



Construction Traffic Analysis: To be or Not to be A Case Study for NC-107 Widening, Sylva NC

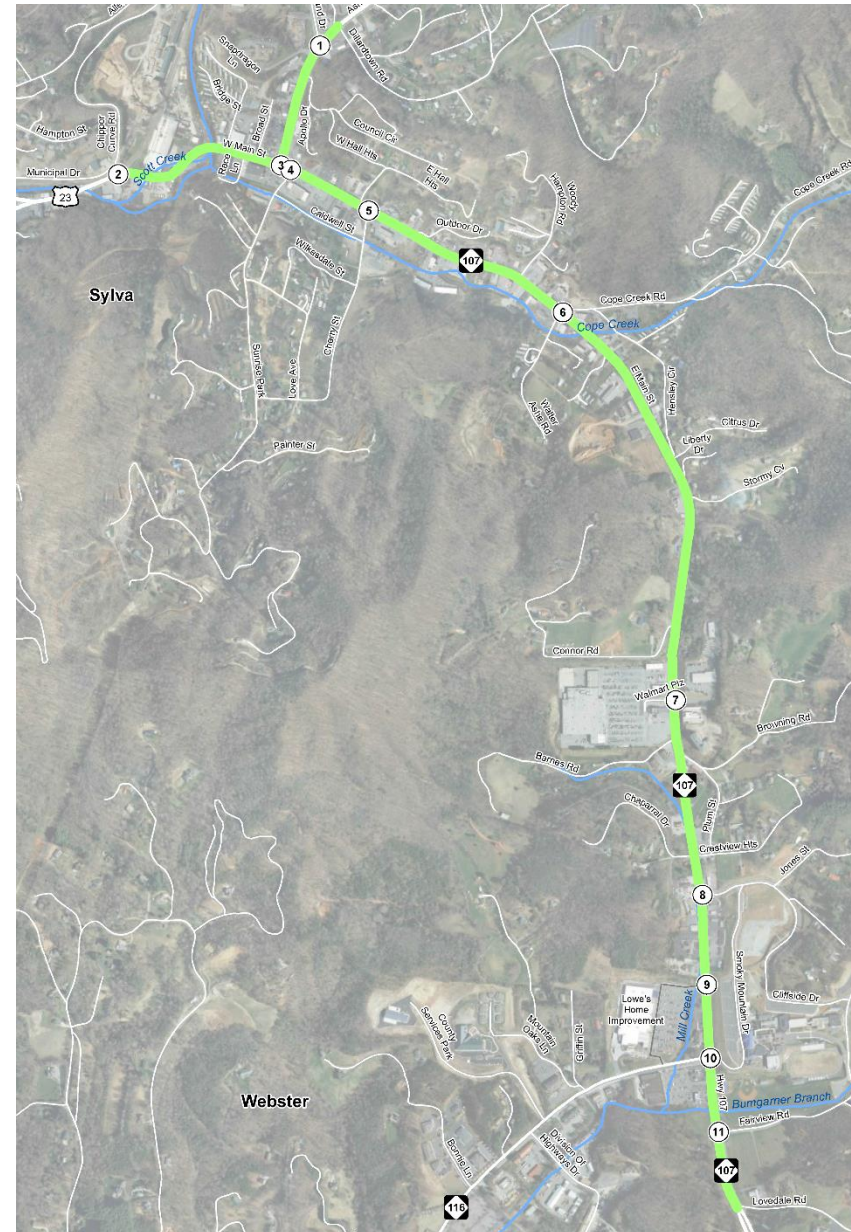


Presented by
Taruna Tayal,
Donald A. Bryson, PE

November 16, 2016

Project Background and Concerns

- Major north/south transportation corridor in Jackson County
- Northern Loop around Sylva and Dillsboro
- 27,000-39,000 AADT in 2035
- Congestion
- Safety
- Prioritize improvements
- Implement traffic calming devices
- Minimize impacts to surrounding businesses



NC-107 Corridor

- Mostly commercial development
- Few educational facilities
- Approximately 95 driveways intersect this corridor
- Sparse residential and commercial development
- Fourteen signalized intersections along US 23 Business and NC 107



Modeling and Analysis



Design and Analysis

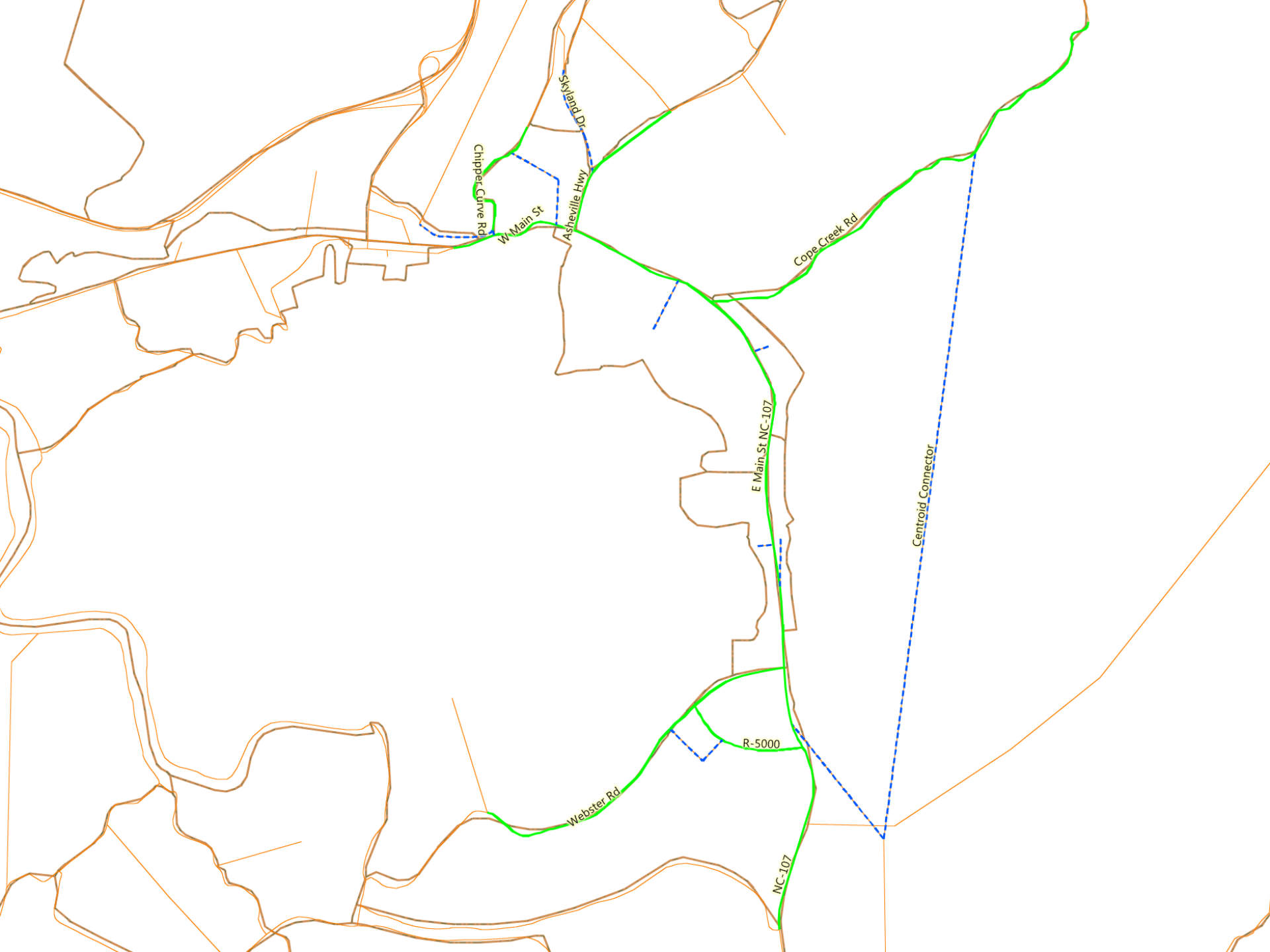
- Design – Synchronized Street
- TransModeler Micro-Simulation analysis
- Scenarios studied
 - 2015: Build and No-Build
 - 2025: No-Build and Construction
 - 2035: Build and No-Build
- Attributes Compared
 - Level of Service
 - Travel Time
 - Delay (sec/veh)
 - Queues



Modeling

- Jackson County Regional Model for Growth and Base network
- Network disaggregated in TransModeler for finer geography
- ODME in TransModeler for 2013 trip table
- Fratar for FY trip table





Chipper Curve Rd

W Main St

Skyland Dr

Asheville Hwy

Cope Creek Rd

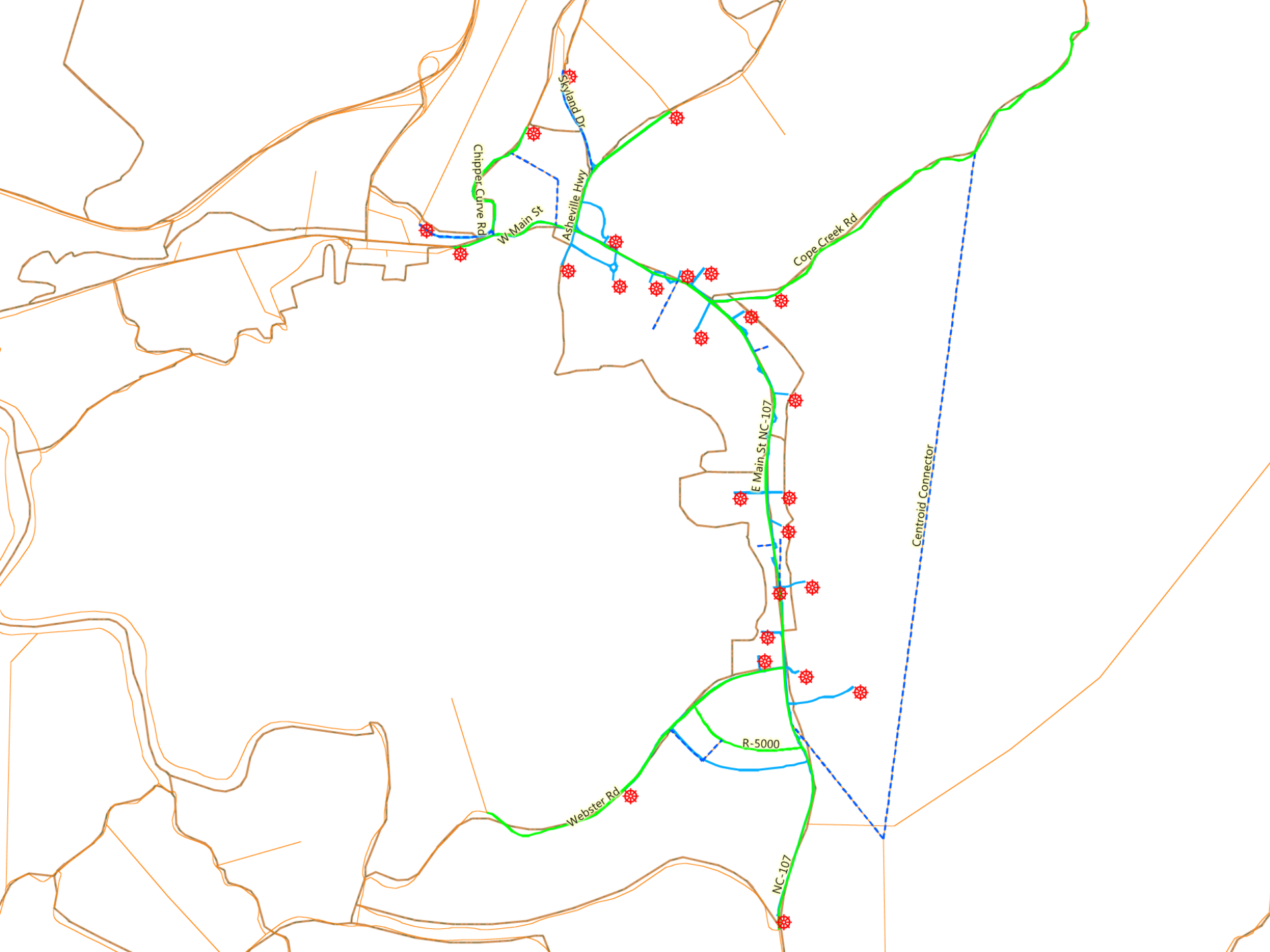
E Main St NC-107

Webster Rd

R-5000

NC-107

Centroid Connector





2025 Under Construction



2035 Build



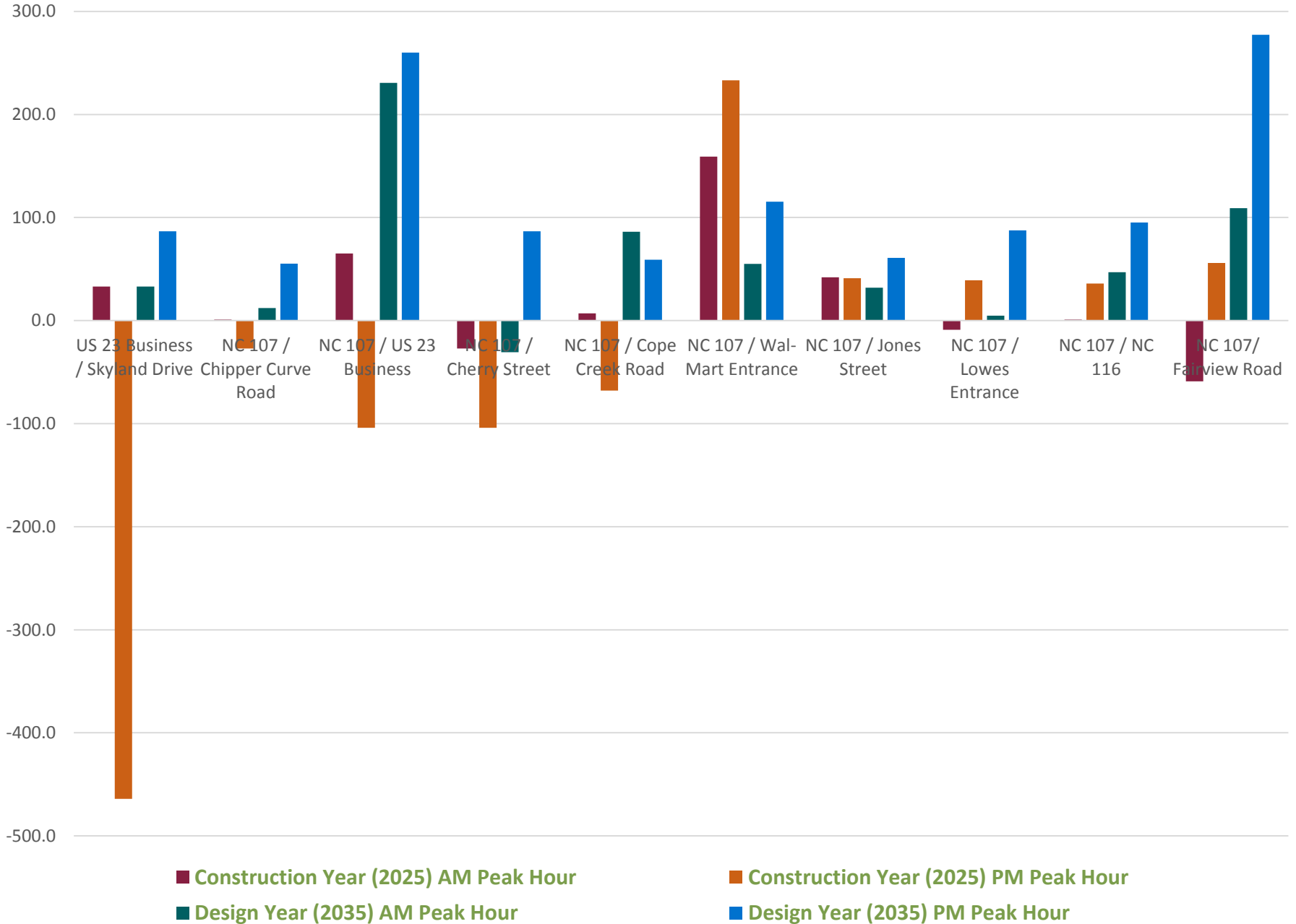
Findings



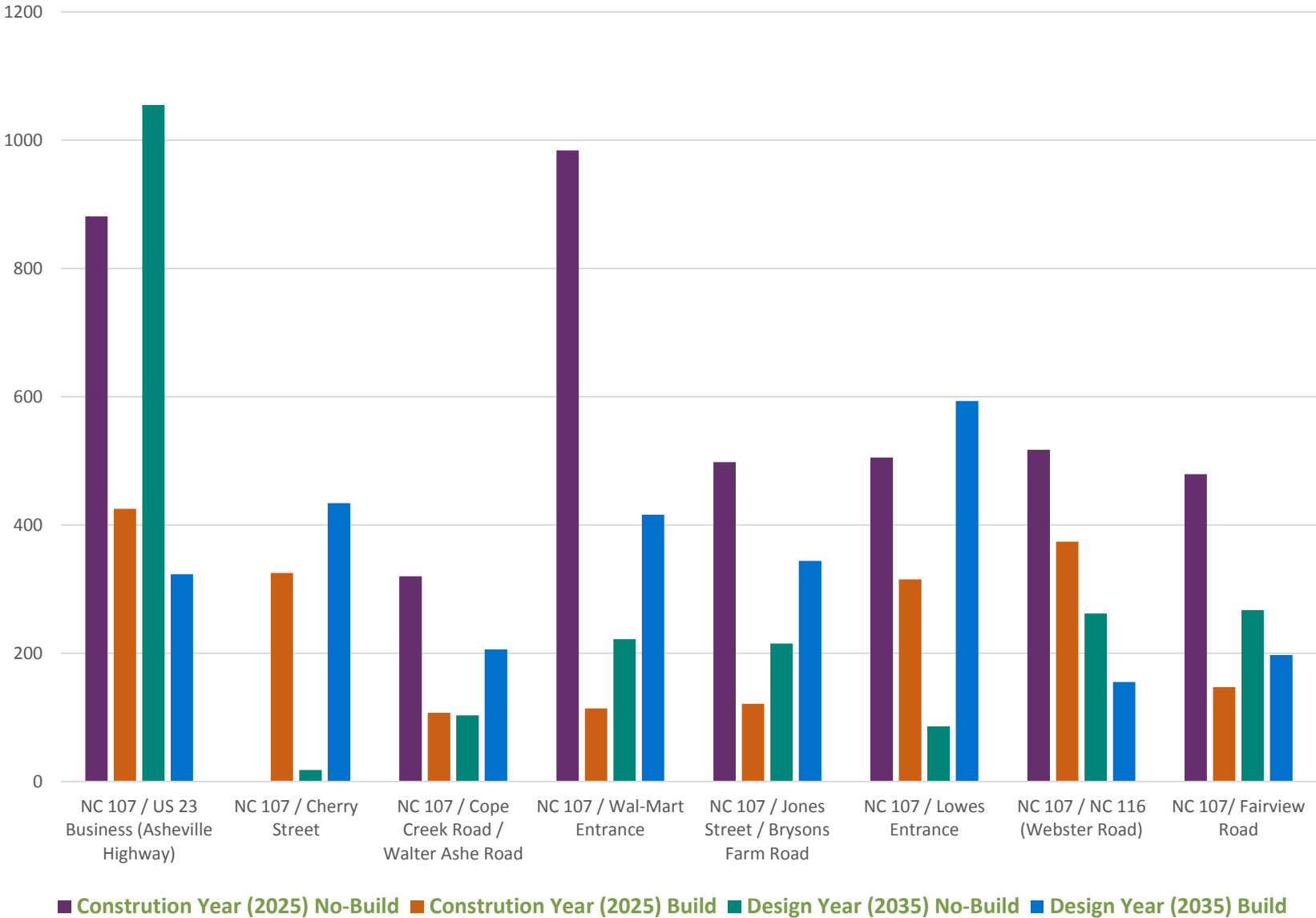
Travel Time Savings and LOS

Skyland Drive to Fairview Road						
Performance Measure	Time of Day	Direction	Construction Year (2025)		Future Year (2035)	
			No Build	Under Construction	No Build	Build
Travel Time (minutes)	(AM Peak Hour)	Northbound	6.3	6.6	13.3	5.5
		Southbound	12.6	9.4	18.7	14.4
	(PM Peak Hour)	Northbound	13.4	22.3	28.3	7.9
		Southbound	12.5	12.7	19.2	14.3
Average Speed (Miles per hour)	(AM Peak Hour)	Northbound	28.8	27.5	10.1	23.6
		Southbound	14.4	19.3	7.0	9.2
	(PM Peak Hour)	Northbound	13.5	8.1	5.1	16.8
		Southbound	14.5	14.3	6.9	9.6
LOS	(AM Peak Hour)	Northbound	B	B	F	C
		Southbound	E	D	F	F
	(PM Peak Hour)	Northbound	E	F	F	D
		Southbound	E	E	F	F

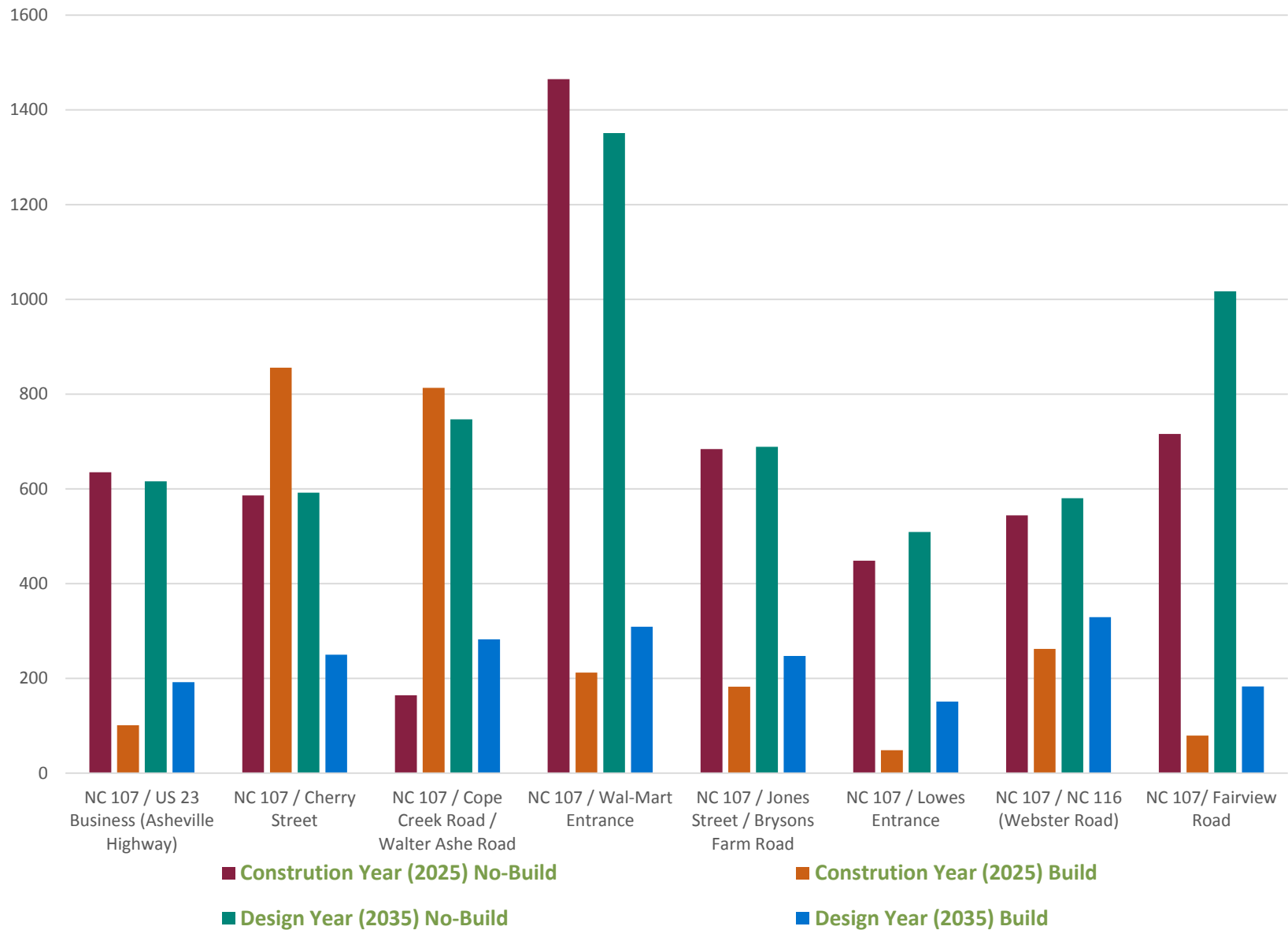
Delay Savings (Seconds/Vehicle)



AM Peak Hour Southbound Queue Length(Feet)



PM Peak Hour Northbound Queue Length(Feet)



Conclusion and Lessons Learned

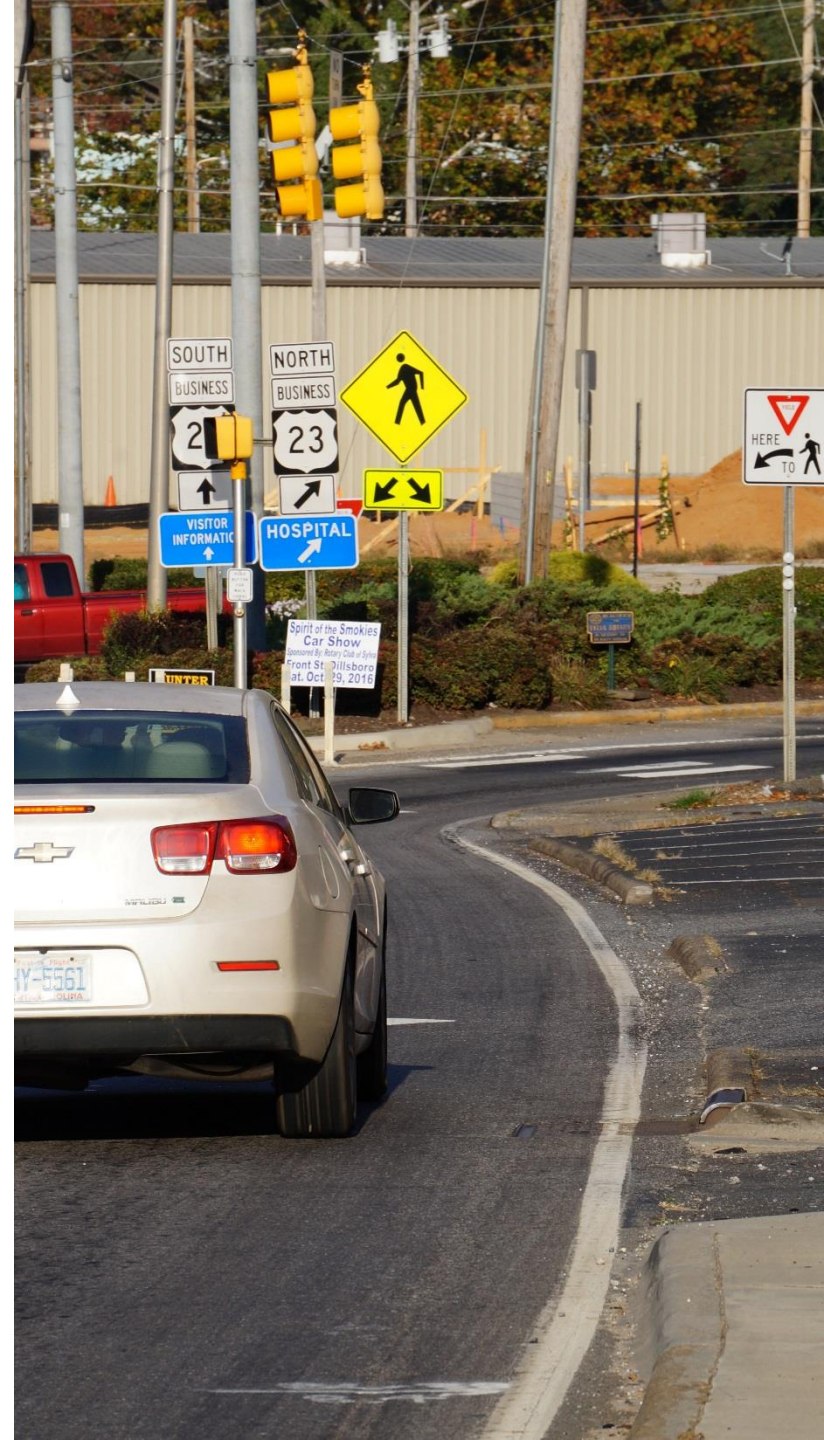


Recommendations

- Work zone implementation strategies such as lane closures and time restrictions,
- Phase construction
 - Construction of U-turn bulb-outs
 - Southbound outside widening
 - Northbound outside widening
 - Median widening
- Left turns may be considered from NC 107 to northbound US 23 Business (Asheville Highway)
- Add roundabout at the intersection of Caldwell Street and Cherry Street

Pros and Cons

- Better Construction
 - Revise interim and final design
 - Help the businesses understand the impacts
-
- Costly Analysis
 - Only Peak Hour impacts
 - No Construction safety

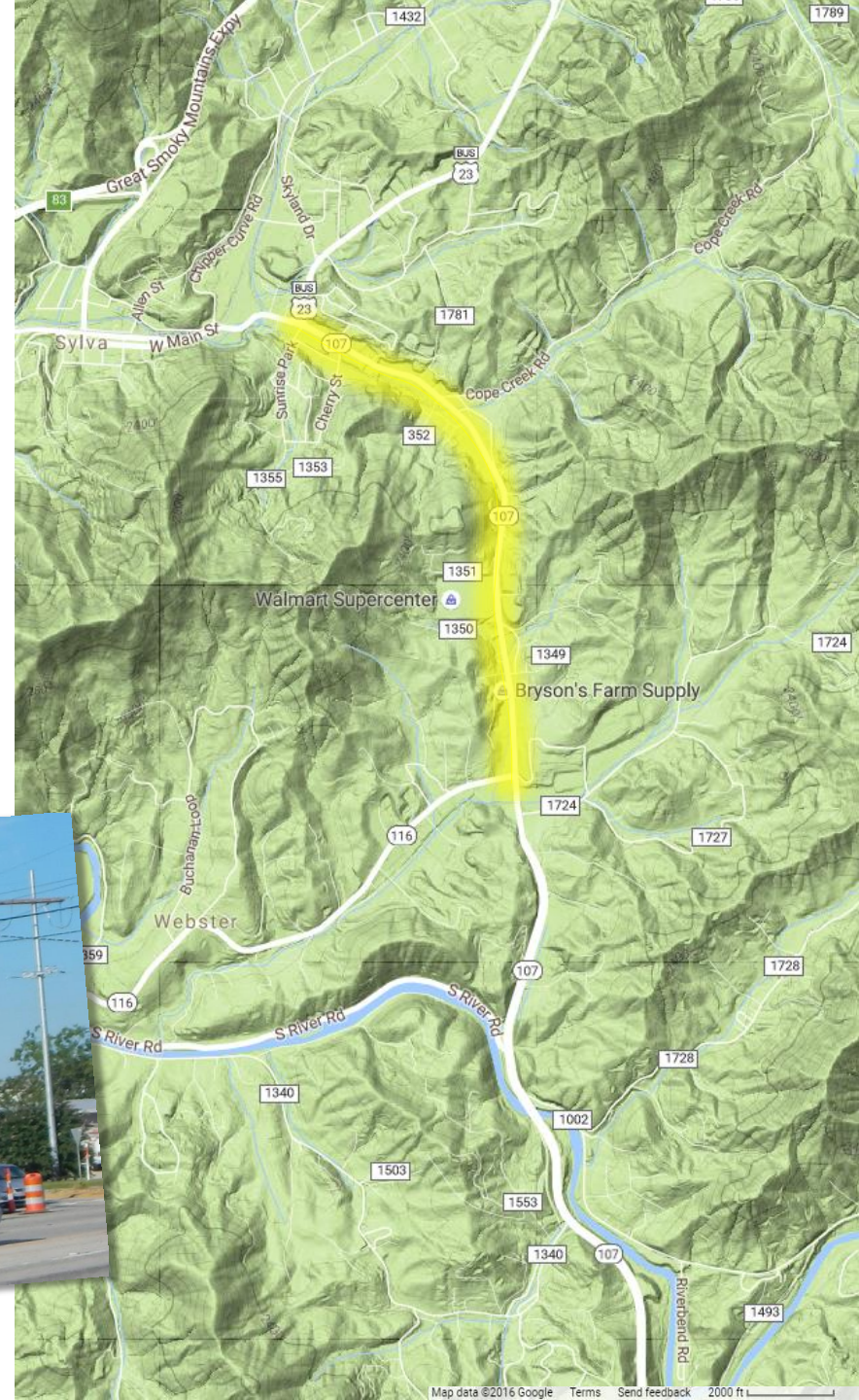


Performance Measures & Construction Impacts



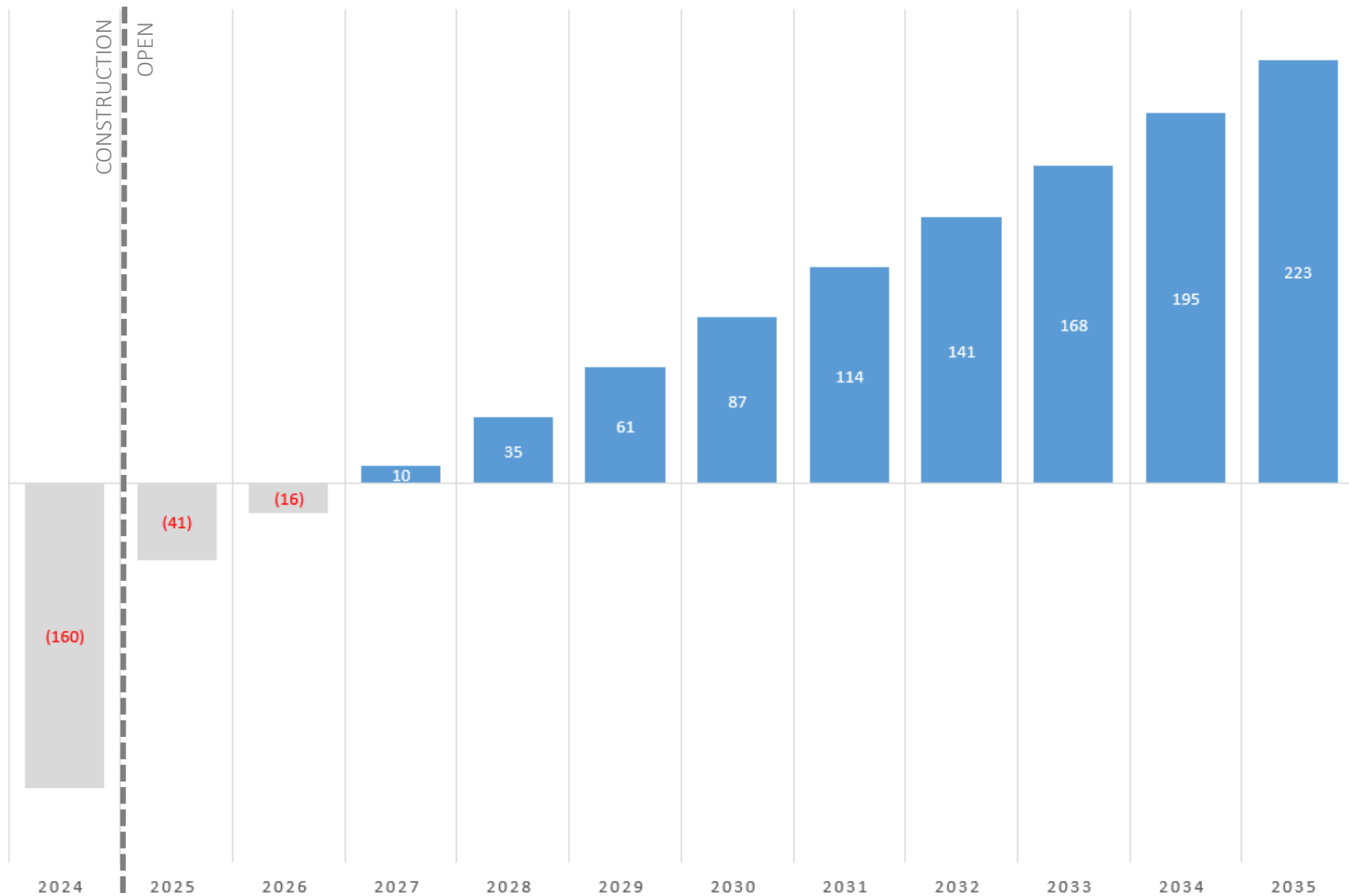
Reducing Travel Delay

- Travel time savings = critical performance measure
- Should construction impacts be considered?
- Excellent case study
 - No feasible alternate routes
 - No practical transit / TDM options
 - Simple but realistic assumptions
- Considers only travel delay benefits



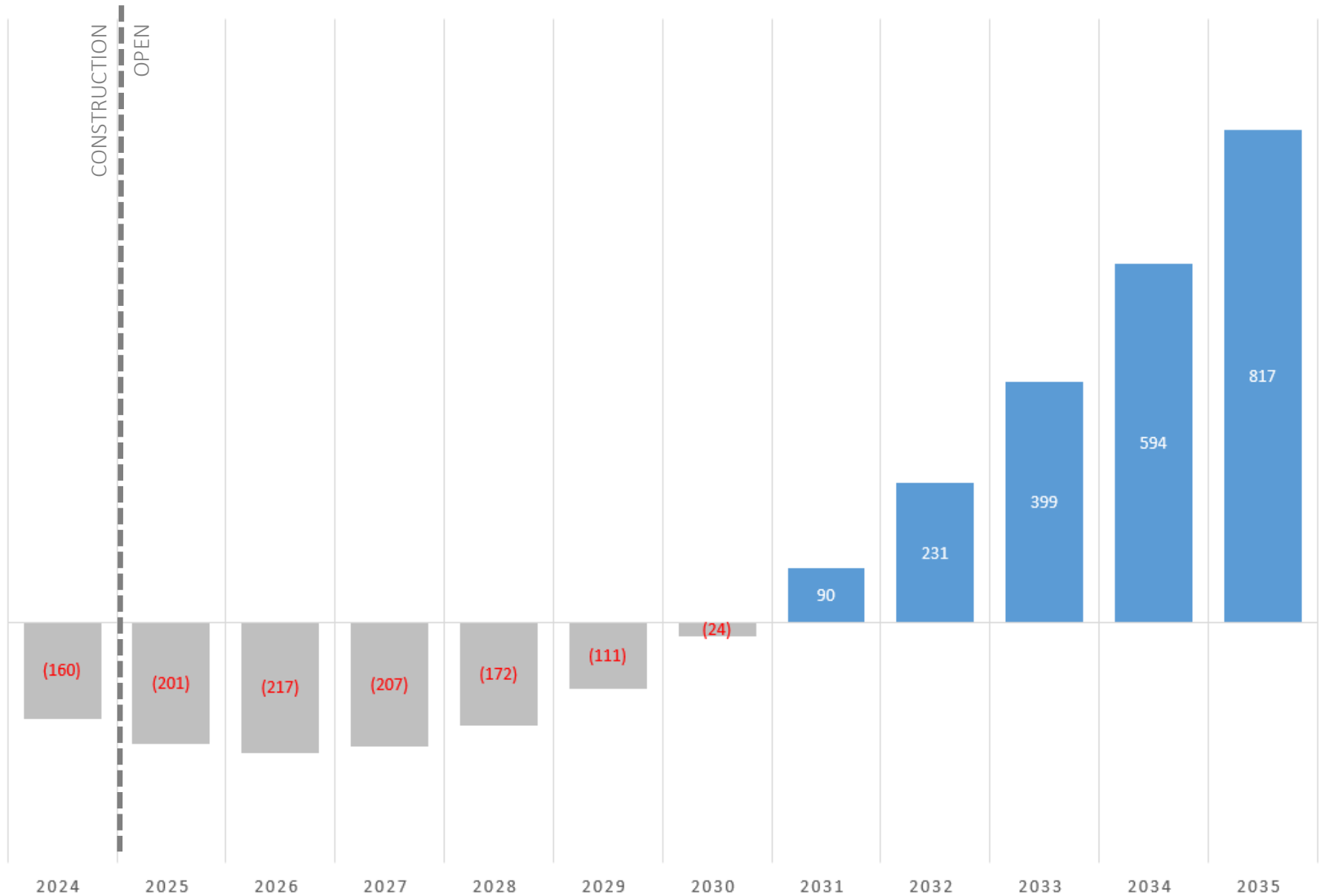
DELAY REDUCTION: CONSTRUCTION IMPACTS & PROJECT BENEFITS

ANNUAL VHT SAVINGS IN 1000'S



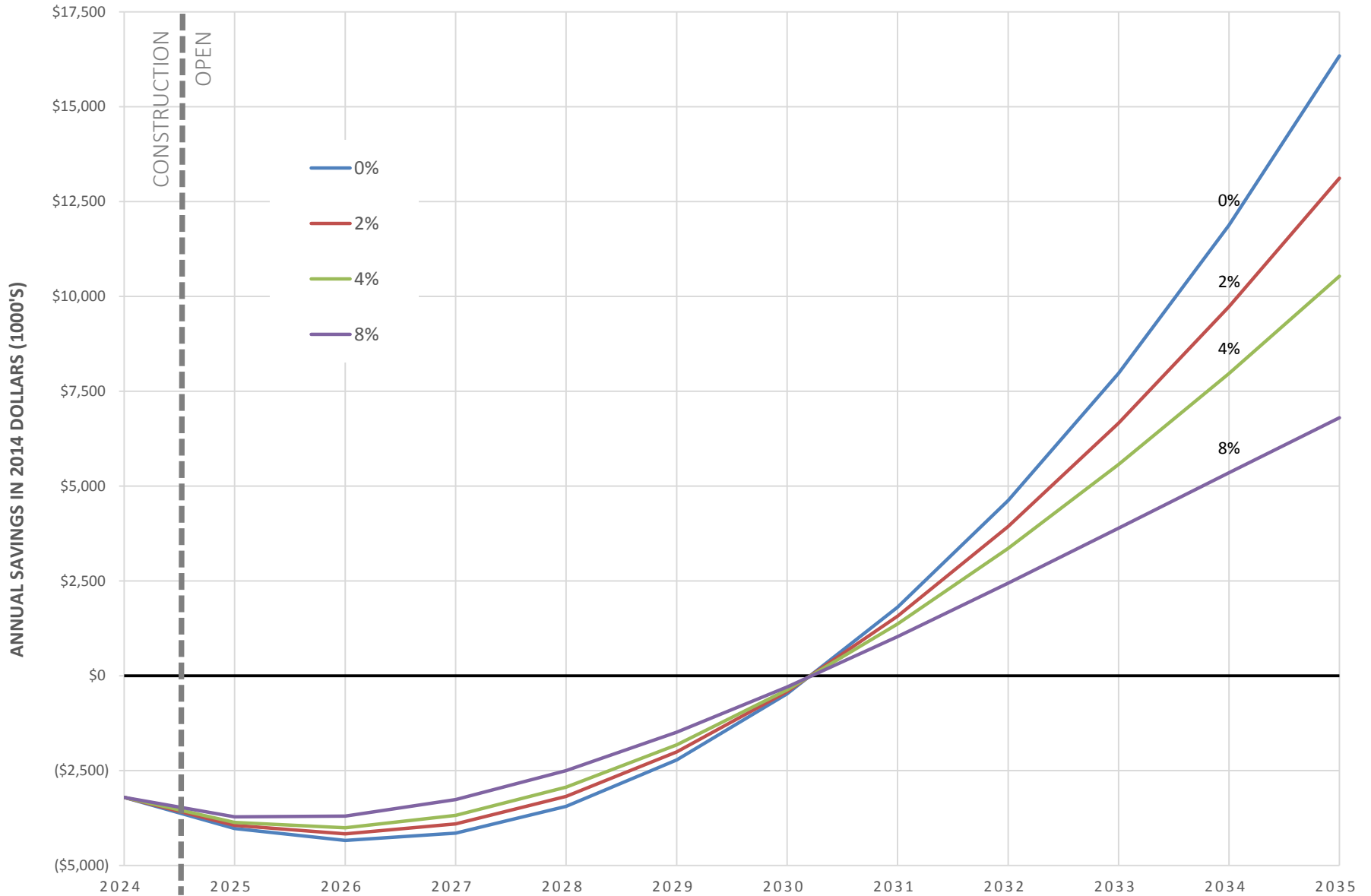
CUMULATIVE DELAY REDUCTION

ANNUAL VHT REDUCTIONS IN 1000'S

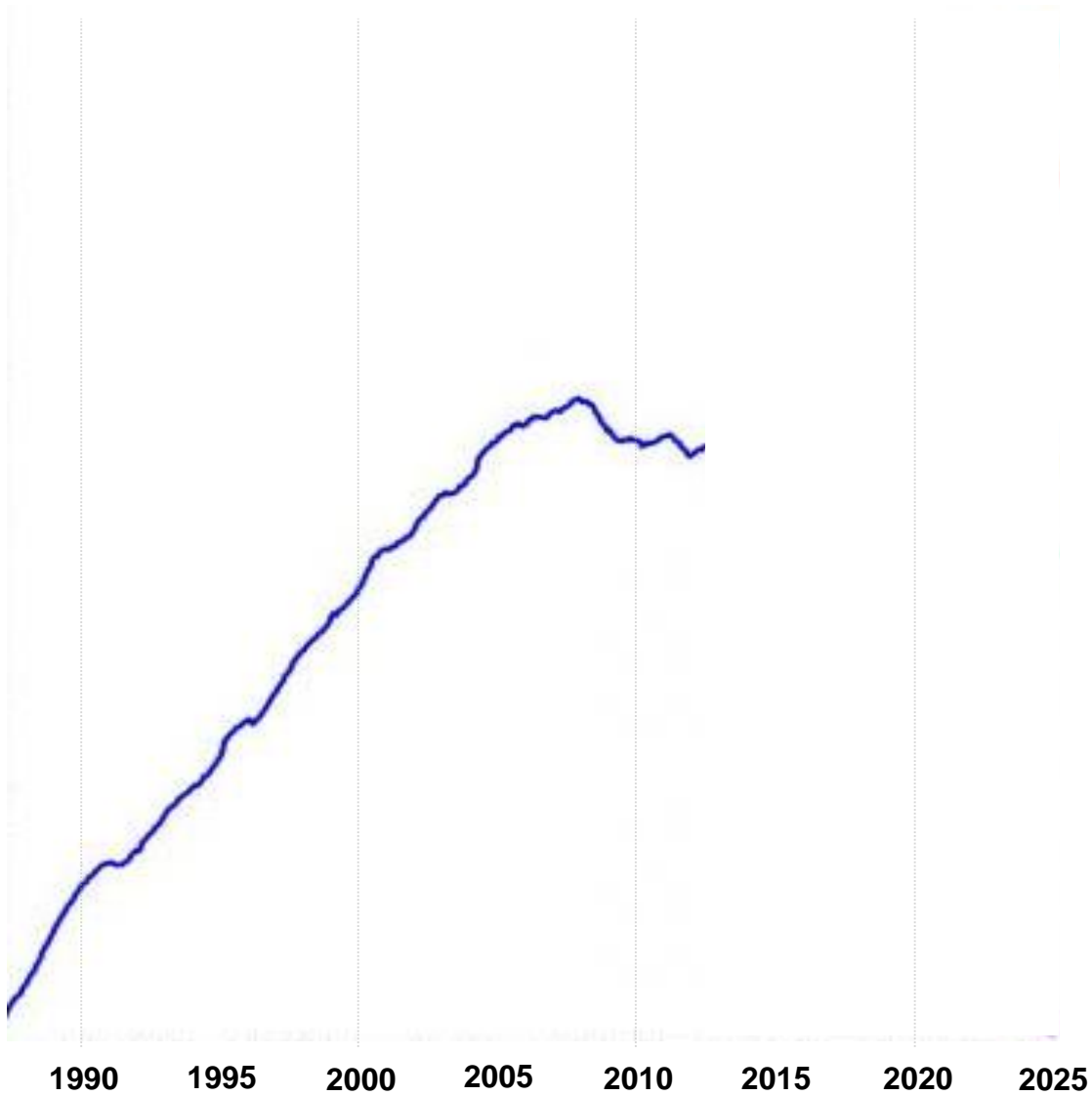


EFFECT OF DISCOUNT RATE ON CUMULATIVE DELAY SAVINGS

ANNUAL TRAVEL TIME SAVINGS IN \$1000S



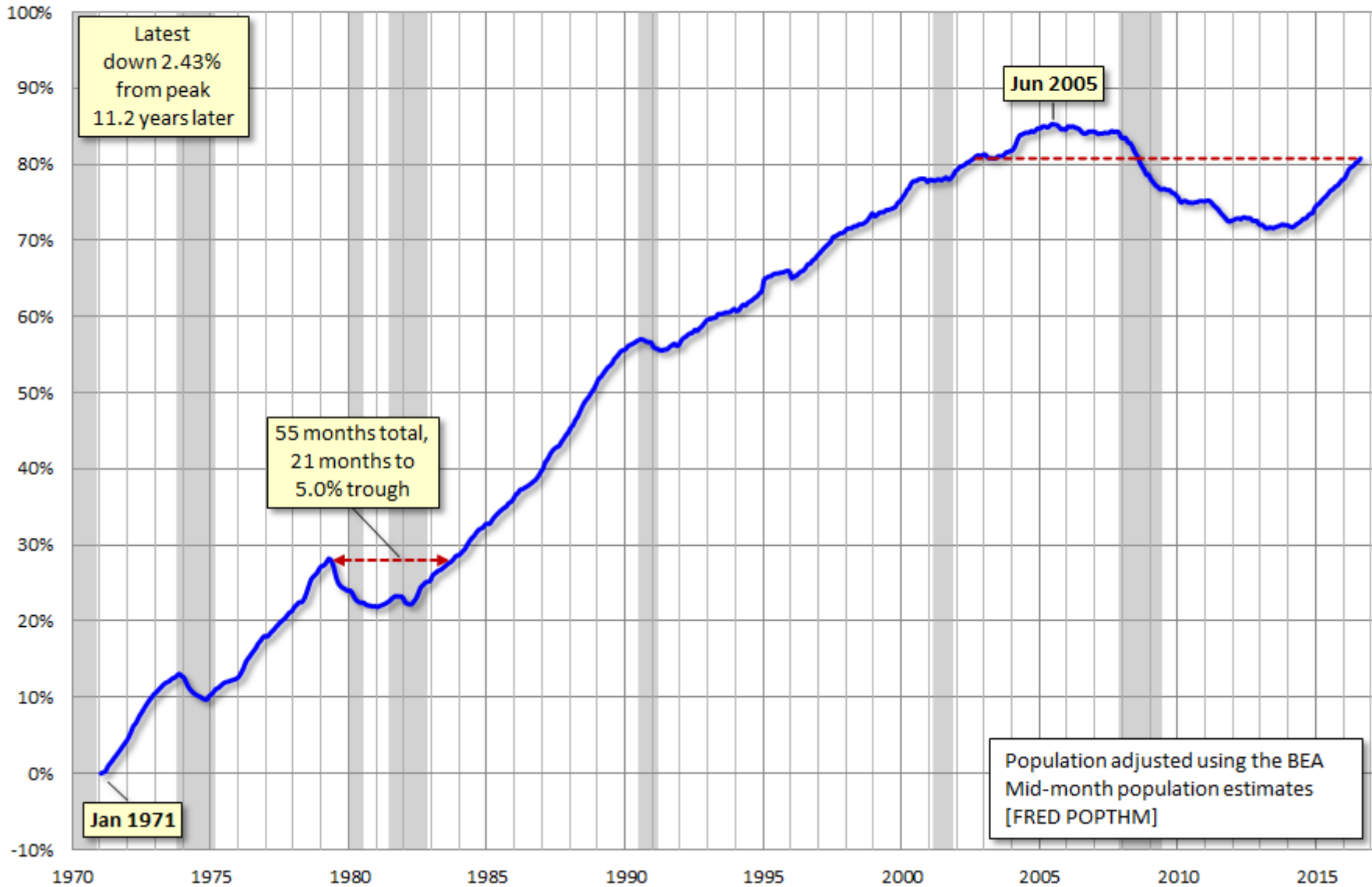
US VMT (12-Month Moving Total)



Estimated Vehicle Miles Traveled on All Roads

dshort.com
October 2016
As of August

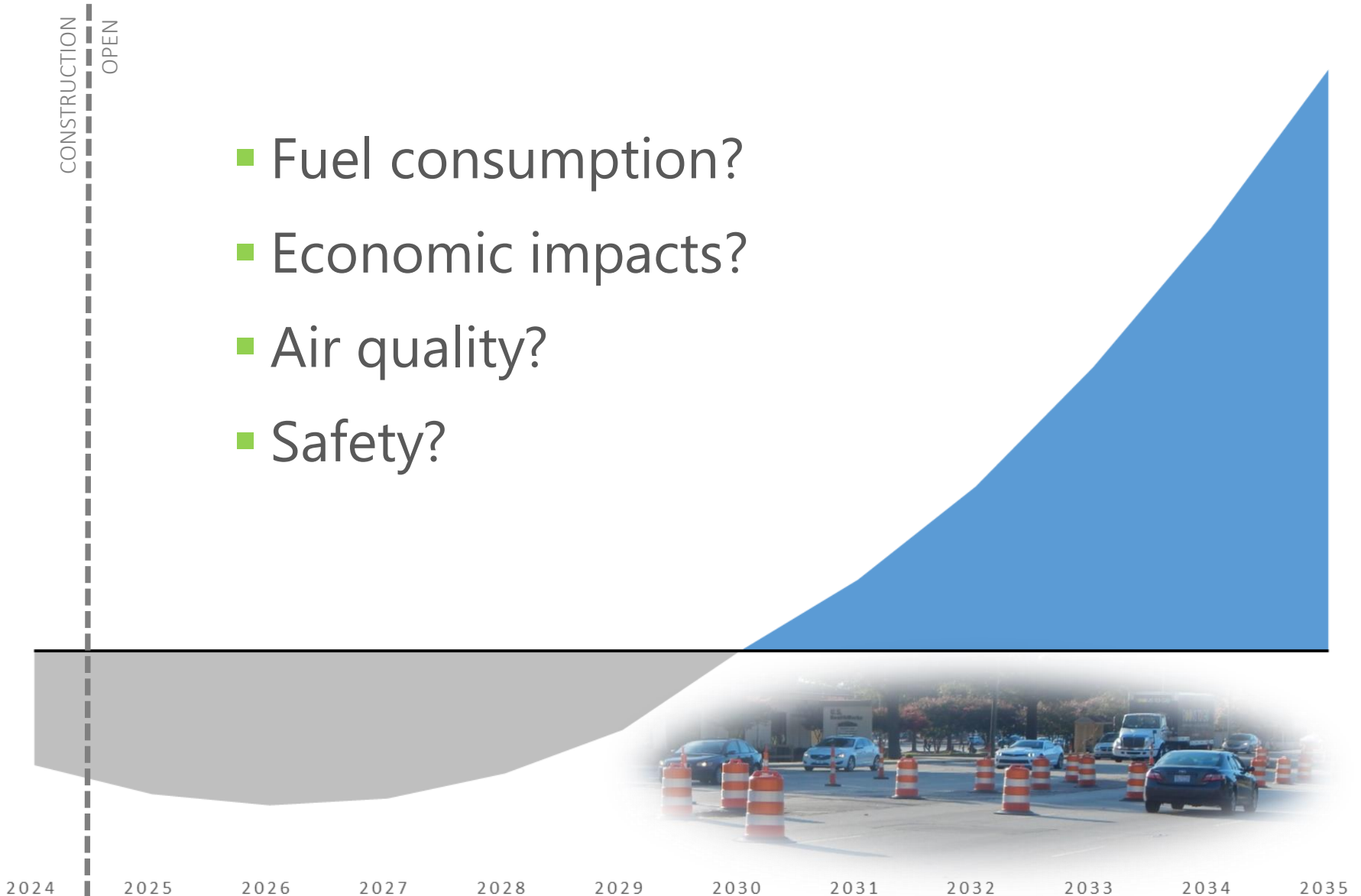
Recessions Population-Adjusted Growth Current Level



Other construction impacts...

CONSTRUCTION
OPEN

- Fuel consumption?
- Economic impacts?
- Air quality?
- Safety?





Things to ponder:

- Construction impacts can be significant
 - New alignment vs widen existing
 - Evaluate:
 - Operational improvements
 - Demand management
 - Alternate modes
 - Is rigorous construction planning justified?
- Beware of “end-state” planning
 - Interim matters
 - Immediate vs long-range impacts
- Benefit/Cost: Simple \leftrightarrow Complicated
- What about uncertainty?

Questions / Comments



23 offices throughout the east coast

www.vhb.com

Taruna Tayal | ttayal@vhb.com | 919.741.5525
Donald A. Bryson | dbryson@vhb.com | 919.334.5615