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PARAISO SPRINGS RESORT

MONTEREY COUNTY, CALIFORNIA

TRAFFIC ANALYSIS REPORT

Final Revised Draft Report

Prepared For

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1 INTRODUCTION

The Paraiso Hot Springs is proposed to be redeveloped as a 103-room destination resort with various ancillary facilities, 17 detached timeshare villas, and 60 attached timeshare units. Prior to 2005, the project consisted of 33 rental units, 8 mobile homes and 20 trailer hookups for the campgrounds, and was open for day guests as well. It is currently closed to the public and is occupied by two caretakers. The project is located at the end of Paraiso Springs Road, southwest of the City of Soledad in the western portion of the Salinas Valley in Monterey County, California. The location of the study project is shown in **Exhibit 1**. The proposed project site plan is shown in **Exhibit 2**.

The project is expected to generate additional traffic compared to its current use and marginally increase traffic compared to its historical use when fully developed. The roadway segments that will be affected are Paraiso Springs Road, Arroyo Seco Road, Clark Road, River Road, Fort Romie Road, and Foothill Road. The intersection expected to be most directly impacted by the project is the Paraiso Springs Road/Clark Road intersection, which is located just over one mile east of the project site. The studied road system is analyzed for level of service and other operational characteristics for Existing, Existing Plus Project and General Plan traffic conditions.

This study complies with the California Environmental Quality Act (CEQA) with respect to determination of the level of project impacts and the corresponding requirements for impact mitigation. The specific CEQA guidelines for analyzing project impacts are stated in CEQA Appendix G: Environmental Checklist Form, Section XVI Transportation/Traffic, and are posed in the following series of questions.

Would the project:

A. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersection, streets, highways and freeways, pedestrian and bicycle paths and mass transit?

B. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for roads or highways?

C. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

D. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

E. Result in inadequate emergency access?

F. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Questions C, E and F are not applicable to the project, or the project has no impacts associated in these areas. Specifically, Question C is not applicable to the project because no air traffic is associated with or near the project. Question E refers to the adequacy of emergency access. As indicated in the following report, the project will not result in additional congestion to the study area, and so will have adequate emergency access with respect to the public road system providing access to the project site. In answer to question F, the project does not conflict with any adopted policies, plans or programs supporting alternative transportation.

This study focuses on answering Questions A and B, which pertain to adopted policies associated with off-site level of service, and Question D, which pertains to safety impacts. A brief section is also included that addresses Question F, which is related to parking adequacy.

Note: This version of the report incorporates revisions that were identified though a previous peer review, such as an updated project trip generation estimate (with additional background regarding its derivation) and an updated roadway safety analysis. It also includes an updated Existing Conditions analysis and applicant-proposed roadway upgrades to Paraiso Springs Road west of Clark Road.

Level of Service Impact Analysis

The County of Monterey thresholds of significance policy is the standard for determining whether the project would represent a significant impact in accordance with the CEQA policies quoted above. Its relevant sections for this project are associated with un-signalized intersections and road segment, and are as follows:

A significant impact at an **unsignalized study intersection** is defined to occur under the following conditions:

- The addition of project traffic causes any traffic movements to operate at LOS F, or any traffic signal warrant to be met.

A significant impact on a **study roadway segment** is defined to occur under the following conditions:

- The addition of project traffic causes a roadway segment operating at LOS A through LOS E to degrade to a lower level of service D, E or F, or

- The addition of one project trip is added to a segment already operating at LOS F.

Safety Impact Analysis

The County of Monterey has not established standards for determining whether the project would "substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses." Therefore, this study employs predicted accident experience compared to state-wide accident rates, which is a standard method employed in deciding whether collision history on a roadway is problematic. Technical procedures documented in the *Highway Safety Manual* were used to calculate the relative increase in accident frequency as a result of the development of the project.

2 EXISTING TRAFFIC CONDITIONS

Access to the project is provided solely by Paraiso Springs Road between the project and Clark Road. Although this section of Paraiso Springs Road allows two-way traffic, there is currently no centerline pavement striping. Pavement width on Paraiso Springs Road varies from less than 16 feet immediately east of the project to between 20 and 22 feet in the vicinity of Clark Road. Currently, as well as historically, very little traffic utilizes this road, which serves the existing Paraiso Hot Springs, agricultural fields, several residences and a small vineyard. The roadway has no congestion.

The American Association of State Highway and Transportation Officials Geometric Design Guidelines for Low Volume Roads, states that "cross section widths of existing roads need not be modified except in those cases where there is evidence of a site-specific safety problem" (p. 20). The guidelines further indicate "the designer is discouraged at most sites from making unnecessary geometric design and roadside improvements" (p.16). More discussion about existing and future roadway safety along Paraiso Springs Road can be found within Chapter 6 of this report.

Paraiso Springs Road extends from the project site to Arroyo Seco Road; their intersection is approximately one mile west of Highway 101.

Arroyo Seco Road has an interchange with Highway 101 approximately one mile south of the City of Soledad. It provides the regional access for the project. Arroyo Seco Road extends in a southeasterly orientation to the west of the City of Greenfield and serves the Arroyo Seco River area south of Paraiso Hot Springs. An additional tributary road, connecting with Arroyo Seco Road is Fort Romie Road, which extends between Arroyo Seco Road and River Road. River Road extends from Fort Romie Road northerly along the westerly edge of the Salinas Valley to Highway 68 west of the City of Salinas. Arroyo Seco Road, Fort Romie Road and River Road carry the highest volumes on the local county road system in the project vicinity and have pavement widths in the range of 20 to 22 feet.

Highway 101 is a four-lane freeway, with an interchange at Arroyo Seco Road and provides regional access for the entire Salinas Valley.

Other roads intersecting Paraiso Springs Road include Clark Road and Foothill Road. Both Clark Road and Foothill Road are very low volume roads with pavement widths of approximately 18 feet.

Existing average daily traffic on each of the roadways in the study area are tabulated on **Exhibit 3** and shown on **Exhibit 4**. **Exhibit 3** also indicates that all roads currently operate at an "A" level of service. **Appendix A** provides planning level thresholds used to determine the level of service on each of the roads in the study area.

The Paraiso Springs Road/Clark Road intersection will experience all traffic generated by the proposed project, thus its inclusion in this analysis. Existing morning, evening and Saturday peak hour turning volumes at this intersection are illustrated on **Exhibit 4.** A single lane is provided on each approach at this existing T intersection. Currently, no traffic control devices are provided at the Paraiso Springs Road/Clark Road intersection. For this analysis, the Clark Road approach was modeled as a Stop controlled approach. All movements at this intersection currently operate at Level of Service 'A', as tabulated on **Exhibit 5**. A description of levels of service for side street stop controlled intersections is provided as **Appendix B**. Level of service calculations for this intersection is included in **Appendix C**.

Existing traffic data shown in this report reflect 2015 traffic conditions; however, previous versions of this report utilized 2004 and 2009 volumes. As shown on **Exhibit 3**, A comparison of 2004, 2009, and 2015 traffic volumes in the study area Monterey County traffic count book indicates there was a 4% increase in 2009 volumes versus 2004 volumes, and a 9% decrease in 2015 volumes versus 2009 volumes. Overall, traffic volumes within the study area decreased a total of 5% in 2015 versus 2004 volumes.

Also note that the volumes within this study, including the existing volumes, represent average traffic conditions in the study area. Traffic volume increases during the harvest period – generally late August and early September of a given year in the project vicinity, according to staff at the winery adjacent to the project site – are a minimal 4 to 5 vehicles per day over a one- to two-week period. This traffic increase occurs during the evening and nighttime hours, to avoid damage to the harvested grapes; this harvesting time period is typical practice across the wine industry. Other vineyards in the area (such as those near the Paraiso Springs Road/Clark Road intersection) presumably also have similar work schedules. However, to be more conservative, monthly adjustment factors within the 2015 Monterey County traffic count book were consulted to estimate daily traffic volumes during the harvest period. Based upon the monthly adjustment factors, daily traffic volumes on roadways in the study area would only increase by an average of about 5% during the harvest period (form example, about 8 trips per day on Paraiso Springs Road). This low level of traffic increase would not result in any significant traffic impacts beyond those cited in this report.

In addition, as further explained in Chapter 6 of this report, there have been very few reported vehicle accidents on roadways in the immediate study area (such as Paraiso Springs Road and Clark Road) between 1991 and 2015, according to Monterey County accident records. This includes the harvest periods during those years, indicating that the harvest period is no more prone to vehicle accidents than other periods of the year. Again, more information about vehicle safety on study area roads can be found in Chapter 6 of this report.

3 EXISTING PLUS PROJECT CONDITIONS

The proposed project includes the following components

- 103 units for the resort hotel
- 17 single-family timeshare villas
- 60 timeshare units

The Paraiso Springs Resort will be developed in four phases. The table below indicates the development associated with each phase.

Facility Description	Units	Number of Units	Number of Units	Number of Units	Number of Units	Total
		Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	
Hotel Rooms	Room	60	15	15	13	103
Time Share Condos						
2 Bedroom	Condo	10	8	8	8	34
3 Bedroom	Condo	8	6	6	6	26
Time Share Villas						
3 bedroom	Villa	3	2	2	2	9
4 bedroom	Villa	2	2	2	2	8

The following level of service analysis addresses the impacts of the build-out of the entire project. The impacts associated with each phase of the project will be less than the project build-out impact.

3.1 Project Traffic Generation

The proposed project has several unique characteristics. It is a resort hotel that includes typical ancillary facilities such as a gift shop (in this case, also including wine tasting), restaurants, conference rooms and recreational facilities. However, the project is also being marketed as a health oriented destination resort with guests staying for as long as seven days. In addition, the project is located in a remote location that will minimize the amount of short distance convenience trips such as lunch hour restaurant clientele or short term visits off-site from guests staying at the facility. In order to be conservative, none of these factors are anticipated to affect the project trip generation rates normally associated with a resort hotel.

To reduce project traffic, the project is planning to provide a shuttle service for non-management employees. Satellite parking will likely occur at an existing park and ride lot in the Salinas Valley, such as the ones located on Front Street in downtown Soledad, although another parking area in the Salinas Valley may be used if that park and ride is unavailable. The use of shuttles is estimated to be approximately 90% effective in reducing employee-generated traffic. In addition, shuttle services available to guests arriving from the Norman Y. Mineta San Jose International Airport (San Jose Airport) and for various types of day trips (i.e., wine tours, Arroyo Seco, Pinnacles) will be 20% effective in reducing guest traffic.

The trip generation for the project is tabulated on **Exhibits 6A** through **6D**. **Exhibits 6A** through **6C** tabulate trip generation for Project Phases 1 through 3. The trip generation estimate for Project Build-out, which is the only phase analyzed, is included as **Exhibit 6D**.

More specifically, the following additional assumptions were also used in deriving the trip generation estimates, based off of both the anticipated operations of the facility and similar facilities.

1. Institute of Transportation Engineers (ITE) trip generation rates were used to estimate the total project trips.

2. The total project trip generation was reduced to account for employee trips that will occur not by passenger vehicle, but by the employee shuttle that will operate between the satellite parking area and the project.

3. The total project trip generation was also reduced to account for off-site guest trips that will be served by shuttle rather than personal vehicle.

4. The employee and guest shuttle trips were estimated and are included in the project trip generation.

5. At project buildout, the applicant anticipates that the facility will be staffed by 218 employees per day operating within three general work shifts when the facility is fully occupied. ITE trip generation data for the Resort Hotel land use indicate that resort hotels are staffed at the rate of 1.7 employees per room. For the project, this rate was used to estimate the total number of employees that will be employed (306) at buildout and was adjusted to a five-day work week to estimate the number of employees that will be employed on a daily basis at the project (218). The number of employees that will be employed by project phase is as follows:

Phase Number	Units	Payroll Employees	Daily Employees
Phase 1	85	145	104
Phase 2	118	201	144
Phase 3	151	257	184
Phase 4	180	306	218

6. It was anticipated that 50% of the employees would work the day shift, 37.5% would work the swing shift and 12.5% would work the night shift. On this basis, the number of employees working each shift would be as follows:

Shift	Phase 1	Phase 2	Phase 3	Phase 4
Day Shift	52	72	92	109
Swing Shift	39	54	69	82
Night Shift	13	18	23	27
Total	104	144	184	218

7. Not all of the employees in any one shift will arrive at the site during the same one-hour period. Employees for any one shift are expected to arrive and depart over a 2- to 3-hour period. Within a peak traffic period on a weekday, there is usually a peak hour for the generator, which is the highest one-hour trip generation for the use, and a street peak hour, which is the highest trip generation for the use that coincides with the highest one-hour volume on the adjacent street network. The peak for the proposed project would generally occur an hour or more prior to the peak hour for the roadway network because shift changes for hotels usually occur at 7 AM, 3 PM and 11 PM. On weekdays, street peaks usually occur after 7 AM and between 4 PM and 6 PM.

8. The project trip generation estimates for the AM and PM weekday conditions represent conditions for the "street peak hour," i.e., the morning and evening commute hours of a typical weekday. The Saturday peak hour volumes represent the "peak hour of the generator," i.e., the one-hour period on a Saturday when the project would generate its largest amount of traffic.

9. A daily trip generation rate for the employees of 2.5 trips per employee was used to estimate the total volume of vehicle trips that would be generated by the employees on a daily basis without the shuttle program. The 2.5 trip rate anticipates that most, if not all, employees would drive via single-occupant vehicle and that a small percentage of employees would make multiple trips on and off the site during the day. Given the remote location of the site, it is not expected that many employees would leave the site during the day. However, the additional 0.5 trips per day per employee included in the daily trip generation rate accounts for multiple trips made by a portion of the employees, additional trips made by employees working split shifts, and additional trips associated with employees that work part-time.

10. The peak hour trip generation rates used in the traffic study for the hotel employees are trip generation rates for ITE Land Use Code 140, Manufacturing. The Manufacturing land use trip generation rates provide a good surrogate for estimating the number of employee trips generated by the resort hotel, as manufacturing employees also typically work in shifts, i.e., start and end their workdays at specific times. In addition, the trips generated by the Manufacturing land use are primarily employee trips because this use

does not generate significant volumes of non-employee trips during the day. The estimated number of employees arriving and departing the project site during the peak hours was used to approximate the peak hour trip generation

11. The estimated number of employees that will arrive and depart during the peak hours are shown in Section A of **Exhibits 6A – 6D**. During the AM weekday peak hour, 32% of the day shift employees are anticipated to arrive and 60% of the night shift employees are anticipated to leave the site. During the weekday PM peak hour, 37% of the day shift were anticipated to depart and 37% of the swing shift were anticipated to arrive. For the Saturday peak hour, 45% of the day shift employees were anticipated to depart and 45% of the swing shift employees were anticipated to arrive. These relationships are based on ITE trip generation data for the Resort Hotel land use for the peak hour of the generator and the peak hour for the adjacent street. Also, it was anticipated that 45% of the peak period project trip generation would occur during the peak hour of the generator (i.e., the project).

12. Ninety percent of the employees working on-site will be required to use the employee shuttle. The shuttle would replace the following number of single-occupant vehicle trips that would otherwise be made by employees:

Time	Phase 1	Phase 2	Phase 3	Phase 4
Daily	235	325	415	492
Weekday AM Peak Hour	22	30	38	46
Weekday PM Peak Hour	30	42	54	63
Saturday Peak Hour	37	51	65	77

13. Guest Day Trips – As the project would be a "getaway" or "destination" resort hotel, i.e., catering to guests who want to minimize the number and frequency of day trips, only one quarter of the guest parties are anticipated to make an off-site trip per day, and 20% of those trips would be served by the resort shuttle bus service. Each guest party is anticipated to consist of two people. The tables below (see below and next page) tabulate the estimated number of off-site guest trips that would be replaced by shuttle trips and the number of shuttle trips that would replace the off-site guest trips.

Guest Parties Daily Off-Site Trips Replaced by Shuttle Trips

Direction	Phase 1	Phase 2	Phase 3	Phase 4
Inbound	4	6	8	9
Outbound	4	6	8	9
Total	8	12	16	18

Daily Shuttle Trips for Off-Site Guest Trips

Direction	Phase 1	Phase 2	Phase 3	Phase 4
Inbound	2	2	3	3
Outbound	2	2	3	3
Total	4	4	6	6

14. As a separate service, the Resort will also provide shuttle service to the San Jose Airport for guests arriving or departing the area by air. During peak day check-in and check-out, 25% of the resort guests would arrive by air, and 25% of those guests (or, 6.25% of all resort guests) are anticipated to use the airport shuttle. On this basis, the guest party trips that would be replaced by shuttle trips and the shuttle trips to and from the airport are presented below

Total Vehicle Trips Replaced by Shuttle Trips (Daily)

Direction	Phase 1	Phase 2	Phase 3	Phase 4
Inbound	5	8	10	11
Outbound	5	8	10	11
Total	10	16	20	22

Shuttle Trips That Replace Off-Site and Airport Trips (Daily)

Direction	Phase 1	Phase 2	Phase 3	Phase 4
Inbound	2	3	4	5
Outbound	2	3	4	5
Total	4	6	8	10

15. The following tables provide a summary of the total shuttle trips that will be made by guests and the total guest vehicle trips that the shuttle trips replace. The first table shows the guest vehicle trips that are replaced by the shuttle and the second table shows the shuttle trips that replace the trips in the upper table.

Total Vehicle Trips Replaced by Shuttle Trips (Daily)

Direction	Phase 1	Phase 2	Phase 3	Phase 4
Inbound	9	14	18	20
Outbound	9	14	18	20
Total	18	28	36	40

Shuttle Trips That Replace Off-Site and Airport Trips (Daily)

Direction	Phase 1	Phase 2	Phase 3	Phase 4
Inbound	4	5	7	8
Outbound	4	5	7	8
Total	8	10	14	16

16. The employee shuttle would make approximately 6 round trips per each shift change between the project site and the satellite parking area at the buildout of the project (Phase 4). Assuming use of the Soledad park and ride, this would allow for about a 45 minute round trip over an approximate 3½ hour period. It is not likely that 6 roundtrips would be required between the swing shift and the night shift. Therefore, the calculation provides an allowance for additional mid-day employee related shuttle trips between the project site and the satellite parking area. The employee shuttle trips for the other project phases was estimated based on the proportion of employees in each phase to the total employees at buildout.

17. The number of weekday AM and PM peak hour trips generated by the guests that would be reduced due to shuttle usage was determined by taking 20% of the remainder of the peak hour project trip generation (after the 10% internal trip reduction calculation) less the peak hour trips generated by the employees that would use the shuttle. For the Saturday peak hour, it was anticipated that two inbound and two outbound airport related trips and that three inbound and three outbound off-site guest trips would be replaced by the shuttle at project buildout (Phase 4). The peak hour Saturday trips replaced by the shuttle for the other project phases is proportional to the total number of units by phase to the total project buildout units.

18. On the basis of the calculations described above, the employee and guest shuttle program will reduce the project trip generation by the following amounts by phase:

Time	Phase 1	Phase 2	Phase 3	Phase 4
Daily	227	319	407	480
AM Peak Hour	18	26	34	42
PM Peak Hour	26	38	50	60
Saturday Peak Hour	33	49	65	79

19. A 70% occupancy rate is anticipated for the project on an average day. The annual hotel occupancy rate was 68.2% on the Monterey Peninsula in 2003. By comparison, the County-wide occupancy rate in November was 47.2% in 2009 and 49.5% in 2010. The peak month for hotel occupancy was August. In 2009, the County-wide occupancy rate was 73.4%. This rate increased in 2010 to 77.2%, decreased in 2013 to 66.9%, but increased again in 2014 to 69%.

20. Amenities available at the proposed project would include three sit-down restaurants, a day spa, a wine tasting area and other small retail and guest demonstration spaces, many of which are typically present in a resort hotel. Although the amenities will be geared towards hotel guests, some of these amenities could attract day trips on an organized tour to the site. However, due to the remoteness of the project site from urbanized areas, only a maximum of about 50 people per day are anticipated to make day trips to the site. Most of these day trips would be made by groups of people, e.g., “day trips” from other hotels

and resorts in the greater Monterey Bay area, and thus would only generate 6-10 vehicle trips per day. This day trip traffic is already accounted for in the hotel trip generation estimate, as these types of trips are typical for resort hotels. In addition, day trip traffic is not anticipated during the morning or evening peak traffic periods.

21. The Wine Pavilion and Paraiso Institute will be used as an educational, conferencing and event area for the resort guests. The garden center is a garden area to grow food for use in the restaurants and a demonstration area for hotel guests. It will be used and managed by the resort employees. Thus, its trip activity is already accounted for elsewhere in the overall trip generation estimate.

22. Latter phases of the project include a small visitor's center near the entrance of the facility, providing guests with information regarding shuttle tours and other area amenities. As it is for exclusive use by guests and will be staffed by resort employees, its trip activity is already accounted for elsewhere in the overall trip generation estimate.

On an average basis, the proposed project is expected to generate approximately 262 daily trips (with the PM peak hour representing about 8% of the daily traffic for the hotel and about 10% for the residential areas), with 7 trips during the morning peak hour, 9 trips during the evening peak hour and 47 trips during the Saturday peak hour.

On occasions when the project reaches maximum occupancy (100%), the project is expected to generate approximately 384 daily trips, with 11 trips during the morning peak hour, 14 trips during the evening peak hour and 68 trips during the Saturday peak hour.

Note that the project will not have any special events that are open to the public; all events will be solely for guests already staying at the project site. Therefore, the special events hosted at the project site will not generate any additional visitor trips or require any additional parking demand above and beyond the levels noted above.

Service and truck traffic to the site will be for food and other supplies that are necessary on a periodic basis. It is estimated that this traffic will be less than 6 trips per week. Truck traffic would consist of smaller trucks; no semi-trailers will be traveling to and from the site. All truck traffic to and from the site is incorporated into the ITE trip rates used to estimate the project traffic.

The proposed project traffic volume will be very similar to the traffic formerly generated by the existing rental units, mobile homes, camp facilities and day usage. Based upon information from the project applicant (who was also the operator of the historic use of the site), the historic and existing use generated about 399 average daily trips with 14 during the morning peak hour, 25 during the evening peak hour and 53 during the Saturday peak hour. Note that the historical trip generation is referenced here for comparison purposes but is not credited in the project site trip activity documented in this report.

The project site is currently gated and only a small amount of traffic is generated by residents at Paraiso Hot Springs. The current traffic on Paraiso Springs Road southeast of Clark Road is utilized in the existing traffic conditions section of this report. The project impact analysis only credits trips occurring at the time of field counts in 2015. No credit is given for the potential traffic that could be generated pursuant to the historic usage or if the existing on-site facilities were simply reactivated.

3.2 Project Traffic Distribution and Assignment

Exhibits 7 and **8** show the project trip distribution and assignment estimates at 70% and 100% occupancy. The trip distribution and assignment are based on the anticipated routes that would be traveled to and from the project site, including traffic from Highway 101 and the surrounding area.

3.3 Existing Plus Project Traffic Conditions

Existing Plus Average Project Day (70% occupancy) daily traffic and levels of service on each of the roadways in the study area are tabulated on **Exhibit 3** and shown on **Exhibit 9**. As shown on **Exhibit 3**, all roads will operate at an "A" level of service with the exception of Arroyo Seco Road between Fort Romie Road and Highway 101, which will operate at level of service B. No mitigations are necessary under the Existing Plus Average Project Day conditions.

Existing Plus average project day morning, evening, and Saturday peak hour turning volumes at the Paraiso Springs Road/Clark Road intersection are illustrated on **Exhibit 9**. **Exhibit 5** indicates that the intersection will operate at Level of Service 'A' under the Existing Plus 70% Project Traffic Conditions. Level of service calculations for the study intersection under this scenario are included in **Appendix C**. The project will result in no impact in level of service anywhere on the County road network. The project will therefore have an insignificant impact on congestion and levels of service. No mitigations will be necessary under the Existing Plus Average Project Day conditions.

Existing plus project at full occupancy (100% occupancy) daily traffic and levels of service on each of the roadways in the study area are tabulated on **Exhibit 3** and shown on **Exhibit 10**. As shown on **Exhibit 3**, all roads will operate at an 'A' level of service with the exception of Arroyo Seco Road between Fort Romie Road and Highway 101, which will operate at Level of Service 'B'. No mitigations will be necessary under the Existing Plus 100% Project traffic conditions.

Existing plus project at full occupancy morning, evening, and Saturday peak hour turning volumes at the Paraiso Springs Road/Clark Road intersection are illustrated on **Exhibit 10. Exhibit 5** indicates that the intersection will operate at Level of Service 'A' under the Existing Plus 100% Project traffic conditions. Level of service calculations for the study intersection under this scenario is included in **Appendix C**. No mitigations will be necessary under Existing Plus 100% Project (i.e., full occupancy) conditions.

Paraiso Springs Road between the project site and Clark Road will experience an increase in traffic from the existing 90 vehicles per day to about 352 vehicles per day at an average 70% occupancy. At 100% occupancy, the project would result in a total of about 474 vehicles per day. On an average day, Paraiso Springs Road would continue to be a relatively low volume road with only about 354 vehicles per day. To put the anticipated average daily traffic in context, Paraiso Springs Road is approximately 1.3 miles long between the existing gate at the Paraiso Hot Springs and Clark Road. Assuming a travel speed of 35 miles per hour, it would take approximately two minutes to traverse this length of roadway. Only about one vehicle will be experienced in each direction every four minutes on Paraiso Springs Road. During the peak hour, only one or two vehicles will be encountered along this entire stretch of roadway as a vehicle enters or exits the project. This is an extremely low amount of vehicular conflict. Combined with the anticipated low travel speeds, the existing roadway is sufficient to accommodate Existing Plus Project traffic.

Note: Although this analysis assumes that the employee shuttle will be in use starting under Phase 1 of the project, its implementation may be delayed until Phase 2 of the project. This would have the effect of temporarily doubling the Phase 1 traffic in **Exhibit 6A** until the shuttle is implemented under Phase 2 of the project. However, traffic conditions under Phase 1 without the employee shuttle would be comparable to project build-out and thus would result in similar operations on the area roadways and no significant traffic impacts.

4 CUMULATIVE GENERAL PLAN BUILDOUT CONDITIONS

Growth in traffic in the study area is anticipated to increase in the future, both from development in the area and future build out of the Monterey County General Plan and the General Plans of Salinas Valley cities, specifically Soledad and Greenfield.

General Plan forecasts obtained from the AMBAG TransCAD model Year 2030 establish a traffic volume growth factor of about 69%. Arroyo Seco Road is therefore expected to carry a total of 7,100 trips on an average day between Fort Romie Road and the Highway 101 Ramps. This number was used to estimate the approximate General Plan volumes on Fort Romie, Foothill, Arroyo Seco, Paraiso Springs, and Clark Road. It must be emphasized that there are no specific plans for development along Paraiso Springs Road. The estimates of future traffic growth rates are therefore not likely to be experienced. The Existing Plus Project volumes along Paraiso Springs Road described earlier in this report are likely to remain unchanged through the General Plan Buildout.

The expected General Plan volumes are tabulated on **Exhibit 3** and shown on **Exhibit 11**. As shown on the **Exhibit 3**, all roads will operate at an 'A' level of service with the exception of Arroyo Seco Road between Fort Romie Road and Highway 101, which will operate at Level of Service 'B'. No mitigations will be necessary under the General Plan conditions.

General Plan morning, evening, and Saturday peak hour turning volumes at the Paraiso Springs Road/Clark Road intersection are illustrated on **Exhibit 11**. **Exhibit 5** indicates that the intersection will operate at Level of Service 'A' under General Plan conditions. Level of service calculations for the study intersection under this scenario is included in **Appendix C**. No mitigations will be necessary under General Plan conditions.

5 ON-SITE CIRCULATION AND PARKING

The project is proposing to provide a total of 310 parking spaces to comply with the Monterey County Zoning Ordinance's parking requirements. This includes parking at the hotel, restaurants, retail space (including the day spa, wine pavilion and institute) and the time-share units. Of these, 86 spaces will be located near the retail space, day spa and institute (referred to as the "Hamlet" on the project site plan). An additional 224 spaces will be provided elsewhere in the resort, including near the hotel and 2- and 3-bedroom timeshare units. Parking at the single family timeshare villas is not included in the total and will be provided, per standard, on each individual unit. As shown on **Exhibit 12**, the proposed parking supply is anticipated to exceed the estimated demand of 276 spaces.

Two turn-around locations, one at the end of the detached timeshare villas and one at the end of the Hillside Village Condominiums, are proposed on-site for emergency vehicle and truck access. A review of the project site plan indicates that project access and circulation will be adequate.

6 SAFETY IMPACT ANALYSIS

6.1 Introduction to the Accident Frequency Prediction Methodology

CEQA Guidelines state the project would have a significant impact if the project would "substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses." The method to document this project's impact on traffic safety is based on the change attributable to the project in frequency and severity of accidents in the vicinity of the project. Numerous studies have been performed by State Departments of Transportation and the Federal Government for decades that address this issue. These studies have established correlations between various roadway features and accident rates. The accident rates can then be applied to anticipated traffic volumes (such as would result from a new development such as the Paraiso Springs Resort) to estimate future accident frequency.

In the past, there was no standard methodology that could be employed throughout the industry in the United States. However, in the summer of 2010, the American Association of State Highway and Transportation Officials (AASHTO) released the first edition of the *Highway Safety Manual* (HSM), which according to the acknowledgements at the beginning of the manual, was developed by a "…long list of highway safety professionals willing to donate many hours to the development of the *Highway Safety Manual*. In addition to the volunteer Members and Friends of the TRB [Transportation Research Board] Task Force, numerous research projects contributed directly or indirectly to the HSM." The companion publication *An Introduction to the Highway Safety Manual* states that the HSM provides the following tools:

1) Methods for developing an effective roadway safety management program and evaluating their effects.
2) A predictive method to estimate crash frequency and severity. This method can be used to make informed decisions throughout the project development process.

3) A catalogue of Crash Modification Factors (CMFs) for a variety of geometric and operational treatment types, backed by robust scientific evidence. The CMFs and the HSM have been developed using high-quality before/after studies that account for regression to the mean.

More information regarding the *Highway Safety Manual* can be found at the AASHTO website (http://www.transportation.org). There is also a website specifically for the *Highway Safety Manual* (www.highwaysafetymanual.org).

This manual was used to develop a quantitative means of predicting accident frequency on Paraiso Springs Road. Rather than providing a lengthy discussion in this report, the most applicable section of the *Highway Safety Manual* is included herein as **Appendix D**. This provides the regression equations used in the accompanying analysis for Paraiso Springs Road. The HSM crash frequency calculation worksheets for the segment and intersection analyses are presented in **Appendices F through L and Appendix N.**

Note: This analysis also reflects application of the Empirical Bayes statistical procedures identified within the *Highway Safety Manual*. Application of these procedures adjusts the predicted accident frequency calculations to better reflect the actual collision histories of the studied roadways and segments. As used throughout this chapter and on **Exhibit 14, 15 and 16**, the term "predicted" refers to the HSM projections without the Empirical Bayes adjustments, while "expected" refers to projections with the Empirical Bayes adjustments.

6.2 Thresholds of Significance for Safety Analysis

For the safety analysis in this report, the significance criteria for a significant impact will be as follows:

- If, with the addition of project, traffic, the project would cause the projected accident frequency on a roadway or at an intersection to raise to a level above the statewide (i.e., California) average accident frequency for that type of facility; or

- If the accident frequency for a roadway or intersection is already above the statewide (i.e. California) average for that type of facility, any increase in the accident frequency caused by the addition of project traffic.

6.3 Accident Frequency Prediction Estimate for Paraiso Springs Road

The accident frequency predictions for Paraiso Springs Road – from Clark Road to the project site – were split into six distinct segments. These are identified as Segments A through F. **Exhibit 13** depicts the locations of each of these segments. Paraiso Springs Road was divided into these segments because each of these segments of the roadway has different characteristics including lane width, shoulder width and roadway curvature.

Exhibit 14 provides a tabulation of the accident frequency prediction calculations for the six segments of Paraiso Springs Road. The first set of numbers at the top of **Exhibit 14** includes a description of each road segment, including the limits of each segment. The upper portion of the spreadsheet also tabulates average annual daily traffic (AADT) on each of these segments, which also varies from segment to segment.

The first column includes the historical traffic volumes before the Hot Springs closed in 2005. At that time the Hot Springs generated about 313 average annual daily trips, which resulted in about 468 daily trips on Paraiso Springs Road between Clark Road and the existing triangular parking area immediately west of Clark Road. The traffic volumes declined the further west one proceeds along Paraiso Springs Road to the project entrance, where Segment E only carried traffic generated by the closed Hot Springs. (The proposed project would also be the only user of this section of Paraiso Springs Road.)

The second column indicates existing annual daily traffic. This represents conditions with the Hot Springs closed. Currently, there is a caretaker and a variety of maintenance and delivery vehicles that are generated by the project site, or about 22 vehicles per day. A comparison with the historical trips indicates that existing traffic volumes are much lower than what was experienced when the Hot Springs were active.

The remaining column represents the resulting average annual daily traffic on each of the six roadway segments for Project Phase 4 (i.e., project buildout). This is described in the traffic analysis.

The second major section of **Exhibit 14** provides additional information on each roadway segment, including its length, paved width, average lane width and average shoulder width, as well as whether the segment is primarily a straight section of road (tangent) or is generally represented by horizontal curves (curves).

The remaining sections of **Exhibit 14** summarize the accident frequency analysis. The HSM model predicts just over 3 crashes should have occurred on Paraiso Springs Road over the last 25-year period. However, over that same period, only 2 crashes have been recorded, based upon County of Monterey accident records, included as **Appendix E**. Applying the Empirical Bayes adjustment to the study roadway, the expected crash frequency is about 3 crashes over the 25-year period or 0.133 crashes per year.

The HSM model predicted 4.1 crashes (0.162 crashes per year) should have occurred on Paraiso Springs Road between 1991 and 2015. During this period, two accidents occurred (0.08 crashes per year). The expected number of crashes during the 1991 to 2015 period after applying the Empirical Bayes method is 2.9 (0.116 crashes per year).

6.4 Paraiso Springs Road Accident Rate Evaluation

The lower portion of **Exhibit 14** provides accident rate calculations for historical and existing conditions. With the combination of the historical and existing traffic volumes with the length of Paraiso Springs Road, there has been an accident rate of 0.51 accidents per million vehicle miles travelled over the past 25 years for which accident data has been provided by the Monterey County Public Works Department. This is less than half the average rate for two lane highways across California. The historic accident rate indicates that the existing Paraiso Springs Road does not constitute a hazardous condition.

At full project buildout, there is expected to be 0.72 accidents per million vehicle miles travelled. This is also less than half of the state-wide average rate for similar two lane rural roads of 1.59 accidents per million vehicle miles travelled. Therefore, the project will not result in substantial increases in hazards on Paraiso Springs Road, and the project is not required to provide off-site mitigations on the basis of safety.

6.5 Accident Frequency Prediction Estimate for Clark Road

Exhibit 15 provides a tabulation of the accident frequency prediction calculations for Clark Road. The format of **Exhibit 15** for Clark Road is identical to that for Paraiso Springs Road on **Exhibit 14**. There apparently have been no accidents on Clark Road for the past 25 years. It therefore has an accident rate of 0.00 accidents per mvm (million vehicle miles travelled). The predicted number of accidents over the past 25 years based on traffic volumes, roadway features and length is 0.025, which is one accident every 40 years. The expected predicted accident rate is 0.022.

6.6 Clark Road Accident Rate Evaluation

Exhibit 15 also provides a summary of the safety analysis for Clark Road using the HSM analysis spreadsheet and the Empirical Bayes adjustments. As noted under Section 6.5, the lack of accidents over the past 25 years on Clark Road results in an accident rate of 0.00 accidents per mvm (million vehicle miles travelled). This is obviously below the statewide average rate of 1.90. The expected accident rate from the buildout of the Paraiso Springs Resort is 0.55 accidents per mvm, which is less than one third of the statewide average. This indicates that no substantial hazards will result from the project. Hence, no safety related project impact mitigations are required on Clark Road.

6.7 Paraiso Springs Road/Clark Road Safety Evaluation

The Paraiso Springs Road/Clark Road intersection is an uncontrolled, three-leg intersection. The HSM does not currently contain prediction algorithms for uncontrolled or YIELD controlled intersections. Application of the three-leg, stop control accident prediction equations that are included in the HSM would not provide a valid analysis of the potential safety impacts of the project to the intersection.

The comparison of the historical crash rates to statewide average crash rates is typically used in traffic impact studies to determine whether an existing safety related problem exists at an intersection. In addition, the need for safety related improvements at an intersection based on existing or future traffic volumes is typically assessed in traffic impact studies by evaluating the following:

1. Warrants for traffic control
2. Warrants for left and right turn channelization
3. Warrants for road lighting

The HSM provides a methodology to estimate future accident rates for rural two-lane roads and intersections, but in the case of the Paraiso Springs Road/Clark Road intersection, the predictive equations and methodology do not apply. Therefore, warrants for traffic control, channelization and road lighting were evaluated at the Paraiso Springs Road/Clark Road intersection as a substitute to a safety analysis based on the HSM predictive equations.

Between 1991 and 2010, there were no reported accidents at the Paraiso Springs Road/Clark Road intersection. This compares to an average statewide accident rate for rural uncontrolled intersections that is documented by Caltrans of 0.10 accidents per million entering vehicles. Based on a 20-year accident history, there have been no accidents and, therefore, there is no demonstrated safety problem at the Paraiso Springs Road/Clark Road intersection.

The California MUTCD provides the following guidance for the installation of STOP signs on low-volume rural roads:

> STOP (R-1) and YIELD (R1-2) signs should be considered for use on low-volume roads where engineering judgment or study, consistent with the provisions of Sections 2B.04 to 2B.10, indicates that either of the following conditions applies:
>
> A. An intersection of a less-important road with a main road where application of the normal right-of-way rule might not be readily apparent.
> B. An intersection that has restricted sight distance for the prevailing vehicle speeds.

There is no indication that application of the normal right-of-way rule is a problem at the intersection or will be a problem in the future with the project developed. There have been no accidents at the intersection over the last 20-year period. The corner sight distance looking from the Clark Road approach to the Paraiso Springs Road approaches is not constrained. The sight distance looking from the Clark Road approach to the south is about 500 feet and the sight distance looking to the north is about 660 feet. Therefore, no change to the existing traffic control is recommended in conjunction with development of the project.

The County of Monterey has an adopted policy for evaluating the need for left turn lanes. The warrant worksheet is provided in **Appendix M**. The left turn warrant was evaluated using the cumulative condition peak hour volumes documented in **Exhibit 11**. As shown on the worksheet, a left turn lane is not warranted on the southbound Paraiso Springs Road approach to Clark Road. The cumulative condition traffic volumes in Chapter 4 of this report represent 20-year forecast traffic condition and approximate General Plan Buildout traffic forecasts as documented in the Monterey County General Plan Circulation Study.

Right-turn lane warrants documented in NCHRP Report 287, *Intersection Channelization Guide*, were used to evaluate the need for right turn channelization on the northbound Paraiso Springs approach to Clark Road. As shown on the worksheet contained in **Appendix M**, a right turn lane would not be warranted on the northbound Paraiso Springs approach to Clark Road based on the cumulative traffic volumes presented in **Exhibit 11**.

Widening to provide separate left and right turn channelization on the Clark Road approach to Paraiso Springs Road is not required because the intersection is projected to continue to operate at an excellent LOS A with the project developed. The Paraiso Springs Road/Clark Road intersection is projected to operate at LOS A for the long-range cumulative condition as documented in Chapter 4 of this report.

Warrants for intersection lighting are published in the Caltrans Traffic Manual. At existing intersections, safety lighting may be provided if one of the following conditions is met:

1. A Minimum Vehicular Volume, an Interruption of Continuous Traffic or Minimum Pedestrian Volume traffic signal warrant is satisfied for any single hour which may be in darkness in winter months.
2. Four or more nighttime accidents in any recent consecutive 12-month interval or six or more nighttime accidents in any recent consecutive 24-month interval.
3. Where a traffic signal or an intersection flashing beacon is installed.
4. Where combinations of sight distance, horizontal or vertical curvature of the roadway, channelization or other factors constitute a confusing or unsatisfactory condition that may be improved with lighting. The project report covering such lighting should include an explanation of the factors constituting the confusing or unsatisfactory condition.

To meet the warrant described in No. 1 would require peak hour volumes entering the intersection of at least 400 vehicles. Peak hour volumes with the project fully developed are not anticipated to exceed 100 vehicles on any of the intersection approaches. Therefore the first warrant is not met. No accidents have been reported in the last 20 years at the intersection. There is no flashing beacon or traffic signal installed at the intersection. The horizontal and vertical alignments of the intersecting roadways and the sight distance conditions at the intersection do not create confusing or unsatisfactory conditions that would require the installation of lighting. The criteria required for the installation of intersection lighting is not met.

On the basis of the analyses described above, safety related improvements consisting of traffic control, left and right turn lanes and roadway lighting are not required at the Paraiso Springs Road/Clark Road intersection under existing conditions or with the project developed.

6.8 Arroyo Seco Road/Clark Road Safety Evaluation

Although the intersection is outside the area of this study, the HSM safety analysis was also applied to Arroyo Seco Road/Clark Road, in order to verify that the project would not have a safety related impact to this intersection. According to Monterey County accident records, no accidents have occurred at the Arroyo Seco Road/Clark Road intersection between 1991 and 2015.

Exhibit 16 shows the results of the HSM accident prediction analysis for the Arroyo Seco Road/Clark Road intersection. The HSM safety model predicts 3.25 accidents should have occurred at the Arroyo Seco Road/Clark Road intersection between 1991 and 2015, or 0.130 accidents per year on average. The HSM accident prediction worksheets for the 1991 to 2015 period are provided in **Appendix N**. Because no accidents occurred at the intersection between 1991 and 2015, the Empirical Bayes adjustment results in an expected crash frequency of just over 1 crash during the 25-year period, or 0.054 crashes per year.

Exhibit 16 also presents a summary of the crash history and expected crash frequency at project buildout at the Arroyo Seco Road/Clark Road intersection. According to Caltrans statistics, the statewide average accident rate for a rural intersection with stop control on the minor road approach is 0.30 accidents per million entering vehicles. The expected accident rate at the Arroyo Seco Road/Clark Road intersection at project buildout is 0.16 accidents per million entering vehicles. The expected accident rate is about half of the statewide average accident rate. Therefore, the safety related impact of the project would not be significant and no improvements would be required at the intersection.

7 ROADWAY IMPROVEMENTS ON PARAISO SPRINGS ROAD

7.1 Proposed Improvements

The project applicant has volunteered to incorporate various roadway improvements on Paraiso Springs Road, specifically between Clark Road and the project entrance, into the proposed project. **Appendix O** contains conceptual designs of these improvements, which include pavement widening on the existing roadway; centerline striping, edgeline striping, and post-mounted delineators; advance curve warning signs; and "Road Narrows" signs. These improvements would further improve driver safety along Paraiso Springs Road. Each type of improvement is discussed below.

Note: The applicant is not proposing to modify the alignment of Paraiso Springs Road. All of the proposed improvements are within the existing Monterey County right-of-way for the roadway.

7.1.1 Pavement Widening

The existing pavement width along Paraiso Springs Road, between Clark Road and the project, varies from 14 to 22 feet, as shown earlier on **Exhibit 13**. The proposed improvements will widen the majority of Paraiso Springs Road to either 18 or 20 feet wide (i.e., at least a 9-foot travel lane) in each direction of travel. Where total pavement widths are less than 20 feet, additional signs will be added, to provide advance warning of the narrower roadway. (See Section 7.1.4 for more information about signing.)

7.1.2 Pavement Striping

Paraiso Springs Road currently does not have any roadway striping. The installation of centerlines, edgelines and post-mounted delineators (raised reflective channeling devices) is proposed.

Note: Monterey County Public Works will determine whether the centerline striping is to be a dashed line (i.e., vehicle passing in the same direction is allowed) or double-yellow (i.e., vehicle passing in the same direction is prohibited), or some combination of the two options.

7.1.3 Advance Warning Signs

Two types of advance warning signs would be installed along Paraiso Springs Road – advance curve warning signs and "ROAD NARROWS" signs. Each is briefly described below (see next page).

- **Advance curve warning signs** (W1-2A – 15 miles per hour advisory speed) would be installed in both directions of Paraiso Springs Road in advance of the sharp curve near the driveway for 34352 Paraiso Springs Road (i.e., the Panziera property). These signs would provide vehicles of advance warning of the curve, which would allow time to slow to the advisory speed prior to entering the curve.

- **"ROAD NARROWS" (W5-1) signs** would also be posted in each direction of Paraiso Springs Road where the roadway pavement narrows below 20 feet in width. These signs would be accompanied by advisory speed signs (varying from 20 miles per hour to 25 miles per hour, depending upon the section of roadway).

7.2 Safety Benefits of Proposed Improvements

Implementation of these improvements would further lower the expected accident rates along Paraiso Springs Road at project buildout. The roadway widening would provide additional pavement width for passing vehicles (i.e., vehicles to pass in opposing directions). Centerline and edgeline striping would further improve the ability for vehicles to pass each other and improve nighttime driving. The edgelines and delineators would minimize vehicle travel off of the roadway. The advance warning signs would also provide advance warning of unexpected roadway geometric issues, especially for drivers unfamiliar with the area.

7.3 Phasing of Proposed Improvements

The anticipated phasing of the proposed improvements to Paraiso Springs Road (relative to the project phasing) is as follows (see **Exhibit 13** for roadway section designations):

- Project Phase 1 – Install all advance curve warning, "ROAD NARROWS," and advisory speed signs
- Project Phase 2 – Widen Roadway Sections E and F to 18 and 20 feet, respectively, where feasible (including associated striping)
- Project Phase 3 – Widen Roadway Sections C and D to 20 feet where feasible (including associated striping and delineators)
- Project Phase 4 – Widen Roadway Sections A and B to 20 feet where feasible (including associated striping)

7.4 Construction Impacts

Construction of the aforementioned improvements may require temporary partial or full closures of sections of Paraiso Springs Road. This may include one-way traffic control. No closures would occur without advance warning of the residents of the properties fronting the roadway. Efforts will be made to ensure that all closures are for as short of a duration as possible and that all closure minimize access restrictions to and from those properties.

8 MITIGATIONS

8.1 Improvements Warranted for Existing Conditions

No existing level of service or safety deficiency exists on any study roadway; therefore, no improvements are required for existing conditions.

8.2 Project Impact Mitigations

The project will not result in a substantial increase in traffic, will not exceed County level of service standards, and will not substantially increase roadway hazards. Therefore, no project traffic impact mitigations are required.

8.3 Long Term Cumulative Impact Mitigation

There are no currently known developments that will impact the road network in the project vicinity. Traffic growth will not be substantial enough to change traffic conditions from the Existing plus Project condition. Therefore, no capacity or safety improvements are required to accommodate long-term traffic growth anywhere in the study area.

9 PROJECT ALTERNATIVE

An alternative project definition would eliminate 12 of the timeshare villas from the primary project definition, leaving only 5 timeshare villas to be built. The proposed project site plan for the alternative project definition is shown in **Exhibit 17**.

The trip generation estimates for the project phases under the alternative project definition are tabulated on **Exhibits 18A** through **18D**. **Exhibits 18A** through **18C** tabulate trip generation for Project Phases 1 through 3, while the trip generation estimate for Project Build-out is included as **Exhibit 18D**.

On an average basis (70% occupancy), the alternative project definition is expected to generate approximately 215 average daily trips, with 4 trips during the morning peak hour, 5 trips during the evening peak hour and 43 trips during the Saturday peak hour. On occasions when the project reaches maximum occupancy (100%), the alternative project definition is expected to generate approximately 317 average daily trips, with 6 trips during the morning peak hour, 8 trips during the evening peak hour and 63 trips during the Saturday peak hour. This would be about a 50 to 70 trip reduction in average daily trips and about a 5- to 6-trip reduction during the AM, PM, and Saturday peak hours, compared to the primary project definition (i.e. **Exhibit 6A-D**); as such, the conclusions regarding the potential project impacts for the primary project definition would also be true for the alternate project definition.

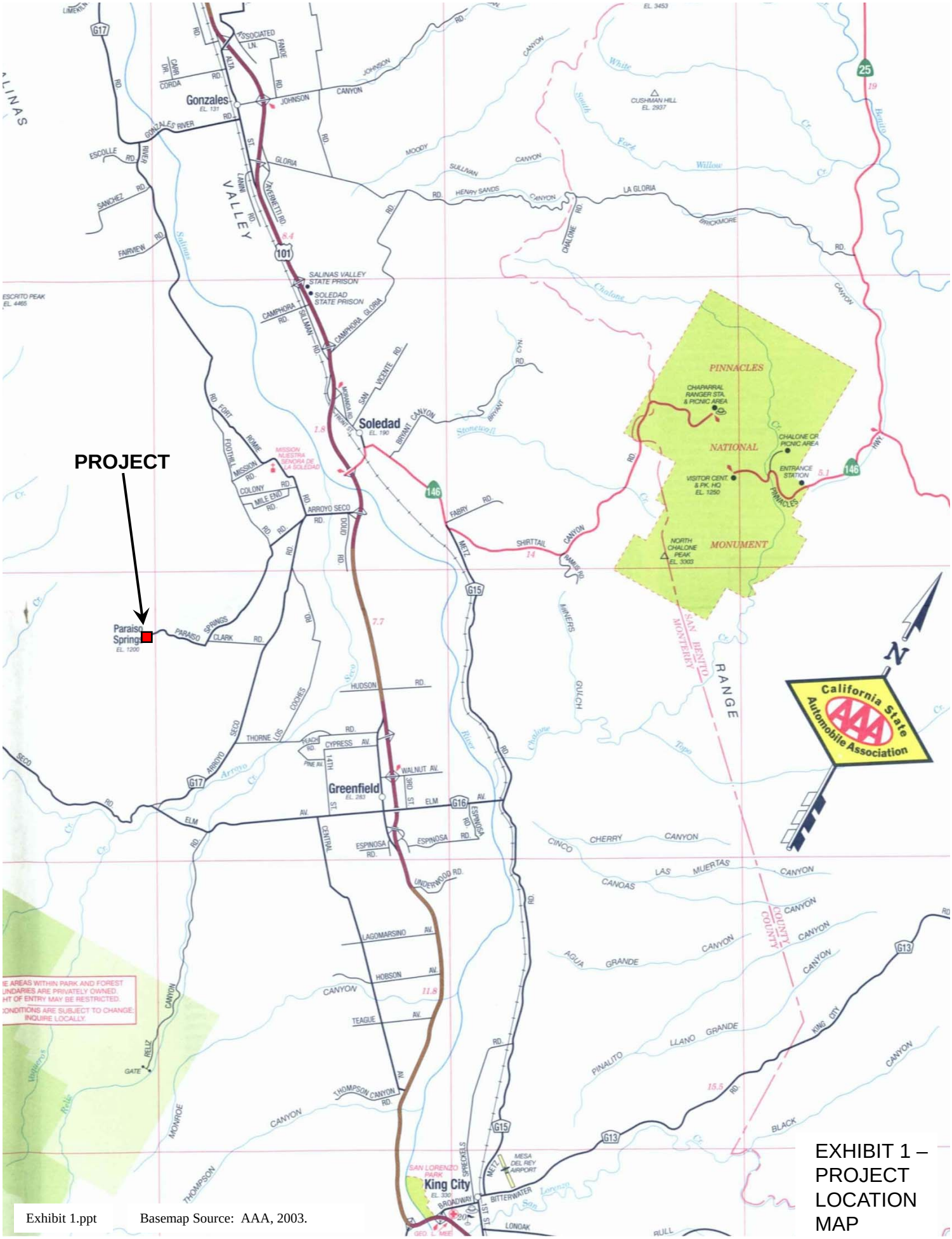

EXHIBIT 1 – PROJECT LOCATION MAP

Exhibit 1.ppt

Basemap Source: AAA, 2003.

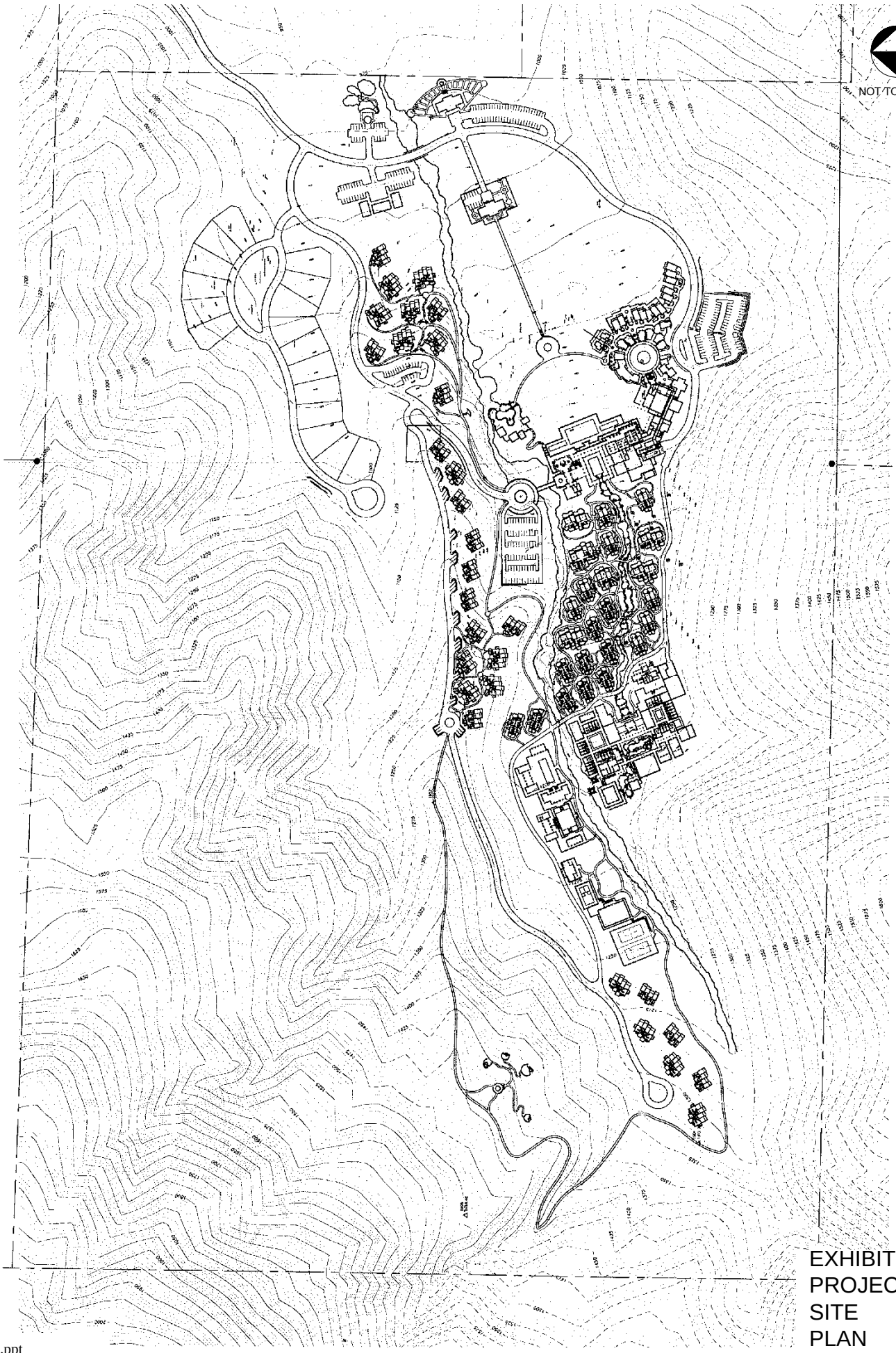

EXHIBIT 2 – PROJECT SITE PLAN

Exhibit 2.ppt

Source: EDSA, 2005

Exhibit 3
Daily Segment Traffic Volumes and Levels of Service
(Based on Average Daily Traffic (ADT))

Location	2004 Volumes	2009 Volumes	Source	Existing (2015) Conditions		Historic Project Traffic	Existing + Historic Project Conditions		70% Project Traffic	Existing + 70% Project Conditions		100% Project Traffic	Existing + 100% Project Conditions		Long Term Cumulative Conditions (69% Growth Factor)	
				Volumes (ADT)	LOS	Volumes (ADT)	Volumes (ADT)	LOS	Volumes (ADT)	Volumes (ADT)	LOS	Volumes (ADT)	Volumes (ADT)	LOS	Volumes (ADT)	LOS
Arroyo Seco Rd. from Thorne Rd. to Clark Rd.	1,800	1,800	1	1,500	A	63	1,563	A	52	1,552	A	76	1,576	A	3,100	A
Arroyo Seco Rd. from Fort Romie Rd. to State Highway 101	4,200	4,400	1	3,900	A	219	4,119	B	184	4,084	B	270	4,170	B	7,100	B
Fort Romie Rd. from Foothill Rd. to Arroyo Seco Rd.	2,100	2,200	1	2,200	A	16	2,216	A	13	2,213	A	19	2,219	A	3,600	A
Foothill Rd. from Fort Romie Rd. to Paraiso Springs Rd.	160	220	1	230	A	16	246	A	13	243	A	19	249	A	260	A
Paraiso Springs Rd. from Clark Rd. to Arroyo Seco Rd.	NA	150	2	160	A	250	410	A	26	186	A	38	198	A	300	A
Paraiso Springs Rd. southwest of Clark Rd. (MP 1.5)	NA	150	2	160	A	313	473	A	262	422	A	384	544	A	570	A
Paraiso Springs Rd. from Project Site to Clark Rd. (MP 0.0-1.5)	NA	85	2	90	A	313	403	A	262	352	A	384	474	A	490	A
Paraiso Springs Rd. at Project Site Entrance (MP 0.0)	NA	20	2	22	A	313	335	A	262	284	A	384	406	A	410	A
Clark Rd. from Paraiso Springs Rd. to Arroyo Seco Rd.	NA	20	2	20	A	63	83	A	236	256	A	346	366	A	367	A
Arroyo Seco Hwy. 101 SB Off-Ramp	1,680	2,000	3	1,630	A	94	1,724	A	79	1,709	A	116	1,746	A	2,840	A
Arroyo Seco Hwy. 101 SB On-Ramp	450	550	3	490	A	16	506	A	13	503	A	19	509	A	760	A
Arroyo Seco Hwy. 101 NB Off-Ramp	390	400	3	490	A	15	505	A	13	503	A	19	509	A	660	A
Arroyo Seco Hwy. 101 NB On-Ramp	1,680	1,500	3	1,640	A	94	1,734	A	79	1,719	A	116	1,756	A	2,840	A
County Volume Totals	8,260	8,620		7,830												
Percentage Change from 2004		4%		-5%												
Percentage Change from 2009				-9%												

Notes:
1. * - The sources of volumes are as follows:
   1. 2009 and 2015 Monterey County Traffic Counts
   2. Estimates from peak hour manual counts.
   3. 2009 and 2014 Ramp Volumes on the California State Freeway System - District 5, Caltrans.
2. NA - Traffic Counts are not provided by Monterey County.
3. MP = Mile Post (roadway mileage as posted on the roadway by Monterey County).

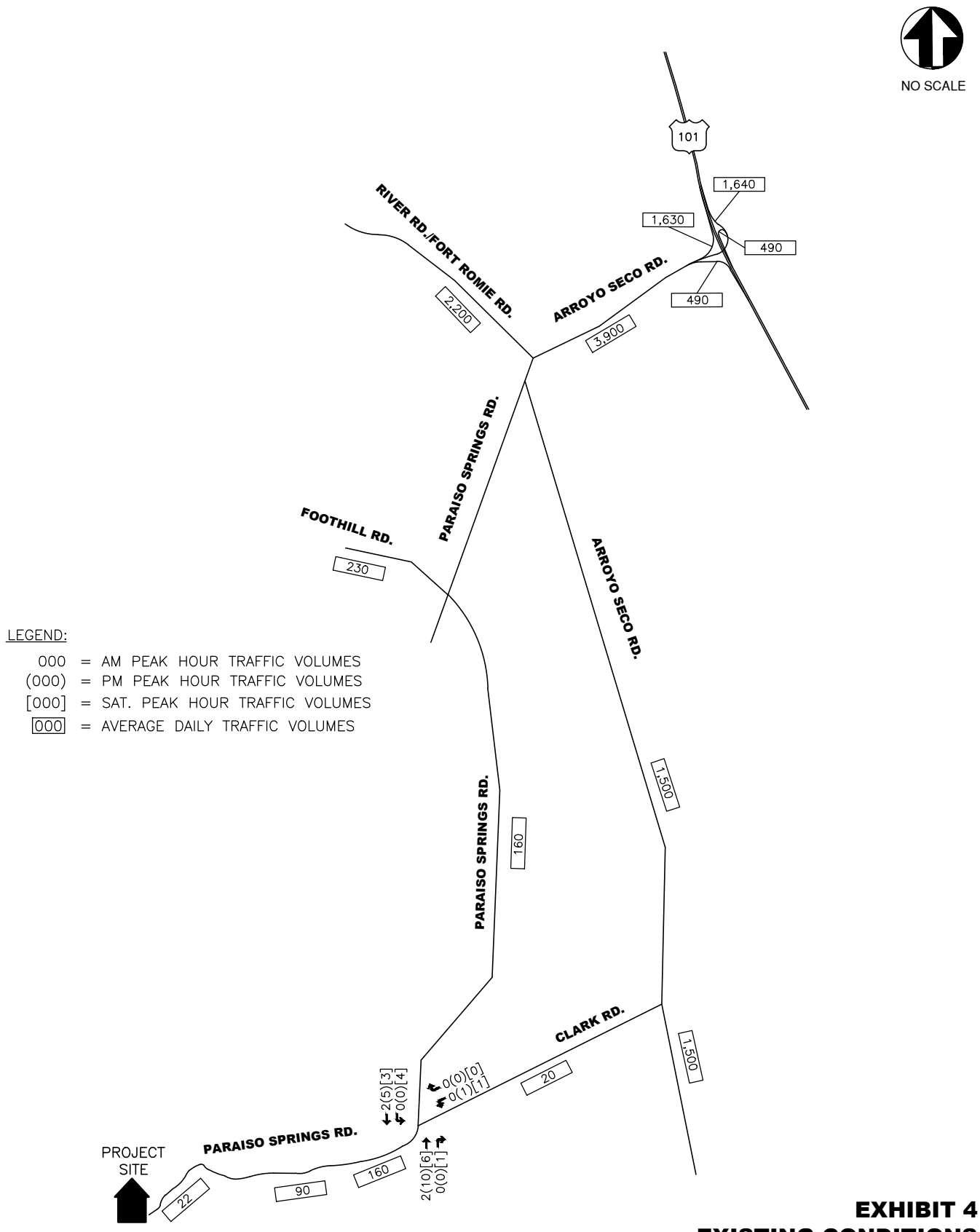

EXHIBIT 4
EXISTING CONDITIONS
TRAFFIC VOLUMES

Hatch Mott MacDonald

Drawing: I:\2016\Jobs\367424 – Paraiso Hot Springs Resort TIA Revision\Exhibits\Exhibit.dwg
Layout: Existing
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Exhibit 5
Intersection Level of Service
Summary Table

N-S Street	E-W Street	Existing Lane Configuration	Existing Intersection Control	Existing Conditions						Existing + 70% Project Conditions						Existing + 100% Project Conditions						Long Term Cumulative Conditions					
				AM Peak Hr		PM Peak Hr		Sat Peak Hr		AM Peak Hr		PM Peak Hr		Sat Peak Hr		AM Peak Hr		PM Peak Hr		Sat Peak Hr		AM Peak Hr		PM Peak Hr		Sat Peak Hr	
				Delay (sec)	LOS V/C	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS V/C	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS V/C	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS V/C	Delay (sec)	LOS	Delay (sec)	LOS
Paraiso Springs Road	Clark Road	NB 1-LTR SB 1-LTR EB 1-LTR	One-way Stop Worst Approach	**0.0** 0.0	**A** A	**0.5** 8.6	**A** A	**2.5** 8.6	**A** A	**1.6** 8.5	**A** A	**2.1** 8.6	**A** A	**4.1** 8.7	**A** A	**1.7** 8.5	**A** A	**2.6** 8.6	**A** A	**4.2** 8.8	**A** A	**1.5** 8.6	**A** A	**2.0** 8.7	**A** A	**4.2** 8.9	**A** A

Notes: 1. L, T, R = Left, Through, Right
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound
3. HCM analysis utilized.

Paraiso Springs Resort, Monterey County
Project Trip Generation
Phase 1

	TRIP RATE SOURCE	INDEPENDENT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT. IN	SAT. OUT
GROSS TRIP GENERATION RATES												
Proposed Project												
Resort Hotel [2]	ITE 330	Per Occupied Room	6.13	0.37	72%	28%	0.49	43%	57%	1.23	50%	50%
Residential (Single-Family Detached) [3]	ITE 210	Per Unit	9.57	0.75	25%	75%	1.01	63%	37%	0.93	53%	47%
Recreational Homes [3]	ITE 260	Per Unit	3.16	0.16	67%	33%	0.26	41%	59%	0.36	48%	52%
Hotel Employee		Per Employee	2.50	-	-	-	-	-	-	-	-	-
Previous Use												
Day Guests		Per Day Guest	5.00	0.4	94%	6%	0.4	6%	94%	0.2	50%	50%
Visitor Units and Campground/Recreational Vehicle Park		Per Occupied Unit	6.13	0.2	42%	58%	0.37	69%	31%	0.74	60%	40%

	TRIP RATE SOURCE	PROJECT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT. IN	SAT. OUT
PROJECT GROSS TRIP GENERATION												
Resort Hotel (100% Occupied)	ITE 330	62 Units	380	23	17	6	30	13	17	76	38	38
Residential Homes (100% Occupied)	ITE 210	5 Units	48	4	1	3	5	3	2	5	3	2
Recreational Homes (100% Occupied)	ITE 260	18 Units	57	3	2	1	5	2	3	6	3	3
Gross Total		85 Units	485	30	20	10	40	18	22	87	44	43
Net Total Assuming 10% Internal Reduction between Residential and Resort			436	27	18	9	36	16	20	78	40	39
EMPLOYEES[4]												
Employees per room	1.7											
Total Payroll Employees (1.7 x 85)	145											
Workweek reduction factor (5 day work week, 5/7)	0.71											
Employees per day (all shifts)	104											
TRIP REDUCTION STRATEGIES	Total Employees	Shuttle Employees										
A. Employee Shuttle Trip Reduction[5]												
Employee Shuttle (Weekday Day)	52	47 Employees		-15	-15	0	-17	0	-17			
Employee Shuttle (Weekday Swing)	39	35 Employees					-13	-13	0			
Employee Shuttle (Weekday Night)	13	12 Employees		-7	0	-7						
Employee Shuttle (Weekend Day)	52	47 Employees								-21	0	-21
Employee Shuttle (Weekend Swing)	39	35 Employees								-16	-16	0
Employee Shuttle (Weekend Night)	13	12 Employees										
Total Employee Shuttle Related Trip Reduction	104	94 Employees	-235	-22	-15	-7	-30	-13	-17	-37	-16	-21
B. Guest Vehicle Trip Reduction[5]			-18	-1	-1	0	-2	-1	-1	-4	-2	-2
C. Shuttle Trips Added[7]												
Employee Shuttles			18	4	2	2	4	2	2	4	2	2
Guest Shuttle			8	1	0	1	2	1	1	4	2	2
Total Shuttle Trips			26	5	2	3	6	3	3	8	4	4
Proposed Project Shuttle Related Trip Reduction Subtotal			-227	-18	-14	-4	-26	-11	-15	-33	-14	-19
NET PROJECT TRIP GENERATION												
Proposed Net Project Trips Subtotal - 100% Occupancy			209	9	4	5	10	5	5	45	26	20
Proposed Net Project Trips Subtotal - 70% Occupancy			146	6	3	3	7	3	4	32	18	14
PREVIOUS PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION (PRE-2005)												
Visitor Units and Campground/Recreational Vehicle Park		61 Units	374	12	5	7	23	16	7	45	27	18
Day Guests		5 Day Guests	25	2	2	0	2	0	2	8	4	4
Previous Project Subtotal (when in full operation pre-2005)			399	14	7	7	25	16	9	53	31	22
EXISTING PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION			22	2	1	1	2	1	1	2	1	1
PROJECT NET TRIP GENERATION ABOVE PREVIOUS (PRE-2005) USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			-190	-5	-3	-2	-15	-11	-4	-8	-5	-2
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			-253	-8	-4	-4	-18	-13	-5	-21	-13	-8
PROJECT NET TRIP GENERATION ABOVE EXISTING USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			187	7	3	4	8	4	4	43	25	19
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			124	4	2	2	5	2	3	30	17	13

Notes:

1. ITE daily rates are not available for Resort Hotel. Daily traffic is estimated based on 8% of the daily trips occuring in the evening peak hour.
2. Resort hotel gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 330, Resort Hotel. This trip generation rate includes trips generated by all facilities and activites at the site associated with the hotel, such as restaurants, gift shops, conference facilities and recreational facilities.
3. Residential and Recreational Homes gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 260, Recreational Homes.
4. ITE trip generation data indicate a resort hotel employs 1.7 people per room. (ITE Land Use Code 330, Resort Hotel, AM & PM Peak Hour of Generator, Trips per Empl. Vs. Trips per Room). The project applicant will be providing 306 employees to facilitate the entire project operation. Staffing will be provided 7 days per week, 24 hours per day. For Phase 1, 145 employees will be provided. Allowing for a 5 day work week, 104 employees will be scheduled to work each day. The employees will be scheduled to work during one of three work shifts, although specific work hours (i.e., arrival/departure times) will vary depending specific job requirements. It is anticipated that 52 employees will work the day shift, 39 employees will work the swing shift and 13 employees will work the night shift.
5. All non-management employees, approximately 90% of the total number of employees, are required to use the employee shuttle. Not all employees will arrive within the same one-hour period. Employee arrivals and departures are expected to be distributed over a 2 to 3 hour period. During the AM weekday, 32% of the of the day shift employees were assumed to arrive and 60% of the night shift employees were assumed to depart. During the PM weekday, 37% of the day shift were assumed to depart and 37% of the swing shift were assumed to arrive. For the Saturday peak hour, 45% of the day shift employees were assumed to depart and 45% of the swing shift employees were assumed to arrrive.
6. Section B shows the number of guest vehicle trips that will be made by shuttle. These trips consist of guest day trips and guest trips to and from the airport. One-quarter of the guests are assumed to make an off-site trip per day: 21 round trips, 42 one-way trips. 20% of the day trips would be made via shuttle: 4 round trips, 8 one-way trips. 5 arrivals and 5 departures via the San Jose Airport are assumed to occur via the shuttle bus each day. 8 day trips + 10 airport trips = 18 total trip reduction.
7. The off-site day trips would be served in 2 shuttle trips: 6 people per shuttle, 8 people total, 4 guest parties. Two round trips per day by the shuttle between the resort and the airport are assumed. 4 shuttle trips for guest day trips + 4 airport trips = 8 guest related shuttle trips. It was assumed that the employee shuttle would made 3 round trips per shift change between the project site and Soledad each day, or 18 total trips per day.

Paraiso Springs Report, Monterey County
Project Trip Generation
Phase 2

	TRIP RATE SOURCE	INDEPENDENT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
GROSS TRIP GENERATION RATES												
Proposed Project												
Resort Hotel [2]	ITE 330	Per Occupied Room	6.13	0.37	72%	28%	0.49	43%	57%	1.23	50%	50%
Residential (Single-Family Detached) [3]	ITE 210	Per Unit	9.57	0.75	25%	75%	1.01	63%	37%	0.93	53%	47%
Recreational Homes [3]	ITE 260	Per Unit	3.16	0.16	67%	33%	0.26	41%	59%	0.36	48%	52%
Hotel Employee		Per Employee	2.50	-	-	-	-	-	-	-	-	-
Previous Use												
Day Guests		Per Day Guest	5.00	0.4	94%	6%	0.4	6%	94%	0.2	50%	50%
Visitor Units and Campground/Recreational Vehicle Park		Per Occupied Unit	6.13	0.2	42%	58%	0.37	69%	31%	0.74	60%	40%

	TRIP RATE SOURCE	PROJECT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
PROJECT GROSS TRIP GENERATION												
Resort Hotel (100% Occupied)	ITE 330	77 Units	472	28	20	8	38	16	22	95	48	47
Residential Homes (100% Occupied)	ITE 210	9 Units	86	7	2	5	9	6	3	8	4	4
Recreational Homes (100% Occupied)	ITE 260	32 Units	101	5	3	2	8	3	5	12	6	6
Gross Total		118 Units	659	40	25	15	55	25	30	115	58	57
Net Total Assuming 10% Internal Reduction between Residential and Resort			593	36	23	14	50	23	27	104	52	51
EMPLOYEES[4]												
Employees per room	1.7											
Total Payroll Employees (1.7 x 118)	201											
Workweek reduction factor (5 day work week, 5/7)	0.71											
Employees per day (all shifts)	144											
TRIP REDUCTION STRATEGIES	Total Employees	Shuttle Employees										
A. Employee Shuttle Trip Reduction[5]												
Employee Shuttle (Weekday Day)	72	65 Employees		-20	-20	0	-24	0	-24			
Employee Shuttle (Weekday Swing)	54	49 Employees					-18	-18	0			
Employee Shuttle (Weekday Night)	18	16 Employees		-10	0	-10						
Employee Shuttle (Weekend Day)	72	65 Employees								-29	0	-29
Employee Shuttle (Weekend Swing)	54	49 Employees								-22	-22	0
Employee Shuttle (Weekend Night)	18	16 Employees										
Total Employee Shuttle Related Trip Reduction	144	130 Employees	-325	-30	-20	-10	-42	-18	-24	-51	-22	-29
B. Guest Vehicle Trip Reduction[5]			-28	-1	0	-1	-2	-1	-1	-6	-3	-3
C. Shuttle Trips Added[7]												
Employee Shuttles			24	4	2	2	4	2	2	4	2	2
Guest Shuttle			10	1	0	1	2	1	1	4	2	2
Total Shuttle Trips			34	5	2	3	6	3	3	8	4	4
Proposed Project Shuttle Related Trip Reduction Subtotal			-319	-26	-18	-8	-38	-16	-22	-49	-21	-28
NET PROJECT TRIP GENERATION												
Proposed Net Project Trips Subtotal - 100% Occupancy			274	10	4	6	12	7	5	54	31	23
Proposed Net Project Trips Subtotal - 70% Occupancy			192	7	3	4	8	5	3	38	22	16
PREVIOUS PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION (PRE-2005)												
Visitor Units and Campground/Recreational Vehicle Park		61 Units	374	12	5	7	23	16	7	45	27	18
Day Guests		5 Day Guests	25	2	2	0	2	0	2	8	4	4
Previous Project Subtotal (when in full operation pre-2005)			399	14	7	7	25	16	9	53	31	22
EXISTING PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION			22	2	1	1	2	1	1	2	1	1
PROJECT NET TRIP GENERATION ABOVE PREVIOUS (PRE-2005) USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			-125	-4	-3	-1	-13	-9	-4	1	0	1
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			-207	-7	-4	-3	-17	-11	-6	-15	-9	-6
PROJECT NET TRIP GENERATION ABOVE EXISTING USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			252	8	3	5	10	6	4	52	30	22
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			170	5	2	3	6	4	2	36	21	15

Notes:

1. ITE daily rates are not available for Resort Hotel. Daily traffic is estimated based on 8% of the daily trips occuring in the evening peak hour.
2. Resort hotel gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 330, Resort Hotel. This trip generation rate includes trips generated by all facilities and activites at the site associated with the hotel, such as restaurants, gift shops, conference facilities and recreational facilities.
3. Residential and Recreational Homes gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 260, Recreational Homes.
4. ITE trip generation data indicate a resort hotel employs 1.7 people per room. (ITE Land Use Code 330, Resort Hotel, AM & PM Peak Hour of Generator, Trips per Empl. Vs. Trips per Room). The project applicant will be providing 306 employees to facilitate the entire project operation. Staffing will be provided 7 days per week, 24 hours per day. For Phase 2, 201 employees will be provided. Allowing for a 5 day work week, 144 employees will be scheduled to work each day. The employees will be scheduled to work during one of three work shifts, although specific work hours (i.e., arrival/departure times) will vary depending specific job requirements. It is anticipated that 72 employees will work the day shift, 54 employees will work the swing shift and 18 employees will work the night shift.
5. All non-management employees, approximately 90% of the total number of employees, are required to use the employee shuttle. Not all employees will arrive within the same one-hour period. Employee arrivals and departures are expected to be distributed over a 2 to 3 hour period. During the AM weekday, 32% of the of the day shift employees were assumed to arrive and 60% of the night shift employees were assumed to depart. During the PM weekday, 37% of the day shift were assumed to depart and 37% of the swing shift were assumed to arrive. For the Saturday peak hour, 45% of the day shift employees were assumed to depart and 45% of the swing shift employees were assumed to arrrive.
6. Section B shows the number of guest vehicle trips that will be made by shuttle. These trips consist of guest day trips and guest trips to and from the airport. One-quarter of the guests are assumed to make an off-site trip per day: 30 round trips, 60 one-way trips. 20% of the day trips would be made via shuttle: 6 round trips, 12 one-way trips. 8 arrivals and 8 departures via the San Jose Airport are assumed to occur via the shuttle bus each day. 12 day trips + 16 airport trips = 28 total trip reduction.
7. The off-site day trips would be served in 2 shuttle trips: 6 people per shuttle, 12 people total, 6 guest parties. Three round trips per day by the shuttle between the resort and the airport are assumed. 4 shuttle trips for guest day trips + 6 airport trips = 10 guest related shuttle trips. It was assumed that the employee shuttle would made 4 round trips per shift change between the project site and Soledad each day, or 24 total trips per day.

EXHIBIT 6B
PROJECT PHASE 2
TRIP GENERATION

Paraiso Springs Resort, Monterey County
Project Trip Generation
Phase 3

	TRIP RATE SOURCE	INDEPENDENT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
GROSS TRIP GENERATION RATES												
Proposed Project												
Resort Hotel [2]	ITE 330	Per Occupied Room	6.13	0.37	72%	28%	0.49	43%	57%	1.23	50%	50%
Residential (Single-Family Detached) [3]	ITE 210	Per Unit	9.57	0.75	25%	75%	1.01	63%	37%	0.93	53%	47%
Recreational Homes [3]	ITE 260	Per Unit	3.16	0.16	67%	33%	0.26	41%	59%	0.36	48%	52%
Hotel Employee		Per Employee	2.50	-	-	-	-	-	-	-	-	-
Previous Use												
Day Guests		Per Day Guest	5.00	0.4	94%	6%	0.4	6%	94%	0.2	50%	50%
Visitor Units and Campground/Recreational Vehicle Park		Per Occupied Unit	6.13	0.2	42%	58%	0.37	69%	31%	0.74	60%	40%

	TRIP RATE SOURCE	PROJECT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
PROJECT GROSS TRIP GENERATION												
Resort Hotel (100% Occupied)	ITE 330	92 Units	564	34	24	10	45	19	26	113	57	56
Residential Homes (100% Occupied)	ITE 210	13 Units	124	10	3	7	13	8	5	12	6	6
Recreational Homes (100% Occupied)	ITE 260	46 Units	145	7	5	2	12	5	7	17	8	9
Gross Total		151 Units	834	51	32	19	70	32	38	142	71	71
Net Total Assuming 10% Internal Reduction between Residential and Resort			750	46	29	17	63	29	34	128	64	64
EMPLOYEES[4]												
Employees per room	1.7											
Total Payroll Employees (1.7 x 151)	257											
Workweek reduction factor (5 day work week, 5/7)	0.71											
Employees per day (all shifts)	184											
TRIP REDUCTION STRATEGIES	Total Employees	Shuttle Employees										
A. Employee Shuttle Trip Reduction[5]												
Employee Shuttle (Weekday Day)	92	83 Employees		-26	-26	0	-31	0	-31			
Employee Shuttle (Weekday Swing)	69	62 Employees					-23	-23	0			
Employee Shuttle (Weekday Night)	23	21 Employees		-12	0	-12						
Employee Shuttle (Weekend Day)	92	83 Employees								-37	0	-37
Employee Shuttle (Weekend Swing)	69	62 Employees								-28	-28	0
Employee Shuttle (Weekend Night)	23	21 Employees										
Total Employee Shuttle Related Trip Reduction	184	166 Employees	-415	-38	-26	-12	-54	-23	-31	-65	-28	-37
B. Guest Vehicle Trip Reduction[5]			-36	-1	0	-1	-2	-1	-1	-8	-4	-4
C. Shuttle Trips Added[7]												
Employee Shuttles			30	4	2	2	4	2	2	4	2	2
Guest Shuttle			14	1	0	1	2	1	1	4	2	2
Total Shuttle Trips			44	5	2	3	6	3	3	8	4	4
Proposed Project Shuttle Related Trip Reduction Subtotal			-407	-34	-24	-10	-50	-21	-29	-65	-28	-37
NET PROJECT TRIP GENERATION												
Proposed Net Project Trips Subtotal - 100% Occupancy			343	12	5	7	13	8	5	63	36	27
Proposed Net Project Trips Subtotal - 70% Occupancy			240	9	3	6	9	5	3	44	25	19
PREVIOUS PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION (PRE-2005)												
Visitor Units and Campground/Recreational Vehicle Park		61 Units	374	12	5	7	23	16	7	45	27	18
Day Guests		5 Day Guests	25	2	2	0	2	0	2	8	4	4
Previous Project Subtotal (when in full operation pre-2005)			399	14	7	7	25	16	9	53	31	22
EXISTING PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION			22	2	1	1	2	1	1	2	1	1
PROJECT NET TRIP GENERATION ABOVE PREVIOUS (PRE-2005) USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			-56	-2	-2	0	-12	-8	-4	10	5	5
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			-159	-5	-4	-1	-16	-11	-6	-9	-6	-3
PROJECT NET TRIP GENERATION ABOVE EXISTING USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			321	10	4	6	11	7	4	61	35	26
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			218	7	2	5	7	4	2	42	24	18

Notes:

1. ITE daily rates are not available for Resort Hotel. Daily traffic is estimated based on 8% of the daily trips occuring in the evening peak hour.
2. Resort hotel gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 330, Resort Hotel. This trip generation rate includes trips generated by all facilities and activites at the site associated with the hotel, such as restaurants, gift shops, conference facilities and recreational facilities.
3. Residential and Recreational Homes gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 260, Recreational Homes.
4. ITE trip generation data indicate a resort hotel employs 1.7 people per room. (ITE Land Use Code 330, Resort Hotel, AM & PM Peak Hour of Generator, Trips per Empl. Vs. Trips per Room). The project applicant will be providing 306 employees to facilitate the entire project operation. Staffing will be provided 7 days per week, 24 hours per day. For Phase 3, 257 employees will be provided. Allowing for a 5 day work week, 184 employees will be scheduled to work each day. The employees will be scheduled to work during one of three work shifts, although specific work hours (i.e., arrival/departure times) will vary depending specific job requirements. It is anticipated that 92 employees will work the day shift, 69 employees will work the swing shift and 21 employees will work the night shift.
5. All non-management employees, approximately 90% of the total number of employees, are required to use the employee shuttle. Not all employees will arrive within the same one-hour period. Employee arrivals and departures are expected to be distributed over a 2 to 3 hour period. During the AM weekday, 32% of the of the day shift employees were assumed to arrive and 60% of the night shift employees were assumed to depart. During the PM weekday, 37% of the day shift were assumed to depart and 37% of the swing shift were assumed to arrive. For the Saturday peak hour, 45% of the day shift employees were assumed to depart and 45% of the swing shift employees were assumed to arrrive.
6. Section B shows the number of guest vehicle trips that will be made by shuttle. These trips consist of guest day trips and guest trips to and from the airport. One-quarter of the guests are assumed to make an off-site trip per day: 38 round trips, 76 one-way trips. 20% of the day trips would be made via shuttle: 8 round trips, 16 one-way trips. 10 arrivals and 10 departures via the San Jose Airport are assumed to occur via the shuttle bus each day. 16 day trips + 20 airport trips = 36 total trip reduction.
7. The off-site day trips would be served in 3 shuttle trips: 6 people per shuttle, 16 people total, 8 guest parties. Four round trips per day by the shuttle between the resort and the airport are assumed. 6 shuttle trips for guest day trips + 8 airport trips = 14 guest related shuttle trips. It was assumed that the employee shuttle would made 5 round trips per shift change between the project site and Soledad each day, or 30 total trips per day.

Paraiso Springs Report, Monterey County
Project Trip Generation
Phase 4 (Project Buildout)

	TRIP RATE SOURCE	INDEPENDENT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
GROSS TRIP GENERATION RATES												
Proposed Project												
Resort Hotel [2]	ITE 330	Per Occupied Room	6.13	0.37	72%	28%	0.49	43%	57%	1.23	50%	50%
Residential (Single-Family Detached) [3]	ITE 210	Per Unit	9.57	0.75	25%	75%	1.01	63%	37%	0.93	53%	47%
Recreational Homes [3]	ITE 260	Per Unit	3.16	0.16	67%	33%	0.26	41%	59%	0.36	48%	52%
Hotel Employee		Per Employee	2.50	-	-	-	-	-	-	-	-	-
Previous Use												
Day Guests		Per Day Guest	5.00	0.4	94%	6%	0.4	6%	94%	0.2	50%	50%
Visitor Units and Campground/Recreational Vehicle Park		Per Occupied Unit	6.13	0.2	42%	58%	0.37	69%	31%	0.74	60%	40%

	TRIP RATE SOURCE	PROJECT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
PROJECT GROSS TRIP GENERATION												
Resort Hotel (100% Occupied)	ITE 330	103 Units	631	38	27	11	50	22	28	127	64	63
Residential Homes (100% Occupied)	ITE 210	17 Units	163	13	3	10	17	11	6	16	8	8
Recreational Homes (100% Occupied)	ITE 260	60 Units	190	10	7	3	16	7	9	22	11	11
Gross Total		180 Units	984	61	37	24	83	40	43	165	83	82
Net Total Assuming 10% Internal Reduction between Residential and Resort			886	55	33	22	75	36	39	149	75	74
EMPLOYEES[4]												
Employees per room	1.7											
Total Payroll Employees (1.7 x 180)	306											
Workweek reduction factor (5 day work week, 5/7)	0.71											
Employees per day (all shifts)	218											
TRIP REDUCTION STRATEGIES	Total Employees	Shuttle Employees										
A. Employee Shuttle Trip Reduction[5]												
Employee Shuttle (Weekday Day)	109	98 Employees		-31	-31	0	-36	0	-36			
Employee Shuttle (Weekday Swing)	82	74 Employees					-27	-27	0			
Employee Shuttle (Weekday Night)	27	24 Employees		-15	0	-15						
Employee Shuttle (Weekend Day)	109	98 Employees								-44	0	-44
Employee Shuttle (Weekend Swing)	82	74 Employees								-33	-33	0
Employee Shuttle (Weekend Night)	27	24 Employees										
Total Employee Shuttle Related Trip Reduction	218	196 Employees	-492	-46	-31	-15	-63	-27	-36	-77	-33	-44
B. Guest Vehicle Trip Reduction[5]			-40	-1	0	-1	-2	-2	0	-10	-5	-5
C. Shuttle Trips Added[7]												
Employee Shuttles			36	4	2	2	4	2	2	4	2	2
Guest Shuttle			16	1	0	1	2	1	1	4	2	2
Total Shuttle Trips			52	5	2	3	6	3	3	8	4	4
Proposed Project Shuttle Related Trip Reduction Subtotal			-480	-42	-29	-13	-59	-26	-33	-79	-34	-45
NET PROJECT TRIP GENERATION												
Proposed Net Project Trips Subtotal - 100% Occupancy			406	13	4	9	16	10	6	70	41	29
Proposed Net Project Trips Subtotal - 70% Occupancy			284	9	3	6	11	7	4	49	29	20
PREVIOUS PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION (PRE-2005)												
Visitor Units and Campground/Recreational Vehicle Park		61 Units	374	12	5	7	23	16	7	45	27	18
Day Guests		5 Day Guests	25	2	2	0	2	0	2	8	4	4
Previous Project Subtotal (when in full operation pre-2005)			399	14	7	7	25	16	9	53	31	22
EXISTING PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION			22	2	1	1	2	1	1	2	1	1
PROJECT NET TRIP GENERATION ABOVE PREVIOUS (PRE-2005) USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			7	-1	-3	2	-9	-6	-3	17	10	7
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			-115	-5	-4	-1	-14	-9	-5	-4	-2	-2
PROJECT NET TRIP GENERATION ABOVE EXISTING USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			384	11	3	8	14	9	5	68	40	28
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			262	7	2	5	9	6	3	47	28	19

Notes:

1. ITE daily rates are not available for Resort Hotel. Daily traffic is estimated based on 8% of the daily trips occuring in the evening peak hour.
2. Resort hotel gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 330, Resort Hotel. This trip generation rate includes trips generated by all facilities and activites at the site associated with the hotel, such as restaurants, gift shops, conference facilities and recreational facilities.
3. Residential and Recreational Homes gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 260, Recreational Homes.
4. ITE trip generation data indicate a resort hotel employs 1.7 people per room. (ITE Land Use Code 330, Resort Hotel, AM & PM Peak Hour of Generator, Trips per Empl. Vs. Trips per Room). The project applicant will be providing 306 employees to facilitate the entire project operation at project buildout. Staffing will be provided 7 days per week, 24 hours per day. Allowing for a 5 day work week, 218 employees will be scheduled to work each day. The employees will be scheduled to work during one of three work shifts, although specific work hours (i.e., arrival/departure times) will vary depending specific job requirements. It is anticipated that 109 employees will work the day shift, 82 employees will work the swing shift and 27 employees will work the night shift.
5. All non-management employees, approximately 90% of the total number of employees, are required to use the employee shuttle. Not all employees will arrive within the same one-hour period. Employee arrivals and departures are expected to be distributed over a 2 to 3 hour period. During the AM weekday, 32% of the of the day shift employees were assumed to arrive and 60% of the night shift employees were assumed to depart. During the PM weekday, 37% of the day shift were assumed to depart and 37% of the swing shift were assumed to arrive. For the Saturday peak hour, 45% of the day shift employees were assumed to depart and 45% of the swing shift employees were assumed to arrrive.
6. Section B shows the number of guest vehicle trips that will be made by shuttle. These trips consist of guest day trips and guest trips to and from the airport. One-quarter of the guests are assumed to make an off-site trip per day: 45 round trips, 90 one-way trips. 20% of the day trips would be made via shuttle: 9 round trips, 18 one-way trips. 11 arrivals and 11 departures via the San Jose Airport are assumed to occur via the shuttle bus each day. 18 day trips + 22 airport trips = 40 total trip reduction.
7. The off-site day trips would be served in three shuttle trips: 6 people per shuttle, 18 people total, 9 guest parties. Five round trips per day by the shuttle between the resort and the airport are assumed. 6 shuttle trips for guest day trips + 10 airport trips = 16 guest related shuttle trips. It was assumed that the employee shuttle would made 6 round trips per shift change between the project site and Soledad each day, or 36 total trips per day.

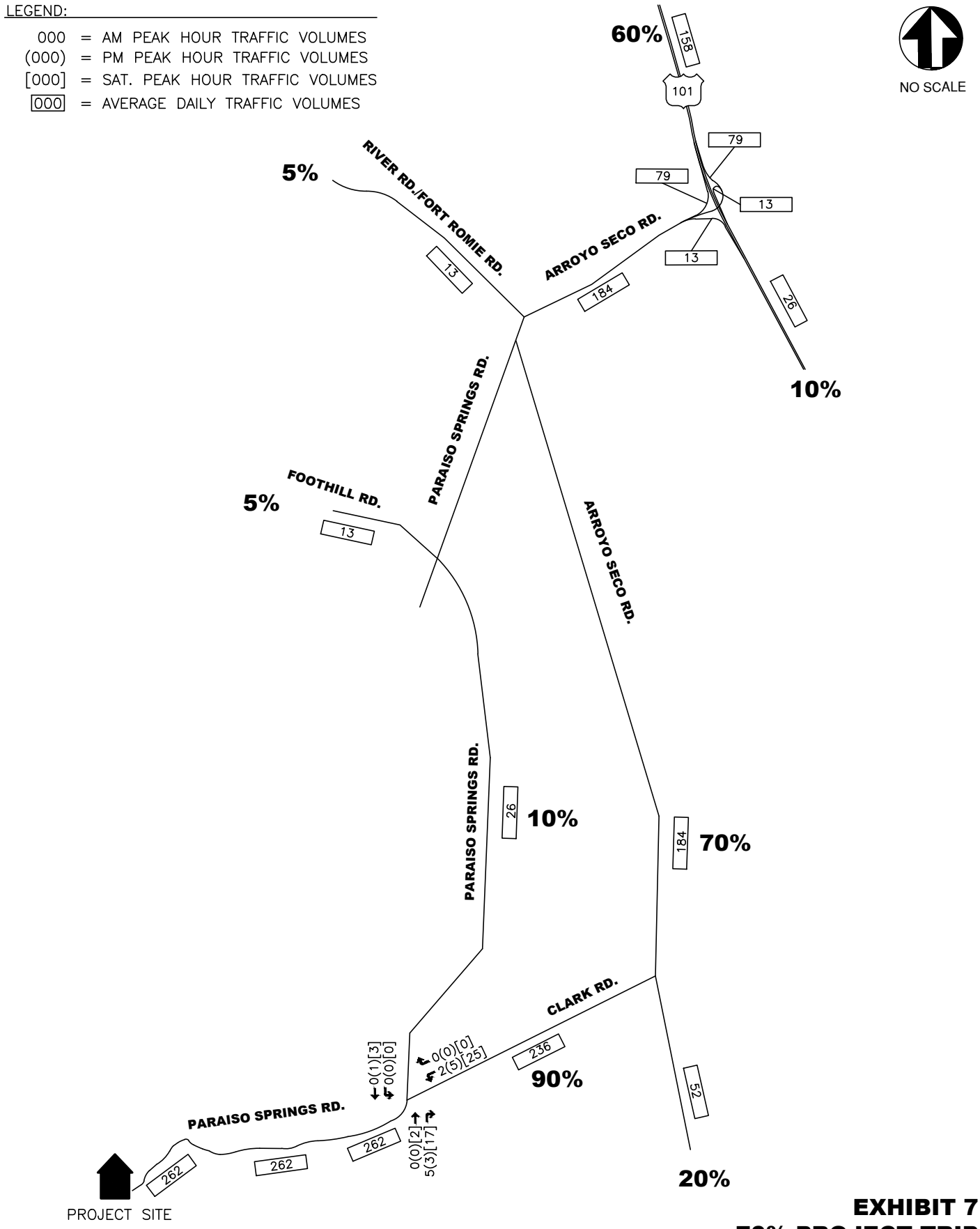

EXHIBIT 7
70% PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Hatch Mott MacDonald

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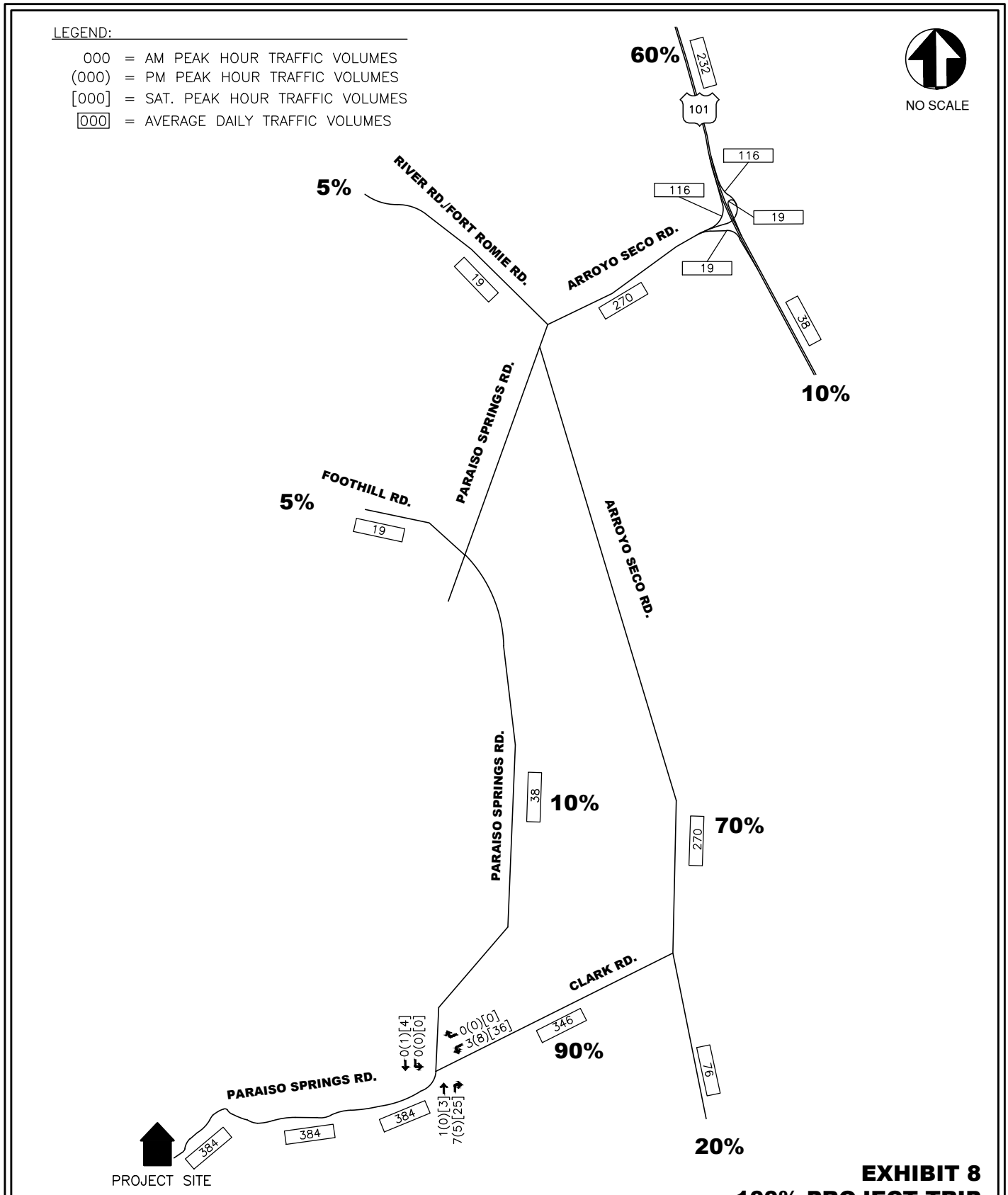

EXHIBIT 8
100% PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Hatch Mott MacDonald

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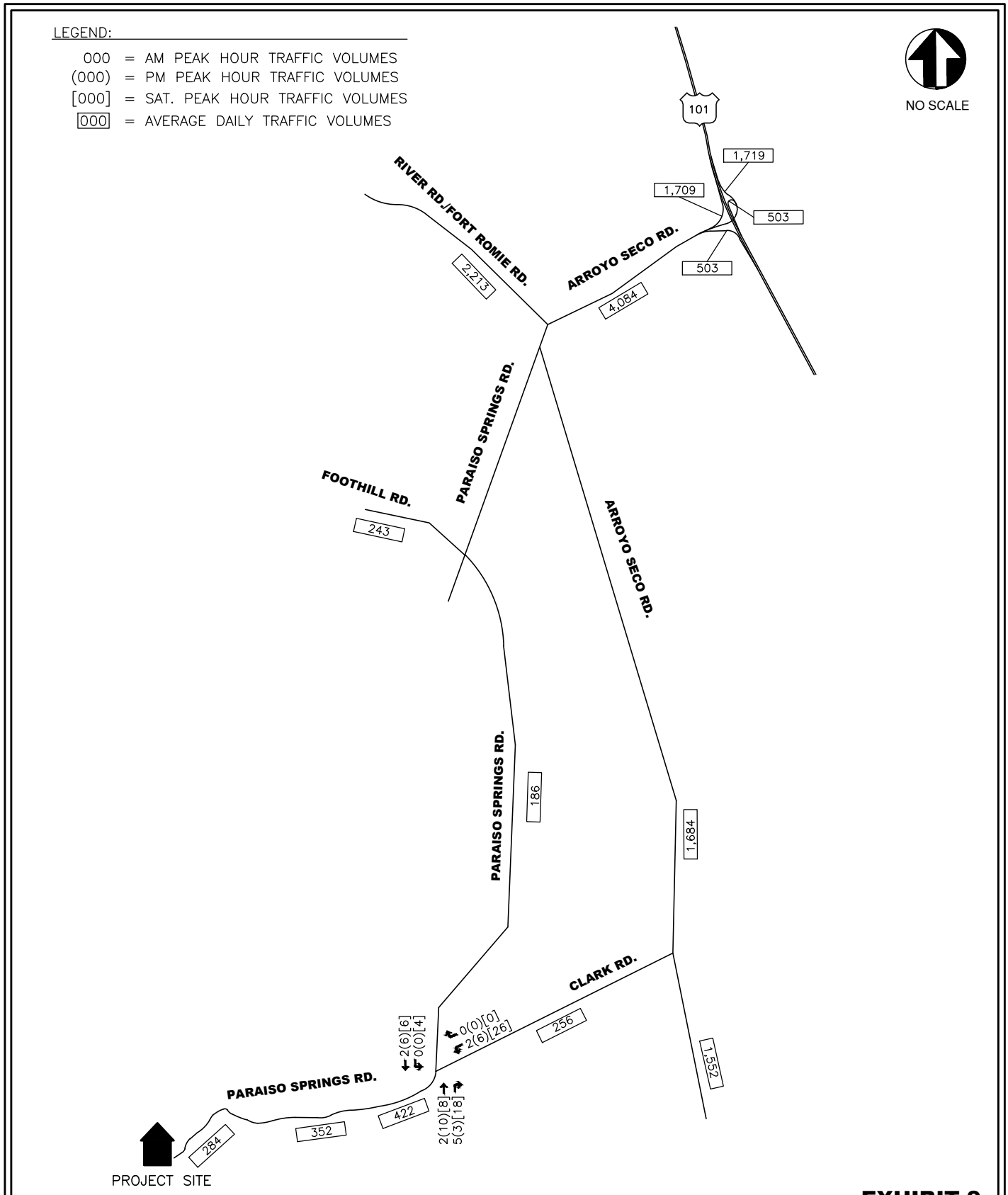

EXHIBIT 9
EXISTING + 70% PROJECT CONDITIONS
TRAFFIC VOLUMES

Hatch Mott MacDonald

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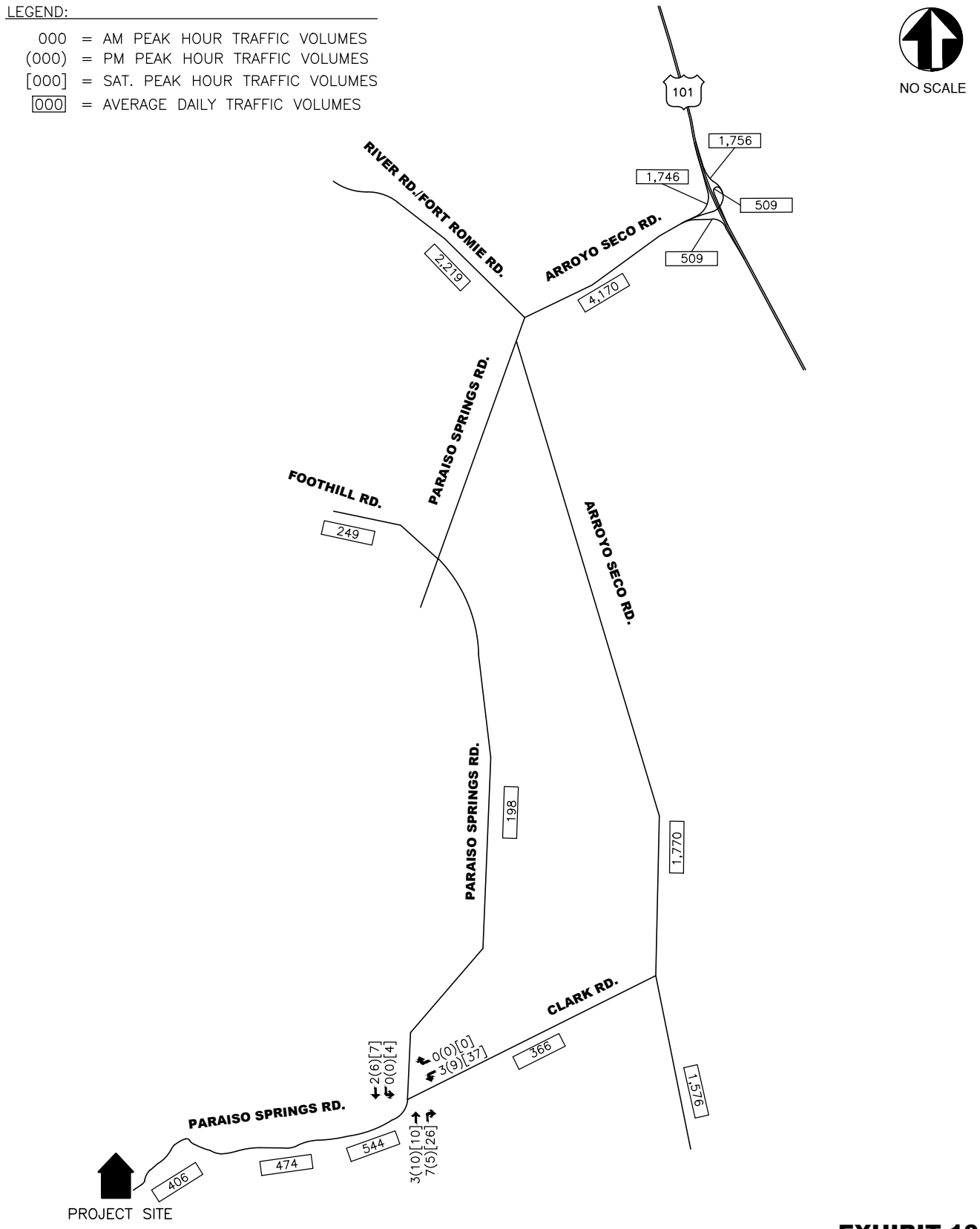

EXHIBIT 10
EXISTING + 100% PROJECT CONDITIONS
TRAFFIC VOLUMES

Hatch Mott MacDonald

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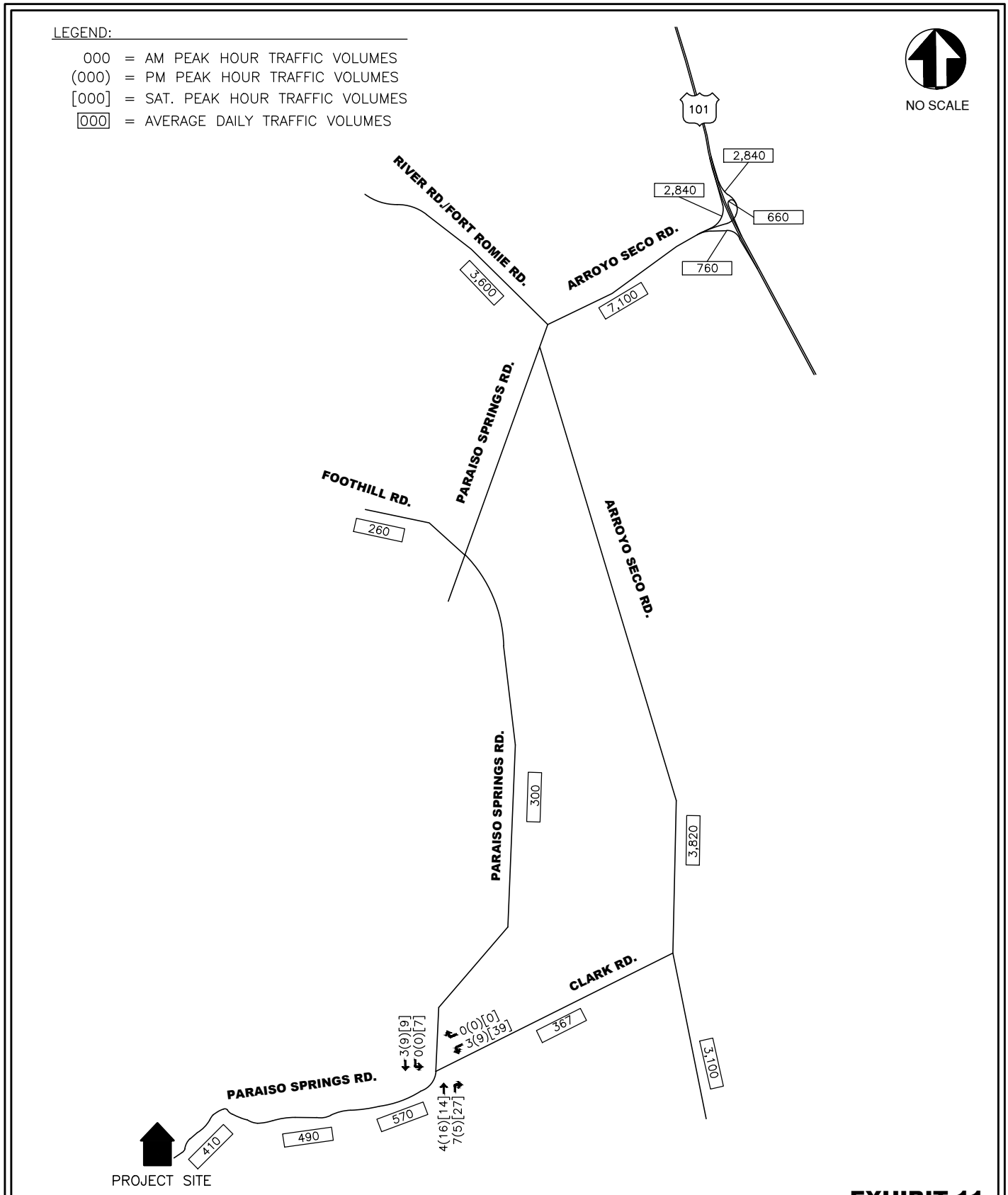

EXHIBIT 11
GENERAL PLAN CONDITIONS
TRAFFIC VOLUMES

Hatch Mott MacDonald

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Exhibit 12
Paraiso Springs Report, Monterey County
Project Parking Generation

Project Component	Size	Required Parking Ratio	Required Parking Spaces
Resort Hotel			
Number of Units	103	1 per Unit	103
Number of Employees (during largest shift)	109	2 per 3 Employees	73
Restaurant (sq. ft.)	7,570	1 per 50 sq. ft.	151
Retail (sq. ft.)	3,550	1 per 250 sq. ft.	14
Resort Hotel Gross Requirement			341
Credit for Guest Shuttle (6.25% of hotel guests arrive by shuttle)			-6
Credit for Employee Shuttle			-63
Credit for Restaurant (assuming 80% guests generated from hotel)			-121
Credit for Retail (assuming 80% guests generated from hotel)			-11
Total Credits			-201
Net Resort Hotel Requirement			**140**
Residential (Timeshare units)			
Recreational Townhomes - 2 bedroom units	34	2 per Unit	68
Recreational Townhomes - 3 or more bedroom units	26	2.2 per Unit	57
Residential Guest Spaces		1 per 4 Units	19
Single Family Detached Homes	17	2 per Unit [3]	0
Residential Gross Requirement			144
Credit for Guest Shuttle (6.25% of residential guests arrive by shuttle)			-8
Net Residential Requirement			**136**
Gross Requirement			485
Net Parking Requirement			**276**
Parking Provided			**310**

Notes:
1. Parking space requirements based on Monterey County Zoning Ordinance - Title 21.
2. Project size information based on Paraiso Resort representative.
3. Single Family Detached parking will be provided at each individual property and is not included as part of the Paraiso Hot Springs Resort parking.
4. Parking demand for the Gareden Center, Day Spa, Wine Pavilion, Institute and other ancilary uses are accounted for in the Resort Hotel and Restaurant parking demand, as those uses would serve (almost exclusively) the hotel guests and staff at the restaurant.

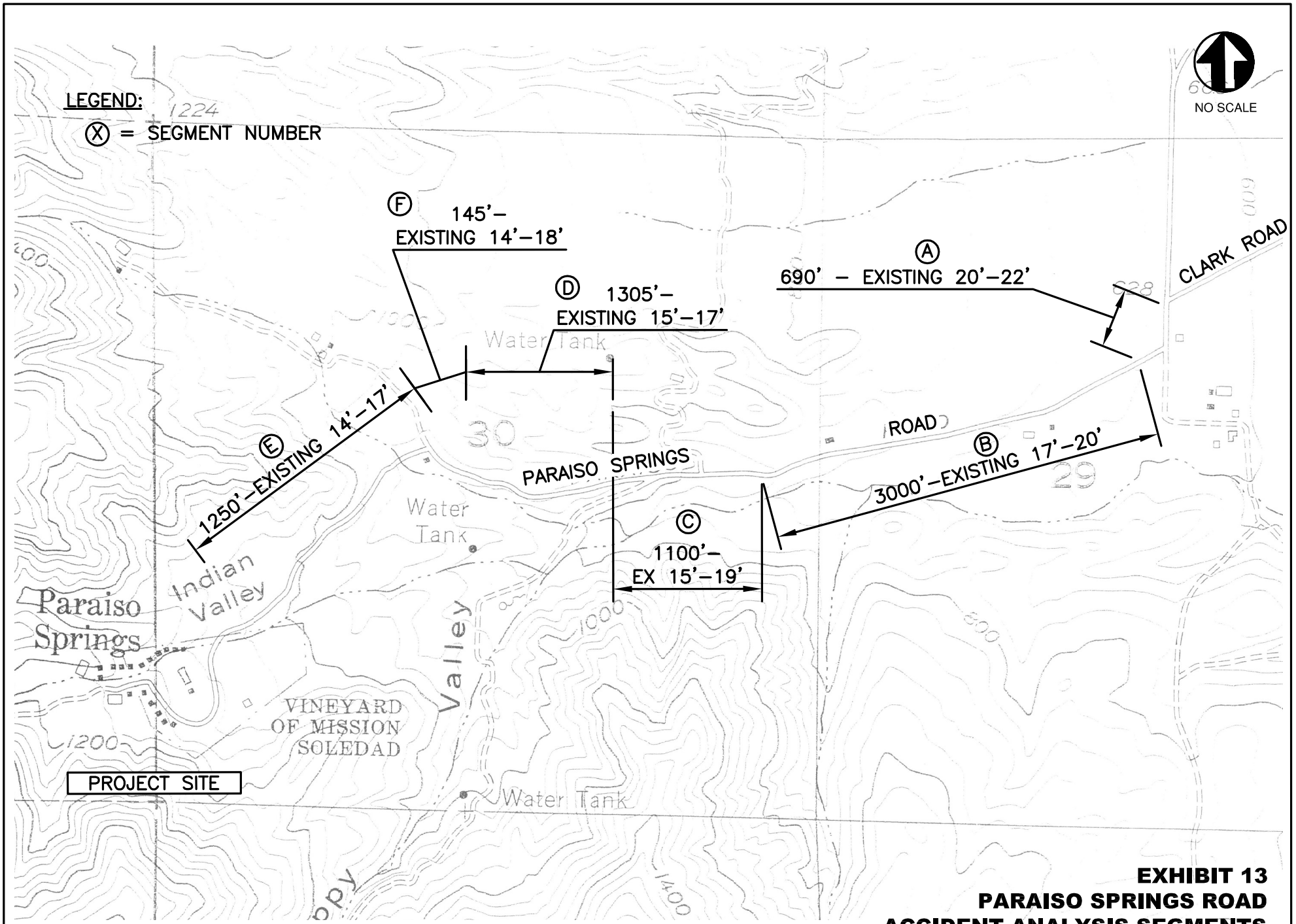

EXHIBIT 13
PARAISO SPRINGS ROAD
ACCIDENT ANALYSIS SEGMENTS

HATCH MOTT MACDONALD

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Layout: Imps
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Exhibit 14 - Paraiso Springs Road Accident Frequency Prediction Calculations

PARAISO SPRINGS ROAD TRAFFIC VOLUMES

NO.	SEGMENT LIMITS			PREVIOUS (BEFORE HOT SPRINGS CLOSURE) (1991-2005)	EXISTING (2006-2015)	PROJECT PHASE 4
ANNUAL AVE TRIP GEN (DAY GUESTS FOR 6 MOS-EXISTING, 70% ANNUAL AVE HOTEL OCCUPANCY)				399	20	**262**
					AADT	
A	Clark Road to west of parking area	SEGMENT	A	549	150	424
B	West of parking area to east of horse corral	SEGMENT	B	517	118	389
C	East of horse corral to west of horse corral	SEGMENT	C	484	85	354
D	West of horse corral to Panziera driveway	SEGMENT	D	452	53	319
E	Panziera driveway to Project	SEGMENT	E	419	20	286
F	Curve at Panziera driveway	SEGMENT	F	452	53	319

ACCIDENT FREQUENCY CALCULATIONS

ROADWAY SEGMENT		LENGTH FEET	LENGTH MILES	AVE. PAVED WIDTH (FT)	AVE. LANE WIDTH (FT)	AVE. SHOULDER WIDTH (FT)		PREDICTED ACCIDENT FREQUENCY (1991-2005)	PREDICTED ACCIDENT FREQUENCY (2006-2015)	PREDICTED ACCIDENT FREQUENCY (1991-2015)	EXPECTED ACCIDENT FREQUENCY (1991-2015)	EXPECTED ACCIDENT FREQUENCY PHASE 4
EXISTING ROADWAY												
A	Existing	690	0.131	21	10.5	2	Curve	0.033	0.011	0.022	0.020	0.019
B	Existing	3,000	0.568	18.5	9.25	1	Tangent	0.067	0.018	0.044	0.039	0.037
C	Existing	1,100	0.208	17	8.5	1	Tangent	0.024	0.005	0.015	0.014	0.013
D	Existing	1,305	0.247	16	8	0	Tangent	0.032	0.005	0.020	0.018	0.016
E	Existing	1,250	0.237	15.5	7.75	0	Tangent	0.026	0.002	0.016	0.014	0.013
F	Existing	145	0.027	15.5	7.75	0	Curve	0.071	0.010	0.045	0.040	0.036
TOTAL		7,490	1.419		ACCIDENTS PREDICTED IN 1 YEAR			0.253	0.051	0.162	0.145	0.133
					ACCIDENTS PREDICTED IN 3 YEARS			0.759	0.153	0.486	0.435	0.399
					ACCIDENTS PREDICTED IN 5 YEARS			1.265	0.255	0.810	0.725	0.666
					NO. OF YEARS FOR ONE ACCIDENT			4	20	6	7	8
					ACCIDENTS PREDICTED DURING PERIOD			3.8	0.3	3.24		
					ACCIDENTS EXPECTED 1991-2015						2.9	
					ACCIDENTS PREDICTED 1991-2015				4.1			
					ACTUAL NUMBER 1991-2015				2			
					LAST 25 YEARS - NO. OF YEARS PER ACCIDENT:							
					PREDICTED				**6**			
					EXPECTED				**7**			
					YEARS PER ACTUAL ACCIDENT 1991-2015				**10**			

Change in Accident Frequency
Based on Expected Frequency Over 25 Years

Base crashes per year =	0.145	crashes per year
Crashes per year at buildout =	0.133	crashes per year
Change in crashes per year =	-0.012	crashes per year
Change per mile of roadway =	-0.008	crashes per year
One additional crash per mile in	-119.4	years

Change in Accident Frequency
Based on Predicted Frequency Over Last 10 Years

Base crashes per year =	0.051	crashes per year
Crashes per year at buildout =	0.133	crashes per year
Change in crashes per year =	0.082	crashes per year
Change per mile of roadway =	0.058	crashes per year
One additional crash per mile in	17.3	years

ACCIDENT RATE CALCULATIONS

ROADWAY SEGMENT	DAILY VEHICLE MI TRAVELLED (DAILY VMT)	DAILY VEHICLE MI TRAVELLED (DAILY VMT)			DAILY VEHICLE MI TRAVELLED (DAILY VMT)
A	72	20			55
B	293	67			221
C	101	18			74
D	112	13			79
E	99	5			68
F	12	1			9
TOTAL	689	124			506
	ANNUAL VMT 251,485	ANNUAL VMT 45,260			ANNUAL VMT 184,690
	VMT IN 19 YRS 3,953,315				
		HISTORICAL ACCIDENT RATE (ACCIDENTS PER MILLION VEHICLE MILES TRAVELLED)			**EXPECTED ACCIDENT RATE** (ACCIDENTS PER MILLION VEHICLE MILES TRAVELLED)
	CALCULATED ACCIDENT RATE	**0.51**			**0.72**
	STATEWIDE AVERAGE RATE	**1.59**			**1.59**
	CALCULATED RATE AS PERCENTAGE OF AVG RATE	**32%**			**45%**

PREDICTED RATE IS BELOW STATEWIDE AVERAGE RATES AT PROJECT BUILDOUT. THERE WILL BE NO SIGNIFICANT IMPACT ON TRAFFIC SAFETY FROM THE PROJECT ON PARAISO SPRINGS ROAD.

Exhibit 15 - Clark Road Accident Frequency Prediction Calculations

CLARK ROAD TRAFFIC VOLUMES					
			PREVIOUS (BEFORE HOT SPRINGS CLOSURE) (1991-2005)	EXISTING (2006-2015)	PROJECT PHASE 4
ANNUAL AVE TRIP GEN (DAY GUESTS FOR 6 MOS-EXISTING, 70% ANNUAL AVE HOTEL OCCUPANCY)			399	20	262
NO.	SEGMENT LIMITS			AADT	
A	Paraiso Springs Rd to Arroyo Seco Rd	SEGMENT A		20	**367**

ACCIDENT FREQUENCY CALCULATIONS											
	ROADWAY SEGMENT	LENGTH FEET	LENGTH MILES	AVE. PAVED WIDTH (FT)	AVE. LANE WIDTH (FT)	AVE. SHOULDER WIDTH (FT)		PREDICTED ACCIDENT FREQUENCY (1991-2005)	PREDICTED ACCIDENT FREQUENCY (2006-2015)	PREDICTED ACCIDENT FREQUENCY (1991-2015)	EXPECTED ACCIDENT FREQUENCY (1991-2015)	EXPECTED ACCIDENT FREQUENCY PHASE 4
EXISTING ROADWAY												
A	Existing	7,140	1.352	18	9	0	Tangent	0.031	0.007	0.025	0.022	0.099
TOTAL		7,140	1.352		ACCIDENTS PREDICTED IN 1 YEAR			0.031	0.007	0.025	0.022	0.099
					ACCIDENTS PREDICTED IN 3 YEARS			0.093	0.021	0.075	0.066	0.297
					ACCIDENTS PREDICTED IN 5 YEARS			0.155	0.035	0.125	0.110	0.495
					NO. OF YEARS FOR ONE ACCIDENT			32	143	40	45	10
					ACCIDENTS PREDICTED DURING PERIOD			0.5	0.1	0.625		
					ACCIDENTS EXPECTED 1991-2015						0.55	
					ACCIDENTS PREDICTED 1991-2015				0.5			
					ACTUAL NUMBER 1991-2015				0			
					LAST 25 YEARS - NO. OF YEARS PER ACCIDENT:							
					PREDICTED				**40**			
					EXPECTED				**45**			
					YEARS PER ACTUAL ACCIDENT 1991-2015				**-**			

Change in Accident Frequency
Based on Expected Frequency Over 25 Years

Base crashes per year =	0.022 crashes per year
Crashes per year at buildout =	0.099 crashes per year
Change in crashes per year =	0.077 crashes per year
Change per mile of roadway =	0.054 crashes per year
One additional crash per mile in	18.4 years

Change in Accident Frequency
Based on Predicted Frequency Over Last 10 Years

Base crashes per year =	0.007 crashes per year
Crashes per year at buildout =	0.099 crashes per year
Change in crashes per year =	0.092 crashes per year
Change per mile of roadway =	0.065 crashes per year
One additional crash per mile in	15.4 years

ACCIDENT RATE CALCULATIONS					
ROADWAY SEGMENT	DAILY VEHICLE MI TRAVELLED (DAILY VMT)	DAILY VEHICLE MI TRAVELLED (DAILY VMT)			DAILY VEHICLE MI TRAVELLED (DAILY VMT)
A	0	27			496
	ANNUAL VMT 0	ANNUAL VMT 9,855			ANNUAL VMT 181,040
		VMT IN 19 YRS 39,420			
		HISTORICAL ACCIDENT RATE (ACCIDENTS PER MILLION VEHICLE MILES TRAVELLED)			**EXPECTED ACCIDENT RATE** (ACCIDENTS PER MILLION VEHICLE MILES TRAVELLED)
	CALCULATED ACCIDENT RATE	**0.00**			**0.55**
	STATEWIDE AVERAGE RATE	**1.90**			**1.90**
	CALCULATED RATE AS PERCENTAGE OF AVG RATE	**0%**			**29%**
PREDICTED RATE IS BELOW STATEWIDE AVERAGE RATES THROUGH PROJECT BUILDOUT. THERE WILL BE NO SIGNIFICANT IMPACT ON TRAFFIC SAFETY FROM THE PROJECT ON CLARK ROAD.					

Exhibit 16 - Arroyo Seco Road/Clark Road Accident Frequency Prediction Calculations

ARROYO SECO/CLARK ROAD TRAFFIC VOLUMES			
	PREVIOUS (BEFORE HOT SPRINGS CLOSURE) (1991-2005)	EXISTING (2006-2015)	PROJECT PHASE 4
ANNUAL AVE TRIP GEN (DAY GUESTS FOR 6 MOS-EXISTING, 70% ANNUAL AVE HOTEL OCCUPANCY)	399	20	262
INTERSECTION LEG		**AADT**	
Arroyo Seco (Entering Vehicles Per Day)	1300	1710	1619
Clark Road (Entering Vehicles Per Day)	42	10	129

ACCIDENT FREQUENCY CALCULATIONS						
		PREDICTED ACCIDENT FREQUENCY			EXPECTED ACCIDENT FREQUENCY	
INTERSECTION		(1991-2005)	(2006-2015)	(1991-2015)	(1991-2015)	PHASE 4
EXISTING INTERSECTION						
A Existing		0.144	0.090	0.130	0.054	0.103
TOTAL	ACCIDENTS PREDICTED IN 1 YEAR	0.144	0.090	0.130	0.054	0.103
	ACCIDENTS PREDICTED IN 3 YEARS	0.432	0.270	0.390	0.162	0.309
	ACCIDENTS PREDICTED IN 5 YEARS	0.720	0.450	0.650	0.270	0.515
	NO. OF YEARS FOR ONE ACCIDENT	7	11	8	19	10
	ACCIDENTS PREDICTED DURING PERIOD	2.160	0.900	3.060		
	ACCIDENTS EXPECTED 1991-2015				1.35	
	ACCIDENTS PREDICTED 1991-2015		3.1			
	ACTUAL NUMBER 1991-2015		0			
	LAST 25 YEARS - NO. OF YEARS PER ACCIDENT:					
	PREDICTED		**7**			
	EXPECTED		**15**			
	YEARS PER ACTUAL ACCIDENT 1991-2015		**0**			

ACCIDENT RATE CALCULATIONS					
ROADWAY SEGMENT	DAILY ENTERING VEHICLES	DAILY ENTERING VEHICLES			DAILY ENTERING VEHICLES
A	1342 ANNUAL ENTERING VEHICLES 489,830	1720 ANNUAL ENTERING VEHICLES 627,800			1748 ANNUAL ENTERING VEHICLES 638,020
	ENTERING VEHICLES IN 25 YRS 13,625,450				
		PREVIOUS ACCIDENT RATE (25-YEAR PERIOD) (ACCIDENTS PER MILLION VEHICLES ENTERING THE INTERSECTION)			**EXPECTED ACCIDENT RATE** (ACCIDENTS PER MILLION VEHICLES ENTERING THE INTERSECTION)
	CALCULATED ACCIDENT RATE	**0.00**			**0.16**
	STATEWIDE AVERAGE RATE	**0.30**			**0.30**
	CALCULATED RATE AS PERCENTAGE OF AVG RATE	**0%**			**54%**
PREDICTED RATE IS BELOW STATEWIDE AVERAGE RATES. THERE WILL BE NO SIGNIFICANT IMPACT ON TRAFFIC SAFETY FROM THE PROJECT AT THE ARROYO SECO/CLARK INTERSECTION.					

NOT TO SCALE

EXHIBIT 17 – ALTERNATIVE PROJECT SITE PLAN

Exhibit 17.ppt

Source: HKS Hospitality Group, 2016.

Paraiso Springs Resort, Monterey County
Project Trip Generation (Alternative Definition)
Phase 1

	TRIP RATE SOURCE	INDEPENDENT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
GROSS TRIP GENERATION RATES												
Proposed Project												
Resort Hotel [2]	ITE 330	Per Occupied Room	6.13	0.37	72%	28%	0.49	43%	57%	1.23	50%	50%
Residential (Single-Family Detached) [3]	ITE 210	Per Unit	9.57	0.75	25%	75%	1.01	63%	37%	0.93	53%	47%
Recreational Homes [3]	ITE 260	Per Unit	3.16	0.16	67%	33%	0.26	41%	59%	0.36	48%	52%
Hotel Employee		Per Employee	2.50	-	-	-	-	-	-	-	-	-
Previous Use												
Day Guests		Per Day Guest	5.00	0.4	94%	6%	0.4	6%	94%	0.2	50%	50%
Visitor Units and Campground/Recreational Vehicle Park		Per Occupied Unit	6.13	0.2	42%	58%	0.37	69%	31%	0.74	60%	40%

	TRIP RATE SOURCE	PROJECT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
PROJECT GROSS TRIP GENERATION												
Resort Hotel (100% Occupied)	ITE 330	62 Units	380	23	17	6	30	13	17	76	38	38
Residential Homes (100% Occupied)	ITE 210	1 Units	10	1	0	1	1	1	0	1	1	0
Recreational Homes (100% Occupied)	ITE 260	18 Units	57	3	2	1	5	2	3	6	3	3
Gross Total		81 Units	447	27	19	8	36	16	20	83	42	41
Net Total Assuming 10% Internal Reduction between Residential and Resort			402	24	17	7	32	14	18	75	38	37
EMPLOYEES[4]												
Employees per room	1.7											
Total Payroll Employees (1.7 x 85)	138											
Workweek reduction factor (5 day work week, 5/7)	0.71											
Employees per day (all shifts)	104											
TRIP REDUCTION STRATEGIES	Total Employees	Shuttle Employees										
A. Employee Shuttle Trip Reduction[5]												
Employee Shuttle (Weekday Day)	49	44 Employees		-14	-14	0	-16	0	-16			
Employee Shuttle (Weekday Swing)	37	33 Employees					-12	-12	0			
Employee Shuttle (Weekday Night)	12	11 Employees		-6	0	-6						
Employee Shuttle (Weekend Day)	49	44 Employees								-20	0	-20
Employee Shuttle (Weekend Swing)	37	33 Employees								-15	-15	0
Employee Shuttle (Weekend Night)	12	11 Employees										
Total Employee Shuttle Related Trip Reduction	98	88 Employees	-222	-20	-14	-6	-29	-12	-16	-35	-15	-20
B. Guest Vehicle Trip Reduction[6]			-18	-1	-1	0	-2	0	0	-4	-2	-2
C. Shuttle Trips Added[7]												
Employee Shuttles			17	4	2	2	4	2	2	4	2	2
Guest Shuttle			8	1	0	1	2	1	1	4	2	2
Total Shuttle Trips			25	5	2	3	6	3	3	8	4	4
Proposed Project Shuttle Related Trip Reduction Subtotal			-215	-16	-13	-3	-24	-10	-14	-31	-13	-18
NET PROJECT TRIP GENERATION												
Proposed Net Project Trips Subtotal - 100% Occupancy			188	8	4	4	8	4	4	44	25	19
Proposed Net Project Trips Subtotal - 70% Occupancy			131	6	3	3	6	3	3	31	17	13
PREVIOUS PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION (PRE-2005)												
Visitor Units and Campground/Recreational Vehicle Park		61 Units	374	12	5	7	23	16	7	45	27	18
Day Guests		5 Day Guests	25	2	2	0	2	0	2	8	4	4
Previous Project Subtotal (when in full operation pre-2005)			399	14	7	7	25	16	9	53	31	22
EXISTING PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION			22	2	1	1	2	1	1	2	1	1
PROJECT NET TRIP GENERATION ABOVE PREVIOUS (PRE-2005) USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			-211	-6	-3	-3	-17	-12	-5	-9	-6	-3
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			-268	-8	-4	-4	-19	-13	-6	-22	-14	-9
PROJECT NET TRIP GENERATION ABOVE EXISTING USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			166	6	3	3	6	3	3	42	24	18
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			109	4	2	2	4	2	2	29	16	12

Notes:

1. ITE daily rates are not available for Resort Hotel. Daily traffic is estimated based on 8% of the daily trips occuring in the evening peak hour.
2. Resort hotel gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 330, Resort Hotel. This trip generation rate includes trips generated by all facilities and activites at the site associated with the hotel, such as restaurants, gift shops, conference facilities and recreational facilities.
3. Residential and Recreational Homes gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 260, Recreational Homes.
4. ITE trip generation data indicate a resort hotel employs 1.7 people per room. (ITE Land Use Code 330, Resort Hotel, AM & PM Peak Hour of Generator, Trips per Empl. Vs. Trips per Room). The project applicant will be providing 306 employees to facilitate the entire project operation. Staffing will be provided 7 days per week, 24 hours per day. For Phase 1, 145 employees will be provided. Allowing for a 5 day work week, 104 employees will be scheduled to work each day. The employees will be scheduled to work during one of three work shifts, although specific work hours (i.e., arrival/departure times) will vary depending specific job requirements. It is anticipated that 52 employees will work the day shift, 39 employees will work the swing shift and 13 employees will work the night shift.
5. All non-management employees, approximately 90% of the total number of employees, are required to use the employee shuttle. Not all employees will arrive within the same one-hour period. Employee arrivals and departures are expected to be distributed over a 2 to 3 hour period. During the AM weekday, 32% of the of the day shift employees were assumed to arrive and 60% of the night shift employees were assumed to depart. During the PM weekday, 37% of the day shift were assumed to depart and 37% of the swing shift were assumed to arrive. For the Saturday peak hour, 45% of the day shift employees were assumed to depart and 45% of the swing shift employees were assumed to arrrive.
6. Section B shows the number of guest vehicle trips that will be made by shuttle. These trips consist of guest day trips and guest trips to and from the airport. One-quarter of the guests are assumed to make an off-site trip per day: 21 round trips, 42 one-way trips. 20% of the day trips would be made via shuttle: 4 round trips, 8 one-way trips. 5 arrivals and 5 departures via the San Jose Airport are assumed to occur via the shuttle bus each day. 8 day trips + 10 airport trips = 18 total trip reduction.
7. The off-site day trips would be served in 2 shuttle trips: 6 people per shuttle, 8 people total, 4 guest parties. Two round trips per day by the shuttle between the resort and the airport are assumed. 4 shuttle trips for guest day trips + 4 airport trips = 8 guest related shuttle trips. It was assumed that the employee shuttle would made 3 round trips per shift change between the project site and Soledad each day, or 18 total trips per day.

EXHIBIT 18A
ALTERNATIVE PROJECT PHASE 1
TRIP GENERATION

Paraiso Springs Report, Monterey County
Project Trip Generation (Alternative Definition)
Phase 2

	TRIP RATE SOURCE	INDEPENDENT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
GROSS TRIP GENERATION RATES												
Proposed Project												
Resort Hotel [2]	ITE 330	Per Occupied Room	6.13	0.37	72%	28%	0.49	43%	57%	1.23	50%	50%
Residential (Single-Family Detached) [3]	ITE 210	Per Unit	9.57	0.75	25%	75%	1.01	63%	37%	0.93	53%	47%
Recreational Homes [3]	ITE 260	Per Unit	3.16	0.16	67%	33%	0.26	41%	59%	0.36	48%	52%
Hotel Employee		Per Employee	2.50	-	-	-	-	-	-	-	-	-
Previous Use												
Day Guests		Per Day Guest	5.00	0.4	94%	6%	0.4	6%	94%	0.2	50%	50%
Visitor Units and Campground/Recreational Vehicle Park		Per Occupied Unit	6.13	0.2	42%	58%	0.37	69%	31%	0.74	60%	40%

	TRIP RATE SOURCE	PROJECT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
PROJECT GROSS TRIP GENERATION												
Resort Hotel (100% Occupied)	ITE 330	77 Units	472	28	20	8	38	16	22	95	48	47
Residential Homes (100% Occupied)	ITE 210	2 Units	19	2	1	1	2	1	1	2	1	1
Recreational Homes (100% Occupied)	ITE 260	32 Units	101	5	3	2	8	3	5	12	6	6
Gross Total		111 Units	592	35	24	11	48	20	28	109	55	54
Net Total Assuming 10% Internal Reduction between Residential and Resort			533	32	22	10	43	18	25	98	50	49
EMPLOYEES[4]												
Employees per room	1.7											
Total Payroll Employees (1.7 x 118)	189											
Workweek reduction factor (5 day work week, 5/7)	0.71											
Employees per day (all shifts)	144											
TRIP REDUCTION STRATEGIES	Total Employees	Shuttle Employees										
A. Employee Shuttle Trip Reduction[5]												
Employee Shuttle (Weekday Day)	67	60 Employees		-19	-19	0	-22	0	-22			
Employee Shuttle (Weekday Swing)	50	45 Employees					-17	-17	0			
Employee Shuttle (Weekday Night)	17	15 Employees		-9	0	-9						
Employee Shuttle (Weekend Day)	67	60 Employees								-27	0	-27
Employee Shuttle (Weekend Swing)	50	45 Employees								-20	-20	0
Employee Shuttle (Weekend Night)	17	15 Employees										
Total Employee Shuttle Related Trip Reduction	134	121 Employees	-303	-28	-19	-9	-39	-17	-22	-47	-20	-27
B. Guest Vehicle Trip Reduction[5]			-26	-1	-1	0	-1	0	-1	-6	-3	-3
C. Shuttle Trips Added[7]												
Employee Shuttles			22	4	2	2	4	2	2	4	2	2
Guest Shuttle			10	1	0	1	2	1	1	4	2	2
Total Shuttle Trips			32	5	2	3	6	3	3	8	4	4
Proposed Project Shuttle Related Trip Reduction Subtotal			-297	-24	-18	-6	-35	-14	-20	-45	-19	-26
NET PROJECT TRIP GENERATION												
Proposed Net Project Trips Subtotal - 100% Occupancy			237	8	4	4	9	4	5	53	30	22
Proposed Net Project Trips Subtotal - 70% Occupancy			166	5	3	3	7	3	3	37	21	16
PREVIOUS PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION (PRE-2005)												
Visitor Units and Campground/Recreational Vehicle Park		61 Units	374	12	5	7	23	16	7	45	27	18
Day Guests		5 Day Guests	25	2	2	0	2	0	2	8	4	4
Previous Project Subtotal (when in full operation pre-2005)			399	14	7	7	25	16	9	53	31	22
EXISTING PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION			22	2	1	1	2	1	1	2	1	1
PROJECT NET TRIP GENERATION ABOVE PREVIOUS (PRE-2005) USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			-162	-6	-3	-3	-16	-12	-4	0	-1	0
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			-233	-9	-4	-4	-18	-13	-6	-16	-10	-6
PROJECT NET TRIP GENERATION ABOVE EXISTING USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			215	6	3	3	7	3	4	51	29	21
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			144	3	2	2	5	2	2	35	20	15

Notes:

1. ITE daily rates are not available for Resort Hotel. Daily traffic is estimated based on 8% of the daily trips occuring in the evening peak hour.
2. Resort hotel gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 330, Resort Hotel. This trip generation rate includes trips generated by all facilities and activites at the site associated with the hotel, such as restaurants, gift shops, conference facilities and recreational facilities.
3. Residential and Recreational Homes gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 260, Recreational Homes.
4. ITE trip generation data indicate a resort hotel employs 1.7 people per room. (ITE Land Use Code 330, Resort Hotel, AM & PM Peak Hour of Generator, Trips per Empl. Vs. Trips per Room). The project applicant will be providing 306 employees to facilitate the entire project operation. Staffing will be provided 7 days per week, 24 hours per day. For Phase 2, 201 employees will be provided. Allowing for a 5 day work week, 144 employees will be scheduled to work each day. The employees will be scheduled to work during one of three work shifts, although specific work hours (i.e., arrival/departure times) will vary depending specific job requirements. It is anticipated that 72 employees will work the day shift, 54 employees will work the swing shift and 18 employees will work the night shift.
5. All non-management employees, approximately 90% of the total number of employees, are required to use the employee shuttle. Not all employees will arrive within the same one-hour period. Employee arrivals and departures are expected to be distributed over a 2 to 3 hour period. During the AM weekday, 32% of the of the day shift employees were assumed to arrive and 60% of the night shift employees were assumed to depart. During the PM weekday, 37% of the day shift were assumed to depart and 37% of the swing shift were assumed to arrive. For the Saturday peak hour, 45% of the day shift employees were assumed to depart and 45% of the swing shift employees were assumed to arrrive.
6. Section B shows the number of guest vehicle trips that will be made by shuttle. These trips consist of guest day trips and guest trips to and from the airport. One-quarter of the guests are assumed to make an off-site trip per day: 30 round trips, 60 one-way trips. 20% of the day trips would be made via shuttle: 6 round trips, 12 one-way trips. 8 arrivals and 8 departures via the San Jose Airport are assumed to occur via the shuttle bus each day. 12 day trips + 16 airport trips = 28 total trip reduction.
7. The off-site day trips would be served in 2 shuttle trips: 6 people per shuttle, 12 people total, 6 guest parties. Three round trips per day by the shuttle between the resort and the airport are assumed. 4 shuttle trips for guest day trips + 6 airport trips = 10 guest related shuttle trips. It was assumed that the employee shuttle would made 4 round trips per shift change between the project site and Soledad each day, or 24 total trips per day.

EXHIBIT 18B
ALTERNATIVE PROJECT PHASE 2
TRIP GENERATION

Paraiso Springs Resort, Monterey County
Project Trip Generation (Alternative Definition)
Phase 3

	TRIP RATE SOURCE	INDEPENDENT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
GROSS TRIP GENERATION RATES												
Proposed Project												
Resort Hotel [2]	ITE 330	Per Occupied Room	6.13	0.37	72%	28%	0.49	43%	57%	1.23	50%	50%
Residential (Single-Family Detached) [3]	ITE 210	Per Unit	9.57	0.75	25%	75%	1.01	63%	37%	0.93	53%	47%
Recreational Homes [3]	ITE 260	Per Unit	3.16	0.16	67%	33%	0.26	41%	59%	0.36	48%	52%
Hotel Employee		Per Employee	2.50	-	-	-	-	-	-	-	-	-
Previous Use												
Day Guests		Per Day Guest	5.00	0.4	94%	6%	0.4	6%	94%	0.2	50%	50%
Visitor Units and Campground/Recreational Vehicle Park		Per Occupied Unit	6.13	0.2	42%	58%	0.37	69%	31%	0.74	60%	40%

	TRIP RATE SOURCE	PROJECT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
PROJECT GROSS TRIP GENERATION												
Resort Hotel (100% Occupied)	ITE 330	92 Units	564	34	24	10	45	19	26	113	57	56
Residential Homes (100% Occupied)	ITE 210	3 Units	29	2	1	1	3	2	1	3	2	1
Recreational Homes (100% Occupied)	ITE 260	46 Units	145	7	5	2	12	5	7	17	8	9
Gross Total		141 Units	738	43	30	13	60	26	34	133	67	66
Net Total Assuming 10% Internal Reduction between Residential and Resort			664	39	27	12	54	23	31	120	60	59
EMPLOYEES[4]												
Employees per room	1.7											
Total Payroll Employees (1.7 x 151)	240											
Workweek reduction factor (5 day work week, 5/7)	0.71											
Employees per day (all shifts)	184											
TRIP REDUCTION STRATEGIES	Total Employees	Shuttle Employees										
A. Employee Shuttle Trip Reduction[5]												
Employee Shuttle (Weekday Day)	85	77 Employees		-24	-24	0	-28	0	-28			
Employee Shuttle (Weekday Swing)	64	58 Employees					-21	-21	0			
Employee Shuttle (Weekday Night)	21	19 Employees		-11	0	-11						
Employee Shuttle (Weekend Day)	85	77 Employees								-34	0	-34
Employee Shuttle (Weekend Swing)	64	58 Employees								-26	-26	0
Employee Shuttle (Weekend Night)	21	19 Employees										
Total Employee Shuttle Related Trip Reduction	170	153 Employees	-384	-34	-24	-11	-50	-21	-28	-60	-26	-34
B. Guest Vehicle Trip Reduction[5]			-32	-1	0	0	-1	0	0	-8	-4	-4
C. Shuttle Trips Added[7]												
Employee Shuttles			28	4	2	2	4	2	2	4	2	2
Guest Shuttle			14	1	0	1	2	1	1	4	2	2
Total Shuttle Trips			42	5	2	3	6	3	3	8	4	4
Proposed Project Shuttle Related Trip Reduction Subtotal			-374	-30	-22	-8	-45	-19	-27	-60	-26	-34
NET PROJECT TRIP GENERATION												
Proposed Net Project Trips Subtotal - 100% Occupancy			291	8	5	3	9	5	4	59	34	25
Proposed Net Project Trips Subtotal - 70% Occupancy			203	6	3	3	6	4	1	42	24	18
PREVIOUS PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION (PRE-2005)												
Visitor Units and Campground/Recreational Vehicle Park		61 Units	374	12	5	7	23	16	7	45	27	18
Day Guests		5 Day Guests	25	2	2	0	2	0	2	8	4	4
Previous Project Subtotal (when in full operation pre-2005)			399	14	7	7	25	16	9	53	31	22
EXISTING PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION			22	2	1	1	2	1	1	2	1	1
PROJECT NET TRIP GENERATION ABOVE PREVIOUS (PRE-2005) USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			-108	-6	-2	-4	-16	-11	-5	6	3	3
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			-196	-8	-4	-4	-19	-12	-8	-11	-7	-4
PROJECT NET TRIP GENERATION ABOVE EXISTING USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			269	6	4	2	7	4	3	57	33	24
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			181	4	2	2	4	3	0	40	23	17

Notes:

1. ITE daily rates are not available for Resort Hotel. Daily traffic is estimated based on 8% of the daily trips occuring in the evening peak hour.
2. Resort hotel gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 330, Resort Hotel. This trip generation rate includes trips generated by all facilities and activites at the site associated with the hotel, such as restaurants, gift shops, conference facilities and recreational facilities.
3. Residential and Recreational Homes gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 260, Recreational Homes.
4. ITE trip generation data indicate a resort hotel employs 1.7 people per room. (ITE Land Use Code 330, Resort Hotel, AM & PM Peak Hour of Generator, Trips per Empl. Vs. Trips per Room). The project applicant will be providing 306 employees to facilitate the entire project operation. Staffing will be provided 7 days per week, 24 hours per day. For Phase 3, 257 employees will be provided. Allowing for a 5 day work week, 184 employees will be scheduled to work each day. The employees will be scheduled to work during one of three work shifts, although specific work hours (i.e., arrival/departure times) will vary depending specific job requirements. It is anticipated that 92 employees will work the day shift, 69 employees will work the swing shift and 21 employees will work the night shift.
5. All non-management employees, approximately 90% of the total number of employees, are required to use the employee shuttle. Not all employees will arrive within the same one-hour period. Employee arrivals and departures are expected to be distributed over a 2 to 3 hour period. During the AM weekday, 32% of the of the day shift employees were assumed to arrive and 60% of the night shift employees were assumed to depart. During the PM weekday, 37% of the day shift were assumed to depart and 37% of the swing shift were assumed to arrive. For the Saturday peak hour, 45% of the day shift employees were assumed to depart and 45% of the swing shift employees were assumed to arrrive.
6. Section B shows the number of guest vehicle trips that will be made by shuttle. These trips consist of guest day trips and guest trips to and from the airport. One-quarter of the guests are assumed to make an off-site trip per day: 38 round trips, 76 one-way trips. 20% of the day trips would be made via shuttle: 8 round trips, 16 one-way trips. 10 arrivals and 10 departures via the San Jose Airport are assumed to occur via the shuttle bus each day. 16 day trips + 20 airport trips = 36 total trip reduction.
7. The off-site day trips would be served in 3 shuttle trips: 6 people per shuttle, 16 people total, 8 guest parties. Four round trips per day by the shuttle between the resort and the airport are assumed. 6 shuttle trips for guest day trips + 8 airport trips = 14 guest related shuttle trips. It was assumed that the employee shuttle would made 5 round trips per shift change between the project site and Soledad each day, or 30 total trips per day.

Paraiso Springs Report, Monterey County
Project Trip Generation (Alternative Definition)
Phase 4 (Project Buildout)

	TRIP RATE SOURCE	INDEPENDENT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
GROSS TRIP GENERATION RATES												
Proposed Project												
Resort Hotel [2]	ITE 330	Per Occupied Room	6.13	0.37	72%	28%	0.49	43%	57%	1.23	50%	50%
Residential (Single-Family Detached) [3]	ITE 210	Per Unit	9.57	0.75	25%	75%	1.01	63%	37%	0.93	53%	47%
Recreational Homes [3]	ITE 260	Per Unit	3.16	0.16	67%	33%	0.26	41%	59%	0.36	48%	52%
Hotel Employee		Per Employee	2.50	-	-	-	-	-	-	-	-	-
Previous Use												
Day Guests		Per Day Guest	5.00	0.4	94%	6%	0.4	6%	94%	0.2	50%	50%
Visitor Units and Campground/Recreational Vehicle Park		Per Occupied Unit	6.13	0.2	42%	58%	0.37	69%	31%	0.74	60%	40%

	TRIP RATE SOURCE	PROJECT SIZE	AVG. DAILY TRIPS [1]	AM PEAK HOUR TOTAL PEAK HOUR	AM IN	AM OUT	PM PEAK HOUR TOTAL PEAK HOUR	PM IN	PM OUT	SAT. PEAK HOUR TOTAL PEAK HOUR	SAT IN	SAT OUT
PROJECT GROSS TRIP GENERATION												
Resort Hotel (100% Occupied)	ITE 330	103 Units	631	38	27	11	50	22	28	127	64	63
Residential Homes (100% Occupied)	ITE 210	5 Units	48	4	1	3	5	3	2	5	3	2
Recreational Homes (100% Occupied)	ITE 260	60 Units	190	10	7	3	16	7	9	22	11	11
Gross Total		168 Units	869	52	35	17	71	32	39	154	78	76
Net Total Assuming 10% Internal Reduction between Residential and Resort			782	47	32	15	64	29	35	139	70	68
EMPLOYEES[4]												
Employees per room	1.7											
Total Payroll Employees (1.7 x 180)	286											
Workweek reduction factor (5 day work week, 5/7)	0.71											
Employees per day (all shifts)	204											
TRIP REDUCTION STRATEGIES	Total Employees	Shuttle Employees										
A. Employee Shuttle Trip Reduction[5]												
Employee Shuttle (Weekday Day)	102	92 Employees		-29	-29	0	-34	0	-34			
Employee Shuttle (Weekday Swing)	76	68 Employees					-25	-25	0			
Employee Shuttle (Weekday Night)	25	23 Employees		-14	0	-14						
Employee Shuttle (Weekend Day)	102	92 Employees								-41	0	-41
Employee Shuttle (Weekend Swing)	76	68 Employees								-31	-31	0
Employee Shuttle (Weekend Night)	25	23 Employees										
Total Employee Shuttle Related Trip Reduction	203	183 Employees	-458	-44	-29	-14	-59	-25	-34	-72	-31	-41
B. Guest Vehicle Trip Reduction[5]			-35	0	-1	0	-1	-1	0	-10	-5	-5
C. Shuttle Trips Added[7]												
Employee Shuttles			34	4	2	2	4	2	2	4	2	2
Guest Shuttle			16	1	0	1	2	1	1	4	2	2
Total Shuttle Trips			50	5	2	3	6	3	3	8	4	4
Proposed Project Shuttle Related Trip Reduction Subtotal			-443	-39	-28	-11	-54	-23	-31	-74	-32	-42
NET PROJECT TRIP GENERATION												
Proposed Net Project Trips Subtotal - 100% Occupancy			339	8	4	4	10	6	4	65	38	26
Proposed Net Project Trips Subtotal - 70% Occupancy			237	6	3	3	7	4	3	45	27	18
PREVIOUS PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION (PRE-2005)												
Visitor Units and Campground/Recreational Vehicle Park		61 Units	374	12	5	7	23	16	7	45	27	18
Day Guests		5 Day Guests	25	2	2	0	2	0	2	8	4	4
Previous Project Subtotal (when in full operation pre-2005)			399	14	7	7	25	16	9	53	31	22
EXISTING PARAISO HOT SPRINGS PROJECT TRAFFIC GENERATION			22	2	1	1	2	1	1	2	1	1
PROJECT NET TRIP GENERATION ABOVE PREVIOUS (PRE-2005) USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			-60	-6	-3	-3	-15	-10	-5	12	7	4
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			-162	-8	-4	-4	-18	-12	-6	-8	-4	-4
PROJECT NET TRIP GENERATION ABOVE EXISTING USE												
MAXIMUM - PROPOSED PROJECT 100% OCCUPIED			317	6	3	3	8	5	3	63	37	25
AVERAGE - PROPOSED PROJECT 70% OCCUPIED			215	4	2	2	5	3	2	43	26	17

Notes:
1. ITE daily rates are not available for Resort Hotel. Daily traffic is estimated based on 8% of the daily trips occuring in the evening peak hour.
2. Resort hotel gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 330, Resort Hotel. This trip generation rate includes trips generated by all facilities and activites at the site associated with the hotel, such as restaurants, gift shops, conference facilities and recreational facilities.
3. Residential and Recreational Homes gross trip generation rates are based on *Trip Generation* , 8th Edition, published by Institute of Transportation Engineers, 2008. Land Use code 260, Recreational Homes.
4. ITE trip generation data indicate a resort hotel employs 1.7 people per room. (ITE Land Use Code 330, Resort Hotel, AM & PM Peak Hour of Generator, Trips per Empl. Vs. Trips per Room). The project applicant will be providing 306 employees to facilitate the entire project operation at project buildout. Staffing will be provided 7 days per week, 24 hours per day. Allowing for a 5 day work week, 218 employees will be scheduled to work each day. The employees will be scheduled to work during one of three work shifts, although specific work hours (i.e., arrival/departure times) will vary depending specific job requirements. It is anticipated that 109 employees will work the day shift, 82 employees will work the swing shift and 27 employees will work the night shift.
5. All non-management employees, approximately 90% of the total number of employees, are required to use the employee shuttle. Not all employees will arrive within the same one-hour period. Employee arrivals and departures are expected to be distributed over a 2 to 3 hour period. During the AM weekday, 32% of the of the day shift employees were assumed to arrive and 60% of the night shift employees were assumed to depart. During the PM weekday, 37% of the day shift were assumed to depart and 37% of the swing shift were assumed to arrive. For the Saturday peak hour, 45% of the day shift employees were assumed to depart and 45% of the swing shift employees were assumed to arrrive.
6. Section B shows the number of guest vehicle trips that will be made by shuttle. These trips consist of guest day trips and guest trips to and from the airport. One-quarter of the guests are assumed to make an off-site trip per day: 45 round trips, 90 one-way trips. 20% of the day trips would be made via shuttle: 9 round trips, 18 one-way trips. 11 arrivals and 11 departures via the San Jose Airport are assumed to occur via the shuttle bus each day. 18 day trips + 22 airport trips = 40 total trip reduction.
7. The off-site day trips would be served in three shuttle trips: 6 people per shuttle, 18 people total, 9 guest parties. Five round trips per day by the shuttle between the resort and the airport are assumed. 6 shuttle trips for guest day trips + 10 airport trips = 16 guest related shuttle trips. It was assumed that the employee shuttle would made 6 round trips per shift change between the project site and Soledad each day, or 36 total trips per day.

EXHIBIT 18D
ALTERNATIVE PROJECT BUILDOUT
TRIP GENERATION

APPENDIX A

SEGMENT LEVEL OF SERVICE THRESHOLD VOLUMES FOR VARIOUS ROADWAY TYPES

APPENDIX
LEVEL OF SERVICE THRESHOLD VOLUMES FOR VARIOUS ROADWAY TYPES
TOTAL DAILY VOLUMES IN BOTH DIRECTIONS (ADT)

ROADWAY TYPE	CODE	LOS A	LOS B	LOS C	LOS D	LOS E
10-Lane Freeway	10F	71,000	110,000	154,000	178,000	202,000
8-Lane Freeway	8F	56,000	88,000	124,000	151,000	162,000
6-Lane Freeway	6F	43,000	66,000	94,000	113,000	122,000
8-Lane Expressway	8E	35,000	54,000	75,000	90,000	98,000
6-Lane Expressway	6E	28,000	42,000	56,000	67,000	74,000
4-Lane Freeway	4F	29,000	44,000	63,000	77,000	82,000
8-Lane Divided Arterial (w/ left-turn lane)	9	40,000	47,000	54,000	61,000	68,000
6-Lane Divided Arterial (w/ left-turn lane)	7	32,000	38,000	43,000	49,000	54,000
4-Lane Expressway	4E	18,000	27,000	36,000	45,000	50,000
4-Lane Divided Arterial (w/ left-turn lane)	5	22,000	25,000	29,000	32,500	36,000
4-Lane Undivided Arterial (no left-turn lane)	4	16,000	19,000	22,000	24,000	27,000
2-Lane Rural Highway	2R	4,000	8,000	12,000	17,000	25,000
2-Lane Arterial (w/ left-turn lane)	3	11,000	12,500	14,500	16,000	18,000
2-Lane Collector	2	6,000	7,500	9,000	10,500	12,000
2-Lane Local	1	1,200	1,400	1,600	1,800	2,000
1-Lane Freeway Diamond Ramp	1D	11,000	12,800	14,700	16,500	18,300
2-Lane Freeway Diamond Ramp	2D	22,000	25,600	29,400	33,000	36,600
1-Lane Freeway Loop Ramp	1L	9,000	10,500	12,000	13,500	15,000
2-Lane Freeway Loop Ramp	2L	16,000	18,700	21,300	24,000	26,700

Notes:

1. The above threshold volumes for preliminary planning purposes only. If available, the results of detailed level of service analyses will typically have priority over the levels of service derived from this table. In that case this table can be used by the analyst for providing additional considerations for recommending the appropriate general roadway type for the specific condition being analyzed.
2. All above facilities assume a 60%/40% peak hour directional split. All above facilities assume peak hour representing approximately 10% of the Average Daily Traffic (ADT), except for mainline freeway facilities, which assume peak hour representing 9% of the Average Daily Traffic (ADT).
3. Based on *Highway Capacity Manual*, Transportation Research Board, 2000.
4. Freeway thresholds are consistent with conditions utilizing a .95 peak hour factor, with 2% trucks and slightly over a one-mile average interchange spacing.
5. Expressways are consistent with the average of a multi-lane highway (with no signals) and Class 1 arterial (with an average signal spacing of 0.8 signals per mile and a .45 G/C ratio).
6. Arterial thresholds are consistent with the average of Class 1 and Class 2 arterials with an assumed signal density of two signals per mile. This assumes a divided arterial with left-turn lanes. Thresholds for four-lane undivided arterials assume approximately three-fourths the capacity of a four-lane divided arterial due to the impedance in traffic flow resulting from left-turning vehicles waiting in the inside through lane, thus significantly reducing the capacity of the roadway.
7. Rural highways are generally consistent with the *2000 Highway Capacity Manual* rural highway, assuming 8% trucks, 4% RV's, 20% no-passing, and level terrain. The greatest difference is that it assumes a maximum capacity (upper end of LOS E) of 25,000 rather than the 28,000 calculated using the new *Highway Capacity Manual*.
8. Two-lane collectors assume approximately three-fourths of the capacity of a two-lane arterial with left-turn lanes. This is based on the assumption that left-turn channelization is not provided on a two-lane collector.
9. Local street level of service thresholds are based upon "Neighborhood Traffic Related Quality-of-Life Considerations" which assumes a standard suburban neighborhood, 40-foot roadway width, and 25 mile per hour speed limit with normal speed violation rates.
10. Capacities for Diamond Ramps and Loop Ramps may be slightly higher or lower than the planning level capacities indicated above. The *2000 Highway Capacity Manual* (2000 HCM) states that the capacity of a one-lane diamond to be 2,200 vehicles per hour (vph), and 1,800 vph for a small radius loop ramp. Two-lane freeway ramp capacities are estimated in the 2000 HCM to be 4,400vph for a two-lane diamond, and 3,200vph 20 for a two-lane small radius loop. Varying intermediate capacities are provided for incremental conditions between these extremes. Capacities given for each service level assume the same level of service for the adjoining merging roadway as well as level of service being determined by volume-to-capacity and not attainable speed. Level of service will be controlled by freeway level of service if worse than ramp. Mitigations of level of service deficiencies may include the addition of a lane on the freeway ramp, the addition of an auxiliary lane on the freeway mainline, the addition of approach lanes at the ramp junction with the local intersecting street, and/or geometric modifications to improve the efficiency of the ramp itself or its termini. The appropriate mitigation should be determined on a case-by-case basis, considering freeway main line volumes and weaving, the extent that the freeway ramp volume exceeds the above planning thresholds, and the level of service of the ramp intersection with the local street.
11. All volumes are approximate and assume ideal roadway characteristics.

APPENDIX B

LEVEL OF SERVICE DESCRIPTION
UNSIGNALIZED INTERSECTIONS
WITH TWO-WAY STOP CONTROL

APPENDIX

LEVEL OF SERVICE (LOS) DESCRIPTION
UNSIGNALIZED INTERSECTIONS WITH TWO-WAY STOP CONTROL (TWSC)

TWSC intersections are widely used and stop signs are used to control vehicle movements at such intersections. At TWSC intersections, the stop-controlled approaches are referred to as the minor street approaches; they can be either public streets or private driveways. The intersection approaches that are not controlled by stop signs are referred to as the major street approaches. A three-leg intersection is considered to be a standard type of TWSC intersection if the single minor street approach (i.e. the stem of the T configuration) is controlled by a stop sign. Three-leg intersections where two of the three approaches are controlled by stop signs are a special form of unsignalized intersection control.

At TWSC intersections, drivers on the controlled approaches are required to select gaps in the major street flow through which to execute crossing or turning maneuvers on the basis of judgement. In the presence of a queue, each driver on the controlled approach must use some time to move into the front-of-queue position and prepare to evaluate gaps in the major street flow. Capacity analysis at TWSC intersections depends on a clear description and understanding of the interaction of drivers on the minor or stop-controlled approach with drivers on the major street. Both gap acceptance and empirical models have been developed to describe this interaction.

Thus, the capacity of the controlled legs is based on three factors:

- the distribution of gaps in the major street traffic stream,;
- driver judgement in selecting gaps through which to execute the desired maneuvers; and
- the follow-up time required by each driver in a queue.

The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, in the absence of incident, control, traffic or geometric delay. Average control delay for any particular minor movement is a function of the capacity of the approach and the degree of saturation and referred to as level of service.

LEVEL OF SERVICE (LOS) CRITERIA FOR TWSC INTERSECTIONS

(Reference Highway Capacity Manual 2000)

Level of Service	Control Delay (seconds / vehicle)
A	**0 - 10**
B	**>10 - 15**
C	**>15 - 25**
D	**>25 - 35**
E	**>35 - 50**
F	**>50**

APPENDIX C

INTERSECTION LEVEL OF SERVICE CALCULATIONS

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 0.0 Worst Case Level Of Service: A[0.0]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1	0 0		0 0 1	0 0		0 0 0	0 0		0 0 1!	0 0	
Volume Module:												
Base Vol:	0	2	0	0	2	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2	0	0	2	0	0	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2	0	0	2	0	0	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	2	0	0	2	0	0	0	0	0	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	4	4	2
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1023	896	1088
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1023	896	1088
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	0	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			*			*		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: A[8.6]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1 0 0			0 0 1 0 0			0 0 0 0 0			1 0 0 0 0		
Volume Module:												
Base Vol:	0	10	0	0	5	0	0	0	0	1	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	10	0	0	5	0	0	0	0	1	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	10	0	0	5	0	0	0	0	1	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	10	0	0	5	0	0	0	0	1	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	15	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1009	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1009	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.6	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			8.6		
ApproachLOS:	*			*			*			A		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 2.5 Worst Case Level Of Service: A[8.6]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 1 0			0 1 0 0 0			0 0 0 0 0			1 0 0 0 0		
Volume Module:												
Base Vol:	0	6	1	4	3	0	0	0	0	1	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	6	1	4	3	0	0	0	0	1	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	6	1	4	3	0	0	0	0	1	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	6	1	4	3	0	0	0	0	1	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	7	xxxx	xxxxx	xxxx	xxxx	xxxxx	18	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	1627	xxxx	xxxxx	xxxx	xxxx	xxxxx	1006	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	1627	xxxx	xxxxx	xxxx	xxxx	xxxxx	1004	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	7.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.6	xxxx	xxxxx
LOS by Move:	*	*	*	A	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	A	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			8.6		
ApproachLOS:	*			*			*			A		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 1.6 Worst Case Level Of Service: A[8.5]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	0	1	0	0		0	0	0	0	0		1	0	0	0	0	
Volume Module:																								
Base Vol:	0		2		5		0		2		0		0		0		0		2		0		0	
Growth Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
Initial Bse:	0		2		5		0		2		0		0		0		0		2		0		0	
User Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Volume:	0		2		5		0		2		0		0		0		0		2		0		0	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
FinalVolume:	0		2		5		0		2		0		0		0		0		2		0		0	
Critical Gap Module:																								
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										6.4	xxxx	xxxxx			
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										3.5	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										7	xxxx	xxxxx			
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										1020	xxxx	xxxxx			
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										1020	xxxx	xxxxx			
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx										0.00	xxxx	xxxx			
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										0.0	xxxx	xxxxx			
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										8.5	xxxx	xxxxx			
LOS by Move:	*	*	*	*	*	*	*	*	*										A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										xxxxx	xxxx	xxxxx			
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										xxxxx	xxxx	xxxxx			
Shared LOS:	*	*	*	*	*	*	*	*	*										*	*	*			
ApproachDel:	xxxxxx			xxxxxx			xxxxxx												8.5					
ApproachLOS:	*			*			*												A					

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 2.1 Worst Case Level Of Service: A[8.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	0	1	0	0		0	0	0	0	0		1	0	0	0	0	
Volume Module:																								
Base Vol:	0	10	3				0	6	0				0	0	0				6	0	0			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	0	10	3				0	6	0				0	0	0				6	0	0			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	0	10	3				0	6	0				0	0	0				6	0	0			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
FinalVolume:	0	10	3				0	6	0				0	0	0				6	0	0			
Critical Gap Module:																								
Critical Gp:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				6.4	xxxx	xxxxx			
FollowUpTim:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				3.5	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				18	xxxx	xxxxx			
Potent Cap.:	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				1006	xxxx	xxxxx			
Move Cap.:	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				1006	xxxx	xxxxx			
Volume/Cap:	xxxx	xxxx	xxxx				xxxx	xxxx	xxxx				xxxx	xxxx	xxxx				0.01	xxxx	xxxx			
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				0.0	xxxx	xxxxx			
Control Del:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				8.6	xxxx	xxxxx			
LOS by Move:	*	*	*				*	*	*				*	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shrd ConDel:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shared LOS:	*	*	*				*	*	*				*	*	*				*	*	*			
ApproachDel:	xxxxxx						xxxxxx						xxxxxx						8.6					
ApproachLOS:	*						*						*						A					

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 4.1 Worst Case Level Of Service: A[8.7]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 1 0			0 1 0 0 0			0 0 0 0 0			1 0 0 0 0		
Volume Module:												
Base Vol:	0	8	18	4	6	0	0	0	0	26	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	8	18	4	6	0	0	0	0	26	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	8	18	4	6	0	0	0	0	26	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	8	18	4	6	0	0	0	0	26	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	26	xxxx	xxxxx	xxxx	xxxx	xxxxx	31	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	1601	xxxx	xxxxx	xxxx	xxxx	xxxxx	988	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	1601	xxxx	xxxxx	xxxx	xxxx	xxxxx	986	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx	0.03	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	A	*	*	*	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	A	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			8.7		
ApproachLOS:	*			*			*			A		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 1.7 Worst Case Level Of Service: A[8.5]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	0	1	0	0		0	0	0	0	0		1	0	0	0	0	
Volume Module:																								
Base Vol:	0		3		7		0		2		0		0		0		0		3		0		0	
Growth Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
Initial Bse:	0		3		7		0		2		0		0		0		0		3		0		0	
User Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Volume:	0		3		7		0		2		0		0		0		0		3		0		0	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
FinalVolume:	0		3		7		0		2		0		0		0		0		3		0		0	
Critical Gap Module:																								
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										6.4	xxxx	xxxxx			
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										3.5	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										9	xxxx	xxxxx			
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										1017	xxxx	xxxxx			
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										1017	xxxx	xxxxx			
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx										0.00	xxxx	xxxx			
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										0.0	xxxx	xxxxx			
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										8.5	xxxx	xxxxx			
LOS by Move:	*	*	*	*	*	*	*	*	*										A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx										xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										xxxxx	xxxx	xxxxx			
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx										xxxxx	xxxx	xxxxx			
Shared LOS:	*	*	*	*	*	*	*	*	*										*	*	*			
ApproachDel:	xxxxxx			xxxxxx			xxxxxx												8.5					
ApproachLOS:	*			*			*												A					

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 2.6 Worst Case Level Of Service: A[8.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	0	1	0	0		0	0	0	0	0		1	0	0	0	0	
Volume Module:																								
Base Vol:	0	10		5			0	6		0			0	0		0			9	0		0		
Growth Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
Initial Bse:	0	10		5			0	6		0			0	0		0			9	0		0		
User Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Volume:	0	10		5			0	6		0			0	0		0			9	0		0		
Reduct Vol:	0	0		0			0	0		0			0	0		0			0	0		0		
FinalVolume:	0	10		5			0	6		0			0	0		0			9	0		0		
Critical Gap Module:																								
Critical Gp:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			6.4	xxxx		xxxxx		
FollowUpTim:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			3.5	xxxx		xxxxx		
Capacity Module:																								
Cnflict Vol:	xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			19	xxxx		xxxxx		
Potent Cap.:	xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			1004	xxxx		xxxxx		
Move Cap.:	xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			1004	xxxx		xxxxx		
Volume/Cap:	xxxx	xxxx		xxxx			xxxx	xxxx		xxxx			xxxx	xxxx		xxxx			0.01	xxxx		xxxx		
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			0.0	xxxx		xxxxx		
Control Del:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			8.6	xxxx		xxxxx		
LOS by Move:	*	*		*			*	*		*			*	*		*			A	*		*		
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx		
SharedQueue:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx		
Shrd ConDel:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx		
Shared LOS:	*	*		*			*	*		*			*	*		*			*	*		*		
ApproachDel:	xxxxxx						xxxxxx						xxxxxx						8.6					
ApproachLOS:	*						*						*						A					

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 4.2 Worst Case Level Of Service: A[8.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 1 0			0 1 0 0 0			0 0 0 0 0			1 0 0 0 0		
Volume Module:												
Base Vol:	0	10	26	4	7	0	0	0	0	37	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	10	26	4	7	0	0	0	0	37	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	10	26	4	7	0	0	0	0	37	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	10	26	4	7	0	0	0	0	37	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	36	xxxx	xxxxx	xxxx	xxxx	xxxxx	38	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	1588	xxxx	xxxxx	xxxx	xxxx	xxxxx	979	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	1588	xxxx	xxxxx	xxxx	xxxx	xxxxx	977	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx	0.04	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.8	xxxx	xxxxx
LOS by Move:	*	*	*	A	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	A	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			8.8		
ApproachLOS:	*			*			*			A		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 1.5 Worst Case Level Of Service: A[8.6]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 1 0			0 0 1 0 0			0 0 0 0 0			1 0 0 0 0		
Volume Module:												
Base Vol:	0	4	7	0	3	0	0	0	0	3	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	4	7	0	3	0	0	0	0	3	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	4	7	0	3	0	0	0	0	3	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	4	7	0	3	0	0	0	0	3	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	11	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1015	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1015	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.6	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			8.6		
ApproachLOS:	*			*			*			A		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 2.0 Worst Case Level Of Service: A[8.7]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 1 0			0 0 1 0 0			0 0 0 0 0			1 0 0 0 0		
Volume Module:												
Base Vol:	0	16	5	0	9	0	0	0	0	9	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	16	5	0	9	0	0	0	0	9	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	16	5	0	9	0	0	0	0	9	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	16	5	0	9	0	0	0	0	9	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	28	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	993	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	993	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			8.7		
ApproachLOS:	*			*			*			A		

Note: Queue reported is the number of cars per lane.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Paraiso_Springs_Rd/Clark_Rd

Average Delay (sec/veh): 4.2 Worst Case Level Of Service: A[8.9]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 1 0			0 1 0 0 0			0 0 0 0 0			1 0 0 0 0		
Volume Module:												
Base Vol:	0	14	27	7	9	0	0	0	0	39	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	14	27	7	9	0	0	0	0	39	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	14	27	7	9	0	0	0	0	39	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	14	27	7	9	0	0	0	0	39	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	41	xxxx	xxxxx	xxxx	xxxx	xxxxx	51	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	1581	xxxx	xxxxx	xxxx	xxxx	xxxxx	964	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	1581	xxxx	xxxxx	xxxx	xxxx	xxxxx	960	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx	0.04	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.9	xxxx	xxxxx
LOS by Move:	*	*	*	A	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	A	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			8.9		
ApproachLOS:	*			*			*			A		

Note: Queue reported is the number of cars per lane.

APPENDIX D

EXCERPTS
FROM THE
HIGHWAY
SAFETY
MANUAL

Chapter 13—Roadway Segments

13.1. INTRODUCTION

Chapter 13 presents the CMFs for design, traffic control, and operational treatments on roadway segments. Pedestrian and bicyclist treatments, and the effects on expected average crash frequency of other treatments such as illumination, access points, and weather issues, are also discussed. The information presented in this chapter is used to identify effects on expected average crash frequency resulting from treatments applied to roadway segments.

The Part D—Introduction and Applications Guidance section provides more information about the processes used to determine the CMFs presented in this chapter.

Chapter 13 is organized into the following sections:

- Definition, Application, and Organization of CMFs (Section 13.2);
- Definition of a Roadway Segment (Section 13.3);
- Crash Effects of Roadway Elements (Section 13.4);
- Crash Effects of Roadside Elements (Section 13.5);
- Crash Effects of Alignment Elements (Section 13.6);
- Crash Effects of Roadway Signs (Section 13.7);
- Crash Effects of Roadway Delineation (Section 13.8);
- Crash Effects of Rumble Strips (Section 13.9);
- Crash Effects of Traffic Calming (Section 13.10);
- Crash Effects of On-Street Parking (Section 13.11);
- Crash Effects of Roadway Treatments for Pedestrians and Bicyclists (Section 13.12);
- Crash Effects of Highway Lighting (Section 13.13);
- Crash Effects of Roadway Access Management (Section 13.14);
- Crash Effects of Weather Issues (Section 13.15); and
- Conclusion (Section 13.16).

Appendix A presents the crash trends for treatments for which CMFs are not currently known, and a listing of treatments for which neither CMFs nor trends are unknown.

13.2. DEFINITION, APPLICATION, AND ORGANIZATION OF CMFS

CMFs quantify the change in expected average crash frequency (crash effect) at a site caused by implementing a particular treatment (also known as a countermeasure, intervention, action, or alternative), design modification, or change in operations. CMFs are used to estimate the potential change in expected crash frequency or crash severity plus or minus a standard error due to implementing a particular action. The application of CMFs involves evaluating the expected average crash frequency with or without a particular treatment, or estimating it with one treatment versus a different treatment.

Specifically, the CMFs presented in this chapter can be used in conjunction with activities in Chapter 6, "Select Countermeasures" and Chapter 7, "Economic Appraisal." Some Part D CMFs are included in Part C for use in the predictive method. Other Part D CMFs are not presented in Part C but can be used in the methods to estimate change in crash frequency described in Section C.7. Chapter 3, "Fundamentals," Section 3.5.3, "Crash Modification Factors" provides a comprehensive discussion of CMFs including: an introduction to CMFs, how to interpret and apply CMFs, and applying the standard error associated with CMFs.

In all Part D chapters, the treatments are organized into one of the following categories:

1. CMF is available;

2. Sufficient information is available to present a potential trend in crashes or user behavior, but not to provide a CMF; and

3. Quantitative information is not available.

Treatments with CMFs (Category 1 above) are typically estimated for three crash severities: fatal, injury, and non-injury. In the HSM, fatal and injury are generally combined and noted as injury. Where distinct CMFs are available for fatal and injury severities, they are presented separately. Non-injury severity is also known as property-damage-only severity.

Treatments for which CMFs are not presented (Categories 2 and 3 above) indicate that quantitative information currently available did not meet the criteria for inclusion in the HSM. However, in Category 2 there was sufficient information to identify a trend associated with the treatments. The absence of a CMF indicates additional research is needed to reach a level of statistical reliability and stability to meet the criteria set forth within the HSM. Treatments for which CMFs are not presented are discussed in Appendix A.

13.3. DEFINITION OF A ROADWAY SEGMENT

A roadway is defined as "the portion of a highway, including shoulders, for vehicular use; a divided highway has two or more roadways (17)." A roadway segment consists of a continuous portion of a roadway with similar geometric, operational, and vehicular characteristics. Roadways where significant changes in these characteristics are observed from one location to another should be analyzed as separate segments (30).

13.4. CRASH EFFECTS OF ROADWAY ELEMENTS

13.4.1. Background and Availability of CMFs

Roadway elements vary depending on road type, road function, environment and terrain. Table 13-1 summarizes common treatments related to roadway elements and the corresponding CMF availability.

Table 13-1. Summary of Treatments Related to Roadway Elements

HSM Section	Treatment	Rural Two-Lane Road	Rural Multilane Highway	Rural Frontage Road	Freeway	Expressway	Urban Arterial	Suburban Arterial
13.4.2.1	Modify lane width	✓	✓	✓	-	-	-	-
13.4.2.2	Add lanes by narrowing existing lanes and shoulders	N/A	-	N/A	✓	-	-	-
13.4.2.3	Remove through lanes or "road diets"	N/A	N/A	N/A	N/A	N/A	✓	N/A
13.4.2.4	Add or widen paved shoulder	✓	✓	✓	-	-	-	-
13.4.2.5	Modify shoulder type	✓	-	-	-	-	-	-
13.4.2.6	Provide a raised median	-	✓	N/A	-	-	✓	-
13.4.2.7	Change width of existing median	N/A	✓	N/A	-	-	✓	-
Appendix A.2.2.1	Increase median width	-	T	N/A	T	T	-	-

NOTE: ✓ = indicates that a CMF is available for this treatment.
T = indicates that a CMF is not available but a trend regarding the potential change in crashes or user behavior is known and presented in Appendix A.
- = indicates that a CMF is not available and a trend is not known.
N/A = indicates that the treatment is not applicable to the corresponding setting.

13.4.2. Roadway Element Treatments with CMFs

13.4.2.1. Modify Lane Width

Rural two-lane roads

Widening lanes on rural two-lane roads reduces a specific set of related crash types, namely single-vehicle run-off-the-road crashes and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe collisions. The CMF for lane width is determined with the equations presented in Table 13-2, which are illustrated by the graphs in Figure 13-1 (10,16,33). The crash effect of lane width varies with traffic volume, as shown in the exhibits.

Relative to a 12-ft-wide lanes base condition, 9-ft-wide lanes increase the frequency of related crash types identified above (10,16).

For roads with an AADT of 2,000 or more, lane width has a greater effect on expected average crash frequency. Relative to 12-ft-wide lanes, 9-ft-wide lanes increase the frequency of related crash types identified above more than either 10-ft-wide or 11-ft-wide lanes (16,33).

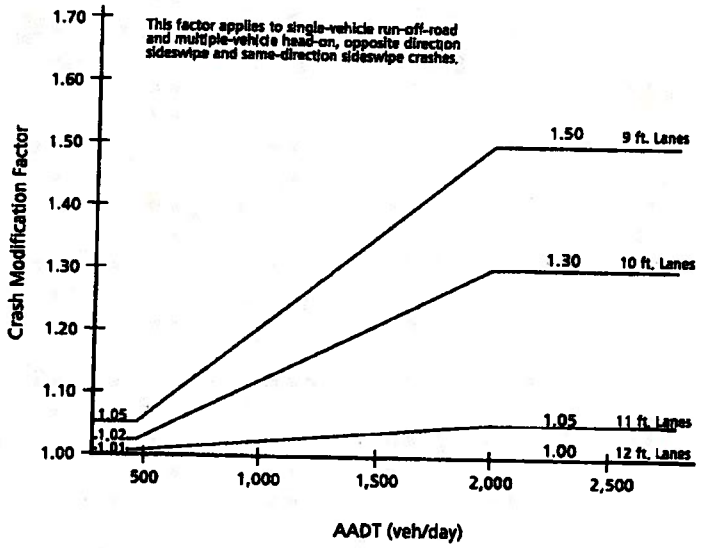
For lane widths other than 9, 10, 11, and 12 ft, the crash effect can be interpolated between the lines shown in Figure 13-1.

If lane widths for the two directions of travel on a roadway segment differ, the CMF is determined separately for the lane width in each direction of travel and then averaged (16). The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is 12-ft-wide lanes.

Table 13-2. CMF for Lane Width on Rural Two-Lane Roadway Segments (16)

Lane Width	Average Annual Daily Traffic (AADT) (vehicles/day)		
	< 400	400 to 2000	> 2000
9 ft or less	1.05	$1.05 + 2.81 \times 10^{-4}(\text{AADT}-400)$	1.50
10 ft	1.02	$1.02 + 1.75 \times 10^{-4}(\text{AADT}-400)$	1.30
11 ft	1.01	$1.01 + 2.5 \times 10^{-5}(\text{AADT}-400)$	1.05
12 ft or more	1.00	1.00	1.00

NOTE: The collision types related to lane width to which these CMFs apply are single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.
Standard error of the CMF is unknown.
To determine the CMF for changing lane width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.



NOTE: Standard error of the CMF is unknown.
To determine the CMF for changing lane width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.

Figure 13-1. Potential Crash Effects of Lane Width on Rural Two-Lane Roads Relative to 12-ft Lanes (3)

Figure 13-7 and Equation 13-3 in Section 13.4.3 may be used to express the lane width CMFs in terms of the crash effect on total crashes, rather than just the crash types identified in Table 13-2 and Figure 13-1 (10,16,33).

The box presents an example of how to apply the preceding equations and graphs to assess the total crash effects of modifying the lane width on a rural two-lane highway.

Effectiveness of Modifying Lane Width

Question:
As part of improvements to a 5-mile section of a rural two-lane road, the local jurisdiction has proposed widening the roadway from 10-ft to 11-ft lanes. What will be the likely reduction in expected average crash frequency for opposite-direction sideswipe crashes, and for total crashes?

Given Information:
- Existing roadway = rural two-lane
- AADT = 2,200 vehicles per day
- Expected average crash frequency without treatment for the 5-mile segment (assumed values):

  a) 9 opposite-direction sideswipe crashes/year

  b) 30 total crashes/year

Find:
- Expected average opposite-direction sideswipe crash frequency with the implementation of 11-ft-wide lanes
- Expected average total crash frequency with the implementation of 11-ft-wide lanes
- Expected average opposite-direction sideswipe crash frequency reduction
- Expected average total crash frequency reduction

Answer:
1) Identify the Applicable CMFs

   a) Figure 13-1 for *opposite-direction sideswipe* crashes

   b) Equation 13-3 or Figure 13-7 for *all* crashes

   Note that for a conversion from *opposite-direction sideswipe crashes* to *all* crashes the information in Section 13.4.3, which contains Equation 13-3 and Figure 13-7, may be applied.

2) Calculate the CMF for the existing 10-ft-wide lanes

   a) For opposite-direction sideswipe crashes

   CMF_{ss} = 1.30 (Figure 13-1)

   b) For total crashes

   CMF_{total} = (1.30 – 1.00) x 0.30 + 1.00 = 1.09 (Equation 13-3 or Figure 13-7)

3) Calculate the CMF for the proposed 11-ft-wide lanes

   a) For opposite-direction sideswipe crashes

   CMF_{ss} = 1.05 (Figure 13-1)

   b) For total crashes

   CMF_{total} = (1.05 – 1.00) x 0.30 + 1.00 = 1.01 (Equation 13-3 or Figure 13-7)

4) Calculate the treatment ($CMF_{treatment}$) corresponding to the change in lane width for opposite-direction sideswipe crashes and for all crashes.

a) For opposite-direction sideswipe crashes

$CMF_{so\ treatment} = 1.05/1.30 = 0.81$

b) For total crashes

$CMF_{total\ treatment} = 1.01/1.09 = 0.93$

5) Apply the treatment CMF ($CMF_{treatment}$) to the expected number of crashes at the intersection without the treatment.

a) For opposite direction sideswipe crashes

= 0.81(9 crashes/year) = 7.3 crashes/year

b) For total crashes

= 0.93(30 crashes/year) = 27.9 crashes/year

6) Calculate the difference between the expected number of crashes without the treatment and the expected number with the treatment.

Change in Expected Average Crash Frequency:

a) For opposite direction sideswipe crashes

9.0 – 7.3 = 1.7 crashes/year reduction

b) For total crashes

30.0 – 27.9 = 2.1 crashes/year reduction

7) Discussion: The proposed change in lane width may potentially reduce opposite direction sideswipe crashes by 1.7 crashes/year and total crashes by 2.1 crashes per year. Note that a standard error has not been determined for this CMF, therefore a confidence interval cannot be calculated.

Rural Multilane Highways

Widening lanes on rural multilane highways reduces the same specific set of related crash types as rural two-lane highways, namely single-vehicle run-off-the-road crashes and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe collisions. The CMF for lane width is determined with the equations presented in Table 13-3 for undivided multilane highways and in Table 13-4 for divided multilane highways. These equations are illustrated by the graphs shown in Figure 13-2 and Figure 13-3, respectively. The crash effect of lane width varies with traffic volume, as shown in the exhibits.

For roads with an AADT of 400 or less, lane width has a small crash effect. Relative to a 12-ft-wide lanes base condition, 9-ft-wide lanes increase the frequency of related crash types identified above.

For roads with an AADT of 2,000 or more, lane width has a greater effect on expected average crash frequency. Relative to 12-ft-wide lanes, 9-ft-wide lanes increase the frequency of related crash types identified above more than either 10-ft-wide or 11-ft-wide lanes.

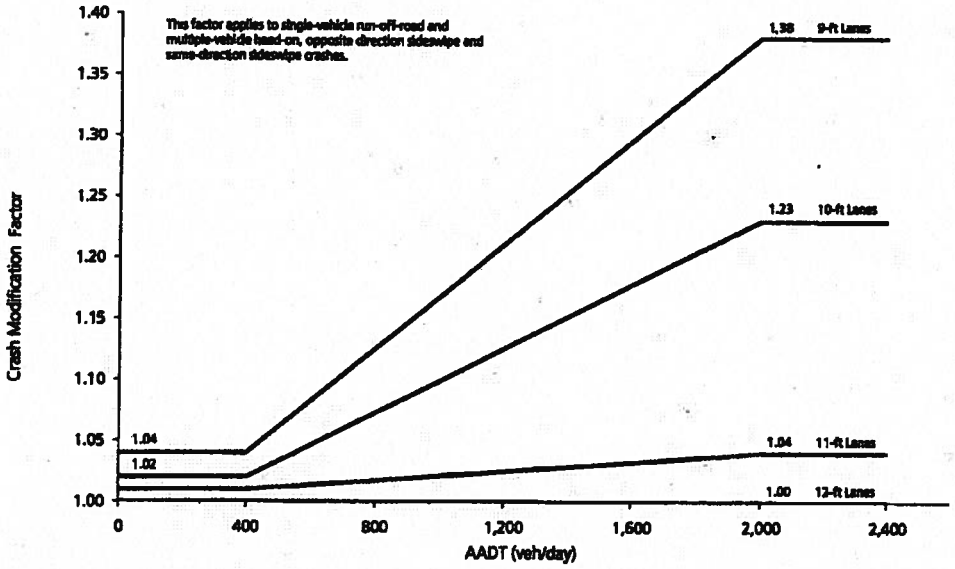
For lane widths other than 9, 10, 11, and 12 ft, the crash effect can be interpolated between the lines shown in Figures 13-2 and 13-3. Lanes less than 9-ft wide can be assigned a CMF equal to 9-ft lanes. Lanes greater than 12-ft wide can be assigned a crash effect equal to 12-ft lanes.

The effect of lane width on undivided rural multilane highways is equal to approximately 75% of the effect of lane width on rural two-lane roads (34). Where the lane widths on a roadway vary, the CMF is determined separately for the lane width in each direction of travel and the resulting CMFs are then averaged. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is 12-ft lanes.

Table 13-3. CMF for Lane Width on Undivided Rural Multilane Roadway Segments (34)

	Average Annual Daily Traffic (AADT) (veh/day)		
Lane Width	**< 400**	**400 to 2000**	**> 2000**
9 ft or less	1.04	$1.04 + 2.13 \times 10^{-4}$(AADT–400)	1.38
10 ft	1.02	$1.02 + 1.31 \times 10^{-4}$(AADT–400)	1.23
11 ft	1.01	$1.01 + 1.88 \times 10^{-5}$(AADT–400)	1.04
12 ft or more	1.00	1.00	1.00

NOTE: The collision types related to lane width to which these CMFs apply are single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.
Standard error of the CMF is unknown.
To determine the CMF for changing lane width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.



NOTE: Standard error of the CMF is unknown.
To determine the CMF for changing lane width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.

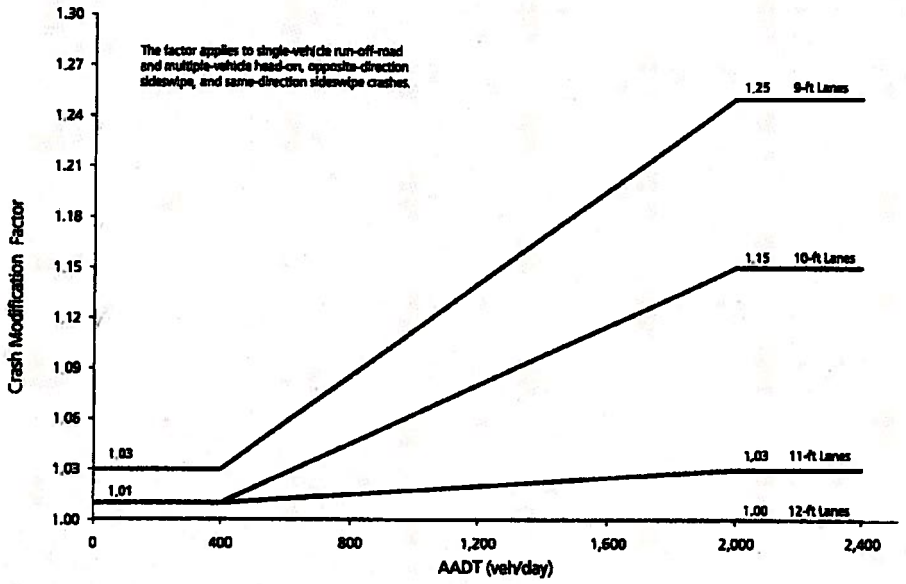
Figure 13-2. Potential Crash Effects of Lane Width on Undivided Rural Multilane Roads Relative to 12-ft Lanes (34)

The effect of lane width on divided rural multilane highways is equal to approximately 50% of the effect of lane width on rural two-lane roads (34). Where the lane widths on a roadway vary, the CMF should be determined separately for the lane width in each direction of travel and the resulting CMFs is then averaged. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is 12-ft lanes.

Table 13-4. CMF for Lane Width on Divided Rural Multilane Roadway Segments (34)

	Average Annual Daily Traffic (AADT) (veh/day)		
Lane Width	< 400	400 to 2000	> 2000
9 ft or less	1.03	$1.03 + 1.38 \times 10^{-4}(AADT-400)$	1.25
10 ft	1.01	$1.01 + 8.75 \times 10^{-5}(AADT-400)$	1.15
11 ft	1.01	$1.01 + 1.25 \times 10^{-5}(AADT-400)$	1.03
12 ft or more	1.00	1.00	1.00

NOTE: The collision types related to lane width to which these CMFs apply are single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.
Standard error of the CMF is unknown.
To determine the CMF for changing lane width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.



NOTE: Standard error of the CMF is unknown.
To determine the CMF for changing lane width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.

Figure 13-3. Potential Crash Effects of Lane Width on Divided Rural Multilane Roads Relative to 12-ft Lanes (34)

Equation 13-3 in Section 13.4.3 may be used to express the lane width CMFs in terms of the crash effect on total crashes, rather than just the collision types identified in in the exhibits presented above.

Rural Frontage Roads

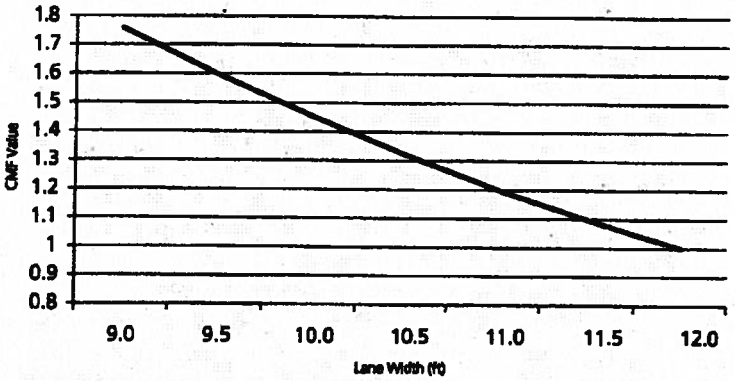
Rural frontage roads differ from rural two-lane roads because they have restricted access along at least one side of the road, a higher percentage of turning traffic, and periodic ramp-frontage-road terminals with yield control (22). CMFs for rural frontage roads are provided separately from CMFs for rural two-lane roads.

Equation 13-1 presents the CMF for lane width on rural frontage roads between successive interchanges (22). Figure 13-4 is based on Equation 13-1. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is 12-ft-wide lanes.

$$CMF_{LW} = e^{-0.188(LW - 12.0)} \quad (13\text{-}1)$$

Where:

LW = average lane width (ft)



NOTE: Standard error of the CMF is unknown.
To determine the CMF for changing lane width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.

Figure 13-4. Potential Crash Effects of Lane Width on Rural Frontage Roads (22)

The average lane width represents the total width of the traveled way divided by the number of through lanes on the frontage road. Relative to 12-ft lanes, 9-ft wide lanes increase the number of crashes more than either 10-ft or 11-ft lanes.

Both one-way and two-way frontage roads were considered in the development of this CMF. Development of this CMF was limited to lane widths ranging from 9 to 12 ft and AADT values from 100 to 6,200.

13.4.2.2. Add Lanes by Narrowing Existing Lanes and Shoulders

This treatment consists of maintaining the existing roadway right-of-way and implementing additional lanes by narrowing existing lanes and shoulders. This treatment is only applicable to roadways with multiple lanes in one direction.

Freeways

The crash effects of adding a fifth lane to a base condition four-lane urban freeway within the existing right-of-way, by narrowing existing lanes and shoulders, are shown in Table 13-5 (4). The crash effects of adding a sixth lane to a base condition five-lane urban freeway by crash severity are also shown in Table 13-5 (4).

These CMFs apply to urban freeways with median barriers with a base condition (i.e., the condition in which the CMF = 1.00) of 12-ft lanes. The type of median barrier is undefined.

For this treatment, lanes are narrowed to 11-ft lanes and the inside shoulders are narrowed to provide the additional width for the extra lane. The new lane may be used as a general purpose lane or a High-Occupancy Vehicle (HOV) lane.

Table 13-5. Potential Crash Effects of Adding Lanes by Narrowing Existing Lanes and Shoulders (4)

Treatment	Setting (Road Type)	Traffic Volume AADT	Crash Type (Severity)	CMF	Std. Error
Four to five lane conversion	Urban (Freeway)	79,000 to 128,000, one direction	All types (All severities)	1.11	0.05
			All types (Injury and Non-injury tow-away)	1.10*	0.07
			All types (Injury)	1.11	0.08
Five to six lane conversion		77,000 to 126,000, one direction	All types (All severities)	1.03*	0.08
			All types (Injury and Non-injury tow-away)	1.04*	0.1
			All types (Injury)	1.07*	0.1

Base Condition: Four or Five 12-ft lanes depending on initial roadway geometry.

NOTE: Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
* Observed variability suggests that this treatment could result in an increase, decrease, or no change in crashes. See Part D—Introduction and Applications Guidance.

Crash migration is generally not found to be a statistically significant outcome of this treatment (20).

13.4.2.3. Remove Through Lanes, or "Road Diets"

A "road diet" usually refers to converting a four-lane undivided road into three lanes: two through lanes plus a center two-way left-turn lane. The remaining roadway width may be converted to bicycle lanes, sidewalks, or on-street parking (4).

Urban arterials

The effect on crash frequency of removing two through lanes on urban four-lane undivided roads and adding a center two-way left-turn lane is shown in Table 13-6 (15). The base condition for this CMF (i.e., the condition in which the CMF = 1.00) is a four-lane roadway cross section. Original lane width is unknown.

Table 13-6. Potential Crash Effects of Four to Three Lane Conversion, or "Road Diet" (15)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Four to three lane conversion	Urban (Arterials)	Unspecified	All types (All severities)	0.71	0.02

Base Condition: Four-lane roadway cross section.

NOTE: Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Original lane width is unknown.

13.4.2.4. Add or Widen Paved Shoulder

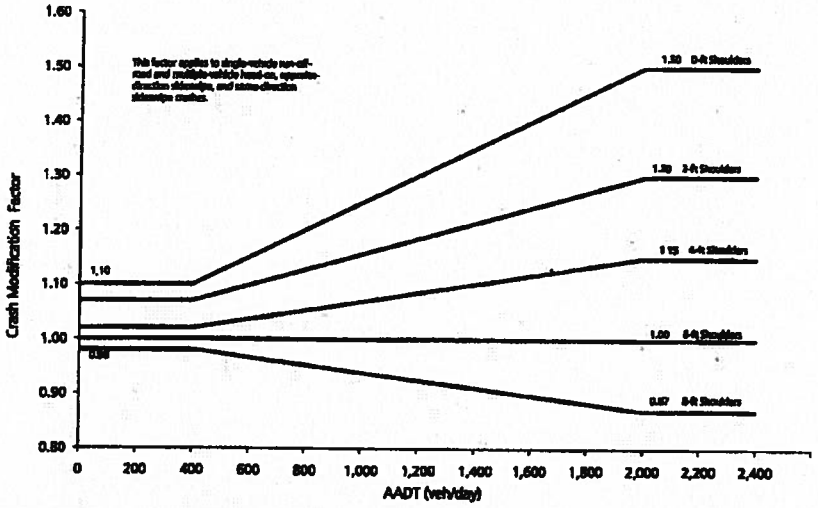
Rural two-lane roads

Widening paved shoulders on rural two-lane roads reduces the same related crashes types as widening lanes; single-vehicle run-off-the-road crashes, multi-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe collisions. The CMF for shoulder width is determined with the equations presented in Table 13-7, which are illustrated by the graph in Figure 13-5 (16,33,36). The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is a 6-ft-wide shoulder.

Table 13-7. CMF for Shoulder Width on Rural Two-Lane Roadway Segments

Shoulder Width	Average Annual Daily Traffic (AADT) (vehicles/day)		
	< 400	400 to 2000	> 2000
0 ft	1.10	$1.10 + 2.5 \times 10^{-4}$ (AADT – 400)	1.50
2 ft	1.07	$1.07 + 1.43 \times 10^{-4}$ (AADT – 400)	1.30
4 ft	1.02	$1.02 + 8.125 \times 10^{-4}$ (AADT – 400)	1.15
6 ft	1.00	1.00	1.00
8 ft or more	0.98	$0.98 - 6.875 \times 10^{-5}$ (AADT – 400)	0.87

NOTE: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the- road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.
Standard error of the CMF is unknown.
To determine the CMF for changing paved shoulder width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.



NOTE: Standard error of CMF is unknown.

Figure 13-5. Potential Crash Effects of Paved Shoulder Width on Rural Two-Lane Roads Relative to 6-ft Paved Shoulders (16)

To determine the CMF for changing paved shoulder width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.

For roads with an AADT of 400 or less, shoulder width has a small crash effect. Relative to 6-ft paved shoulders, no shoulders (0-ft) increase the related crash types by a small amount (16,33,36). Relative to 6-ft paved shoulders, shoulders 8-ft wide decrease the related collision types by a small amount (16,33,36).

For shoulder widths within the range of 0 to 8-ft, the crash effect can be interpolated between the lines shown in Figure 13-5. Shoulders greater than 8 ft wide can be assigned a CMF equal to 8-ft wide shoulders (16).

If the shoulder widths for the two travel directions on a roadway segment differ, the CMF is determined separately for each travel direction and then averaged (16).

Figure 13-7 and Equation 13-3 in Section 13.4.3 may be used to express the crash effect of paved shoulder width on rural two-lane roads as an effect on total crashes, rather than just the crash types identified in Figure 13-5 (16).

Rural multilane highways

Research by Harkey et al. (15) concluded that the shoulder width CMF presented in Table 13-7 and Figure 13-5 may be applied to undivided segments of rural multilane highways as well as to rural two-lane highways.

The CMF for changing shoulder width on multilane divided highways in

Table 13-8 applies to the shoulder on the right side of a divided roadway. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is an 8-ft-wide shoulder.

Table 13-8. Potential Crash Effects of Paved Right Shoulder Width on Divided Segments (15)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
8-ft to 6-ft conversion	Rural (Multilane Highways)	Unspecified	All types (Unspecified)	1.04	N/A
8-ft to 4-ft conversion				1.09	N/A
8-ft to 2-ft conversion				1.13	N/A
8-ft to 0-ft conversion				1.18	N/A
Base Condition: 8-ft-wide shoulder.					

NOTE: N/A = Standard error of CMF is unknown.

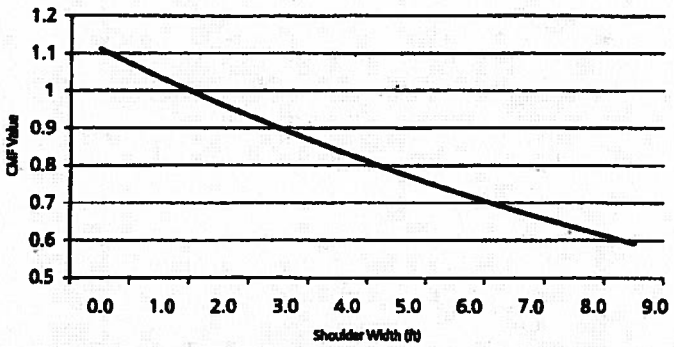
Rural frontage roads

Rural frontage roads typically consist of an environment that is slightly more complex than a traditional rural two-lane highway. Equation 13-2 presents a CMF for shoulder width on rural frontage roads (22), Figure 13-6 is based on Equation 13-2. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is a shoulder width (SW) of 1.5-ft.

$$CMF_{SW} = e^{-0.070(SW-1.5)} \quad (13\text{-}2)$$

Where:

SW = average paved shoulder width ([left shoulder width + right shoulder width]/2) (ft).



NOTE: Standard error of the CMF is unknown.
To determine the CMF for changing lane width and/or AADT, divide the "new" condition CMF by the "existing" condition CMF.

Figure 13-6. Potential Crash Effects of Paved Shoulder Width on Rural Frontage Roads

The average paved shoulder width represents the sum of the left shoulder width and the right shoulder width on the frontage road divided by two. Both one-way and two-way frontage roads were considered in the development of this CMF. Development of this CMF was limited to shoulder widths ranging from 0 to 9 ft and AADT values from 100 to 6,200.

13.4.2.5. Modify Shoulder Type

Rural two-lane roads

The crash effect of modifying the shoulder type on rural two-lane roads is shown in Table 13-9 (16,33,36). The crash effect varies by shoulder width and type, assuming that a paved shoulder is the base condition (i.e., the condition in which the CMF = 1.00) and that some type of shoulder is currently in place. Note that this CMF cannot be applied for a single shoulder type (horizontally across the table), the CMF in Table 13-9 is exclusively for application to a situation that consists of modification from one shoulder type to another shoulder type (vertically in the table for one given shoulder width).

Table 13-9. Potential Crash Effects of Modifying the Shoulder Type on Rural Two-Lane Roads for Related Crash Types (16,33,36)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)		CMF						
				Shoulder type	Shoulder width (ft)						
					1	2	3	4	6	8	10
Modify Shoulder Type	Rural (Two-lane Roads)	Unspecified	Single-vehicle run-off-the-road crashes and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe collisions (Unspecified)	Paved	1.00	1.00	1.00	1.00	1.00	1.00	1.00
				Gravel	1.00	1.01	1.01	1.01	1.02	1.02	1.03
				Composite	1.01	1.02	1.02	1.03	1.04	1.06	1.07
				Turf	1.01	1.03	1.04	1.05	1.08	1.11	1.14

Base Condition: Paved shoulder.

NOTE: Composite shoulders are 50 percent paved and 50 percent turf.
Standard error of the crash effect is unknown.
The related crash types to which this CMF applies include single-vehicle run-off-the-road crashes and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe collisions.
To determine the CMF for changing the shoulder type, divide the "new" condition CMF by the "existing" condition CMF.
This CMF cannot be applied for a single shoulder type to identify a change in shoulder width (horizontally in the table). This CMF is to be applied exclusively to a situation that consists of modifying one shoulder type to another shoulder type (vertically in the table for one given shoulder width).

If the shoulder types for two travel directions on a roadway segment differ, the CMF is determined separately for the shoulder type in each direction of travel and then averaged (16).

Figure 13-7 and Equation 13-3 in Section 13.4.3 may be used to determine the crash effect of shoulder type on total crashes, rather than just the crash types identified in Table 13-9.

13.4.2.6. Provide a Raised Median

Urban two-lane roads

The crash effects of a raised median on urban two-lane roads are shown in Table 13-10 (8). This effect may be related to the restriction of turning maneuvers at minor intersections and access points (8). The type of raised median was unspecified.

The base condition of the CMF (i.e., the condition in which the CMF = 1.00) is the absence of a raised median.

Table 13-10. Potential Crash Effects of Providing a Median on Urban Two-Lane Roads (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Provide a raised median	Urban (Two-lane)	Unspecified	All types (Injury)	**0.61**	**0.1**

Base Condition: Absence of raised median.

NOTE: Based on International studies: Leong 1970; Thorson and Mouritsen 1971; Muskaug 1985; Blakstad and Glaever 1989.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.

Rural multilane highways and urban arterials

The crash effects of providing a median on urban arterial multilane roads are shown in Table 13-11 (8). Providing a median on rural multi-lane roads reduces both injury and non-injury crashes, as shown in Table 13-11 (8). The base condition of the CMF (i.e., the condition in which the CMF = 1.00) is the absence of a raised median.

Table 13-11. Potential Crash Effects of Providing a Median on Multi-Lane Roads (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Provide a median	Urban (Arterial Multilane[a])	Unspecified	All types (Injury)	**0.78?**	**0.02**
			All types (Non-injury)	**1.09?**	**0.02**
	Rural (Multilane[a])		All types (Injury)	**0.88**	**0.03**
			All types (Non-injury)	**0.82**	**0.03**

Base Condition: Absence of raised median.

NOTE: Based on U.S. studies: Kihlberg and Tharp 1968; Garner and Deen 1973; Harwood 1986; Squires and Parsonson 1989; Bowman and Vecellio 1994; Bretherton 1994; Bonneson and McCoy 1997 and International studies: Leon 1970; Thorson and Mouritsen 1971; Andersen 1977; Muskaug 1985; Scriven 1986; Blakstad and Glaever 1989; Dijkstra 1990; Kohler and Schwamb 1993; Claessen and Jones 1994.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
(a) Includes minor intersections.
? Treatment results in a decrease in injury crashes and an increase in non-injury crashes. See Part D—Introduction and Applications Guide.

13.4.2.7. Change the Width of an Existing Median

The main objective of widening medians is to reduce the frequency of severe cross-median collisions.

Rural multilane highways and urban arterials

Table 13-12 through Table 13-16 present CMFs for changing the median width on divided roads with traversable medians. These CMFs are based on the work by Harkey et al. (15). Separate CMFs are provided for roads with TWLTLs, full access control and with partial or no access control. For urban arterials, the CMFs are also dependent upon whether the arterial has four lanes or more. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the presence of a 10-ft-wide traversable median. The type of traversable median (grass, depressed) was not identified.

Table 13-12. Potential Crash Effects of Median Width on Rural Four-Lane Roads with Full Access Control (15)

Median Width (ft)	Setting (Road Type)	Traffic Volume AADT	Crash Type (Severity)	CMF	Std. Error
10-ft to 20-ft conversion	Rural (4 lanes with full access control)	2,400 to 119,000	Cross-median crashes (Unspecified)	**0.86**	**0.02**
10-ft to 30-ft conversion				**0.74**	**0.04**
10-ft to 40-ft conversion				**0.63**	**0.05**
10-ft to 50-ft conversion				**0.54**	**0.06**
10-ft to 60-ft conversion				**0.46**	**0.07**
10-ft to 70-ft conversion				**0.40**	**0.07**
10-ft to 80-ft conversion				**0.34**	**0.07**
10-ft to 90-ft conversion				**0.29**	**0.07**
10-ft to 100-ft conversion				**0.25**	**0.06**
Base condition: 10-ft-wide traversable median.					

NOTE: Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.

Table 13-13. Potential Crash Effects of Median Width on Rural Four-Lane Roads with Partial or No Access Control (15)

Median Width (ft)	Setting (Road Type)	Traffic Volume AADT	Crash Type (Severity)	CMF	Std. Error
10-ft to 20-ft conversion	Rural (4 lanes with partial or no access control)	1,000 to 90,000	Cross-median crashes (Unspecified)	**0.84**	**0.03**
10-ft to 30-ft conversion				**0.71**	**0.06**
10-ft to 40-ft conversion				**0.60**	**0.07**
10-ft to 50-ft conversion				**0.51**	**0.08**
10-ft to 60-ft conversion				**0.43**	**0.09**
10-ft to 70-ft conversion				**0.36**	**0.09**
10-ft to 80-ft conversion				**0.31**	**0.09**
10-ft to 90-ft conversion				**0.26**	**0.08**
10-ft to 100-ft conversion				**0.22**	**0.08**
Base condition: 10-ft-wide traversable median.					

NOTE: Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.

Table 13-14. Potential Crash Effects of Median Width on Urban Four-Lane Roads with Full Access Control (15)

Median Width (ft)	Setting (Road Type)	Traffic Volume AADT	Crash Type (Severity)	CMF	Std. Error
10-ft to 20-ft conversion	Urban (4 lanes with full access control)	4,400 to 131,000	Cross-median crashes (Unspecified)	**0.89**	**0.04**
10-ft to 30-ft conversion				**0.80**	**0.07**
10-ft to 40-ft conversion				**0.71**	**0.09**
10-ft to 50-ft conversion				**0.64**	**0.1**
10-ft to 60-ft conversion				**0.57**	**0.1**
10-ft to 70-ft conversion				**0.51**	**0.1**
10-ft to 80-ft conversion				**0.46**	**0.1**
10-ft to 90-ft conversion				**0.41**	**0.1**
10-ft to 100-ft conversion				**0.36**	**0.1**
Base condition: 10-ft-wide traversable median.					

NOTE: Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.

Table 13-15. Potential Crash Effects of Median Width on Urban Roads with at least Five Lanes with Full Access Control (15)

Median Width (ft)	Setting (Road Type)	Traffic Volume AADT	Crash Type (Severity)	CMF	Std. Error
10-ft to 20-ft conversion	Urban (5 or more lanes with full access control)	2,600 to 282,000	Cross-median crashes (Unspecified)	**0.89**	**0.04**
10-ft to 30-ft conversion				**0.79**	**0.07**
10-ft to 40-ft conversion				**0.71**	**0.1**
10-ft to 50-ft conversion				**0.63**	**0.1**
10-ft to 60-ft conversion				**0.56**	**0.1**
10-ft to 70-ft conversion				**0.50**	**0.1**
10-ft to 80-ft conversion				**0.45**	**0.1**
10-ft to 90-ft conversion				*0.40*	*0.2*
10-ft to 100-ft conversion				*0.35*	*0.2*
Base condition: 10-ft-wide traversable median.					

NOTE: Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Italic text is used for less reliable CMFs. These CMFs have standard errors between 0.2 to 0.3.

Table 13-16. Potential Crash Effects of Median Width on Urban Four-Lane Roads with Partial or No Access Control (15)

Median Width (ft)	Setting (Road Type)	Traffic Volume AADT	Crash Type (Severity)	CMF	Std. Error
10-ft to 20-ft conversion	Urban (4 lanes with partial or no access control)	1,900 to 150,000	Cross-median crashes (Unspecified)	**0.87**	**0.04**
10-ft to 30-ft conversion				**0.76**	**0.06**
10-ft to 40-ft conversion				**0.67**	**0.08**
10-ft to 50-ft conversion				**0.59**	**0.1**
10-ft to 60-ft conversion				**0.51**	**0.1**
10-ft to 70-ft conversion				**0.45**	**0.1**
10-ft to 80-ft conversion				**0.39**	**0.1**
10-ft to 90-ft conversion				**0.34**	**0.1**
10-ft to 100-ft conversion				**0.30**	**0.1**
Base condition: 10-ft-wide traversable median.					

NOTE: Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.

13.4.3. Conversion Factor for Total-Crashes

This section presents an equation for the conversion of CMFs for crashes related to specific crash types into CMFs for total crashes.

Figure 13-7 and Equation 13-3 may be used to express the lane width CMF (Section 13.4.2.1), add or widen paved shoulder CMF (Section 13.4.2.4), and modify shoulder type CMF (Section 13.4.2.5) in terms of the crash effect on total crashes, rather than just the related crash types identified in the respective sections (10,16,33).

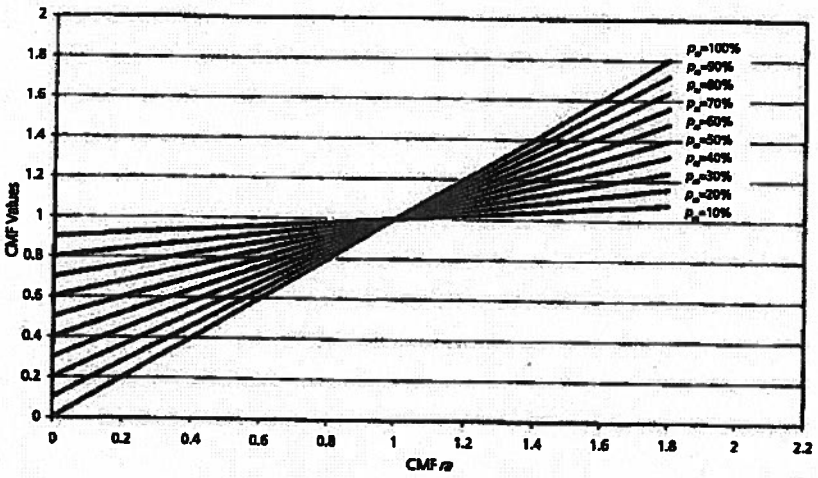


Figure 13-7. Potential Crash Effects of Lane Width on Rural Two-Lane Roads on Total Crashes (16)

$$CMF = (CMF_{ra} - 1.0) \times p_{ra} + 1.0 \quad (13\text{-}3)$$

Where:

CMF = crash modification factor for total crashes;

CMF_{ra} = crash modification factor for related crashes, i.e., single-vehicle run-off-the-road crashes and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe collisions; and

p_{ra} = related crashes expressed as a proportion of total crashes.

13.5. Crash Effects of Roadside Elements

13.5.1. Background and Availability of CMFs

The roadside is defined as the "*area between the outside shoulder edge and the right-of-way limits. The area between roadways of a divided highway may also be considered roadside* (23)." The AASHTO *Roadside Design Guide* is an invaluable resource for roadside design, including clear zones, geometry, features, and barriers (3).

The knowledge presented here may be applied to roadside elements as well as to the median of divided highways. Table 13-17 summarizes common treatments related to roadside elements and the corresponding CMF availability.

Table 13-17. Summary of Treatments Related to Roadside Elements

HSM Section	Treatment	Rural Two-Lane Road	Rural Multi-Lane Highway	Freeway	Expressway	Urban Arterial	Suburban Arterial
13.5.2	Flatten sideslopes	✓	✓	—	—	—	—
13.5.2.2	Increase distance to roadside features	✓	—	✓	—	—	—
13.5.2.3	Change roadside barrier along embankment to less rigid type	✓	✓	✓	✓	✓	✓
13.5.2.4	Install median barrier	N/A	✓	T	—	—	—
13.5.2.5	Install crash cushions at fixed roadside features	✓	✓	✓	✓	✓	✓
13.5.2.6	Reduce roadside hazard rating	✓	—	—	—	—	—
Appendix	Increase clear roadside recovery distance	T	—	—	—	—	—
Appendix	Install curbs	—	—	—	—	T	T
Appendix	Increase the distance to utility poles and decrease utility pole density	T	T	T	T	T	T
Appendix	Install roadside barrier along embankments	T	T	T	T	T	T

NOTE: ✓ = indicates that a CMF is available for this treatment.
T = indicates that a CMF is not available but a trend regarding the potential change in crashes or user behavior is known and presented in Appendix A.
— = indicates that a CMF is not available and a trend is not known.
N/A = indicates that the treatment is not applicable to the corresponding setting.

13.5.2. Roadside Element Treatments with CMFs

13.5.2.1. Flatten Sideslopes

Rural two-lane roads

The effect on total crashes of flattening the roadside slope of a rural two-lane road is shown in Table 13-18 (15). The effect on single-vehicle crashes of flattening side slopes is shown in Table 13-19 (15). The base conditions of the CMFs (i.e., the condition in which the CMF = 1.00) is the sideslope in the *before* condition.

Table 13-18. Potential Crash Effects on Total Crashes of Flattening Sideslopes (15)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF				
				Sideslope in Before Condition	Sideslope in After Condition			
					1V:4H	1V:5H	1V:6H	1V:7H
Flatten Sideslopes	Rural (Two-lane road)	Unspecified	All types (Unspecified)	1V:2H	0.94	0.91	0.88	0.85
				1V:3H	0.95	0.92	0.89	0.85
				1V:4H		0.97	0.93	0.89
				1V:5H			0.97	0.92
				1V:6H				0.95

Base Condition: Existing sideslope in *before* condition.

NOTE: Standard error of the CMF is unknown.

Table 13-19. Potential Crash Effects on Single Vehicle Crashes of Flattening Sideslopes (15)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF				
				Sideslope in Before Condition	Sideslope in After Condition			
					1V:4H	1V:5H	1V:6H	1V:7H
Flatten Sideslopes	Rural (Two-lane road)	Unspecified	Single Vehicle (Unspecified)	1V:2H	0.90	0.85	0.79	0.73
				1V:3H	0.92	0.86	0.81	0.74
				1V:4H		0.94	0.88	0.81
				1V:5H			0.94	0.86
				1V:6H				0.92

Base Condition: Existing sideslope in *before* condition.

NOTE: Standard error of the CMF is unknown.

The box presents an example of how to apply the preceding CMFs to assess the crash effects of modifying the sideslope on a rural two-lane highway.

Effectiveness of Modifying Sideslope

Question:
A high crash frequency segment of a rural two-lane highway is being analyzed for a series of improvements. Among the improvements, the reduction of the 1V:3H sideslope to a 1V:7H sideslope is being considered. What will be the likely reduction in expected average crash frequency for single vehicle crashes and total crashes?

Given Information:
- Existing roadway = rural two-lane
- Existing sideslope = 1V:3H
- Proposed sideslope = 1V:7H
- Expected average crash frequency without treatment for the segment (assumed values):

  a) 30 total crashes/year

  b) 8 single vehicle crashes/year

Find:
- Expected average total crash frequency with the reduction in sideslope
- Expected average single vehicle crash frequency with the reduction in sideslope
- Expected average total crash frequency reduction
- Expected average single vehicle crash frequency reduction

Answer:
1) Identify the CMFs corresponding to the change in sideslope from 1V:3H to 1V:7H

   a) For total crashes

   CMF_{total} = 0.85 (Table 13-18)

   b) For single, vehicle crashes

   $CMF_{single\ vehicle}$ = 0.74 (Table 13-19)

2) Apply the treatment CMF ($CMF_{treatment}$) to the expected number of crashes on the rural two-lane highway without the treatment.

   a) For total crashes

   = 0.85 x 30 crashes/year = 25.5 crashes/year

   b) For single-vehicle crashes

   = 0.74 x 8 crashes/year = 5.9 crashes/year

3) Calculate the difference between the expected number of crashes without the treatment and the expected number with the treatment.

Change in Expected Average Crash Frequency

a) For total crashes

30.0 – 25.5 = 4.5 crashes/year reduction

b) For single vehicle crashes

8.0 – 5.9 = 2.1 crashes/year reduction

4) Discussion: The change in sideslope from 1V:3H to 1V:7H may potentially cause a reduction of 4.5 total crashes/year and 2.1 single vehicle crashes/year. A standard error is not available for these CMFs.

Rural multilane highways

Table 13-20 presents CMFs for the effect of sideslopes on multilane undivided roadway segments. These CMFs were developed by Harkey et al. (10) from the work of Zegeer et al. (6). The base condition for this CMF (i.e., the condition in which the CMF = 1.00) is a sideslope of 1V:7H or flatter.

Table 13-20. Potential Crash Effects of Sideslopes on Undivided Segments (15,34)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
1V:7H or Flatter	Rural (Multilane highway)	Unspecified	All types (Unspecified)	1.00	N/A
1V:6H				1.05	
1V:5H				1.09	
1V:4H				1.12	
1V:2H or Steeper				1.18	

Base Condition: Provision of a 1V:7H or flatter sideslope.

13.5.2.2. Increase the Distance to Roadside Features

Rural two-lane roads and freeways

The crash effects of increasing the distance to roadside features from 3.3 ft to 16.7 ft, or from 16.7 ft to 30.0 ft are shown in Table 13- (8). CMF values for other increments may be interpolated from the values presented in Table 13-21.

The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is a distance of either 3.3 ft or 16.7 ft to roadside features depending on original geometry.

Table 13-21. Potential Crash Effects of Increasing the Distance to Roadside Features (8)

Treatment	Setting (Road type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Increase distance to roadside features from 3.3 ft to 16.7 ft	Rural (Two-lane roads and freeways)	Unspecified	All types (All severities)	**0.78**	**0.02**
Increase distance to roadside features from 16.7 ft to 30.0 ft				**0.56**	**0.01**
Base Condition: Distance to roadside features of 3.3 ft or 16.7 ft depending on original geometry.					

NOTE: Based on U.S. studies: Cirillo (1967), Zegeer et al. (1988).
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Distance measured from the edgeline or edge of travel lane.

13.5.2.3. Change Roadside Barrier along Embankment to Less Rigid Type

The type of roadside barrier applied can vary from very rigid to less rigid. In order of rigidity, the following generic types of barriers are available: (8)

- Concrete (most rigid)
- Steel
- Wire or cable (least rigid)

Rural two-lane roads, rural multilane highways, freeways, expressways, and urban and suburban arterials

Changing the type of roadside barrier along an embankment to a less rigid type reduces the number of injury run-off-the-road crashes, as shown in Table 13-22 (8). The CMF for fatal run-off-the-road crashes is shown in Table 13-22 (8). A less rigid barrier type may not be suitable in certain circumstances.

The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the use of rigid barrier.

Table 13-22. Potential Crash Effects of Changing Barrier to Less Rigid Type (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Change barrier along embankment to less rigid type	Unspecified (Unspecified)	Unspecified	Run-off-the-road (Injury)	**0.68**	**0.1**
			Run-off-the-road (Fatal)	*0.59*	*0.3*
Base Condition: Provision of a rigid roadside barrier.					

NOTE: Based on U.S. studies: Glennon and Tamburri 1967; Tamburri, Hammer, Glennon, Lew 1968; Willston 1969; Woods, Bohuslav and Keese 1976; Ricker, Banks, Brenner, Brown and Hall 1977; Perchonok, Ranney, Baum, Morris and Eppick 1978; Hall 1982; Bryden and Fortuniewicz 1986; Schultz 1986; Ray, Troxel and Carney 1991; Hunter, Stewart and Council 1993; Gattis, Alguire and Narla 1996; Short and Robertson 1998; and International studies: Good and Joubert 1971; Pettersson 1977; Schandersson 1979; Boyle and Wright 1984; Domhan 1986; Corben, Deery, Newstead, Mullan and Dyte 1997; Ljungblad 2000.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Italic text is used for less reliable CMFs. These CMFs have standard errors between 0.2 to 0.3.
Distance to roadside barrier is unspecified.

13.5.2.4. Install Median Barrier

A median barrier is "*a longitudinal barrier used to prevent an errant vehicle from crossing the highway median* (8)." The AASHTO *Roadside Design Guide* provides performance requirements, placement guidelines, and structural and safety characteristics of different median barrier systems (3).

Rural multilane highways

Installing any type of median barrier on rural multilane highways reduces fatal-and-injury crashes of all types, as shown in Table 13-2 (8).

The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of a median barrier.

Table 13-23. Potential Crash Effects of Installing a Median Barrier (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Install any type of median barrier	Unspecified (Multilane divided highways)	AADT of 20,000 to 60,000	All types (Fatal)	0.57[?]	0.1
			All types (Injury)	0.70[?]	0.06
			All types (All severities)	1.24[?]	0.03
Install steel median barrier			All types (Injury)	0.65	0.08
Install cable median barrier				0.71	0.1

Base Condition: Absence of a median barrier.

NOTE: Based on U.S. studies: Billion 1956; Moskowitz and Schaefer 1960; Beaton, Field and Moskowitz 1962; Billion and Parsons 1962; Billion, Taragin and Cross 1962; Sacks 1965; Johnson 1966; Williston 1969; Galati 1970; Tye 1975; Ricker, Banks, Brenner, Brown and Hall 1977; Hunter, Steward and Council 1993; Sposito and Johnston 1999; Hancock and Ray 2000; Hunter et al 2001; and International studies: Moore and Jehu 1968; Good and Joubert 1971; Andersen 1977; Johnson 1980; Statens vegverk 1980; Martin et al 1998; Nilsson and Ljungblad 2000.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
? Treatment results in a decrease in fatal-and-injury crashes and an increase in crashes of all severities. See Part D—Introduction and Applications Guide.
Width of the median where the barrier was installed and the use of barrier warrants are unspecified.

13.5.2.5. Install Crash Cushions at Fixed Roadside Features

Rural two-lane roads, rural multilane highways, freeways, expressways, and urban and suburban arterials

The crash effects of installing crash cushions at fixed roadside features are shown in Table 13-24 (8). The crash effects for fatal and non-injury crashes with fixed objects are also shown in Table 13-24 (12). The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of crash cushions.

Table 13-24. Potential Crash Effects of Installing Crash Cushions at Fixed Roadside Features (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Install crash cushions at fixed roadside features	Unspecified (Unspecified)	Unspecified	Fixed object (Fatal)	*0.31*	*0.3*
			Fixed object (Injury)	**0.31**	**0.1**
			Fixed object (Non-injury)	*0.54*	*0.3*

Base Condition: Absence of crash cushions.

NOTE: Based on U.S. studies: Viner and Tamanini 1973; Griffin 1984; Kurucz 1984; and International studies: Schoon 1990; Proctor 1994.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Italic text is used for less reliable CMFs. These CMFs have standard errors between 0.2 to 0.3.
The placement and type of crash cushions and fixed objects are unspecified.

13.5.2.6. Reduce Roadside Hazard Rating

For reference, the quantitative descriptions of the seven roadside hazard rating (RHR) levels are summarized in Table 13-25. Photographs that illustrate the roadside design for each RHR level are presented in Appendix A.

Table 13-25. Quantitative Descriptors for the Seven Roadside Hazard Ratings (16)

Rating	Clear zone width	Sideslope	Roadside
1	Greater than or equal to 30 ft	Flatter than 1V:4H; recoverable	N/A
2	Between 20 and 25 ft	About 1V:4H; recoverable	
3	About 10 ft	About 1V:3H or 1V:4H; marginally recoverable	Rough roadside surface
4	Between 5 and 10 ft	About 1V:3H or 1V:4H; marginally forgiving, increased chance of reportable roadside crash	May have guardrail (offset 5 to 6.5 ft) May have exposed trees, poles, other objects (offset 10 ft)
5		About 1V:3H; virtually non-recoverable	May have guardrail (offset 0 to 5 ft) May have rigid obstacles or embankment (offset 6.5 to 10 ft)
6	Less than or equal to 5 ft	About 1V:2H; non-recoverable	No guardrail Exposed rigid obstacles (offset 0 to 6.5 ft)
7		1V:2H or steeper; non-recoverable with high likelihood of severe injuries from roadside crash	No guardrail Cliff or vertical rock cut

NOTE: Clear zone width, guardrail offset, and object offset are measured from the pavement edgeline.
N/A = no description of roadside is provided.

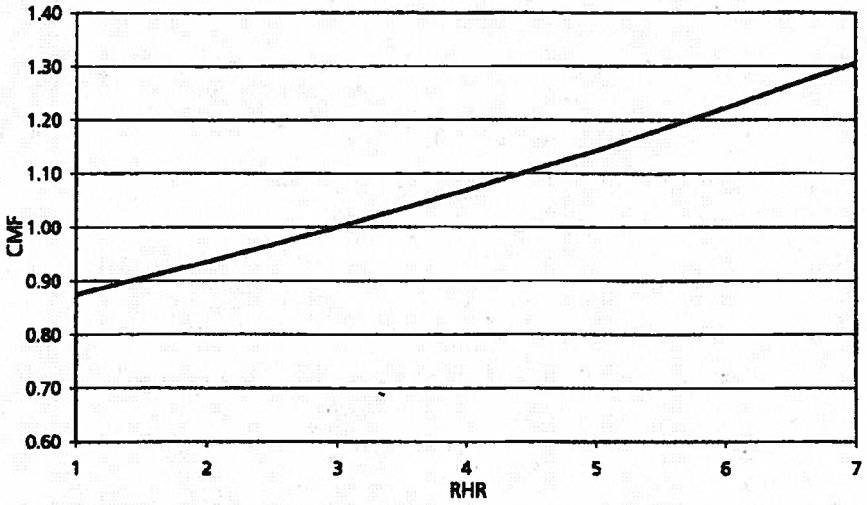
Rural two-lane roads

The CMFs for roadside design are presented in Equation 13-4 and Figure 13-8, using RHR equal to 3 as the base condition (i.e., the condition in which the CMF = 1.00).

$$CMF = \frac{e^{(-0.6869 + 0.0668 \times RHR)}}{e^{(-0.4865)}} \quad (13\text{-}4)$$

Where:

RHR = Roadside hazard rating for the roadway segment.



NOTE: Standard error of CMF is unknown.
To determine the CMF for changing RHR, divide the "new" condition CMF by the "existing" condition CMF.
RHR = Roadside Hazard Rating.

Figure 13-8. Potential Crash Effects of Roadside Hazard Rating for Total Crashes on Rural Two-Lane Highways (16)

13.6. CRASH EFFECTS OF ALIGNMENT ELEMENTS

13.6.1. Background and Availability of CMFs

Table 13-26 summarizes common treatments related to alignment elements and the corresponding CMF availability.

Table 13-26. Summary of Treatments Related to Alignment Elements

HSM Section	Treatment	Rural Two-Lane Road	Urban Two-Lane Road	Rural Multi-Lane Highway	Freeway	Expressway	Urban Arterial	Suburban Arterial
13.6.2.1	Modify horizontal curve radius and length, and provide spiral transitions	✓	—	—	—	—	—	—
13.6.2.2	Improve superelevation of horizontal curve	✓	—	—	—	—	—	—
13.6.2.3	Change vertical grade	✓	—	—	—	—	—	—
Appendix A	Modify Tangent Length Prior to Curve	T	T	T	T	T	T	T
Appendix A	Modify Horizontal Curve Radius	—	—	—	—	—	T	T

NOTE: ✓ = Indicates that a CMF is available for this treatment.
T = Indicates that a CMF is not available but a trend regarding the potential change in crashes or user behavior is known and presented in Appendix A.
— = Indicates that a CMF is not available and a trend is not known.

13.6.2. Alignment Treatments with CMFs

13.6.2.1. Modify Horizontal Curve Radius and Length, and Provide Spiral Transitions

Rural two-lane roads

The probability of a crash generally decreases with longer curve radii, longer horizontal curve length, and the presence of spiral transitions (16). The crash effect for horizontal curvature, radius, and length of a horizontal curve and presence of spiral transition curve is presented as a CMF, as shown in Equation 13-5. The standard error of this CMF is unknown. This equation applies to all types of roadway segment crashes (16,35). Figure 13-9 illustrates a graphical representation of Equation 13-5. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of curvature.

$$CMF_{3r} = \frac{(1.55 \times L_c) + \left(\frac{80.2}{R}\right) - (0.012 \times S)}{(1.55 \times L_c)} \quad (13\text{-}5)$$

Where:

L_c = Length of horizontal curve including length of spiral transitions, if present (mi);

R = Radius of curvature (ft); and

S = 1 if spiral transition curve is present; 0 if spiral transition curve is not present.

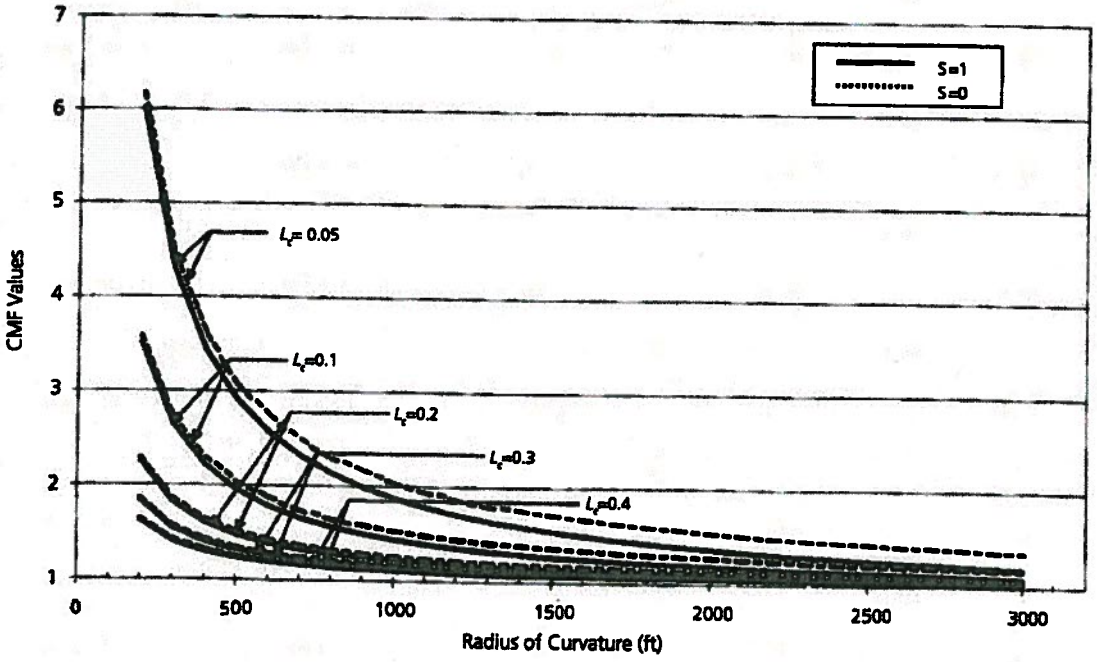


Figure 13-9. Potential Crash Effect of the Radius, Length, and Presence of Spiral Transition Curves in a Horizontal Curve

13.6.2.2. Improve Superelevation of Horizontal Curves

Rural two-lane roads

Crash effects of superelevation variance on a horizontal curve are shown in Table 13-27 (16,35). The base condition of the CMFs summarized in Table 13-27 (i.e., the condition in which the CMF = 1.00) is an SV value that is less than 0.01.

Table 13-27. Potential Crash Effects of Improving Superelevation Variance (SV) of Horizontal Curves on Rural Two-Lane Roads (16,35)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF
Improve SV < 0.01	Rural (Two-lane)	Unspecified	All types (All severities)	1.00
Improve 0.01 ≤ SV < 0.02				= 1.00 + 6 (SV – 0.01)
Improve SV > 0.02				= 1.06 + 3 (SV – 0.02)
Base Condition: Superelevation variance < 0.01.				

NOTE: Standard error of CMF is unknown.
Based on a horizontal curve radius of 842.5 ft.
SV = Superelevation variance: Difference between recommended design value for superelevation and existing superelevation on a horizontal curve, where existing superelevation is less than recommended.
To determine the CMF for changing superelevation, divide the "new" condition CMF by the "existing" condition CMF.

13.6.2.3. Change Vertical Grade

Rural two-lane roads

Crash effects of increasing the vertical grade of a rural two-lane road, with a posted speed of 55 mph and a surfaced or stabilized shoulder, are shown in Table 13-28 (35). The crash effect of increasing the vertical grade for crashes of all types and severities relative to a flat roadway (i.e., 0% grade) is also shown in Table 13-28 (16).

These CMFs may be applied to each individual grade section on the roadway, without respect to the sign of the grade (i.e., upgrade or downgrade). These CMFs may be applied to the entire grade from one point of vertical intersection (PVI) to the next (16).

The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is a level (0% grade) roadway.

Table 13-28. Potential Crash Effects of Changing Vertical Grade on Rural Two-Lane Roads (16,24)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Increase vertical grade by 1%	Rural (Two-lane)	Unspecified	SVROR (All severities (24))	1.04^	0.02
			All types (All severities (16))	1.02	N/A
Base Condition: Level roadway (0% grade)					

NOTE: Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
SVROR = single-vehicle run-off-the-road crashes.
CMFs are based on roads with 55 mph posted speed limit, 12 ft lanes, and no horizontal curves.
^ Observed variability suggests that this treatment could result in no crash effect. See Part D—Introduction and Applications Guidance.
N/A = Standard error of CMF is unknown.

13.7. CRASH EFFECTS OF ROADWAY SIGNS

13.7.1. Background and Availability of CMFs

Traffic signs are typically classified into three categories: regulatory signs, warning signs, and guide signs. As defined in the *Manual on Uniform Traffic Control Devices* (MUTCD) (19), regulatory signs provide notice of traffic laws or regulations, warning signs give notice of a situation that might not be readily apparent, and guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information.

The MUTCD provides standards and guidance for signing within the right-of-way of all types of highways open to public travel. Many agencies supplement the MUTCD with their own guidelines and standards.

Table 13-29 summarizes common treatments related to signs and the corresponding CMF availability.

Table 13-29. Summary of Treatments Related to Roadway Signs

HSM Section	Treatment	Rural Two-Lane Road	Rural Multilane Highway	Freeway	Expressway	Urban Local Street or Arterial	Suburban Arterial
13.7.2.1	Install combination horizontal alignment/ advisory speed signs (W1-1a, W1-2a)	✓	✓	✓	✓	✓	✓
13.7.2.2	Install changeable crash ahead warning signs	—	—	✓	—	—	—
13.7.2.3	Install changeable "Queue Ahead" warning signs	—	—	✓	—	—	—
13.7.2.4	Install changeable speed warning signs	✓	✓	✓	✓	✓	✓
Appendix A	Install signs to conform to MUTCD	—	—	—	—	T	—

NOTE: ✓ = indicates that a CMF is available for this treatment.
T = indicates that a CMF is not available but a trend regarding the potential change in crashes or user behavior is known and presented in Appendix A.
— = indicates that a CMF is not available and a trend is not known.

13.7.2. Roadway Sign Treatments with CMFs

13.7.2.1. Install Combination Horizontal Alignment/Advisory Speed Signs (W1-1a, W1-2a)

Combination horizontal alignment/advisory speed signs are installed prior to a change in the horizontal alignment to indicate that drivers need to reduce speed (9).

Rural two-lane roads, rural multilane highways, expressways, freeways, and urban and suburban arterials

Compared to no signage, providing combination horizontal alignment/advisory speed signs reduces the number of all types of injury crashes, as shown in Table 13-30 (8). The crash effect on all types of non-injury crashes is also shown in Table 13-30.

The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of any signage.

Table 13-30. Potential Crash Effects of Installing Combination Horizontal Alignment/ Advisory Speed Signs (W1-1a, W1-2a) (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Install combination horizontal alignment/ advisory speed signs	Unspecified (Unspecified)	Unspecified	All types (Injury)	**0.87**	**0.09**
			All types (Non-injury)	*0.71*	*0.2*

Base Condition: Absence of any signage.

NOTE: Based on U.S. studies: McCamment 1959; Hammer 1969; and International study: Rutley 1972.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Italic text is used for less reliable CMFs. These CMFs have standard errors between 0.2 to 0.3.

13.7.2.2. Install Changeable Crash Ahead Warning Signs

Freeways

Changeable crash warning signs on freeways inform drivers of a crash on the roadway ahead. The crash effect of installing changeable crash ahead warning signs on urban freeways is shown in Table 13-31 (8). The base condition of the CMF (i.e., the condition in which the CMF = 1.00) is the absence of crash ahead warning signs.

Table 13-31. Potential Crash Effects of Installing Changeable Crash Ahead Warning Signs (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Install changeable crash ahead warning signs	Urban (Freeways)	Unspecified	All types (Injury)	*0.56*	*0.2*

Base Condition: Absence of changeable crash ahead warning signs.

NOTE: Based on International study: Duff 1971.
Italic text is used for less reliable CMFs. These CMFs have standard errors between 0.2 to 0.3.

13.7.2.3. Install Changeable "Queue Ahead" Warning Signs

Changeable "Queue Ahead" warning signs give road users real-time information about queues on the road ahead.

Freeways

Crash effects of installing changeable "Queue Ahead" warning signs are shown in Table 13-32 (8). The crash effect on rear-end, non-injury crashes is also shown in Table 13-32 (8). The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of changeable "Queue Ahead" warning signs.

Table 13-32. Potential Crash Effects of Installing Changeable "Queue Ahead" Warning Signs (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Install changeable "Queue Ahead" warning signs	Urban (Freeways)	Unspecified	Rear-end (Injury)	**0.84**[?]	**0.1**
			Rear-end (Non-injury)	*1.16*[?]	*0.2*
Base Condition: Absence of changeable "Queue Ahead" warning signs.					

NOTE: Based on international studies: Erke and Gottlieb 1980; Cooper, Sawyer and Rutley 1992; Persaud, Mucsi and Ugge 1995.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Italic text is used for less reliable CMFs. These CMFs have standard errors between 0.2 to 0.3.
? Treatment results in a decrease in injury crashes and an increase in non-injury crashes. See Part D—Introduction and Applications Guidance.

13.7.2.4. Install Changeable Speed Warning Signs

Individual changeable speed warning signs give individual drivers real-time feedback regarding their speed.

Rural two-lane roads, rural multilane highways, expressways, freeways, and urban and suburban arterials

The crash effect of installing individual changeable speed warning signs is shown in Table 13-33. The base condition of the CMF (i.e., the condition in which the CMF = 1.00) is the absence of changeable speed warning signs.

Table 13-33. Potential Crash Effects of Installing Changeable Speed Warning Signs for Individual Drivers (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Install changeable speed warning signs for individual drivers	Unspecified (Unspecified)	Unspecified	All types (All severities)	*0.54*	*0.2*
Base Condition: Absence of changeable speed warning signs.					

NOTE: Based on international study: Van Houten and Nau 1981.
Italic text is used for less reliable CMFs. These CMFs have standard errors between 0.2 to 0.3.

13.8. CRASH EFFECTS OF ROADWAY DELINEATION

13.8.1. Background and Availability of CMFs

Delineation includes all methods of defining the roadway operating area for drivers and has long been considered an essential element for providing guidance to drivers. Methods of delineation include devices such as pavement markings (made from a variety of materials), raised pavement markers (RPMs), chevron signs, object markers, and post-mounted delineators (PMDs) (11). Delineation may be used alone to convey regulations, guidance, or warnings (19). Delineation may also be used to supplement other traffic control devices, such as signs and signals. The MUTCD provides guidelines for retroreflectivity, color, placement, types of materials, and other delineation issues (19).

Table 13-34 summarizes common treatments related to delineation and the corresponding CMF availability.

Table 13-34. Summary of Treatments Related to Delineation

HSM Section	Treatment	Rural Two-Lane Road	Rural Multi-Lane Highway	Freeway	Expressway	Urban Arterial	Suburban Arterial
13.8.2.1	Install PMDs	✓	—	—	—	—	—
13.8.2.2	Place standard edgeline markings	✓	—	—	—	—	—
13.8.2.3	Place wide edgeline markings	✓	—	—	—	—	—
13.8.2.4	Place centerline markings	✓	—	N/A	N/A	—	—
13.8.2.5	Place edgeline and centerline markings	✓	✓	N/A	N/A	—	—
13.8.2.6	Install edgelines, centerlines, and PMDs	✓	✓	N/A	N/A	—	—
13.8.2.7	Install snowplowable, permanent RPMs	✓	—	✓	—	—	—
Appendix A	Install chevron signs on horizontal curves	—	—	—	—	T	T
Appendix A	Provide distance markers	—	—	T	—	—	—
Appendix A	Place converging chevron pattern markings	—	—	—	—	T	T
Appendix A	Place edgeline and directional pavement markings on horizontal curves	T	—	—	—	—	—

NOTE: ✓ = Indicates that a CMF is available for this treatment.
T = Indicates that a CMF is not available but a trend regarding the potential change in crashes or user behavior is known and presented in Appendix A.
— = Indicates that a CMF is not available and a trend is not known.
N/A = Indicates that the treatment is not applicable to the corresponding setting..

13.8.2. Roadway Delineation Treatments with CMFs

13.8.2.1. Install Post-Mounted Delineators (PMDs)

PMDs are considered guidance devices rather than warning devices (9). PMDs are typically installed in addition to existing edgeline and centerline markings.

Rural two-lane roads

The crash effects of installing PMDs on rural two-lane roads, including tangent and curved road sections, are shown in Table 13-35. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of PMDs.

Table 13-35. Potential Crash Effects of Installing PMDs (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Install PMDs	Rural (Two-lane undivided)	Unspecified	All types (Injury)	1.04*	0.1
			All types (Non-injury)	1.05*	0.07

Base Condition: Absence of PMDs.

Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
* Observed variability suggests that this treatment could result in an increase, decrease, or no change in crashes. See Part D—Introduction and Applications Guidance.

13.8.2.2. Place Standard Edgeline MarkingsPlace Standard Edgeline Markings (4 to 6 inches wide)

The MUTCD contains guidance on installing edgeline pavement markings (9).

Rural two-lane roads

The crash effects of installing standard edgeline markings, 4 to 6 inches wide, on rural two-lane roads that currently have centerline markings are shown in Table 13-36. The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of standard edgeline markings.

Table 13-36. Potential Crash Effects of Placing Standard Edgeline Markings (4 to 6 inches wide) (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Place standard edgeline marking	Rural (Two-lane)	Unspecified	All types (Injury)	0.97*	0.04
			All types (Non-injury)	0.97*	0.1

Base Condition: Absence of standard edgeline markings.

NOTE: Based on U.S. studies: Thomas 1958; Musick 1960; Williston 1960; Basile 1962; Tamburri, Hammer, Glennon and Law 1968; Roth 1970; Ball, Potts, Fee, Taylor and Glennon 1978 and International studies: Charnock and Chessell 1978, McBean 1982; Rosbach 1984; Willis, Scott and Barnes 1984; Corben, Deery, Newstead, Mullan and Dyte 1997.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Observed variability suggests that this treatment could result in an increase, decrease or no change in crashes. See Part D—Introduction and Applications Guidance.

13.8.2.3. Place Wide (8 inches) Edgeline Markings

The MUTCD indicates that wide (8 inches) solid edgeline markings can be installed for greater emphasis (9).

Rural two-lane roads

The crash effects of placing 8-inch-wide edgeline markings on rural two-lane roads that currently have standard edgeline markings are shown in Table 13-37 (8). The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the use of standard edgeline markings (4 to 6 inches wide).

Table 13-37. Potential Crash Effects of Placing Wide (8 inch) Edgeline Markings (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Place wide (8 inches) edgeline markings	Rural (Two-lane)	Unspecified	All types (Injury)	**1.05*?**	**0.08**
			All types (Non-injury)	*0.99*?*	*0.2*

Base Condition: Standard edgeline markings (4 to 6 inches wide).

NOTE: Based on U.S. studies: Hall 1987; Cottrell 1988; Lum and Hughes 1990.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
Italic text is used for less reliable CMFs. These CMFs have standard errors between 0.2 to 0.3.
* Observed variability suggests that this treatment could result in an increase, decrease, or no change in crashes. See Part D—Introduction and Applications Guidance.
? Treatment results in an increase in injury crashes and a decrease in non-injury crashes. See Part D—Introduction and Applications Guidance.

13.8.2.4. Place Centerline Markings

The MUTCD provides guidelines and warrants for installing centerline markings (9).

Rural two-lane roads

The crash effects of placing centerline markings on rural two-lane roads that currently do not have centerline markings are shown in Table 13-38 (8). The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of centerline markings.

Table 13-38. Potential Crash Effects of Placing Centerline Markings (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Place centerline markings	Rural (Two-lane)	Unspecified	All types (Injury)	**0.99*?**	**0.06**
			All types (Non-injury)	**1.01*?**	**0.05**

Base Condition: Absence of centerline markings.

NOTE: Based on US studies: Tamburri, Hammer, Glennon and Law 1968; Glennon 1986 and international studies: Engel and Krogsgard Thomsen 1983.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.
* Observed variability suggests that this treatment could result in an increase, decrease, or no change in crashes. See Part D—Introduction and Applications Guidance.
? Treatment results in a decrease in injury crashes and an increase in non-injury crashes. See Part D Introduction and Applications Guidance.
Study does not report if the roadway segments meet MUTCD guidelines for applying centerline markings.

13.8.2.5. Place Edgeline and Centerline Markings

The MUTCD provides guidelines and warrants for applying edgeline and centerline markings (9).

Rural two-lane roads and rural multilane highways

Placing edgeline and centerline markings where no markings exist decreases injury crashes of all types, as shown in Table 13-39. The base condition of the CMF (i.e., the condition in which the CMF = 1.00) is the absence of markings.

Table 13-39. Potential Crash Effects of Placing Edgeline and Centerline Markings (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Place edgeline and centerline markings	Rural (Two-lane/ Multilane undivided)	Unspecified	All types (Injury)	**0.76**	**0.1**

Base Condition: Absence of markings.

NOTE: Based on U.S. study: Tamburri, Hammer, Glennon and Lew, 1968. Study does not report if the roadway segments meet MUTCD guidelines for applying edgeline and centerline markings.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.

13.8.2.6. Install Edgelines, Centerlines, and PMDs

Edgeline markings, centerline markings, and PMDs are often combined on roadway segments.

Rural two-lane roads, and rural multilane highways

The crash effects of installing edgelines, centerlines, and PMDs where no markings exist are shown in Table 13-40. The base condition of the CMF (i.e., the condition in which the CMF = 1.00) is the absence of markings.

Table 13-40. Potential Crash Effects of Installing Edgelines, Centerlines, and PMDs (8)

Treatment	Setting (Road Type)	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Install edgelines, centerlines, and PMDs	Urban/Rural (Two-lane/multilane undivided)	Unspecified	All types (Injury)	**0.55**	**0.1**

Base Condition: Absence of markings.

NOTE: Based on U.S. studies: Tamburri, Hammer, Glennon and Lew 1968, Roth 1970.
Bold text is used for the most reliable CMFs. These CMFs have a standard error of 0.1 or less.

13.8.2.7. Install Snowplowable, Permanent RPMs

Installing snowplowable, permanent RPMs requires consideration of traffic volumes and horizontal curvature (2).

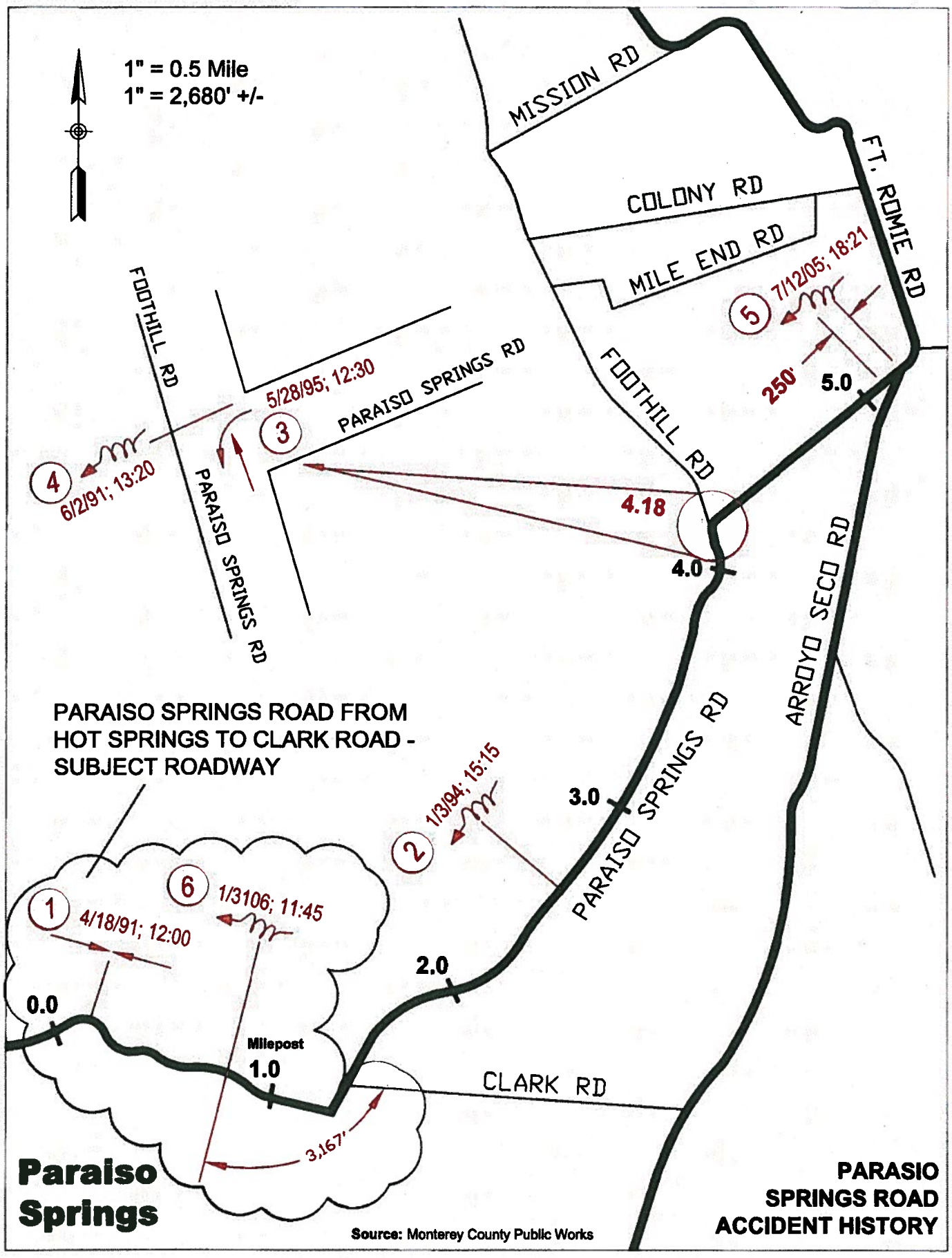
Rural two-lane roads

The crash effects of installing snowplowable, permanent RPMs on low volume (AADT of 0 to 5,000), medium volume (AADT of 5,001 to 15,000), and high volume (AADT of 15,001 to 20,000) roads are shown in Table 13-411 (2).

The varying crash effect by traffic volume is likely due to the lower design standards (e.g., narrower lanes, narrower shoulders, etc.) associated with low-volume roads (2). Providing improved delineation, such as RPMs, may cause drivers to increase their speeds. The varying crash effect by curve radius is likely related to the negative impact of speed increases (2). The base condition of the CMFs (i.e., the condition in which the CMF = 1.00) is the absence of RPMs.

APPENDIX E

ACCIDENT HISTORY DATA


1" = 0.5 Mile
1" = 2,680' +/-
MISSION RD
FT. ROMIE RD
COLONY RD
MILE END RD
FOOTHILL RD
PARAISO SPRINGS RD
ARROYO SECO RD
CLARK RD
5
7/12/05; 18:21
250'
5.0
3
5/28/95; 12:30
4
6/2/91; 13:20
4.18
4.0
3.0
2
1/3/94; 15:15
6
1/3106; 11:45
1
4/18/91; 12:00
2.0
0.0
Milepost
1.0
3,167'
PARAISO SPRINGS ROAD FROM HOT SPRINGS TO CLARK ROAD - SUBJECT ROADWAY
Paraiso Springs
Source: Monterey County Public Works
PARASIO SPRINGS ROAD ACCIDENT HISTORY

Monterey County ASAP Program

Collision Report of PARAISO SPRINGS RD — **MONTEREY COUNTY PUBLIC WORKS, Traffic Section**

07-Oct-10 — From DATE: 1/1/81 — To DATE: 12/31/99 — LIMITS: From Milepost = — To Milepost =

All of Paraiso Springs Rd

Located	MP	Date	Time	Severity	Kill	Inj	Lighting	P1 DPC	P1 MPC	P1 Sobriety	P2 DPC	P2 MPC	P2 Sobriety	ASAP Id
AT MILEPOST #	0.17	4/18/91	12:00	PDO	0	0	Daylight	East	Crossed Into Oppos	HNBD	West	Proceeding Straight	HNBD	3348
AT MILEPOST #	2.60	1/8/94	16:15	Other Injur	0	2	Daylight	West	Ran Off Road	HNBD	N/A	N/A	N/A	2882
FOOTHILL RD	4.16	5/28/98	12:30	PDO	0	0	Daylight	West	Making Left Turn	HNBD	North	Proceeding Straight	HNBD	9233
FOOTHILL RD	4.16	6/2/91	13:20	PDO	0	0	Daylight	West	Ran Off Road	Imp Unk(H	N/A	N/A	N/A	3268

PDO	K	Inj
3	0	1

Total Collisions: 4

No collisions from year 2000 to Sept 1, 2003

CROSSROADS PROGRAM

Monterey County Dept of Public Works

Traffic Engineering Department

Collision Report Summary

9/7/2010

Date Range Reported: 9/1/03 - 9/1/10

Total Number of Collisions: 2

All of Paraiso Springs Road

	Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.	Ver.
5	0507016	7/12/05	18:21	Paraiso Springs Road & Arroyo Seco Road	250' MP 3.28	West	Overturned	Non-Collision	East	Proceeding Straight			Improper Turning	0	0	
6	0601027	1/31/06	11:45	Paraiso Springs Road & Clark Road	3167' MP 0.77	West	Overturned	Non-Collision	East	Ran Off Road			Wrong Side of Road	0	0	

Monterey County Dept of Public Works
Traffic Engineering Department

2/24/2016

Traffic Collision History Report
Midblock Collisions

Arterial: PARAISO SPRINGS RD
Limit 1: CLARK RD
Limit 2: ARROYO SECO RD

Total Number of Collisions: 0
Date Range Reported: 1/1/2010 - 12/31/2015

Report No.	Date Time	Dist/Dir	Location	Type of Collision	Motor Veh. Involved With	DOT1	MPC 1	DOT2	MPC 2	PCF	# Inj	# Kl

Total Number of Collisions: 0 Segment Length: 3.98 miles (21,030')

Settings Used For Query

Parameter	Setting
Limit 1	Include Intersection Related
Limit 2	Include Intersection Related
Intermediate Intersections	Include Intersection Related
Sorted By	'Date and Time'

Clark Road from Paraiso Springs to Arroyo Seco Rd

Wednesday, February 24, 2016
11:17 AM

Monterey County Dept of Public Works
Traffic Engineering Department

Traffic Collision History Report
Midblock Collisions

2/24/2016
Page 1

Arterial: CLARK RD
Limit 1: PARAISO SPRINGS RD
Limit 2: ARROYO SECO RD

Total Number of Collisions: 0
Date Range Reported: 1/1/2010 - 12/31/2015

Report No.	Date Time	Dist/Dir	Location	Type of Collision	Motor Veh. Involved With	DOT1	MPC 1	DOT2	MPC 2	PCF	# Inj	# Kl

Total Number of Collisions: 0 **Segment Length:** 1.36 miles (7,176')

Settings Used For Query

Parameter	Setting
Limit 1	Include Intersection Related
Limit 2	Include Intersection Related
Intermediate Intersections	Include Intersection Related
Sorted By	'Date and Time'

APPENDIX F

PREDICTIVE
AVERAGE CRASH FREQUENCY
CALCULATION
WORKSHEETS

PARAISO SPRINGS ROAD
SEGMENT A

Paraiso Springs Road - Segment A
1991-2005

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -A
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment A
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	1991-2005	Analysis Year	1991

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.131				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	463				AADT OK
Lane width (ft)		12	10.5				
Shoulder width (ft)		6	Right Shld:	2	Left Shld:	2	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.11				
Radius of curvature (ft)		0	450				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	5				
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	2				
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)
1.01	1.05	2.05	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	2.036

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	0.016	1.80	1.000	0.016	2.04	1.00	0.033
Fatal and Injury (FI)	--	--	0.321	0.005	2.04	1.00	0.011
Property Damage Only (PDO)	--	--	0.679	0.011	2.04	1.00	0.022

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	0.033	1.000	0.011	1.000	0.022
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.004	0.038	0.000	0.184	0.004
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.017	0.545	0.006	0.505	0.011
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.023	0.638	0.007	0.735	0.016
MULTIPLE-VEHICLE						
Angle collision	0.085	0.003	0.100	0.001	0.072	0.002
Head-on collision	0.016	0.001	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.005	0.164	0.002	0.122	0.003
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.010	0.362	0.004	0.265	0.006

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	0.0	0.131	0.3
Fatal and Injury (FI)	0.321	0.0	0.131	0.1
Property Damage Only (PDO)	0.679	0.0	0.131	0.2

Paraiso Springs Road - Segment A
1991-2005

Paraiso Springs Rd -A **1991-2005** **ADT = 463**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.08	Calculated Left Shoulder Width (CMF_{wra}) :	1.08
Calculated Right Shoulder Type (CMF_{tra}) :	1.01	Calculated Left Shoulder Type (CMF_{tra}) :	1.01
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	450
Adjusted Curve Length (if less than 100 ft):	0.11
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	2.045
Adjusted Horizontal Curve CMF:	2.045

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.07	1.50
9.5	1.04	1.05	1.40
10	1.02	1.03	1.30
10.5	1.02	1.02	1.18
11	1.01	1.01	1.05
11.5	1.01	1.01	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.12	1.50
1	1.09	1.10	1.40
2	1.07	1.08	1.30
3	1.05	1.05	1.23
4	1.02	1.03	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment A
1991-2005

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,** $N_{expected}$
	$N_{predicted}$ (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	0.033	0.011	0.022	0	1.802	0.944	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.033	0.011	0.022	0	--	--	0.0

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
	0.033	0.031
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.011	0.010
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.022	0.021

Paraiso Springs Road - Segment A
2006-2015

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -A
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment A
Date Performed	03/26/16	Jurisdiction	Monterey County, CA
Analysis Condition	2006-2015	Analysis Year	2006

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.131				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	150				AADT OK
Lane width (ft)		12	10.5				
Shoulder width (ft)		6	Right Shld:	2	Left Shld:	2	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.11				
Radius of curvature (ft)		0	450				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.01	1.05	2.05	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	2.019

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	0.005	1.80	1.000	0.005	2.02	1.00	0.011
Fatal and Injury (FI)	--	--	0.321	0.002	2.02	1.00	0.003
Property Damage Only (PDO)	--	--	0.679	0.004	2.02	1.00	0.007

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	0.011	1.000	0.003	1.000	0.007
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.001	0.038	0.000	0.184	0.001
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.006	0.545	0.002	0.505	0.004
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.007	0.638	0.002	0.735	0.005
MULTIPLE-VEHICLE						
Angle collision	0.085	0.001	0.100	0.000	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.002	0.164	0.001	0.122	0.001
Sideswipe collision	0.037	0.000	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.003	0.362	0.001	0.265	0.002

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	0.0	0.131	0.1
Fatal and Injury (FI)	0.321	0.0	0.131	0.0
Property Damage Only (PDO)	0.679	0.0	0.131	0.1

Paraiso Springs Road - Segment A
2006-2015

Paraiso Springs Rd -A **2006-2015** **ADT = 150**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.07	Calculated Left Shoulder Width (CMF_{wra}) :	1.07
Calculated Right Shoulder Type (CMF_{tra}) :	1.01	Calculated Left Shoulder Type (CMF_{tra}) :	1.01
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	450
Adjusted Curve Length (if less than 100 ft):	0.11
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	2.045
Adjusted Horizontal Curve CMF:	2.045

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	**< 400**	**400 to 2000**	**> 2000**
9	1.05	0.98	1.50
9.5	1.04	0.98	1.40
10	1.02	0.98	1.30
10.5	1.02	0.99	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	**< 400**	**400 to 2000**	**> 2000**
0	1.10	1.04	1.50
1	1.09	1.04	1.40
2	1.07	1.03	1.30
3	1.05	1.02	1.23
4	1.02	1.00	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment A
2006-2015

Paraiso Springs Rd -A **2006-2015** **ADT = 150**

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,** $N_{expected}$
	$N_{predicted}$ (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	0.011	0.003	0.007	0	1.802	0.981	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.011	0.003	0.007	0	--	--	0.0

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
	0.011	0.010
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.003	0.003
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.007	0.007

Paraiso Springs Road - Segment A
Phase 1

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -A
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment A
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 1	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.131				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	284				AADT OK
Lane width (ft)		12	10.5				
Shoulder width (ft)		6	Right Shld:	2	Left Shld:	2	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.11				
Radius of curvature (ft)		0	450				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.01	1.05	2.05	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	2.019

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	0.010	1.80	1.000	0.010	2.02	1.00	0.020
Fatal and Injury (FI)	--	--	0.321	0.003	2.02	1.00	0.006
Property Damage Only (PDO)	--	--	0.679	0.007	2.02	1.00	0.014

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	0.020	1.000	0.006	1.000	0.014
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.010	0.545	0.004	0.505	0.007
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.014	0.638	0.004	0.735	0.010
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.006	0.362	0.002	0.265	0.004

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	0.0	0.131	0.2
Fatal and Injury (FI)	0.321	0.0	0.131	0.0
Property Damage Only (PDO)	0.679	0.0	0.131	0.1

Paraiso Springs Road - Segment A
Phase 1

Paraiso Springs Rd -A **Phase 1** **ADT = 284**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.07	Calculated Left Shoulder Width (CMF_{wra}) :	1.07
Calculated Right Shoulder Type (CMF_{tra}) :	1.01	Calculated Left Shoulder Type (CMF_{tra}) :	1.01
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	450
Adjusted Curve Length (if less than 100 ft):	0.11
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	2.045
Adjusted Horizontal Curve CMF:	2.045

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.02	1.50
9.5	1.04	1.01	1.40
10	1.02	1.00	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.07	1.50
1	1.09	1.06	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment A
Phase 1

Paraiso Springs Rd -A **Phase 1** **ADT = 284**

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**
	$N_{predicted}$ (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	0.020	0.006	0.014	0	1.802	0.965	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.020	0.006	0.014	0	--	--	0.0

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
	0.020	0.019
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.006	0.006
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.014	0.013

Paraiso Springs Road - Segment A
Phase 2

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -A
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment A
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 2	Analysis Year	1991

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.131				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	330				AADT OK
Lane width (ft)		12	10.5				
Shoulder width (ft)		6	Right Shld:	2	Left Shld:	2	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.11				
Radius of curvature (ft)		0	450				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.01	1.05	2.05	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	2.019

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	0.012	1.80	1.000	0.012	2.02	1.00	0.023
Fatal and Injury (FI)	--	--	0.321	0.004	2.02	1.00	0.007
Property Damage Only (PDO)	--	--	0.679	0.008	2.02	1.00	0.016

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	0.023	1.000	0.007	1.000	0.016
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.003	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.012	0.545	0.004	0.505	0.008
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.016	0.638	0.005	0.735	0.012
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.007	0.362	0.003	0.265	0.004

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	0.0	0.131	0.2
Fatal and Injury (FI)	0.321	0.0	0.131	0.1
Property Damage Only (PDO)	0.679	0.0	0.131	0.1

Paraiso Springs Road - Segment A
Phase 2

Paraiso Springs Rd -A **Phase 2** **ADT = 330**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.07	Calculated Left Shoulder Width (CMF_{wra}) :	1.07
Calculated Right Shoulder Type (CMF_{tra}) :	1.01	Calculated Left Shoulder Type (CMF_{tra}) :	1.01
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	450
Adjusted Curve Length (if less than 100 ft):	0.11
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	2.045
Adjusted Horizontal Curve CMF:	2.045

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.03	1.50
9.5	1.04	1.02	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.08	1.50
1	1.09	1.07	1.40
2	1.07	1.06	1.30
3	1.05	1.04	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment A
Phase 2

Paraiso Springs Rd -A **Phase 2** **ADT = 330**

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**
	$N_{predicted}$ (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	0.023	0.007	0.016	0	1.802	0.960	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.023	0.007	0.016	0	--	--	0.0

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
	0.023	0.022
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.007	0.007
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.016	0.015

Paraiso Springs Road - Segment A
Phase 3

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -A
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment A
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 3	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.131				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	378				AADT OK
Lane width (ft)		12	10.5				
Shoulder width (ft)		6	Right Shld:	2	Left Shld:	2	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.11				
Radius of curvature (ft)		0	450				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.01	1.05	2.05	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	2.019

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	0.013	1.80	1.000	0.013	2.02	1.00	0.027
Fatal and Injury (FI)	--	--	0.321	0.004	2.02	1.00	0.009
Property Damage Only (PDO)	--	--	0.679	0.009	2.02	1.00	0.018

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	0.027	1.000	0.009	1.000	0.018
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.003	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.014	0.545	0.005	0.505	0.009
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.019	0.638	0.005	0.735	0.013
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.004	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.008	0.362	0.003	0.265	0.005

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	0.0	0.131	0.2
Fatal and Injury (FI)	0.321	0.0	0.131	0.1
Property Damage Only (PDO)	0.679	0.0	0.131	0.1

Paraiso Springs Road - Segment A
Phase 3

Paraiso Springs Rd -A **Phase 3** **ADT = 378**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.07	Calculated Left Shoulder Width (CMF_{wra}) :	1.07
Calculated Right Shoulder Type (CMF_{tra}) :	1.01	Calculated Left Shoulder Type (CMF_{tra}) :	1.01
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	450
Adjusted Curve Length (if less than 100 ft):	0.11
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	2.045
Adjusted Horizontal Curve CMF:	2.045

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

Lane Width (ft)	AADT (veh/day)		
	< 400	400 to 2000	> 2000
9	1.05	1.04	1.50
9.5	1.04	1.03	1.40
10	1.02	1.02	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

Shoulder Width (ft)	AADT (veh/day)		
	< 400	400 to 2000	> 2000
0	1.10	1.09	1.50
1	1.09	1.08	1.40
2	1.07	1.07	1.30
3	1.05	1.04	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment A
Phase 3

Paraiso Springs Rd -A **Phase 3** **ADT = 378**

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**
	$N_{predicted}$ (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	0.027	0.009	0.018	0	1.802	0.954	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.027	0.009	0.018	0	--	--	0.0

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
	0.027	0.025
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.009	0.008
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.018	0.017

Paraiso Springs Road - Segment A
Phase 4 - Buildout

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -A
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment A
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 4 - Buildout	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.131				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	424				AADT OK
Lane width (ft)		12	10.5				
Shoulder width (ft)		6	Right Shld:	2	Left Shld:	2	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.11				
Radius of curvature (ft)		0	450				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.01	1.05	2.05	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	2.026

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	0.015	1.80	1.000	0.015	2.03	1.00	0.030
Fatal and Injury (FI)	--	--	0.321	0.005	2.03	1.00	0.010
Property Damage Only (PDO)	--	--	0.679	0.010	2.03	1.00	0.020

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	0.030	1.000	0.010	1.000	0.020
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.004	0.038	0.000	0.184	0.004
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.016	0.545	0.005	0.505	0.010
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.021	0.638	0.006	0.735	0.015
MULTIPLE-VEHICLE						
Angle collision	0.085	0.003	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.004	0.164	0.002	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.009	0.362	0.003	0.265	0.005

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	0.0	0.131	0.2
Fatal and Injury (FI)	0.321	0.0	0.131	0.1
Property Damage Only (PDO)	0.679	0.0	0.131	0.2

Paraiso Springs Road - Segment A
Phase 4 - Buildout

Paraiso Springs Rd -A **Phase 4 - Buildout** **ADT = 424**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.07	Calculated Left Shoulder Width (CMF_{wra}) :	1.07
Calculated Right Shoulder Type (CMF_{tra}) :	1.01	Calculated Left Shoulder Type (CMF_{tra}) :	1.01
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	450
Adjusted Curve Length (if less than 100 ft):	0.11
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	2.045
Adjusted Horizontal Curve CMF:	2.045

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

Lane Width (ft)	AADT (veh/day)		
	< 400	400 to 2000	> 2000
9	1.05	1.06	1.50
9.5	1.04	1.04	1.40
10	1.02	1.02	1.30
10.5	1.02	1.02	1.18
11	1.01	1.01	1.05
11.5	1.01	1.01	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

Shoulder Width (ft)	AADT (veh/day)		
	< 400	400 to 2000	> 2000
0	1.10	1.11	1.50
1	1.09	1.09	1.40
2	1.07	1.07	1.30
3	1.05	1.05	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment A
Phase 4 - Buildout

Paraiso Springs Rd -A **Phase 4 - Buildout** **ADT = 424**

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,** $N_{expected}$
	$N_{predicted}$ (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	0.030	0.010	0.020	0	1.802	0.949	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.030	0.010	0.020	0	--	--	0.0

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
	0.030	0.029
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.010	0.009
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.020	0.019

APPENDIX G

PREDICTIVE
AVERAGE CRASH FREQUENCY
CALCULATION
WORKSHEETS

PARAISO SPRINGS ROAD
SEGMENT B

Paraiso Springs Road - Segment B
1991-2005

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -B
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment B
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	1991-2005	Analysis Year	1991

Input Data	Base Conditions	Site Conditions				
Length of segment, L (mi)	--	0.568				
AADT (veh/day) ($AADT_{MAX}$ = 17,800 (veh/day))	--	431				AADT OK
Lane width (ft)	12	9				
Shoulder width (ft)	6	Right Shld:	1	Left Shld:	1	
Shoulder type	Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)	0	0.00				
Radius of curvature (ft)	0	0				Radius Value OK
Spiral transition curve (present/not present)	Not Present	Not Present				
Superelevation variance (ft/ft)	< 0.01	0				
Grade (%)	0	0				
Driveway density (driveways/mile)	5	5				
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	2				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.017

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	0.065	0.42	1.000	0.065	1.02	1.00	0.067
Fatal and Injury (FI)	--	--	0.321	0.021	1.02	1.00	0.021
Property Damage Only (PDO)	--	--	0.679	0.044	1.02	1.00	0.045

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	0.067	1.000	0.021	1.000	0.045
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.008	0.038	0.001	0.184	0.008
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.002	0.037	0.001	0.015	0.001
Ran off road	0.521	0.035	0.545	0.012	0.505	0.023
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.046	0.638	0.014	0.735	0.033
MULTIPLE-VEHICLE						
Angle collision	0.085	0.006	0.100	0.002	0.072	0.003
Head-on collision	0.016	0.001	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.009	0.164	0.004	0.122	0.006
Sideswipe collision	0.037	0.002	0.038	0.001	0.038	0.002
Other multiple-vehicle collision	0.027	0.002	0.026	0.001	0.030	0.001
Total multiple-vehicle crashes	0.307	0.020	0.362	0.008	0.265	0.012

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	0.1	0.568	0.1
Fatal and Injury (FI)	0.321	0.0	0.568	0.0
Property Damage Only (PDO)	0.679	0.0	0.568	0.1

Paraiso Springs Road - Segment B
1991-2005

Paraiso Springs Rd -B **1991-2005** **ADT = 431**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.06	1.50
9.5	1.04	1.04	1.40
10	1.02	1.03	1.30
10.5	1.02	1.02	1.18
11	1.01	1.01	1.05
11.5	1.01	1.01	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.11	1.50
1	1.09	1.09	1.40
2	1.07	1.07	1.30
3	1.05	1.05	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment B
1991-2005

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,** $N_{}$
	$N_{predicted}$ (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	0.067	0.021	0.045	0	0.415	0.973	0.1
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.067	0.021	0.045	0	--	--	0.1

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
	0.067	0.065
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.021	0.021
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.045	0.044

Paraiso Springs Road - Segment B
2006-2015

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -B
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment B
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	2006-2015	Analysis Year	2006

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.568				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	118				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.009

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	0.018	0.42	1.000	0.018	1.01	1.00	0.018
Fatal and Injury (FI)	--	--	0.321	0.006	1.01	1.00	0.006
Property Damage Only (PDO)	--	--	0.679	0.012	1.01	1.00	0.012

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	0.018	1.000	0.006	1.000	0.012
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.002
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.009	0.545	0.003	0.505	0.006
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.013	0.638	0.004	0.735	0.009
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.001
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.006	0.362	0.002	0.265	0.003

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	0.0	0.568	0.0
Fatal and Injury (FI)	0.321	0.0	0.568	0.0
Property Damage Only (PDO)	0.679	0.0	0.568	0.0

Paraiso Springs Road - Segment B
2006-2015

Paraiso Springs Rd -B **2006-2015** **ADT = 118**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.97	1.50
9.5	1.04	0.97	1.40
10	1.02	0.97	1.30
10.5	1.02	0.99	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.03	1.50
1	1.09	1.03	1.40
2	1.07	1.03	1.30
3	1.05	1.01	1.23
4	1.02	1.00	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment B
2006-2015

Paraiso Springs Rd -B **2006-2015** **ADT = 118**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.018	0.006	0.012	1	0.415	0.993	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.018	0.006	0.012	1	--	--	0.0

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
	0.018	0.025
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.006	0.008
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.012	0.017

Paraiso Springs Road - Segment B
Phase 1

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -B
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment B
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 1	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.568				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	249				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.009

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	0.038	0.42	1.000	0.038	1.01	1.00	0.038
Fatal and Injury (FI)	--	--	0.321	0.012	1.01	1.00	0.012
Property Damage Only (PDO)	--	--	0.679	0.026	1.01	1.00	0.026

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	0.038	1.000	0.012	1.000	0.026
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.005	0.038	0.000	0.184	0.005
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.020	0.545	0.007	0.505	0.013
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.026	0.638	0.008	0.735	0.019
MULTIPLE-VEHICLE						
Angle collision	0.085	0.003	0.100	0.001	0.072	0.002
Head-on collision	0.016	0.001	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.005	0.164	0.002	0.122	0.003
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.012	0.362	0.004	0.265	0.007

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	0.0	0.568	0.1
Fatal and Injury (FI)	0.321	0.0	0.568	0.0
Property Damage Only (PDO)	0.679	0.0	0.568	0.0

Paraiso Springs Road - Segment B
Phase 1

Paraiso Springs Rd -B **Phase 1** **ADT = 249**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.01	1.50
9.5	1.04	1.00	1.40
10	1.02	0.99	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.06	1.50
1	1.09	1.06	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment B
Phase 1

Paraiso Springs Rd -B **Phase 1** **ADT = 249**

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**
	$N_{predicted}$ (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	0.038	0.012	0.026	0	0.415	0.984	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.038	0.012	0.026	0	--	--	0.0

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
	0.038	0.038
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.012	0.012
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.026	0.025

Paraiso Springs Road - Segment B
Phase 2

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -B
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment B
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 2	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.568				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	295				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.009

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	0.045	0.42	1.000	0.045	1.01	1.00	0.045
Fatal and Injury (FI)	--	--	0.321	0.014	1.01	1.00	0.015
Property Damage Only (PDO)	--	--	0.679	0.030	1.01	1.00	0.031

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	0.045	1.000	0.015	1.000	0.031
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.005	0.038	0.001	0.184	0.006
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.001	0.015	0.000
Ran off road	0.521	0.024	0.545	0.008	0.505	0.015
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.031	0.638	0.009	0.735	0.023
MULTIPLE-VEHICLE						
Angle collision	0.085	0.004	0.100	0.001	0.072	0.002
Head-on collision	0.016	0.001	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.006	0.164	0.002	0.122	0.004
Sideswipe collision	0.037	0.002	0.038	0.001	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.014	0.362	0.005	0.265	0.008

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	0.0	0.568	0.1
Fatal and Injury (FI)	0.321	0.0	0.568	0.0
Property Damage Only (PDO)	0.679	0.0	0.568	0.1

Paraiso Springs Road - Segment B
Phase 2

Paraiso Springs Rd -B **Phase 2** **ADT = 295**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.02	1.50
9.5	1.04	1.01	1.40
10	1.02	1.00	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.07	1.50
1	1.09	1.06	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment B
Phase 2

Paraiso Springs Rd -B **Phase 2** **ADT = 295**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.045	0.015	0.031	0	0.415	0.982	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.045	0.015	0.031	0	--	--	0.0

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
	0.045	0.044
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.015	0.014
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.031	0.030

Paraiso Springs Road - Segment B
Phase 3

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -B
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment B
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 3	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.568				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	343				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.009

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	0.052	0.42	1.000	0.052	1.01	1.00	0.053
Fatal and Injury (FI)	--	--	0.321	0.017	1.01	1.00	0.017
Property Damage Only (PDO)	--	--	0.679	0.035	1.01	1.00	0.036

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	0.053	1.000	0.017	1.000	0.036
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.006	0.038	0.001	0.184	0.007
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.001	0.015	0.001
Ran off road	0.521	0.027	0.545	0.009	0.505	0.018
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.036	0.638	0.011	0.735	0.026
MULTIPLE-VEHICLE						
Angle collision	0.085	0.004	0.100	0.002	0.072	0.003
Head-on collision	0.016	0.001	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.007	0.164	0.003	0.122	0.004
Sideswipe collision	0.037	0.002	0.038	0.001	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.016	0.362	0.006	0.265	0.009

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	0.1	0.568	0.1
Fatal and Injury (FI)	0.321	0.0	0.568	0.0
Property Damage Only (PDO)	0.679	0.0	0.568	0.1

Paraiso Springs Road - Segment B
Phase 3

Paraiso Springs Rd -B **Phase 3** **ADT = 343**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.03	1.50
9.5	1.04	1.02	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.09	1.50
1	1.09	1.07	1.40
2	1.07	1.06	1.30
3	1.05	1.04	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment B
Phase 3

Paraiso Springs Rd -B **Phase 3** **ADT = 343**

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,** $N_{expected}$
	$N_{predicted}$ (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	0.053	0.017	0.036	0	0.415	0.979	0.1
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.053	0.017	0.036	0	--	--	0.1

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
	0.053	0.051
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.017	0.017
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.036	0.035

Paraiso Springs Road - Segment B
Phase 4 - Buildout

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -B
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment B
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 4 - Buildout	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.568				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	389				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	2				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.009

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	0.059	0.42	1.000	0.059	1.01	1.00	0.060
Fatal and Injury (FI)	--	--	0.321	0.019	1.01	1.00	0.019
Property Damage Only (PDO)	--	--	0.679	0.040	1.01	1.00	0.040

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	0.060	1.000	0.019	1.000	0.040
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.007	0.038	0.001	0.184	0.007
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.001	0.015	0.001
Ran off road	0.521	0.031	0.545	0.010	0.505	0.020
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.041	0.638	0.012	0.735	0.030
MULTIPLE-VEHICLE						
Angle collision	0.085	0.005	0.100	0.002	0.072	0.003
Head-on collision	0.016	0.001	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.008	0.164	0.003	0.122	0.005
Sideswipe collision	0.037	0.002	0.038	0.001	0.038	0.002
Other multiple-vehicle collision	0.027	0.002	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.018	0.362	0.007	0.265	0.011

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	0.1	0.568	0.1
Fatal and Injury (FI)	0.321	0.0	0.568	0.0
Property Damage Only (PDO)	0.679	0.0	0.568	0.1

Paraiso Springs Road - Segment B
Phase 4 - Buildout

Paraiso Springs Rd -B **Phase 4 - Buildout** **ADT = 389**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.05	1.50
9.5	1.04	1.03	1.40
10	1.02	1.02	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.10	1.50
1	1.09	1.08	1.40
2	1.07	1.07	1.30
3	1.05	1.04	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment B
Phase 4 - Buildout

Paraiso Springs Rd -B **Phase 4 - Buildout** **ADT = 389**

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**
	$N_{predicted}$ (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	0.060	0.019	0.040	0	0.415	0.976	0.1
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.060	0.019	0.040	0	--	--	0.1

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
	0.060	0.058
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.019	0.019
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.040	0.039

APPENDIX H

PREDICTIVE
AVERAGE CRASH FREQUENCY
CALCULATION
WORKSHEETS

PARAISO SPRINGS ROAD
SEGMENT C

Paraiso Springs Road - Segment C
1991-2005

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -C
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment C
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	1991-2005	Analysis Year	1991

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.208				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	398				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	5				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.079

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	0.022	1.13	1.000	0.022	1.08	1.00	0.024
Fatal and Injury (FI)	--	--	0.321	0.007	1.08	1.00	0.008
Property Damage Only (PDO)	--	--	0.679	0.015	1.08	1.00	0.016

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	0.024	1.000	0.008	1.000	0.016
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.003	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.012	0.545	0.004	0.505	0.008
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.017	0.638	0.005	0.735	0.012
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.007	0.362	0.003	0.265	0.004

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	0.0	0.208	0.1
Fatal and Injury (FI)	0.321	0.0	0.208	0.0
Property Damage Only (PDO)	0.679	0.0	0.208	0.1

Paraiso Springs Road - Segment C
1991-2005

Paraiso Springs Rd -C **1991-2005** **ADT = 398**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.05	1.50
9.5	1.04	1.03	1.40
10	1.02	1.02	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.10	1.50
1	1.09	1.08	1.40
2	1.07	1.07	1.30
3	1.05	1.04	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment C
1991-2005

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,** $N_{}$
	$N_{predicted}$ (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	0.024	0.008	0.016	0	1.135	0.974	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.024	0.008	0.016	0	--	--	0.0

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
	0.024	0.023
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.008	0.007
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.016	0.016

Paraiso Springs Road - Segment C
2006-2015

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -C
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment C
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	2006-2015	Analysis Year	2006

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.208				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	85				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.079

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	0.005	1.13	1.000	0.005	1.08	1.00	0.005
Fatal and Injury (FI)	--	--	0.321	0.002	1.08	1.00	0.002
Property Damage Only (PDO)	--	--	0.679	0.003	1.08	1.00	0.003

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	0.005	1.000	0.002	1.000	0.003
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.001	0.038	0.000	0.184	0.001
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.003	0.545	0.001	0.505	0.002
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.004	0.638	0.001	0.735	0.003
MULTIPLE-VEHICLE						
Angle collision	0.085	0.000	0.100	0.000	0.072	0.000
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.001	0.164	0.000	0.122	0.000
Sideswipe collision	0.037	0.000	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.002	0.362	0.001	0.265	0.001

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	0.0	0.208	0.0
Fatal and Injury (FI)	0.321	0.0	0.208	0.0
Property Damage Only (PDO)	0.679	0.0	0.208	0.0

Paraiso Springs Road - Segment C
2006-2015

Paraiso Springs Rd -C **2006-2015** **ADT = 85**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.96	1.50
9.5	1.04	0.96	1.40
10	1.02	0.96	1.30
10.5	1.02	0.98	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.02	1.50
1	1.09	1.02	1.40
2	1.07	1.02	1.30
3	1.05	1.01	1.23
4	1.02	0.99	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment C
2006-2015

Paraiso Springs Rd -C **2006-2015** **ADT = 85**

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,** $N_{}$
	$N_{predicted}$ (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	0.005	0.002	0.003	0	1.135	0.994	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.005	0.002	0.003	0	--	--	0.0

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
	0.005	0.005
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.002	0.002
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.003	0.003

Paraiso Springs Road - Segment C
Phase 1

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -C
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment C
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 1	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.208				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	214				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.079

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	0.012	1.13	1.000	0.012	1.08	1.00	0.013
Fatal and Injury (FI)	--	--	0.321	0.004	1.08	1.00	0.004
Property Damage Only (PDO)	--	--	0.679	0.008	1.08	1.00	0.009

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	0.013	1.000	0.004	1.000	0.009
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.002
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.007	0.545	0.002	0.505	0.004
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.009	0.638	0.003	0.735	0.006
MULTIPLE-VEHICLE						
Angle collision	0.085	0.001	0.100	0.000	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.002	0.164	0.001	0.122	0.001
Sideswipe collision	0.037	0.000	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.004	0.362	0.001	0.265	0.002

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	0.0	0.208	0.1
Fatal and Injury (FI)	0.321	0.0	0.208	0.0
Property Damage Only (PDO)	0.679	0.0	0.208	0.0

Paraiso Springs Road - Segment C
Phase 1

Paraiso Springs Rd -C **Phase 1** **ADT = 214**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.00	1.50
9.5	1.04	0.99	1.40
10	1.02	0.99	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.05	1.50
1	1.09	1.05	1.40
2	1.07	1.04	1.30
3	1.05	1.02	1.23
4	1.02	1.00	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment C
Phase 1

Paraiso Springs Rd -C **Phase 1** **ADT = 214**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.013	0.004	0.009	0	1.135	0.986	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.013	0.004	0.009	0	--	--	0.0

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
	0.013	0.013
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.004	0.004
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.009	0.009

Paraiso Springs Road - Segment C
Phase 2

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -C
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment C
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 2	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.208				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	260				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.079

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	0.014	1.13	1.000	0.014	1.08	1.00	0.016
Fatal and Injury (FI)	--	--	0.321	0.005	1.08	1.00	0.005
Property Damage Only (PDO)	--	--	0.679	0.010	1.08	1.00	0.011

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	0.016	1.000	0.005	1.000	0.011
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.002
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.008	0.545	0.003	0.505	0.005
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.011	0.638	0.003	0.735	0.008
MULTIPLE-VEHICLE						
Angle collision	0.085	0.001	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.002	0.164	0.001	0.122	0.001
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.005	0.362	0.002	0.265	0.003

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	0.0	0.208	0.1
Fatal and Injury (FI)	0.321	0.0	0.208	0.0
Property Damage Only (PDO)	0.679	0.0	0.208	0.1

Paraiso Springs Road - Segment C
Phase 2

Paraiso Springs Rd -C **Phase 2** **ADT = 260**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.01	1.50
9.5	1.04	1.00	1.40
10	1.02	1.00	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.07	1.50
1	1.09	1.06	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment C
Phase 2

Paraiso Springs Rd -C **Phase 2** **ADT = 260**

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**
	$N_{predicted}$ (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	0.016	0.005	0.011	0	1.135	0.983	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.016	0.005	0.011	0	--	--	0.0

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
	0.016	0.015
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.005	0.005
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.011	0.010

Paraiso Springs Road - Segment C
Phase 3

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -C
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment C
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 3	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.208				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	308				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.079

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	0.017	1.13	1.000	0.017	1.08	1.00	0.018
Fatal and Injury (FI)	--	--	0.321	0.005	1.08	1.00	0.006
Property Damage Only (PDO)	--	--	0.679	0.012	1.08	1.00	0.013

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	0.018	1.000	0.006	1.000	0.013
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.002
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.010	0.545	0.003	0.505	0.006
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.013	0.638	0.004	0.735	0.009
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.006	0.362	0.002	0.265	0.003

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	0.0	0.208	0.1
Fatal and Injury (FI)	0.321	0.0	0.208	0.0
Property Damage Only (PDO)	0.679	0.0	0.208	0.1

Paraiso Springs Road - Segment C
Phase 3

Paraiso Springs Rd -C **Phase 3** **ADT = 308**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.02	1.50
9.5	1.04	1.01	1.40
10	1.02	1.00	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.08	1.50
1	1.09	1.07	1.40
2	1.07	1.06	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment C
Phase 3

Paraiso Springs Rd -C **Phase 3** **ADT = 308**

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,** $N_{}$
	$N_{predicted}$ (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	0.018	0.006	0.013	0	1.135	0.979	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.018	0.006	0.013	0	--	--	0.0

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
	0.018	0.018
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.006	0.006
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.013	0.012

Paraiso Springs Road - Segment C
Phase 4 - Buildout

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -C
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment C
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 4 - Buildout	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.208				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	354				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	1	Left Shld:	1	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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)
1.03	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.079

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	0.020	1.13	1.000	0.020	1.08	1.00	0.021
Fatal and Injury (FI)	--	--	0.321	0.006	1.08	1.00	0.007
Property Damage Only (PDO)	--	--	0.679	0.013	1.08	1.00	0.014

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	0.021	1.000	0.007	1.000	0.014
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.003	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.011	0.545	0.004	0.505	0.007
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.015	0.638	0.004	0.735	0.011
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.007	0.362	0.002	0.265	0.004

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	0.0	0.208	0.1
Fatal and Injury (FI)	0.321	0.0	0.208	0.0
Property Damage Only (PDO)	0.679	0.0	0.208	0.1

Paraiso Springs Road - Segment C
Phase 4 - Buildout

Paraiso Springs Rd -C **Phase 4 - Buildout** **ADT = 354**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.09	Calculated Left Shoulder Width (CMF_{wra}) :	1.09
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.05	Computed Left Shoulder CMF_{2r} :	1.05

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.04	1.50
9.5	1.04	1.02	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.09	1.50
1	1.09	1.08	1.40
2	1.07	1.06	1.30
3	1.05	1.04	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment C
Phase 4 - Buildout

Paraiso Springs Rd -C **Phase 4 - Buildout** **ADT = 354**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.021	0.007	0.014	0	1.135	0.976	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.021	0.007	0.014	0	--	--	0.0

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
	0.021	0.021
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.007	0.007
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.014	0.014

APPENDIX I

PREDICTIVE
AVERAGE CRASH FREQUENCY
CALCULATION
WORKSHEETS

PARAISO SPRINGS ROAD
SEGMENT D

Paraiso Springs Road - Segment D
1991-2005

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -D
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment D
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	1991-2005	Analysis Year	1991

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.247				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	366				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	5				
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	6				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	1.329

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	0.024	0.95	1.000	0.024	1.33	1.00	0.032
Fatal and Injury (FI)	--	--	0.321	0.008	1.33	1.00	0.010
Property Damage Only (PDO)	--	--	0.679	0.016	1.33	1.00	0.022

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	0.032	1.000	0.010	1.000	0.022
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.004	0.038	0.000	0.184	0.004
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.017	0.545	0.006	0.505	0.011
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.022	0.638	0.007	0.735	0.016
MULTIPLE-VEHICLE						
Angle collision	0.085	0.003	0.100	0.001	0.072	0.002
Head-on collision	0.016	0.001	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.005	0.164	0.002	0.122	0.003
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.010	0.362	0.004	0.265	0.006

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	0.0	0.247159091	0.1
Fatal and Injury (FI)	0.321	0.0	0.247159091	0.0
Property Damage Only (PDO)	0.679	0.0	0.247159091	0.1

Paraiso Springs Road - Segment D
1991-2005

Paraiso Springs Rd -D **1991-2005** **ADT = 366**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.04	1.50
9.5	1.04	1.03	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.09	1.50
1	1.09	1.08	1.40
2	1.07	1.07	1.30
3	1.05	1.04	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment D
1991-2005

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,** $N_{expected}$
	$N_{predicted}$ (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	0.032	0.010	0.022	0	0.955	0.970	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.032	0.010	0.022	0	--	--	0.0

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
	0.032	0.031
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.010	0.010
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.022	0.021

Paraiso Springs Road - Segment D
2006-2015

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -D
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment D
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	2006-2015	Analysis Year	2006

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.247				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	53				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	1.329

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	0.003	0.95	1.000	0.003	1.33	1.00	0.005
Fatal and Injury (FI)	--	--	0.321	0.001	1.33	1.00	0.001
Property Damage Only (PDO)	--	--	0.679	0.002	1.33	1.00	0.003

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	0.005	1.000	0.001	1.000	0.003
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.001	0.038	0.000	0.184	0.001
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.002	0.545	0.001	0.505	0.002
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.003	0.638	0.001	0.735	0.002
MULTIPLE-VEHICLE						
Angle collision	0.085	0.000	0.100	0.000	0.072	0.000
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.001	0.164	0.000	0.122	0.000
Sideswipe collision	0.037	0.000	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.001	0.362	0.001	0.265	0.001

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	0.0	0.247159091	0.0
Fatal and Injury (FI)	0.321	0.0	0.247159091	0.0
Property Damage Only (PDO)	0.679	0.0	0.247159091	0.0

Paraiso Springs Road - Segment D
2006-2015

Paraiso Springs Rd -D **2006-2015** **ADT = 53**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.95	1.50
9.5	1.04	0.96	1.40
10	1.02	0.96	1.30
10.5	1.02	0.98	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.01	1.50
1	1.09	1.02	1.40
2	1.07	1.02	1.30
3	1.05	1.01	1.23
4	1.02	0.99	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment D
2006-2015

Paraiso Springs Rd -D **2006-2015** **ADT = 53**

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, $N_{}$**
	$N_{predicted}$ (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	0.005	0.001	0.003	1	0.955	0.996	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.005	0.001	0.003	1	--	--	0.0

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
	0.005	0.009
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.001	0.003
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.003	0.006

Paraiso Springs Road - Segment D
Phase 1

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -D
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment D
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 1	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.247				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	179				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	1.329

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	0.012	0.95	1.000	0.012	1.33	1.00	0.016
Fatal and Injury (FI)	--	--	0.321	0.004	1.33	1.00	0.005
Property Damage Only (PDO)	--	--	0.679	0.008	1.33	1.00	0.011

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	0.016	1.000	0.005	1.000	0.011
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.002
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.008	0.545	0.003	0.505	0.005
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.011	0.638	0.003	0.735	0.008
MULTIPLE-VEHICLE						
Angle collision	0.085	0.001	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.002	0.164	0.001	0.122	0.001
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.005	0.362	0.002	0.265	0.003

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	0.0	0.247159091	0.1
Fatal and Injury (FI)	0.321	0.0	0.247159091	0.0
Property Damage Only (PDO)	0.679	0.0	0.247159091	0.0

Paraiso Springs Road - Segment D
Phase 1

Paraiso Springs Rd -D **Phase 1** **ADT = 179**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	**< 400**	**400 to 2000**	**> 2000**
9	1.05	0.99	1.50
9.5	1.04	0.98	1.40
10	1.02	0.98	1.30
10.5	1.02	0.99	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	**< 400**	**400 to 2000**	**> 2000**
0	1.10	1.04	1.50
1	1.09	1.04	1.40
2	1.07	1.04	1.30
3	1.05	1.02	1.23
4	1.02	1.00	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment D
Phase 1

Paraiso Springs Rd -D **Phase 1** **ADT = 179**

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**
	$N_{predicted}$ (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	0.016	0.005	0.011	0	0.955	0.985	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.016	0.005	0.011	0	--	--	0.0

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
	0.016	0.015
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.005	0.005
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.011	0.011

Paraiso Springs Road - Segment D
Phase 2

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -D
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment D
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 2	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.247				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	225				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	1.329

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	0.015	0.95	1.000	0.015	1.33	1.00	0.020
Fatal and Injury (FI)	--	--	0.321	0.005	1.33	1.00	0.006
Property Damage Only (PDO)	--	--	0.679	0.010	1.33	1.00	0.013

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	0.020	1.000	0.006	1.000	0.013
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.002
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.010	0.545	0.003	0.505	0.007
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.014	0.638	0.004	0.735	0.010
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.006	0.362	0.002	0.265	0.004

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	0.0	0.247159091	0.1
Fatal and Injury (FI)	0.321	0.0	0.247159091	0.0
Property Damage Only (PDO)	0.679	0.0	0.247159091	0.1

Paraiso Springs Road - Segment D
Phase 2

Paraiso Springs Rd -D **Phase 2** **ADT = 225**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.00	1.50
9.5	1.04	1.00	1.40
10	1.02	0.99	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.06	1.50
1	1.09	1.05	1.40
2	1.07	1.04	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment D
Phase 2

Paraiso Springs Rd -D **Phase 2** **ADT = 225**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.020	0.006	0.013	0	0.955	0.981	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.020	0.006	0.013	0	--	--	0.0

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
	0.020	0.019
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.006	0.006
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.013	0.013

Paraiso Springs Road - Segment D
Phase 3

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -D
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment D
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 3	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.247				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	273				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	1.329

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	0.018	0.95	1.000	0.018	1.33	1.00	0.024
Fatal and Injury (FI)	--	--	0.321	0.006	1.33	1.00	0.008
Property Damage Only (PDO)	--	--	0.679	0.012	1.33	1.00	0.016

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	0.024	1.000	0.008	1.000	0.016
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.003	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.012	0.545	0.004	0.505	0.008
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.017	0.638	0.005	0.735	0.012
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.007	0.362	0.003	0.265	0.004

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	0.0	0.247159091	0.1
Fatal and Injury (FI)	0.321	0.0	0.247159091	0.0
Property Damage Only (PDO)	0.679	0.0	0.247159091	0.1

Paraiso Springs Road - Segment D
Phase 3

Paraiso Springs Rd -D **Phase 3** **ADT = 273**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.01	1.50
9.5	1.04	1.01	1.40
10	1.02	1.00	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.07	1.50
1	1.09	1.06	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment D
Phase 3

Paraiso Springs Rd -D **Phase 3** **ADT = 273**

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**
	$N_{predicted}$ (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	0.024	0.008	0.016	0	0.955	0.978	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.024	0.008	0.016	0	--	--	0.0

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
	0.024	0.023
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.008	0.008
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.016	0.016

Paraiso Springs Road - Segment D
Phase 4 - Buildout

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -D
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment D
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 4 - Buildout	Analysis Year	

Input Data	Base Conditions	Site Conditions				
Length of segment, L (mi)	--	0.247				
AADT (veh/day) ($AADT_{MAX}$ = 17,800 (veh/day))	--	319				AADT OK
Lane width (ft)	12	9				
Shoulder width (ft)	6	Right Shld:	0	Left Shld:	0	
Shoulder type	Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)	0	0.00				
Radius of curvature (ft)	0	0				Radius Value OK
Spiral transition curve (present/not present)	Not Present	Not Present				
Superelevation variance (ft/ft)	< 0.01	0				
Grade (%)	0	0				
Driveway density (driveways/mile)	5	0				
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	6				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	1.329

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	0.021	0.95	1.000	0.021	1.33	1.00	0.028
Fatal and Injury (FI)	--	--	0.321	0.007	1.33	1.00	0.009
Property Damage Only (PDO)	--	--	0.679	0.014	1.33	1.00	0.019

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	0.028	1.000	0.009	1.000	0.019
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.003	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.015	0.545	0.005	0.505	0.010
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.019	0.638	0.006	0.735	0.014
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.004	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.009	0.362	0.003	0.265	0.005

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	0.0	0.247159091	0.1
Fatal and Injury (FI)	0.321	0.0	0.247159091	0.0
Property Damage Only (PDO)	0.679	0.0	0.247159091	0.1

Paraiso Springs Road - Segment D
Phase 4 - Buildout

Paraiso Springs Rd -D **Phase 4 - Buildout** **ADT = 319**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.03	1.50
9.5	1.04	1.02	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.08	1.50
1	1.09	1.07	1.40
2	1.07	1.06	1.30
3	1.05	1.04	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment D
Phase 4 - Buildout

Paraiso Springs Rd -D **Phase 4 - Buildout** **ADT = 319**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.028	0.009	0.019	0	0.955	0.974	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.028	0.009	0.019	0	--	--	0.0

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
	0.028	0.027
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.009	0.009
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.019	0.019

APPENDIX J

PREDICTIVE
AVERAGE CRASH FREQUENCY
CALCULATION
WORKSHEETS

PARAISO SPRINGS ROAD
SEGMENT E

Paraiso Springs Road - Segment E
1991-2005

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -E
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment E
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	1991-2005	Analysis Year	1991

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.237				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	333				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	5				
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	5				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.243

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	0.021	1.00	1.000	0.021	1.24	1.00	0.026
Fatal and Injury (FI)	--	--	0.321	0.007	1.24	1.00	0.008
Property Damage Only (PDO)	--	--	0.679	0.014	1.24	1.00	0.018

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	0.026	1.000	0.008	1.000	0.018
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.003	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.014	0.545	0.005	0.505	0.009
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.018	0.638	0.005	0.735	0.013
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.004	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.008	0.362	0.003	0.265	0.005

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	0.0	0.237	0.1
Fatal and Injury (FI)	0.321	0.0	0.237	0.0
Property Damage Only (PDO)	0.679	0.0	0.237	0.1

Paraiso Springs Road - Segment E
1991-2005

Paraiso Springs Rd -E **1991-2005** **ADT = 333**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.03	1.50
9.5	1.04	1.02	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.08	1.50
1	1.09	1.07	1.40
2	1.07	1.06	1.30
3	1.05	1.04	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment E
1991-2005

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,** $N_{}$
	$N_{predicted}$ (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	0.026	0.008	0.018	1	0.996	0.975	0.1
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.026	0.008	0.018	1	--	--	0.1

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
	0.026	0.051
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.008	0.016
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.018	0.035

Paraiso Springs Road - Segment E
2006-2015

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -E
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment E
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	2006-2015	Analysis Year	2006

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.237				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	20				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	5				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.243

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	0.001	1.00	1.000	0.001	1.24	1.00	0.002
Fatal and Injury (FI)	--	--	0.321	0.000	1.24	1.00	0.001
Property Damage Only (PDO)	--	--	0.679	0.001	1.24	1.00	0.001

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	0.002	1.000	0.001	1.000	0.001
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.000	0.038	0.000	0.184	0.000
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.001	0.545	0.000	0.505	0.001
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.001	0.638	0.000	0.735	0.001
MULTIPLE-VEHICLE						
Angle collision	0.085	0.000	0.100	0.000	0.072	0.000
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.000	0.164	0.000	0.122	0.000
Sideswipe collision	0.037	0.000	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.000	0.362	0.000	0.265	0.000

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	0.0	0.237	0.0
Fatal and Injury (FI)	0.321	0.0	0.237	0.0
Property Damage Only (PDO)	0.679	0.0	0.237	0.0

Paraiso Springs Road - Segment E
2006-2015

Paraiso Springs Rd -E **2006-2015** **ADT = 20**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.94	1.50
9.5	1.04	0.95	1.40
10	1.02	0.95	1.30
10.5	1.02	0.98	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.01	1.50
1	1.09	1.01	1.40
2	1.07	1.02	1.30
3	1.05	1.00	1.23
4	1.02	0.99	1.15
5	1.01	0.99	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.01	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment E
2006-2015

Paraiso Springs Rd -E **2006-2015** **ADT = 20**

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,** $N_{}$
	$N_{predicted}$ (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	0.002	0.001	0.001	0	0.996	0.998	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.002	0.001	0.001	0	--	--	0.0

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
	0.002	0.002
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.001	0.001
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.001	0.001

Paraiso Springs Road - Segment E
Phase 1

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -E
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment E
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 1	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.237				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	146				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	5				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.243

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	0.009	1.00	1.000	0.009	1.24	1.00	0.011
Fatal and Injury (FI)	--	--	0.321	0.003	1.24	1.00	0.004
Property Damage Only (PDO)	--	--	0.679	0.006	1.24	1.00	0.008

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	0.011	1.000	0.004	1.000	0.008
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.001	0.038	0.000	0.184	0.001
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.006	0.545	0.002	0.505	0.004
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.008	0.638	0.002	0.735	0.006
MULTIPLE-VEHICLE						
Angle collision	0.085	0.001	0.100	0.000	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.002	0.164	0.001	0.122	0.001
Sideswipe collision	0.037	0.000	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.004	0.362	0.001	0.265	0.002

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	0.0	0.237	0.0
Fatal and Injury (FI)	0.321	0.0	0.237	0.0
Property Damage Only (PDO)	0.679	0.0	0.237	0.0

Paraiso Springs Road - Segment E
Phase 1

Paraiso Springs Rd -E **Phase 1** **ADT = 146**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.98	1.50
9.5	1.04	0.98	1.40
10	1.02	0.98	1.30
10.5	1.02	0.99	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.04	1.50
1	1.09	1.04	1.40
2	1.07	1.03	1.30
3	1.05	1.02	1.23
4	1.02	1.00	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment E
Phase 1

Paraiso Springs Rd -E **Phase 1** **ADT = 146**

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**
	$N_{predicted}$ (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	0.011	0.004	0.008	0	0.996	0.989	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.011	0.004	0.008	0	--	--	0.0

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
	0.011	0.011
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.004	0.004
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.008	0.008

Paraiso Springs Road - Segment E
Phase 2

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -E
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment E
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 2	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.237				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	192				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	5				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.243

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	0.012	1.00	1.000	0.012	1.24	1.00	0.015
Fatal and Injury (FI)	--	--	0.321	0.004	1.24	1.00	0.005
Property Damage Only (PDO)	--	--	0.679	0.008	1.24	1.00	0.010

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	0.015	1.000	0.005	1.000	0.010
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.002
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.008	0.545	0.003	0.505	0.005
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.010	0.638	0.003	0.735	0.008
MULTIPLE-VEHICLE						
Angle collision	0.085	0.001	0.100	0.000	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.002	0.164	0.001	0.122	0.001
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.005	0.362	0.002	0.265	0.003

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	0.0	0.237	0.1
Fatal and Injury (FI)	0.321	0.0	0.237	0.0
Property Damage Only (PDO)	0.679	0.0	0.237	0.0

Paraiso Springs Road - Segment E
Phase 2

Paraiso Springs Rd -E **Phase 2** **ADT = 192**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	**< 400**	**400 to 2000**	**> 2000**
9	1.05	0.99	1.50
9.5	1.04	0.99	1.40
10	1.02	0.98	1.30
10.5	1.02	0.99	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	**< 400**	**400 to 2000**	**> 2000**
0	1.10	1.05	1.50
1	1.09	1.04	1.40
2	1.07	1.04	1.30
3	1.05	1.02	1.23
4	1.02	1.00	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment E
Phase 2

Paraiso Springs Rd -E **Phase 2** **ADT = 192**

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**
	$N_{predicted}$ (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	0.015	0.005	0.010	0	0.996	0.985	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.015	0.005	0.010	0	--	--	0.0

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
	0.015	0.015
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.005	0.005
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.010	0.010

Paraiso Springs Road - Segment E
Phase 3

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -E
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment E
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 3	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.237				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	240				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	5				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.243

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	0.015	1.00	1.000	0.015	1.24	1.00	0.019
Fatal and Injury (FI)	--	--	0.321	0.005	1.24	1.00	0.006
Property Damage Only (PDO)	--	--	0.679	0.010	1.24	1.00	0.013

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	0.019	1.000	0.006	1.000	0.013
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.002	0.038	0.000	0.184	0.002
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.010	0.545	0.003	0.505	0.006
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.013	0.638	0.004	0.735	0.009
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.006	0.362	0.002	0.265	0.003

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	0.0	0.237	0.1
Fatal and Injury (FI)	0.321	0.0	0.237	0.0
Property Damage Only (PDO)	0.679	0.0	0.237	0.1

Paraiso Springs Road - Segment E
Phase 3

Paraiso Springs Rd -E **Phase 3** **ADT = 240**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	**< 400**	**400 to 2000**	**> 2000**
9	1.05	1.01	1.50
9.5	1.04	1.00	1.40
10	1.02	0.99	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	**< 400**	**400 to 2000**	**> 2000**
0	1.10	1.06	1.50
1	1.09	1.05	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment E
Phase 3

Paraiso Springs Rd -E **Phase 3** **ADT = 240**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.019	0.006	0.013	0	0.996	0.982	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.019	0.006	0.013	0	--	--	0.0

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
	0.019	0.019
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.006	0.006
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.013	0.013

Paraiso Springs Road - Segment E
Phase 4 - Buildout

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -E
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment E
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 4 - Buildout	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.237				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	286				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.00				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	5				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.243

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	0.018	1.00	1.000	0.018	1.24	1.00	0.023
Fatal and Injury (FI)	--	--	0.321	0.006	1.24	1.00	0.007
Property Damage Only (PDO)	--	--	0.679	0.012	1.24	1.00	0.015

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	0.023	1.000	0.007	1.000	0.015
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.003	0.038	0.000	0.184	0.003
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.012	0.545	0.004	0.505	0.008
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.016	0.638	0.005	0.735	0.011
MULTIPLE-VEHICLE						
Angle collision	0.085	0.002	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.003	0.164	0.001	0.122	0.002
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.007	0.362	0.003	0.265	0.004

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	0.0	0.237	0.1
Fatal and Injury (FI)	0.321	0.0	0.237	0.0
Property Damage Only (PDO)	0.679	0.0	0.237	0.1

Paraiso Springs Road - Segment E
Phase 4 - Buildout

Paraiso Springs Rd -E **Phase 4 - Buildout** **ADT = 286**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.02	1.50
9.5	1.04	1.01	1.40
10	1.02	1.00	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.07	1.50
1	1.09	1.06	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment E
Phase 4 - Buildout

Paraiso Springs Rd -E **Phase 4 - Buildout** **ADT = 286**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.023	0.007	0.015	0	0.996	0.978	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.023	0.007	0.015	0	--	--	0.0

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
	0.023	0.022
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.007	0.007
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.015	0.015

APPENDIX K

PREDICTIVE
AVERAGE CRASH FREQUENCY
CALCULATION
WORKSHEETS

PARAISO SPRINGS ROAD
SEGMENT F

Paraiso Springs Road - Segment F
1991-2005

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -F
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment F
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	1991-2005	Analysis Year	1991

Input Data	Base Conditions	Site Conditions				
Length of segment, L (mi)	--	0.0275				
AADT (veh/day) ($AADT_{MAX}$ = 17,800 (veh/day))	--	366				AADT OK
Lane width (ft)	12	9				
Shoulder width (ft)	6	Right Shld:	0	Left Shld:	0	
Shoulder type	Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)	0	0.03				
Radius of curvature (ft)	0	100				Radius Value OK
Spiral transition curve (present/not present)	Not Present	Not Present				
Superelevation variance (ft/ft)	< 0.01	0				
Grade (%)	0	0				
Driveway density (driveways/mile)	5	5				
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	6				
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)
1.03	1.06	19.84	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	26.371

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	0.003	8.58	1.000	0.003	26.37	1.00	0.071
Fatal and Injury (FI)	--	--	0.321	0.001	26.37	1.00	0.023
Property Damage Only (PDO)	--	--	0.679	0.002	26.37	1.00	0.048

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	0.071	1.000	0.023	1.000	0.048
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.009	0.038	0.001	0.184	0.009
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.002	0.037	0.001	0.015	0.001
Ran off road	0.521	0.037	0.545	0.012	0.505	0.024
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.049	0.638	0.015	0.735	0.035
MULTIPLE-VEHICLE						
Angle collision	0.085	0.006	0.100	0.002	0.072	0.003
Head-on collision	0.016	0.001	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.010	0.164	0.004	0.122	0.006
Sideswipe collision	0.037	0.003	0.038	0.001	0.038	0.002
Other multiple-vehicle collision	0.027	0.002	0.026	0.001	0.030	0.001
Total multiple-vehicle crashes	0.307	0.022	0.362	0.008	0.265	0.013

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	0.1	0.0275	2.6
Fatal and Injury (FI)	0.321	0.0	0.0275	0.8
Property Damage Only (PDO)	0.679	0.0	0.0275	1.8

Paraiso Springs Road - Segment F
1991-2005

Paraiso Springs Rd -F **1991-2005** **ADT = 366**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	100
Adjusted Curve Length (if less than 100 ft):	0.027462
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	19.841
Adjusted Horizontal Curve CMF:	19.841

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.04	1.50
9.5	1.04	1.03	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.09	1.50
1	1.09	1.08	1.40
2	1.07	1.07	1.30
3	1.05	1.04	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment F
1991-2005

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,** $N_{}$
	$N_{predicted}$ (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	0.071	0.023	0.048	0	8.582	0.622	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.071	0.023	0.048	0	--	--	0.0

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
	0.071	0.044
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.023	0.014
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.048	0.030

Paraiso Springs Road - Segment F
2006-2015

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

General Information		Location Information	
Analyst	DT	Roadway	Paraiso Springs Rd -F
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment F
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	2006-2010	Analysis Year	2006

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.0275				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	53				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.03				
Radius of curvature (ft)		0	100				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	19.84	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	26.371

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	0.000	8.58	1.000	0.000	26.37	1.00	0.010
Fatal and Injury (FI)	--	--	0.321	0.000	26.37	1.00	0.003
Property Damage Only (PDO)	--	--	0.679	0.000	26.37	1.00	0.007

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	0.010	1.000	0.003	1.000	0.007
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.001	0.038	0.000	0.184	0.001
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.005	0.545	0.002	0.505	0.004
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.007	0.638	0.002	0.735	0.005
MULTIPLE-VEHICLE						
Angle collision	0.085	0.001	0.100	0.000	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.001	0.164	0.001	0.122	0.001
Sideswipe collision	0.037	0.000	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.003	0.362	0.001	0.265	0.002

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	0.0	0.0275	0.4
Fatal and Injury (FI)	0.321	0.0	0.0275	0.1
Property Damage Only (PDO)	0.679	0.0	0.0275	0.3

Paraiso Springs Road - Segment F
2006-2015

Paraiso Springs Rd -F **2006-2010** **ADT = 53**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	100
Adjusted Curve Length (if less than 100 ft):	0.027462
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	19.841
Adjusted Horizontal Curve CMF:	19.841

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.95	1.50
9.5	1.04	0.96	1.40
10	1.02	0.96	1.30
10.5	1.02	0.98	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.01	1.50
1	1.09	1.02	1.40
2	1.07	1.02	1.30
3	1.05	1.01	1.23
4	1.02	0.99	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment F
2006-2015

Paraiso Springs Rd -F **2006-2010** **ADT = 53**

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,** $N_{}$
	$N_{predicted}$ (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	0.010	0.003	0.007	0	8.582	0.919	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.010	0.003	0.007	0	--	--	0.0

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
	0.010	0.009
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.003	0.003
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.007	0.006

Paraiso Springs Road - Segment F
Phase 1

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -F
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment F
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 1	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.0275				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	179				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.03				
Radius of curvature (ft)		0	100				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	19.84	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	26.371

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	0.001	8.58	1.000	0.001	26.37	1.00	0.035
Fatal and Injury (FI)	--	--	0.321	0.000	26.37	1.00	0.011
Property Damage Only (PDO)	--	--	0.679	0.001	26.37	1.00	0.024

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	0.035	1.000	0.011	1.000	0.024
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.004	0.038	0.000	0.184	0.004
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.018	0.545	0.006	0.505	0.012
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.024	0.638	0.007	0.735	0.017
MULTIPLE-VEHICLE						
Angle collision	0.085	0.003	0.100	0.001	0.072	0.002
Head-on collision	0.016	0.001	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.005	0.164	0.002	0.122	0.003
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.011	0.362	0.004	0.265	0.006

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	0.0	0.0275	1.3
Fatal and Injury (FI)	0.321	0.0	0.0275	0.4
Property Damage Only (PDO)	0.679	0.0	0.0275	0.9

Paraiso Springs Road - Segment F
Phase 1

Paraiso Springs Rd -F **Phase 1** **ADT = 179**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	100
Adjusted Curve Length (if less than 100 ft):	0.027462
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	19.841
Adjusted Horizontal Curve CMF:	19.841

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.99	1.50
9.5	1.04	0.98	1.40
10	1.02	0.98	1.30
10.5	1.02	0.99	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.04	1.50
1	1.09	1.04	1.40
2	1.07	1.04	1.30
3	1.05	1.02	1.23
4	1.02	1.00	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment F
Phase 1

Paraiso Springs Rd -F **Phase 1** **ADT = 179**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.035	0.011	0.024	0	8.582	0.771	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.035	0.011	0.024	0	--	--	0.0

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
	0.035	0.027
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.011	0.009
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.024	0.018

Paraiso Springs Road - Segment F
Phase 2

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -F
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment F
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 2	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.0275				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	225				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.03				
Radius of curvature (ft)		0	100				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	19.84	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	26.371

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	0.002	8.58	1.000	0.002	26.37	1.00	0.044
Fatal and Injury (FI)	--	--	0.321	0.001	26.37	1.00	0.014
Property Damage Only (PDO)	--	--	0.679	0.001	26.37	1.00	0.030

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	0.044	1.000	0.014	1.000	0.030
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.005	0.038	0.001	0.184	0.005
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.001	0.015	0.000
Ran off road	0.521	0.023	0.545	0.008	0.505	0.015
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.030	0.638	0.009	0.735	0.022
MULTIPLE-VEHICLE						
Angle collision	0.085	0.004	0.100	0.001	0.072	0.002
Head-on collision	0.016	0.001	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.006	0.164	0.002	0.122	0.004
Sideswipe collision	0.037	0.002	0.038	0.001	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.013	0.362	0.005	0.265	0.008

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	0.0	0.0275	1.6
Fatal and Injury (FI)	0.321	0.0	0.0275	0.5
Property Damage Only (PDO)	0.679	0.0	0.0275	1.1

Paraiso Springs Road - Segment F
Phase 2

Paraiso Springs Rd -F **Phase 2** **ADT = 225**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	100
Adjusted Curve Length (if less than 100 ft):	0.027462
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	19.841
Adjusted Horizontal Curve CMF:	19.841

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

Lane Width (ft)	AADT (veh/day)		
	< 400	400 to 2000	> 2000
9	1.05	1.00	1.50
9.5	1.04	1.00	1.40
10	1.02	0.99	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

Shoulder Width (ft)	AADT (veh/day)		
	< 400	400 to 2000	> 2000
0	1.10	1.06	1.50
1	1.09	1.05	1.40
2	1.07	1.04	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment F
Phase 2

Paraiso Springs Rd -F **Phase 2** **ADT = 225**

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,** $N_{expected}$
	$N_{predicted}$ (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	0.044	0.014	0.030	0	8.582	0.728	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.044	0.014	0.030	0	--	--	0.0

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
	0.044	0.032
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.014	0.010
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.030	0.022

Paraiso Springs Road - Segment F
Phase 3

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -F
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment F
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 3	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.0275				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	273				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.03				
Radius of curvature (ft)		0	100				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	19.84	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	26.371

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	0.002	8.58	1.000	0.002	26.37	1.00	0.053
Fatal and Injury (FI)	--	--	0.321	0.001	26.37	1.00	0.017
Property Damage Only (PDO)	--	--	0.679	0.001	26.37	1.00	0.036

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	0.053	1.000	0.017	1.000	0.036
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.006	0.038	0.001	0.184	0.007
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.001	0.015	0.001
Ran off road	0.521	0.028	0.545	0.009	0.505	0.018
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.037	0.638	0.011	0.735	0.026
MULTIPLE-VEHICLE						
Angle collision	0.085	0.004	0.100	0.002	0.072	0.003
Head-on collision	0.016	0.001	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.008	0.164	0.003	0.122	0.004
Sideswipe collision	0.037	0.002	0.038	0.001	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.016	0.362	0.006	0.265	0.010

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	0.1	0.0275	1.9
Fatal and Injury (FI)	0.321	0.0	0.0275	0.6
Property Damage Only (PDO)	0.679	0.0	0.0275	1.3

Paraiso Springs Road - Segment F
Phase 3

Paraiso Springs Rd -F **Phase 3** **ADT = 273**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	100
Adjusted Curve Length (if less than 100 ft):	0.027462
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	19.841
Adjusted Horizontal Curve CMF:	19.841

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	**< 400**	**400 to 2000**	**> 2000**
9	1.05	1.01	1.50
9.5	1.04	1.01	1.40
10	1.02	1.00	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	**< 400**	**400 to 2000**	**> 2000**
0	1.10	1.07	1.50
1	1.09	1.06	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment F
Phase 3

Paraiso Springs Rd -F **Phase 3** **ADT = 273**

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,** $N_{}$
	$N_{predicted}$ (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	0.053	0.017	0.036	0	8.582	0.688	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.053	0.017	0.036	0	--	--	0.0

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
	0.053	0.036
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.017	0.012
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.036	0.025

Paraiso Springs Road - Segment F
Phase 4 - Buildout

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

General Information		Location Information	
Analyst	JMW	Roadway	Paraiso Springs Rd -F
Agency or Company	Hatch Mott MacDonald	Roadway Section	Segment F
Date Performed	03/27/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 4 - Buildout	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	0.0275				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	319				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.03				
Radius of curvature (ft)		0	100				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	0				
Driveway density (driveways/mile)		5	0				
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	6				
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)
1.03	1.06	19.84	1.00	1.00	1.00	1.00	1.00	1.00	1.22	1.00	1.00	26.371

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	0.002	8.58	1.000	0.002	26.37	1.00	0.062
Fatal and Injury (FI)	--	--	0.321	0.001	26.37	1.00	0.020
Property Damage Only (PDO)	--	--	0.679	0.002	26.37	1.00	0.042

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	0.062	1.000	0.020	1.000	0.042
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.007	0.038	0.001	0.184	0.008
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.002	0.037	0.001	0.015	0.001
Ran off road	0.521	0.032	0.545	0.011	0.505	0.021
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.043	0.638	0.013	0.735	0.031
MULTIPLE-VEHICLE						
Angle collision	0.085	0.005	0.100	0.002	0.072	0.003
Head-on collision	0.016	0.001	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.009	0.164	0.003	0.122	0.005
Sideswipe collision	0.037	0.002	0.038	0.001	0.038	0.002
Other multiple-vehicle collision	0.027	0.002	0.026	0.001	0.030	0.001
Total multiple-vehicle crashes	0.307	0.019	0.362	0.007	0.265	0.011

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	0.1	0.0275	2.2
Fatal and Injury (FI)	0.321	0.0	0.0275	0.7
Property Damage Only (PDO)	0.679	0.0	0.0275	1.5

Paraiso Springs Road - Segment F
Phase 4 - Buildout

Paraiso Springs Rd -F **Phase 4 - Buildout** **ADT = 319**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	100
Adjusted Curve Length (if less than 100 ft):	0.027462
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	19.841
Adjusted Horizontal Curve CMF:	19.841

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.03	1.50
9.5	1.04	1.02	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.08	1.50
1	1.09	1.07	1.40
2	1.07	1.06	1.30
3	1.05	1.04	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Paraiso Springs Road - Segment F
Phase 4 - Buildout

Paraiso Springs Rd -F **Phase 4 - Buildout** **ADT = 319**

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,** $N_{}$
	$N_{predicted}$ (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	0.062	0.020	0.042	0	8.582	0.653	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.062	0.020	0.042	0	--	--	0.0

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
	0.062	0.040
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.020	0.013
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.042	0.027

APPENDIX L

PREDICTIVE AVERAGE CRASH FREQUENCY CALCULATION WORKSHEETS

CLARK ROAD

Clark Road
1991-2005

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

General Information		Location Information	
Analyst	DT	Roadway	Clark Road
Agency or Company	Hatch Mott MacDonald	Roadway Section	MP 0.0 to MP 1.352
Date Performed	07/29/11	Jurisdiction	Monterey County, CA
Analysis Condition	1991-2005	Analysis Year	1991

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	1.352				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	83				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.0				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	2				
Driveway density (driveways/mile)		5	5				
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	2				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.017

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	0.030	0.17	1.000	0.030	1.02	1.00	0.031
Fatal and Injury (FI)	--	--	0.321	0.010	1.02	1.00	0.010
Property Damage Only (PDO)	--	--	0.679	0.020	1.02	1.00	0.021

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	0.031	1.000	0.010	1.000	0.021
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.004	0.038	0.000	0.184	0.004
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.001	0.037	0.000	0.015	0.000
Ran off road	0.521	0.016	0.545	0.005	0.505	0.010
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.021	0.638	0.006	0.735	0.015
MULTIPLE-VEHICLE						
Angle collision	0.085	0.003	0.100	0.001	0.072	0.001
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.004	0.164	0.002	0.122	0.003
Sideswipe collision	0.037	0.001	0.038	0.000	0.038	0.001
Other multiple-vehicle collision	0.027	0.001	0.026	0.000	0.030	0.001
Total multiple-vehicle crashes	0.307	0.009	0.362	0.004	0.265	0.005

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	0.0	1.352	0.0
Fatal and Injury (FI)	0.321	0.0	1.352	0.0
Property Damage Only (PDO)	0.679	0.0	1.352	0.0

Clark Road
1991-2005

Clark Road **1991-2005** **ADT = 83**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.96	1.50
9.5	1.04	0.96	1.40
10	1.02	0.96	1.30
10.5	1.02	0.98	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.02	1.50
1	1.09	1.02	1.40
2	1.07	1.02	1.30
3	1.05	1.01	1.23
4	1.02	0.99	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.00	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Clark Road
1991-2005

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,** $N_{expected}$
	$N_{predicted}$ (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	0.031	0.010	0.021	0	0.175	0.995	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.031	0.010	0.021	0	--	--	0.0

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
	0.031	0.030
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.010	0.010
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.021	0.021

Clark Road
2006-2015

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

General Information		Location Information	
Analyst	JMW	Roadway	Clark Road
Agency or Company	Hatch Mott MacDonald	Roadway Section	MP 0.0 to MP 1.352
Date Performed	03/26/16	Jurisdiction	Monterey County, CA
Analysis Condition	2006-2015	Analysis Year	2006

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	1.352				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	20				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.0				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	2				
Driveway density (driveways/mile)		5	5				
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	2				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.017

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	0.007	0.17	1.000	0.007	1.02	1.00	0.007
Fatal and Injury (FI)	--	--	0.321	0.002	1.02	1.00	0.002
Property Damage Only (PDO)	--	--	0.679	0.005	1.02	1.00	0.005

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	0.007	1.000	0.002	1.000	0.005
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.001	0.038	0.000	0.184	0.001
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.000	0.037	0.000	0.015	0.000
Ran off road	0.521	0.004	0.545	0.001	0.505	0.003
Other single-vehicle collision	0.021	0.000	0.007	0.000	0.029	0.000
Total single-vehicle crashes	0.693	0.005	0.638	0.002	0.735	0.004
MULTIPLE-VEHICLE						
Angle collision	0.085	0.001	0.100	0.000	0.072	0.000
Head-on collision	0.016	0.000	0.034	0.000	0.003	0.000
Rear-end collision	0.142	0.001	0.164	0.000	0.122	0.001
Sideswipe collision	0.037	0.000	0.038	0.000	0.038	0.000
Other multiple-vehicle collision	0.027	0.000	0.026	0.000	0.030	0.000
Total multiple-vehicle crashes	0.307	0.002	0.362	0.001	0.265	0.001

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	0.0	1.352	0.0
Fatal and Injury (FI)	0.321	0.0	1.352	0.0
Property Damage Only (PDO)	0.679	0.0	1.352	0.0

Clark Road
2006-2015

Clark Road **2006-2015** **ADT = 20**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	0.94	1.50
9.5	1.04	0.95	1.40
10	1.02	0.95	1.30
10.5	1.02	0.98	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.01	1.50
1	1.09	1.01	1.40
2	1.07	1.02	1.30
3	1.05	1.00	1.23
4	1.02	0.99	1.15
5	1.01	0.99	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	1.01	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Clark Road
2006-2015

Clark Road **2006-2015** **ADT = 20**

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, $N_{expected}$**
	$N_{predicted}$ (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	0.007	0.002	0.005	0	0.175	0.999	0.0
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.007	0.002	0.005	0	--	--	0.0

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
	0.007	0.007
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.002	0.002
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.005	0.005

Clark Road
Phase 1

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

General Information		Location Information					
Analyst	JMW	Roadway	Clark Road				
Agency or Company	Hatch Mott MacDonald	Roadway Section	MP 0.0 to MP 1.352				
Date Performed	03/26/16	Jurisdiction	Monterey County, CA				
Analysis Condition	Phase 1	Analysis Year					

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	1.352				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	190				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.0				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	2				
Driveway density (driveways/mile)		5	5				
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	2				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.017

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	0.069	0.17	1.000	0.069	1.02	1.00	0.070
Fatal and Injury (FI)	--	--	0.321	0.022	1.02	1.00	0.022
Property Damage Only (PDO)	--	--	0.679	0.047	1.02	1.00	0.047

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	0.070	1.000	0.022	1.000	0.047
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.008	0.038	0.001	0.184	0.009
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.002	0.037	0.001	0.015	0.001
Ran off road	0.521	0.036	0.545	0.012	0.505	0.024
Other single-vehicle collision	0.021	0.001	0.007	0.000	0.029	0.001
Total single-vehicle crashes	0.693	0.048	0.638	0.014	0.735	0.035
MULTIPLE-VEHICLE						
Angle collision	0.085	0.006	0.100	0.002	0.072	0.003
Head-on collision	0.016	0.001	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.010	0.164	0.004	0.122	0.006
Sideswipe collision	0.037	0.003	0.038	0.001	0.038	0.002
Other multiple-vehicle collision	0.027	0.002	0.026	0.001	0.030	0.001
Total multiple-vehicle crashes	0.307	0.021	0.362	0.008	0.265	0.013

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	0.1	1.352	0.1
Fatal and Injury (FI)	0.321	0.0	1.352	0.0
Property Damage Only (PDO)	0.679	0.0	1.352	0.0

Clark Road
Phase 1

Clark Road **Phase 1** **ADT = 190**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	**< 400**	**400 to 2000**	**> 2000**
9	1.05	0.99	1.50
9.5	1.04	0.99	1.40
10	1.02	0.98	1.30
10.5	1.02	0.99	1.18
11	1.01	1.00	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	**< 400**	**400 to 2000**	**> 2000**
0	1.10	1.05	1.50
1	1.09	1.04	1.40
2	1.07	1.04	1.30
3	1.05	1.02	1.23
4	1.02	1.00	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Clark Road
Phase 1

Clark Road **Phase 1** **ADT = 190**

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**
	$N_{predicted}$ (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	0.070	0.022	0.047	0	0.175	0.988	0.1
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.070	0.022	0.047	0	--	--	0.1

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
	0.070	0.069
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.022	0.022
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.047	0.047

Clark Road
Phase 2

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

General Information		Location Information	
Analyst	JMW	Roadway	Clark Road
Agency or Company	Hatch Mott MacDonald	Roadway Section	MP 0.0 to MP 1.352
Date Performed	03/26/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 2	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	1.352				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	247				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.0				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	2				
Driveway density (driveways/mile)		5	5				
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	2				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.017

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	0.089	0.17	1.000	0.089	1.02	1.00	0.091
Fatal and Injury (FI)	--	--	0.321	0.029	1.02	1.00	0.029
Property Damage Only (PDO)	--	--	0.679	0.061	1.02	1.00	0.062

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	0.091	1.000	0.029	1.000	0.062
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.011	0.038	0.001	0.184	0.011
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.002	0.037	0.001	0.015	0.001
Ran off road	0.521	0.047	0.545	0.016	0.505	0.031
Other single-vehicle collision	0.021	0.002	0.007	0.000	0.029	0.002
Total single-vehicle crashes	0.693	0.063	0.638	0.019	0.735	0.045
MULTIPLE-VEHICLE						
Angle collision	0.085	0.008	0.100	0.003	0.072	0.004
Head-on collision	0.016	0.001	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.013	0.164	0.005	0.122	0.008
Sideswipe collision	0.037	0.003	0.038	0.001	0.038	0.002
Other multiple-vehicle collision	0.027	0.002	0.026	0.001	0.030	0.002
Total multiple-vehicle crashes	0.307	0.028	0.362	0.011	0.265	0.016

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	0.1	1.352	0.1
Fatal and Injury (FI)	0.321	0.0	1.352	0.0
Property Damage Only (PDO)	0.679	0.1	1.352	0.0

Clark Road
Phase 2

Clark Road **Phase 2** **ADT = 247**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

Lane Width (ft)	AADT (veh/day)		
	< 400	400 to 2000	> 2000
9	1.05	1.01	1.50
9.5	1.04	1.00	1.40
10	1.02	0.99	1.30
10.5	1.02	1.00	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

Shoulder Width (ft)	AADT (veh/day)		
	< 400	400 to 2000	> 2000
0	1.10	1.06	1.50
1	1.09	1.05	1.40
2	1.07	1.05	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.00	1.08
6	1.00	1.00	1.00
7	0.99	1.00	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Clark Road
Phase 2

Clark Road **Phase 2** **ADT = 247**

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,** $N_{expected}$
	$N_{predicted}$ (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	0.091	0.029	0.062	0	0.175	0.984	0.1
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.091	0.029	0.062	0	--	--	0.1

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
	0.091	0.089
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.029	0.029
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.062	0.061

Clark Road
Phase 3

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

General Information		Location Information					
Analyst	JMW	Roadway	Clark Road				
Agency or Company	Hatch Mott MacDonald	Roadway Section	MP 0.0 to MP 1.352				
Date Performed	03/26/16	Jurisdiction	Monterey County, CA				
Analysis Condition	Phase 3	Analysis Year					
Input Data		**Base Conditions**	**Site Conditions**				
Length of segment, L (mi)		--	1.352				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	309				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.0				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	2				
Driveway density (driveways/mile)		5	5				
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	2				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.017

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	0.112	0.17	1.000	0.112	1.02	1.00	0.114
Fatal and Injury (FI)	--	--	0.321	0.036	1.02	1.00	0.036
Property Damage Only (PDO)	--	--	0.679	0.076	1.02	1.00	0.077

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	0.114	1.000	0.036	1.000	0.077
		(2)x(3)TOTAL		(4)x(5)FI		(6)x(7)PDO
SINGLE-VEHICLE						
Collision with animal	0.121	0.014	0.038	0.001	0.184	0.014
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.003	0.037	0.001	0.015	0.001
Ran off road	0.521	0.059	0.545	0.020	0.505	0.039
Other single-vehicle collision	0.021	0.002	0.007	0.000	0.029	0.002
Total single-vehicle crashes	0.693	0.079	0.638	0.023	0.735	0.057
MULTIPLE-VEHICLE						
Angle collision	0.085	0.010	0.100	0.004	0.072	0.006
Head-on collision	0.016	0.002	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.016	0.164	0.006	0.122	0.009
Sideswipe collision	0.037	0.004	0.038	0.001	0.038	0.003
Other multiple-vehicle collision	0.027	0.003	0.026	0.001	0.030	0.002
Total multiple-vehicle crashes	0.307	0.035	0.362	0.013	0.265	0.020

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	0.1	1.352	0.1
Fatal and Injury (FI)	0.321	0.0	1.352	0.0
Property Damage Only (PDO)	0.679	0.1	1.352	0.1

Clark Road
Phase 3

Clark Road **Phase 3** **ADT = 309**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.02	1.50
9.5	1.04	1.01	1.40
10	1.02	1.00	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.08	1.50
1	1.09	1.07	1.40
2	1.07	1.06	1.30
3	1.05	1.03	1.23
4	1.02	1.01	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.99	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Clark Road
Phase 3

Clark Road **Phase 3** **ADT = 309**

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,** $N_{}$
	$N_{predicted}$ (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	0.114	0.036	0.077	0	0.175	0.981	0.1
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.114	0.036	0.077	0	--	--	0.1

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
	0.114	0.111
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.036	0.036
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.077	0.076

Clark Road
Phase 4 - Buildout

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

General Information		Location Information	
Analyst	JMW	Roadway	Clark Road
Agency or Company	Hatch Mott MacDonald	Roadway Section	MP 0.0 to MP 1.352
Date Performed	03/26/16	Jurisdiction	Monterey County, CA
Analysis Condition	Phase 4 - Buildout	Analysis Year	

Input Data		Base Conditions	Site Conditions				
Length of segment, L (mi)		--	1.352				
AADT (veh/day)	$AADT_{MAX}$ = 17,800 (veh/day)	--	367				AADT OK
Lane width (ft)		12	9				
Shoulder width (ft)		6	Right Shld:	0	Left Shld:	0	
Shoulder type		Paved	Right Shld:	Gravel	Left Shld:	Gravel	
Length of horizontal curve (mi)		0	0.0				
Radius of curvature (ft)		0	0				Radius Value OK
Spiral transition curve (present/not present)		Not Present	Not Present				
Superelevation variance (ft/ft)		< 0.01	0				
Grade (%)		0	2				
Driveway density (driveways/mile)		5	5				
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	2				
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)
1.03	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.017

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	0.133	0.17	1.000	0.133	1.02	1.00	0.135
Fatal and Injury (FI)	--	--	0.321	0.043	1.02	1.00	0.043
Property Damage Only (PDO)	--	--	0.679	0.090	1.02	1.00	0.092

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	0.135	1.000	0.043	1.000	0.092
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.121	0.016	0.038	0.002	0.184	0.017
Collision with bicycle	0.002	0.000	0.004	0.000	0.001	0.000
Collision with pedestrian	0.003	0.000	0.007	0.000	0.001	0.000
Overturned	0.025	0.003	0.037	0.002	0.015	0.001
Ran off road	0.521	0.070	0.545	0.024	0.505	0.046
Other single-vehicle collision	0.021	0.003	0.007	0.000	0.029	0.003
Total single-vehicle crashes	0.693	0.093	0.638	0.028	0.735	0.067
MULTIPLE-VEHICLE						
Angle collision	0.085	0.011	0.100	0.004	0.072	0.007
Head-on collision	0.016	0.002	0.034	0.001	0.003	0.000
Rear-end collision	0.142	0.019	0.164	0.007	0.122	0.011
Sideswipe collision	0.037	0.005	0.038	0.002	0.038	0.003
Other multiple-vehicle collision	0.027	0.004	0.026	0.001	0.030	0.003
Total multiple-vehicle crashes	0.307	0.041	0.362	0.016	0.265	0.024

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	0.1	1.352	0.1
Fatal and Injury (FI)	0.321	0.0	1.352	0.0
Property Damage Only (PDO)	0.679	0.1	1.352	0.1

Clark Road
Phase 4 - Buildout

Clark Road **Phase 4 - Buildout** **ADT = 367**

Supplemental CMF Calculations for Shoulders:

Calculated Right Shoulder Width (CMF_{wra}) :	1.10	Calculated Left Shoulder Width (CMF_{wra}) :	1.10
Calculated Right Shoulder Type (CMF_{tra}) :	1.00	Calculated Left Shoulder Type (CMF_{tra}) :	1.00
Computed Right Shoulder CMF_{2r} :	1.06	Computed Left Shoulder CMF_{2r} :	1.06

Supplemental CMF Calculations for Horizontal Curves:

Adjusted Curve Radius (if less than 100 ft):	0
Adjusted Curve Length (if less than 100 ft):	0
Numeric Value for S:	0
Calculated Horizonatal Curve CMF:	1.000
Adjusted Horizontal Curve CMF:	1.000

Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF_{ra})

	AADT (veh/day)		
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	1.04	1.50
9.5	1.04	1.03	1.40
10	1.02	1.01	1.30
10.5	1.02	1.01	1.18
11	1.01	1.01	1.05
11.5	1.01	1.00	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF_{wra})

	AADT (veh/day)		
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	1.09	1.50
1	1.09	1.08	1.40
2	1.07	1.07	1.30
3	1.05	1.04	1.23
4	1.02	1.02	1.15
5	1.01	1.01	1.08
6	1.00	1.00	1.00
7	0.99	0.99	0.94
8	0.98	0.98	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Clark Road
Phase 4 - Buildout

Clark Road **Phase 4 - Buildout** **ADT = 367**

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,** $N_{}$
	$N_{predicted}$ (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	0.135	0.043	0.092	0	0.175	0.977	0.1
Segment 2						1.000	0.0
Segment 3						1.000	0.0
Segment 4						1.000	0.0
Segment 5						1.000	0.0
Segment 6						1.000	0.0
Segment 7						1.000	0.0
Segment 8						1.000	0.0
INTERSECTIONS							
Intersection 1						1.000	0.0
Intersection 2						1.000	0.0
Intersection 3						1.000	0.0
Intersection 4						1.000	0.0
Intersection 5						1.000	0.0
Intersection 6						1.000	0.0
Intersection 7						1.000	0.0
Intersection 8						1.000	0.0
COMBINED (sum of column)	0.135	0.043	0.092	0	--	--	0.1

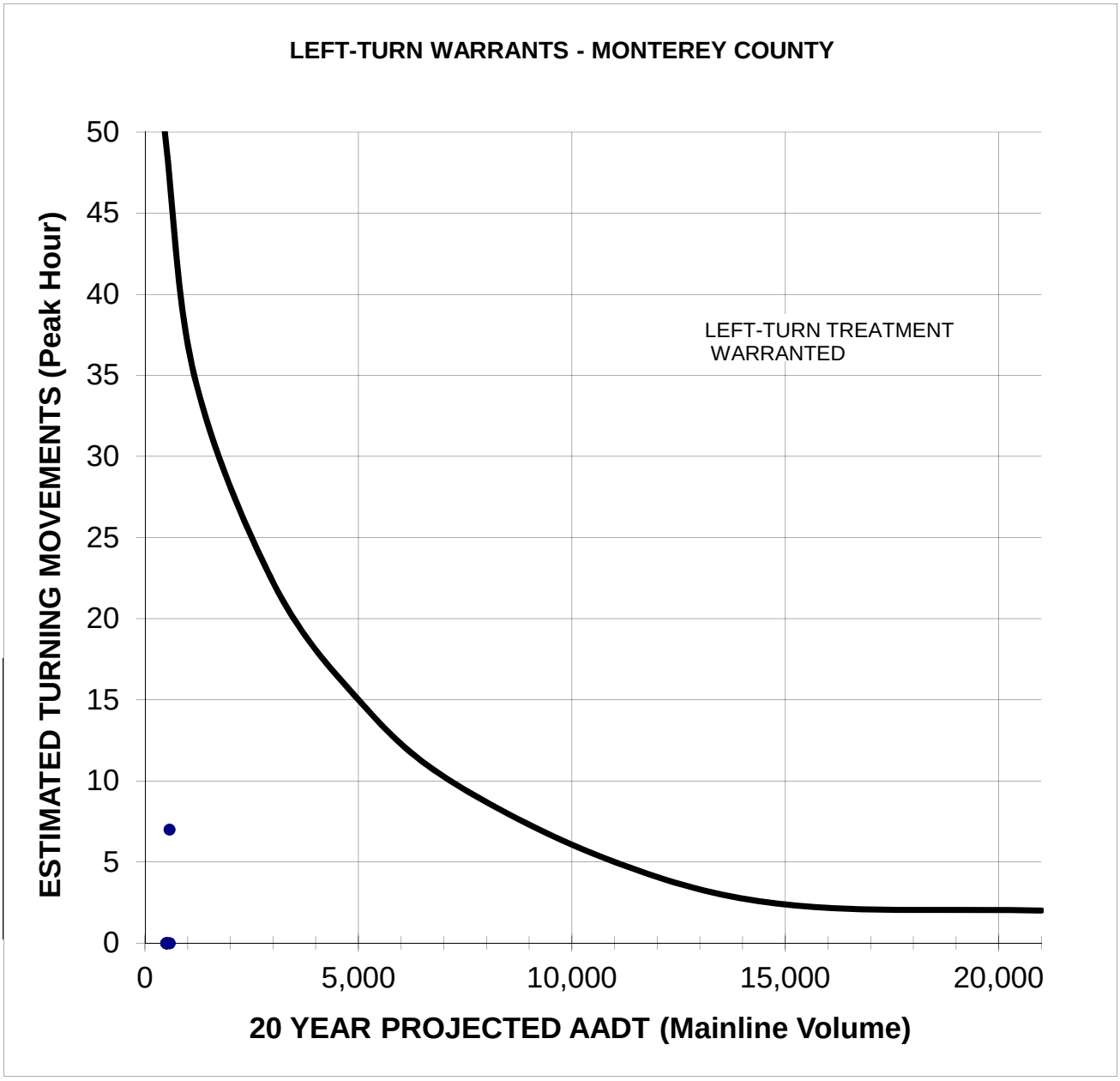
Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	0.135	0.132
Fatal and Injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	0.043	0.042
Property Damage Only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	0.092	0.089

APPENDIX M

WARRANT WORKSHEETS

Paraiso Springs Road/Clark Road
Southbound Direction



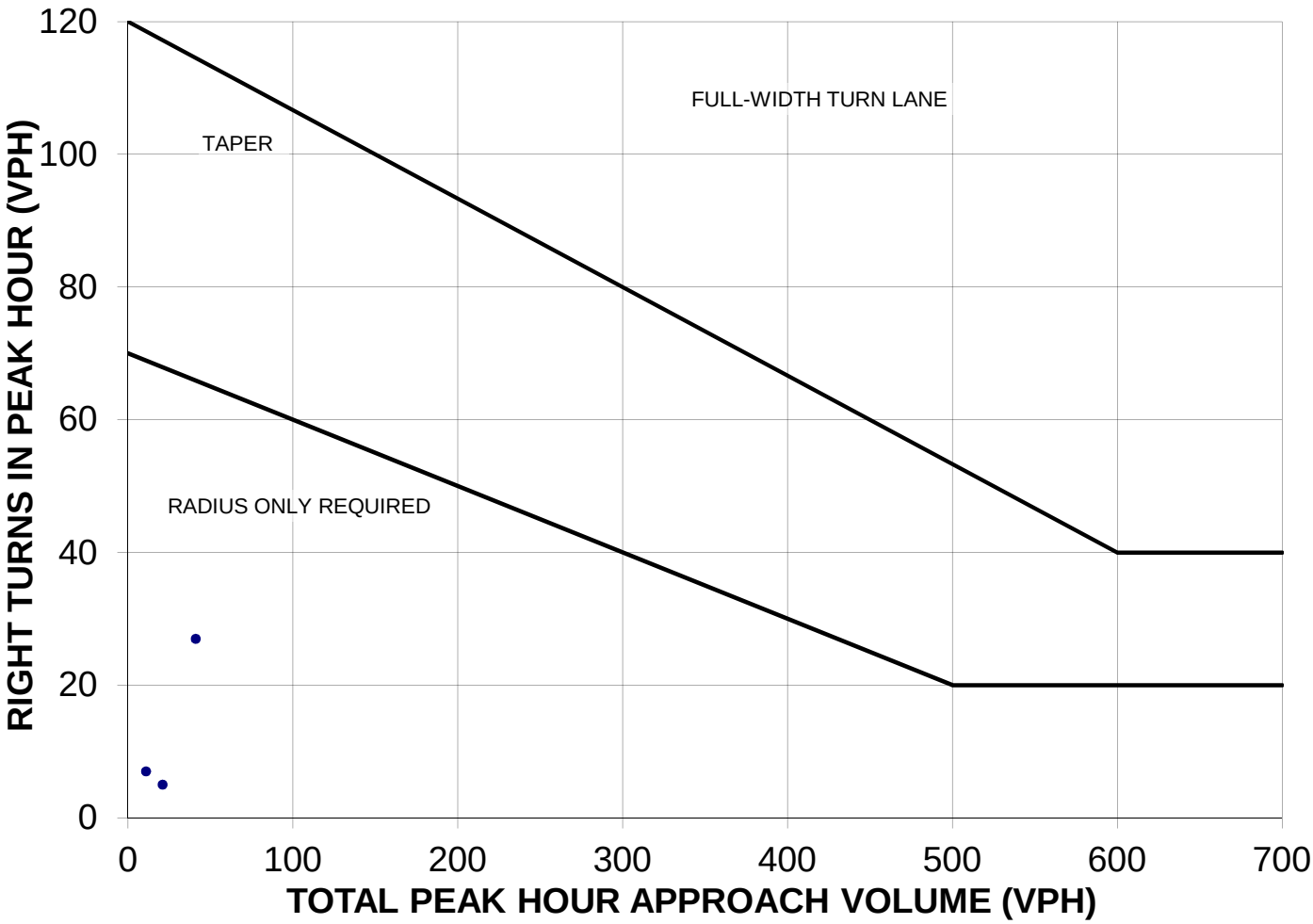
Analysis Scenario	Left Turn Volume	20-Yr. Mainline Volume	Warrant Met?
A. Cumulative AM	0	570	No
B. Cumulative PM	0	570	No
C. Cumulative Saturday	7	570	No

Adapted from Monterey County Left Turn Policy, adopted on February 26, 1980.

Note: Warrant is met if dot is above and to the left of curve shown above.

Paraiso Springs Road/Clark Road
Northbound Direction

RIGHT-TURN WARRANTS , 2-LANE HIGHWAY



Scenario	Total	Right-Turning	Warrant Met?
A. Cumulative AM	11	7	No
B. Cumulative PM	21	5	No
C. Cumulative Sat	41	27	No

Source: Transportation Research Board, "Intersection Channelization Guide", NCHRP Report 287, November, 1985, p. 64.

Note: For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust right turn volumes.

Adjust peak hour right turns = peak hour right turns - 20.

Hatch Mott MacDonald

APPENDIX N

PREDICTIVE
AVERAGE CRASH FREQUENCY
CALCULATION
WORKSHEETS

ARROYO SECO ROAD/CLARK ROAD
INTERSECTION

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1991

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,000			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]		No		0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.107	0.54	1.000	0.107	1.11	1.00	0.118
Fatal and Injury (FI)	--	--	0.415	0.044	1.11	1.00	0.049
Property Damage Only (PDO)	--	--	0.585	0.062	1.11	1.00	0.069

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.118	1.000	0.049	1.000	0.069
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.000
Ran off road	0.244	0.029	0.240	0.012	0.247	0.017
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.001
Total single-vehicle crashes	0.294	0.035	0.283	0.014	0.302	0.021
MULTIPLE-VEHICLE						
Angle collision	0.237	0.028	0.275	0.013	0.210	0.014
Head-on collision	0.052	0.006	0.081	0.004	0.032	0.002
Rear-end collision	0.278	0.033	0.260	0.013	0.292	0.020
Sideswipe collision	0.097	0.011	0.051	0.002	0.131	0.009
Other multiple-vehicle collision	0.042	0.005	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.083	0.717	0.035	0.698	0.048

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1992

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,000			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]		No		0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.107	0.54	1.000	0.107	1.11	1.00	0.118
Fatal and Injury (FI)	--	--	0.415	0.044	1.11	1.00	0.049
Property Damage Only (PDO)	--	--	0.585	0.062	1.11	1.00	0.069

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.118	1.000	0.049	1.000	0.069
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.000
Ran off road	0.244	0.029	0.240	0.012	0.247	0.017
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.001
Total single-vehicle crashes	0.294	0.035	0.283	0.014	0.302	0.021
MULTIPLE-VEHICLE						
Angle collision	0.237	0.028	0.275	0.013	0.210	0.014
Head-on collision	0.052	0.006	0.081	0.004	0.032	0.002
Rear-end collision	0.278	0.033	0.260	0.013	0.292	0.020
Sideswipe collision	0.097	0.011	0.051	0.002	0.131	0.009
Other multiple-vehicle collision	0.042	0.005	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.083	0.717	0.035	0.698	0.048

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1993

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,000			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.107	0.54	1.000	0.107	1.11	1.00	0.118
Fatal and Injury (FI)	--	--	0.415	0.044	1.11	1.00	0.049
Property Damage Only (PDO)	--	--	0.585	0.062	1.11	1.00	0.069

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.118	1.000	0.049	1.000	0.069
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.000
Ran off road	0.244	0.029	0.240	0.012	0.247	0.017
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.001
Total single-vehicle crashes	0.294	0.035	0.283	0.014	0.302	0.021
MULTIPLE-VEHICLE						
Angle collision	0.237	0.028	0.275	0.013	0.210	0.014
Head-on collision	0.052	0.006	0.081	0.004	0.032	0.002
Rear-end collision	0.278	0.033	0.260	0.013	0.292	0.020
Sideswipe collision	0.097	0.011	0.051	0.002	0.131	0.009
Other multiple-vehicle collision	0.042	0.005	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.083	0.717	0.035	0.698	0.048

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1994

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,000			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.107	0.54	1.000	0.107	1.11	1.00	0.118
Fatal and Injury (FI)	--	--	0.415	0.044	1.11	1.00	0.049
Property Damage Only (PDO)	--	--	0.585	0.062	1.11	1.00	0.069

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.118	1.000	0.049	1.000	0.069
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.000
Ran off road	0.244	0.029	0.240	0.012	0.247	0.017
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.001
Total single-vehicle crashes	0.294	0.035	0.283	0.014	0.302	0.021
MULTIPLE-VEHICLE						
Angle collision	0.237	0.028	0.275	0.013	0.210	0.014
Head-on collision	0.052	0.006	0.081	0.004	0.032	0.002
Rear-end collision	0.278	0.033	0.260	0.013	0.292	0.020
Sideswipe collision	0.097	0.011	0.051	0.002	0.131	0.009
Other multiple-vehicle collision	0.042	0.005	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.083	0.717	0.035	0.698	0.048

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1995

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,000			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.107	0.54	1.000	0.107	1.11	1.00	0.118
Fatal and Injury (FI)	--	--	0.415	0.044	1.11	1.00	0.049
Property Damage Only (PDO)	--	--	0.585	0.062	1.11	1.00	0.069

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.118	1.000	0.049	1.000	0.069
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.000
Ran off road	0.244	0.029	0.240	0.012	0.247	0.017
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.001
Total single-vehicle crashes	0.294	0.035	0.283	0.014	0.302	0.021
MULTIPLE-VEHICLE						
Angle collision	0.237	0.028	0.275	0.013	0.210	0.014
Head-on collision	0.052	0.006	0.081	0.004	0.032	0.002
Rear-end collision	0.278	0.033	0.260	0.013	0.292	0.020
Sideswipe collision	0.097	0.011	0.051	0.002	0.131	0.009
Other multiple-vehicle collision	0.042	0.005	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.083	0.717	0.035	0.698	0.048

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1996

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,300			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.131	0.54	1.000	0.131	1.11	1.00	0.145
Fatal and Injury (FI)	--	--	0.415	0.054	1.11	1.00	0.060
Property Damage Only (PDO)	--	--	0.585	0.077	1.11	1.00	0.085

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.145	1.000	0.060	1.000	0.085
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.003	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.001
Ran off road	0.244	0.035	0.240	0.014	0.247	0.021
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.043	0.283	0.017	0.302	0.026
MULTIPLE-VEHICLE						
Angle collision	0.237	0.034	0.275	0.017	0.210	0.018
Head-on collision	0.052	0.008	0.081	0.005	0.032	0.003
Rear-end collision	0.278	0.040	0.260	0.016	0.292	0.025
Sideswipe collision	0.097	0.014	0.051	0.003	0.131	0.011
Other multiple-vehicle collision	0.042	0.006	0.050	0.003	0.033	0.003
Total multiple-vehicle crashes	0.706	0.102	0.717	0.043	0.698	0.059

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1997

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,200			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]		No		0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.123	0.54	1.000	0.123	1.11	1.00	0.136
Fatal and Injury (FI)	--	--	0.415	0.051	1.11	1.00	0.057
Property Damage Only (PDO)	--	--	0.585	0.072	1.11	1.00	0.080

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.136	1.000	0.057	1.000	0.080
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.003	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.001
Ran off road	0.244	0.033	0.240	0.014	0.247	0.020
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.040	0.283	0.016	0.302	0.024
MULTIPLE-VEHICLE						
Angle collision	0.237	0.032	0.275	0.016	0.210	0.017
Head-on collision	0.052	0.007	0.081	0.005	0.032	0.003
Rear-end collision	0.278	0.038	0.260	0.015	0.292	0.023
Sideswipe collision	0.097	0.013	0.051	0.003	0.131	0.010
Other multiple-vehicle collision	0.042	0.006	0.050	0.003	0.033	0.003
Total multiple-vehicle crashes	0.706	0.096	0.717	0.041	0.698	0.056

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1998

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,900			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.177	0.54	1.000	0.177	1.11	1.00	0.196
Fatal and Injury (FI)	--	--	0.415	0.074	1.11	1.00	0.081
Property Damage Only (PDO)	--	--	0.585	0.104	1.11	1.00	0.115

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.196	1.000	0.081	1.000	0.115
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.004	0.008	0.001	0.026	0.003
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.003	0.022	0.002	0.007	0.001
Ran off road	0.244	0.048	0.240	0.020	0.247	0.028
Other single-vehicle collision	0.016	0.003	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.058	0.283	0.023	0.302	0.035
MULTIPLE-VEHICLE						
Angle collision	0.237	0.046	0.275	0.022	0.210	0.024
Head-on collision	0.052	0.010	0.081	0.007	0.032	0.004
Rear-end collision	0.278	0.054	0.260	0.021	0.292	0.033
Sideswipe collision	0.097	0.019	0.051	0.004	0.131	0.015
Other multiple-vehicle collision	0.042	0.008	0.050	0.004	0.033	0.004
Total multiple-vehicle crashes	0.706	0.138	0.717	0.058	0.698	0.080

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.2
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	1999

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,200			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.123	0.54	1.000	0.123	1.11	1.00	0.136
Fatal and Injury (FI)	--	--	0.415	0.051	1.11	1.00	0.057
Property Damage Only (PDO)	--	--	0.585	0.072	1.11	1.00	0.080

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.136	1.000	0.057	1.000	0.080
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.003	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.001
Ran off road	0.244	0.033	0.240	0.014	0.247	0.020
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.040	0.283	0.016	0.302	0.024
MULTIPLE-VEHICLE						
Angle collision	0.237	0.032	0.275	0.016	0.210	0.017
Head-on collision	0.052	0.007	0.081	0.005	0.032	0.003
Rear-end collision	0.278	0.038	0.260	0.015	0.292	0.023
Sideswipe collision	0.097	0.013	0.051	0.003	0.131	0.010
Other multiple-vehicle collision	0.042	0.006	0.050	0.003	0.033	0.003
Total multiple-vehicle crashes	0.706	0.096	0.717	0.041	0.698	0.056

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2000

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,300			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.131	0.54	1.000	0.131	1.11	1.00	0.145
Fatal and Injury (FI)	--	--	0.415	0.054	1.11	1.00	0.060
Property Damage Only (PDO)	--	--	0.585	0.077	1.11	1.00	0.085

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.145	1.000	0.060	1.000	0.085
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.003	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.001
Ran off road	0.244	0.035	0.240	0.014	0.247	0.021
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.043	0.283	0.017	0.302	0.026
MULTIPLE-VEHICLE						
Angle collision	0.237	0.034	0.275	0.017	0.210	0.018
Head-on collision	0.052	0.008	0.081	0.005	0.032	0.003
Rear-end collision	0.278	0.040	0.260	0.016	0.292	0.025
Sideswipe collision	0.097	0.014	0.051	0.003	0.131	0.011
Other multiple-vehicle collision	0.042	0.006	0.050	0.003	0.033	0.003
Total multiple-vehicle crashes	0.706	0.102	0.717	0.043	0.698	0.059

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2001

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,400			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.139	0.54	1.000	0.139	1.11	1.00	0.154
Fatal and Injury (FI)	--	--	0.415	0.058	1.11	1.00	0.064
Property Damage Only (PDO)	--	--	0.585	0.081	1.11	1.00	0.090

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.154	1.000	0.064	1.000	0.090
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.003	0.008	0.001	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.001
Ran off road	0.244	0.038	0.240	0.015	0.247	0.022
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.045	0.283	0.018	0.302	0.027
MULTIPLE-VEHICLE						
Angle collision	0.237	0.036	0.275	0.018	0.210	0.019
Head-on collision	0.052	0.008	0.081	0.005	0.032	0.003
Rear-end collision	0.278	0.043	0.260	0.017	0.292	0.026
Sideswipe collision	0.097	0.015	0.051	0.003	0.131	0.012
Other multiple-vehicle collision	0.042	0.006	0.050	0.003	0.033	0.003
Total multiple-vehicle crashes	0.706	0.109	0.717	0.046	0.698	0.063

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.2
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2002

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,100			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.115	0.54	1.000	0.115	1.11	1.00	0.127
Fatal and Injury (FI)	--	--	0.415	0.048	1.11	1.00	0.053
Property Damage Only (PDO)	--	--	0.585	0.067	1.11	1.00	0.074

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision Type$_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision Type$_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision Type$_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.127	1.000	0.053	1.000	0.074
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.001
Ran off road	0.244	0.031	0.240	0.013	0.247	0.018
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.001
Total single-vehicle crashes	0.294	0.037	0.283	0.015	0.302	0.022
MULTIPLE-VEHICLE						
Angle collision	0.237	0.030	0.275	0.015	0.210	0.016
Head-on collision	0.052	0.007	0.081	0.004	0.032	0.002
Rear-end collision	0.278	0.035	0.260	0.014	0.292	0.022
Sideswipe collision	0.097	0.012	0.051	0.003	0.131	0.010
Other multiple-vehicle collision	0.042	0.005	0.050	0.003	0.033	0.002
Total multiple-vehicle crashes	0.706	0.090	0.717	0.038	0.698	0.052

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2003

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,300			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.131	0.54	1.000	0.131	1.11	1.00	0.145
Fatal and Injury (FI)	--	--	0.415	0.054	1.11	1.00	0.060
Property Damage Only (PDO)	--	--	0.585	0.077	1.11	1.00	0.085

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.145	1.000	0.060	1.000	0.085
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.003	0.008	0.000	0.026	0.002
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.001	0.007	0.001
Ran off road	0.244	0.035	0.240	0.014	0.247	0.021
Other single-vehicle collision	0.016	0.002	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.043	0.283	0.017	0.302	0.026
MULTIPLE-VEHICLE						
Angle collision	0.237	0.034	0.275	0.017	0.210	0.018
Head-on collision	0.052	0.008	0.081	0.005	0.032	0.003
Rear-end collision	0.278	0.040	0.260	0.016	0.292	0.025
Sideswipe collision	0.097	0.014	0.051	0.003	0.131	0.011
Other multiple-vehicle collision	0.042	0.006	0.050	0.003	0.033	0.003
Total multiple-vehicle crashes	0.706	0.102	0.717	0.043	0.698	0.059

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2004

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,800			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]		No		0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.170	0.54	1.000	0.170	1.11	1.00	0.188
Fatal and Injury (FI)	--	--	0.415	0.070	1.11	1.00	0.078
Property Damage Only (PDO)	--	--	0.585	0.099	1.11	1.00	0.110

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.188	1.000	0.078	1.000	0.110
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.004	0.008	0.001	0.026	0.003
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.002	0.022	0.002	0.007	0.001
Ran off road	0.244	0.046	0.240	0.019	0.247	0.027
Other single-vehicle collision	0.016	0.003	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.055	0.283	0.022	0.302	0.033
MULTIPLE-VEHICLE						
Angle collision	0.237	0.044	0.275	0.021	0.210	0.023
Head-on collision	0.052	0.010	0.081	0.006	0.032	0.004
Rear-end collision	0.278	0.052	0.260	0.020	0.292	0.032
Sideswipe collision	0.097	0.018	0.051	0.004	0.131	0.014
Other multiple-vehicle collision	0.042	0.008	0.050	0.004	0.033	0.004
Total multiple-vehicle crashes	0.706	0.132	0.717	0.056	0.698	0.077

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.2
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2005

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,900			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	83			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.177	0.54	1.000	0.177	1.11	1.00	0.196
Fatal and Injury (FI)	--	--	0.415	0.074	1.11	1.00	0.081
Property Damage Only (PDO)	--	--	0.585	0.104	1.11	1.00	0.115

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.196	1.000	0.081	1.000	0.115
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.004	0.008	0.001	0.026	0.003
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.003	0.022	0.002	0.007	0.001
Ran off road	0.244	0.048	0.240	0.020	0.247	0.028
Other single-vehicle collision	0.016	0.003	0.011	0.001	0.020	0.002
Total single-vehicle crashes	0.294	0.058	0.283	0.023	0.302	0.035
MULTIPLE-VEHICLE						
Angle collision	0.237	0.046	0.275	0.022	0.210	0.024
Head-on collision	0.052	0.010	0.081	0.007	0.032	0.004
Rear-end collision	0.278	0.054	0.260	0.021	0.292	0.033
Sideswipe collision	0.097	0.019	0.051	0.004	0.131	0.015
Other multiple-vehicle collision	0.042	0.008	0.050	0.004	0.033	0.004
Total multiple-vehicle crashes	0.706	0.138	0.717	0.058	0.698	0.080

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.2
Fatal and Injury (FI)	0.415	0.1
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2006

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,900			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.088	0.54	1.000	0.088	1.11	1.00	0.098
Fatal and Injury (FI)	--	--	0.415	0.037	1.11	1.00	0.040
Property Damage Only (PDO)	--	--	0.585	0.052	1.11	1.00	0.057

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.098	1.000	0.040	1.000	0.057
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.024	0.240	0.010	0.247	0.014
Other single-vehicle collision	0.016	0.002	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.029	0.283	0.011	0.302	0.017
MULTIPLE-VEHICLE						
Angle collision	0.237	0.023	0.275	0.011	0.210	0.012
Head-on collision	0.052	0.005	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.027	0.260	0.011	0.292	0.017
Sideswipe collision	0.097	0.009	0.051	0.002	0.131	0.007
Other multiple-vehicle collision	0.042	0.004	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.069	0.717	0.029	0.698	0.040

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2007

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,850			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.086	0.54	1.000	0.086	1.11	1.00	0.095
Fatal and Injury (FI)	--	--	0.415	0.036	1.11	1.00	0.040
Property Damage Only (PDO)	--	--	0.585	0.051	1.11	1.00	0.056

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision Type$_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) (8)$_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision Type$_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) (8)$_{FI}$ from Worksheet 2C	(6) Proportion of Collision Type$_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) (8)$_{PDO}$ from Worksheet 2C
Total	1.000	0.095	1.000	0.040	1.000	0.056
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.023	0.240	0.010	0.247	0.014
Other single-vehicle collision	0.016	0.002	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.028	0.283	0.011	0.302	0.017
MULTIPLE-VEHICLE						
Angle collision	0.237	0.023	0.275	0.011	0.210	0.012
Head-on collision	0.052	0.005	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.027	0.260	0.010	0.292	0.016
Sideswipe collision	0.097	0.009	0.051	0.002	0.131	0.007
Other multiple-vehicle collision	0.042	0.004	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.067	0.717	0.028	0.698	0.039

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2008

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,800			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.085	0.54	1.000	0.085	1.11	1.00	0.093
Fatal and Injury (FI)	--	--	0.415	0.035	1.11	1.00	0.039
Property Damage Only (PDO)	--	--	0.585	0.049	1.11	1.00	0.055

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.093	1.000	0.039	1.000	0.055
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.023	0.240	0.009	0.247	0.013
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.027	0.283	0.011	0.302	0.017
MULTIPLE-VEHICLE						
Angle collision	0.237	0.022	0.275	0.011	0.210	0.011
Head-on collision	0.052	0.005	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.026	0.260	0.010	0.292	0.016
Sideswipe collision	0.097	0.009	0.051	0.002	0.131	0.007
Other multiple-vehicle collision	0.042	0.004	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.066	0.717	0.028	0.698	0.038

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.1

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2009

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,500			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]		No		0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.073	0.54	1.000	0.073	1.11	1.00	0.081
Fatal and Injury (FI)	--	--	0.415	0.030	1.11	1.00	0.034
Property Damage Only (PDO)	--	--	0.585	0.043	1.11	1.00	0.047

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.081	1.000	0.034	1.000	0.047
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.020	0.240	0.008	0.247	0.012
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.024	0.283	0.010	0.302	0.014
MULTIPLE-VEHICLE						
Angle collision	0.237	0.019	0.275	0.009	0.210	0.010
Head-on collision	0.052	0.004	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.022	0.260	0.009	0.292	0.014
Sideswipe collision	0.097	0.008	0.051	0.002	0.131	0.006
Other multiple-vehicle collision	0.042	0.003	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.057	0.717	0.024	0.698	0.033

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.0

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2010

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,500			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.073	0.54	1.000	0.073	1.11	1.00	0.081
Fatal and Injury (FI)	--	--	0.415	0.030	1.11	1.00	0.034
Property Damage Only (PDO)	--	--	0.585	0.043	1.11	1.00	0.047

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.081	1.000	0.034	1.000	0.047
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.020	0.240	0.008	0.247	0.012
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.024	0.283	0.010	0.302	0.014
MULTIPLE-VEHICLE						
Angle collision	0.237	0.019	0.275	0.009	0.210	0.010
Head-on collision	0.052	0.004	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.022	0.260	0.009	0.292	0.014
Sideswipe collision	0.097	0.008	0.051	0.002	0.131	0.006
Other multiple-vehicle collision	0.042	0.003	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.057	0.717	0.024	0.698	0.033

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.0

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	JMW	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	03/28/16	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2011

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,500			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution (2)$_{TOTAL}$ * (4)	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.073	0.54	1.000	0.073	1.11	1.00	0.081
Fatal and Injury (FI)	--	--	0.415	0.030	1.11	1.00	0.034
Property Damage Only (PDO)	--	--	0.585	0.043	1.11	1.00	0.047

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision Type$_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) (8)$_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision Type$_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) (8)$_{FI}$ from Worksheet 2C	(6) Proportion of Collision Type$_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) (8)$_{PDO}$ from Worksheet 2C
Total	1.000	0.081	1.000	0.034	1.000	0.047
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.020	0.240	0.008	0.247	0.012
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.024	0.283	0.010	0.302	0.014
MULTIPLE-VEHICLE						
Angle collision	0.237	0.019	0.275	0.009	0.210	0.010
Head-on collision	0.052	0.004	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.022	0.260	0.009	0.292	0.014
Sideswipe collision	0.097	0.008	0.051	0.002	0.131	0.006
Other multiple-vehicle collision	0.042	0.003	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.057	0.717	0.024	0.698	0.033

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.0

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	JMW	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	03/28/16	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2012

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,600			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.077	0.54	1.000	0.077	1.11	1.00	0.085
Fatal and Injury (FI)	--	--	0.415	0.032	1.11	1.00	0.035
Property Damage Only (PDO)	--	--	0.585	0.045	1.11	1.00	0.050

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.085	1.000	0.035	1.000	0.050
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.021	0.240	0.008	0.247	0.012
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.025	0.283	0.010	0.302	0.015
MULTIPLE-VEHICLE						
Angle collision	0.237	0.020	0.275	0.010	0.210	0.010
Head-on collision	0.052	0.004	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.024	0.260	0.009	0.292	0.015
Sideswipe collision	0.097	0.008	0.051	0.002	0.131	0.007
Other multiple-vehicle collision	0.042	0.004	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.060	0.717	0.025	0.698	0.035

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.0

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	JMW	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	03/26/16	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2013

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,400			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.069	0.54	1.000	0.069	1.11	1.00	0.077
Fatal and Injury (FI)	--	--	0.415	0.029	1.11	1.00	0.032
Property Damage Only (PDO)	--	--	0.585	0.041	1.11	1.00	0.045

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.077	1.000	0.032	1.000	0.045
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.001	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.019	0.240	0.008	0.247	0.011
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.023	0.283	0.009	0.302	0.014
MULTIPLE-VEHICLE						
Angle collision	0.237	0.018	0.275	0.009	0.210	0.009
Head-on collision	0.052	0.004	0.081	0.003	0.032	0.001
Rear-end collision	0.278	0.021	0.260	0.008	0.292	0.013
Sideswipe collision	0.097	0.007	0.051	0.002	0.131	0.006
Other multiple-vehicle collision	0.042	0.003	0.050	0.002	0.033	0.001
Total multiple-vehicle crashes	0.706	0.054	0.717	0.023	0.698	0.031

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.0

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	JMW	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	03/26/16	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2014

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,500			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.073	0.54	1.000	0.073	1.11	1.00	0.081
Fatal and Injury (FI)	--	--	0.415	0.030	1.11	1.00	0.034
Property Damage Only (PDO)	--	--	0.585	0.043	1.11	1.00	0.047

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.081	1.000	0.034	1.000	0.047
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.020	0.240	0.008	0.247	0.012
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.024	0.283	0.010	0.302	0.014
MULTIPLE-VEHICLE						
Angle collision	0.237	0.019	0.275	0.009	0.210	0.010
Head-on collision	0.052	0.004	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.022	0.260	0.009	0.292	0.014
Sideswipe collision	0.097	0.008	0.051	0.002	0.131	0.006
Other multiple-vehicle collision	0.042	0.003	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.057	0.717	0.024	0.698	0.033

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.0

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	JMW	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	03/26/16	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app		Analysis Year	2015

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,500			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution (2)$_{TOTAL}$ * (4)	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.073	0.54	1.000	0.073	1.11	1.00	0.081
Fatal and Injury (FI)	--	--	0.415	0.030	1.11	1.00	0.034
Property Damage Only (PDO)	--	--	0.585	0.043	1.11	1.00	0.047

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision Type$_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) (8)$_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision Type$_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) (8)$_{FI}$ from Worksheet 2C	(6) Proportion of Collision Type$_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) (8)$_{PDO}$ from Worksheet 2C
Total	1.000	0.081	1.000	0.034	1.000	0.047
		(2)x(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)x(7)$_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.020	0.240	0.008	0.247	0.012
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.024	0.283	0.010	0.302	0.014
MULTIPLE-VEHICLE						
Angle collision	0.237	0.019	0.275	0.009	0.210	0.010
Head-on collision	0.052	0.004	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.022	0.260	0.009	0.292	0.014
Sideswipe collision	0.097	0.008	0.051	0.002	0.131	0.006
Other multiple-vehicle collision	0.042	0.003	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.057	0.717	0.024	0.698	0.033

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.1
Fatal and Injury (FI)	0.415	0.0
Property Damage Only (PDO)	0.585	0.0

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	DT	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	08/25/11	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app	Base Period Accident Prediction	Analysis Year	

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,500			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	20			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.073	0.54	1.000	0.073	1.11	1.00	0.081
Fatal and Injury (FI)	--	--	0.415	0.030	1.11	1.00	0.034
Property Damage Only (PDO)	--	--	0.585	0.043	1.11	1.00	0.047

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.081	1.000	0.034	1.000	0.047
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.002	0.008	0.000	0.026	0.001
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.001	0.022	0.001	0.007	0.000
Ran off road	0.244	0.020	0.240	0.008	0.247	0.012
Other single-vehicle collision	0.016	0.001	0.011	0.000	0.020	0.001
Total single-vehicle crashes	0.294	0.024	0.283	0.010	0.302	0.014
MULTIPLE-VEHICLE						
Angle collision	0.237	0.019	0.275	0.009	0.210	0.010
Head-on collision	0.052	0.004	0.081	0.003	0.032	0.002
Rear-end collision	0.278	0.022	0.260	0.009	0.292	0.014
Sideswipe collision	0.097	0.008	0.051	0.002	0.131	0.006
Other multiple-vehicle collision	0.042	0.003	0.050	0.002	0.033	0.002
Total multiple-vehicle crashes	0.706	0.057	0.717	0.024	0.698	0.033

Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.081
Fatal and Injury (FI)	0.415	0.034
Property Damage Only (PDO)	0.585	0.047

Worksheet 2A -- General Information and Input Data for Rural Two-Lane Two-Way Roadway Intersections

General Information		Location Information	
Analyst	JMW	Roadway	Arroyo Seco Road
Agency or Company	HMM	Intersection	Clark Road
Date Performed	03/27/16	Jurisdiction	Monterey County
Unsignalized three-leg (stop control on minor-road app	Project Buildout Predicted Accidents	Analysis Year	

Input Data				Base Conditions	Site Conditions			
Intersection type (3ST, 4ST, 4SG)				--	3ST			
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ =	19,500	(veh/day)	--	1,684			
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ =	4,300	(veh/day)	--	257			
Intersection skew angle (degrees) [If 4ST, does skew differ for minor legs?]			No	0	Skew for Leg 1 (All):	25	Skew for Leg 2 (4ST only):	0
Number of signalized or uncontrolled approaches with a left-turn lane (0, 1, 2, 3, 4)				0	0			
Number of signalized or uncontrolled approaches with a right-turn lane (0, 1, 2, 3, 4)				0	0			
Intersection lighting (present/not present)				Not Present	Not Present			
Calibration Factor, C_i				1.00	1.00			

Worksheet 2B -- Crash Modification Factors for Rural Two-Lane Two-Way Roadway Intersections

(1) CMF for Intersection Skew Angle CMF_{1i} from Equations 10-22 or 10-23	(2) CMF for Left-Turn Lanes CMF_{2i} from Table 10-13	(3) CMF for Right-Turn Lanes CMF_{3i} from Table 10-14	(4) CMF for Lighting CMF_{4i} from Equation 10-24	(5) Combined CMF CMF_{COMB} (1)*(2)*(3)*(4)
1.11	1.00	1.00	1.00	1.11

Worksheet 2C -- Intersection Crashes for Rural Two-Lane Two-Way Roadway Intersections

(1) Crash Severity Level	(2) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ from Equations 10-8, 10-9, or 10-10	(3) Overdispersion Parameter, k from Section 10.6.2	(4) Crash Severity Distribution from Table 10-5	(5) $N_{spf\ 3ST,\ 4ST\ or\ 4SG}$ by Severity Distribution $(2)_{TOTAL} * (4)$	(6) Combined CMFs from (5) of Worksheet 2B	(7) Calibration Factor, C_i	(8) Predicted average crash frequency, $N_{predicted\ int}$ (5)*(6)*(7)
Total	0.280	0.54	1.000	0.280	1.11	1.00	0.310
Fatal and Injury (FI)	--	--	0.415	0.116	1.11	1.00	0.129
Property Damage Only (PDO)	--	--	0.585	0.164	1.11	1.00	0.181

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections

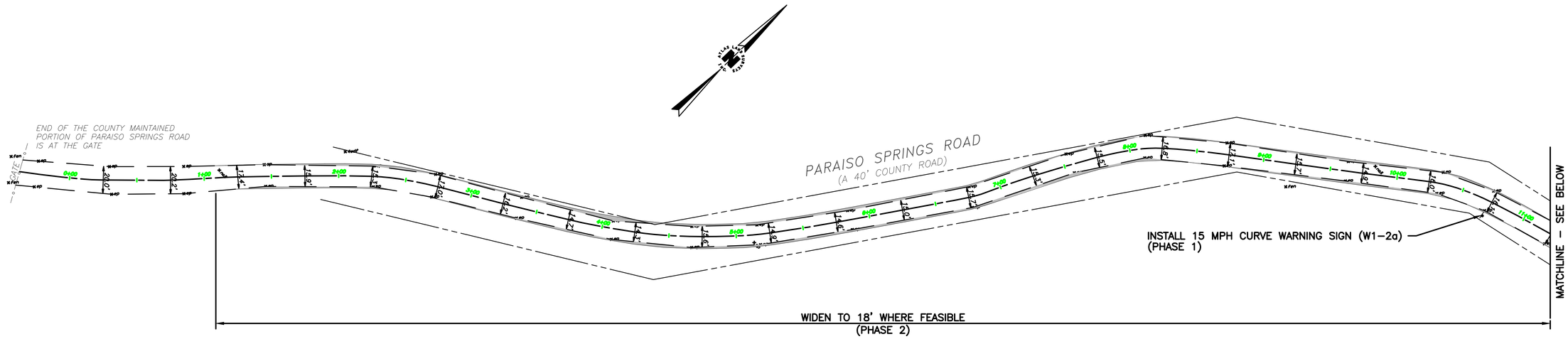
(1) Collision Type	(2) Proportion of Collision $Type_{(TOTAL)}$ from Table 10-6	(3) $N_{predicted\ int\ (TOTAL)}$ (crashes/year) $(8)_{TOTAL}$ from Worksheet 2C	(4) Proportion of Collision $Type_{(FI)}$ from Table 10-6	(5) $N_{predicted\ int\ (FI)}$ (crashes/year) $(8)_{FI}$ from Worksheet 2C	(6) Proportion of Collision $Type_{(PDO)}$ from Table 10-6	(7) $N_{predicted\ int\ (PDO)}$ (crashes/year) $(8)_{PDO}$ from Worksheet 2C
Total	1.000	0.310	1.000	0.129	1.000	0.181
		$(2)x(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)x(7)_{PDO}$
SINGLE-VEHICLE						
Collision with animal	0.019	0.006	0.008	0.001	0.026	0.005
Collision with bicycle	0.001	0.000	0.001	0.000	0.001	0.000
Collision with pedestrian	0.001	0.000	0.001	0.000	0.001	0.000
Overturned	0.013	0.004	0.022	0.003	0.007	0.001
Ran off road	0.244	0.076	0.240	0.031	0.247	0.045
Other single-vehicle collision	0.016	0.005	0.011	0.001	0.020	0.004
Total single-vehicle crashes	0.294	0.091	0.283	0.036	0.302	0.055
MULTIPLE-VEHICLE						
Angle collision	0.237	0.073	0.275	0.035	0.210	0.038
Head-on collision	0.052	0.016	0.081	0.010	0.032	0.006
Rear-end collision	0.278	0.086	0.260	0.033	0.292	0.053
Sideswipe collision	0.097	0.030	0.051	0.007	0.131	0.024
Other multiple-vehicle collision	0.042	0.013	0.050	0.006	0.033	0.006
Total multiple-vehicle crashes	0.706	0.219	0.717	0.092	0.698	0.126

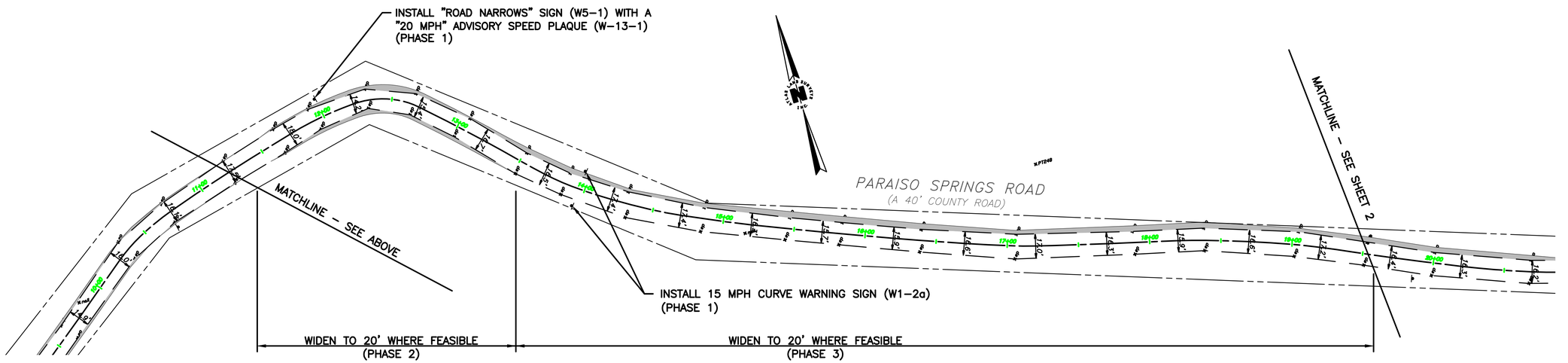
Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections

(1) Crash severity level	(2) Crash Severity Distribution (proportion) (4) from Worksheet 2C	(3) Predicted average crash frequency (crashes / year) (8) from Worksheet 2C
Total	1.000	0.310
Fatal and Injury (FI)	0.415	0.129
Property Damage Only (PDO)	0.585	0.181

APPENDIX O

PARAISO SPRINGS ROAD
IMPROVEMENT DESIGN





LEGEND:

= NEW PAVEMENT

= NEW SIGN

= NEW DELINEATOR

BASE MAP SOURCE: ATLAS LAND SURVEYS, INC., AUG. 18, 2008.

40 0 40 80
SCALE: 1" = 40'

REVISIONS

DESIGNED BY

DRAWN BY

DATE:

CIVIL ENGINEER

PE#:

EXP:

Hatch Mott MacDonald
1300-B First Street
Gilroy, CA 95020
ph 408.848.3122 fax 408.848.2202

PREPARED FOR: JOHN & BILL THOMPSON

PARAISO SPRINGS ROAD
PAVEMENT IMPROVEMENTS
STATION 0+00 - 20+00

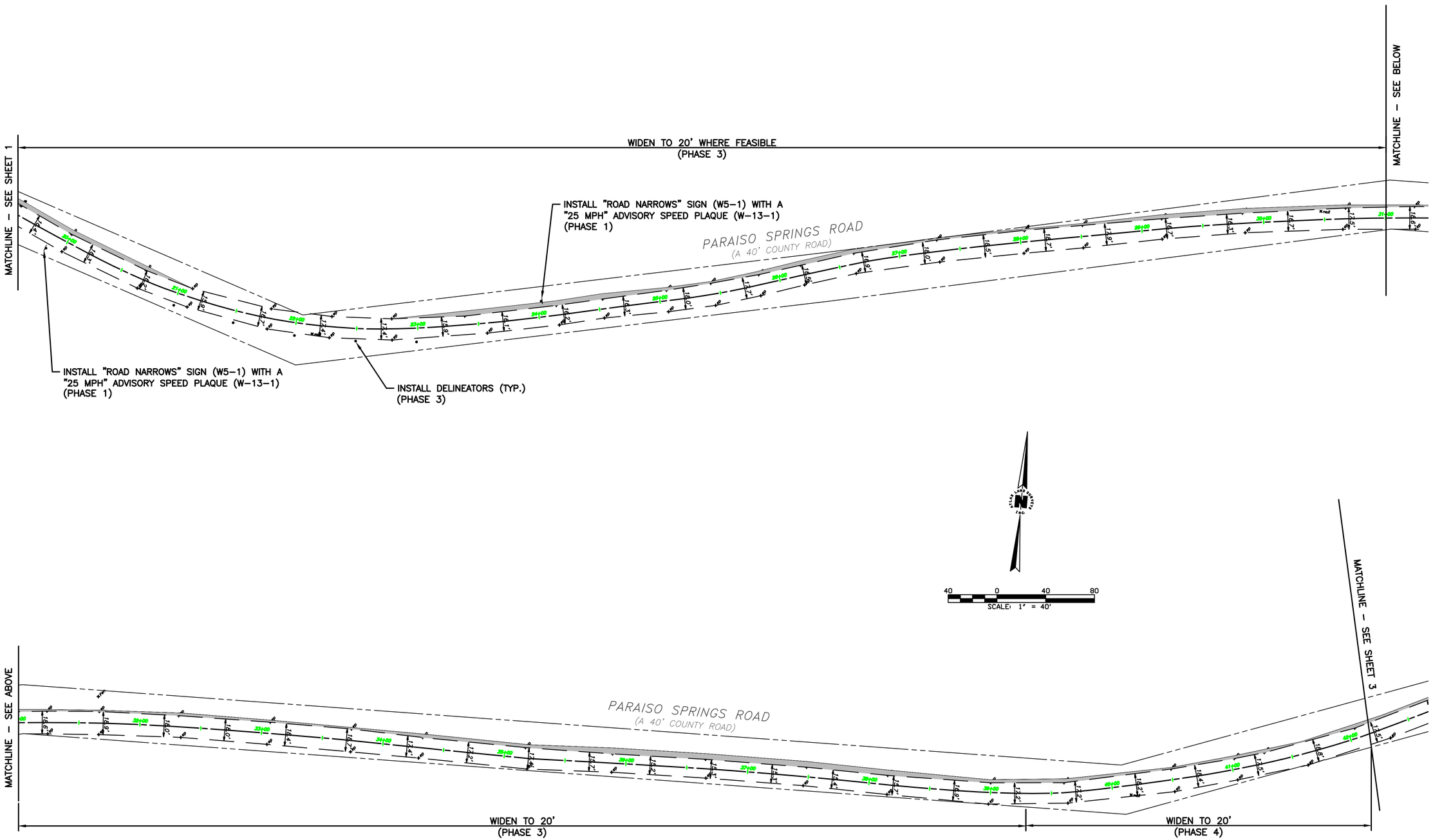
COUNTY OF MONTEREY CALIFORNIA

SCALE: 1" = 40'

DATE: 8/2/16

SHEET: 1 OF 4

JOB: 367424



LEGEND:

= NEW PAVEMENT

= NEW SIGN

= NEW DELINEATOR

BASE MAP SOURCE: ATLAS LAND SURVEYS, INC., AUG. 18, 2008.

REVISIONS

DESIGNED BY

DRAWN BY

DATE:

CIVIL ENGINEER

PE#:

EXP:

Hatch Mott MacDonald
1300-B First Street
Gilroy, CA 95020
ph 408.848.3122 fax 408.848.2202

PREPARED FOR: JOHN & BILL THOMPSON

PARAISO SPRINGS ROAD
PAVEMENT IMPROVEMENTS
STATION 20+00 – 43+00

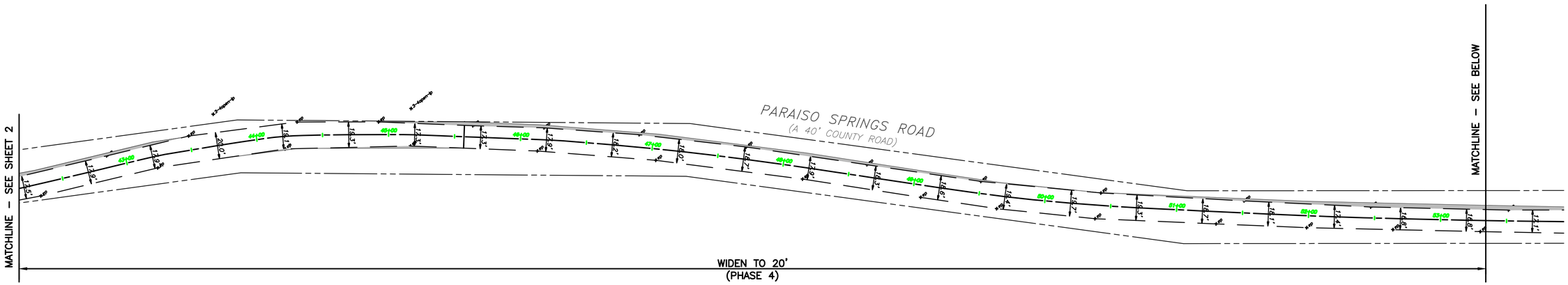
COUNTY OF MONTEREY CALIFORNIA

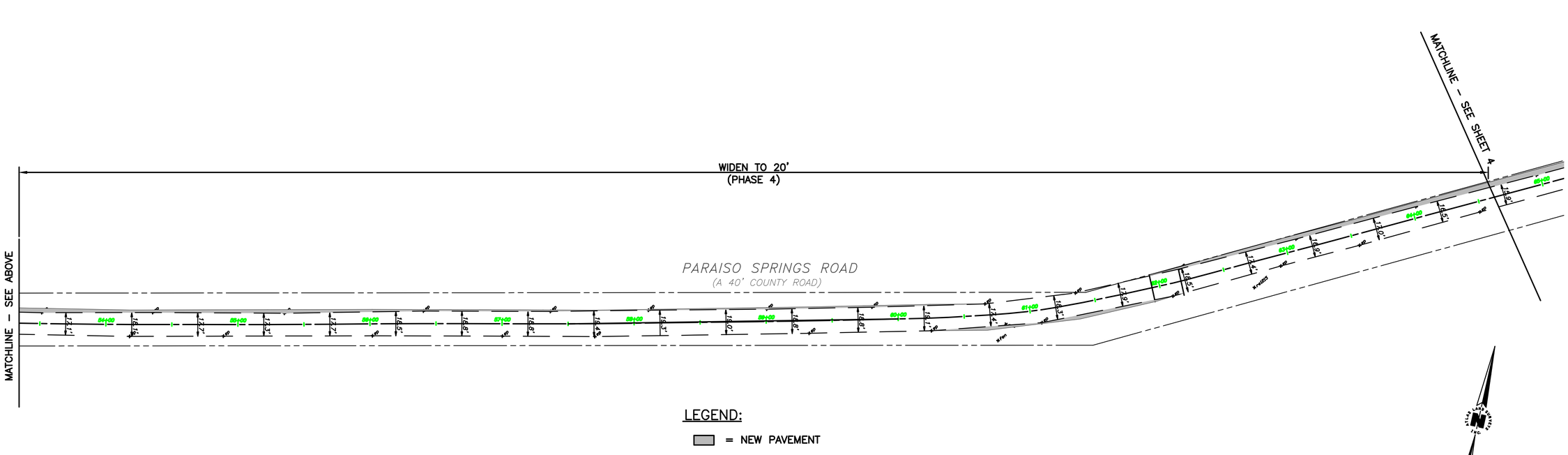
SCALE: 1" = 40'

DATE: 8/2/16

SHEET: 2 OF 4

JOB: 367424





BASE MAP SOURCE: ATLAS LAND SURVEYS, INC., AUG. 18, 2008.

REVISIONS

DESIGNED BY

DRAWN BY

DATE:

CIVIL ENGINEER

PE#:

EXP:

Hatch Mott MacDonald
1300-B First Street
Gilroy, CA 95020
ph 408.848.3122 fax 408.848.2202

PREPARED FOR: JOHN & BILL THOMPSON

PARAISO SPRINGS ROAD
PAVEMENT IMPROVEMENTS
STATION 43+00 – 65+00

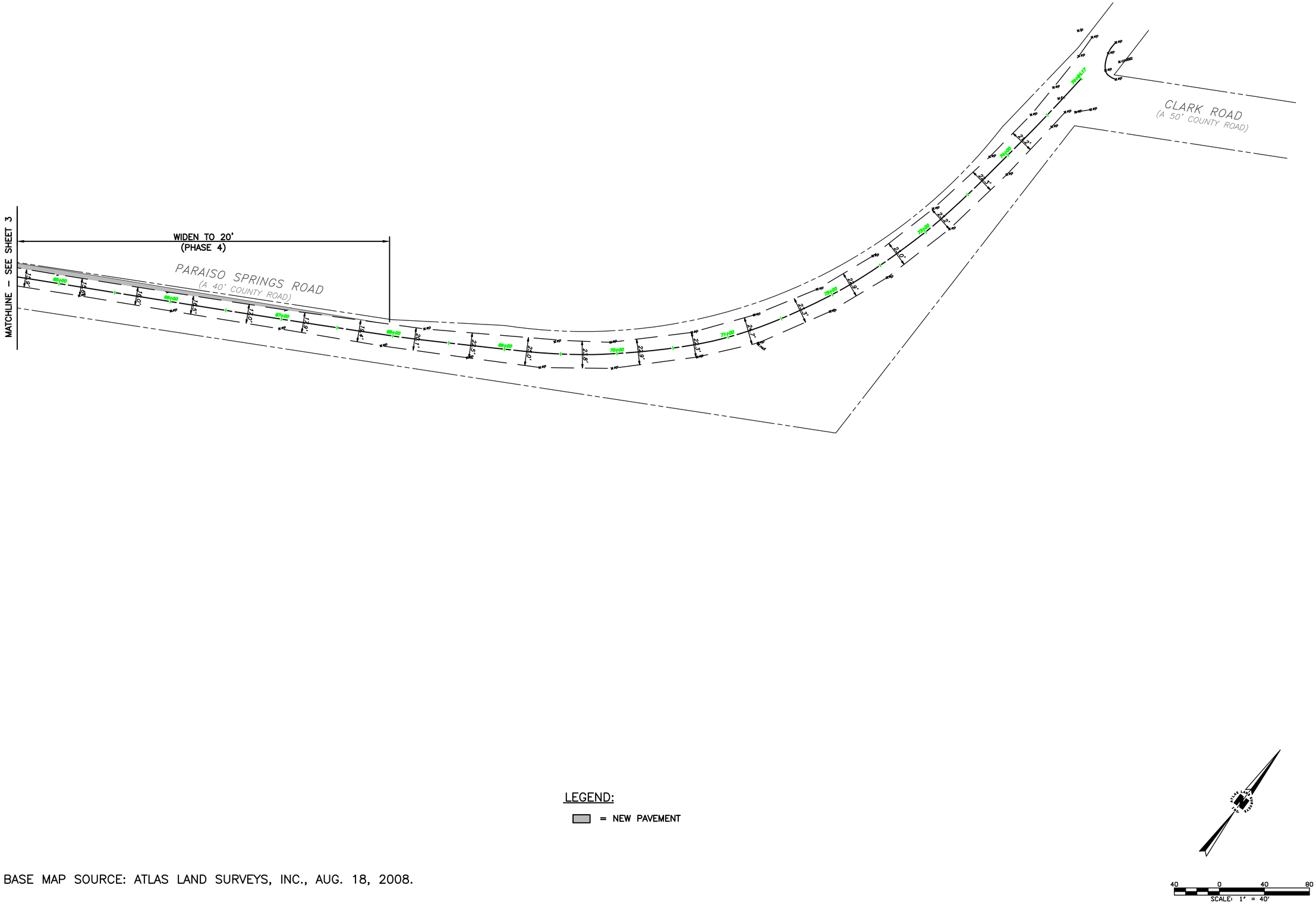
COUNTY OF MONTEREY CALIFORNIA

SCALE: 1" = 40'

DATE: 8/2/16

SHEET: 3 OF 4

JOB: 367424



LEGEND:

= NEW PAVEMENT

BASE MAP SOURCE: ATLAS LAND SURVEYS, INC., AUG. 18, 2008.

40 0 40 80
SCALE: 1" = 40'

REVISIONS

DESIGNED BY

DRAWN BY

DATE:

CIVIL ENGINEER

PE#:

EXP:

Hatch Mott MacDonald
1300-B First Street
Gilroy, CA 95020
ph 408.848.3122 fax 408.848.2202

PREPARED FOR: JOHN & BILL THOMPSON

PARAISO SPRINGS ROAD
PAVEMENT IMPROVEMENTS
STATION 65+00 – 75+00

COUNTY OF MONTEREY CALIFORNIA

SCALE: 1" = 40'

DATE: 8/2/16

SHEET: 4 OF 4

JOB: 367424