TEXAS TRANSPORTATION INSTITUTE
THE TEXAS A&M UNIVERSITY SYSTEM

Project Summary Report 2136-S
Project 0-2136: Revising the Pedestrian Warrant
for the Installation of a Traffic Signal

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PROJECT SUMMARY REPORT

Revising the Traffic Signal Warrants to Better Accommodate Pedestrians and Cyclists: Summary Report

The public has expressed concern about the inability of cities and the Texas Department of Transportation (TxDOT) to install traffic signals at locations not meeting the required traffic signal warrants. They are specifically concerned about locations where pedestrians cross the street, especially elderly and disabled pedestrians. A proposed warrant suggested by a citizens group was considered during the 76th Texas Legislative Session.

The current Minimum Pedestrian Volume Warrant is very rarely used to justify the installation of a traffic signal. This rare use may be partly due to the fact that a high number of pedestrians is required and locations with that type of pedestrian traffic typically will meet one of the other warrants. It may also be partly due to the fact that the required data collection for the Minimum Pedestrian Volume Warrant is very time consuming.

There was a need to address the concerns of the general public and state lawmakers, as well as a need to develop a more "user friendly" pedestrian warrant while still recognizing the disadvantages of installing an

unwarranted traffic signal. The purpose of this project was two-fold. One objective was to consider pedestrian-related factors and, if appropriate, develop a revised pedestrian warrant or other traffic signal warrant(s) that are practical and easy to use.

A second objective of the project was to develop guidelines for providing a safe and effective pedestrian crossing where a traffic signal may not be warranted. The research team felt that these pedestrian crossing guidelines should outline the numerous design alternatives that are available to address pedestrian safety problems or public concerns at roadway crossings. It is not the intent of the guidelines to recommend a specific pedestrian crossing treatment exclusive of conditions, nor to recommend specific design dimensions. General criteria and design dimensions used elsewhere may be provided with some treatments, but engineering judgment should be used in applying these criteria and designs.

What We Did . . .

For the warranting criteria, researchers performed a literature review on the relevant material and met with the Signals Technical Committee (STC) of the National Committee on Uniform Traffic Control Devices in order to determine the origins of the current pedestrian warrant criteria. A team of engineers also visited five unsignalized locations where pedestrian issues have been a concern. The engineers provided their professional judgment in terms of the traffic control need at the various locations. The engineers were then informed of the current warrant analysis results and asked to comment and/or suggest alternative criteria so that the warrant analyses would better match their professional judgment concerning the need for traffic control. The comments and suggestions were considered for possible inclusion in a new or revised warrant. From these activities, warranting criteria recommendations were made.

The *Pedestrian Crossing Guidelines for Texas* contains best practices for providing safe and effective pedestrian crossings.

In developing the pedestrian crossing guidelines, the research team reviewed numerous pedestrian planning and design references. Researchers also contacted and interviewed several pedestrian experts about preferred designs and practices for pedestrian crossings. The best practices from these references and experts were compiled into the *Pedestrian Crossing Guidelines for Texas.*

What We Found . . .

We learned that the current pedestrian warrant signal is the least used warrant to justify the installation of a signal. However, this limited use is not because of lack of effort. Many traffic engineers indicated that the minimum pedestrian volume thresholds are too high and make satisfying the current warrants very difficult. The literature review and STC presentation were inconclusive in terms of identifying the origins of these volumes, although they appear to be indirectly based on research recommendations. The literature review did reveal that the latest revision of the Pedestrian Warrant was the first in the Manual on Uniform Traffic Control Devices (MUTCD) history that did not include a combination of vehicle and pedestrian volumes.

The engineers who made the site assessment visits generally agreed with the current pedestrian warrant

results. However, areas for improvement were noted: for instance, combining the vehicle and pedestrian counts on the minor-street approaches and using the current pedestrian warrant as an exclusive mid-block warrant. The engineers also emphasized the need for increased flexibility but with the discretion to decline a signal request when site-specific conditions justify it.

The research team found that many other city and state departments of transportation are faced with similar problems about providing safe pedestrian crossings along roadways with moderate to high traffic volumes. Several of these city and state agencies have developed pedestrian design guidance or are in the process of developing design guidelines for safer pedestrian crossings. The researchers found that there were several features associated with good pedestrian crossing design:

- The street crossing task is made simple and convenient for pedestrians.
- The crossing location and any waiting or crossing pedestrian(s) have excellent visibility.
- Motor vehicle speeds are slowed or controlled in the vicinity of the pedestrian crossing.
- Enforcement personnel use periodic enforcement (where and when necessary) to ensure that vehicle drivers yield the right-of-way to pedestrians.
- Pedestrians are encouraged to use designated crossing locations and to obey applicable state and local traffic laws.

Three warrant recommendations were made as a result of this project.

The Researchers Recommend . . .

Three warrant recommendations were made as a result of this project. The recommendations are summarized below with the warrants that are affected for each recommendation. The research shows that results from warrant analyses with the revised warrants better match professional engineering judgment than the results of warrant analyses using the current warrants. The following warrant recommendations should not be used until they are officially adopted by TxDOT.

1. Include pedestrians and cyclists in the minor-street approach volumes for all warrants that currently consider only vehicles for the minor-street approach volumes (Warrants 1, 2, 9, 10, 11, and 12).

2. Include a 30 percent volume reduction factor in the warrants listed here based upon the presence of certain types of pedestrian trip generators such as medical facilities, pedestrian transportation facilities, and activity centers serving pedestrians (Warrants 1, 2, 3, 9, 11, and 12).

3. Change the existing pedestrian warrant to a mid-block only pedestrian crossing warrant, remove language about pedestrian crossing speeds, and add a reduction factor for high-speed roadways or built-up areas (Warrant 3).

The *Pedestrian Crossing Guidelines for Texas* contains best practices for providing safe and effective pedestrian crossings. The researchers recommend that these guidelines be distributed to TxDOT engineers in the district and area offices, and that the guidelines (or parts of the guidelines) be considered for inclusion in TxDOT's *Roadway Design Manual*.

For More Details . . .

The research is documented in the following two reports:
2136-1, *Revising the Traffic Signal Warrants to Better Accommodate Pedestrians and Cyclists*
2136-2, *Pedestrian Crossing Guidelines for Texas*

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To obtain copies of the reports, contact Dolores Hott, Texas Transportation Institute, Information & Technology Exchange Center, (979) 845-4853, or e-mail d-hott@tamu.edu. See our on-line catalog at http://tti.tamu.edu.

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by John Bassett, P.E., RTI Research Engineer

The warrant recommendations resulting from the research have been presented to the National Committee on Uniform Traffic Control Devices. The committee is considering adoption of the recommendations. If TxDOT adopts the recommendations, they will provide more flexibility and the potential to improve some pedestrian crossings.

The *Pedestrian Crossing Guidelines for Texas* will provide a useful reference source. It can be used by TxDOT to improve existing pedestrian crossings and in the design of new crossings.

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