

MEMORANDUM

DATE: November 4, 2016

SUBJECT: Fields Ertel Road & Conrey Road Intersection Study

PREPARED BY: Edward R. Williams, PE, PTOE

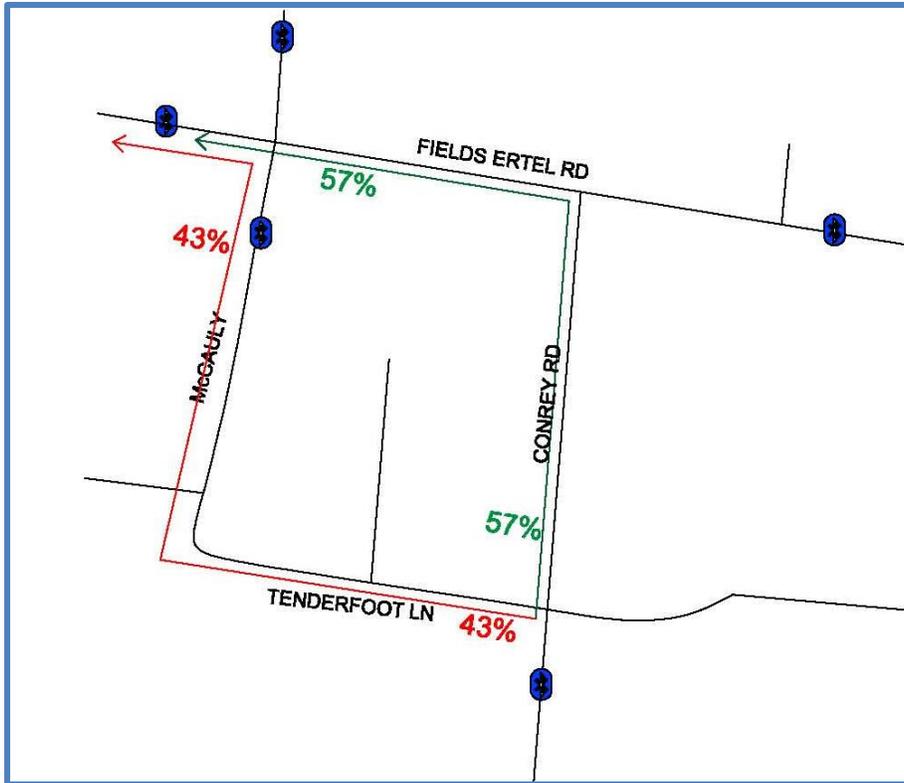
PREPARED FOR: Tracy Kellums

Conrey Road is an arterial collector roadway which connects Fields Ertel Road with Kemper Road to the south. Conrey Road's northern terminus is at Fields Ertel Road in a Tee intersection. Across from Conrey is a Sharonville Fire Department station, whose driveway, though slightly offset, constitutes the fourth leg of the intersection. The intersection is controlled by a stop sign for northbound Conrey and an implied stop sign for the fire house driveway, with Fields Ertel free-flowing.

During peak hours, traffic is quite heavy on Fields Ertel Road. This makes it difficult to turn left from northbound Conrey to Fields Ertel with the two-way stop. Many drivers desiring to make the left turn from Conrey onto westbound Fields Ertel cut through Tenderfoot Lane and McCauly Street and use the four-way stop at McCauly and Fields Ertel to access Fields Ertel. This makes for much easier left turns, but produces undesirable traffic volumes on narrow residential streets.

TEC utilized Bluetooth devices to track routes of vehicles from Conrey Road to Fields Ertel Road to determine the extent to which McCauly Road is being used as a cut-through route. Bluetooth devices were placed along Conrey Road, McCauly Road and Fields Ertel to determine the percentage of vehicles using the McCauly Road/Fields Ertel Road intersection versus the Conrey Road/Fields Ertel Road intersection. Because not all vehicles are Bluetooth-equipped, absolute volumes cannot be derived from this type of study.

The Bluetooth data shows that, of all traffic northbound on Conrey which ends up at the Fields Ertel/McCauley intersection, a full 43% got there by the cut-through route. Applying that percentage to actual turning movement counts would equate to 290 left turning vehicles at Conrey and Tenderfoot intersection from 4pm until 6pm. Residential trips are not included in this volume. This volume is vehicles that were detected by the Bluetooth at Conrey Road/Tenderfoot and again detected on McCauley Road. The remaining volume is vehicles detected at Conrey Road/Tenderfoot and again detected at Fields Ertel/McCauley.



There are several possible measures which could be taken to reduce the cut-through traffic.

- Change the intersection of Fields Ertel and McCauly to a two-way stop
 This step would take all benefit from the cut-through, but at high cost in delay to all movements, including residents of McCauly and Tenderfoot. There is no real advantage to this alternate.
- Make the Tenderfoot-McCauley route less attractive through traffic calming measures, one-way streets, or prohibiting the northbound left turn from McCauly
 - Traffic Calming Devices* - Some combination of diverters, circular islands, and medians could lessen the cut-through traffic somewhat. Cost would include possible property acquisition, construction, inconvenience to residents, and increased delay for northbound Conrey.
 - Left turn prohibition* – Prohibition of the northbound left turn at Tenderfoot would be simple and cheap, but create the same increased delay. The need for enforcement would be constant.
 - One Way Option* – All or part of Tenderfoot Lane could be made one-way eastbound. The most feasible segment would be between Eaglescout Court and Conrey Road. This would also require the northbound left-turn prohibition. With very little egressing traffic from Tenderfoot, the temptation for northbound

drivers to ignore the prohibition and one-way operation would be great, especially if a queue were visible at Fields Ertel. A one way designation is more definitive than a left turn prohibition. Some enforcement may be required, but the one way designation will deter a lot of cut through traffic.

Installation of a Gate - A more extreme form of traffic calming would be installation of a gate for westbound traffic on Tenderfoot, with key card operation and key cards issued to residents. It is likely that some widening would be needed to allow large vehicles to get past the card reader. Other problems with this approach would include ongoing costs (power, maintenance), service vehicle/visitor confusion, lost key cards, and the need for turn-around space for drivers who enter Tenderfoot before realizing that they can't get through. It is also possible that there would be a legal challenge to installation of a gate in a public right-of-way.

With some form of prohibiting traffic on Tenderfoot (traffic calming device, left turn prohibition, one way operation, installation of gate), northbound traffic on Conrey Road would be forced to use the intersection of Conrey/Fields Ertel. This would add a significant amount of vehicles to this intersection, especially in the PM peak. Various options were considered to ease congestion at Conrey/Fields Ertel. These options do not take into account the effects on Fields Ertel/McCauley. Further field analysis would need to be performed for final recommendations at Fields Ertel/McCauley. To help ease congestion at Conrey/Fields Ertel, the following options are presented:

- Install a traffic signal at the intersection of Fields Ertel and Conrey
A Traffic Signal Warrant Study has been conducted, and the intersection has been determined to meet Warrant 2, the Four-Hour Volume Warrant. A signal at Conrey could essentially eliminate the cut-through traffic, and also aid the firehouse. Of course, a traffic signal involves both construction and ongoing maintenance costs, and could increase delay for Fields Ertel. It should be noted that the signal warrant was conducted using the existing volumes. The northbound volumes would significantly increase if the traffic now diverting to Tenderfoot were added back in. A traffic signal will improve the PM level of service significantly. The scenarios were modeled using existing volumes, with cut through traffic using the Conrey/Fields Ertel intersection.

Delay and Level of Service				
Scenario	Overall	EB	WB	NB
Existing AM	4.5 (A)	0 (A)	6.5 (A)	39.2 (E)
Signalized AM	8.6 (A)	4.1 (A)	12.9 (B)	28.2 (C)
Existing PM	91.4 (F)	0 (A)	2.0 (A)	294.5 (F)
Signalized PM	20.5 (C)	15.8 (B)	25.7 (C)	22.1 (C)

95th Percentile Queue (ft)			
Scenario	EB	WB	NB
Existing AM	31	199	135
Signalized AM	150	337	77
Existing PM	0	157	842
Signalized PM	227	446	407

The delay from the addition of a traffic signal would greatly benefit the delay on the northbound approach, while only slightly increasing the delay for Fields Ertel. The traffic queues do not extend to the intersection of McCauley and Fields Ertel.

- Make the intersection of Fields Ertel and Conrey a four-way stop

A Multi-Way Stop Warrant Study was also conducted. Since the intersection does meet the criteria for a signal warrant, a multi-way stop is technically warranted at the intersection. This gives most of the benefits of the traffic signal at much lower cost. Cut-through traffic would be no better off than staying on Conrey, and the firehouse would also benefit. Delay for Fields Ertel would increase, with two four-way stops within 500 feet.

Delay and Level of Service				
Scenario	Overall	EB	WB	NB
Existing AM	4.5 (A)	0 (A)	6.5 (A)	39.2 (E)
4-Way Stop AM	35.7 (E)	46.9 (E)	22.7 (C)	10.5 (B)
Existing PM	91.4 (F)	0 (A)	2.0 (A)	294.5 (F)
4-Way Stop PM	45.6 (E)	63.1 (F)	30.5 (D)	36.1 (E)

95th Percentile Queue (ft)			
Scenario	EB	WB	NB
Existing AM	31	199	135
4-Way Stop AM	296	180	55
Existing PM	0	157	842
4-Way Stop PM	370	146	320

The overall delay is decreased at the intersection of Fields Ertel & Conrey due to the decreased delay for northbound Conrey. In addition, the queues do not extend to Fields Ertel & McCauley.

- Make the intersection of Fields Ertel and Conrey a roundabout
A roundabout at this intersection would promote free flow traffic movement while allowing the safe left turn from Conrey to Fields Ertel. A roundabout will work based on the existing volumes. See the included traffic analysis. A concern is the four way stop at Fields Ertel Road and McCauley. Due to the construction cost of a roundabout and right of way needs, this solution is not recommended at this time. This recommendation was reviewed in the Fields Ertel Road Corridor Study completed in 2010, and was listed as the primary alternative. The study identified the cut-through traffic on Tenderfoot; the recommendations for Conrey & McCauley were intended to reduce the cut through traffic.

Given the possible measures to reduce cut-through traffic, the Township can eliminate the problem but not without major effects on surrounding traffic patterns. The most practical option is to make Tenderfoot a one-way street. This would prevent vehicles from using Tenderfoot to access the intersection of Fields Ertel and McCauley. However, this option has major effects on the intersections of Fields Ertel and Conrey and Fields Ertel and McCauley.

The installation of a traffic signal is warranted at Fields Ertel and Conrey and would benefit the fire station. The traffic signal should be semi actuated to limit the amount of time it displays red for Fields Ertel Road. **This solution would need to be approved by the Hamilton County Engineer's Office.** The effects of the nearby stop controlled intersection of Fields Ertel and McCauley should be further analyzed. This recommendation was reviewed in the Fields Ertel Road Corridor Study completed in 2010, and was listed as the secondary alternative. The study identified the cut-through traffic on Tenderfoot; the recommendations for Conrey & McCauley were intended to reduce the cut through traffic.

An unfortunate consequence of any modifications to the operation of Tenderfoot is the increase of left turning movements at Conrey & Fields Ertel, with free flow conditions on Fields Ertel. This has the potential of increasing the crashes at the intersection. This may further contribute to the need for a traffic signal or four way stop at this intersection.

It is also recommended that further study be completed at Fields Ertel & McCauley to develop a holistic approach to the traffic issues at that intersection. This will allow both intersections to work together, improving traffic on Fields Ertel, improving safety at both intersections and addressing the side street traffic.