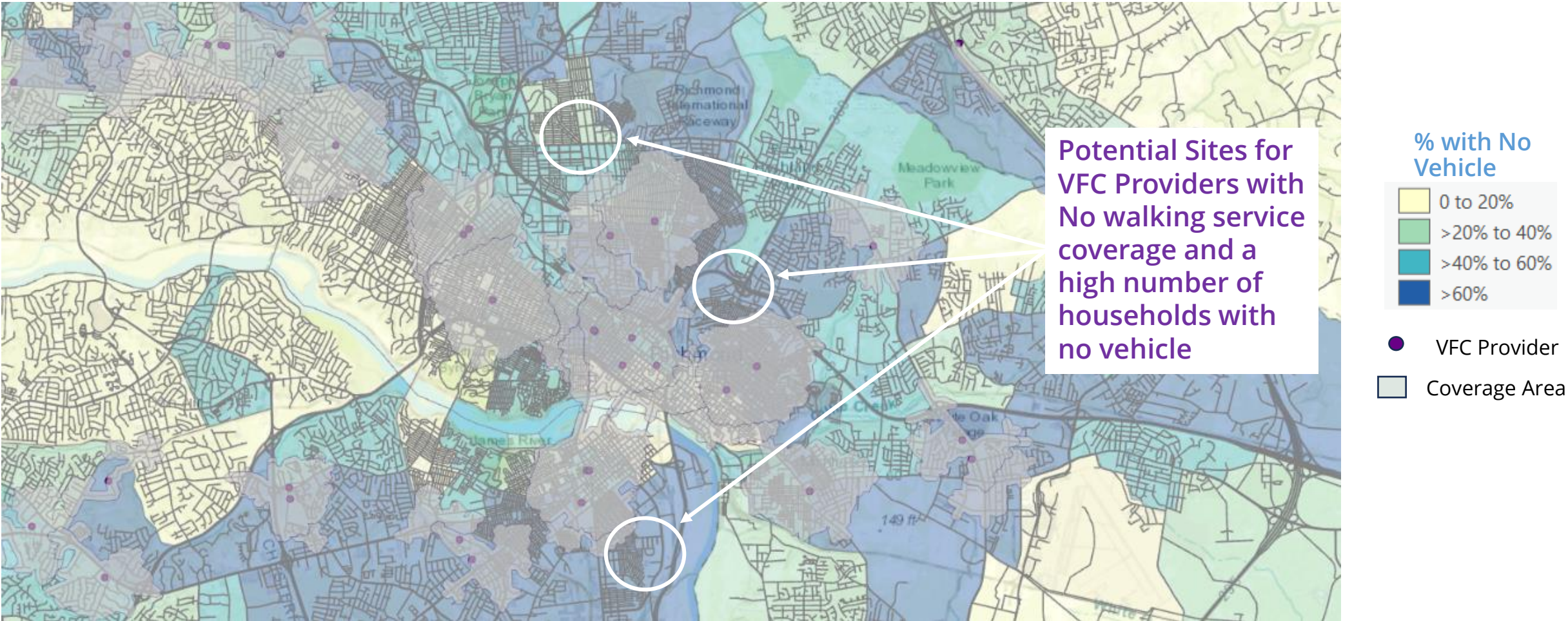
VFC Providers Walking Coverage Area with SVI



VFC Providers Walking Coverage Area with No Vehicle Rate



VFC Providers Walking Coverage Area with No Vehicle Rate



Vaccines for Children

Determining the travel time between Existing Providers and a Potential VFC Providers

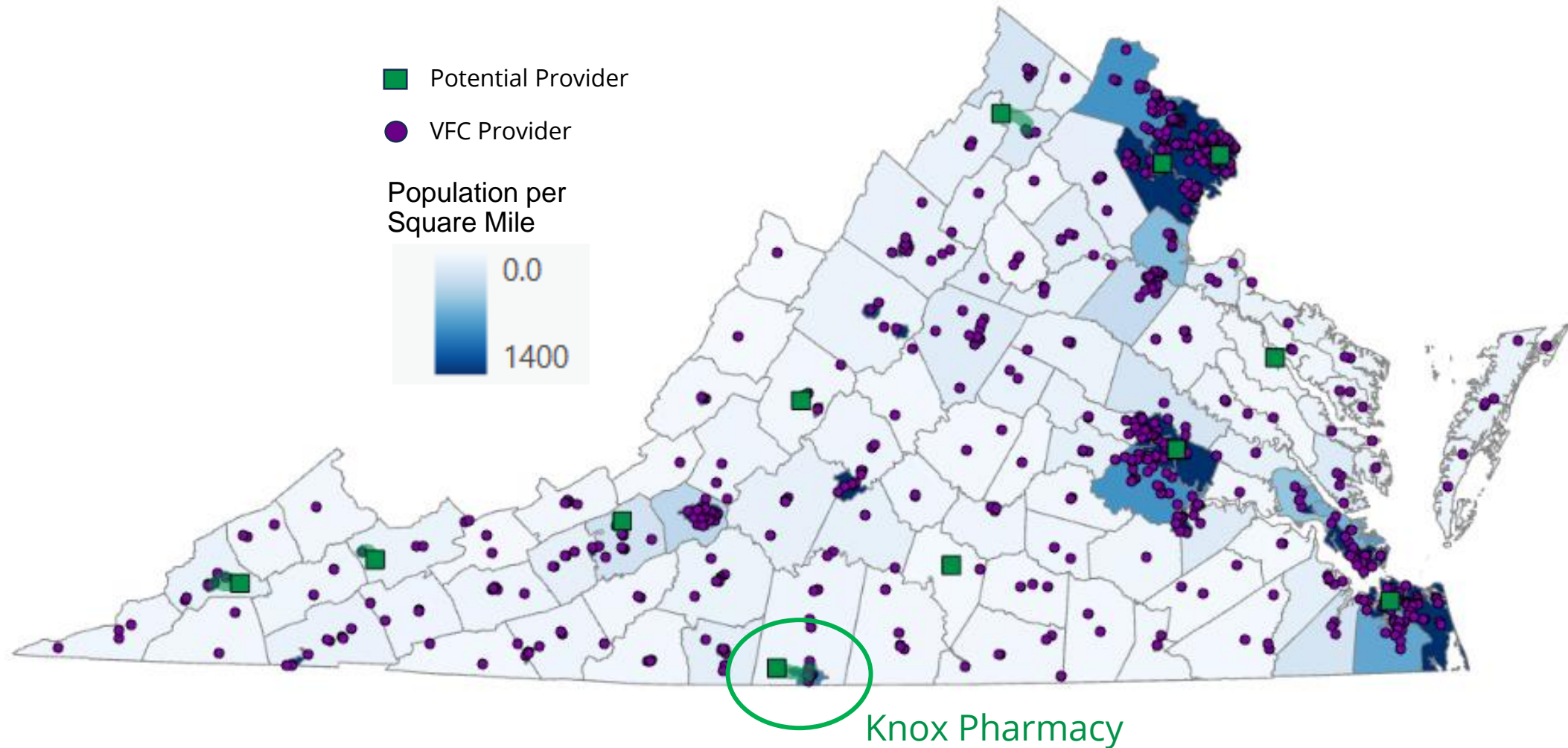
- When given a list of candidates for the VFC program, we can see the travel time to the closest existing VFC location using an ArcGIS Analysis with the VGIN Road Mapping

Candidate Pharmacy	Closest Existing VFC Locations	Travel Time (Minutes)
Knox Pharmacy	PATHS - George Washington HS	13.1
Spartan Drug & Wise Rx Pharmacies	HEALTH WAGON	8.5
ADKOA Pharmacy	UVA HEALTH PEDIATRICS MANASSAS	4.4
Blacksburg Pharmacy	NRV COMMUNITY SERVICES - BLACKSBURG	3.5
Claypool Hill Pharmacy	CLINCH VALLEY PHYSICIAN ASSOCIATES	2.5
Lexington Prescription Center	LEXINGTON - ROCKBRIDGE HD	2.1
Vandorn Pharmacy	MELINDA SEBASTIAN, M.D.	1.4
Peoples Pharmacy	TIDEWATER PEDIATRIC CONSULTANTS - NOR	0.9
Hope Pharmacy	PRACTICE OF DR. RICHARD BENNETT	0.9
Charlotte Drug Company	CHARLOTTE COUNTY HD	0.3
Tappahannock Pharmacy	LEDWITH LEWIS FREE CLINIC	0.3
Strasburg Pharmacy	Strasburg Pharmacy	0.0

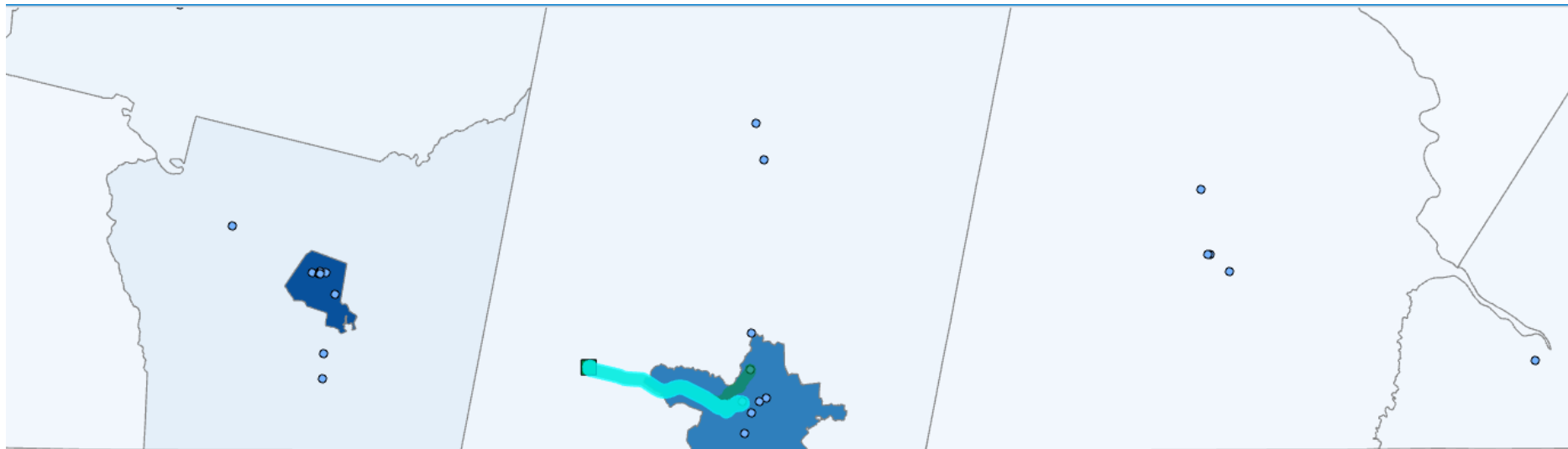
Proposed Providers with Closest Existing Pharmacy Route

Updated 3/26/24

- The Proposed Providers are all within a 15 minute drive of an existing provider



- Knox Pharmacy is the furthest from an existing provider, and the analysis and map in ArcGIS display the total time to travel



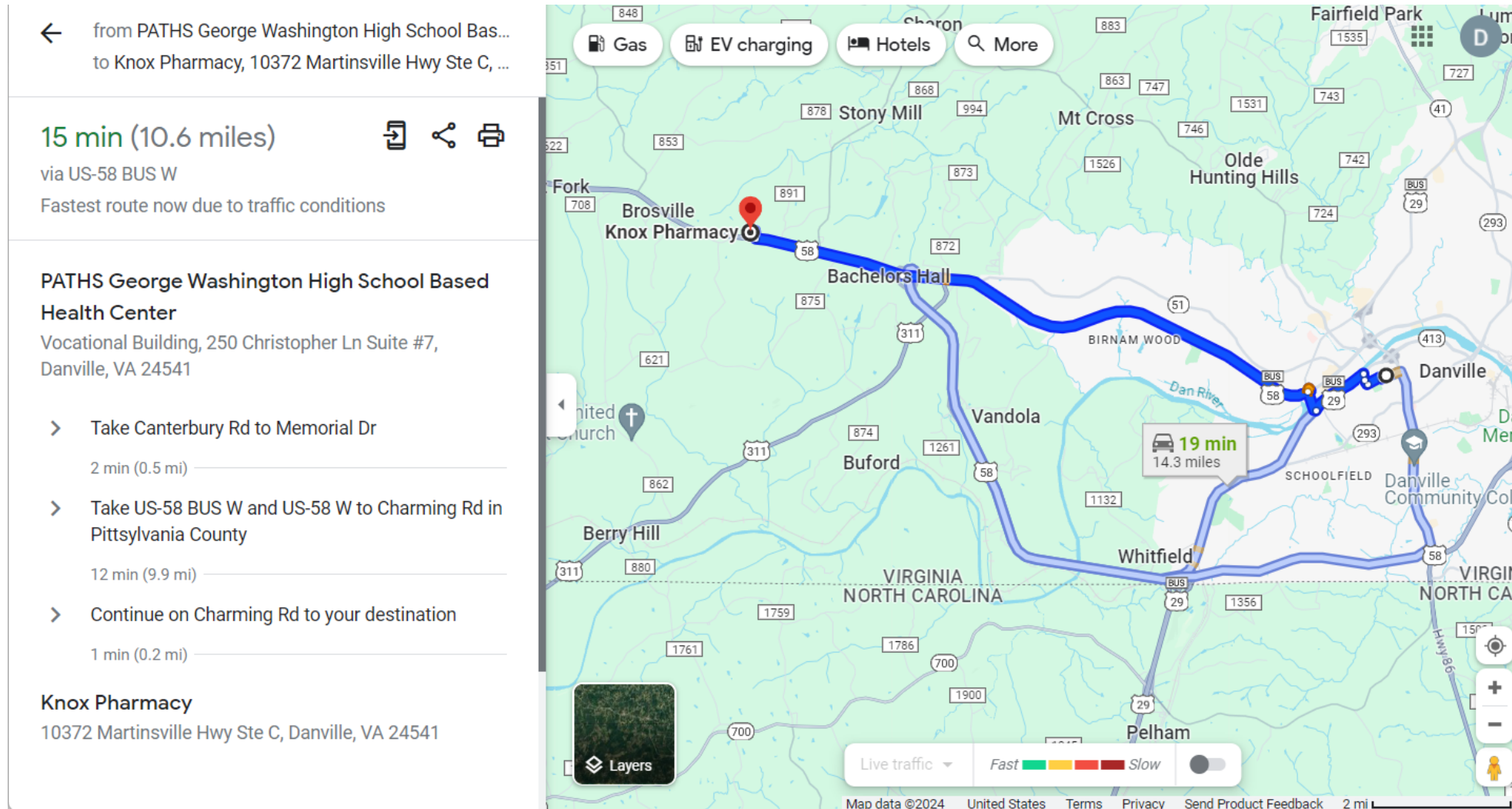
1:515,713 | 35,585.96E 56,107.93N m | Selected Features: 1

Routes X County USA Counties

Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

	ObjectID *	Shape *	FacilityID	FacilityRank	Name	Total_Time	Total_Length	Shape_Length
27	7	Polyline M	14	2	Knox Pharmacy - Knox Pharmacy	0	0	0
28	8	Polyline M	26	3	Knox Pharmacy - Knox Pharmacy	0	0	0
29	9	Polyline M	664	4	Knox Pharmacy - PATHS - George Washington HS	13.12162	16659.500042	16662.440998
30	10	Polyline M	660	5	Knox Pharmacy - PIEDMONT PEDIATRICS, INC.	14.788326	18116.25327	18119.42215
31	49	Polyline M	648	4	Lexington Prescription Center - LEXINGTON-ROCKBRID...	2.068228	1572.541833	1572.224961

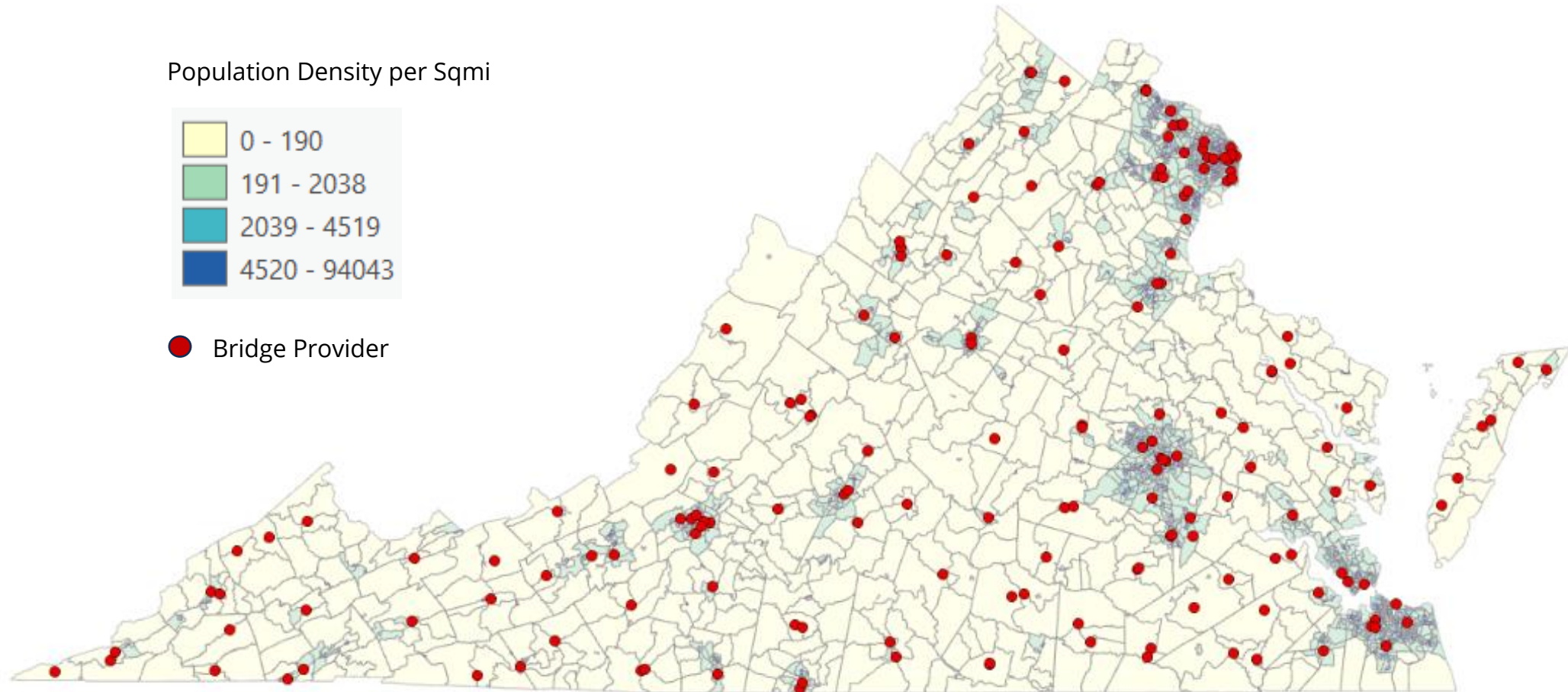
- Google Maps serves to verify the closest existing provider, but includes traffic data not available in ArcGIS



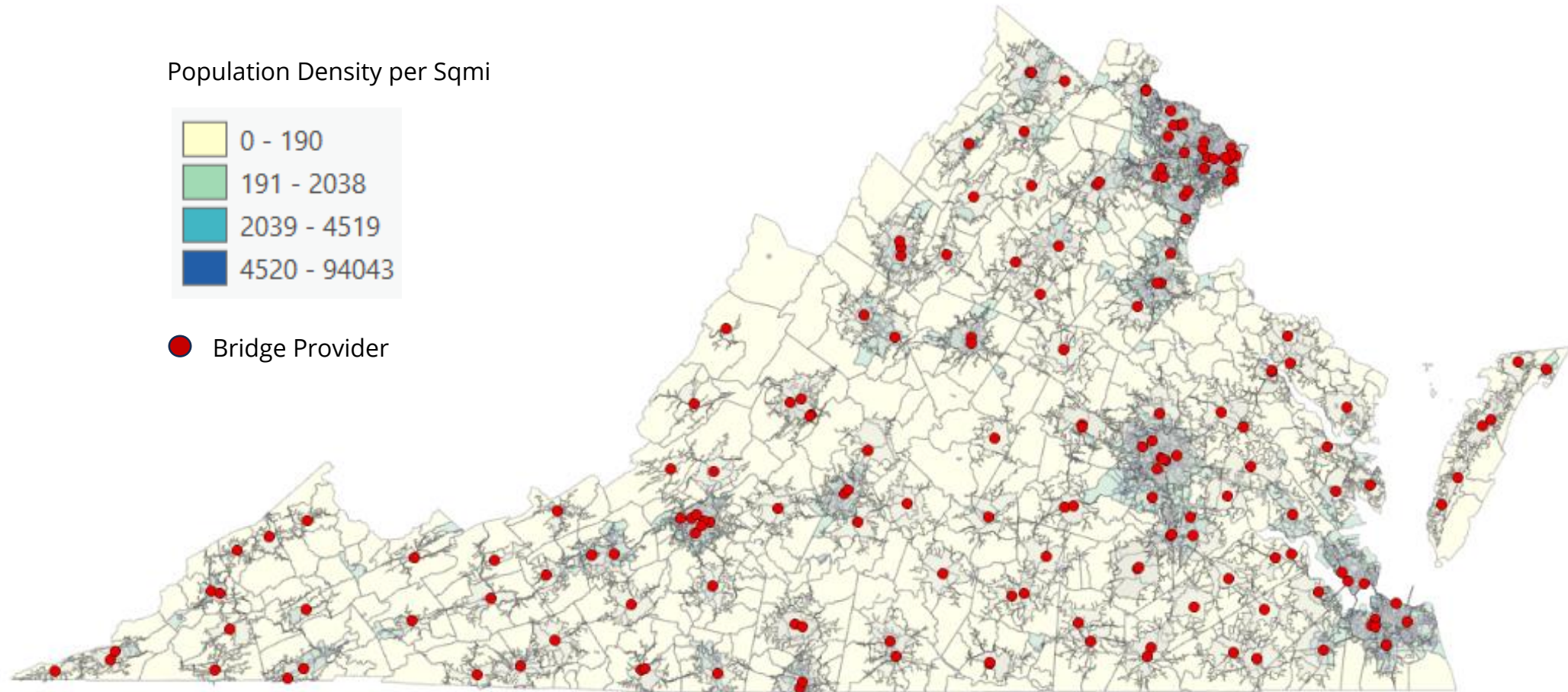
Bridge Program

Locating Areas of Need for New Bridge Program Providers

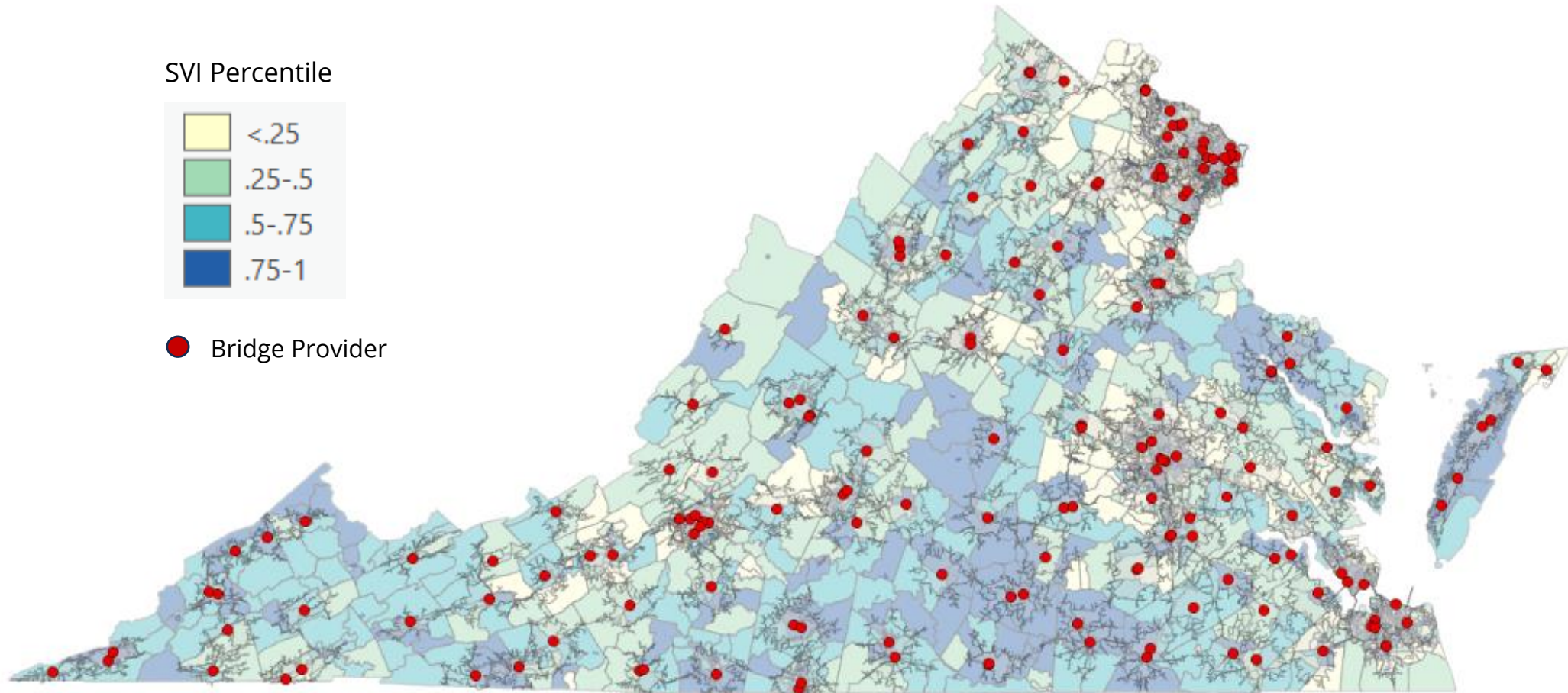
- The map details the bridge providers over a map of Population Density



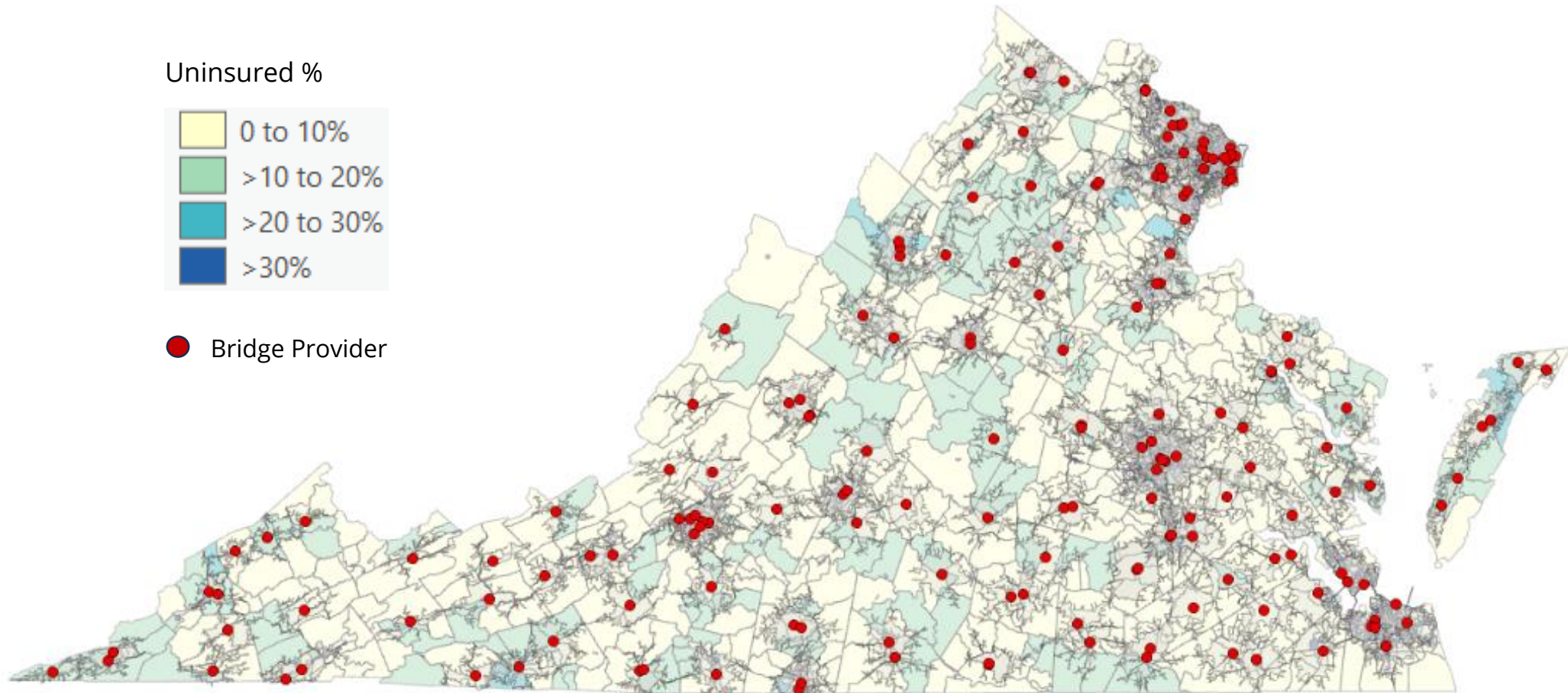
- The map details the bridge providers and their 15 minute drive time coverage over a map Population Density



- The map details the bridge providers and their coverage over a map of Social Vulnerability Index by Percentile



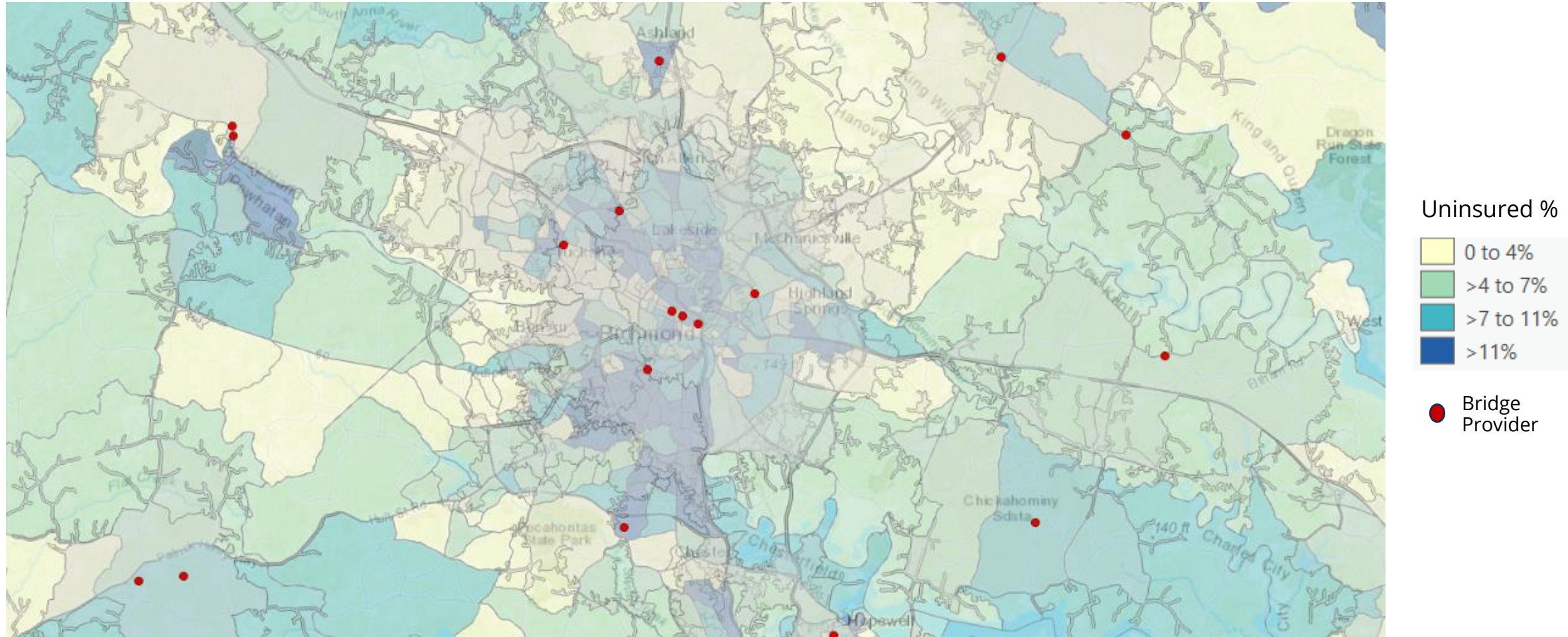
- The map details the bridge providers and their 15 minute drive time coverage over a map of uninsured rates



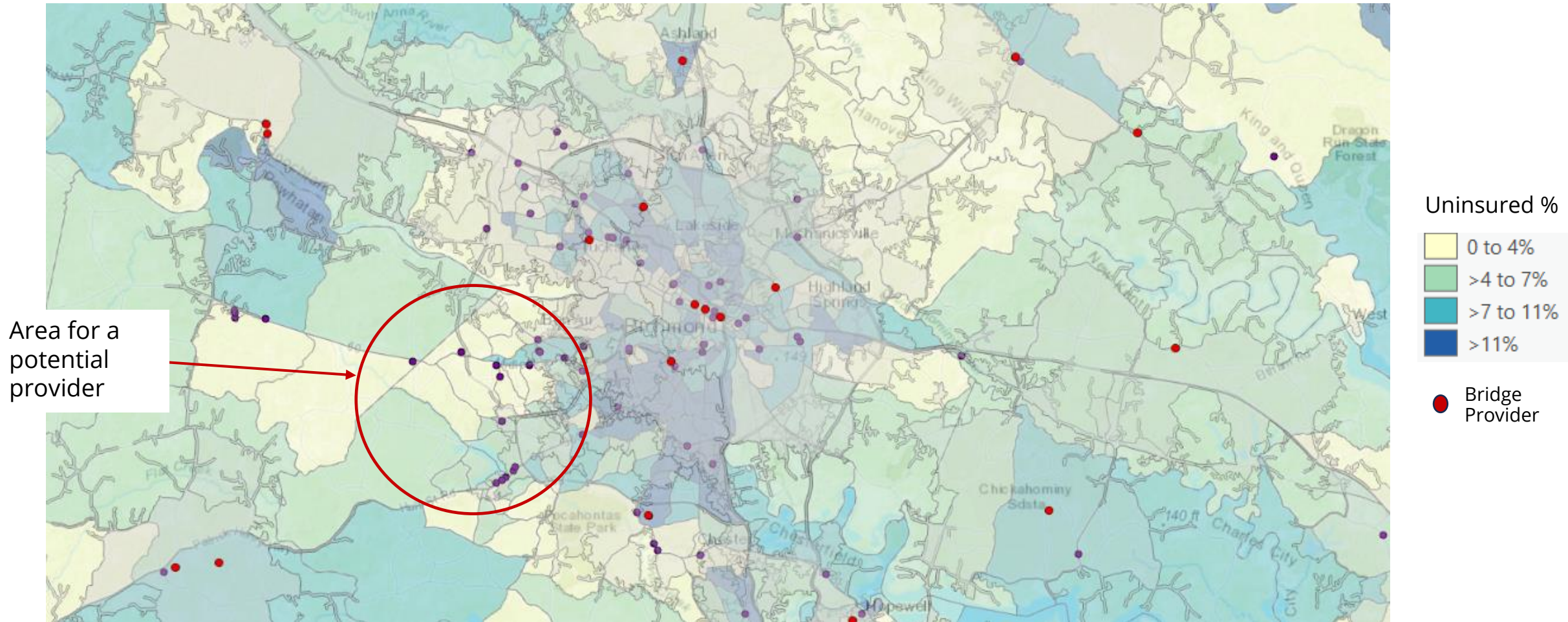
- The map details the bridge providers in the Richmond Area



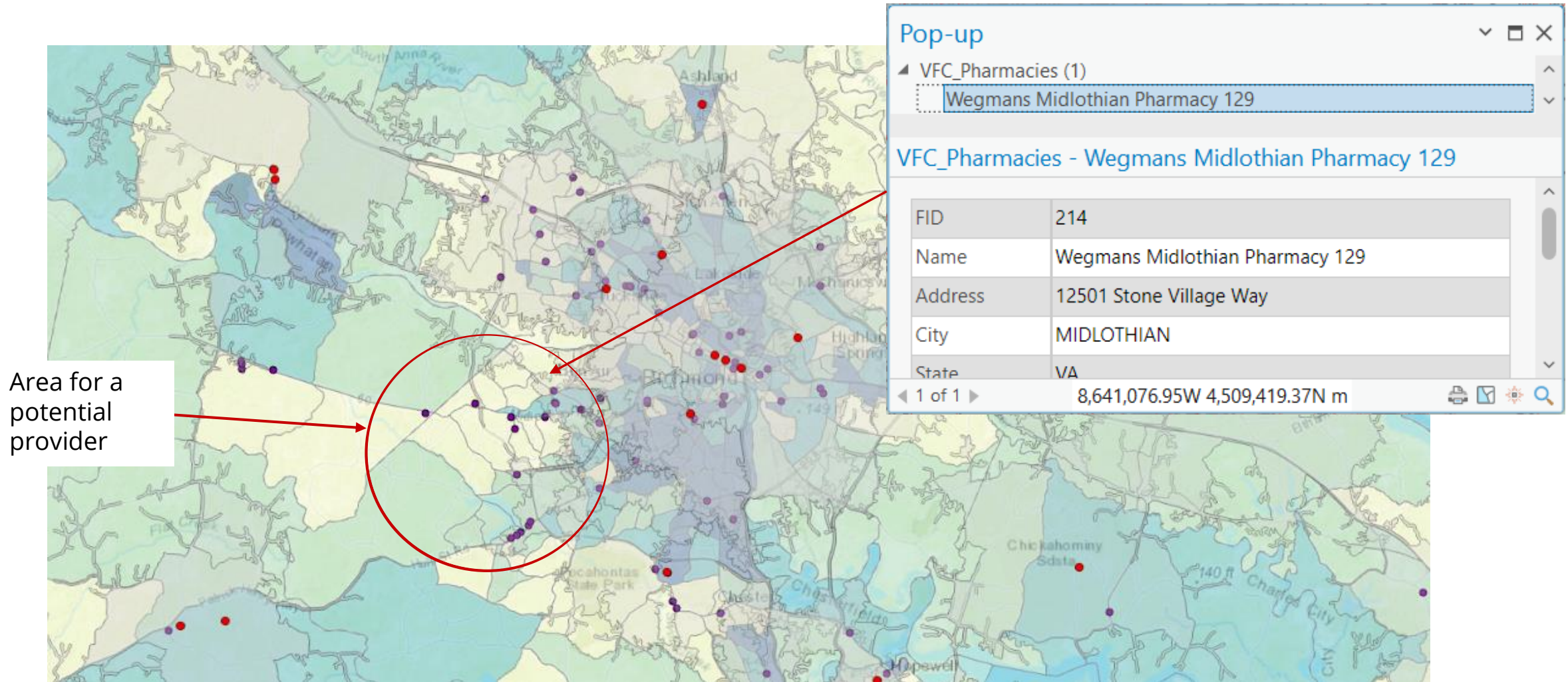
- The map details the bridge providers and their 15 minute drive time coverage over a map of Uninsured Rates



- The map details the bridge providers and their 15 minute drive time coverage over a map of Uninsured Rates with an area highlighted for a potential provider



- Wegmans Midlothian would be an example of a location that would serve a location with high rate of uninsured, a high population density and an area of high social vulnerability



Summary



Visualization of Geographic Coverage by Vaccine Programs

Vaccines for Children
CDC Bridge Program



Identify Areas that Lack Coverage

15, 20 minute Drive
time Coverage
15 Minute Walk time
Coverage
Drive Time to Existing
Providers



Highlight Areas of Need by Overlaying Coverage Area on SVI maps

High Social Vulnerability
Index
High Population Density
Uninsured Populations
No Access to a Vehicle



Combine Analyses to Optimize Locations for Better Vaccine Access in Virginia

Acknowledgements

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