

Shepard Boulevard and Danforth Drive Intersection Analysis

Evaluating intersection for All-Way Stop Warrants



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Shepard Boulevard and Danforth Drive Intersection Analysis

Objective

To determine if the Shepard Boulevard and Danforth Drive intersection meets the Manual on Uniform Traffic Control Devices (MUTCD) warrants for all-way stop control.

All-Way Stop Warrants

Per section 2B.07 of the MUTCD:

Multiway stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multiway stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multiway stop control is used where the volume of traffic on the intersecting roads is approximately equal.

The restrictions on the use of STOP signs described in Section 2B.04 also apply to multiway stop applications.

Guidance:

The decision to install multiway stop control should be based on an engineering study.

The following criteria should be considered in the engineering study for a multiway STOP sign installation:

- A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.*

This intersection does not meet traffic control signal warrants, and there are no plans to install a signal at this location.

Warrant is not met.

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- B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.*

No crashes have been reported at this intersection within the last year.

Warrant is not met.

C. Minimum volumes:

- 1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and*
- 2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but*
- 3. If the 85th percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*

Over 8 hours the Shepard Boulevard approaches average 100 vehicles per hour. This does not meet the warrant requirement of 300 vehicles per hour for any 8 hours.

Over 8 hours, the Danforth Drive approaches average approximately 20 units per hour. The delay for minor street traffic was not calculated; however, the delay is estimated to be significantly less than 30 seconds per vehicle.

The 85th percentile speed for eastbound and westbound traffic on Shepard Boulevard approaching Danforth Drive is 38 mph, less than the 40 mph required to consider reduced volumes for this warrant.

Warrant is not met.

D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

There were zero crashes at this intersection in the past year, and the entering vehicles do not meet the thresholds of 80 percent of the minimum values.

Warrant is not met.

Option:

Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;

Left turning movements from and onto Danforth Drive are low. The vehicle volumes on Shepard Boulevard provide for adequate gaps for left turning traffic. The risk of conflict at this intersection is low due to the low vehicle volumes.

Warrant is not met.

- B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;*

The total pedestrian volume for all approaches is approximately 60 over an 11 hour period. The low volume of pedestrians and low volume of vehicles provides for low risk of conflicts between pedestrians and vehicles. Crosswalk improvements are being completed on the east leg that will provide visibility improvements to pedestrians crossing this intersection.

Warrant is not met.

- C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting traffic is also required to stop; and*

Adequate sight distance is provided on both Shepard Boulevard and Danforth Drive.

Warrant is not met.

- D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.*

Shepard Boulevard is classified as a Neighborhood Collector. However, Danforth Drive is classified and functions as a local residential street. The current multi-way stop control does not improve traffic operation characteristics of this intersection.

Warrant is not met.

Discussion:

The vehicle volumes on Shepard Boulevard and Danforth Drive do not meet the minimum volume thresholds provided in the MUTCD. There were no crashes reported at this intersection within the past year, and the approach delay for Danforth Drive does not exceed 30 seconds. The intersection of Shepard Boulevard and Danforth Drive does not meeting MUTCD warrants for multi-way stop control.

During the Audubon Drive and Shepard Boulevard traffic calming project public involvement process, several residents expressed concern with drivers not stopping at the all-way stop at Shepard Boulevard and Danforth Drive. Following these discussions, the intersection was evaluated for turning movement volumes, sight distance, and crash history. As part of the traffic calming project, Council approved the installation of a series of speed humps, speed tables, and crosswalk improvements along Shepard Boulevard, including a speed table and crosswalk improvement at the intersection of Shepard Boulevard and Danforth Drive. It is expected the speed profile along Shepard Boulevard will be significantly reduced following the completion of this project.

Conclusion

The intersection of Shepard Boulevard and Danforth Drive does not meet MUTCD warrants for all-way stop control. The stop signs on Shepard Boulevard and Danforth Drive will be removed following the construction of a speed table at the intersection.