



Modeling Tourism in Sevier County



Sevier County Travel Demand Model



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Agenda

1. Sevier County Context and Travel Characteristics
2. Model Overview and Framework
3. Project Applications and Insights
4. Questions and Discussion

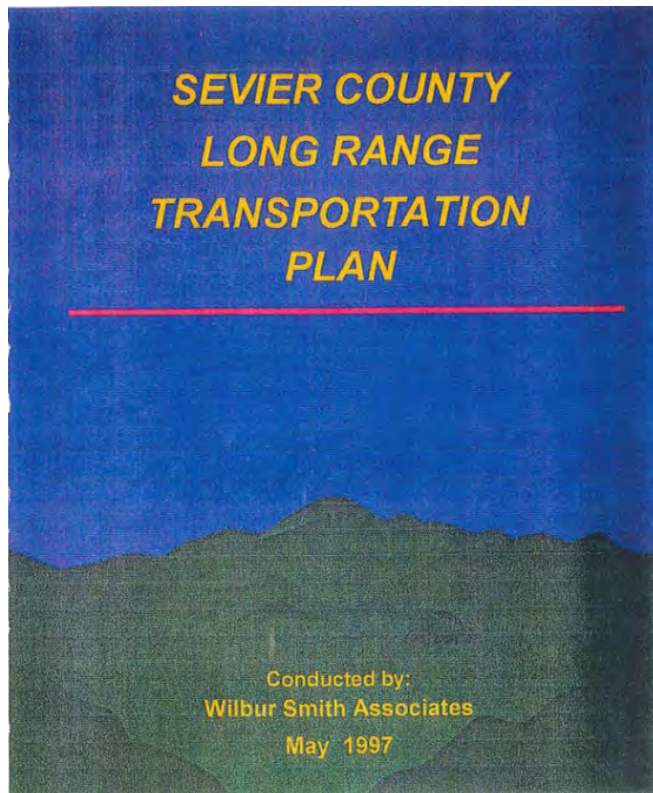


Sevier County Context and Travel Characteristics

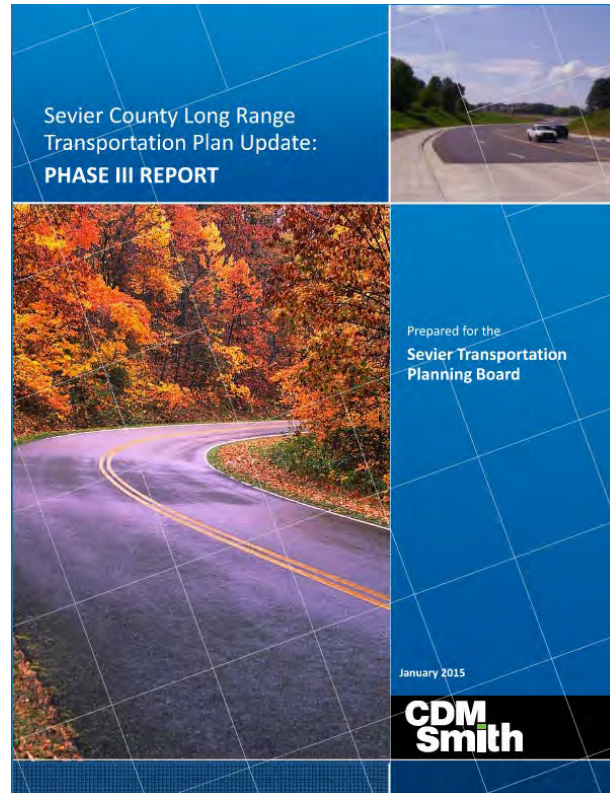
Sevier County Transportation Planning

- SC Transportation Planning Board
- Sevier County Long Range Transportation Plan

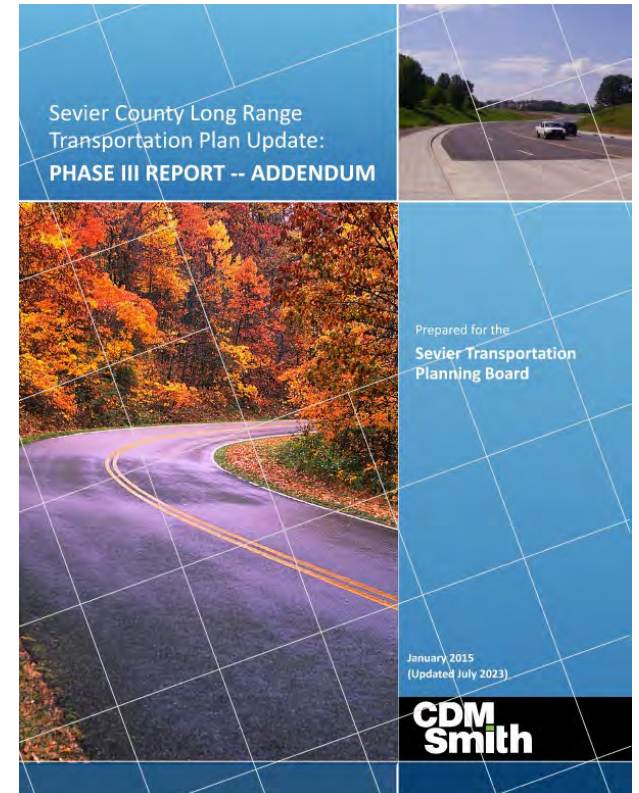
1997 – Original LRTP
Included TRANPLAN Model



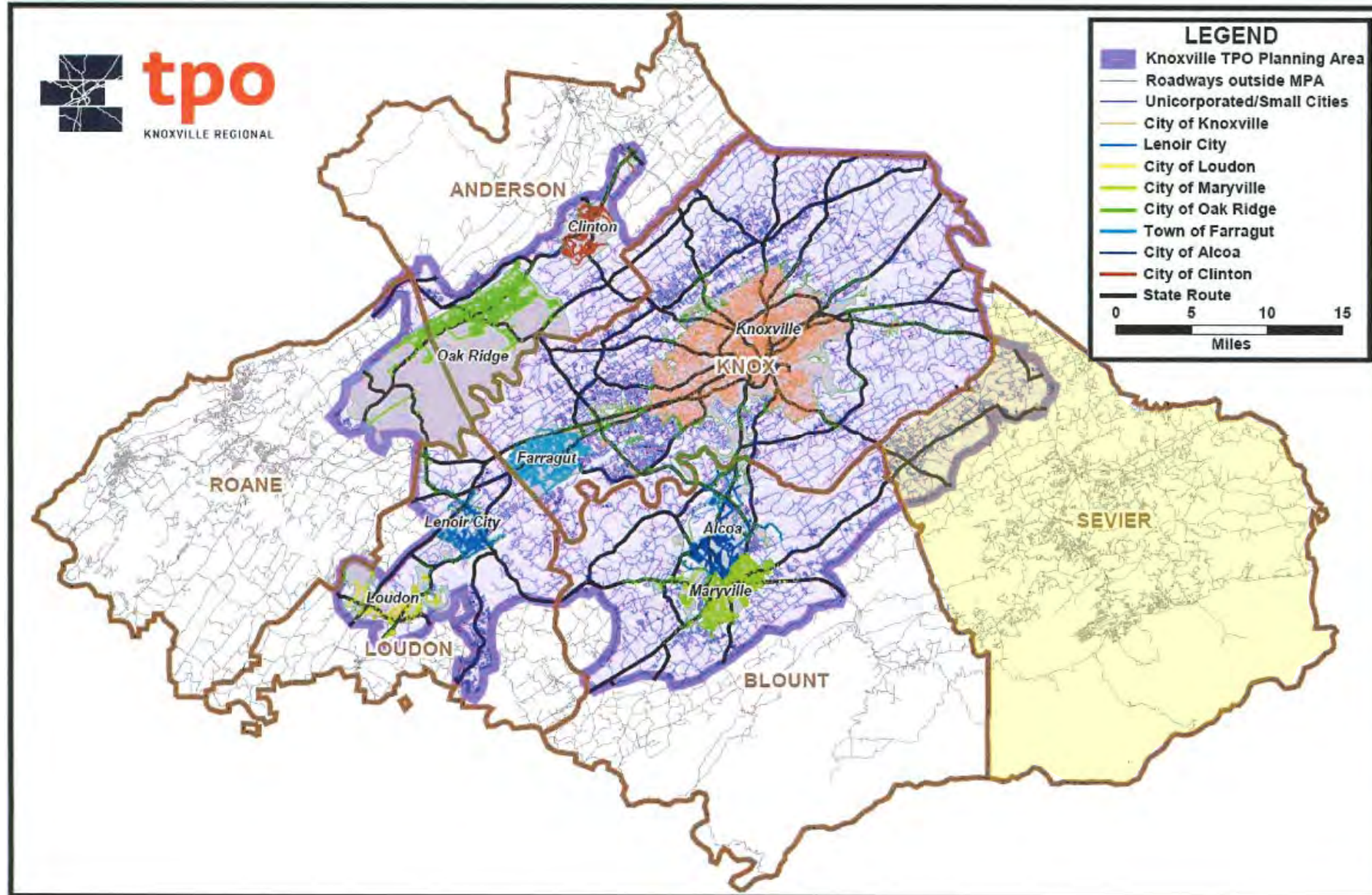
2015 – LRTP Update
Recommended New TDM



2023 – LRTP Addendum (Reprioritize Projects)
Included Creation of new TDM



Knoxville Regional TDM





Sevier County Background

- **Tourism Hub:** 38% jobs, \$4B impact, 21M visitors in 2024
- **Economic Shift:** From distressed to top TN tourism economy
- **Modeling Need:** Knoxville TDM and TDOT TSMv4 cannot represent seasonal & visitor travel
- **EDA Project:** Grant funding to build TDM
- **Regional Partnership:** Sevier County, Sevierville, Pigeon Forge, Gatlinburg, Pittman Center



Demographic & Economic Profile

- **Population** $\approx$ 100 K (2024) $\rightarrow$ +34 % by 2045
- **Employment** $\approx$ 63 K (2024) $\rightarrow$ +44 % by 2045
- **Visitor growth** $\approx$ 25 % (21 M $\rightarrow$ 26 M) driven by added lodging and higher occupancy
- **\$4 B direct visitor spending** $\rightarrow$ critical link between mobility and economic performance



Geography and Key Infrastructure

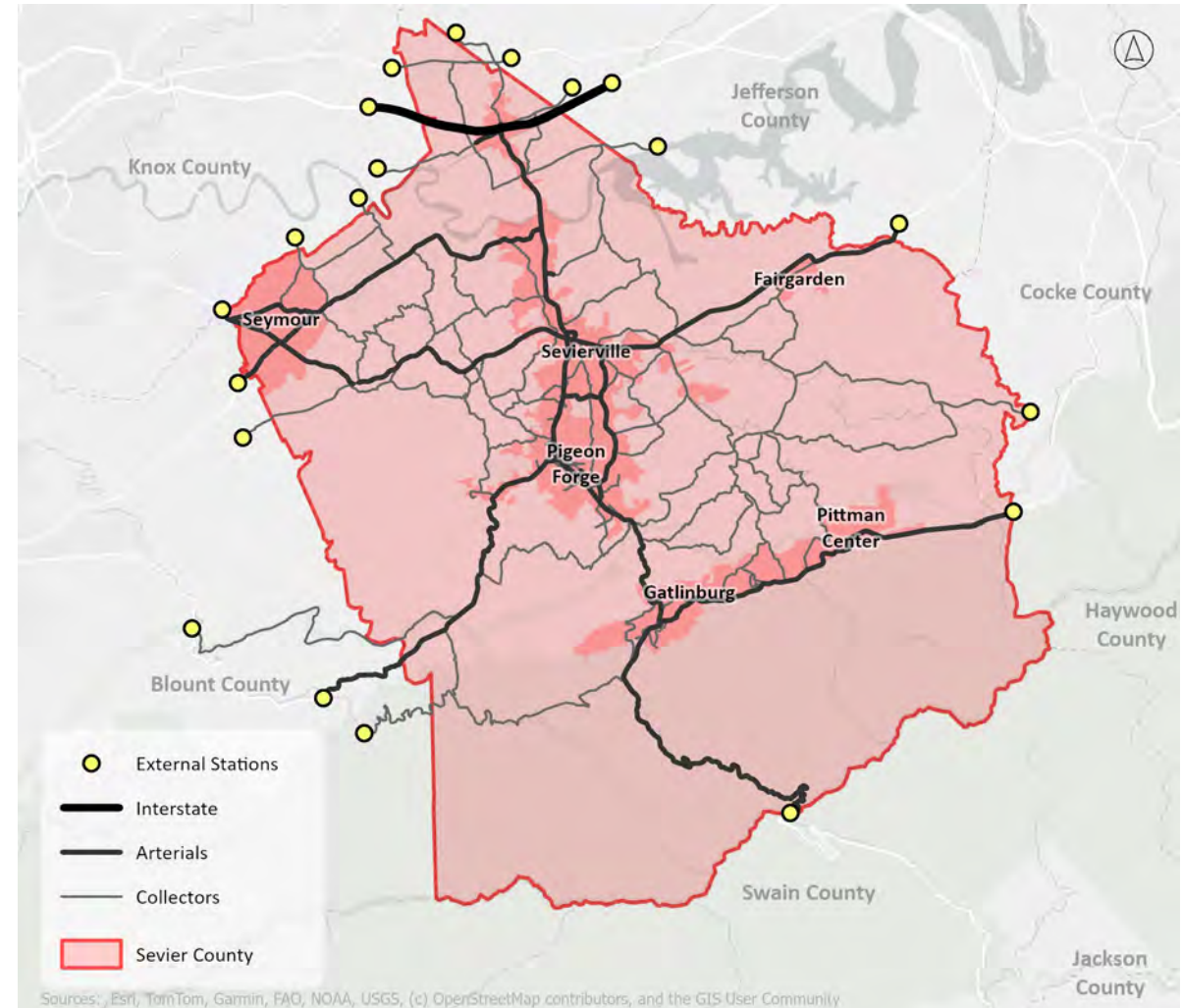
- **Key Routes:** SR 66 (Parkway), US 441 (Chapman Hwy), SR 35 (Newport Hwy), SR 449 (Veterans Blvd)
- **Gateway Access:** I-40 → SR 66 & US 441 (serves residents + tourists)
- **Freight Overlap:** Shared with visitor routes → congestion & reliability issues



Model Overview and Framework

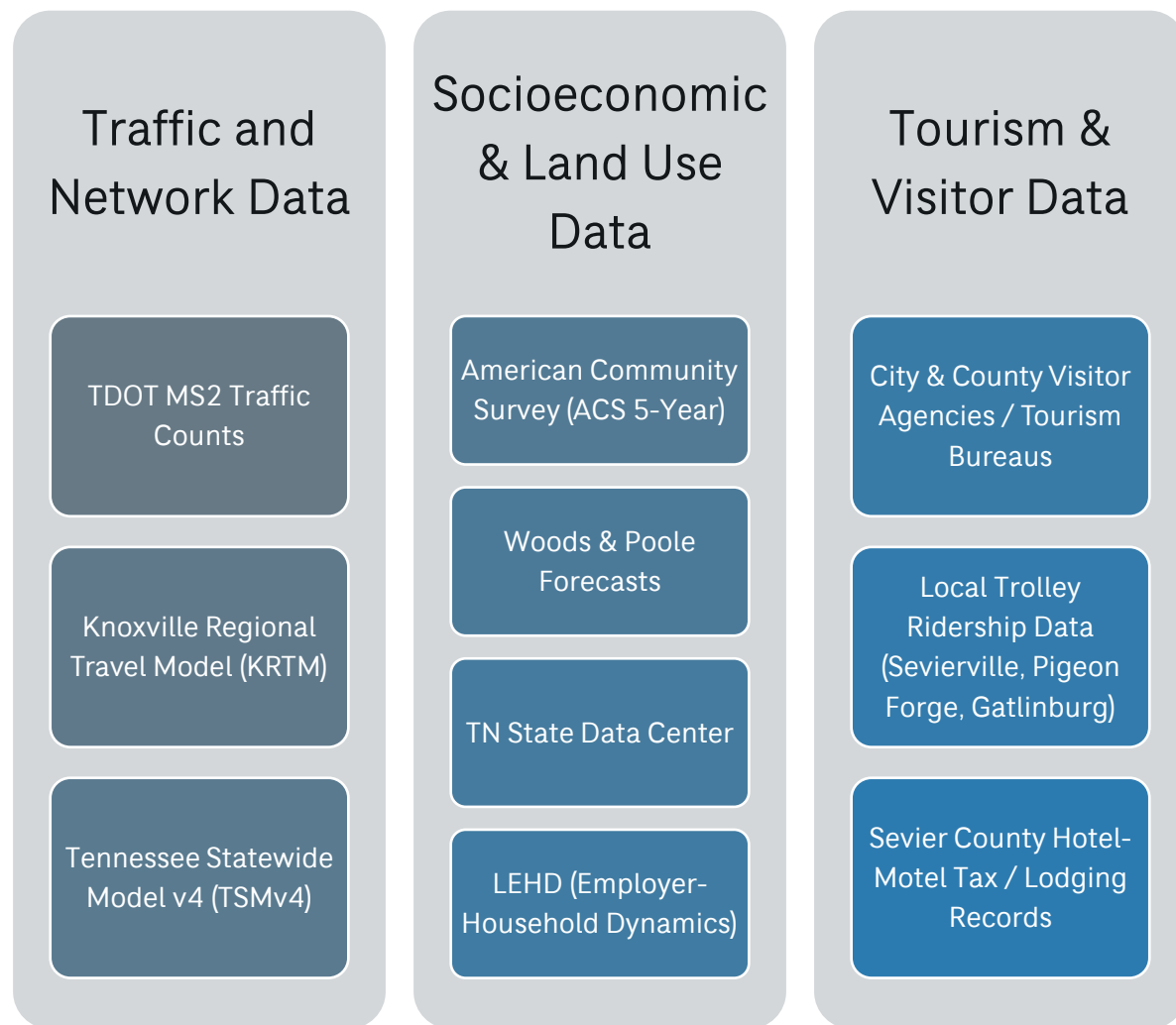
Purpose & Design of the Sevier County TDM

- Captures seasonal, directional, tourism-driven travel patterns not reflected in statewide or regional models.
- Three-step daily trip-based structure
 1. Trip Generation
 2. Trip Distribution
 3. Trip Assignment
- Calibrated to 2021 data; base year 2024 with forecasts for 2030–2045 aligned to county long-range plans.



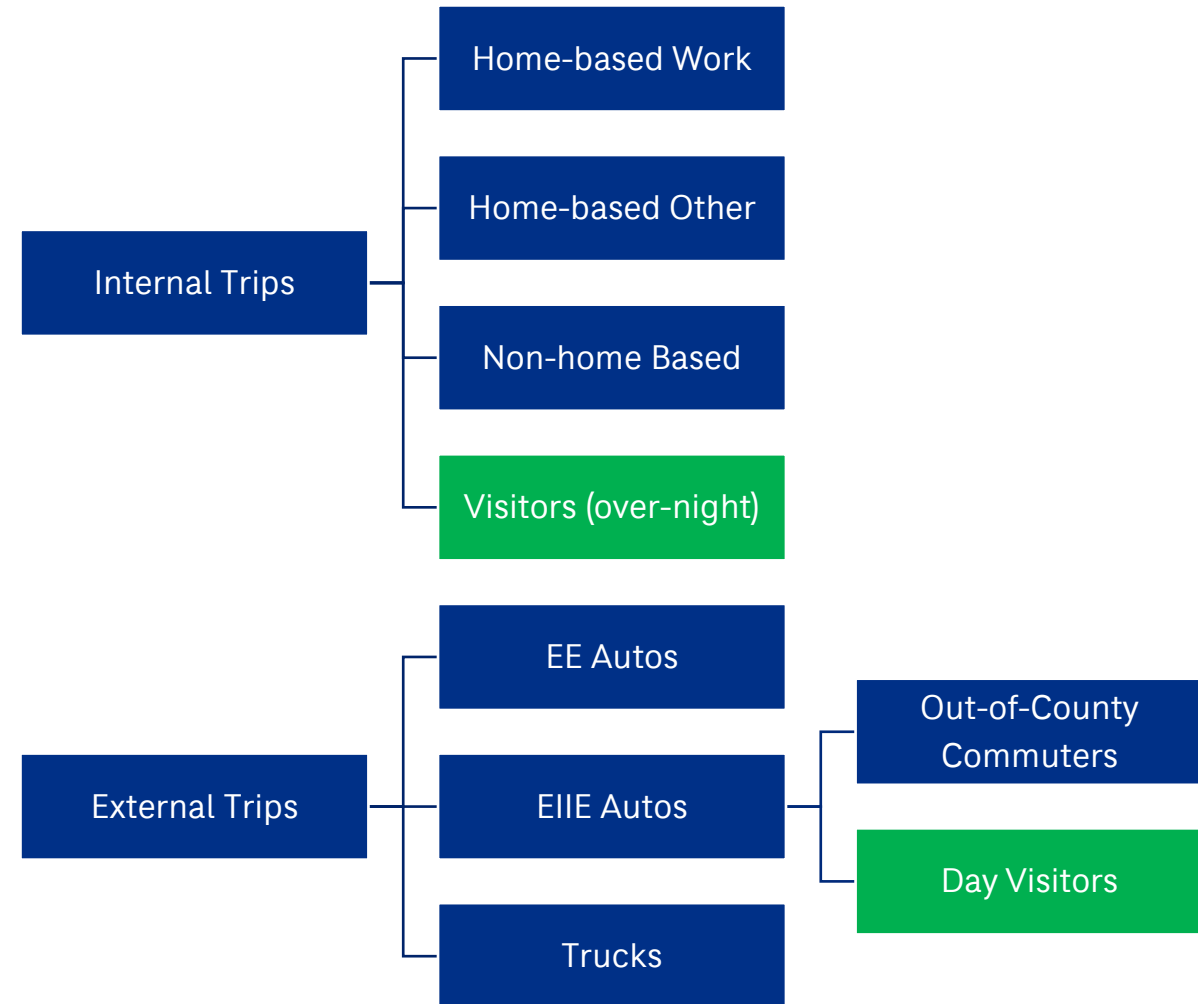
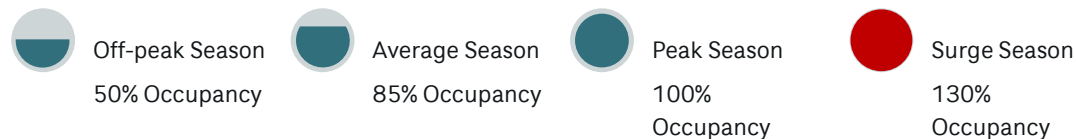
Model Inputs & Data Sources

- 81 internal and 20 external zones tied to KRTM/TSMv4 boundaries (provides external context)
- Local and state data: TDOT counts, land use data, population/employment forecasts
- Tourism datasets: lodging inventories, occupancy rates, trolley use, tax data for seasonal traffic patterns
- Specific data for attractions like Dollywood and Great Smoky Mountains National Park



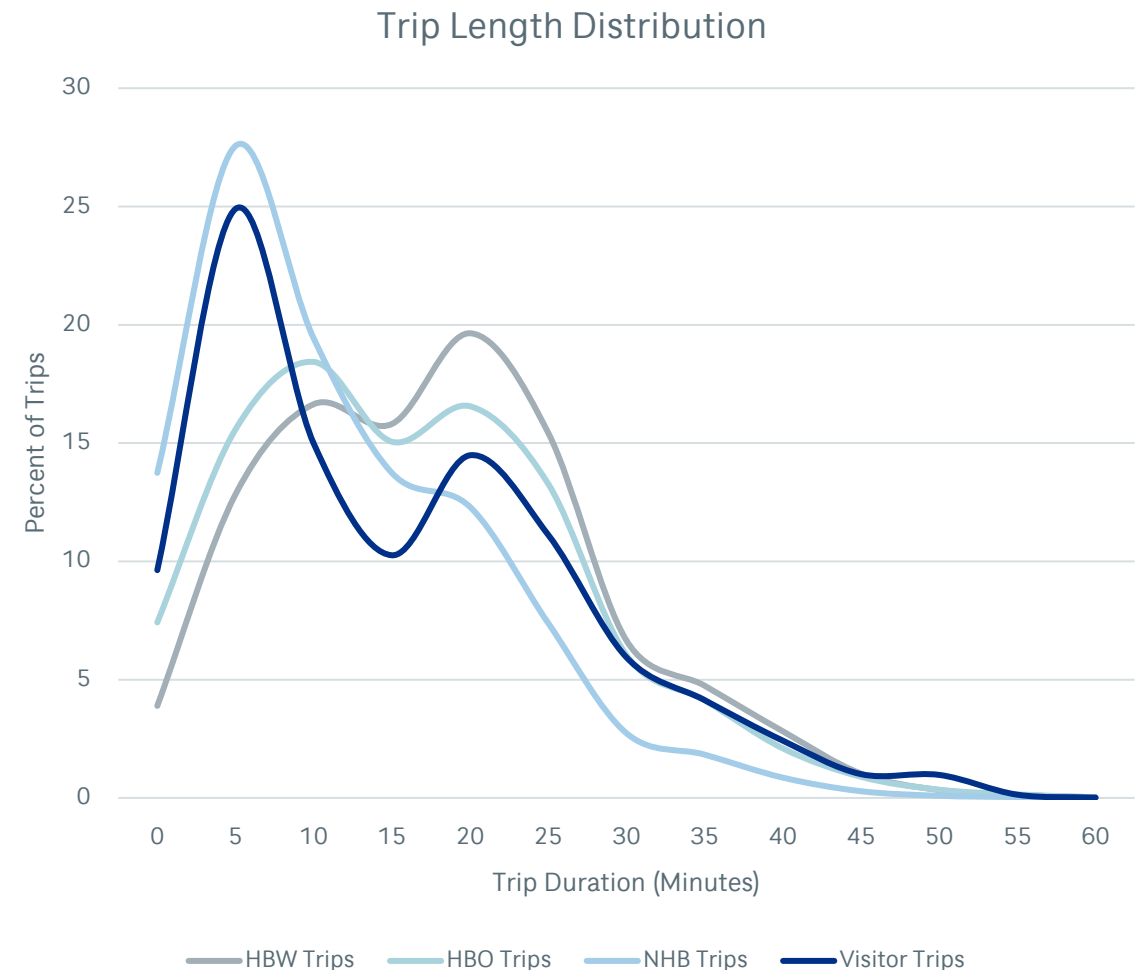
Visitor Integration in Trip Generation

- Adds a two visitor-focused purpose alongside household-based HBW, HBO, and NHB trips
- Captures overnight vs day visitors, reflecting different travel and trip-length patterns
- Generates visitor trips using hotel/rental unit inventories and variable occupancy rates (50 – 130 %)



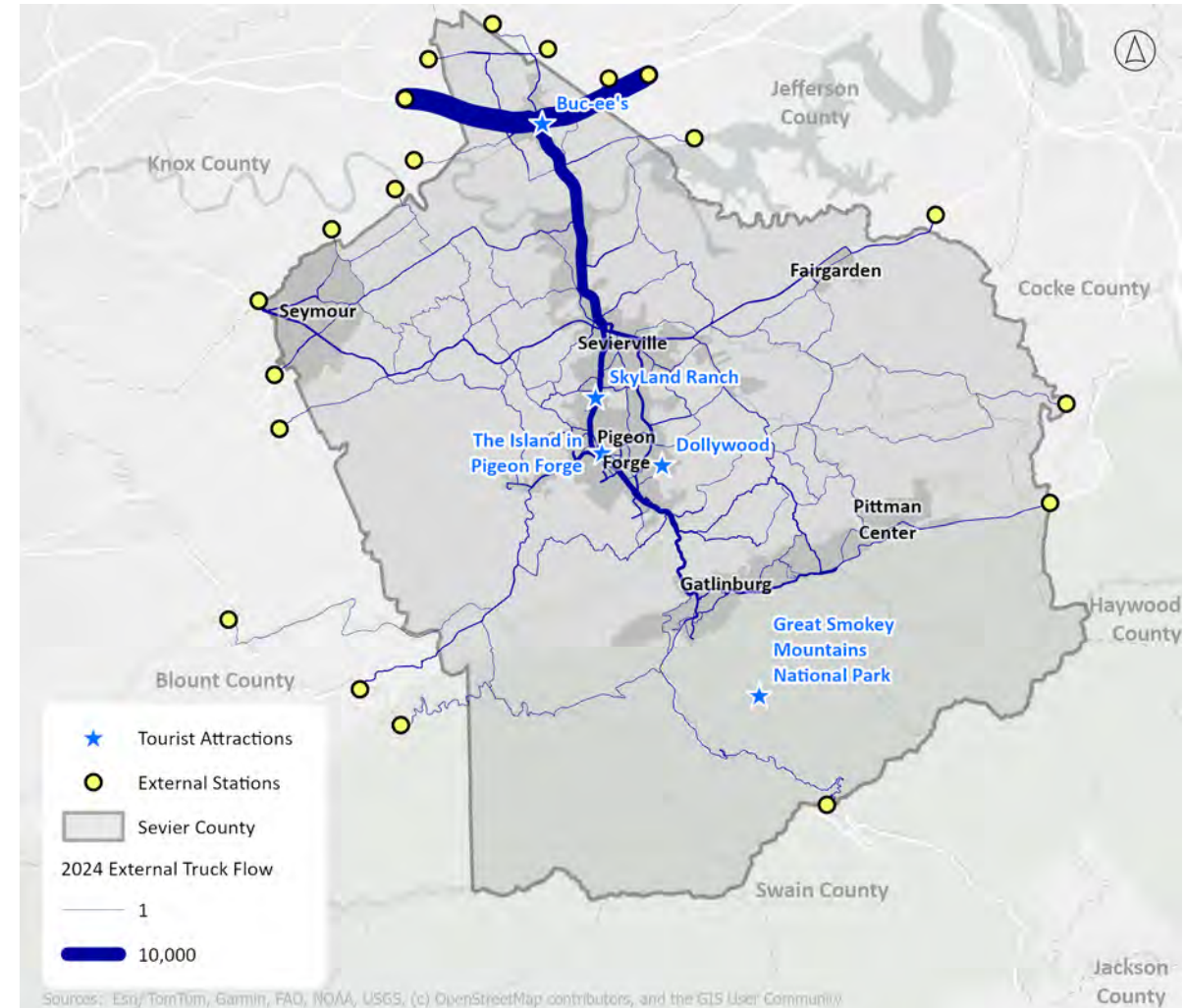
Trip Distribution & Seasonality

- Doubly-constrained gravity model connect origins and destinations for each trip purpose.
- Visitor trip purposes use steeper friction factors to reflect shorter, localized tourist movements
- Captures directional congestion patterns between lodging areas, attractions, and gateways during peak tourism periods.



External Gateways & Truck Flows

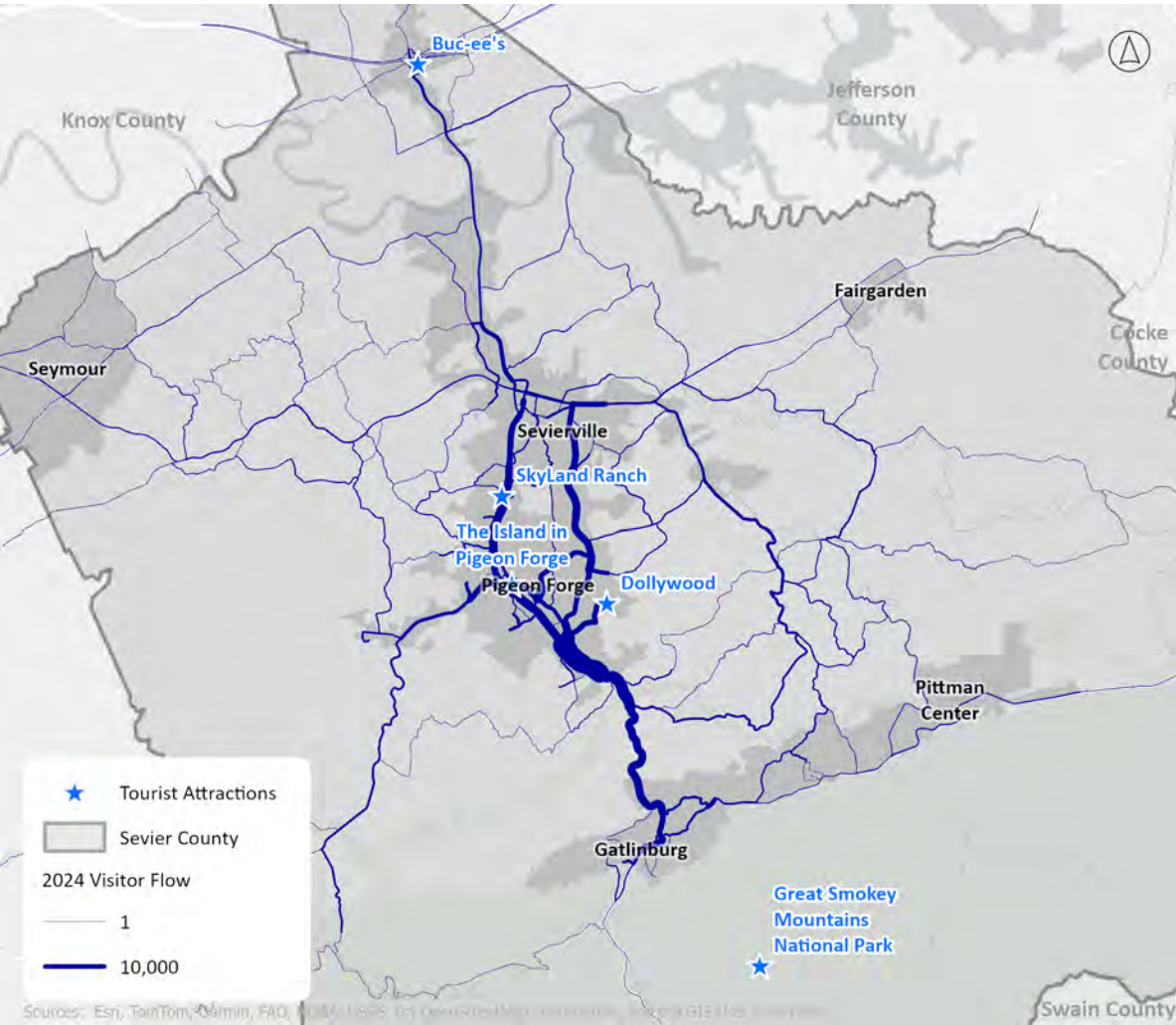
- 20 external stations capture traffic entering and leaving Sevier County
- External and trucks derived from KTRM and TSMv4 subareas matrices
- Ensures consistency with regional and statewide freight and commuter forecasts
- Day-trip visitor flows modeled through Auto EIIIE trips to represent regional tourism and event travel



Traffic Assignment & Validation

- Calibrated to TDOT MS2 2021 Counts, validated to a 2024 base year.
- Overall %RMSE $\approx$ 20%, overall volume error $\approx$ 2% at the 85% seasonality.

Assigned Volume Class	% RMSE	TN Guidelines for %RMSE
<1,000	68.9%	<100%
1,000-2,500	31.9%	<100%
2,500-5,000	27.7%	<100%
5,000-10,000	28.0%	<45%
10,000-25,000	24.2%	<27%
25,000-50,000	10.2%	<25%
Overall	20.4%	<45%



Forecast 2045 Scenario

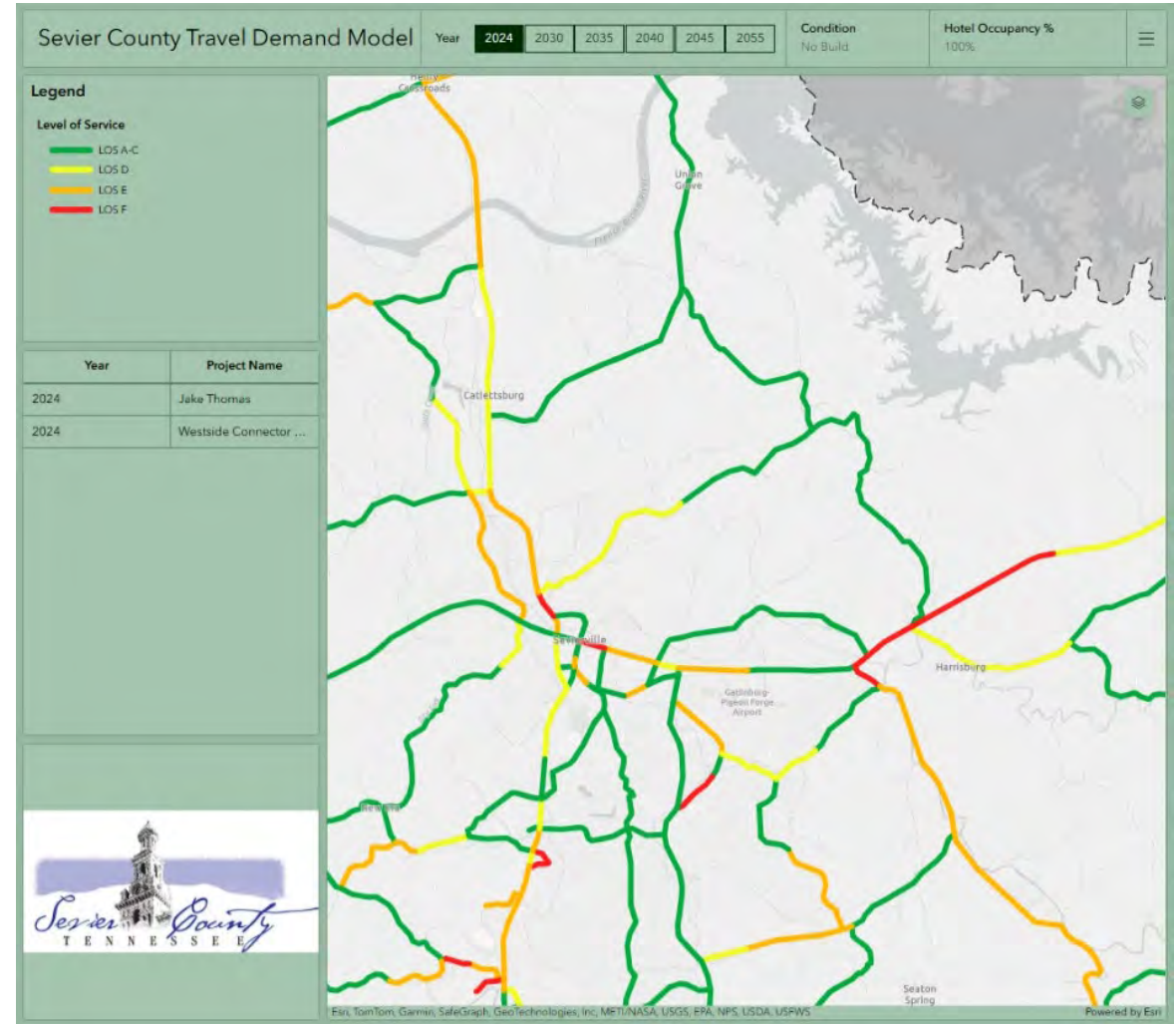
- Population +34% and Employment +44% (2021–2045).
- Visitor volumes +25% (≈ 21M → 26M annually) from added lodging and higher occupancy rates.
- External and truck flows grown using KRTM and TSMv4 regional forecasts
- Master network includes committed projects planned through 2045.

Trip Purpose	2021 Person Trips	2045 Person Trips	CAGR (%)
HBW	39,819	53,659	1.3%
HBO	134,059	180,776	1.3%
NHB	122,243	164,314	1.2%
Visitor	133,242	155,767	0.7%
Auto EII*	104,130	181,520	2.3%
Auto EE	45,348	64,720	1.5%
SUT	19,274	19,209	0.0%
MUT	29,207	47,749	2.1%
Total	627,321	867,713	1.4%

* Includes Day Visitors

Model Management & Enhancements

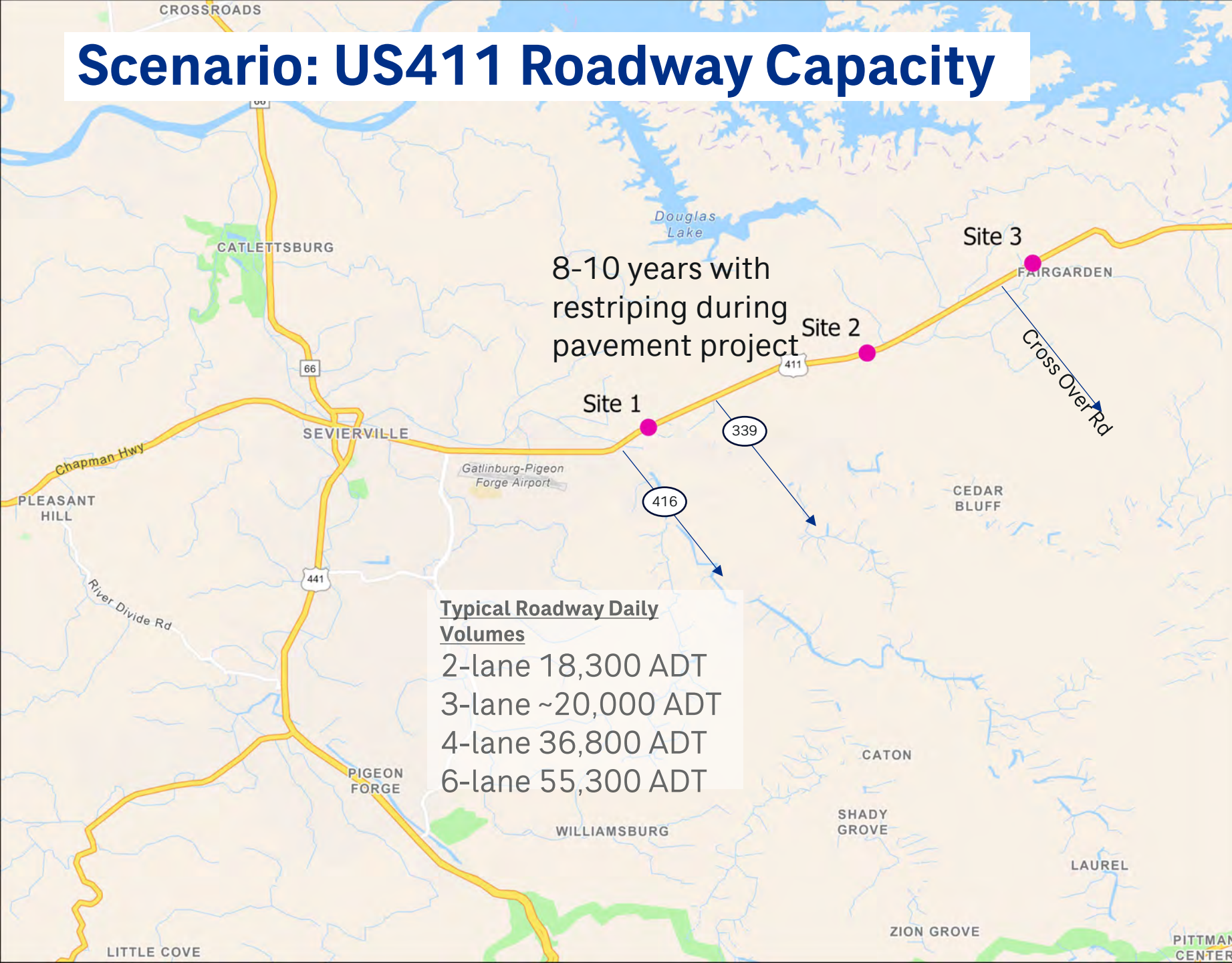
- Model updates recommended every 2 years to maintain accuracy with new growth, visitor data, and roadway changes
- Future enhancements include detailed visitor travel surveys, RV/campground trips, and ongoing network updates
- New ArcGIS Online dashboard publishes TDM results for easy access by local staff





Project Applications and Insights

Scenario: US411 Roadway Capacity



Site 1

2024 Existing (2Ln) = 24,362 ADT

2035 No Build (3Ln) = 32,930 ADT

2035 Build (4Ln) = 32,930 ADT

2045 No Build (3Ln) = 46,930 ADT

2045 Build (4Ln) = 46,930 ADT

Site 2

2024 Existing = 16,275 ADT

2035 No Build (3Ln) = 20,685 ADT

2035 Build (4Ln) = 20,685 ADT

2045 No Build (3Ln) = 32,835 ADT

2045 Build (4Ln) = 32,835 ADT

Site 3

2024 Existing = 13,861 ADT

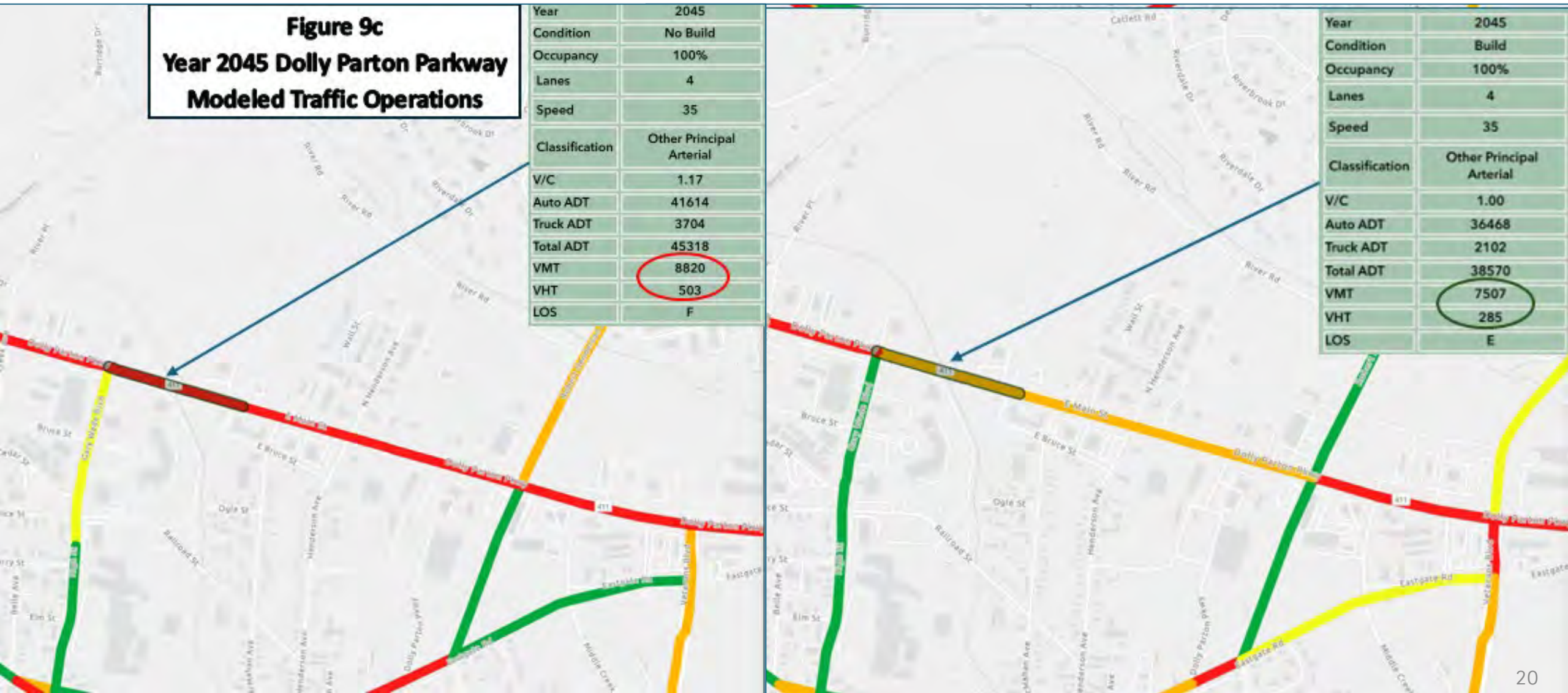
2035 No Build (3Ln) = 14,080 ADT

2035 Build (4Ln) = 14,080 ADT

2045 No Build (3Ln) = 25,600 ADT

2045 Build (4Ln) = 25,600 ADT

Scenario: Dolly Parton Parkway Roadway Capacity with SR-449 Extension in downtown Sevierville



Summary of ADT and LOS for major corridors in downtown Sevierville

			NO-BULD (without Veterans Blvd Extension)		BUILD (with Veterans Blvd Extension)	
Road Name	2024		2045		2045	
	ADT	LOS	ADT	LOS	ADT	LOS
Parkway (SR-66) (south of Gists Creek Rd)	55,130	E	68,945	F	52,368	E
North Parkway (SR-448) (SR-66 to Main St)	23,131	B	36,850	E	21,640	B
Dolly Parton Pkwy (SR-35/US-411) (east of Gary Wade Blvd.)	34,770	E	45,381	F	38,570	E
Veterans Blvd. (SR-449) Extension (east of Gists Creek Rd)	N/A	N/A	N/A	N/A	26,528	C

Scenario: Benefits of the Intra County Parkway (SR 449)

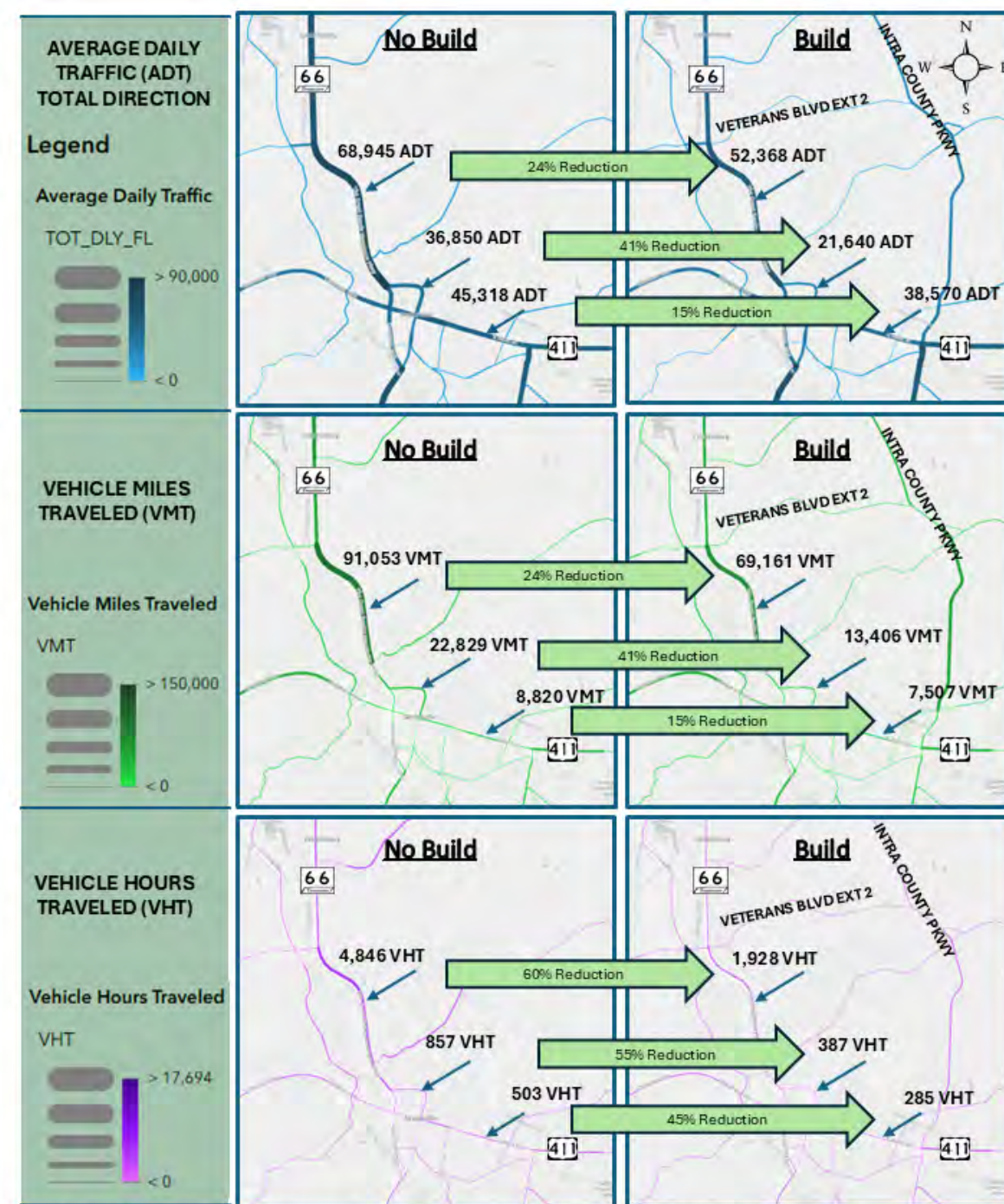
 **Reduces Overcapacity on SR 66** Prevents 20% overcapacity and LOS F congestion by 2045.

 **Improves Traffic Flow** Lowers SR 66 volume from 69K to 46K vehicles/day, restoring LOS D.

 **Adds a Parallel Relief Corridor** SR 449 carries ~25K vehicles/day at LOS C, supporting future growth.

 **Supports Tourism & Local Mobility** Maintains travel speeds and comfort for residents and visitors.

 **Preserves Continuous Flow** Access-controlled design minimizes interruptions and enhances regional connectivity.



Foothills Parkway Roadway Alignment

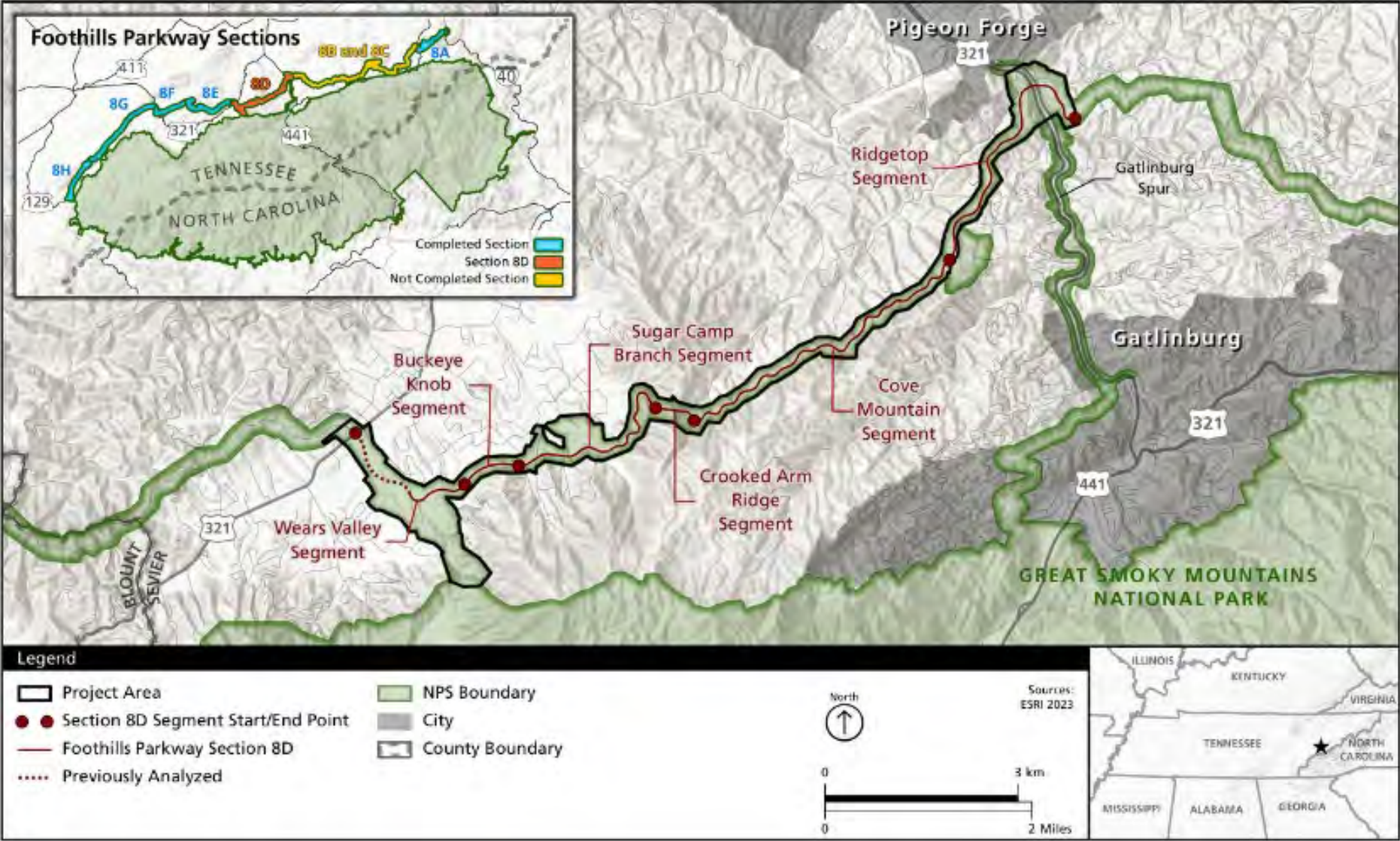


Figure 1 | Project Area Map



Questions and Discussion



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Sevier County Travel Demand Model



**CDM
Smith**