All-Way Stop Control: Challenging Standard Practice for Installations in Austin, TX

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Overview

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Starting in 2012, the City of Austin put a **greater emphasis on** considering the appropriateness of all-way stop (AWS) installations from **a context-sensitive, network perspective**

This approach **challenged the view that minimum volumes or crashes must be met** to be appropriate applications

This **evaluation analyzes impacts to crash rates for 68 AWS installations** in the City of Austin from 2012 to 2024

AWS Applications – MUTCD

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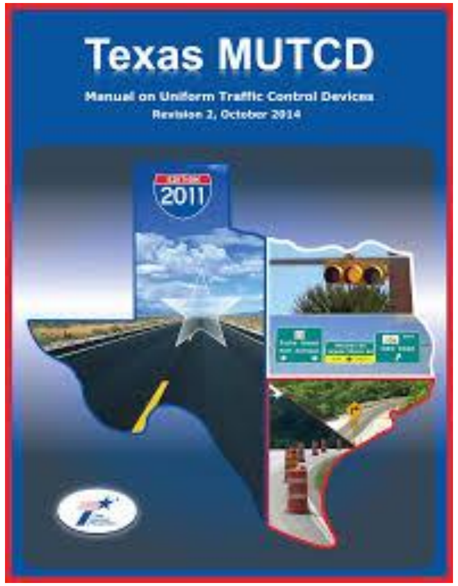
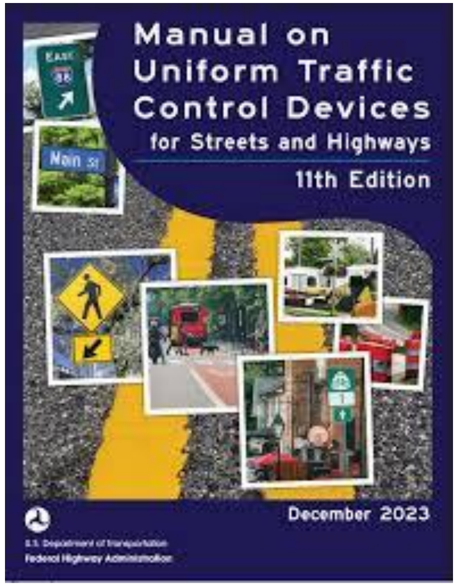
When Is It Appropriate?

- Volume on intersecting streets is approximately equal
- Interim measure prior to traffic signal installation
- Minimum crash history susceptible to correction
- Minimum 8-hour volumes
- Crash and volume combination



What About the Option for Other Factors?

- Control left-turn conflicts
- Control vehicle and pedestrian conflicts
- Mitigate view obstructions
- Install at intersection of two residential collectors of equal characteristics where AWS *would improve operations*



AWS Considerations – Past Austin Practice

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When Did the City of Austin Consider AWS?

- Minimum volume, crash, or combination guidance met
- Volume spilt on major street streets would not exceed 60%
- Not to control speed or stop the flow of traffic
- Not if residents “felt like an intersection should have AWS”

Why Was the Other Factors Option Not Typically Used?

- Harder to quantify, unlike other guidelines in factors option
- Closely followed the guidance of approximately equal intersecting volumes
- Concern that inappropriate installations would *lead to higher crash rates*

AWS Considerations – Current Austin Practice

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Greater Emphasis on Overall Street Network

- Intersection of similar streets, particularly primary ones in neighborhoods
- Proximity to schools, bus stops, pedestrian generators
- Distances between designated pedestrian crossings (Transportation Criteria Manual)
- Breaks in free-flow conditions over long distances

Less Emphasis on Minimum Criteria

- Volumes and crashes can guide, but not always decide determinations
- Engineering judgment used to improve intersection operations

Evaluation Criteria

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Include intersections within period of practice that considered other factors

Have at least 12 months of crash data Pre-AWS and Post-AWS

Include crashes susceptible by correction by AWS

Use FHWA's crash rate per million entering vehicles (MEV)

Compare against average crash rates (California data published 11/15/24)

$$R = \frac{1,000,000 \times C}{365 \times N \times V}$$

Where:

R = Crash rate for the intersection expressed as accidents per million entering vehicles (MEV).
C = Total number of intersection crashes in the study period.
N = Number of years of data.
V = Traffic volumes entering the intersection daily.[10]

Suburban Neighborhood Example

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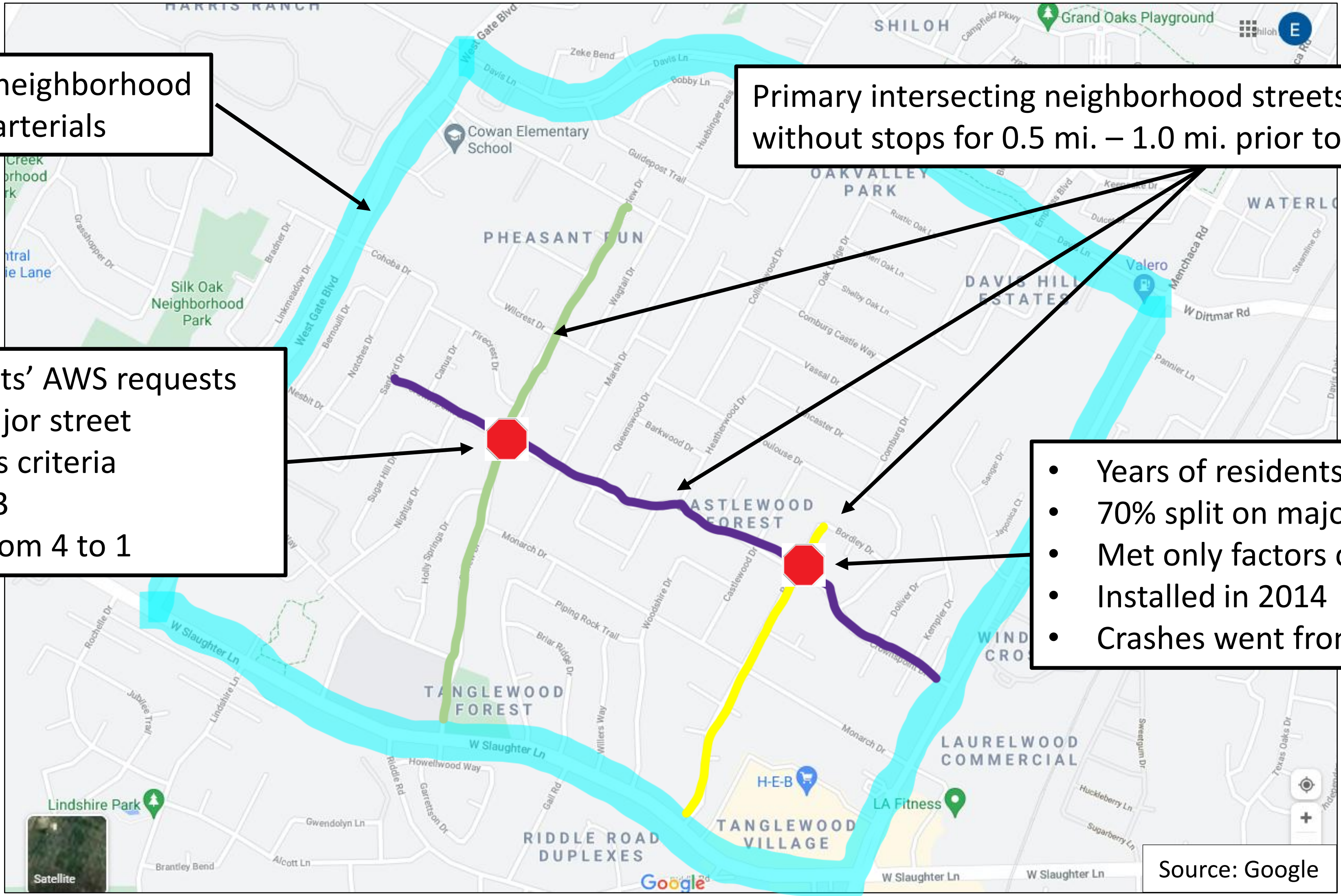
1 mi. x 1 mi. neighborhood bounded by arterials

Primary intersecting neighborhood streets of similar character without stops for 0.5 mi. – 1.0 mi. prior to AWS installations



- Years of residents' AWS requests
- 70% split on major street
- Met only factors criteria
- Installed in 2013
- Crashes went from 4 to 1

- Years of residents' AWS requests
- 70% split on major street
- Met only factors criteria
- Installed in 2014
- Crashes went from 3 to 0

Source: Google

Locations by Context

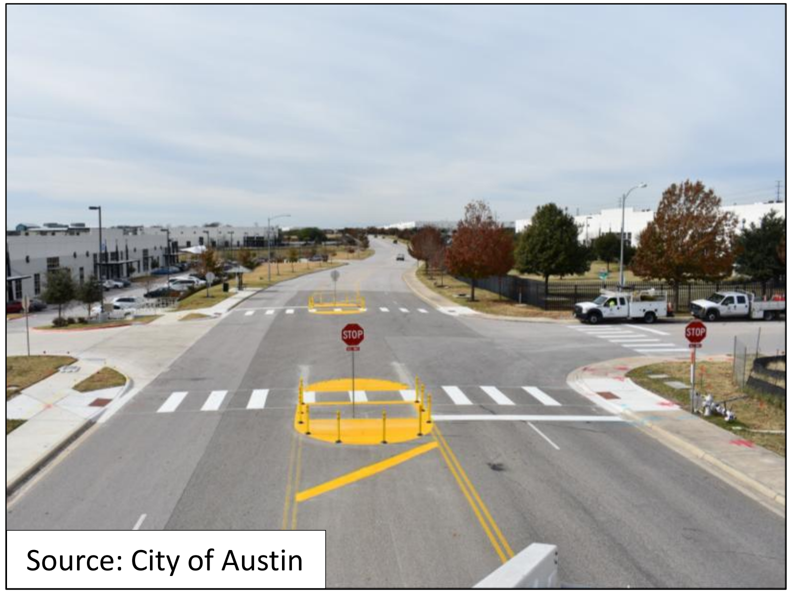
Suburban Local/Collector

- 52 intersections (76%)
- 4,019 average ADT
- 0.29 average Pre-AWS crash rate
- 0.05 average Post-AWS crash rate

Source: Google

Suburban Arterial

- 3 intersections (4%)
- 11,789 average ADT
- 0.22 average Pre-AWS crash rate
- 0.12 average Post-AWS crash rate



Source: City of Austin

Locations by Context

Urban Local/Collector

- 13 intersections (19%)
- 5,185 average ADT
- 0.33 average Pre-AWS crash rate
- 0.11 average Post-AWS crash rate

Source: City of Austin

Urban Arterial

- 1 intersection (1%)
- 6,350 ADT
- 0.25 Pre-AWS crash rate
- 0.29 Post-AWS crash rate

Source: Google

Evaluation Findings

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Guidelines Met (# Installs)	Major Street Split – Avg	Pre-AWS Crash Rate – Avg	Post-AWS Crash Rate – Avg	Change in Crash Rate	
				Value	%
Factors Only (58)	68%	0.26	0.06	-0.20	-76%
Crash Only (3)*	77%	0.60	0.03	-0.57	-95%
Volume Only (3)*	62%	0.22	0.13	-0.09	-42%
Crash + Factors (2)*	82%	0.46	0.06	-0.31	-66%
Crash + Volume (1)*	64%	0.48	0.00	-0.48	-100%
Crash + Volume + Factors (1)*	50%	1.24	0.00	-1.24	-100%
All Intersections	**68%**	**0.30**	**0.06**	**-0.23**	**-78%**

* Limited Sample Size

Crash Rates (MEV) – CA		
Context (% Installs)	Side-Street	AWS
Suburban (79%)	0.22	0.18
Urban (21%)	0.13	0.11

Evaluation Findings

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Intersections with Crash Rate Increases

- 11 of 68 intersections (16%)
- Average increase MEV crash rate of +0.10
- Split of intersecting traffic volumes had little correlation to crash rates
- Greater increases at wider intersections or newer installations
- Most increases were *only one crash* from Pre-AWS to Post-AWS crash

Intersections with No Crash Rate Change

- 27 of 68 intersections (40%)

Evaluation Findings

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Intersections with Crash Rate Decreases

- 30 of 68 intersections (44%)
- Eliminated higher-than-average crash rates at 19 of 30 reductions (63%)
- Average reduction MEV crash rate of -0.52
- Split of intersecting traffic volumes had little correlation to crash rates
- Greater decreases when rates were relatively high Pre-AWS

Conclusions

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- New AWS practice has overall safety and mobility benefit
  - Crate rates not impacted by volume splits or daily volumes
  - Effective tool in decreasing crashes, even when crash guideline not met
  - Average crash reduction was 5x average crash increase
  - Engineering judgment still needed as initial check for appropriateness
- AWS offers secondary benefits to consider
  - Protected crossings and breaks in the street network
  - Slower speeds near stop signs, which is a common concern of residents
  - Only 10 of 68 installations would have happened following past practices

Conclusions

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Evaluate data to guide engineering decisions and set processes

- Years might be needed for enough data points to fully understand impacts
- Helpful in identifying intersections with crash rate increases where additional attention is needed

Opportunities for additional analysis

- Use average crash rates more localized to Austin
- Clearly define suburban and urban contexts
- Incorporate comprehensive crash costs to evaluate severity of crashes
- Evaluate intersections installed fewer than 12 months and those to be installed

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Source: Imagine Austin Plan