MEMORANDUM

To: Traffic Study Files
From: Alison Mills, P.E., South Area Transportation Engineer
Transportation Engineering Division
Austin Transportation Department
Date: December 27, 2021
Subject: SPEED ZONE INVESTIGATION

Location: Nuckols Crossing Road: E. St. Elmo Road to S. Pleasant Valley Road
E. St. Elmo Road: Nuckols Crossing Road to Todd Lane/S. Pleasant Valley Road

Date(s) of Previous Investigation: None

A traffic engineering investigation has been conducted by the Transportation Engineering Division (TED) to determine the appropriate speed limit on Nuckols Crossing Road from E. St. Elmo Road to S. Pleasant Valley Road and on E. St. Elmo Road from Nuckols Crossing to Todd Lane/S. Pleasant Valley Road. E. St. Elmo Road becomes Nuckols Crossing Road east of S. Pleasant Valley Road at a curve in the roadway. Currently, the speed limit on Nuckols Crossing Road and E. St. Elmo Road in these sections of roadway are 40 MPH. Figure 1 represents a map of the study area.

Location Conditions

Nuckols Crossing Road from E. St. Elmo Road to S. Pleasant Valley Road is an undivided, two-way, two-lane, collector signed at 40 MPH. The roadway is approximately 1.4 miles and treated as a single segment due to similar land use and functional classification along the 1.4 miles. The roadway has two schools, a library, and fire and EMS station in this segment. While the roadway does not have many front-facing homes, it provides access to nearby residences via streets intersecting Nuckols Crossing Road.

E. St. Elmo Road from Nuckols Crossing Road to Todd Lane is an undivided, two-way, two-lane, collector signed at 40 MPH. The roadway is approximately 0.5 miles and treated as a single segment due to similar land use and functional classification.

Table 1 presents more information of each street segment studied, while Figures 2 and 3 present maps of the street segments studied.
Table 1: Location Information

<table>
<thead>
<tr>
<th>Street Segment</th>
<th>Segment Length (Miles)</th>
<th>Number of Unsignalized Access Points</th>
<th>Number of Signalized Intersections</th>
<th>Width (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuckols Crossing Road – E. St. Elmo Road to S. Pleasant Valley Road</td>
<td>1.4</td>
<td>40</td>
<td>2</td>
<td>22-32</td>
</tr>
<tr>
<td>E. St. Elmo Road – Nuckols Crossing Road to Todd Lane</td>
<td>0.5</td>
<td>12</td>
<td>0</td>
<td>22</td>
</tr>
</tbody>
</table>
Figure 2: Nuckols Crossing Rd from E. St. Elmo Rd to S. Pleasant Valley Rd

Figure 3: E. St. Elmo Rd from Todd Lane to Nuckols Crossing Rd
**Investigation Data**

TED's investigation was conducted in accordance with the TxDOT's “Procedures for Establishing Speed Zones,” which focuses on a traditional methodology of 85th percentile speeds.

This investigation also utilized FHWA’s USLIMITS2 tool to evaluate speed limits from a safe systems approach, which includes the following inputs to consider in setting reasonable, safe, and consistent speed limits based on the context and operating characteristics on the study segment:

- 85th percentile speed
- 50th percentile speed
- Statutory speed limit
- Section length
- Road alignment
- Median treatment
- Number of through lanes
- Adjacent land use
- Driveway density
- Traffic control devices
- Bicycle, pedestrian, and parking activity
- Daily vehicular volume
- Crash rate

Speed and volume data were collected in December 2021 to determine the appropriate posted speed limit for Nuckols Crossing Road and E. St. Elmo Road.

Table 2 summarizes the 85th percentile speed, 50th percentile speed, and daily traffic volumes collected on Nuckols Crossing Road at various points.
Table 2: Nuckols Crossing Road Speed and Volume Data

<table>
<thead>
<tr>
<th>Street Segment</th>
<th>Existing Speed Limit (mph)</th>
<th>85% Speed (mph)</th>
<th>50% Speed (mph)</th>
<th>Traffic Volumes (ADT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EB</td>
<td>WB</td>
<td>EB</td>
<td>WB</td>
</tr>
<tr>
<td>Pleasant Valley Rd to Parell Path</td>
<td>40</td>
<td>41</td>
<td>39</td>
<td>34</td>
</tr>
<tr>
<td>Parell Path to Stassney Ln</td>
<td>40</td>
<td>38</td>
<td>40</td>
<td>32</td>
</tr>
<tr>
<td>Stassney Ln to Maufrais Ln</td>
<td>40</td>
<td>32</td>
<td>32</td>
<td>29</td>
</tr>
<tr>
<td>Maufrais Ln to St Elmo Rd</td>
<td>40</td>
<td>39</td>
<td>42</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 3 summarizes the 85th percentile speed, 50th percentile speed, and daily traffic volumes collected on E. St. Elmo Road.

Table 3: E. St. Elmo Road Speed and Volume Data

<table>
<thead>
<tr>
<th>Street Segment</th>
<th>Existing Speed Limit (mph)</th>
<th>85% Speed (mph)</th>
<th>50% Speed (mph)</th>
<th>Traffic Volumes (ADT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>East of Todd Ln</td>
<td></td>
<td>31.8</td>
<td>37.6</td>
<td>28.7</td>
</tr>
</tbody>
</table>

Crash data was obtained from the City of Austin’s Vision Zero database. This database obtains crash data from the Texas Department of Transportation (TxDOT) Crash Record Information System (CRIS) database. Total number of crashes and total number of fatal or injury crashes from November 30, 2016 to November 30, 2021 were obtained for the extents of this project limits and summarized in Table 4. A crash was determined to be within the study area if the primary address was along the Nuckols Crossing Road or E. St. Elmo Road street segments.

Table 4: Crash Data

<table>
<thead>
<tr>
<th>Street</th>
<th>Limits</th>
<th>Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Injury/Fatal</td>
</tr>
<tr>
<td>Nuckols Crossing Rd</td>
<td>St. Elmo Rd to S. Pleasant Valley Rd</td>
<td>93</td>
</tr>
<tr>
<td>St. Elmo Rd</td>
<td>Todd Ln to Nuckols Crossing Rd</td>
<td>44</td>
</tr>
</tbody>
</table>

A USLIMITS2 study was run in both directions for all identified data points on Nuckols Crossing Road and E. St. Elmo Road. In accordance with the “Texas Procedures for Establishing Speed Zones,” the same speed limit shall be maintained in both directions of travel on undivided roadways. Therefore, the recommended speed limit is to be 30 MPH along all identified street segments. In addition, on Nuckols Crossing Road, the land use and functional classification is maintained for the length of the segment. Speed recommendations at each point were considered to select one consistent speed limit for the length of the segment. The results of the USLIMITS2 Speed Zoning Report are summarized in Table 5 below.
### Table 5: USLIMITS2 Speed Zoning Report Results

<table>
<thead>
<tr>
<th>Street</th>
<th>Data Location</th>
<th>Existing Speed Limit (mph)</th>
<th>USLIMITS2 Recommended Speed Limit (mph)</th>
<th>Recommended Speed Limit – Both Directions (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuckols Crossing Rd</td>
<td>Pleasant Valley Rd to Parell Path</td>
<td>40</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Parell Path to Stassney Ln</td>
<td>40</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Stassney Ln to Maufrais Ln</td>
<td>40</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Maufrais Ln to St Elmo Rd</td>
<td>40</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>St. Elmo Rd</td>
<td>Pleasant Valley Rd to Parell Path</td>
<td>40</td>
<td>30</td>
<td>35</td>
</tr>
</tbody>
</table>

Figure 5 presents a map of the study area and the proposed speed limit based on the collected data and analysis.
Recommendation

TED has determined a speed limit of 30 mph is appropriate for the study segments, based on the two methodologies used for setting speed limits and taking into account that the crash rate and injury crash rates for the study segments both exceed average crash rates for similar roads.
USLIMITS2 Speed Zoning Report

Project Overview

**Project Name: Nuckols Crossing Road Speed Study**

**Analyst:** Cody Stone  
**Date:** 2021-12-17

**Basic Project Information**
- **Route Name:** Nuckols Crossing Road  
- **From:** St. Elmo Rd  
- **To:** S. Pleasant Valley Rd  
- **State:** Texas  
- **County:** Travis County  
- **City:** Austin city  
- **Route Type:** Road Section in Developed Area  
- **Route Status:** Existing

**Roadway Information**
- **Section Length:** 1.4 mile(s)  
- **Statutory Speed Limit:** None  
- **Existing Speed Limit:** 40 mph  
- **Adverse Alignment:** No  
- **One-Way Street:** No  
- **Divided/Undivided:** Undivided  
- **Number of Through Lanes:** 2  
- **Area Type:** Residential-Collector/Arterial  
- **Number of Driveways:** 40  
- **Number of Signals:** 2

**Crash Data Information**
- **Crash Data Years:** 5.00  
- **Crash AADT:** 4550 veh/day  
- **Total Number of Crashes:** 93  
- **Section Crash Rate:** 800 per 100 MVM  
- **Section Injury Crash Rate:** 224 per 100 MVM  
- **Crash Rate Average for Similar Roads:** 232  
- **Injury Rate Average for Similar Roads:** 66

**Traffic Information**
- **85th Percentile Speed:** 38 mph  
- **50th Percentile Speed:** 32 mph  
- **AADT:** 4550 veh/day  
- **On Street Parking and Usage:** Not High  
- **Pedestrian / Bicyclist Activity:** Not High

**Recommended Speed Limit:**

**Note:** The section crash rate of 800 per 100 MVM is above the critical rate (310). The injury crash rate for the section of 224 per 100 MVM is above the critical rate (110). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

**Disclaimer:** The U.S. Government assumes no liability for the use of the information contained in this report. This report does not constitute a standard, specification, or regulation.

**Equations Used in the Crash Data Calculations**

**Exposure (M)**

\[ M = \frac{\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data}}{100000000} \]

\[ M = \frac{4550 \times 365 \times 1.4 \times 5.00}{100000000} \]

\[ M = 0.1163 \]

**Crash Rate (Rc)**

\[ Rc = \frac{\text{Section Crash Average} \times 100000000}{\text{Section AADT} \times 365 \times \text{Section Length}} \]

\[ Rc = \frac{18.60 \times 100000000}{4550 \times 365 \times 1.4} \]

\[ Rc = 799.98 \text{ crashes per 100 MVM} \]

**Injury Rate (Ri)**

\[ Ri = \frac{\text{Section Injury Crash Average} \times 100000000}{\text{Section AADT} \times 365 \times \text{Section Length}} \]

\[ Ri = \frac{5.20 \times 100000000}{4550 \times 365 \times 1.4} \]

\[ Ri = 223.65 \text{ injuries per 100 MVM} \]

**Critical Crash Rate (Cc)**

\[ \text{Cc} = \text{Crash Average of Similar Sections} + 1.645 \times (\text{Crash Average of Similar Sections} / \text{Exposure}) ^ {1/2} + (1 / (2 \times \text{Exposure})) \]

\[ \text{Cc} = 231.80 + 1.645 \times (231.80 / 0.1163) ^ {1/2} + (1 / (2 \times 0.1163)) \]

\[ \text{Cc} = 309.56 \text{ crashes per 100 MVM} \]
**Critical Injury Rate (Ic)**

Ic = Injury Crash Average of Similar Sections + 1.645 * (Injury Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))

Ic = 66.27 + 1.645 * (66.27 / 0.1163) ^ (1/2) + (1 / (2 * 0.1163))

Ic = 109.85 injuries per 100 MVM
USLIMITS2 Speed Zoning Report

Project Overview

**Project Name:** Nuckols Crossing Road Speed Study

**Analyst:** Cody Stone

**Date:** 2021-12-17

**Basic Project Information**
- **Route Name:** Nuckols Crossing Road
- **From:** St. Elmo Rd
- **To:** S. Pleasant Valley Rd
- **State:** Texas
- **County:** Travis County
- **City:** Austin city
- **Route Type:** Road Section in Developed Area
- **Route Status:** Existing

**Crash Data Information**
- **Crash Data Years:** 5.00
- **Crash AADT:** 4550 veh/day
- **Total Number of Crashes:** 93
- **Total Number of Injury Crashes:** 26
- **Section Crash Rate:** 800 per 100 MVM
- **Section Injury Crash Rate:** 224 per 100 MVM
- **Crash Rate Average for Similar Roads:** 232
- **Injury Rate Average for Similar Roads:** 66

**Roadway Information**
- **Section Length:** 1.4 mile(s)
- **Statutory Speed Limit:** None
- **Existing Speed Limit:** 40 mph
- **Adverse Alignment:** No
- **One-Way Street:** No
- **Divided/Undivided:** Undivided
- **Number of Through Lanes:** 2
- **Area Type:** Residential-Collector/Arterial
- **Number of Driveways:** 40
- **Number of Signals:** 2

**Traffic Information**
- **85th Percentile Speed:** 40 mph
- **50th Percentile Speed:** 34 mph
- **AADT:** 4550 veh/day
- **On Street Parking and Usage:** Not High
- **Pedestrian / Bicyclist Activity:** Not High

**Recommended Speed Limit:** 35 mph

**Note:** The section crash rate of 800 per 100 MVM is above the critical rate (310). The injury crash rate for the section of 224 per 100 MVM is above the critical rate (110). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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**Exposure (M)**
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\]

**Crash Rate (Rc)**
\[
Rc = \frac{\text{(Section Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})}
\]

**Injury Rate (Ri)**
\[
Ri = \frac{\text{(Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})}
\]

**Critical Crash Rate (Cc)**
\[
Cc = \text{Crash Average of Similar Sections} + 1.645 \times (\text{Crash Average of Similar Sections} / \text{Exposure})^{1/2} + (1 / (2 \times \text{Exposure}))
\]

Cc = 309.56 crashes per 100 MVM
Critical Injury Rate (Ic)

$Ic = \text{Injury Crash Average of Similar Sections} + 1.645 \times \left( \frac{\text{Injury Crash Average of Similar Sections}}{\text{Exposure}} \right)^{\frac{1}{2}} + \frac{1}{2 \times \text{Exposure}}$

$Ic = 66.27 + 1.645 \times \left( \frac{66.27}{0.1163} \right)^{\frac{1}{2}} + \frac{1}{2 \times 0.1163}$

$Ic = 109.85 \text{ injuries per 100 MVM}$
USLIMITS2 Speed Zoning Report

Project Overview

Project Name: Nuckols Crossing Road Speed Study

Analyst: Cody Stone

Basic Project Information
Route Name: Nuckols Crossing Road
From: St. Elmo Rd
To: S. Pleasant Valley Rd
State: Texas
County: Travis County
City: Austin city
Route Type: Road Section in Developed Area
Route Status: Existing

Roadway Information
Section Length: 1.4 mile(s)
Statutory Speed Limit: None
Existing Speed Limit: 40 mph
Adverse Alignment: Yes
One-Way Street: No
Divided/Undivided: Undivided
Number of Through Lanes: 2
Area Type: Residential-Collector/Arterial
Number of Driveways: 40
Number of Signals: 2

Date: 2021-12-17

Crash Data Information
Crash Data Years: 5.00
Crash AADT: 4550 veh/day
Total Number of Crashes: 93
Total Number of Injury Crashes: 26
Section Crash Rate: 800 per 100 MVM
Section Injury Crash Rate: 224 per 100 MVM
Crash Rate Average for Similar Roads: 232
Injury Rate Average for Similar Roads: 66

Traffic Information
85th Percentile Speed: 39 mph
50th Percentile Speed: 33 mph
AADT: 4550 veh/day
On Street Parking and Usage: Not High
Pedestrian / Bicyclist Activity: Not High

Recommended Speed Limit: 35

Note: Sections with adverse alignments may need specific 'advisory speed warnings' which may be different from the general speed limit for the section. See Procedures for Setting Advisory Speeds on Curves, Publication No. FHWA-SA-11-22, June 2011, for more guidance.

Note: The section crash rate of 800 per 100 MVM is above the critical rate (310). The injury crash rate for the section of 224 per 100 MVM is above the critical rate (110). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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Equations Used in the Crash Data Calculations

Exposure (M)

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M = \frac{(\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data})}{(100000000)}
\]

\[
M = \frac{(4550 \times 365 \times 1.4 \times 5.00)}{(100000000)}
\]

\[
M = 0.1163
\]

Crash Rate (Rc)

\[
Rc = \frac{(\text{Section Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})}
\]

\[
Rc = \frac{(18.60 \times 100000000)}{(4550 \times 365 \times 1.4)}
\]

\[
Rc = 799.98 \text{ crashes per 100 MVM}
\]

Injury Rate (Ri)

\[
Ri = \frac{(\text{Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})}
\]

\[
Ri = \frac{(5.20 \times 100000000)}{(4550 \times 365 \times 1.4)}
\]

\[
Ri = 223.65 \text{ injuries per 100 MVM}
\]
**Critical Crash Rate (Cc)**

Cc = Crash Average of Similar Sections + 1.645 * (Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))

Cc = 231.80 + 1.645 * (231.80 / 0.1163) ^ (1/2) + (1 / (2 * 0.1163))
Cc = 309.56 crashes per 100 MVM

**Critical Injury Rate (Ic)**

Ic = Injury Crash Average of Similar Sections + 1.645 * (Injury Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))

Ic = 66.27 + 1.645 * (66.27 / 0.1163) ^ (1/2) + (1 / (2 * 0.1163))
Ic = 109.85 injuries per 100 MVM
USLIMITS2 Speed Zoning Report

Project Overview

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Analyst: Cody Stone

Date: 2021-12-17

Basic Project Information
Route Name: Nuckols Crossing Road
From: St. Elmo Rd
To: S. Pleasant Valley Rd
State: Texas
County: Travis County
City: Austin city
Route Type: Road Section in Developed Area
Route Status: Existing

Roadway Information
Section Length: 1.4 mile(s)
Statutory Speed Limit: None
Existing Speed Limit: 40 mph
Adverse Alignment: Yes
One-Way Street: No
Divided/Undivided: Undivided
Number of Through Lanes: 2
Area Type: Residential-Collector/Arterial
Number of Driveways: 40
Number of Signals: 2

Crash Data Information
Crash Data Years: 5.00
Crash AADT: 4550 veh/day
Total Number of Crashes: 93
Total Number of Injury Crashes: 26
Section Crash Rate: 800 per 100 MVM
Section Injury Crash Rate: 224 per 100 MVM
Crash Rate Average for Similar Roads: 232
Injury Rate Average for Similar Roads: 66

Traffic Information
85th Percentile Speed: 42 mph
50th Percentile Speed: 36 mph
AADT: 4550 veh/day
On Street Parking and Usage: Not High
Pedestrian / Bicyclist Activity: Not High

Recommended Speed Limit: 35

Note: Sections with adverse alignments may need specific 'advisory speed warnings' which may be different from the general speed limit for the section. See Procedures for Setting Advisory Speeds on Curves, Publication No. FHWA-SA-11-22, June 2011, for more guidance.

Note: The section crash rate of 800 per 100 MVM is above the critical rate (310). The injury crash rate for the section of 224 per 100 MVM is above the critical rate (110). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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Equations Used in the Crash Data Calculations

Exposure (M)
M = (Section AADT * 365 * Section Length * Duration of Crash Data) / (100000000)
M = (4550 * 365 * 1.4 * 5.00) / (100000000)
M = 0.1163

Crash Rate (Rc)
Rc = (Section Crash Average * 100000000) / (Section AADT * 365 * Section Length)
Rc = (18.60 * 100000000) / (4550 * 365 * 1.4)
Rc = 799.98 crashes per 100 MVM

Injury Rate (Ri)
Ri = (Section Injury Crash Average * 100000000) / (Section AADT * 365 * Section Length)
Ri = (5.20 * 100000000) / (4550 * 365 * 1.4)
Ri = 223.65 injuries per 100 MVM
Critical Crash Rate (Cc)

\[
Cc = \text{Crash Average of Similar Sections} + 1.645 \times \left(\frac{\text{Crash Average of Similar Sections}}{\text{Exposure}}\right)^{1/2} + \frac{1}{2 \times \text{Exposure}}
\]

\[
Cc = 231.80 + 1.645 \times (231.80 / 0.1163)^{1/2} + \frac{1}{2 \times 0.1163}
\]

\[
Cc = 309.56 \text{ crashes per 100 MVM}
\]

Critical Injury Rate (Ic)

\[
Ic = \text{Injury Crash Average of Similar Sections} + 1.645 \times \left(\frac{\text{Injury Crash Average of Similar Sections}}{\text{Exposure}}\right)^{1/2} + \frac{1}{2 \times \text{Exposure}}
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\]

\[
Ic = 109.85 \text{ injuries per 100 MVM}
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USLIMITS2 Speed Zoning Report

Project Overview

**Project Name:** Nuckols Crossing Road Speed Study

**Analyst:** Cody Stone

**Date:** 2021-12-17

**Basic Project Information**

Route Name: Nuckols Crossing Road  
From: St. Elmo Rd  
To: S. Pleasant Valley Rd  
State: Texas  
County: Travis County  
City: Austin city  
Route Type: Road Section in Developed Area  
Route Status: Existing

**Roadway Information**

Section Length: 1.4 mile(s)  
Statutory Speed Limit: None  
Existing Speed Limit: 40 mph  
Adverse Alignment: Yes  
One-Way Street: No  
Divided/Undivided: Undivided  
Number of Through Lanes: 2  
Area Type: Residential-Collector/Arterial  
Number of Driveways: 40  
Number of Signals: 2

**Recommended Speed Limit:** 30 mph

**Crash Data Information**

Crash Data Years: 5.00  
Crash AADT: 4550 veh/day  
Total Number of Crashes: 93  
Total Number of Injury Crashes: 26  
Section Crash Rate: 800 per 100 MVM  
Section Injury Crash Rate: 224 per 100 MVM  
Crash Rate Average for Similar Roads: 232  
Injury Rate Average for Similar Roads: 66

**Traffic Information**

85th Percentile Speed: 32 mph  
50th Percentile Speed: 29 mph  
AADT: 4550 veh/day  
On Street Parking and Usage: Not High  
Pedestrian / Bicyclist Activity: Not High

**Note:** Sections with adverse alignments may need specific 'advisory speed warnings' which may be different from the general speed limit for the section. See Procedures for Setting Advisory Speeds on Curves, Publication No. FHWA-SA-11-22, June 2011, for more guidance.

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**Equations Used in the Crash Data Calculations**

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M = \frac{(\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data})}{100000000}
\]

\[
M = \frac{(4550 \times 365 \times 1.4 \times 5.00)}{100000000} = 0.1163
\]

\[
Rc = \frac{(\text{Section Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})}
\]

\[
Rc = \frac{(18.60 \times 100000000)}{(4550 \times 365 \times 1.4)} = 799.98 \text{ crashes per 100 MVM}
\]

\[
Ri = \frac{(\text{Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})}
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Ri = \frac{(5.20 \times 100000000)}{(4550 \times 365 \times 1.4)} = 223.65 \text{ injuries per 100 MVM}
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**Critical Crash Rate (Cc)**
Cc = Crash Average of Similar Sections + 1.645 * (Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))
Cc = 231.80 + 1.645 * (231.80 / 0.1163) ^ (1/2) + (1 / (2 * 0.1163))
Cc = 309.56 crashes per 100 MVM

**Critical Injury Rate (Ic)**
Ic = Injury Crash Average of Similar Sections + 1.645 * (Injury Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))
Ic = 66.27 + 1.645 * (66.27 / 0.1163) ^ (1/2) + (1 / (2 * 0.1163))
Ic = 109.85 injuries per 100 MVM
USLIMITS2 Speed Zoning Report

Project Overview

**Project Name:** Nuckols Crossing Road Speed Study

**Analyst:** Cody Stone

**Basic Project Information**

Route Name: Nuckols Crossing Road  
From: St. Elmo Rd  
To: S. Pleasant Valley Rd  
State: Texas  
County: Travis County  
City: Austin city  
Route Type: Road Section in Developed Area  
Route Status: Existing

**Roadway Information**

Section Length: 1.4 mile(s)  
Statutory Speed Limit: None  
Existing Speed Limit: 40 mph  
Adverse Alignment: Yes  
One-Way Street: No  
Divided/Undivided: Undivided  
Number of Through Lanes: 2  
Area Type: Residential-Collector/Arterial  
Number of Driveways: 40  
Number of Signals: 2

**Crash Data Information**

Crash Data Years: 5.00  
Crash AADT: 4550 veh/day  
Total Number of Crashes: 93  
Total Number of Injury Crashes: 26  
Section Crash Rate: 800 per 100 MVM  
Section Injury Crash Rate: 224 per 100 MVM  
Crash Rate Average for Similar Roads: 232  
Injury Rate Average for Similar Roads: 66

**Traffic Information**

85th Percentile Speed: 32 mph  
50th Percentile Speed: 26 mph  
AADT: 4550 veh/day  
On Street Parking and Usage: Not High  
Pedestrian / Bicyclist Activity: Not High

**Recommended Speed Limit:**

![Speed Limit 25]

**Note:** Sections with adverse alignments may need specific 'advisory speed warnings' which may be different from the general speed limit for the section. See Procedures for Setting Advisory Speeds on Curves, Publication No. FHWA-SA-11-22, June 2011, for more guidance.

**Note:** The section crash rate of 800 per 100 MVM is above the critical rate (310). The injury crash rate for the section of 224 per 100 MVM is above the critical rate (110). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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**Equations Used in the Crash Data Calculations**

**Exposure (M)**

\[
M = \frac{(\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data})}{100000000}
\]

\[
M = \frac{(4550 \times 365 \times 1.4 \times 5.00)}{100000000}
\]

\[
M = 0.1163
\]

**Crash Rate (Rc)**

\[
Rc = \frac{(\text{Section Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})}
\]

\[
Rc = \frac{(18.60 \times 100000000)}{(4550 \times 365 \times 1.4)}
\]

\[
Rc = 799.98 \text{ crashes per 100 MVM}
\]

**Injury Rate (Ri)**

\[
Ri = \frac{(\text{Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})}
\]

\[
Ri = \frac{(5.20 \times 100000000)}{(4550 \times 365 \times 1.4)}
\]

\[
Ri = 223.65 \text{ injuries per 100 MVM}
\]
Critical Crash Rate \((Cc)\)
\[
Cc = \text{Crash Average of Similar Sections} + 1.645 \times \left( \frac{\text{Crash Average of Similar Sections}}{\text{Exposure}} \right)^{1/2} + \left( \frac{1}{2 \times \text{Exposure}} \right)
\]
\[
Cc = 231.80 + 1.645 \times (231.80 / 0.1163)^{1/2} + (1 / (2 \times 0.1163))
\]
\[
Cc = 309.56 \text{ crashes per 100 MVM}
\]

Critical Injury Rate \((Ic)\)
\[
Ic = \text{Injury Crash Average of Similar Sections} + 1.645 \times \left( \frac{\text{Injury Crash Average of Similar Sections}}{\text{Exposure}} \right)^{1/2} + \left( \frac{1}{2 \times \text{Exposure}} \right)
\]
\[
Ic = 66.27 + 1.645 \times (66.27 / 0.1163)^{1/2} + (1 / (2 \times 0.1163))
\]
\[
Ic = 109.85 \text{ injuries per 100 MVM}
\]
USLIMITS2 Speed Zoning Report

Project Overview

**Project Name: Nuckols Crossing Road Speed Study**

**Analyst:** Cody Stone

**Date:** 2021-12-17

**Basic Project Information**

Route Name: Nuckols Crossing Road

From: St. Elmo Rd

To: S. Pleasant Valley Rd

State: Texas

County: Travis County

City: Austin city

Route Type: Road Section in Developed Area

Route Status: Existing

**Crash Data Information**

Crash Data Years: 5.00

Crash AADT: 4550 veh/day

Total Number of Crashes: 93

Total Number of Injury Crashes: 26

Section Crash Rate: 800 per 100 MVM

Section Injury Crash Rate: 224 per 100 MVM

Crash Rate Average for Similar Roads: 232

Injury Rate Average for Similar Roads: 66

**Roadway Information**

Section Length: 1.4 mile(s)

Statutory Speed Limit: None

Existing Speed Limit: 40 mph

Adverse Alignment: No

One-Way Street: No

Divided/Undivided: Undivided

Number of Through Lanes: 2

Number of Driveways: 40

Number of Signals: 2

**Traffic Information**

85th Percentile Speed: 41 mph

50th Percentile Speed: 35 mph

AADT: 4550 veh/day

On Street Parking and Usage: Not High

Pedestrian / Bicyclist Activity: Not High

**Recommended Speed Limit:**

Note: The section crash rate of 800 per 100 MVM is above the critical rate (310). The injury crash rate for the section of 224 per 100 MVM is above the critical rate (110). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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**Equations Used in the Crash Data Calculations**

*Exposure (M)*

\[ M = \frac{(\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data})}{100000000} \]

\[ M = \frac{(4550 \times 365 \times 1.4 \times 5.00)}{100000000} \]

\[ M = 0.1163 \]

*Crash Rate (Rc)*

\[ Rc = \frac{(\text{Section Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]

\[ Rc = \frac{(18.60 \times 100000000)}{(4550 \times 365 \times 1.4)} \]

\[ Rc = 799.98 \text{ crashes per 100 MVM} \]

*Injury Rate (Ri)*

\[ Ri = \frac{(\text{Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]

\[ Ri = \frac{(5.20 \times 100000000)}{(4550 \times 365 \times 1.4)} \]

\[ Ri = 223.65 \text{ injuries per 100 MVM} \]

*Critical Crash Rate (Cc)*

\[ Cc = \text{Crash Average of Similar Sections} + 1.645 \times (\text{Crash Average of Similar Sections} / \text{Exposure})^{(1/2)} + (1 / (2 \times \text{Exposure})) \]

\[ Cc = 231.80 + 1.645 \times (231.80 / 0.1163)^{(1/2)} + (1 / (2 \times 0.1163)) \]

\[ Cc = 309.56 \text{ crashes per 100 MVM} \]
Critical Injury Rate ($I_c$)

$I_c = \text{Injury Crash Average of Similar Sections} + 1.645 \times (\text{Injury Crash Average of Similar Sections} / \text{Exposure})^{1/2} + \frac{1}{2 \times \text{Exposure}}$

$I_c = 66.27 + 1.645 \times (66.27 / 0.1163)^{1/2} + \frac{1}{2 \times 0.1163}$

$I_c = 109.85$ injuries per 100 MVM
USLIMITS2 Speed Zoning Report

Project Overview

**Project Name:** Nuckols Crossing Road Speed Study

**Analyst:** Cody Stone

**Date:** 2021-12-17

**Basic Project Information**

Route Name: Nuckols Crossing Road
From: St. Elmo Rd
To: S. Pleasant Valley Rd
State: Texas
County: Travis County
City: Austin city
Route Type: Road Section in Developed Area
Route Status: Existing

**Roadway Information**

Section Length: 1.4 mile(s)
Statutory Speed Limit: None
Existing Speed Limit: 40 mph
Adverse Alignment: No
One-Way Street: No
Divided/Undivided: Undivided
Number of Through Lanes: 2
Area Type: Residential-Collector/Arterial
Number of Driveways: 40
Number of Signals: 2

**Traffic Information**

85th Percentile Speed: 39 mph
50th Percentile Speed: 33 mph
AADT: 4550 veh/day
On Street Parking and Usage: Not High
Pedestrian / Bicyclist Activity: Not High

**Recommended Speed Limit:**

![SPEED LIMIT 35](image)

**Note:** The section crash rate of 800 per 100 MVM is above the critical rate (310). The injury crash rate for the section of 224 per 100 MVM is above the critical rate (110). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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**Equations Used in the Crash Data Calculations**

*Exposure (M)*

\[ M = \frac{(\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data})}{(100000000)} \]

\[ M = \frac{(4550 \times 365 \times 1.4 \times 5.00)}{(100000000)} \]

\[ M = 0.1163 \]

*Crash Rate (Rc)*

\[ Rc = \frac{(\text{Section Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]

\[ Rc = \frac{(18.60 \times 100000000)}{(4550 \times 365 \times 1.4)} \]

\[ Rc = 799.98 \text{ crashes per 100 MVM} \]

*Injury Rate (Ri)*

\[ Ri = \frac{(\text{Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]

\[ Ri = \frac{(5.20 \times 100000000)}{(4550 \times 365 \times 1.4)} \]

\[ Ri = 223.65 \text{ injuries per 100 MVM} \]

*Critical Crash Rate (Cc)*

\[ Cc = \text{Crash Average of Similar Sections} \times 1.645 \times (\text{Crash Average of Similar Sections / Exposure})^{(1/2)} + (1 / (2 \times \text{Exposure})) \]

\[ Cc = \frac{231.80 + 1.645 \times (231.80 / 0.1163)^{(1/2)} + (1 / (2 \times 0.1163))}{2} \]

\[ Cc = 309.56 \text{ crashes per 100 MVM} \]
Critical Injury Rate ($I_c$)
$I_c = \text{Injury Crash Average of Similar Sections} + 1.645 \times (\text{Injury Crash Average of Similar Sections} / \text{Exposure})^{(1/2)} + (1 / (2 \times \text{Exposure}))$
$I_c = 66.27 + 1.645 \times (66.27 / 0.1163)^{(1/2)} + (1 / (2 \times 0.1163))$
$I_c = 109.85$ injuries per 100 MVM
USLIMITS2 Speed Zoning Report

Project Overview

**Project Name: St. Elmo Road Speed Study**

**Analyst:** Cody Stone  
**Date:** 2021-12-17

**Basic Project Information**

- Route Name: St. Elmo Road  
- From: Nuckels Crossing Road  
- To: Todd Lane  
- State: Texas  
- County: Travis County  
- City: Austin city  
- Route Type: Road Section in Developed Area  
- Route Status: Existing  

**Roadway Information**

- Section Length: 0.5 mile(s)  
- Statutory Speed Limit: None  
- Existing Speed Limit: 40 mph  
- Adverse Alignment: Yes  
- One-Way Street: No  
- Divided/Undivided: Undivided  
- Number of Through Lanes: 2  
- Area Type: Residential-Collector/Arterial  
- Number of Driveways: 12  
- Number of Signals: 0

**Traffic Information**

- 85th Percentile Speed: 32 mph  
- 50th Percentile Speed: 29 mph  
- AADT: 8024 veh/day  
- On Street Parking and Usage: Not High  
- Pedestrian / Bicyclist Activity: Not High

**Recommended Speed Limit:**

![SPEED LIMIT 30](image)

**Note:** Sections with adverse alignments may need specific 'advisory speed warnings' which may be different from the general speed limit for the section. See Procedures for Setting Advisory Speeds on Curves, Publication No. FHWA-SA-11-22, June 2011, for more guidance.

**Note:** The section crash rate of 601 per 100 MVM is above the critical rate (369). The injury crash rate for the section of 191 per 100 MVM is above the critical rate (136). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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**Equations Used in the Crash Data Calculations**

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**Exposure (M)**

\[ M = \frac{\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data}}{100000000} \]

\[ M = \frac{8024 \times 365 \times 0.5 \times 5.00}{100000000} \]

\[ M = 0.0732 \]

**Crash Rate (Rc)**

\[ Rc = \frac{\text{Section Crash Average} \times 100000000}{\text{Section AADT} \times 365 \times \text{Section Length}} \]

\[ Rc = \frac{8.80 \times 100000000}{8024 \times 365 \times 0.5} \]

\[ Rc = 600.94 \text{ crashes per 100 MVM} \]

**Injury Rate (Ri)**

\[ Ri = \frac{\text{Section Injury Crash Average} \times 100000000}{\text{Section AADT} \times 365 \times \text{Section Length}} \]

\[ Ri = \frac{2.80 \times 100000000}{8024 \times 365 \times 0.5} \]

\[ Ri = 191.21 \text{ injuries per 100 MVM} \]
**Critical Crash Rate (Cc)**

Cc = Crash Average of Similar Sections + 1.645 * (Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))

Cc = 263.24 + 1.645 * (263.24 / 0.0732) ^ (1/2) + (1 / (2 * 0.0732))

Cc = 368.70 crashes per 100 MVM

**Critical Injury Rate (Ic)**

Ic = Injury Crash Average of Similar Sections + 1.645 * (Injury Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))

Ic = 76.11 + 1.645 * (76.11 / 0.0732) ^ (1/2) + (1 / (2 * 0.0732))

Ic = 135.98 injuries per 100 MVM
USLIMITS2 Speed Zoning Report

Project Overview

**Project Name: St. Elmo Road Speed Study**

**Analyst:** Cody Stone

**Date:** 2021-12-17

**Basic Project Information**

Route Name: St. Elmo Road
From: Nuckels Crossing Road
To: Todd Lane
State: Texas
County: Travis County
City: Austin city
Route Type: Road Section in Developed Area
Route Status: Existing

**Roadway Information**

Section Length: 0.5 mile(s)
Statutory Speed Limit: None
Existing Speed Limit: 40 mph
Adverse Alignment: Yes
One-Way Street: No
Divided/Undivided: Undivided
Number of Through Lanes: 2
Area Type: Residential-Collector/Arterial
Number of Driveways: 12
Number of Signals: 0

**Traffic Information**

85th Percentile Speed: 38 mph
50th Percentile Speed: 33 mph
AADT: 8024 veh/day
On Street Parking and Usage: Not High
Pedestrian / Bicyclist Activity: Not High

**Recommended Speed Limit:**

35

**Crash Data Information**

Crash Data Years: 5.00
Crash AADT: 8024 veh/day
Total Number of Crashes: 44
Total Number of Injury Crashes: 14
Section Crash Rate: 601 per 100 MVM
Section Injury Crash Rate: 191 per 100 MVM
Crash Rate Average for Similar Roads: 263
Injury Rate Average for Similar Roads: 76

**Note:** Sections with adverse alignments may need specific 'advisory speed warnings' which may be different from the general speed limit for the section. See Procedures for Setting Advisory Speeds on Curves, Publication No. FHWA-SA-11-22, June 2011, for more guidance.

**Note:** The section crash rate of 601 per 100 MVM is above the critical rate (369). The injury crash rate for the section of 191 per 100 MVM is above the critical rate (136). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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**Equations Used in the Crash Data Calculations**

**Exposure (M)**

\[ M = \frac{(\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data})}{100000000} \]

\[ M = \frac{(8024 \times 365 \times 0.5 \times 5.00)}{100000000} \]

\[ M = 0.0732 \]

**Crash Rate (Rc)**

\[ Rc = \frac{(\text{Section Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]

\[ Rc = \frac{(8.80 \times 100000000)}{(8024 \times 365 \times 0.5)} \]

\[ Rc = 600.94 \text{ crashes per 100 MVM} \]

**Injury Rate (Ri)**

\[ Ri = \frac{(\text{Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]

\[ Ri = \frac{(2.80 \times 100000000)}{(8024 \times 365 \times 0.5)} \]

\[ Ri = 191.21 \text{ injuries per 100 MVM} \]
**Critical Crash Rate (Cc)**
Cc = Crash Average of Similar Sections + 1.645 * (Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))
Cc = 263.24 + 1.645 * (263.24 / 0.0732) ^ (1/2) + (1 / (2 * 0.0732))
Cc = 368.70 crashes per 100 MVM

**Critical Injury Rate (Ic)**
Ic = Injury Crash Average of Similar Sections + 1.645 * (Injury Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))
Ic = 76.11 + 1.645 * (76.11 / 0.0732) ^ (1/2) + (1 / (2 * 0.0732))
Ic = 135.98 injuries per 100 MVM