memo

APEX DESIGN

TO: Jeff Rice, El Paso County

FROM: Diana McHale, PE - Apex Design, A CONSOR Company

DATE: April 27, 2022

RE: Meridian Road Cycle Length Analysis Summary

1 Introduction

The purpose of this memo is to describe the process of performing the cycle length analysis and summarizing the recommendations from that analysis. The primary objective of this signal timing project is to create timings for the new signal at Eastonville Road, and coordinate the signals along Meridian Road that are currently using free operation. The following intersections are included in this study, along Meridian Road in El Paso County.

- Meridian Road & Woodmen Hills Drive
- Meridian Road & Bent Grass Meadow
- Meridian Road & Eastonville Road
- Meridian Road & Woodmen Road
- Meridian Road & Rolling Thunder Road
- Meridian Road & US 24

Cycle Length Evaluation

The traffic signal timing software, Synchro, was updated with the current signal timing parameters, and the existing timing at Meridian Road & US 24 that will not be changed. The cycle length analysis tool in Synchro was used to perform a comparison of measures of effectiveness (MOEs) that are calculated for various cycle lengths. All signals were set to coordinated, and a range of between 90 and 150 seconds were evaluated. The Meridian Road & US 24 timing was locked, therefore held constant. Table 1 shows the proposed recommendations, while Table 2 shows the comparison of MOEs.

Since this signal timing project includes a locked signal, multiple iterations of the cycle length tool were performed, using different groups of signals to see what worked best. Due to the higher cycle length of 140 seconds in the AM and PM peak, it is recommended to have a cycle length break between US 24 and Woodmen Hills Road.

1675 Larimer Street, Suite 400 | Denver, CO 80202 | o: 303.339.0440 | www.apexdesignpc.com

Table 1. Proposed Cycle Lengths

		Meridian Road	
	Meridian & US 24	Existing	Proposed
AM Peak	140	Uncoord	120 sec
Off Peak	100	Uncoord	100 sec
PM Peak	140	Uncoord	120 sec

Table 1. Meridian Road MOE Comparison

(see next sheet)

1675 Larimer Street, Suite 400 | Denver, CO 80202 | o: 303.339.0440 | www.apexdesignpc.com

Best
Worst

Meridian Road - Cycle Length Analysis

# Intersections = 6			Includes Meridian & US 24						Excludes Meridian & US 24								
TOD	**Zone/MOE**	**Existing MOEs**	**90 sec**	**100 sec**	**110 sec**	**120 sec**	**130 sec**	**140 sec**	**90 sec**	**95 sec**	**100 sec**	**105 sec**	**110 sec**	**115 sec**	**120 sec**	**125 sec**	**130 sec**
	Meridian Road					**120**									**120**		
	Performance Index	185.6	122.9	123.8	125.6	**127.1**	130.6	133.0	122.6	122.0	123.8	**125.3**	**125.6**	126.0	**127.1**	128.4	130.3
	Total Delay (hr)	160	98	99	102	**103**	107	109	98	97	99	**101**	**102**	102	**103**	105	107
	Stops (#)	9147	8967	8766	8377	**8547**	8537	8718	8963	8853	8766	**8644**	**8377**	8479	**8547**	8455	8461
AM	Stops/Veh (#)	0.51	0.50	0.49	0.47	**0.48**	0.48	0.49	0.50	0.49	0.49	**0.48**	**0.47**	0.47	**0.48**	0.47	0.47
	Fuel Consumed (gal)	403	355	354	350	**354**	356	358	355	354	354	**354**	**350**	352	**354**	353	355
	Avg. Speed (mph)	18	20	20	21	**21**	21	22	23	23	23	**23**	**23**	23	**23**	22	22
	# Half Cycle	0	0	0	0	**0**	0	0	0	0	0	**0**	**0**	0	**0**	0	0
	# Uncoordinated	5	0	0	0	**0**	0	0	0	0	0	**0**	**0**	0	**0**	0	0
	Meridian Road			**100**							**100**						
	Performance Index	150.3	88.6	**89.8**	92.8	96.3	97.9	100.7	88.6	89.3	**89.8**	92.8	92.8	94.4	96.4	97.7	97.8
	Total Delay (hr)	129	68	**69**	73	76	79	81	68	68	**69**	72	73	74	76	78	78
	Stops (#)	7565	7579	**7341**	7277	7376	6957	6981	7579	7588	**7341**	7623	7277	7319	7330	7246	6932
MD	Stops/Veh (#)	0.45	0.46	**0.44**	0.44	0.44	0.42	0.42	0.46	0.45	**0.44**	0.46	0.44	0.44	0.44	0.44	0.42
	Fuel Consumed (gal)	351	306	**304**	306	309	304	307	306	306	**304**	310	306	308	309	309	304
	Avg. Speed (mph)	20	27	**27**	26	26	25	25	27	27	**27**	26	26	26	26	25	25
	# Half Cycle	0	0	**0**	0	0	0	0	0	0	**0**	0	0	0	0	0	0
	# Uncoordinated	5	0	**0**	0	0	0	0	0	0	**0**	0	0	0	0	0	0
	Meridian Road					**120**									**120**		
	Performance Index	306.1	132.5	130.3	135.0	**140.0**	142.8	147.4	132.5	130.1	130.3	132.6	135.0	137.2	**140.6**	140.7	142.8
	Total Delay (hr)	279	106	104	108	**114**	117	121	106	104	104	106	108	111	**114**	115	117
	Stops (#)	9806	9652	9459	9718	**9501**	9364	9338	9652	9524	9459	9734	9718	9611	**9581**	9357	9364
PM	Stops/Veh (#)	0.48	0.48	0.47	0.48	**0.47**	0.46	0.46	0.48	0.47	0.47	0.48	0.48	0.47	**0.47**	0.46	0.46
	Fuel Consumed (gal)	515	384	379	387	**388**	391	394	384	380	379	386	387	387	**388**	389	391
	Avg. Speed (mph)	13	24	24	23	**23**	23	22	24	24	24	24	23	23	**23**	23	23
	# Half Cycle	0	0	0	0	**0**	0	0	0	0	0	0	0	0	**0**	0	0
	# Uncoordinated	5	0	0	0	**0**	0	0	0	0	0	0	0	0	**0**	0	0