

Meyers, El Dorado County, California

Road Safety Audit



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Prepared By: FHWA Resource Center and
in Cooperation with Tahoe Regional Planning Agency

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Introduction

Purpose/Background

According to the Federal Highway Administration’s (FHWA) *Road Safety Audit Guidelines*, a Road Safety Audit (RSA) is a formal safety examination of a future roadway plan or project or an in-service facility and is conducted by an independent, experienced, and multidisciplinary RSA team. The primary focus of an RSA is safety while working within the context of mobility, access, surrounding land use, and/or aesthetics. RSAs enhance safety by identifying potential safety issues affecting all road users under all conditions and suggesting measures for consideration by the design team or responsible agency.

An RSA is not simply a standards check. Standards checks are part of the design process to ensure adherence to design standards and guidelines. Although the RSA team may identify safety issues by comparing items of concern to standards, the general intention of the RSA is to identify areas where applied standards may interact with road user behaviors to generate a potential safety issue.



In addition to using an RSA as a tool to assess and improve safety performance of facilities in their jurisdiction, public agencies may wish to conduct RSAs oriented to assess or address safety issues related to specific user groups, such as pedestrians and bicyclists. RSA’s can be performed as both a proactive and reactive approach to assessing and improving safety on a facility.

Figure 1: RSA Team at the Intersection of US 50 & SR 89. (Photo Source: Beryl)



Figure 2: Pioneer Trail Crosswalk (Photo Source: Beryl)

An RSA was conducted along a 1.3 mile stretch of US 50 near Meyers, CA. US 50 was selected because its function is multi-faceted (state highway and “main street”), and must be flexible enough to adjust based on season (including major snow events), day of the week, and time of day. As one of only two entrances to the Region from the western part of California, Meyers experiences intense traffic peaks during holidays, and seasonal weekend tourism.

Meyers is the southern gateway to South Lake Tahoe and depending on the season, this historical roadway either functions as a high speed¹ state highway and main street or a gridlocked roadway.

Meyers, CA, shown in Figure 3², is an unincorporated community in El Dorado County along US 50 with roughly 8,560³ year round residents. It is estimated that Meyers sees approximately 2 million visitors⁴ drive through their community every year. Meyers offers many neighborhoods, school(s), and access to recreation, restaurants, industrial and commercial businesses and also supports a typical cyclist route for recreational bicyclists. There are three major and six minor intersections in Meyers as well as two marked cross walks. The average traffic through Meyers varies from season to season but typically is reported as between 13,100 and 17,200 vehicles per day⁵. During peak summer periods, Meyers serves an estimated 300 pedestrian and bicyclists per day⁶.

Caltrans has programmed a safety improvement project at the intersection of US 50 and SR 89, as a response to high crash rates at this location. To leverage an opportunity to improve safety at more than just the US 50/SR 89 intersection, Tahoe Regional Planning Agency / Tahoe Metropolitan

¹ The term “high speed” can be defined several different ways depending on roadway context and users. For the purposes of this report high speed is defined as any speed over 35mph.

² Draft Active Transportation Plan, February 2016

³ Draft Meyers Area Plan, June 2014

⁴ El Dorado County, Visitors Authority

⁵ Caltrans 2014 Traffic Volumes on California State Highways

⁶ Summer & Fall 2015 Data Collection Report, October 2015

Planning Organization (TRPA/TMPO) awarded El Dorado County an On Our Way grant to develop a complimentary complete street design titled the Meyers Corridor Project, which will conclude in a 2016 California Active Transportation program grant application.

The RSA evaluated the US 50 corridor between the intersection of North Upper Truckee and the intersection of Pioneer Trail. The RSA was to assess:

- Existing conditions along the US 50 for all roadway users, including pedestrians, bicyclists, and other vehicles.
- Pedestrian crossings of US 50
- Balance of roadway for all users
- Safety and mobility during chain installation and removal
- Local access during peak traffic periods
- Opportunities for the use of excess right of way
- The impact of California Department of Food and Agriculture Plant Health and Pest Prevention Services Pest Exclusion - Agricultural Inspection Station (Hereinafter referred to as the CA Ag Inspection Station) on safety and operations
- Caltrans intersection safety improvements at SR 89/US 50 and its impact on the corridor
- Identify potential improvements that can enhance safety of all users, accommodate transit, and enhance pedestrian and bicycle connectivity across and along US 50.

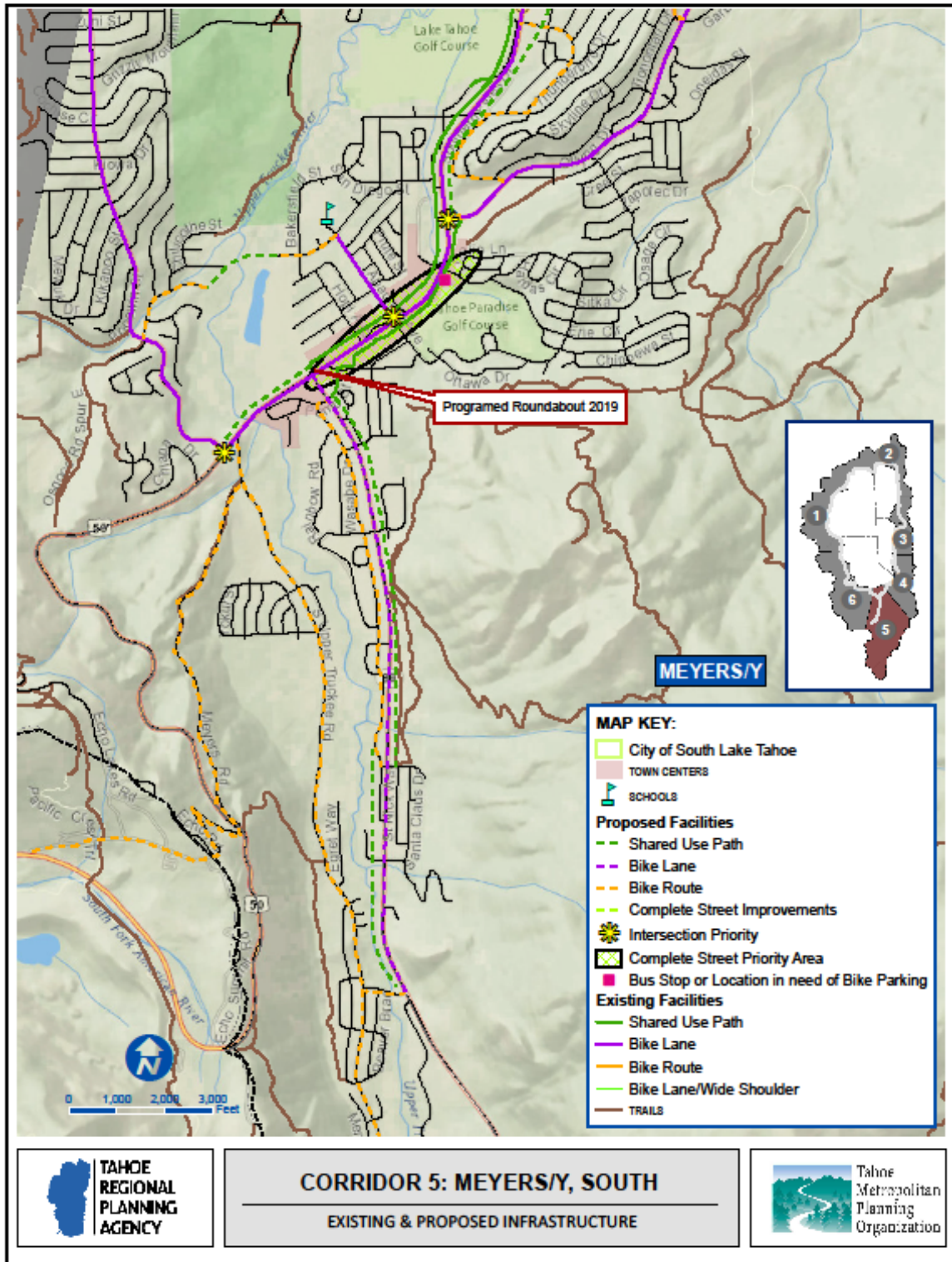


Figure 3: Map of Meyers. Source: Linking Tahoe: Active Transportation Plan, TRPA/TMPO

Study Area

The location for this RSA was originally scoped to extend roughly one mile along US 50 from the intersection of State Route 89 (South) to the intersection of Pioneer Trail. However, while meeting with California Highway Patrol (CHP) in preparation for the RSA, it became evident the study area would need to extend to North Upper Truckee, which is used by a large portion of the year round residents and is being used as a bypass for tourists in an attempt to avoid peak congestion on US 50, and chain control regulations located at the bottom of the grade near Pomo Street. Thus, the area assessed starts at the intersection of North Upper Truckee Rd. and extends 1.3 miles through Meyers to Pioneer Trail.



Figure 4: N & S Upper Truckee Rd Intersections (Source: Google Earth)

The RSA team was comprised of individuals with a variety of backgrounds including: law enforcement, engineering, planning, and local government and community representatives. Representatives include from El Dorado County, California Department of Transportation (Caltrans), TRPA/TMPO, California Highway Patrol (CHP), Meyers Community Foundation, and the Federal Highway Administration (FHWA). The RSA team reviewed and took into account all previous public visioning processes conducted as part of the 2016 Linking Tahoe: Active Transportation Plan and the 2013 draft Meyers Area Plan.

Existing Conditions

Site Characteristics

The study area along US 50 is predominantly a three lane roadway that includes a two way left turn lane (TWLTL). The paved roadway width varies between 45ft and 60ft with the exception near the CA Ag Inspection Station where the pavement width is 150ft. The Caltrans right of way is consistently between 200ft and 280ft, except for a 780ft stretch where the right of way is 100ft. The minor local street intersections include, North Upper Truckee Rd., Cirugu/Pomo St, Navahoe Dr., Apache Ave, and Santa Fe Rd/Apache Ave. The two major intersections are a stop controlled T intersection at SR 89 and a signalized T intersection at Pioneer Trail. Photos and a map of the corridor are shown in Figures 5, and 6.

Bicycle facilities include the shoulder for 0.2 miles between N. Upper Truckee and Pomo/ Ciguru St., a marked bike lane through a portion of the study area with some inconsistencies through the intersections, and a Class I shared-use path (Meyers Bikeway) adjacent to and on both sides of US 50 from the SR 89/US 50 intersection to the Pioneer Trail intersection that extends roughly 0.8 miles.

Two marked crosswalks and a third signed crosswalk are in the study limits. A marked mid-block crosswalk, signed as a school crossing, is located within the CA Ag Inspection Station area, approximately 150ft west of the Apache Ave intersection. A signalized pedestrian crossing is located at the Pioneer Trail intersection for east-west pedestrian movements on the north side of the intersection only. It does not provide connectivity to the Class I shared-use paths on the east side US 50. Additionally, there is a signed crossing with two pedestrian crossing signs on either side of the Santa Fe Rd/Apache Ave intersection.

Meyers feels like a bedroom community along a state highway where the posted speeds are 40mph through the community. Driving eastbound (EB) towards Meyers near North Upper Truckee Rd the posted speed limit is 55mph to Cirugu/Pomo St where it drops to 45mph and it drops again to 40 mph after SR 89/US 50 at the CA Ag Inspection Station through the rest of Meyers and just past Pioneer Trail. Similarly, driving westbound (WB) into Meyers the posted speed drops from 55mph to 40mph just before Pioneer Trail. After Apache Ave and before CA Ag Inspection Station a 25mph advisory speed sign supplements the Reverse Turn sign and after CA Ag Inspection Station the posted speed increases to 45 mph and again increases to 55mph near Cirugu/Pomo St. A high speed corridor is typically defined by a roadway that is posted at 40mph to 45 mph and higher for

design purposes; however, for the comfort and safety of all users, speeds greater than 20-30mph have significantly more risk for pedestrians and bicyclists.

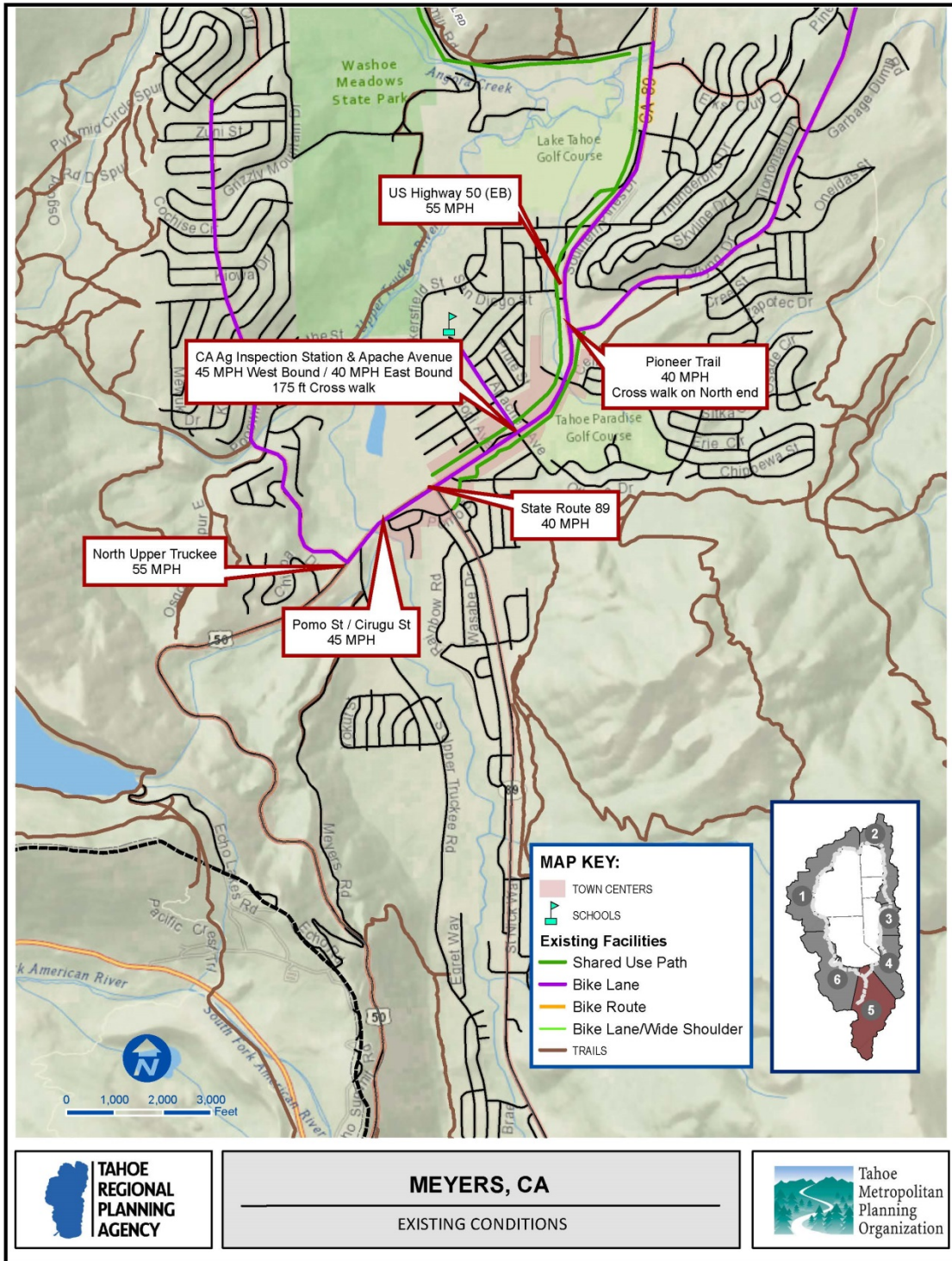


Figure 5: Overview of RSA Study Area. Source: TRPA/TMPO



SR 89 & US 50 (Aerial Image Source: Google Earth)



SR 89 & US 50 Intersection. (Photo Source: Beryl)



Apache Ave (Aerial Image Source: Google Earth)



Residents crossing Apache Ave (Photo Source: Vollmer)



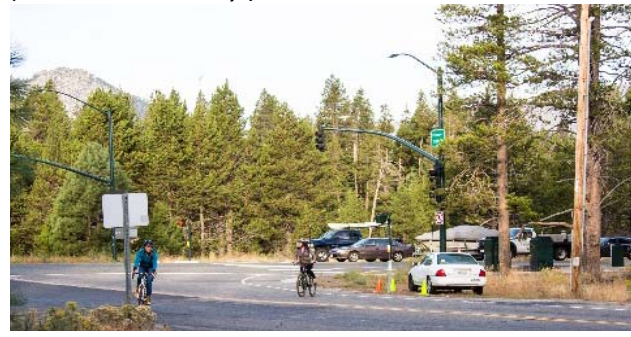
Santa Fe Rd/Apache Ave & US 50 (Aerial Image Source: Google Earth)



Large Right of Way leading to Santa Fe Rd Intersection. (Photo Source: Beryl)



Pioneer Tr. & US 50 (Aerial Image Source: GoogleEarth)



Bicyclists illegal crossing (Photo Source: Vollmer)

Figure 6: Images of the Corridor

The land use along the corridor is mixed. Uses include commercial, recreational, and open space. Amenities consist of trail heads, restaurants, a grocery store, local small businesses, and various agency offices that include living accommodations. Moving west to east, from North Upper Truckee Rd. to the SR 89/US 50 intersection, the adjacent land is forested; however, it includes 1,000ft of chain up area next to the shoulder of the WB lane. The next 4,000ft (to the east) includes 23 accesses (driveways) to businesses and commercial areas. The wide shoulders are used for snow storage and snow removal operations. The Meyers Bikeway provides a full connection that extends from the intersection of SR 89/US 50 to the City of South Lake Tahoe.

Two very unique aspects of this corridor are the CA Ag Inspection Station and the chain on/chain off designated areas. The CA Ag Inspection Station diverges *a*//WB traffic around the inspection building for ~750ft within the Caltrans right of way and when in operation can stop *a*//WB traffic before leaving Meyers on US 50. During large snow events, the chain on/chain off area between the SR 89 intersection and Cirugu/Pomo St becomes a critical area for drivers to get properly equipped to navigate Echo Summit; however, during a major snow event there is not sufficient chain on/chain off areas to accommodate all vehicles.

Vehicle Crash Data

Crash data from 2007 to 2015 was provided by CHP from N Upper Truckee Rd to Pioneer Trail as shown in Figures 7 and 8. There were 111 crashes reported in this 1.3 mile stretch through Meyers with concentrations near SR 89, the CA Ag Inspection Station and Pioneer Trail. That averages over 12 reported crashes per year in Meyers. The data shows consistent crash trends in terms of total and injury crashes from 2007 to 2012 and then a decrease in total crashes from 2013 to 2015. The injury crashes remained average from 2013 to 2015. The ratio of injury crashes to total crashes is consistent at 25% based on a rolling five years average over the nine years. Twenty-eight percent of the total crashes in the study area occurred at intersection while forty-four percent of the injury crashes occurred at the intersections. Figure 9 shows the number of total crashes per intersection.

Nearly sixty-one percent of the total crashes and nearly all of the injury crashes occurred during dry conditions. Ninety percent of the total crashes were multi-vehicle crashes. Overall, a majority of the crashes occurred in the chain up/off segment of US 50, intersection of SR89, CA Ag Inspection Station or at Pioneer Trail as shown on Figure 9. According to CHP, not all property damage only (PDO) crashes are reported, due to high volume of crashes and other safety related issues such as complications with the chain up area, and drivers and passengers leaving their vehicles during long delays. This is common practice nationally.

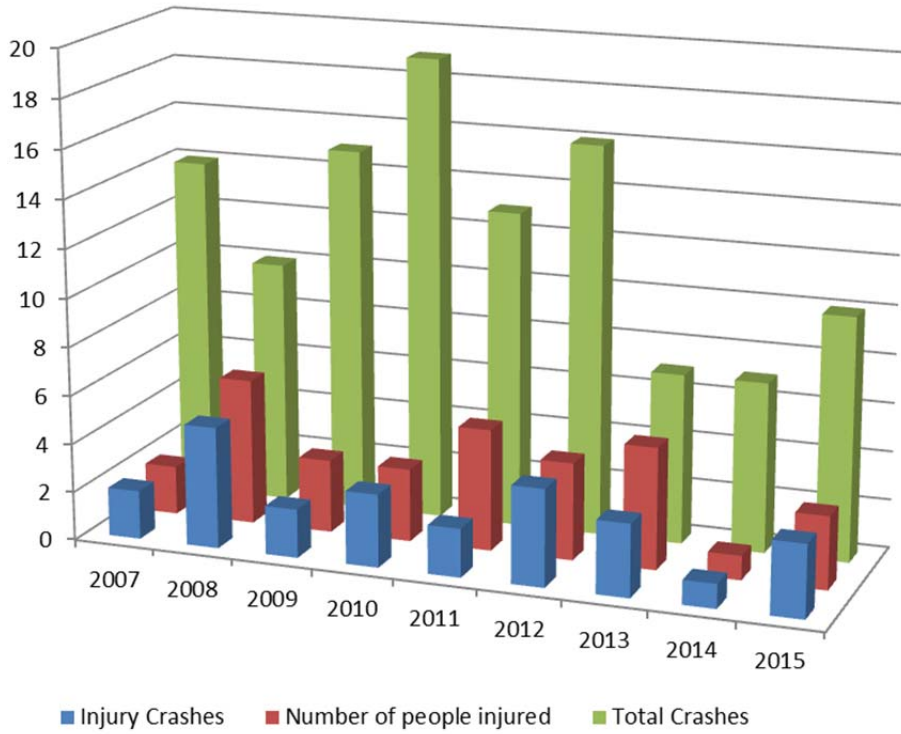


Figure 7: Crash Data from 2007 to 2015 (Data Source: CHP)

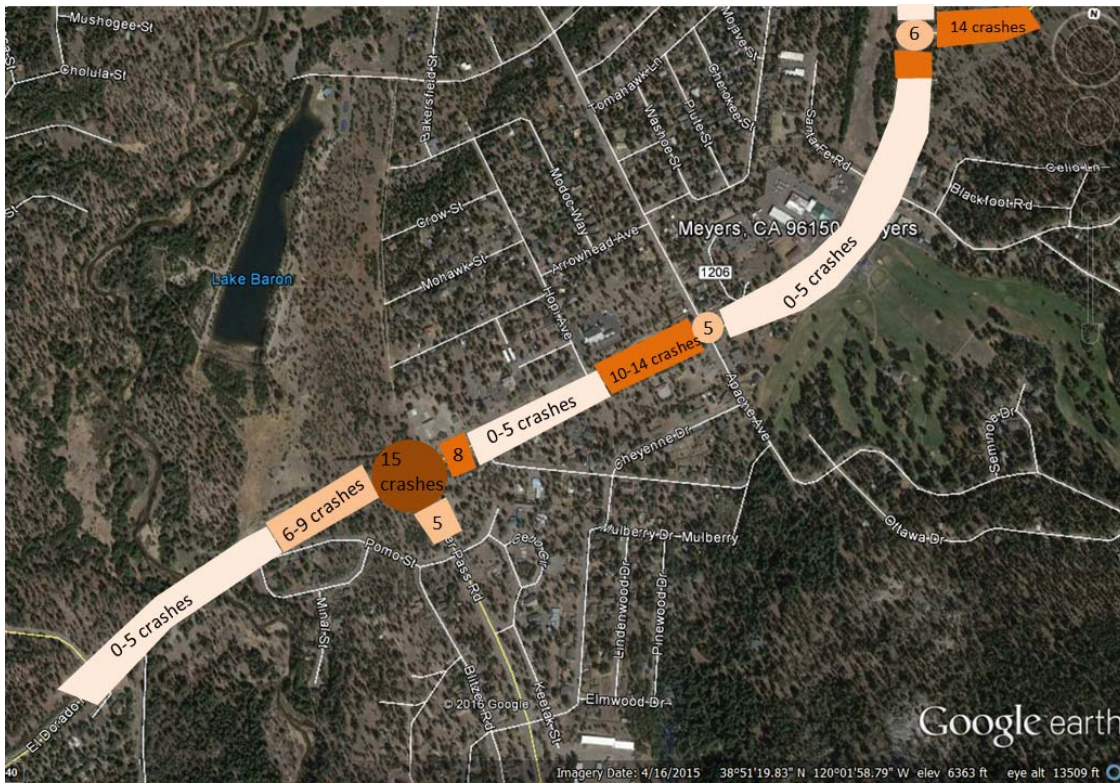


Figure 8: Total crashes from 2007-2015 by Segment and Intersection (Data Source: CHP)

Intersection Injury Crashes

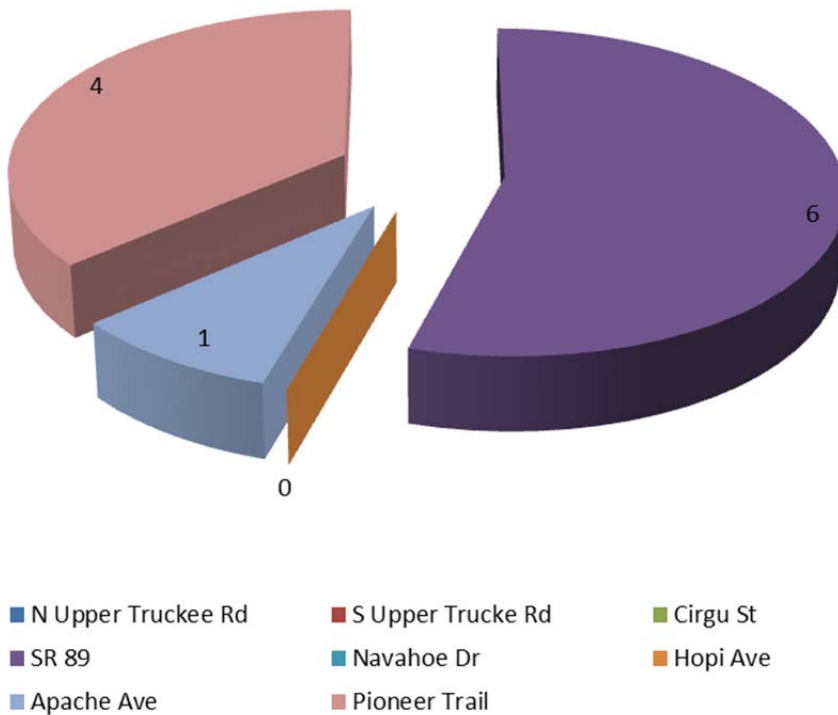


Figure 9: Intersection Injury Crash data from 2007-2015 (Data Source: CHP)

The 2015 US 50/ SR 89 Caltrans Project Study Report, states this intersection experienced total crashes above statewide average for similar facilities in a 3-year period from April 1, 2010 to March 31, 2013, as shown in Figure 10. There were nine total crashes including five crashes that resulted in injuries. Of the nine crashes, five were rear end crashes and the other four were broad side crashes. Four of the five rear end collisions occurred on SR 89 which is stop controlled approach. All four broad side crashes occurred on US 50 which has uncontrolled approaches. The crash data was obtained from the TASAS.

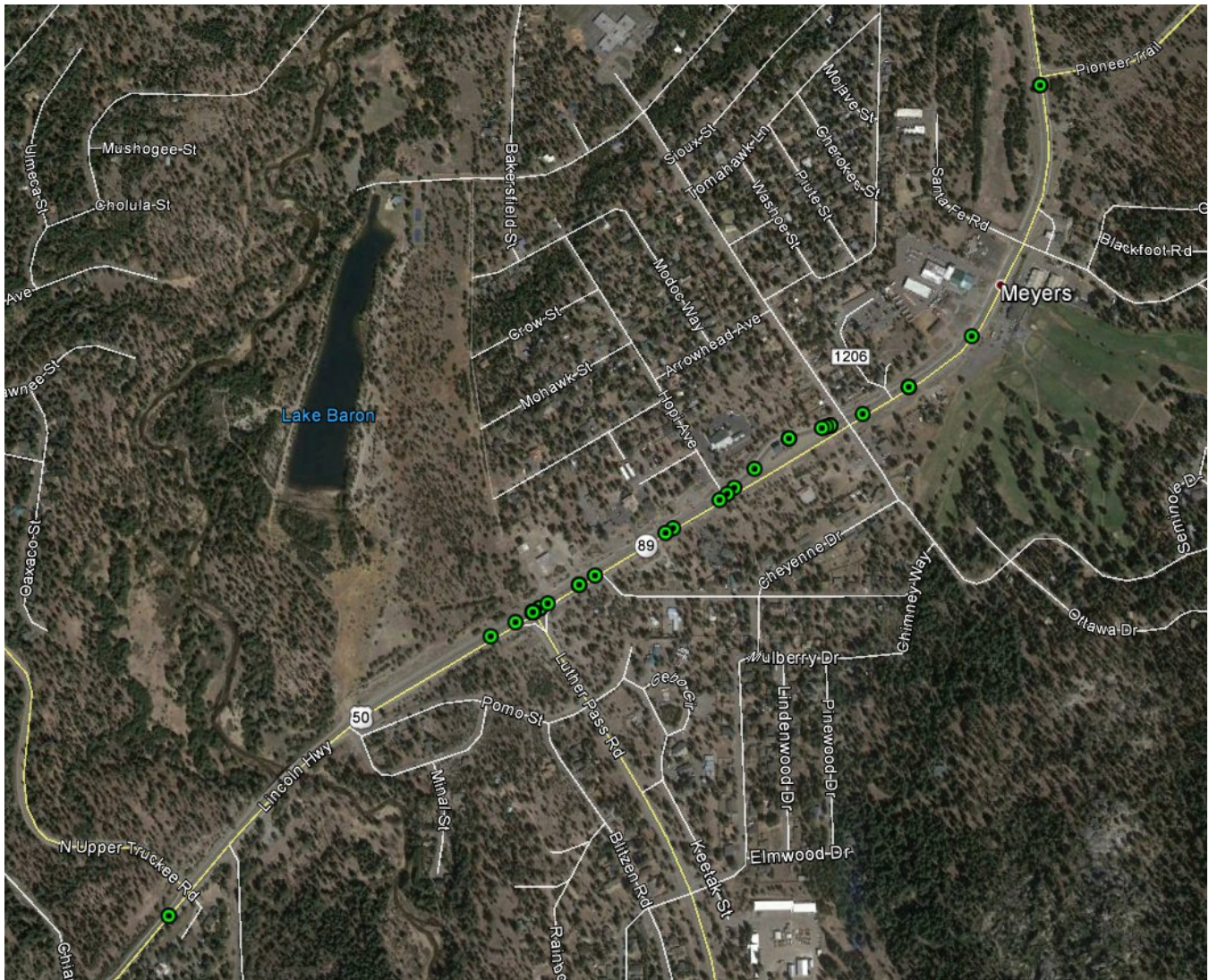


Figure 10: Location of Crashes, April 2010 -March 2013. (Source: Caltrans, TASAS)

Pedestrian & Bicycle Crash Data

No reported fatalities have occurred in the recent past in the study area⁷. However, this corridor lacks complete pedestrian infrastructure along this high speed corridor and does not align with the goals and policies of the TRPA's *2012 Regional Plan*, *TMPO's Regional Transportation Plan and Active Transportation Plan* which seeks to create bikable, walkable town centers. The area also does not align with California's desire to reduce vehicle miles traveled by offering multi-modal accessibility and *Caltrans' Complete Streets Deputy Directive 64-R1*.⁸

⁷ On March 27, 2016 a hit and run pedestrian injury crash occurred in Meyers, CA.

⁸ http://www.dot.ca.gov/hq/tpp/offices/ocp/complete_streets_files/dd_64_r1_signed.pdf

During 2014 and 2015, TRPA/TMPO, the Community Mobility Workgroup, and the Lake Tahoe Bicycle Coalition worked with agencies to collect data and discuss where and how reporting can be more robust. Crashes may not always be accurately reported due to technical difficulties with recording systems, staff availability, injury severity, and non-reporting by victims⁹.

In the 2015-2019 *California Strategic Highway Safety Plan (CA SHSP)*¹⁰, pedestrian fatalities and severe injuries represented 17.32 percent of the total number of traffic fatalities and severe injuries in California in 2012. Fatal and injury bicyclist crashes are on the rise in California. In 2012, 978 bicyclist were injured in crashes and 147 bicyclist fatalities were reported, both of which are the second highest numbers in the nation over the period from 2003-2012. Additionally, the Intersection Challenge Area reported, in 2012, nearly half (45.7 percent) of all fatalities and severe injuries were related to crossing and left turn movements at intersections and the merging, weaving and lane changing movements generated by freeway, expressway and carpool lane entrances and exits.

While the RSA is pedestrian and bicycle-focused, to gain a more complete understanding of how the corridor functions, it is important to look at crashes involving both motorized and non-motorized vehicles. It is a known fact that pedestrians and bicyclists are vulnerable road users if they are involved in a crash. Figure 11 is from the Seattle DOT Pedestrian Safety Action Plan illustrating the exponential risk associated with vehicular speeds.

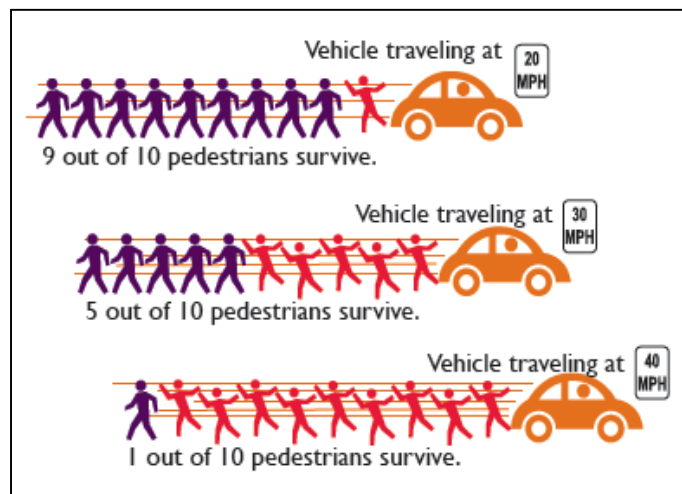


Figure 11 Survivability of Pedestrians (Source: Seattle DOT)

If a vehicle is traveling at 20mph, a pedestrian has a 90% chance of surviving; at 30 mph a 50% chance of surviving; and at 40mph a 10% chance of surviving. For comparison, the entire US 50 corridor through Meyers is posted 40 mph or higher.

⁹ For more information, see Chapter 2 of *Linking Tahoe: Active Transportation Plan*.
http://www.dot.ca.gov/hq/traffops/shsp/docs/SHSP15_Update.pdf

Public Input from Meyers Area Plan & Active Transportation Plan

The Meyers Area Plan planning process began in the spring of 2012 and the draft Plan was developed through an open, community-led process that involved extensive community outreach and participation including 14 separate public hearings or community workshops. In addition to the series of public workshops and hearings, the County has accepted community input on the draft Plan throughout the planning process. A dedicated comment form and email has been available on the County Website since September 2013, and comments have been accepted in any form since the initiation of the process. There is general consensus on many issues in Meyers. These primarily revolve around: enhancing public safety (including lighting, crossings, etc.), improving mobility and access, ensuring Meyers has a functioning 'main street', helping to build a more robust economy in Meyers and working toward creating a healthier community in Meyers.

The *2016 Linking Tahoe: Active Transportation Plan* also collected and analyzed extensive public feedback during a robust six-month outreach process. Over 600 surveys, two community gatherings, and multiple association and public event meetings took place. TRPA/TMPO staff analyzed this information in its *2015 Community Outreach Report*.¹¹ Further, Chapter Four¹² of the *Active Transportation Plan* houses network recommendations for the entire region, including Meyers as part of Corridor 5. Recommendations include consistency with the Meyers Area Plan, as well as updated improvements based on community input provided during the TRPA/TMPO outreach process.

Summary of Completed Area Traffic Studies

In 2010, the El Dorado County Department of Transportation funded signal warrant studies¹³ for a total of six intersections along US 50 in the unincorporated community of Meyers, California.

Conclusions from this report include the following:

- "The Caltrans signal warrant analysis procedures do not specifically address the issue of how the warrant process should be applied in resort areas with wide variations in traffic volumes." The traffic signal warrant analysis concludes that at least one signal warrant has been satisfied during at least one analysis period at the following intersections: US 50/Pioneer Trail, US 50/Apache Avenue/Santa Fe Road, US 50/Apache Avenue (south), US 50/Luther Pass Road (SR 89), and US 50/North Upper Truckee Road.

¹¹ http://tahoempo.org/documents/ATP/2015CommunityOutreachReport_Comb.pdf

¹² http://tahoempo.org/ActiveTransportationPlan/docs/4_ATP_Ch4_NetworkRecommendations.pdf

¹³ Meyers Operational Study Phase II, November 2010,

- “The intersection of US 50/North Upper Truckee Road is shown to operate at poor LOS during summer weekend AM and PM peak hours. Satisfactory LOS C is achieved during summer weekdays and during fall. A traffic signal is warranted at this intersection. An additional engineering study including LOS, traffic safety, and design constraints would be necessary to determine if a traffic signal or roundabout would be appropriate at this intersection.”
- “The intersection of US 50/South Upper Truckee Road is shown to operate with satisfactory LOS C or better for all analysis periods. A traffic signal is not warranted at this intersection.
- “The intersection of US 50/Luther Pass Road (SR 89) does not meet LOS standards during summer weekend AM and PM peak hours and during the summer weekday PM peak hour. A traffic signal warrant is satisfied at this intersection during summer weekend conditions only. A modern roundabout could improve intersection LOS with potentially less delays to through traffic on US 50. Overall, if the delays for movements turning onto US 50 from SR 89 are considered to be sufficient to warrant intersection improvements, additional detailed engineering studies would be necessary.”
- “The US 50/Apache Avenue/Santa Fe Road intersection experiences LOS F conditions during six of the eight analysis periods. The peak hour traffic signal warrant is satisfied at this intersection on summer weekend. No other traffic signal warrants are met. A traffic signal is not adequately warranted at this location.”
- “The intersection of US 50/Pioneer Trail does not warrant any intersection improvements” based on traffic operations.

A 2010 Speed Study¹⁴ reported 85th percentile speeds west of the SR 89/US 50 intersection to be 53 mph and 51 mph, for westbound and eastbound respectively. Near the Apache Ave intersection recorded speeds were 39mph and 44mph, for westbound and eastbound respectively. South of the Pioneer Trail intersection the recorded 85th percentile speeds for westbound and eastbound were 43mph and 40mph, respectively.

A June 2015, Caltrans Project Study Report¹⁵ for the intersection of US 50 and SR 89 South followed the Caltrans Intersection Control Evaluation (ICE) directive screening process of three intersection control alternatives: all-way stop, traffic signals, and a roundabout. The roundabout evaluation provided for a potential increase in safety and traffic flow and was determined to be the most viable alternative of the three evaluated and is now under design.

¹⁴ Cite reference and sponsor

¹⁵ District 03- ED - 50 – PM 70.621, Expenditure Authorization (EA) 03-4F840K – Project Number 0314000305

Assessment of Findings

Safety Benefits of Existing Roadway

While conducting the RSA, the Team noted positive roadway features along US 50, including the following, also shown in Figure 12.

- **Available Right of Way:** There is nearly 200ft 280ft of Caltrans right-of-way along the entire study area¹⁶, with the exception within the curve north of the Chevron station, where the right-of-way is approximately 100ft wide.
- **Active Transportation Facilities:** The corridor includes active transportation facilities, including the Class I Meyers's Bikeway and Class II bike lanes.
- **Intersection Lighting:** Intersection lighting is located at all of the intersections which is a known safety feature.
- **Turn Lanes:** The intersection turn lanes and TWLTL provide space for turning vehicles to move out of the travel lane, where the posted speed limit is greater than 40mph, to identify safe gaps before turning across traffic.
- **Snow Storage Areas:** Snow storage areas are essential to maintain safe roadway conditions.



Meyers Bikeway, Photo Source: Vollmer



US 50 Vehicle Lanes, Photo Source: Beryl

Figure 12: Photos of Existing Features on US 50 through Meyers

¹⁶ NAME SOURCE

Identified Study Area Issues and Suggested Improvements

The discussion of the corridor is separated by segments and intersections. Numerous strategies were identified as possible improvements along the corridor to increase safety and efficiency for all users for the following categories:

- Intersections, residential and business access
- Pedestrian and bicycle crossings
- Chain up area
- Class I and Class II bicycle facilities
- Posted speed reduction for a portion of the study area
- Effective use of available right of way

North Upper Truckee Rd Intersection

N. Upper Truckee Rd is a local neighborhood road that connects to Lake Tahoe Blvd and is a parallel route to US 50 into South Lake Tahoe, as shown in Figure 13. There are approximately 2,000 residential properties along N. Upper Truckee Rd which generates a high volume of local traffic daily. The 2014 AADT for N. Upper Truckee Rd was approximately 5,750 vehicles per day¹⁷. During peak periods this route has become a “bypass” for long traffic delays on US 50 through Meyers to leave Tahoe. Anecdotally, it is also thought to be used as a bypass of chain control during inclement weather events. It is also speculated that smart map technologies are showing this as an optional route, which results in higher than normal traffic volumes for this facility. During peak periods the traffic on this roadway likely exceeds its capacity as noted anecdotally by CHP, and local residents.

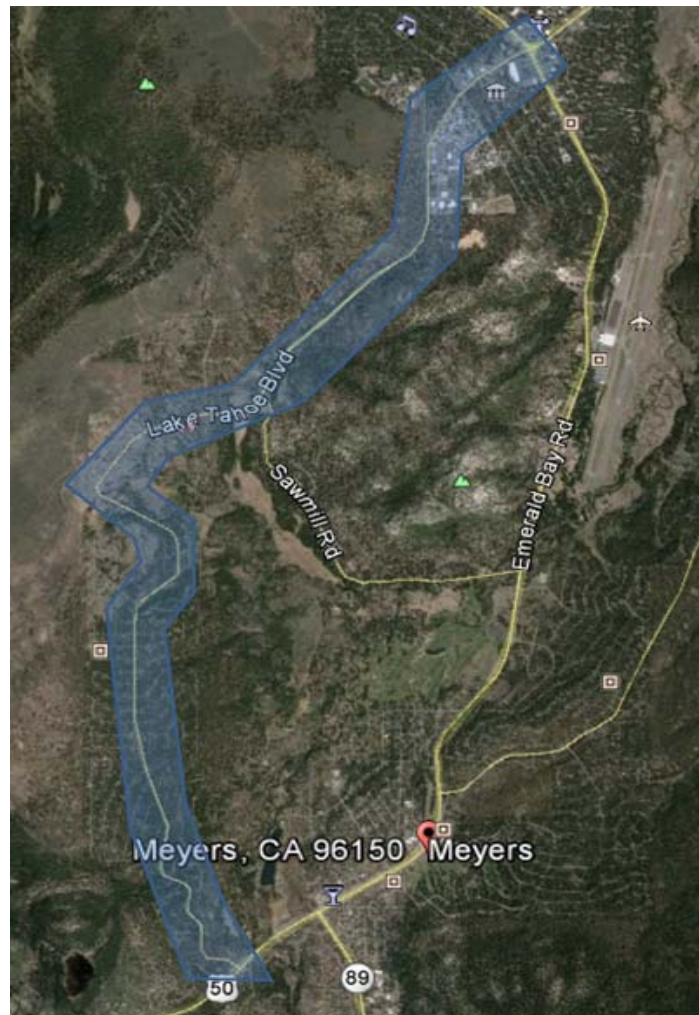


Figure 13: N. Upper Truckee Rd (Aerial Image Source: Google Earth)

¹⁷ El Dorado County, 2016

N. Upper Truckee Rd also accommodates a Class II bike lane. In both the 2010 El Dorado County traffic study and the 2016 TRPA/TMPO *Active Transportation Plan* the intersection with US 50 is designated as a top priority intersection for improvements. This intersection intersects US 50 on approximately a 6% grade, with a wide cross section. Drivers on US 50 tend to have high speeds (>40mph) on the downgrade and the N. Upper Truckee intersection may have limited sight distance during some seasons (i.e. trees, snow banks). No turn lanes are provided on N Upper Truckee Rd.

Suggested Improvements:

- Consider installation of **speed feedback signs** and lighting on the downgrade of EB US 50 and an **intersection ahead warning sign** possibly with the supplemental street name sign. See Figure 14 for examples.
- Consider **intersection design improvements** for safety and operations (i.e. turn lanes, checking sight distance/triangles seasonally)
- Consider static **signage** to discourage bypassing chain control or designation as a local road, “no through traffic/local traffic only”
- **Enhancements to rural/ local road ITS** using both permanent and temporary Changeable Message Signs (CMS) to disperse travel demand. Messaging can include time to reach SR 89/US 50 intersection, or promote changing travel plans due to current delays.
- Extension of the shared-use path known as the **Meyers Bikeway** should be constructed to reach North Upper Truckee along US 50 with consideration for separated or buffered bike lane along N. Upper Truckee. Please TRPA/TMPO's *Complete Street Resource Guide*¹⁸ for design recommendations.



Figure 14: Example of Speed Feedback Sign on I-70 in CO (Aerial Image Source: Google Earth) and Intersection Warning Sign with cross street name (Source: FHWA)

¹⁸http://tahoempo.org/ActiveTransportationPlan/docs/appendices/Appendix%20A_Complete%20Street%20Resource%20Guide.pdf

South Upper Truckee Rd Intersection



S. Upper Truckee Rd is a popular cyclist route and provides access to recreational day hikes as well as provides access to Christmas Valley residents. The intersection with US 50 has some challenges with grade and possible sight distance/triangle issues (i.e. trees and snow) as shown in Figure 15. Similar to the N. Upper Truckee Rd intersection with US 50, steep downgrades along US 50 contribute to high speeds in this area.

Figure 15: Grade of S. Upper Truckee Rd and US 50 Intersection (Image Source: Google Maps)

Suggested Improvements:

- Consider **intersection design improvements** for safety and operations (i.e. turn lanes, checking sight distance/triangles seasonally) .
- Consider installation of an **intersection ahead warning sign** possibly with the supplemental street name sign on US 50.
- Extension of the shared-use path known as the **Meyers Bikeway** should be constructed to South Upper Truckee along US 50. Please TRPA/TMPO's *Complete Street Resource Guide*¹⁹ for design recommendations.

Due to the proximity of this intersection to the N. Upper Truckee Rd intersection, improvements for these intersections should be coordinated.

¹⁹http://tahoempo.org/ActiveTransportationPlan/docs/appendices/Appendix%20A_Complete%20Street%20Resource%20Guide.pdf

Tire Chain up Area (Pomo St/Cirugu St to SR 89)

During the winter months, and in particular during snow events, the chain up area can cause significant disruption to the safety and operations of US 50 as well as to the local roads. CHP reports that during these events drivers on both sides of the highway, in all types of vehicles, leave their cars to do other tasks (walking around, walking dogs, playing in the snow) when there are long delays. Recently, during significant snow events Caltrans and CHP provided additional staff at N Upper Truckee Rd for six hours to help mitigate potential issues.



Figure 16: WB US 50 Entering the Chain up Area (Photo Source: Loehr)

The Cirugu St/Pomo St intersection provides an opportunity for un-authorized/restricted vehicles (i.e. large trucks) to make a U-turn when those vehicles are prohibited. The chain up area for WB US 50 traffic extends from Cirugu St/Pomo St to SR 89 and can be seen in Figure 16. A chain off area for EB US 50 traffic is not currently signed/posted. The Caltrans right of way is typically 240ft in this area.

Suggested Improvements:

- Designate chain on and off area limits and **sign chain on and off areas clearly** for both directions of traffic. Both static and dynamic CMS should be considered.
- Consider **expansion and re-design of the chain up area** on US 50 by moving or adding an area away from through traffic to **provide separation (10ft to 20ft) of chain on operations and through traffic**. The separation could also serve as pedestrian refuge, snow storage area, and



stormwater run-off retention/filtration area. See Figures 17 and 19.

Consideration could be made during summer months; chain up area could be used as an active transportation only facility.

- Evaluate **painted buffers** for Class II bike lanes to best practices (i.e. MUTCD, NACTO, AASHTO, FHWA).
- Consider **enhancements** to rural/ local road **ITS** adding both permanent (see Figure 18) and temporary CMS as well as **real time communication (alert feature) with public** via texting, email (e.g. public could sign up for communications²⁰

See examples of real time emails from Colorado in Appendix A.

- Investigate potential to acquire **abandoned property** for corridor improvements, such as intercept parking or transit center.
- Consider **innovative collaboration and education** to encourage drivers to **adjust their travel times** and behaviors. See *Colorado DOT "Change Your Peak Time"*²² efforts in working with ski resorts and mountain communities.
- Consider a **Peer Exchange with State DOT's regarding challenges in mountain corridors**²³ and strategies for high tourism traffic. This could result in a synthesis or best practice for mountain corridor communications and educational campaigns with resorts, transportation shuttles, etc.
- Study the possibility of combining the CA Ag Inspection Station with the chain up area in the future.
- Consider monitoring the performance (i.e. operations, safety, etc.) of the recent addition of staff during snow events to assess the effectiveness.



Figure 17: Separated Chain Up Example from I-70 in Idaho Springs, CO²¹ (Aerial Image Source: Google Earth)

²⁰ Colorado DOT travel alert sign up information <https://service.govdelivery.com/accounts/CODOT/subscriber/new>

²¹ <https://www.google.com/maps/@39.7440324,-105.4825525,242m/data=!3m1!1e3>

²² https://www.facebook.com/ChangeYourPeakTime/info/?tab=page_info

²³ Consider seeking assistance from the National Center for Rural Road Safety - <http://www.ruralsafetycenter.org/>



Figure 18: Permanent ITS Signs used in advance of Snow Storm on I-70 mountain corridor (Aerial Image Source: Google Earth)



Figure 19: Separate Chain Up Example from I-70 in Idaho Springs, CO²⁴ and Georgetown, CO²⁵ (Aerial Image Source: Google Earth)

²⁴ <https://www.google.com/maps/place/Idaho+Springs,+CO/@39.7437684,-105.4839077,325m/data=!3m1!1e3!4m2!3m1!1s0x876ba525c91b6e55:0xfb9e9ae2915f3f68>

US 50 & SR 89 Intersection

A Caltrans intersection safety improvement project is moving forward at US 50/SR 89 where a modern roundabout is being designed by Caltrans. Two concept drawings for the roundabout design are shown in Figure 20. The intersection is within the chain up (and chain off) area along US 50. There is a wide amount of right of way in the intersection functional area. This intersection includes access to two active transportation facilities; the Class I path parallel to US 50 to the north, and the Class II bike lanes on US 50. The bike lane markings are inconsistent throughout this intersection area. The proposed intersection improvements will provide access and hopefully improve designs to three existing facilities; the Class I parallel to SR 89 on the east, Class I parallel to US 50 to the north, and the Class II bike lanes on US 50. A large Jeffery pine tree is located on top of a prominent hill on the NE quadrant of the intersection.

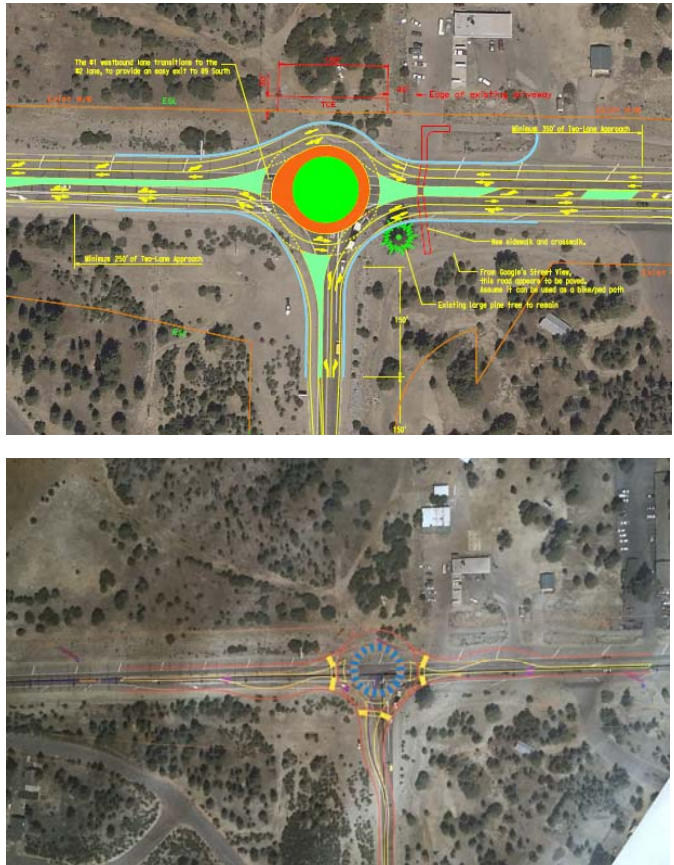


Figure 20: Concept drawing of roundabout (Source:Caltrans PSR, 2015)

Both Caltrans and CHP noted that this intersection is the site of a number of vehicle crashes. Of particular note are rear-end crashes between vehicles that are turning from NB SR 89 to EB US 50. After stopping at the STOP sign on SR 89, vehicles enter the acceleration lane on US 50. However, the traffic volumes on US 50 often prevents the vehicle from SR 89 from merging onto US 50, which forces the merging vehicle to slow or stop in the acceleration lane. Drivers in the following vehicle may not see the vehicle in front is stopped, and the crash occurs. The CHP also noted a number of vehicles either run the STOP sign on SR 89 and proceed across US 50, or slide through the STOP sign and across US 50. A 1.2% grade leads SR 89 into the US 50 intersection.

²⁵ <https://www.google.com/maps/place/Georgetown,+CO/@39.7250804,-105.6963947,414m/data=!3m1!1e3!4m2!3m1!1s0x876a5316be154fc7:0x4bbd507c543c22ec>

Suggested Improvements:

- Consider **maintenance project to restripe** this area to **eliminate the acceleration lane** from SR 89 to US 50 and **restripe the bike lane markings** on US 50 to be consistent and use of state of the practice for bike lane markings though and approaching intersections.
- Agency collaboration on **rightsizing roundabout improvement** consistent with Caltrans Intersection Control Evaluation (ICE) directive and state of the practice roundabout design guidance and operational tools.
- Consider reconstruction of US 50/SR 89 to **include gateway features and create a transition/traffic calming presence** i.e. lower posted speed²⁶ through the remainder of Meyers (increase posted speed, as appropriate, after Pioneer Trail intersection).
- Consider possible **new configurations for chain up area** as a part of roundabout design so project does not preclude future changes to the chain up area (i.e. separation between travel lanes and chain up area, additional chain up area).
- Consider providing **connectivity between the Class I pathway** facility parallel and to the east SR 89 and the Class I facility parallel and to the north of US 50. Connectivity should also be provided to North Upper Truckee and Christmas Valley.

CA Ag Inspection Station

The CA Ag Inspection Station is a unique feature along this corridor as shown in Figure 21. In advance of the Ag Station, the WB US 50 lane is diverted along an approximate 800ft reverse curve around the inspection building and the transitions start and end with the Hopi Ave and Apache Ave intersections. Although the posted speed limit in the area is 40mph, an advisory speed warning sign of 25mph is posted on a reverse turn warning sign. Currently a midblock school pedestrian crossing is also within this area. According to California Highway Patrol, this is the second highest crash location within the study area and the approach to the Ag Station includes numerous traffic control devices intended to warn and channelize drivers as well as mitigate the damage from a potential crash. The wide (280ft+) Caltrans right of way continues through this area. The current operations and functions of the CA Ag Inspection Station were unknown by the members of RSA Team.

²⁶ See uSLIMITS Tool for additional information. <http://safety.fhwa.dot.gov/uslimits/>



EB US 50 with midblock school crossing sign and crosswalk in 40 mph posted speed zone.



WB US 50 – School crossing sign blocks reverse turn sign.

Figure 21: CA Ag Inspection Station (Source: Isebrands and Google Earth)

Suggested Improvements:

- Verify the Reverse Turn warning sign is not correct for current geometry and as appropriate replace with a **Reverse Curve warning sign** (MUTCD W1-3) and confirm that the 25mph advisory speed plate is the appropriate sign for this geometry and speed reduction as well as the **appropriate location for the signs**. The existing signs are well within the reverse curve and directly behind the warning sign for the school pedestrian crossing sign. After verification of sign, consider **separating signs** so drivers have ample time to detect and react to the change in the roadway.
- **Improve striping** approaching and departing CA Ag Inspection Station to enhance and proper use of chain on area and future roundabout project.
- **Coordination with roadway agency partners - Caltrans, El Dorado County, TRPA, and CA Dept. of Agriculture** to determine the current and future operations of the CA Ag Inspection Station. Consider discussing the following:
 - Original operations under the permit/easement and its relevance to current and foreseeable future operations.
 - Options for routing WB US 50 traffic to its expected location (adjacent to EB US 50) and using a taper “exit” only for vehicles which will be inspected. This would be done in combination with CMS and dynamic signing.
 - Options for moving the operations and co-locating with a re-designed chain up area
- See discussion below on the midblock school crossing.

Midblock School Crossing and Apache Ave Intersection

In 2014, a high visibility marked crosswalk was constructed approximately 150ft SW of the Apache Ave intersection creating a midblock pedestrian crossing that is marked as a school crossing. High visibility thermoplastic markings are recessed into the pavement and school crossing warning signs are posted. The midblock school crossing is 130ft in length and has a 25ft flush refuge area between the travel lanes, as shown in Figure 22.



This design is not consistent with best practices for a pedestrian/school crossing on a high speed (40mph) roadway. The community was vocal about not wanting to move the crosswalk; however, the crosswalk was relocated as part of *1A732 Water Quality* project. (It also installed the most current stripping for bike lanes.)



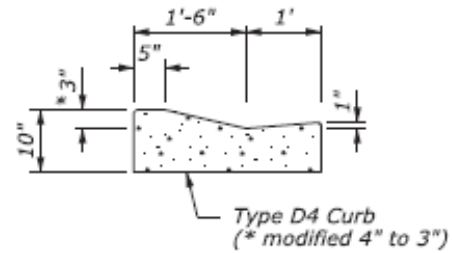
Figure 22: Apache Ave Intersection and Midblock School Pedestrian Crossing (Photo Source: Isebrands; Aerial Image Source: Google Earth)

Caltrans determined the mid-block crossing near the CA Ag Inspection Station is an easier place to cross, due to the wide gap in travel lanes created by the CA Ag Inspection Station widening, than the Apache Ave intersection where more vehicle conflicts exist. The crosswalk at the intersection was removed for potential safety reasons prior to the installation of the crosswalk at the CA Ag Inspection Station. Rear end collisions had occurred while pedestrians were trying to cross. The connections and pathways to/from this crosswalk are currently not maintained in the winter so pedestrians must walk in US 50 between the crosswalk and Apache Ave²⁷.

²⁷ Eldorado County plans to start performing winter maintenance/plowing on the Meyers bikeway in winter 2016 - 2017

Suggested Improvements:

- Consider **evaluating current location of the midblock** school pedestrian crossing in consultation with the school and users. Re-assess conflicts and safety of the mid-block vs. intersection high visibility crossing where a shorter crossing (90ft/40 ft shorter) can be achieved and winter maintenance at the crossings can be done with street plowing.



**MODIFIED D4 CURB
WITH 1 FT GUTTER**

Figure 23: Mountable/Plowable Curb Examples
(Source: Caltrans)

- Consider a **mountable/plowable raised pedestrian refuge island** in the design keeping in mind winter maintenance needs and a landing area/transition to any on street pedestrian movements on Apache Ave. A mountable curb is shown in Figure 23 and Appendix B.
- Consider analysis of warrant/need for a pedestrian activated Rectangular Rapid Flash Beacon (RRFB) or a Pedestrian Hybrid Beacon (PHB) if the crossing remains at the midblock location the PHB could also be considered at an intersection crossing (see MUTCD for more information).
- Consider adding **turn lane(s) on Apache Ave** to help with conflicts and delays with or without the addition of a crosswalk at this location.
- Conduct **field inspection of signs** in this area to reduce sign clutter and increase visibility
- Under striping operations **update bike lane markings** to current CA-MUTCD standards that includes a buffer.
- Determine if this marked school crossing is in a school zone (by law) and whether a school zone posted speed limit reduction is warranted in this area. A speed feedback sign to alert drivers when they are over the posted speed limit may be an option as a part of that effort.
- *Long term consideration* for a roundabout at Apache Ave to continue to encourage drivers to use a lower speed in the Meyers community (Refer to 2010 traffic study)

Segment between Apache Ave and Santa Fe St/Apache Ave

In this 1,500ft stretch of the study area, there are 11 access points (driveways) with almost all of those being within 700ft of the Santa Fe St/Apache Ave intersection. This includes one lane in each direction on US 50, a two-way-left-hand-turn-lane (TWLTL) and a Class I and II bikeway. Between the golf course parking lot and just west of Pioneer Trail the right of way through Meyers is its narrowest.

Although not observed during the RSA, the RSA Team was able to share past observations of the typical ingress and egress movements when pedestrians and cyclists are using this area.

Additionally, the pathway is not currently maintained in the winter and is impassable, as shown in Figure 24; however in 2017 it is anticipated to be maintained by El Dorado County through Measure R/S funding.

There is approximately 1,700ft between the two high visibility pedestrian crossings on either side of this area; however, there are active crossing areas near the Chevron, Lira's grocery, Meeks, Conservation Corp, restaurants, and various small businesses.



**Figure 24: Class I Pathway near Meeks Lumber
(Photo Source: Isebrands)**

Suggested Improvements:

- Re-design²⁸ driveways to allow the Class I pathway to be contiguous through the driveways, reducing effect that the driveway looks and operates like an intersection, as shown in Figure 25.
- Consider a **pedestrian crossing study** (i.e. origins and destinations of pedestrian movements) in this area to establish the best location for a marked high visibility pedestrian crossing.
- Provide a **high visibility pedestrian crossing** once optimal and safest location is determined
 - A **RRFB or PHB** may also be considered to supplement the crossing on this high speed roadway if warranted.
 - Consider a mountable/plowable raised pedestrian refuge island in the design keeping in mind winter maintenance needs.
- **Plan for changes in snow removal operations** due to Class I pathway being maintained during the winter and **coordinate** with Caltrans, El Dorado County and property owners. Consider requiring contractor to coordinate with Caltrans plowing procedures and **update current maintenance agreement**, signed in 1992 between County and Caltrans.
- Consider preparing a **“Snow Management Plan”** that includes consideration for US 50, Pathways, business owners.
- Consult with business owners on their operations and need for all access points to US 50.

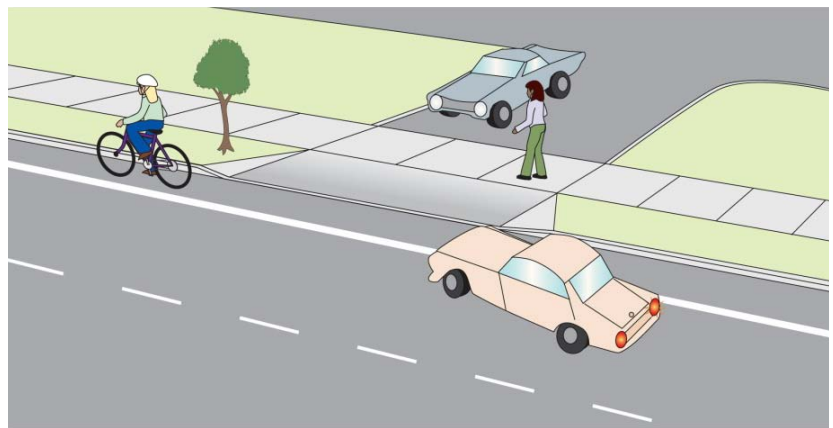
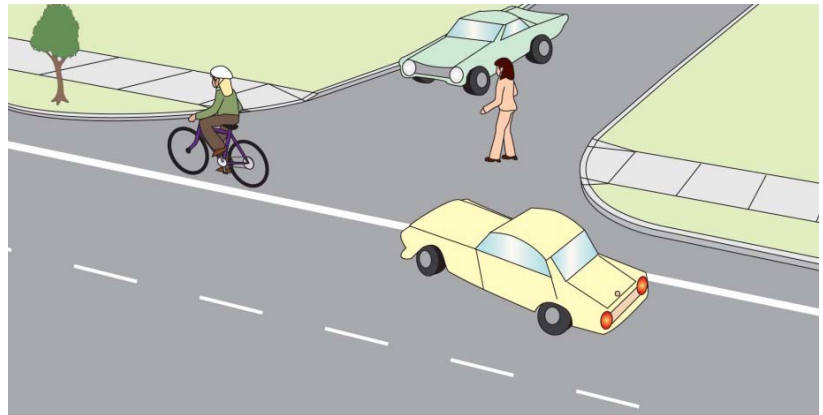


Figure 25: Comparison of a commercial driveway designed with and without emphasis on sidewalk (Source: FHWA)

Pioneer Trail Intersection

The Pioneer Trail intersection is the northern gateway to Meyers from South Lake Tahoe. It is the only signalized intersection in the study area. Drivers are required to reduce their 55 mph speed to a 40 mph headed into Meyers in this area. The AADT of Pioneer Trail is approximately 6,335 vehicles per day. According to CHP this is the highest crash location within the study area. This intersection is a choke point during the peak periods. Right turning vehicles from NB US 50 to Pioneer Trail are given priority for intersection efficiency (right green arrow). This right turn tends to be a fast movement. During the winter months this area can be icy (cross slope, drainage issues and lack of sun/freeze-thaw) and contributes to crashes. A number of the crashes occur when vehicles on EB US 50 turn right onto EB Pioneer Trail at an unsafe speed and then slide into the WB side of Pioneer Trail. Intersection and stopping sight distance/triangles at the intersection may be affected by trees, poles, signal cabinet and signs.

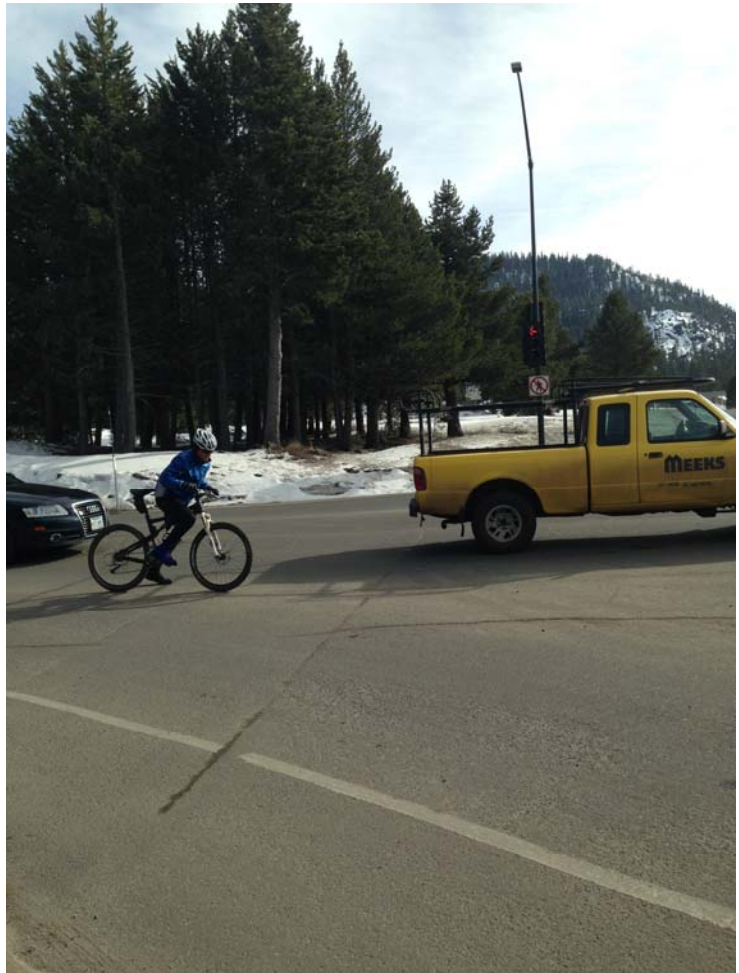


Figure 26: Pioneer Trail Intersection (Source: Isebrands)

Pedestrian and bicycle facilities are disjointed and lack connectivity at this intersection. Pedestrians are only allowed to cross US 50 in the crosswalk on the north side of the intersection and that crossing does not connect to another pedestrian facility. All other pedestrian movements are prohibited. The Class I bicycle facility parallel to US 50 does not connect to the Class II facility or the Class I pathway east of US 50.

Suggested Improvements:

- Consider providing **full access for pedestrians and bicyclists** including crosswalks and refuge islands.
- Provide a crosswalk across Pioneer Trail to **connect the crosswalk to the Class I bikeway**.
- Consider **alternative signal timings** (adaptive signals) based on demand - daily and seasonally.
- Examine feasibility of modifying the low area on the right turn to **improve drainage**. If reconstruction is not an option, high-friction surface treatment (HFST) may improve the area at a lower cost and in a shorter time frame.
- Consideration could be given to this intersection serving as a **gateway to Meyers** with features that would encourage slower speeds through Meyers.
- Long term consideration for a roundabout.

Summary of Safety and Operational Improvements

Table 1 summarizes the safety and operational improvements suggested as a part of this RSA. The improvements can also be considered in terms of ease of implementation from short-term to mid-term to long-term goals and strategies.

Table 1: Summary of Improvement Strategies

Location	Strategy							
	Intersection Sight Distance/Triangle Field Checks	Bicycle Facility Connections	Bicycle Facility Marking Adjustments	Crosswalk Marking Adjustments	RRFB or PHB	ITS	Re-design	Roundabout consideration
N Upper Truckee Rd	X	X				X		
S Upper Truckee Rd	X	X						
Chain up Area (Pomo to SR 89)						X	X	
SR 89		X	X	X			X	X ²
CA Ag Inspection Station				X	X	X	X	
Apache Ave	X		X	X			X	X
Apache Ave/Sante Fe			X	X	X ³			
Pioneer Trail	X	X		X			X ¹	X
¹ At Pioneer intersection this includes signal re-timing ² A roundabout is under design for this location. To be constructed in 2019. ³ This would be for mid block locations only.								

Short Term (next 6 months)

- Pavement Markings and Signs
 - Chain on and Chain off area/limits signing for both directions
 - Bicycle lane marking improvements including buffered bike lanes in lieu of hatched markings
 - Signing in the CA Ag Inspection station area (placement of signs and use of warning signs)
 - Midblock Apache Ave school crossing study
 - Santa Fe St/Apache Ave crosswalk markings and location study
- Collaboration, Education and Enforcement
 - Meeting with CA ICE TAP for roundabout design and impacts
 - Consider traffic incident management meeting to discuss innovative ways to work with community and employers related to peak periods
 - Coordinate with the CA Department of Food and Agriculture
 - Request a Peer Exchange with other agency's in snowy mountain climates and tourism

Mid Term (6 months – 2 yrs)

- Update signal timings on Pioneer Trail
- Provide pedestrians full access at Pioneer Trail intersection - with pedestrian signal
- Study to design a buffered bike lane through Meyers
- Reconstruct US 50/SR 89 intersection (2019) and include expansion of Class I facilities to N. and S. Upper Truckee.
- Study and re-design chain up area to expand and separate from traveled way and to serve as an active transportation only roadway during summer months.
- Implement education strategies by collaborating with resorts, tourism industry and communities
- Access control and interface of driveways and Pathway crossings

Long Term (2 yrs- 5 yrs)

- Reconstruct chain up area
- Relinquishment of excess Right of Way
- Consider conversion of the Pioneer Trail and Apache Ave intersections to roundabouts as the capacity and safety improvements are needed.
- Modify CA Ag Inspection Station

The recommended strategies for the Meyers RSA are consistent with the 2015 CA SHSP Pedestrian and Bicycle and Intersection Challenge Area strategies as shown in Tables 4 and 5.

Table 4: CA Strategic Highway Safety Plan Pedestrian and Bicycle Challenge Area Strategies

Pedestrians	Bicycles
<ul style="list-style-type: none"> • Improve the safety of pedestrian crossings by using proven effective countermeasures. • Expand effective enforcement and education of all roadway users to improve pedestrian safety based on known risk factors and data trends. • Increase funding for pedestrian safety infrastructure and non-infrastructure projects. • Improve collection, use, and analysis of data needed for pedestrian safety planning and programming. • Increase pedestrian safety-focused coordination among State, regional, and local agencies including on transportation planning and land use efforts. 	<ul style="list-style-type: none"> • Improve roadway and bikeway planning, design, operations, and connectivity to enhance bicycling safety and mobility to all destinations. • Improve data collection regarding bicyclist trips, injuries, and fatalities on California roadways and bicycle paths. • Improve education and enforcement to promote safe multi-modal travel. • Encourage more bicycle travel by improving public attitudes about bicycling as a safe mode of transportation. • Develop safe, direct, and connected routes for bicycling.

Table 5: CA Strategic Highway Safety Plan Intersection/Interchange/Access Challenge Area Strategies

- Mainstream and accelerate the deployment of innovative solutions that have proven to be highly effective and cost-effective.
- Pursue programmatic application of low-cost and high impact strategies, countermeasures, and activities.
- Focus on continuous improvement and collaboration by building on the foundational work products and findings generated by previous strategic safety and other statewide initiatives.
- Emphasize the role and importance of visibility among road users and workers (especially during hours of darkness).
- Minimize or avoid safety performance degradation resulting from land use and highway infrastructure investment proposals.
- Increase understanding and collaboration among transportation system owners, operators, investors, and regional agencies regarding the effect of access-related decisions on safety and overall system performance.

Funding Sources for Safety and Operational Improvements

Some of the identified projects and funding sources for safety and operational studies and improvements include the following:

Active Projects

- El Dorado County's TRPA funded On Our Way grant for the Meyers Corridor Project
- Caltrans SHOPP US 50/89 intersection improvements (programmed for 2019)

Potential Funding Sources

- SHOPP – State Highway Operations Protection Plan (Caltrans)
 - Pedestrian Crossing Enhancement Program*
 - Operational Improvements (Request can be made to Caltrans to perform an engineering investigation to develop a project proposal. Caltrans SHOPP funding - Pedestrian Crossing Enhancement Program for improvements related to pedestrian crossings.)
- Active Transportation Program (Caltrans/FHWA)
- State and local HSIP programs
- Federal Lands Access Program (FLAP)
- TRPA / El Dorado County Congestion Management Air Quality Funds (CMAQ)
- Facilitation of the Mountain Corridor Peer Exchange could be requested to the National Center for Rural Road Safety

Conclusions

RSA's are conducted to address both proactive and reactive safety issues and are not solely based on documented crash data but also take into consideration the perceived risk of the users.²⁹ The Meyers, CA RSA Team reviewed traffic reports, crash and user count data, stakeholder perspectives as well as conducted field observations of the study area to assess the performance of US 50 for all roadway users.

Some of the improvement goals and strategies include:

- Seek out both **innovative and state of the practice** design and technologies for pedestrian crossings, roundabouts and chain on/off areas in similar environments with high altitude seasonal peaking traffic.
- **Utilize the excess right of way** throughout the corridor to improve maintenance, operations and safety for all users regardless of the season and traffic volumes.
- Align small, medium and large opportunities and projects with **community, data and performance driven strategies**.
- Strive for **connectivity of pedestrians and bicycle facilities year round**
- Coordinate and collaborate with all agency and community stakeholders for both seasonal issues as well as peak and off-peak periods which would produce a **snow management plan**, an updated cooperative agreement, and address other issues explained throughout this report.

Improving this corridor will not only be a proactive approach to increase safety, but also provide opportunities for Meyers' residents and visitors to use safe multi-modal transportation.

Acknowledgements

The RSA Team would like to thank the California Conservation Corps for use of the Tahoe Center during the field review.

²⁹ FHWA. Bicycle Road Safety Audit Guidelines and Prompt Lists.

Appendix A – Real Time Incident Messaging

From: "Colorado Department of Transportation" <cdot@service.govdelivery.com>

Date: March 23, 2016 at 6:29:48 PM MDT

To:

Subject: Traction Law I-70 between Silverthorne and Tunnel

Reply-To: cdot@service.govdelivery.com

Traction Law I-70 both directions between Silverthorne and the Tunnel. Passenger vehicles required to have snow or mud/snow tires, use chains/alternative traction devices, or be a 4WD/AWD vehicle.

Visit COtrip.org or call 511 for more info.



From: "Colorado Department of Transportation" <cdot@service.govdelivery.com>

Date: March 16, 2016 at 8:33:54 PM MDT

To:

Subject: Heavy Traffic I-70 EB 30

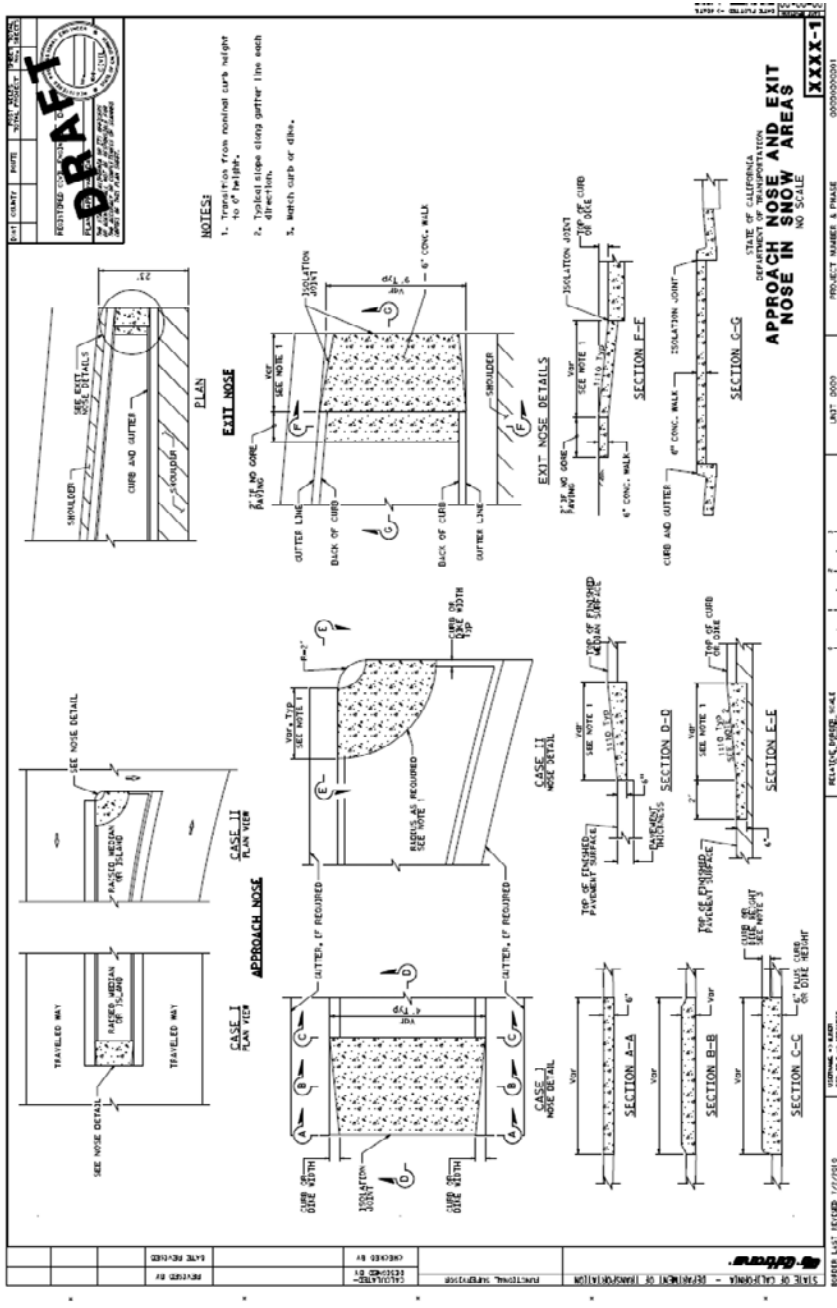
Reply-To: cdot@service.govdelivery.com

Heavy Traffic Update I-70 EB 30+ minutes extra travel time from Silverthorne to Denver/C-470, MM 205-259. Total travel time approximately 85 minutes.

Call 511 or visit COtrip.org or get CDOT Mobile App



Appendix B – Mountable/Plowable Curb Details



Appendix C – Pioneer Trail/US 50 Intersection Concepts

