RESOLUTION 2022 – 148

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LINCOLN
AUTHORIZING THE ADOPTION OF THE LOCAL ROADWAY SAFETY PLAN (LRSP)
AND DELEGATING AUTHORITY TO THE CITY ENGINEER
TO ADOPT UPDATES TO THE PLAN

WHEREAS, on November 12, 2019, the City Council adopted Resolution No. 2019-251 approving and allowing the City Manager to execute Program Supplemental Agreement No. V56 to the Administering-State Agreement for State-Funded Projects for the development of the Local Road Safety Plan (LRSP); and

WHEREAS, on January 21, 2021, the City of Lincoln received a grant for $53,000, with a local match of $26,927 for a project total of $79,927 from the State to develop the Local Roadway Safety Plan (LSRP); and

WHEREAS, starting in 2021 Caltrans, will require any agency applying for Highway Safety Improvement Program (HSIP) funding to have an adopted Local Roadway Safety Plan (LRSP) to be eligible for traffic safety project funding; and

WHEREAS, the consultant completed the LRSP, City staff reviewed and completed the review of the LRSP, and now recommends that City Council approves and adopts the document; and

WHEREAS, the City Council of the City of Lincoln wishes to delegate authority to the City Engineer to update the Plan, when based upon the advice of a professional engineer, provided that the City Council and City Manager receive notification of such updates.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Lincoln authorizes:

1. The adoption of the Local Road Safety Plan for the City of Lincoln in the form attached hereto as Exhibit "A."

2. The City Engineer to adopt updates to the Local Road Safety Plan if such updates are based upon the advice of a licensed, professional engineer. Notification of the updates shall be provided timely to the City Manager and City Council.

PASSED AND ADOPTED this 14th day of June 2022.

AYES: COUNCILMEMBERS: Silhi, Joiner, Karleskint, Lauritsen, Andreatta

NOES: COUNCILMEMBERS:

ABSENT: COUNCILMEMBERS:

Holly Andreatta

Holly Andreatta, Mayor

ATTEST:

Gwen Scanlon

Gwen Scanlon, City Clerk

Attachment A:

Local Roadway Safety Plan (LRSP) Final Report

CITY OF LINCOLN
Local Roadway Safety Plan (LRSP)









Prepared for:

Prepared by:

Kimley»Horn

Expect More. Experience Better.

FINAL REPORT

For

City of Lincoln

LOCAL ROADWAY SAFETY PLAN (LRSP)

Prepared for:

City of Lincoln
Community Development Department
600 Sixth Street
Lincoln, California 95648

Prepared by:

Kimley»Horn
Expect More. Experience Better.

Kimley-Horn
555 Capitol Mall, Suite 300
Sacramento, California 95814
(916) 858-5800

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ACKNOWLEDGEMENTS

The City of Lincoln employees and partners were instrumental in the development, review, and refinement of this Local Roadway Safety Plan. The City of Lincoln Community Development Department and Kimley-Horn would like to express their appreciation to the following supporting staff and partners for their participation and contributions:

City of Lincoln

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Mark Swarksbrook *(Maintenance)*
Will Foote *(Building)*
Steve Prosser *(Community Development)*

Western Placer Unified School District

Mike Adell

Consultant Team (Kimley-Horn)

Robert Paderna
Amy Butler
Darryl DePencier
Molly O'Brien
Zachary Ramalingam
Matt Weir

STATUTORY NOTICE

23 U.S.C. § 409: US Code - Section 409: Discovery and admission as evidence of certain reports and surveys

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway- highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds 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 mentioned or addressed in such reports, surveys, schedules, lists, or data.

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LIST OF ACRONYMS

A	Severe Injury Crash
AASHTO	American Association of State Highway and Transportation Officials
ARIDE	Advance Roadside Impaired Enforcement
ATP	Active Transportation Program
B	Non-incapacitating Injury Crash
BCR	Benefit/Cost Ratio
C	Possible Injury Crash
Caltrans	California Department of Transportation
CCR	Critical Crash Rate
City	City of Lincoln
CMF	Crash Modification Factor
CRF	Crash Reduction Factor
CTC	California Transportation Commission
DEV	Daily Entering Volume
DRE	Drug Recognition Expert
EPDO	Equivalent Property Damage Only
FAST	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
GIS	Geographic Information System
HFST	High Friction Surface Treatment
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
IIP	Interregional Improvement Program
ITIP	Interregional Transportation Improvement Program
K	Fatal Crash
K+SI	Fatal and Severe Injury Crashes
LPI	Leading Pedestrian Interval
LRSM	Local Roadway Safety: A Manual for California's Local Road Owners (Version 1.5, April 2020)
LRSP	Local Roadway Safety Plan
NHTSA	National Highway Traffic Safety Administration
O	No Injury Crash (Property Damage Only)
OTS	Office of Traffic Safety
PDO	Property Damage Only
RRFB	Rectangular Rapid Flashing Beacon
R/W	Right-of-Way
SACOG	Sacramento Area Council of Governments
SB1	California Senate Bill 1
SHSP	Strategic Highway Safety Plan
STIP	State Transportation Improvement Program
SWITRS	Statewide Integrated Traffic Records System
VMT	Vehicle Miles Traveled

Section 1

INTRODUCTION



1. INTRODUCTION



The City of Lincoln is located in Placer County and is one of the fastest growing cities in the Sacramento Metropolitan Area. Lincoln has a population approaching 50,000 and covers approximately 24 square miles. The City's transportation network includes 253 centerline miles of City-maintained roads and 24 traffic signals, the majority of which are located on key arterial and collector roadways.

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 type of crash, certain locations, and notable relationships between current efforts and crash history. The LRSP analyzes crash data on an aggregate basis, as well as at specific locations to identify citywide safety trends, high-crash locations, high-risk locations, and locations with unusual crash patterns or high-crash severities. The analysis of crash history throughout the City's transportation network allows for opportunities to:

- Identify safety factors in the transportation network that may be challenging for various roadway users
- Improve safety at specific high-crash and high-risk locations
- Develop safety measures aligning with the California Strategic Highway Safety Plan (SHSP) Five Es of safety: **Engineering, Enforcement, Education, Emergency Response, and Emerging Technologies,** to encourage safer driver behavior and reduce fatalities and severe injuries



The process and analysis performed in development of the City's LRSP, including establishing the initial vision and goals for the LRSP, performing crash history analysis, identification of emphasis areas and recommended engineering and non-engineering safety countermeasures are summarized in this LRSP. The information compiled provide a foundation for decision making and prioritization for safety countermeasures and projects that enhance safety for all modes of travel within the City.

The City has taken steps to enhance multi-modal safety and through this LRSP is continuing to make safety a priority in its planning processes. The City builds upon the safety practices that have led to prioritizing traffic safety across its road network in this LRSP by identifying areas of emphasis and systemic recommendations that can be implemented to further enhance safety. This LRSP analyzes the most recent range of crash data that was available at the start of the project (January 1, 2015 – December 31, 2019) and roadway improvements to assess historic trends, crash patterns, and areas of increasing concern.

The intent of the LRSP is to:



1.1. Document Organization

The LRSP is organized into the following sections:

Section 1	*Provides an introduction to the LRSP.*
Section 2	*Presents the vision, goal, and objectives for the LRSP.*
Section 3	*Summarizes the LRSP development process including guidance documents and analysis techniques.*
Section 4	*Presents the project stakeholders and stakeholder engagement.*
Section 5	*Summarizes the review of City planning documents.*
Section 6	*Contains the LRSP data sources.*
Section 7	*Provides a summary of safety trends.*
Section 8	*Includes recommended engineering and non-infrastructure countermeasures.*
Section 9	*Summarizes the evaluation and implementation of the safety countermeasures.*
Section 10	*Identifies next steps.*
Appendices	

Section 2

VISION, GOAL, AND OBJECTIVES



2. VISION, GOAL, AND OBJECTIVES

This 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 and passengers, bicyclists, and pedestrians), the interaction of travel modes, 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 reaction to crashes as they occur.

The Federal Highway Administration (FHWA) maintains a list of Proven Safety Countermeasures. The list currently contains twenty (20) Proven Safety Countermeasures, one of which is the LRSP. Implementation of LRSPs has improved safety in local jurisdictions across the country by providing a guide for local jurisdictions to systemically address the conditions that are know to contribute to fatal and severe-injury crashes. LRSPs provide a locally developed and customized "roadmap" to directly address the jurisdictions' most common safety challenges.

Following discussions with City staff and a review of existing plans and policies for the area, the following Vision, Goal, and Objectives were established for this LRSP:

VISION:

Support the California vision of moving towards significantly reducing fatalities and severe injuries for all road users

GOAL:

Identify transportation safety initiatives (projects and programs) and partnerships under the 5 Es of traffic safety including Engineering, Enforcement, Education, Emergency Response, and Emerging Technologies, to continue reducing fatalities and severe injuries in Lincoln.

OBJECTIVES:

- Identify major contributing factors to crashes and define priority locations for roadway safety improvements including pedestrian, bicycle, and vehicular modes of travel
- Identify cost-effective countermeasures and safety investments that can be applied systemically (i.e., flashing yellow arrow, retroreflective backplates, leading pedestrian interval, etc.)
- Promote safe, equitable, and multimodal mobility opportunities
- Create an LRSP document to capitalize on established safety initiatives and identify other strategies to prioritize safety investments
- Document Lincoln's procedures for on-going crash data monitoring
- Utilize LRSP as a baseline to monitor crash trends and overall safety performance of City's transportation network

Section 3

PROCESS



3. PROCESS

One of the primary objectives of the City of Lincoln and its stakeholders is to provide safe, sustainable, and efficient mobility choices for their residents and visitors. The City will continue its collaboration with stakeholders to identify and discuss safety issues within the community through the development of the LRSP and its implementation.

Guidance on the LRSP process is provided at both the national and State level through the FHWA and the California Department of Transportation (Caltrans), respectively. Both agencies have developed a general framework of data and recommendations to be included in a LRSP.

The FHWA encourages:

- The establishment of a working group (Stakeholders) to participate in developing an LRSP
- Review crash, traffic, and roadway data to identify areas of concern
- Establish goals, priorities, and countermeasures to recommend improvements at spot locations, systemically, and comprehensively

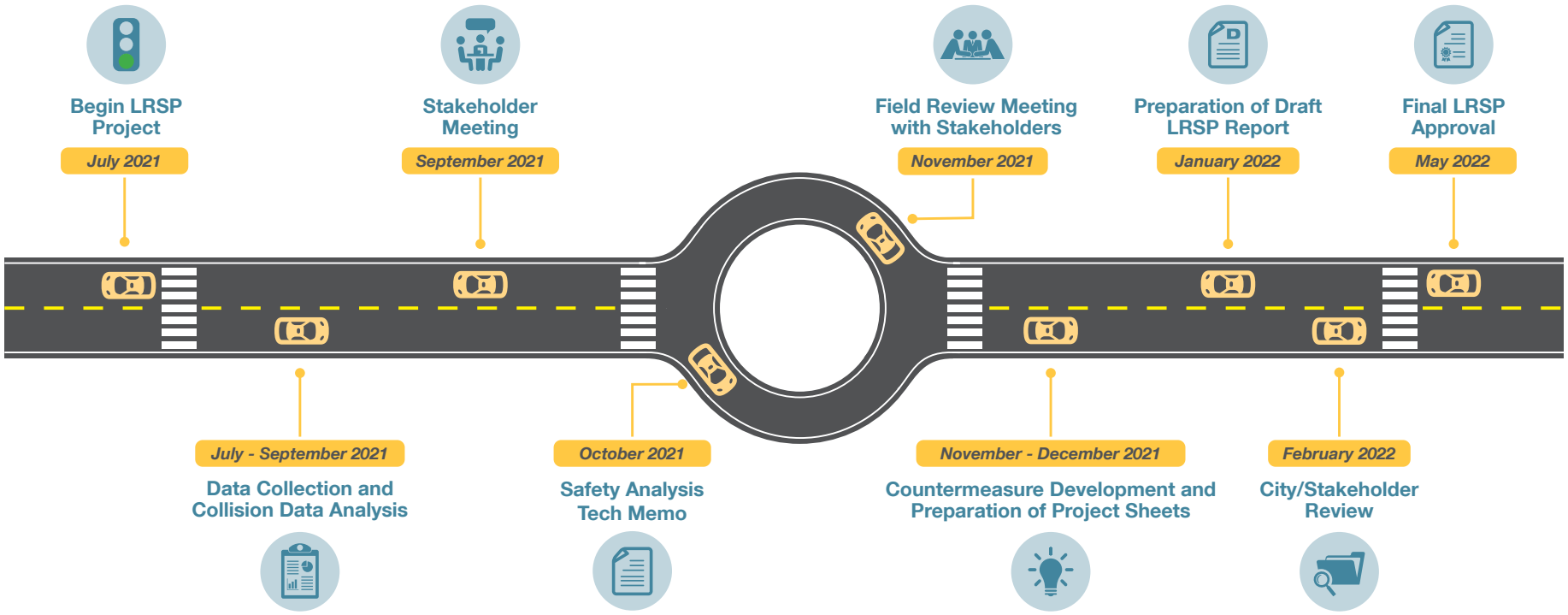
Caltrans' guidance follows a similar outline with the following steps:

- Establish leadership
- Analyze the safety data
- Determine emphasis areas
- Identify strategies
- Prioritize and incorporate strategies
- Evaluate and update the LRSP

This LRSP documents the results of data and information obtained, including the vision, goal, and objectives for the LRSP; existing safety efforts; collision analysis; emphasis areas; and project sheets for priority locations. Furthermore, the development of the LRSP recommendations considers the "Five Es" of traffic safety defined by the California SHSP: Engineering, Enforcement, Education, Emergency Response, and Emerging Technologies throughout its process.

Figure 1 illustrates the project timeline.

FIGURE 1: *LRSP Project Timeline*



3.1. Guiding Manuals

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

This process uses the latest National and State best practices for statistical roadway analysis described in the following sections.

3.1.1. Local Roadway Safety: A Manual for California's Local Road Owners

Caltrans published the Local Roadway Safety: A Manual for California's Local Road Owners (Version 1.5, April 2020) (LRSM) with the intention of encouraging local agencies to pursue a proactive approach to identifying and analyzing safety issues, while preparing to compete for project funding opportunities.

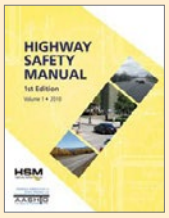
A proactive approach is defined as analyzing the safety of the entire roadway network through either a one-time, network wide analysis, or by routine analyses of the roadway network.

According to the 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 grant 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 (BCR). The LRSM suggests using a mixture of quantitative and qualitative measures to identify and rank locations that considers 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 traffic control 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 crash reduction that can be expected from implementation of a given countermeasure. If more than one countermeasure is under consideration, the LRSM provides guidance on how to apply CMFs appropriately.

3.1.2. Highway Safety Manual



The American Association of State Highway and Transportation Officials (AASHTO) Highway Safety Manual (HSM), published in 2010, presents a variety of methods for quantitatively estimating crash frequency or severity at a variety of locations. This four-part manual is divided into 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 realize a reduction in the frequency of crashes.

The HSM identifies five steps in this process:

1. **Establish Focus:** Identify the purpose or intended outcome of the network screening analysis. This decision will influence data needs, the selection of performance measures and the screening method that can be applied.
2. **Identify Network and Establish Reference Populations:** Specify the types of sites or facilities being screened (i.e., segments, intersections, geometrics) and identify groupings of similar sites or facilities.
3. **Select Performance Measures:** There are a variety of performance measures available to evaluate the potential to reduce crash frequency at a site. In this step, the performance measure is selected as a function of the screening focus and the data and analytical tools available.
4. **Select Screening Method:** There are three principal 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.

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

3.2. Analysis Techniques

3.2.1. Crash and Network Screening Analysis

Intersections and roadways were analyzed using four crash metrics:

- Number of Crashes
- CCR (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 crash analysis established sub-populations of roadway segments and intersections that have similar characteristics. For this LRSP, intersections were grouped by their control type (Signalized and Unsignalized) and segments by their roadway category (Major Arterial, Minor Arterial, Collector, and Local). Individual crash 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 occurring.

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:



CRASH SEVERITY – *fatal, severe injury, other visible injury, complaint of pain, and property damage only (PDO)*

CRASH TYPE – *broadside, rear-end, sideswipe, head-on, hit object, overturned, bicycle, pedestrian, and other*

ENVIRONMENTAL FACTORS – *lighting and wet roads*

DRIVER BEHAVIOR – *impaired, aggressive, and distracted driving*

From the results of the network screening analyses, a short-list of locations was chosen based on crash activity, CCR, crash severity, crash patterns, location type, and area within the City 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 City.

3.2.2. Critical Crash Rate (CCR) Analysis

Reviewing the number of crashes at a location is a good way to understand the cost to society incurred at the local level, but does not provide a complete indication of the level of risk for those who use that intersection or roadway segment on a daily basis. The HSM describes the CCR 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 CCR analysis compares the observed crash rate to the expected crash rate at a particular location based on facility type and traffic 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-percent 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. A CCR value of greater than zero reflects a location that has a higher crash rate than facilities with similar volumes, while a negative CCR value signifies a below-average crash rate. It should be noted that the CCR does not reflect the severity of the crashes occurring at the location, but rather the number of crashes for the given volume.

⚠ 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 is calculated using:

- Daily Entering Volume (DEV) 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
- Crash records in Geographic Information Systems (GIS) or tabular form including coordinates or linear measures

⊕ STRENGTHS

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

⊖ WEAKNESSES

- Does not account for regression to the mean bias

3.2.3. Probability of Specific Crash Types Exceeding Threshold Proportion

When analyzing crash data systematically, it is important to identify areas where certain types of crashes are occurring with greater frequency. The HSM describes a method of identifying locations where probability of a specific crash type exceeds the threshold population. This method prioritizes locations based on the probability that the true proportion (long-term predicted proportion) of a type of crash or injury level will exceed the threshold proportion. The threshold proportion is based on the proportion of a specific crash type/severity to all crashes within the dataset (HSM, Chapter 4). This analysis identifies locations where certain crash types are over-represented to be isolated for further analysis.

3.2.4. Equivalent Property Damage Only (EPDO)

The EPDO method is described in the HSM. This method assigns weighting factors to crashes based on injury level (severe, injury, property damage only, etc.) 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 value 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 value allows all locations to be compared based on injury crash costs (HSM, Chapter 4).

EPDO FORMULA: FORMULA

$$EPDO = \frac{(N_F + N_S) * 2{,}530{,}000 + (N_O * 142{,}300) + (N_C * 80{,}900) + (N_{PDO} * 13{,}300)}{13{,}300}$$

Where,

EPDO = Equivalent Property Damage Only (in units of crashes)
N_F = Number of fatal crashes
N_S = Number of severe injury crashes
N_O = Number of other visible injury crashes
N_C = Number of complaint of pain crashes
N_{PDO} = Number of PDO crashes

Source: Highway Safety Manual

The cost to society for each crash type at unsignalized intersections is as follows:

- Fatal: $2,530,000
- Severe: $2,530,000
- Other Visible Injury: $142,300
- Complaint of Pain: $80,900
- PDO: $13,300

To give an example from Appendix D, the intersection of A Street & McBean Park Drive/4th Street had 4 crashes. The crashes are broken down by severity as follows: 1 fatal crash, 1 crash resulting in other visible injuries, and 2 PDO crashes.

$$EPDO = \frac{(1 + 0) * 2{,}530{,}000 + (1 * 142{,}300) + (0 * 80{,}900) + (2 * 13{,}300)}{13{,}300} = 203$$

The 4 crashes of ranging severity that took place at the intersection of A Street & McBean Park Drive/4th Street comprise the monetary equivalent of 203 property damage only crashes. This intersection also has a CCR value of -0.02. Together the EPDO and CCR values show that the intersection of A Street & McBean Park Drive/4th Street has historically had a relative crash rate that is slightly lower than average for similar facilities, but that that the crashes that have occurred there have generally resulted in significant levels of injuries.

Section 4

STAKEHOLDER ENGAGEMENT



4. STAKEHOLDER ENGAGEMENT

As part of the LRSP, local stakeholders were included in the process to ensure local perspective was kept at the forefront of this planning effort. A stakeholder group comprised of City staff and external stakeholders was formed. This group consisted of elected officials, members of City staff, representatives from the Lincoln Police Department and the Lincoln Fire Department.

The stakeholders were called together to offer insight on the safety concerns present in the City's transportation network. After the initial network screening and safety analysis, the stakeholder group met in the field to observe ten "priority" locations and to discuss potential countermeasures. The summary of the stakeholder meetings is provided below.

4.1. Stakeholder Meetings

A project stakeholder workshop was conducted virtually on September 20, 2021 . At the meeting, the LRSP stakeholder group was introduced to the project and provided an overview of the data used, data analysis approach, preliminary results and priority/emphasis areas. In addition to the LRSP overview, stakeholders were asked to provide local insight and knowledge for several "priority" locations that were identified after the initial network screening and crash analysis process.

The stakeholder group met in the field on November 17, 2021, at the ten priority locations selected based on the crash analysis and stakeholder input. This meeting provided an opportunity to perform a field assessment and offer another opportunity to solicit feedback from members of the multidisciplinary stakeholder group. Potential safety countermeasures for each location were recommended and discussed at the field review meeting.



Section 5

REVIEW OF CITY PLANNING DOCUMENTS

5. REVIEW OF CITY PLANNING DOCUMENTS

Existing plans, policies, and projects that were recently completed, planned, or are on-going within the City 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.

The following planning documents were reviewed to obtain planned and programmed projects:

- Lincoln Downtown Urban Design Plan, 1992
- NEV Transportation Plan, 2006
- General Plan, 2008
- Bicycle Transportation Plan Update, 2012
- Neighborhood Electric Vehicle (NEV) Map, 2015
- Lincoln Boulevard Improvements Project, 2015
- ADA Transition Plan & Self-Evaluation Update, 2018
- Traffic Signal Communications Master Plan, 2020

A matrix identifying plans and improvements is included in **Appendix A**. The intent of this matrix is to provide an idea of the types of strategies in place or encouraged by the City and to reveal projects that may impact the safety analysis process.



Section 6

DATA SOURCES



6. DATA SOURCES

The following data was obtained from the City for use in crash data analysis.

6.1. Roadway Network

The crash analysis, which is described in detail in **Section 3**, used California Department of Transportation's (Caltrans') roadway classification system. The roadway network classification was assigned to each corridor roadway segment as either a major arterial, minor arterial, collector, or local road to develop crash rates specific to the functional design and capacity. Comparative statistics were stratified by roadway classification (i.e., only major arterials are compared to major arterials).

6.2. Intersections

The crash analysis also required each intersection within the City to be classified by control type. Intersections throughout the City were classified as either signalized or unsignalized. The safety analysis also only compared intersection safety performance with similar control types (i.e., signalized intersections are only compared to signalized intersections) within the City.

6.3. Crashes

Crash data for the five-year period from January 1, 2015 through December 31, 2019[1] was used for the crash analysis. Using data for the past five-year period is sufficient to identify potential trends in crashes by location and type, while not being outdated as to have data that would include long-term technology and cultural changes. The crash data comes from Crossroads, which contains crash records from the Statewide Integrated Traffic Records System (SWITRS) database. This database contains law enforcement records and provide GPS coordinate data that can be used to geocode crashes into a Geographic Information System (GIS) format.

The Crossroads crash data required preliminary cleaning and scrubbing to make it compatible with the GIS network screening tool. In total, there were 835 crash records in the Crossroads database from January 1, 2015 to December 31, 2019. Of these crashes, 683 crash records contained GPS data and were used in the statistical analysis.

[1] *The majority of 2020 traffic volumes and patterns are acknowledged to have been influenced by the COVID-19 pandemic. As a result, this data (all of 2020) was intentionally excluded from this assessment.*

Section 7

SAFETY TRENDS

7. SAFETY TRENDS

The following sections contain the results of the analysis process which included evaluation of fatal and severe injury (K+SI) crashes to statewide K+SI crashes, among other evaluations including crash by severity level, cause, pedestrian, and bicycle crashes. Summary tables presenting the crash data analysis and network screening results for all intersections and roadway segments are provided in Appendix C and Appendix D, respectively.

7.1. K+SI Crashes Compared to Statewide K+SI Crashes

The California SHSP focuses on 16 challenge areas identified by the SHSP Executive Leadership and Steering Committees after an in-depth analysis of California K+SI crash data as well as an extensive statewide outreach process that involved hundreds of diverse traffic stakeholders around the state. Crashes can be attributed to 14 of the 16 challenge areas in Lincoln. Table 1 contains a comparison of City K+SI crashes to the statewide K+SI crashes. Challenge areas where the City percentages were higher than the statewide percentages are noted in Table 1.

TABLE 1: *City K+SI Crashes Compared to Statewide K+SI Crashes*

California SHSP Challenge Area	Lincoln Comparison to Statewide Percentages	City of Lincoln	Statewide Percentages
Intersections	↑	40.00%	23.60%
Young Drivers	↑	24.40%	13.10%
Occupant Protection	↑	20.00%	14.20%
Work Zones	↑	6.70%	1.40%
Lane Departure	↑	46.70%	43.30%
Bicyclists	↑	11.10%	8.30%
Aggressive Driving	↑	35.60%	33.10%
Distracted Driving	↑	6.70%	5.00%
Aging Drivers	↑	13.30%	12.40%
Impaired Driving	↓	22.20%	25.30%
Motorcyclists	↓	17.80%	21.00%
Commercial Vehicles	↓	2.20%	6.40%
Driver Licensing	↓	16.7%	24.3%
Pedestrians	↓	8.90%	19.20%

Source: *Statewide Integrated Traffic Records System (2015 – 2019).*

Notes:

1. *Percentages will not add up to 100%, as a fatality or severe injury could have involved multiple Challenge Areas (i.e., a young driver that was impaired and unrestrained)*
2. *California SHSP does not have reported crash data for the following two challenge areas: Emergency Response and Emerging Technology*

7.2. Severity Level

Knowing the outcomes of the crash (the injuries or type of damage which occurred) is a key part of assessing the environment and safety factors around the site of the crash. Over the observed time period, there were a total of 3 fatal crashes and 11 crashes resulting in severe injuries, as shown in Figure 2. Figure 3 presents crashes by severity resulting in other visible injuries, complaints of pain, and no property damage only (PDO). Table 2 below summarizes the crashes by severity for signalized intersections, unsignalized intersections, and segments.

The National Safety Council developed the "KABCO" injury scale, which is frequently used by law enforcement for classifying injuries:

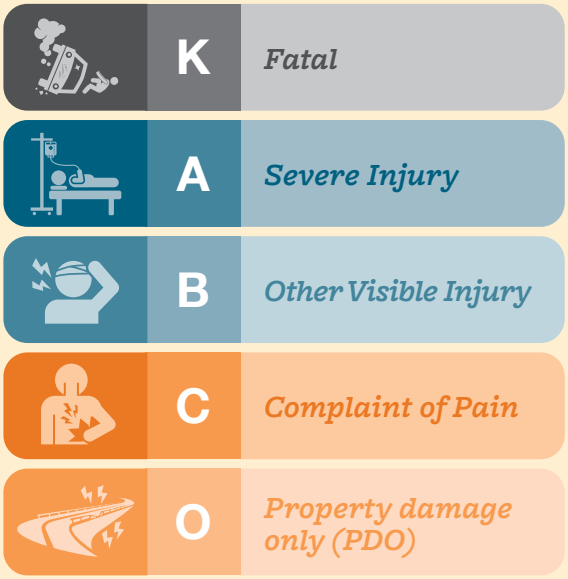


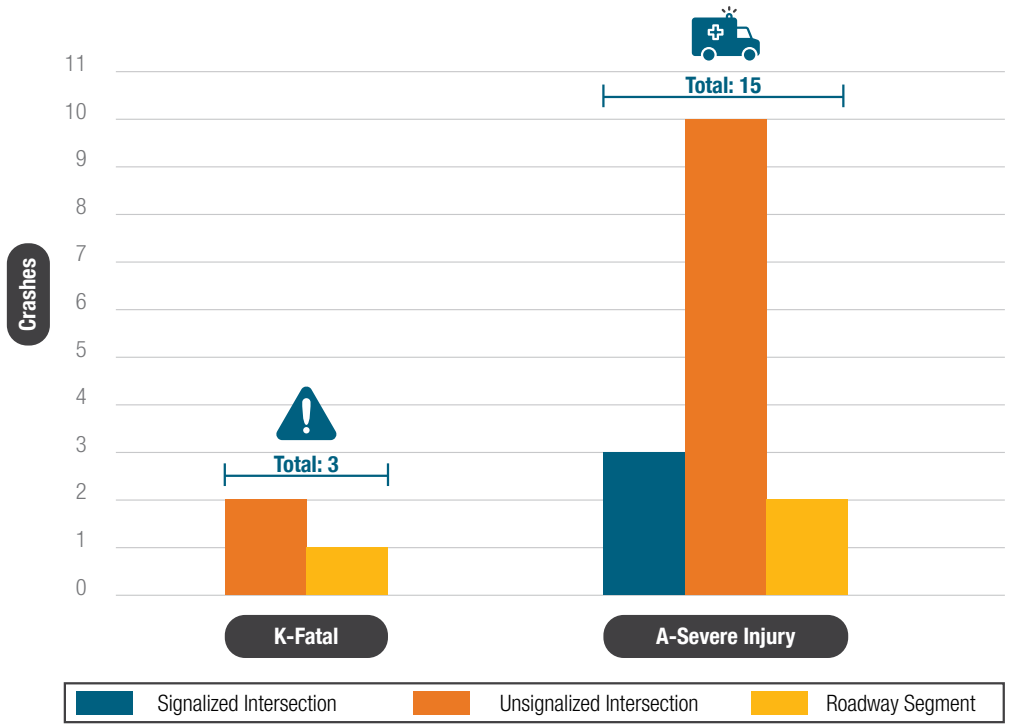
TABLE 2: *Crashes by Severity*

Severity	Signalized Intersection		Unsignalized Intersection		Roadway Segments		Total	
	Crashes	*%*	*Crashes*	*%*	*Crashes*	*%*	*Crashes*	*%*
Fatal	0	0%	2	67%	1	33%	3	0%
Severe Injury	3	20%	10	67%	2	13%	15	2%
Other Visible Injury	48	36%	65	49%	19	14%	132	19%
Complaint of Pain	60	44%	60	44%	15	11%	135	20%
No Injury (PDO)	144	36%	214	54%	40	10%	398	58%
Total	**255**	**37%**	**351**	**51%**	**77**	**11%**	**683**	

Source: Statewide Integrated Traffic Records System (2015 – 2019); processed by Crossroads.

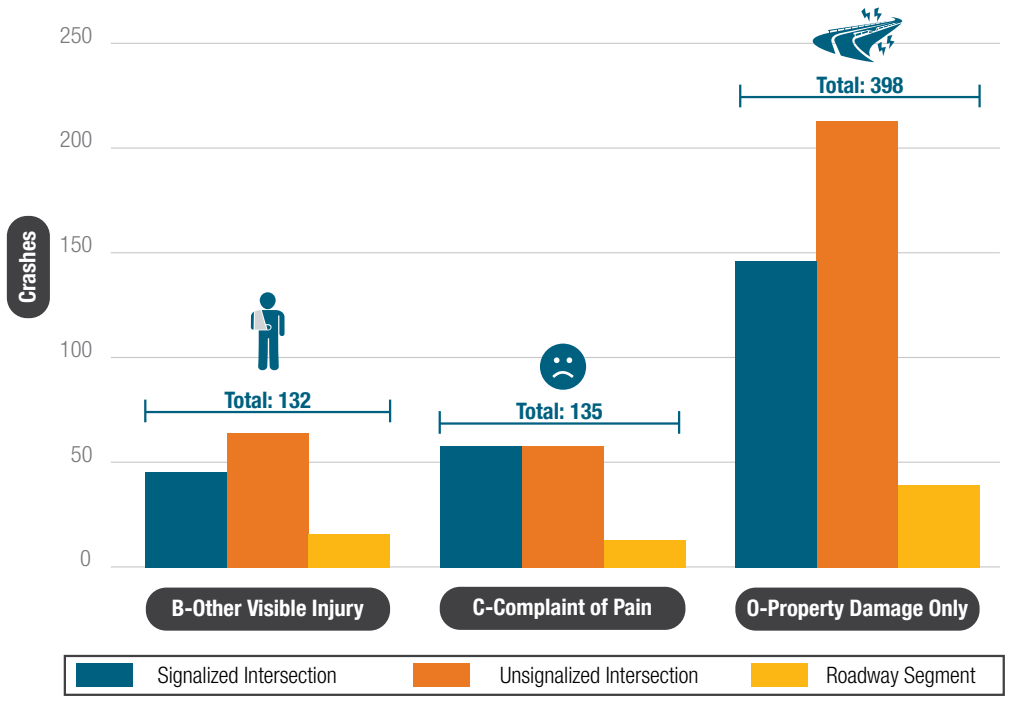
As summarized in Table 2, a high proportion (88%) of crashes in the City over the five year period occurred at intersections. Figure 5 illustrates the intersection K+SI crashes throughout the City. More than half of all the crashes from 2015-2019 occurred at unsignalized intersections.

FIGURE 2: *Crashes by Severity: KA*



Source: Statewide Integrated Traffic Records System (2015 – 2019); processed by Crossroads.

FIGURE 3: *Crashes by Severity: BCO*



Source: Statewide Integrated Traffic Records System (2015 – 2019); processed by Crossroads.

Figure 4 below presents the crashes by severity on a yearly basis. Fatal crashes occurred in 2015 and 2017. Crashes resulting in severe injuries and other visible injuries peaked in 2018 and decreased in 2019. The number of crashes resulting in complaints of pain has shown a decreasing trend, though there is a noticeable increase from 2018 to 2019. Property Damage Only crashes peaked in 2017 and have trended downwards since then.

FIGURE 4: *Crashes by Severity, 5 Year Trend*

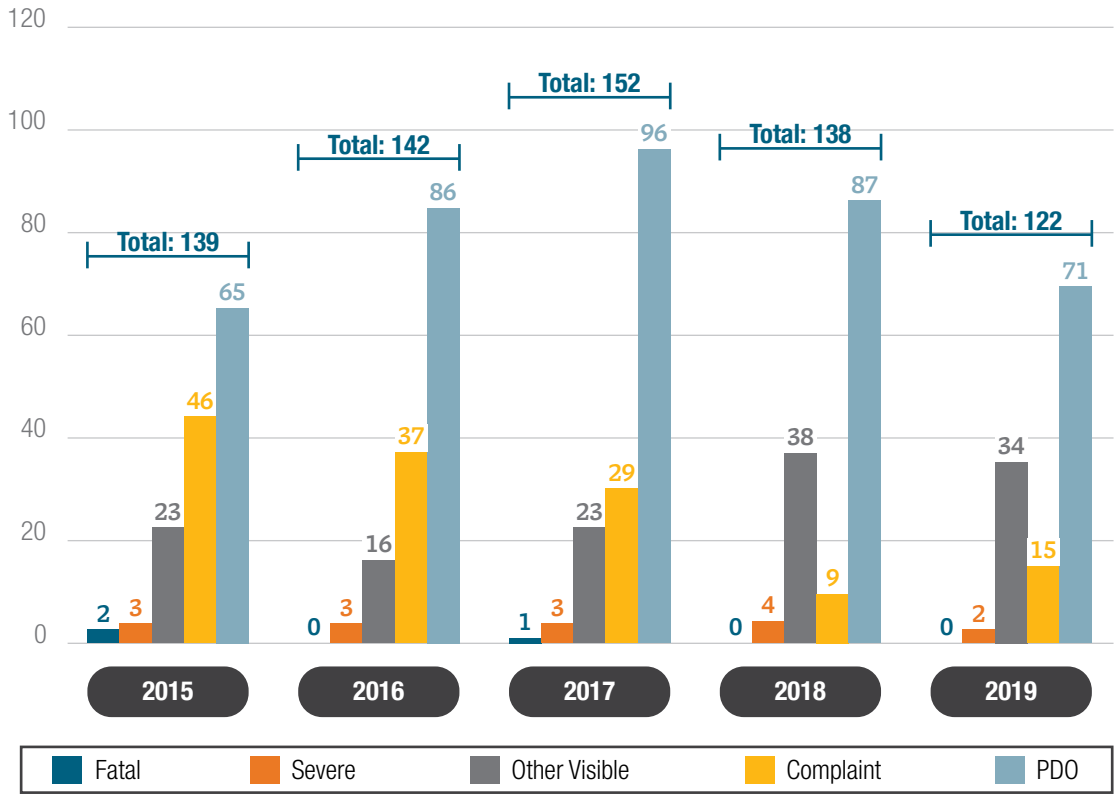
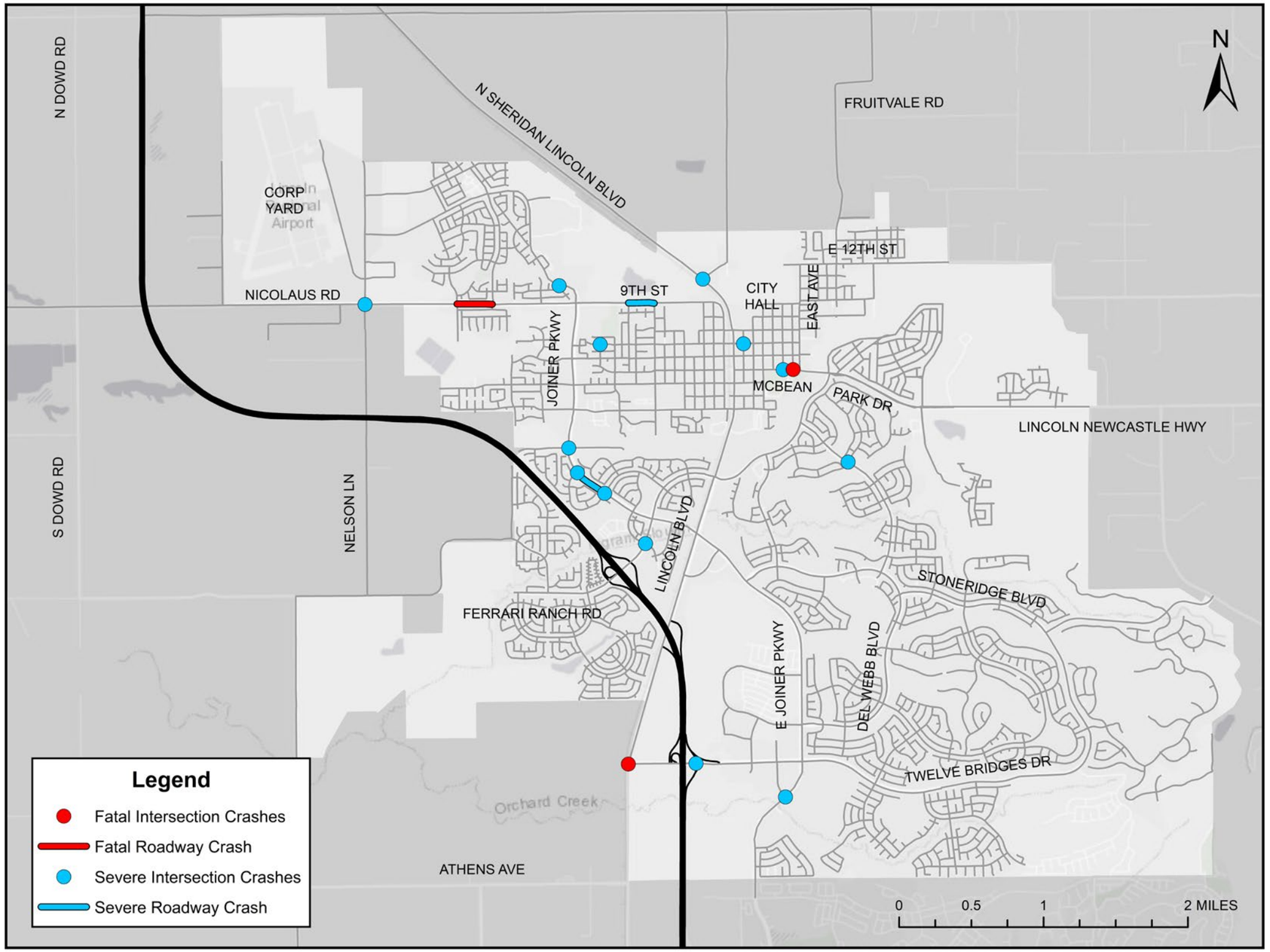


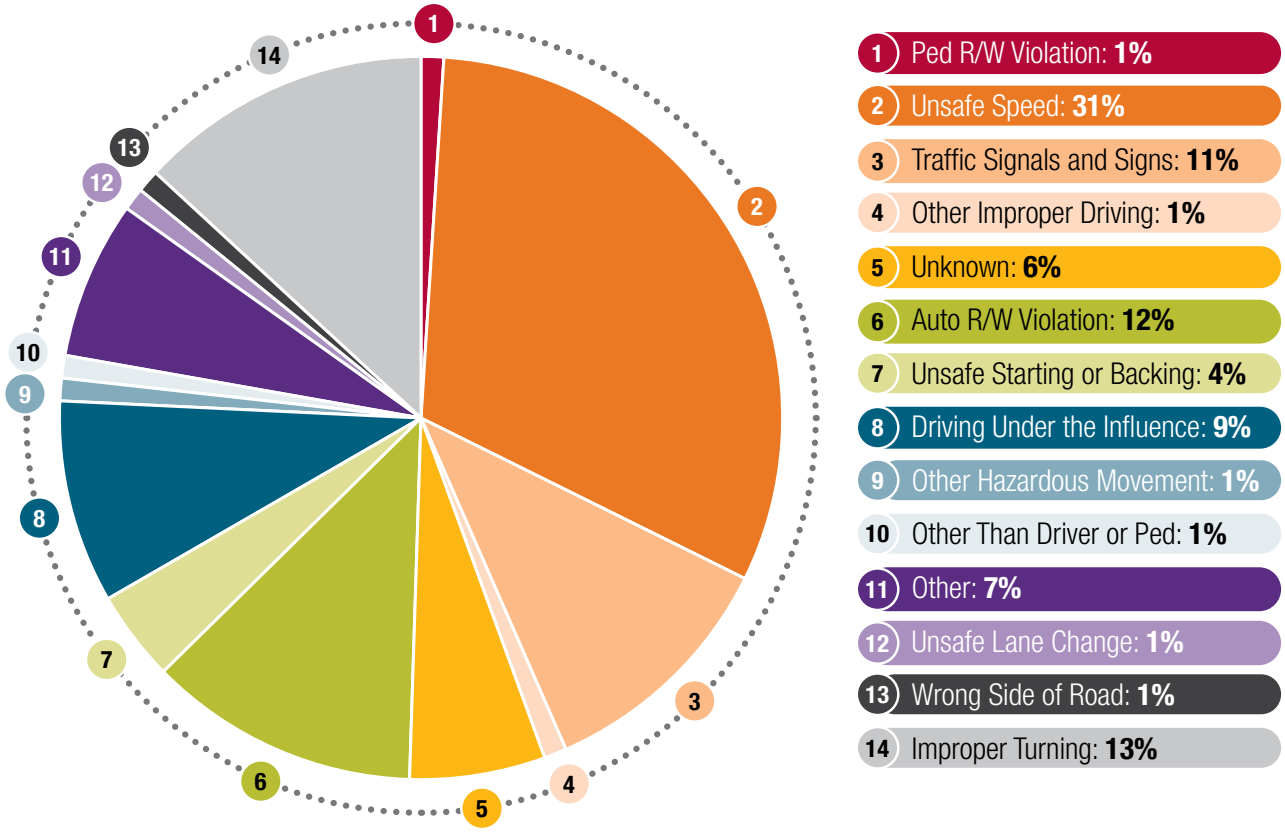
FIGURE 5: *Intersection K+SI Crash Map*



Cause of Crash

As shown in Figure 6, the most frequent contributing factor for crashes was 'Unsafe Speed' (31%). The next most frequent factors were 'Improper Turning' (13%), 'Automobile Right-of-Way (R/W) Violation' (12%), and 'Traffic Signals and Signs' violations (11%). The remaining causes made up approximately 40% of all crashes and included 'Driving or Bicycling Under the Influence of Alcohol or Drugs' (9%), 'Other' (7%), and 'Unsafe Starting or Backing' (4%), and several others with percentages less than three percent.

FIGURE 6: *Crashes by Cause*



7.3. Highest Occurring Crash Types

According to reported data, approximately 835 crashes occurred within the City of Lincoln during the five-year study period, of which 683 had clear, discernable spatial data that did not occur on private property. As shown on Figure 7, the most common crash types were broadsides, followed closely by hit object crashes. Rear-end crashes were the third most common crash type. The remaining crash types are presented in Figure 8. As can be observed in the figures below, unsignalized intersections had more crashes occurring than signalized intersections or roadway segments.

FIGURE 7: *Crashes by Type: Broadsides, Hit Object, and Rear End*

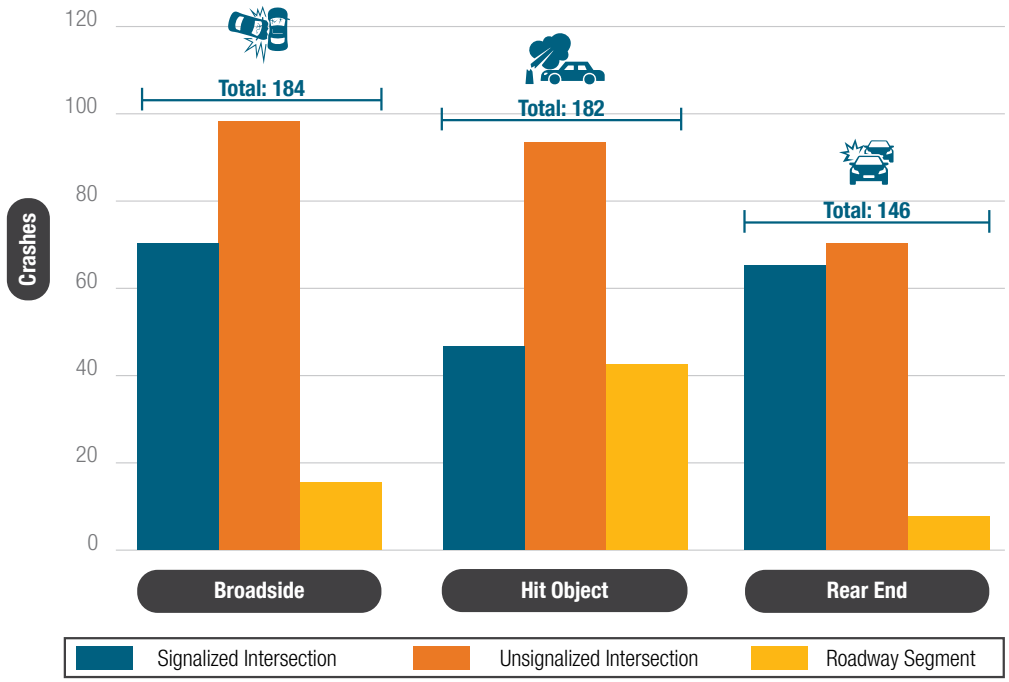
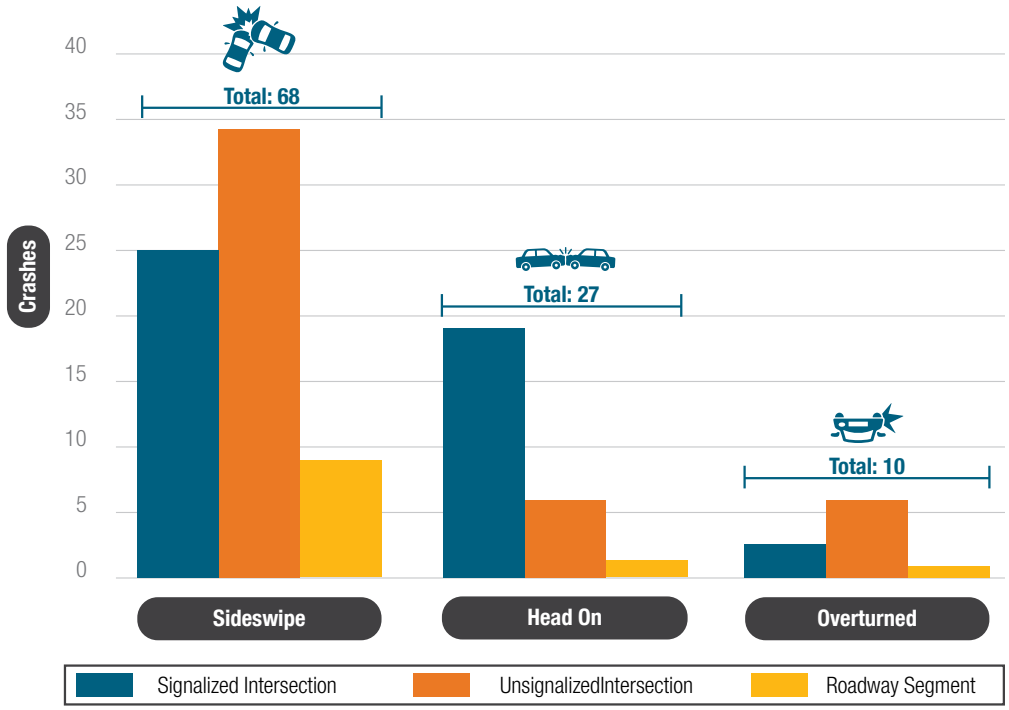


FIGURE 8: *Crashes by Type: Sideswipe, Head On and Overturned*



Source: Statewide Integrated Traffic Records System (2015 – 2019); processed by Crossroads.

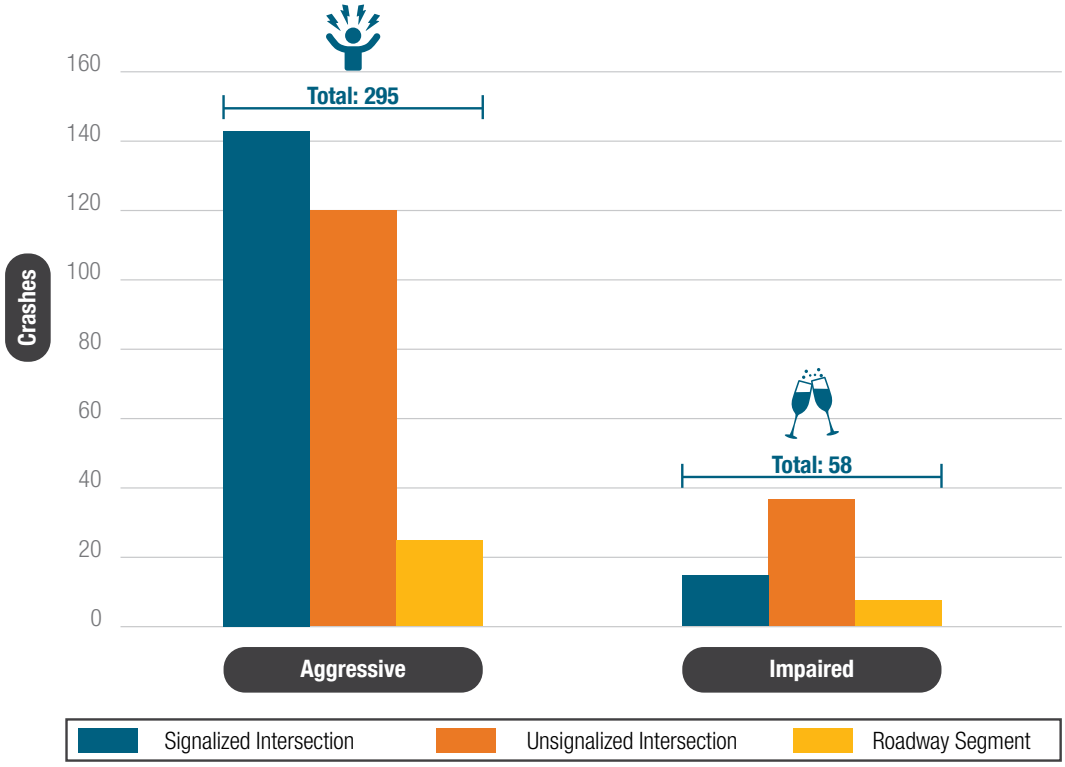
7.4. Lane Departure

Caltrans defines crashes involving lane departure as those with crash types listed as 'Head-On', 'Hit Object', or 'Overturned'. This also includes instances where a vehicle runs off the road or crosses into the opposing lane prior to the crash. There were 222 lane departure crashes over the study period within the City. Of the 222 lane departure crashes, 2 were fatal, 3 were reported with severe injuries, 35 with other visible injuries, 33 with complaints of pain, and 149 with PDO.

7.5. Aggressive and Impaired

Figure 9 contains a summary of aggressive and impaired crashes by intersections and segments. Additional information is included in the following sections.

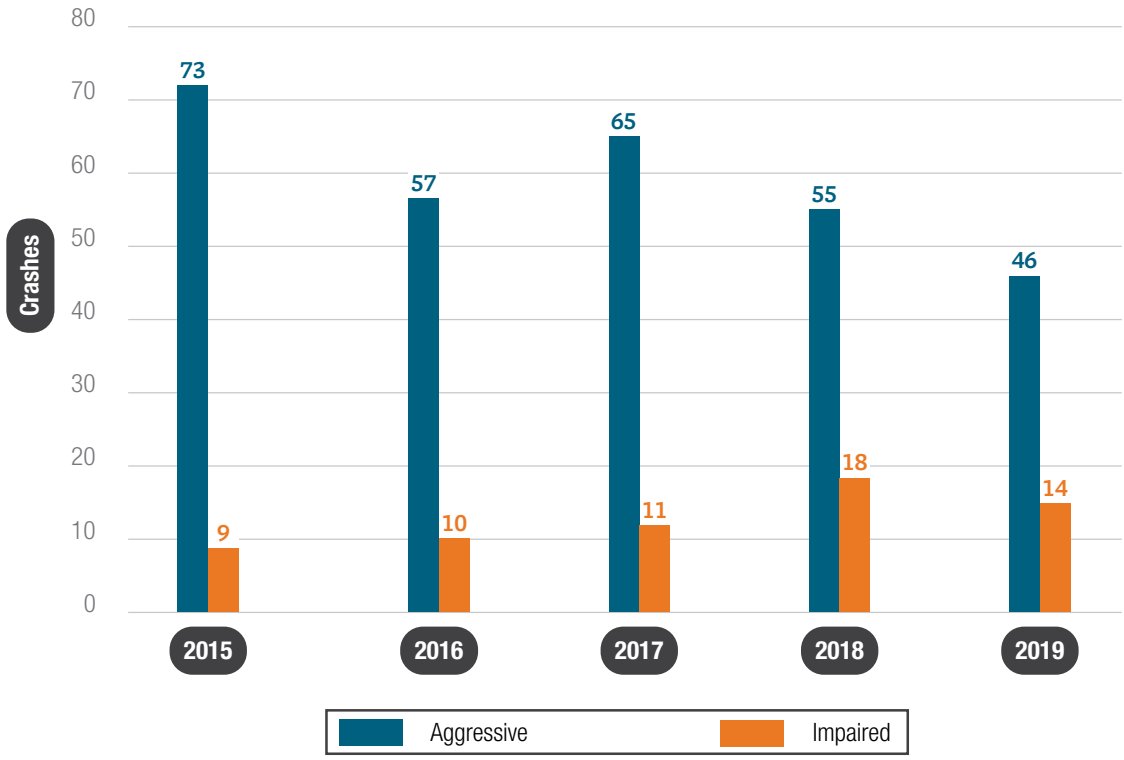
FIGURE 9: *Aggressive and Impaired Driving Crashes*



Source: Statewide Integrated Traffic Records System (2015 – 2019); processed by Crossroads.

Figure 10 below shows the number of crashes involving aggressive and impaired driving from 2015-2019. Aggressive driving has shown a decreasing trend over the 5 year study period, while impaired driving has increased slightly. 2018 had the most impaired driving crashes, and 2015 had the most aggressive driving crashes.

FIGURE 10: *Aggressive and Impaired Crashes by Year*



7.5.1. Aggressive Driving

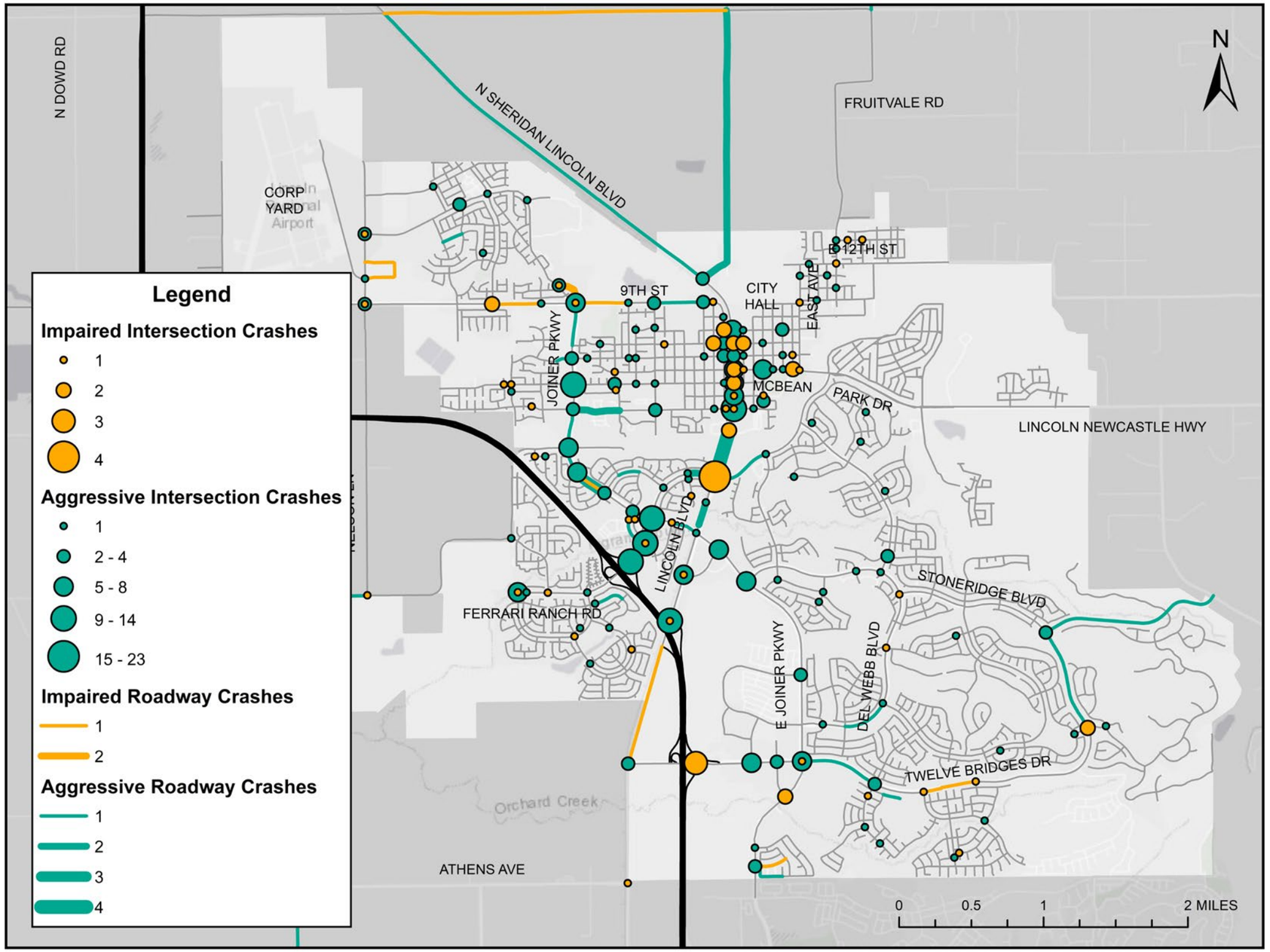
The California SHSP data definition for aggressive driving is a collision where primary collision factor violation category is unsafe speed, following too closely, or traffic signals and signs or the other associated factor violation category is failure to heed stop signal, failure to heed stop sign, unsafe speed, reckless driving, or following too closely. There were 294 aggressive driving crashes from 2015 to 2019. None of the crashes resulted in a fatality, though 4 of the crashes resulted in severe injuries. Figure 11 presents the aggressive driving crashes that resulted in fatal and severe injuries.

7.5.2. Impaired Driving

Collisions involving drugs or alcohol include all collisions where there was any evidence of drug or alcohol use by the driver. This is different from impaired driving statistics in that drivers do not need to exceed the legally defined threshold of intoxication to be counted. There were 62 impaired driving crashes between 2015 and 2019. One of the crashes resulted in a fatality and 4 resulted in severe injuries. Seventy-two percent of crashes involving impaired driving occurred at night.

Caltrans considers any level of alcohol consumption to have the potential to impact driver responsiveness and decision making.

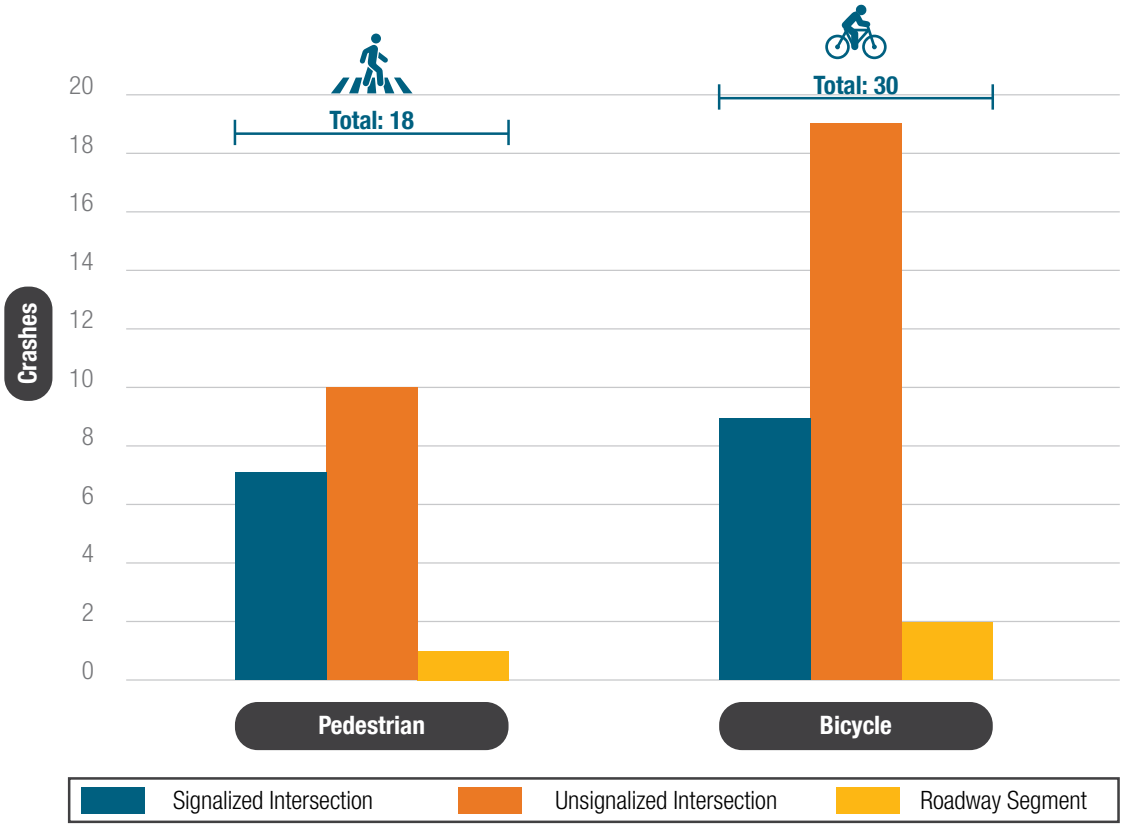
FIGURE 11: *Aggressive and Impaired Driving Crash Map*



7.6. Bicycle and Pedestrian Crashes

As shown in Figure 12, the majority of bicycle and pedestrian crashes are occurring at intersections as opposed to roadway segments. Pedestrian and bicycle crashes are more prevalent at unsignalized intersections. Figure 13 illustrates the locations of pedestrian and bicycle crashes within the City. Additional information on pedestrian and bicycle crashes is provided in the following sections.

FIGURE 12: *Bicycle and Pedestrian Crashes*



Source: Statewide Integrated Traffic Records System (2015 – 2019); processed by Crossroads.

7.6.1. Bicycle Crashes

There were 30 bicycle-involved crashes that occurred in the City over the study period. Of the bicycle-involved injury crashes, none were fatal, 3 were reported with severe injuries, 15 with other visible injuries, 9 with complaints of pain, and 3 with no injuries (PDO).

7.6.2. Pedestrian Crashes

Over the span from 2015 to 2019, a total of 18 pedestrian-involved crashes occurred in the City. Of the pedestrian-involved injury crashes, none were fatal, 2 were reported with severe injuries, 10 with other visible injuries, 3 with complaints of pain, and 3 with no injuries (PDO).

7.7. Juvenile Crashes

A juvenile crash is defined as a crash in which at least one driver involved was under the age of 18. Over the span from 2015 to 2019, a total of thirty-four juvenile-involved crashes occurred in the City of Lincoln. Six of the crashes involved pedestrians and seven of the crashes involved bicyclists. There were no fatal crashes, however two of the crashes resulted in severe injuries.

7.8. Neighborhood Electric Vehicle (NEV) and Golf Cart Crashes

As shown in **Figure 14**, there were 7 crashes involving NEVs and Golf Carts in Lincoln from 2015-2019. One of these crashes occurred on a road with a designated NEV lane (E Joiner Parkway), while the rest of the crashes occurred on roads without an NEV lane but where NEVs are permitted. There was one fatal crash involving an NEV at the intersection of Del Webb Boulevard and E Joiner Parkway.



FIGURE 13: *Non-Motorized Crash Map*

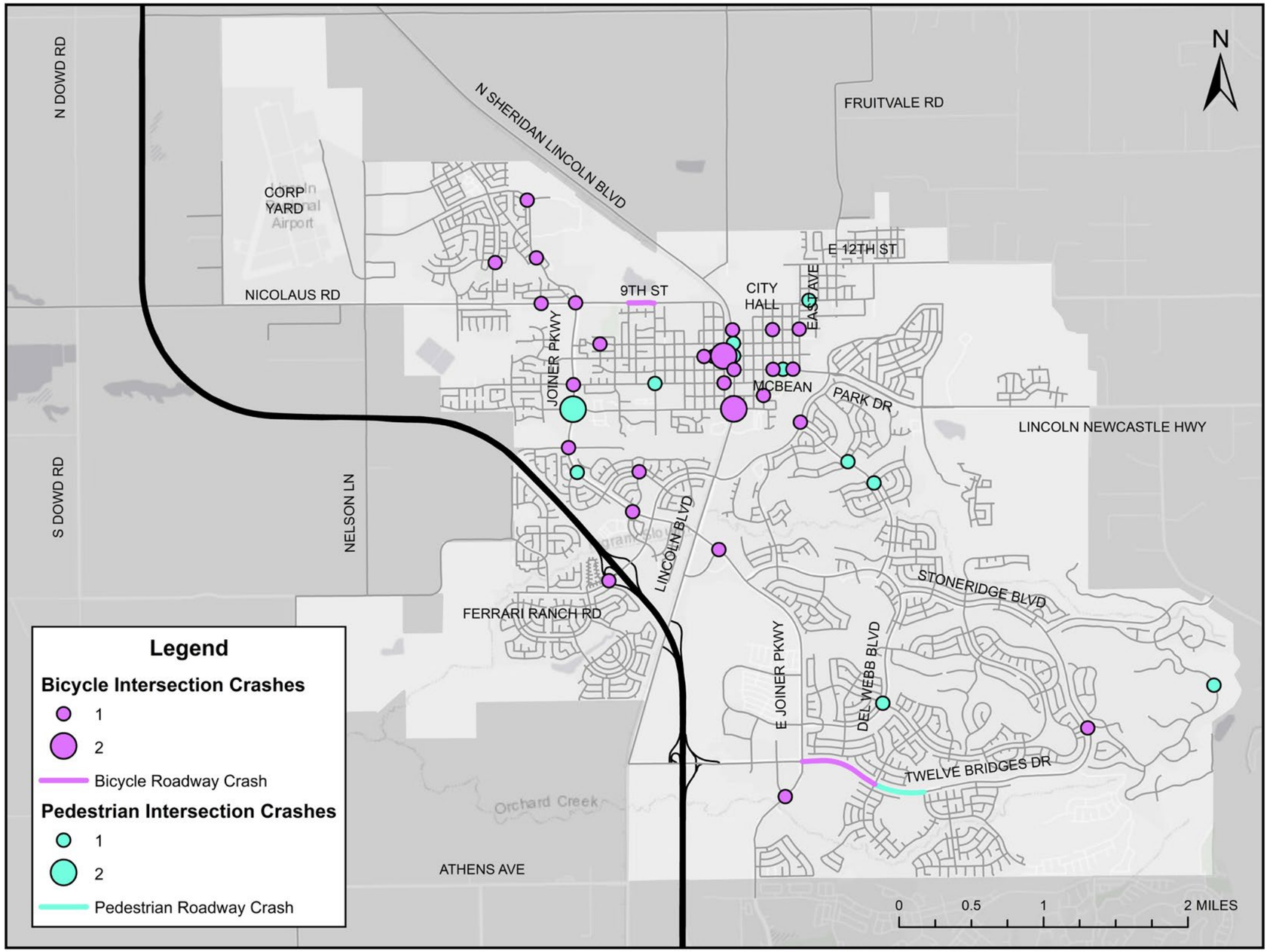
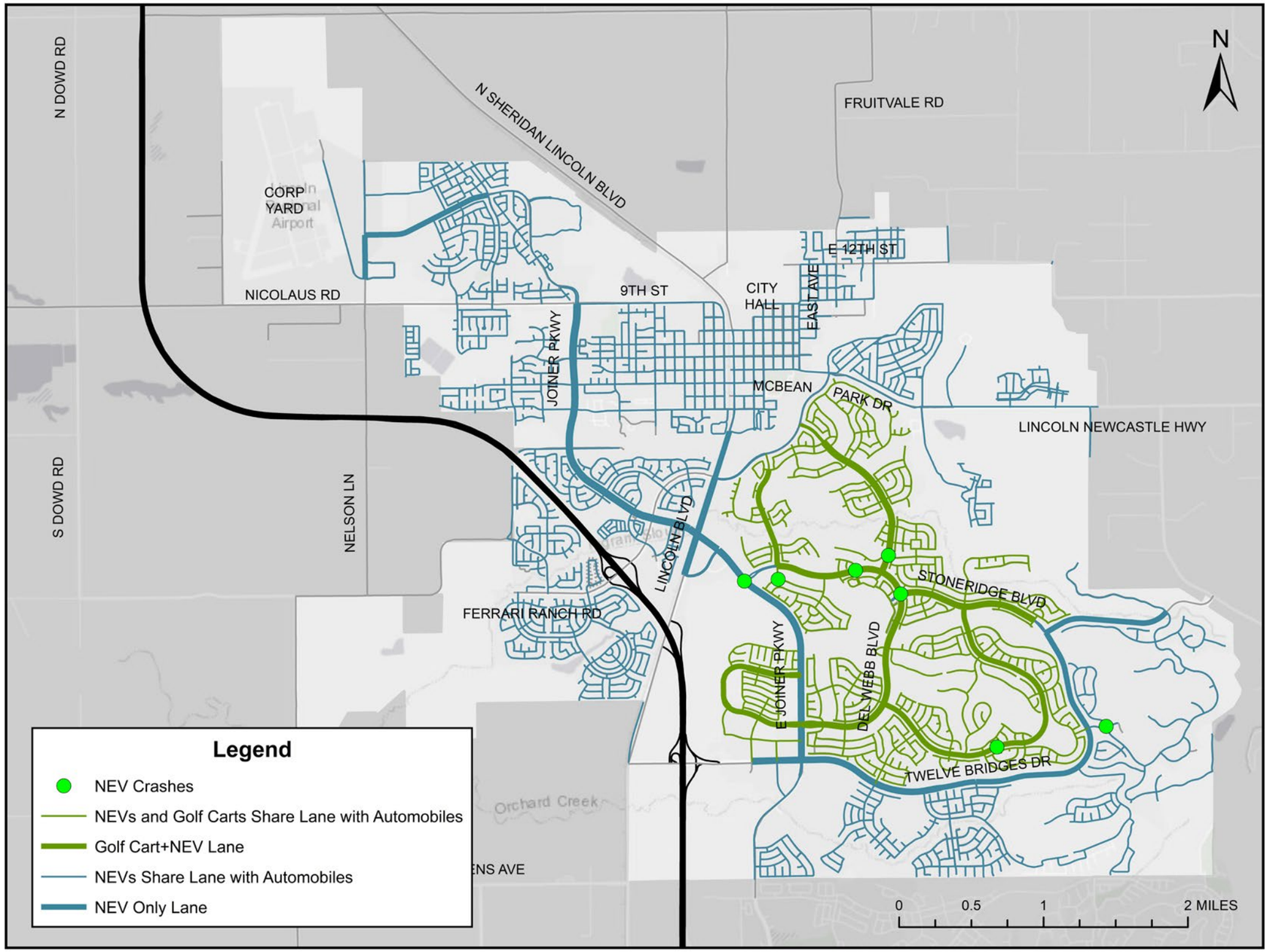


FIGURE 14: *Neighborhood Electric Vehicle (NEV) Crash Map*



Section 8

RECOMMENDATIONS



8. RECOMMENDATIONS

The following sections provide more information on potential engineering and non-infrastructure safety countermeasures that are likely to address conditions that were observed to contribute to crash activity in the City.

8.1. Engineering Countermeasures

While there are many safety countermeasures that could be used to systemically improve roadway safety, the following sections provide countermeasures for consideration by the City of Lincoln. The following sections contain a description of Crash Modification Factors (CMFs) and Crash Reduction Factors (CRFs) associated with the engineering countermeasures toolbox.

8.1.1. Crash Modification Factors (CMFs)

When identifying potential systemic safety improvements, it is important to look at CMFs for the proposed improvements. The CMF Method is found in Part D of the HSM. CMFs are defined as the ratio of effectiveness of one condition in comparison to another condition and represent the relative change in crash frequency due to a change in one specific condition. In other words, a CMF is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site. Countermeasures with CMFs less than one are expected to reduce crashes if applied, while those countermeasures with CMFs greater than one are expected to increase crashes. **Figure 15** illustrates the definition of CMFs.

FIGURE 15: *CMF Calculation*

$$CMF = \frac{\text{EXPECTED CRASHES WITH TREATMENT}}{\text{EXPECTED CRASHES WITHOUT TREATMENT}}$$

CMF = 1.0	Expected to have no impact on safety
CMF < 1.0	Expected to reduce crashes
CMF > 1.0	Expected to increase crashes

The CMF Method is used to calculate the expected number of crashes by taking the observed number of crashes and multiplying those crashes by the applicable CMF for the proposed countermeasure. It is recommended that CMFs be applied to a minimum of three years of crash data for urban and suburban sites and five years of crash data for a rural site. Figure 16 is a sample calculation of the CMF method with one CMF being applied to a particular site for a single year.

FIGURE 16: *CMF Method Sample Calculation*

10.1 crashes / year x 0.91 (CMF) =	*9.2 crashes / year: a reduction of 0.9 total crashes per year and a CRF of 9%*

A CRF is similar to a CMF but stated in different terms. A CRF is defined as a percentage of crash reduction that might be expected after the implementation of a given countermeasure at a specific site. Figure 17 presents how a CRF is calculated in relationship to a CMF.

FIGURE 17: *CRF Calculation*

$$CRF = (1 - CMF) \times 100$$

Caution should be used in the selection of appropriate CMFs. The following guidance should be considered when selecting CMFs for predictive crash analysis:

- CMFs should be selected from the HSM Part D, the LRSM, or from the FHWA CMF Clearinghouse website (http://www.cmfclearinghouse.org/).
- Read the countermeasure abstract to determine if the CMF is applicable to the proposed improvement.
- Only CMFs with a four-star rating or higher should be considered for use in analysis.
- Be sure the selected CMF is applicable to the set of crash data being used for analysis. Some CMFs may only be applicable to a subset of the crash data.
- The application of multiple CMFs can overestimate the expected crash reduction. Unless each CMF addresses independent crash types, multiple CMFs should not be used. It is suggested that no more than three independent CMFs be applied to a particular site.

The countermeasures proposed in this document were chosen because of their effectiveness in reducing crashes.

8.1.2. Engineering Countermeasures Toolbox

The systemic improvements identified as most likely effective for the City are listed in **Table 3**, and include low-cost and higher-cost items that can be implemented in phases where appropriate. The CMF indicates how effective the countermeasure is at reducing crashes. CMFs and CRFs have been provided for reference to aid the City in understanding potential reductions from crashes by different countermeasures.

TABLE 3: *Lincoln Engineering Countermeasures Toolbox*

Countermeasure	Also Addresses		Crash Modification Factor (CMF)	Crash Reduction Factor (CRF)	CMF/CRF Applies to			Caltrans Funding	Cost to Implement
	Pedestrian	*Bicycle*			*All*	*Nighttime*	*Pedestrian and Bicycle*		
Signalized Intersections									
Install intersection lighting			0.60	40%		X		100%	$$
Retroreflective backplates			0.85	15%	X			100%	$
Improve signal timing (coordination)			0.85	15%	X			50%	$$
Advanced dilemma zone detection			0.60	40%	X			100%	$$
Install Left Turn Lane, Add Left Turn Phase			0.45	55%	X			100%	$$$
Protected left turn phase			0.70	30%	X			100%	$$
Convert signal from pedestal-mounted to mast arm			0.70	30%	X			100%	$$$
Install raised pavement markers and striping			0.90	10%	X			100%	$
Install flashing beacons as advanced warning			0.70	30%	X			100%	$$
Install High Friction Surface Treatment (HFST)			0.45	55%	X			100%	$$$
Install raised median on approaches			0.75	25%	X			100%	$$
Install pedestrian median fencing on approaches	X		0.65	35%			X	90%	$$
Pedestrian countdown signal heads	X		0.75	25%			X	100%	$
Pedestrian scramble	X		0.60	40%			X	100%	$$
Advanced stop bar before crosswalk and bicycle box	X	X	0.85	15%			X	100%	$
Modify signal to provide a Leading Pedestrian Interval (LPI)	X		0.40	60%			X	100%	$
Flashing yellow arrow			0.94	6%	X			N/A	$
Signal ahead warning signs			0.85	15%	X			N/A	$
Unsignalized Intersections									
Add intersection lighting			0.60	40%		X		100%	$$
Install all-way STOP control			0.50	50%	X			100%	$
Convert intersection to roundabout			Varies	Varies	X			100%	$$$
Install/upgrade intersection warning/regulatory signs			0.85	15%	X			100%	$
Upgrade pavement markings			0.75	25%	X			100%	$
Install flashing beacons at stop-controlled intersections			0.85	15%	X			100%	$$
Install flashing beacons as advanced warning			0.70	30%	X			100%	$$
Clear sight triangles			0.80	20%	X			90%	$ - $$$
Install High Friction Surface Treatment (HFST)			0.55	55%	X			100%	$$$

Countermeasure	Also Addresses		Crash Modification Factor (CMF)	Crash Reduction Factor (CRF)	CMF/CRF Applies to			Caltrans Funding	Cost to Implement
	Pedestrian	*Bicycle*			*All*	*Nighttime*	*Pedestrian and Bicycle*		
Install splitter-islands on minor road approaches			0.60	40%	X			100%	$$
Install raised median on approaches			0.75	25%	X			90%	$$
Directional median openings to restrict turning movements			0.50	50%	X			90%	$$
Reduced Left-Turn Conflict (R-CUT) intersections			0.50	50%	X			90%	$$$
Install right-turn lane			0.80	20%	X			90%	$$
Install left-turn lane			0.65	35%	X			90%	$$
Pedestrian refuge island	X		0.55	45%			X	90%	$$
Install/upgrade pedestrian crossing (with enhanced safety features)	X		0.65	35%			X	100%	$
Rectangular Rapid Flashing Beacon (RRFB)	X		0.65	35%			X	100%	$$
Pedestrian Signal	X		0.45	55%			X	100%	$$$
Retroreflective strips on signposts			Not Available	Not Available	X				$
Crosswalk lighting	X		0.60	40%			X	100%	$$
Colored bicycle lanes		X	0.61	39%			X		$
Curb extensions	X		0.63	37%			X		$$$
Segments									
Add segment lighting			0.65	35%		X		100%	$$
Remove or relocate fixed object outside of Clear Recovery Zone			0.65	35%	X			90%	$$$
Install impact attenuators			0.75	25%	X			100%	$$
Install pedestrian median fencing	X	X	0.65	35%			X	90%	$$
Install bike lanes	X	X	0.65	35%			X	90%	$$
Install/upgrade pedestrian crossing (with enhanced safety features)	X	X	0.65	35%			X	90%	$
Install raised pedestrian crossing	X	X	0.65	35%			X	90%	$$
Rectangular Rapid Flashing Beacon (RRFB)	X	X	0.65	35%			X	100%	$$
Speed feedback signs (mobile or fixed)	X	X	Not Available	Not Available	X			Opportunity for OTS funding	$

8.1.3. Project Sheets for Priority Locations

From the citywide analysis, five project case study locations were selected for further analysis and development of safety improvement recommendations. For each of these priority locations, project sheets 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 crash 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.

Each project sheet includes location maps with an aerial, crash data summary, and list of recommended safety countermeasures with corresponding CMFs, number of crashes anticipated to be reduced, 10-year crash reduction estimate and benefit, and planning level construction cost estimates. The potential safety countermeasures identified reflect safety improvements that can be applied to reduce the likelihood of future crashes. Countermeasures were subjected to a benefit/cost assessment to determine their potential return on investment. These case studies can be used to select the most appropriate countermeasure(s), 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 crash history. These project sheets can also be used to position the City for future grant funding opportunities.

Table 4 presents a summary of the potential safety countermeasures identified for each of the priority locations listed below and corresponding benefit/cost. A project sheet was developed for each of the priority locations containing additional information and are included in **Appendix E**.

- Ferrari-Ranch Road and Joiner Parkway
- Lincoln Blvd and Ferrari-Ranch Road
- Lincoln Blvd and 1st Street
- A Street & McBean Park Drive/4th Street
- E Joiner Parkway and Del Webb Blvd



TABLE 4: *Priority Location Summary*

Location	Potential Countermeasures	B/C
Ferrari Ranch Rd & Joiner Parkway	Install Retrofeflective Backplates	18
	Improve sight triangle, cut back vegetation	73
	Extend all-red time	310
	Change sequence such that LT goes then through traffic moves	310
	Advanced signal ahead sign and markings	5
	Square up the SE corner of the intersection to remove free right	–
Lincoln Blvd and Ferrari Ranch Rd	Install Retrofeflective Backplates	22
	Better signing for EB traffic, make it clear that right lane is RT only	27
	Add signal head to NB/SB approaches	42
	Provide Advanced Dilemma Zone Detection for high speed approaches	22
	Extend bike lane to RR track	0
Lincoln Blvd & 1st Street	Install Retroreflective Backplates	25
	Update signal phases at the intersection	337
	No RT trucks at the intersection	165
	Green bike lane treatement in confict zones	69
	Re-design pork chops island to make it more effective at prohibiting LTs	64
A Steet & McBean Park Drive/ 4th Street	Re-stripe the center turn lane	12,067
	Adding supplemental speed limit signs	9,877
	Pedestrian activated crossing and sign at B St and McBean	0
E Joiner Pkwy & Del Webb Blvd	Bring SW approach up to the sidewalk	1,117
	Add signage to EB Joiner approach, making it clear that one lane is LT only	1,555
	Signal Warrant	14

8.2. Non-Infrastructure Countermeasures

The National Highway Traffic Safety Administration (NHTSA) Countermeasures that Work, Ninth Edition, is a reference to assist safety stakeholders in selecting effective, science-based non-infrastructure traffic safety countermeasures for major highway safety problem areas. While many of the countermeasures are more appropriate to apply at the state-level or require legislative modifications to implement, Table 5 contains countermeasures that have demonstrated effectiveness and could be applied at the City level. Access to Drug Recognition Experts (DREs) and Advanced Roadside Impaired Driving Enforcement (ARIDE) training for law enforcement is not included in the document but is something that could also be considered for the City. These non-infrastructure countermeasures can be implemented through securing grant funding such as California Office of Traffic Safety (OTS) grants and other federal, state, and regional funding programs presented in **Section 9**.

TABLE 5: *Non-Infrastructure Countermeasures Toolbox*

Countermeasure	Effectiveness	Cost to Implement	Use	Time to Implement
Impaired Driving				
Publicized Sobriety Checkpoints	*****	$$$	Medium	Short
High-Visibility Saturation Patrols	****	$$	High	Short
Occupant Protection (Seat Belts, Helmets, Child Seats)				
Short-term high visibility enforcement	*****	$$$	Medium	Medium
Integrated nighttime seat belt enforcement	****	$$$	Unknown	Medium
Distracted Driving				
High visibility cellphone/text messaging enforcement	****	$$$	Low	Medium

★ Effectiveness:

***** *Demonstrated to be effective by several high quality evaluations with consistent results*
**** *Demonstrated to be effective in certain situations*

$ Cost to Implement:

$$$ Requires extensive new facilities, staff, equipment, or publicity, or makes heavy demands on current resources
$$ Requires some additional staff time, equipment, facilities, and/or publicity
$ Can be implemented with current staff, perhaps with training; limited costs for equipment, facilities, and publicity
†Can be covered by income from citations

⚙ Use:

High: *More than two-thirds of states, or a substantial majority of communities*
Medium: *Between one-third and two-thirds of states or communities*
Low: *Less than one-third of states or communities*
Unknown: *Data not available*

🕒 Time to Implement:

Long: *More than 1 year*
Medium: *More than 3 months but less than 1 year*
Short: *3 months or less*

Section 9

EVALUATION AND IMPLEMENTATION



9. EVALUATION AND IMPLEMENTATION

9.1. 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 are recommended to be conducted to track the implementation of the plan. In addition, the success of the plan will be evaluated on a reoccurring (quarterly) basis.
- An update to the plan should be considered after no more than five to seven 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, based on historical crash data.

9.2 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.

9.2.1. Near- and Mid-Term Focus Areas

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



Analysis conducted at the citywide level indicated that these factors were some of the most frequent influences contributing to K+SI crashes within the City. The countermeasure opportunities previously discussed in this LRSP 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 citywide crash rates), allowing competitive projects to be developed even at sites with little to no direct crash history, but with conditions that might contribute to future crashes.

9.3. Updates to the LRSP

The following steps outline the process for updating the City's LRSP every 5 to 7 years.

1. **Access necessary data**
   - Roadway and intersection classification/configurations
   - Average Daily Traffic Volumes (Collected from counts where available)
   - Collision history
2. **Network screening**
   - Calculate the CCR for each roadway functional classification and intersection control type
   - Rank for each facility type
   i. **Roadway Segment**
      a. *Primary*
      b. *Secondary*
      c. *Local*
   iv. **Intersection**
      e. *Signalized*
      f. *Unsignalized*
3. **Select locations**
   - Identify the location with a higher CCR than what is typical of comparable facility types within City
   - Analyze the collision history and work with local officials to understand any significant exterior influences on the location
4. **Countermeasures**
   - Using the Engineering Countermeasures Toolbox (Table 3) and Non-Infrastructure Toolbox (Table 5), identify potential countermeasures that can be applied to the local roadway network to enhance safety features
5. **Develop a Project Sheet** that can serve as a template for analyzing future locations
6. **Calculate the benefit and the cost** of each applicable countermeasure using Highway Safety Improvement Program (HSIP) tool and LRSM countermeasures. If those are not available, refer to other resources such as the CMF Clearinghouse and follow a similar calculation (using 20-year cost and benefit numbers). See more information in the section HSIP Analyzer below.

The LRSP has completed steps 1 through 6. In subsequent years, the City can begin at step 1 to continue the LRSP process. Additional items the City can do to keep the LRSP current are:

1 *When new or reconstruction projects arise, use the data processed to identify locations with similar characteristics and apply countermeasures which proved effective*

2 *Proactively update its roadway and traffic standards to address systemic safety issues identified in the LRSP*

9.3.1. HSIP Analyzer

As of 2021, the preferred way to calculate the BCR for the HSIP program uses Caltrans HSIP Analyzer tool in the form of an active PDF. The PDF tool contains 4 sections which are used to calculate the Benefit Cost Ratio for the Highway Safety Improvement Program.

This tool can be accessed on the Caltrans website:

- https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program/apply-now

Projects appropriate for other state grant programs can be analyzed using the Life-Cycle Benefit Cost Analysis Model (CalB/C) which has a much more comprehensive benefit assessment tool set.

9.3.2. HSIP Eligibility

Per Chapter 9 of the Highway Safety Improvement Program, funds are eligible for projects that improve the safety of its users on any public road or publicly owned bicycle or pedestrian pathway or trail, or on tribal lands for general use of tribal members.

HSIP looks for safety projects that can be designed and constructed expeditiously and do not require significant acquisition of rights-of-way. Proposed projects should not require extensive environmental review and mitigation. Additional information on the HSIP project selection criteria can be accessed online:

- Benefit Cost Ratio Applications
  https://dot.ca.gov/-/media/dot-media/programs/local-assistance/documents/hsip/2020/hsipanalyzerinstructions2020bcr.pdf
- Funding Set-asides (Non-Benefit Cost Ratio Applications)
  https://dot.ca.gov/-/media/dot-media/programs/local-assistance/documents/hsip/2020/hsipanalyzerinstructions2020sa.pdf

HSIP project eligibility is subject to the California SHSP. The SHSP identifies statewide challenge areas that correspond to safety concerns at the statewide level and potential countermeasure to address them and determine HSIP project eligibility. SHSP's are developed in compliance with FHWA requirements. A list of eligible project types can be seen in the current HSIP Analyzer. More information can be accessed online at the Caltrans HSIP grant website:

- https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program/apply-now

9.4. Funding

Competitive funding resources are available to assist in the development and implementation of safety projects in Lincoln. The following is a high-level introduction into some of the main funding programs and grants for which the City can apply.

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 Lincoln.



9.4.1. Highway Safety Improvement Program (HSIP)

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. Safety improvement projects eligible for this funding include:

- New or upgraded traffic signals
- Upgraded guard rails
- Marked crosswalks

California's local HSIP focuses on infrastructure projects with nationally 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 is available at: https://safety.fhwa.dot.gov/hsip/. California specific HSIP information – including dates for upcoming call for projects – is available at: http://www.dot.ca.gov/hq/LocalPrograms/hsip.html.

9.4.2. Caltrans Active Transportation Program (ATP)

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

9.4.3. State Transportation Improvement Program (STIP)

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.

9.4.4. 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



9.4.5. 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 LRSP) 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

9.4.6. SACOG Regional Funding Programs

The Sacramento Area Council of Governments (SACOG) provides funding allocation for various multi-modal transportation projects in the Sacramento region. Projects that are considered for this regional funding program must be eligible for CMAQ, RSTP, or STIP funds.

Performance outcomes which are considered for selection include those which:

- Reduce regional VMT per capita
- Reduce regional congest VMT per capita
- Increase multi-modal or alternative travel choices
- Provide long term benefits, sustaining both rural and urban economies
- Improve movement of goods, in and through the region
- Improve safety and security
- Maintain and improve upon the existing transportation system

Section 10

NEXT STEPS



10. NEXT STEPS

The City of Lincoln has completed this LRSP to **guide the process of future transportation safety improvements** for years to come. The data-driven analysis process identified crash types, related primary crash factors, and locations of many crashes. Based on this process, emphasis areas were identified. These emphasis areas will guide traffic safety improvements, education programs, and capital improvements for the City. Using the analyzed data and outputs from this LRSP, the City will:

- Apply for HSIP grant funding for safety improvements throughout the City that address the various emphasis areas identified, including intersections and vulnerable users (pedestrians and bicyclists)
- Actively seek other funding opportunities to improve safety for all modal users
- Collaborate with established stakeholders and neighboring municipalities (i.e. Sacramento County) as improvements are made to create a cohesive transportation network
- Iteratively evaluate existing and proposed transportation safety programs and capital improvements to design and operate a safer transportation network in Lincoln
- Complete annual review of safety data

The City also plans to have the City Council formally approve and adopt this LRSP. Based on current Caltrans guidelines, the City will plan to update the LRSP in five years in 2027.

Appendix A

LITERATURE REVIEW

ID	Document Name	Year	Agency	Document Description	Transportation Improvements / Policies	Safety	Appendix Added?
1	General Plan	2008	City of Lincoln	Serves as a blueprint for future growth and development	- Maintain a LOS C at all signalized intersections in the City during the p.m. peak hours - Restrict truck traffic on residential streets - Maintaining a ridesharing program - Minimize the number, properly space, and interconnect traffic signals to maximize progression	- Constructing new grade-separated crossings of the Union Pacific Railroad tracks and Highway 65 - Constructing the SR 65 Bypass with interchanges - Require that existing and future aerterial improvements be designed to minimize conflicting traffic movements - Goal: Provide an interconnected system of bikeways that would provide users with direct linkages at a city and regional level - Provide traffic signal phasing that is adequate for bicycle turning and straight-through movements - Provide pedestrian/bicycle crossings at appropriate intervals along new roadways that will adequately serve new large-scale commercial as well as schools and parks	
2	NEV Transportation Plan	2006	City of Lincoln	Plan of integrating NEVs into the existing golf cart circulation system within the City of Lincoln	- NEV = Neighborhood Electric Vehicles - Minor modifications to the existing street and circulation system are needed to accommodate NEVs. The City plans to implement signing and striping improvements consistent with this report, create special parking spaces, and develop a Class II NEV path system - NEVs would be allowed to travel on SR 193 between Ferrari Ranch Road and A Street to access the downtown residential streets in Lincoln		
3	Bicycle Transporation Plan Update	2012	City of Lincoln	Contains goals, policies, funding analysis, and actions related to bicycle mobility	- Existing and proposed bikeway system includes a total of 119 miles of bicycle, NEV and golf cart facilities. The entire system is comprised of approximately 51miles of existing bikeways, and an additional 68 miles of proposed facilities. See Figure 4 - Priority routes were selected based on expected use, type of route, connectivity, potential improvements to connectivity and safety, and funding potential. See pages 41-43.	- Use appropriate devices at street crossings with high levels of pedestrian and bicycle demand when warranted by engineering standards (i.e. signing, striping, flashing beacons, raised crossing bumps, pedestrian actuated signals, ect.) - Install bicycle detection at signalized intersections, located within the striped bike lane, along the bikeway system as intersections are upgraded	
4	Lincoln Downtown Urban Design Plan	1992	City of Lincoln	Provides Vision of the Future, 20 year time fram (1992-2012), of the core commercial district of the community		- Provide pedestrian / bicycle crossings at appropriate intervals along new roadways that will adequately serve new large-scale commercial developments	
5	Lincoln Boulevard Improvements Project (Website, pdf)	2015	City of Lincoln		- Class 2 bike and NEV access along project corridor - Equipment upgrades to traffic signals and systemic traffic signal timing improvements	- Curb returns with bulb-outs to shorten the pedestrian path - Pedestrian crossing improvements of the railroad tracks to the side streets adjacent to a half mile stretch of corridor	
6	ADA Transition Plan & Self-Evaluation Update	2018	City of Lincoln	Strategy to meet State and Federal in terms of accessibility / physical barriers	See pages 15-17 for the city's barrier removal prioritized list. Including list of barriers and list of facilities.	- Prioritized factors relating to street safety of pedestrians: Parking (off street), Accessible Routes, Curb Ramps, Detectable Warnings, signs	
7	Traffic Signal Communications Master Plan	2019	City of Lincoln	Establish a roadmap for systematic traffic signal technology implementation, to outline opportunities for providing communications to all City signalized intersections, and to equip the City with tools to more effectively manage its transportation network	- See Page 25-28 for deployment strategies & prioritization - Deploy Coordination and GPS-Based Time Source Receivers on Primary Corridors - ATMS and Traffic Signal Controller Evaluation - Develop CCTV Camera and Detection Specifications - Establish Communication Backbone on Lincoln Boulevard - Procure Advanced Traffic Management System - Establish Traffic Operations Center - Expand Communications to Other Primary Corridors - Expand Communications to Secondary and Minor Corridors		
8	Neighborhood Electric Vehicle (NEV) Map	2015	City of Lincoln	Map showing where NEVs are allowed	- NEVallowed to drive in automoible lanes for a large percentage of the roads depicted - Larger roads where NEV are allowed have a seperate lane for them		

FEDERAL FUNDING SOURCES

The primary federal source of surface transportation funding, including bicycle and pedestrian facilities, is the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users. This Federal bill was established by Congress in 1991 with the Intermodal Surface Transportation Efficiency Act, and renewed in 1998 and extended in 2003 through the Transportation Equity Act for the 21st Century and the Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003. Also known as the Federal Transportation Bill, it was passed in 2005 and authorizes federal surface transportation programs for the five-year period.

In late September 2009, as the 2005 federal transportation bill (SAFETEA-LU) was set to expire, a debate emerged in Congress regarding the length of time to extend the current bill while new policy is created. Rather than a simple reauthorization of existing policy, a new bill is being crafted with new policies and funding formulas, in recognition of the urgency of national needs – obesity prevention, escalating fuel prices, the need for energy independence from Middle East oil, and perhaps most important, the battle against global climate change. In December 2009 Congress voted to extend the current bill until September 2010.

Federal funding is administered through the state (Caltrans and the State Resources Agency) and regional planning agencies. Most, but not all, of these funding programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Many Federal programs require a local match of between 10-20%. Federal funding is intended for capital improvements and safety and education programs and projects must relate to the surface transportation system.

Federal Lands Highway Funds

Federal Lands Highway Funds may be used to build bicycle and pedestrian facilities in conjunction with roads and parkways at the discretion of the department charged with administration of the funds. The projects must be transportation-related and tied to a plan adopted by the State and Metropolitan Planning Organization. Federal Lands Highway Funds may be used for planning and construction and is managed by the United States Department of Transportation.

Transportation, Community and System Preservation Program

The Transportation, Community and System Preservation Program provides federal funding for transit oriented development, traffic calming and other projects that improve the efficiency of the transportation system, reduce the impact on the environment, and provide efficient access to jobs, services and trade centers. The program is intended to provide communities with the resources to explore the integration of their transportation system with community preservation and environmental activities. The Program funds, which are administered through the Federal Highway Administration (FHA) require a 20% match, and can be applied to planning, design and construction.

Land and Water Conservation Fund

The Land and Water Conservation Fund is a federally funded program that provides grants for planning and acquiring outdoor recreation areas and facilities. The Fund is administered by the National Parks Service and the California Department of Parks and Recreation and has been reauthorized until 2015. Cities, counties and districts authorized to acquire, develop, operate and maintain park and recreation facilities are eligible to apply. The application deadline is in May, and applicants must fund the entire project, and will be reimbursed for 50% of costs. Property acquired or developed under the program must be retained in perpetuity for public recreational use.

Congestion Mitigation and Air Quality Improvement Program (CMAQ)

CMAQ Funds are directed to transportation projects and programs which contribute to the attainment or maintenance of National Ambient Air Quality Standards in non-attainment or air quality maintenance areas for ozone, carbon monoxide, or particulate matter under provisions in the Federal Clean Air Act. Eligible projects include bicycle facilities.

Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program is managed locally by Caltrans. For a project to be eligible for HSIP funds, the project must be on any public road, publicly owned bicycle path, pedestrian pathway, or trail. Projects must identify a specific safety problem that can be corrected or be improved significantly.

Regional Surface Transportation Program (RSTP)

Regional Surface Transportation Program (RSTP) funding is distributed based on population, among the urbanized and non-urbanized areas of the State through Metropolitan Planning Organizations (MPOs) such as SACOG and Regional Transportation Planning Agencies. Bicycle facilities are eligible for funding through the federally administered program.

Federal Safe Routes to School (SRTS)

Eligible projects fall under the category of infrastructure (capital improvements), or non-infrastructure (education, encouragement, enforcement). Infrastructure projects must be located within a two mile radius of a grade school or middle school. Local Caltrans representatives serve as the administrative authority on SRTS projects.

Transportation Enhancements (TE)

Federal Transportation Enhancement funds are to be used for transportation related capital improvement projects that enhance quality-of-life in or around transportation facilities. Facilities that qualify for TE funds include bicycle safety, education and facility projects. Transportation Enhancements projects are managed locally by Caltrans.

STATEWIDE FUNDING SOURCES

The State of California uses both federal sources and its own budget resources to fund bicycle projects and programs throughout the State.

Bicycle Transportation Account (BTA)

The Bicycle Transportation Account (BTA) is an annual program providing state funds for city and county projects that improve safety and convenience for bicycle commuters. In accordance with the Streets and highways Code (SHC) Section 890-894.2 – California Bicycle Transportation Act, projects must be designed and developed to achieve the functional commuting needs and physical safety of all bicyclists. Local agencies establish eligibility for projects by preparing and adopting a Bicycle Transportation Plan (BTP) that complies with SHC Section 891.2 – 11 required elements (see Table 1). Funds are available for both planning and construction. Bicycle Transportation Account funding is administered by Caltrans. Caltrans anticipates approximately $7.2 million annually for eligible projects. The maximum amount available to any applicant through the Bicycle Transportation Account is no more than 25 percent of the total amount transferred to the BTA in a single fiscal year. Cities and counties are eligible to apply. All projects must be designed to the standards outlined in Chapter 1000 of the Highway Design Manual. The "call for projects" normally occurs between December and March of each year.

Community Based Transportation Planning Grant Program

This fund, administered by Caltrans, provides funding for projects that exemplify livable community concepts including bicycle improvement projects. Eligible applicants include local governments, Metropolitan Planning Organizations and regional transportation planning agencies. A 20% local match is required and projects must demonstrate a transportation component or objective. There is $3 million available annually statewide. The application deadline is normally in October.

State Safe Routes to School (SR2S)

To be eligible for SR2S funds, the project must be located on any state highway or on any local road. Projects must correct an identified safety hazard or problem on a route that students use for trips to and from school. Up to 10 percent of the project's cost can fund a non-infrastructure component that supports the infrastructure project. Only cities and counties are eligible to compete for funds.

State Transportation Improvement Program (STIP)

All STIP projects must be capital projects (including project development costs) needed to improve transportation. Eligible projects include bicycle facility improvements and improved access to transit and are administered by Caltrans.

Transportation Development Act

Transportation Development Act Article 3 funds are state block grants awarded monthly to local jurisdictions for transit, bicycle and pedestrian projects in California by Caltrans. Funds for pedestrian projects originate from the Local Transportation Fund, which is derived from a ¼ cent of the general state sales tax. Local

VII. IMPLEMENTATION

This section addresses the construction phasing issues related to implementation of the proposed system. It includes guidelines for establishing priorities for implementing specific routes and also provides typical design standards for each bikeway classification.

BIKEWAY SYSTEM PHASING

The specific implementation of any given route or facility, with all other things considered equal, should be based on the following criteria:

- Where an opportunity, such as a road widening or re-paving, makes implementation favorable.
- Where new roadways are constructed as part of the general plan development process.
- To complete improvements contained in adopted plans that add to circulation efficiency, completeness and safety (e.g., downtown core).
- Where an eminent loss of an opportunity, such as the sale of a railroad right-of-way, makes implementation necessary.
- Where resolution of a major obstacle, such as railroad levees, creeks, or embankments makes implementation necessary.
- Where the segment is not disconnected or otherwise poorly accessible from the rest of the system.

In many situations, the most needed bikeway improvement may not be implemented first. In these cases, external factors such as new construction create opportunities to provide new bikeway facilities without consideration for need. Therefore, the proposed system does not include a ranking of specific routes, but does include the following list of high priority routes.

PRIORITY ROUTES

Priority routes were selected based on expected use, type of route, connectivity, potential improvements to connectivity and safety, and funding potential. The following projects currently have the highest priority for implementation (no priority order).

- Ferrari Ranch Road Bike Lanes. The Class II bike lanes on Ferrari Ranch Road between 4th Street and SR 65 will provide a much needed connection from the east side of the City to Highway 65. The connection will enhance bicycle travel by residents of Sun City – Lincoln Hills and provide bicycle access to the Safeway Shopping Center. ($165,000)



- 12th Street/Virginia Town Road Bike Lanes. Class II bike lanes are recommended for 12th Street and Virginia Town Road. This project entails mostly restriping. ($12,000)





- O Street Bike Lanes. Class II bike lanes on O Street from 1st Street to Nicolaus Road. These lanes will enhance bicycle travel in the downtown core by completing an existing gap in the bicycle system. (estimated construction cost $15,000)





- 3rd Street Bike Lanes and Bike Signal Detectors at 3rd Street and G Street. Class II bike lanes on 3rd from the east terminus to the west terminus will complete an existing gap. The signal detectors will be installed at the intersection of 3rd Street and G Street to assist bicyclists with crossing both facilities. (estimated construction cost $63,000)





- Moor Gap Bikeway Completion. Complete the Moor Gap bikeway under Highway 65 as proposed in the City's Safe Routes to School application. Moore Road was closed at this location due to the realignment of SR 65. The route to school is presently along a circuitous route along roads without sidewalks, and collector streets with average daily traffic exceeding 10,000 vehicles. (estimated construction cost $85,000).







A more detailed description of the Moore Road project is shown in Appendix H.

Section 504. The methods adopted by the City of Lincoln for barrier removal will ultimately be determined by the ADA Coordinator, feedback from the public, individuals with disabilities, and those organizations that represent individuals with disabilities. The ADA Coordinator, related staff and feedback organizations may deviate from barrier removal methods, if doing so, helps to ensure public safety, is more efficient or maximizes the overall benefit and utilizes public funds in the most effective manner.

Barrier Removal Priorities

Priority 1: Grievances from the public and, specifically individuals with disabilities will be the first priority for barrier removal, regardless of what building or facility the grievance pertains to, so long as, the building or facility is owned, operated or governed by the City of Lincoln;

Priority 2: Physical locations identified to be problem areas via public involvement, consumer surveys, and the Transition Plan comment period will be the second priority for barrier removal;

Priority 3: The following information will determine barriers to be removed under the 3rd Priority:

A. City of Lincoln owned or governed Buildings, parks, trails, and sports fields determined to have high density public activity, including facilities determined to be frequented by individuals with disabilities.
B. Pedestrian facilities within the right of ways along Major roadways (Arterials or thoroughfares with a minimum 80-foot wide right-of-way) and all pedestrian facilities within these right-of-ways, including but not limited to intersections and sidewalks along these arterials or thoroughfares; and
C. Intersections and roadway segments serving Priority Level 3 buildings and facilities including:
    I. City of Lincoln owned buildings, parks, trails, and sports fields,
    II. Public schools, hospitals, health clinics and health centers, including those which serve individuals with disabilities;
    III. Public housing, homeless shelters, senior facilities, rehabilitation facilities, and various facilities which specifically serve individuals with disabilities, such as group homes;
    IV. Law enforcement facilities, transportation hubs, public agency service facilities, jails, and prisons

Priority 4: The following information will determine barriers to be removed under the 4th Priority:

A. Street right of ways with minimum 60-foot wide right-of-way and other roadways, and all pedestrian facilities within the right-of-way including, but not limited to, intersections and sidewalks along these highways; and
B. Intersection and roadways serving level 2 facilities, including:
    I. ADA Title III Public Accommodations, such as, supermarkets, strip retail markets, and retail centers;
    II. Major employment sites; and
    III. Housing complexes and apartments
C. The right-of-way along roadways serving industrial areas, single family residential areas, and other right-of-way not listed in higher priorities.
D. Buildings and facilities that owned, operated, or governed by the City of Lincoln not defined in the 3rd and 4th priorities

Barrier Removal Schedule

The finalized barrier removal schedule is based on funding availability as each facility has a differing fund source including the general fund. The ADA Coordinator will work to identify funding sources on an on-going annual basis. Once funding has been determined, the following barrier removal schedule and activities will provide a guidance mechanism for construction activities.

The City of Lincoln plans to propose capital improvement projects annually to implement the ADA Transition Plan and remove identified barriers to facilities, and also plans to apply for competitive funds to accelerate the transition process where feasible. The facility reports appended to this document (Attachment D) provide the identification of barriers and the specific barrier removal actions.

The barrier removal projects will be divided by fiscal year for the next five years. It is felt that a detailed breakdown of projects past the five year period would be inappropriate, since conditions would be subject to numerous changes over such a time span. The barrier removal schedule was compiled by first grouping the barriers and prioritizing them as shown below. The highest priority was placed on those barrier removal items that provide accessibility at the main entrance of a facility or improve a path of travel to the portion of the facility where the program activities take place.

Group Priority	
1	Parking - Off Street
2	Accessible Routes
3	Curb Ramps
4	Detectable Warnings
5	Ramps - (Not a Curb Ramp)
6	Doors
7	Elevators & Lifts
8	Restrooms
9	Plumbing Fixtures & Elements
10	Fire Alarms
11	Fire Extinguishers
12	Sales and Service Counters/Tables
13	Reach Ranges
14	Pool/Spa
15	Clear Floor Space
16	Kitchens and Kitchenettes and Wet Bars
17	Dining/Bar and Work Surfaces
18	Assembly Areas
19	Stairways
20	ATM's and Fare Machines
21	Operable Parts
22	Signs

The facilities were also prioritized based on the level of use by the public. The facilities were separated by function park vs facility (i.e. building) and prioritized as shown below.

Priority	Facility	Fund #	Facility Type
1	City Hall	540	Facility
1A	Lincoln Area Chamber of Commerce	540	Facility
2	Community Center	540	Facility
2A	Existing Downtown Parking	221	Fund 221 if on street
3	Twelve Bridges Library	244	Facility
4	Police Department	100	Facility
5	Civic Center	540	Facility
6	Lincoln Museum	100	Facility
7	Lincoln Airport	750	Facility
8	Fire Station 34	100	Facility
9	Fire Station 33	100	Facility
10	Fire Station 35	100	Facility
11	Police Activities League Building	540	Facility
12	Carnegie Library	244	Facility
Parks			
1	1911 Foskett Regional Park	270	Park
2	McBean Park	270	Park
3	Wilson Park	270	Park
4	Peter Singer Park	270	Park
5	Auburn Ravine Park	270	Park
6	Joiner Park	270	Park
7	Twelve Bridges Park	270	Park
8	Markham Park	270	Park
9	Sheffield Park	270	Park
10	Machado Park	270	Park
11	Scheiber Park	270	Park
12	Coyote Pond Park	270	Park
13	Brown Park	270	Park
14	Pete Demas Park	270	Park

Because the City of Lincoln has a large number of facilities, it is impossible to immediately renovate all the facilities that create barriers to program access. Barriers in City facilities will be removed systematically, City-wide and based on the established priorities (i.e. group and facility priority). The barrier removal schedule is included as Attachment C. The City of Lincoln reserves the right to modify barrier removal priorities in order to allow flexibility in changes in City programs, funding constraints and opportunities.

The locations of work are subject to review and recommendations by the City of Lincoln, the ADA Coordinator, any Advisory Committees and the public. Likewise, it is probable that specific locations and project groupings will need to be adjusted among the various years of the plan, after

VII. DEPLOYMENT STRATEGIES & PRIORITIZATION

The following strategies and recommended prioritization are provided to guide phasing of future deployments and implementation of new technologies. The proposed strategies are separated into near-term (1-4 years), mid-term (5-8 years), and long-term (>8 years). As the City's traffic signal communications system is established, the City should periodically revisit its goals to reprioritize or adjust these strategies based on current needs.

A. Near-Term Implementation (1-4 years)

The near-term strategies are intended to establish a strong foundational network on which the City can continue to expand. Near-term strategies aim to address the City's highest and most pressing needs while considering the level of effort to complete.

1. Deploy Coordination and GPS-Based Time Source Receivers on Primary Corridors

The City is currently in the process of deploying revised coordination timing plans along Lincoln Boulevard. However, since there is no existing signal equipment that allows for communication between the signals or time-syncing, the signal coordination will lose effectiveness overtime. To provide quick benefits to the City, signal timing coordination paired with GPS-based Time Source Receivers can quickly be established along each of the City's primary corridors (Lincoln Boulevard, Joiner Parkway, Ferrari Ranch Road, and Twelve Bridges Drive). Traffic signal controllers will not need to be upgraded to accept the receivers. The use of GPS receivers and coordination timings will be a cost-effective solution to improve operations until a more extensive communications network can be established.

2. ATMS and Traffic Signal Controller Evaluation

Before implementing any improvements to traffic signal communications, the City should conduct an evaluation of the ATMS and traffic signal controllers that will be interconnected and provide the remote operations desired by the City. The procurement process under which the ATMS and associated controllers will be provided can vary depending on the type of funding available. If federal funding is used, a formal FHWA System Engineering process will need to be followed. If local funds are used, a more streamlined specifications and requirements development process can be utilized. In both processes, the City will need to evaluate and identify ATMS and traffic signal controller functionality that is desired by the City to meet its operational needs.

3. Develop CCTV Camera and Detection Specifications

Similar to strategy #2, the City will need to conduct an evaluation of available CCTV cameras and video detection systems. The evaluation will be used to create standard specifications for future camera and detection deployments. If the City desires to identify and select a preferred vendor and device for the CCTV cameras and detection system, it is recommended that the evaluation include developing initial equipment requirements based on the City's needs, developing of vendor evaluation criteria, and conducting vendor interviews/demonstrations. Based on the outcome of the evaluation, the City will be able to develop specifications for the selected equipment.

4. Establish Communication Backbone on Lincoln Boulevard

As Lincoln Boulevard essentially bisects the City and intersects most of the other primary signalized corridors, it will serve as the communication backbone in the City. As part of the first implementation projects, the City should install communications along Lincoln Boulevard from State Route 65 (SR-65) to 7th Street. The backbone should include establishing a center-to-field connection to City Hall via new communications along 6th Street. There is existing empty conduit between 1st Street and 7th Street that can be utilized. Fiber optic technology is recommended to provide the City with the greatest expansion and data capacity capabilities. However, as an interim solution, wireless communications south of 1st Street could be considered if the City desires to quickly establish interconnect on Lincoln Boulevard and to help span the Ingram Slough Bridge.



Lincoln Boulevard intersects most of the primary signalized corridors and will serve as the communication backbone of the City.

As part of the corridor upgrade traffic signal controllers, CCTV cameras, and video detection equipment should be implemented based on the outcome of Strategies #2 and #3 above. Note, remote operation and functionality of Lincoln Boulevard elements will be limited until a central system is deployed (see Strategy #5 below).

B. Mid-Term Implementation (5-8 years)

After establishing traffic signal equipment standards and the communication backbone along Lincoln Boulevard, the City will be able to expand the traffic signal communications network. These mid-term strategies utilize the base created by the near-term strategies above and enhance City's traffic management and communications capabilities.

5. Procure Advanced Traffic Management System

Having established the Lincoln Boulevard backbone, a connection to City Hall, and begun deploying upgraded traffic signal controllers, the City is ready to establish an ATMS for remote operations and management. Using the system requirements and specifications developed under Strategy #2 above, the City will conduct a qualifications-based selection of the ATMS vendor. Depending on available project funding, this procurement can include the purchase of some or all the traffic signal controllers for the City's existing traffic signals. This procurement would also include workstations, server equipment, and other elements required provide a fully functional ATMS.

6. Establish Traffic Operations Center

Potentially in conjunction with Strategy #5, the City can deploy a small-scale TOC within an existing conference room or empty office space at City Hall. While it is anticipated that the TOC will not be utilized daily, it will be utilized during special events which require joint operations between multiple City departments.

7. Expand Communications to Other Primary Corridors

Spreading out from the Lincoln Boulevard backbone, communications will be expanded along Joiner Parkway, Ferrari Ranch Road, and Twelve Bridges Drive. Since the communications on these roadways provide connections to most of the City, and lead to potential expansion areas of the City, it is recommended that trunk line communications (preferably fiber optic cables) be implemented on these corridors. Extending the new communications on E. Joiner Parkway to the City limit should be considered to allow for a potential communication connection to the City of Rocklin. This connection could be leveraged for day-to-day joint operations along shared corridors, or to support regional emergency response activities, and to expand the traffic signal communications network.

C. Long-Term Implementation (>8 years)

Long-term strategies include approaches to complete the buildout of the traffic signals communications system and prepare for expansion to other development areas of the City.

8. Expand Communications to Secondary and Minor Corridors

Building off the primary corridor trunk lines, the City should expand communications, traffic signal controller upgrades, CCTV cameras, and enhanced detection to all signals within the City. Like the previous communications implementation strategies, fiber optic communications are preferred when funds are available. However, as appropriate, other communication technologies like wireless interconnect or cellular modems should be considered. When establishing communications on secondary and minor corridors, media type and bandwidth capacity should allow for potential expansion to planned signalized corridors and intersections.

Table 6: Summary of Implementation Strategies

	Strategy	Deployment Cost*	Deployment Timeline
1	Deploy Signal Coordination and GPS-Based Time Source Receivers	$123,000	Near-Term Implementation (0-4 Years)
2	ATMS and Traffic Signal Controller Evaluation	$44,000**	
3	Develop CCTV Camera and Detection Specifications	$30,000	
4	Establish Communication Backbone on Lincoln Boulevard	$2,195,300	
5	Procure Advanced Traffic Management System	$350,000	Mid-Term Implementation (5-8 Years)
6	Establish Traffic Operations Center	$85,100	
7	Expand Communications to Other Primary Corridors	$5,896,100	
8	Expand Communications to Secondary and Minor Corridors	$4,468,300	Long-Term Implementation (8+ Years)

**See* Table 7 *for individual recommended project breakdown.*

***Assumes federally funded procurement.*

VIII. PROJECT IMPLEMENTATION

This section lists the projects that have been identified to address the City of Lincoln's traffic signal communication priorities and needs. The projects are categorized according to the associated near-term, mid-term, and long-term implementation strategies and are based on the consideration of the City's primary corridors, secondary corridors, and technological goals. The project list has been developed as a guide and does not necessarily correlate to the exact order in which they should be implemented. The phasing of the projects should be assessed as the funds and as other capital improvement projects (e.g., roadway widening, paving rehabilitation) are initiated. The City should evaluate opportunities to combine projects based on efficiency and effectiveness.

Specific Projects

Below are summaries of the four key categories of projects that are proposed. The summaries include brief descriptions of the type of work that should be completed along with assumptions for determining the planning levels for the project development and capital costs.

The near-term, mid-term, and long-term implementation projects are presented in Exhibits 2 and Exhibit 3 and Exhibit 4. A prioritized project list with planning level costs is provided in Table 7.



Deploying time-synced signal timing coordination will reduce delay and improve travel time on primary corridors.

Traffic Signal Coordination Projects

To facilitate efficient traffic signal operations on the primary signalized corridors, the City will deploy signal timing coordination and GPS-based time source receivers to reduce delay and improve travel times on the City's primary corridors. The key corridors identified for coordination are Lincoln Boulevard, Joiner Parkway, Ferrari Ranch Road, and Twelve Bridges Drive. Because the City recently deployed updated signal coordination along Lincoln Boulevard between Gateway Drive and 7th Street, the implementation project on Lincoln Boulevard will include time source receivers at all intersections, but new signal timing will only be needed south of Gateway Drive.

NEIGHBORHOOD ELECTRIC VEHICLE (NEV) MAP

- AIRPORT
- DOWNTOWN
- ENTERTAINMENT
- FOOD
- LIBRARY
- MEDICAL
- PARK
- POST OFFICE
- SENIOR LIVING
- SHOPPING

- NEV LANE
- NEV PROHIBITED
- NEVs ALLOWED TO USE AUTOMOBILE LANE

N

5,000 FT

SHERIDAN LINCOLN BLVD
VENTURE DR
LAKESIDE DR
JOINER PKWY
AVIATION BLVD
NICOLAUS RD
9TH ST
E 12TH ST
VIRGINIATOWN RD
8TH ST
7TH ST
6TH ST
5TH ST
4TH ST
3RD ST
1ST ST
C ST
A ST
B ST
EAST AVE
J ST
I ST
Q ST
O ST
N ST
M ST
L ST
P ST
F ST
D ST
K ST
H ST
R ST
O ST
MCBEAN PARK DR
TO NEWCASTLE
SIERRA COLLEGE BLVD
SORRENTO PKWY
FERRARI RANCH RD
LINCOLN BLVD
INGRAM PKWY
SUN CITY BLVD
STONERIDGE BLVD
MOORE RD
BELLA BREEZE DR
DEL WEBB BLVD
SPRING VALLEY PKWY
TWELVE BRIDGES DR
E JOINER PKWY
STATE HIGHWAY 65
INDUSTRIAL AVE
TO ROCKLIN & ROSEVILLE

Appendix B

INTERSECTION NETWORK SCREENING RESULTS

Intersection	OBJECTID	Crashes	Local CCR Differential[1]	EPDO[2]	*Fatal*	*Severe Injury*	*Other Visible Injury*	*Complaint of Pain*	*Property Damage Only*	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Impaired	Dark	Wet
Signalized Intersections																						
Lincoln Blvd & Ferrari Ranch Rd	688	**29**	0.13	84	0	0	3	5	21	7	4	14	2	2	0	0	0	0	20	3	3	2
Ferrari Ranch Rd & Groveland Ln	603	**20**	0.17	208	0	1	4	6	9	14	1	2	1	2	0	0	0	0	10	1	5	0
Lincoln Blvd & 1st St	770	**20**	0.12	75	0	0	3	5	12	4	0	8	1	3	0	0	2	2	12	0	4	5
Lincoln_Blvd & Ca 65 Nb Offramp	1227	**15**	2.72	74	0	0	5	2	8	5	2	0	2	3	1	2	0	0	9	1	4	3
Ferrari Ranch Rd & Joiner Pkwy	620	**14**	-0.09	69	0	0	3	5	6	3	1	3	5	2	0	0	0	0	8	0	4	1
Ferrari Ranch Road & Ca 65 Nb Offramp	1220	**13**	0.36	33	0	0	0	4	9	3	2	5	0	3	0	0	0	0	8	0	3	1
Joiner Pkwy & Downing Cir/Danbury Dr	709	**13**	0.24	166	0	1	2	3	7	9	1	1	0	1	0	0	1	0	5	0	8	2
Lincoln Blvd & 3rd ST	886	**12**	-0.01	42	0	0	2	2	8	3	0	4	1	3	0	1	0	0	6	1	1	2
Joiner Pkwy_S & Twelve Bridges Dr	140	**10**	-0.15	49	0	0	3	2	5	1	2	2	0	4	0	0	0	0	5	1	2	3
Joiner Pkwy & 1St	782	**10**	-0.07	44	0	0	3	1	6	2	1	1	0	2	1	0	2	0	4	0	2	2
Lincoln Blvd & 7th St	998	**10**	-0.02	45	0	0	2	3	5	4	0	2	0	1	0	1	1	1	6	0	5	1
Colonnade Dr & Twelve Bridges Dr	20	**9**	-0.14	44	0	0	2	3	4	3	0	5	0	1	0	0	0	0	6	0	2	3
Sterling Pkwy & Joiner Pkwy	557	**9**	0.00	38	0	0	3	0	6	1	2	0	1	3	0	0	1	1	5	0	4	1
Lincoln Blvd & Lincoln Newcastle Hwy	922	**9**	-0.11	34	0	0	1	3	5	2	2	3	1	0	0	0	0	1	5	1	2	0
Lincoln_Blvd & Gateway Dr	1226	**9**	0.00	34	0	0	1	3	5	2	1	2	1	2	0	0	0	0	3	1	1	3
Lincoln Blvd_S & Sterling Pkwy	389	**8**	-0.06	28	0	0	1	2	5	0	2	5	0	1	0	0	0	0	4	0	1	1
Joiner Pkwy & 3rd ST	837	**8**	-0.06	42	0	0	3	1	4	4	2	0	0	1	0	0	0	1	7	0	1	0
Twelve Bridges Dr & Ca 65 Onramp	1232	**7**	-0.07	155	0	1	3	0	3	0	1	3	1	1	1	0	0	0	3	3	4	2
Groveland Ln & Joiner Pkwy	654	**6**	-0.19	41	0	0	2	3	1	3	1	0	0	1	0	0	0	1	3	0	2	0
Joiner Pkwy & Nicolaus Rd	992	**6**	-0.17	21	0	0	0	3	3	1	0	1	0	3	0	0	0	1	4	0	3	1
Lincoln Blvd & 5th ST	949	**5**	-0.22	15	0	0	1	0	4	0	1	0	1	2	0	0	1	0	2	0	1	0
Fieldstone Dr & Twelve Bridges Dr	119	**4**	-0.28	19	0	0	1	1	2	1	0	3	0	0	0	0	0	0	3	0	0	0
East Ave & Lincoln Newcastle Hwy	891	**4**	-0.27	19	0	0	0	3	1	0	0	1	1	2	0	0	0	0	1	1	1	0
Eastridge Dr & Twelve Bridges Dr	114	**3**	-0.29	8	0	0	0	1	2	1	0	1	0	1	0	0	0	0	1	1	3	0
Connecting Rd & Twelve Bridges Dr_S	121	**3**	-0.30	8	0	0	0	1	2	1	0	0	0	2	0	0	0	0	3	0	2	1
Danbury Dr & Joiner Pkwy	687	**3**	-0.30	131	0	1	1	0	1	2	0	1	0	0	0	0	0	0	1	0	1	0
Unsignalized Intersections																						
Lincoln Blvd & 6th ST	979	**10**	0.22	34	0	0	2	1	7	4	1	1	0	3	0	0	1	0	1	2	1	1
Twelve Bridges Dr & Catta Verdera	193	**8**	0.54	27	0	0	2	0	6	0	1	1	0	5	0	0	0	1	3	2	4	1

Intersection	OBJECTID	Crashes	Local CCR Differential[1]	EPDO[2]	*Fatal*	*Severe Injury*	*Other Visible Injury*	*Complaint of Pain*	*Property Damage Only*	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Impaired	Dark	Wet
Lincoln Blvd & Gladding Road	1053	**8**	0.21	227	0	1	2	2	3	5	0	0	0	1	2	0	0	0	2	0	4	1
Caledon Cir & Ferrari Ranch Rd	508	**7**	0.01	32	0	0	1	3	3	1	1	1	0	2	1	1	0	0	6	0	1	1
H St & 3rd ST	885	**7**	0.54	41	0	0	3	1	3	2	2	0	1	0	0	1	0	1	1	0	0	0
Lakeside Dr & Nicolaus Rd	1028	**7**	0.18	22	0	0	1	1	5	3	0	0	0	4	0	0	0	0	1	2	4	3
Joiner Pkwy & West Del Webb Blvd	538	**6**	0.02	31	0	0	1	3	2	1	0	4	0	1	0	0	0	0	5	0	0	2
Joiner Pkwy & Moore Rd	754	**6**	-0.01	234	0	1	4	0	1	1	0	1	0	2	0	1	0	1	4	0	2	2
Lincoln Blvd & 2nd ST	843	**6**	0.00	26	0	0	1	2	3	0	1	5	0	0	0	0	0	0	4	0	1	0
D St & Lincoln Newcastle Hwy	924	**5**	0.01	25	0	0	1	2	2	3	0	2	0	0	0	0	0	0	4	0	0	0
H St & 5th ST	948	**5**	0.47	20	0	0	1	1	3	3	0	0	0	0	0	0	0	2	1	0	1	1
F St & 6th ST	980	**5**	1.98	194	0	1	0	0	4	1	1	1	0	2	0	0	0	0	0	2	2	1
H St & 7th ST	999	**5**	0.17	15	0	0	1	0	4	0	1	2	0	1	0	0	0	0	2	0	2	1
Aviation Blvd & Venture Dr	1095	**5**	0.22	15	0	0	0	2	3	1	1	0	0	2	0	1	0	0	3	1	4	1
O St & 1st ST	802	**4**	0.09	4	0	0	0	0	4	1	1	2	0	0	0	0	0	0	3	0	2	0
Nelson Ln P & Nicolaus Rd	870	**4**	-0.05	198	0	1	0	1	2	3	0	0	0	1	0	0	0	0	1	1	2	0
R St & 3rd ST	882	**4**	0.21	14	0	0	1	0	3	3	0	1	0	0	0	0	0	0	2	0	0	1
F St & 5th ST	928	**4**	0.85	4	0	0	0	0	4	1	1	1	0	1	0	0	0	0	1	0	2	1
A St & 4th Street/McBean Park Drive	940	**4**	-0.02	203	1	0	1	0	2	1	0	1	0	1	0	0	0	1	2	1	1	0
J St & 5th ST	946	**4**	0.19	9	0	0	0	1	3	2	1	0	0	0	0	0	0	1	1	0	1	1
J St & 9th ST	1022	**4**	0.01	23	0	0	2	0	2	1	0	2	0	1	0	0	0	0	3	0	0	0
Moore Rd P & Fiddyment Rd	1234	**3**	1.28	8	0	0	0	1	2	1	0	0	0	2	0	0	0	0	1	0	1	1
Joiner Pkwy & Bridgestone Dr	1	**3**	-0.08	13	0	0	0	2	1	1	0	1	0	1	0	0	0	0	2	0	1	1
Fieldstone Dr & Joiner Pkwy	68	**3**	-0.10	192	0	1	0	0	2	2	0	0	0	0	0	0	0	1	0	0	1	0
Sun City Ln & Del Webb Blvd	543	**3**	-0.09	22	0	0	2	0	1	2	0	1	0	0	0	0	0	0	1	0	0	0
B St & 7th ST	861	**3**	0.00	13	0	0	0	2	1	0	1	2	0	0	0	0	0	0	2	0	0	0
I St & 3rd ST	884	**3**	0.03	8	0	0	0	1	2	1	0	1	0	0	0	0	0	0	0	0	1	0
B St & Lincoln Newcastle Hwy	888	**3**	-0.08	2	0	0	0	0	2	1	0	0	0	1	0	0	1	0	1	0	1	0
E St & 3rd ST	889	**3**	0.27	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0
F St & Lincoln Newcastle Hwy	892	**3**	-0.08	8	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0	1	1	1
H St & 8th ST	1008	**3**	-0.05	13	0	0	0	2	1	1	0	1	0	1	0	0	0	0	1	0	1	0
O St & Nicolaus Rd	1021	**3**	-0.06	3	0	0	0	0	3	1	0	1	0	1	0	0	0	0	3	0	0	0

Intersection	OBJECTID	Crashes	Local CCR Differential[1]	EPDO[2]	*Fatal*	*Severe Injury*	*Other Visible Injury*	*Complaint of Pain*	*Property Damage Only*	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Impaired	Dark	Wet
Industrial Ave & Twelve Bridges Dr	1233	**2**	-0.14	196	1	0	0	1	0	1	0	1	0	0	0	0	0	0	1	0	1	0

1. Local Critical Crash Rate Differential

2. Equivalent Property Damage Only Crashes

Appendix C

SEGMENT NETWORK SCREENING RESULTS

Facility	OBJECTID	Cross Street 1	Cross Street 2	Crashes	Local CCR Differential[1]	EPDO[2]	*Fatal*	*Severe Injury*	*Other Visible Injury*	*Complaint of Pain*	*Property Damage Only*	Broadside	Sideswipe	Rear End	Head On	Hit Object	Overturned	Other	Pedestrian	Bicycle	Aggressive	Impaired	Dark	Wet
Minor Arterials																								
Lincoln Blvd	**1417**	**Ferrari Ranch Rd**	**Gateway Dr**	**5**	0.15	20	0	0	0	3	2	2	1	2	0	0	0	0	0	0	3	0	1	1
Lincoln Blvd	2332	Gateway Dr	1St St	**5**	0.48	15	0	0	0	2	3	4	0	0	1	0	0	0	0	0	0	0	0	0
Twelve Bridges Dr	2289	E Joiner Pkwy	Parkside Dr	**3**	-0.01	17	0	0	1	1	0	0	0	0	0	2	0	0	0	1	1	0	0	0
Joiner Pkwy	1092	Danbury Dr	Downing Cir	**2**	0.00	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	2	0	0	0
Lincoln Blvd	1523	Lincoln Blvd	Lincoln City Limits	**2**	-0.09	12	0	0	1	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0
Joiner Pkwy	1987	Moore Rd	1st St	**2**	-0.02	2	0	0	0	0	2	0	0	0	0	2	0	0	0	0	1	0	0	0
Twelve Bridges Dr	2288	Industrial Ave P	US 65 W On/Offramps	**2**	-0.07	6	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	1
Industrial Ave	2342	Ca-65 On-Ramp S, Industrial Pkwy	Twelve Bridges Dr	**2**	-0.09	17	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0	1	1	0
Collectors																								
Ferrari Ranch Rd	**1416**	**Lincoln Blvd**	**Ingram Pkwy**	**4**	0.16	19	0	0	1	1	2	2	2	0	0	0	0	0	0	0	1	0	0	1
Joiner Pkwy	34	Nicolaus Rd	Maloney Dr	**3**	1.67	3	0	0	0	0	3	0	0	0	0	3	0	0	0	0	1	2	3	1
9Th St	36	O St	J ST	**2**	0.06	2	0	0	0	0	2	0	0	1	0	1	0	0	0	0	1	0	2	0
Twelve Bridges Dr	756	Camino Verdera	Twelve Bridges Dr Terminus	**2**	0.08	12	0	0	1	0	1	0	1	0	0	1	0	0	0	0	1	0	2	0
Twelve Bridges Dr	804	Catta Verdera	Stoneridge Blvd	**2**	0.00	21	0	0	2	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0
Local																								
Gladding Rd	1522	Lincoln Blvd	W Wise Rd	**3**	0.94	8	0	0	0	1	2	0	1	0	0	2	0	0	0	0	1	0	0	0

1. Local Critical Crash Rate Differential

2. Equivalent Property Damage Only Crashes

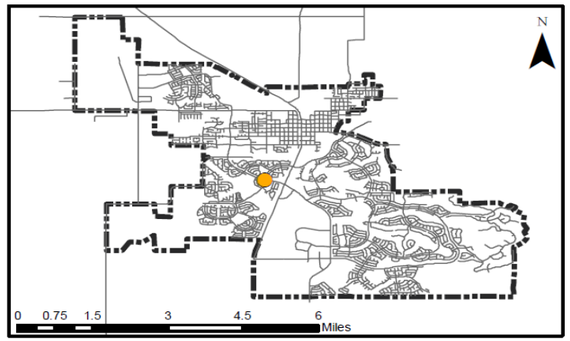
Appendix D

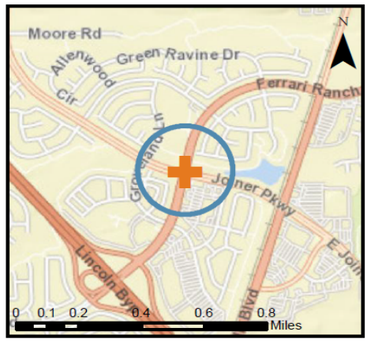
PROJECT SHEETS

City of Lincoln Local Road Safety Plan
Project Description for Intersection Improvements

Signalized Intersection

Location: Ferrari Ranch Rd & Joiner Parkway
Agency Name: City of Lincoln
Contact Name: Edgar Garcia
E-mail: edgar.garcia@lincolnca.gov







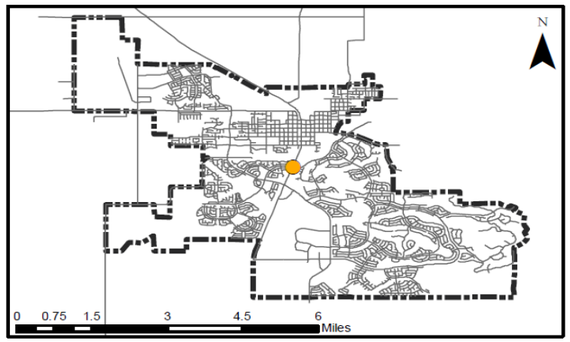
Total Crashes	14
Local CCR Differential	-0.09
Equivalent Property Damage Only	69
Fatal	0
Severe Injury	0
Other Visible Injury	3
Complaint of Pain	5
PDO	6
Crash Type	
Broadside	3
Sideswipe	1
Rear End	3
Head On	5
Hit Object	2
Overturned	0
Non-Motorist Crashes	
Pedestrian	0
Bicycle	0
Contributing Factors	
Aggressive	8
Impaired	0
Crash Conditions	
Dark	4
Wet	1

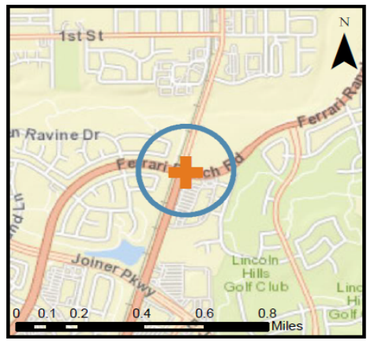
NOTES	COLLISION TYPE	RECOMMENDATION	LRSM/CMF COUNTERMEASURE	LRSM #	Expected Life (Years)	CMF	CALTRANS FUNDING	NUMBER OF CRASHES (2015-2019)		NUMBER OF HISTORIC CRASHES REDUCED	10-YEAR CRASH REDUCTION ESTIMATE	CRASH SEVERITY COST	10-YEAR CRASH REDUCTION BENEFIT (2016 $)	TOTAL 10-YEAR CRASH REDUCTION BENEFIT (2016 $)	QUANTITY/ NUMBER OF UNITS	UNIT COST	COST ESTIMATE	BENEFIT/COST
-	All	Install Retroreflective Backplates	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	S02	10	0.85	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 273,361	20 Retroreflective Backplates (1 signals at 20 per signal)	$ 750	$ 15,000	**18**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	0.45	0.90	$ 142,301	$ 128,071					
								COMPLAINT OF PAIN	5	0.75	1.50	$ 80,900	$ 121,350					
								PDO	6	0.9	1.80	$ 13,300	$ 23,940					
-	All	Improve sight triangle, cut back vegetation	Improve sight distance to intersection (Clear Sight Triangles)	NS11	10	0.80	90%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 364,481	Lump Sum	$ 5,000	$ 5,000	**73**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	0.6	1.20	$ 142,301	$ 170,761					
								COMPLAINT OF PAIN	5	1	2.00	$ 80,900	$ 161,800					
								PDO	6	1.2	2.40	$ 13,300	$ 31,920					
-	All	Extend all-red time	Improve signal timing (coordination, phases, red, yellow, or operation)	S03	10	0.15	50%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 1,549,045	1 Lump Sum	$ 5,000	$ 5,000	**310**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	2.55	5.10	$ 142,301	$ 725,735					
								COMPLAINT OF PAIN	5	4.25	8.50	$ 80,900	$ 687,650					
								PDO	6	5.1	10.20	$ 13,300	$ 135,660					
-	All	Change sequence such that LT movement preceeds through traffic movement	Improve signal timing (coordination, phases, red, yellow, or operation)	S04	10	0.15	50%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 1,549,045	1 Lump Sum	$ 5,000	$ 5,000	**310**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	2.55	5.10	$ 142,301	$ 725,735					
								COMPLAINT OF PAIN	5	4.25	8.50	$ 80,900	$ 687,650					
								PDO	6	5.1	10.20	$ 13,300	$ 135,660					
-	All	Advanced signal ahead sign and markings	Install flashing beacons as advance warning (S.I.)	S10	10	0.30	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 1,275,684	1 Signs	$ 258,000	$ 258,000	**5**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	2.1	4.20	$ 142,301	$ 597,664					
								COMPLAINT OF PAIN	5	3.5	7.00	$ 80,900	$ 566,300					
								PDO	6	4.2	8.40	$ 13,300	$ 111,720					
-	All	Square up the SE corner of the intersection to remove free right		-	-	-	-	FATAL	0			$ 1,590,000	$ -	$ -	Lump Sum	$ 5,000	$ -	**0**
								SEVERE	0			$ 1,590,000	$ -					
								OTHER VISIBLE	3			$ 142,301	$ -					
								COMPLAINT OF PAIN	5			$ 80,900	$ -					
								PDO	6			$ 13,300	$ -					

City of Lincoln Local Road Safety Plan
Project Description for Intersection Improvements

Signalized Intersection

Location: Lincoln Blvd & Ferrari Ranch Rd
Agency Name: City of Lincoln
Contact Name: Edgar Garcia
E-mail: edgar.garcia@lincolnca.gov







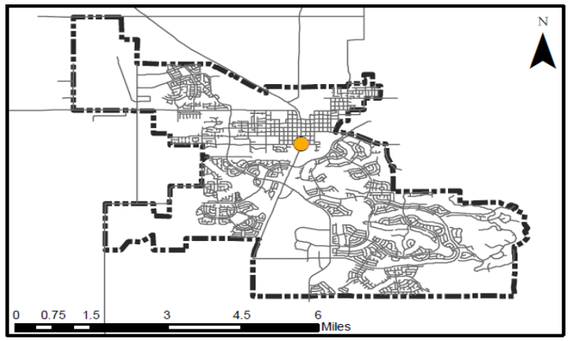
Total Crashes	29
Local CCR Differential	0.13
Equivalent Property Damage Only	84
Fatal	0
Severe Injury	0
Other Visible Injury	3
Complaint of Pain	5
PDO	21
Crash Type	
Broadside	7
Sideswipe	4
Rear End	14
Head On	2
Hit Object	2
Overturned	0
Non-Motorist Crashes	
Pedestrian	0
Bicycle	0
Contributing Factors	
Aggressive	20
Impaired	3
Crash Conditions	
Dark	3
Wet	2

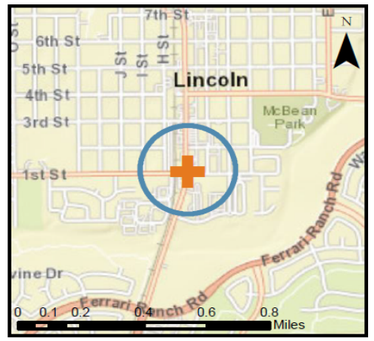
NOTES	COLLISION TYPE	RECOMMENDATION	LRSM/CMF COUNTERMEASURE	LRSM #	Expected Life (Years)	CMF	CALTRANS FUNDING	NUMBER OF CRASHES (2015-2019)		NUMBER OF HISTORIC CRASHES REDUCED	10-YEAR CRASH REDUCTION ESTIMATE	CRASH SEVERITY COST	10-YEAR CRASH REDUCTION BENEFIT (2016 $)	TOTAL 10-YEAR CRASH REDUCTION BENEFIT (2016 $)	QUANTITY/ NUMBER OF UNITS	UNIT COST	COST ESTIMATE	BENEFIT/COST
-	All	Install Retroreflective Backplates	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	S02	10	0.85	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 333,211	20 Retroreflective Backplates (1 signals at 20 per signal)	$ 750	$ 15,000	**22**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	0.45	0.90	$ 142,301	$ 128,071					
								COMPLAINT OF PAIN	5	0.75	1.50	$ 80,900	$ 121,350					
								PDO	21	3.15	6.30	$ 13,300	$ 83,790					
-	All	Improve signing for EB traffic to make lane configuration clearer (particularly RT lane)	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	NS06	10	0.85	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 11,970	1 Signs	$ 450	$ 450	**26.6**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	0	0	0.00	$ 142,301	$ -				
								COMPLAINT OF PAIN	0	0	0.00	$ 80,900	$ -				
								PDO	3	0.45	0.90	$ 13,300	$ 11,970					
-	All	Add signal head to NB/SB approaches	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	S02	10	0.85	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 333,211	1 Signal Heads	$ 8,000	$ 8,000	**42**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	0.45	0.90	$ 142,301	$ 128,071					
								COMPLAINT OF PAIN	5	0.75	1.50	$ 80,900	$ 121,350					
								PDO	21	3.15	6.30	$ 13,300	$ 83,790					
-	All	Provide Advanced Dilemma Zone Detection for high speed approaches	Provide Advanced Dilemma Zone Detection for high speed approaches	S04	10	0.60	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 888,562	1 Signals (Detection)	$ 40,000	$ 40,000	**22**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	1.2	2.40	$ 142,301	$ 341,522					
								COMPLAINT OF PAIN	5	2	4.00	$ 80,900	$ 323,600					
								PDO	21	8.4	16.80	$ 13,300	$ 223,440					
-	Pedestrian and Bicyclist	Extend bike lane to RR track	Install advance stop bar before crosswalk (Bicycle Box)	S20PB	10	0.15	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ -	70 SQFT of striping	$ 7	$ 455	**0**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	0	0	0.00	$ 142,301	$ -				
								COMPLAINT OF PAIN	0	0	0.00	$ 80,900	$ -				
								PDO	0	0	0.00	$ 13,300	$ -				

City of Lincoln Local Road Safety Plan
Project Description for Intersection Improvements

Signalized Intersection

Location: Lincoln Blvd & 1st Street
Agency Name: City of Lincoln
Contact Name: Edgar Garcia
E-mail: edgar.garcia@lincolnca.gov







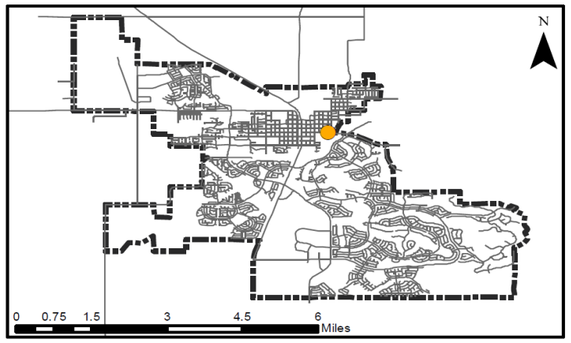
Total Crashes	20
Local CCR Differential	0.12
Equivalent Property Damage Only	75
Fatal	0
Severe Injury	0
Other Visible Injury	3
Complaint of Pain	5
PDO	12
Crash Type	
Broadside	4
Sideswipe	0
Rear End	8
Head On	1
Hit Object	3
Overturned	0
Non-Motorist Crashes	
Pedestrian	2
Bicycle	2
Contributing Factors	
Aggressive	12
Impaired	0
Crash Conditions	
Dark	4
Wet	5

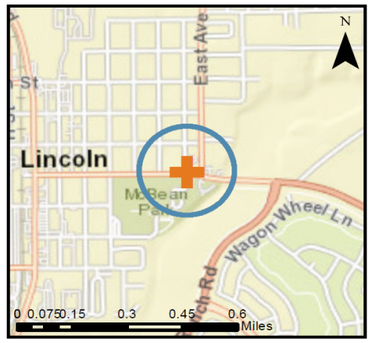
NOTES	COLLISION TYPE	RECOMMENDATION	LRSM/CMF COUNTERMEASURE	LRSM #	Expected Life (Years)	CMF	CALTRANS FUNDING	NUMBER OF CRASHES (2015-2019)		NUMBER OF HISTORIC CRASHES REDUCED	10-YEAR CRASH REDUCTION ESTIMATE	CRASH SEVERITY COST	10-YEAR CRASH REDUCTION BENEFIT (2016 $)	TOTAL 10-YEAR CRASH REDUCTION BENEFIT (2016 $)	QUANTITY/ NUMBER OF UNITS	UNIT COST	COST ESTIMATE	BENEFIT/COST
-	All	Install Retroreflective Backplates	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	S02	10	0.85	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 297,301	16 Retroreflective Backplates (0.8 signals at 20 per signal)	$ 750	$ 12,000	**25**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	0.45	0.90	$ 142,301	$ 128,071					
								COMPLAINT OF PAIN	5	0.75	1.50	$ 80,900	$ 121,350					
								PDO	12	1.8	3.60	$ 13,300	$ 47,880					
-	All	Update signal phases at the intersection	Improve signal timing (coordination, phases, red, yellow, or operation)	S04	10	0.15	50%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 1,684,705	1 Lump Sum	$ 5,000	$ 5,000	**336.9**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	2.55	5.10	$ 142,301	$ 725,735					
								COMPLAINT OF PAIN	5	4.25	8.50	$ 80,900	$ 687,650					
								PDO	12	10.2	20.40	$ 13,300	$ 271,320					
-	All	No RT trucks at the intersection	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	NS06	10	0.85	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 297,301	4 Signs	$ 450	$ 1,800	**165**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	3	0.45	0.90	$ 142,301	$ 128,071					
								COMPLAINT OF PAIN	5	0.75	1.50	$ 80,900	$ 121,350					
								PDO	12	1.8	3.60	$ 13,300	$ 47,880					
-	Pedestrian and Bicyclist	Green bike lane treatment in conflict zones	Install advance stop bar before crosswalk (Bicycle Box)	S20PB	10	0.15	100%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 539,582	1200 SQFT of striping	$ 7	$ 7,800	**69**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	1	0.85	1.70	$ 142,301	$ 241,912					
								COMPLAINT OF PAIN	2	1.7	3.40	$ 80,900	$ 275,060					
								PDO	1	0.85	1.70	$ 13,300	$ 22,610					
-	All	Re-design pork chop island to make it more effective at prohibiting LTs	Install median (flush)	R09	20	0.85	90%	FATAL	0	0	0.00	$ 1,590,000	$ -	$ 56,520	1 CY of Concrete	$ 881	$ 881	**64**
								SEVERE	0	0	0.00	$ 1,590,000	$ -				
								OTHER VISIBLE	0	0	0.00	$ 142,301	$ -				
								COMPLAINT OF PAIN	2	0.3	0.60	$ 80,900	$ 48,540					
								PDO	2	0.3	0.60	$ 13,300	$ 7,980					

City of Lincoln Local Road Safety Plan
Project Description for Intersection Improvements

Unsignalized Intersection

Location: A Street & McBean Park Drive/4th Street
Agency Name: City of Lincoln
Contact Name: Edgar Garcia
E-mail: edgar.garcia@lincolnca.gov







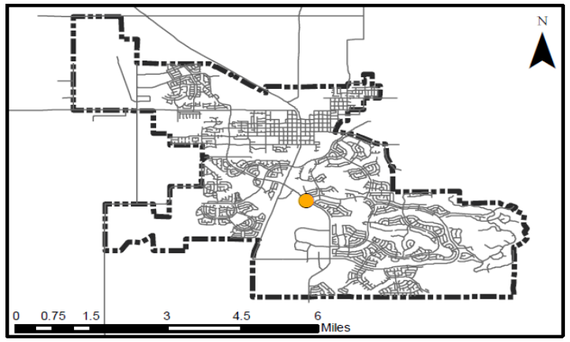
Total Crashes	4
Local CCR Differential	-0.02
Equivalent Property Damage Only	203
Fatal	1
Severe Injury	0
Other Visible Injury	1
Complaint of Pain	0
PDO	2
Crash Type	
Broadside	1
Sideswipe	0
Rear End	1
Head On	0
Hit Object	1
Overturned	0
Non-Motorist Crashes	
Pedestrian	0
Bicycle	1
Contributing Factors	
Aggressive	2
Impaired	1
Crash Conditions	
Dark	1
Wet	0

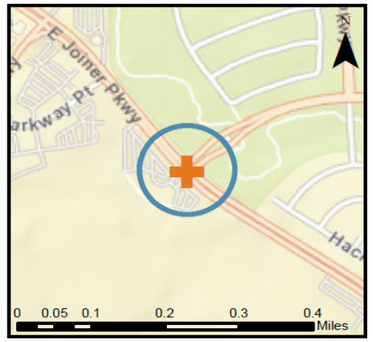
NOTES	COLLISION TYPE	RECOMMENDATION	LRSM/CMF COUNTERMEASURE	LRSM #	Expected Life (Years)	CMF	CALTRANS FUNDING	NUMBER OF CRASHES (2015-2019)		NUMBER OF HISTORIC CRASHES REDUCED	10-YEAR CRASH REDUCTION ESTIMATE	CRASH SEVERITY COST	10-YEAR CRASH REDUCTION BENEFIT (2016 $)	TOTAL 10-YEAR CRASH REDUCTION BENEFIT (2016 $)	QUANTITY/ NUMBER OF UNITS	UNIT COST	COST ESTIMATE	BENEFIT/COST
-	All	Re-stripe the center turn lane	Upgrade intersection pavement markings (NS.I.)	NS07	10	0.25	100%	FATAL	1	0.75	1.50	$ 2,530,000	$ 3,795,000	$ 4,048,352	100 SQFT of Striping	$ 7	$ 650	**6,228**
								SEVERE	0	0	0.00	$ 2,530,000	$ -				
								OTHER VISIBLE	1	0.75	1.50	$ 142,301	$ 213,452					
								COMPLAINT OF PAIN	0	0	0.00	$ 80,900	$ -					
								PDO	2	1.5	3.00	$ 13,300	$ 39,900					
-	All	Adding supplemental speed limit signs	Install/Upgrade larger or additional stop signs or other intersection warning/regulatory signs	NS06	10	0.15	100%	FATAL	1	0.85	1.70	$ 2,530,000	$ 4,301,000	$ 4,588,132	2 Signs	$ 450	$ 900	**5,098**
								SEVERE	0	0	0.00	$ 2,530,000	$ -				
								OTHER VISIBLE	1	0.85	1.70	$ 142,301	$ 241,912					
								COMPLAINT OF PAIN	0	0	0.00	$ 80,900	$ -					
								PDO	2	1.7	3.40	$ 13,300	$ 45,220					
-	Pedestrian and Bicyclist	Pedestrian activated crossing and sign at B St and McBean	Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	NS23PB	20	0.55	100%	FATAL	0	0	0.00	$ 2,530,000	$ -	$ 128,071	1 HAWK Signal	$ 300,000	$ 300,000	**0**
								SEVERE	0	0	0.00	$ 2,530,000	$ -				
								OTHER VISIBLE	1	0.45	0.90	$ 142,301	$ 128,071					
								COMPLAINT OF PAIN	0	0	0.00	$ 80,900	$ -					
								PDO	0	0	0.00	$ 13,300	$ -					

City of Lincoln Local Road Safety Plan
Project Description for Intersection Improvements

Unsignalized Intersection

Location: E Joiner Pkwy & West Del Webb Blvd
Agency Name: City of Lincoln
Contact Name: Edgar Garcia
E-mail: edgar.garcia@lincolnca.gov







Total Crashes	6
Local CCR Differential	0.02
Equivalent Property Damage Only	31
Fatal	0
Severe Injury	0
Other Visible Injury	1
Complaint of Pain	3
PDO	2
Crash Type	
Broadside	1
Sideswipe	0
Rear End	4
Head On	0
Hit Object	1
Overturned	0
Non-Motorist Crashes	
Pedestrian	0
Bicycle	0
Contributing Factors	
Aggressive	5
Impaired	0
Crash Conditions	
Dark	0
Wet	2

NOTES	COLLISION TYPE	RECOMMENDATION	LRSM/CMF COUNTERMEASURE	LRSM #	Expected Life (Years)	CMF	CALTRANS FUNDING	NUMBER OF CRASHES (2015-2019)		NUMBER OF HISTORIC CRASHES REDUCED	10-YEAR CRASH REDUCTION ESTIMATE	CRASH SEVERITY COST	10-YEAR CRASH REDUCTION BENEFIT (2016 $)	TOTAL 10-YEAR CRASH REDUCTION BENEFIT (2016 $)	QUANTITY/ NUMBER OF UNITS	UNIT COST	COST ESTIMATE	BENEFIT/COST
-	All	Bring SW approach up to the sidewalk	Upgrade intersection pavement markings (NS.I.)	NS07	10	0.25	100%	FATAL	0	0	0.00	$ 2,530,000	$ -	$ 617,402	85 SQFT of striping	$ 7	$ 553	**1,117**
								SEVERE	0	0	0.00	$ 2,530,000	$ -				
								OTHER VISIBLE	1	0.75	1.50	$ 142,301	$ 213,452					
								COMPLAINT OF PAIN	3	2.25	4.50	$ 80,900	$ 364,050					
								PDO	2	1.5	3.00	$ 13,300	$ 39,900					
-	All	Add signage to EB Joiner approach, making it clear that #1 lane is LT only	Install/Upgrade larger or additional stop signs or other intersection warning/regulatory signs	NS06	10	0.15	100%	FATAL	0	0	0.00	$ 2,530,000	$ -	$ 699,722	1 Signs	$ 450	$ 450	**1,555**
								SEVERE	0	0	0.00	$ 2,530,000	$ -				
								OTHER VISIBLE	1	0.85	1.70	$ 142,301	$ 241,912					
								COMPLAINT OF PAIN	3	2.55	5.10	$ 80,900	$ 412,590					
								PDO	2	1.7	3.40	$ 13,300	$ 45,220					
-	All	Signal Warrant	Install traffic signal	NS03	20	0.30	100%	FATAL	0	0	0.00	$ 2,530,000	$ -	$ 576,241	1 Lump Sum	$ 40,000	$ 40,000	**14**
								SEVERE	0	0	0.00	$ 2,530,000	$ -				
								OTHER VISIBLE	1	0.7	1.40	$ 142,301	$ 199,221					
								COMPLAINT OF PAIN	3	2.1	4.20	$ 80,900	$ 339,780					
								PDO	2	1.4	2.80	$ 13,300	$ 37,240					