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Fisher Road, Wilson Road to Hague Avenue Capacity Analysis Summary

While the main priority of the project is to proactively address safety, the Franklin County Engineer's Office (FCEO) looked at multiple ways of assessing the capacity of Fisher Road both in existing and proposed conditions. Guidance from the Federal Highway Administration (FHWA) advises that roadways with Average Daily Traffic (ADT) of 20,000 vehicles/day or less may be good candidates for a Road Diet. Fisher Road has a counted ADT of 17,800. The FHWA Road Diet Informational Guide also speaks to peak hour volumes in determining good candidates for a Road Diet. Peak Hour volumes above 875 vehicles are expected to reduce level of service during that peak hour. The heaviest movement on Fisher Road at Hague Avenue is eastbound Fisher Road in the morning. The volume counted is 845 vehicles during that peak hour. The heaviest movement on Fisher Road at Wilson Road is westbound Fisher Road in the afternoon. The volume counted during that peak hour is 858 vehicles.

Signals at either end of the project control the flow of vehicles in and out of the project roadway. The proposed three-lane section will end prior to Hague Avenue and Wilson Road, maintaining the existing through lanes at each intersection. The existing lengths for the eastbound left turn lane at Hague Avenue and the westbound left turn lane at Wilson Road also do not change with the project. Capacity analysis for a signalized intersection grades level of service (LOS) and vehicle delay in seconds during the peak AM and PM periods. The analysis software called Synchro uses counted traffic volumes, signal timings, and the Highway Capacity Manual (HCM) to calculate the vehicular delay. A growth factor was applied to existing traffic volumes to estimate delay in 2030 and 2040 for both existing (No Build) and proposed (Build) conditions. Below are the results of the Synchro analysis:

Intersection	Approach/Movement	2030				2040			
		AM No Build	AM Build	PM No Build	PM Build	AM No Build	AM Build	PM No Build	PM Build
Fisher Road at Wilson Road	Overall (LOS/Seconds per Vehicle)	D/45.7	D/49.9	D/46.0	D/47.3	D/52.6	E/57.7	D/49.7	D/51.4
Fisher Road at Hague Avenue	Overall (LOS/Seconds per Vehicle)	D/39.5	D/39.4	C/34.4	C/34.8	D/43.2	D/43.1	D/37.7	D/38.3

The above peak hour analysis only focuses on the highest volume conditions and does not capture how much available capacity exists during the remainder of the day. A 24-hour analysis was performed to analyze how much of the day the existing two through lanes are needed at each intersection. Throughout the 24-hour analysis, both intersections operate acceptably for all 24 hours in their existing configuration with two through lanes eastbound and westbound. The 24-hour analysis also suggests that two through lanes eastbound and westbound at the intersections are only needed 2-4 hours each day.

In conclusion, both signal capacity analyses show the corridor will operate acceptably and the proposed road diet does not degrade the level of service at either intersection in a substantial manner. With maintaining two through lanes eastbound and westbound at both signals, the intersections operate similar to No Build level of service. The segment where the road diet is occurring will remain free flow and capacity will be controlled by the signal operations on either end, which is the same as it operates today.

Peak Hour Capacity Analysis Summary (Level of Service/Seconds of Delay per Vehicle)

Intersection	Approach/ Movement	2030				2040			
		AM No Build	AM Build	PM No Build	PM Build	AM No Build	AM Build	PM No Build	PM Build
Fisher Rd at Wilson Rd (COC)	EB	E/68.9	F/81.4	E/59.1	E/63.6	F/86.2	F/101.8	E/61.0	E/66.2
	WB	D/38.5	D/38.9	E/67.3	E/68.9	D/40.7	D/40.7	E/73.8	E/76.3
	NB	C/33.8	C/33.8	C/28.9	C/28.9	D/36.5	D/36.5	C/32.4	C/32.4
	SB	C/30.9	C/30.9	C/31.4	C/31.4	C/33.2	C/33.2	D/36.5	D/36.5
	Overall	D/45.7	D/49.9	D/46.0	D/47.3	D/52.6	E/57.7	D/49.7	D/51.4
Fisher Rd at Hague Ave (FCEO)	EB	C/28.6	C/28.6	C/26.6	C/26.8	C/30.4	C/30.4	C/28.1	C/28.4
	WB	C/24.2	C/23.4	C/22.8	C/24.7	C/25.6	C/24.8	C/24.0	C/26.3
	NB^	D/49.7	D/49.7	D/43.3	D/43.4	D/53.9	D/53.9	D/46.7	D/46.7
	SB	D/47.9	D/47.9	D/44.1	D/44.1	D/52.9	D/52.9	D/49.8	D/49.8
	Overall	D/39.5	D/39.4	C/34.4	C/34.8	D/43.2	D/43.1	D/37.7	D/38.3

^ Northbound Right Turn Unsignalized Yield Control Movement is excluded from calculations of delay

24-Hour Capacity Analysis (NCHRP 1036)

Fisher Rd at Wilson Rd (COC)

2030

1 Key Metrics				
Metrics	Eastbound		Westbound	
	Existing	Proposed	Existing	Proposed
Maximum peak hour volume-to-capacity (d/c) ratio	0.55	1.09	0.65	1.30
16-hour efficiency	0.0%	37.5%	6.3%	37.5%
16-hour excess capacity	11.38	6.93	11.20	6.84
Total hours below capacity	24	21	24	22

2040

1 Key Metrics				
Metrics	Eastbound		Westbound	
	Existing	Proposed	Existing	Proposed
Maximum peak hour volume-to-capacity (d/c) ratio	0.59	1.18	0.68	1.37
16-hour efficiency	0.0%	37.5%	6.3%	43.8%
16-hour excess capacity	11.00	6.51	10.95	6.47
Total hours below capacity	24	20	24	22

Fisher Rd at Hague Ave (FCEO)

2030

1 Key Metrics				
Metrics	Eastbound		Westbound	
	Existing	Proposed	Existing	Proposed
Maximum peak hour volume-to-capacity (d/c) ratio	0.41	0.83	0.27	0.54
16-hour efficiency	0.0%	25.0%	0.0%	0.0%
16-hour excess capacity	12.01	8.02	14.35	12.71
Total hours below capacity	24	24	24	24

2040

1 Key Metrics				
Metrics	Eastbound		Westbound	
	Existing	Proposed	Existing	Proposed
Maximum peak hour volume-to-capacity (d/c) ratio	0.44	0.87	0.29	0.58
16-hour efficiency	0.0%	31.3%	0.0%	0.0%
16-hour excess capacity	11.81	7.61	14.22	12.43
Total hours below capacity	24	24	24	24