TSITE 2015 Summer Meeting

Gatlinburg, TN

July 30, 2015

Center Street (S.R. 36) Road Diet Kingsport, TN

Jason Carder, P.E. – Mattern & Craig

Najmeh Jami, E.I.T – RPM Transportation Consultants

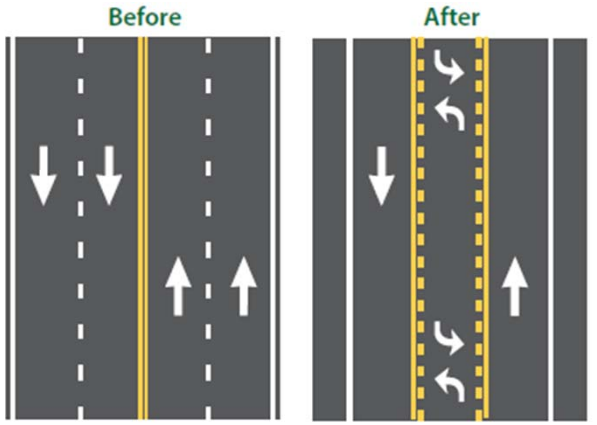
AGENDA

- BACKGROUND
- CASE STUDY
- CAPACITY ANALYSIS
- RESULTS
- LESSON LEARNED

BACKGROUND

BENEFITS OF ROAD DIET

- Improve safety
- Reduce speeds
- Mitigate queues associated with left-turning traffic
- Improve pedestrian environment
- Improve bicyclist accessibility
- Enhance transit stops
- Low-Cost solution



Source: FHWA Road Diet Informational Guide

BACKGROUND

HISTORY OF ROAD DIETS

System and capacity expansion was the main focus of roadway projects during the 1950s and 1960s.

Three-lane alternate wasn't considered during that time

First Road Diet occurred in **1979 in Billings, Montana**.

First installation of Road Diets in urban areas in 1990s in Seattle and Portland.

Now it's a **"PROVEN SAFETY COUNTERMEASURE"** by FHWA

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CASE STUDY

S.R. 36 (Center Street) scheduled to be resurfaced by TDOT in 2014

Before: 2 lanes each direction, no TWLTL

Traffic volumes (AADT, per TDOT):
- Downtown section = 16,000 vpd
- Eastern section = 20,000 vpd

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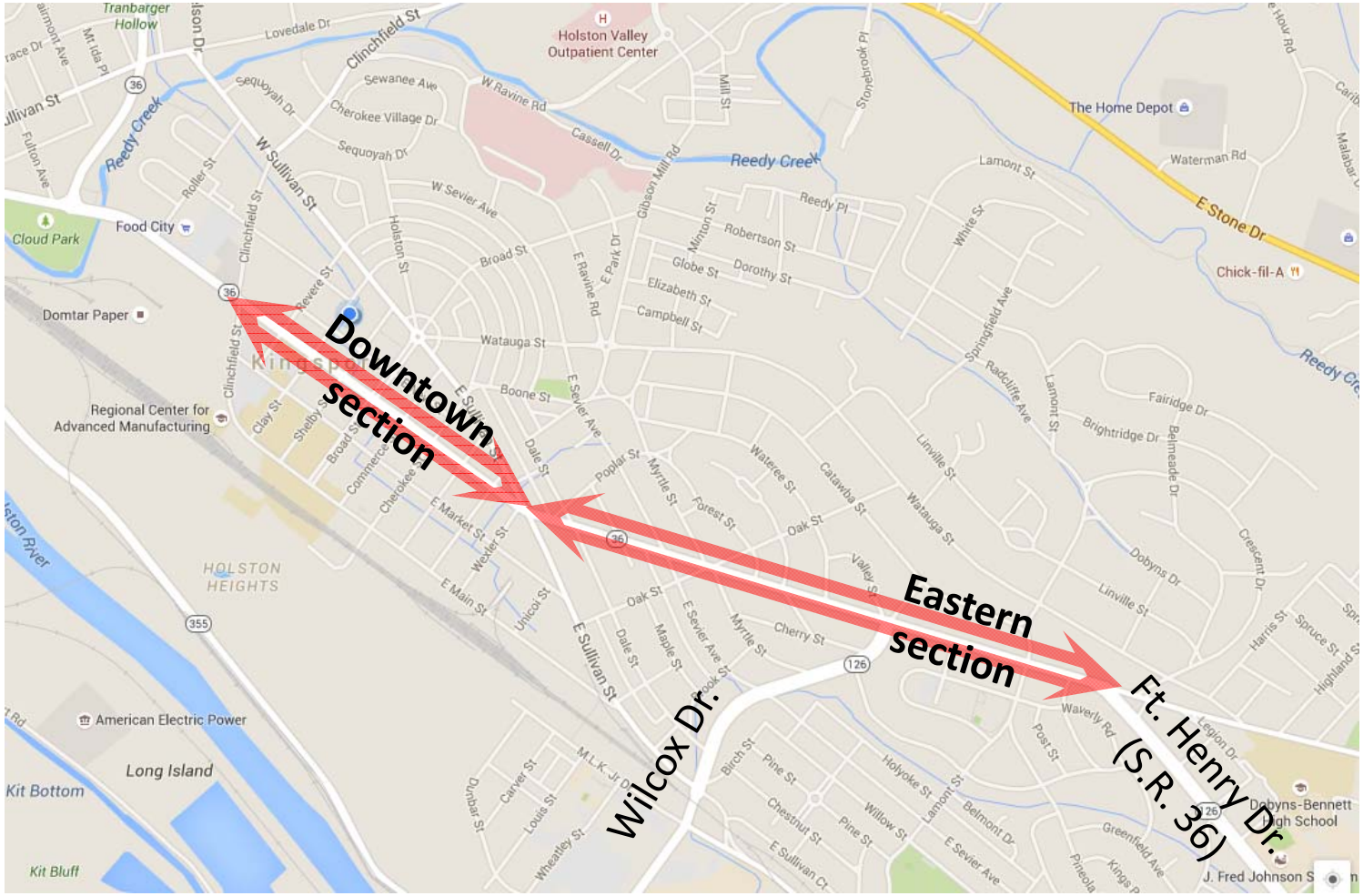
CASE STUDY



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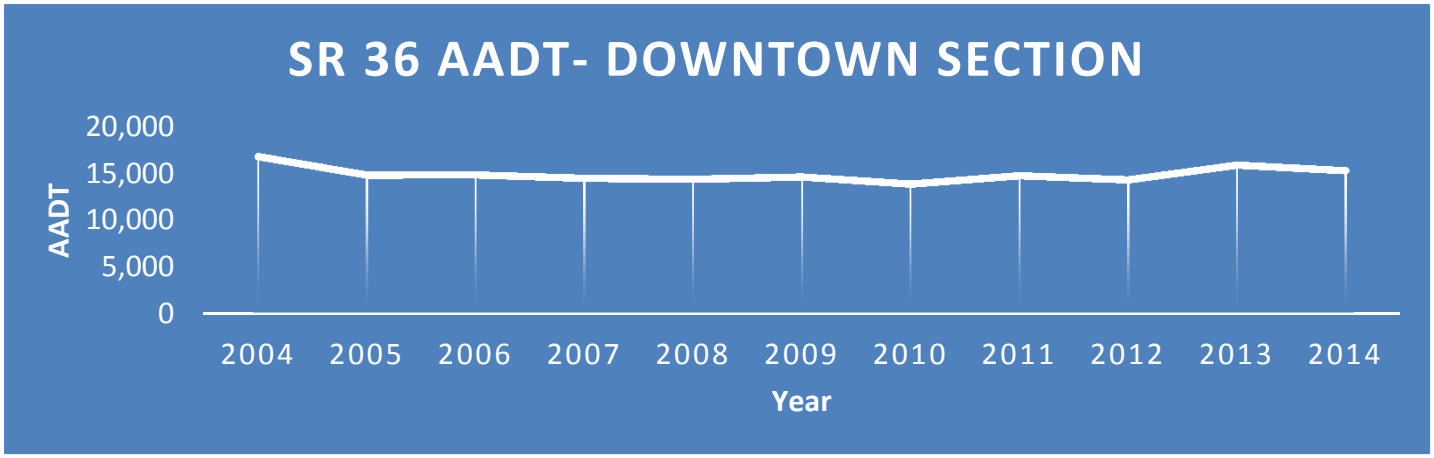
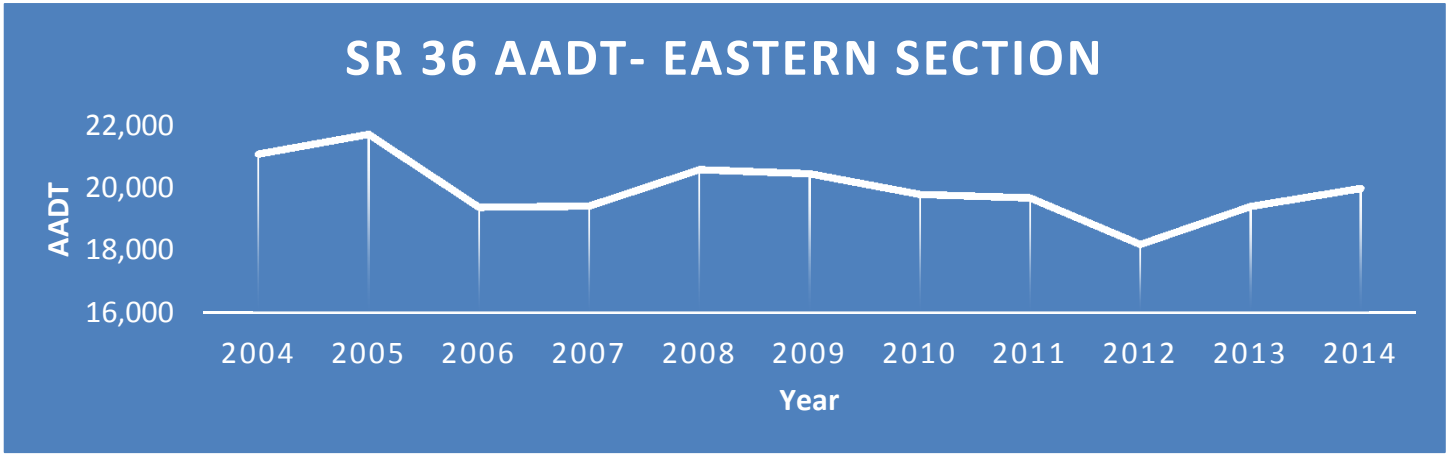
CASE STUDY





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CASE STUDY

Coalition of groups (Downtown Merchant Association, Parks & Rec, Housing Authority, others) along with Assistant City Manager saw this as a **once in lifetime opportunity to change the dynamics of downtown**:

Normalize speeds	Reduce crashes	Provide left turn refuge	On-street parking improvement	Improve pedestrian facilities/Bike Lanes

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CASE STUDY

- City realized that by acting in coordination with resurfacing project, the road diet would incur the City essentially no cost (only cost was for consulting fees)
- Limited window of opportunity (repaving cycle is 15-20 years)
- Thus, City investigated a road diet on Center Street, focused on the downtown portion

CASE STUDY

June 2013	• City staff began discussions about possibility of road diet
July 2013	• City hired RPM Transportation Consultants and Mattern & Craig to determine if road diet was feasible and produce design plans
September 2013	• Plan submittal and begin review process with TDOT
October 2013	• Plans sent to TDOT design
April 2014	• TDOT Bid Letting
June 2014	• Construction begins
August 2014	• Construction complete

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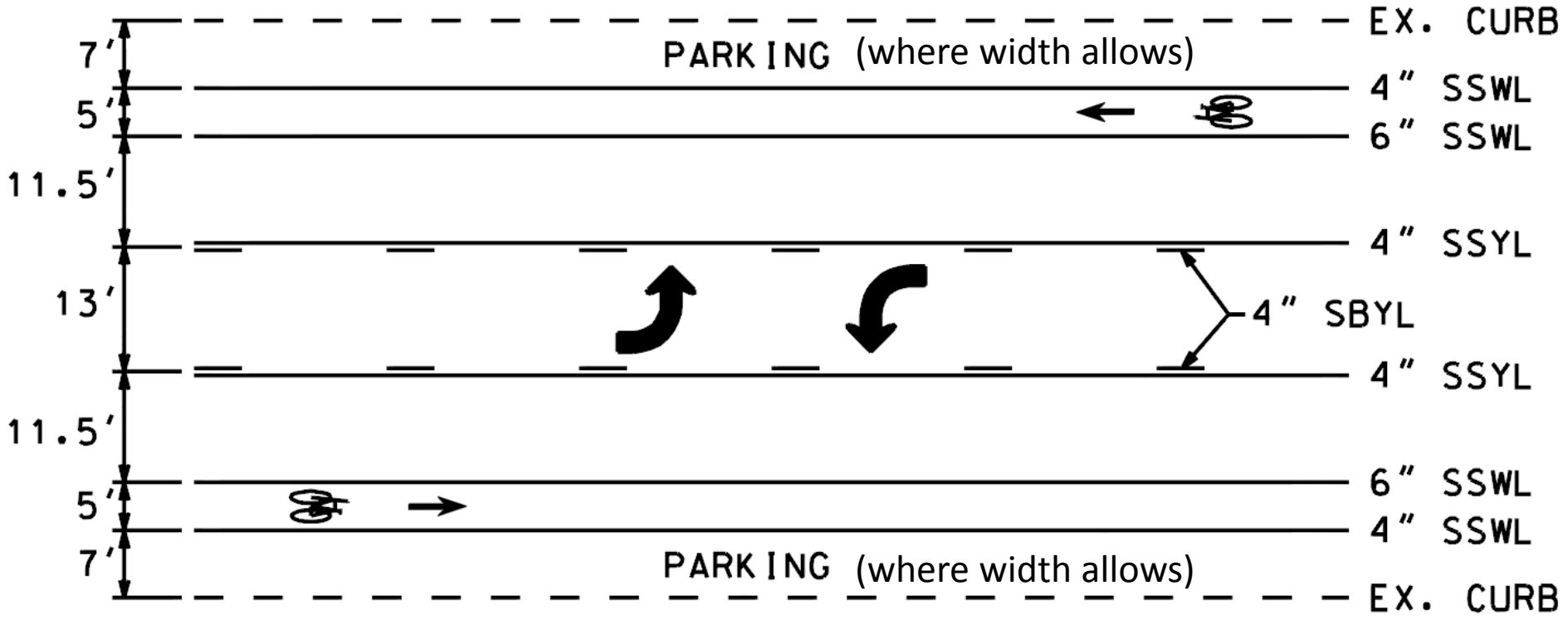
CASE STUDY

Typical Section



CAPACITY ANALYSIS

ROAD DIET FEASIBILITY DETERMINATION –OPERATIONAL FACTORS

Average Daily Traffic

- The FHWA advises that roadways with ADT of **20,000 vpd** or less may be good candidates for a Road Diet and should be evaluated for feasibility.

De Facto Three-Lane Roadway Operation

- Approximately **80% of thru traffic used the outside lanes**, making the inner lanes defacto left turn lanes leading to most likely operational success of a Road Diet.

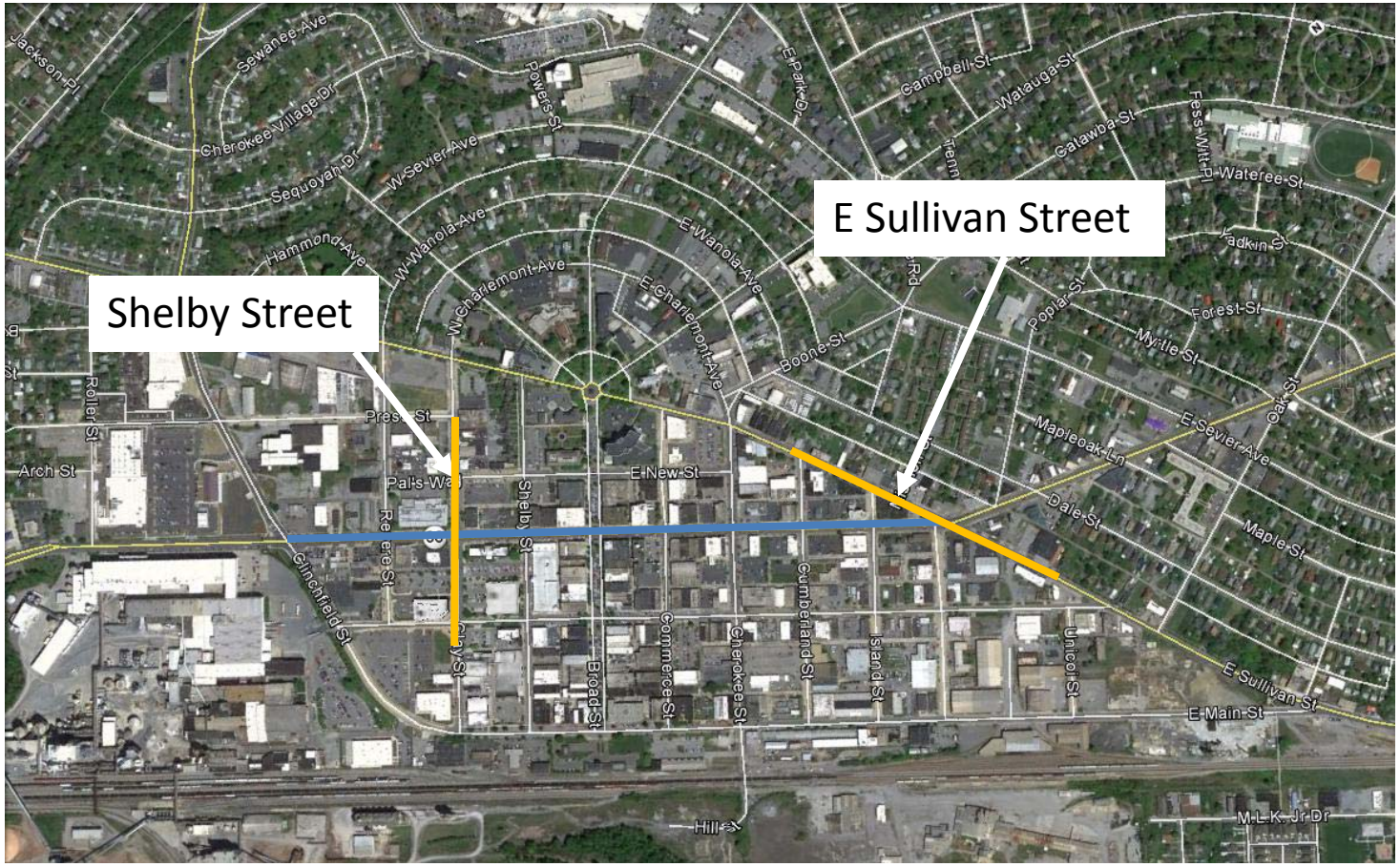
Level of Service (LOS)

- Synchro and SimTraffic were used to measure delay and LOS along the corridor after conversion and to optimize the operational performance by signal timing and coordination between adjacent signals.

Bicycle and Pedestrians Considerations

- Bike routes were included in the typical section as one of the city's priorities to improve the livability of the corridor specifically in downtown segments.

CAPACITY ANALYSIS



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CAPACITY ANALYSIS

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CAPACITY ANALYSIS

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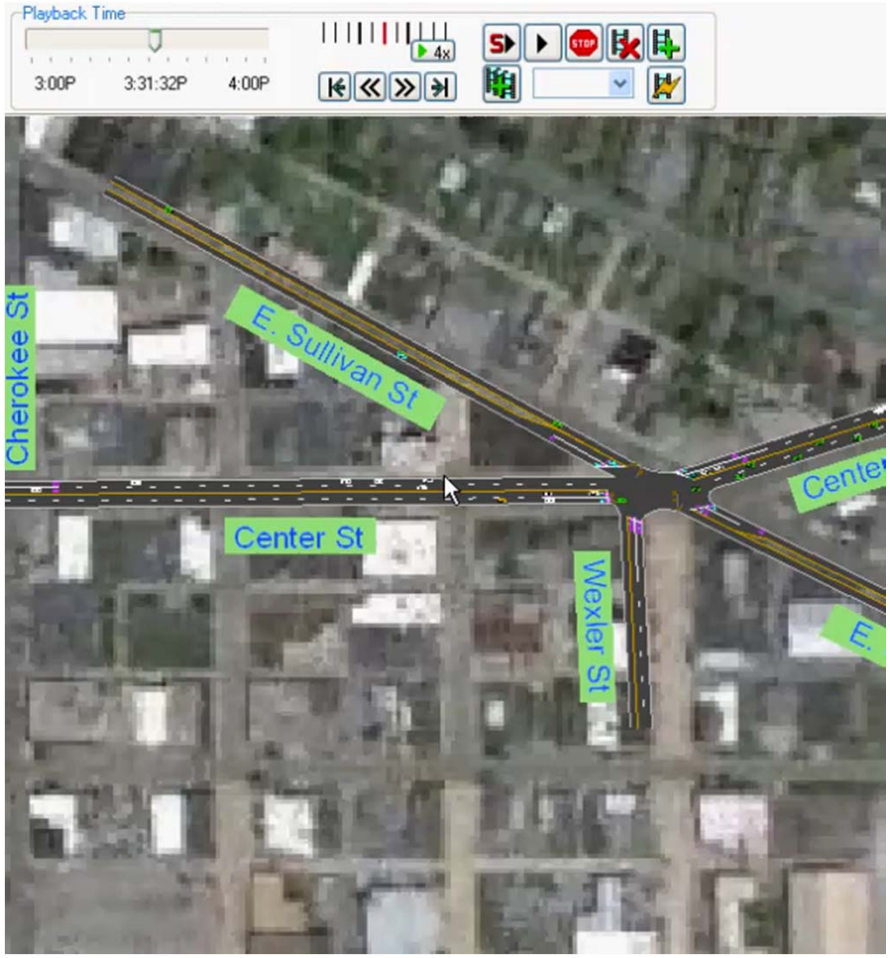
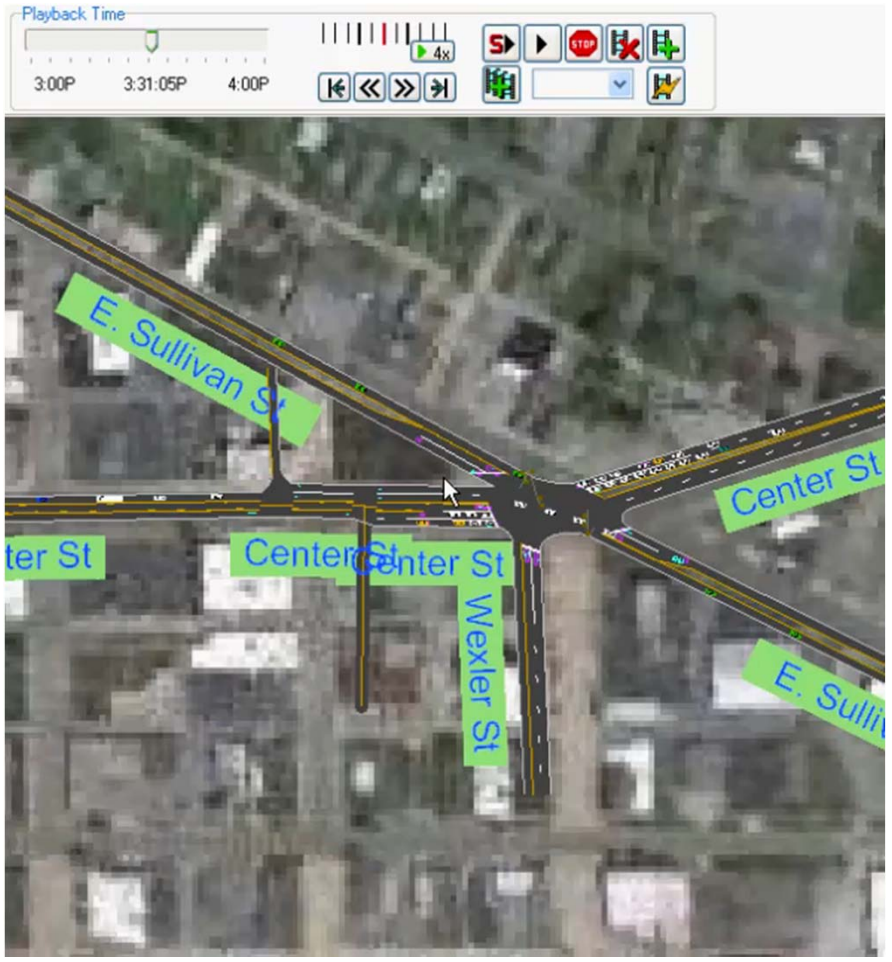
CAPACITY ANALYSIS





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CAPACITY ANALYSIS

ANTICIPATED TRAVEL TIMES
(BASED ON SYNCHRO/SIMTRAFFIC MODELS)

	DIRECTION	TRAVEL TIME						
		AM PEAK		MID-DAY PEAK		PM PEAK		FREE-FLOW
		4-LANE	ROAD DIET	4-LANE	ROAD DIET	4-LANE	ROAD DIET	
DOWNTOWN SECTION	Eastbound	02:30	02:18	02:25	02:24	02:24	02:10	01:18
	Westbound	02:31	02:14	02:30	02:24	02:21	02:30	
EASTERN SECTION	Eastbound	03:06	03:02	03:03	03:37	03:18	04:16	02:18
	Westbound	02:51	03:06	03:01	03:36	03:06	03:34	
ENTIRE CORRIDOR	Eastbound	05:36	05:20	05:28	06:01	05:42	06:26	03:36
	Westbound	05:22	05:20	05:31	06:00	05:27	06:04	

Scenario	Travel Time Difference (Avg)
AM Peak	3% Decrease
MD Peak	9% Increase
PM Peak	11% Increase
Total	6% Increase

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At Clinchfield St., facing east

BEFORE

AFTER

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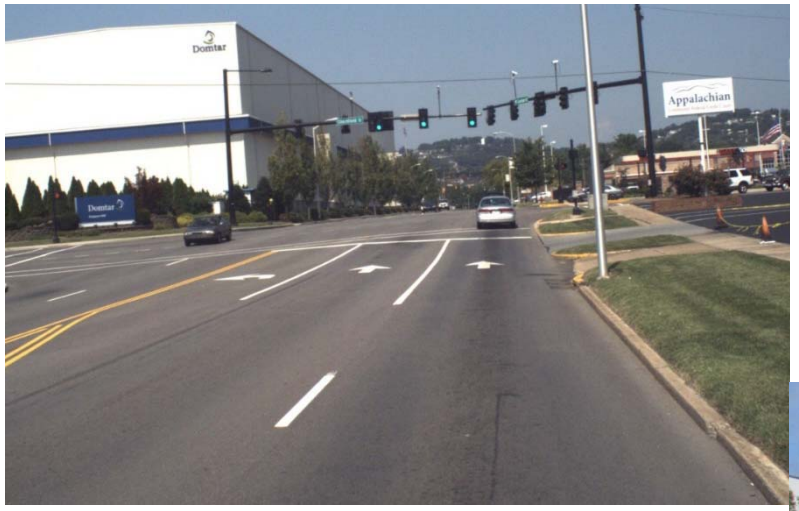
At Clinchfield St., facing west



BEFORE

AFTER

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At Clay St., facing east

BEFORE

AFTER

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At Clay St., facing west

BEFORE

AFTER

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At Shelby St., facing east

BEFORE

AFTER

At Broad St., facing east

BEFORE

AFTER

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At Cherokee St.

BEFORE

AFTER

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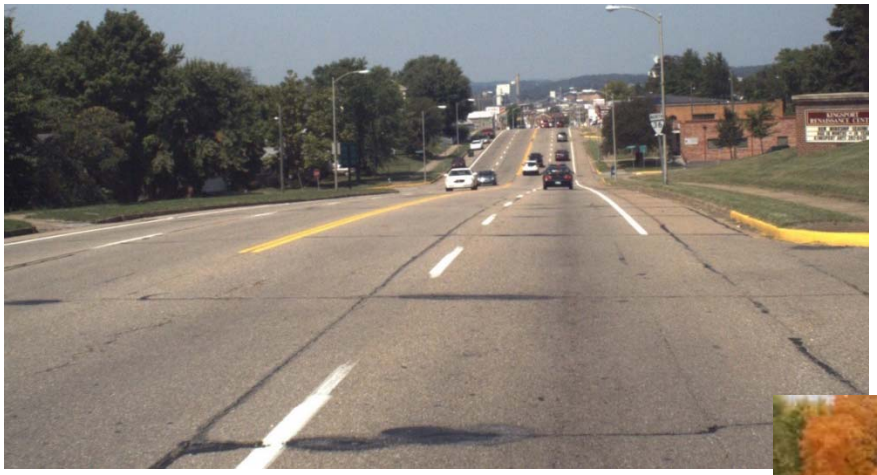
At Wateree St.



BEFORE

AFTER

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At Fort Henry Dr.

BEFORE

AFTER

RESULTS

Speeds have normalized

- Downtown section – 85% speed 31 mph *after* (posted 30) – no data before
- Eastern section – 85% speed 38 mph *before*, 35 mph *after* (posted 30)
- Anecdotal evidence suggests speeds prior to road diet were higher, with a significant speed differential between lanes

Crashes have been affected

- Rear end crashes increased
- Angle crashes decreased

TIME		ADT	# OF CRASHES BY TYPE				
			REAR END	ANGLE	SIDE-SWIPE	BIKE-PED	TOTAL
BEFORE	JUNE '12 - MAY '13	16,265	52	25	12	0	95
BEFORE	JUNE '13 - MAY '14	17,665	42	19	9	0	77
AFTER	JUNE '14 - MAY '15	17,651	66	14	10	3	94

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RESULTS

Travel times have been affected

- No significant increase in travel times (decrease in several peak periods/directions)

DIRECTION		TRAVEL TIME (SECONDS)									
		AM PEAK			MID-DAY PEAK			PM PEAK			FREE-FLOW
		BEFORE	AFTER	Δ	BEFORE	AFTER	Δ	BEFORE	AFTER	Δ	
DOWNTOWN SECTION	EB	120	99	-21%	121	134	10%	151	120	-26%	78
	WB	116	137	15%	152	155	2%	118	121	2%	
EASTERN SECTION	EB	231	190	-22%	246	246	0%	236	260	9%	138
	WB	221	206	-7%	261	218	-20%	235	237	1%	
ENTIRE CORRIDOR	EB	351	289	-21%	367	380	3%	387	380	-2%	216
	WB	337	343	2%	413	373	-11%	353	358	1%	

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Lessons Learned

More public education/advertisement was needed

- Although public notices were mailed, businesses were personally visited, and press releases made (newspaper, radio, TV), there were still people who seemed surprised by the change.

Help partner/supportive organizations to be more vocal & involved in promoting project

Better coordination with TDOT & contractor was needed

More data should have been collected prior to change

- Before/after travel time studies
- Volume/speed data

You can't please everyone!

Questions?

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