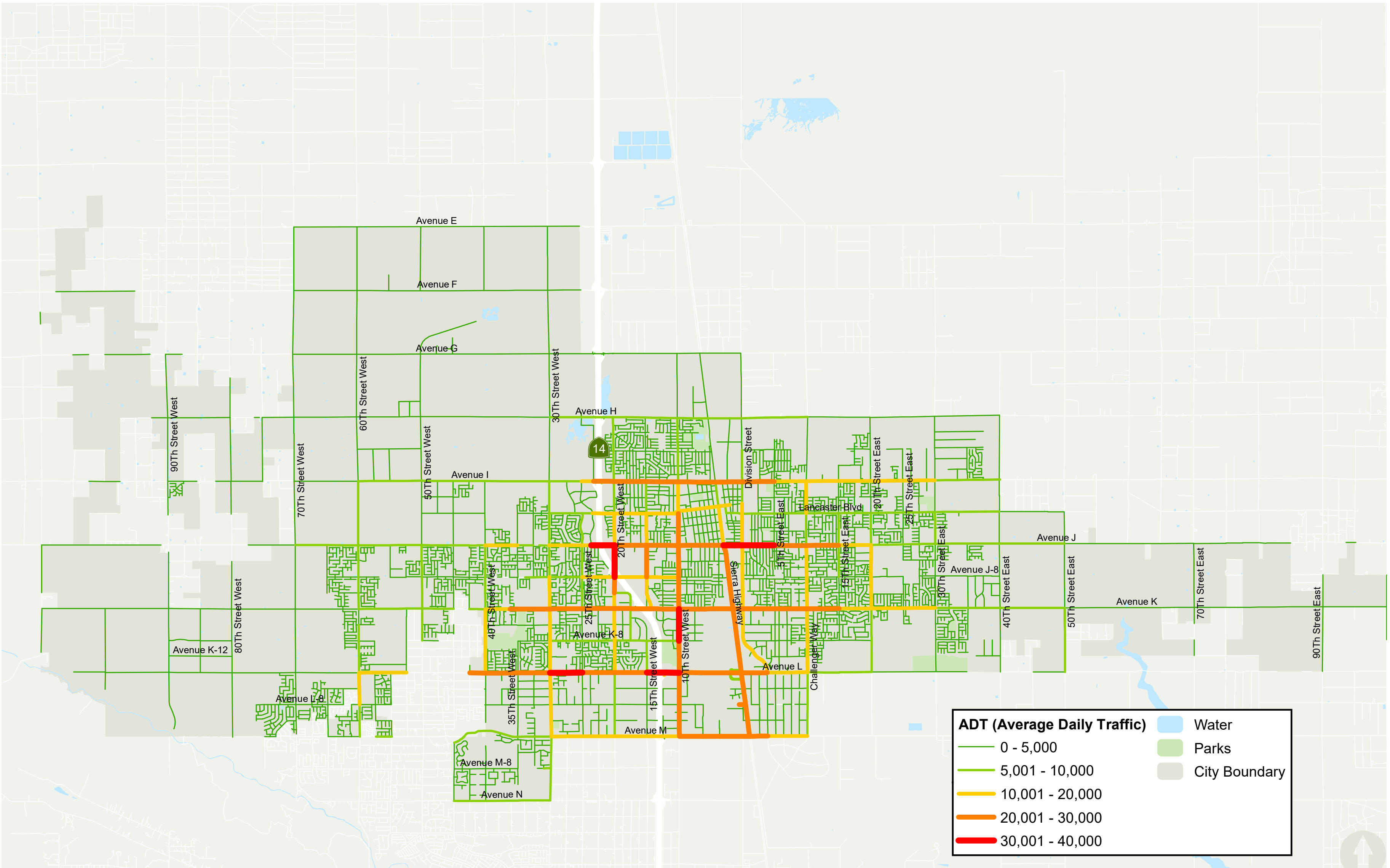
FIGURE A14 VEHICLE COUNTS



HIGHWAY SAFETY MANUAL

The AASHTO *Highway Safety Manual* (HSM), published in 2010, presents a variety of methods for quantitatively estimating crash frequency or severity at a variety of locations. This four-part manual is divided into: A) Introduction, Human Factors, and Fundamentals, B) Roadway Safety Management Process, C) Predictive Method, and D) Crash Modification Factors.

Chapter 4 of Part B of the HSM discusses the Network Screening process. The Network Screening Process is a tool for an agency to analyze their entire network, and identify/rank locations that (based on the implementation of a countermeasure) are most likely to least likely to realize a reduction in the frequency of crashes.

The HSM identifies five steps in this process:

1. Establish Focus: Identify the purpose or intended outcome of the network screening analysis. This decision will influence data needs, the selection of performance measures, and the screening method that can be applied.
2. Identify Network and Establish Reference Populations: Specify the types of sites or facilities being screened (i.e., segments, intersections, geometrics), and identify groupings of similar sites or facilities.
3. Select Performance Measures: There are a variety of performance measures available to evaluate the potential to reduce crash frequency at a site. In this step, the performance measure is selected as a function of the screening focus, and the data and analytical tools available.
4. Select Screening Method: There are three principle screening methods described in this chapter, including ranking, sliding window, peak searching. Each method has advantages and disadvantages; the most appropriate method for a given situation should be selected.
5. Screen and Evaluate Results: The final step in the process is to conduct the screening and analysis and evaluate the results.

The HSM provides a number of statistical methods for screening roadway networks to identify high risk locations based on overall crash histories. In addition to flat crash quantities, the method used in this study is referred to as Critical Crash Rate (CCR).

SITE VISITS

This study included a field visit to intersections and roadway segments with high or unusual crash activity. To identify locations for site visits, the team first identified a set of candidate locations for each intersection and segment type; these were primarily locations with a high number of crashes (either overall or for a specific crash type) or locations with a high proportion of one type of crash. The team then selected a set of 12 locations for site visits from these candidate locations. Selection focused on locations with a high number of fatal crashes and a diversity of location and crash types.

PERFORMANCE MEASURES

HIGH CRASH LOCATIONS

Crash records were mapped in ArcGIS. Each crash was assigned to the nearest intersection within 300 feet, or the nearest roadway segment if no intersection was within range. A raw count of crashes was calculated for each intersection and roadway segment.

The top five intersections and roadway segments by sub-population (where there were more than five crashes) have been identified in Table A2 - Top Crash Locations - Intersections (2013 - 2017) and Table A3 - Top Crash Locations - Segments (2013 - 2017), respectively.

TABLE A2 TOP CRASH LOCATIONS - INTERSECTIONS (2013 - 2017)

LOCATION	CRASHES	LEADING CRASH TYPE
SIGNALIZED INTERSECTIONS		
Sierra Hwy & Avenue K	140	Rear-End
10th St W & Avenue K	129	Sideswipe
Challenger Way & Avenue J	113	Rear-End
Division St & Avenue J	112	Rear-End
10th St W & Avenue L	108	Rear-End
ALL-WAY STOP-CONTROLLED INTERSECTIONS		
60th St W & Avenue H	22	Broadside
15th St E & Lancaster Blvd	15	Broadside
50th St W & Avenue K	16	Broadside
70th St E & Avenue K	14	Broadside
40th St W & Avenue J-8	12	Broadside
SIDE-STREET STOP-CONTROLLED INTERSECTIONS		
Beech Ave & Avenue J	32	Broadside
13th St W & Avenue K	29	Broadside
10th St E & Avenue K-8	27	Broadside
10th St E & Avenue J-14	24	Broadside
Fern Ave & Lancaster Blvd	24	Broadside
UNCONTROLLED INTERSECTIONS		
27th St E & Via Romana	9	Rear-End
5th St E & Avenue J-9	8	Broadside
10th St W & Avenue L-4	7	Rear-End

TABLE A3 TOP CRASH LOCATIONS - SEGMENTS (2013 - 2017)

SEGMENT	FROM	TO	CRASHES	DAILY VOLUME
PRINCIPAL ARTERIALS				
20th Street West	Rt 14 NB Off-Ramp	Avenue J	31	32,700
Avenue K	Sierra Highway	Park Avenue	24	28,300
Avenue J	20th Street West	Rt 14 NB On-Ramp	23	32,300
Avenue J	17th Street West	20th Street West	21	25,900
Avenue J	Challenger Way	11th Street East	14	23,200
COLLECTORS				
15th Street West	Meadow View Lane	Avenue J-8	8	19,600
5th Street East	Lancaster Blvd	Kettering Street	7	4,300
RESIDENTIAL				
Valley Central Way	Central Court	Lancaster Blvd	15	2,500
Valley Central Way	Avenue J	Central Court	12	2,500
Jenner Street	Sancroft Avenue	Andale Avenue	6	2,000
Motor Lane	Drivers Way	12th Street West	6	1,000
12th Street West	Commerce Center Drive	Avenue K	6	1,000

CRITICAL CRASH RATE (CCR)

Reviewing the number of crashes at a location is a good way to understand the cost to society incurred at the local level, but does not give a complete indication of the level of risk for those who use that intersection or roadway segment on a daily basis. The *Highway Safety Manual* describes the Critical Crash Rate (CCR) method which provides a statistical review of locations to determine where risk is higher than that experienced in other similar locations. It is also the first step in analyzing for patterns that may suggest systemic issues that can be addressed at that location, and proactively at others to prevent new safety challenges from emerging.

The CCR compares the observed crash rate to the expected crash rate at a particular location based on facility type and volume using a locally calculated average crash rate for the specific type of intersection or roadway segment being analyzed. Based on traffic volumes and a weighted citywide crash rate for each facility type, a critical crash rate threshold is established at the 95% confidence level to determine locations with higher crash rates that are unlikely to be random. The threshold is calculated for each location individually based on its traffic volume and the crash profile of similar facilities.

FIGURE A15 CRITICAL CRASH RATE FORMULA

$$R_{c,i} = R_a + \left[P \times \sqrt{\frac{R_a}{MEV_i}}\right] + \left[\frac{1}{(2 \times (MEV_i))}\right]$$

Where,

$R_{c,i}$ = Critical crash rate for intersection i

R_a = Weighted average crash rate for reference population

P = P-value for corresponding confidence level

MEV_i = Million entering vehicles for intersection i

Source: Highway Safety Manual

DATA NEEDS

CCR can be calculated using:

> Daily entering volume for intersections, or VMT for roadway segments
> Intersection control types to separate them into like populations
> Roadway functional classification to separate them into like populations
> Crash records in GIS or tabular form including coordinates or linear measures

CCR's strengths are that it:

> Reduces low volume exaggeration
> Considers variance
> Establishes comparison threshold

CCR METHODOLOGY

The process of analyzing the CCR and comparing locations (separately by intersections and segments) is a multi-step process. The following is a high-level description of the process undertaken to develop the initial ranking of locations.

The first step in the process was to establish a city-wide crash rate for each facility population. These populations are broken into two categories with sub-categories:

> Intersection:
- *Signalized*
- *All-Way Stop-Controlled*
- *Side-Street Stop-Controlled*
- *Uncontrolled*

> Roadway Classification:
- *Arterial*
- *Collector*
- *Residential*

The individual crash rate for each location was then calculated based on the associated traffic volume. This volume was either collected through data count resources or calculated based on the roadway classification. The next step was to establish a Significance Threshold. This Threshold was used to determine what level of exceedance (how much the crash rate exceeded the critical crash rate) a location has to have based on traffic volume in order to provide a high level of confidence that the crash occurring at the location was not random. For this study, a confidence level of 95% was used. The local crash rates were then compared to the Significance Threshold to see if each location exceeded the expected CCR and if so, by how much.

After this analysis was completed, the locations were ranked by their categories according to that level of exceedance. The CCR analysis identified locations that have statistically higher crash rates than other similar locations as shown in Table A4 - Analysis Rankings - Intersections (2013 - 2017) and Table A5 - Analysis Rankings - Segments (2013 - 2017).

PROBABILITY OF SPECIFIC CRASH TYPES EXCEEDING THRESHOLD PROPORTION

The Highway Safety Manual describes the methodology for determining the probability that particular crash type is greater than an identified threshold proportion. This helps to identify locations where a particular crash type is more likely to occur.

DATA NEEDS

The probability of a specific crash type can be determined using crash records with location data, and classifications of the locations (intersections or segments) studied.

HSM's strength are that its:

> Can be used as a diagnostic tool
> Considers variance in data
> Is not affected by selection bias

The HSM methodology first determines the frequency of a specific crash type at an individual location, then determines the observed proportion of that crash type relative to all crash types at that location. A threshold proportion is then determined for the specific crash type; HSM suggests utilizing the proportion of the crash type observed in the entire reference population (e.g. throughout the entire City of Lancaster).

These proportions are then utilized to determine the probability that the proportion of a specific crash type is greater than the long-term expected proportion of that crash type, using the formula shown in Figure A16.

FIGURE A16 PROBABILITY OF SPECIFIC CRASH TYPES EXCEEDING THRESHOLD PROPORTION

$$P\left(p_i > \overline{p*_i} \,/\, N_{observedj}, N_{observedj(TOTAL)}\right) = 1 - betadist\left(\overline{p*_i}, \alpha + N_{observedj}, \beta + N_{observedj(TOTAL)} - N_{observedj}\right) \tag{4-23}$$

Where:

$\overline{p^*_i}$ = Threshold proportion

p_i = Observed proportion

$N_{observed,i}$ = Observed target crashes for a site i

$N_{observed,i(TOTAL)}$ = Total number of crashes for a site i

Source: Highway Safety Manual

Table A4 - Analysis Rankings - Intersections (2013 - 2017) and Table A5 - Analysis Rankings - Segments (2013 - 2017) show the number of crashes occurring at locations in Lancaster by crash type, and highlights locations in which the probability of those crash types exceeding the threshold proportion is greater than 0, with higher probabilities noted (see Table A4 and Table A5 legend). The rankings are ordered by the number of total crashes. The tables include a breakdown of crash type, including vehicle crash types (broadside, rear-end, sideswipe, head-on, other), as well as bicycle and pedestrian crashes. These crash type categories are mutually exclusive and, taken together, total the number of crashes at a given location.

Also included in the table are the numbers of fatal and severe injury crashes at each location, as well as crashes occurring in the dark, in wet conditions, or with an impaired driver. These fields are not mutually exclusive. Causality types were not included in this analysis, as there are often inconsistencies in recorded causality data which limit the accuracy of intersection or segment-level analysis. Figure A17 - Top Ten Crash Segments and Intersections (2013 - 2017) shows the ten intersections and ten roadway segments which had the highest number of crashes.

TABLE A4 ANALYSIS RANKINGS - INTERSECTIONS (2013 - 2017)

Intersection	Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
Signalized Intersections														
17th St E & Avenue J	0.92	56	1	1	32	4	13	3	4	-	-	12	-	1
20th St E & Avenue K	0.86	64	3	-	29	17	7	6	4	1	-	18	2	8
Challenger Way & Avenue J	0.83	113	3	1	31	50	16	7	4	1	4	29	5	9
15th St E & Avenue J	0.74	76	1	-	36	14	7	8	7	3	1	30	1	5
Sierra Hwy & Avenue K	0.71	140	1	-	15	91	25	-	7		2	22	4	9
30th St W & Avenue J-8	0.67	57	3	1	35	4	7	6	3	1	1	15	2	3
25th St W & Avenue J-8	0.57	49	1	-	20	11	11	3	3	-	1	10	2	2
Valley Central Way & Avenue J	0.51	72	1	1	39	15	9	2	4	2	1	15	2	2
Division St & Avenue J	0.5	112	2	1	29	47	25	7	2	-	2	19	5	8
Gadsden Ave & Avenue K	0.47	77	1	1	42	16	7	5	4	-	3	11	5	4
10th St W & Avenue I	0.41	95	1	-	28	31	18	7	4	3	4	24	5	6
Challenger Way & Avenue K	0.41	88	3	-	13	46	18	2	4	4	1	28	3	17
10th St W & Avenue K	0.36	129	1	-	39	42	38	2	3	3	2	28	7	8
Sierra Hwy & Avenue J	0.35	97	2	-	10	53	15	-	5	7	7	21	3	7
Division St & Avenue I	0.29	65	4	1	28	16	6	4	7	2	2	19	2	7
20th St E & Avenue J	0.29	52	1	-	13	21	11	1	4	2	-	12	3	2
10th St W & Avenue J	0.28	102	1	-	28	37	29	3	2	1	2	14	2	4
15th St W & Avenue J	0.28	85	-	-	21	38	17	2	5	2	-	13	2	5
10th St W & Jackman St	0.18	46	1	-	21	10	7	-	2	4	2	12	1	1
20th St W & Lancaster Blvd	0.17	58	2	-	26	12	7	8	4	-	1	20	-	2
10th St W & Avenue L	0.15	108	2	1	37	37	23	2	6	1	2	22	4	5
12th St W & Avenue K	0.14	59	-	-	15	27	10	1	4	-	2	9	2	1
20th St W & Avenue J	0.13	101	-	-	22	43	25	2	7	1	1	19	8	1
25th St W & Avenue J	0.12	45	1	-	20	11	8	2	2	1	1	9	-	1
Division St & Avenue K	0.11	70	1	-	10	36	16	2	5	1	-	9	5	2
30th St W & Avenue K	0.09	67	-	-	16	32	6	1	6	3	3	8	1	5
20th St W & Avenue I	0.06	59	-	-	8	25	19	1	5	-	1	19	2	4
15th St W & Avenue K	0.02	63	1	-	16	26	13	2	3	-	3	16	4	2
30th St W & Avenue L	-0.07	60	1	-	7	36	10	2	3	1	1	12	2	7
20th St W & Avenue K	-0.1	60	2	1	23	18	13	1	3	1	1	15	2	1
17th St W & Avenue K	-0.1	50	-	-	13	21	9	-	5	-	2	10	-	2

LEGEND

CCR Differential: >1.0 · 0.33-1.0 · <0.33

Probability of Crash Type Exceeding Threshold Proportion: 90-100% · 80-90% · 70-80%

Fatalities: >1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

Intersection	Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
20th St W & Avenue J-8	-0.12	**56**	2	-	20	17	12	1	2	3	1	15	2	3
15th St W & Lancaster Blvd	-0.12	**40**	1	-	24	7	5	3	1	-	-	7	-	-
Sierra Hwy & Columbia Way	-0.15	**50**	-	-	7	22	11	1	9	-	-	13	1	4
Sierra Hwy & Avenue I	-0.16	**44**	1	1	8	24	10	-	1	1	-	8	-	4
10th St W & Avenue J-4	-0.17	**42**	-	-	10	18	9	-	4	-	1	8	2	5
25th St W & Avenue K	-0.17	**42**	2	1	14	15	4	2	4	2	1	10	-	2
20th St W & Avenue L	-0.33	**39**	1	-	6	24	4	4	-	-	1	5	2	2
Sierra Hwy & Avenue L	-0.41	**43**	-	-	9	19	8	-	6	1	-	9	2	3
Fern Ave & Avenue I	-0.43	**28**	1	1	11	7	2	-	2	4	2	7	1	2
10th St W & Lancaster Blvd	-0.84	**55**	-	-	22	19	7	4	2	-	1	12	2	3
Side-Street Stop-Controlled Intersections														
Valley Central Way & Central Ct	2.17	**16**	-	-	6	3	5	-	2	-	-	1	1	-
60th St W & Avenue F	2.01	**11**	-	-	8	1	-	-	2	-	-	4	-	-
60th St W & Avenue G	1.98	**12**	-	-	8	-	4	-	-	-	-	6	2	-
Sierra Hwy & Avenue G	1.89	**19**	-	-	16	-	1	1	1	-	-	9	-	3
10th St E & Avenue K-8	0.77	**26**	2	-	21	-	3	1	1	-	-	5	1	3
10th St W & Avenue H-14	0.61	**18**	1	-	4	3	1	4	2	3	1	5	-	2
10th St W & Avenue H-12	0.61	**17**	-	-	6	5	1	3	2	-	-	3	-	1
Challenger Way & Avenue M	0.58	**18**	1	-	8	6	3	1	-	-	-	6	-	1
Beech Ave & Avenue J	0.52	**32**	-	-	18	2	6	1	4	-	1	3	1	-
Sierra Hwy & Jackman St	0.52	**12**	-	-	1	2	5	1	2	-	1	2	2	-
110th St W & Avenue K	0.41	**2**	-	-	-	-	-	-	2	-	-	-	-	-
Challenger Way & Avenue J-14	0.4	**24**	1	-	10	3	5	3	2	1	-	5	2	4
10th St W & Avenue H-8	0.4	**13**	-	-	7	1	2	-	2	-	1	4	-	-
25th St E & Avenue K	0.37	**12**	-	-	4	1	1	1	5	-	-	5	-	2
25th St E & Avenue J	0.35	**10**	1	-	6	-	4	-	-	-	-	1	1	-
Division St & Avenue K-8	0.33	**17**	-	-	10	2	2	1	2	-	-	8	2	3
26th St E & Avenue J	0.33	**11**	-	-	9	1	-	-	1	-	-	1	-	-
13th St W & Avenue K	0.32	**29**	1	-	9	7	6	1	4	2	-	6	-	2
Fern Ave & Lancaster Blvd	0.32	**24**	-	-	8	-	7	-	4	2	3	8	1	1
7th St E & Avenue I	0.25	**14**	1	-	7	-	4	1	1	-	1	4	1	1
Cedar Ave & Avenue J	0.24	**18**	-	-	4	3	5	1	2	2	1	5	3	3

LEGEND

CCR Differential
>1.0 0.33-1.0 <0.33

Probability of Crash Type Exceeding Threshold Proportion
90-100% 80-90% 70-80%

Fatalities
>1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

Intersection	Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
17th St E & Avenue I	0.24	**13**	1	-	2	2	2	1	5	1	-	5	-	-
30th St W & Avenue K-12	0.19	**13**	-	-	6	2	1	1	2	-	1	5	1	1
Kingtree Ave & Avenue I	0.17	**22**	1	-	9	3	4	1	2	2	1	7	-	4
16th St W & Avenue J	0.16	**20**	-	-	4	8	5	1	1	-	1	1	-	-
8th St E & Avenue K	0.16	**17**	2	-	2	2	9	1	3	-	-	6	-	1
17th St W & Avenue J	0.1	**16**	1	-	2	4	3	1	4	-	2	1	1	1
Date Ave & Avenue J	0.1	**15**	1	1	2	5	5	-	1	1	1	4	-	-
6th St E & Avenue K	0.1	**15**	-	-	7	2	3	-	2	1	-	1	-	-
4th St W & Avenue M	0.1	**12**	-	-	3	1	2	-	6	-	-	1	1	-
40th St W & Avenue L-2	0.09	**2**	-	-	-	-	-	1	1	-	-	1	-	1
11th St W & Avenue I	0.08	**17**	-	-	2	6	3	2	3	1	-	1	-	1
Elm Ave & Lancaster Blvd	0.08	**14**	-	-	3	3	3	-	4	1	-	5	-	-
30th St W & Avenue K-4	0.08	**13**	-	-	3	6	1	1	1	1	-	4	-	2
27th St W & Avenue K	0.07	**14**	-	-	4	5	2	-	3	-	-	4	1	2
11th St E & Avenue J	0.07	**12**	-	-	6	-	2	-	4	-	-	3	-	2
Trevor Ave & Avenue J	0.06	**18**	-	-	2	10	1	-	2	-	3	1	1	1
10th St W & Avenue J-12	0.06	**14**	1	1	6	3	3	-	1	1	-	6	-	4
Beech Ave & Lancaster Blvd	0.06	**13**	-	-	3	-	4	1	3	1	1	4	1	1
10th St W & Avenue J-2	0.05	**16**	-	-	7	5	2	-	1	1	-	4	-	1
Beech Ave & Avenue I	0.05	**15**	-	1	3	3	-	-	4	1	4	5	1	-
Genoa Ave & Avenue J	0.05	**13**	-	-	7	4	1	-	1	-	-	1	1	-
30th St W & Avenue F	0.05	**2**	-	2	2	-	-	-	-	-	-	-	-	-
Elm Ave & Avenue J	0.04	**13**	-	-	5	1	6	-	1	-	-	1	-	-
3rd St E & Avenue J	0.02	**15**	-	-	7	1	2	1	1	2	1	3	-	1
Glenraven Rd & Avenue J	0.02	**15**	-	-	2	8	3	-	1	1	-	2	-	-
Kirckland Ave & Avenue K	0.02	**12**	-	-	4	-	5	1	2	-	-	6	1	1
Yucca Ave & Avenue I	0.01	**13**	-	-	1	6	2	-	3	1	-	4	-	-
18th St W & Avenue K	0.01	**13**	-	-	4	6	1	-	1	1	-	-	-	1
Rodin Ave & Avenue J	-0.01	**12**	1	1	3	3	-	-	5	1	-	5	-	3
SR 14 NB On Ramp & Avenue J	-0.04	**11**	-	-	6	2	-	1	2	-	-	1	-	-
50th St E & Avenue L	-0.18	**2**	-	-	1	-	-	-	1	-	-	1	1	-

LEGEND

CCR Differential: >1.0 | 0.33-1.0 | <0.33

Probability of Crash Type Exceeding Threshold Proportion: 90-100% | 80-90% | 70-80%

Fatalities: >1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

Intersection	Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
All-Way Stop-Controlled Intersections														
60th St W & Avenue H	3.3	**22**	1	1	15	1	1	1	4	-	-	4	2	1
70th St E & Avenue K	1.76	**14**	-	-	12	1	-	-	1	-	-	3	1	1
5th St E & Kettering St	0.92	**9**	1	-	2	1	1	-	3	2	-	-	-	-
15th St E & Lancaster Blvd	0.38	**15**	-	-	6	3	3	-	2	1	-	6	-	-
40th St W & Avenue J-8	0.28	**12**	-	-	5	3	2	-	2	-	-	3	-	-
50th St W & Avenue K	0.24	**16**	-	-	8	7	1	-	-	-	-	5	1	2
40th St E & Avenue K	0.19	**10**	-	-	3	5	1	-	1	-	-	3	2	1
50th St E & Avenue K	0.16	**10**	1	-	2	5	1	1	1	-	-	4	-	-
27th St E & Lancaster Blvd	0.16	**6**	-	-	1	2	-	1	2	-	-	1	1	1
32nd St W & Lancaster Blvd	0.14	**6**	-	-	-	2	2	-	-	1	1	-	-	-
70th St W & Avenue L	0.11	**7**	-	-	3	-	-	1	3	-	-	1	-	1
Gadsden Ave & Avenue J-12	0.1	**5**	-	-	2	2	1	-	-	-	-	3	-	2
40th St E & Avenue J	0.07	**10**	-	-	7	3	-	-	-	-	-	5	2	2
25th St W & Avenue K-8	0.06	**9**	-	-	4	1	1	1	2	-	-	1	1	-
Fern Ave & Milling St	0.05	**9**	-	-	7	1	-	-	1	-	-	2	-	-
15th St E & Avenue J-8	0.05	**8**	-	-	4	3	-	-	1	-	-	-	-	1
12th St W & Commerce Center Drive	0.05	**3**	-	-	1	-	-	-	2	-	-	-	1	-
Division St & Avenue H	0.01	**9**	1	-	3	2	-	-	1	2	1	3	-	1
Fern Ave & Jackman St	0	**8**	-	-	2	-	1	1	2	1	1	1	-	-
30th St E & Avenue H	-0.05	**4**	1	1	2	1	-	-	1	-	-	1	-	2
30th St E & Lancaster Blvd	-0.06	**7**	-	-	4	3	-	-	-	-	-	-	-	1
90th St E & Avenue K	-0.07	**3**	-	-	-	1	-	1	1	-	-	2	-	1
Gingham Ave & Avenue J-11	-0.11	**3**	-	-	-	2	-	1	-	-	-	1	-	-
17th St E & Avenue J-4	-0.11	**3**	-	-	1	-	1	-	1	-	-	1	1	-
35th St W & Avenue L-8	-0.12	**4**	-	-	2	-	2	-	-	-	-	1	-	-
5th St E & Avenue H-8	-0.12	**3**	-	-	-	1	-	-	2	-	-	-	-	-
35th St E & Avenue K	-0.15	**5**	-	-	3	1	-	-	1	-	-	2	1	-
70th St W & Avenue K	-0.15	**3**	-	-	2	-	1	-	-	-	-	-	-	-
90th St W & Avenue H	-0.15	**2**	-	-	2	-	-	-	-	-	-	-	1	-
Challenger Way & Avenue H	-0.16	**4**	1	1	2	1	1	-	-	-	-	1	-	-

LEGEND

CCR Differential
>1.0 0.33-1.0 <0.33

Probability of Crash Type Exceeding Threshold Proportion
90-100% 80-90% 70-80%

Fatalities
>1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

Intersection	Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
Elm Ave & Avenue J-4	-0.18	3	-	-	1	1	-	-	1	-	-	2	-	-
Beech Ave & Newgrove St	-0.27	3	-	-	3	-	-	-	-	-	-	-	-	-
12th St W & Avenue J-7	-0.29	2	-	-	-	-	1	1	-	-	-	1	-	-
55th St W & Avenue L-8	-0.3	2	-	-	1	-	-	-	1	-	-	1	-	-
32nd St W & Avenue K-4	-0.31	2	-	-	-	-	1	-	-	1	-	-	-	-
55th St W & Avenue M	-0.31	2	-	-	1	-	-	-	1	-	-	1	-	-
12th St W & Avenue J-12	-0.31	2	-	-	-	-	2	-	-	-	-	-	-	-
3rd St E & Glenraven Road	-0.31	2	-	-	-	2	-	-	-	-	-	-	-	-
Fern Ave & Newgrove St	-0.33	2	-	-	-	-	2	-	-	-	-	-	-	-
57th St W & Avenue L-8	-0.33	2	-	-	1	-	1	-	-	-	-	-	-	-
Beech Ave & Milling St	-0.33	1	-	-	-	-	-	-	1	-	-	-	-	-
Uncontrolled Intersections														
27th St E & Via Romana	2.61	9	-	-	2	4	1	1	1	-	-	2	-	-
Robinson Drive & Drysdale Drive	1.19	2	-	-	-	-	1	-	1	-	-	2	1	-
5th St E & Avenue J-9	0.98	8	-	-	3	2	1	1	1	-	-	5	1	2
Aspen St & Nugent St	0.79	4	-	-	2	1	-	-	-	1	-	1	-	-
Gillan Ave & Avenue J-6	0.67	5	-	-	2	-	-	1	1	-	1	1	-	-
Picaso St & Lincoln Ave	0.67	5	1	-	3	-	2	-	-	-	-	2	1	1
17th St E & Mesa Dr	0.67	5	-	-	4	-	-	-	1	-	-	2	1	1
Ivyton St & Sancroft Ave	0.44	5	-	-	-	-	2	-	2	1	-	3	-	1
Brentwood Ave & Archwood Way	0.44	4	-	-	1	-	-	-	3	-	-	2	-	-
Sunmist Court & Roywood Drive	0.43	4	-	-	1	2	-	-	-	-	1	-	-	-
27th St E & Regal Court	0.42	3	-	-	1	1	1	-	-	-	-	-	-	-
27th St E & Nugent St	0.42	2	-	-	-	-	-	-	2	-	-	1	-	1
38th St W & Avenue K-14	0.25	4	-	-	-	1	2	-	1	-	-	3	-	-
15th St Fr W & Norberry St	0.25	4	-	-	-	2	2	-	-	-	-	1	-	1
39th St W & Avenue K-15	0.25	1	-	-	1	-	-	-	-	-	-	-	-	-
57th St W & Lyric Ave	0.24	2	-	-	-	1	-	-	1	-	-	1	1	-
Silver Bow Road & Avenue J-12	0.18	3	-	-	-	2	1	-	-	-	-	-	-	-
Timothy Ct & Sierra View Ave	0.18	3	-	-	-	1	-	1	1	-	-	3	1	-
17th St E & Sierra View Ave	0.18	3	-	-	1	-	1	-	1	-	-	3	-	-

LEGEND

CCR Differential: >1.0 · 0.33-1.0 · <0.33

Probability of Crash Type Exceeding Threshold Proportion: 90-100% · 80-90% · 70-80%

Fatalities: >1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

Intersection	Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
11th St E & Landsford St	0.18	**3**	-	-	2	1	-	-	-	-	-	2	-	-
18th St E & Jenner St	0.18	**3**	-	-	-	-	-	1	2	-	-	2	-	-
Avenue H-14 & Genoa Ave	0.15	**4**	-	1	-	-	2	-	1	1	-	-	-	1
13th St W & Boyden Ave	0.15	**4**	-	-	-	-	3	-	1	-	-	1	-	-
Gadsden Ave & Avenue H-9	0.15	**4**	-	-	1	-	1	-	2	-	-	1	-	-
Glenraven Rd & Avenue J Fr	0.07	**3**	-	-	-	-	1	-	1	1	-	1	-	1
Summer Lane & Avenue L-12	0.07	**3**	-	-	-	2	-	-	1	-	-	-	-	-
57th St W & Avenue L-2	0.07	**3**	1	-	-	1	-	-	2	-	-	2	-	-
Fairlee Dr & Avenue K-15	0.07	**3**	-	-	2	-	-	-	-	-	-	1	-	1
Alep St & Avenue K-13	0.07	**3**	-	-	-	1	2	-	-	-	-	2	-	-
Gadsden Ave & Avenue J-11	0.07	**3**	-	-	-	-	1	1	1	-	-	2	1	-
4th St E & Avenue J-12	0.07	**3**	-	-	1	-	2	-	-	-	-	1	-	1
Elm Ave & Avenue J-9	0.07	**3**	-	-	1	-	2	-	-	-	-	2	-	1
Adler Ave & Avenue J-8	0.07	**3**	-	-	1	1	1	-	-	-	-	1	-	-
10th St Fr W & Avenue J-7	0.07	**3**	-	-	1	1	1	-	-	-	-	-	-	-
Rodin Ave & Avenue J-7	0.07	**3**	-	-	-	1	2	-	-	-	-	2	-	1
Rodin Ave & Avenue J-5	0.07	**3**	-	-	1	-	-	1	1	-	-	2	-	1
47th St W & Jade Court	0.07	**3**	-	-	-	-	2	-	1	-	-	1	-	-
4th St E & Avenue J Fr	0.07	**3**	-	-	1	-	2	-	-	-	-	2	-	-
4th St E & Nugent St	0.07	**3**	-	-	-	-	1	-	2	-	-	2	-	1
21st St W & Lancaster Blvd Fr	0.07	**3**	-	-	2	-	-	-	1	-	-	1	-	-
10th St W & Avenue L-4	0.06	**7**	-	-	1	3	1	1	1	-	-	2	-	-
Lostwood Ave & Avenue H-14	0.01	**3**	-	-	-	1	-	-	2	-	-	1	-	-
Gadsden Ave & Avenue H-8	0.01	**3**	-	-	-	1	1	-	1	-	-	3	-	2
36th St W & Avenue N	-0.04	**3**	-	-	-	3	-	-	-	-	-	-	-	1
17th St W & Avenue J-15	-0.08	**3**	-	-	1	1	1	-	-	-	-	-	-	-
Cedar Ave & Gilley Way	-0.11	**3**	-	-	1	-	1	-	1	-	-	-	-	-
Benald St & Avenue J Fr Rd	-0.12	**5**	-	-	-	2	2	-	1	-	-	-	-	-
13th St E & Avenue J	-0.16	**3**	-	-	-	2	-	-	1	-	-	-	-	-
Rt 14 NB On Ramp & Avenue K	-0.17	**3**	-	-	-	2	1	-	-	-	-	-	-	-

LEGEND

CCR Differential
>1.0 0.33-1.0 <0.33

Probability of Crash Type Exceeding Threshold Proportion
90-100% 80-90% 70-80%

Fatalities
>1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

TABLE A5 ANALYSIS RANKINGS - SEGMENTS (2013 - 2017)

Roadway Segment			Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
Street	Cross Street 1	Cross Street 2														
Arterials																
20Th Street East	Avenue J-2	Avenue J	55.22	**14**			12		1		1			3	1	1
Avenue J	Challenger Way	11th Street East	34.08	**14**			4		4	1	4		1	3		
Avenue J	Division Street	Glenraven Road	31.96	**12**			5	3	2	1	1			2		
Avenue I	12th Street East	Via Quintana	25.89	**15**		2	8	1	1		3	1	1	6		1
Challenger Way	Avenue J-3	Avenue J	25.67	**13**	1		9	1				2	1			
10Th Street West	Newgrove Street	Lancaster Way	21.11	**9**				5	1		1	1	1	1		1
Avenue K	Sierra Highway	Park Avenue	18.53	**24**				21	3					7	2	1
Avenue K	10th Street West	12th Street West	16.81	**13**	1	1	6	4	2		1			3	2	1
20Th Street West	Rt 14 NB Off/R	Avenue J	16.48	**31**			14	10	3		4			3		
Avenue J	17th Street West	20th Street West	15.67	**21**			8	4	5		2		2	2	1	
Avenue K	8th Street East	Challenger Way	15.39	**9**			6	3							2	
Avenue K	Division Street	Sierra Highway	12.25	**9**				7	1	1				2		1
Avenue I	Fern Avenue	10th Street West	11.53	**10**			3	4	1	1		1		2		
Avenue I	Via Quintana	15th Street East	11.25	**7**	2	2	4	1				1	1	2		
Avenue J	Lowtree Avenue	15th Street West	10.9	**7**			3	2	1		1					1
Avenue M	Sierra Highway	3rd Street East	10.38	**10**			2	6		1	1			2	2	
Avenue J	10th Street West	Kingtree Avenue	9.91	**9**				6	2		1			2		
20Th Street East	Avenue K-4	Avenue K	9.03	**6**			2	2	1			1		3	1	1
Avenue L	27th Street West	28th Street West	8.7	**6**			5						1	2		1
Avenue J	20th Street West	Rt 14 NB On/R	8.26	**23**		1	13	4	1		1	2	2	3		
Avenue I	3rd Street East	5th Street East	8.22	**8**				4	2		2			3	1	1
Avenue J	Division Street	Trevor Avenue	7.94	**12**			7	4			1			2		
10Th Street West	Avenue J	Oldfield Street	6.92	**7**	1	1	1	5				1				
Avenue M	37th Street West	40th Street West	6.25	**7**	3	2				1	6			4		1
Avenue K	20th Street West	21St Street West	5.11	**9**			2	1	3		3			1		2
20Th Street West	Avenue J	Newgrove Street	4.83	**7**			3	1	2		1			3		
Avenue M	6th Street West	10th Street West	4.12	**7**			1	5			1			3	1	
Avenue K	Lowes Driveway	10th Street West	3.84	**12**			4	3	4				1	1		
Avenue L	40th Street West	42nd Street West	3.68	**6**			2	1	1		2			2		2
Avenue J	Genoa Avenue	10th Street West	3.33	**7**			3	1	2	1				2		

LEGEND

CCR Differential: >1.0 | 0.33-1.0 | <0.33

Probability of Crash Type Exceeding Threshold Proportion: 90-100% | 80-90% | 70-80%

Fatalities: >1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

Roadway Segment																
Street	Cross Street 1	Cross Street 2	Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
Avenue J	17th Street East	20th Street East	2.64	**11**			3	1	4		3			3		1
Avenue L	5th Street West	8th Street West	1.9	**6**			1	2	2			1		1		
Challenger Way	Avenue H-12	Avenue H	1.75	**8**	1		1	5		1	1			1		
Avenue K	30th Street West	32nd Street West	1.58	**5**			1	1		1	1		1	2		2
Division Street	Avenue I	Avenue H-8	0.59	**6**			2		2		2			1		1
Avenue L	Avenue L To Sierra Hwy Eb/R	5th Street West	0.42	**9**			2	6	1						1	
Avenue L	60th Street West	65th Street West	0.28	**7**			2	2	2			1				
20Th Street West	Linda Avenue	Avenue I	-0.09	**8**			4	2	1			1		6	1	1
10Th Street West	Kildare Street	Jackman Street	-0.19	**6**			2	1			3			1		
Avenue I	17th Street West	20th Street West	-0.88	**5**			1	1	1		2			2	1	1
Collectors																
15Th Street West	Meadow View Lane	Avenue J-8	11.57	**8**	1	1	4	2		1		1		2		
Avenue J-8	20th Street East	22nd Street East	7.88	**5**			2		2		1					
5Th Street East	Lancaster Blvd	Kettering Street	5.54	**7**			1	3	1	1	1			2		
15Th Street Fr West	Pillsbury Street	Norberry Street	5.13	**4**			1		1		1		1	2		1
Avenue J-8	22nd Street East	25th Street East	3.3	**3**				1			2			2	1	1
Lancaster Blvd	Foxton Avenue	5th Street East	3	**2**			1	1								
15Th Street West	Avenue J	Pillsbury Street	1.88	**4**			1		1		1		1	2		1
25Th Street East	Avenida Del Brisa	Nugent Street	1.84	**2**			1		1						1	
17Th Street West	Avenue J-15	Avenue J-12	1.68	**2**			1				1			1		1
Avenue J-8	10th Street Fr West	12th Street West	1.23	**2**				1	1					2		
15Th Street West	Avenue L	Park Somerset Street	1.17	**3**			2		1					2		
15Th Street East	Kettering Street	Linda Vista Avenue	0.73	**2**							1	1		1		
Avenue J-8	15th Street West	20th Street West	0.66	**4**			2	1			1			2		
25Th Street East	Nugent Street	Newgrove Street	0.66	**2**			1		1						1	
15Th Street East	Avenue J	Nugent Street	0.5	**4**			2	1		1				2		
Avenue J-8	30th Street East	35th Street East	0.44	**3**			2		1							
Lancaster Blvd	5th Street East	Andale Avenue	0.18	**2**				2								
15Th Street West	Avenue J-8	Avenue J-5	0.15	**2**					1	1						

LEGEND

CCR Differential: >1.0 · 0.33-1.0 · <0.33

Probability of Crash Type Exceeding Threshold Proportion: 90-100% · 80-90% · 70-80%

Fatalities: >1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

Roadway Segment			Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
Street	Cross Street 1	Cross Street 2														
Lancaster Blvd	32nd Street West	35th Street West	0.06	**2**				1	1					1		
Avenue J-12	17th Street West	20th Street West	-0.1	**2**			1				1			1		1
Avenue L-8	32nd Street West	35th Street West	-0.28	**3**					1		2			1	1	
15Th Street West	Avenue K-8	Avenue K-2	-0.37	**5**	1			2	1		2			3		1
35Th Street West	Avenue J	Lancaster Blvd	-0.42	**2**			1				1			1		1
Residential																
Kingtree Avenue	Avenue J-4	Avenue J-2	29.61	**4**				1	2		1			1	1	1
Business Center Parkway	Avenue K-15	Federal Drive	18.15	**5**		2					5			2		2
Valley Central Way	Avenue J	Central Court	13.45	**12**			6	2	2		1		1	2	1	
12Th Street West	Avenue L-8	Avenue L-4	13.43	**4**	1			1			3			1		
Lightcap Street	Hanstead Avenue	Denmore Avenue	12.35	**4**							4			1		
Motor Lane	Drivers Way	12th Street West	11.26	**6**				4			2			4		2
13Th Street West	Commerce Center Drive	Avenue K	10.18	**4**			2		1		1			1		
12Th Street West	Commerce Center Drive	Avenue K	9.7	**6**			5			1				1		
Valley Central Way	Lancaster Blvd	Amoy Street	9.04	**3**			2				1					1
Avenue M	40th Street West	Avenue M	8.54	**7**	3	2				1	6			2		1
Valley Central Way	Central Court	Lancaster Blvd	8.35	**15**			13	1	1					2	1	
4Th Street East	Avenue M	Avenue L-12	4.67	**3**			2	1							1	
Avenue L-9	East End	10th Street West	4.26	**3**			1		2							1
Avenue J-4	17th Street East	20th Street East	4.04	**2**					2					1		
Avenue J-6	Mariposa Drive	35th Street West	3.65	**4**			1	2	1					2		
Newgrove Street	Fern Avenue	Genoa Avenue	3.63	**3**					1		2					
Nugent Street	Aspen Street	East End	3.61	**3**				1	2					1		
Avenue I	13th Street West	15th Street West	3.46	**4**				1	1		2				1	
Beech Avenue	Avenue J-7	Avenue J-5	3.06	**3**				3						3		1
Avenue K-4	Gadsden Avenue	10th Street West	2.73	**4**			1	1			2			2		
Avenue K-4	30th Street West	32nd Street West	2.72	**4**			2	1		1				1		
Avenue L Fr	Cinema Avenue	17th Street West	2.2	**2**				1	1							
Jackman Street	Fern Avenue	10th Street West	2.08	**3**							2		1	2		1
Jenner Street	Jackman Street	15th Street West	1.84	**3**			1	1			1				1	

LEGEND

CCR Differential: >1.0 | 0.33-1.0 | <0.33

Probability of Crash Type Exceeding Threshold Proportion: 90-100% | 80-90% | 70-80%

Fatalities: >1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

Roadway Segment			Local CCR Differential	Crashes	Severe Injury	Fatality	Broadside	Rear-End	Sideswipe	Head On	Other	Pedestrian	Bicycle	Dark	Wet	Impaired Driver
Street	**Cross Street 1**	**Cross Street 2**														
22Nd Street West	Avenue K-4	Avenue K	1.72	**3**					2		1				1	
Avenue J-14	10th Street West	12th Street West	1.68	**2**				1	1					1		
Ivesbrook Street	Kingtree Avenue	13th Street West	1.41	**1**								1		1	1	1
Yucca Avenue	Lancaster Blvd	Kettering Street	1.35	**2**			1						1			
4Th Street East	Avenue L-4	Avenue L	1.24	**3**			2				1					
32Nd Street West	Avenue J	Lancaster Blvd	1.1	**4**			1		2				1			
Avenue J-10	10th Street Fr West	12th Street West	0.65	**2**	1				1		1			2		
Avenue J Fr	Palo Verde Street	Sedona Way	0.45	**5**				4			1			1		
Cinema Avenue	Avenue L Fr	Park Somerset Street	0.29	**3**				1	2					2		1
Avenue J-2	Lowtree Avenue	15th Street Fr West	0.26	**1**					1							
Jenner Street	Sancroft Avenue	Andale Avenue	0.24	**6**				1	3	1	1			3	2	1
28Th Street East	28th Street East	Avenue I	0.15	**2**							1	1		1		2
Genoa Avenue	Avenue J	Oldfield Street	0.15	**2**			1				1					
35Th Street East	Avenue J-2	Avenue J	0	**3**			1	2								
Avenue J-8	12th Street West	13th Street West	-0.18	**2**					1		1					
Elm Avenue	Oldfield Street	Newgrove Street	-0.29	**2**					1		1			1		

LEGEND

CCR Differential: >1.0 · 0.33-1.0 · <0.33

Probability of Crash Type Exceeding Threshold Proportion: 90-100% · 80-90% · 70-80%

Fatalities: >1 Fatality

Local CCR Differential is the difference between an intersection's Observed Crash Rate and its Critical Crash Rate. Positive values mean more crashes than expected.

FIGURE A17 TOP TEN CRASH SEGMENTS AND INTERSECTIONS (2013 - 2017)