

Knox County traffic signal requests

Knox County maintains numerous traffic signals, and we are occasionally asked to install others. The justification for traffic signal control of an intersection is based on two primary factors: safety and delay. When there is a trend of crashes that could be corrected by a traffic signal, then one may be considered. Also, when drivers on the minor approaches to an intersection experience undue delay, a traffic signal may be considered.

There are nationally published standards that guide the decision as to whether or not a traffic signal should be installed. These are contained within the Manual on Uniform Traffic Control Devices (MUTCD) published by the Federal Highway Administration (see document at https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm). The MUTCD presents nine warrants that may indicate whether or not a traffic signal should be considered. While these warrants help to guide decision makers, “the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal” (2009 MUTCD, p. 436). The nine warrants are as follows:

- Warrant 1, Eight-Hour Vehicular Volume where a sufficient volume of intersecting traffic is present or where the traffic volume on the main street is so heavy that intersecting traffic suffers excessive delay. The threshold volumes must be met for eight hours of an average day.
- Warrant 2, Four-Hour Vehicular Volume where the volume of intersecting traffic is the principal reason to consider a traffic signal. The threshold volumes for this warrant must be met for four hours of an average day.
- Warrant 3, Peak Hour where minor street traffic suffers undue delay when entering or crossing a major street for one hour of an average day.
- Warrant 4, Pedestrian Volume where pedestrians experience delay trying to cross a major street.
- Warrant 5, School Crossing where school children cross a major street.
- Warrant 6, Coordinated Signal System where a series of traffic signals operate in coordination and the addition of a signal will benefit that operation.
- Warrant 7, Crash Experience where the frequency and severity of crashes suggest the need for a traffic signal.
- Warrant 8, Roadway Network where a traffic signal will encourage traffic to utilize particular roads. This may be where drivers travel through a residential neighborhood but would avoid it if a signal is present to facilitate the use of a nonresidential travel path.
- Warrant 9, Intersection Near a Grade Crossing where the proximity of an at-grade railroad crossing suggests the need for a traffic signal at the roadway intersection.

The most commonly employed warrants are the eight-hour warrant and the crash experience warrant. While the MUTCD allows for the four-hour and peak hour volume warrants, there are many intersections that would satisfy one or both of these. Thus, it is impractical to consider a traffic signal if only Warrants 2 or 3 are met. Warrants 4, 5, 6, 8 and 9 apply less frequently in Knox County.

Anyone may contact Knox County Engineering and Public Works to request that a traffic signal be considered. In response to such a request, we will assemble pertinent data including traffic volumes and the history of reported crashes. Satisfaction of Warrant 1 generally requires that at least 50 vehicles per hour for eight hours of the day make a left turn from the minor street or proceed straight across the major street. (Right turns from a minor street have few conflicts, so they usually are not included in the signal warrant evaluation.) While it is frequently the case that the minimum volume of minor street traffic is present during the morning or afternoon peak traffic period, there are fewer locations where sufficient minor street traffic is present throughout the day. Thus, the eight-hour warrant helps to ensure that a traffic signal is needed all day long and not just for a brief period.

There have been instances when the volume of traffic was not sufficient to justify a traffic signal, but a trend of crashes was present that support the need for a signal. The MUTCD threshold for Warrant 7 is five crashes per year of a type correctable by a traffic signal. The most common correctable crash type is an angle crash where minor street drivers pull into the path of major street traffic. Another crash type correctable by a signal may be where major street drivers trying to turn left are frequently struck by opposing through vehicles.

There are other considerations that affect the decision to install a traffic signal. In some cases all-way STOP control or a roundabout may be a better solution. Roundabouts in particular have been shown to achieve excellent reductions in delay and crashes, and they require less maintenance than a traffic signal. Also, the cost of a roundabout may be similar to that of a traffic signal if turn lanes would be required for the signalized operation.

Also, in order to be diligent stewards of County resources, we prioritize improvements including traffic signals relative to other needs throughout the County. For the most part, this prioritization is based on data such as crashes, traffic volumes, anticipated growth trends and other objective criteria. While there may be a demonstrated need for an improvement, it may have to wait until after more urgent needs are funded.

Finally, if a traffic signal is requested for an intersection that includes a state-maintained route, the Tennessee Department of Transportation (TDOT) must also approve of the traffic signal. TDOT does not maintain traffic signals; it is the responsibility of the local city or county to take care of the ongoing upkeep. When a traffic signal is requested for an intersection on a state route, Knox County may support the request and ask that TDOT review the justification. In general, TDOT uses the same standards as Knox County, but they do have the authority to deny a request based on their decision-making process.

Please contact John Sexton at 215-5860 if you have questions or if you would like to request that an intersection be considered for signalization.