SAFETY ANALYSIS REPORT

Project Development and Environment (PD&E) Study
SR A1A Over Sebastian Inlet – Bridge 880005
Bridge Replacement
Indian River County and Brevard County, Florida

Financial Project ID: 445618-1-22-02
Federal Aid Number: D420 075B
ETDM Number: 14433

PREPARED FOR

Florida Department of Transportation
District Four
3400 West Commercial Boulevard
Fort Lauderdale, Florida 33309

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by the Federal Highway Administration and FDOT.

November 2022

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1.0 SAFETY ANALYSIS

Safety analysis was performed along SR A1A over the Sebastian Inlet roadway segment within the study area using the latest available 5 years of crash data to identify crash patterns, contributing causes, countermeasures, and provide recommendations for further studies, if needed. The following sections summarize the safety analysis performed.

1.1 CRASH DATA

Crash data from 2016 to 2020 for SR A1A between the southern and northern access points to Sebastian Inlet State Park was obtained from the FDOT State Safety Office GIS (SSOGis) Query Tool on the Traffic Safety Web Portal. The data includes environmental and driver characteristics that were existent at the time of each crash and provides the basis for the crash data analysis (See **Appendix A**).

1.2 CRASH SUMMARY

Based on the crash analysis, a total of six crashes occurred on the SR A1A mainline within the study area from 2016 to 2020. Four crashes occurred in 2016, and one crash each in 2018 and 2020. Off-road crashes were the predominant crash type with overturn/rollover crashes accounting for 3 (50%) of the total crashes. Others included, one bicycle crash, one crash with utility pole, and one fire/explosion crash. 5 of the 6 of the crashes occurred under daylight and dry weather conditions.

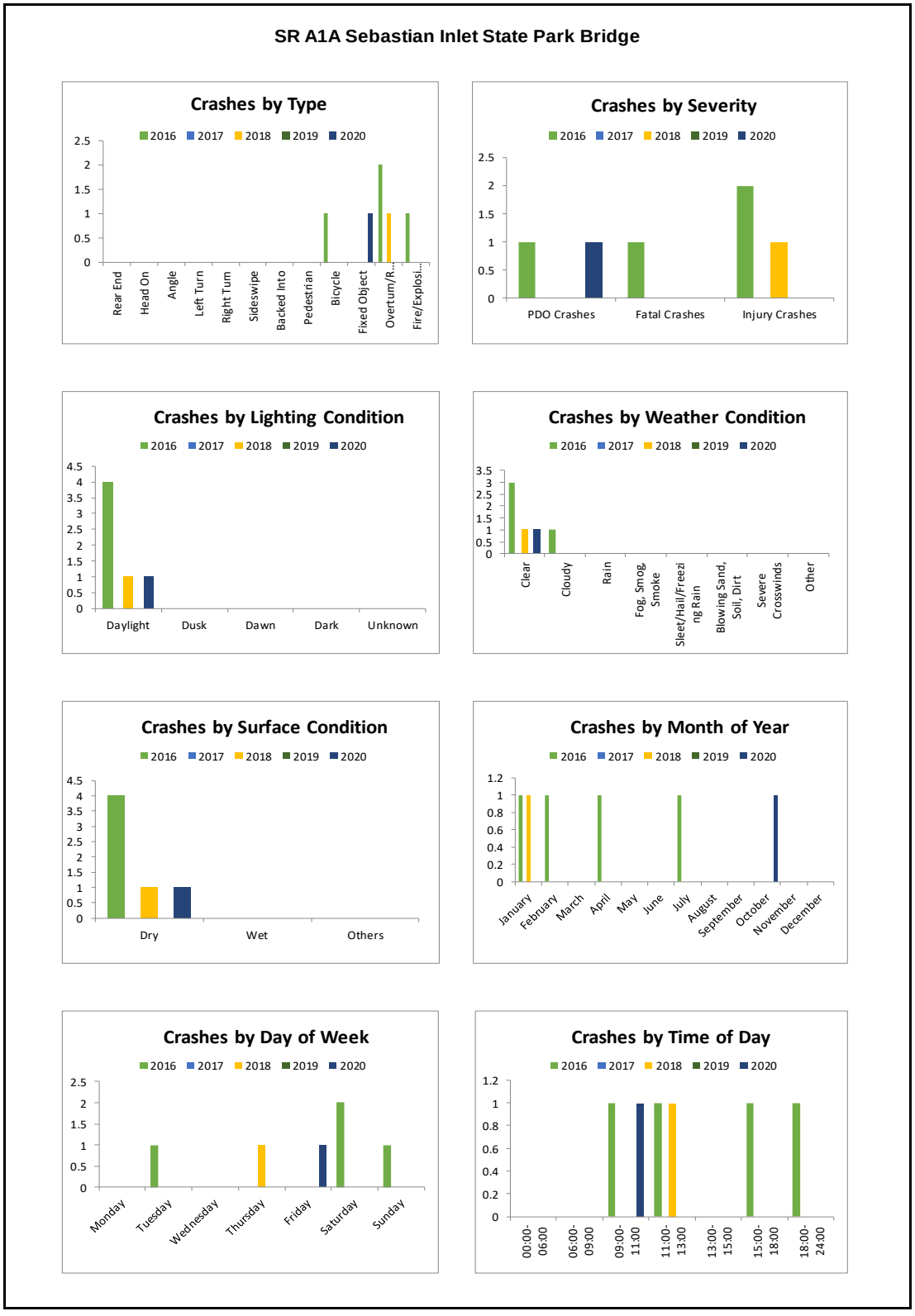
One (1) fatal crash occurred within the study limits during the five-year period under wet surface conditions. Property Damage Only (PDO) crashes accounted for 2 crashes and the remaining 3 crashes resulted in injury. Among the contributing causes documented in the crash data, ‘carelessness or negligent manner’ (2 crashes) resulted in the most crashes. Other contributing causes included ‘improper turn’ (1 crash), ‘failed to keep in proper lane’ (1 crash), ‘ran off roadway’ (1 crash), and ‘other contributing action’ (1 crash). **Table 1-1** and **Figure 1-1** show the crash summary along SR A1A mainline within the study area.

Table 1-1 SR A1A Crash Summary Statistics									
SR A1A Sebastian Inlet State Park Bridge		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		Year							
		2016	2017	2018	2019	2020			
CRASH TYPE	Rear End	0	0	0	0	0	0	0	0.0%
	Head On	0	0	0	0	0	0	0	0.0%
	Angle	0	0	0	0	0	0	0	0.0%
	Left-turn	0	0	0	0	0	0	0	0.0%
	Right-turn	0	0	0	0	0	0	0	0.0%
	Sideswipe	0	0	0	0	0	0	0	0.0%
	Backed Into	0	0	0	0	0	0	0	0.0%
	Pedestrian	0	0	0	0	0	0	0	0.0%
	Bicycle	1	0	0	0	0	1	0	16.7%
	Fixed Object	*0*	*0*	*0*	*0*	*1*	*1*	*0*	*16.7%*
	Impact Attenuator/Crash Cushion	0	0	0	0	0	0	0	0.0%
	Bridge Overhead Structure	0	0	0	0	0	0	0	0.0%
	Bridge Pier or Support	0	0	0	0	0	0	0	0.0%
	Bridge Rail	0	0	0	0	0	0	0	0.0%
	Culvert	0	0	0	0	0	0	0	0.0%
	Curb	0	0	0	0	0	0	0	0.0%
	Ditch	0	0	0	0	0	0	0	0.0%
	Embankment	0	0	0	0	0	0	0	0.0%
	Guardrail Face	0	0	0	0	0	0	0	0.0%
	Guardrail End	0	0	0	0	0	0	0	0.0%
	Cable Barrier	0	0	0	0	0	0	0	0.0%
	Concrete Traffic Barrier	0	0	0	0	0	0	0	0.0%
	Other Traffic Barrier	0	0	0	0	0	0	0	0.0%
	Tree (Standing)	0	0	0	0	0	0	0	0.0%
	Utility Pole/Light Support	0	0	0	0	1	1	0	16.7%
	Traffic Sign Support	0	0	0	0	0	0	0	0.0%
	Traffic Signal Support	0	0	0	0	0	0	0	0.0%
	Other Post, Pole or Support	0	0	0	0	0	0	0	0.0%
	Fence	0	0	0	0	0	0	0	0.0%
	Mailbox	0	0	0	0	0	0	0	0.0%
	Other Fixed Object	0	0	0	0	0	0	0	0.0%
	Other Non-Fixed Object Collisions	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.0%*
	Railway Vehicle (Train, Engine)	0	0	0	0	0	0	0	0.0%
	Animal	0	0	0	0	0	0	0	0.0%
	Motor Vehicle in Transport	0	0	0	0	0	0	0	0.0%
	Parked Motor Vehicle	0	0	0	0	0	0	0	0.0%
	Work Zone/Maintenance Equip.	0	0	0	0	0	0	0	0.0%
	Struck by Falling/Shifting Cargo	0	0	0	0	0	0	0	0.0%
	Other Non-Fixed Object	0	0	0	0	0	0	0	0.0%
	Non-Collisions	*3*	*0*	*1*	*0*	*0*	*4*	*1*	*66.7%*
	Overturn/Rollover	2	0	1	0	0	3	1	50.0%
	Fire/Explosion	1	0	0	0	0	1	0	16.7%
	Immersion	0	0	0	0	0	0	0	0.0%
	Jackknife	0	0	0	0	0	0	0	0.0%

Table 1-1 SR A1A Crash Summary Statistics									
SR A1A Sebastian Inlet State Park Bridge		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		Year							
		2016	2017	2018	2019	2020			
	Cargo/Equipment Loss or Shift	0	0	0	0	0	0	0	0.0%
	Fell/Jumped from Motor Vehicle	0	0	0	0	0	0	0	0.0%
	Thrown or Falling Object	0	0	0	0	0	0	0	0.0%
	Ran into Water/Canal	0	0	0	0	0	0	0	0.0%
	Other Non-Collision	0	0	0	0	0	0	0	0.0%
	Others	0	0	0	0	0	0	0	0.0%
	Total Crashes	**4**	**0**	**1**	**0**	**1**	**6**	**1**	**100.0%**
SEVERITY	PDO Crashes	1	0	0	0	1	2	0	33.3%
	Fatal Crashes	1	0	0	0	0	1	0	16.7%
	Injury Crashes	2	0	1	0	0	3	1	50.0%
LIGHTING CONDITIONS	Daylight	4	0	1	0	1	6	1	100.0%
	Dusk	0	0	0	0	0	0	0	0.0%
	Dawn	0	0	0	0	0	0	0	0.0%
	Dark	0	0	0	0	0	0	0	0.0%
	Unknown	0	0	0	0	0	0	0	0.0%
SURFACE CONDITIONS	Dry	4	0	1	0	1	6	1	100.0%
	Wet	0	0	0	0	0	0	0	0.0%
	Others	0	0	0	0	0	0	0	0.0%
MONTH OF YEAR	January	1	0	1	0	0	2	0	33.3%
	February	1	0	0	0	0	1	0	16.7%
	March	0	0	0	0	0	0	0	0.0%
	April	1	0	0	0	0	1	0	16.7%
	May	0	0	0	0	0	0	0	0.0%
	June	0	0	0	0	0	0	0	0.0%
	July	1	0	0	0	0	1	0	16.7%
	August	0	0	0	0	0	0	0	0.0%
	September	0	0	0	0	0	0	0	0.0%
	October	0	0	0	0	1	1	0	16.7%
	November	0	0	0	0	0	0	0	0.0%
	December	0	0	0	0	0	0	0	0.0%
DAY OF WEEK	Monday	0	0	0	0	0	0	0	0.0%
	Tuesday	1	0	0	0	0	1	0	16.7%
	Wednesday	0	0	0	0	0	0	0	0.0%
	Thursday	0	0	1	0	0	1	0	16.7%
	Friday	0	0	0	0	1	1	0	16.7%
	Saturday	2	0	0	0	0	2	0	33.3%
	Sunday	1	0	0	0	0	1	0	16.7%
HOUR OF DAY	00:00-06:00	0	0	0	0	0	0	0	0.0%
	06:00-09:00	0	0	0	0	0	0	0	0.0%
	09:00-11:00	1	0	0	0	1	2	0	33.3%
	11:00-13:00	1	0	1	0	0	2	0	33.3%

Table 1-1 SR A1A Crash Summary Statistics									
SR A1A Sebastian Inlet State Park Bridge		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		Year							
		2016	2017	2018	2019	2020			
	13:00-15:00	0	0	0	0	0	0	0	0.0%
	15:00-18:00	1	0	0	0	0	1	0	16.7%
	18:00-24:00	1	0	0	0	0	1	0	16.7%
CONTRIBUTING CAUSES (VEHICLE ONLY	No Contributing Action	0	0	0	0	0	0	0	0.0%
	Careless or Negligent Manner	1	0	1	0	0	2	0	33.3%
	Failed to Yield Right of way	0	0	0	0	0	0	0	0.0%
	Improper Backing	0	0	0	0	0	0	0	0.0%
	Improper Turn	1	0	0	0	0	1	0	16.7%
	Followed too Closely	0	0	0	0	0	0	0	0.0%
	Ran Red Light	0	0	0	0	0	0	0	0.0%
	Drove too Fast for Conditions	0	0	0	0	0	0	0	0.0%
	Ran Stop Sign	0	0	0	0	0	0	0	0.0%
	Improper Passing	0	0	0	0	0	0	0	0.0%
	Exceed Posted Speed	0	0	0	0	0	0	0	0.0%
	Wrong Side or Wrong Way	0	0	0	0	0	0	0	0.0%
	Failed to Keep in Proper Lane	1	0	0	0	0	1	0	16.7%
	Ran Off Roadway	1	0	0	0	0	1	0	16.7%
	Disregarded Other Traffic Sign	0	0	0	0	0	0	0	0.0%
	Disregarded Road Markings	0	0	0	0	0	0	0	0.0%
	Over-Correcting/Steering	0	0	0	0	0	0	0	0.0%
	Swerved or avoided	0	0	0	0	0	0	0	0.0%
	Erratic, Reckless or Aggressive	0	0	0	0	0	0	0	0.0%
	Other Contributing Action	0	0	0	0	1	1	0	16.7%
WEATHER CONDITIONS	Clear	3	0	1	0	1	5	1	83.3%
	Cloudy	1	0	0	0	0	1	0	16.7%
	Rain	0	0	0	0	0	0	0	0.0%
	Fog, Smog, Smoke	0	0	0	0	0	0	0	0.0%
	Sleet/Hail/Freezing Rain	0	0	0	0	0	0	0	0.0%
	Blowing Sand, Soil, Dirt	0	0	0	0	0	0	0	0.0%
	Severe Crosswinds	0	0	0	0	0	0	0	0.0%
	Other	0	0	0	0	0	0	0	0.0%

Figure 1-1 SR A1A Crash Summary Statistics Histograms



1.3 FATAL CRASHES

Fatal crashes are a major concern in roadway safety analysis. Based on the crash data, there was 1 fatal crash within the study area along SR A1A. The police report for this crash was obtained from the FDOT and reviewed to identify specific contributing factors that may have caused or influenced this fatal crash. The description of the fatal crash, as obtained from the crash report, is presented below.

On 07/03/2016, a vehicle traveling southbound failed to keep in the proper lane and overturned/rolled over. The driver of this vehicle who died, was alone in the vehicle and found to have been under the influence of drugs at the time of the incident. This crash occurred under wet surface conditions and during the daytime. **Figure 1-2** shows the fatal crash location identified within the study area.

Figure 1-2 Crash Locations within Study Area

1.4 CRASH RATES AND SAFETY RATIO

Crash Rates, Safety Ratios and Confidence Levels were calculated for the SR A1A project corridor for the analysis years 2016 to 2020 and summarized in **Table 1-2.** Average crash rates for a rural 2-3 lane 2-way undivided roadway segment were utilized in computing the safety ratios and confidence levels. A safety ratio greater than one indicates that the roadway segment presents abnormally high crash occurrences. Safety ratios less than one translate into random occurrences of crashes within normal ranges based on the safety ratio analysis.

Based on the analysis, except for 2016 which recorded 4 crashes, all the remaining years recorded only one or no crashes. This results in a statistically significant crash occurrence for 2016 with calculated safety ratio of 3.018 for 2016 which is greater than one. The calculated overall 5-year safety ratios and confidence levels as shown in **Table 1-2** suggests that the crash rates at this location were not abnormally high.

Table 1-2 Crash Rates and Safety Ratios

Year	Num of Crashes	ADT	Actual Crash Rate (ACR)	District 4 Average Crash Rate (A)	Average Vehicle Exposure (M)	Critical Crash Rate (CCR)	Safety Ratio	Statistical Significance	Confidence Level
2016	4	3023	3.251	0.469	1.230	1.077	3.018	5.167	99.99%
2017	-	-	-	-	-	-	-	-	-
2018	1	3149	0.780	0.469	1.282	1.073	0.727	1.161	85.00%
2019	-	-	-	-	-	-	-	-	-
2020	1	3125	0.786	0.469	1.272	1.074	0.732	1.171	85.00%
Overall	6	3099	0.951	0.469	1.261	1.075	0.885	1.442	90.00%

Notes:
ADT – Average Daily Traffic
ACR – Actual Crash Rate = No. of crashes in a year / Average Vehicle Exposure (M)
M – Average Vehicle Exposure (million vehicles or million vehicles miles) = [(ADT * 365 * L) / 1,000,000]
A – Average Crash Rate
CCR – Critical Crash Rate
Safety Ratio = ACR/CCR
Level of statistical significance = (ACR - A + (1/2M))/SQRT(A/M)

Confidence Level = Percent probability that the crash rate is abnormally high for the location under study, using the district-wide average as a basis.

1.5 QUANTITATIVE SAFETY ANALYSIS

A future crash prediction analysis for the SR A1A corridor within the project limits was performed as part of the safety study. The Highway Safety Manual (HSM) Predictive Method for Rural Two-Lane, Two-Way Roads Analysis Spreadsheet Tool was used for the predictive safety analysis. The crash prediction analysis follows the methodology outlined in the Highway Safety Manual.

Expected crashes were predicted for the No-Build and Build Alternative for the 2025 opening year and the 2045 design year using the HSM Predictive Spreadsheet Tool. The crash prediction spreadsheet tool implements the Empirical Bayes Analysis Methodology which combines the predicted crashes from the safety performance functions with the historical crash data to obtain the expected crashes.

The geometric, cross sectional and traffic operation characteristics as well as the historic crash data for the No-Build and Build Alternative were input into the HSM Predictive Spreadsheet Tool to obtain the expected crashes for the analysis years. The Build Alternative provides wider shoulders as well as a shared use path and auxiliary lanes to enhance safety within the project limits. The HSM Spreadsheets are provided in **Appendix B**.

Table 1-3 shows the average predicted crash frequency along the SR A1A corridor within the project limits. The detailed crash prediction analyses are provided in the Project Traffic Forecast Analysis Report on file with FDOT District Four.

Table 1-3 Expected Crash Prediction

Crash Severity	Crash Frequency				% Change from No-Build	
	2025		2045		2025	2045
	No-Build	Build Alternative	No-Build	Build Alternative		
Fatal & Injury	0.35	0.24	0.41	0.28	-31.4%	-31.7%
Property Damage Only	0.74	0.50	0.88	0.60	-32.4%	-31.8%
Total	**1.08**	**0.74**	**1.29**	**0.88**	**-31.5%**	**-31.8%**

Based on the results shown in **Table 1-3,** the Build Alternative will result in a lower number of expected total crashes with an overall crash reduction of 31.5% for the 2025 opening year and 31.8% for the 2045 design year compared to the No-Build Alternative.

APPENDIX A

CRASH DATA

State of Florida Department of Transportation
CRASH SUMMARY

SECTION:	88070000			STATE ROUTE:	0
ROADWAY LIMITS:	MP	M.P. 0.000	TO 1.115	ENGINEER:	GOAL Associates Inc.
STUDY PERIOD:	FROM 1/ 2016	TO 12/ 2016		COUNTY:	Indian River

No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURIES	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE (VEHICLE ONLY)
1	0.133	01/12/2016	Tue	1625	Fire/Explosion	0	0	1	Day	Dry	Ran Off Roadway
2	0.205	04/02/2016	Sat	2100	Overturn/Rollover	0	2	0	Day	Dry	Careless or Negligent Manner
3	0.210	07/03/2016	Sun	1250	Overturn/Rollover	1	0	0	Day	Wet	Failed To Keep In Proper Lane
4	22.295	02/20/2016	Sat	1050	Pedalcycle	0	1	0	Day	Dry	Improper Turn

Total No.	Fatal	Injury	PDO	Rear-End	Head-On	Angle	Left-Turn	Right-Turn	Sideswipe	Backed Into	Ped/Bike	Parked Car	Fixed Object	Ran into Water	Other
4	**1**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
Percent	*25.00%*	*50.00%*	*25.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*25.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*

Contrib. Cause	Day	Night	Wet	Dry	Careless Driving	FTYRW	Improper Turn	Ran Red Light	Exceeded Speed	Improper Passing	Disreg Cntl Dev	Erratic/ Aggress	Ran off Road	DUI	Wrong Way
Total	**4**	**0**	**1**	**3**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
Percent	*100.00%*	*0.00%*	*25.00%*	*75.00%*	*25.00%*	*0.00%*	*25.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*25.00%*	*0.00%*	*0.00%*

TOTAL ENTERING VEHICLES/ADT: **3,023**

SEGMENT CRASH RATE: **3.251** CRASHES PER MILLION VEHICLE MILES

State of Florida Department of Transportation
CRASH SUMMARY

SECTION:			88070000								STATE ROUTE:		0				
ROADWAY LIMITS:			MP					M.P.	0.000	TO	1.115	ENGINEER:	GOAL Associates Inc.				
STUDY PERIOD:			FROM	1/ 2018				TO	12/ 2018			COUNTY:	Indian River				

No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURIES	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE (VEHICLE ONLY)
1	0.076	01/18/2018	Thu	1215	Overturn/Rollover	0	4	0	Day	Dry	Careless or Negligent Manner

Total No.	Fatal	Injury	PDO	Rear-End	Head-On	Angle	Left-Turn	Right-Turn	Sideswipe	Backed Into	Ped/Bike	Parked Car	Fixed Object	Ran into Water	Other
1	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Percent	*0.00%*	*100.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*

Contrib. Cause	Day	Night	Wet	Dry	Careless Driving	FTYRW	Improper Turn	Ran Red Light	Exceeded Speed	Improper Passing	Disreg Cntl Dev	Erratic/ Aggress	Ran off Road	DUI	Wrong Way
Total	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Percent	*100.00%*	*0.00%*	*0.00%*	*100.00%*	*100.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*

TOTAL ENTERING VEHICLES/ADT: **3,149**

SEGMENT CRASH RATE: **0.780** CRASHES PER MILLION VEHICLE MILES

State of Florida Department of Transportation
CRASH SUMMARY

SECTION: **88070000** STATE ROUTE: **0**

ROADWAY LIMITS: **MP** M.P. **0.000** TO **1.115** ENGINEER: **GOAL Associates Inc.**

STUDY PERIOD: FROM **1/ 2020** TO **12/ 2020** COUNTY: **Indian River**

Crash Number	No.	MILE POST	DATE	DAY	TIME	CRASH TYPE	FATAL	INJURIES	PROP DAM	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE (VEHICLE ONLY)
900014470	1	22.512	10/02/2020	Fri	1015	Utility Pole/Light Support	0	0	1	Day	Dry	Other Contributing Action

	Total No.	Fatal	Injury	PDO	Rear-End	Head-On	Angle	Left-Turn	Right-Turn	Sideswipe	Backed Into	Ped/Bike	Parked Car	Fixed Object	Ran into Water	Other
	1	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Percent	*0.00%*	*0.00%*	*100.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
	Contrib. Cause	Day	Night	Wet	Dry	Careless Driving	FTYRW	Improper Turn	Ran Red Light	Exceeded Speed	Improper Passing	Disreg Cntl Dev	Erratic/ Aggress	Ran off Road	DUI	Wrong Way
	Total	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Percent	*100.00%*	*0.00%*	*0.00%*	*100.00%*	*100.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*

TOTAL ENTERING VEHICLES/ADT: **3,149** SEGMENT CRASH RATE: **0.780** CRASHES PER MILLION VEHICLE MILES

APPENDIX B

HSM PREDICTIVE ANALYSIS

Worksheet 1A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Segments

General Information		Location Information	
Analyst	Daniel Torres	Roadway	SR A1A
Agency or Company	GOAL Associates	Roadway Section	88070000 & 70060000
Date Performed	08/23/21	Alternative	No-Build Alternative
		Analysis Year	2025

Input Data		Base Conditions	Site Conditions			
Length of segment, L (mi)		--	1.115			
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	3,100			
Lane width (ft)		12	12			
Shoulder width (ft)		6	Right Shld:	2	Left Shld:	2
Shoulder type		Paved	Right Shld:	Paved	Left Shld:	Paved
Length of horizontal curve (mi)		0	0.0			
Radius of curvature (ft)		0	0			
Spiral transition curve (present/not present)		Not Present	Not Present			
Superelevation variance (ft/ft)		< 0.01	0			
Grade (%)		0	3			
Driveway density (driveways/mile)		5	2.00			
Centerline rumble strips (present/not present)		Not Present	Not Present			
Passing lanes [present (1 lane) /present (2 lane) / not present)]		Not Present	Not Present			
Two-way left-turn lane (present/not present)		Not Present	Not Present			
Roadside hazard rating (1-7 scale)		3	3			
Segment lighting (present/not present)		Not Present	Not Present			
Auto speed enforcement (present/not present)		Not Present	Not Present			
Calibration Factor, Cr		1	1.00			

Worksheet 1B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
CMF for Lane Width	CMF for Shoulder Width and Type	CMF for Horizontal Curves	CMF for Super-elevation	CMF for Grades	CMF for Driveway Density	CMF for Centerline Rumble Strips	CMF for Passing Lanes	CMF for Two-Way Left-Turn Lane	CMF for Roadside Design	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMR 5r*	*CMF 6r*	*CMF 7r*	*CMF 8r*	*CMF 9r*	*CMF 10r*	*CMF 11r*	*CMF 12r*	*CMF comb*
from Equation 10-11	from Equation 10-12	from Equation 10-13	from Equations 10-14, 10-15, or 10-16	from Table 10-11	from Equation 10-17	from Section 10.7.1	from Section 10.7.1	from Equation 10-18 & 10-19	from Equation 10-20	from Equation 10-21	from Section 10.7.1	(1)x(2)x … x(11)x(12)
1.00	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.172

Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Crash Severity Level	**N spf rs**	**Overdispersion Parameter, k**	**Crash Severity Distribution**	**N spf rs by Severity Distribution**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted average crash frequency, N**
	from Equation 10-6	from Equation 10-7	from Table 10-3 (proportion)	(2)TOTAL x (4)	(13) from Worksheet 1B		(5)x(6)x(7)
Total	0.923	0.21	1.000	0.923	1.17	1.00	1.083
Fatal and Injury (FI)	--	--	0.321	0.296	1.17	1.00	0.347
Property Damage Only (PDO)	--	--	0.679	0.627	1.17	1.00	0.735

Worksheet 1D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Collision Type	**Proportion of Collision Type(TOTAL)**	**N *predicted rs* (TOTAL) (crashes/year)**	**Proportion of Collision Type(FI)**	**N *predicted rs* (FI) (crashes/year)**	**Proportion of Collision Type(PDO)**	**N *predicted rs* (PDO) (crashes/year)**
	from Table 10-4	(8)TOTAL from Worksheet 1C	from Table 10-4	(8)FI from Worksheet 1C	from Table 10-4	(8)PDO from Worksheet 1C
Total	1.000	1.083	1.000	0.347	1.000	0.735
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.131	0.038	0.013	0.184	0.135
Collision with bicycle	0.002	0.002	0.004	0.001	0.001	0.001
Collision with pedestrian	0.003	0.003	0.007	0.002	0.001	0.001
Overturned	0.025	0.027	0.037	0.013	0.015	0.011
Ran off road	0.521	0.564	0.545	0.189	0.505	0.371
Other single-vehicle collision	0.021	0.023	0.007	0.002	0.029	0.021
Total single-vehicle crashes	0.693	0.750	0.638	0.222	0.735	0.540
MULTIPLE-VEHICLE						
Angle collision	0.085	0.092	0.100	0.035	0.072	0.053
Head-on collision	0.016	0.017	0.034	0.012	0.003	0.002
Rear-end collision	0.142	0.154	0.164	0.057	0.122	0.090
Sideswipe collision	0.037	0.040	0.038	0.013	0.038	0.028
Other multiple-vehicle collision	0.027	0.029	0.026	0.009	0.030	0.022
Total multiple-vehicle crashes	0.307	0.332	0.362	0.126	0.265	0.195

Worksheet 1E -- Summary Results for Rural Two-Lane Two-Way Roadway Segments				
(1)	(2)	(3)	(4)	(5)
Crash severity level	**Crash Severity Distribution (proportion)**	**Predicted average crash frequency (crashes/year)**	**Roadway segment length (mi)**	**Crash rate (crashes/mi/year)**
	(4) from Worksheet 1C	(8) from Worksheet 1C		(3)/(4)
Total	1.000	1.08	1.115	1.0
Fatal and Injury (FI)	0.321	0.35	1.115	0.3
Property Damage Only (PDO)	0.679	0.74	1.115	0.7

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment_1	1.083	0.347	0.735	1.200	0.212	0.814	1.104
Segment_2	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_3	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_4	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_5	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment Totals:	1.083	0.347	0.735	1.200			1.104
INTERSECTIONS							
Intersection_1	0.000	0.000	0.000	0.000	0.540	1.000	0.000
Intersection_2	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection Totals:	0.000	0.000	0.000	0.000			0.000
COMBINED (sum of column)	1.083	0.347	0.735	1.200	--	--	1.104

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	1.083	1.104
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.347	0.355
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.735	0.750

Worksheet 1A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Segments

General Information		Location Information	
Analyst	Daniel Torres	Roadway	SR A1A
Agency or Company	GOAL Associates	Roadway Section	88070000 & 70060000
Date Performed	08/23/21	Alternative	Build Alternative
		Analysis Year	2025

Input Data		Base Conditions	Site Conditions			
Length of segment, L (mi)		--	1.115			
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	3,100			
Lane width (ft)		12	12			
Shoulder width (ft)		6	Right Shld:	8	Left Shld:	8
Shoulder type		Paved	Right Shld:	Paved	Left Shld:	Paved
Length of horizontal curve (mi)		0	0.0			
Radius of curvature (ft)		0	0			
Spiral transition curve (present/not present)		Not Present	Not Present			
Superelevation variance (ft/ft)		< 0.01	0			
Grade (%)		0	3			
Driveway density (driveways/mile)		5	2.00			
Centerline rumble strips (present/not present)		Not Present	Present			
Passing lanes [present (1 lane) /present (2 lane) / not present)]		Not Present	Not Present			
Two-way left-turn lane (present/not present)		Not Present	Not Present			
Roadside hazard rating (1-7 scale)		3	3			
Segment lighting (present/not present)		Not Present	Present			
Auto speed enforcement (present/not present)		Not Present	Not Present			
Calibration Factor, Cr		1	1.00			

Worksheet 1B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
CMF for Lane Width	CMF for Shoulder Width and Type	CMF for Horizontal Curves	CMF for Super-elevation	CMF for Grades	CMF for Driveway Density	CMF for Centerline Rumble Strips	CMF for Passing Lanes	CMF for Two-Way Left-Turn Lane	CMF for Roadside Design	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMR 5r*	*CMF 6r*	*CMF 7r*	*CMF 8r*	*CMF 9r*	*CMF 10r*	*CMF 11r*	*CMF 12r*	*CMF comb*
from Equation 10-11	from Equation 10-12	from Equation 10-13	from Equations 10-14, 10-15, or 10-16	from Table 10-11	from Equation 10-17	from Section 10.7.1	from Section 10.7.1	from Equation 10-18 & 10-19	from Equation 10-20	from Equation 10-21	from Section 10.7.1	(1)x(2)x … x(11)x(12)
1.00	0.93	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.00	0.92	1.00	0.802

Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Crash Severity Level	**N spf rs**	**Overdispersion Parameter, k**	**Crash Severity Distribution**	**N spf rs by Severity Distribution**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted average crash frequency, N**
	from Equation 10-6	from Equation 10-7	from Table 10-3 (proportion)	(2)TOTAL x (4)	(13) from Worksheet 1B		(5)x(6)x(7)
Total	0.923	0.21	1.000	0.923	0.80	1.00	0.740
Fatal and Injury (FI)	--	--	0.321	0.296	0.80	1.00	0.238
Property Damage Only (PDO)	--	--	0.679	0.627	0.80	1.00	0.503

Worksheet 1D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Collision Type	**Proportion of Collision Type(TOTAL)**	**N *predicted rs* (TOTAL) (crashes/year)**	**Proportion of Collision Type(FI)**	**N *predicted rs* (FI) (crashes/year)**	**Proportion of Collision Type(PDO)**	**N *predicted rs* (PDO) (crashes/year)**
	from Table 10-4	(8)TOTAL from Worksheet 1C	from Table 10-4	(8)FI from Worksheet 1C	from Table 10-4	(8)PDO from Worksheet 1C
Total	1.000	0.740	1.000	0.238	1.000	0.503
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.090	0.038	0.009	0.184	0.092
Collision with bicycle	0.002	0.001	0.004	0.001	0.001	0.001
Collision with pedestrian	0.003	0.002	0.007	0.002	0.001	0.001
Overturned	0.025	0.019	0.037	0.009	0.015	0.008
Ran off road	0.521	0.386	0.545	0.130	0.505	0.254
Other single-vehicle collision	0.021	0.016	0.007	0.002	0.029	0.015
Total single-vehicle crashes	0.693	0.513	0.638	0.152	0.735	0.369
MULTIPLE-VEHICLE						
Angle collision	0.085	0.063	0.100	0.024	0.072	0.036
Head-on collision	0.016	0.012	0.034	0.008	0.003	0.002
Rear-end collision	0.142	0.105	0.164	0.039	0.122	0.061
Sideswipe collision	0.037	0.027	0.038	0.009	0.038	0.019
Other multiple-vehicle collision	0.027	0.020	0.026	0.006	0.030	0.015
Total multiple-vehicle crashes	0.307	0.227	0.362	0.086	0.265	0.133

Worksheet 1E -- Summary Results for Rural Two-Lane Two-Way Roadway Segments				
(1)	(2)	(3)	(4)	(5)
Crash severity level	**Crash Severity Distribution (proportion)**	**Predicted average crash frequency (crashes/year)**	**Roadway segment length (mi)**	**Crash rate (crashes/mi/year)**
	(4) from Worksheet 1C	(8) from Worksheet 1C		(3)/(4)
Total	1.000	0.74	1.115	0.7
Fatal and Injury (FI)	0.321	0.24	1.115	0.2
Property Damage Only (PDO)	0.679	0.50	1.115	0.5

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment_1	0.740	0.238	0.503	1.200	0.212	0.865	0.803
Segment_2	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_3	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_4	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_5	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment Totals:	0.740	0.238	0.503	1.200			0.803
INTERSECTIONS							
Intersection_1	0.000	0.000	0.000	0.000	0.540	1.000	0.000
Intersection_2	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection Totals:	0.000	0.000	0.000	0.000			0.000
COMBINED (sum of column)	0.740	0.238	0.503	1.200	--	--	0.803

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	0.740	0.803
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.238	0.258
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.503	0.545

Worksheet 1A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Segments

General Information		Location Information	
Analyst	Daniel Torres	Roadway	SR A1A
Agency or Company	GOAL Associates	Roadway Section	88070000 & 70060000
Date Performed	08/23/21	Alternative	No-Build Alternative
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions			
Length of segment, L (mi)		--	1.115			
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	3,700			
Lane width (ft)		12	12			
Shoulder width (ft)		6	Right Shld:	2	Left Shld:	2
Shoulder type		Paved	Right Shld:	Paved	Left Shld:	Paved
Length of horizontal curve (mi)		0	0.0			
Radius of curvature (ft)		0	0			
Spiral transition curve (present/not present)		Not Present	Not Present			
Superelevation variance (ft/ft)		< 0.01	0			
Grade (%)		0	3			
Driveway density (driveways/mile)		5	2.00			
Centerline rumble strips (present/not present)		Not Present	Not Present			
Passing lanes [present (1 lane) /present (2 lane) / not present)]		Not Present	Not Present			
Two-way left-turn lane (present/not present)		Not Present	Not Present			
Roadside hazard rating (1-7 scale)		3	3			
Segment lighting (present/not present)		Not Present	Not Present			
Auto speed enforcement (present/not present)		Not Present	Not Present			
Calibration Factor, Cr		1	1.00			

Worksheet 1B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
CMF for Lane Width	CMF for Shoulder Width and Type	CMF for Horizontal Curves	CMF for Super-elevation	CMF for Grades	CMF for Driveway Density	CMF for Centerline Rumble Strips	CMF for Passing Lanes	CMF for Two-Way Left-Turn Lane	CMF for Roadside Design	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMR 5r*	*CMF 6r*	*CMF 7r*	*CMF 8r*	*CMF 9r*	*CMF 10r*	*CMF 11r*	*CMF 12r*	*CMF comb*
from Equation 10-11	from Equation 10-12	from Equation 10-13	from Equations 10-14, 10-15, or 10-16	from Table 10-11	from Equation 10-17	from Section 10.7.1	from Section 10.7.1	from Equation 10-18 & 10-19	from Equation 10-20	from Equation 10-21	from Section 10.7.1	(1)x(2)x … x(11)x(12)
1.00	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.172

Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Crash Severity Level	**N spf rs**	**Overdispersion Parameter, k**	**Crash Severity Distribution**	**N spf rs by Severity Distribution**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted average crash frequency, N**
	from Equation 10-6	from Equation 10-7	from Table 10-3 (proportion)	(2)TOTAL x (4)	(13) from Worksheet 1B		(5)x(6)x(7)
Total	1.102	0.21	1.000	1.102	1.17	1.00	1.292
Fatal and Injury (FI)	--	--	0.321	0.354	1.17	1.00	0.415
Property Damage Only (PDO)	--	--	0.679	0.748	1.17	1.00	0.877

Worksheet 1D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Collision Type	**Proportion of Collision Type(TOTAL)**	**N *predicted rs* (TOTAL) (crashes/year)**	**Proportion of Collision Type(FI)**	**N *predicted rs* (FI) (crashes/year)**	**Proportion of Collision Type(PDO)**	**N *predicted rs* (PDO) (crashes/year)**
	from Table 10-4	(8)TOTAL from Worksheet 1C	from Table 10-4	(8)FI from Worksheet 1C	from Table 10-4	(8)PDO from Worksheet 1C
Total	1.000	1.292	1.000	0.415	1.000	0.877
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.156	0.038	0.016	0.184	0.161
Collision with bicycle	0.002	0.003	0.004	0.002	0.001	0.001
Collision with pedestrian	0.003	0.004	0.007	0.003	0.001	0.001
Overturned	0.025	0.032	0.037	0.015	0.015	0.013
Ran off road	0.521	0.673	0.545	0.226	0.505	0.443
Other single-vehicle collision	0.021	0.027	0.007	0.003	0.029	0.025
Total single-vehicle crashes	0.693	0.895	0.638	0.265	0.735	0.645
MULTIPLE-VEHICLE						
Angle collision	0.085	0.110	0.100	0.041	0.072	0.063
Head-on collision	0.016	0.021	0.034	0.014	0.003	0.003
Rear-end collision	0.142	0.183	0.164	0.068	0.122	0.107
Sideswipe collision	0.037	0.048	0.038	0.016	0.038	0.033
Other multiple-vehicle collision	0.027	0.035	0.026	0.011	0.030	0.026
Total multiple-vehicle crashes	0.307	0.397	0.362	0.150	0.265	0.232

Worksheet 1E -- Summary Results for Rural Two-Lane Two-Way Roadway Segments				
(1)	(2)	(3)	(4)	(5)
Crash severity level	**Crash Severity Distribution (proportion)**	**Predicted average crash frequency (crashes/year)**	**Roadway segment length (mi)**	**Crash rate (crashes/mi/year)**
	(4) from Worksheet 1C	(8) from Worksheet 1C		(3)/(4)
Total	1.000	1.29	1.115	1.2
Fatal and Injury (FI)	0.321	0.41	1.115	0.4
Property Damage Only (PDO)	0.679	0.88	1.115	0.8

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment_1	1.292	0.415	0.877	1.200	0.212	0.785	1.272
Segment_2	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_3	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_4	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_5	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment Totals:	1.292	0.415	0.877	1.200			1.272
INTERSECTIONS							
Intersection_1	0.000	0.000	0.000	0.000	0.540	1.000	0.000
Intersection_2	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection Totals:	0.000	0.000	0.000	0.000			0.000
COMBINED (sum of column)	1.292	0.415	0.877	1.200	--	--	1.272

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	1.292	1.272
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.415	0.408
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.877	0.864

Worksheet 1A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Segments

General Information		Location Information	
Analyst	Daniel Torres	Roadway	SR A1A
Agency or Company	GOAL Associates	Roadway Section	88070000 & 70060000
Date Performed	08/23/21	Alternative	Build Alternative
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions			
Length of segment, L (mi)		--	1.115			
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	3,700			
Lane width (ft)		12	12			
Shoulder width (ft)		6	Right Shld:	8	Left Shld:	8
Shoulder type		Paved	Right Shld:	Paved	Left Shld:	Paved
Length of horizontal curve (mi)		0	0.0			
Radius of curvature (ft)		0	0			
Spiral transition curve (present/not present)		Not Present	Not Present			
Superelevation variance (ft/ft)		< 0.01	0			
Grade (%)		0	3			
Driveway density (driveways/mile)		5	2.00			
Centerline rumble strips (present/not present)		Not Present	Present			
Passing lanes [present (1 lane) /present (2 lane) / not present)]		Not Present	Not Present			
Two-way left-turn lane (present/not present)		Not Present	Not Present			
Roadside hazard rating (1-7 scale)		3	3			
Segment lighting (present/not present)		Not Present	Present			
Auto speed enforcement (present/not present)		Not Present	Not Present			
Calibration Factor, Cr		1	1.00			

Worksheet 1B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
CMF for Lane Width	CMF for Shoulder Width and Type	CMF for Horizontal Curves	CMF for Super-elevation	CMF for Grades	CMF for Driveway Density	CMF for Centerline Rumble Strips	CMF for Passing Lanes	CMF for Two-Way Left-Turn Lane	CMF for Roadside Design	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMR 5r*	*CMF 6r*	*CMF 7r*	*CMF 8r*	*CMF 9r*	*CMF 10r*	*CMF 11r*	*CMF 12r*	*CMF comb*
from Equation 10-11	from Equation 10-12	from Equation 10-13	from Equations 10-14, 10-15, or 10-16	from Table 10-11	from Equation 10-17	from Section 10.7.1	from Section 10.7.1	from Equation 10-18 & 10-19	from Equation 10-20	from Equation 10-21	from Section 10.7.1	(1)x(2)x … x(11)x(12)
1.00	0.93	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.00	0.92	1.00	0.802

Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Crash Severity Level	**N spf rs**	**Overdispersion Parameter, k**	**Crash Severity Distribution**	**N spf rs by Severity Distribution**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted average crash frequency, N**
	from Equation 10-6	from Equation 10-7	from Table 10-3 (proportion)	(2)TOTAL x (4)	(13) from Worksheet 1B		(5)x(6)x(7)
Total	1.102	0.21	1.000	1.102	0.80	1.00	0.884
Fatal and Injury (FI)	--	--	0.321	0.354	0.80	1.00	0.284
Property Damage Only (PDO)	--	--	0.679	0.748	0.80	1.00	0.600

Worksheet 1D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Collision Type	**Proportion of Collision Type(TOTAL)**	**N *predicted rs* (TOTAL) (crashes/year)**	**Proportion of Collision Type(FI)**	**N *predicted rs* (FI) (crashes/year)**	**Proportion of Collision Type(PDO)**	**N *predicted rs* (PDO) (crashes/year)**
	from Table 10-4	(8)TOTAL from Worksheet 1C	from Table 10-4	(8)FI from Worksheet 1C	from Table 10-4	(8)PDO from Worksheet 1C
Total	1.000	0.884	1.000	0.284	1.000	0.600
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.107	0.038	0.011	0.184	0.110
Collision with bicycle	0.002	0.002	0.004	0.001	0.001	0.001
Collision with pedestrian	0.003	0.003	0.007	0.002	0.001	0.001
Overturned	0.025	0.022	0.037	0.010	0.015	0.009
Ran off road	0.521	0.460	0.545	0.155	0.505	0.303
Other single-vehicle collision	0.021	0.019	0.007	0.002	0.029	0.017
Total single-vehicle crashes	0.693	0.612	0.638	0.181	0.735	0.441
MULTIPLE-VEHICLE						
Angle collision	0.085	0.075	0.100	0.028	0.072	0.043
Head-on collision	0.016	0.014	0.034	0.010	0.003	0.002
Rear-end collision	0.142	0.125	0.164	0.047	0.122	0.073
Sideswipe collision	0.037	0.033	0.038	0.011	0.038	0.023
Other multiple-vehicle collision	0.027	0.024	0.026	0.007	0.030	0.018
Total multiple-vehicle crashes	0.307	0.271	0.362	0.103	0.265	0.159

Worksheet 1E -- Summary Results for Rural Two-Lane Two-Way Roadway Segments				
(1)	(2)	(3)	(4)	(5)
Crash severity level	**Crash Severity Distribution (proportion)**	**Predicted average crash frequency (crashes/year)**	**Roadway segment length (mi)**	**Crash rate (crashes/mi/year)**
	(4) from Worksheet 1C	(8) from Worksheet 1C		(3)/(4)
Total	1.000	0.88	1.115	0.8
Fatal and Injury (FI)	0.321	0.28	1.115	0.3
Property Damage Only (PDO)	0.679	0.60	1.115	0.5

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment_1	0.884	0.284	0.600	1.200	0.212	0.842	0.933
Segment_2	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_3	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_4	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_5	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment Totals:	0.884	0.284	0.600	1.200			0.933
INTERSECTIONS							
Intersection_1	0.000	0.000	0.000	0.000	0.540	1.000	0.000
Intersection_2	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_3	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_4	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_5	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection Totals:	0.000	0.000	0.000	0.000			0.000
COMBINED (sum of column)	0.884	0.284	0.600	1.200	--	--	0.933

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	0.884	0.933
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.284	0.300
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.600	0.634