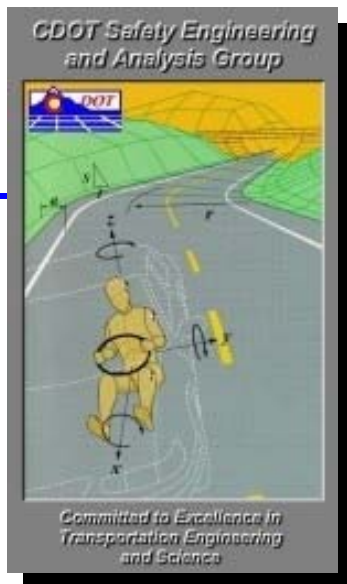


**Appendix D CDOT Safety Assessment Report
July 2017 (August 2020 Addendum)**



SAFETY ASSESSMENT REPORT

**SH 82A: MP 2.95 - MP 4.50
Region 3
Interchange Reconfiguration and Design**

**July 2017
August 2020 (Addendum)**



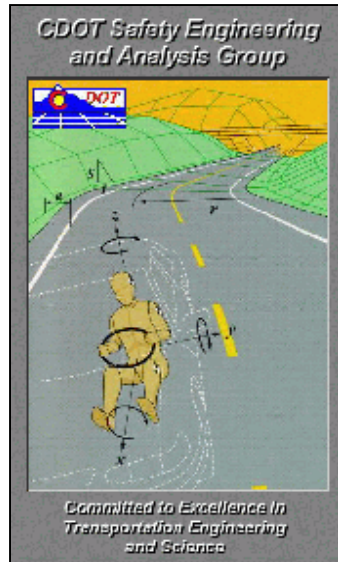
Prepared by: The Colorado Department of Transportation
HQ Safety and Traffic Engineering Branch
Safety Engineering and Analysis Group
4201 E. Arkansas Ave., 3rd Floor
Denver, CO 80222

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Written Authority from the CDOT Safety Engineering and Analysis Group*

This report is prepared solely for the purpose of identifying, evaluating and planning safety improvements on public roads. It is subject to the provisions of 23 U.S.C.A. 409, and therefore is not subject to discovery and is excluded from evidence. Applicable provisions of 23 U.S.C.A. 409 are cited below:

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 152 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.

Any intentional or inadvertent release of this report, or any data derived from its use shall not constitute a waiver of privilege pursuant to 23 U.S.C.A. 409.



A Statement of Philosophy

The efficient and responsible investment of resources in addressing safety problems is a difficult task. Since crashes occur on all highways in use, it is inappropriate to say of any highway that it is safe. However, it is correct to say that highways can be built to be safer or less safe. Road safety is a matter of degree. When making decisions effecting road safety, it is critical to understand that expenditure of limited available funds on improvements in places where it prevents few injuries and saves few lives can mean that injuries will occur and lives will be lost by not spending them in places where more accidents could have been prevented¹. It is CDOT's objective to maximize accident reduction within the limitations of available budgets by making road safety improvements at locations where it does the most good or prevents the most accidents.

INTRODUCTION

The primary intent of this project is to identify any safety concerns of State Highway (SH) 82A from milepost (MP) 2.95 to MP 4.50. An opportunity exists from the detection of safety problems and the implementation of selected improvements at locations where it is justified by crash experience.

The scope of this report is as follows:

- Assess the magnitude and nature of the safety problem within the project limits
- Relate crash causality to roadway geometrics, roadside features, traffic control devices, traffic operations, driver behavior, and vehicle type.
- Suggest cost effective counter measures to address identified problems.

This report is based on the comprehensive analysis of five (5) years of crash history and a video log review. The Region is advised to verify through field survey, the information included in this report regarding physical features and roadside characteristics in the study area.

¹ Hauer, E., (1999) *Safety Review of Highway 407: Confronting Two Myths*. TRB

SITE LOCATION

This study addresses SH 82A in Garfield County, beginning at MP 2.95 and continuing southeast to MP 4.50. The included distance is one and a half (1.5) miles. SH 82A is classified as a principal arterial for the entire study section.

SITE CONDITIONS

The terrain is classified as mountainous, and the travel lanes and shoulders are asphalt throughout the entire study section.

The highway is a four-lane divided facility with travel lane widths of 12 feet for the entire study section. Shoulder widths of nine (9) feet are typical throughout the entire study section, as shown in Table 1.

Table 1: Pavement / Shoulder Width and Type

MP	Travel Type	Travel Width (ft)	Shoulder Type	Shoulder Width (ft)
2.95 to 4.50	Asphalt	48	Asphalt	9

The approximate Annual Average Daily Traffic (AADT) and the percent trucks are summarized in Table 2 below based on the 2015 CORIS data.

Table 2: Annual Average Daily Traffic (AADT)

MP	AADT	PERCENT TRUCKS
2.95 to 4.50	25,000	3.7

The highway speed limits found throughout this study section are summarized in Table 3.

Table 3: Authorized Speed Limits

MP	Authorized Speed Limit Primary (MPH)	Authorized Speed Limit Secondary (MPH)
2.95 to 3.40	55	55
3.40 to 3.50	65	55
3.50 to 4.50	65	65

There are 2 intersections throughout the study section, one of which is signalized. The list of these intersections within the study section is summarized in Table 4.

Table 4: Intersection Locations

MP	Name
3.55 to 3.58	RD W (CO RD 154)
4.31 to 4.40	RD NE (Frontage Rd) – RD SW (Driveway)

CO RD 154 heading west is a signalized intersection, however, there is another intersection which is not officially listed, just 750 ft south which includes a driveway to the west and a frontage Rd and CO RD 115 to the east.

The crash history for the period of January 1st, 2011 to December 31st, 2015 was examined between MP 2.95 and MP 4.50 to locate crash clusters and identify collision causes. 82 crashes were reported during the 5-year study period, one (1) of which was a fatality and 20 of which were injuries.

Figure 1 shows a graphical breakdown, by severity, of these collisions during the study period compared to the statewide averages for rural, mountainous, divided, four-lane highways. The study section is technically classified as urban, but behaves more as a rural environment.

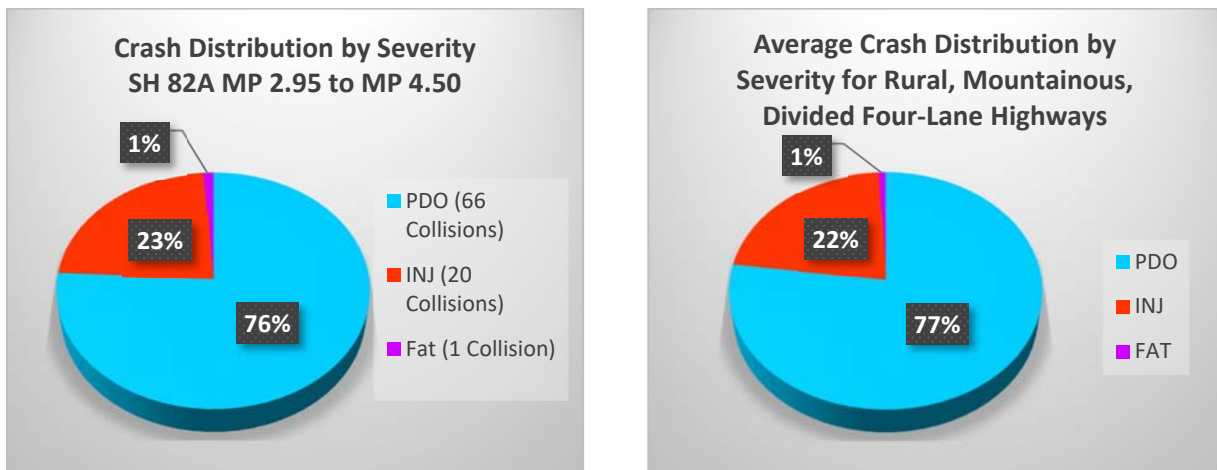


Figure 1: Crash Severity for Rural, Mountainous Terrain Comparison

As the figure shows, 23% of the collisions resulted in injuries and 1% resulted in fatalities during the study period. Both of these percentages are very similar to the statewide average for rural, mountainous highways.

The pie chart in Figure 2 shows a breakdown of the 82 collisions that occurred on SH 82A during the five-year study period by crash location.

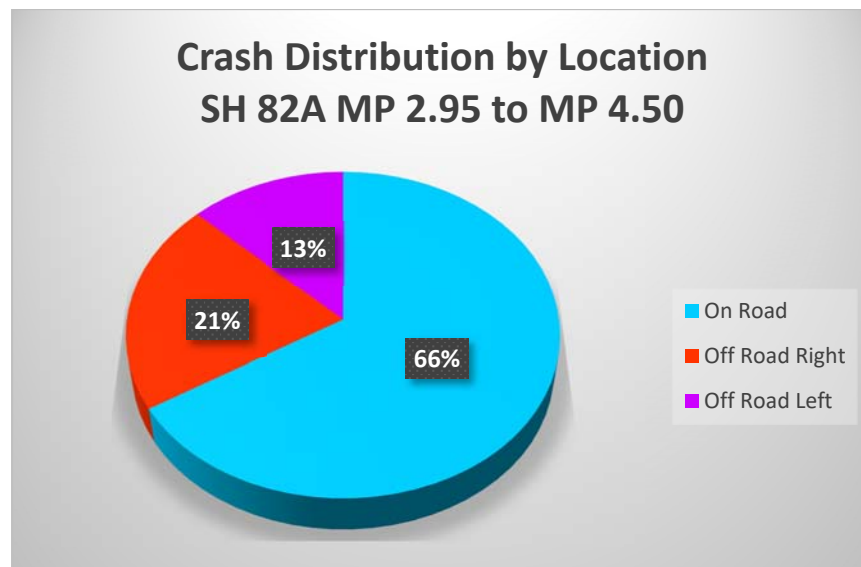


Figure 2: Crash Distribution by Location

Figure 2 shows that 66% (57 of 82 collisions) were located on-road while 34% of the collisions were located off-road for the entire study section. For this study section, off-road crash locations are lower than the statewide averages for similar arterials.

Figure 3 shows the breakdown of crashes by crash type for the study section from MP 2.95 to MP 4.50. Fixed Object crashes accounted for the largest percentage of collisions in this milepoint range at 23% (20 crashes), followed by Wild Animal and Intersection Related collisions at 21% (18 crashes), each. Wild Animal and Overturning collisions have higher crash rates when compared to the statewide average for similar highways.

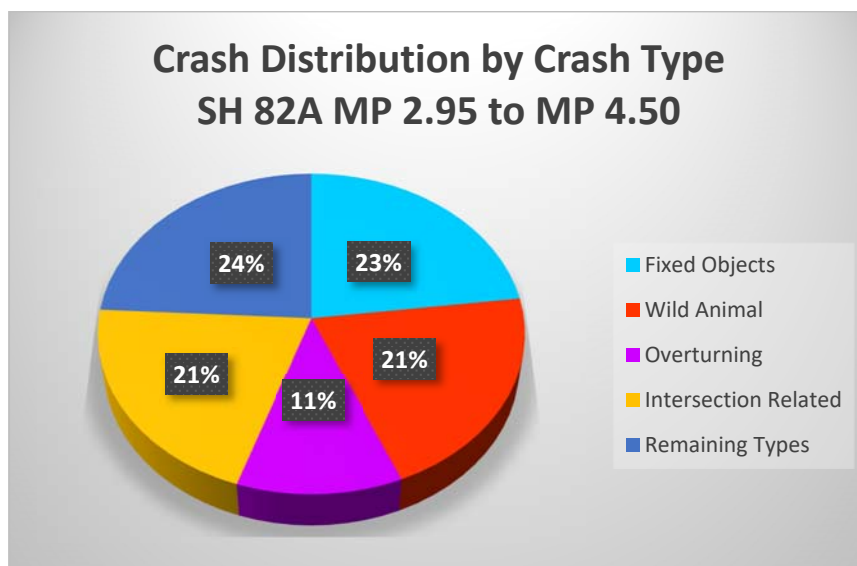


Figure 3: Crash Distribution by Crash Type

The most common Intersection Related collisions involved Rear End followed by Broadside as shown in Figure 4. A more in depth analysis of these intersections will be performed later in the report.

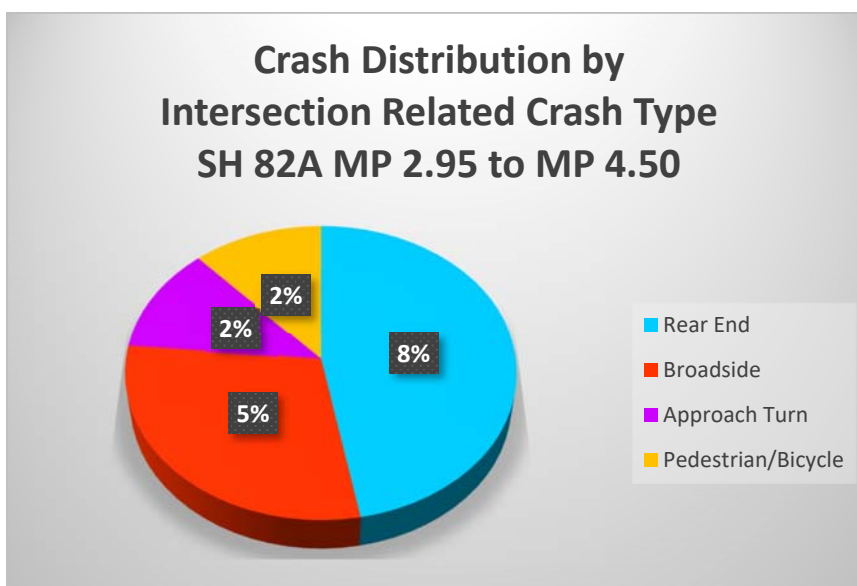


Figure 4: Crash Distribution by Intersection Related Crash Type

Adverse weather appeared not to be a factor, as only Snowy road condition collision types were higher than statewide averages for similar arterials. Figure 5 shows the graphical breakdown for the total crashes by road conditions.

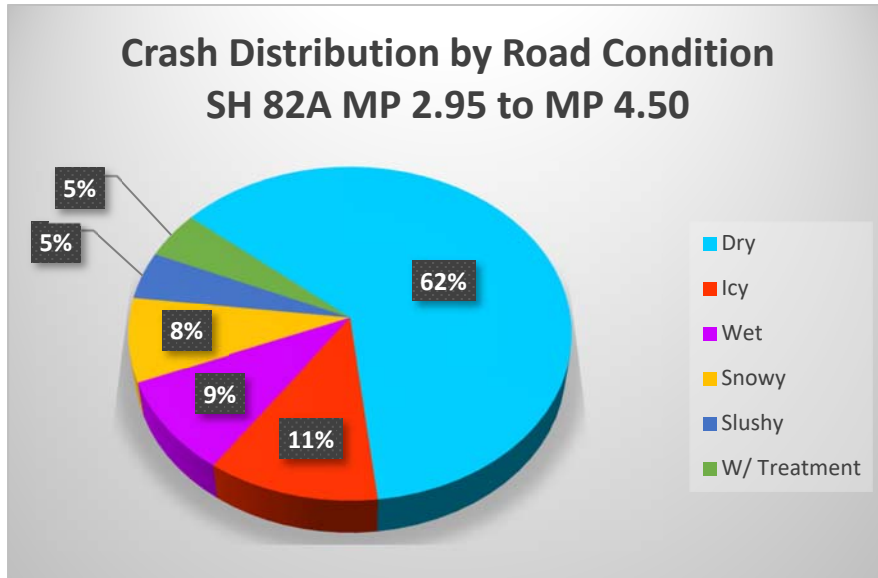


Figure 5: Crash Distribution by Road Condition

Poor lighting conditions appeared to be a factor as Dark-Unlighted and Dawn/Dusk conditions had higher crash rates than the statewide averages for similar arterials. Figure 6 shows the graphical breakdown for the total crashes by lighting conditions.

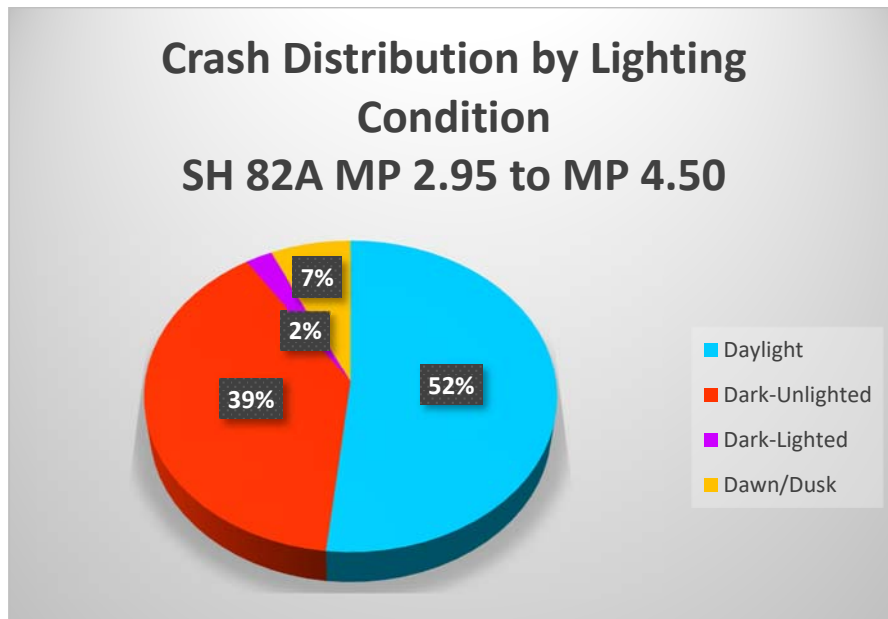


Figure 6: Crash Distribution by Lighting Condition

Safety Performance Functions

We have refined the assessment of the magnitude of safety problems on highway segments through the use of Safety Performance Functions (SPF). The SPF reflects the complex relationship between traffic exposure, measured in average daily traffic (ADT), and accident count for a unit of road section measured in accidents per mile per year. The SPF models provide an estimate of the normal or expected accident frequency and severity for a range of ADT among similar facilities. Two kinds of Safety Performance Functions were calibrated. The first one addresses the total number of accidents and the second one looks only at accidents involving an injury or fatality. It allows us to assess the magnitude of the safety problem from the frequency and severity standpoint.

All of the dataset preparation was performed using the Colorado Department of Transportation (CDOT) accident databases. Accident history for each facility was prepared using the most recent 10 years of available accident data. The ADT for each roadway segment for each of the 10 years was entered into the same dataset. Each dataset is corrected for the regression to the mean bias using the Empirical Bayes (EB) procedure.

Development of the SPF lends itself well to the conceptual formulation of the Level of Service of Safety (LOSS). The concept of level of service uses qualitative measures that characterize safety of a roadway segment in reference to its expected performance. If the level of safety predicted by the SPF will represent a normal or expected number of crashes at a specific level of ADT, selected percentiles within the frequency distribution can be stratified to represent specific levels of safety.

- LOSS I – Indicates a low potential for accident reduction (Below 20th percentile)
- LOSS II – Indicates a low to moderate potential for accident reduction (20th percentile to Mean)
- LOSS III – Indicates a moderate to high potential for accident reduction (Mean to 80th percentile)
- LOSS IV – Indicates a high potential for accident reduction (Above 80th percentile)

LOSS reflects how the roadway segment is performing in regard to its expected crash frequency and severity at a specific level of ADT. It only provides a crash frequency and severity comparison with the expected norm. It does not, however, provide any information related to the nature of the safety problem itself. If the safety problem is present, LOSS will only describe its magnitude from the frequency and severity standpoint. The nature of the problem is determined through diagnostic analysis using direct diagnostic and pattern recognition techniques.

Figure 7 displays the safety performance of SH 82 at the intersection of CO RD 154 near MP 3.55 from a total frequency standpoint. This section of the highway is classified as an LOSS III and performed near expected with a moderate potential for crash reduction in comparison to other Colorado urban 4-lane divided signalized 3-leg intersections.

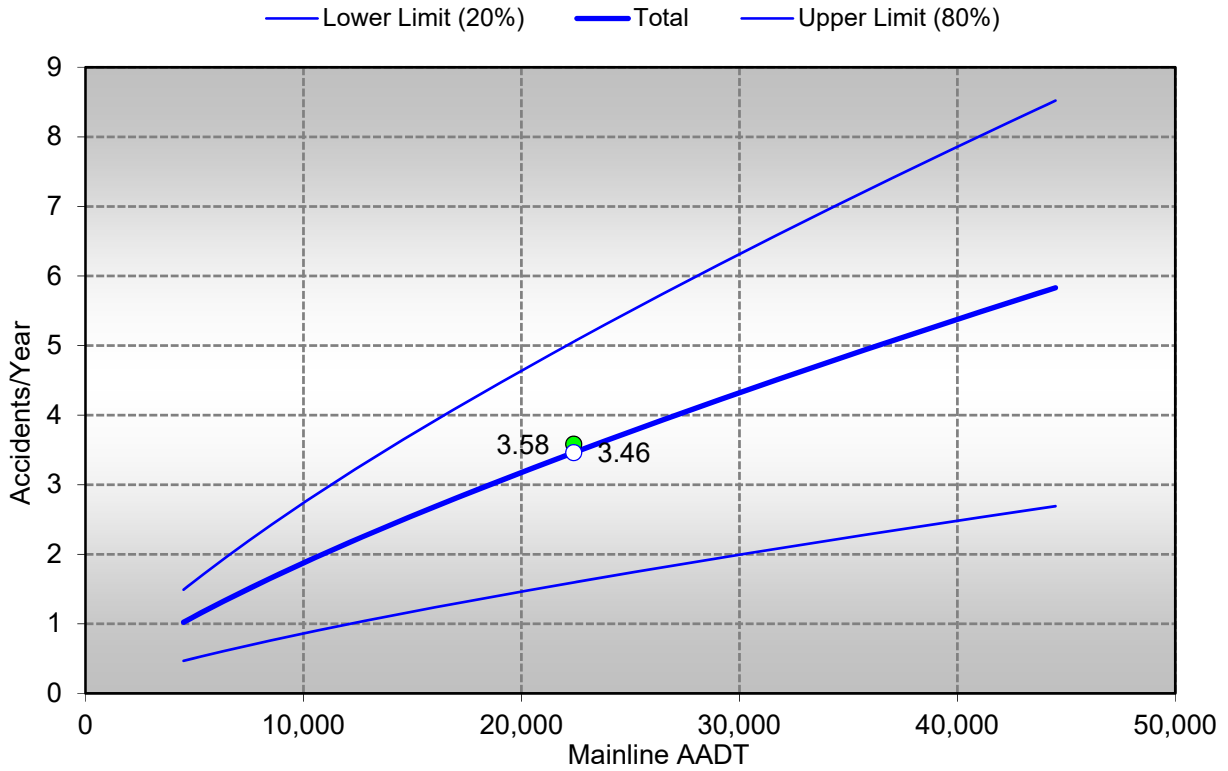


Figure 7: Overall Safety Performance Function

Figure 8 displays the safety performance of SH 82 at the intersection of CO RD 154 near MP 3.55 from a severity standpoint. This section of the highway is classified as an LOSS IV and performed far from expected with a high potential for crash reduction in comparison to other Colorado urban 4-lane divided signalized 3-leg intersections.

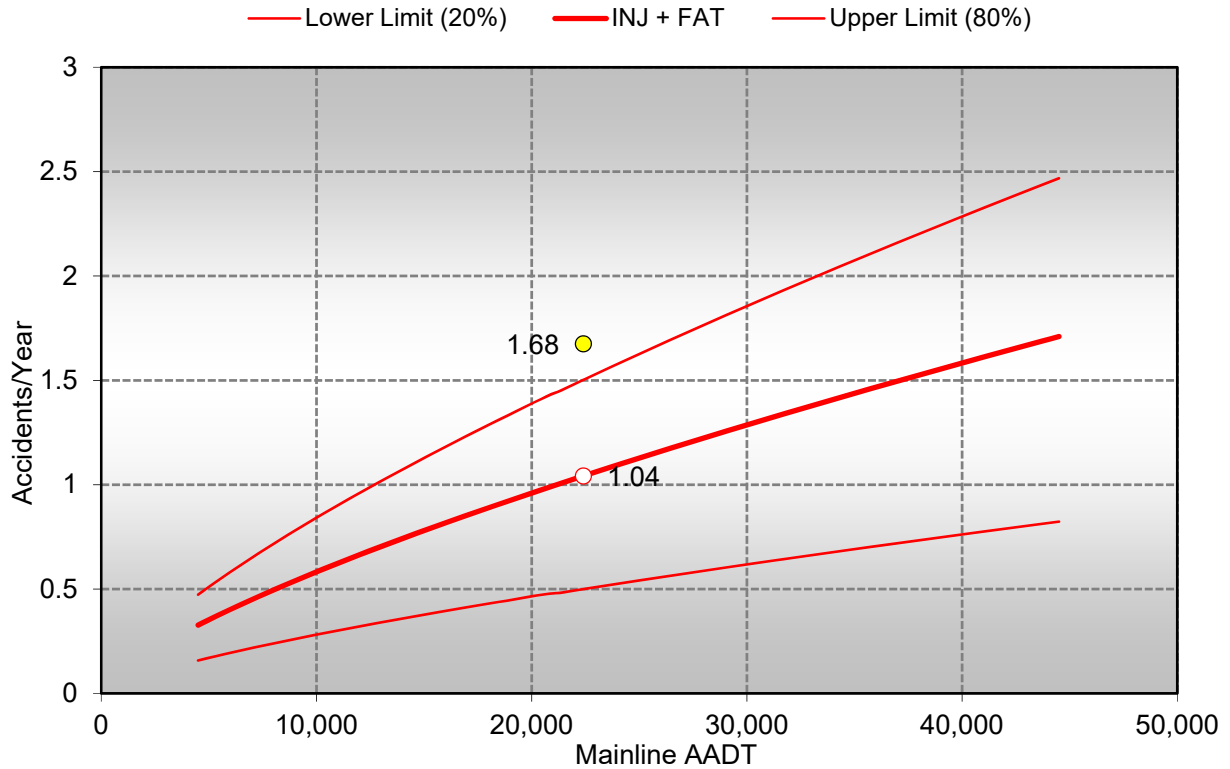


Figure 8: Severity Safety Performance Function

Wild Animal – This segment of highway contains a higher frequency of Wild Animal crashes when compared to similar Colorado highways. Figure 9 shows that the entire study section contains a Wild Animal crash pattern. Typically, with the addition of proper crossing methods and the inclusion of fencing, crash rates can achieve a reduction of 82%-87%. If the Region wished to consider this type of treatment, the Region would have to be strategic in order to avoid simply redirecting the wild animals to cross at the intersections located at MP 3.55, 3.70, and 4.31.

SAFETY ASSESSMENT ADDENDUM

August 2020

2040 Crash Projections (SH 82)

According to the Environmental Assessment Report, there is a projected 2.0% annual growth rate in the SH 82 corridor area. Table 5 shows the projected crashes per year for the “No Action” scenario as well as the “Preferred Alternative” scenario (¾ movement at CR 154 / new signalized intersection at Airport Rd) for the predicted number of total crashes while Table 6 shows the projected crashes per year for both scenarios for the predicted number of severe (injury or fatal) crashes. Data collected for these projections include crash data from January 1st, 2015 to December 31st, 2019 and have been filtered to only involve intersection or driveway related crashes.

Table 5: Predicted Total Crashes per Year

Intersection	ADT (Major/Minor) (2019)	ADT (Major/Minor) (2022)	ADT (Major/Minor) (2040)	Crashes/Yr (2015-2019)	Crashes/Yr (No Action) (2022)	Crashes/Yr (No Action) (2040)	Crashes/Yr (Preferred Alternative) (2022)	Crashes/Yr (Preferred Alternative) (2040)
CO RD 154	24,600 / 3,100	26,000 / 3,300	41,500 / 4,800	3.9	4.2	7.2	1.5	2.1
Holy Cross Electric / Red Canyon Rd	24,600 / 1,200	26,000 / 1,300	41,500 / 2,000	1.0	1.0	1.8	N/A	N/A
Lazy H Ranch	24,600 / 1,200	26,000 / 1,300	41,500 / 2,000	0.4	0.5	0.7	N/A	N/A
Airport Rd	N/A	26,000 / 4,000	41,500 / 8,000	N/A	N/A	N/A	6.3	12.6
Total				5.3	5.7	9.7	7.8	14.7

Table 6: Predicted Severe Crashes per Year

Intersection	ADT (Major/Minor) (2019)	ADT (Major/Minor) (2022)	ADT (Major/Minor) (2040)	Crashes/Yr (2015-2019)	Crashes/Yr (No Action) (2022)	Crashes/Yr (No Action) (2040)	Crashes/Yr (Preferred Alternative) (2022)	Crashes/Yr (Preferred Alternative) (2040)
CO RD 154	24,600 / 3,100	26,000 / 3,300	41,500 / 4,800	1.1	1.2	3.1	0.5	0.7
Holy Cross Electric / Red Canyon Rd	24,600 / 1,200	26,000 / 1,300	41,500 / 2,000	0.4	0.4	0.6	N/A	N/A
Lazy H Ranch	24,600 / 1,200	26,000 / 1,300	41,500 / 2,000	0.3	0.3	0.4	N/A	N/A
Airport Rd	N/A	26,000 / 4,000	41,500 / 8,000	N/A	N/A	N/A	1.8	3.4
Total				1.8	1.9	4.1	2.3	4.1

SH 82/CO RD 154

This intersection is defined as a 4-lane, 4-leg, signalized intersection. However, due to low local traffic volumes on the east leg of the intersection, this signalized intersection behaves closer to that of a 3-leg intersection and thus the analysis is based off of said model. The preferred alternative has this intersection from a full movement signalized intersection to a $\frac{3}{4}$ movement (left turns from CO RD 154 onto northbound SH82 would not be allowed). The eastbound leg (cardinal directions) would be closed and access to the highway would be diverted along the existing frontage road.

SH 82/Holy Cross Electric and Red Canyon Rd (CO RD 115)

This intersection is defined as a 4-lane, 4-leg, unsignalized intersection. The preferred alternative closes access to SH 82 from both east and west legs. Traffic from Red Canyon Rd would be diverted along the existing frontage road. While this effectively removes intersection related crashes and conflict points at this location, these crashes, in reality, are diverted to the proposed intersection at Airport Road.

SH82/Lazy H Ranch

This intersection is defined as a right-in/right-out for eastbound SH 82. Laze H Ranch access to the highway would also be closed and traffic would be diverted to the newly constructed South Bridge/Airport Road. There are no recorded crashes involving this traffic movement at this time.

SH82/Airport Road (Proposed)

The preferred alternative proposed intersection is designed as a 4-lane, 4-leg signalized intersection.

CONCLUSIONS AND RECOMMENDATIONS

These conclusions and recommendations are based on the analysis of five years of crash history (January 1st, 2011 to December 31st, 2015) and a review of the video log. The Region is advised to verify through a field survey, the observations made in this report regarding physical features, roadside characteristics, and traffic control devices.

Considering the amount of traffic exposure, the crash frequency and severity on SH 82A between MP 2.95 and MP 4.50 is performing below average, in terms of safety, when compared to other rural highways. This fact is reflected by the LOSS-III and LOSS-IV of the Overall and Severity Safety Performances during the five-year study period.

There were 82 collisions (Property-Damage Only, Injury, and Fatality) during the five-year study period on this stretch of SH 82. The most common type of collision was Fixed Object, accounting for 23% (20 crashes) of the total crashes. Intersection Related and Wild Animal collisions accounted for the second most crash types at 21% (18 crashes), each.

The study was analyzed further to identify where most of the collisions were occurring. Figure 9 shows a graphical representations of crash frequency and severity, by location, along the length of the study section.

Wild Animal Collisions

This segment of highway contains a higher frequency of Wild Animal crashes when compared to similar Colorado highways. With proper crossing methods included with fencing, reduction rates of 82%-87% can be achieved. With that being said, this section of highway contains a frontage road on one side, a trail on the other, and a few intersections throughout the study section. Therefore, if the Region wished to pursue this type of mitigation, the Region would need to be strategic in placement in order to avoid simply moving the animal crossing to an intersection location. If funding were to ever become available, the Region may wish to consider analyzing this section of state highway in order to determine if there is a possibility to control the amount of wildlife entering the limits of pavement.

Intersection Related Collisions

MP 3.55 (CO RD 154) – There were 13 crashes at this signalized intersection which related to Rear End, Approach Turn, Broadside, and Ped/Bike collisions on this stretch of SH 82, eight (8) of which resulted in injuries and one (1) which resulted in a fatality. Rear End crash types were the most common with six (6), followed by Broadside with three (3). Considering the crash frequency and the crash severity, the Region is recommended to identify this intersection as a possible candidate for intersection redesign.

MP 3.70 (CO RD 115 / Frontage Rd) – There were four (4) crashes at this unsignalized intersection which related to Overturning and Broadside collisions on this segment of SH 82, two (2) of which resulted in injuries. This intersection is in the middle of a curve and geometric design may contribute to the crashes in this study section. Enhancements and/or the addition of acceleration and deceleration lanes may benefit the reduction in crashes at this intersection. Based upon the proximity of this unsignalized intersection to the signalized intersection of CO RD 154, the Region may also wish to include this intersection in the potential redesign of CO RD 154, if at all possible.

Overtuning Collisions

This segment of highway contains spot locations where Overtuning crashes may be able to be mitigated. There were ten (10) total crashes on this stretch of SH 82A, three (3) of which resulted in injuries.

MP 3.70 – Three (3) Overtuning crashes occurred near the intersection of CO RD 115. One (1) crash was caused by a vehicle turning onto Eastbound SH 82 from CO RD 115. Another crash was caused by a vehicle turning right from Westbound SH 82 to CO RD 115, and the remaining incident was caused by a vehicle swerving to avoid contact with a Wild Animal. With only two (2) collisions at this location which could potentially be mitigated, there is not strong evidence of a pattern and therefore there are no recommendations at this time. If the Region wished to pursue a potential reduction in collisions near this milepoint, there may be some benefit to adding or extending the acceleration/deceleration lanes. This recommendation is made in conjunction with the recommendation listed for MP 3.70 (CO RD 115 / Frontage Rd) on page 9.

MP 3.90 – Three (3) Overtuning crashes occurred near this milepoint range, one (1) of which resulted in an injury. No commonalities were found between the three (3) Overtuning collisions and therefore a pattern is not identified. No recommendations are made at this time.

2022 and 2040 Crash Projections (SH 82)

Tables 7 and 8 show the projected crashes per year (total and severe, respectively) for all alternatives. Data collected for these projections include crash data from January 1st, 2015 to December 31st, 2019 and have been filtered to only involve intersection or driveway related crashes.

Table 7: Predicted Total Crashes per Year

Intersection	ADT (Major/Minor) (2019)	ADT (Major/Minor) (2022)	ADT (Major/Minor) (2040)	Crashes/Yr (2015- 2019)	Crashes/Yr (No Action) (2022)	Crashes/Yr (No Action) (2040)	Crashes/Yr (Preferred Alternative) (2022)	Crashes/Yr (Preferred Alternative) (2040)
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Lazy H Ranch	24,600 / 1,200	26,000 / 1,300	41,500 / 2,000	0.4	0.5	0.7	N/A	N/A
Airport Rd	N/A	26,000 / 4,000	41,500 / 8,000	N/A	N/A	N/A	6.3	12.6
Total				5.3	5.7	9.7	7.8	14.7

Table 8: Predicted Severe Crashes per Year

Intersection	ADT (Major/Minor) (2019)	ADT (Major/Minor) (2022)	ADT (Major/Minor) (2040)	Crashes/Yr (2015- 2019)	Crashes/Yr (No Action) (2022)	Crashes/Yr (No Action) (2040)	Crashes/Yr (Preferred Alternative) (2022)	Crashes/Yr (Preferred Alternative) (2040)
CO RD 154	24,600 / 3,100	26,000 / 3,300	41,500 / 4,800	1.1	1.2	3.1	0.5	0.7
Holy Cross Electric / Red Canyon Rd	24,600 / 1,200	26,000 / 1,300	41,500 / 2,000	0.4	0.4	0.6	N/A	N/A
Lazy H Ranch	24,600 / 1,200	26,000 / 1,300	41,500 / 2,000	0.3	0.3	0.4	N/A	N/A
Airport Rd	N/A	26,000 / 4,000	41,500 / 8,000	N/A	N/A	N/A	1.8	3.4
Total				1.8	1.9	4.1	2.3	4.1

APPENDIX

Detailed Summary of Crash History

Overall Summary of Crash History

Individual Years

- January 1, 2011 to December 31, 2011
- January 1, 2012 to December 31, 2012
- January 1, 2013 to December 31, 2013
- January 1, 2014 to December 31, 2014
- January 1, 2015 to December 31, 2015

Strip Maps

Highway CORIS (Colorado Roadway Inventory System)

Crash Listing for January 1, 2011 to December 31, 2015



Colorado Department of Transportation
DiExSys™ Roadway Safety Systems
Detailed Summary of Crashes Report

07/11/2017

Job #: 20170711114320

Location: 82A Begin: 2.95 End: 4.50 From:01/01/2011 To:12/31/2015

Severity

PDO:	66	
INJ:	20	31 :Injured
FAT:	1	1 :Killed
Total:	87	

Number of Vehicles

One Vehicle:	52
Two Vehicles:	29
Three or More:	6
Unknown:	0
Total:	87

Location

On Road:	57
Off Road Left:	11
Off Road Right:	18
Off Road at Tee:	0
Off in Median:	1
Unknown:	0
Total:	87

Lighting Conditions

Daylight:	45
Dawn or Dusk:	6
Dark - Lighted:	2
Dark - Unlighted:	34
Unknown:	0
Total:	87

Weather Conditions

None:	67
Rain:	6
Snow/Sleet/Hail:	14
Fog:	0
Dust:	0
Wind:	0
Unknown:	0
Total:	87

Crash Rates

PDO:	1.05 *	* MVMT
INJ:	0.32 *	** 100 MVMT
FAT:	1.59 **	
Total:	1.38 *	

Crash Type

Overtuning:	10	Bridge Abutment:	0
Other Non Collision:	2	Column/Pier:	0
Pedestrians:	1	Culvert/Headwall:	0
Broadside:	5	Embankment:	9
Head On:	2	Curb:	0
Rear End:	11	Delineator Post:	1
Sideswipe (Same):	4	Fence:	0
Sideswipe (Opposite):	2	Tree:	1
Approach Turn:	2	Large Boulders or Rocks:	0
Overtaking Turn:	0	Barricade:	0
Parked Motor Vehicle:	2	Wall/Building:	0
Railway Vehicle:	0	Crash Cushion:	0
Bicycle:	1	Mailbox:	0
Motorized Bicycle:	0	Other Fixed Object:	0
Domestic Animal:	1	Total Fixed Objects:	20
Wild Animal:	18	Rocks in Roadway:	0
Light/Utility Pole:	0	Vehicle Cargo/Debris:	3
Traffic Signal Pole:	0	Road Maintenance Equipment:	0
Sign:	2	Involving Other Object:	3
Bridge Rail:	0	Total Other Objects:	6
Guard Rail:	4	Unknown:	0
Cable Rail:	0	Total:	87
Concrete Barrier:	3		

Mainline/Ramps/Frontage Roads

Mainline:	85	Frontage/Ramp Intersections
Crossroad (A):	0	M: 0 N: 0 O: 0 P: 0
Ramps		
B: 0 F: 0 J: 0		Left Frontage Rd (L): 2
C: 0 G: 0 K: 0		Rt Frontage Rd (R): 0
D: 0 H: 0 T: 0		HOV Lanes (V): 0
E: 0 I: 0		Unknown: 0
		Total: 87

Road Description

At Intersection:	14
At Driveway Access:	4
Intersection Related:	9
Non Intersection:	60
In Alley:	0
Roundabout:	0
Ramp:	0
Parking Lot:	0
Unknown:	0
Total:	87

Road Conditions

Dry:	54
Wet:	8
Muddy:	0
Snowy:	7
Icy:	10
Slushy:	4
Foreign Material:	0
With Road Treatment:	0
Dry w/Icy Road Treatment:	1
Wet w/Icy Road Treatment:	0
Snowy w/Icy Road Treatment:	0
Icy w/Icy Road Treatment:	3
Slushy w/Icy Road Treatment:	0
Unknown:	0
Total:	87

ADT: 22,400 Length: 1.54



Colorado Department of Transportation
DiExSys™ Roadway Safety Systems
Detailed Summary of Crashes Report

07/11/2017

Job #: 20170711114320

Location: 82A **Begin: 2.95** **End: 4.50** **From:01/01/2011** **To:12/31/2015**

Vehicle Type	Veh 1	Veh 2	Veh 3
Passenger Car/Van:	42	9	2
Passenger Car/Van w/Trl:	0	0	0
Pickup Truck/Utility Van:	15	10	1
Pickup Truck/Utility Van w/Trl:	3	1	0
SUV:	20	13	3
SUV w/Trl:	0	0	0
Truck 10k lbs or Less:	0	0	0
Trucks > 10k lbs/Bus > 15 People:	4	0	0
School Bus < 15 People:	0	0	0
Non School Bus < 15 People:	1	0	0
Motorhome:	0	0	0
Motorcycle:	1	0	0
Bicycle:	0	1	0
Motorized Bicycle:	0	0	0
Farm Equipment:	1	0	0
Hit and Run - Unknown:	0	0	0
Other:	0	1	0
Unknown:	0	0	0
Total:	87	35	6

Vehicle Movement	Veh 1	Veh 2	Veh 3
Going Straight:	44	14	3
Slowing:	3	2	1
Stopped in Traffic:	0	6	2
Making Right Turn:	5	1	0
Making Left Turn:	4	5	0
Making U-Turn:	0	0	0
Passing:	0	0	0
Backing:	0	0	0
Enter/Leave Parked Position:	1	0	0
Starting in Traffic:	0	0	0
Parked:	0	2	0
Changing Lanes:	2	0	0
Avoiding Object/Veh in Road:	3	3	0
Weaving:	1	0	0
Wrong Way:	1	0	0
Other:	23	2	0
Unknown:	0	0	0
Total:	87	35	6

Contributing Factor	Veh 1	Veh 2	Veh 3
No Apparent Contributing Factor:	49	34	6
Asleep at the Wheel:	1	0	0
Illness:	1	0	0
Distracted by Passenger:	0	0	0
Driver Inexperience:	6	0	0
Driver Fatigue:	1	0	0
Driver Preoccupied:	5	0	0
Driver Unfamiliar with Area:	3	0	0
Driver Emotionally Upset:	0	0	0
Evading Law Enforcement Officer:	0	0	0
Physical Disability:	0	0	0
Unknown:	21	1	0
Total:	87	35	6

Direction	Veh 1	Veh 2	Veh 3
North:	4	2	0
Northeast:	1	0	0
East:	37	13	2
Southeast:	1	0	0
South:	2	4	1
Southwest:	1	0	0
West:	41	15	3
Northwest:	0	1	0
Unknown:	0	0	0
Total:	87	35	6

Condition of Driver	Veh 1	Veh 2	Veh 3
No Impairment Suspected:	82	34	6
Alcohol Involved:	5	0	0
RX, Medication, or Drugs Involved:	0	1	0
Illegal Drugs Involved:	0	0	0
Alcohol and Drugs Involved:	0	0	0
Driver/Pedestrian not Observed:	0	0	0
Unknown:	0	0	0
Total:	87	35	6

ADT: 22,400 Length: 1.54



Colorado Department of Transportation
DiExSys™ Roadway Safety Systems
General Summary of Crashes Report

07/11/2017

Job #: 20170711114320

Location: 82A Begin: 2.95 End: 4.50 From:01/01/2011 To:12/31/2015

Severity	
PDO:	66
INJ:	20 31 :Injured
FAT:	1 1 :Killed
Total:	87

Number of Vehicles	
One Vehicle:	52
Two Vehicles:	29
Three or More:	6
Unknown:	0
Total:	87

Location	
On Road:	57
Off Road:	30
Unknown:	0
Total:	87

Mainline/Ramps/Frontage Rds	
Mainline:	85
Ramps:	0
Frontage/Ramp Intsx:	0
Frontage Roads:	2
HOV Lanes:	0
Unknown:	0
Total:	87

Lighting Conditions	
Daylight:	45
Dawn or Dusk:	6
Dark - Lighted:	2
Dark - Unlighted:	34
Unknown:	0
Total:	87

Crash Rates	
PDO:	1.05* * Per MVMT
INJ:	0.32* ** Per 100 MVMT
FAT:	1.59**
Total:	1.38*

Crash Type	
Overtuning:	10
Other Non Collision:	2
Pedestrians:	1
Broadside:	5
Head On:	2
Rear End:	11
Sideswipe Same:	4
Sideswipe Opposite:	2
Approach Turn:	2
Overtaking Turn:	0
Parked Motor Vehicle:	2
Railway Vehicle:	0
Bicycles:	1
Domestic Animal:	1
Wild Animal:	18
Fixed Objects:	20
Other Objects:	6
Unknown:	0
Total:	87

Weather Conditions	
None:	67
Rain:	6
Snow/Sleet/Hail:	14
Fog:	0
Dust:	0
Wind:	0
Unknown:	0
Total:	87

Road Conditions	
Dry:	54
Wet:	8
Muddy:	0
Snowy:	7
Icy:	10
Slushy:	4
Foreign Material:	0
With Road Treatment:	4
Unknown:	0
Total:	87

Vehicle Types	Vehicle 1	Vehicle 2	Vehicle 3
Passenger Car/Van:	42	9	2
Passenger Car/Van w/Trailer:	0	0	0
Pickup Truck/Utility Van:	15	10	1
Pickup Truck/Utility Van w/Trailer:	3	1	0
SUV:	20	13	3
SUV w/Trailer:	0	0	0
Truck 10k lbs or Less:	0	0	0
Trucks > 10k lbs/Busses > 15 People:	4	0	0
School Bus < 15 People:	0	0	0
Non School Bus < 15 People:	1	0	0
Motorhome:	0	0	0
Motorcycle:	1	0	0
Bicycle:	0	1	0
Motorized Bicycle:	0	0	0
Farm Equipment:	1	0	0
Hit and Run - Unknown:	0	0	0
Other:	0	1	0
Unknown:	0	0	0
Total:	87	35	6

ADT: 22,400 Length: 1.54



Colorado Department of Transportation
DiExSys™ Roadway Safety Systems
General Summary of Crashes Report

07/11/2017

Job #: 20170711114434

Location: 82A **Begin: 2.95** **End: 4.50** **From:01/01/2011** **To:12/31/2011**

Severity	
PDO:	13
INJ:	4 9 :Injured
FAT:	1 1 :Killed
Total:	18

Number of Vehicles	
One Vehicle:	11
Two Vehicles:	5
Three or More:	2
Unknown:	0
Total:	18

Location	
On Road:	13
Off Road:	5
Unknown:	0
Total:	18

Mainline/Ramps/Frontage Rds	
Mainline:	18
Ramps:	0
Frontage/Ramp Intsx:	0
Frontage Roads:	0
HOV Lanes:	0
Unknown:	0
Total:	18

Lighting Conditions	
Daylight:	8
Dawn or Dusk:	2
Dark - Lighted:	0
Dark - Unlighted:	8
Unknown:	0
Total:	18

Crash Rates	
PDO:	1.10* * Per MVMT
INJ:	0.34* ** Per 100 MVMT
FAT:	8.46**
Total:	1.52*

Crash Type	
Overtuning:	3
Other Non Collision:	0
Pedestrians:	0
Broadside:	2
Head On:	1
Rear End:	0
Sideswipe Same:	1
Sideswipe Opposite:	1
Approach Turn:	0
Overtaking Turn:	0
Parked Motor Vehicle:	0
Railway Vehicle:	0
Bicycles:	0
Domestic Animal:	1
Wild Animal:	2
Fixed Objects:	4
Other Objects:	3
Unknown:	0
Total:	18

Weather Conditions	
None:	15
Rain:	2
Snow/Sleet/Hail:	1
Fog:	0
Dust:	0
Wind:	0
Unknown:	0
Total:	18

Road Conditions	
Dry:	13
Wet:	2
Muddy:	0
Snowy:	1
Icy:	1
Slushy:	0
Foreign Material:	0
With Road Treatment:	1
Unknown:	0
Total:	18

Vehicle Types	Vehicle 1	Vehicle 2	Vehicle 3
Passenger Car/Van:	9	1	0
Passenger Car/Van w/Trailer:	0	0	0
Pickup Truck/Utility Van:	3	2	1
Pickup Truck/Utility Van w/Trailer:	1	0	0
SUV:	3	4	1
SUV w/Trailer:	0	0	0
Truck 10k lbs or Less:	0	0	0
Trucks > 10k lbs/Busses > 15 People:	1	0	0
School Bus < 15 People:	0	0	0
Non School Bus < 15 People:	0	0	0
Motorhome:	0	0	0
Motorcycle:	1	0	0
Bicycle:	0	0	0
Motorized Bicycle:	0	0	0
Farm Equipment:	0	0	0
Hit and Run - Unknown:	0	0	0
Other:	0	0	0
Unknown:	0	0	0
Total:	18	7	2

ADT: 21,000 Length: 1.54



Colorado Department of Transportation
DiExSys™ Roadway Safety Systems
General Summary of Crashes Report

07/11/2017

Job #: 20170711114453

Location: 82A Begin: 2.95 End: 4.50 From:01/01/2012 To:12/31/2012

Severity	
PDO:	16
INJ:	3 3 :Injured
FAT:	0 0 :Killed
Total:	19

Crash Type	
Overtuning:	2
Other Non Collision:	0
Pedestrians:	0
Broadside:	2
Head On:	1
Rear End:	2
Sideswipe Same:	2
Sideswipe Opposite:	0
Approach Turn:	0
Overtaking Turn:	0
Parked Motor Vehicle:	1
Railway Vehicle:	0
Bicycles:	0
Domestic Animal:	0
Wild Animal:	7
Fixed Objects:	2
Other Objects:	0
Unknown:	0
Total:	19

Weather Conditions	
None:	15
Rain:	1
Snow/Sleet/Hail:	3
Fog:	0
Dust:	0
Wind:	0
Unknown:	0
Total:	19

Number of Vehicles	
One Vehicle:	11
Two Vehicles:	6
Three or More:	2
Unknown:	0
Total:	19

Road Conditions	
Dry:	11
Wet:	2
Muddy:	0
Snowy:	1
Icy:	4
Slushy:	1
Foreign Material:	0
With Road Treatment:	0
Unknown:	0
Total:	19

Location	
On Road:	14
Off Road:	5
Unknown:	0
Total:	19

Mainline/Ramps/Frontage Rds	
Mainline:	17
Ramps:	0
Frontage/Ramp Intsx:	0
Frontage Roads:	2
HOV Lanes:	0
Unknown:	0
Total:	19

Vehicle Types	Vehicle 1	Vehicle 2	Vehicle 3
Passenger Car/Van:	13	3	1
Passenger Car/Van w/Trailer:	0	0	0
Pickup Truck/Utility Van:	2	2	0
Pickup Truck/Utility Van w/Trailer:	0	0	0
SUV:	3	3	1
SUV w/Trailer:	0	0	0
Truck 10k lbs or Less:	0	0	0
Trucks > 10k lbs/Busses > 15 People:	0	0	0
School Bus < 15 People:	0	0	0
Non School Bus < 15 People:	1	0	0
Motorhome:	0	0	0
Motorcycle:	0	0	0
Bicycle:	0	0	0
Motorized Bicycle:	0	0	0
Farm Equipment:	0	0	0
Hit and Run - Unknown:	0	0	0
Other:	0	0	0
Unknown:	0	0	0
Total:	19	8	2

Lighting Conditions	
Daylight:	10
Dawn or Dusk:	0
Dark - Lighted:	1
Dark - Unlighted:	8
Unknown:	0
Total:	19

Crash Rates	
PDO:	1.35* * Per MVMT
INJ:	0.25* ** Per 100 MVMT
FAT:	0.00**
Total:	1.60*

ADT: 21,000 Length: 1.54



Colorado Department of Transportation
DiExSys™ Roadway Safety Systems
General Summary of Crashes Report

07/11/2017

Job #: 20170711114511

Location: 82A Begin: 2.95 End: 4.50 From:01/01/2013 To:12/31/2013

Severity	
PDO:	16
INJ:	5 6 :Injured
FAT:	0 0 :Killed
Total:	21

Number of Vehicles	
One Vehicle:	12
Two Vehicles:	8
Three or More:	1
Unknown:	0
Total:	21

Location	
On Road:	14
Off Road:	7
Unknown:	0
Total:	21

Mainline/Ramps/Frontage Rds	
Mainline:	21
Ramps:	0
Frontage/Ramp Intsx:	0
Frontage Roads:	0
HOV Lanes:	0
Unknown:	0
Total:	21

Lighting Conditions	
Daylight:	12
Dawn or Dusk:	3
Dark - Lighted:	0
Dark - Unlighted:	6
Unknown:	0
Total:	21

Crash Rates	
PDO:	1.29* * Per MVMT
INJ:	0.40* ** Per 100 MVMT
FAT:	0.00**
Total:	1.69*

Crash Type	
Overtuning:	1
Other Non Collision:	1
Pedestrians:	0
Broadside:	1
Head On:	0
Rear End:	4
Sideswipe Same:	0
Sideswipe Opposite:	1
Approach Turn:	0
Overtaking Turn:	0
Parked Motor Vehicle:	1
Railway Vehicle:	0
Bicycles:	1
Domestic Animal:	0
Wild Animal:	4
Fixed Objects:	5
Other Objects:	2
Unknown:	0
Total:	21

Weather Conditions	
None:	16
Rain:	2
Snow/Sleet/Hail:	3
Fog:	0
Dust:	0
Wind:	0
Unknown:	0
Total:	21

Road Conditions	
Dry:	13
Wet:	2
Muddy:	0
Snowy:	0
Icy:	2
Slushy:	1
Foreign Material:	0
With Road Treatment:	3
Unknown:	0
Total:	21

Vehicle Types	Vehicle 1	Vehicle 2	Vehicle 3
Passenger Car/Van:	8	3	1
Passenger Car/Van w/Trailer:	0	0	0
Pickup Truck/Utility Van:	2	3	0
Pickup Truck/Utility Van w/Trailer:	0	0	0
SUV:	8	2	0
SUV w/Trailer:	0	0	0
Truck 10k lbs or Less:	0	0	0
Trucks > 10k lbs/Busses > 15 People:	2	0	0
School Bus < 15 People:	0	0	0
Non School Bus < 15 People:	0	0	0
Motorhome:	0	0	0
Motorcycle:	0	0	0
Bicycle:	0	1	0
Motorized Bicycle:	0	0	0
Farm Equipment:	1	0	0
Hit and Run - Unknown:	0	0	0
Other:	0	0	0
Unknown:	0	0	0
Total:	21	9	1

ADT: 22,000 Length: 1.54



Colorado Department of Transportation
DiExSys™ Roadway Safety Systems
General Summary of Crashes Report

07/11/2017

Job #: 20170711114552

Location: 82A Begin: 2.95 End: 4.50 From:01/01/2014 To:12/31/2014

Severity	
PDO:	10
INJ:	3 4 :Injured
FAT:	0 0 :Killed
Total:	13

Number of Vehicles	
One Vehicle:	8
Two Vehicles:	5
Three or More:	0
Unknown:	0
Total:	13

Location	
On Road:	6
Off Road:	7
Unknown:	0
Total:	13

Mainline/Ramps/Frontage Rds	
Mainline:	13
Ramps:	0
Frontage/Ramp Intsx:	0
Frontage Roads:	0
HOV Lanes:	0
Unknown:	0
Total:	13

Lighting Conditions	
Daylight:	6
Dawn or Dusk:	1
Dark - Lighted:	1
Dark - Unlighted:	5
Unknown:	0
Total:	13

Crash Rates	
PDO:	0.77* * Per MVMT
INJ:	0.23* ** Per 100 MVMT
FAT:	0.00**
Total:	1.00*

Crash Type	
Overtuning:	2
Other Non Collision:	0
Pedestrians:	0
Broadside:	0
Head On:	0
Rear End:	2
Sideswipe Same:	0
Sideswipe Opposite:	0
Approach Turn:	1
Overtaking Turn:	0
Parked Motor Vehicle:	0
Railway Vehicle:	0
Bicycles:	0
Domestic Animal:	0
Wild Animal:	2
Fixed Objects:	5
Other Objects:	1
Unknown:	0
Total:	13

Weather Conditions	
None:	9
Rain:	0
Snow/Sleet/Hail:	4
Fog:	0
Dust:	0
Wind:	0
Unknown:	0
Total:	13

Road Conditions	
Dry:	6
Wet:	0
Muddy:	0
Snowy:	5
Icy:	1
Slushy:	1
Foreign Material:	0
With Road Treatment:	0
Unknown:	0
Total:	13

Vehicle Types	Vehicle 1	Vehicle 2	Vehicle 3
Passenger Car/Van:	7	1	0
Passenger Car/Van w/Trailer:	0	0	0
Pickup Truck/Utility Van:	2	1	0
Pickup Truck/Utility Van w/Trailer:	2	0	0
SUV:	2	3	0
SUV w/Trailer:	0	0	0
Truck 10k lbs or Less:	0	0	0
Trucks > 10k lbs/Busses > 15 People:	0	0	0
School Bus < 15 People:	0	0	0
Non School Bus < 15 People:	0	0	0
Motorhome:	0	0	0
Motorcycle:	0	0	0
Bicycle:	0	0	0
Motorized Bicycle:	0	0	0
Farm Equipment:	0	0	0
Hit and Run - Unknown:	0	0	0
Other:	0	0	0
Unknown:	0	0	0
Total:	13	5	0

ADT: 23,000 Length: 1.54



Colorado Department of Transportation
DiExSys™ Roadway Safety Systems
General Summary of Crashes Report

07/11/2017

Job #: 20170711114612

Location: 82A Begin: 2.95 End: 4.50 From:01/01/2015 To:12/31/2015

Severity	
PDO:	11
INJ:	5 9 :Injured
FAT:	0 0 :Killed
Total:	16

Number of Vehicles	
One Vehicle:	10
Two Vehicles:	5
Three or More:	1
Unknown:	0
Total:	16

Location	
On Road:	10
Off Road:	6
Unknown:	0
Total:	16

Mainline/Ramps/Frontage Rds	
Mainline:	16
Ramps:	0
Frontage/Ramp Intsx:	0
Frontage Roads:	0
HOV Lanes:	0
Unknown:	0
Total:	16

Lighting Conditions	
Daylight:	9
Dawn or Dusk:	0
Dark - Lighted:	0
Dark - Unlighted:	7
Unknown:	0
Total:	16

Crash Rates	
PDO:	0.78* * Per MVMT
INJ:	0.36* ** Per 100 MVMT
FAT:	0.00**
Total:	1.14*

Crash Type	
Overtuning:	2
Other Non Collision:	1
Pedestrians:	1
Broadside:	0
Head On:	0
Rear End:	3
Sideswipe Same:	1
Sideswipe Opposite:	0
Approach Turn:	1
Overtaking Turn:	0
Parked Motor Vehicle:	0
Railway Vehicle:	0
Bicycles:	0
Domestic Animal:	0
Wild Animal:	3
Fixed Objects:	4
Other Objects:	0
Unknown:	0
Total:	16

Weather Conditions	
None:	12
Rain:	1
Snow/Sleet/Hail:	3
Fog:	0
Dust:	0
Wind:	0
Unknown:	0
Total:	16

Road Conditions	
Dry:	11
Wet:	2
Muddy:	0
Snowy:	0
Icy:	2
Slushy:	1
Foreign Material:	0
With Road Treatment:	0
Unknown:	0
Total:	16

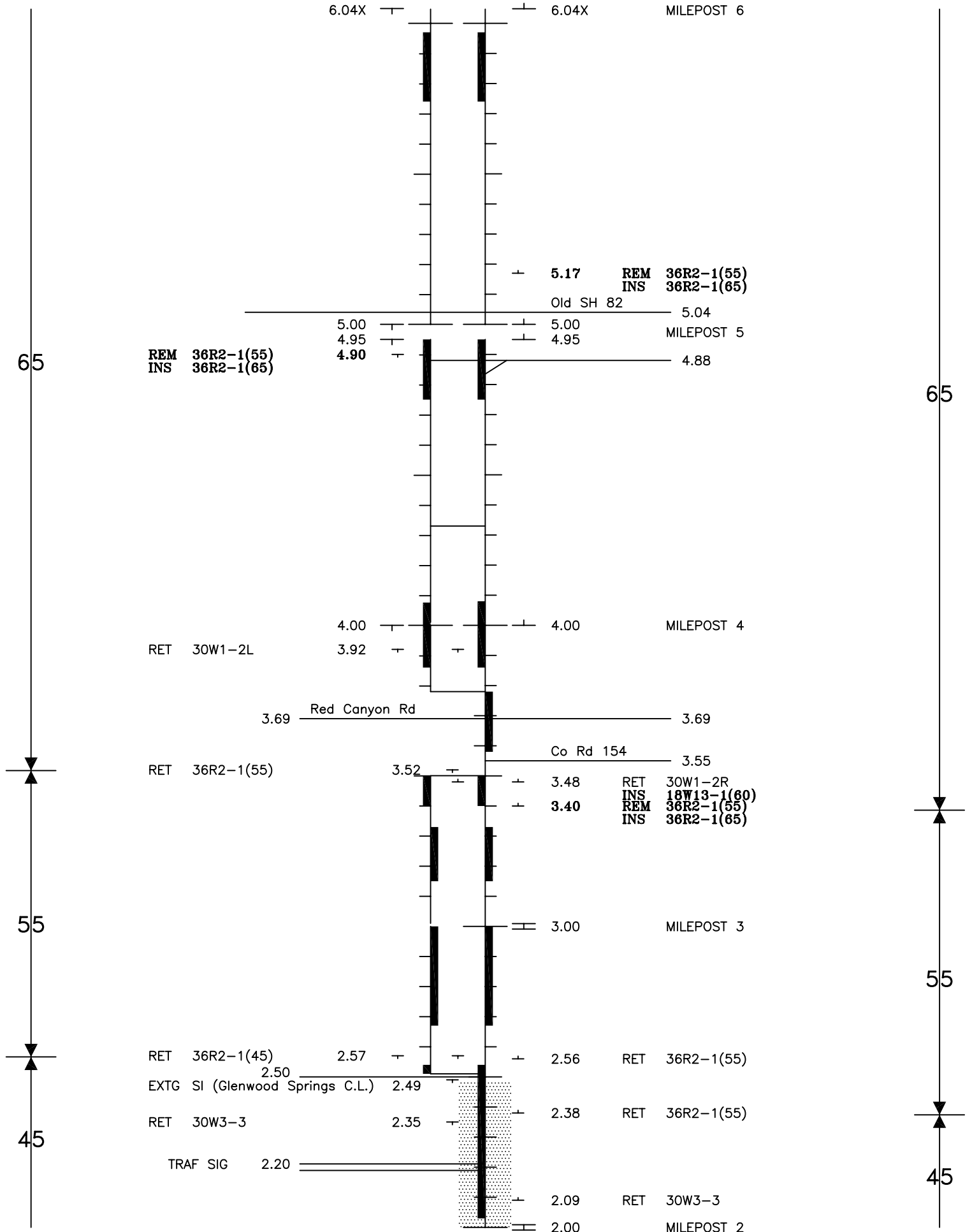
Vehicle Types	Vehicle 1	Vehicle 2	Vehicle 3
Passenger Car/Van:	5	1	0
Passenger Car/Van w/Trailer:	0	0	0
Pickup Truck/Utility Van:	6	2	0
Pickup Truck/Utility Van w/Trailer:	0	1	0
SUV:	4	1	1
SUV w/Trailer:	0	0	0
Truck 10k lbs or Less:	0	0	0
Trucks > 10k lbs/Busses > 15 People:	1	0	0
School Bus < 15 People:	0	0	0
Non School Bus < 15 People:	0	0	0
Motorhome:	0	0	0
Motorcycle:	0	0	0
Bicycle:	0	0	0
Motorized Bicycle:	0	0	0
Farm Equipment:	0	0	0
Hit and Run - Unknown:	0	0	0
Other:	0	1	0
Unknown:	0	0	0
Total:	16	6	1

ADT: 25,000 Length: 1.54

AUTHORIZED SPEED LIMITS AND RECOMMENDED TRAFFIC CONTROL DEVICES

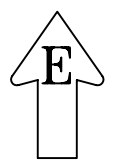
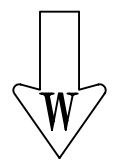


AUTHORIZED
SPEED
LIMITS



AUTHORIZED
SPEED
LIMITS

Traffic Engineer



Date: _____

SIGNLOG ON 08-28-96

	FILE	MEMO	SHEET	Implemented with changes as marked
	880.082.01	5937	2	Date: _____ By: _____

SH 82 FROM SH 70 IN GLENWOOD SPRINGS TO E/O ASPEN

SUPERSEDES SHEET 2, MEMO 5031, 04-20-90

Colorado Roadway Inventory System

Highway	Milepoint	Length	Description	County
82A	3.00	0.57	MILEPOST 3	GARFIELD
82A	3.55	0.42	RD W (CO RD 154)	GARFIELD
82A	4.00	0.31	MILEPOST 4	GARFIELD
82A	4.31	0.69	RD NE (ACCESS TO FRONTAGE RD) - RD SW (DRIVEWAY)	GARFIELD

Crashes on SH82A from MP 2.95 to 4.50 for the Period of January 1, 2011 to December 31, 2015

Table with 14 columns: MP, Date, Severity, Location, Accident Type, Road Contour, Road Description, Direction, Road Condition, Weather, Speed, Road Lighting, Vehicle Type, Human Factor, Vehicle Movement. Contains 500 rows of crash data.