

## REVISED NOTICE OF SPECIAL MEETING

Pursuant to Section 54956 of the Government Code of the State of California, a Special Concurrent Meeting of the **Tracy City Council** and the **Tracy Transportation Advisory Commission** is hereby called for:

**Date/Time:** **Tuesday, February 7, 2023, 6:00 p.m.**  
(or as soon thereafter as possible)

**Location:** **Tracy City Hall**  
**333 Civic Center Plaza, Tracy, CA.**

Government Code Section 54954.3 states that every public meeting shall provide an opportunity for the public to address the Tracy City Council on any item, before or during consideration of the item, however no action shall be taken on any item not on the agenda.

***This meeting will be open to the public for in-person and remote participation pursuant to Government Code Section 54953(e)***

***The City of Tracy remains under a local emergency for COVID-19 and is now conducting teleconference meetings pursuant to State Law. Teleconferenced locations may include various locations including Tracy City Hall. In accordance with the California Department of Public Health Guidelines, universal masking is recommended for all persons regardless of vaccination status and social distancing protocols will be in place for Tracy City Hall.***

### **For Remote Public Comment:**

*During the Items from the Audience, public comment will be accepted via the options listed below. If you would like to comment remotely, please follow the protocols below:*

- *Comments via:*
  - **Online by visiting** <https://cityoftracyevents.webex.com> and using the following Event Number: 2555 489 1055 and Event Password: TracyCC
  - **If you would like to participate in the public comment anonymously**, you may submit your comment via phone or in WebEx by typing "Anonymous" when prompted to provide a First and Last Name and inserting [Anonymous@example.com](mailto:Anonymous@example.com) when prompted to provide an email address.
  - Join by phone by dialing +1-408-418-9388, enter 25554891055#8722922# Press \*3 to raise the hand icon to speak on an item
- *Protocols for commenting via WebEx:*
  - *If you wish to comment under "Items from the Audience/Public Comment" portion of the agenda:*
    - Listen for the Mayor to open "Items from the Audience/Public Comment", then raise your hand to speak by clicking on the Hand icon on the Participants panel to the right of your screen.
    - If you no longer wish to comment, you may lower your hand by clicking on the Hand icon again.
  - *Comments for the "Items from the Audience/Public Comment" will be accepted until the public comment period is closed.*

1. CALL TO ORDER
2. ROLL CALL
3. Items from the audience - *In accordance with Council Meeting Protocols and Rules of Procedure, adopted by Resolution 2019-240, a five-minute maximum time limit per speaker will apply to all individuals speaking during "Items from the Audience/Public Comment". For non-agendized items, Council Members may briefly respond to statements made or questions posed by individuals during public comment; ask questions for clarification; direct the individual to the appropriate staff member; or request that the matter be placed on a future agenda or that staff provide additional information to Council.*
4. DISCUSSION ITEMS
  - 4.A. The Tracy City Council and the Tracy Transportation Advisory Commission, Concurrently, Conduct a Workshop to Discuss and Provide Feedback on the City's Local Roadway Safety Plan.
5. COUNCIL ITEMS AND COMMENTS
6. ADJOURNMENT



Mayor

**Posting Date: February 3, 2023**

The City of Tracy is in compliance with the Americans with Disabilities Act and will make all reasonable accommodations for the disabled to participate in employment, programs and facilities. Persons requiring assistance or auxiliary aids in order to participate, should contact the City Manager's Office at (209) 831-6000 at least 24 hours prior to the meeting.

February 7, 2023

## Agenda Item 4.A

### RECOMMENDATION

**Staff recommends that the Tracy City Council and the Tracy Transportation Advisory Commission, concurrently, conduct a workshop to discuss and provide feedback on the City's Local Roadway Safety Plan.**

### EXECUTIVE SUMMARY

City of Tracy has created a local roadway safety plan (LRSP), which establishes a framework to identify, analyze, and develop traffic safety enhancements on the City's transportation system. LRSP is a statewide data-driven traffic safety plan that coordinates the efforts of a wide range of organizations to reduce traffic accident fatalities and serious injuries on all public roads. The LRSP was developed with a combination of data analysis, and local stakeholder feedback to create a plan that meets federal and state guidelines and responds to local issues and needs. Through this process, the plan has identified areas to inform and refine the safety improvement process and focus future evaluation and planning for the City's transportation network.

### BACKGROUND AND LEGISLATIVE HISTORY

Caltrans announced that beginning in April 2022, applications for Highway Safety Improvement Project Program (HSIP) Cycle 11 funds will require agencies eligible to apply to have an LRSP (Local Roadway Safety Plan). The City received \$72,000 in State funds for developing the LRSP in March 2020. The City entered into an agreement with Kimley-Horn & Associates, Inc. to develop the LRSP through Resolution No. 2021-097 under the Capital Improvement Project (CIP) 72119. The development of the LRSP will enhance traffic safety City-wide and better position the City to apply for all safety funding from state and federal grant programs.

### ANALYSIS

The City of Tracy's LRSP evaluates the transportation network as well as non-infrastructure programs and policies and identifies the vision to reduce the frequency of traffic fatalities and serious injury-related crashes and outlines the goals to achieve it.

The City's LRSP was developed in accordance with the latest National and State best practices for statistical roadway analysis. As part of the LRSP, local stakeholders were included in the process to ensure the local perspective was kept at the forefront of this planning effort. In addition to the Project Team which included Engineering Staff, a stakeholder group was organized. This group consisted of members from the Tracy Police Department, Tracy Unified School District, City of Tracy ADA Compliance Office, the South San Joaquin County Fire Authority, San Joaquin County Public Health Services, and the City of Tracy Transit Service Division. These representatives in the City and community were called together to offer insight on the safety issues present in the City's transportation network.

Existing plans, policies, and projects that were recently completed, planned, or are on-going within the City of Tracy were compiled at the start of the LRSP process to gain perspective on the existing efforts for transportation-related improvements within the City. High-level key points regarding transportation improvements and safety-related topics were identified to inform

decision making in this LRSP. Several data inputs were used in the analysis, namely the roadway network, intersection classification, traffic counts and collision data. With this data, the collision safety trends were analyzed. The collision trends helped identify the emphasis areas which are the collision factors or conditions that the City of Tracy can strategically focus efforts to have a large impact on transportation safety.

The emphasis areas that were developed include:

1. Impaired driving,
2. Lane departure,
3. Young drivers, and
4. Vulnerable road users (pedestrians and bicyclists).

It was observed that in comparison to the Statewide collision rates and fatalities, Tracy's rates were higher in impaired driving, lane departure, young drivers' emphasis areas, but lower in the pedestrian category.

The LRSP also analyzed collision data on an aggregate basis as well as at specific locations to identify high-crash locations, high-risk locations, and city-wide trends and patterns. The analysis of collision history on the City's transportation network allowed for opportunities to: 1) identify factors in the transportation network that inhibit safety for all roadway users, 2) improve safety at specific high-collision locations, and 3) develop safety measures using the 5E's of transportation safety: Engineering, Enforcement, Education, Emergency Services, and Emerging Technologies, to encourage safe driver behavior, reduce the frequency and severity of crashes, and to institutionalize a process for monitoring safety and making safety investment decisions.

The LRSP report also provides a list of grant opportunities from state, and federal resources which the City can pursue to implement safety improvements throughout the City.

#### FISCAL IMPACT

The Development of the LRSP makes the City better positioned to apply for a variety of state and federal grant opportunities for traffic safety projects.

#### PUBLIC OUTREACH/ INTEREST

This item does not require any public outreach.

#### COORDINATION

The City's Engineering Division coordinated with several stakeholders like Tracy Police Department, Tracy Unified School District, City of Tracy ADA Compliance Office, the San Joaquin County Fire Department, San Joaquin County Public Health Services, and the City of Tracy Transit Service Division to seek input for the development of the LRSP.

#### CEQA DETERMINATION

This action of providing feedback to the LRSP will not pose any environmental impact and is not

subject to CEQA.

**STRATEGIC PLAN**

This agenda item supports the City of Tracy's Quality of Life Strategic Priority, which is to provide an outstanding quality of life by enhancing the City's amenities, business mix and services and cultivating connections to promote positive change and progress in our community.

**ACTION REQUESTED OF THE CITY COUNCIL**

Staff recommends that the Tracy City Council and the Tracy Transportation Advisory Commission, concurrently, conduct a workshop to discuss and provide feedback on the City's Local Roadway Safety Plan.

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Reviewed by: Koosun Kim, PE, Interim City Engineer  
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Approved by: Michael Rogers, City Manager

**ATTACHMENTS**

Attachment A – City of Tracy Local Roadway Safety Plan Final Report  
Attachment B – PowerPoint Presentation

# **City of Tracy**

## **Local Road Safety Plan (LRSP)**



**January 2023**

**FINAL**

Prepared By:

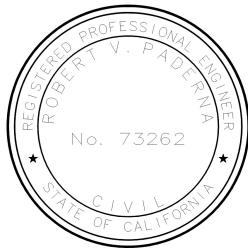
**Kimley»Horn**

**STATUTORY NOTICE**

(Per Section 148 of Title 23, United States Code [23 U.S.C. §148(h) (4)] REPORTS

DISCOVERY AND ADMISSION INTO EVIDENCE OF CERTAIN REPORTS, SURVEYS, AND INFORMATION—Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section, shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.)

SIGNED AND STAMPED BY:



## 1.1 Executive Summary

Tracy has created a local roadway safety plan (LRSP), which establishes a framework to identify, analyze, and develop traffic safety enhancements on the City's transportation system. The LRSP was developed with a combination of data analysis, and local stakeholder feedback to create a plan that meets federal and state guidelines and responds to local issues and needs. Through this process, the plan has identified emphasis areas to inform and refine the safety improvement process and to focus future evaluation and planning for the City's transportation network. The emphasis areas include impaired driving, lane departure collisions, young drivers, and vulnerable road users (pedestrians and bicyclists). The LRSP also analyzes collision data on an aggregate basis as well as at specific locations to identify high-crash locations, high-risk locations, and city-wide trends and patterns. The analysis of collision history on the City's transportation network allows for opportunities to: 1) identify factors in the transportation network that inhibit safety for all roadway users, 2) improve safety at specific high-collision locations, and 3) develop safety measures using the 5E's of transportation safety: Engineering, Enforcement, Education, Emergency Services, and Emerging Technologies, to encourage safer driver behavior, reduce the frequency and severity of crashes, and to institutionalize a process for monitoring safety and making safety investment decisions.

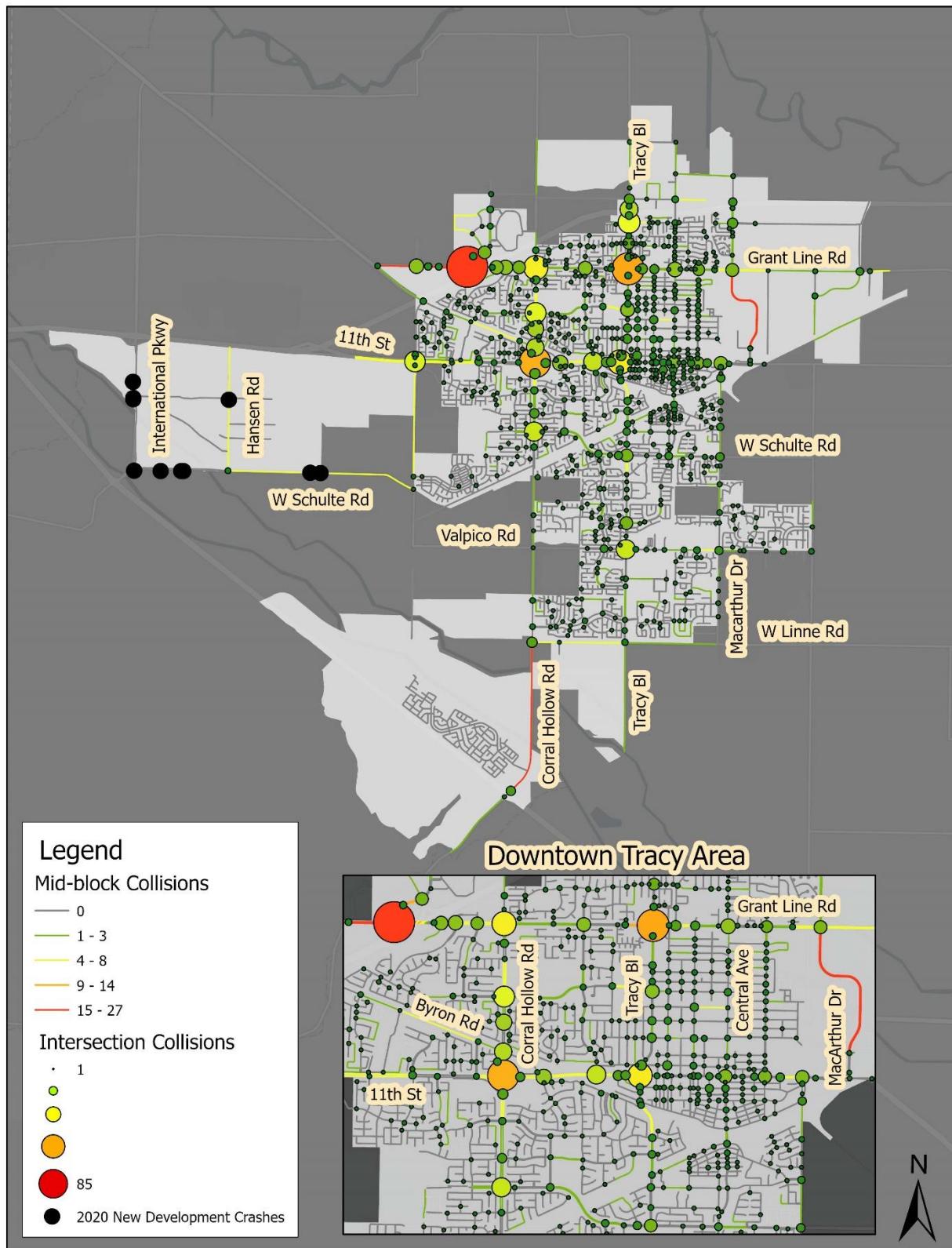
The California Office of Traffic Safety (OTS) has ranked Tracy in the 57<sup>th</sup> percentile for safety as compared to peer cities. The City continues its safety efforts in this LRSP by identifying areas of emphasis and systemic opportunities that can be implemented to enhance safety. This LRSP analyzes the most recent range of crash data (January 1, 2015 – December 31, 2019) and roadway improvements to assess historic trends, patterns, and areas of increasing concern.

As part of the LRSP development process, the City identified a vision and outlined goals to achieve it. The vision is to enhance the transportation network to reduce the frequency of traffic fatalities and serious injury related crashes. The goals were identified as:

- Identify areas with a high risk for collisions.
- Illustrate the value of a comprehensive safety program and the systemic process.
- Define safety improvements for the near-, mid- and long-term, including projects for HSIP and other program funding consideration
- Identify emphasis areas to prioritize countermeasure application.

Tracy's collision history was analyzed to identify locations with elevated risk of collisions either through their collision histories or their similarities to other locations that have more active collision patterns. Using a network screening process, locations within the City that will most likely benefit from safety enhancements were identified. Using historic collision data, collision risk factors for the entire network were derived. The outcomes informed the identification and prioritization of engineering and non-infrastructure safety measures that address certain roadway characteristics and related behaviors that contribute to collisions. The figure below shows the results of collision analysis, including the number of crashes that occurred at each intersection and along each roadway segment in the City.

## Number of Collisions per Intersection and Roadway Segment



Emphasis areas were developed by revisiting the vision and goals developed at the onset of the planning process and comparing them with the trends and patterns identified in the crash analysis. Where these areas aligned, or major challenges were observed, the following emphasis areas were developed:

1. Impaired Driving
2. Lane Departure Collisions
3. Young Drivers
4. Vulnerable Road Users (Pedestrians and Bicyclists)

The LRSP identified countermeasures for both infrastructure and non-infrastructure improvements. The report then applies Crash Modification Factor's (CMFs) where available, which are used to estimate the safety effects of safety improvements to compare and prioritize the improvements. An order of magnitude planning level cost estimate is also provided for each countermeasure, providing a cost/benefit estimate that the City can use to prioritize improvements.

Site-specific opportunities for improvement were identified for the following 8 case study locations. The case study locations were chosen to be representative of a variety of corridor and intersection designs throughout the City.

1. **Unsignalized Intersection:** F Street & 11<sup>th</sup> Street
2. **Unsignalized Intersection:** Parker Avenue & Eaton Avenue
3. **Roadway Segment:** Holly Drive from Larch Road to Sloan Court
4. **Roadway Segment:** Pavilion Parkway from Robertson Drive to Auto Plaza Way
5. **Signalized Intersection:** Naglee Road & Grant Line Road
6. **Roadway Segment:** Grant Line Road from Lammers Road to Byron Road
7. **Roadway Segment:** Byron Road from Berg Road to Belconte Drive
8. **Signalized Intersection:** Lowell Avenue & Corral Hollow Road
9. **Roadway Segment:** Lammers Road from 11<sup>th</sup> Street to Redbridge Road
10. **Roadway Segment:** Tracy Boulevard from Schulte Road to Menay Drive

Citywide opportunities that can be implemented systemically throughout the City have also been assembled into the “countermeasure toolbox” shown below, and include both engineering-based and non-engineering countermeasures. This information can be used to help the City apply for grants and other funding opportunities to implement these safety improvements.

**City-wide Countermeasure Toolbox (Engineering Opportunities)**

COUNTERMEASURE	CMF/LRSM ID	CRF	20-YEAR COST ESTIMATE	PER UNIT
Install High-Visibility Crosswalk	4124	19%	\$25,000	per crosswalk
Install signals	NS03	25%	\$270,000	per intersection

COUNTERMEASURE	CMF/LRSM ID	CRF	20-YEAR COST ESTIMATE	PER UNIT
Install/upgrade larger or additional stop signs/other intersections warning/regulatory signs (stop signs with LED borders)	NS06	15%	\$1,500	per sign
Install raised medians (refuge islands)	NS19PB	45%	\$25,000	per intersection
Add segment lighting	R01	35%	\$50,000	per mile
Remove or relocate fixed objects outside of Clear Recovery Zone	R02	35%	\$10,000	per location
Install Median Barrier	R03	25%	\$20,000	per location
Install Safety Edges	R15	30%	\$100,000	per mile
Install dynamic/variable speed warning systems	R26	30%	\$16,000	per sign
Install delineators, reflectors, and/or object markers	R27	15%	\$5	per LF
Install edge-lines and centerlines	R28	25%	\$8,000	per mile
Install bike lane (class III/sharrows)	R32PB	35%	\$25	per linear foot
Install separated bike lanes (Class IV)	R33PB	45%	\$250,000	per mile
Install Rectangular Rapid Flashing Beacon (RRFB)	R37PB	35%	\$50,000	per intersection
Install retroreflective backplates	S02	15%	\$12,000	per intersection
Improve signal timing (coordination, phasing, red, yellow, operation)	S03	15%	\$8,000	per intersection
Install advanced dilemma zone detection	S04	40%	\$34,000	per intersection
Provide protected left-turn phase	S07	30%	\$40,000	per intersection
Install raised pavement markers and striping (Through Intersection)	S09	10%	\$22,000	per intersection
Pedestrian Scramble	S19PB	40%	\$120,000	per intersection
Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	S21PB	60%	\$8,000	per intersection

## Non-Engineering Safety Strategy Countermeasures:

The identified non-engineering countermeasures below were derived from the collision analysis and build on existing efforts. These relate to the additional Es of Traffic Safety outside of Engineering. This includes Enforcement, Education, Emergency Services and Emerging Technologies.

## City-wide Countermeasure Toolbox (Non-Engineering Opportunities)

PROPOSED COUNTERMEASURE	POTENTIAL PARTNERS	EXAMPLES OF COUNTERMEASURE
<b>ENFORCEMENT</b>		
Establish enforcement and visibility program for aggressive driving	Local law enforcement; CHP	<a href="#">CHP's Regulate Aggressive Driving and Reduce Speed (RADARS) Program</a>
Continued enforcement in school zones	Local law enforcement; CHP; school districts	Obtain grant funding for additional personnel in school zones
Increased enforcement of safe driving & active transportation behaviors near busy crosswalk locations	Local law enforcement; CHP	Obtain grant funding for additional enforcement near high pedestrian activity locations
<b>EDUCATION</b>		
Campaign to target aggressive driving and DUIs	Local law enforcement; CHP; California Office of Traffic Safety (OTS)	<a href="#">CHP's Regulate Aggressive Driving and Reduce Speed (RADARS) Program</a>
Bicycle and pedestrian safety campaign	Local law enforcement	SCAG's 'Go Human' Campaign; 'OTS' 'Ride With Traffic' campaign
Explore safe routes to school education grants to expand program	Local school districts; local law enforcement; SCAG	<a href="#">Safe Routes to School Program</a> , funded by Caltrans
Coordinate safety education campaigns	SJCOG; local law enforcement	<a href="#">Roadway safety fairs at schools</a> <a href="#">Education campaign for aging drivers</a>
<b>EMERGENCY SERVICES</b>		
Continue to work on interdepartmental communication between City staff and City police department and fire department	Local law enforcement & fire department	Incorporate law enforcement/fire department as stakeholders on transportation improvement projects
Incorporate public health agencies and fire departments as stakeholders in safety projects	Local public health agencies and fire departments	Adjust safety project development processes to include public health and fire department feedback
<b>EMERGING TECHNOLOGY</b>		
Continue to use best practices for pedestrian crossings at high pedestrian traffic areas	City Public Works; Caltrans	Continuously update pedestrian crossing design standards in accordance with latest best practices
Utilize new data sources to monitor traffic conditions and inform County safety plans	City Public Works; Caltrans	Utilization of data from a traffic management center

An evaluation and implementation plan were created that identifies actionable items that will help the City achieve the goals and vision set out in this report. This section laid out next steps for the City to continue to capitalize on the analysis and information provided in this report.

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## 2 Introduction

Tracy is a vibrant community in southern San Joaquin County, known for its rich history and proximity to the San Francisco Bay area. Tracy has a population of around 93,000 residents, and a median age of 34 years. With an economy based on retail, light manufacturing, logistics, and healthcare, the City has varied transportation needs.

This Local Roadway Safety Plan (LRSP) identifies emphasis areas to inform and guide further safety evaluation of the City's transportation network. The emphasis areas include impaired driving, lane departure collisions, young drivers, and vulnerable road users (pedestrians and bicyclists). The LRSP also analyzes collision data on an aggregate basis as well as at specific locations to identify high-crash locations, high-risk locations, and city-wide trends and patterns. The analysis of collision history on the City's transportation network allows for opportunities to: 1) identify factors in the transportation network that inhibit safety for all roadway users, 2) improve safety at specific high-collision locations, and 3) develop safety measures using the 5E's of transportation safety: Engineering, Enforcement, Education, Emergency Services, and Emerging Technologies, to encourage safer driver behavior, reduce the frequency and severity of crashes, and to institutionalize a process for monitoring safety and making safety investment decisions.

The process and analysis performed for the City's LRSP including initial vision and goals for the LRSP development, crash history analysis, and emphasis areas is included in this Plan. The information compiled will provide a foundation for decision making and prioritization for safety countermeasures and projects that enhance safety for all modes.

The California Office of Traffic Safety ranked Tracy against 105 peer cities. Compared to these peer cities, Tracy ranks as a relatively safe community and shows the efforts the City has taken to create a safe network have been successful. According to the California OTS' 2019 rankings (most recent available), Tracy was ranked 60/105 for traffic injuries and fatalities. Tracy received its lowest ranking in the category: Had Been Drinking with Driver under 21 (10/105). Other areas of concern are for collisions involving motorcyclists and bicyclists. The City ranks well for pedestrian collisions, being ranked 86/105. The City is continuing these safety efforts through this plan by identifying areas of emphasis and opportunities for system improvement that can be implemented to enhance safety. This LRSP analyzes the most recent 5-year period of available crash data (January 1, 2015 – December 31, 2019) and roadway improvements to assess historic trends, patterns, and areas of elevated collision activity.

The intent of the LRSP is to:

- Create a greater awareness of road safety and risks
- Reduce the number of fatal and severe-injury crashes
- Develop lasting partnerships
- Support for grant/funding applications, and
- Help prioritize investments in traffic safety.

## 3 Vision and Goals

The Tracy LRSP evaluates the transportation network as well as non-infrastructure programs and policies within the City. Mitigation measures are evaluated using criteria to analyze the safety of road users (drivers, bicyclists, and pedestrians), the interaction of modes, influences on the roadway network from adjacent municipalities, and the potential benefits of safety countermeasures. This effort is intended to use historical data to identify trends and develop a toolbox of countermeasures applicable to conditions in the City that can be used for proactive identification and implementation of opportunities, without relying solely on a reaction and response to crashes as they occur.

LRSPs have been effective across the country as part of the effort to reduce fatal and severe-injury crashes because they provide a locally developed and customized roadmap to directly address the most common safety challenges in the given jurisdiction. Consistent with these findings, the following Vision, Goals, and Objectives have been established for this project.

**VISION:** To enhance the transportation network for all users to reduce the frequency of traffic fatalities and serious injuries.

### 3.1 Goal #1: Identify areas with a high risk for collision.

#### **Objectives:**

- a. Evaluate the City's roadway network for crash activity.
- b. Identify intersections and segments in need of mitigation.
- c. Identify areas of interest with respect to safety concerns for pedestrians and bicycles.

### 3.2 Goal #2: Illustrate the value of a comprehensive safety program and the systemic process.

#### **Objectives:**

- a. Demonstrate the systemic process' ability to identify locations with higher risk for collisions based on present characteristics closely associated with severe collisions.
- b. Demonstrate, through the systemic process, the gaps and data collection activities that can be improved upon.

### 3.3 Goal #3: Define safety improvements for the near-, mid- and long-term, including projects for HSIP and other program funding consideration

#### **Objectives:**

- a. Create the outline for a prioritization process that can be used in forth-coming funding cycles.
- b. Use the systemic process to create Project Case Study sheets.
- c. Use Project Case Study sheets to apply for upcoming HSIP funding consideration.
- d. Demonstrate the correlation between the proposed safety countermeasures with the Vision Zero Initiative and the California State Highway Safety Plan.

### 3.4 Goal #4: Identify emphasis areas to prioritize countermeasure application

#### **Objectives:**

- a. Use systemic collision analysis to identify emphasis areas.
- b. Prioritize emphasis areas for countermeasure development.
- c. Align emphasis areas with current City areas of concern: speeding, distracted driving, DUI, bicycle and pedestrian collisions.

## 4 Process

The following section describes the analysis process undertaken to evaluate safety within Tracy at a systemic level. Using a network screening process, locations within the City that will most likely benefit from safety enhancements will be identified. Using historic collision data, collision risk factors for the entire network are derived. The outcomes will inform the identification and prioritization of engineering and non-infrastructure safety measures that address certain roadway characteristics and related behaviors that contribute to motor vehicle collisions with active transportation users.

The following section describes the analysis process undertaken to evaluate safety within Tracy at a systemic level. Using a network screening process, locations within the City that will most likely benefit from safety enhancements will be identified. Using historic collision data, collision risk factors for the entire network are derived. The outcomes will inform the identification and prioritization of engineering and non-infrastructure safety measures that address certain roadway characteristics and related behaviors that contribute to motor vehicle collisions with active transportation users.

### 4.1 Guiding Manuals

The following section describes the analysis process undertaken to evaluate safety within Tracy at a systemic level. Using a network screening process, locations within the City that will most likely benefit from safety enhancements will be identified. Using historic collision data, collision risk factors for the entire network are derived. The outcomes will inform the identification and prioritization of engineering and non-infrastructure safety measures that address certain roadway characteristics and related behaviors that contribute to motor vehicle collisions with active transportation users.

This process uses the latest National and State best practices for statistical roadway analysis described as follows.

#### 4.1.1 Local Roads Safety Manual

The *Local Roadway Safety Manual: A Manual for California's Local Road Owners* (Version 1.5, April 2020) purpose is to encourage local agencies to pursue a proactive approach to identifying and analyzing safety issues, while preparing to compete for project funding opportunities. A proactive approach is defined as analyzing the safety of the entire roadway network through either a one-time, network wide analysis, or by routine analyses of the roadway network.<sup>1</sup>

According to the *Local Roadway Safety Manual* (LRSM), “The California Department of Transportation (Caltrans) – Division of Local Assistance is responsible for administering California's federal safety funding intended for local safety improvements.”

To provide the most benefit and to be competitive for funding, the analysis leading to countermeasure selection should focus on both intersections and roadway segments and be considerate of roadway characteristics and traffic volumes. The result should be a list of locations that are most likely to benefit from cost-effective countermeasures, preferably prioritized by benefit/cost ratio. The manual suggests using a mixture of quantitative and

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<sup>1</sup> Local Roadway Safety Manual (Version 1.5) 2020. Page 5.

qualitative measures to identify and rank locations that consider both crash frequency and crash rates. These findings should then be screened for patterns such as crash types and severity to aid in the determination of issues causing higher numbers of crashes and the potential countermeasures that could be most effective. Qualitative analysis should include field visits and a review of existing roadway characteristics and devices. The specific roadway context can then be used to assess what conditions may increase safety risk at the site and systematic level.

Countermeasure selection should be supported using Crash Modification Factors (CMFs). These factors are the peer reviewed product of before and after research that quantifies the expected rate of collision reduction that can be expected from a given countermeasure. If more than one countermeasure is under consideration, the LRSM provides guidance on how to apply CMFs appropriately.

#### 4.1.2 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.”<sup>2</sup> This four-part manual is divided into Parts: A) Introduction, Human Factors, and Fundamentals, B) Roadway Safety Management Process, C) Predictive Method, 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 collisions.

The HSM identifies five steps in this process:<sup>3</sup>

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 (i.e., 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.

<sup>2</sup> AASHTO. *Highway Safety Manual*, 2010, Washington D.C., <http://www.highwaysafetymanual.org/Pages/About.aspx>

<sup>3</sup> AASHTO. *Highway Safety Manual*. 2010. Washington, DC. Page 4-2.

The HSM provides several statistical methods for screening roadway networks to identify high risk locations based on overall collision histories. In addition to identifying the total number of collisions, this study uses a method referred to as Critical Crash Rate to analyze the data.

## 4.2 Analysis Techniques

### 4.2.1 Collision and Network Screening Analysis

Intersections and roadways were analyzed using four collision metrics:

- Number of Collisions
- Critical Crash Rate (HSM Ch. 4)
- Probability of Specific Crash Types Exceeding Threshold Proportion (HSM Ch. 4)
- Equivalent Property Damage Only (HSM Ch. 4)

The initial steps of the collision analysis established sub-populations of roadway segments and intersections that have similar characteristics. For this study, intersections were grouped by their control type (Signalized and Unsignalized) and segments by their roadway category (Arterial, Collector, Minor Collector, Local). Individual collision rates were calculated for each sub-population. The population level crash rates were then used to assess whether a specific location has more or fewer crashes than expected. These sub-populations were also used to determine typical crash patterns to help identify locations where unusual numbers of specific crash types are seen.

The network screening process ranks intersections and roadway segments by the number of crashes that occurred at each one over the analysis period, and then identifies areas that had more of a given type of crash than would be expected for that type of location. These crash type factors were 1) collision injury (fatal, serious injury, other visible injury, complaint of pain, property damage only), 2) collision type (broadside, rear-end, sideswipe, head-on, hit object, overturned, bicycle, pedestrian, other), 3) environmental factors (lighting, wet roads), and 4) driver behavior (impaired, aggressive, and distracted driving). With these additional factors, the locations were further analyzed and assigned a new rank.

From the results of the network screening analyses, a short-list of locations was chosen based on crash activity, crash severity, crash patterns, location type, and area of the City of Tracy to provide the greatest variety of locations covering the widest range of safety opportunities for toolbox development. The intent is to populate the safety toolbox with mitigation measures that will be applicable to most of the crash activity in the county. Ten locations will ultimately be selected for mitigation analysis.

### 4.2.2 Critical Crash Rate (CCR) Analysis

Reviewing the number of collisions 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 method, which provides a statistical review of locations to determine where risk is higher than that experienced by 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 Critical Crash Rate 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 1: 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 vehicle miles traveled (VMT) for roadway segments,
- Intersection control types to separate them into like populations,
- Roadway functional classification to separate them into like populations,
- Collision records in GIS or tabular form including coordinates or linear measures.

### **Strengths**

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

### **4.2.3 Probability Analysis**

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

### **Data Needs**

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

## Strengths

- Can be used as a diagnostic tool
- Considers variance in data
- Not affected by selection bias

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

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.

Figure 2: Probability of Specific Crash Types Exceeding Threshold Proportion

$$P(p_i > \bar{p}_i^* / N_{\text{observed},i}, N_{\text{observed},i(\text{TOTAL})}) = 1 - \text{betadist}(\bar{p}_i^*, \alpha + N_{\text{observed},i}, \beta + N_{\text{observed},i(\text{TOTAL})} - N_{\text{observed},i})$$

Where:

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

$p_i$  = Observed proportion

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

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

Source: Highway Safety Manual

### 4.2.4 Equivalent Property Damage Only (EPDO)

The equivalent property damage only (EPDO) method is described in the Highway Safety Manual. This method assigns weighting factors to crashes based on injury level (severe, injury, property damage only) to develop a property damage only score. In this analysis, the injury crash costs were calculated for each location (based on the latest Caltrans injury costs). This figure is then divided by the injury cost for a property damage only crash. The resulting number is the equivalent number of property damage only crashes at each site. This figure allows all locations to be compared based on injury crash costs. (Highway Safety Manual, Chapter 4).

## 5 Safety Partners

As part of the LRSP, local stakeholders were included in the process to ensure the local perspective was kept at the forefront of this planning effort. In addition to the Project Team which included City Staff, a stakeholder group was organized. This group consisted of members from the Tracy Police Department, Tracy Unified School District, City of Tracy ADA Compliance

Office, the San Joaquin County Fire Department, San Joaquin County Public Health Services, and the City of Tracy Transit Service Division.

These leaders in the City and community were called together to offer insight on the safety issues present in the city's transportation network. After the initial network screening and safety analysis, the stakeholder group met to discuss potential countermeasures and challenge areas. The summary of the stakeholder meeting(s) are outlined below.

## 5.1 Stakeholder Meeting #1

The first stakeholder meeting was conducted virtually using the Microsoft Teams platform on November 15th, 2021. At the meeting, stakeholders were introduced to the project and provided an overview of the data used, the required outputs, and the potential outcomes of the study.

In addition to the overview, Stakeholders were asked to provide local insight and knowledge at 10 'case study' locations that were identified after the initial network screening and crash analysis process.

Stakeholder feedback regarding the plan and opportunities were reviewed and incorporated into the study process for the development of the LRSP.

## 5.2 Field Tour and Stakeholder Meeting #2

On December 7<sup>th</sup>, 2021, the Project Team performed a field tour of the 10 'case study' locations to observe traffic, look for roadway features that can be related to collision activity and to get input from stakeholders on things they have seen, heard of, or experienced at these locations.

Following the field tour, a virtual meeting was held on December 14<sup>th</sup> to review the findings and brainstorm potential projects that could improve safety at the case study locations. This information was processed and incorporated into the LRSP.

## 6 Existing Efforts

Existing plans, policies, and projects that were recently completed, planned, or are on-going within the City of Tracy were compiled at the start of the LRSP process in order to gain perspective on the existing efforts for transportation-related improvements within the City. High-level key points regarding transportation improvements and safety-related topics were identified to inform decision making in this LRSP. Information reviewed included the following:

**Table 1: Existing Documents Reviewed**

Name	Year	Agency	Description	Transportation Policies/Improvements	Funding Sources
General Plan (Circulation Element)	2011	City of Tracy	Long-Term Planning	<ul style="list-style-type: none"> <li>Future circulation element plan</li> <li>Congestion Management Plan (CMP)</li> <li>Transportation Master Plan (TMP)</li> <li>New interchanges with I-205</li> <li>Raise LOS at select intersections and roadways</li> <li>Continued build-out of bike/ped infrastructure and mode separation.</li> </ul>	<ul style="list-style-type: none"> <li>Measure K (San Joaquin County ½ Penny Sales Tax)</li> <li>San Joaquin County</li> <li>State of California</li> <li>San Joaquin Council of Governments</li> </ul>
City of Tracy Bikeways Master Plan	2005	City of Tracy	Non-Motorized Transportation Plan	<ul style="list-style-type: none"> <li>Gap closure of existing system</li> <li>Development of a class I bike path</li> <li>New development to include bike facilities</li> <li>Pursue development of multi-use trails plan</li> <li>Develop a city-wide class I trail loop</li> <li>Promote bike safety and education</li> </ul>	<ul style="list-style-type: none"> <li>Developer Impact Fees</li> <li>Caltrans</li> <li>U.S. DOT</li> <li>California Transportation Commission</li> <li>San Joaquin Council of Governments</li> </ul>

Name	Year	Agency	Description	Transportation Policies/Improvements	Funding Sources
Tracy Roadway & Transportation Master Plan	2012 (updated 2016)	City of Tracy	Transportation Improvement Plan	<ul style="list-style-type: none"> <li>• Provide implementation plan for the circulation element</li> <li>• Develop Travel Demand Management (TDM) principles</li> <li>• Implement complete streets policy</li> <li>• Enhance street connectivity</li> <li>• Implement grade separated crossings at select railroad crossings.</li> <li>• Implement safe routes to school program</li> <li>• Create a bicycle and pedestrian safety action plan</li> </ul>	<ul style="list-style-type: none"> <li>• Capital improvement plan</li> <li>• Tax increment financing</li> </ul>

## 7 Data Summary

As a data driven process, utilizing the most recent and accurate data is crucial. The following section describes the data inputs used for the analysis process of this LRSP.

### 7.1 Roadway Network

The collision analysis is built upon the existing roadway network. The base network was derived from the Caltrans California Road System (CRS) and updated to include more newly developed neighborhoods within the city. **Figure 3** illustrates Tracy's roadway network categorized using Caltrans' Classification System. This classification assigned to each corridor roadway segment as either Other Principal Arterial, Minor Arterial, Major Collector, Minor Collector, or Local road is used in the analysis process. Ultimately, corridors will be compared to roadway segments with similar designations.

### 7.2 Intersections

The collision analysis requires each intersection be classified by type: Signalized or Unsignalized. The safety analysis compares intersection safety performance to locations with similar control types. This information is also displayed in **Figure 3**.

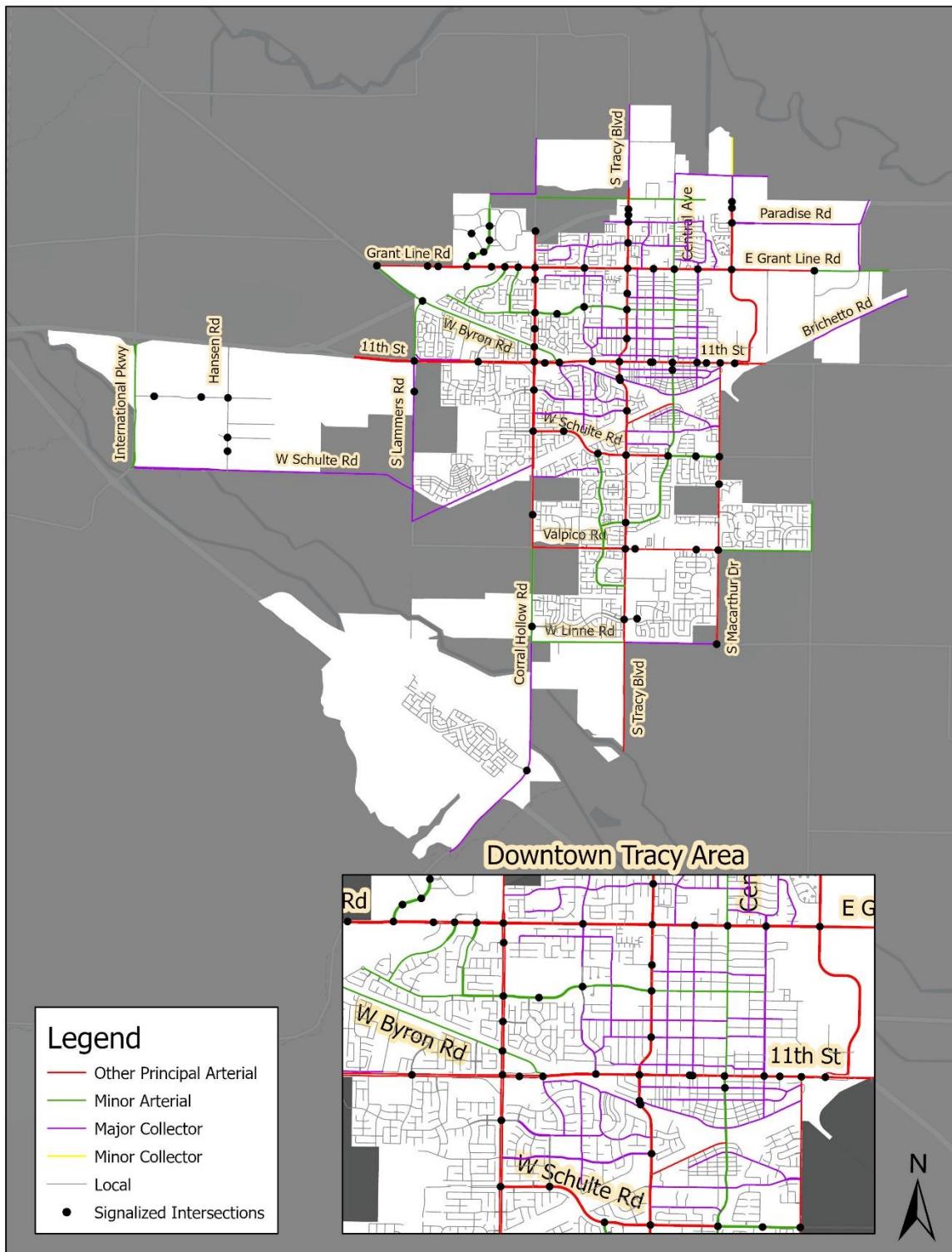
### 7.3 Count Data

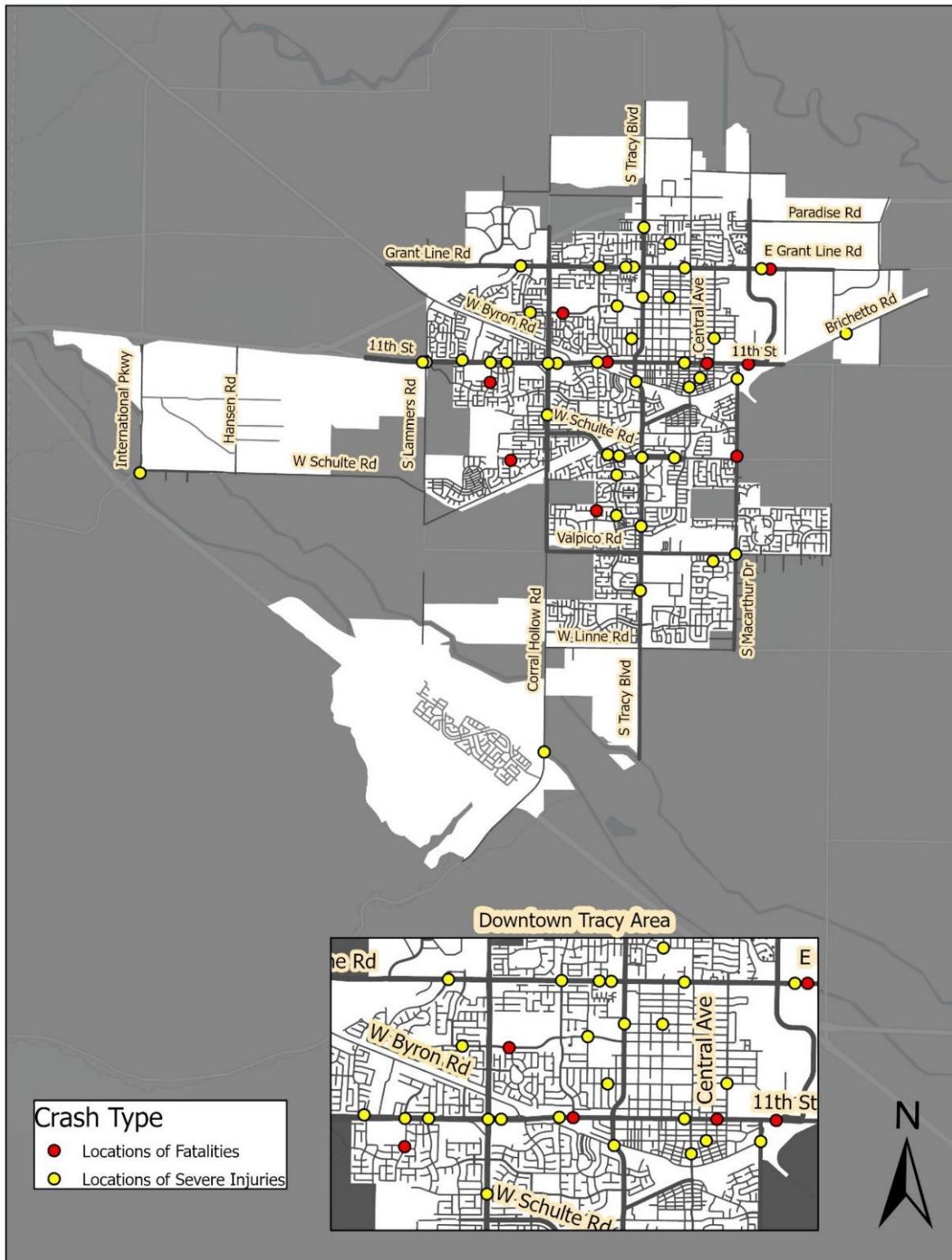
Vehicular count data is used as part of the analysis process to evaluate the impact of traffic and understand the natural hierarchy of the roadway network. The volumes were collected from the 2015 Tracy Travel Demand Model. For locations without volume or count data, other resources were utilized to identify a reasonable assumption for individual corridors and classification types.

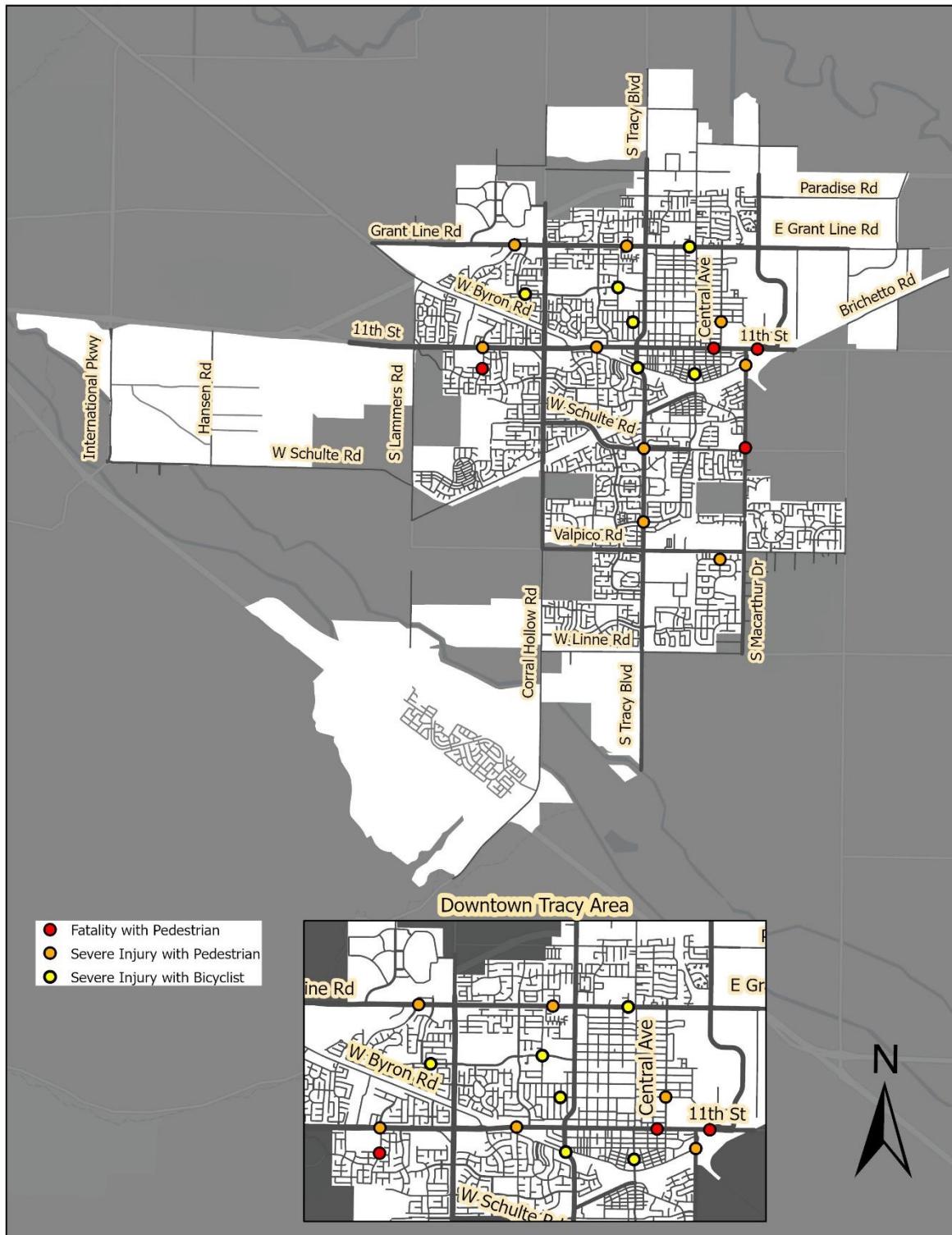
### 7.4 Collision Data

Collision data was collected from Crossroads Software for the period from January 1, 2015 through December 31, 2019 to have a complete set of collision data for analysis. This project uses five-years of data instead of the standard three to provide more history to evaluate trends or patterns. Analysis of the raw collision data is the first step in understanding the specific and systemic challenges faced throughout the City. Analyzing the five years of data provided insight on the following collision trends and patterns. The locations of fatal and severe injury collisions are displayed in **Figure 4**. The locations of fatal and severe injury collisions involving bicycles and pedestrians are shown in **Figure 5**. The density of collisions at intersections and along roadway segments is show in **Figure 6**.

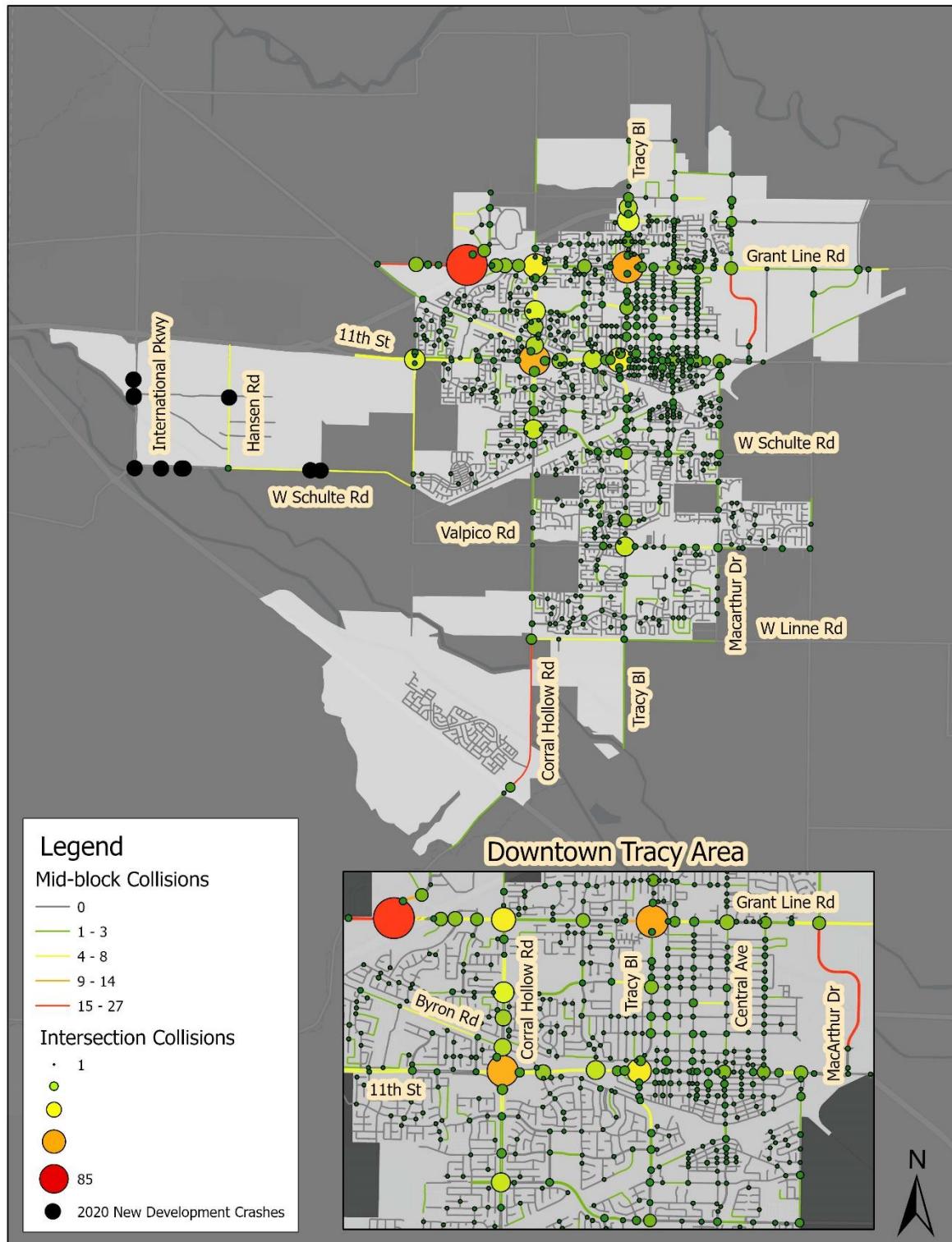
**Figure 3: Functional Classification (CRS) and Intersection Type as of 2020**



**Figure 4: All Collisions resulting in Severe Injury or Fatality (2015-2019)**

**Figure 5: Fatalities Locations for Pedestrians and Bicycle Collisions (2015-2019)**

**Figure 6: Density of all Collisions at Intersections and Segments (2015-2019)**



## 8 Collision Safety Trends

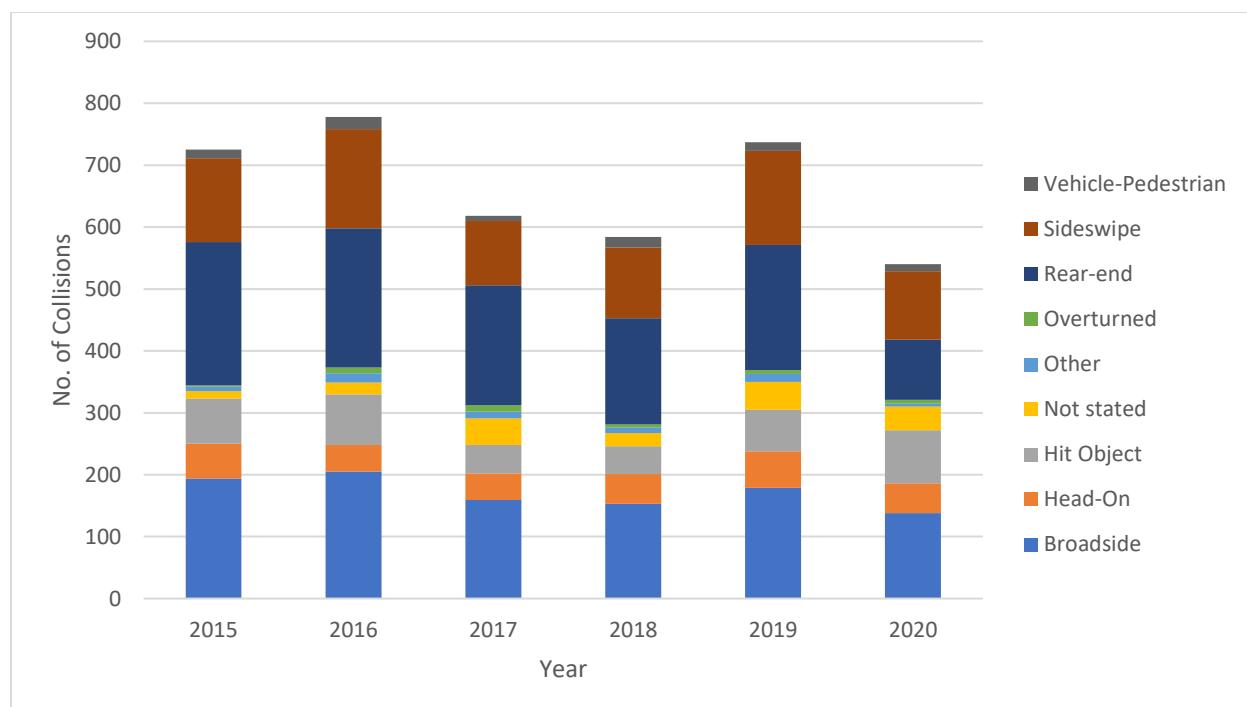
The following section breaks down the collision data by a variety of input factors and user types. This information will be used to highlight areas of concern for the City.

### 8.1 All Collisions

This report utilized collision data for a five-year period to provide a better understanding of trends and to reflect the patterns in crashes that have occurred on City streets. New data is added to the system in an ongoing basis which means that each time the City updates the analysis, a full 5-year draw from the database, rather than just adding records from the last query should be standard practice. Data used for this report were extracted from Crossroads Software analytics on July 22nd, 2021 and was current as of that date. Collision data from January 1, 2015 through December 31, 2019 as reported to Crossroads from the local enforcement indicated that during this time there were 3,442 collisions recorded within Tracy.

During this time, the most common occurring collision types were Rear-End (30%) and Broadside (26%) The total number of collisions per year was similar in 2015, 2016, and 2019, with 725, 778, and 737 crashes respectively. Crashes dropped significantly in 2017, 2018 and 2020, with 618, 584, and 540 crashes respectively.

**Figure 7: Collision Type by Year**



## 8.2 Fatalities & Severe injuries

During the study period, 9 fatal and 42 severe injury collisions occurred, as seen in **Figure 4**. These collisions were mainly concentrated along the City's arterial roadways, such as 11<sup>th</sup> Street, Tracy Boulevard, and Grant Line Road. As shown in **Table 2** below, a majority fatal & severe injury collision solely involved vehicles, but a significant number involved pedestrians and bicyclists.

**Table 2: Fatal & Severe Injury Collisions by Mode (2015-2019)**

Involved With	# of Fatal Collisions	# of Severe Injury Collisions
Vehicle	5	27
Bicycle	-	6
Pedestrian	4	9

The cause of the fatal & severe injury collisions is shown in

Table 3 below. The most common cause for fatal collisions is driving under the influence (33%), while the

common cause for severe collision is right of way violation (19%) and improper turning (19%).

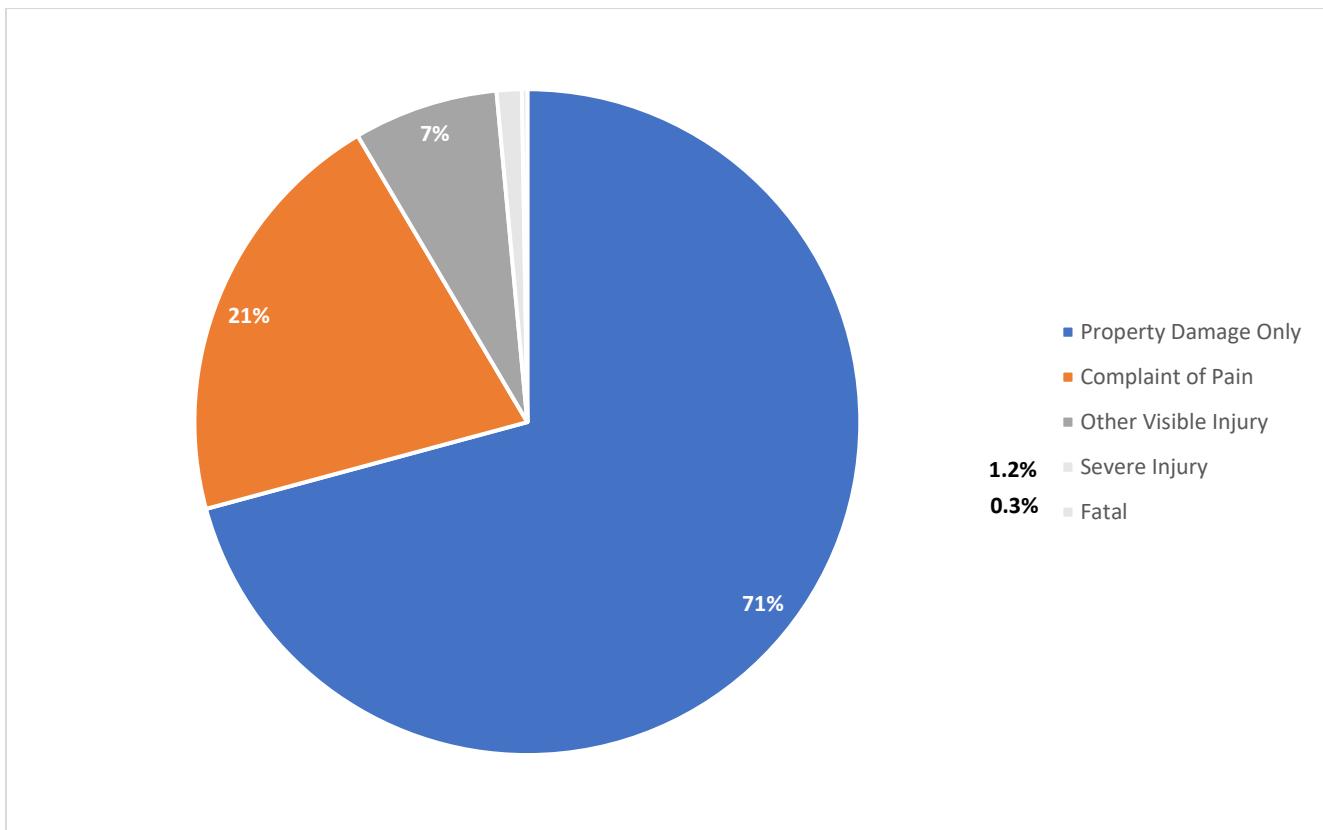
Collision Cause	# of Fatal Collisions	# of Severe Injury Collisions
Auto R/W Violation	1	8
Improper Turning	1	8
Driving Under Influence	3	7
Pedestrian Violation	-	5
Unsafe Speed	1	4
Wrong Side of Road	1	4
Traffic Signals and Signs	-	2
Ped R/W Violation	1	1
Collision Cause	# of Fatal Collisions	# of Severe Injury Collisions
Auto R/W Violation	1	8
Unstated	-	1
Improper Turning	1	8
Driving Under Influence	3	7
Pedestrian Violation	-	5
Unsafe Speed	1	4
Wrong Side of Road	1	4
Traffic Signals and Signs	-	2
Ped R/W Violation	1	1
Unknown	1	1
Improper Passing	-	1

**Table 3:**  
**& Severe**

Unstated	-	1	Fatal
<b>Injury Collisions by Cause (2015-2019)</b>			

### 8.3 Injury Levels

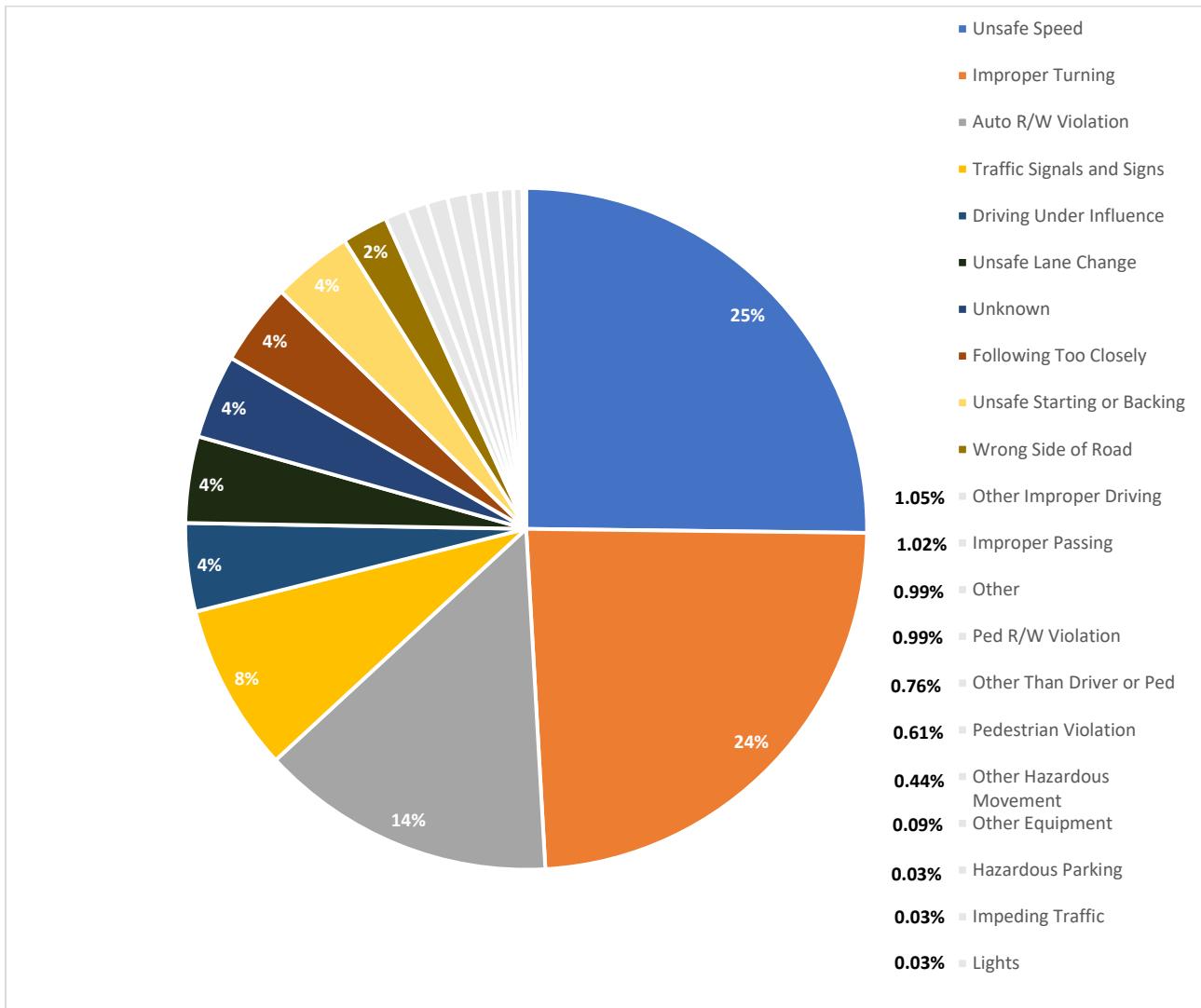
**Figure 8** shows the distribution of collisions by injury level. Roughly more than half (70%) of the collisions reported during the time-period resulted in property damage only. Fatalities and severe injuries totaled less than 2% of all collisions.

**Figure 8: Collisions by Injury Levels (2015- 2019)**

## 8.4 Cause of Collision

The highest cause of collision in Tracy is unsafe speed at 25%, followed by improper turning at 24% and by automobile right-of-way violation at 14%. 8% of the collisions were caused by drivers ignoring traffic signals or signs. **Figure 9** shows the distribution of collisions by cause.

**Figure 9: Collisions by Cause (2015-2019)**



## 8.5 Vulnerable Users

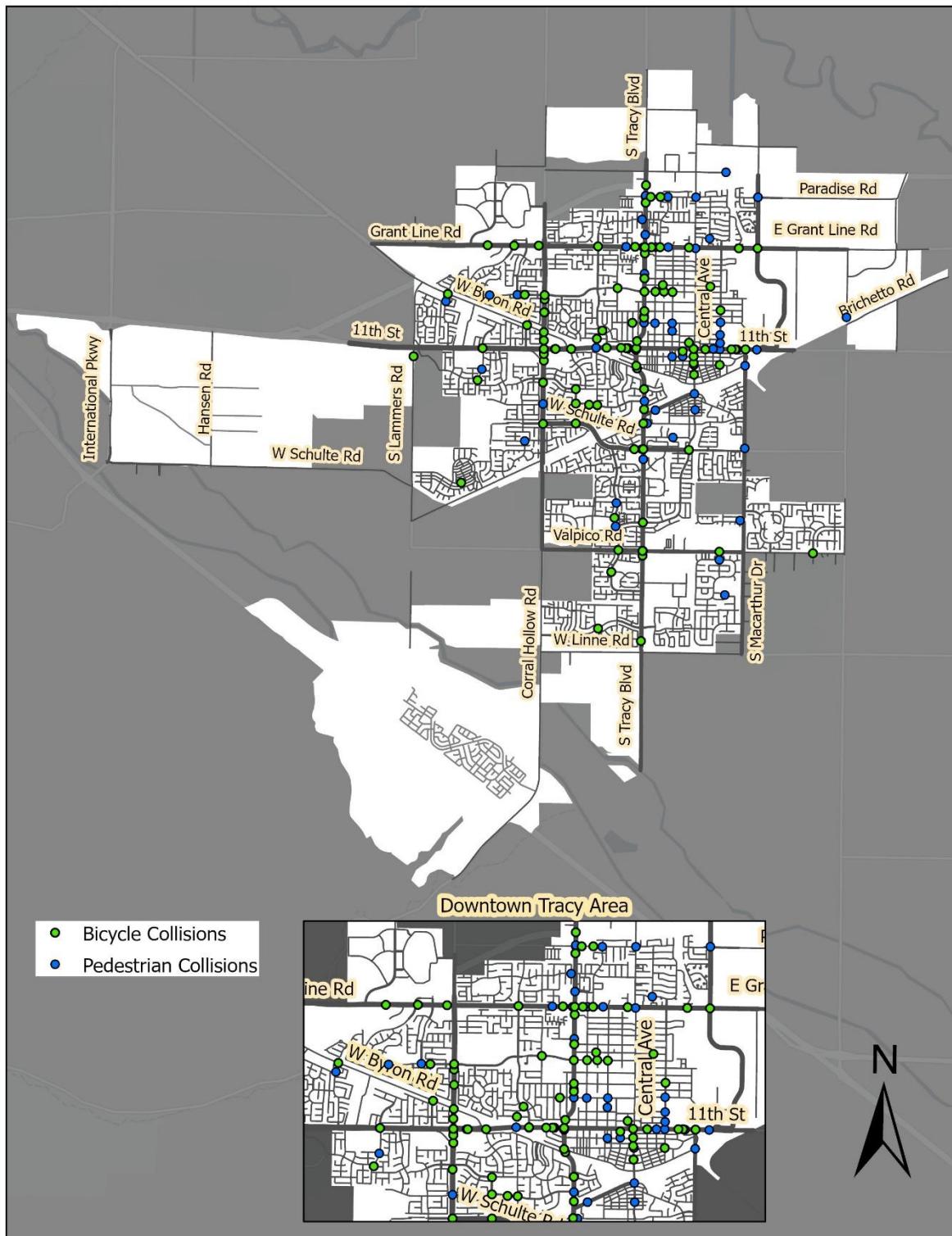
### 8.5.1 Pedestrians

81 pedestrian-involved collisions occurred during the study period, resulting in 4 fatal collisions, 9 severe injury collisions, and 63 with some form of reported injury or pain. Thirty-five percent (35%) of the collisions occurred at night, and about 2% of these were in areas without

streetlights or when they were not functioning (did not turn on or light had burned out). Just about 25% of pedestrian collisions occurred while the pedestrian was crossing in the crosswalk.

### **8.5.2 Bicycle**

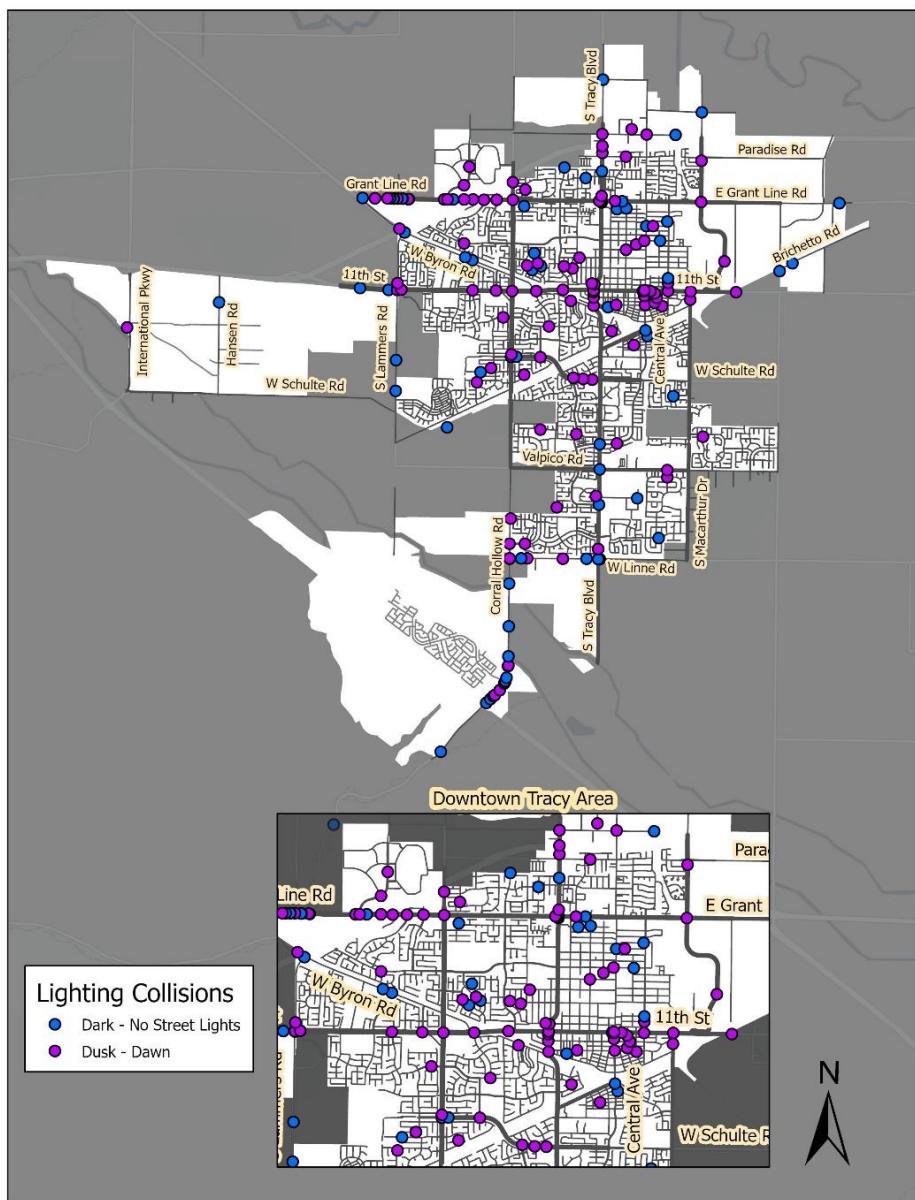
During the study period, 102 collisions involving bicycles were reported. Of these, six (6) resulted in severe injuries, twenty-seven (27) resulted in property damage only, and sixty-nine (69) with some form of reported injury or pain. About 23% of collisions occurred at night. However, 75% of the collisions occurred during the day. Just under half (41%) of the bicycle collisions were caused by a vehicle or bicycle being on the wrong side of the road. **Figure 10** shows the location of pedestrian and bicycle collisions in the City.

**Figure 10: Pedestrian and Bicycle Collisions (2015-2019)**

## 8.6 Other Significant Trends

- Six percent of collisions (229) occurred at night without streetlights or during dusk/dawn. Many of these collisions still occurred at or near intersections. **Figure 11** shows the location of these collisions.
- 30 percent of collisions (1025) involved rear-end and 26 percent of collisions (890) involved broadside. Although significant in number, there are no discernable city-wide patterns to these collisions.
- Six percent of drivers at fault were aged 65 and older. Looking at the expanded range of aged 55 and older, this group accounts for just over 14% of collisions.
- 27 percent of the drivers at fault were between 16 and 25 years old.

**Figure 11: Dark Lighting Collisions (2015-2019)**



## 8.7 Behavioral

### 8.7.1 Driving Under the Influence

292 collisions, just over 8% of all collisions, were reported as the driver being under the influence of drugs or alcohol. 70% of the DUI collisions resulted in property damage only. 33% of the traffic fatalities involved a DUI.

### 8.7.2 Aggressive Driving

Twenty-nine percent of the collisions were primarily caused by aggressive driving (drivers traveling at unsafe speed or following too closely). These types of collisions are located primarily on major arterials.

### 8.7.3 Driver Inattention

Less than one percent of collisions had driver inattention as a possible contributing factor. This category is assumed to be underreported as it is difficult to determine that driver inattention led to a crash. Caltrans is prioritizing improved reporting of these types of crashes.

## 8.8 Statewide Comparison

Due to the availability of data, a comparison of fatal and severe injury data to the State averages could only be conducted for data from 2009-2018. These numbers may vary slightly from those mentioned previously, due to the differences in the years of the study period. The following table compares factors involved in serious injury and fatal crashes between the City of Tracy and totals for the state.

**Table 4: Comparison of Statewide and Tracy Fatal & Severe Injury Collisions (2009-2018)**

Challenge Area	Statewide %	Tracy %	# of Collisions	% Difference
Lane Departure	42.1%	<b>55.1%</b>	435	12.9%
Impaired Driving	23.8%	<b>31.4%</b>	248	7.6%
Commercial Vehicles	6.5%	<b>11.5%</b>	91	5.0%
Improper Use of Occupant Protection	13.8%	<b>18.0%</b>	142	4.2%
Young Drivers	12.3%	<b>13.7%</b>	108	1.3%
Work Zones	1.4%	<b>2.5%</b>	20	1.1%
Aging Drivers (65+)	13.1%	<b>13.3%</b>	105	0.2%
Distracted Driving	4.7%	2.7%	21	-2.1%
Aggressive Driving	33.3%	30.9%	244	-2.4%

Challenge Area	Statewide %	Tracy %	# of Collisions	% Difference
Bicyclists	7.5%	3.3%	26	-4.2%
Motorcyclists	21.8%	15.6%	123	-6.2%
Intersections	23.9%	8.0%	63	-15.9%
Pedestrians	19.3%	0.6%	5	-18.7%

## 8.9 Network Screening Analysis Results

Table 5 and Table 6 show the number of crashes occurring at locations in Tracy by crash type for the locations that will be studied further in the Report, and highlights locations in which the probability of those crash types exceeding the threshold proportion is greater than 33%.

The tables are ordered by the number of collisions that occurred at that segment or intersection. In order to be statistically significant, only locations where more than two collisions occurred are represented. At locations with two or less collisions, random chance can account for crash history as much or more than specific roadway characteristics. The tables include the top 10 locations by number of crashes for each intersection and roadway type.

The tables are separated into sub-sections visible by the blue gradient. The first two columns, Crashes and Local CCR Differential, represent the level of crash activity in absolute terms, and as relative to other similar locations, respectively.

Per guidance from the Local Roadway Safety Manual (LRSM) each sub-population of locations was ranked according to the number of collisions. The second column shows the CCR, which highlights whether or not the collision activity was higher or lower than the average for the sub-population based on the individual segment or intersection volume. This volume was either collected through data count resources or calculated based on the roadway classification. All averages used in the CCR calculation were established based on City of Tracy's crash data to determine what locations might be best to prioritize at the local level. This process highlights locations of collisions that are unusual for the City to determine Tracy's challenge areas, and not problems faced by peer cities that do not apply in Tracy. The remaining columns total collisions by type, to evaluate each sub-population and understand what proportion of crashes in the City are of a particular type. The city-wide proportion was compared with the local intersection or segment specific proportion to determine which locations have more of a given crash type than would be expected when considering the City average. A confidence level of 95% was used for the CCR Calculations. For this study, two categories of ranges were highlighted:

- **Light Gray:** >50% probability that this crash type is over-represented on this segment/intersection as compared to other characteristically similar locations within the City of Tracy. Although these locations have a slightly higher probability of this crash type than their counterparts, they are not necessarily highly significant.
- **Dark Gray:** >75% probability that this crash type is over-represented on this segment/intersection as compared to other characteristically similar locations within the

City of Tracy. These locations are highly significant in regard to the number of collisions occurring here and should be further investigated.

After this analysis was completed, the locations were ranked against other similar locations within the City by their categories according to the expected proportion of that crash type within Tracy. Locations with higher than expected crashes of that type were identified by the probability that random chance would not account for exceedances.

Additionally, it should be noted that the columns for Collision Severity, Type, Involved With, and Behavior are additional characteristics of the collisions and should not be counted as a separate collision.

The following provides an example of how to read **Table 5** and **Table 6**.

*Table Definitions:*

- Total Collisions: Number of collisions observed at the intersection or segment from January of 2015 through December of 2019.
- Local Critical Crash Rate (CCR) Differential: The CCR specific to the intersection or segment.
- Fatal, Severe, Other Visible Injury, Complaint of Pain, Property Damage Only (PDO): The number of collisions with that injury level that occurred at this location in the study period.
- Broadside, Sideswipe, Rear-End, Head-On, Hit Object, Overturned, Other, Pedestrian, Bicycle: The number of these types of collisions that occurred at this location in the study period.
- Other: The number of miscellaneous collision types (mostly single vehicle) that occurred at this location in the study period.
- Aggressive, Distracted, Impaired, Dark, Wet: The number of the collisions with this factor identified as the cause of collision.

Table 5: Analysis Rankings – Intersections (Top Locations Per Intersection Type)

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
<b>Signalized Intersections</b>																						
Naglee Rd & W Grant Line Rd	85	0.65	235	0	0	6	18	61	12	25	36	2	2	1	0	0	0	39	0	2	0	9
W Grant Line Rd & Tracy Blvd	65	0.22	136	0	0	1	12	52	13	7	36	2	4	0	0	1	1	38	0	0	0	5
N Corral Hollow Rd & 11th St	63	0.15	336	0	1	5	12	45	16	9	27	0	2	1	1	4	1	33	1	3	0	6
11th St & Tracy Blvd	48	0.77	144	0	0	2	15	31	10	11	19	1	2	1	1	1	3	20	0	2	0	1
Nivens St & W Grant Line Rd	47	-0.16	147	0	0	3	14	30	13	7	21	4	2	0	0	0	0	27	0	2	1	3
Tracy Blvd & Clover Rd	42	-0.11	97	0	0	2	7	33	8	5	21	2	1	1	0	2	0	21	0	0	0	3
W Lowell Ave & Corral Hollow Rd	40	0.32	155	0	0	4	15	21	10	9	17	1	1	0	0	1	3	21	0	1	0	5
S Lammers Rd & 11th St	39	-0.15	619	0	3	5	8	23	13	6	11	4	3	0	0	0	0	22	0	1	1	1
W Valpico Rd & Tracy Blvd	36	0.41	121	0	0	4	9	23	8	7	11	5	1	0	1	0	3	18	0	1	1	4
Corral Hollow Rd & W Schulte Rd	36	-0.01	66	0	0	1	4	31	5	5	14	2	7	0	1	0	1	18	0	3	1	4
Lincoln Blvd & Lincoln Blvd	35	0.11	264	1	0	2	9	23	5	5	15	0	7	0	1	2	2	13	0	5	0	2
Tracy Blvd & I-205 Ramp	33	0.27	78	0	0	1	7	25	14	8	5	1	3	0	0	2	2	11	0	1	0	2
Corral Hollow Rd & Byron Rd	32	-0.12	107	0	0	3	9	20	10	1	16	1	2	0	1	0	2	20	0	0	0	4
Corral Hollow Rd & Fieldview Dr	29	-0.06	129	0	0	4	12	13	7	3	16	0	2	0	0	0	2	21	0	0	0	4
Alden Glen Dr & Byron Rd	27	-0.13	72	0	0	2	5	20	3	3	12	3	4	0	0	1	2	14	0	0	0	2
Holly Dr & W Grant Line Rd	26	0.09	72	0	0	0	9	17	8	4	10	1	2	0	0	1	0	16	0	0	0	2
W Grant Line Rd & Henley Pkwy	25	-0.30	224	0	1	0	7	17	5	2	14	1	0	0	1	1	1	16	0	0	0	2

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
W Lowell Ave & Tracy Blvd	24	0.02	59	0	0	1	5	18	9	7	5	1	1	0	0	0	1	10	0	0	0	3
Lincoln Blvd & W Grant Line Rd	24	-0.11	248	0	1	2	8	13	9	3	6	4	0	0	0	2	2	12	0	0	0	4
Holly Dr & 11th St	23	0.05	53	0	0	1	4	18	6	6	5	2	0	0	0	1	1	13	0	0	0	2
N Mac Arthur Dr & 11th St	23	0.08	53	0	0	0	6	17	2	1	13	2	3	0	1	0	1	12	0	4	0	3
11th St & East St	22	-0.02	52	0	0	0	6	16	10	4	7	1	0	0	0	1	0	14	0	1	0	4
E Grant Line Rd & N Macarthur Dr	22	-0.12	42	0	0	1	2	19	6	8	3	1	2	0	0	2	1	8	0	0	0	2
Tracy Blvd & Central Ave	21	0.17	240	0	1	2	7	11	5	5	6	0	3	0	0	1	1	15	0	1	1	2
Tracy Blvd & W Schulte Rd	21	-0.05	244	0	1	3	6	11	5	5	4	1	2	0	0	3	2	7	0	0	0	2
W Grant Line Rd & Orchard Pkwy	21	-0.30	61	0	0	1	6	14	8	3	8	2	0	0	0	0	0	17	0	0	0	1
Naglee Rd & I-205 Ramp	21	0.14	46	0	0	0	5	16	5	1	9	4	0	1	0	0	0	12	0	1	0	1
East St & E Grant Line Rd	19	-0.21	44	0	0	1	3	15	5	4	5	1	1	1	0	0	0	9	0	0	0	2
Tracy Blvd & W Kavanagh Ave	19	-0.30	64	0	0	2	5	12	8	2	5	2	1	1	0	0	0	15	0	0	0	1
E Pescadero Ave & N Macarthur Dr	16	-0.28	46	0	0	0	6	10	5	2	7	1	1	0	0	1	0	11	0	0	0	1
Tracy Blvd & Eaton Ave	13	-0.24	33	0	0	0	4	9	4	3	2	2	0	0	0	2	0	4	0	0	0	2
Parker Ave & W Grant Line Rd	13	-0.05	28	0	0	1	1	11	6	1	4	0	2	0	0	0	0	5	0	1	0	1
11th St & Shopping Plaza east of Corral Hollow Rd	13	-0.19	202	0	1	1	3	8	5	0	2	2	0	0	1	1	1	9	0	0	0	0
S Macarthur Dr & W Schulte Rd	12	-0.02	196	1	0	1	2	8	4	4	3	0	0	0	0	1	0	7	0	1	0	0
N Fabian St & E Hamilton Ln	12	-0.04	27	0	0	1	1	10	5	2	1	1	2	0	0	0	2	1	0	0	0	2
S Macarthur Dr & Valpico Rd	11	-0.16	195	0	1	1	2	7	3	2	3	1	1	0	0	0	0	8	0	1	0	0

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Crash Type										Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
				Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned						
Alegre Dr & Corral Hollow Rd	11	-0.29	16	0	0	0	1	10	3	4	3	0	0	0	0	0	5	0	0	0
N MacArthur Dr & I-205 Ramp	11	-0.24	26	0	0	0	3	8	2	2	6	0	1	0	0	0	6	0	0	0
Central Ave & W Schulte Rd	10	-0.18	49	0	0	4	0	6	5	3	0	1	0	0	1	0	4	0	2	0
Schulte Rd & Lauriana Ln	10	-0.18	40	0	0	2	2	6	3	0	0	2	3	0	0	1	1	2	0	2
Tennis Ln & Tracy Blvd	10	-0.26	25	0	0	0	3	7	1	1	4	1	0	0	0	1	0	6	0	1
11th St & Crossroads Dr	10	-0.37	209	0	1	1	5	3	4	0	4	0	0	0	0	1	1	5	0	0
Tracy Blvd & I-205 Ramp	10	-0.32	20	0	0	0	2	8	0	4	2	0	3	0	0	0	0	2	0	1
W Schulte Rd & Sycamore Pkwy	9	-0.12	39	0	0	2	2	5	1	2	0	4	0	0	1	0	0	5	0	1
Corral Hollow Rd & Cypress Dr	9	-0.35	44	0	0	1	5	3	3	0	6	0	0	0	0	0	1	7	0	0
Central Ave & 10th St	9	-0.14	24	0	0	1	1	7	2	1	4	1	0	0	0	0	1	2	0	0
W Grant Line Rd & Shopping Plaza east of Byron Rd	9	-0.22	29	0	0	0	4	5	1	2	6	0	0	0	0	0	0	5	0	1
Bessie Ave & Vallerand Rd	9	-0.25	28	0	0	2	0	7	2	3	3	0	0	0	0	1	0	5	0	0
Naglee Rd & Tracy Pavillion Plaza	9	-0.28	19	0	0	0	2	7	1	3	4	1	0	0	0	0	0	5	0	0
Glenbriar Dr & Valpico Rd	8	-0.25	23	0	0	1	1	6	2	2	3	0	1	0	0	0	1	5	0	0
Tracy Blvd & 6th St	8	-0.31	13	0	0	0	1	7	2	0	2	2	1	0	1	0	1	4	0	0
Parker Ave & 11th St	8	-0.27	33	0	0	1	3	4	4	1	1	0	0	0	1	0	0	5	0	0
Grant Line Rd & Shopping Plaza west of the I-205	8	-0.31	28	0	0	1	2	5	1	2	4	0	0	0	0	0	0	5	0	1
Tracy Blvd & Beechnut Ave	7	-0.32	181	0	1	0	2	4	0	0	4	0	2	0	0	0	1	3	0	1
S Lammers Rd & W Byron Rd	7	-0.25	31	0	0	2	1	4	0	1	5	1	0	0	0	0	0	5	0	0
W Lowell Ave & Lincoln Blvd	6	-0.12	6	0	0	0	0	6	1	2	2	0	0	0	0	0	0	4	0	0

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
205 Ramp & W Grant Line Rd	6	-0.41	16	0	0	0	2	4	0	2	2	0	1	0	0	0	0	4	0	0	0	2
Robertson & Naglee Rd	6	-0.38	6	0	0	0	0	6	3	1	1	1	0	0	0	0	0	4	0	0	0	0
Valpico Rd & Shopping Plaza east of Tracy Blvd	6	-0.34	21	0	0	0	3	3	1	0	3	0	1	0	0	0	0	6	0	0	0	1
Corral Hollow Rd & Calaveras Ct	5	-0.41	25	0	0	1	2	2	0	0	3	0	2	0	0	0	0	3	0	0	0	0
Byron Rd & Grant Line Rd	5	-0.21	10	0	0	0	1	4	1	0	3	1	0	0	0	0	0	4	0	0	1	0
Maplecrest Ct & Tracy Blvd	4	-0.44	9	0	0	0	1	3	0	0	1	0	3	0	0	0	0	1	0	1	0	0
S Macarthur Dr & Yosemite Dr	4	-0.43	9	0	0	0	1	3	0	0	4	0	0	0	0	0	0	2	0	0	0	0
Chrisman Rd & E Grant Line Rd	4	-0.40	9	0	0	0	1	3	1	1	0	0	2	0	0	0	0	1	0	0	0	1
Corral Hollow Rd & Starflower Dr	3	-0.47	8	0	0	0	1	2	0	0	1	1	0	0	0	0	0	1	0	0	0	2
West St & 11th St	3	-0.46	3	0	0	0	0	3	1	1	0	0	1	0	0	0	0	0	0	0	0	0
N Macarthur Dr & 205 Ramp	3	-0.47	3	0	0	0	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0
<b>Unsignalized Intersections</b>																						
S Lammers Rd & W Grant Line Rd	25	1.0	95	0	0	3	8	14	4	3	16	0	1	0	0	0	0	16	0	1	2	0
Toste Rd & W Grant Line Rd	23	0.2	48	0	0	1	3	19	6	6	8	3	0	0	0	0	0	7	0	0	0	1
Corral Hollow Rd & W Linne Rd	16	0.2	36	0	0	0	4	12	8	0	5	0	1	2	0	0	0	11	0	1	1	1
Corral Hollow Rd & Krohn Rd	16	0.3	51	0	0	1	5	10	7	1	6	1	1	0	0	0	1	6	0	0	0	1
Buthmann Rd & W Grant Line Rd	16	0.4	51	0	0	1	5	10	9	1	3	1	1	0	0	0	1	2	0	0	0	1
Bessle Ave & 12th St	13	0.4	43	0	0	1	4	8	9	1	0	1	1	0	0	0	0	3	0	0	0	0

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Crash Type										Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
				Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned						
W Schulte Rd & Morris Phelps Dr	11	0.3	41	0	0	2	2	7	7	0	4	0	0	0	0	1	6	0	0	0
Macarthur Dr & 6th St	11	0.3	195	0	1	1	2	7	3	0	3	2	0	1	1	0	4	0	1	0
B St & 10th St	11	0.7	41	0	0	2	2	7	2	3	3	1	0	0	0	1	0	0	0	1
Madison Ave & Beverly Pl	11	0.0	51	0	0	1	6	4	6	2	0	1	0	0	0	1	1	0	0	0
Parker Ave & Carlton Way	11	0.6	26	0	0	0	3	8	6	1	3	0	0	0	1	0	0	1	0	1
Valpico Rd & Sycamore Pkwy	10	0.07	30	0	0	0	4	6	8	0	1	0	0	0	1	0	1	8	0	1
Corral Hollow Rd & Seville Dr	10	1.93	35	0	0	1	3	6	6	1	1	0	0	0	0	0	1	1	0	0
Paradise Rd & E Grant Line Rd	10	0.19	25	0	0	0	3	7	1	2	3	3	1	0	0	0	0	3	0	0
Macarthur Dr & E Mount Diablo Ave	9	0.10	54	0	0	2	5	2	3	0	5	0	0	1	0	0	0	6	0	0
W Mount Diablo Ave & Tracy Blvd	9	0.03	29	0	0	1	2	6	3	3	0	0	1	0	0	1	1	1	0	2
Centre Court Dr & Tracy Blvd	9	0.15	14	0	0	0	1	8	1	3	2	1	2	0	0	0	1	2	0	1
11th St & 10th St	9	-0.02	9	0	0	0	0	9	2	1	1	4	1	0	0	0	0	1	0	1
B St & 11th St	9	0.25	24	0	0	1	1	7	4	1	2	1	0	0	0	0	1	2	0	0
F St & 11th St	9	0.28	178	1	0	0	1	7	3	1	3	0	1	0	0	1	0	6	1	0
Parker Ave & Eaton Ave	9	0.23	34	0	0	1	3	5	6	1	1	0	0	0	0	2	0	4	0	0
Bessie Ave & Beverly Pl	9	0.27	19	0	0	0	2	7	3	2	2	1	0	0	0	0	0	1	0	0
Holly Dr & W Lowell Ave	9	0.10	14	0	0	0	1	8	1	1	6	1	0	0	0	0	0	4	0	0
Tracy Blvd & Cordoza Rd	9	-0.03	33	0	0	2	1	6	2	3	1	0	2	0	0	1	0	2	0	0
Central Ave & 4th St	8	0.18	23	0	0	1	1	6	2	2	3	0	0	0	0	1	0	5	0	0
Parker Ave & 12th St	8	0.13	33	0	0	1	3	4	6	1	0	0	1	0	0	0	0	3	0	0
W Grant Line Rd & 23rd St	8	0.06	28	0	0	1	2	5	0	1	5	1	0	0	0	0	1	4	0	1



Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Crash Type												Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
				Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other							
Bessie Ave & 11th St	6	-0.02	6	0	0	0	0	6	1	1	2	1	0	0	1	0	0	2	0	0	0	
Roosevelt Ave & 11th St	6	0.01	11	0	0	0	1	5	3	1	1	0	0	0	1	0	0	0	0	0	0	
Walnut St & Eaton Ave	6	0.24	6	0	0	0	0	6	4	0	1	0	0	0	0	0	0	1	0	0	0	
Colony Dr & Essex Ct	6	-0.07	11	0	0	0	1	5	0	2	1	1	1	0	0	0	0	1	1	0	0	
Tracy Blvd & Apartments Tracy Garden	6	-0.08	6	0	0	0	0	6	1	1	3	0	0	0	1	0	0	3	0	0	1	
Tracy Blvd & Holiday Inn	6	-0.04	16	0	0	0	2	4	4	0	0	0	0	0	0	0	0	1	0	0	0	
Corral Hollow Rd & Peony Dr	5	-0.07	10	0	0	0	1	4	2	1	0	0	1	0	0	0	0	1	0	0	0	
Windsong Dr & Tracy Blvd	5	-0.06	15	0	0	1	0	4	2	1	1	0	1	0	0	0	0	1	1	0	1	
Westwood Dr & Whispering Wind Dr	5	0.48	15	0	0	0	2	3	3	1	1	0	0	0	0	0	0	1	1	0	1	
Gandy Dancer Dr & Tracy Blvd	5	-0.03	24	0	0	2	0	3	4	1	0	0	0	0	0	0	0	1	0	0	0	
Pebblebrook Dr & Valpico Rd	5	-0.02	10	0	0	0	1	4	2	0	1	1	1	0	0	0	0	2	0	0	0	
Chrisman Rd & Valpico Rd	5	0.13	10	0	0	0	1	4	3	1	0	0	0	0	1	0	0	1	0	0	0	
Central Ave & Sycamore Pkwy	5	0.41	20	0	0	1	1	3	2	0	0	0	1	0	0	1	0	0	0	0	0	
S Macarthur Dr & Eastlake Dr	5	-0.04	20	0	0	1	1	3	0	1	3	1	0	0	0	0	0	3	0	0	0	
Macarthur Dr & Wagtail Dr	5	-0.05	15	0	0	0	2	3	1	0	2	2	0	0	0	0	0	2	0	0	1	
N Mac Arthur Dr & E Hamilton Ln	5	-0.08	15	0	0	0	2	3	1	0	3	1	0	0	0	0	0	2	0	0	0	
Sequoia Blvd & Beechnut Ave	5	0.07	40	0	0	2	3	0	0	1	0	2	1	0	0	0	0	1	0	0	1	
Tracy Blvd & 9th St	5	-0.05	10	0	0	0	1	4	1	1	1	1	1	0	0	0	0	1	0	1	0	
N Mac Arthur Dr & 11th St	5	0.15	174	1	0	0	1	3	0	2	2	0	0	0	0	1	0	2	0	0	1	

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal	Serious Injury		Other Visible Injury		Complaint of Pain		PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive			Distracted			Impaired			Dark	Wet
					Crash Type	Crash Type	Crash Type	Crash Type	Crash Type	Crash Type											Crash Type										
Adam St & 11th St	5	0.02	174	0	1	0	1	3	2	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
Holly Dr & W Highland Ave	5	0.13	10	0	0	0	1	4	0	3	1	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0		
Bessie Ave & W Grant Line Rd	5	-0.08	15	0	0	0	2	3	1	2	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1		
Bessie Ave & Eaton Ave	5	0.01	10	0	0	0	1	4	0	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0		
Holly Dr & Eaton Ave	5	0.01	20	0	0	1	1	3	1	1	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0		
Belconte Dr & Byron Rd	5	-0.08	20	0	0	1	1	3	4	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0		
Bessie Ave & Carlton Way	5	0.16	10	0	0	0	1	4	4	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0		
Deborah St & E Lowell Ave	5	0.03	5	0	0	0	0	5	1	0	3	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	2	0		
Bessie Ave & W Lowell Ave	5	-0.03	20	0	0	1	1	3	2	0	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	1			
Lankershire Dr & Byron Rd	5	0.07	15	0	0	0	2	3	2	0	0	3	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1			
Laurelbrook Dr & Lowell Ave	5	0.01	10	0	0	0	1	4	0	1	0	0	3	0	0	0	0	0	1	0	2	0	0	0	0	0	1				
Cindy Way & Lowell Ave	5	-0.02	5	0	0	0	0	5	2	0	1	0	1	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0			
East St & Emerson Ave	5	0.18	5	0	0	0	0	5	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
Parker Ave & W Whittier Ave	5	0.01	169	0	1	0	0	4	4	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0			
Holly Dr & 20th St	5	0.21	25	0	0	1	2	2	1	2	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2	0	0	1			
East St & 20th St	5	0.06	15	0	0	1	0	4	0	2	3	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0				
Thames Dr & Dove Dr	4	0.27	14	0	0	1	0	3	1	0	1	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0			
Monument Dr & Sycamore Pkwy	4	0.03	9	0	0	0	1	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
Arches Ct & Parkside Dr	4	0.05	9	0	0	0	1	3	0	0	1	1	1	1	0	0	0	0	0	0	2	0	1	0	0	0	0	0			
W Schulte Rd & Weeping Willow Ct	4	0.02	4	0	0	0	0	4	0	1	1	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0			
Joronollo Dr & Schulte Rd	4	0.21	4	0	0	0	0	4	1	0	2	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0			

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Crash Type																
				Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted	Impaired
Amaretto Dr & Cedar Mountain Dr	4	0.17	14	0	0	0	2	2	0	0	4	0	0	0	0	0	4	0	0	0
Gianelli St & Schulte Rd	4	-0.10	178	0	1	0	2	1	0	0	2	0	2	0	0	0	0	0	1	0
Thomas Dehaven Ln & Tennis Ln	4	-0.01	28	0	0	2	1	1	0	1	0	0	0	1	0	0	1	1	0	0
Central Ave & 1st St	4	-0.07	9	0	0	0	1	3	1	2	0	0	0	0	0	1	0	1	0	0
A St & 9th St	4	0.03	9	0	0	0	1	3	3	1	0	0	0	0	0	0	0	0	0	0
Windeler Ave & 10th St	4	0.03	9	0	0	0	1	3	3	1	0	0	0	0	0	0	0	1	0	0
Taft Ave & 10th St	4	0.03	9	0	0	0	1	3	2	1	0	0	0	0	0	0	0	0	0	0
Roosevelt Ave & 10th St	4	-0.06	23	0	0	2	0	2	3	1	0	0	0	0	0	0	0	1	0	0
F St & 10th St	4	-0.02	9	0	0	0	1	3	4	0	0	0	0	0	0	0	0	0	0	0
E St & 11th St	4	-0.03	9	0	0	0	1	3	1	0	1	0	0	0	0	0	1	1	0	0
Alden Glen Dr & Byron Rd	4	-0.08	14	0	0	0	2	2	1	0	3	0	0	0	0	0	0	2	0	0
Mariani Ct & Stoneridge Dr	4	-0.09	4	0	0	0	0	4	1	0	0	1	1	0	0	0	0	0	0	0
Crossroads Dr & Tolbert Dr	4	0.29	9	0	0	0	1	3	3	1	0	0	0	0	0	0	0	1	0	0
Ferngrove Ln & Maplegrove Ln	4	0.47	9	0	0	0	1	3	1	0	2	0	0	0	1	0	0	2	0	1
Lincoln Blvd & Beverly Pl	4	-0.06	19	0	0	1	1	2	0	0	3	1	0	0	0	0	0	3	0	0
East St & Acacia St	4	0.04	9	0	0	0	1	3	2	0	2	0	0	0	0	0	0	2	0	0
Promenade Cir & W Lowell Ave	4	0.06	173	1	0	0	1	2	0	0	1	0	3	0	0	0	0	2	0	1
Parker Ave & W Lowell Ave	4	-0.07	19	0	0	1	1	2	2	2	0	0	0	0	0	0	1	0	0	0
Chabot Ct & E Grant Line Rd	4	-0.05	9	0	0	0	1	3	0	1	2	0	0	0	0	0	0	2	0	0
Lincoln Blvd & Michelle Ave	4	-0.03	14	0	0	0	2	2	0	2	1	1	0	0	0	0	0	0	0	0
Ackles Ct & Corral Hollow Rd	4	-0.11	4	0	0	0	0	4	0	1	2	0	1	0	0	0	0	2	0	0

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Crash Type															
				Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted
Wall St & Emerson Ave	4	0.29	14	0	0	0	2	2	2	1	1	0	0	0	0	1	1	0	0
Bessie Ave & W Whittier Ave	4	-0.09	4	0	0	0	0	4	1	1	1	0	0	0	0	0	0	1	0
Tracy Blvd & W Whittier Ave	4	-0.11	173	0	1	0	1	2	2	0	0	0	2	0	0	1	2	0	0
East St & 22nd St	4	-0.06	4	0	0	0	0	4	2	2	0	0	0	0	0	0	0	1	0
Entrada Way & E Portola Way	4	-0.08	14	0	0	1	0	3	0	1	0	0	1	0	2	0	0	0	0
Buthmann Ave & Cordoza Rd	4	0.20	9	0	0	0	1	3	2	1	0	1	0	0	0	0	0	1	0
Naglee Rd & Corral Hollow Rd	4	-0.07	19	0	0	1	1	2	1	1	0	0	2	0	0	0	1	0	0
Lincoln Blvd & Kavanagh Ave	4	0.00	9	0	0	0	1	3	1	1	1	0	1	0	0	0	2	0	0
Camellia Dr & Kavanagh Ave	4	0.00	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0
Buthmann Ave & W Kavanagh Ave	4	-0.03	9	0	0	0	1	3	2	0	1	0	0	0	0	0	0	0	0
S Tracy Blvd & W Sugar Rd	4	0.07	9	0	0	0	1	3	1	1	0	1	0	0	1	0	0	0	2
Schulte Ct & W Schulte Rd	3	-0.14	8	0	0	0	1	2	0	1	1	0	1	0	0	0	1	0	0
S Macarthur Dr & Fairoaks Rd	3	-0.09	3	0	0	0	0	3	1	0	0	0	2	0	0	0	0	0	1
English Oak Ave & Whispering Wind Dr	3	0.11	8	0	0	0	1	2	0	2	1	0	0	0	0	0	1	0	0
Sycamore Pkwy & Tracy Blvd	3	-0.12	172	0	1	0	1	1	1	0	0	1	0	0	0	0	1	0	1
Mission Ct & Valpico Rd	3	-0.10	18	0	0	1	1	1	0	0	2	1	0	0	0	0	2	0	0
Valpico Rd & Unnamed Rd east of Mission Ct	3	-0.09	18	0	0	1	1	1	1	0	2	0	0	0	0	0	2	0	0
11th St & Glenbriar Cir	3	0.11	167	0	1	0	0	2	0	1	0	0	0	0	0	1	0	1	0
Lakeview Dr & Valpico Rd	3	-0.07	13	0	0	1	0	2	1	0	0	0	2	0	0	0	1	0	0

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
Tracy Blvd & Loma Verde Way	3	-0.07	3	0	0	0	0	3	1	0	1	0	1	0	0	0	0	1	0	0	0	1
Monument Dr & Tracy Blvd	3	-0.08	3	0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	1
S Lammers Rd & Redbridge Rd	3	-0.12	3	0	0	0	0	3	1	0	0	2	0	0	0	0	0	1	0	0	0	0
S Lammers Rd & Jackson Ave	3	-0.13	13	0	0	0	2	1	1	0	1	0	1	0	0	0	1	1	0	0	0	0
West St & W Mount Diablo Ave	3	-0.04	3	0	0	0	0	3	0	1	1	0	0	0	1	0	0	0	0	0	0	0
Quail Meadows Ln & Schulte Rd	3	-0.12	3	0	0	0	0	3	1	1	1	0	0	0	0	0	2	0	0	1	0	0
B St & 1st St	3	0.11	3	0	0	0	0	3	0	2	0	0	0	0	0	0	2	0	0	0	0	1
Renown Dr & Tennis Ln	3	-0.08	3	0	0	0	0	3	0	0	1	1	0	0	0	0	0	0	0	1	0	0
Cypress Dr & Larrlana Ln	3	-0.04	13	0	0	1	0	2	1	0	0	1	1	0	0	0	1	1	0	0	0	0
C St & 4th St	3	-0.08	3	0	0	0	0	3	2	0	0	0	0	0	1	0	0	1	0	0	0	0
Barcelona Dr & Cypress Dr	3	0.11	8	0	0	0	1	2	2	1	0	0	0	0	0	0	0	1	0	0	0	0
Crossroads Dr & Jakson Ave	3	0.23	13	0	0	1	0	2	1	0	1	0	1	0	0	0	1	1	0	0	0	0
Central Ave & 7th St	3	-0.06	172	0	1	0	1	1	2	0	0	1	0	0	0	0	1	1	0	1	0	1
Alden Glen Dr & Locust Dr	3	-0.04	8	0	0	0	1	2	0	0	2	1	0	0	0	0	0	1	0	0	0	1
E St & 9th St	3	-0.06	172	0	1	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Central Ave & 9th St	3	-0.09	8	0	0	0	1	2	0	1	0	0	0	0	0	1	1	0	0	0	0	1
C St & 9th St	3	-0.02	8	0	0	0	1	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0
Taft Ave & 9th St	3	-0.01	13	0	0	0	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	1
Peacock Ct & Sequoia Blvd	3	-0.01	8	0	0	0	1	2	1	0	1	0	1	0	0	0	0	1	0	0	0	0
11th St & Unnamed Rd south of N MacArthur Dr	3	-0.13	8	0	0	0	1	2	0	1	0	1	1	0	0	0	0	0	0	2	0	0
Central Ave & Gillette Aly	3	-0.04	8	0	0	0	1	2	2	0	1	0	0	0	0	0	1	0	0	0	0	0

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal		Serious Injury		Other Visible Injury		Complaint of Pain		PDO		Broadside		Sideswipe		Rear End		Head On		Hit Object		Overturned		Other		Pedestrian		Bicycle		Aggressive		Distracted		Impaired		Dark		Wet	
				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
A St & Gillette Aly	3	0.11	3	0	0	0	0	0	0	3	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0								
Wood Thrush Ln & Sequoia Blvd	3	-0.04	13	0	0	0	0	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0							
Jefferson Pkwy & 11th St	3	-0.14	8	0	0	0	1	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Macarthur Dr & N Macarthur Dr	3	-0.04	3	0	0	0	0	0	3	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	1	0	1	0	0							
East St & 12th St	3	-0.09	8	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0							
Belconte Dr & Redington Dr	3	-0.09	3	0	0	0	0	0	3	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Parker Ave & W Highland Ave	3	-0.06	13	0	0	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Valerie Ln & Lincoln Blvd	3	-0.08	8	0	0	0	1	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0						
East St & Eaton Ave	3	-0.09	167	0	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Schleiger Dr & Berkeley St	3	0.23	13	0	0	1	0	2	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0						
Crossroads Dr & Gaines Ct	3	0.23	3	0	0	0	0	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0						
Gentry Ln & Anthony Dr	3	0.11	3	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0						
Parker Ave & Beverly Pl	3	-0.10	3	0	0	0	0	3	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0						
East St & E Hollywood Ave	3	-0.06	3	0	0	0	0	3	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0						
Promenade Cir & Fieldview Dr	3	0.11	3	0	0	0	0	3	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
East St & Beverly Pl	3	-0.09	8	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0						
Annie Ct & Vera Ln	3	0.23	3	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0						
Bristol Ln & Oxford Ln	3	0.11	3	0	0	0	0	3	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Bessie Ave & Emerson Ave	3	-0.06	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1						
East St & 21st St	3	-0.08	3	0	0	0	0	3	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Parker Ave & 23rd St	3	0.01	3	0	0	0	0	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0					

Intersection	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
W Grant Line Rd & Unnamed Rd east of Holly Dr	3	-0.11	8	0	0	0	1	2	0	2	1	0	0	0	0	0	2	0	0	0	0	0
Travao Ln & Travao Ln	3	-0.14	3	0	0	0	0	3	0	0	2	0	1	0	0	0	0	2	0	1	0	0
Elsinore Dr & W Kavanagh Ave	3	-0.04	3	0	0	0	0	3	1	1	1	0	0	0	0	0	0	1	0	0	0	0
Holly Dr & E Manzanita Ln	3	-0.09	3	0	0	0	0	3	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Golden Springs Dr & Kavanagh Ave	3	-0.09	3	0	0	0	0	3	1	1	0	0	1	0	0	0	0	0	0	0	0	0
Holly Dr & E Kavanagh Ave	3	-0.05	8	0	0	0	1	2	1	1	0	0	1	0	0	0	0	1	0	1	0	0
Butler Ct & W Kavanagh Ave	3	-0.03	8	0	0	0	1	2	0	0	1	0	0	0	1	0	0	1	0	1	1	0
Corbett Ln & Kavanagh Ave	3	-0.04	8	0	0	0	1	2	0	2	0	0	0	0	0	0	0	0	0	0	1	0
Clover Rd & Unnamed Rd east of Gabriel Dr	3	-0.04	3	0	0	0	0	3	0	1	0	0	1	0	0	0	0	0	0	0	0	0
N Mac Arthur Dr & Arbor Ave	3	-0.12	3	0	0	0	0	3	1	1	0	0	0	0	1	0	0	2	0	0	1	0

- 1. Local Critical Crash Rate Differential & 2. Equivalent Property Damage Only Crash

Table 6: Analysis Rankings – Segments (Top Locations Per Segment Type)

Facility	Limits	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet	
<b>Other Principal Arterial</b>																								
W Grant Line Rd	Naglee Rd-Signal e/o Lammers Rd	23	0.5	69	0	0	0	9	14	7	6	8	2	0	0	0	0	0	6	0	0	0	1	
Grant Line Rd	Byron Rd-Lammers Rd	23	2.3	92	0	0	4	6	13	1	0	19	1	1	1	0	0	0	0	19	0	1	2	2
N Macarthur Dr	Grant Line Rd-Stonebridge Dr	19	0.3	73	0	0	4	3	12	2	2	0	4	8	2	0	0	0	0	4	0	2	0	2
W Grant Line Rd	Ohara Dr-Tracy Bl	14	0.6	208	0	1	1	4	8	6	3	4	0	1	0	0	0	0	2	0	0	0	0	
W Grant Line Rd	S Lammers Rd-Byron Rd	13	1.0	53	0	0	2	4	7	0	3	10	0	0	0	0	0	0	10	1	0	1	0	
Essex Ct	Grant Line Rd-Grant Line Rd	11	7.2	31	0	0	1	2	8	6	2	2	1	0	0	0	0	0	6	0	0	0	1	
W Grant Line Rd	Naglee Rd-Toste Rd	10	0.7	0	2	3	5	1	0	8	0	0	0	0	0	0	0	9	0	0	0	0	0	
Tracy Blvd	Schulte Rd-Menay Dr	7	0.6	17	0	0	0	2	5	1	1	1	0	1	1	1	1	1	0	1	0	1	0	
11th St	Corral Hollow Rd-Alden Glen Dr	7	-0.1	12	0	0	0	1	6	2	3	0	1	0	0	0	0	0	2	0	0	0	0	
11th St	Civic Center Dr-Macarthur Dr	7	0.7	17	0	0	1	0	6	3	0	2	1	0	0	0	1	0	2	0	0	0	1	
Hawthorne Rd	Buthmann Ave-Briar Ln	7	0.0	171	0	1	0	0	6	3	1	2	0	1	0	0	0	0	0	0	0	0	0	
11th St	205 Ramp-Lammers Rd	6	-0.2	21	0	0	0	3	3	0	0	4	0	2	0	0	0	0	5	0	0	2	0	
Valpico Rd	S Macarthur Dr-Glenbriar Dr	5	0.4	15	0	0	0	2	3	1	0	2	1	1	0	0	0	0	2	0	0	0	1	
11th St	Lincoln Blvd-9th St	5	0.1	5	0	0	0	0	5	0	1	2	1	0	0	0	0	0	2	0	0	0	1	
11th St	Belconte Dr-N Corral Hollow Rd	5	-0.1	30	0	0	1	3	1	0	1	3	0	1	0	0	0	0	4	0	0	0	0	
11th St	Jefferson Ln-Crossroads Dr	5	-0.2	5	0	0	0	0	5	0	1	2	0	1	0	0	0	0	2	0	0	0	1	
11th St	Jefferson Ln- Lammers Rd	5	-0.2	10	0	0	0	1	4	0	1	4	0	0	0	0	0	0	3	0	0	0	2	

Facility	Limits	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Distracted	Impaired	Dark	Wet
11th St	Alden Glen Dr- Lincoln Blvd	5	-0.2	183	0	1	1	1	2	1	1	2	1	0	0	0	1	0	2	0	0	0	0
Corral Hollow Rd	Foothill Ranch Dr- Lowell Ave	5	0.0	20	0	0	1	1	3	0	1	4	0	0	0	0	0	0	5	0	0	0	0
W Grant Line Rd	Orchard Pkwy-N Corral Hollow Rd	5	-0.2	20	0	0	1	1	3	0	3	1	0	1	0	0	0	0	1	0	1	0	0
Tracy Blvd	Beechnut Ave- Centre Court Dr	4	0.0	23	0	0	2	0	2	0	0	0	1	3	0	0	0	0	2	0	0	0	2
Corral Hollow Rd	Cypress Dr-Crohn Rd	4	0.0	14	0	0	0	2	2	1	0	3	0	0	0	0	0	0	3	0	0	0	0
E Grantline Rd	MacArthur Dr-Skylark Way	4	-0.1	331	1	1	0	0	2	1	0	1	0	1	1	0	0	0	1	0	1	0	0
E Grant Line Rd	Colony Dr-N MacArthur Dr	4	-0.1	9	0	0	0	1	3	0	0	2	0	2	0	0	0	0	1	0	0	0	0
W Grant Line Rd	Buthmann Ave-Palker Ave	4	0.2	19	0	0	1	1	2	1	2	0	0	0	0	0	1	0	0	0	0	1	0
W Grant Line Rd	Joe Pombo Pkwy- Orchard Pkwy	4	-0.2	9	0	0	0	1	3	1	1	2	0	0	0	0	0	0	1	0	0	0	0
W Schulte Rd	Larrlana Ln-Sycamore Pkwy	3	-0.2	8	0	0	0	1	2	0	0	1	1	1	0	0	0	0	1	0	1	0	0
Macarthur Dr	Wagtail Dr-6th St	3	0.1	8	0	0	0	1	2	0	1	2	0	0	0	0	0	0	3	0	0	0	0
Corral Hollow Rd	Grant Line Rd-Alegre Dr	3	-0.3	3	0	0	0	0	3	0	2	1	0	0	0	0	0	0	1	0	0	0	0
W Grant Line Rd	Parker Ave-Altoga Ave	3	-0.1	13	0	0	0	2	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0
Tracy Blvd	Cordoba Rd-W Grant Line Rd	3	-0.2	8	0	0	0	1	2	0	0	3	0	0	0	0	0	0	2	0	0	0	0
White Oak Dr	Grant Line Rd-Unnamed Rd west of N MacArthur Dr	3	-0.2	8	0	0	0	1	2	0	0	1	0	0	0	1	0	0	0	0	0	0	1
<b>Minor Arterial</b>																							

Facility	Limits	Crashes	Local CCR Differential <sup>1</sup>	EPDO <sup>2</sup>	Fatal		Serious Injury		Other Visible Injury		Complaint of Pain		PDO		Broadside		Sideswipe		Rear End		Head On		Hit Object		Overturned		Other		Pedestrian		Bicycle		Aggressive		Distracted		Impaired		Dark		Wet	
					0	0	0	0	2	7	2	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Royal Ct	Grant Line Rd-Pavillon Pkwy	9	0.3	19	0	0	0	0	2	7	2	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
W Byron Rd	Belconte Dr-Berg Rd	6	0.4	31	0	0	1	0	3	2	2	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0						
E Grantline Rd	City Limits-Chabot Ct	5	0.8	15	0	0	0	0	2	3	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0							
W Linne Rd	Tracy Bl-Tracy Airport Ctr	4	0.0	19	0	0	1	0	1	2	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0							
W Linne Rd	Tracy Airport Ctr-Corral Hollow Rd	4	0.0	19	0	0	1	0	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0							
W Lowell Ave	Chester Dr-Tracy Bl	4	-0.1	9	0	0	0	0	1	3	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0							
Holly Dr	E Larch Rd-Sloan Ct	4	0.9	9	0	0	0	0	1	3	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0							
W Lowell Ave	Corral Hollow Rd-Promenade Cir	3	0.6	3	0	0	0	0	0	3	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
<b>Major Collector</b>																																										
Corral Hollow Rd	I-580-Linne Rd	27	6.0	288	0	1	9	2	15	3	3	3	5	6	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0							
W Clover Rd	Tracy Blvd-Buthmann Ave	8	1.7	33	0	0	1	3	4	2	3	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0							
S Lammers Rd	11th St-Redbridge Rd	7	0.2	32	0	0	1	3	3	1	0	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0							
W Schulte Rd	S Lammers Rd-Hansen Rd	4	0.1	19	0	0	1	1	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0							
Brichetto Rd	Chrisman Rd-City Limits	3	0.7	167	0	1	0	0	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0							
<b>Local</b>																																										
Pavillion Pkwy	Robertson-Auto Plaza Way	5	2.02	25	0	0	1	2	2	1	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2							
Hansen Rd	Schulte Rd-City Limits	4	0.45	9	0	0	0	1	3	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0						
Carlton Way	Holly Dr-Parker Ave	4	4.68	9	0	0	0	1	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1						
Palm Cir	Alden Park-Beechnut Ave	3	3.76	3	0	0	0	0	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
12th St	Lincoln Bl-Schleiger Dr	3	3.28	22	0	0	2	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						

## 9 Emphasis Areas

Emphasis Areas are collisions factors or conditions that the City of Tracy can strategically focus efforts to have a large impact on transportation safety. Emphasis areas were developed by revisiting the Vision and Goals developed at the onset of this planning process and comparing them with the trends and patterns identified in the collision analysis. Where these areas aligned, or major challenges were observed, Emphasis Areas and strategies were developed.

### **9.1 Emphasis Area #1: Impaired Driving**

**Description:** Impaired driving crashes are a high priority challenge area within the Caltrans SHSP. Caltrans defines these as crashes where any evidence of drug or alcohol use by the driver is present, even if the driver was not over the legal limit. 292 collisions, just over 8% of all collisions, were reported as the driver being under the influence of drugs or alcohol. 70% of the DUI collisions resulted in property damage only. 33% of the traffic fatalities involved a DUI. 17% of the collisions in the study period were reported as the driver being under the influence of alcohol or drugs. Eight of these crashes resulted in a fatality and 27 in a severe injury. Almost 2/3 of these crashes (423) resulted in Property Damage Only.

#### **Goal for Emphasis Area #1:**

- Reduce the number of crashes attributed to impaired driving
- Identify hot spots and priority corridors for countermeasures to reduce impaired driving
- Apply for funding to implement countermeasures to reduce impaired driving crashes

#### **Strategies for Emphasis Area #1:**

- Authorize, publicize, and conduct sobriety checkpoints programs
- Implement an impaired driving education campaign
- Develop educational programs targeting specific audiences based on age group
- Additional enforcement presence
- Create effective media campaigns in both visual and print media
- Implement additional lighting along corridors with high frequencies of impaired driving collisions
- Install speed control measures such as speed feedback signage or lane width reductions along corridors with high frequencies of impaired driving collisions

These strategies will be implemented by the City, law enforcement, and community organizations. Funding sources for these strategies may include HSIP, OTS, and SB1 grant programs.

### **9.2 Emphasis Area #2: Lane Departure (Head-On, Hit Object, Overturned)**

**Description:** Lane Departure, as defined by the Caltrans SHSP, includes head-on, hit object, and overturned collisions. This includes instances where a vehicle runs off the road or crosses into the opposing lane prior to the collision. 55.1% of fatal & severe injury collisions involved

lane departure collisions in the City, compared to 42.1% statewide. These types of collisions were 17% of the collisions in the study period.

#### **Goal for Emphasis Area #2:**

- Reduce the number of crashes due to lane departure collisions in the City
- Identify hot spots and priority corridors for lane departure collisions
- Apply for funding and implement countermeasures to address lane departure collisions

#### **Strategies for Emphasis Area #2:**

- Address lane departure collisions by implementing proven countermeasures, such as guardrails, median barriers, safety edges, segment lighting, speed feedback signage

Identify priority corridors for lane departure collisions and implement countermeasures on these corridors. These strategies will be implemented by the City, law enforcement, and community organizations. Funding sources for these strategies may include HSIP, OTS and SB1 grant programs.

### **9.3 Emphasis Area #3: Young Drivers**

**Description:** Young drivers, as defined by the Caltrans SHSP, are drivers between 15 and 20 years of age. 13.7% of fatal & severe injury collisions involved young drivers in the City, compared to 12.3% statewide. 27% of collisions involved a driver at fault that was between the age of 16 and 25 years old.

#### **Goal for Emphasis Area #3:**

- Reduce the number severity and of young driver collisions
- Identify hot spots and priority corridors for young driver collisions
- Apply for funding and implement countermeasures to address young drivers

#### **Strategies for Emphasis Area #3:**

Strategies to address young driver behaviors will mainly focus on education, encouragement, and enforcement. Strategies that have had success nationally include driver's education courses, implementing technology in young drivers' vehicles, and education campaigns to target aging drivers with messages regarding road safety, common mistakes, and challenges that young drivers face. Strategies may also include increased enforcement near hotspots of young driver collisions and increased coordination with community organizations. Strategies can also address challenges faced by inexperienced drivers by simplifying complex driving environments by reducing sign clutter and simplifying signage.

These strategies will be implemented by the City, law enforcement, and local community organizations. Funding sources for these strategies may include HSIP, STIP, and SB1 grant programs.

## 9.4 Emphasis Area #4: Vulnerable Road Users (Pedestrians and Bicyclists)

**Description:** Vulnerable road user collisions, as defined by the SHSP, are those identified as those involving pedestrians and bicyclists. 44% of fatal injuries in the City involved pedestrians. 21% of severe injury collisions involved pedestrians. 14% of severe injury collisions involved bicyclists.

81 pedestrian-involved collisions occurred during the study period, resulting in 4 fatal collisions, 9 severe injury collisions, and 63 with some form of reported injury or pain. About 25% of pedestrian collisions occurred while the pedestrian was crossing in the crosswalk. During the study period, 102 collisions involving bicycles were reported. Of these, six (6) resulted in severe injuries, twenty-seven (27) resulted in property damage only, and sixty-nine (69) with some form of reported injury or pain. About 23% of collisions occurred at night.

### Goal for Emphasis Area #4:

- Reduce the number of collisions involving pedestrians and bicyclists
- Identify high areas of pedestrians and bicycle collisions
- Apply for funding and implement countermeasures at pedestrian and bicycle collision hotspots

### Strategies for Emphasis Area #4:

- Implement pedestrian and bicycle priority detection at certain key locations
- Install pedestrian and bicycle infrastructure at key locations, such as bicycle lanes, rectangular rapid flashing beacons (RRFBs), pedestrian scrambles, and Leading Pedestrian Interval (LPI) timing
- Install pedestrian and bicycle counters to determine where high active transportation volume locations are
- Establish education and training program to improve pedestrian and bicyclist safety in the City

# 10 Opportunities

The following provides more information on general identified issues, crash modification factors, improvements, and countermeasures identified for the City of Tracy, as well as for specific project locations identified as part of this analysis.

## 10.1 Infrastructure Improvements

### 10.1.1 Countermeasure Selection Process

Part D of the HSM provides information on Crash Modification Factors (CMF) for roadway segments, intersections, interchanges, special facilities, and road networks. CMFs are used to estimate the safety effects of highway improvements and apply CMFs to compare and select highway safety improvements. A CMF less than 1.0 indicates that a treatment has the potential to reduce collisions. A CMF greater than 1.0 indicates that a treatment has the potential to increase collisions. The application of an appropriate CMF can influence the decision to

implement a particular project, and the misapplication of CMFs can lead to misinformed decisions. Key factors to consider when applying CMFs include:

1. Selection of an appropriate CMF,
2. Estimation of collisions without treatment,
3. Application of CMFs by type and severity, and
4. Estimation of the combined effect for multiple treatments

Examples of Safety Countermeasures can be found through several sources. This Report utilizes the countermeasures found in the California LRSM (<https://dot.ca.gov/-/media/dot-media/programs/local-assistance/documents/hsp/2020/lrsm2020.pdf>) and the CMF Clearinghouse (CMF CH) website (<http://www.cmfclearinghouse.org/>).

Countermeasures for each of the Safety Project Case Studies are based on the data analysis and site visits. Additional countermeasures were identified for the high-level issues on a city-wide level and are discussed in **General City-Wide Safety Project Opportunities** in **Section 10.3** of this Report.

### **10.1.2 Safety Project Case Studies**

From the city-wide analysis, ten project case study locations were selected for further analysis and opportunity identification. For each of these locations, Safety Project Case Studies were developed to provide a case study to organize projects when applying for funding. These locations were identified through the analysis process based on their collision histories, the observed crash patterns, and their differing characteristics to provide the most insight into potential systemic safety countermeasures that the City can employ to achieve the most cost-effective safety benefits.

A Safety Project Case Study was developed for these locations:

1. **Unsignalized Intersection:** F Street & 11<sup>th</sup> Street
2. **Unsignalized Intersection:** Parker Avenue & Eaton Avenue
3. **Roadway Segment:** Holly Drive from Larch Road to Sloan Court
4. **Roadway Segment:** Pavilion Parkway from Robertson Drive to Auto Plaza Way
5. **Signalized Intersection:** Naglee Road & Grant Line Road
6. **Roadway Segment:** Grant Line Road from Lammers Road to Byron Road
7. **Roadway Segment:** Byron Road from Berg Road to Belconte Drive
8. **Signalized Intersection:** Lowell Avenue & Corral Hollow Road
9. **Roadway Segment:** Lammers Road from 11<sup>th</sup> Street to Redbridge Road
10. **Roadway Segment:** Tracy Boulevard from Schulte Road to Menay Drive

**Appendix A** contains the Case Study pages which summarize conditions at each location, and potentially beneficial countermeasures. Countermeasures were subjected to a benefit/cost assessment and scored according to their potential return on investment. These case studies can be used to select the most appropriate countermeasure, and to potentially phase improvements over the longer-term. The potential benefit of these countermeasures at locations with similar design characteristics can then be extrapolated regardless of collision history. These case study sheets can also be used to position the City for future grant funding opportunities.

## 10.2 Non-Infrastructure Improvements

Non-Infrastructure improvements have also been proven to impact safety conditions of the transportation network. These education and enforcement measure opportunities are developed to target specific behavior types and populations. Based on a review of the existing plans, policies, and programs within the City, the following topics have been reviewed to identify areas where the City can implement or enhance safety efforts.

**Table 7: Summary of Program, Policies, and Practices**

Topic	Initiatives	
	Status	Implement or Enhance
<b>Complete Streets Policies</b>	Complete streets policies being as part of Traffic Management Plan	Identify roadways that are good candidates for complete street implementation consistent with guidance provided in these plans
<b>Traffic Impact Fees</b>	City assesses for capacity improving projects and railroad grade separation project	Continue to assess traffic impact fees; Devote a portion of impact fees to safety enhancements as part of the next Nexus update
<b>Safe Routes to School</b>	Have applied for funding, but have not been successful; Have received funds for signal adaptation plan	Identify potential grant projects and apply for grant funding
<b>Traffic Safety Education</b>	No	Implement traffic safety education program
<b>Crash Activity Review</b>	No formal program, but uses SWITRS on a case-by-case basis	Set up formal program for reviewing crash activity; update database for future LRSP analysis & updates
<b>Crossroads Database</b>	Yes	Implement automatic daily updates of collision data into database
<b>Active Transportation Safety Ordinances</b>	Yes	Continue enforcement of current laws; Begin coordination between enforcement and school education programs
<b>Sobriety/Seatbelt Checks</b>	Yes	Continue sobriety & seat belt checks; increase enforcement in hot spots
<b>Adjacent Jurisdictions Coordination</b>	Yes, coordinates with Sheriff, County and CHP	Continue to coordinate with adjacent jurisdictions

Topic	Initiatives	
	Status	Implement or Enhance
<b>Speed Surveys</b>	Conducts every 5 years	Continue to update as required by California Vehicle Code; review new guidance from Assembly Bill 43
<b>Traffic Calming Policies</b>	Yes, building traffic calming for new developments	Continue to enact traffic calming implementations throughout the City; Identify areas in older neighborhoods where traffic calming policies are appropriate
<b>Transit Accommodation of Bicycles</b>	Yes	Continue to accommodate bicycles on transit to promote multi-modal trips
<b>Coordination between City staff and transit providers</b>	Yes, bus stop projects are funded by development. City is working on a banking fee to help funding transit improvements	Continue coordination; work to identify areas for improvements such as first/last mile improvements
<b>Bicycle and Pedestrian Master Plan</b>	Policies being incorporated into Traffic Management Plan	Continue to update master plans
<b>Active Transportation Inventory</b>	No	Implement active transportation inventory
<b>Traffic Safety Audit Program</b>	No	Implement a traffic safety audit program to regularly identify traffic safety issues citywide
<b>Coordination with Emergency Response</b>	Yes, fire department is engaged in planning	Continue engaging emergency response in transportation planning processes
<b>Coordination with Health Agencies</b>	No	Implement formal coordination processes with local health agencies; involve in collision analysis and planning process
<b>Citizen Feedback</b>	Yes, City receives complaints	Continue to seek out resident feedback and incorporate into policies and implementations
<b>Roadway Maintenance</b>	Yes	Continue regular maintenance of roadway surfaces; determine how safety implementations can be incorporated
<b>Roadway Safety Funding</b>	No	Continue to advance Transportation Demand Management programs and support per General Plan policies

Topic	Initiatives	
	Status	Implement or Enhance
<b>Transportation Demand Management</b>	Traffic Management Plan identifies TDM and VMT monitoring	Continue to advance Transportation Demand Management programs and support per General Plan policies
<b>VMT Reduction Policies</b>	City is doing TOD development	Continue this process; identify area where infill development will require safety improvements
<b>Signage Inventory</b>	No	Implement a signage inventory
<b>Local Design Standards</b>	Yes, the City has design guides that include buffered bike lanes, green lanes, and bus stops	Continue to implement and update design standards
<b>Transportation Planning/Safety Advisory Committee</b>	No	Implement a formal transportation planning advisory committee
<b>Active Transportation Volume Collection</b>	Standard practice, but not a formal policy	Continue traffic & active transportation volume collection; utilize this data in collision analysis
<b>Wayfinding Signage</b>	Yes, program included in the Bike and Parks master plan	Continue to identify funding for wayfinding signage; implement in high pedestrian/bicycle locations
<b>Traffic Control Warrants</b>	City uses MUTCD warrants	Continue to use CA MUTCD warrants; identify areas where additional warrants can be used (such as flashing stop signs)

## 10.3 City-wide Countermeasure Toolbox

This evaluation considered city-wide trends to identify countermeasures that would likely provide the most benefit with widespread implementation. Countermeasures for each of the 5E Safety Strategies (Engineering, Enforcement, Education, Encouragement, and Emergency Services) were identified. These include both infrastructure improvements, non-infrastructure improvements. **Section 10.3** outlines the city-wide safety project improvements, which is also

referred to as the “Countermeasure Toolbox”. Within the toolbox, the description of the countermeasure along with its LRSM ID number is listed. The next column, Crash Reduction Factor (CRF) also known as Crash Modification Factor (CMF), are “multiplicative factors used to estimate the expected number of crashes after implementing a given countermeasure at a specific site (the lower the CMF, the greater the expected reduction in crashes)<sup>4</sup>.”

For each of these countermeasures, a planning level benefit/cost analysis was completed. Applying the benefit/cost at the city-wide level was estimated assuming some randomness in crash distribution. The location characteristics, such as whether there is a traffic signal, and the type of crashes, were used at the city-wide level to calculate an average cost of crashes that the countermeasure might reduce. The benefit per location was then factored out to a 20-year life-cycle savings, with an Opinion of Project Probable Cost (OPCC). The cost shown in **Table 9** should be considered initial planning costs using 2021 dollars and not assumed final.

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<sup>4</sup> LRSM Version 1ro.5 (2020), Page 27

Table 8: City-wide Countermeasure Toolbox

COUNTERMEASURE	CMF/LRSM ID	CRF	20-YEAR COST ESTIMATE	PER UNIT
Install High-Visibility Crosswalk	4124	19%	\$25,000	per crosswalk
Install signals	NS03	25%	\$270,000	per intersection
Install/upgrade larger or additional stop signs/other intersections warning/regulatory signs (stop signs with LED borders)	NS06	15%	\$1,500	per sign
Install raised medians (refuge islands)	NS19PB	45%	\$25,000	per intersection
Add segment lighting	R01	35%	\$50,000	per mile
Remove or relocate fixed objects outside of Clear Recovery Zone	R02	35%	\$10,000	per location
Install Median Barrier	R03	25%	\$20,000	per location
Install Safety Edges	R15	30%	\$100,000	per mile
Install dynamic/variable speed warning systems	R26	30%	\$16,000	per sign
install delineators, reflectors, and or object markers	R27	15%	\$5	per LF
Install edge-lines and centerlines	R28	25%	\$8,000	per mile
Install bike lane (class III/sharrows)	R32PB	35%	\$25	per linear foot
Install separated bike lanes (Class IV)	R33PB	45%	\$250,000	per mile
Install Rectangular Rapid Flashing Beacon (RRFB)	R37PB	35%	\$50,000	per intersection
Install retroreflective backplates	S02	15%	\$12,000	per intersection
Improve signal timing (coordination, phasing, red, yellow, operation)	S03	15%	\$8,000	per intersection
Install advanced dilemma zone detection	S04	40%	\$34,000	per intersection
Provide protected left-turn phase	S07	30%	\$40,000	per intersection
Install raised pavement markers and striping (Through Intersection)	S09	10%	\$22,000	per intersection
Pedestrian Scramble	S19PB	40%	\$120,000	per intersection
Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	S21PB	60%	\$8,000	per intersection

**Table 9** describes additional improvements for the remaining categories of traffic safety which includes Enforcement, Education, Encouragement, and Emergency Services.

## Non-Engineering Safety Countermeasures:

These non-engineering countermeasures were derived from the collision analysis and build on the actions identified in **Section 9.3**. These relate to the additional Es of Traffic Safety outside of Engineering. This includes Enforcement, Encouragement, Education, and Emergency Services.

**Table 9: Non-Engineering Safety Strategy Countermeasures**

PROPOSED COUNTERMEASURE	POTENTIAL PARTNERS	EXAMPLES OF COUNTERMEASURE
<b>ENFORCEMENT</b>		
Establish enforcement and visibility program for aggressive driving	Local law enforcement; CHP	<a href="#">CHP's Regulate Aggressive Driving and Reduce Speed (RADARS) Program</a>
Continued enforcement in school zones	Local law enforcement; CHP; school districts	Obtain grant funding for additional personnel in school zones
Increased enforcement of safe driving & active transportation behaviors near busy crosswalk locations	Local law enforcement; CHP	Obtain grant funding for additional enforcement near high pedestrian activity locations
<b>EDUCATION</b>		
Campaign to target aggressive driving and DUIs	Local law enforcement; CHP; California Office of Traffic Safety (OTS)	<a href="#">CHP's Regulate Aggressive Driving and Reduce Speed (RADARS) Program</a>
Bicycle and pedestrian safety campaign	Local law enforcement	SCAG's 'Go Human' Campaign; 'OTS' 'Ride With Traffic' campaign
Explore safe routes to school education grants to expand program	Local school districts; local law enforcement; SCAG	<a href="#">Safe Routes to School Program</a> , funded by Caltrans
Coordinate safety education campaigns	SJCOG; local law enforcement	<a href="#">Roadway safety fairs at schools</a> <a href="#">Education campaign for aging drivers</a>
<b>EMERGENCY SERVICES</b>		
Continue to work on interdepartmental communication between City staff and City police department and fire department	Local law enforcement & fire department	Incorporate law enforcement/fire department as stakeholders on transportation improvement projects
Incorporate public health agencies and fire departments as stakeholders in safety projects	Local public health agencies and fire departments	Adjust safety project development processes to include public health and fire department feedback

PROPOSED COUNTERMEASURE	POTENTIAL PARTNERS	EXAMPLES OF COUNTERMEASURE
EMERGING TECHNOLOGY		
Continue to use best practices for pedestrian crossings at high pedestrian traffic areas	City Public Works; Caltrans	Continuously update pedestrian crossing design standards in accordance with latest best practices
Utilize new data sources to monitor traffic conditions and inform County safety plans	City Public Works; Caltrans	Utilization of data from a traffic management center

## 11 Evaluation & Implementation

### 11.1 Evaluation

The success of the LRSP will be evaluated using the preliminary process outlined below. This process will be useful to ensure proper implementation of goals and to determine when updates are needed.

- Quarterly progress meetings will be conducted to track the implementation of the plan. In addition, the success of the plan will be evaluated on an annual basis.
- An update to the plan should be considered after no more than five years.
- Continued monitoring and recording of traffic incidents on local roadways by law enforcement.
- Maintain a list of focus areas where there are transportation safety concerns.

### 11.2 Implementation

Implementation of the LRSP can be accomplished through several avenues including development of projects, the establishment of new policies and programs, and development/strengthening of relationships with stakeholders.

With regard to projects, the following identifies potential focus areas for the City in the near-to-mid-term.

#### Near- & Mid-Term Focus Areas

The opportunities identified in this report provide more of the systemic countermeasures that can be applied within the City. Over the next three to five years, the City has the opportunity to concentrate its efforts on the emphasis areas:

1. Impaired Driving
2. Lane Departure Collisions
3. Young Drivers
4. Vulnerable Road Users (Pedestrians and Bicyclists)

Analysis conducted at the citywide level indicated that these factors were some of the most frequent influences contributing to collisions within the City. The countermeasure opportunities previously discussed in this report for both systemic and project-specific improvements can be used as a basis for developing projects at locations where addressing these focus areas would

be of the most benefit. Projects that address these focused areas can be developed with a high benefit-to-cost ratio (by applying City-wide collision rates), allowing projects to be developed even at sites with little to no direct collision history, but with conditions that might contribute to future collisions.

## 11.3 Funding

Competitive funding resources are available to assist in the development and implementation of safety projects in Tracy. The City should continue to seek available funding and grant opportunities from local, state, and federal resources to accelerate their ability to implement safety improvements throughout Tracy. The following is a high-level introduction into some of the main funding programs and grants for which the City can apply. In addition to the funding sources mentioned below, the City should consider examining and allocating a portion of its Measure A and other local funding sources to help fund safety improvements. The City should also work with regional agencies such as San Joaquin County Council of Governments, San Joaquin Valley Council of Governments, and Caltrans to identify and apply for safety improvement funding.

### 11.3.1 Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) is a Federal program housed under Fixing America's Surface Transportation (FAST) Act. This program apportions funding as a lump sum for each state, which is then divided among apportioned programs. These flexible funds can be used for projects to preserve or improve safety conditions and performance on any Federal-aid highway, bridge projects on any public road, facilities for non-motorized transportation, and other project types. Example safety improvement projects eligible for this funding include:

- New or upgraded traffic signals
- Upgraded guard rails
- Pedestrian warning flashing beacons
- Marked crosswalks

California's local HSIP focuses on infrastructure projects with national recognized crash reduction factors. Normally HSIP call-for-projects is made at an interval of one to two years. The applicant must be a city, a county, or a tribal government federally recognized within the State of California.

Additional information regarding this program at the Federal level can be found online at: <https://safety.fhwa.dot.gov/hsip/>. California specific HSIP information – including dates for upcoming call for projects – can be found at: <http://www.dot.ca.gov/hq/LocalPrograms/hsip.html>.

### 11.3.2 Caltrans Active Transportation Program

Caltrans Active Transportation Program (ATP) is a statewide funding program, created in 2013, consolidating several federal and state programs. The ATP funds projects that encourage increased mode share for walking and bicycling, improve mobility and safety for non-motorized users, enhance public health, and decrease greenhouse gas emissions. Projects eligible for this funding include:

- Bicycle and pedestrian infrastructure projects
- Bicycle and pedestrian planning projects (e.g. safe routes to school)

- Non-infrastructure programs (education and enforcement)

This program funding is provided annually. The ATP call for projects typically comes out in the spring. Information on this program and cycles can be found online at:

<http://www.dot.ca.gov/hq/LocalPrograms/atp/>

### **11.3.3 State Transportation Improvement Program**

The State Transportation Improvement Program (STIP) provides state and federal gas tax money for improvements both on and off the state highway system. STIP programming occurs every two years. The programming cycle begins with the release of a proposed fund estimate, followed by California Transportation Commission (CTC) adoption of the fund estimate. The fund estimate serves to identify the amount of new funds available for the programming of transportation projects. Once the fund estimate is adopted, Caltrans and the regional planning agencies prepare transportation improvement plans for submittal. Caltrans prepares the Interregional Transportation Improvement Program (ITIP) using Interregional Improvement Program (IIP) funds, and regional agencies prepare Regional Transportation Improvement Programs (RTIPs) using Regional Improvement Program (RIP) funds. The STIP is then adopted by the CTC.

### **11.3.4 California Senate Bill 1 (SB 1)**

SB 1 is a landmark transportation investment to rebuild California by fixing neighborhood streets, freeways, and bridges in communities across California and targeting funds toward transit and congested trade and commute corridor improvements.

California's state-maintained transportation infrastructure will receive roughly half of SB 1 revenue: \$26 billion. The other half will go to local roads, transit agencies, and an expansion of the state's growing network of pedestrian and cycle routes. Each year, this new funding will be used to tackle deferred maintenance needs both on the state highway system and the local road system, including:

- Bike and Pedestrian Projects: \$100 million
  - This will go to cities, counties and regional transportation agencies to build or convert more bike paths, crosswalks and sidewalks. It is a significant increase in funding for these projects through the Active Transportation Program (ATP).
- Local Planning Grants: \$25 million

### **11.3.5 California Office of Traffic Safety (OTS) Grants**

This program has funding for projects related to traffic safety, including transportation safety education and encouragement activities. Grants applications must be supported by local crash data (such as the data analyzed in this report) and must relate to the following priority program areas:

- Alcohol Impaired Driving
- Distracted Driving
- Drug-Impaired Emergency Medical Services
- Motorcycle Safety
- Occupant Protection
- Pedestrian and Bicycle Safety
- Police Traffic Services

- Public Relations, Advertising, and Marketing Program
- Roadway Safety and Traffic Records

## 11.4 Next Steps

The City of Tracy has completed this LRSP to guide the process of future transportation safety improvements for years to come. The data-driven analysis process identified collision types, related primary collision factors, and locations of many collisions. Based on this process, Emphasis Areas were developed. These Emphasis Areas will guide corridor improvements, education programs, and capital improvements for the City.

Using the analyzed data and outputs from this LRSP, the City has also completed, or plans to complete, the following tasks:

- Actively seek other funding opportunities to improve safety for all modal users
- Collaborate with established safety partners & neighboring municipalities as improvements are made to create a cohesive transportation network
- Iteratively evaluate existing and proposed transportation safety programs and capital improvements to design a safer transportation network in Tracy.
- Begin designing safety improvements identified in the Case Study sheets contained in this report.

Based on current Caltrans guidelines, the LRSP is valid for 5 years from the date of completion for eligibility for HSIP grant funding.

## **APPENDIX A – CASE STUDY SHEETS**



## Case Study Sheet: Location #1

**Project Name:** Tracy LRSP  
**Agency Name:** Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

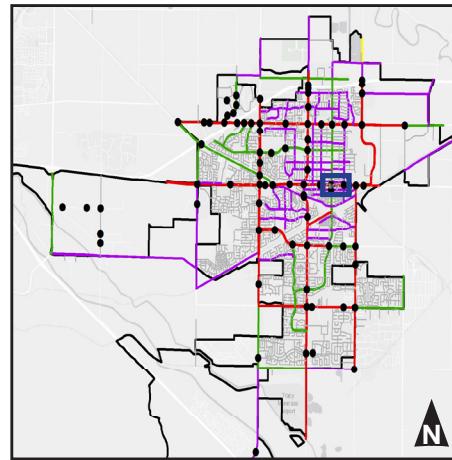
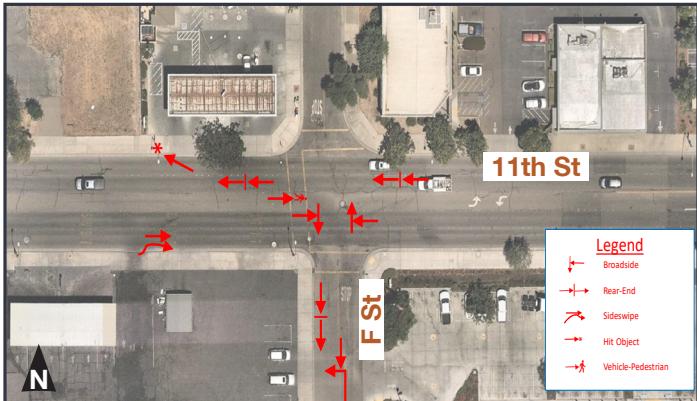
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

INTERSECTION

### Project Location Description & Maps:

**Intersection:** F St and 11th St (Unsignalized Intersection)

**Examples of Similar Intersections:** 11th St & E St, 11th St & Adam St



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	9
<b>Fatal and Injury Collisions</b>	Fatal Injury - 1 Severe Injury - 0 Visible Injury - 0
<b>Top 2 Collision Types</b>	Broadside (33%) Rear-End (33%)
<b>Total Nighttime Collisions</b>	4
<b>Wet Surface Collisions</b>	0
<b>Drug and Alcohol Related Collisions</b>	1

Traffic Data	
<b>Number of Approaches</b>	4
<b>Total Entering Vehicles</b>	8,863
<b>Crosswalk Condition</b>	No crosswalk on NB leg
<b>Control Type</b>	Two way stop
<b>Lighting</b>	Yes
<b>Highest Posted Speed Limit</b>	35 MPH
<b>Median</b>	No

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
7	1	0

### Additional Notes:

- Speeding is concern - speed limit is 35, observed higher
- High pedestrian activity including students (East and 11th St is entrance to HS)
- Fatal pedestrian collision (involved pedestrian under influence, not within marked crosswalk)
- Adjacent to signal at East and 11st St



## Countermeasure Evaluation

Primary Issues	Potential Counter-measures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
Bike & Pedestrian	Install Rectangular Rapid Flashing Beacon (RRFB)	0.65 (R37PB)	\$3,066,00	\$50,000	61.32
Bike & Pedestrian	Install high-visibility crosswalks (possibly Triple-4 style)	0.81 (4124)	\$1,664,400	\$50,000	33.29
All	Install/upgrade larger or additional stop signs/ other intersections warning/ regulatory signs (stop signs with LED borders)	0.85 (NS06)	\$1,418,400	\$3,000	472.80
All	Provide protected left-turn phase	0.70 (S07)	\$2,836,800	\$40,000	70.92
All	Improve signal timing (coordination, phasing, red, yellow, operation)	0.85 (S03)	\$1,418,400	\$8,000	177.30
All	Install raised pavement markers and striping (through intersection)	0.90 (S09)	\$945,600	\$22,000	42.98



## Case Study Sheet: Location #2

**Project Name:** Tracy LRSP  
**Agency Name:** City of Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

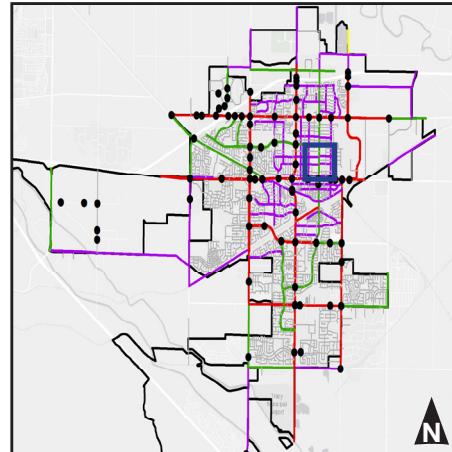
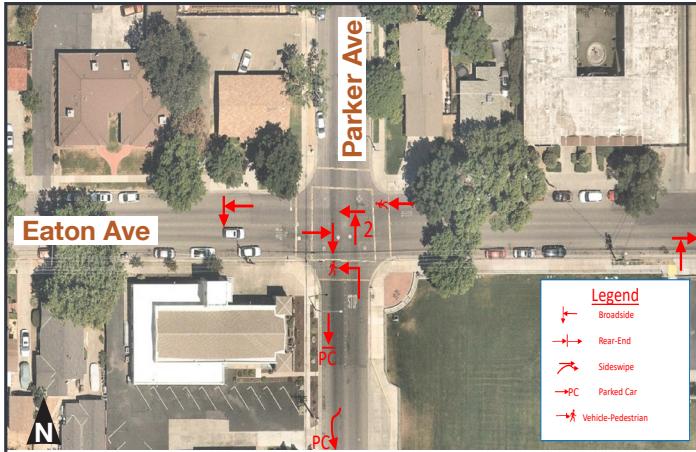
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

INTERSECTION

### Project Location Description & Maps:

**Intersection:** Parker Ave & Eaton Ave (Unsignalized Intersection)

**Examples of Similar Intersections:** Parker Ave & Carlton Way, E Lowell Ave & Mae Ave



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	9
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 1
<b>Top 4 Collision Types</b>	Broadside (66.7%) Rear-End (11.1%) Sideswipe (11.1%) Vehicle-Pedestrian (11.1%)
<b>Total Nighttime Collisions</b>	3
<b>Wet Surface Collisions</b>	2
<b>Drug and Alcohol Related Collisions</b>	0

Traffic Data	
<b>Number of Approaches</b>	4
<b>Total Entering Vehicles</b>	10,000
<b>Crosswalk Condition</b>	4 striped crosswalks
<b>Control Type</b>	4 way stop
<b>Lighting</b>	Yes
<b>Highest Posted Speed Limit</b>	25 MPH
<b>Median</b>	No

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
5	2	0

### Additional Notes:

- High number of broadsides at all-way stop
- Inattention may contribute to crash pattern
- Drivers not adhering to left turn restriction at school driveway (Central Elementary)



## Countermeasure Evaluation

Primary Issues	Potential Counter-measures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
All	Install high-visibility crosswalk	0.81 (4124)	\$122,968	\$25,000	4.92
All	Install raised pavement markers and striping (through intersection)	0.90 (S09)	\$180,600	\$22,000	8.21
All	Install edge-lines and centerlines	0.75 (R28)	\$451,500	\$8,000	56.44



## Project Template: Location #3

**Project Name:** Tracy LRSP  
**Agency Name:** City of Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

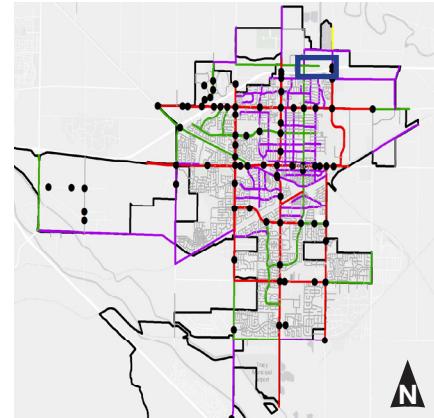
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

SEGMENT

### Project Location Description & Maps:

**Segment:** Holly Dr - Larch Rd to Sloan Ct (Minor Arterial)

**Examples of Similar Segments:** N Tracy Blvd - W Larch Rd to W Sugar Rd; Corral Hollow Rd - W Larch Rd to W Clover Rd



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	4
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 0
<b>Top 3 Collision Types (percentage)</b>	Head-On (25%) Sideswipe (25%) Vehicle-Pedestrian (25%) Not Stated (25%)
<b>Total Nighttime Collisions</b>	3
<b>Wet Surface Collisions</b>	0
<b>Drug and Alcohol Related Collisions</b>	0

Traffic Data	
<b>Average Daily Traffic (ADT)</b>	5,000
<b>Lighting</b>	Yes
<b>Highest Posted Speed Limit</b>	35 MPH

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
0	1	0

### Additional Notes:

- 3 out of 4 collisions were hit objects
- No continuous sidewalk on northside
- Transient population in this area



## Countermeasure Evaluation

Primary Issues	Potential Countermeasures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
Bike & Ped	Install green paint in bicycle lanes	0.65 (R32PB)	\$113,260	\$50,000	2.27
Bike & Ped	Install separated bike lanes (Class IV)	0.55 (R33PB)	\$145,620	\$94,750	1.54
Bike & Pedestrian	Add segment lighting	0.65 (R01)	\$169,120	\$18,950	8.92
Hit Object	Remove or relocate fixed objects outside of Clear Recovery Zone	0.65 (R02)	\$169,120	\$10,000	16.91



## Project Template: Location #4

**Project Name:** Tracy LRSP  
**Agency Name:** City of Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

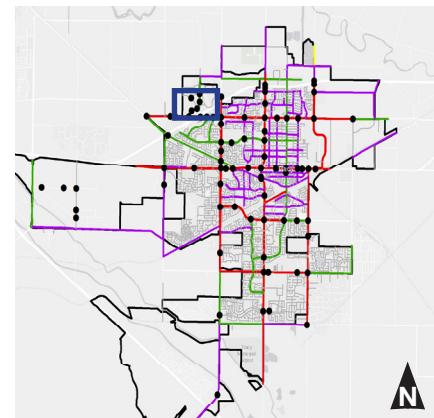
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

SEGMENT

### Project Location Description & Maps:

**Segment:** Pavilion Pkwy/Auto Plaza Dr: Robertson Dr to Auto Plaza Way (Local Roadway)

**Examples of Similar Segments:** Naglee Rd - W Valley Mall to Auto Plaza Dr; Joe Pombo Pkwy - Grant Line Rd to Birdie Creek Cir



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	5
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 1
<b>Top Collision Types (percentage)</b>	Head-On (40%) Broadside (20%) Hit Object (20%) Sideswipe (20%)
<b>Total Nighttime Collisions</b>	2
<b>Wet Surface Collisions</b>	2
<b>Drug and Alcohol Related Collisions</b>	1

Traffic Data		
<b>Average Daily Traffic (ADT)</b> 1,500		
<b>Lighting</b> Yes		
<b>Highest Posted Speed Limit</b> 45 MPH		
Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
2	0	0

### Additional Notes:

- Lower priority location
- Tire marks in middle of intersection of Power Rd/Pavilion Pkwy
- Relatively low volumes currently, but in development area
- Truck deliveries for adjacent commercial uses



## Countermeasure Evaluation

Primary Issues	Potential Countermeasures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
All	Install reflective markers	0.85 (R27)	\$198,420	\$10,000	19.84
Dark	Add segment lighting	0.65 (R01)	\$462,980	\$9,450	48.99
All	Upgrade signage	0.85 (NS06)	\$198,420	\$6,000	33.07



## Case Study Sheet: Location #5

**Project Name:** Tracy LRSP  
**Agency Name:** Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

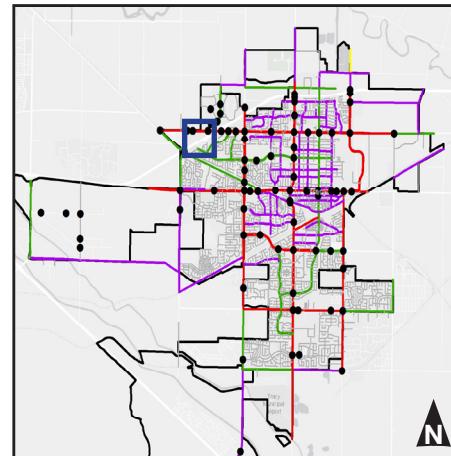
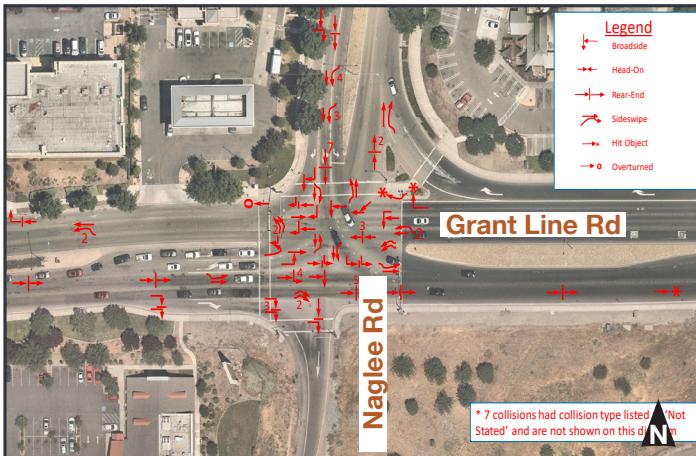
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

INTERSECTION

### Project Location Description & Maps:

**Intersection:** Naglee Rd & Grant Line Rd (Signalized Intersection)

**Examples of Similar Intersections:** Grant Line Rd & Toste Rd/I-205, Naglee Rd & Pavilion Parkway



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	85
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 6
<b>Top 2 Collision Types</b>	Rear-End (42.4%) Sideswipe (29.4%) Broadside (14.1%)
<b>Total Nighttime Collisions</b>	18
<b>Wet Surface Collisions</b>	9
<b>Drug and Alcohol Related Collisions</b>	3

Traffic Data	
<b>Number of Approaches</b>	4
<b>Total Entering Vehicles</b>	40,765
<b>Crosswalk Condition</b>	3 Legs with Pedestrian Timing
<b>Control Type</b>	Signalized
<b>Lighting</b>	Yes
<b>Highest Posted Speed Limit</b>	40 MPH
<b>Median</b>	Yes

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
80	0	0

### Additional Notes:

- Top crash location in city
- Southbound right turn traffic observed not stopping on red (conflicts with eastbound U-turns)
- 8-inch signal heads
- Aggressive drivers (adjacent to freeway ramps)
- Wide westbound right slip lane



## Countermeasure Evaluation

Primary Issues	Potential Counter-measures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
All	Install retroreflective backplates	0.85 (S02)	\$1,872,780	\$12,000	156.07
Bike & Pedestrian	Install green paint in bicycle lanes	0.65 (R32PB)	-	\$15,000	-
All	Adjust signal timing (coordination, phasing, red, yellow, operation)	0.85 (S03)	\$1,872,780	\$8,000	234.10
All	Install through arrow signal heads on WB movement to reinforce no LTs	0.70 (NS03)	\$3,743,560	\$75,000	24.97
All	Provide protected left-turn phase	0.70 (S07)	\$3,745,560	\$40,000	93.64
All	Install advanced dilemma zone detection	0.60 (S04)	\$3,745,560	\$34,000	110.16
All	Install High-Visibility Crosswalk	0.81 (4124)	-	\$75,000	-
All	Install raised medians (refuge islands)	0.55 (NS19PB)	\$5,618,340	\$75,000	74.91
All	Upgrade 8" signal heads to 12" signal heads	0.85 (S02)	\$1,872,780	\$12,000	156.07



## Project Template: Location #6

**Project Name:** Tracy LRSP  
**Agency Name:** Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

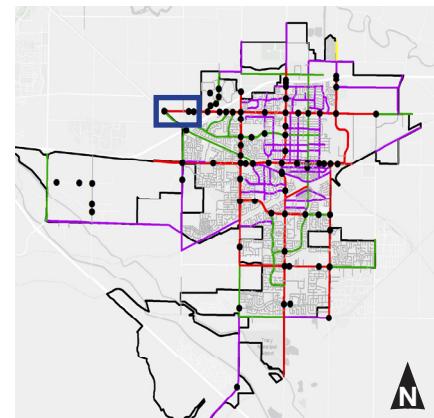
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

SEGMENT

### Project Location Description & Maps:

**Segment:** Grant Line Rd - Lammers Rd to Byron Rd (Principal Arterial)

**Examples of Similar Segments:** Grant Line Rd - N MacArthur Dr to Skylark Way, Byron Rd - Grant Line Rd to Von Sosten Rd



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	23
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 4
<b>Top 3 Collision Types (percentage)</b>	Rear-End (82.6%) Broadside (4.3%) Head-On (4.3%) Hit Object (4.3%) Overturned (4.3%)
<b>Total Nighttime Collisions</b>	12
<b>Wet Surface Collisions</b>	2
<b>Drug and Alcohol Related Collisions</b>	1

Traffic Data	
<b>Average Daily Traffic (ADT)</b>	10,000
<b>Lighting</b>	No
<b>Highest Posted Speed Limit</b>	40 MPH

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
20	0	0

### Additional Notes:

- Recent/ongoing construction at this location
- Closely spaced driveways
- High speeds observed along Grant Line Rd
- Residential development is recent (4 collisions in 2016, 4 in 2017, 6 in 2018, and 9 in 2019)
- Lammers Rd is recently signalized



## Countermeasure Evaluation

Primary Issues	Potential Countermeasures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
All	Install dynamic/variable speed warning systems	0.70 (R26)	\$1,473,000	\$32,000	46.03
All	Install/upgrade larger or additional stop signs/ other intersections warning/regulatory signs (stop signs with LED borders)	0.85 (NS06)	\$736,500	\$9,000	81.83



## Project Template: Location #7

**Project Name:** Tracy LRSP  
**Agency Name:** Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

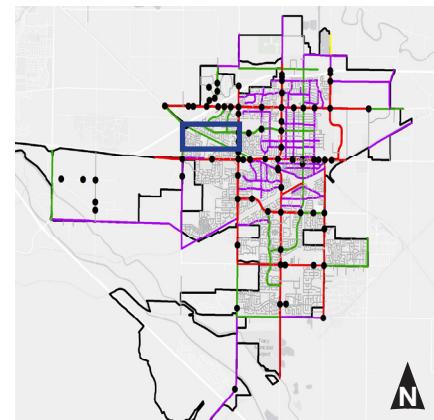
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

SEGMENT

### Project Location Description & Maps:

**Segment:** Byron Rd - Berg Rd to Belconte Dr (Minor Arterial)

**Examples of Similar Segments:** Beechnut Ave - Tracy Blvd to Sequoia Blvd, E 6th St - N MacArthur Dr to D St



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	7
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 1
<b>Top Collision Types (percentage)</b>	Broadside (28.6%) Rear-End (28.6%) Sideswipe (14.3%) Hit Object (14.3%) Other (14.3%)
<b>Total Nighttime Collisions</b>	2
<b>Wet Surface Collisions</b>	0
<b>Drug and Alcohol Related Collisions</b>	0

Traffic Data	
<b>Average Daily Traffic (ADT)</b>	6,845
<b>Lighting</b>	No
<b>Highest Posted Speed Limit</b>	45 MPH

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
5	0	0

### Additional Notes:

- Speeding observed - posted speed limit is 45 mph, observed higher speeds
- Lacking continuous street lighting
- No bike lanes here



## Countermeasure Evaluation

Primary Issues	Potential Countermeasures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
All	Install dynamic/variable speed warning systems	0.70 (R26)	\$591,000	\$16,000	36.94
Dark	Add segment lighting	0.65 (R01)	\$312,480	\$28,400	11.00
Bikes & Pedestrians	Add buffered bike lane	0.65 (R33PB)	\$886,500	\$284,000	3.12
All	Install median barrier	0.75 (R03)	\$492,500	\$20,000	24.63



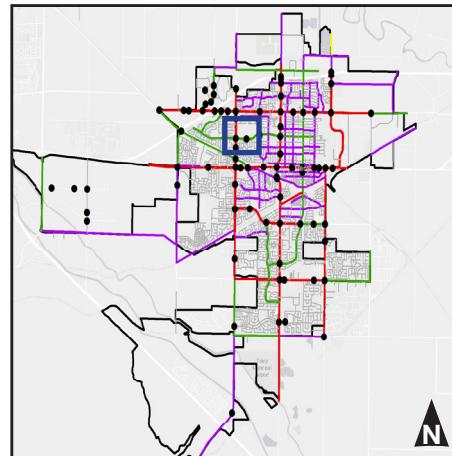
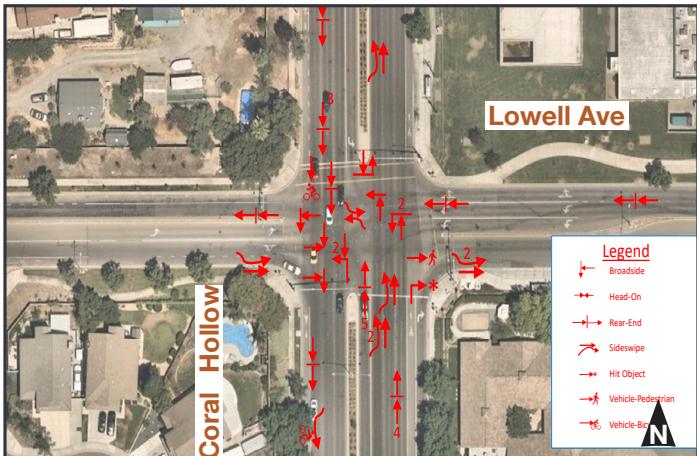
## Case Study Sheet: Location #8

**Project Name:** Tracy LRSP  
**Agency Name:** Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

INTERSECTION

### Project Location Description & Maps:



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	40
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 4
<b>Top 2 Collision Types</b>	Rear-End (42.5%) Sideswipe (22.5%) Broadside (22.5%)
<b>Total Nighttime Collisions</b>	12
<b>Wet Surface Collisions</b>	5
<b>Drug and Alcohol Related Collisions</b>	1

Traffic Data	
<b>Number of Approaches</b>	4
<b>Total Entering Vehicles</b>	26,101
<b>Crosswalk Condition</b>	3 Legs with Pedestrian Timing
<b>Control Type</b>	Signalized
<b>Lighting</b>	Yes
<b>Highest Posted Speed Limit</b>	40 MPH
<b>Median</b>	Yes

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
35	1	3

### Additional Notes:

- Tire marks on south leg median, clipped by westbound lane movements
- 3 bicycle involved collisions
- Evidence that this intersection needs pavement upgrades



## Countermeasure Evaluation

Primary Issues	Potential Counter-measures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
Bike & Pedestrian	Install green paint in bicycle lanes	0.65 (R32PB)	\$539,000	\$15,000	35.93
All	Improve signal timing (coordination, phasing, red, yellow, operation)	0.85 (S03)	\$1,237,200	\$8,000	154.65
Bike & Pedestrian	Install High-Visibility crosswalk	0.81 (4124)	\$292,600	\$75,000	3.90
All	Install retroreflective backplates	0.85 (S02)	\$1,237,200	\$12,000	103.10
Bike & Pedestrian	Install advanced dilemma zone detection	0.60 (S04)	\$3,299,200	\$34,000	97.04
All	Install raised medians (refuge islands)	0.55 (NS19PB)	\$3,711,600	\$25,000	148.46
Bike & Pedestrian	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	0.40 (S21PB)	\$4,948,800	\$8,000	618.60
Bike & Pedestrian	Pedestrian scramble during school hours	0.60 (S19PB)	\$616,000	\$120,000	5.13



## Project Template: Location #3

**Project Name:** Tracy LRSP  
**Agency Name:** Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

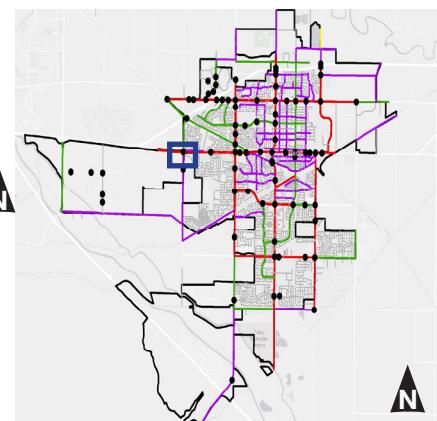
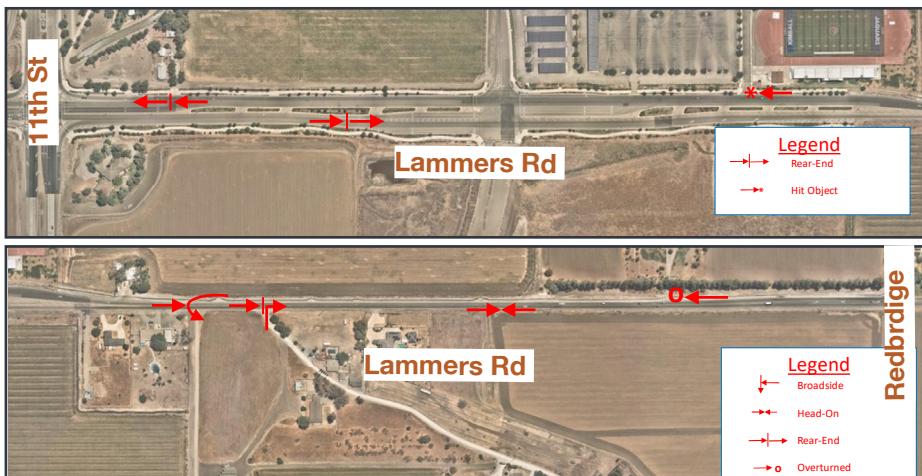
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

SEGMENT

### Project Location Description & Maps:

**Segment:** Lammers Rd - 11th St to Redbridge Rd (Collector)

**Examples of Similar Segments:** S Lammers Rd - W Schulte Rd to Valpico Rd, W Schulte Rd - S Lammers Rd to Hansen Rd



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	7
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 1
<b>Top 3 Collision Types (percentage)</b>	Rear-End (42.9%) Broadside (14.3%) Hit Object (14.3%) Head-On (14.3%) Overturned (14.3%)
<b>Total Nighttime Collisions</b>	2
<b>Wet Surface Collisions</b>	1
<b>Drug and Alcohol Related Collisions</b>	0

Traffic Data		
<b>Average Daily Traffic (ADT)</b> 15,825		
Lighting		
<b>Highest Posted Speed Limit</b> 35 MPH		

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
5	0	0

### Additional Notes:

- Adjacent to high school
- Wide roadway and lanes
- High speeding
- During school release there are two outbound lanes from driveway



## Countermeasure Evaluation

Primary Issues	Potential Countermeasures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
All	Install dynamic/variable speed warning systems	0.70 (R26)	\$509,880	\$32,000	15.93
Bikes & Pedestrians	Modify signal phasing to implement a Leading Pedestrian Interval (LPI) at school signal	0.40 (S21PB)	-	\$8,000	-
All	Add safety edges	0.70 (R15)	\$509,880	\$22,000	23.18



## Project Template: Location #10

**Project Name:** Tracy LRSP  
**Agency Name:** Tracy  
**Contact Name:** Anju Pillai, P.E.  
**Email:** Anju.Pillai@cityoftracy.org

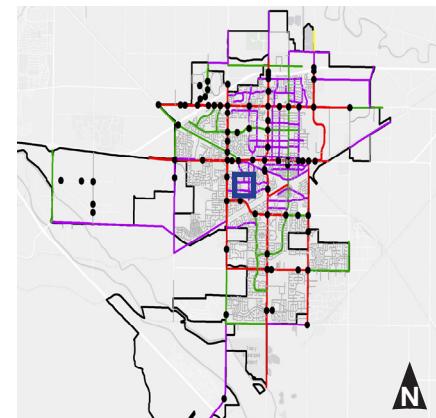
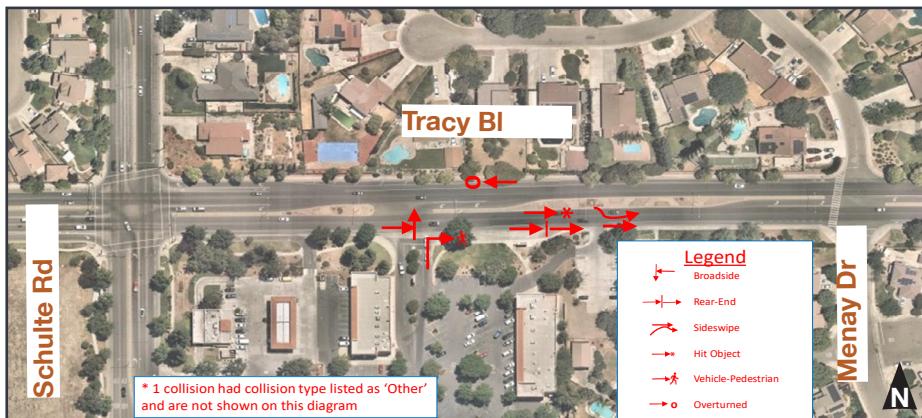
**Prepared by:** Kimley-Horn  
**Checked by:** Darryl DePencier  
**Date:** February 2022

SEGMENT

### Project Location Description & Maps:

**Segment:** Tracy Blvd - Schulte Rd to Menay Dr (Principal Arterial)

**Examples of Similar Segments:** Sycamore Pkwy - W Schulte Rd to Amberwood Way, Coral Hollow Rd - W Schulte Rd to Golden Leaf Ln



### Traffic and Geometric Data:

Collision Data	
<b>Total Collisions</b>	7
<b>Fatal and Injury Collisions</b>	Fatal Injury - 0 Severe Injury - 0 Visible Injury - 0
<b>Top 3 Collision Types (percentage)</b>	Rear-End (14.3%) Broadside (14.3%) Hit Object (14.3%)
<b>Total Nighttime Collisions</b>	2
<b>Wet Surface Collisions</b>	1
<b>Drug and Alcohol Related Collisions</b>	0

Traffic Data	
<b>Average Daily Traffic (ADT)</b>	7,604
<b>Lighting</b>	Yes
<b>Highest Posted Speed Limit</b>	45 MPH

Collision Breakdown		
Veh vs. Veh	Veh vs. Ped	Veh vs. Bike
3	1	0

### Additional Notes:

- One pedestrian involved crash
- Not a high priority location



## Countermeasure Evaluation

Primary Issues	Potential Countermeasures	Crash Modification Factor (LRSM/CMF ID)	20 Year Safety Benefit	Total 20-Year Costs	Safety Related B/C
All	Install dynamic/variable speed warning systems	0.70 (R26)	\$273,960	\$32,000	8.56



# Local Road Safety Plan City of Tracy

LRSP Workshop

# Agenda

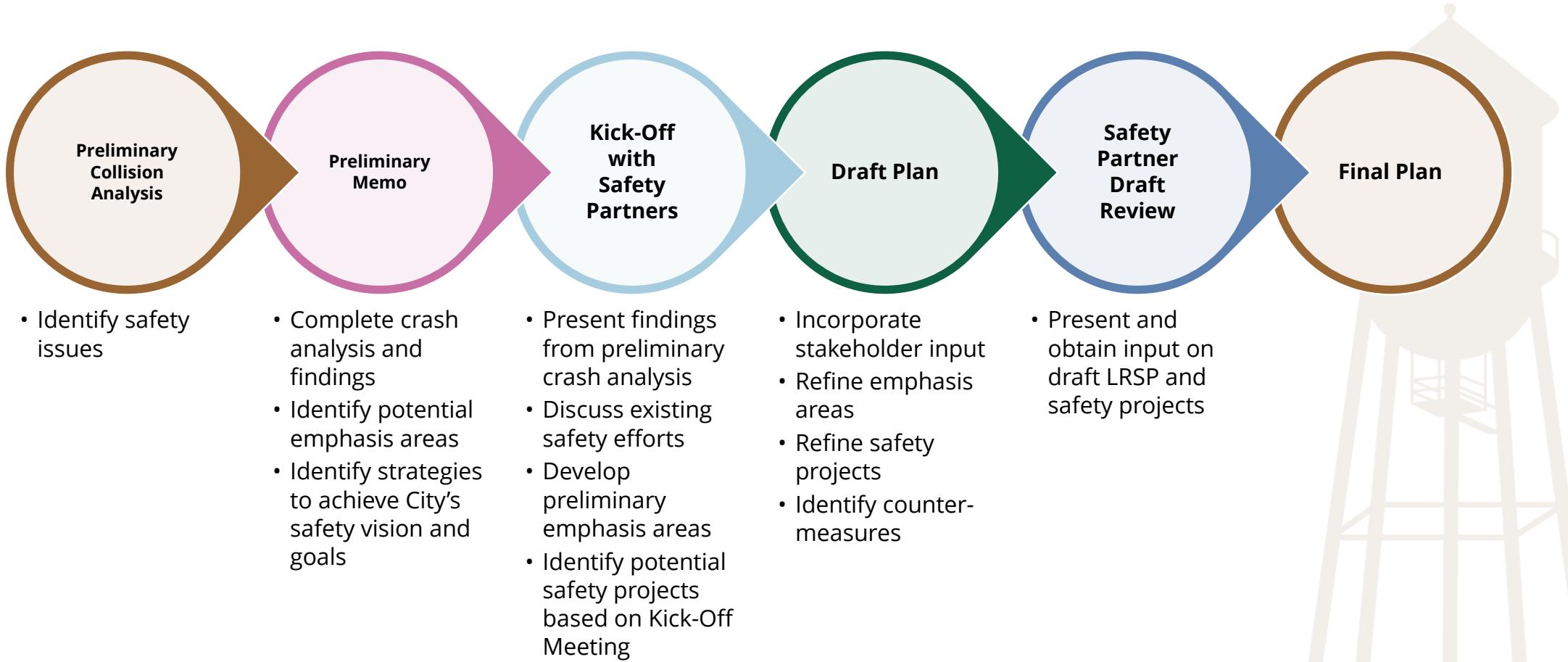
- Project Overview
- Project Purpose
- Citywide Safety Background and Trends
- Emphasis Areas
- Case Study/Field Visit Locations

# Project Overview

- What is a Local Road Safety Plan (LRSP)?
  - A statewide data-driven traffic safety plan that coordinates the efforts of a wide range of organizations to reduce traffic accident fatalities and serious injuries on all public roads.

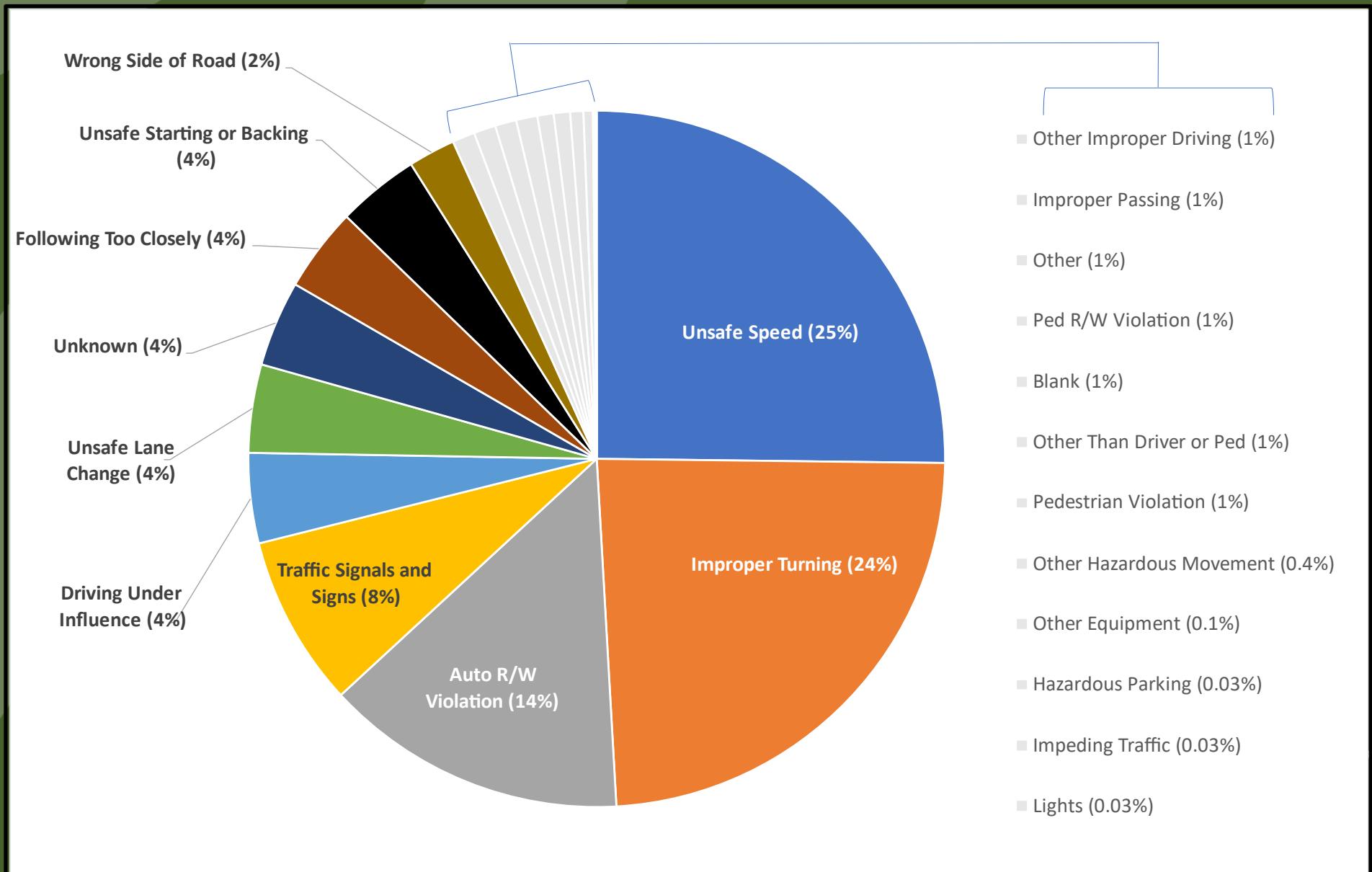


# Project Overview

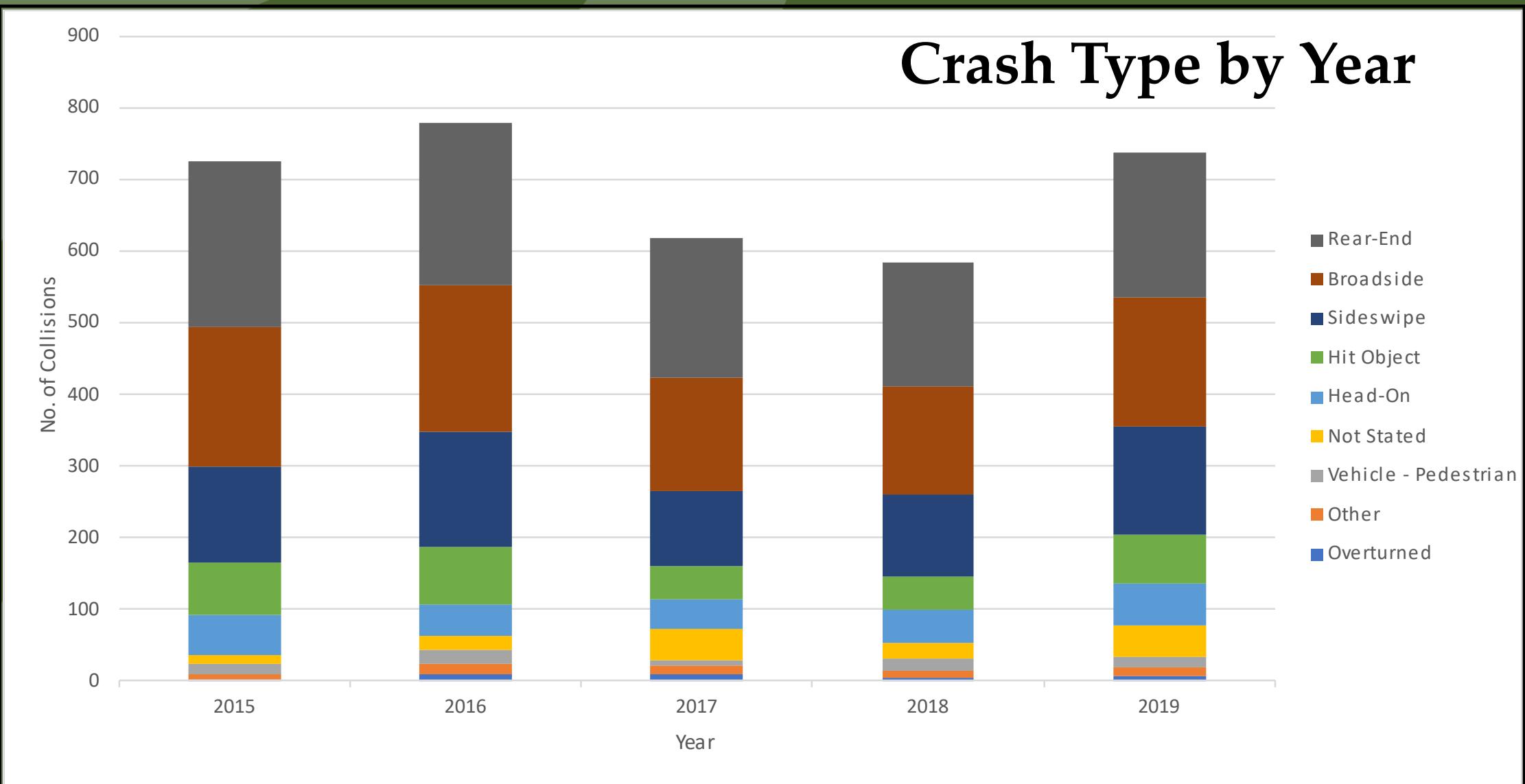


# Citywide Safety Background and Trends

- Cause of Crash
- 2015-2020



# Citywide Safety Background and Trends (2015-2020)





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# Statewide Comparison (2009-2018)

Challenge Area	Statewide %	Tracy %	# of Tracy Collisions	% Difference
Lane Departure	42.1%	55.1%	435	12.9%
Impaired Driving	23.8%	31.4%	248	7.6%
Commercial Vehicles	6.5%	11.5%	91	5.0%
Improper Use of Occupant Protection	13.8%	18.0%	142	4.2%
Young Drivers	12.3%	13.7%	108	1.3%
Work Zones	1.4%	2.5%	20	1.1%
Aging Drivers (65+)	13.1%	13.3%	105	0.2%
Distracted Driving	4.7%	2.7%	21	-2.1%
Aggressive Driving	33.3%	30.9%	244	-2.4%
Bicyclists	7.5%	3.3%	26	-4.2%
Motorcyclists	21.8%	15.6%	123	-6.2%
Intersections	23.9%	8.0%	63	-15.9%
Pedestrians	19.3%	0.6%	5	-18.7%

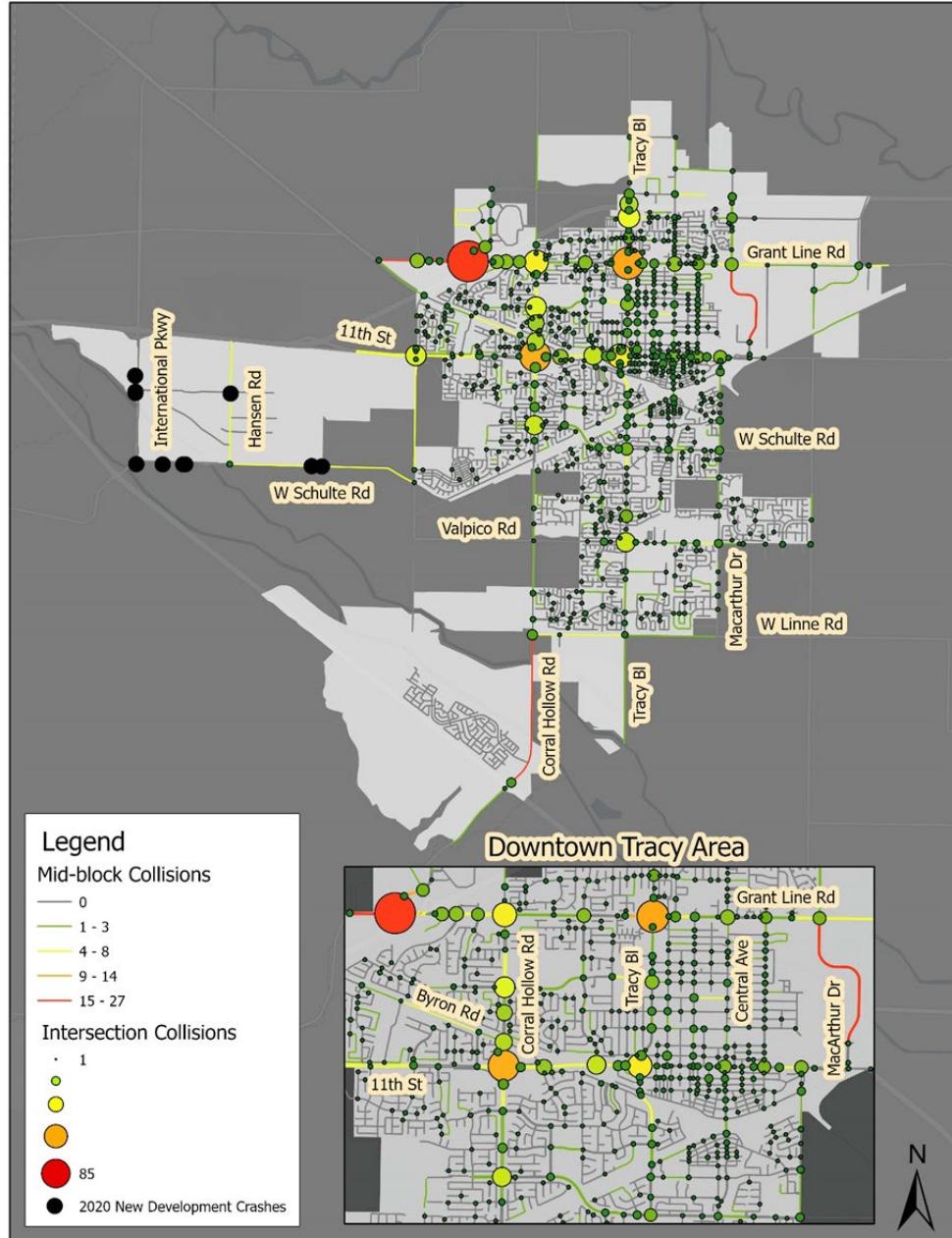


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# Crash Spatial Distribution (2015-2020)

- Density at intersections & along roadway segments between the intersections (mid-blocks) in the entire City

February 7, 2023





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# Emphasis Areas

## 1. Impaired Driving

- Includes any collisions involving use of alcohol or drugs (8% of all collisions)
- Countermeasures include:
  - Sobriety checkpoints
  - Impaired driving educational campaign
  - Additional enforcement presence
  - Implement lighting and speed control along high frequency corridors

## 2. Lane Departure Collisions

- Includes all head-on, hit object, and overturned collisions (17% of all collisions)
- Countermeasures include:
  - Speed feedback signage
  - Speed checks
  - Guardrails
  - Median barriers
  - Safety edge
  - Segment lighting



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# Emphasis Areas

## 3. Young Drivers

- Includes collisions involving drivers aged 15 to 20 (27% of all collisions)
- Countermeasures include:
  - Driver's education courses
  - Increased enforcement in hot spots

## 4. Vulnerable Road Users (Pedestrians and Bicyclists)

- Includes collisions involving pedestrians and bicyclists
- 44% of fatalities and 21% of severe injuries involved pedestrians
- 14% of severe injuries involved bicyclists
- Countermeasures include:
  - Pedestrian and bicycle priority detection at key locations
  - Install bicycle lanes, rectangular rapid flashing beacons (RRFBs), pedestrian scramble
  - Implement Leading Pedestrian Interval (LPI) timing
  - Establish education and training program to improve pedestrian and bicyclist safety



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# Case Study/Site Visit Locations

- 1. Unsignalized Intersection:** F Street & 11th Street
- 2. Unsignalized Intersection:** Parker Avenue & Eaton Avenue
- 3. Roadway Segment:** Holly Drive from Larch Road to Sloan Court
- 4. Roadway Segment:** Pavilion Parkway from Robertson Drive to Auto Plaza Way
- 5. Signalized Intersection:** Naglee Road & Grant Line Road
- 6. Roadway Segment:** Grant Line Road from Lammers Road to Byron Road
- 7. Roadway Segment:** Byron Road from Berg Road to Belconte Drive
- 8. Signalized Intersection:** Lowell Avenue & Corral Hollow Road
- 9. Roadway Segment:** Lammers Road from 11th Street to Redbridge Road
- 10. Roadway Segment:** Tracy Boulevard from Schulte Road to Menay Drive



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# Countermeasure Toolbox

Countermeasure	Crash Reduction Factor (CRF)
Install High-Visibility Crosswalk	19%
Install traffic signals	25%
Install/upgrade larger or additional stop signs/other intersections warning/regulatory signs (stop signs with LED borders)	15%
Install raised medians (refuge islands)	45%
Add segment lighting	35%
Remove or relocate fixed objects outside of Clear Recovery Zone	35%
Install Median Barrier	25%
Install Safety Edges	30%
Install dynamic/variable speed warning systems	30%
install delineators, reflectors, and or object markers	15%
Install edge-lines and centerlines	25%
Install bike lane (class III/sharrows)	35%



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# Countermeasure Toolbox (continued)

Countermeasure	Crash Reduction Factor (CRF)
Install separated bike lanes (Class IV)	19%
Install Rectangular Rapid Flashing Beacon (RRFB)	25%
Install retroreflective backplates	15%
Improve signal timing (coordination, phasing, red, yellow, operation)	45%
Install advanced dilemma zone detection	35%
Provide protected left-turn phase	35%
Install raised pavement markers and striping (Through Intersection)	25%
Pedestrian Scramble	30%
Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	30%



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# Discussion and Q&A