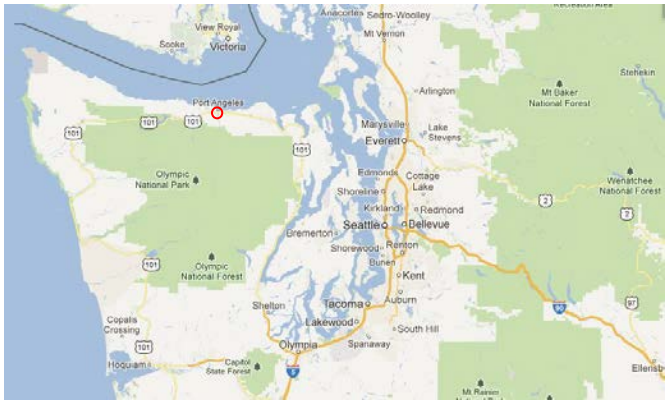
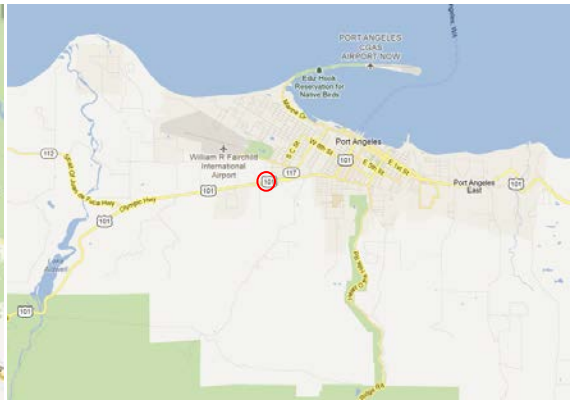
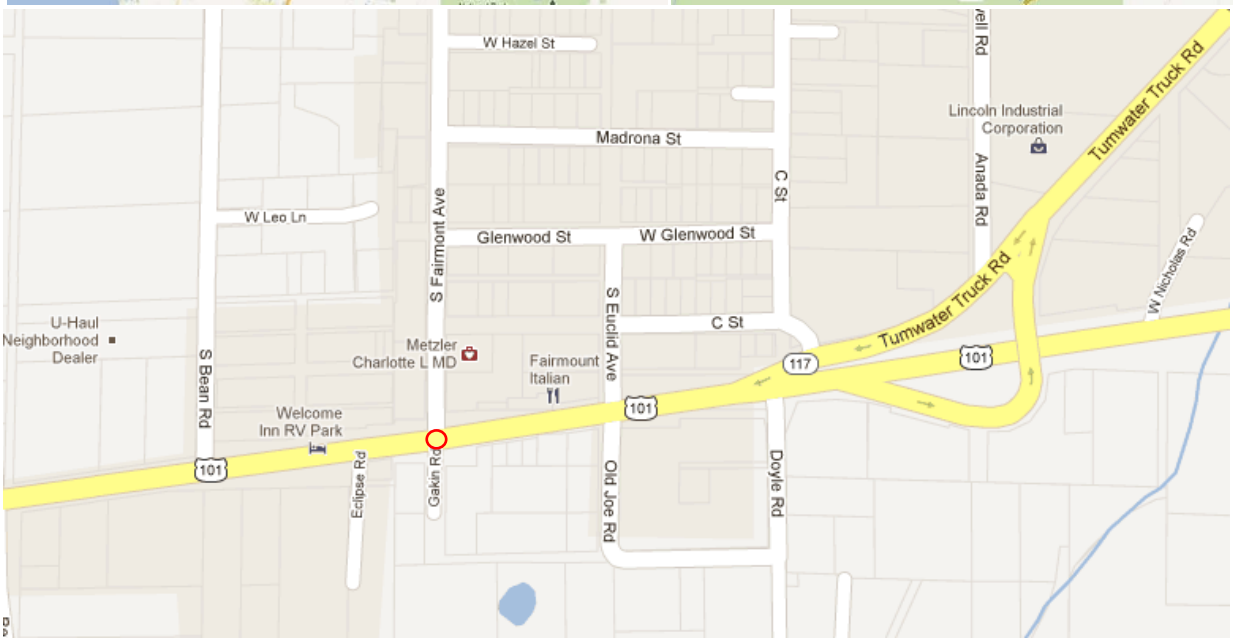
Crash Analysis Report (Example)

Under Federal Law, 23 United States Code Section 409, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, and planning for safety enhancements or for developing safety projects which may be implemented using Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceedings.







Intersection of US 101 and S Fairmont Ave/Gakin Rd

HQ CPDM

Washington State Department of Transportation

Olympic Region

JUNE 2012

INTRODUCTION

Template 1-1

The intersection of US 101 and S Fairmont Ave/Gakin Rd is located in the City of Port Angeles, Clallam County. The intersection is part of a Collision Analysis Corridor (CAC) (MP245.72-MP250.66), a Collision Analysis Location (CAL) (MP245.55-246.10), and is an Intersection Analysis Location (IAL) based on number of crashes from 2004 to 2008. This section of highway is a four-lane roadway, with one eastbound lane and two westbound lanes separated by a 12-foot, two-way turn lane. This roadway carries a high percentage of truck traffic (13%) due to the freight traffic using the port. Port Angeles is a major focal point for truck activity for the North Olympic Peninsula.

No traffic- turning counts are available for this intersection. Table 1 below shows a Summary of Geometric Characteristics.

Table 1 Geometric Characteristics ***Template 1-2***

Region	Olympic Region
State Route	101
Milepost	245.87
ARM	241.15
County	Clallam
City	Port Angeles
Functional Class	Urban Principal Arterial
Urban/ Rural	Urban
NHS Status	NHS
Roadway	Multilane (1 lane EB and 2 lanes WB)

Posted Speed	45 mph
Posted Speed minor	Unknown
Lane Width	12 ft.
Shoulder Width	4 ft.
ADT major	12,000
ADT minor	64 (estimated)
Truck %	13.09%

Template 1-2.1

To develop a visual site overview, a conditional diagram (Figure 1) is created. The traffic control is a two way stop. The intersection is composed of US 101 and S Fairmont Ave. to the North and Gakin Rd. to the South. A stop sign and stop line are located at S Fairmont Ave and at Gakin Rd. Gakin Rd is a dead end with three residential houses.

There are no dedicated left-turn lanes or right-turn lanes at this intersection. A Gas Station (Shell) is located on the NE corner of this intersection. A Bus pullout is located on the NW corner of this intersection.

Template 1-3

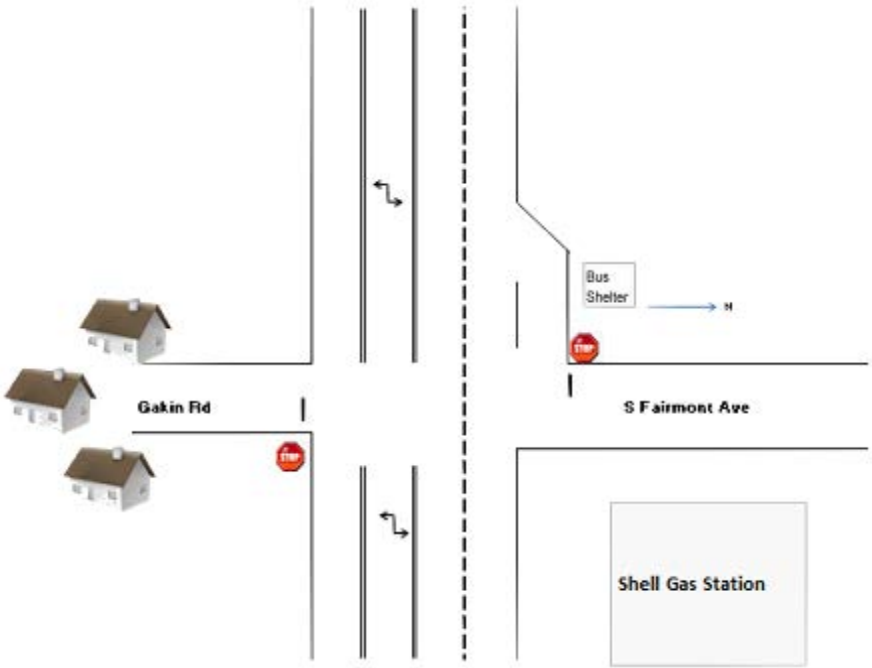


Figure 1. Conditional Diagram

DIAGNOSTICS *(What crashes are Happening / Current Safety Performance)*

Template 2

A crash summary report (Appendix A) was created using Safety Anlyst. This report was created based on 2005-2010 observed crash frequencies for the intersection. Table 2 summarizes the severity of the crashes based on the most severe injury to any person involved. The table shows that there haven't been any fatal crashes over the six year period.

Table 2 Crash Severity Level 2005-2010 ***Template 2-1***

Description	2005	2006	2007	2008	2009	2010	Total	Observed Percent
Fatal	0	0	0	0	0	0	0	0
Severe Injury	0	0	0	1	0	0	1	6
Non-Incapacitating Injury	0	0	2	1	0	0	3	18
Possible Injury	0	0	1	1	2	3	7	41
Property-Damage-Only	1	3	1	1	0	0	6	35
Total Accidents	1	3	4	4	2	3	17	100

The following tables (3, 4, & 5) summarize the Type of Crash, Light Condition, and Multiple Vehicle Alcohol Impaired Indicator.

Table 3. Type of Crash ***Template 2-2***

Description	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Collision with fixed object	0	1	0	0	0	0	1	6	4
Rear-end	1	1	0	0	0	0	2	12	21
Angle	0	0	4	4	1	3	12	71	46
Other multiple-vehicle collision	0	1	0	0	1	0	2	12	20
Total Accidents	1	3	4	4	2	3	17	100	100

Table 4. Light Condition ***Template 2-3***

Table 26. Light Condition									
Description	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Daylight	1	3	3	4	1	3	15	88	76
Dark-lighted	0	0	1	0	0	0	1	6	15
Dark-unknown lighting	0	0	0	0	1	0	1	6	3

Table 26. Light Condition									
Description	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**	**Observed Percent**	**Average Percent**
Total Accidents	1	3	4	4	2	3	17	100	100

Table 5. MV Alcohol Impaired Indicator ***Template 2-3***

Description	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Yes	0	1	0	0	0	0	1	6	3
No	1	2	4	4	2	3	16	94	97
Total Accidents	1	3	4	4	2	3	17	100	100

Table 6. MV Alcohol Impaired Indicator ***Template 2-3***

Table 27. Vehicle Configuration										
Description	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**	**Observed Percent**	**Average Percent**
Passenger car	3	1	2	2	3	3	3	17	44	N/A
Light truck, only four tires	2	1	3	5	5	1	3	20	51	N/A
Truck tractor/semi-trailer	0	0	0	1	0	0	0	1	3	N/A
Bus	1	0	0	0	0	0	0	1	3	N/A
Total Vehicles	6	2	5	8	8	4	6	39	100	N/A

These Four tables indicate that: *Template 2-4*

- Angle crashes comprise 77% of the crashes.
- 88% of crashes occurred during daylight.
- Only six percent of observed crashes were alcohol impaired.
- The largest percentages of vehicle collisions were Light trucks (pickups) and passenger cars. Therefore, these two vehicle types will be evaluated because larger trucks are experiencing a much lower crash rate probably because their eye height is much higher giving them much better sight distance.

Crash locations are summarized in the crash diagram shown in Figure 2 below. *Template 2-5*

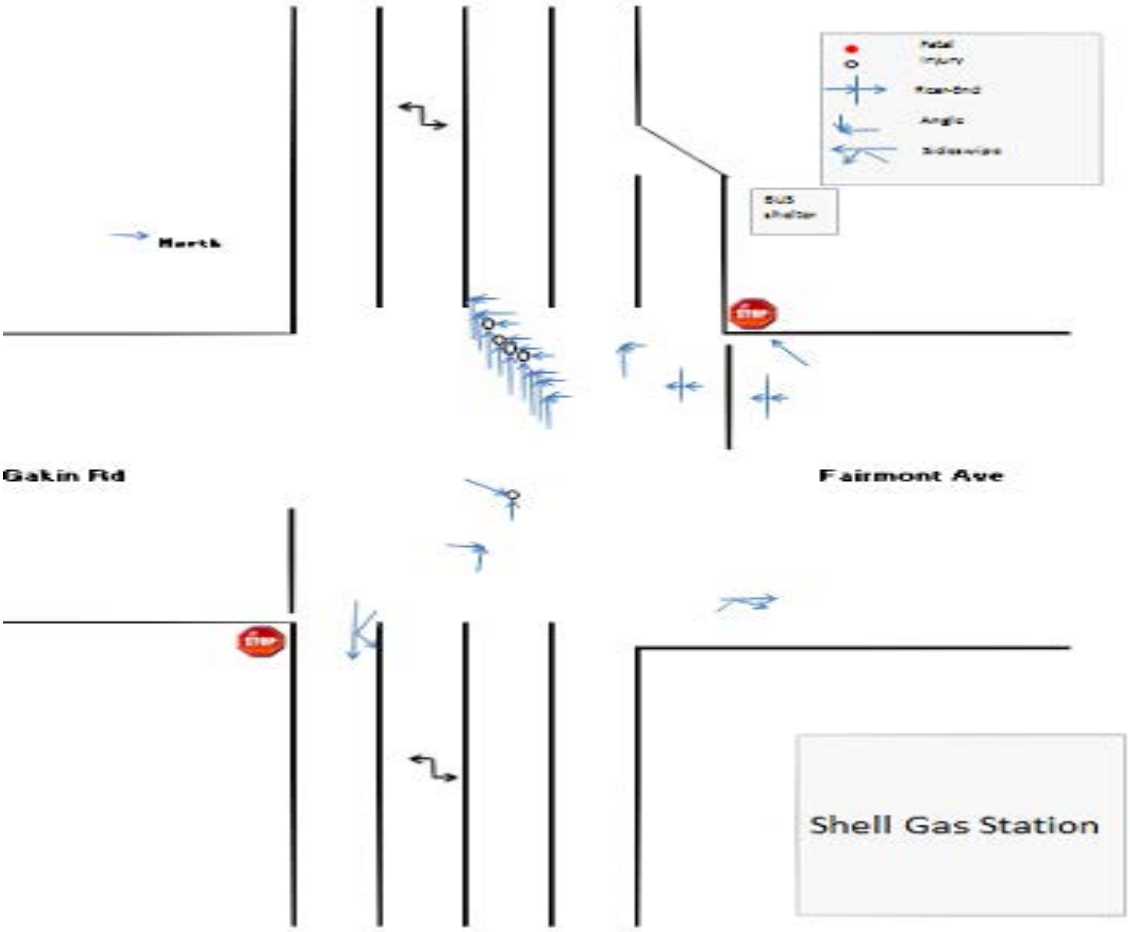


Figure 2 Crash Diagram ***Template 2-6***

As mentioned earlier, angle crashes comprise the largest percentage (71%) of the crashes. A review of police crash reports indicates that many of the angle crashes occurred on the westbound inside lane of US101. The key risk for this area is the location of the bus stop, which may impact sight distance from the approach.

Current Safety Performance ***Template 2-7***

Crashes per year for the last 5 years (see Appendix B)

Fatal & All Injury Crashes

0.4 expected Fatal and all Injury crashes per year compared to 0.3 predicted Fatal and all Injury crashes per year for 0.1 more crashes per year or 1 crash in ten years more than is typical for this type of intersection.

Property Damage Only (PDO) Crashes

0.7 expected PDO crashes per year compared to 0.5 predicted PDO crashes per year for 0.2 more crashes per year or 2 crash in ten years more crashes than is typical for this type of intersection.

ALTERNATIVE COMPARISION AND PREFERED ALTERNAYIVE SELECTION

Template 3

This intersection had 17 crashes in the past six years. Twelve crashes are angle crashes. Because of the free-flow condition on US 101, very few gaps are available for vehicles traveling from South Fairmont Avenue. ***Template 3-1.2***

Three possible countermeasures address the key risk identified above. ***Template 3-1***

- Alternative 1 – Relocate Bus pullout away from the intersection and relocate the stop sign and stop bar forward to increase sight distance and decrease the distance traveled to make a left turn.
- Alternative 2 – Install a Roundabout to reduce conflict points and to reduce crash severity.
- Alternative 3 – install a Signal to control conflict points and reduce at angel crashes.

A more detailed explanation follows.

Alternative 1– Relocate the Bus pullout and relocate the stop sign and stop bar forward (Reducing the time gap by a lane width and improving the sight triangles).

The stop sign and stop bar on South Fairmont Avenue is located approximately 12 feet back from the traveled way of the outside westbound lane of US101. A driver turning left from South Fairmont Avenue onto US 101 needs to cross the 12-foot bus pull out lane, the two 12 foot through lanes, and the 12-foot two-way turn lane. (Figure 3) As per Design Manual, Exhibit 1310-27a the current time gap needed for light trucks and passenger cars to turning left from South Fairmont Avenue in the current configuration is 10 seconds. This equates to a needed sight distance at 45 mph of 661 feet. The existing sight distance is 580 feet. ***Template 3-1.3***

Removing or relocating the bus pullout away from the intersection and moving the stop sign and bar 12 feet closer to the intersection decreases the time gap needed to 9 seconds. This equates to a needed sight distance of 595 feet. This is 66 feet less needed sight distance than is needed now. The sight distance using this alternative would be 630 feet. (Figure 4) ***Template 3-1.4***

Two Crash Modification Factors (CMFs) were chosen for this alternative (Appendix B):

Template 3-1.5

- CMF 1: CMF # 307 “Increase triangle sight distance” for all crash Types and for serious and minor injuries with a CMF of 0.53 and a star rating of 3.
- CMF 2: CMF # 308 “ Increase triangle sight distance” for all crash Types and for property damage only with a CMF of 0.89 and a star rating of 3.

These CMFs were the best available ones for this situation because; they were the only ones that matched this situation for intersection sight distance and had a star rating.

Figure 3 Current conditions

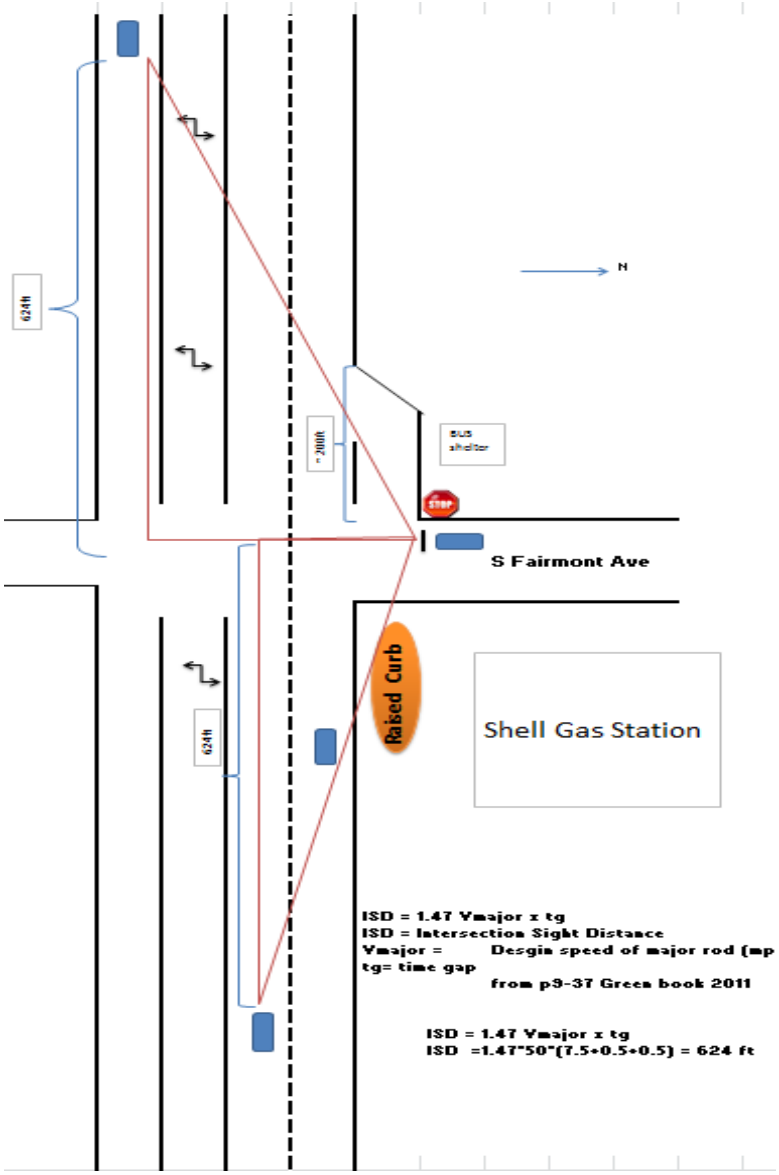
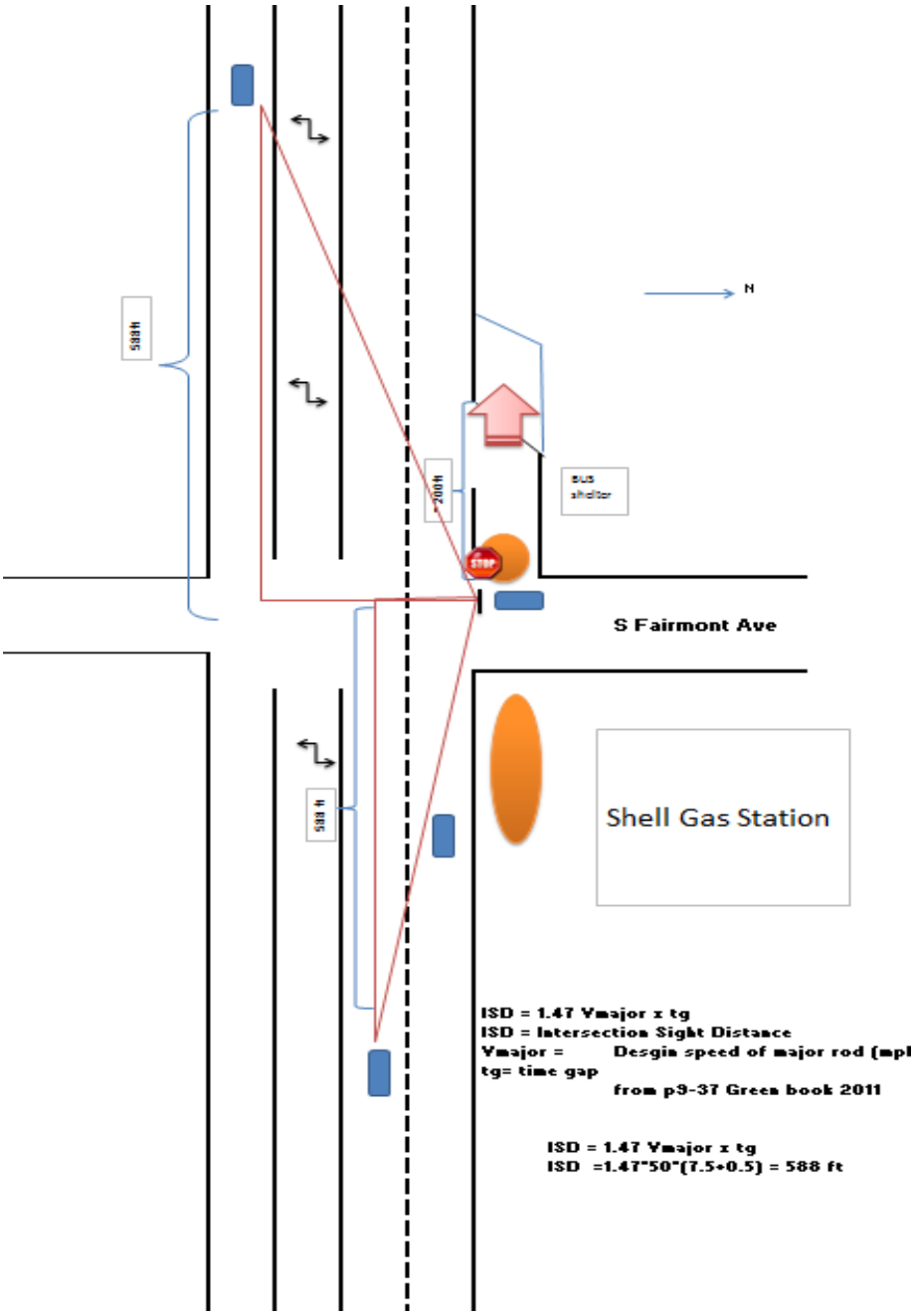


Figure 4 Alternative 1 – Move or Relocate Bus Pullout



The cost of these striping and signing changes (Alternative 1) is estimated to be $50,000.

Template 3-1.6

Alternative 2– Install a Roundabout

Roundabouts reduce right angle crashes and because of the slow entrance and circulating speed, if there is a crash, it is a low severity crash. In this situation a traffic signal would have 34 conflict points and a roundabout would have 10. Moreover, this alternative will provide additional benefit for Mobility. ***Template 3-1.3 and Template 3-1.4***

A CMF called "Conversion of stop-controlled intersection into single-lane roundabouts" (CMF # 206) with a CMF value of 0.28, with a star rating of 4 was selected from the CMF Clearinghouse for this alternative. (Appendix B) ***Template 3-1.5***

This CMF was the best one for this situation because:

- It was for converting from a minor road stop-controlled intersection.
- The main line is 45 mph. Not high speed.
- It is for a single lane roundabout
- Looking for a star rating of 3 or better.
- This analysis pin points vehicle crashes.
- Addresses all crash types.
- This is an urban area.

Figure 5 Alternative 2 – Rough Roundabout Configuration

The cost of this roundabout alternative (Alternative 2) is estimated to be $123,000. ***Template 3-1.6***

Alternative 3 – Install a Signal

Installing a signal will reduce right-angle crashes but increase, usually less severe, rear-end crashes. This location meets the MUTCD Signal Warrant 7, which is five or more crashes are reported within a 12-month period. ***Template 3-1.3 and Template 3-1.4***

The predicted crash frequency of this signal alternative is derived from the Safety Performance Function (SPF) of a signal for this specific intersection.

Template 3-1.5

The cost of this roundabout alternative (Alternative 2) is estimated to be $123,000. ***Template 3-1.6***

CRASH FREQUENCY ESTIMATE AND BENEFIT COST ANALYSIS ***Template 3-2***

The predicted average crash frequencies and the expected average crash frequencies were calculated using the crash assessment tool (CAT). The changes in expected average crash frequencies of proposed alternatives were calculated. The results of the calculations are shown in the following table. ***Template 3-2.2***

Table 7 Crash Frequencies of each alternative

Crash Frequencies (crashes/year)	Base	Alternative 1	Alternative 2	Alternative 3
Total Predicted Average	1.005	0.53265	0.28130**	0.83387
Fatal and Injury (FI) Predicted Average	0.352	0.18664	0.09860	0.29222
Property Damage Only (PDO) Predicted Average	0.653	0.34582	0.1827	0.541575
Total Vehicle Expected Average	2.337	1.23861	N/A*	N/A*
Fatal and Injury (FI) Vehicle Expected Average	0.819	0.43407	N/A*	N/A*
Property Damage Only (PDO) Vehicle Expected Average	1.518	0.80454	N/A*	N/A*
Total Vehicle-Pedestrian Expected Average**	N/A	N/A	N/A	N/A*
Total Vehicle-Bicycle Expected Average**	N/A	N/A	N/A	N/A

*Total vehicle expected average was not calculated for Alternative 2 and 3 since the intersection control type changed.

*Total predicted injury crashes plus total predicted property damage only crashes.

The benefit cost ratio for alternatives are calculated to determine the most valuable countermeasures of this intersection.

Table 8 Economic Appraisal ***Template 3-2.5***

	Years of service	Crash Modification Factor (CMF)	Cost Estimate	Present Value of Estimated Change in Crash Frequency	Benefit/ Cost
Alternative 1	10	0.53	$50,000	$65,890	1.32
Alternative 2	20	0.28	$2,000,000	$123,000	0.06
Alternative 3	20	0.83	$500,000	$90,172	0.18

** Societal Cost of Fata/ injury is $158,200 (FHWA). Societal Cost of PDO is $ 7,000 (WSDOT)

PREFERED ALTERNATIVE / COUNTERMEASURES *Template 4*

Our recommendation is Alternative 1, which is relocating the bus pullout and the existing stop sign and stop line forward. The benefit cost ratio of Alternative 1 is 1.32 which is economically justified. This solution should reduce the number of crashes at this intersection. ***Template 4.1***

APPENDIXIES

Appendix A: Crash Summary Report *Template 5*

1. Crash Summary

This is a summary of the accident data associated with the following Intersection from the **EntireSR** data set, created on Jan 25, 2012 3:03 PM:

Route US 101, Milepost 245.15 (Intersection 101245.8700A)

The details for this site are listed in the next section.

Notes:
The summary includes **20 Total Accidents** spanning the dates **1/1/2004** to **12/31/2010**.

Dates excluded from the summary period due to major reconstruction: **option not selected when specifying the analysis period.**

1.1 Accident Month

The month in which the accident occurred.

Table 1. Accident Month

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
January	2	0	0	0	0	1	0	3	15	8
March	0	0	0	0	0	0	1	1	5	8
April	1	0	0	0	1	0	0	2	10	8
May	0	0	1	1	1	0	0	3	15	8
June	0	0	0	0	0	0	1	1	5	8
July	0	0	0	0	1	1	0	2	10	9
August	0	0	0	0	1	0	1	2	10	8
September	0	0	1	1	0	0	0	2	10	8
October	0	0	0	1	0	0	0	1	5	9
November	0	0	1	0	0	0	0	1	5	9
December	0	1	0	1	0	0	0	2	10	9
Total Accidents	3	1	3	4	4	2	3	20	100	100

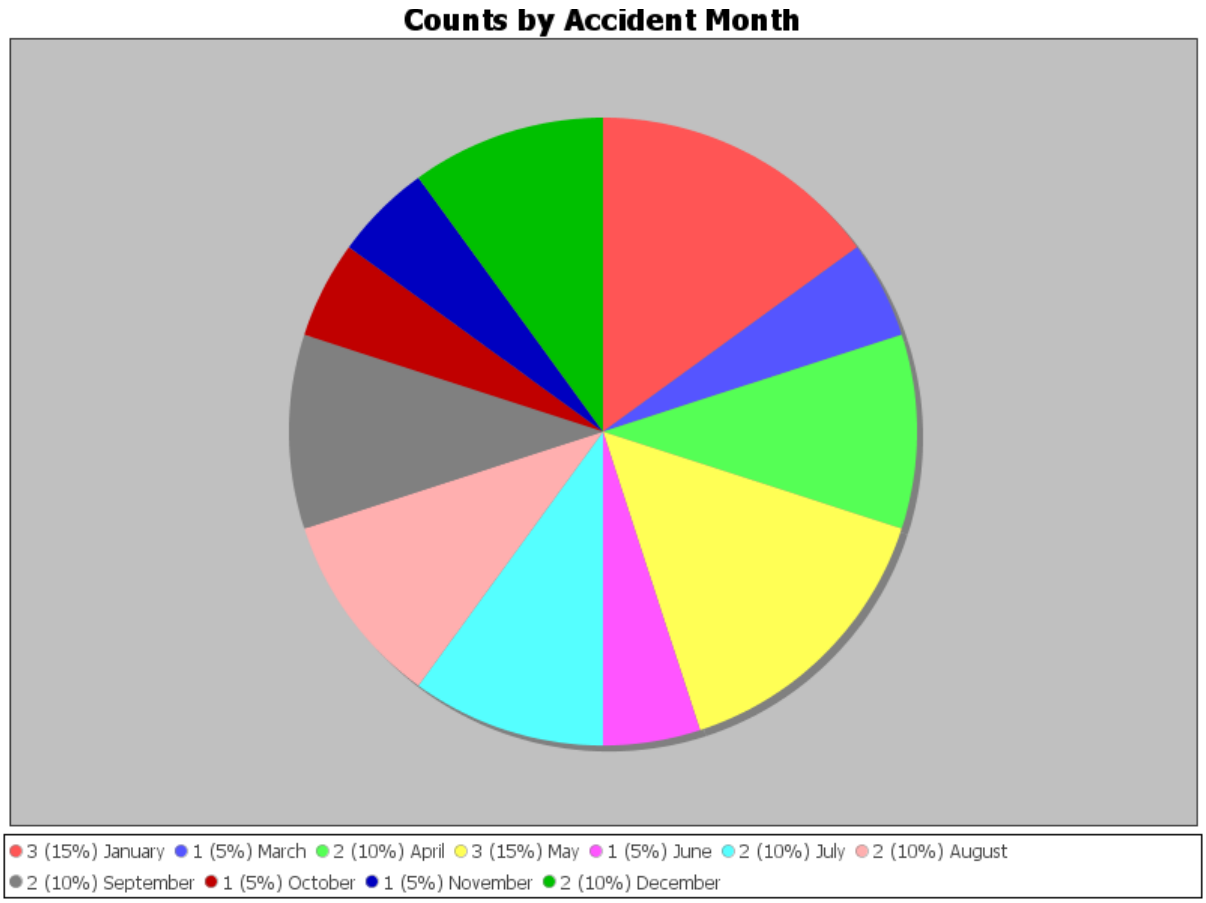


Figure 1. Counts by Accident Month

1.2 Accident Severity Level 1

The severity of the accident based on the most severe injury to any person involved.

Table 2. Accident Severity Level 1

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Fatal Injury	1	0	0	0	0	0	0	1	5	N/A
Severe Injury	1	0	0	0	1	0	0	2	10	N/A
Non-Incapacitating Injury	0	0	0	2	1	0	0	3	15	N/A
Possible Injury	0	0	0	1	1	2	3	7	35	N/A
Property-Damage-Only	1	1	3	1	1	0	0	7	35	N/A
Total Accidents	3	1	3	4	4	2	3	20	100	N/A

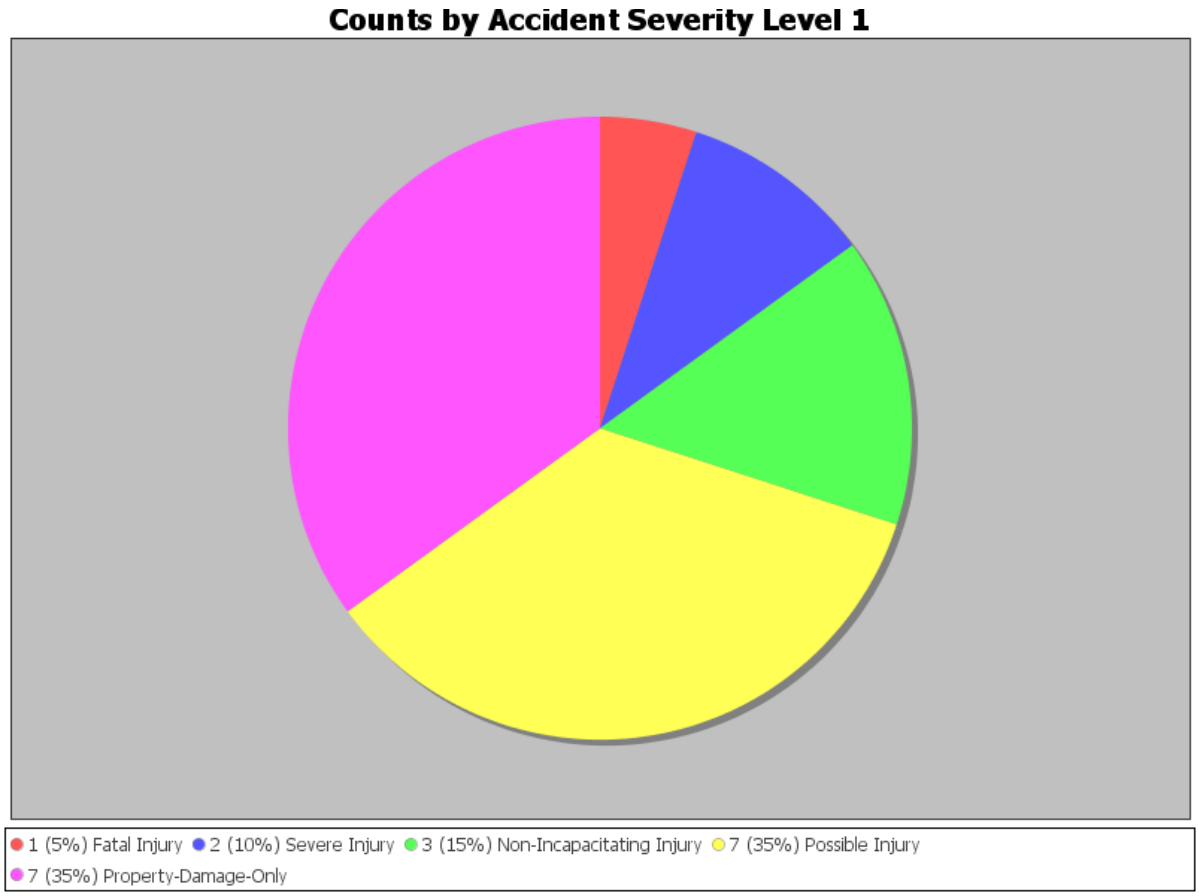


Figure 2. Counts by Accident Severity Level 1

1.3 Accident Time of Day

The time (hour and minute) at which the accident occurred.

Table 3. Accident Time of Day

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
12:00 am to 12:59 am	3	1	3	4	4	2	3	20	100	N/A
Total Accidents	3	1	3	4	4	2	3	20	100	N/A

1.4 Accident Type and Manner of Collision

The type of first harmful event in a single-vehicle crash or, in a multiple-vehicle crash, manner in which two vehicles in transport initially came together without regard to the direction of force, or the type of object with which a single vehicle collided.

Table 4. Accident Type and Manner of Collision

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Collision with fixed object	0	0	1	0	0	0	0	1	5	4
Rear-end	0	1	1	0	0	0	0	2	10	21
Angle	3	0	0	4	4	1	3	15	75	46
Other multiple-vehicle collision	0	0	1	0	0	1	0	2	10	20
Total Accidents	3	1	3	4	4	2	3	20	100	100

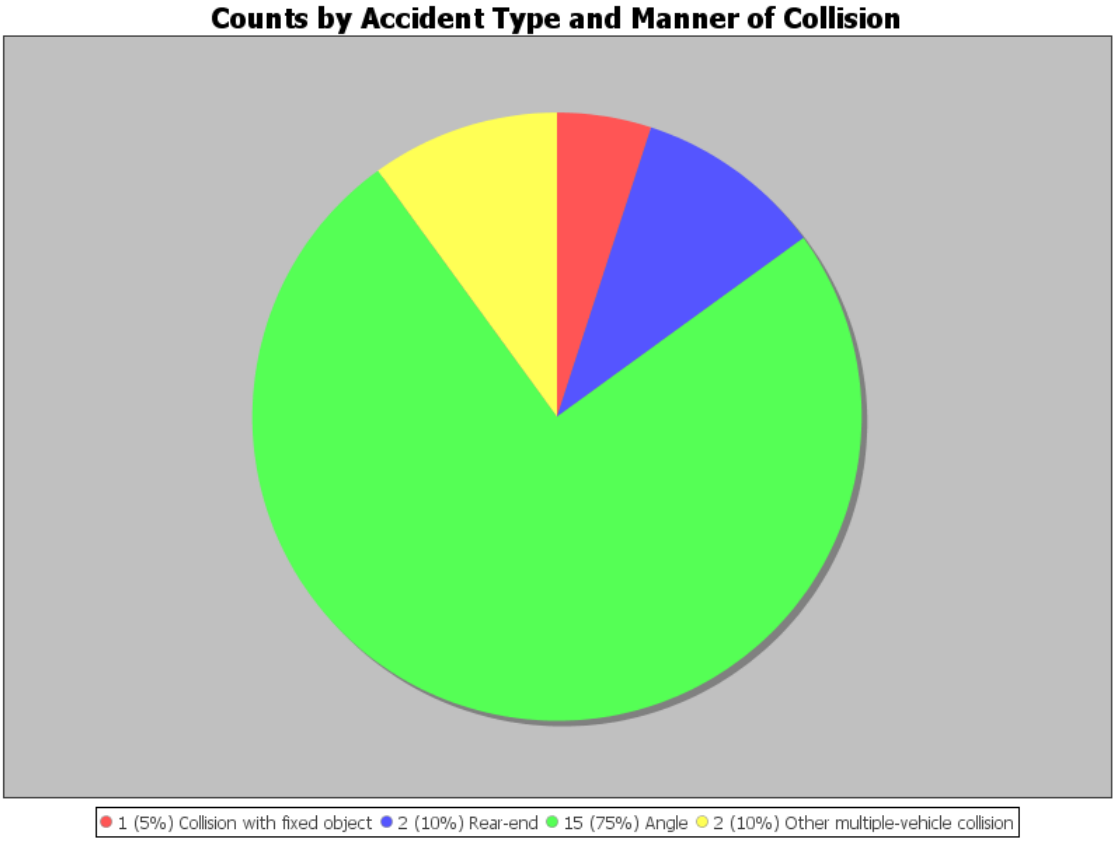


Figure 4. Counts by Accident Type and Manner of Collision

1.5 Alcohol/Drug Involvement

1.6 Bicycle Indicator

There are no reported bicycle crashes.

1.9 Day of Week

The day of the week on which the accident occurred.

Table 6. Day of Week										
Description	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**	**Observed Percent**	**Average Percent**
Monday	0	0	2	0	0	0	1	3	15	14
Tuesday	1	0	0	1	2	1	2	7	35	16
Wednesday	1	0	0	2	0	1	0	4	20	16
Thursday	1	0	0	1	1	0	0	3	15	16
Friday	0	1	0	0	0	0	0	1	5	18
Saturday	0	0	1	0	1	0	0	2	10	12
Total Accidents	3	1	3	4	4	2	3	20	100	100

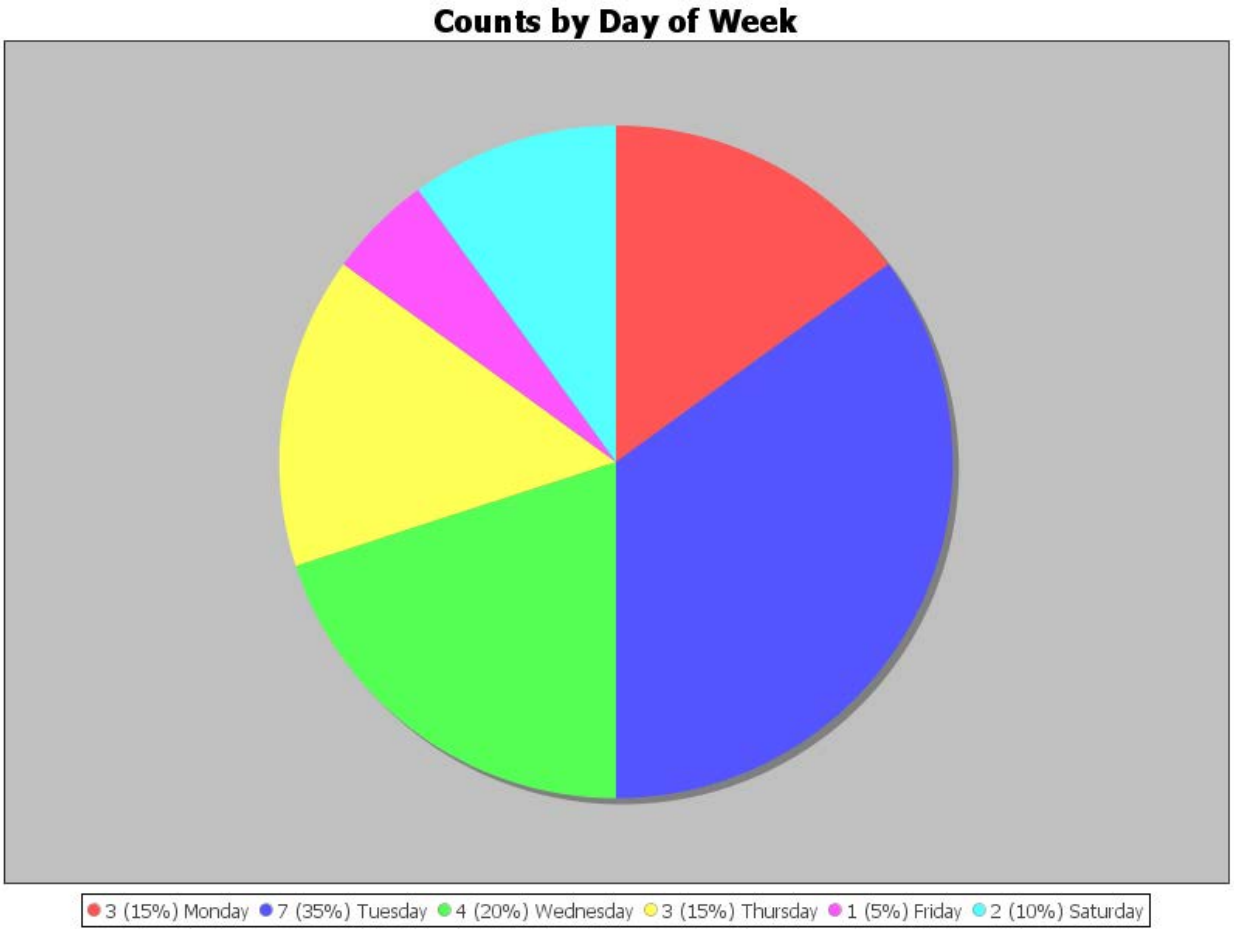


Figure 6. Counts by Day of Week

1.11 Driveway Indicator

No crashes occurred at or near a driveway junction.

1.12 Fire Resulted Indicator

No crashes resulted in a fire.

1.13 First Harmful Event

1.14 First Object Struck

One crash was reported as striking a sign. No other strikes were reported.

1.15 Hit and Run Indicator

There were no hit and run crashes reported.

1.17 Intersection Relationship

All selected crashes were intersection related.

1.18 Light Condition

The type/level of lighting that existed at the time of the accident.

Table 13. Light Condition

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Daylight	1	1	3	3	4	1	3	16	80	76
Dark-lighted	0	0	0	1	0	0	0	1	5	15
Dark-not lighted	1	0	0	0	0	0	0	1	5	1
Dark-unknown lighting	1	0	0	0	0	1	0	2	10	3
Total Accidents	3	1	3	4	4	2	3	20	100	100

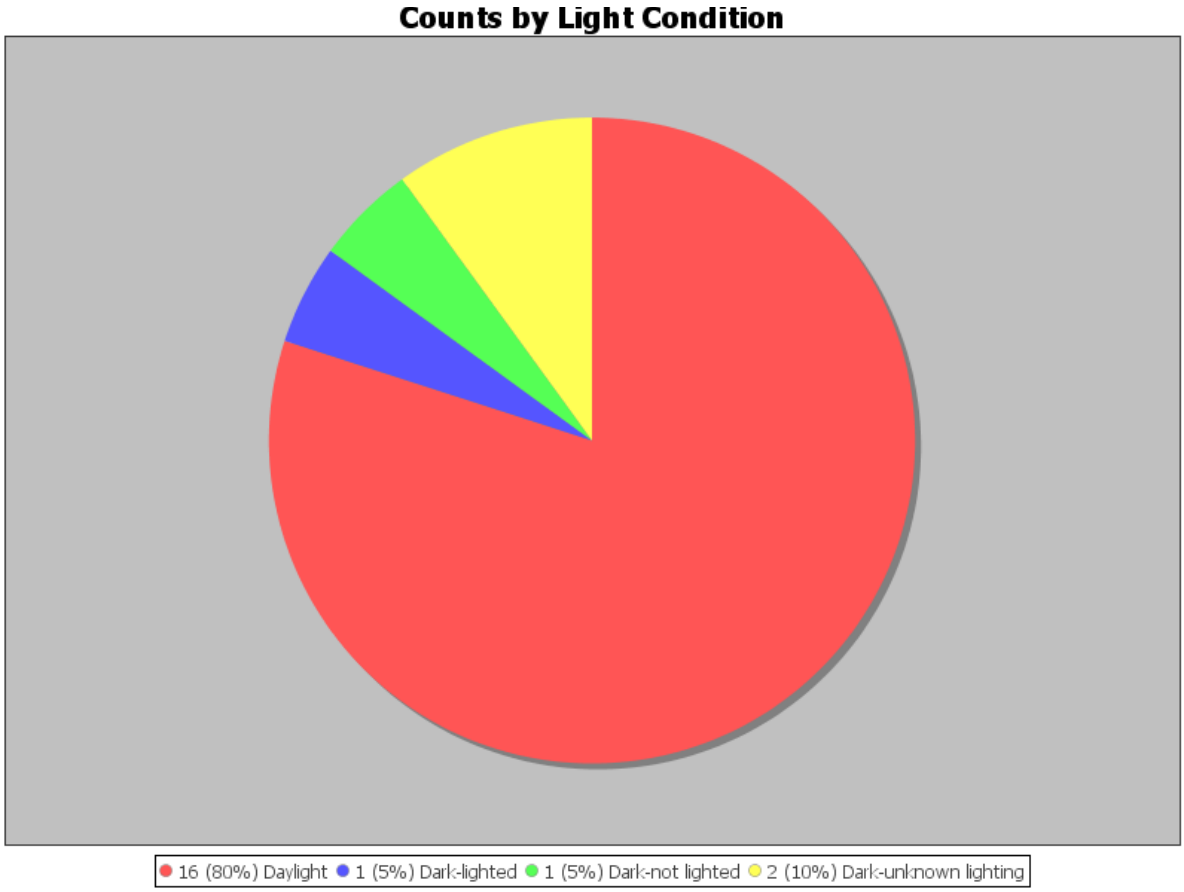


Figure 13. Counts by Light Condition

1.19 MV Alcohol Impaired Indicator

Only one crash in 2006 was reported as alcohol impaired.

1.20 MV Alcohol Related Indicator

Only two crashes one in 2004 and one in 2006 were reported as alcohol impaired.

1.22 MV Speed Related Indicator

There were no crashes at which speed was reported as a factor.

1.23 Most Severe Injury Type

Table 18. Most Severe Injury Type

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent

Table 18. Most Severe Injury Type										
Description	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**	**Observed Percent**	**Average Percent**
Unknown	1	0	0	0	0	0	0	1	5	2
No Injury	1	1	3	1	1	0	0	7	35	59
Serious Injury	1	0	0	0	1	0	0	2	10	2
Evident Injury	0	0	0	2	1	0	0	3	15	10
Possible Injury	0	0	0	1	1	2	3	7	35	26
Total Accidents	3	1	3	4	4	2	3	20	100	100

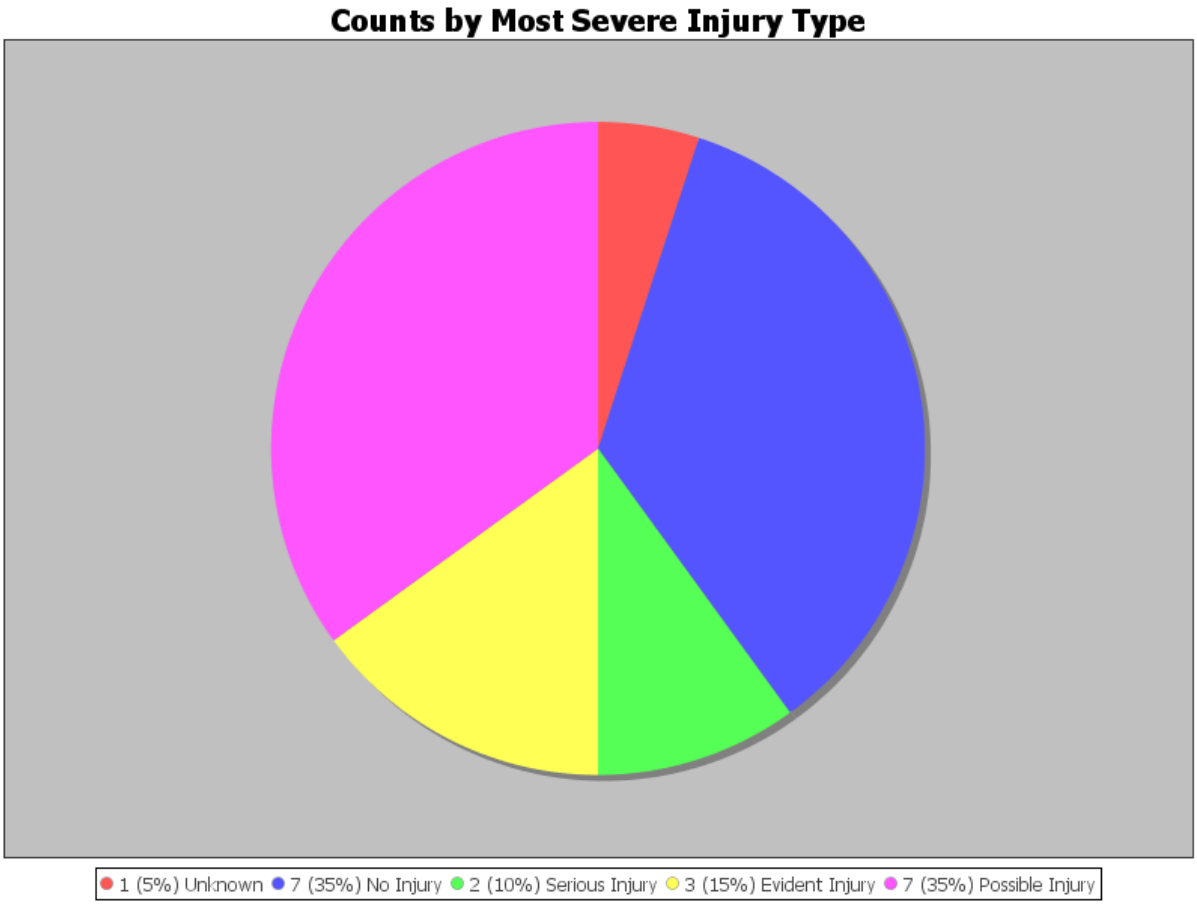


Figure 18. Counts by Most Severe Injury Type

1.24 Number of Vehicles Involved

The count of motor vehicles (e.g., automobiles, single-unit trucks, truck combinations that are in motion or on a roadway) involved in the accident. (Note: Parked vehicles are not included in this vehicle count, nor are bicycles and pedestrians.)

All of the crashes were 2 vehicle crashes except for one in 2006.

1.25 Pedestrian Indicator

There were no reported pedestrian crashes.

1.27 Roadway Surface Condition

The roadway surface condition at the time and place of the accident.

Table 22. Roadway Surface Condition

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Dry	2	1	2	4	4	1	2	16	80	72
Wet	1	0	1	0	0	1	1	4	20	24
Total Accidents	3	1	3	4	4	2	3	20	100	100

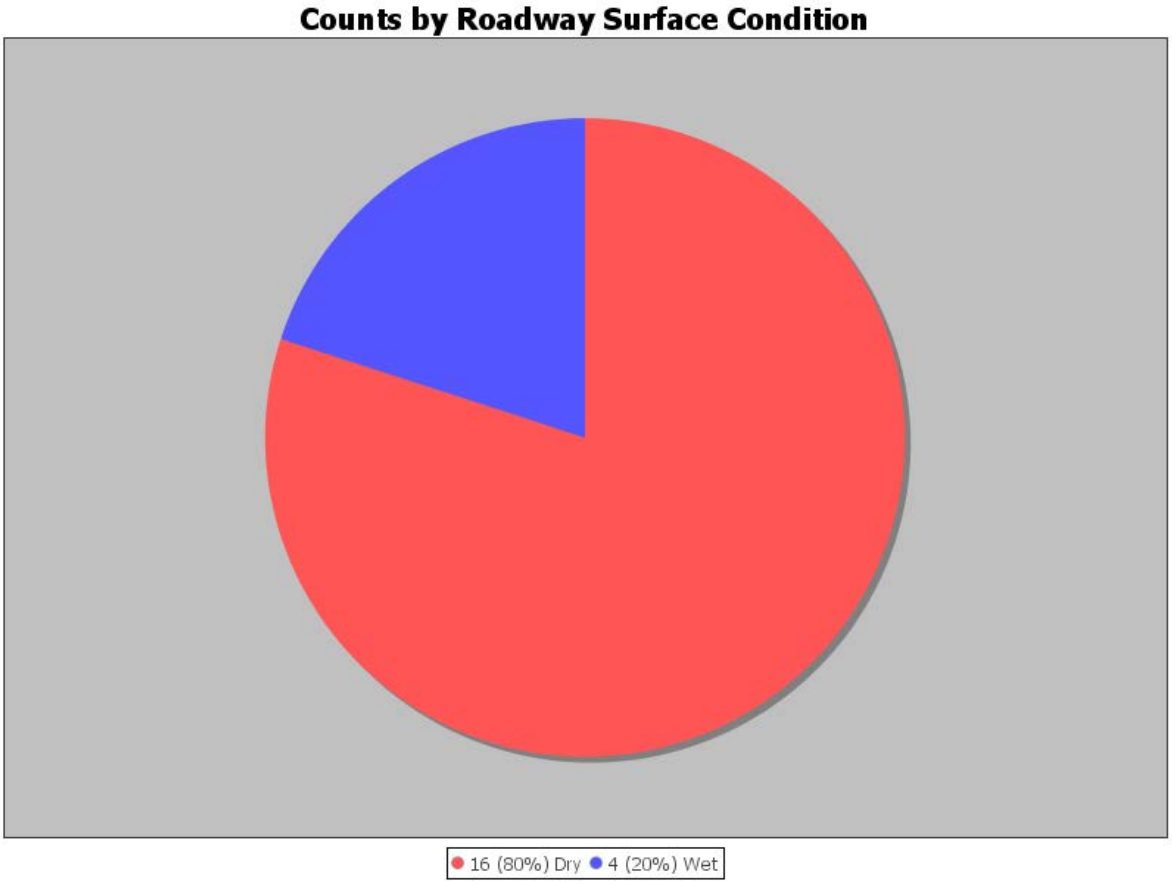


Figure 22. Counts by Roadway Surface Condition

1.28 Run-Off Road Indicator

Indicates whether any vehicle involved in the accident ran off the roadway.

Table 23. Run-Off Road Indicator

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
No	0	0	0	4	4	2	3	13	65	51
Unknown	3	1	3	0	0	0	0	7	35	48
Total Accidents	3	1	3	4	4	2	3	20	100	100

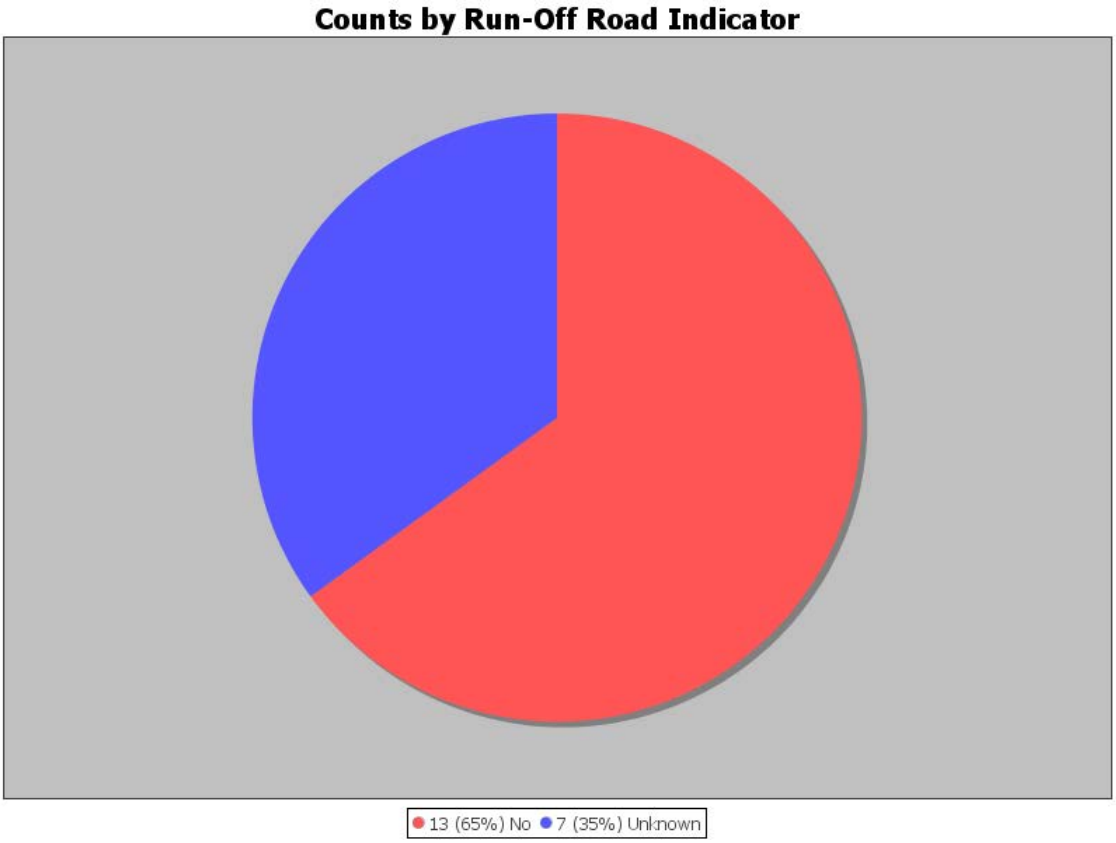


Figure 23. Counts by Run-Off Road Indicator

1.29 School Bus Related

Indicates if a school bus or vehicle functioning as a school bus for a school-related purpose was involved in the accident. The school bus, with or without a passenger on board, must be directly involved as a contact vehicle or indirectly involved as a non-contact vehicle.

None of the crashes reported school bus involvement.

1.31 Tow-Away Indicator

Indicates whether any vehicle involved in the accident was towed away from the scene.

Table 26. Tow-Away Indicator

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Yes	0	0	0	3	3	1	2	9	45	26
No	0	1	2	1	0	1	1	6	30	43
Unknown	3	0	1	0	1	0	0	5	25	30
Total Accidents	3	1	3	4	4	2	3	20	100	100

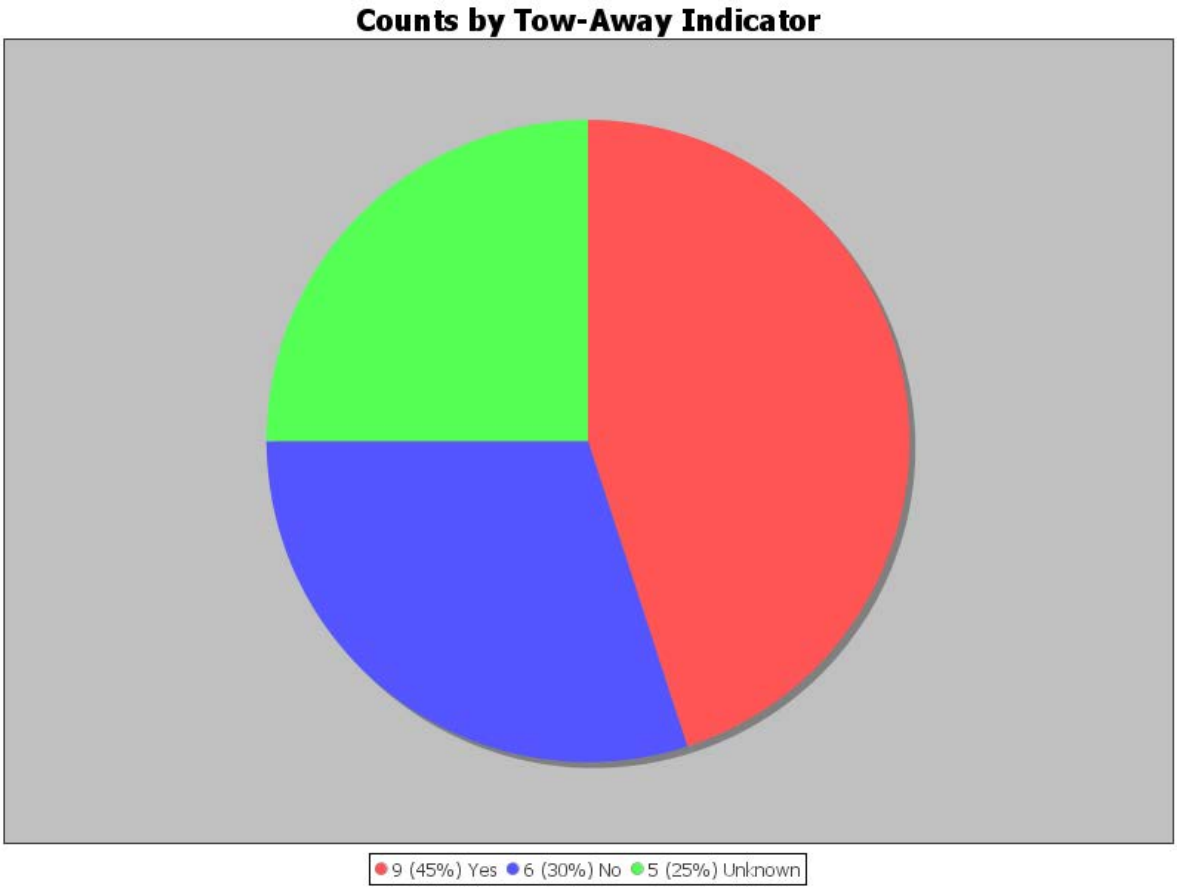


Figure 26. Counts by Tow-Away Indicator

1.32 Vehicle Configuration

Indicates the general configuration of the vehicle.

Table 27. Vehicle Configuration

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Passenger car	3	1	2	2	3	3	3	17	44	N/A
Light truck, only four tires	2	1	3	5	5	1	3	20	51	N/A
Truck tractor/semi-trailer	0	0	0	1	0	0	0	1	3	N/A
Bus	1	0	0	0	0	0	0	1	3	N/A
Total Vehicles	6	2	5	8	8	4	6	39	100	N/A

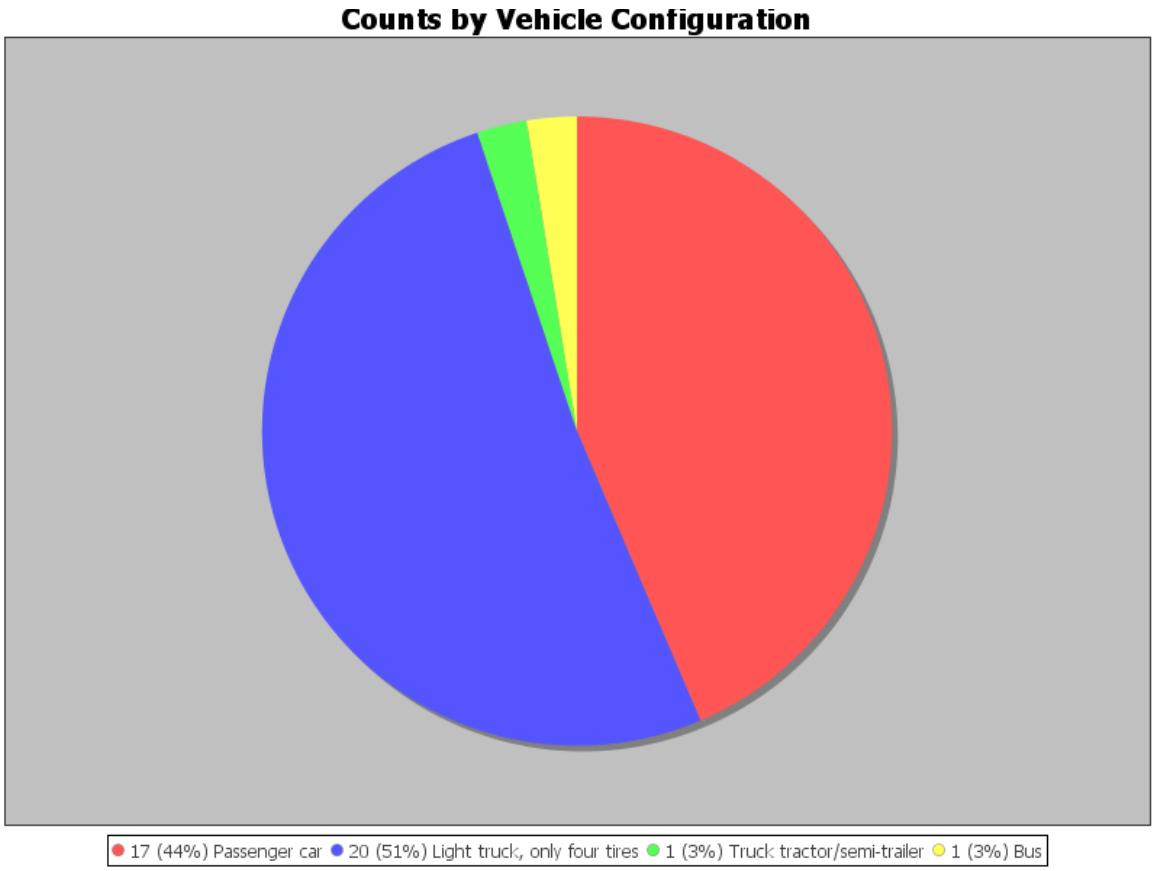


Figure 27. Counts by Vehicle Configuration

1.33 Vehicle Maneuver/Action

The controlled maneuver that the vehicle was doing prior to the first event in the sequence of events for this vehicle.

Table 28. Vehicle Maneuver/Action

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Movements essentially straight ahead	4	1	2	3	4	2	4	20	51	N/A
Changing lanes	0	0	0	1	0	0	0	1	3	N/A
Turning right	0	0	1	0	0	0	0	1	3	N/A
Turning left	2	0	1	4	4	2	2	15	38	N/A
Stopped in traffic	0	1	1	0	0	0	0	2	5	N/A
Total Vehicles	6	2	5	8	8	4	6	39	100	N/A

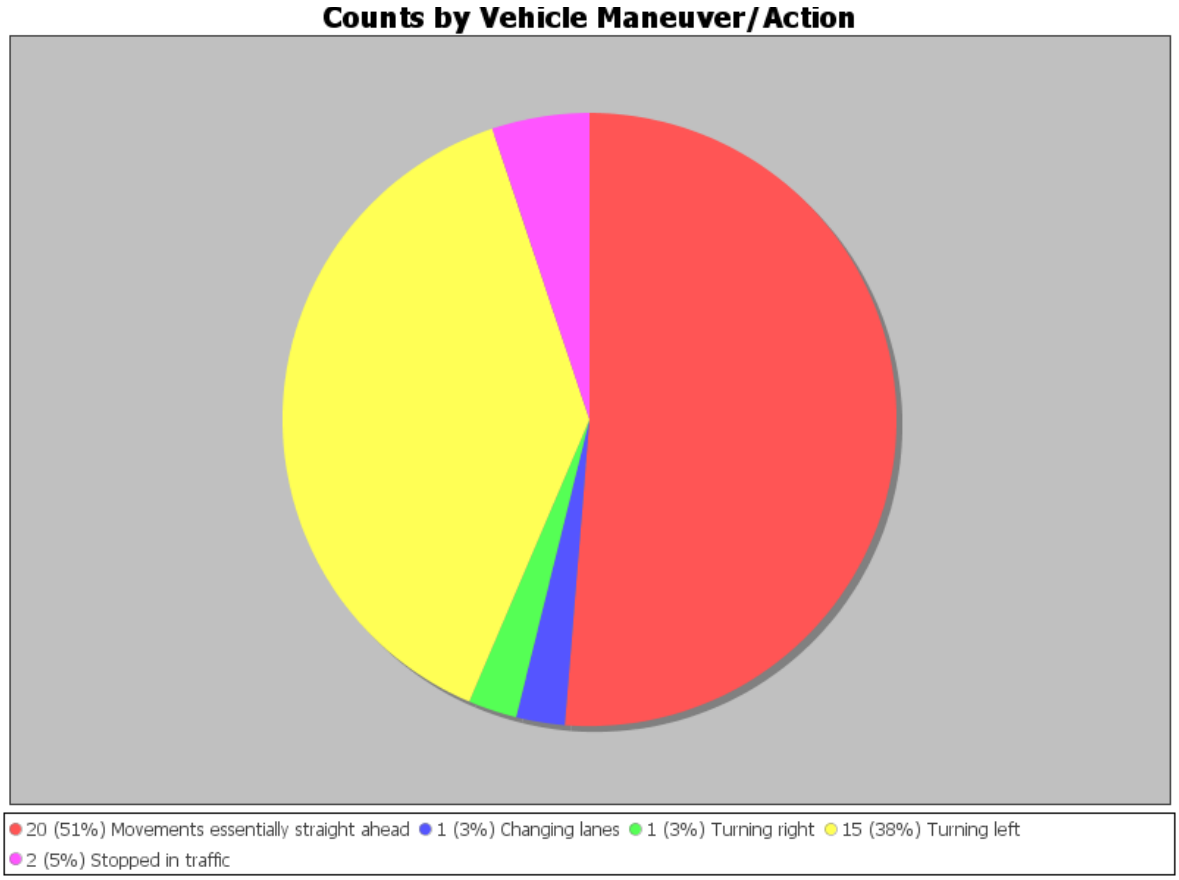


Figure 28. Counts by Vehicle Maneuver/Action

1.34 Vehicle Turning Movement

Characterization of multiple vehicle accidents where any involved vehicle was performing a turning maneuver prior to impact. Any left turn maneuver or U-turn maneuver will take precedence over any right turn maneuver. For example, if Vehicle 1 made a left turn and Vehicle 2 made a right turn, then this data item will be classified as a left turn accident. Even though the first level of this data element is labeled Left turn, the left turn category also includes U-turn accidents.

Table 29. Vehicle Turning Movement

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Left turn	2	0	1	4	4	2	2	15	75	34
No-turn	1	1	2	0	0	0	1	5	25	55
Total Accidents	3	1	3	4	4	2	3	20	100	100

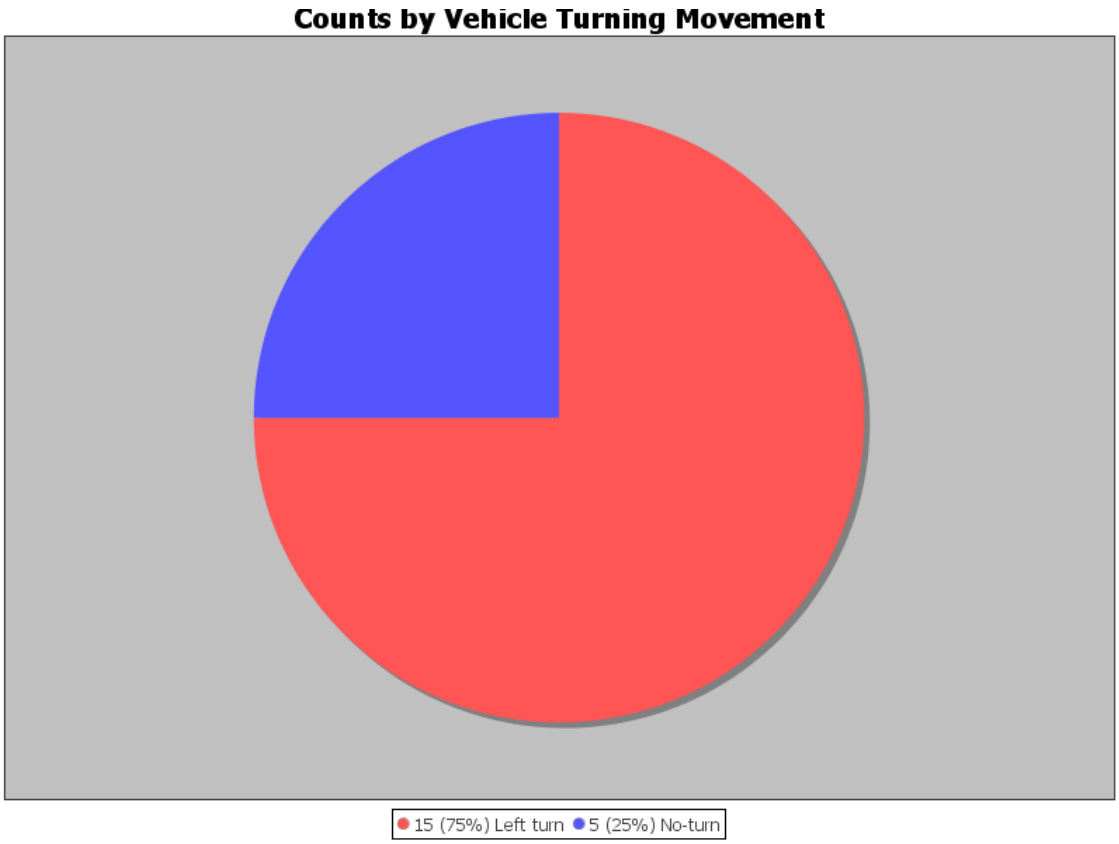


Figure 29. Counts by Vehicle Turning Movement

1.35 Weather Condition

The main prevailing atmospheric conditions that existed at the time of the accident.

Table 30. Weather Condition

Description	2004	2005	2006	2007	2008	2009	2010	Total	Observed Percent	Average Percent
Clear	1	1	2	4	4	2	2	16	80	64
Cloudy	2	0	1	0	0	0	0	3	15	18
Rain	0	0	0	0	0	0	1	1	5	15
Total Accidents	3	1	3	4	4	2	3	20	100	100

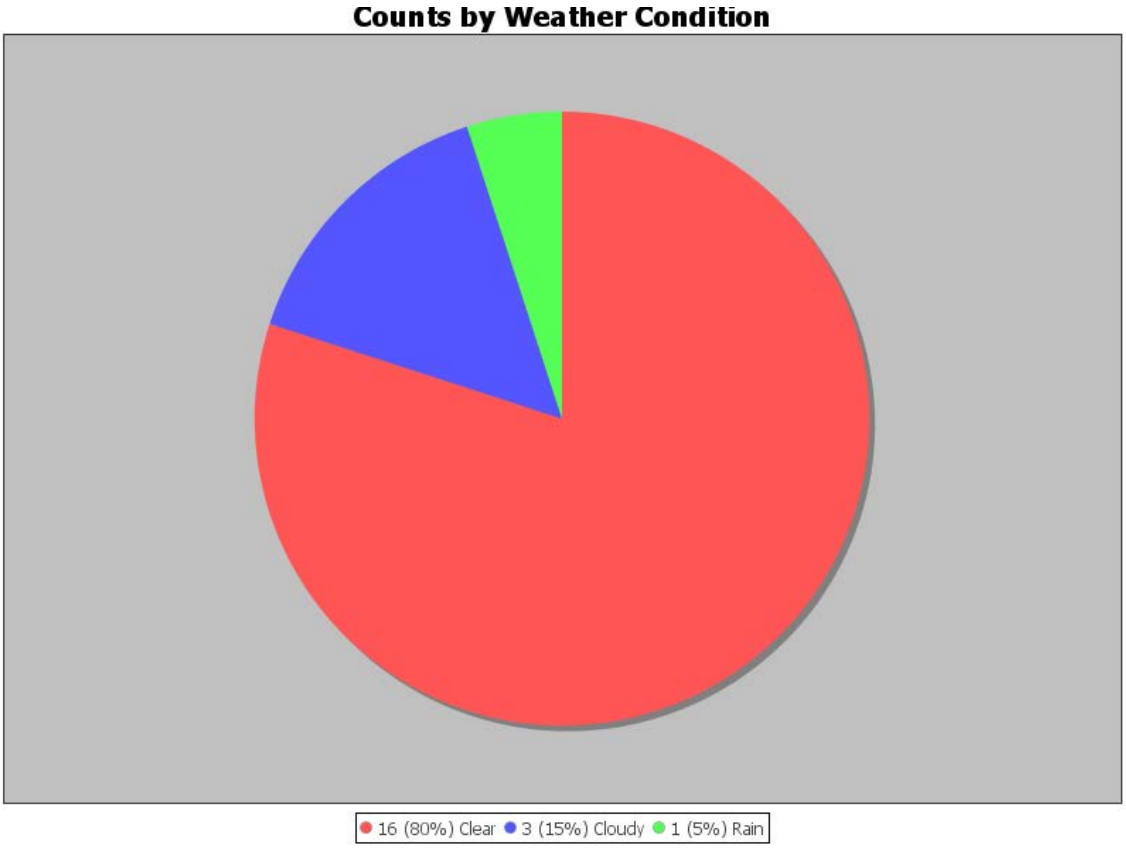


Figure 30. Counts by Weather Condition

1.36 Work Zone Related

Appendix B: Current Safety Performance

HSM Urban/Suburban Model expanded spreadsheet input sheet:

WORKSHEET 2A – GENERAL INFORMATION AND INPUT DATA FOR URBAN AND SUBURBAN ARTERIAL INTERSECTIONS			
General Information		**Location Information**	
Analyst	John Tevis	Roadway	US 101
Agency or Company	WSDOT - HQ Design	Location Information	MP 245.87
Date Performed	1/21/2014	Jurisdiction	US 101 & Fairmont Ave
Intersection	Intersection 1	Analysis Year	2012
Signalized/Unsignalized	Unsignalized		

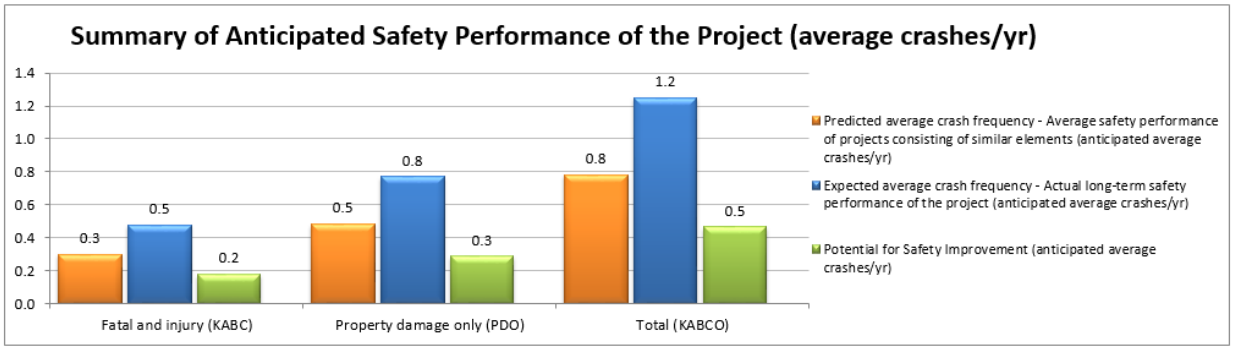
Input Data				**Site Conditions**
Intersection type (3ST, 3SG, 4ST, 4SG)				4ST
AADT $_{major}$ (veh/day) (total entering on major approaches)*	$AADT_{MAX}$ =	46,800	(veh/day)	10,931
AADT $_{minor}$ (veh/day) (total entering on minor approaches)*	$AADT_{MAX}$ =	5,900	(veh/day)	1,000
Intersection lighting (present/not present)				Present
Calibration factor, C_i				1.00
Data for unsignalized intersections only:				
Number of major-road approaches with left-turn lanes (0,1,2)				2
Number of major-road approaches with right-turn lanes (0,1,2)				1
Data for signalized intersections only:				
~~Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]~~				~~0~~
~~Number of approaches with right-turn lanes: for 4SG, use maximum value of 4, all other, max 2)~~				~~0~~
~~Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]~~				~~0~~
~~Type of left-turn signal phasing for Leg #1~~				
~~Type of left-turn signal phasing for Leg #2~~				
~~Type of left-turn signal phasing for Leg #3~~				
~~Type of left-turn signal phasing for Leg #4 (if applicable)~~				
~~Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]~~				~~0~~
~~Intersection red light cameras (present/not present)~~				~~Not Present~~
~~Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only~~				
~~Maximum number of lanes crossed by a pedestrian (n_{lanes})~~				
~~Number of bus stops within 300 m (1,000 ft) of the intersection~~				~~0~~
~~Schools within 300 m (1,000 ft) of the intersection (present/not present)~~				~~Not Present~~
~~Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection~~				~~0~~

Average Annual Crash History (3 or 5-yr average)			
Multiple vehicle crashes	KABC	Fatal and Injury Only	1.4
	PDO	Property Damage Only	1.0
Single-vehicle crashes	KABC	Fatal and Injury Only	0.6
	PDO	Property Damage Only	1.2

HSM Urban/Suburban Model expanded spreadsheet report sheet:

Agency/Company	WSDOT - HQ Design
Contact Email	TevisJ@WSDOT.WA.Gov
Contact Phone	(360) 705-7460
Date Completed	01/21/14

PROJECT SUMMARY



Project Element	Total Crashes/yr (KABCO)			Fatal and Injury Crashes/yr (KABC)			Property Damage Only Crashes/yr (PDO)		
	Predicted average crash frequency	Expected average crash frequency	Potential for Improvement	Predicted average crash frequency	Expected average crash frequency	Potential for Improvement	Predicted average crash frequency	Expected average crash frequency	Potential for Improvement
	$N_{predicted\ (KABCO)}$	$N_{expected\ (KABCO)}$		$N_{predicted\ (KABC)}$	$N_{expected\ (KABC)}$		$N_{predicted\ (O)}$	$N_{expected\ (O)}$	
INDIVIDUAL INTERSECTIONS									
Intersection 1	0.8	1.2	0.5	0.3	0.5	0.2	0.5	0.8	0.3
COMBINED (sum of column)	0.8	1.2	0.5	0.3	0.5	0.2	0.5	0.8	0.3

PROJECT SUMMARY -- Site-Specific EB Method Summary Results for Urban and Suburban Arterial Project

Crash severity level	$N_{predicted(PROJECT)}$ Predicted average crash frequency - Average safety performance of projects consisting of similar elements (anticipated average crashes/yr)	$N_{expected\ (PROJECT)}$ Expected average crash frequency - Actual long-term safety performance of the project (anticipated average crashes/yr)	$N_{potential\ for\ improvement\ (PROJECT)}$ Potential for Safety Improvement (anticipated average crashes/yr)
Fatal and injury (KABC)	0.3	0.5	0.2
Property damage only (PDO)	0.5	0.8	0.3
Total (KABCO)	0.8	1.2	0.5

Discussion of Results

Given the potential effects of project characteristics on safety performance, results indicate that:

1. It is anticipated that the project will, on average, experience 1.2 crashes per year (0.5 fatal and injury crashes per year; and 0.8 property damage only crashes per year).

2. A similar project is anticipated, on average, to experience 0.8 crashes per year (0.3 fatal and injury crashes per year; and 0.5 property damage only crashes per year).

3. It is anticipated the project has, on average, a potential for safety improvement of 0.5 crashes per year (0.2 fatal and injury crashes per year; and 0.3 property damage only crashes per year).