Town of Moraga	Agenda Item
Ordinances, Resolutions, Requests for Action	10. B.

Meeting Date: June 8, 2022

TOWN OF MORAGA **STAFF REPORT**

To: **Honorable Mayor and Councilmembers**

From: **Shawn Knapp, Public Works Director / Town Engineer**
Bret Swain, Senior Civil Engineer

Subject: **Receive the Local Roadway Safety Plan (LRSP) Second Presentation and Provide Feedback to Staff**

Request

TJKM Transportation Consultants (TJKM) have analyzed the Town's collision data and received input through stakeholder and community meetings, and use of a dedicated LRSP project website for community feedback and surveys in preparing the Town's draft LRSP. Staff is looking for feedback from Town Council to finalize the draft LRSP in order to bring back for approval at a future meeting. Feedback is specifically encouraged on three core areas of the LRSP:

1) the seven identified priority emphasis areas for safety improvements developed from the collision data;
2) the Countermeasure Toolbox of safety measures for the identified priority intersections and road segments; and
3) the proposed five safety projects with the highest benefit to cost ratios with the greatest potential for grant funding.

Background

On April 13, 2022, the Town Council received a staff report and LRSP Powerpoint Presentation on the Local Roadway Safety Plan. TJKM discussed the goals and schedule for the preparation of the Town's LRSP. TJKM and staff solicited the Town Council and the community to provide their safety concerns input through the project's dedicated website: Local Road Safety Plan | Moraga, CA.

As of January 2022, an LRSP is required for local agencies to be eligible for Highway Safety Improvement Program (HSIP) funding, and as such is strongly oriented towards the HSIP format. The LRSP is also being adopted as a requirement for other forms of roadway safety-oriented grant funding, such as One Bay Area Grants (OBAG) Cycle 3.

Background on the HSIP might be helpful to understanding the structure of a Local Roadway Safety Plan. HSIP funds can be used to complete work on any public road or publicly owned bicycle or pedestrian pathway or trail, or on tribal lands for general use of tribal members, that improves the safety for its users. There are 28 project categories identified as eligible as listed under 23 U.S.C. §148(a)(4)(B).

The HSIP program is intended to fund safety projects that can be designed and constructed expeditiously. Projects must not require the acquisition of significant rights of way (not more than 10% of the construction cost), nor must they require extensive environmental review and mitigation. Proposed projects that typically take the longest time to deliver need to demonstrate that an incremental approach of installing lower cost countermeasures first has been followed and have not proved to be effective before these more expensive and time-consuming types of safety improvements (realignments, shoulder widenings, etc.) are considered.

HSIP funding also requires that a specific safety problem be identified based on existing validated accident data, such as Statewide Integrated Traffic Records System (SWITRs) or Transportation Injury Management System (TIMS), and the proposed countermeasure(s) must substantially address the condition. All proposed projects must lead to and complete the construction of safety improvements. All proposed projects must be consistent with the SHSP.

The HSIP is a competitive grant program. Proposed projects are evaluated based on Benefit/Cost Ratios (BCRs). Applications without fatal flaws are prioritized in descending order, statewide, by the BCRs. Projects with the highest BCRs will be selected for funding. The benefits are calculated through the HSIP Analyzer based on TIMS or SWITRS data. This automated process is outside of the control of local agencies. The HSIP Cycle 10 received 147 applications, totaling $184.6 million of HSIP funds, selected based on their BCRs. The BCR cutoff for an application to be selected for funding was 12.0. The average BCR of the selected applications was 24.3

From time-to-time, funding from the State is set aside for certain safety specific countermeasures or improvements when common roadway safety concerns are identified statewide, such as funding the Town received in HSIP Cycle 10 for striping and signage improvements for crosswalks. These are typically smaller, city-wide minor improvements that can be accomplished rapidly. The BCR calculation may not be required for projects that meet the criteria of the set-asides. The HSIP Cycle 10 State set-aside funding from the California Transportation Commission (CTC) for Pedestrian Crossing Enhancements, Guardrail Upgrade and Installing Edgelines received 119 applications, totaling $43.0 million of HSIP funds.

A staff goal is to work with the Town Council on expediently approving the LRSP so the Town can apply for upcoming federally funded transportation grants. On May 23, 2022, the One Bay Area Grant Cycle 3 (OBAG 3) Call for Projects was issued by the Contra Costa Transportation Authority (CCTA) with applications to CCTA due by June 15, 2022, for this federally funded “complete streets” transportation grant program. The Town was previously awarded $1.2 Million OBAG2 and $0.6 Million CCTA grant funding for the Moraga Way and Canyon Road Improvement Project completed in 2020. Town

staff is working with a consultant to develop an OBAG3 grant application for portions of Moraga Road and Canyon Road. On May 9, 2022, a Call for Projects was issued for HSIP Cycle 11 with applications due on September 12, 2022. As part of this LRSP process, TJKM will be assisting the Town with the application.

Staff is seeking final comments from the Town Council and the community on the Draft Moraga Local Road Safety Plan in order to finalize the LRSP. The Draft Moraga LRSP incorporates all the technical memorandum recommendations and public input and provides recommendations to address the Town's roadway concerns and issues.

Discussion

Development of Moraga's LRSP includes a data driven analysis of the Town's safety issues supported by feedback from key stakeholders knowledgeable in some aspect of the 5 Es of Safety: Engineering, Enforcement, Education, Equity and Emergency Medical Services (EMS). In preparing the LRSP, TJKM analyzed historical collision data, identified potential roadway hazards related to the collisions, received stakeholder feedback, and will recommend safety improvements, demonstrate the Town's responsiveness to safety challenges, and offer a proactive approach to addressing roadway safety needs for the entire transportation network.

Stakeholder feedback was critical to help inform the preparation of the LRSP. TJKM engaged the community for feedback through a project website. Currently, residents can review collision history and submit comments regarding areas of concern through the Town's website. To date 128 public comments have been received through the website. A survey was available starting April 22, 2022 for Moraga residents to provide input regarding the concerns they have observed and the location.

Focus group feedback is another essential part of the process. The Town's focus group consisted of public safety and education stakeholders from the Moraga-Orinda Fire District, Moraga Police Department, Moraga School District, Acalanes Union High School District and Moraga Public Works Department. The focus group has met twice on April 19 and May 23. During the first meeting the focus group discussed their perceived safety concerns. TJKM then gathered data and feedback for analysis, developed emphasis areas, and recommended goals and objectives. During the second meeting, staff brought the findings from the study to the focus group and discussed the proposed emphasis areas, bicycle and pedestrian safety emphasis areas, how high injury intersections and roadway segments are scored, the rankings for the worst 11 high injury intersections and roadway segments and countermeasures with the group. A summary of the findings from the data analysis, focus group meetings and public feedback are presented in two memoranda (Attachments A and B) and an overview of the findings, as shown in the presentation, are presented below:

Intersection collisions made up the vast majority of collisions occurring on the Moraga high injury network during the study period, a total of 73%. Three of the five Fatal or Serious Injury (KSI) collisions occurred at intersections. The analysis of intersection collision data revealed the following statistics for accidents: 31% were broadside

collisions (turning movements); 47% involved pedestrians or cyclists; and 42% occurred on Moraga Road.

Based on a review of the data and evaluation of the feedback from the public survey and focus groups, TJKM has recommended the following Priority Emphasis Areas:

- Intersection Safety
- Collisions within 250 feet of intersections
- Address Hit Object Collisions
- Address Broadside Collisions and Automobile Right of Way Violations
- Improve Bicycle and Pedestrian Safety
- Address Nighttime Collisions
- Improve Safety Around Schools
- Address Improper Turning Violations

To determine the high-risk intersections and road segments, the crash data collected by the Moraga Police Department for the period of five years prior to COVID was analyzed using the equivalent property damage only (EPDO). The EPDO weighting method of crashes is a commonly used, standard method for transportation safety analysis in North America, and conforms to the requirements set forth in the CalTrans Local Roadway Safety Manual 2020. The EPDO Score is the sum of following collision report data:

(165 x # of Fatal Collisions) +
(165 x # of Severe Injury Collisions) +
(11 x # of Other Visible Injury Collisions) +
(6 x # of Complaint of Pain Collisions) +
(1 x # of PDO Collisions)

Based on the collision data, the 11 worst High Injury Intersections and Roadway Segments were determined within the Town of Moraga. The following table below presents the 11 worst High Injury intersections within Moraga with the worst streets listed first.

Table 1. High Injury Intersections

ID	Intersection	Total Collisions	F+SI Collisions	EPDO Score
1	Moraga Rd at Lucas Dr	6	2	374
2	Moraga Wy at Moraga Valley Ln	1	1	165
3	Moraga Rd at Campolindo Dr	3	0	28
4	Moraga Rd at St. Mary's Rd	3	0	28
5	Moraga Rd at Alta Mesa	3	0	23

6	Camino Pablo at Sanders Ranch Rd	2	0	22
7	Moraga Rd at Ascot Dr	3	0	18
8	Moraga Rd at Donald Dr	2	0	17
9	Rheem Blvd at St. Mary's Rd	2	0	17
10	Moraga Wy at School St	2	0	12
11	Moraga Rd at Corliss Dr	1	0	6

Table 2. High Injury Roadway Segments

ID	Intersection	Total Collisions	F+SI Collisions	Length (miles)	EPDO Score
A	Moraga Wy: Town Limit to Moraga Rd	5	1	1.0	199
B	Canyon Rd: 300' E of Valle Vista Staging Area to Town Limit (East)	1	1	0.3	165
C	Moraga Rd/Canyon Rd: Larch Ln to Town Limit (North)	10	0	3.1	85
D	Rheem Blvd: La Salle Dr to Moraga Rd	2	0	0.4	12
E	Corliss Dr/Sullivan Dr: Hardie Dr to Moraga Rd	2	0	1.6	12
F	Country Club Dr: Viader Dr to 875' E of Southard Ct	1	0	0.4	11
G	Larch Ave: Canyon Rd to Baitx Ave	1	0	0.4	6
H	St. Mary's Rd: 500' E of Stafford Rd to Town Limit	1	0	0.8	6

Based on the analysis of the high-injury road network and stakeholder input, the following non-engineering strategies were recommended:

<u>Education</u>

- Conduct public information and education campaign for intersection safety laws, unsafe speeds, distracted driving, improper turning and driving under the influence.
- Conduct bicycle and pedestrian safety campaigns and outreach to raise their awareness of bicycle and pedestrian safety needs through media outlets and social platforms in Moraga every three to five years

<u>Enforcement</u>

- Targeted enforcement at high-risk locations.

- Increase the number of personnel who have completed Advanced Roadside Impaired Driving Enforcement (ARIDE) training

EMS

- Install emergency vehicle pre-emption systems
- Increase the number of EMS/fire control personnel taking Traffic Incident Management Training

Other

- Prepare a Town-wide Traffic Calming Plan

Additionally, the following countermeasures presented below in Tables 4, 5 and 6 were recommended:

Table 3. Countermeasures for Signalized Intersections

HSIP Code	Countermeasure	HSIP Funding Eligibility
S01	Add intersection lighting	100%
S02	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	100%
S03	Improve signal timing (coordination, phases, red, yellow, or operation)	50%
S09	Install raised pavement markers and striping (Through Intersection)	100%
S10	Install flashing beacons as advance warning (S.I.)	100%
S11	Improve pavement friction (High Friction Surface Treatments)	100%
S12	Install raised median on approaches (S.I.)	90%
S20PB	Install advance stop bar before crosswalk (Bicycle Box)	100%
S21PB	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	100%

Table 4. Countermeasures for Unsignalized Intersections

HSIP Code	Countermeasure	HSIP Funding Eligibility
NS01	Add intersection lighting (NS.I.)	100%

NS02	Convert to all-way STOP control (from 2-way or Yield control)	100%
NS03	Install Signals	100%
NS05	Convert intersection to roundabout (from 2-way stop or Yield control)	100%
NS06	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	100%
NS07	Upgrade intersection pavement markings (NS.I.)	100%
NS08	Install Flashing Beacons at Stop-Controlled Intersections	100%
NS09	Install flashing beacons as advance warning (NS.I.)	100%
NS11	Improve sight distance to intersection (Clear Sight Triangles)	90%
NS12	Improve pavement friction (High Friction Surface Treatments)	100%
NS13	Install splitter-islands on the minor road approaches	90%
NS14	Install raised median on approaches (NS.I.)	90%
NS19PB	Install raised medians (refuge islands)	90%
NS21PB	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)	100%
NS22PB	Install Rectangular Rapid Flashing Beacon (RRFB)	100%

Table 5. Countermeasures for Roadway Segments

HSIP Code	Countermeasure	HSIP Funding Eligibility
R01	Add Segment Lighting	100%
R02	Remove or relocate fixed objects outside of Clear Recovery Zone	90%
R21	Improve pavement friction (High Friction Surface Treatments)	100%
R22	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	100%

R23	Install chevron signs on horizontal curves	100%
R25	Install curve advance warning signs (flashing beacon)	100%
R26	Install dynamic/variable speed warning signs	100%
R27	Install delineators, reflectors and/or object markers	100%
R28	Install edge-lines and centerlines	100%
R30	Install centerline rumble strips/stripes	100%
R31	Install edge-line rumble strips/stripes	100%
R32PB	Install bike lanes	90%
R33PB	Install Separated Bike Lanes	90%
R34PB	Install sidewalk/pathway (to avoid walking along roadway)	90%
R35PB	Install/upgrade pedestrian crossing (with enhanced safety features)	90%
R36PB	Install raised pedestrian crossing	90%
R37PB	Install Rectangular Rapid Flashing Beacon (RRFB)	100%

Based on the evaluation of the high-injury network and the recommended countermeasures, the following list of safety improvements are recommended for Moraga's 11 high injury intersections and roadway segments:

Table 6. List of Viable Safety Projects

Location	CM1	CM2	CM3	Cost per Location	Preliminary Cost Estimate	B/C Ratio
Project 1 – Non-Signalized Intersections (Install/Upgrade Larger Stop Signs or other Intersection Regulatory/Warning Signs, Flashing Beacon as Advance Warning, and Install Rectangular Rapid Flashing Beacon						
Moraga Rd at Lucas Dr	NS06		NS22PB	$127,792	$461,342	27.05
Moraga Wy at Moraga Valley Ln	NS06	NS09		$80,892		
Moraga Rd at Alta Mesa	NS06	NS09		$80,542		
Camino Pablo at Sanders Ranch Rd	NS06			$8,512		
Rheem Blvd at St. Mary's Rd	NS06	NS09		$82,502		
Moraga Rd at Corliss Dr	NS06	NS09		$81,102		
Project 2: Pedestrian Set Aside Application						
Moraga Wy: Town Limit to Moraga Rd	R35PB			$31,220	$243,712	N/A*

Location	CM1	CM2	CM3	Cost per Location	Preliminary Cost Estimate	B/C Ratio
Moraga Rd/Canyon Rd: Larch Ln to Town Limit (North)	R35PB			$129,570		
Rheem Blvd: La Salle Dr to Moraga Rd	R35PB			$31,920		
Moraga Wy at Moraga Valley Rd	NS21PB			$39,802		
Moraga Rd at Corliss Dr	NS21PB			$11,200		
Project 3: Signalized Intersections (Improve Signal Timing, Install Raised Pavement Markers, and Install Leading Pedestrian Interval)						
Moraga Rd at Campolindo Dr	S21PB	S09	S03	$16,450	$82,712	26.26
Moraga Rd at St. Mary's Rd	S21PB	S09	S03	$16,240		
Moraga Rd at Ascot Dr	S21PB	S09	S03	$16,870		
Moraga Rd at Donald Dr	S21PB	S09	S03	$16,870		
Moraga Wy at School St	S21PB	S09	S03	$16,282		
Project 4: Non-Signalized Intersections (High Friction Surface Treatments and Intersection Lighting)						
Moraga Rd at Lucas Dr	NS12			$147,854	$458,370	28.41
Moraga Wy at Moraga Valley Ln	NS12	NS01		$310,516		
Project 5: Roadway Segments: Install/Upgrade Signs with Fluorescent Sheeting and Install Delineators/Reflectors/Object Markers						
Moraga Wy: Town Limit to Moraga Rd	R22	R27		$36,610	$227,220	18.72
Canyon Rd: 300' E of Valle Vista Staging Area to Town Limit (East)	R22	R27		$18,410		
Moraga Rd/Canyon Rd: Larch Ln to Town Limit (North)	R22	R27		$117,145		
Rheem Blvd: La Salle Dr to Moraga Rd	R22	R27		$7,595		
Country Club Dr: Viader Dr to 875' E of Southard Ct	R22	R27		$12,915		
Larch Ave: Canyon Rd to Baitx Ave	R22	R27		$10,185		
St. Mary's Rd: 500' E of Stafford Rd to Town Limit	R22	R27		$13,440		
Corliss Dr/Sullivan Dr: Hardie Dr to Moraga Rd	R22	R27		$10,920		

Notes: CM – countermeasure. B/C ratio is the estimated dollar amount of benefits divided by the estimated cost of the recommended countermeasure.

The costs presented are preliminary, planning level estimates for discussion and are still being reviewed.

Next steps

- Finalize Safety Projects and BCR Analysis,
- Draft Final Local Road Safety Plan Report, and
- Prepare two HSIP grant application ready materials based on the findings of the LRSP, and feedback from this Council meeting.

Staff anticipates returning to Council in early July to present for adoption the final LRSP report and project recommendations for the LRSP, and to seek any additional Council feedback at that time.

Fiscal Impact

None

Alternatives

1. Receive LRSP presentation and provide direction or feedback; or
2. Receive LRSP presentation, and do not provide direction or feedback; or
3. Do not receive the LRSP presentation.

Recommendation

Staff recommends the Town Council receive this staff report, the draft Local Roadway Safety Plan (LRSP) report and presentation and provide feedback to staff on the recommended Priority Emphasis Areas, Countermeasure Toolbox, and proposed Safety Projects.

Report reviewed by: **Cynthia Battenberg, Town Manager**

Attachments:

A. Technical Memorandum – Systemic Safety and Trend Analysis and Identification of High Injury Network for the Town of Moraga Local Roadway Safety Plan (LRSP) Link
B. Technical Memorandum - Emphasis Areas for the Town of Moraga Local Roadway Safety Plan (LRSP) Link
C. Technical Memorandum - Moraga Local Roadway Safety Plan (LRSP): Draft Countermeasure Toolbox Link
D. Draft Town of Moraga Local Roadway Safety Plan (LRSP) – May 2022 Link
E. Town Council Local Roadway Safety Plan (LRSP) Presentation No. 2

ATTACHMENT A

Technical Memorandum - Systemic Safety and Trend Analysis and Identification of High Injury Network for the Town of Moraga Local Roadway Safety Plan (LRSP) Link

ATTACHMENT B

Technical Memorandum - Emphasis Areas for the Town of Moraga Local Roadway Safety Plan (LRSP) Link

ATTACHMENT C

Technical Memorandum - Moraga Local Roadway Safety Plan (LRSP): Draft Countermeasure Toolbox Link

ATTACHMENT D

Draft Town of Moraga Local Roadway Safety Plan – May 2022
Link

ATTACHMENT E

Town Council Local Roadway Safety Plan (LRSP)
Presentation No. 2

Local Roadway Safety Plan

Town Council Meeting

June 8, 2022

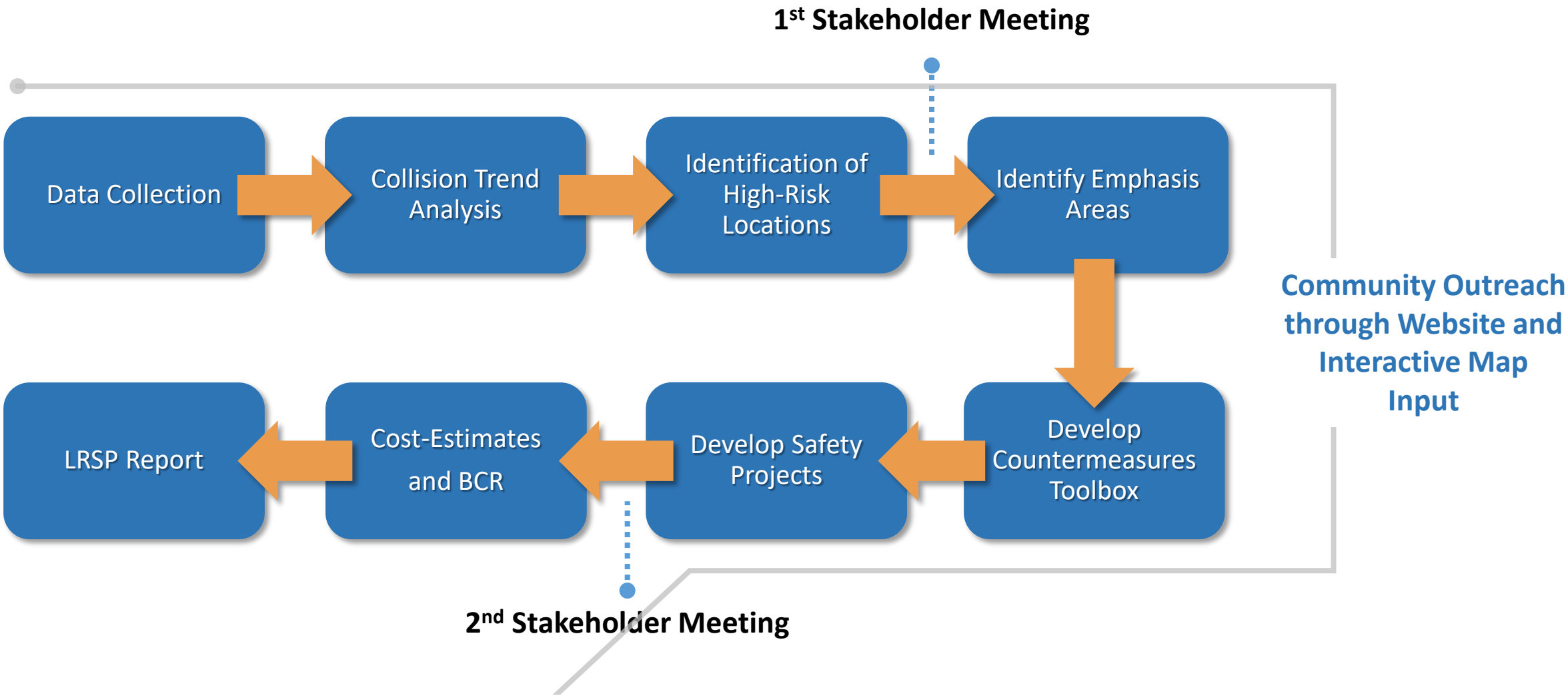
Council Feedback

- How did we get here?
  - *Collision Analysis*
  - *Community Input*
  - *Identify High-Injury Intersections and Roadway Segments*
- What is being recommended?
  - *Priority Emphasis Areas*
    - Do these emphasis areas align with Council expectations, or are there any other emphasis areas we need to consider?
  - *Countermeasure Toolbox*
    - Do these solutions align with Council expectations, or are there any other solutions that we need to consider?
  - *Safety Projects*
    - Do you have feedback for the project team on the proposed projects?

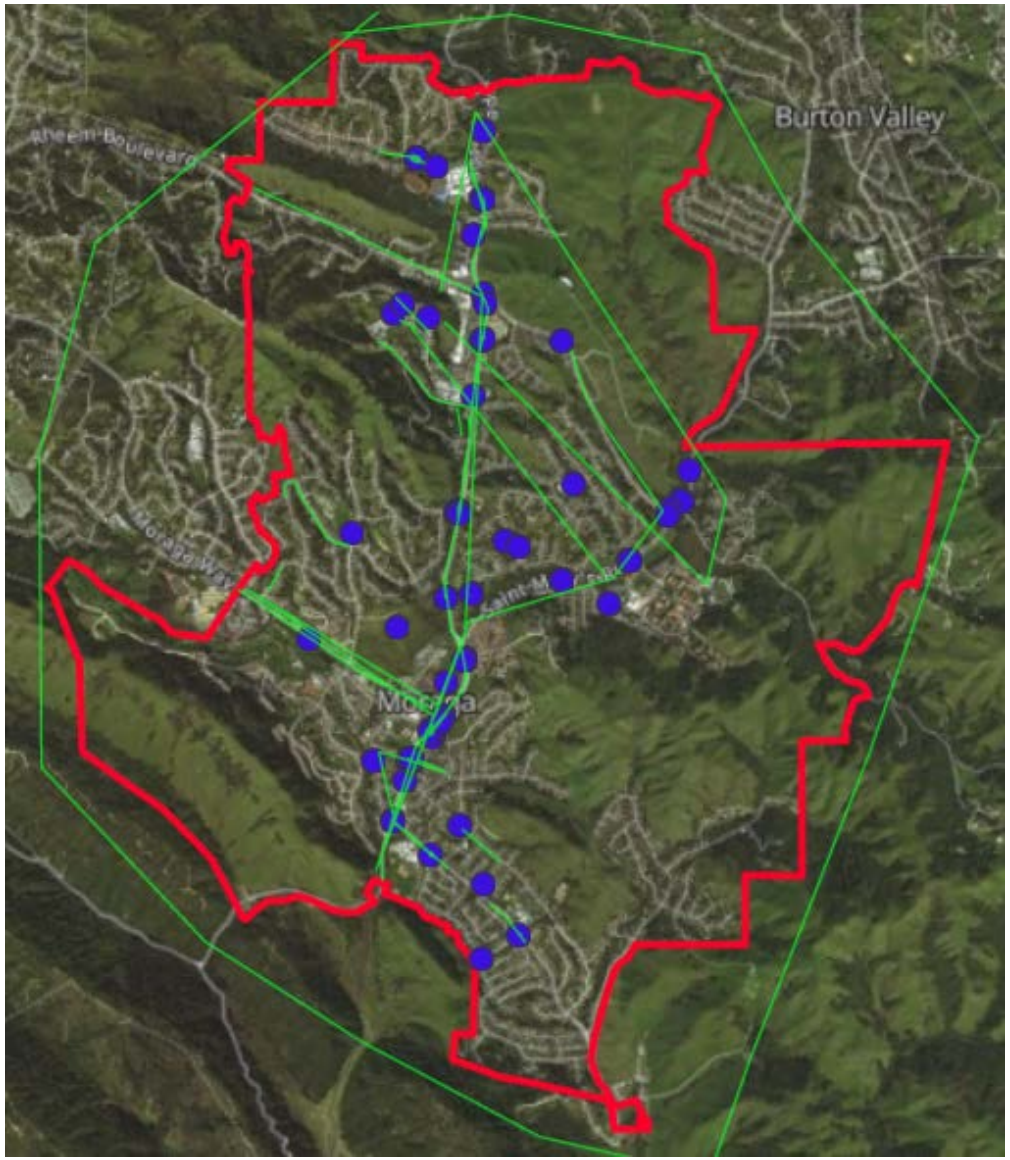
Agenda

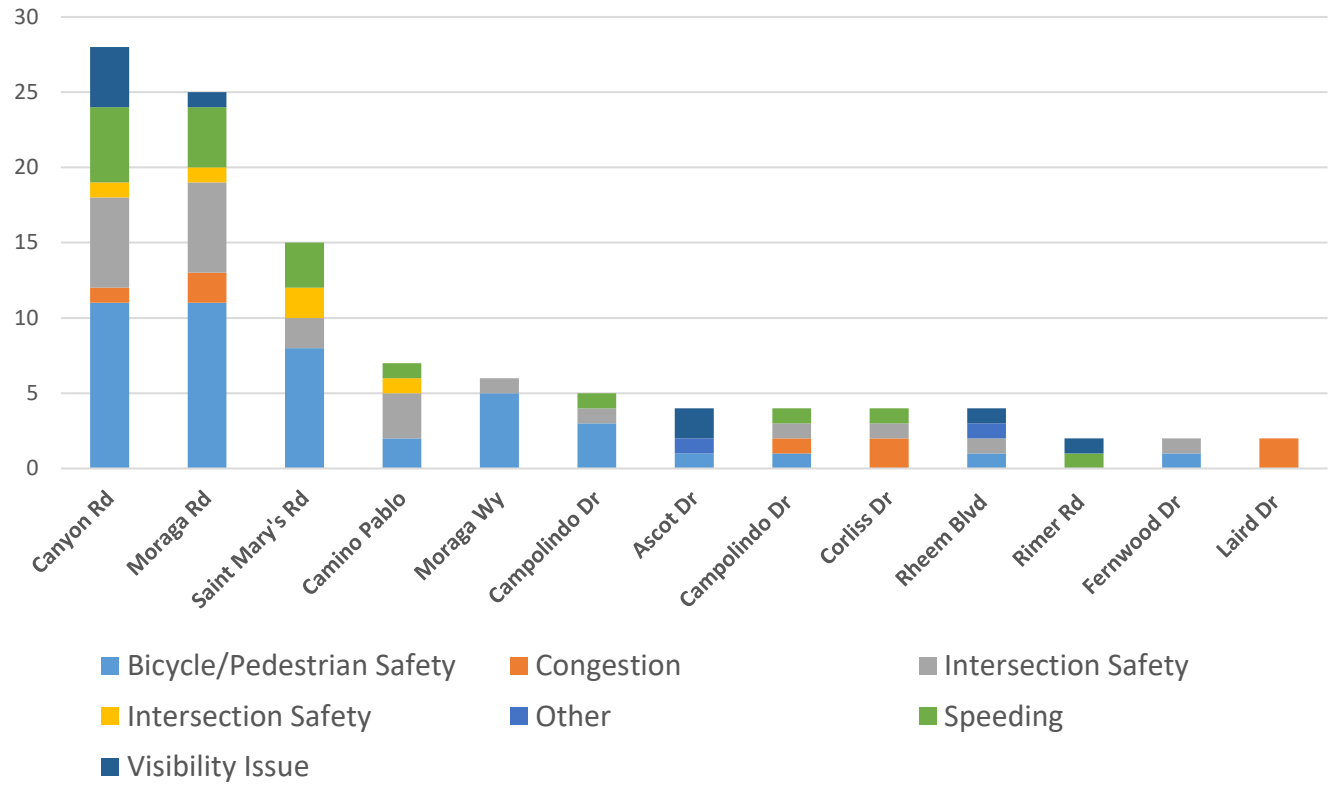
- Project Status and Milestones
- Community Input
- Collision Analysis Findings
- Priority Emphasis Areas
- Draft Engineering and Non-Engineering Countermeasures
- Draft Safety Projects
- Implementation
- Questions to Council
- Open Discussion/Comments

Project Status and Milestones



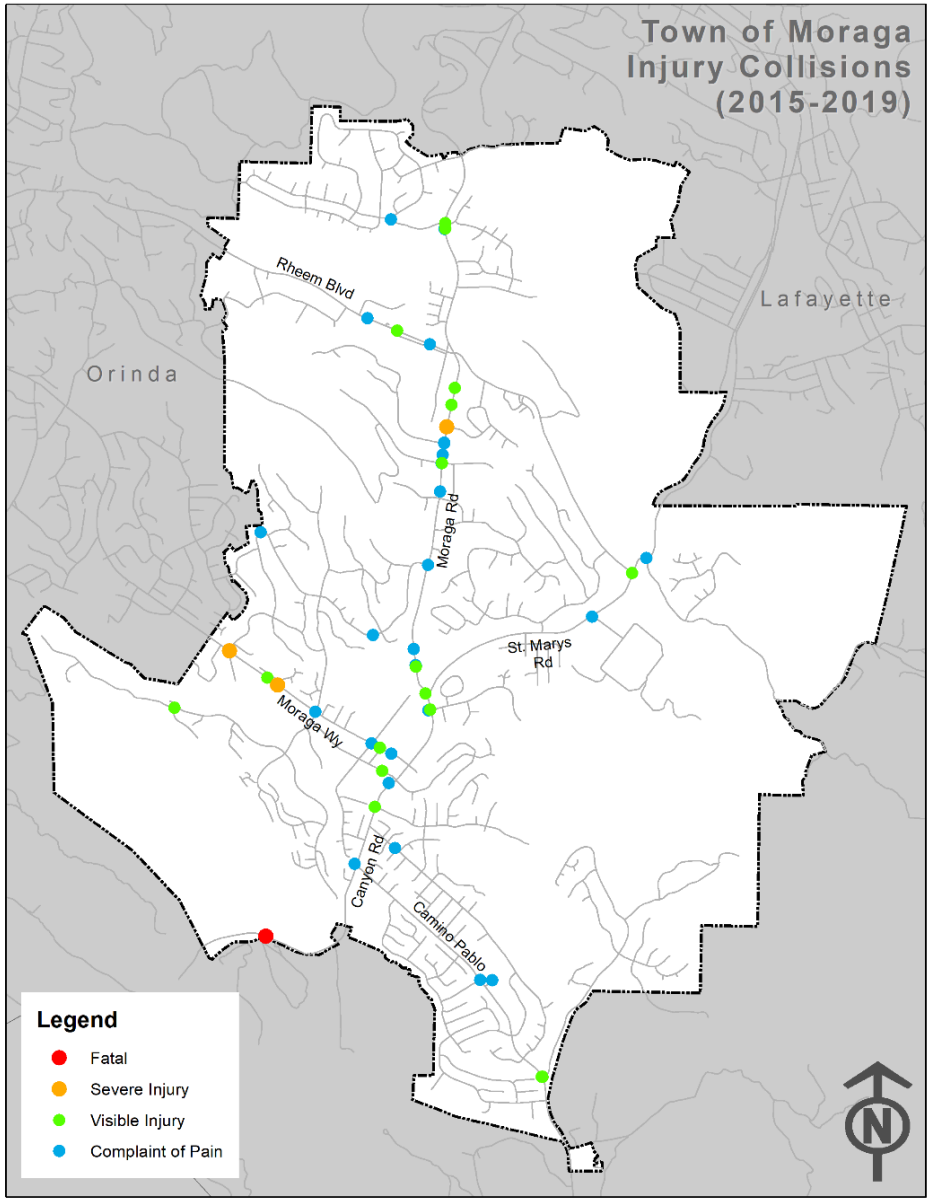
Community Input

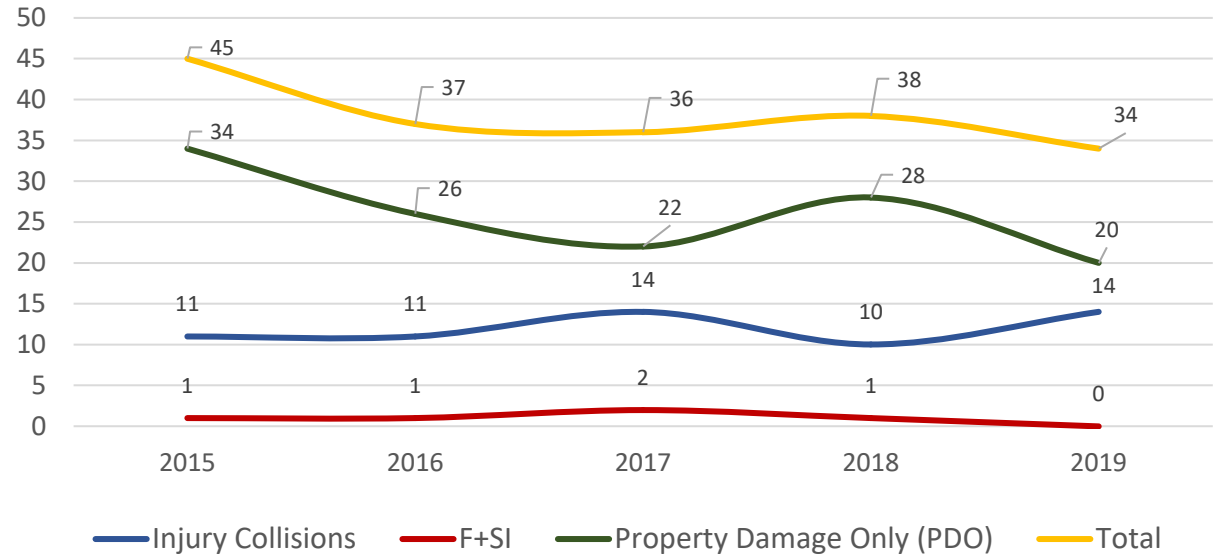


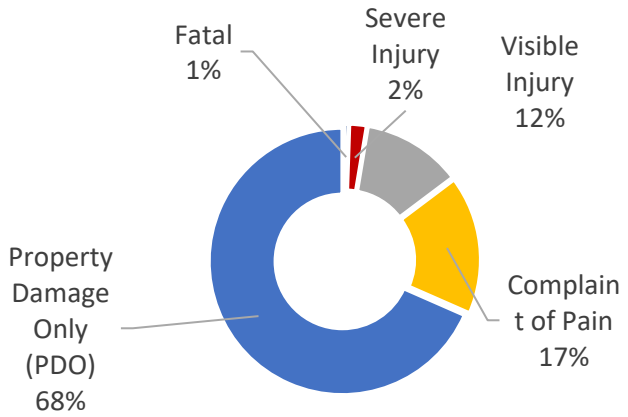


- 128 comments received
- Map was promoted on Town website and social media

Collision Analysis Findings







- 190 collisions between 2015-2019
- 60 injury collisions, plus 5 Fatal and Severe Injury (KSI) collisions
- 47% of all injury collisions occurred on Moraga Rd/Canyon Rd corridor

Equivalent Property Damage Only (EPDO) Score

Collision Severity	EPDO Score
Fatal and Severe Injury Combined	165
Visible Injury	11
Complaint of Pain	6
Property Damage Only (PDO)	1

EPDO Score =

(165 x # of Fatal Collisions) +

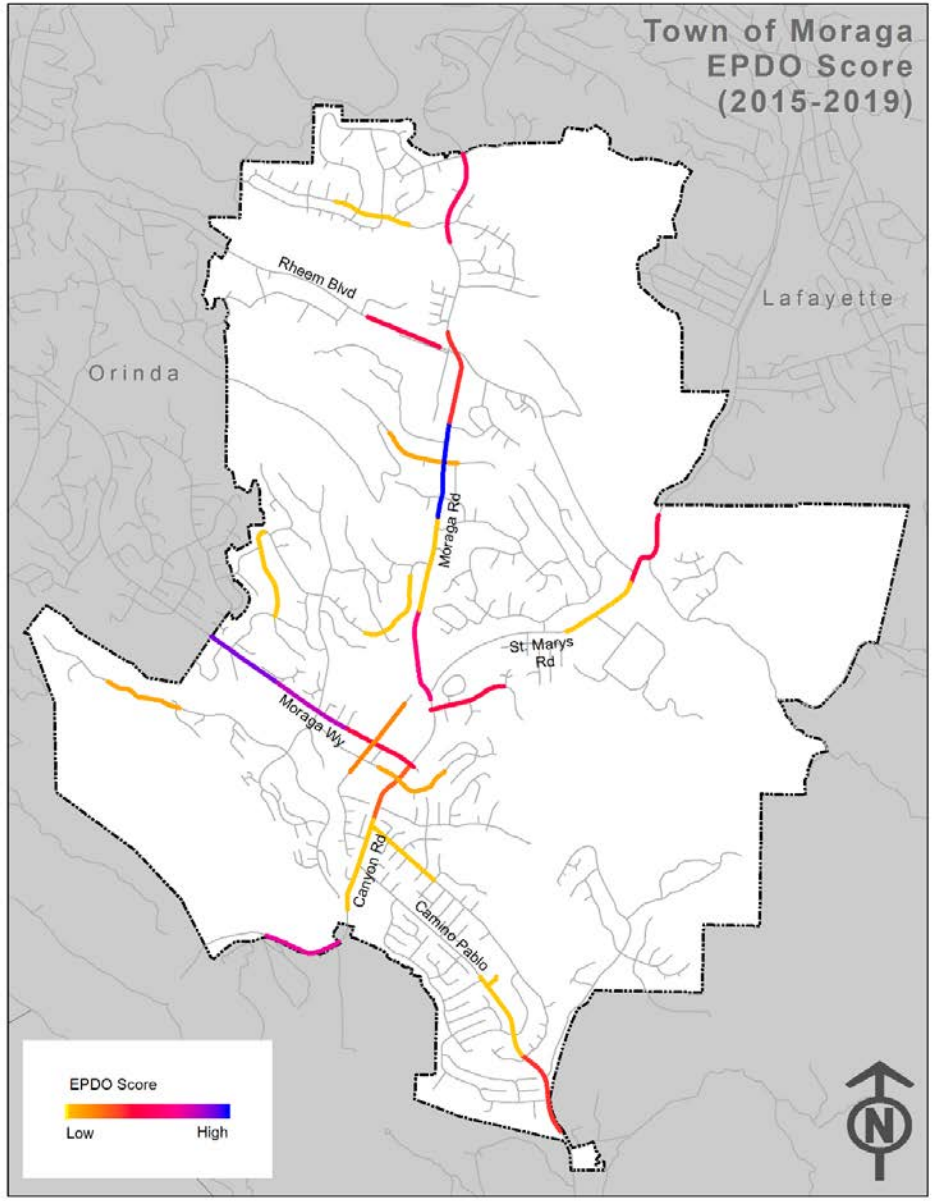
(165 x # of Severe Injury Collisions) +

(11 x # of Other Visible Injury Collisions) +

(6 x # of Complaint of Pain Collisions) +

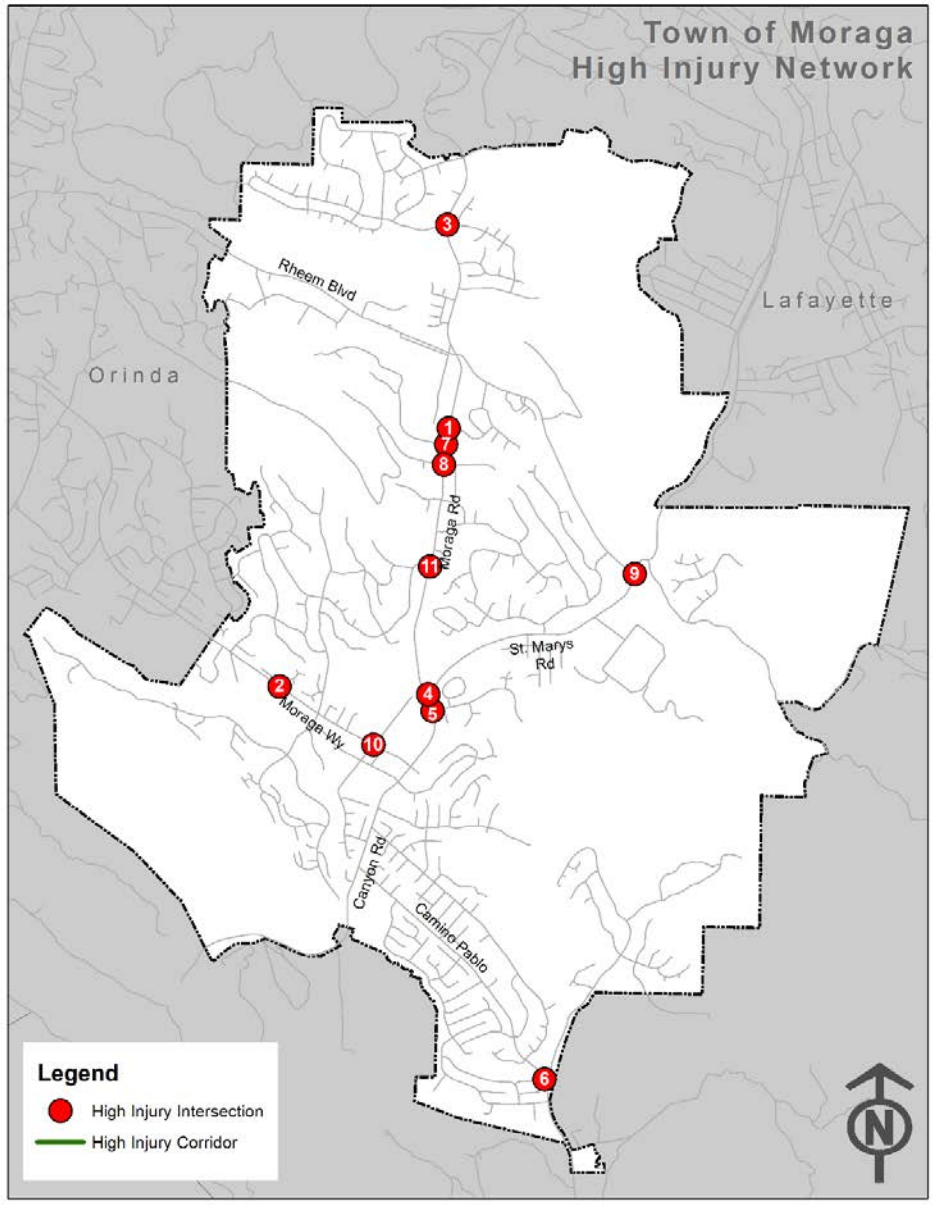
(1 x # of PDO Collisions)

(Source: Local Roadway Safety Manual 2020, Caltrans)



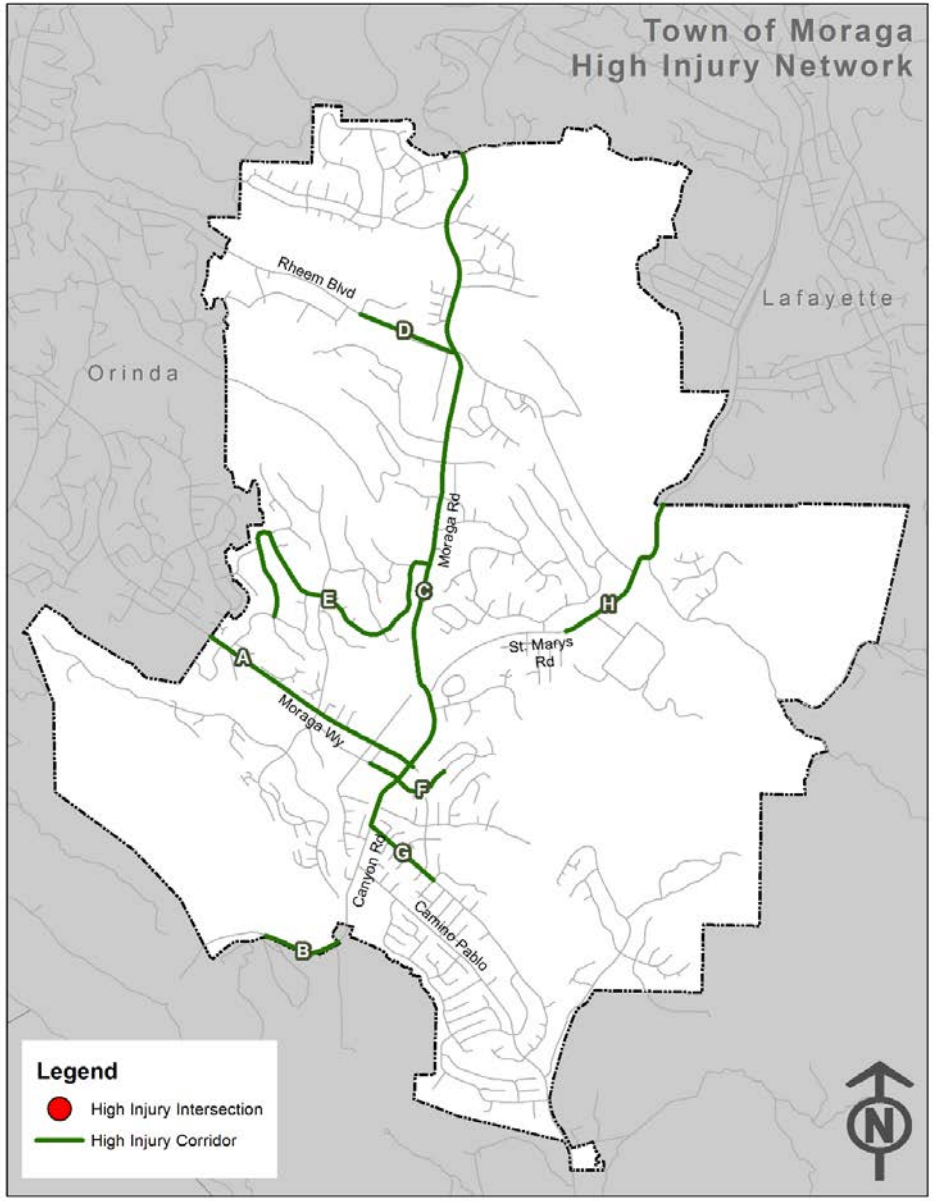
High-Injury Intersections

ID	Intersection	Total Collisions	F+SI Collisions	EPDO Score
1	Moraga Rd at Lucas Dr	6	2	374
2	Moraga Wy at Moraga Valley Ln	1	1	165
3	Moraga Rd at Campolindo Dr	3	0	28
4	Moraga Rd at St. Mary's Rd	3	0	28
5	Moraga Rd at Alta Mesa	3	0	23
6	Camino Pablo at Sanders Ranch Rd	2	0	22
7	Moraga Rd at Ascot Dr	3	0	18
8	Moraga Rd at Donald Dr	2	0	17
9	Rheem Blvd at St. Mary's Rd	2	0	17
10	Moraga Wy at School St	2	0	12
11	Moraga Rd at Corliss Dr	1	0	6



High-Injury Corridors

ID	Intersection	Total Collisions	F+SI Collisions	Length (miles)	EPDO Score
A	Moraga Wy: Town Limit to Moraga Rd	5	1	1.0	199
B	Canyon Rd: 300’ E of Valle Vista Staging Area to Town Limit (East)	1	1	0.3	165
C	Moraga Rd/Canyon Rd: Larch Ln to Town Limit (North)	10	0	3.1	85
D	Rheem Blvd: La Salle Dr to Moraga Rd	2	0	0.4	12
E	Corliss Dr/Sullivan Dr: Hardie Dr to Moraga Rd	2	0	1.6	12
F	Country Club Dr: Viader Dr to 875’ E of Southard Ct	1	0	0.4	11
G	Larch Ave: Canyon Rd to Baitx Ave	1	0	0.4	6
H	St. Mary’s Rd: 500’ E of Stafford Rd to Town Limit	1	0	0.8	6



List of Priority Emphasis Areas

- Intersection Safety
  - Collisions within 250 feet of intersections

31% Broadside Collisions	47% Involved Pedestrian or Bike	42% Occurred on Moraga Rd

- Address Hit Object Collisions

38% Occurred at Night	2 of 5 KSI Collisions	50% Roadway Segments

- Address Broadside Collisions and Automobile Right of Way Violations

79% At Intersections	36% Involved a Bicycle	64% Involved Another Vehicle

- Improve Bicycle and Pedestrian Safety

10% KSI Collisions	85% At Intersections	30% Occurred on Moraga Rd

- Address Nighttime Collisions

38% Involved Alcohol	27% Improper Turning Violations	36% Involved Pedestrian or Bike

- Improve Safety Around Schools

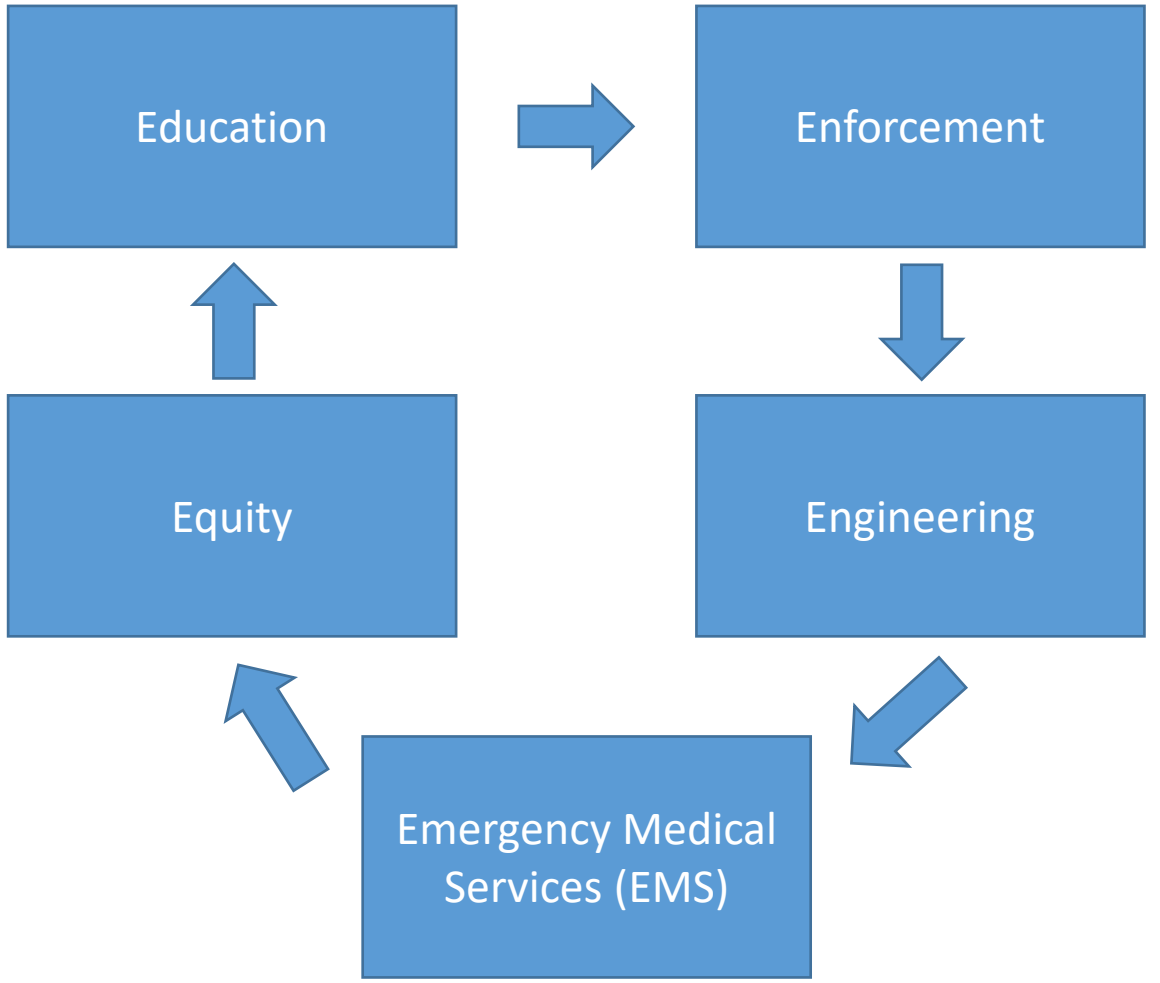
38% Involved Bike or Pedestrian	46% Occurred between 7am-9am or 4pm-6pm	31% Hit Object Collisions

- Address Improper Turning Violations

38% Involved Fixed Object	38% Occurred at Night	75% At Intersections

The 5 E’s of Traffic Safety

- Conduct focused public information and education campaigns
- Create pocket guides and informational fliers with pedestrian laws, stop sign violations, etc.
- Safe Routes to School education programs



- Targeted enforcement at high risk intersections
- Place high priority on enforcement of violation type that contribute to the most fatalities and severe injuries

- Consideration of impact of collisions on disadvantaged communities

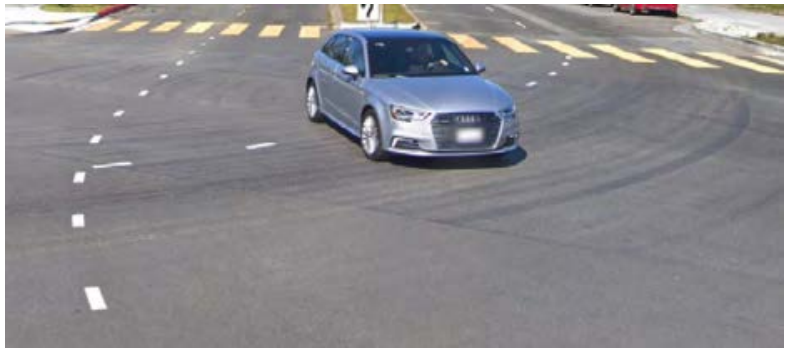
- HSIP eligible countermeasures
- E.g.: Improve intersection lighting, install median refuge island, install bulb outs, improving signs and striping

- Improve deployment to collision sites
- Ensure emergency routes are defined and clear

Draft Signalized Intersection Improvements

S02: Improve Signal Hardware

S11: Improve pavement friction



S09: Install raised pavement markers

S12: Install raised median on approaches

S20PB: Advance Stop Bar (Bicycle Box)

S21PB: Modify signal phasing to implement a Leading Pedestrian Interval (LPI)

Draft Unsignalized Intersection Improvements

NS01: Add intersection lighting

NS06: Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs

NS09: Install flashing beacons at or in advance of intersection

NS07: Upgrade intersection pavement markings

NS21PB: Install/upgrade pedestrian crossing (with enhanced safety features)

NS22PB: Install Rectangular Rapid Flashing Beacon

Draft Roadway Segment Improvements

R22: Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)

R26: Install dynamic/variable speed warning signs

R34PB: Install sidewalk/pathway

R35PB: Install/upgrade pedestrian crossing (with enhanced safety features)

R33PB: Install Separated Bike Lane

R23: Install chevron signs on horizontal curves

Non-Engineering Strategies

- Education
  - Public information campaigns against unsafe driving habits
  - Bicycle/pedestrian education campaigns and/or Safe Routes to School
- Enforcement
  - Targeted enforcement
  - Advanced Roadside impaired Driving Enforcement (ARIDE) training
- EMS
  - Install emergency vehicle pre-emption systems
  - Traffic Incident Management Training
- Other
  - Prepare a Town-wide Traffic Calming Plan

Draft Safety Projects

Location	CM1	CM2	CM3	Cost per Location	Total Cost	B/C Ratio
Project 1 – Non-Signalized Intersections (Install/Upgrade Larger Stop Signs or other Intersection Regulatory/Warning Signs, Flashing Beacon as Advance Warning, and Install Rectangular Rapid Flashing Beacon						
Moraga Rd at Lucas Dr	NS06		NS22PB	$127,792	$461,342	27.05
Moraga Wy at Moraga Valley Ln	NS06	NS09		$80,892		
Moraga Rd at Alta Mesa	NS06	NS09		$80,542		
Camino Pablo at Sanders Ranch Rd	NS06			$8,512		
Rheem Blvd at St. Mary's Rd	NS06	NS09		$82,502		
Moraga Rd at Corliss Dr	NS06	NS09		$81,102		
Project 2: Pedestrian Set Aside Application						
Moraga Wy: Town Limit to Moraga Rd	R35PB			$31,220	$243,712	N/A*
Moraga Rd/Canyon Rd: Larch Ln to Town Limit (North)	R35PB			$129,570		
Rheem Blvd: La Salle Dr to Moraga Rd	R35PB			$31,920		
Moraga Wy at Moraga Valley Rd	NS21PB			$39,802		
Moraga Rd at Corliss Dr	NS21PB			$11,200		

Draft Safety Projects

Location	CM1	CM2	CM3	Cost per Location	Total Cost	B/C Ratio
Project 3: Signalized Intersections (Improve Signal Timing, Install Raised Pavement Markers, and Install Leading Pedestrian Interval)						
Moraga Rd at Campolindo Dr	S21PB	S09	S03	$16,450	$82,712	26.26
Moraga Rd at St. Mary's Rd	S21PB	S09	S03	$16,240		
Moraga Rd at Ascot Dr	S21PB	S09	S03	$16,870		
Moraga Rd at Donald Dr	S21PB	S09	S03	$16,870		
Project 4: Non-Signalized Intersections (High Friction Surface Treatments and Intersection Lighting)						
Moraga Rd at Lucas Dr	NS12			$147,854	$458,370	28.41
Moraga Wy at Moraga Valley Ln	NS12	NS01		$310,516		

Draft Safety Projects

Location	CM1	CM2	CM3	Cost per Location	Total Cost	B/C Ratio
Project 5: Roadway Segments: Install/Upgrade Signs with Fluorescent Sheeting and Install Delineators/Reflectors/Object Markers						
Moraga Wy: Town Limit to Moraga Rd	R22	R27		$36,610	$227,220	18.72
Canyon Rd: 300’ E of Valle Vista Staging Area to Town Limit (East)	R22	R27		$18,410		
Moraga Rd/Canyon Rd: Larch Ln to Town Limit (North)	R22	R27		$117,145		
Rheem Blvd: La Salle Dr to Moraga Rd	R22	R27		$7,595		
Country Club Dr: Viader Dr to 875’ E of Southard Ct	R22	R27		$12,915		
Larch Ave: Canyon Rd to Baitx Ave	R22	R27		$10,185		
St. Mary's Rd: 500’ E of Stafford Rd to Town Limit	R22	R27		$13,440		
Corliss Dr/Sullivan Dr: Hardie Dr to Moraga Rd	R22	R27		$10,920		

Draft Safety Project #1

Example
Moraga Rd at Lucas Dr

Rectangular Rapid Flashing Beacon

Install/Upgrade Larger STOP Signs or other Intersection Regulatory/Warning Signs

Flashing Beacon as Advance Warning

Example
Rheem Blvd approaching St Mary's Rd

Draft Safety Project #2

Example
Moraga Rd at Corliss Dr

High Visibility Crosswalk

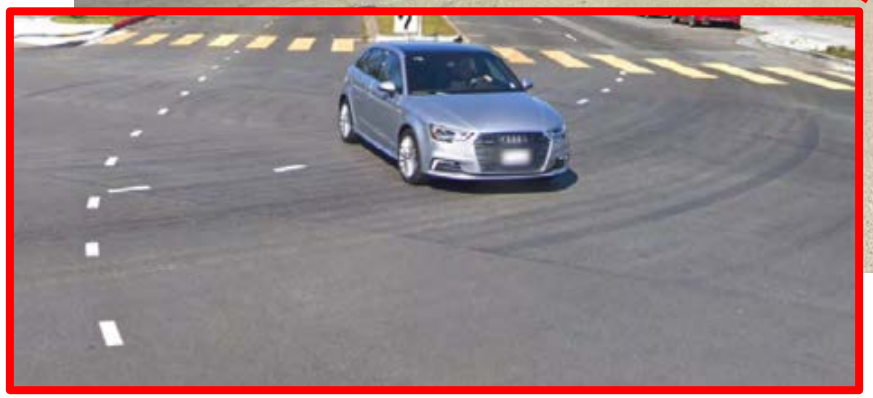
Draft Safety Project #3

Leading Pedestrian Interval

Example
Moraga Rd at St. Mary's Rd

Improve Signal Timing

Raised Pavement Markers



Draft Safety Project #4

Example
Moraga Rd at Lucas Dr

High Friction Surface Treatment

Intersection Lighting

Draft Safety Project #5

Install Delineators, Reflectors, or Object Markers

Example
Canyon Rd

New/Updated Signs with Retroreflective Sheeting

Example of faded retroreflectivity

Other Examples – School Zone Crossings

Los Gatos, CA

- High visibility crosswalk
- Advance stop bar
- Rectangular Rapid Flashing Beacons
- Median refuge island

Other Examples – School Zone Crossings

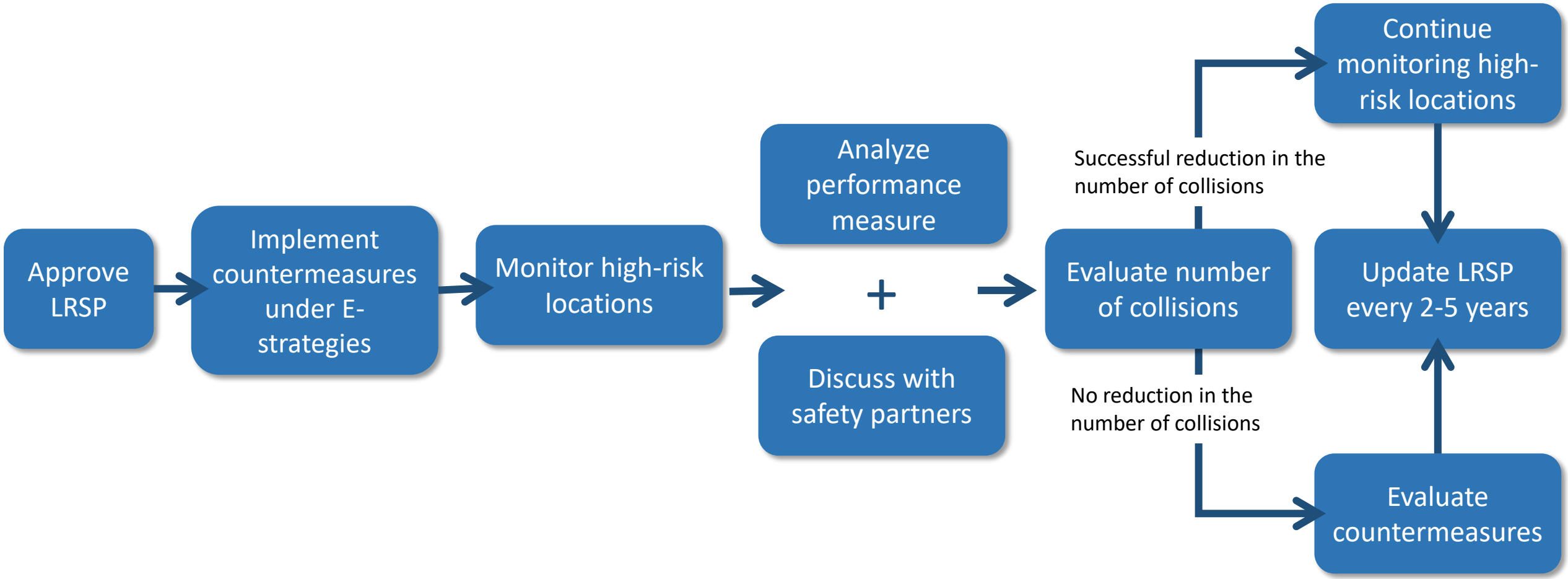
Dinuba, CA

- Rectangular Rapid Flashing Beacons
- Intersection bulb-outs
- Median refuge island
- Yellow high visibility crosswalk

Sunnyvale, CA

- Yellow high visibility crosswalk
- Advance stop bar

Implementation



Questions to Council

- Does Council have any feedback on the high-injury intersections or roadway segments?
- Are there any questions or feedback on the priority emphasis areas?
- Are there any questions or feedback on the recommended countermeasures for the high-injury intersections or roadway segments?
  - *How about the non-engineering strategies?*
- Are there any questions or feedback on the safety projects?

Thank you!
Questions and Feedback